Sacramento River
Watershed Sanitary Survey
2020 Update Report

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Prepared by

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In Association With

rincon

SACRAMENTO RIVER WATERSHED SANITARY SURVEY 2020 UPDATE REPORT

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1995 Survey – Sacramento River Watershed Sanitary Survey, December 1995
2000 Update – Sacramento River Watershed Sanitary Survey, December 2000
2010 Update – Sacramento River Watershed Sanitary Survey 2010 Update
2015 Update – Sacramento River Watershed Sanitary Survey 2015 Update
2020 Update – Sacramento River Watershed Sanitary Survey 2020 Update

AAL – Archived Advisory Level
AB – Assembly Bill
ACL – Administrative Civil Liability
ACP – Agricultural Civil Penalty
AF – acre-feet
AFB – Air Force Base
AFFF – aqueous film-forming foam
AFO – animal feeding operation
Air Force – US Department of the Air Force
AMR – Annual Monitoring Report
ARGET – American River Groundwater Extraction and Treatment
AWAF – Abandoned Watercraft Abatement Fund
AWWA – American Water Works Association

BKS – Betts-Kismat-Silva
BMP – best management practice
BNR – biological nutrient removal
BS1 – Butte Slough

CAAP – concentrated aquatic animal production
CAC – County Agricultural Commissioner
$CaCO_3$ – calcium carbonate
CAFO – concentrated animal feeding operation
CalFIRE – California Department of Forestry and Fire Protection
Cal OES – California Office of Emergency Services
Caltrans – California Department of Transportation
Campaign – Boating Clean and Green Campaign
CAP – *Cryptosporidium* Action Plan
CBD – Colusa Basin Drain
CBD1 – Colusa Basin Drain near Knights Landing
CBD5 – Colusa Basin Drain near Highway 20
CCBN – California Clean Boating Network
CCC – California Coastal Commission
CCR – Consumer Confidence Report
CDEC – California Data Exchange Center
CDO – Cease and Desist Order
CDWR - California Department of Water Resources
CDWR CMP – CDWR Sacramento Watershed Coordinated Monitoring Program
CEDEN – California Environmental Data Exchange Network
CEQA – California Environmental Quality Act

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act
CFE – combined filter effluent
cfs – cubic feet per second
CHP – California Highway Patrol
Cities – City of West Sacramento and City of Sacramento
CIWQS - California Integrated Water Quality System
CNRFC – California/Nevada River Forecast Center
CRC – California Rice Commission
CRRIC – California Rangelands Research and Information Center
CRWL – California Rangelands Watershed Laboratory
CS – collection system
CSO – Combined Sewer Overflow
CSQMP – Comprehensive Surface Water Quality Management Plan
CSS – Combined Sewer System
CSU – California State University
CT – disinfection contact time
CUPA – Certified Unified Program Agency
CV-SALTS – Central Valley Salinity Alternatives for Long-Term Sustainability
CWA – Clean Water Act
CWTP – Combined Wastewater Treatment Plant
cysts/L – cysts per liter

D/DBP– Disinfectants/Disinfection By-Products
DBP – disinfection by-product
DBW – California State Parks, Division of Boating and Waterways
DDW – State Water Resources Control Board, Division of Drinking Water
DFW – California Department of Fish and Wildlife
DLR – detection limit for reporting
DOC – dissolved organic carbon
DOD – US Department of Defense
DPR – California Department of Pesticide Regulation
DQAP – Dairy Quality Assurance Program
DTSC – Department of Toxic Substances Control

E. coli – *Escherichia coli*
EID – El Dorado Irrigation District
EIR – Environmental Impact Report
EIS – Environmental Impact Statement
EBMUD – East Bay Municipal Utility District
EOC – Emergency Operations Center
ERA – Exceedence Response Actions

°F – degree Fahrenheit
FIRO – forecast-informed reservoir operations
FRWA – Freeport Regional Water Authority
FSA – Farm Service Agency

FSC – Folsom South Canal
FSCC – Folsom South Canal Connector
FY – fiscal year

GAC – Granular Activated Carbon
GC1 – Norman Road at Willow Creek
GC2 – Norman Road at Colusa Basin Drain
GET – groundwater extraction and treatment
GIS – geographic information system
GKWTP – George Kristoff Water Treatment Plant
gpm – gallons per minute
gpm/sf – gallons per minute per square foot
GRP – geographic response plan
GWTS – groundwater treatment system

HA – Health Advisory
HAA5 – haloacetic acids (five)
HAA6Br – haloacetic acids (six brominated)
HAA9 - haloacetic acids (nine)
HHAP – Homeless Housing, Assistance and Prevention
HHBP – Human Health Benchmark for Pesticides
HSC – Health and Safety Code

IFE – individual filter effluent
IESWTR – Interim Enhanced Surface Water Treatment Rule
ILRP – Irrigated Lands Regulatory Program
IOC – inorganic compound

KOWC – Keep Our Waters Clean

LEPC – local emergency planning committee
LID – Low Impact Development
LMUN – Limited MUN
LRAA – locational running annual average
LT1ESWTR – Long Term 1 Enhanced Surface Water Treatment Rule
LT2ESWTR – Long Term 2 Enhanced Surface Water Treatment Rule

MCL – Maximum Contaminant Level
MEP – maximum extent practicable
mg – million gallons
mg/L – milligrams per liter
mgd – million gallons per day
MID – Merced Irrigation District
mm - millimeter
MMRSA – Medical Marijuana Regulation and Safety Act
MP – Management Plan

MPPR – Management Plan Progress Report
MPN/100 mL – most probable number per 100 milliliters
MRAA – maximum running annual average
MRP – Monitoring and Reporting Program
MS4 – Municipal Separate Storm Sewer System
MST – microbial source tracking
MUN – Municipal and Domestic Water Supply

NAL – Numeric Action Level
NBC – Natomas Basin Conservancy
NCWA – Northern California Water Association
ND – non-detect
NDMA – N-nitrosodimethylamine
NEL – Numeric Effluent Limitation
NEPA – National Environmental Policy Act
ng/L – nanograms per liter
NIMS – National Incident Management System
NL – Notification Level
NMWC – Natomas Mutual Water Company
N/O – Not operational
NOD – North of Delta
NOI – Notice of Intent
NPDES – National Pollutant Discharge Elimination System
NPLH – No Place Like Home
NPS – Non-Point Source
NRC – National Response Center
NRCS – Natural Resources Conservation Service
NTU – nephelometric turbidity unit
NWQI – National Water Quality Initiative

OAL – Office of Administrative Law
OEHHA – Office of Environmental Health Hazard Assessment
oocysts/L – oocysts per liter
OSPR – DFW, Office of Spill Prevention and Response
OU – operating unit

PAC – polyaluminum chloride
PAH – polycyclic aromatic hydrocarbons
PCE – tetrachloroethylene
PCWA – Placer County Water Agency
PEP – Pesticide Evaluation Protocol
PFAS – per- and polyfluoroalkyl substances
PFCs – perfluorinated compounds
PFHxA – perfluorohexanoic acid
PFOA – perfluorooctanoic acid
PFOS – perfluorooctane sulfonic acid

PHG – Public Health Goal
PIT – Point-in-Time
POA – Principles of Agreement
POTW – Publicly Owned Treatment Work
PRT – Park Response Team
PWQC – priority water quality constituent

QSE – qualifying storm event

RAA – running annual average
RCMP – River Corridor Management Plan
RCPP – Regional Conservation Partnership Program
RD – reclamation district
Regional Board – Central Valley Regional Water Quality Control Board
Regional Plant – Regional San Regional Wastewater Treatment Plant
Regional San – Sacramento Regional County Sanitation District
RFP – Registered Professional Forester
RI – remedial investigation
RIMS – Response Information Management System
RMAC – Rangeland Management Advisory Committee
RMP – Regional Monitoring Program
ROD – Record of Decision
RPP – Rice Pesticide Program
RWQMP – Rangeland Water Quality Management Program
RWTF – Regional Water Treatment Facility

SASD – Sacramento Area Sewer District
SAVE – Surrendered and Abandoned Vessel Exchange
SB – Senate Bill
SCADA – supervisory control and data acquisition
SCWA – Sacramento County Water Agency
SDWA – Safe Drinking Water Act
Second Update – Sacramento River Watershed Sanitary Survey Second Update
SEMS – Standardized Emergency Management System
SEWG – Storm Event Work Group
SMARTS – Stormwater Multiple Application and Report Tracking System
SOC – synthetic organic compound
SQIP – Stormwater Quality Improvement Plan
SPD – City of Sacramento Police Department
SR1 – Sacramento River at Village Marina
SRR – Sacramento River Water Treatment Plant intake
SRSWPP – Sacramento River Source Water Protection Program
SRWTP – Sacramento River Water Treatment Plant
SSB – Sacramento Slough Bridge near Karnak
SSMP – Sanitary Sewer Management Plan
SSO – Sanitary Sewer Overflow

SSQP – Sacramento Stormwater Quality Partnership
State Board – State Water Resources Control Board
sVGP – Small Vessel General Program
SVWQC – Sacramento Valley Water Quality Coalition
SWAMP – Surface Water Ambient Monitoring Program
SWMP – Stormwater Management Plan
SWP – State Water Project
SWPPP – Stormwater Pollution Prevention Plan
SWTR – Surface Water Treatment Rule

TAF – thousand acre-feet
TC – Technical Committee
TCE – trichloroethylene
THC - tetrahydrocannabinol
THP – timber harvest plan
TMDL – Total Maximum Daily Load
ToC – top of conservation
TOC – total organic carbon
TSS – Total Suspended Solids
TTHM – total trihalomethanes

UC – University of California
UC Davis – University of California at Davis
UCCE – University of California Cooperative Extension
UCMR3 – Unregulated Contaminant Monitoring Rule 3
UCMR4 – Unregulated Contaminant Monitoring Rule 4
µg/L – micrograms per liter
UPRR – Union Pacific Railroad
US – United States
USACE – US Army Corps of Engineers
USBLM – US Bureau of Land Management
USBR – US Bureau of Reclamation
USDA – US Department of Agriculture
USEPA – US Environmental Protection Agency
USFS – US Forest Service
USGS – US Geological Survey
UV – ultraviolet light
UV254 – ultraviolet light at 254 nanometers

VGP – Vessel General Permit
VOC – volatile organic compound
VSWTP – Vineyard Surface Water Treatment Plant
VTIP – Vessel Turn-In Program

WDCWA – Woodland-Davis Clean Water Agency
WDRs – waste discharge requirements

WQMH – Water Quality Management Handbook
WQMP – Water Quality Management Plan
WPCP – Water Pollution Control Plant
WSR – George Kristoff Water Treatment Plant intake
WTP – water treatment plant
WWTF – Wastewater Treatment Facility
WWTP – Wastewater Treatment Plant
WWTRF – Wastewater Treatment and Reclamation Facility

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Drinking water utilities that use surface water are required by the State Water Resources Control Board, Division of Drinking Water (DDW) to conduct a watershed sanitary survey for that source, under the California Surface Water Treatment Rule (SWTR), and then update that study every five years. This 2020 Update to the Sacramento River Watershed Sanitary Survey (2020 Update) is the fifth update and covers the period January 2015 through December 2019. This report presents the information collected and the evaluations conducted, highlights key changes over the past five years, identifies key findings, and presents recommendations for source and treated water protection.

OBJECTIVES OF THE 2020 UPDATE

The overall objective of this 2020 Update is to assess the source water quality of the Sacramento River as diverted in the Sacramento metropolitan area to ensure the ability of the participating water agencies' existing water treatment plants to continue to provide their customers with drinking water that meets all drinking water standards. This 2020 Update also presents information on a planned diversion, for the applicable participating water agencies, to use in selecting and planning treatment facilities.

This 2020 Update is intended to accomplish the following objectives:

- Fulfillment of the California SWTR and the Interim Enhanced Surface Water Treatment Rule (IESWTR) requirements that surface water agencies conduct a sanitary survey of the source watershed once every five years and submit to DDW. Any significant changes within the last five years that affect source water quality are to be identified in each update. In addition, it is required to comment on the appropriate level of treatment for pathogens, specifically for *Giardia*, viruses, and *Cryptosporidium*.
- Review and evaluation of selected constituents of interest for the study period, January 2015 through December 2019, to identify potential water quality or treatment issues at each water treatment plant or future/planned diversion site. Assess the ability of the existing water treatment plants to meet standards based on the current regulatory framework. Development of recommendations for treatment plant actions to address water quality or treatment issues and/or address planning needs to meet expected future regulations.
- Review and evaluation of selected potential contaminating activities to identify impacts on source water quality. Identify whether it may be useful to conduct additional research or monitoring to further assess contaminant levels in the source water or contaminants from a particular watershed source.
- Identification of appropriate watershed management actions to protect and possibly improve source water quality. Development of recommendations for source water protection efforts that are economically feasible and within the authority of the participating water agencies to implement is critical. Of importance is to target contaminant activities that are most likely to affect source water quality, such as activities located in the protection zones or activities that are predominant in the watershed.

PARTICIPATING WATER AGENCIES

The City of West Sacramento and City of Sacramento (Cities) jointly conducted the 1995 Survey and the 2000 Update. The Second Update was conducted by the Cities as well as Placer County Water Agency (PCWA), the City of Roseville, Sacramento County Water Agency (SCWA), and East Bay Municipal Utility District (EBMUD). PCWA and the City of Roseville participated in anticipation of a potential diversion from the Sacramento River to supply western Placer County. The 2010 and 2015 Updates were conducted by the Cities, PCWA, the City of Roseville, SCWA, and EBMUD, as well as the Woodland-Davis Clean Water Agency (WDCWA). This 2020 Update is being conducted by almost all of the water agencies as the 2015 Update, with only PCWA and the City of Sacramento participating for a potential future water diversion described below. Together this group is herein referred to as the participating water agencies. The diversions and facilities included in this 2020 Update include, from upstream to downstream:

- The potential future RiverArc Project water diversion for western Placer and northern Sacramento counties is expected to utilize the Natomas Mutual Water Company (NMWC) Pritchard Lake pumping plant, located approximately at River Mile 75. This includes PCWA and the City of Sacramento.
- The new water diversion for WDCWA is located approximately at River Mile 70.5 just upstream of the I-5 Bridge crossing at Veteran's Bridge.
- The City of West Sacramento diverts water to its George Kristoff Water Treatment Plant (GKWTP) from the Sacramento River approximately two miles upstream of the confluence with the American River, near River Mile 62.5.
- The City of Sacramento diverts water to its Sacramento River Water Treatment Plant (SRWTP) from the Sacramento River just downstream of the American River confluence, near River Mile 60.
- The water diversion for Freeport Regional Water Authority (FRWA) is located near River Mile 47, approximately 13 miles downstream of the American River confluence and upstream of the Freeport Bridge. This is the supply for SCWA's Vineyard Surface Water Treatment Plant (VSWTP) and a supplemental water supply during drought conditions for EBMUD.

SACRAMENTO RIVER SOURCE WATER PROTECTION PROGRAM

The City of Sacramento, City of West Sacramento, and SCWA sponsor the Sacramento River Source Water Protection Program (SRSWPP). In addition, EBMUD and WDCWA participate in the Voluntary Spill Notification Program task. The City of Sacramento manages the formal program and each participating water agency determines which tasks they will actively participate in with funding. This partnership provides joint follow-up source water protection efforts based on recommendations from the Sacramento River Watershed Sanitary Survey Updates. Joint work is conducted using expert support, and some work is also conducted by individual agencies and shared with the group. The SRSWPP seeks to preserve and protect the source water quality of the Sacramento River drinking water supply for current and future generations.

There are several key focus areas of the SRSWPP:

- Pesticides, including proactive stakeholder efforts on the rice herbicide thiobencarb and other stakeholder efforts to support protection of the Sacramento River water supply from current, increased use, and new pesticides of potential importance for drinking water public health and aesthetics.
- Agricultural discharge, including active stakeholder participation in the Rice Pesticides Program and the Irrigated Lands Regulatory Program for the Rice Waiver and Sacramento Valley orders.
- Industrial National Pollutant Discharge Elimination System (NPDES) permits, including tracking and review of various revised permits and direct coordination with regulators and dischargers.
- Basin Planning efforts at the Central Valley Regional Water Quality Control Board (Regional Board), including active stakeholder participation in the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) Program, Triennial Review, and Municipal and Domestic Supply (MUN) Beneficial Use De-Designation Program.
- Emerging contaminant investigations, including tracking new constituents of interest in drinking water, such as cyanotoxins, pharmaceuticals, and per- and polyfluoroalkyl substances (PFAS).
- Voluntary Spill Notification Program, including direct notification from participating agencies and development of tools to assist with spill notification and response. EBMUD and WDCWA are participants in this program.

The program received the American Water Works Association (AWWA) California/Nevada Section's 2010 Exemplary Source Water Protection Award. In addition, the City of Sacramento received the 2012 AWWA National Exemplary Source Water Protection Program award for metropolitan-sized system on behalf of the program.

SIGNIFICANT CHANGES SINCE 2015 UPDATE

During the past five years, new information has been generated that was used to evaluate source water quality, treatment capabilities, and watershed contaminant sources, and has been summarized in **Section 6**. Some key changes and continued efforts include:

- The scope of interest for this 2020 Update includes the potential future RiverArc Project diversion. This project is in the early stages of planning, but expects to utilize an existing NMWC intake structure on the Sacramento River near Pritchard Lake and treat water at a central Regional Water Treatment Plant east of Sacramento International Airport.
- The new WDCWA diversion and RWTF began operations in July 2016.
- The City of West Sacramento's GKWTP converted primary disinfectant from chlorine gas to sodium hypochlorite.

- The City of Sacramento's SRWTP completed a major rehabilitation construction project in 2016 to bring the plant capacity to the permitted capacity of 160 million gallons per day (mgd). The SRWTP has four separate but identical process basins, with Basins 3 and 4 built in 2016. This included sludge dewater process update, the high service pump station replacement, new filters installation, and vortex breakers addition to the intake structure.
- The FRWA Intake, which supplies SCWA's VSWTP and the EBMUD raw water supply system, did not undergo any changes. EBMUD has worked to expand their ability to store and treat Sacramento River water.
- The California Department of Water Resources Sacramento River Coordinated Monitoring Program (CDWR CMP) conducted monitoring for total organic carbon (TOC), metals, and *Escherichia coli* (*E. coli).*
- The Delta Regional Monitoring Program (RMP) program conducted a two year pathogen study to coordinate with the *Cryptosporidium* monitoring requirements of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) Round 2.
- A Recreational Beneficial Use Assessment was conducted by the Regional Board on the Lower Sacramento River during the summer of 2018. *E. coli* samples were collected from 11 sites on the Lower Sacramento River and two sites on the Lower American River and determined that the United States Environmental Protection Agency (USEPA) Recreational Water Quality Criterion was being met on the Lower Sacramento River.
- There were two significant watershed conditions of interest that had the potential to impact source water quality: the drought from the previous study period continued through 2015, as well as below normal water years in 2016 and 2018, and the Lake Oroville spillway failed in February 2017.
- Data indicate that turbidity levels in the Sacramento River were higher during this study period than the last study period for the RWTF, GKWTP, and VSWTP, while they were lower at the SRWTP. This likely shows the influence of the Lower American River on the SRWTP and reflects water system operations (i.e., timing of releases from Folsom Lake).
- Data indicate that *Giardia* and *Cryptosporidium* levels in the Sacramento River continue to be low and support 3/4/2-log reduction requirements under the SWTRs. Monitoring conducted by the Delta RMP indicate that the Colusa Basin Drain has much higher concentrations of protozoa and is a source to the Sacramento River.
- Data continue to indicate that there is a significant increase in TOC levels in the Sacramento River between Colusa and Verona. Agricultural drains entering in this reach of the river have higher levels of TOC than the mainstem. TOC levels in the source water during this study period were substantially similar to the last study period. Treated water TOC levels at the water treatment plants stabilized during this study period.
- The only Title 22 regulated organic detected at the water treatment plants was thiobencarb, which was detected at ultra-low levels as part of the Rice Pesticide Program (RPP) specialty monitoring program. There was a significant increase in the number of detections, all of which are well below the secondary Maximum Contaminant Level (MCL) of 1 microgram per liter (µg/L). These detections

correlated to substantially increased detections in the upstream agricultural drainages.

- The City of Sacramento and SCWA conducted monitoring for PFAS in 2019 and all were non-detect. These are emerging contaminants of interest and there are potential sources in the watershed.
- Data indicate that iron and aluminum levels in the Sacramento River at the water treatment plants exceeds the secondary MCLs. Similar to TOC, the levels increase between Colusa and Verona and agricultural drains have substantially higher levels than the mainstem.
- The Regional Board implemented the long-term management program for agricultural drainage; the Irrigated Lands Regulatory Program (ILRP). This includes issuance of two coalition group orders in the Sacramento Valley; one for rice crops and one for all other irrigated crops.
- Overall, there was a six percent reduction in the acreage of irrigated agriculture in the Sacramento River watershed, continuing the decreasing trend from the last study period. This included a 22 percent reduction in the acreage of rice grown in the Sacramento Valley during the study period, likely contributed to by the extended drought and decreased water availability. In contrast, the increasing trend for orchard acreage continued with a 21 percent increase during the study period. Pastureland acreage continued its slow decline with a nine percent decrease.
- The Regional Board approved the Pesticides Evaluation Protocol (PEP) in November 2016 that formalized the process for the ILRP enrollees to select pesticides to monitor. This only utilizes MCLs, Notification Levels, Archived Advisory Levels, USEPA Health Advisories, and selected USEPA Human Health Benchmarks for Pesticides as trigger limits.
- Although the rice planted acreage decreased during the study period, there was not a commensurate decrease in the amount of pesticides applied. There was only a 15 percent reduction in total pesticides applied. However, it should be noted that thiobencarb use doubled between 2013 and 2017, largely due to agricultural practices during the extended drought. During the study period there were more frequent detections of thiobencarb in agricultural drains and at higher concentrations than the previous study period. There were also low detections at the raw water at GKWTP and SRWTP in 2015, 2016, and 2019; all were below levels of human health concern and below the secondary drinking water standard. In addition, a new pesticide, benzobicyclon, was introduced in 2017 and used at maximum capacity in the Sacramento River watershed through 2019.
- There is a broader spectrum of pesticides used on a wide variety of non-rice crops, over 400. Few pesticides were monitored in the Sacramento River watershed upstream of FRWA Intake diversion due to the ILRP PEP, approximately 30 per year. Four were detected above human health thresholds; diuron, malathion, mancozeb, and oxyfluorfen. None of these have a primary MCL.
- The 2018 Farm Bill expressly recognizes drinking water source water protection as a goal of United States Department of Agriculture (USDA) conservation programs. This includes funding set aside for these programs and water utilities may participate in joint programs with farmers and ranchers.

- The overall livestock population in the Sacramento River watershed remained stable during the study period, but this included a significant reduction (31 percent) in dairy cows. In addition, regulation and management efforts continued for both rangeland and dairy livestock.
- Commercial poultry operations are now regulated by the Regional Board to prevent discharge to receiving waters. There are limited facilities in the Sacramento River watershed.
- Forest activities, including timber harvesting and wildfires, was investigated in this 2020 Update. Timber harvesting operations are substantial and occur primarily in the upper watershed. Wildfires occur throughout the watershed, and can be substantial and severe resulting in immediate and long-term impacts on source water quality. There were 22 wildfires over 1,000 acres burning over 1 million acres of land in the Sacramento River watershed during the study period. The Regional Board conducted receiving water monitoring after the Carr and Camp Fires in 2018 and 2019.
- Public education related to recreation has continued through “Keep Our Waters Clean” and the “Pups in the Park” campaigns.
- The homeless population has increased substantially in the near intake protection zone, nearly doubling the number of total homeless and quadrupling the number of unsheltered homeless. Strong management programs in both Sacramento and Yolo counties continue efforts to assist unsheltered homeless.
- In 2018 the Regional Board initiated an effort to confirm and address fecal bacteria contamination of the Lower American River by implementing a bacterial monitoring program, including a microbial source tracking study.
- Stormwater and urban runoff management continued under the NPDES permit program, including updates to the Phase 1 NPDES permits in the Central Valley.
- Three municipal wastewater treatment plants (WWTP) ceased discharging during the study period, two were upgraded to tertiary treatment, and five were moved into a General Order NPDES permit.
- Population growth in the watershed has slowed again. Over the past five years most growth occurred in or near the Sacramento metropolitan area. Increases in population may lead to an increasing urbanization of the watershed as well as land use changes.
- Regional Board programs and policies are increasingly impacting the MUN beneficial use, and may not be sufficiently addressing long-term, downstream protections.
- There are several key activities underway that may have the potential to impact how the Central Valley water supply system is operated. Any operational modifications to reservoir storage and river flows have a high likelihood of impacting the source water quality of the Sacramento River.
- Outdoor cannabis cultivation has been legalized due to changes in State regulations. Both personal and commercial cultivation is allowed in portions of the Sacramento River watershed, and is governed by County ordinances. Commercial cultivation is limited. Outdoor cultivation is managed through State Water Resources Control Board (State Board) and California Department of Fish and Wildlife permits.

KEY FINDINGS AND CONCLUSIONS

The key findings and conclusions for this report are organized as they pertain to Sacramento River water quality, treatment and treated water quality regulatory compliance, and watershed contaminant sources.

Sacramento River Water Quality

Overall, the Sacramento River continued to provide good quality raw water. The raw water can currently be treated to meet all drinking water standards using conventional water treatment processes. There are no long-term constituent trends prevalent in the raw water that necessitates special treatment processes at this time. Key findings for each of the constituents of interest are presented below.

Turbidity

The turbidity levels are seasonally variable, with the highest levels occurring during the wet season, typically in January and February. Turbidity appears to be related to high river flow caused by upstream sources, as well as local precipitation, for the water treatment plants. Turbidity data at RWTF and GKWTP are comparable; therefore the potential future RiverArc Project diversion is likely to have similar turbidity levels. The turbidity levels at SRWTP are generally lower than GKWTP, likely due to the influence of the Lower American River. Average turbidity data at the FRWA Intake for VSWTP is lower than the other water treatment plants, likely due to sedimentation occurring at the FRWA Intake and in the 13 mile transmission pipeline to the water treatment plant site. Overall turbidity levels at RWTF, GKWTP, and VSWTP were higher during this study period, as compared with the previous study period, while the SRWTP was lower during this study period. Most of the peak turbidity values at the water treatment plants occurred during February 2019, except that the SRWTP was off-line, and this was a peak storm event period following the significant wildfire burn period of June through November 2018.

Coliform

Average and median *Escherichia coli* (*E. coli)* levels increase with travel downstream. The large difference between the median and average values at each site indicates that there are high outlying values, or peak events. Higher coliform peak concentrations are seen downstream (more peaking effect). Elevated levels of coliform occur during the winter months at all monitoring sites. The highest levels occur during high precipitation events, which are the periods of high flow from the main stem river and tributaries as well as local discharges from precipitation events. Overall, the *E. coli* levels were lower at the RWTF, GKWTP, and SRWTP during this study period, as compared with the previous study period, with median levels less than 13 most probable number per 100 milliliters (MPN/100 mL). However, *E. coli* levels were higher at the VSWTP during this study period with median levels at 20 MPN/100 mL. In almost all cases, the monthly medians at RWTF, GKWTP, SRWTP, and VSWTP are less than 200 MPN/100 mL.

Generally, the monthly medians that exceeded this threshold occurred during the wet weather months.

Giardia/Cryptosporidium

There continue to be limited detections of *Giardia* and *Cryptosporidium* in the Sacramento River water. *Giardia* is detected more frequently, and at higher concentrations, than *Cryptosporidium*. GKWTP, SRWTP, and FRWA Intake all conducted Round 2 monitoring for the LT2ESWTR between 2015 and 2017. There were only two detects of *Cryptosporidium* (one each at SRWTP and FRWA Intake) and nine detects of *Giardia* (three at GKWTP, four at SRWTP, and two at FRWA Intake). The maximum running annual average (RAA) for *Cryptosporidium* (0.017 oocysts per liter at SRWTP) was well below the Bin 2 threshold of 0.075 oocysts per liter. The maximum RAA for *Giardia* (0.042 cysts per liter at FRWA Intake) was below levels of concern. The Regional Board's Delta RMP Pathogen Study included two sample sites in the Sacramento River watershed upstream of the FRWA Intake diversion; Colusa Basin Agricultural Drainage and the Sacramento River at the Westin Boat Dock (between SRWTP and VSWTP). No *Cryptosporidium* was detected at either site. *Giardia* was detected in five samples at the Westin Boat Dock site with a maximum RAA of 0.025 cysts per liter, similar to the water treatment plants' data. *Giardia* was detected in seven samples in the Colusa Basin Agricultural Drainage site with a maximum RAA of 0.42 cysts per liter, much higher than the mainstem data.

Total Organic Carbon

All water treatment plants had median raw water TOC levels less than 2 milligrams per liter (mg/L). The average values of TOC were equal to or higher than the median values at all sites. Raw water TOC levels are higher at the GKWTP than the SRWTP, likely due to the influence of the Lower American River on the Sacramento River water downstream of the confluence of the rivers. TOC levels are seasonally variable, with the highest levels during the wet season (late fall to early spring). The CDWR CMP data show that there are significant increases in TOC along the Sacramento River between Colusa and Verona, where three large agricultural drains enter the river (Butte Slough, Colusa Basin Drain, and Sacramento Slough). The highest levels were seen in the Colusa Basin Drain, with a median value of 7.4 mg/L. Median raw water levels at RWTF and GKWTP were lower during this study period than the 2015 Update, while median levels at the SRWTP and VSWTP were higher.

Volatile and Synthetic Organic Compounds

Other than the low level detection of the rice herbicide thiobencarb, there were no other reported detections of any volatile organic compounds (VOCs) or synthetic organic compounds (SOCs) in the raw water at the existing water treatment plants. The GKWTP and SRWTP specialty RPP monitoring resulted in detects of thiobencarb in raw water in 2015, 2016, and 2019, with a maximum detected value of 0.13 micrograms per liter (µg/L), below the secondary MCL of 1 µg/L.

Specialty Monitoring

PFAS are a large group of human-made substances that do not occur naturally in the environment and are resistant to heat, water, and oil, including perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). In August 2019, DDW established Notification Levels at concentrations of 6.5 nanograms per liter (ng/L) for PFOS and 5.1 ng/L for PFOA. Notification Levels are a non-regulatory, precautionary health-based measure for concentrations in drinking water that warrant notification and further monitoring and assessment. Public water systems are encouraged to test their water for contaminants with Notification Levels. DDW also has requested that the Office of Environmental Health Hazard Assessment (OEHHA) develop public health goals (PHGs) for both PFOA and PFOS, the next step in the process of establishing regulatory standards, or MCLs, in drinking water. In advance of these potential regulations the City of Sacramento and SCWA tested their Sacramento River water sources and treated water for all PFAS compounds monitored using EPA Method 537.1. All results for both were non-detect.

Aluminum/Iron/Manganese

Raw water levels of iron and aluminum can be well above their respective primary and/or secondary MCLs in the Sacramento River. The GKWTP median values were lower for both aluminum and iron during this study period, but still at levels of interest. The CDWR CMP collected quarterly samples from 2015 through 2017 along the Sacramento River. A review of the data continues to show that aluminum and iron levels increase downstream of Colusa. Butte Slough, Colusa Basin Drain, and Sutter Bypass all enter downstream of Colusa and have recorded very high levels of aluminum and iron. Another increase from Verona to GKWTP is not well understood, but could be related to the Natomas Cross Canal or Reclamation District (RD) 1000 discharges into the Sacramento River. Peak values occurred in January 2019, which was a peak storm period that followed the intense wildfire burn period from June through November 2018.

Total manganese levels in raw water can also be found above its secondary MCL, but the average and median values were below the secondary MCL at all sites in the Sacramento River watershed. Peaks were seen as high as 330 µg/L. The CDWR CMP also collected data for manganese and the same trend was seen for manganese as iron and aluminum, so the same sources are likely contributing manganese as well but at lower overall levels.

Treatment and Treated Water Quality Regulatory Compliance

The RWTF, GKWTP, SRWTP, and VSWTP are currently in compliance with all existing drinking water regulations. All participating water agencies implement conventional filtration processes and meet all current drinking water standards, including MCLs and treatment technology requirements. The water treatment plant associated with the potential future RiverArc Project diversion will be designed to meet all drinking water standards. Below is a summary of the key treatment and regulatory compliance topics.

Turbidity Reduction Requirements

The water treatment plants achieve excellent suspended solids removal. The solids removal through sedimentation ranges from 88.1 percent at the RWTF to 96.1 percent at the VSWTP. The average combined filter effluent turbidities ranged from 0.026 nephelometric turbidity units (NTU) at GKWTP to 0.04 NTU at VSWTP. The overall percent solids removed ranged from 99.7 percent at SRWTP and VSWTP to 99.9 at GKWTP. Treated water turbidity at RWTF, GKWTP, SRWTP, and VSWTP meets the Interim Enhanced Surface Water Treatment Rule (IESWTR) standards, and all plants have a 2-log reduction credit for *Cryptosporidium*.

Giardia/Virus/Cryptosporidium Reduction Requirements

Monthly median *E. coli* values are less than 200 MPN/100 mL in almost all cases at all four existing water treatment plants, and *Giardia* maximum RAA levels have been low; therefore, the source water microbial data support that 3/4-log reduction requirements for *Giardia* and viruses continue to be appropriate. Existing data for *Cryptosporidium* maximum RAA levels have put RWTF, GKWTP, SRWTP, and VSWTP, in the Bin 1 classification. Therefore, all water treatment plants should continue to, or plan to, provide 3/4/2-log reduction for *Giardia*/virus/*Cryptosporidium*.

Total Organic Carbon Reduction Requirements

The TOC levels in the raw water were substantially similar to the previous study period. The percent of monthly raw water samples less than 2 mg/L varied: 68 percent at RWTF, 62 percent at GKWTP, 68 percent at SRWTP, and 85 percent at VSWTP. The percent of monthly treated water samples less than 2 mg/L varied also: 100 percent at RWTF, 97 percent at GKWTP, 93 percent at SRWTP, and 100 percent at VSWTP. RWTF and VSWTP met the alternative compliance criterion for treated water TOC in all months. GKWTP had two months with treated water TOC greater than 2 mg/L and SRWTP had three months with treated water TOC greater than 2 mg/L, but the RAA for both facilities was always in compliance with the alternative compliance criterion.

Disinfection By-Products Requirements

Distribution system levels for total Trihalomethanes (TTHM) and haloacetic acids (HAA5) are less than their respective MCLs of 80 and 60 μg/L, expressed as locational running annual averages (LRAAs), for the distribution systems associated with RWTF (as measured by the City of Woodland, City of Davis, and the University of California at Davis), GKWTP, SRWTP, and VSWTP. A review of the quarterly averages shows that only one quarter (GKWTP distribution system, July 2015) exceeded 80 μg/L for TTHMs, just at 80.5 μg/L. There are no clear trends in the data as most of the distribution systems are impacted by other sources or operational parameters that impact the treated water quality.

Watershed Contaminant Sources

There are numerous types of potential contaminating activities in the watershed. Eight activities were selected for evaluation in this report based on constituents of interest, proximity to protection zones, and/or predominance in the watershed. The key findings for each of these activities are provided below.

Agricultural Drainage

The acreage of irrigated agriculture in the Sacramento Valley decreased again, six percent, in the past five years to approximately 1.77 million acres. The acreage of rice production accounts for approximately 25 percent of that land, and it saw a decrease of 22 percent between 2012 and 2017. Orchards now account for the largest share of the land at 32 percent, and have seen a 21 percent increase between 2012 and 2017. Pastureland accounts for approximately 13 percent, and has seen a 9 percent decrease in acreage over the five year period. The remaining acreage is row crops and wetlands.

There were low level detections of the rice herbicide thiobencarb at the GKWTP and SRWTP intakes in 2015, 2016, and 2019 as part of the RPP special rice season monitoring program, but these did not exceed the secondary MCL of 1 µg/L. There was a high and persistent trend of thiobencarb detections in the agricultural drainages during the study period, with results up to 11 µg/L and 26 detects above the Performance Goal of 1.5 µg/L. There is a trend of broader pesticide use on rice crops due to increased weed resistance. Pesticide use on rice decreased 15 percent during this study period; this is not commensurate with the 22 percent reduction in land planted in rice. However, despite overall reductions in pesticide use, thiobencarb use more than doubled over the study period. The RPP has continued with generally the same management measures, with additional efforts to address the increased levels in the agricultural drains.

The Regional Board continued to implement the long-term ILRP, under Orders affecting two coalition groups formed in the Sacramento Valley – one for rice, the Sacramento Valley Rice Growers Order, and one for all other irrigated agriculture, the Growers within the Sacramento River Watershed that are Members of a Third-Party Group (Sacramento River Watershed) Order. The ILRP adopted the PEP to assist coalitions with selection of pesticides to be monitored and this has resulted in fewer pesticides being monitored and limited the application of human health thresholds that are not drinking water standards. The Sacramento Valley Rice Growers sampled for turbidity and TOC and found high levels of both in rice drainage, with median turbidity levels above 20 NTU and median TOC values ranging from 6 to 9.4 mg/L. Six rice pesticides were sampled during the study period and most were detectable, but at levels below human health thresholds. There are no thresholds for the new pesticide benzobicyclon and its metabolite B. The Sacramento River Watershed Order sampled for a wider suite of pesticides, over 20, and most were not detectable at levels of concern. There were results for diuron, malathion, mancozeb, and oxyfluorfen that were above their respective human health thresholds. *E. coli* continues to be persistent at high levels in agricultural drainage as well, but the Coalition does not believe that agricultural activities are the source. Arsenic was detectable above the primary MCL in the Lower Snake River. The median TOC level was 4.1 mg/L and the median dissolved organic carbon (DOC) level was 3.8 mg/L, with paired samples showing 97 percent of organic carbon present in the dissolved fraction. The highest levels of TOC were found in the waterbodies in the Sacramento Valley and the lowest levels were in the upper watershed.

Livestock

The overall population of cattle remained stable in the watershed over the past five years. The number of dairy cattle in the watershed reduced 31 percent and now only account for 4.3 percent of the total watershed cattle population, primarily in Glenn and Tehama counties. Commercial poultry operations include a relatively small number of animals and farms in the Sacramento River watershed. Most of these are small farms with fewer than 400 animals, while there are 17 farms greater than 400 animals. There is limited use of pesticides related to any type of livestock operations.

The Regional Board issues individual NPDES and general order NPDES permits to dairies, depending on size. There are five individual NPDES permits and 36 General Dairy Order enrollees in the Sacramento River watershed. The Dairy Quality Assurance Program (DQAP) has been incorporated into the General Dairy Order as an elective education program for dairies on protecting water quality. There is a new NPDES permit for Confined Bovine Feeding Operations, such as stockyards and cattle yards, established in 2017 that has 11 facilities enrolled. In addition, there is a new NPDES permit for Poultry Operations that has three enrollees. All of these permits specifically prohibit discharges to surface waters and address manure handling, management, and application.

The Central Valley Regional Board is working with the Lahontan Regional Board to develop a Waiver of Waste Discharge Requirements (WDRs) for nonpoint sources on federal lands. This would include grazing. The WDRs is expected to include best management practices (BMPs) that would ensure protection of source water quality.

Forest Activities

Timber harvesting can occur on both public and private lands and is regulated separately. Timber harvesting on federal lands is regulated by the United States Forest Service (USFS), and on state and private lands by the California Department of Forestry and Fire Protection (CalFIRE). There has been a significant increase in fuel reduction and vegetation management by the USFS and private landowners due to the significant tree mortality associated with the drought and bark beetle infestation. The Regional Board’s General Order for Timberland Management Activities was revised and continues to require BMPs and protection of surface water bodies. There were nearly 1,500 timber harvest plans implemented during the study period in the Sacramento River watershed counties, with the majority in the upper watershed. Anyone conducting harvest activities, except those emergency or special exemptions, must apply for coverage under the Order. The Order also contains monitoring and reporting conditions. Other than the herbicide glyphosate, there is limited use of pesticides on forested lands.

The Central Valley Regional Board is working with the Lahontan Regional Board to develop WDRs for nonpoint sources on federal lands. This would include timber harvesting. The WDRs is expected to include BMPs that would ensure protection of source water quality.

Wildfires cause the loss of ground cover, the chemical transformation of soil, and the reduction in soil infiltration rates; these all increase the likelihood of erosion and hydrophobic soils contributing to increased solids in the receiving water, resulting in an increase in the turbidity, organic carbon, metals, and nutrients of the raw water at the water treatment plants. There were 22 wildfires greater than 1,000 acres during the study period. Combined, these fires burned over 1 million acres. The top five fires all burned greater than 50,000 acres each and combined for over 900,000 acres. Fourteen of the fires occurred during the second half of 2018 (June through December) and accounted for 960,000 acres, or 92 percent of the total burn area for the study period. This included the Ranch, Carr, and Camp fires. The Regional Board implemented post-fire monitoring programs for both the Carr and Camp fires in the downstream receiving waters. The data showed significant increases in turbidity and TOC in the first flush storm events, which decreased over time, and elevated levels of metals, including aluminum and iron well above the MCLs.

River Corridor and River Recreation

Extensive recreation occurs in the river and within the river corridor along the Lower Sacramento and American Rivers. It is not possible to quantify the number of users, or the type of recreation that specifically occurs. There are still 12 marina facilities located in the protection zones, with an additional fuel dock identified at Steamboat Landing. Various participating agencies have continued to sponsor the public education campaigns “Keep Our Waters Clean” to encourage use of restrooms and sewage pumpouts and “Pups in the Park” to encourage use of pet waste pickup bags. The cities of Sacramento and West Sacramento and Sacramento County have continued enforcement of derelict boat removal. Sacramento County, the City of Sacramento, and the City of West Sacramento all require a permit and inspection for boats moored for extended periods of time.

Homeless populations in the Sacramento metropolitan area have increased tremendously over the study period. Yolo County estimates a doubling of homeless numbers between 2015 and 2017, but a low percent are expected to be unsheltered in the river corridor. Sacramento County also saw a doubling of homeless numbers during the study period, but they also saw a near quadrupling of unsheltered homeless numbers. Illegal camping still occurs in the river corridor along the Lower American River Parkway and in West Sacramento in the Lighthouse Marina area. Legal challenges to the ability to enforce illegal camping ordinances in 2018 have reduced the number of citations issued locally. Sacramento County Department of Regional Parks has continued to clean illegal camp sites, removing 1,612 tons of debris in 2018 and 1,397.5 tons of debris in 2019. The City of Sacramento Police Department has also tracked metrics on the cubic yards of debris removed from illegal camping sites, with over 10,000 cubic yards removed between July 2017 and April 2019. Sacramento City and County, as well as the City of West Sacramento and Yolo County, continue to work on creating housing for the homeless and reduce the number of unsheltered homeless.

The Regional Board continued their monitoring program to investigate bacteria in the Lower American River. The weekly *E. coli* monitoring continues to show the highest concentrations in the lowest three miles of the American River, near the confluence with the Sacramento River. These sites had higher median levels during the dry weather period, unlike the upper portion of the Lower American River which has higher levels during wet weather. The Regional Board, in conjunction with other local entities, is implementing a Bacteria Study to verify the impacts and conduct a microbial source tracking study to allow for development of a strategy to address the bacterial contamination.

Stormwater and Urban Runoff

Stormwater and urban runoff can occur throughout the watershed. The urbanization of the watershed upstream of the Sacramento metropolitan area will change the amount, type, quality, and timing of runoff. The State Board and Regional Board permit runoff through a variety of NPDES permits. There are two municipal NPDES permit programs (Phase I and II), an Industrial NPDES permit program, and a Construction NPDES permit program.

In the Sacramento River watershed there are two NPDES Stormwater Phase I permits; the Region-Wide General Permit for Discharges from Municipal Separate Storm Sewer Systems and the Statewide California Department of Transportation (Caltrans). The Region-Wide General Permit is a replacement for the Sacramento Stormwater Quality Partnership (SSQP) Permit for the Sacramento metropolitan urban area. Each participating agency is now enrolled individually, but the SSQP continues many of its cooperative elements. This includes an urban discharge and urban tributary monitoring program and this data continues to show the potential water quality impact that urban runoff can have on ambient water quality. Levels of contaminants in urban tributaries and in the urban runoff discharges can be higher than some of the respective water quality objectives, including E. coli, organic carbon, and iron. Studies show that new development areas have discharges with significantly lower levels of pollutants than older development areas. The SSQP implements an extensive pollution reduction program that addresses constituents of interest for source water protection, including illegal discharges, fecal waste, sediment, TOC, and pesticides. Caltrans continues to implement a statewide Stormwater Management Plan to reduce the impacts of highway runoff on local receiving waters. Caltrans also enrolled 75 sites in the Construction

Stormwater Program, with 25 of those located in the seven counties in the protection zones.

Small cities and urban areas continue to be regulated under the Phase II Stormwater Program. Under the Phase II Stormwater Program, Stormwater Management Plans were implemented with specific BMPs to minimize pollution, including implementation of treatment BMPs in new development. Monitoring was not required for any Phase II permittees in the Sacramento River watershed.

An inventory was obtained from the California Integrated Water Quality System (CIWQS) to identify the Industrial Stormwater Permittees in the watershed, resulting in 828 sites. Four hundred-fifty of these are located within the seven counties in the protection zones. An inventory was also obtained from CIWQS of the Construction Stormwater Program resulted in identification of 2,225 sites. Fifteen hundred of these are located within the seven counties in the protection zones.

Industrial NPDES Dischargers

There were 44 Industrial NPDES permitted facilities identified and three of these were prioritized for discussion, including: Sterling Caviar, Former McClellan Air Force Base (AFB), and Aerojet Rocketdyne (both treated groundwater and stormwater).

Sterling Caviar has had complex NPDES permitting over the study period. The primary water quality concerns are related to elevated levels of arsenic and manganese in the effluent, due to the use of local groundwater as a source. In December 2017 the Regional Board adopted a new NPDES permit that significantly relaxed permit effluent limits for both constituents, actually removing manganese, based on questionable implementation details related to data interpretation. Monitoring data is still being collected for both constituents and is expected to be considered when the permit is renewed in 2022.

McClellan AFB was operating under an individual NPDES permit, but was converted to a low threat General Order NPDES permit during the study period. The facility is a groundwater extraction and treatment (GET) system to address groundwater contamination issues at the site. The primary constituents of interest include VOCs, hexavalent chromium, 1,4-dioxane, 1,2,3-trichloropropane, and most recently PFAS. Despite 1,4-dioxane being detectable above the DDW Notification Level, it is not addressed in the most recent permit. PFOA has been detected in the GET effluent above its DDW Notification Level.

Aerojet Rocketdyne has two individual NPDES permits; one for sitewide stormwater runoff related to industrial operations and one for the GET facilities. Aerojet Rocketdyne officially closed industrial operations in December 2019, so the sitewide stormwater NPDES was rescinded in July 2020. During the study period it was operating normally and monitoring data reveals the detectability of perchlorate in Alder Creek, but does not identify any specific source of contamination. The GET NPDES permit includes 10 GET facilities that discharge nearly 50 mgd of treated groundwater to the Lower American River. There is a wide array of constituents addressed, but the key contaminants include VOCs, perchlorate, 1,4-dioxane, N-nitrosodimethylamine, and most recently PFAS. The GET facilities generally perform well and meet permit effluent limitations. There is new concern related to the PFAS, specifically high levels of PFOA and PFOS, and the potential for migration of groundwater plumes into Lake Natoma.

Wastewater Facilities

There are 30 NPDES permitted wastewater facilities in the watershed at or upstream of the FRWA Intake diversion. During the study period three facilities were closed, two were upgraded to tertiary treatment, two had capacity decreased, and one had capacity slightly increased. A review of enforcement orders shows generally good compliance, with most violations related to pH, coliform, chlorine residual, disinfection byproducts, and nitrate.

There are 110 sanitary sewer collection systems in the Sacramento River watershed. Collection system spills, known as sanitary sewer overflows (SSOs), can occur in any collection system and contain raw sewage. The spills of greatest concern are those that reach the receiving water and have substantial volume. During the study period, 41 collection systems had Category 1 SSOs for a total of nearly 5.8 million gallons (mg). Two single events accounted for 67 percent of this volume; both occurred upstream of major reservoirs (Mount Shasta above Lake Shasta and City of Placerville above Folsom Lake). The Sacramento Area Sewer District (SASD) had 25 SSOs greater than 5,000 gallons that reached surface water.

The City of Sacramento's combined sewer system (CSS) has continued to have fewer number of discharges of combined sewer overflows (CSOs). There were no untreated CSO discharges. The Sacramento Regional County Sanitation District (Regional San) operates the Regional Wastewater Treatment Plant (Regional Plant). Discharge is still prohibited during negative downstream flow times, in addition to discharge only when minimum dilution of 14:1 (or river flow of 1,300 cubic feet per second [cfs]) is met. Regional San discharge permit was renewed in 2016 and the new permit requires the Regional Plant be modified to add tertiary treatment and implement seasonal disinfection requirements.

Bacteria and protozoa monitoring at the VSWTP potentially correlate to the City of Sacramento's CSS discharges and SSOs. SCWA and EBMUD have operational agreements with the City of Sacramento and Regional San regarding notification of events potentially impacting source water quality.

Watershed Spills

Cal OES continues operation of the Response Information Management System (RIMS) as part of the State's Standardized Emergency Management System (SEMS). The purpose of RIMS is to provide a single point for statewide tracking of the status and progress of hazardous materials spills information. This can be accessed on-line to view information on current and archived hazardous materials spills.

A review of the Cal OES Hazardous Spill Database for the seven counties located in the protection zones showed over 700 spill events that reached surface water. Of this, there were 22 not related to sewage that were potentially significant, including fire-fighting chemicals, petroleum products, and water discharges. The participating water agencies did not receive notification from DDW for most of these events. There appears to be a significant gap in communication between Cal OES and DDW.

The Sacramento River Source Water Protection Program (SRSWPP) has continued to implement a voluntary spill notification and response program to help enhance timely direct notification of hazardous spills upstream of the water treatment plants.

The California Department of Fish and Wildlife is implementing Geographical Response Plans to manage response actions for inland water petroleum spills. One has been completed for the North Fork of the American River and the Upper Sacramento River and one is currently being prepared for the Lower Sacramento River. This includes notification to impacted drinking water utilities.

RECOMMENDATIONS

A final objective of this report is to identify appropriate watershed management actions that may assist in protecting and possibly improving source water quality. **Table ES-1** presents the recommendations developed for this 2020 Update, listed by subject area and not by priority.

Development of recommendations for watershed management actions that are economically feasible and within the authority of the participating water agencies to implement is critical. Of importance is to target potential contaminating activities that may be most likely to affect source water quality, such as activities located in the protection zones or activities that are predominant in the watershed. Some recommendations provide for information tracking, which will facilitate updating management actions as needed.

Recommendations apply to all participating water agencies, unless noted, and may be implemented by them as they have resources available. However, since PCWA is not currently using the Sacramento River supply none of these recommendations specifically apply to them at this time. These recommendations could be implemented by individual agencies, or as part of the SRSWPP.

Table ES-1
2020 Update Recommendations

Recommendation	Notes
Water Quality and Treatment	
Continue to optimize treatment and distribution, especially during times of reduced source water quality or increased source water vulnerability (i.e. peak storm events, high river flows, unusual reservoir release patterns, irrigation drainage periods, post-wildfire runoff periods, hazardous materials spill events, and sanitary sewer overflow events).	WDCWA should also consider specific optimization of pre-treatment to increase solids removal. FRWA should continue to optimize during City of Sacramento Combined Sewer System treated/untreated discharge events and Sacramento River reverse flow conditions.
Ensure that *Giardia* and *Cryptosporidium* are analyzed as part of the second round of LT2ESWTR monitoring.	Only applicable to WDCWA.
Complete Unregulated Contaminant Monitoring Rule (UCMR) 4 monitoring requirement.	Only applicable to the City of Sacramento and WDCWA.
Consider per- and polyfluoroalkyl substances (PFAS) raw water monitoring in advance of potential drinking water standard.	Only applicable to the WDCWA and City of West Sacramento.
Consider water treatment plants conduct quarterly aluminum and iron raw water monitoring to coordinate with the Department of Water Resources (DWR) to allow for source isolation along Lower Sacramento River.	
Consider verification/further evaluation of other sources of organic carbon and metals between Verona and GKWTP intake (i.e., the Natomas Cross Canal and Reclamation District 1000 discharges).	
Consider requesting DWR to add Natomas Cross Canal to the DWR Sacramento River Coordinated Monitoring Program.	
Discontinue special investigation of raw water manganese in watershed sanitary survey updates.	

Table ES-1 Cont'd
2020 Update Recommendations

Recommendation	Notes
Watershed Contaminant Sources	
Consider participating in the Rice Pesticide Program (RPP) seasonal monitoring for raw water thiobencarb.	Only applicable to WDCWA.
Continue to, or consider, supporting the Keep Our Waters Clean.	Continue to be applicable to: City of West Sacramento, City of Sacramento, SCWA, and EBMUD. Consider applicability to: WDCWA
Continue to, or consider, supporting the Pups in the Park campaign.	Continue to be applicable to: Sacramento and SCWA. Consider applicability to: EBMUD
Continue participation in the Sacramento River Voluntary Spill Notification Program. Consider options to improve formal notification via Office of Emergency Services (OES) and Division of Drinking Water (DDW).	
Continue to track Aerojet and act as an active stakeholder for permitting.	Only applicable to City Sacramento, SCWA, and EBMUD.
Continue to coordinate with Sacramento Regional County Sanitation District and City of Sacramento on operations agreements and notifications.	Only applicable to SCWA and EBMUD.
Through the Sacramento River Source Water Protection Program, or individual agency activities, continue to, or consider: 1. Continue to/consider participating as an active stakeholder in Central Valley Regional Board management programs (NPDES Tracking, Region-Wide MUN De-designation, CV-SALTS Secondary MCL Implementation, ILRP, RPP, Lower American River Microbial Evaluations, Non-Point Source Program, etc.). 2. Continue to track Sterling Caviar NPDES Permit as will be one of the first renewals impacted by the new Secondary MCL Policy from CV-SALTS. 3. Continue tracking water system operational programs to ensure that drinking water quality impacts are being addressed (i.e. Delta Conveyance Project, DWR Reoperation Study, Folsom Joint Federal Project, and USBR Basin Study). 4. Continue to track selected NPDES dischargers (such as McClellan) and act as an active stakeholder for permitting. 5. Consider contacting State Board about Cannabis Priority Watersheds to better understand criteria and why American River/Bear River are not included. 6. Consider coordinating with DPR/USEPA to request preparation of human health thresholds for benzobicyclon and metabolite B. 7. Consider coordinating with State Conservationist/State Technical Committee to better understand SWP Funding Opportunities from 2018 Farm Bill.	Applicable to: WDCWA, City of West Sacramento, City of Sacramento, and SCWA. Consider applicability to: EBMUD

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This report presents the findings of the 2020 Update to the Sacramento River Watershed Sanitary Survey (2020 Update). This study covers the period January 2015 through December 2019. The initial watershed sanitary survey was completed in 1995 (1995 Survey), the first update was completed in 2000 (2000 Update), the second update was completed in 2006 (Second Update), the third update was completed in 2010 (2010 Update), and the fourth update was completed in 2015 (2015 Update), all in accordance with the California Surface Water Treatment Rule (SWTR).

This section identifies the objectives of the study, provides a list of the participating water agencies, discusses the Sacramento River Source Water Protection Program, presents the constituents and topics covered in the update, generally describes the conduct of the study, and provides the outline of the report.

For assistance with abbreviations and acronyms, the reader is referred to the List of Abbreviations at the front of the Report.

OBJECTIVES OF THE 2020 UPDATE

The overall objective of this 2020 Update is to assess the source water quality of the Sacramento River as diverted in the Sacramento metropolitan area to ensure the ability of the participating water agencies' existing water treatment plants to continue to provide their customers with drinking water that meets all drinking water standards. This 2020 Update also presents information on a planned diversion, for the applicable participating water agencies, to use in selecting and planning treatment facilities.

A watershed sanitary survey focuses on the first barrier to contamination of the drinking water supply, namely source water protection. Evaluating source water quality and watershed contaminant sources provides key information to aid in understanding how to maintain and possibly improve the first barrier. In order to assess the ability of the participating water agencies to treat Sacramento River source water, some evaluation of treatment plant capabilities and treated water quality is also necessary. Therefore certain aspects of the second (water treatment plant) barrier are also evaluated in relationship to water quality.

This 2020 Update is intended to accomplish the following objectives:

1. Fulfillment of the California SWTR and the Interim Enhanced Surface Water Treatment Rule (IESWTR) requirements that surface water agencies conduct a sanitary survey of the source watershed once every five years and submit to the State Water Resources Control Board, Division of Drinking Water (DDW). Any significant changes within the last five years that affect source water quality are to be identified in each update. In addition, it is required to comment on the appropriate level of treatment for pathogens, specifically for *Giardia*, viruses, and *Cryptosporidium*.
2. Review and evaluation of selected constituents of interest for the study period, January 2015 through December 2019, to identify potential water quality or

treatment issues at each water treatment plant or future/planned diversion site. Assess the ability of the existing water treatment plants to meet standards based on the current regulatory framework. Development of recommendations for treatment plant actions to address water quality or treatment issues and/or address planning needs to meet expected future regulations.

3. Review and evaluation of selected potential contaminating activities to identify impacts on source water quality. Identify whether it may be useful to conduct additional research or monitoring to further assess contaminant levels in the source water or contaminants from a particular watershed source.
4. Identification of appropriate watershed management actions to protect and possibly improve source water quality. Development of recommendations for source water protection efforts that are economically feasible and within the authority of the participating water agencies to implement is critical. Of importance is to target contaminant activities that are most likely to affect source water quality, such as activities located in the protection zones or activities that are predominant in the watershed.

PARTICIPATING WATER AGENCIES

The City of West Sacramento and City of Sacramento (Cities) jointly conducted the 1995 Survey and the 2000 Update. The Second Update was conducted by the Cities as well as Placer County Water Agency (PCWA), the City of Roseville, Sacramento County Water Agency (SCWA), and East Bay Municipal Utility District (EBMUD). PCWA and the City of Roseville participated in anticipation of a potential diversion from the Sacramento River to supply western Placer County. The 2010 and 2015 Updates were conducted by the Cities, PCWA, the City of Roseville, SCWA, and EBMUD, as well as the Woodland-Davis Clean Water Agency (WDCWA). This 2020 Update is being conducted by almost all of the water agencies as the 2015 Update, with only PCWA and the City of Sacramento participating for a potential future water diversion described below. Together this group is herein referred to as the participating water agencies. The diversions and facilities included in this 2020 Update include, from upstream to downstream:

- The potential future RiverArc Project water diversion for western Placer and northern Sacramento counties is expected to utilize the Natomas Mutual Water Company (NMWC) Pritchard Lake pumping plant, located approximately at River Mile 75. This includes PCWA and the City of Sacramento.
- The new water diversion for WDCWA is located approximately at River Mile 70.5 just upstream of the I-5 Bridge crossing at Veteran's Bridge.
- The City of West Sacramento diverts water to its George Kristoff Water Treatment Plant (GKWTP) from the Sacramento River approximately two miles upstream of the confluence with the American River, near River Mile 62.5.

- The City of Sacramento diverts water to its Sacramento River Water Treatment Plant (SRWTP) from the Sacramento River just downstream of the American River confluence, near River Mile 60.
- The water diversion for Freeport Regional Water Authority (FRWA) is located near River Mile 47, approximately 13 miles downstream of the American River confluence and upstream of the Freeport Bridge. This is the supply for SCWA's Vineyard Surface Water Treatment Plant (VSWTP) and a source water supply for EBMUD.

SACRAMENTO RIVER SOURCE WATER PROTECTION PROGRAM

The City of Sacramento, City of West Sacramento, and SCWA sponsor the Sacramento River Source Water Protection Program (SRSWPP). In addition, EBMUD and WDCWA participate in the Voluntary Spill Notification Program task. The City of Sacramento manages the formal program and each participating water agency determines which tasks they will actively participate in with funding. This partnership provides joint follow-up source water protection efforts based on recommendations from the Sacramento River Watershed Sanitary Survey Updates. Joint work is conducted using expert support, and some work is also conducted by individual agencies and shared with the group. The Sacramento River Source Water Protection Program seeks to preserve and protect the source water quality of the Sacramento River drinking water supply for current and future generations.

There are several key focus areas of the SRSWPP:

- Pesticides, including proactive stakeholder efforts on the rice herbicide thiobencarb and other stakeholder efforts to support protection of the Sacramento River water supply from current, increased use, and new pesticides of potential importance for drinking water public health and aesthetics.
- Agricultural discharge, including active stakeholder participation in the Rice Pesticides Program and the Irrigated Lands Regulatory Program for the Rice Waiver and Sacramento Valley orders.
- Industrial National Pollutant Discharge Elimination System (NPDES) permits, including tracking and review of various revised permits and direct coordination with regulators and dischargers.
- Basin Planning efforts at the Central Valley Regional Water Quality Control Board (Regional Board), including active stakeholder participation in the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) Program, Triennial Review, and Municipal and Domestic Supply (MUN) Beneficial Use De-Designation Program.
- Emerging contaminant investigations, including tracking new constituents of interest in drinking water, such as cyanotoxins, pharmaceuticals, and per- and polyfluoroalkyl substances.

- Voluntary Spill Notification Program, including direct notification from participating agencies and development of tools to assist with spill notification and response. EBMUD and WDCWA are participants in this program.

The program received the American Water Works Association (AWWA) California/Nevada Section's 2010 Exemplary Source Water Protection Award. In addition, the City of Sacramento received the 2012 AWWA National Exemplary Source Water Protection Program award for metropolitan-sized system on behalf of the program.

CONSTITUENTS AND TOPICS COVERED IN THE 2020 UPDATE

Several water quality constituents were selected for evaluation as part of the 2020 Update. **Table 1-1** presents a summary of the water quality constituents selected and the reason for selection.

Eight potential contaminating activities were selected for review as part of the 2020 Update: agricultural drainage (rice and other irrigated agriculture, including pastureland), livestock (dairy and rangeland), forest activities (timber management and wildfires), river corridor and river recreation (recreation and homeless/illegal camping), stormwater and urban runoff, industrial NPDES permitted dischargers, wastewater, and watershed spills. Each of these activities can contribute at least one of the constituents identified in **Table 1-1** to the source water. Watershed management programs that support source water protection are discussed and opportunity for participating water agency participation is highlighted.

Four special topics are also included briefly in the 2020 Update. These topics are summarized only for informational purposes.

- An update on the growth and urbanization trends occurring in the watershed that may impact the type, magnitude and location of potential contaminating activities.
- An update of selected Central Valley Regional Water Quality Control Board's policies and basin planning efforts, including; the Drinking Water Policy for Surface Water of the Delta and its Upstream Tributaries (Drinking Water Policy), the MUN Beneficial Use Regional De-Designation Project, and the CV-SALTS Program.
- An update on potential future Central Valley water system operational impacts and modifications, such as climate change and other Delta/reservoir management programs.
- An update on outdoor cannabis cultivation management programs.

Table 1-1
Water Quality Constituents Selected for Evaluation as Part of the 2020 Update

Constituent	Reason for Inclusion in 2020 Update
Turbidity	Turbidity is a measurement of suspended solids in water. Treated water turbidity levels are regulated in the SWTR and the IESWTR.
Escherichia coli (E. coli)	The United States Environmental Protection Agency (USEPA) believes that source water *E. Coli* may be the best surrogate to determine treatment requirements in lieu of actual pathogen and virus data.
Giardia	*Giardia lamblia* is infectious to humans. Source water levels of *Giardia* are used to determine treatment requirements under the SWTR.
Cryptosporidium	*Cryptosporidium parvum* is infectious to humans. Actual source water levels of *Cryptosporidium* are used to determine treatment requirements as part of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR).
Total Organic Carbon	Total organic carbon (TOC) is a surrogate measure of disinfection by-products (DBP) precursor material in water. TOC levels in either source or treated water are used to determine treatment requirements in the Stage 1 Disinfectant/Disinfection By-Product Rule (D/DBP Rule).
Total Trihalomethanes	Total trihalomethanes (TTHM) are disinfection by-products formed in treated water. Treated water levels are regulated by the Stage 1 D/DBP Rule and further regulated under the Stage 2 D/DBP Rule.
Haloacetic Acids	Haloacetic acids (HAA5) are disinfection by-products formed in treated water. Treated water levels are regulated by the Stage 1 D/DBP Rule and further regulated under the Stage 2 D/DBP Rule.
Detectable Volatile and Synthetic Organic Compounds of Interest	Volatile and synthetic organic compounds (VOCs and SOCs) are formulated for, or are by-products from, industrial, agricultural, and urban use. Pesticides are a main subgroup of the SOCs used for agriculture and urban application, including the rice herbicide thiobencarb. Many of these constituents have been regulated by the Phase I, II, and V regulations.
Specialty Monitoring	Per- and polyfluoroalkyl substances (PFAS) are a large group of human-made substances that do not occur naturally in the environment and are resistant to heat, water, and oil. Perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) have USEPA Health Advisories and DDW Notification Levels, while more PFAS may be regulated in the future.
Detectable Title 22 Constituents of Interest	Aluminum, iron, and manganese are trace metals found in surface water supplies that have secondary drinking water standards; in addition, aluminum has a primary drinking water standard higher than the secondary standard. These metals can be contributed naturally and by a variety of contaminant sources.

DESCRIPTION OF HOW THE 2020 UPDATE WAS CONDUCTED

The project team consisted of a Technical Committee (TC) comprised of representatives from all participating water agencies and the consulting team of Starr Consulting, Palencia Consulting Engineers, and Rincon Consultants, Inc. The TC participated in developing the scope of work and reviewed identification and development of key findings and recommendations. DDW was provided with the proposed report outline prior to commencing work.

The consulting team obtained information from the existing water treatment plants, as well as the planned diversion site, through an agency survey that addressed each treatment plant's processes. This agency survey included a discussion of treatment challenges and changes since the 2015 Update. Participating water agencies provided raw and treated water data, as well as information on their actions relevant to recommendations from the 2015 Update. In addition, site visits were conducted for the WDCWA Regional Water Treatment Facility and the City of Sacramento's Sacramento River Water Treatment Plant to inspect new facilities.

The consulting team obtained additional source water quality data from the California Department of Water Resources Sacramento Watershed Coordinated Monitoring Program (CDWR CMP), the Delta Regional Monitoring Program, and the Regional Board.

The consulting team collected information on potential contaminant activities reviewed in this report through literature reviews, Internet searches, and discussions with various agencies' staff. A list of agency contacts and a bibliography are provided in **Appendix A**. This data was reviewed to identify conditions of interest and relationships to source water quality, review source water protection activities, and identify significant changes in the watershed since the 2015 Update.

REPORT ORGANIZATION

Section 1 - Introduction

This section describes the objectives of the 2020 Update, identifies the participating water agencies that funded the study, introduces the SRSWPP and its activities, lists the main topics and constituents covered in the 2020 Update, describes how the 2020 Update was conducted, and includes a description of the basic report organization. **Appendix A** provides a list of references.

Section 2 - The Watershed and Water Supply Systems

This section is largely descriptive and provides (1) a brief overview of the physical, hydrologic, and land use characteristics of the watershed, (2) a description of the four existing water supply systems, and (3) a description of the potential future RiverArc Project diversion. The watershed description includes a definition of the protection zones for all the diversion sites. For more detailed descriptive information on watershed characteristics, the reader is referred to the 1995 Survey.

Section 3 - Sacramento River Water Quality Review

This section contains three parts. The first part is a brief regulatory context to highlight the constituents selected for evaluation and the framework for those evaluations. **Appendix B** provides the detailed Regulatory Framework for the water quality evaluations. The second part provides an overall review of the available source, or raw, water quality data in the focus area of the Sacramento River for this study. The focus area includes the Sacramento River from the Feather River confluence to Freeport and the American River at the confluence with the Sacramento River. The third part provides a review of the constituents of interest, including an explanation for their selection and a summary of the data obtained for the period of study, for each constituent. Participating water agency data used in the water quality review are provided in **Appendix C**.

Section 4 - Watershed Contaminant Sources Review

This section describes pertinent characteristics of each of the eight potential contaminating activities that were reviewed as part of this update, as well as an update on the participating water agencies' related source water protection efforts. Also included is information on the other four special topics. **Appendix D** presents selected materials related to Watershed Contaminant Sources and from several source water protection activities implemented by the participating water agencies.

Section 5 - Individual Intake Location Compliance Evaluations

This section contains an evaluation of the existing water treatment plants' treated water quality, as well as an evaluation of each existing treatment plant's ability to meet the SWTRs as well as other existing regulations. A detailed Regulatory Framework was developed to guide the evaluations and is presented in **Appendix B**.

Section 6 - Findings and Recommendations

This section presents the key findings for the 2020 Update report and a list of recommendations for the participating water agencies. Significant changes since the 2015 Update are summarized at the beginning of this section.

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This section provides an overview description of the watershed, which summarizes physical, hydrologic, and land use characteristics. Major watershed characteristics have changed little since the original 1995 Survey. For a more detailed account of this information, the reader is referred to the 1995 Survey. This section also provides a brief description of the new Woodland-Davis Clean Water Agency (WDCWA) diversion and treatment facility, and the existing City of West Sacramento, City of Sacramento, and Freeport Regional Water Authority (FRWA) Sacramento River diversions and water supply systems. The water treatment plants are further described in **Section 5**. These descriptions include a summary of significant changes since the 2015 Update. In addition, a description of the potential future RiverArc Project is provided. The water supply facilities included as part of the watershed sanitary survey include diversion and water treatment plant facilities. This report does not include evaluation of distribution system physical facilities.

For assistance with abbreviations and acronyms, the reader is referred to the List of Abbreviations at the front of the Report.

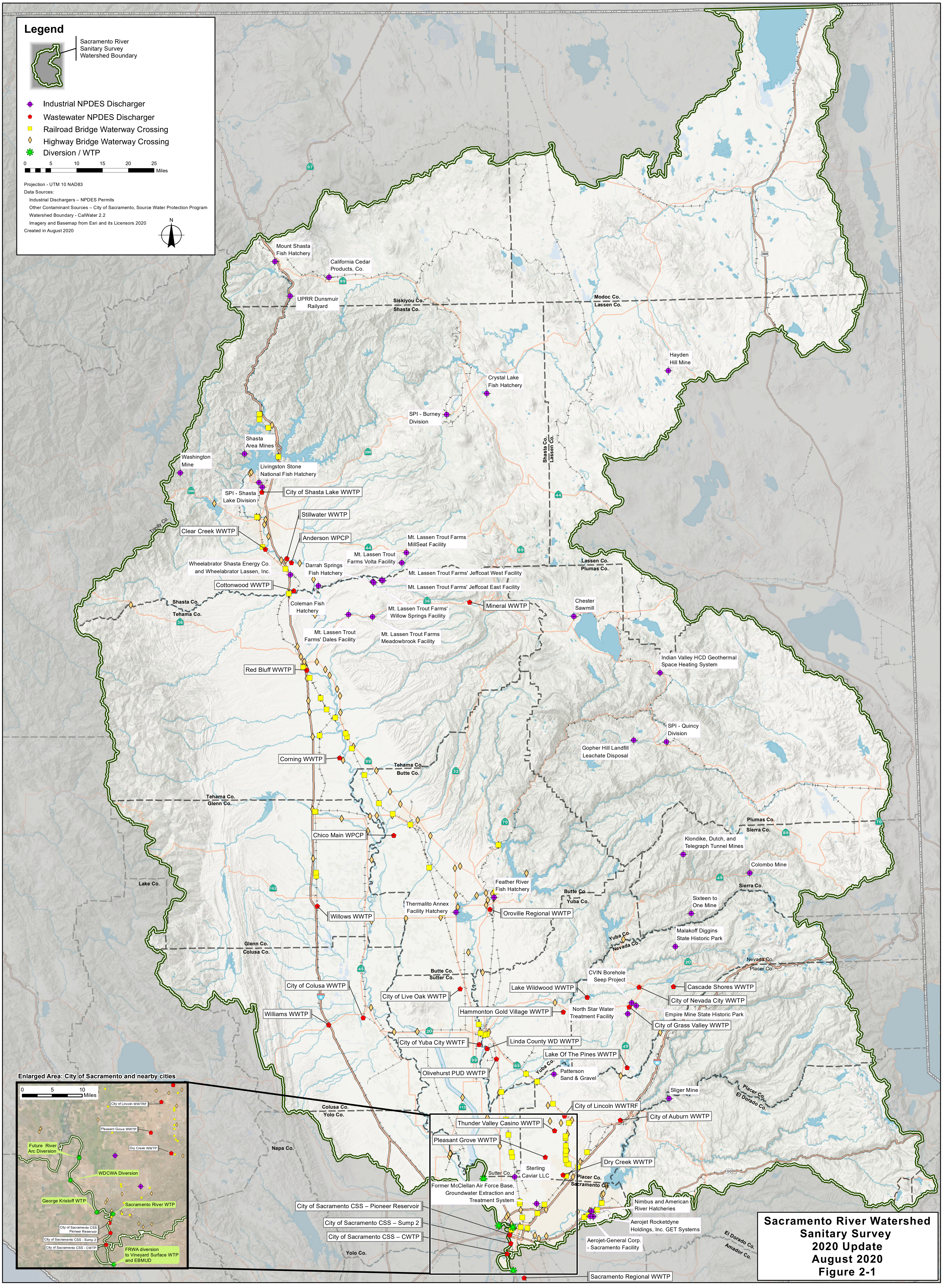
THE WATERSHED

The Sacramento River is California's largest river. The entire watershed encompasses nearly 25,000 square miles. The river is heavily regulated by the operation of dams, including Shasta Dam on the main stem, Oroville Dam on the Feather River, Folsom Dam on the American River, and numerous other dams on both major and minor tributaries. River flow is heavily dependent on releases from the dams and precipitation from winter storms.

The weather throughout the watershed is typically characterized by hot, dry summers and rainy winters, with snow falling and accumulating at the higher elevations in the watershed. Historically, most precipitation has occurred between October and April. However, climate change is resulting in changes to typical weather patterns. This is causing longer dry periods and shorter wet periods and reduced snow pack at higher elevations.

The watershed consists of three major areas: the upper watershed, the Sacramento Valley, and the Sacramento metropolitan area. An updated Watershed Map has been developed which delineates the watershed boundary upstream of the FRWA Intake diversion, as well as identifies the existing and potential future diversions included in this project and the protection zones (see **Figure 2-1)**. Several features of the map were updated in this Report, including; railroad and highway bridge crossings, industrial National Pollutant Discharge Elimination System (NPDES) permitted facilities, and municipal wastewater NPDES permitted facilities.

On the Sacramento Valley floor, a network of flood control facilities and irrigation canals and drains creates a maze-like pattern of water flow. The highly developed system of flood control basins, levees, channels, and bypasses serve as auxiliary channels to the Sacramento River during the wet season. The nearest flood control facility to the cities'



Sacramento River Watershed Sanitary Survey 2020 Update
August 2020
Figure 2-1

intakes is the Sacramento Weir, just upstream of the City of West Sacramento's George Kristoff Water Treatment Plant (GKWTP), which directs flood flow into the Yolo Bypass to relieve flood conditions in the Sacramento metropolitan area. The river levees are part of the flood control system; the river system is levied throughout the protection zones and for a considerable distance upstream. Along with the flood control system, there is a highly developed system of agricultural canals and drains. River water is diverted for irrigation and then restored to the river as agricultural drainage. Water for agricultural irrigation is primarily used during the spring, summer, and early fall months.

The contributory area near the GKWTP, the City of Sacramento's Sacramento River Water Treatment Plant (SRWTP), and FRWA Intake diversion is an urban area which includes the presence of natural waterways, such rivers and creeks, as well as an engineered stormwater collection system and a combined sewer system.

The watershed for the potential future RiverArc Project diversion and the new WDCWA Regional Water Treatment Facility (RWTF) includes the upper watershed and the Sacramento Valley upstream of the respective diversion locations. The watershed for the GKWTP includes the upper watershed, the Sacramento Valley upstream of the intake, and the northern portion of the Sacramento metropolitan area. The watershed for the SRWTP includes the upper watershed, the Sacramento Valley upstream of the intake, the American River watershed, and a portion of the Sacramento metropolitan area. The watershed for the FRWA Intake diversion includes the upper watershed, the Sacramento Valley and American River watershed upstream of the diversion, as well as the majority of the Sacramento metropolitan area. None of the participating water agencies own or control a significant amount of land or land use in the watershed.

The Upper Watershed

The upper watershed consists of four distinct geomorphic provinces: the Sierra Nevada, the Cascade Range, the Coast Ranges, and the Modoc Plateau. At the upper elevations of the Sierra Nevada, Cascade, and Coast Ranges, there are coniferous forests. At lower elevations, the land supports grasses, oaks, and chaparral. The Modoc Plateau is an arid semi-desert scrubland in the rain shadow of the Pacific Divide.

There is one source of water that does not naturally contribute to the Sacramento River watershed, but has been modified by constructed facilities to import water into the watershed. As part of the Central Valley Project, Lewiston Dam was constructed on the Trinity River in the late 1950's and early 1960's. Water is diverted from the Trinity River into the Clear Creek Tunnel and then imported over the ridge into Whiskeytown Reservoir. Whiskeytown Reservoir is located west of Redding and is contributory to the Sacramento River downstream of Redding, via Spring Creek.

The United States Bureau of Reclamation (USBR) operates the facilities and controls the flow and volume of water transferred from the Trinity River. A Record of Decision now requires operation of the facilities to account for water year type. Since 2004 there are now five annual operating scenarios for the Trinity River Diversion - extremely wet year, wet year, normal year, dry year, and critically dry year. The volume of water exported from the Trinity River into the Sacramento River Basin varied during the study period from no flow to as high as 3,378 cubic feet per second (cfs). During the study period the amount of water transferred into the Sacramento River basin ranged from 245,000 acre-feet annually (2016) to over 654,000 acre-feet annually (2017), and averaged nearly 444,000 acre-feet annually. This was 25 percent lower than during the last study period, which averaged 600,000 acre-feet annually. It should also be noted that although there are low flows provided throughout the year, the most significant contributions during the study period occurred between June and October.

Trinity River watershed is very rural with minimal historic contamination risk (limited grazing, recreation, and historical mining). The water quality is considered very high quality with no major concerns on this fork. Similar to the previous watershed sanitary surveys, the study area has been largely limited to downstream of the major reservoirs, including Whiskeytown Reservoir, and for this reason no discussions are related to this imported water source.

Upper watershed land uses include recreation, timber harvesting, mining, agriculture in mountain meadows, and rangeland livestock grazing.

The Sacramento Valley

The Sacramento Valley is a flat-floored, northwest trending trough filled with sedimentary deposits. Elevation in the valley ranges from about 20 feet at the south end of the valley to 470 feet in Redding, at the north end of the valley. Agricultural crops have replaced much of the native vegetation in the valley. There are some areas of preserved or re-created riparian vegetation, native grasslands, and wetlands.

Irrigated agriculture is the primary land use in the Sacramento Valley, and rice is the largest single crop grown. There are also orchards along some of the river corridors and various row and grain crops. Other land uses include livestock grazing on pastureland and other livestock operations such as dairies.

The largest population center is around Sacramento, although growth is occurring throughout the watershed centered on smaller urban centers. The southeastern portion of the Sacramento Valley, between Lincoln and Oroville, continues to see significant population growth. There is considerable use of the river system for recreation.

The Sacramento Metropolitan Area

The Sacramento metropolitan area is a developed urban area that lies at an elevation of about 20 to 40 feet above sea level. Both banks of the river are fully levied and most drainage is pumped into the river.

The left bank is the City of Sacramento urban area. There have been few changes since this was a heavily developed urban area previously. The contributory area consists of two distinct and separate drainage systems. The combined sewer system (CSS) serves downtown, Land Park and east Sacramento, and collects both urban runoff and wastewater in a single collection system. Typically this is routed to the Sacramento Regional County Sanitation District (Regional San) Regional Wastewater Treatment Plant (Regional Plant) for treatment. If a storm event exceeds the conveyance capacity to the Regional Plant, the CSS system is designed to store some excess volume. If storage is exceeded, the City of Sacramento has two primary treatment plants with disinfection that can discharge to the Sacramento River. During extreme high volume events that exceed conveyance, storage, and treatment capacities, raw wastewater discharges from the CSS into the Sacramento River can occur. The stormwater system is a separate system containing urban runoff, located north, south, and east of the downtown area. Typically, urban runoff is collected through pipelines, creeks, and canals, sent to sumps, and then discharged to either the Sacramento or American rivers.

The right bank is the City of West Sacramento urban area. Although there have been significant changes in land use over the past two decades as growth has occurred, the contributory area is limited due to topography. The drainage to the Sacramento River only includes urban runoff from two small drainage basins within the City of West Sacramento limits, Raley and Lighthouse pump stations. Similar to the City of Sacramento, urban runoff is collected through pipelines, creeks, sent to sumps, and then discharged to the Sacramento River.

There are several marinas and parks located within the levee that have recreation associated with them, primarily non-body contact.

The Protection Zones

In the 2000 Update, the protection zones for GKWTP and SRWTP were formally defined. In the Second Update near-intake zones were defined for the potential future RiverArc Project and FRWA Intake diversion locations. In the 2010 Update the near intake zone for the proposed WDCWA diversion, now the RWTF, was defined. The protection zone provides the focus for the source water quality review and the watershed contaminant sources review. Contaminants added to the river further upstream on the valley floor may be mitigated by distance (due to fate and transport factors) and dilution. In the upper watershed, above the major reservoirs, contaminants are mitigated by reservoir settling and residence time as well as distance and dilution. Contaminants added in or near the protection zones have less opportunity for mitigation and may be of higher concern at the water treatment plants. There is less time for the water treatment plants to respond to spills in the protection zone than spills that occur further upstream.

The protection zones for the potential future RiverArc Project diversion, RWTF, GKWTP, SRWTP, and FRWA Intake diversion are described in **Table 2-1**.

Table 2-1
Protection Zones

Water Treatment Plant Or Diversion Location	Protection Zone
Potential Future RiverArc Project Diversion (River Mile 75)	Sacramento River: The area within the levees on the Sacramento River from the diversion locations to River Mile 85. Feather River: The area within the levees on the Feather River from the confluence with the Sacramento River to River Mile 5.
Regional WTF (River Mile 70.5)	Sacramento River: The area within the levees on the Sacramento River from the diversion location to River Mile 82. Feather River: The area within the levees on the Feather River from the confluence with the Sacramento River to River Mile 2.
George Kristoff WTP (River Mile 62.5)	The area within the levees on the Sacramento River from the GKWTP to the confluence with the Feather River at River Mile 80.
Sacramento River WTP (River Mile 60)	Sacramento River: The area within the levees on the Sacramento River from the SRWTP to the confluence with the Feather River at River Mile 80. American River: The area within the levees on the American River from the confluence with the Sacramento River to Folsom Dam.
FRWA Intake Diversion (River Mile 47)	Sacramento River: The area within the levees on the Sacramento River from the diversion site to the confluence with the Feather River at River Mile 80. American River: The area within the levees on the American River from the confluence with the Sacramento River to Folsom Dam.

Note: discharges conveyed through the levees include urban runoff and agricultural drains. These discharges are evaluated as watershed contaminant sources.

THE WATER SUPPLY SYSTEMS

A brief discussion of the water supply systems for each diversion location is presented below. The major modifications completed in the past five years are highlighted.

Potential Future RiverArc Project Diversion

The potential future RiverArc Project is a multi-agency project to enhance water supply and reliability for the region. The potential future RiverArc Project diversion and water treatment facility would provide additional treated water from the Sacramento River to PCWA and the City of Sacramento, as well as potentially several other local water agencies. Diversions from the Sacramento River are planned to occur through the

Natomas Mutual Water Company's existing (NMWC) Pritchard Lake intake, located near River Mile 75. Diversions will occur in wet years to offset water currently diverted from the American River and will also recharge groundwater basins directly or in-lieu (by using surface water instead of pumping groundwater). Raw water will be transported east through a new pipeline to a new water treatment plant, and treated water will be distributed through new and existing pipelines to local water agencies.

As of the writing of this 2020 Update report, the projected start date for Phase 1 is expected to be in 2025. Phase 1 (2025 to 2035) consists of upgrading the NMWC diversion facility, a 72 inch raw water pipeline, a 30 million gallons per day (mgd) water treatment plant, and a 60 to 72 inch treated water pipeline. Phase 2 (2035 to 2045) would upgrade the water treatment plant to 55 mgd and would also include additional treated water pipelines. Phase 3 (2045 to 2055) would complete the regional water bank infrastructure that provides a statewide benefit.

Regional Water Treatment Facility

The new RWTF provides treated water from the Sacramento River to the cities of Woodland and Davis, as well as the University of California at Davis (UC Davis). This diversion is located just north of the Interstate 5 Bridge (Veterans Bridge) crossing near River Mile 70.5. The RWTF was operational in July 2016.

The water treatment facility is a conventional filtration plant with an initial capacity of 30 mgd. It can be expanded up to 34 mgd. The City of Woodland will receive up to 18 mgd and the City of Davis and UC Davis will collectively receive up to 12 mgd. The RWTF is designed to provide at least 3-log *Giardia,* 4-log virus, and 2-log *Cryptosporidium* reduction.

The RWTF is a conventional water treatment plant employing Actiflo® ballasted flocculation. Ferric chloride is used as the primary coagulant. The water is then routed to an ozone chamber, and then to the five dual media filters with sand and granular activated carbon (GAC). Chlorine is used as the residual disinfectant. The finished water pump station has different pH, orthophosphate concentration, and chlorine residual for the Cities of Davis and Woodland.

George Kristoff Water Treatment Plant

The GKWTP was constructed in 1988 as a conventional plant with a capacity of 24 mgd. In 2003, the plant underwent major expansion efforts that resulted in new process selection and an increase in capacity to 58 mgd. This included installation of Actiflo® for pretreatment and eight new deep-bed GAC filters. Information on the plant's design, operations, intake, chemical additions, and unit processes were obtained using an agency survey. The GKWTP provides 3-log *Giardia,* 4-log virus, and 2-log *Cryptosporidium* reduction through the conventional treatment removal credit and inactivation by maintaining a free chlorine residual necessary to achieve the overall reduction required.

The plant operates on a twenty-four hour basis, twelve months per year. The plant intake is located on the Sacramento River upstream of the American River confluence at River Mile 62.5. The intake structure and water treatment plant are gated, and access is restricted. Emergency situations within the plant are programmed into and monitored by the plant control system. An alarm system alerts plant staff. The plant has backup equipment and standby power.

Between 2015 and 2019 the only significant change at the GKWTP was the conversion from chlorine gas to sodium hypochlorite for disinfection.

Sacramento River Water Treatment Plant

The SRWTP was constructed in 1924 and has since undergone several upgrade projects. In 2003, a new intake facility was constructed and the SRWTP was expanded to increase capacity. The replacement intake structure is located approximately 1,000 feet south of the previous intake structure and is located further out in the river channel. The SRWTP has a permitted capacity of 160 mgd, but only had a sustainable capacity of 135 mgd due to hydraulics limitations. A rehabilitation construction project was completed in 2016 to bring the plant capacity to the permitted capacity of 160 mgd. The SRWTP has four separate but identical process basins. Basins 1 and 2 were built in 2003 and Basins 3 and 4 were built in 2016. Information on the plant's design, operations, intake, chemical additions, and unit processes were obtained using an agency survey. The SRWTP provides 3-log *Giardia,* 4-log virus, and 2-log *Cryptosporidium* reduction through the conventional treatment removal credit and inactivation by maintaining a free chlorine residual necessary to achieve the overall reduction required.

The plant operates on a continuous basis throughout the year, but is shut down periodically in the winter months for maintenance and repairs. The plant intake is located on the Sacramento River downstream of the American River confluence at River Mile 60. The water at the existing intake is, therefore, a mixture of Sacramento and American River water with the ratio varying considerably depending on river flows. The intake structure and plant are gated and access is restricted. Emergency situations within the plant are alarmed to the plant supervisory control and data acquisition (SCADA) system, which is monitored by the operators. The plant has backup equipment, including standby power and spare equipment.

Between 2015 and 2019, a major rehabilitation construction project was completed in 2016. As a result, there are now four identical treatment basins with a total design capacity of 160 mgd. In addition, the following modifications were made.

- Updated the sludge dewatering process by adding three centrifuge pumps and related equipment to help expedite sludge drying and removal.
- Replaced the High Service Pump Station.

- Installed eight new filters to replace 16 filters that were built in the 1920's and 1930's.
- Added vortex breakers to the intake structure to help reduce pump cavitation during low river levels.

FRWA Intake Diversion

FRWA is a joint-powers authority formed by the Sacramento County Water Agency (SCWA) and the East Bay Municipal Utility District (EBMUD) to operate an untreated water delivery system from the Sacramento River at Freeport. FRWA has a 185 mgd intake at River Mile 47. There have been no significant changes to the FRWA Intake since the 2015 Update.

SCWA can receive up to 100 mgd at its Vineyard Surface Water Treatment Plant (VSWTP), located at an 80-acre site at the intersection of Florin Road and Knox Road, 13.5 miles of pipeline from the intake. The VSWTP has a permitted capacity of 60 mgd, with provisions for expansion to 100 mgd. This facility has been designed to provide 3-log *Giardia,* 4-log virus, and 2-log *Cryptosporidium* reduction through the conventional treatment (flocculation/sedimentation and dual media filtration) removal credit and inactivation by maintaining a free chlorine residual necessary to achieve the overall reduction required. The facility was operational in September 2011. The facility is operated based on SCWA system demands, which typically means that the VSWTP is off-line in December and January due to lower demands. There have been no significant changes to the VSWTP since the 2015 Update.

EBMUD receives up to 100 mgd of untreated water at the Folsom South Canal (FSC), approximately 17 miles from the intake as a supplemental water supply during drought conditions. The amount of water diverted varies throughout the year, and depends on water availability. EBMUD pumps the equivalent volume of water out of the FSC near the terminus, approximately 12 miles downstream, for discharge into the Mokelumne Aqueducts. EBMUD blends this water into its raw water supply system in its Bay Area terminal reservoirs for treatment at its surface water treatment plants. In 2015, EBMUD received approval from the State Water Resources Control Board, Division of Drinking Water to utilize the Sacramento River source differently than originally approved. From August to December 2015, EBMUD was allowed to store the water in more terminal reservoirs and use it for direct application at several of their Bay Area in-line water treatment plants.

This section provides a brief regulatory context, an overall review of the Sacramento River water quality data available within the focus area of this study, and a detailed review of selected constituents of interest. The focus area includes the Sacramento River from the Feather River confluence to Freeport and the American River at the confluence with the Sacramento River. Primarily, this data review includes all of the source (raw) water data collected by the participating water agencies. In addition to those data sets, the California Department of Water Resources Sacramento Watershed Coordinated Monitoring Program (CDWR CMP), the Central Valley Regional Water Quality Control Board (Regional Board) Recreational Beneficial Use Study, and the Delta Regional Monitoring Pathogen Study had relevant ambient water quality data in the study area and study period. The review of the constituents of interest includes an explanation for their selection and a summary of the data obtained for the study period, which is 2015 through 2019.

For assistance with abbreviations and acronyms, the reader is referred to the List of Abbreviations at the front of the Report.

REGULATORY CONTEXT

Appendix B provides the detailed Regulatory Framework used as the basis for evaluation and contains a summary of each of the contaminants currently regulated in drinking water by both the United States Environmental Protection Agency (USEPA) and the State Water Resources Control Board, Division of Drinking Water (DDW).

Drinking water regulations cover a wide variety of topics. Since the watershed sanitary survey focuses on source water quality and treatment compliance, the regulations discussed and utilized in this evaluation are those focused on drinking water quality compliance. This includes existing regulations and programs that evaluate constituents for potential future regulatory determination, such as the Contaminant Candidate Lists and Unregulated Contaminant Monitoring Rules. Anticipated regulations were limited to those currently in development and projected to be implemented within the next five years. A review of these regulations, in coordination with knowledge of watershed contaminant sources and historical source water quality, was used to identify the constituents of interest to be included in the detailed review.

OVERALL WATER QUALITY REVIEW

The review of overall water quality is largely based on comparison of the participating water agencies' intake water (also called raw water) to drinking water standards for the constituents currently regulated in California. This includes all constituents with primary and secondary Maximum Contaminant Levels (MCLs) and unregulated constituents that have Notification Levels or Archived Advisory Levels. In general, it is assumed that if the raw water is below these limits, then the treated water (also called finished water) will also be below these limits. The point of compliance for MCLs, Notification Levels, and Archived Advisory Levels varies based on the specific regulation, but many are based on treated water sample results.

Overall, the Sacramento River provides good quality raw water. The raw water can currently be treated to meet all drinking water standards using conventional filtration processes. There are no long-term constituent trends prevalent in the raw water that necessitates implementation of special treatment processes at this time. The individual water treatment plant intake evaluations for treated water and regulatory compliance are presented in **Section 5**.

Table 3-1 shows the participating water agencies and ambient monitoring programs for which 2015 through 2019 data was collected for this review. The frequency of data collection varies by constituent and monitoring program. **Figure 3-1** provides a schematic of the approximate location of the monitoring sites. **Appendix C** contains a summary of the data provided by each of the participating water agencies.

The CDWR CMP is a coordinated monitoring effort, for selected constituents, between the DWR Northern District and the Regional Board. This program began monitoring in November 2008. However, DWR has monitored water quality at sites in the Northern Sacramento River Watershed since its formation in 1956. The purpose of the CDWR CMP is to implement comprehensive statewide water quality monitoring, which is conducted quarterly. The primary objective is to provide information to the State Water Resources Control Board (State Board) and Regional Board to enable effective management of the State's water resources. The CDWR CMP focuses primarily on sites along the Sacramento River above the Feather River confluence; however, there are one or two sites at or below this point, depending on constituent. The nine sites of interest from this study are shown in **Figure 3-1**. Data summary tables were not made for the CDWR CMP since relevant data focused on total organic carbon (TOC), trace metals, and *Escherichia coli* (*E. coli),* which will be discussed under selected constituent review.

The Delta Regional Monitoring Program (RMP) Pathogen Study was conducted from April 2015 to March 2017. Pathogen study results will be discussed in the *Cryptosporidium* and *Giardia* section later.

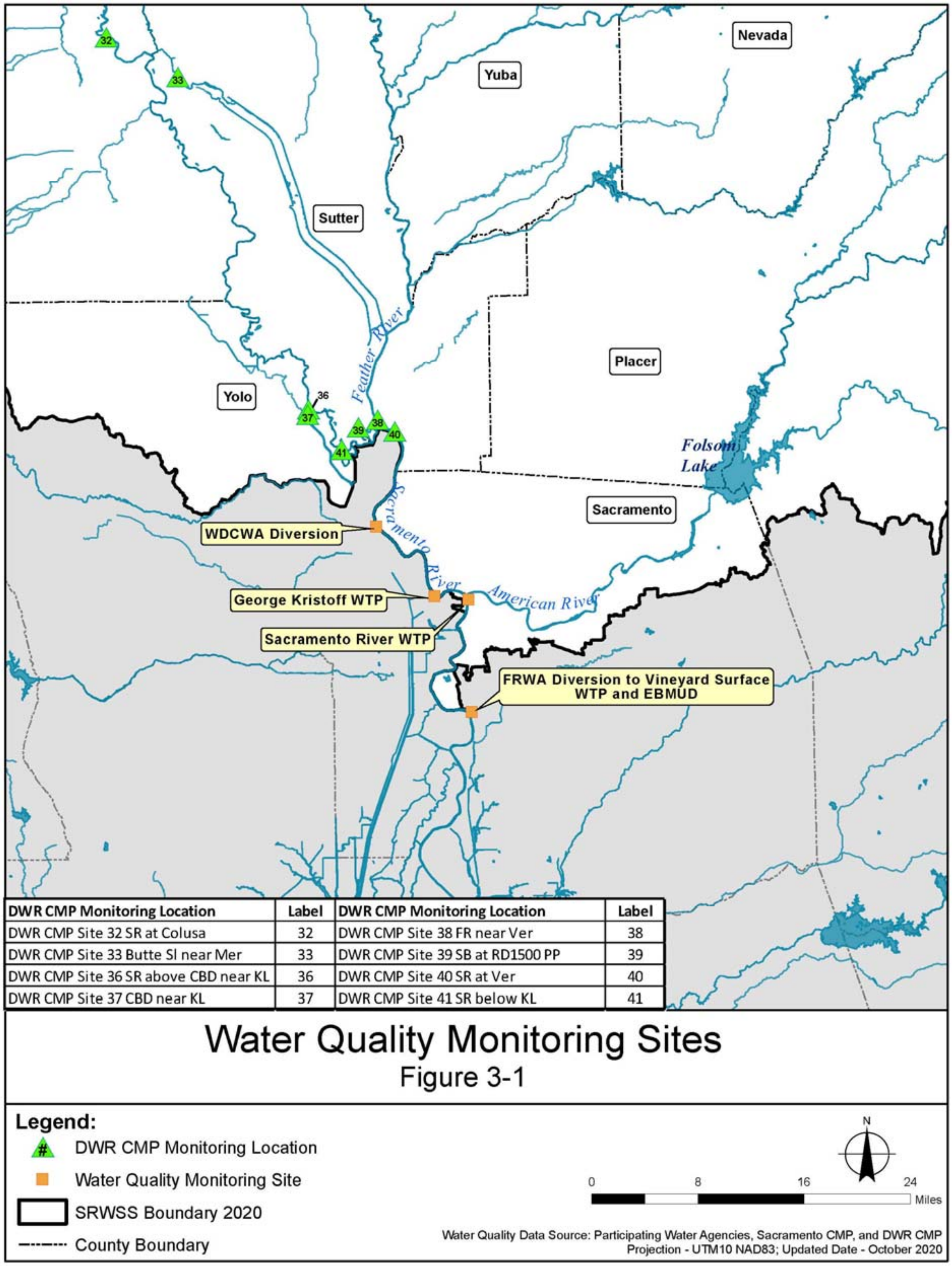
A Recreational Beneficial Use Assessment was conducted by the Regional Board during the summer of 2018. *E. coli* samples were collected from 11 sites on the Lower Sacramento River and two sites on the Lower American River to determine if the USEPA Recreational Water Quality Criterion is being met. *E. coli* results will be discussed in the section later.

In all data reviews, samples reported as non-detect (ND) were considered to be zero for statistical evaluations. Any calculated average or median less than the reporting limit is shown as ND, or less than the reporting limit.

Table 3-1
Summary of Water Quality Data Sources

Agency	Data Collected	Sampling Location	Period of Record
Woodland-Davis Clean Water Agency (WDCWA)	Title 22 Regulated and Unregulated Constituents, Turbidity, Total Organic Carbon (TOC), *Escherichia coli* (*E. coli*)	Sacramento River – Regional Water Treatment Facility (RWTF)	June 2016-2019
City of West Sacramento	Title 22 Regulated and Unregulated Constituents, Turbidity, TOC, *E. coli*, *Giardia*, *Cryptosporidium,* Rice Pesticides	Sacramento River – George Kristoff Water Treatment Plant (GKWTP)	2015-2019
City of Sacramento	Title 22 Regulated and Unregulated Constituents, Turbidity, TOC, *E. coli*, *Giardia*, *Cryptosporidium,* Rice Pesticides, Per- and polyfluoroalkyl substances (PFAS)	Sacramento River – Sacramento River Water Treatment Plant (SRWTP)	2015-2019
Freeport Regional Water Authority (FRWA) – Sacramento County Water Agency (SCWA)	Title 22 Regulated and Unregulated Constituents, Turbidity, TOC, DBPs, *E. coli*, *Giardia*, *Cryptosporidium,* PFAS	Sacramento River – FRWA Intake Diversion for all constituents except turbidity which is sampled at Vineyard Surface Water Treatment Plant (VSWTP)	2015-2019
East Bay Municipal Utility District (EBMUD)	Aluminum, Iron, Manganese, TOC, *E. coli*, Turbidity, *Giardia*, *Cryptosporidium,* Thiobencarb	FRWA Intake Diversion	2015-2019
	Aluminum, Iron, Manganese, *E. coli*	Clay Station Pumping Plant (PP)	April–December 2015
	Aluminum, Iron, Manganese, TOC, Turbidity	Lafayette 1 Aqueduct	May 6, 2015
Sacramento Watershed Coordinated Monitoring Program (CDWR CMP)	Inorganics, TOC, *E. coli*	Sacramento River from Balls Ferry to Verona	2015-2017
Delta Regional Monitoring Program Pathogen Study	*Cryptosporidium* and *Giardia*	Colusa Basin Ag Drain and Westin Boat Dock	April 2015-March 2017
Recreational Beneficial Use Assessment – Lower Sacramento River Watershed	*E. coli*	Various Sites in Lower Sacramento River	Summer 2018

Figure 3-1. Water Quality Monitoring Sites



DWR CMP Monitoring Location	Label	DWR CMP Monitoring Location	Label
DWR CMP Site 32 SR at Colusa	32	DWR CMP Site 38 FR near Ver	38
DWR CMP Site 33 Butte Sl near Mer	33	DWR CMP Site 39 SB at RD1500 PP	39
DWR CMP Site 36 SR above CBD near KL	36	DWR CMP Site 40 SR at Ver	40
DWR CMP Site 37 CBD near KL	37	DWR CMP Site 41 SR below KL	41

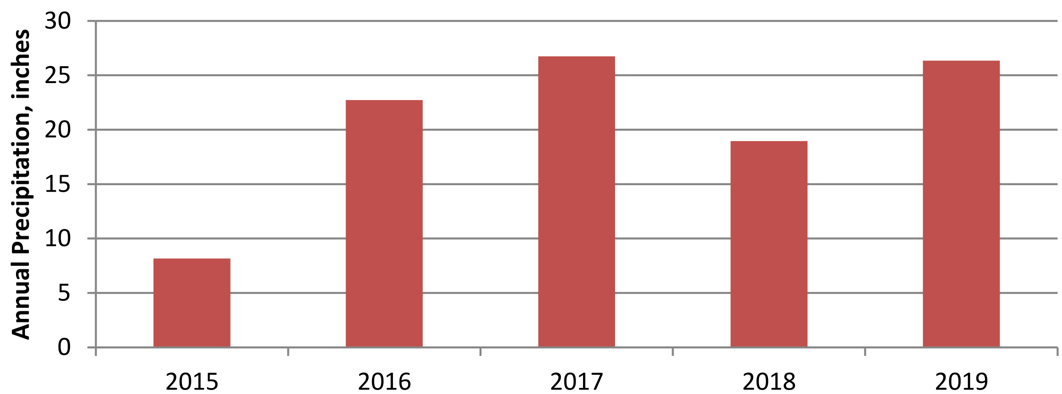
Water Quality Monitoring Sites
Figure 3-1

Significant Watershed Conditions of Interest

Drought

The drought from the previous watershed sanitary survey update period continued in 2015, with it being considered a critical water year. 2016 and 2018 were considered below normal water years, while 2017 and 2019 were both considered wet years. **Figure 3-2** presents the annual precipitation at the California Data Exchange Center (CDEC) California State University (CSU) station in Sacramento.

Figure 3-2. Annual Precipitation at CSU, inches



The extended drought resulted in very low reservoir storage for 2015 through 2017, further exacerbating low river flow conditions and contributing to degraded source water quality.

Oroville Spillway Failure

Heavy rainfall and high inflow into Lake Oroville necessitated the use of the main spillway in February 2017. After putting the main spillway into operation, erosion was observed and the main spillway was considerably damaged by February 7, 2017. On February 11, water began to overflow the emergency spillway as well. Repairs were made by placing rocks and concrete under the emergency spillway weir to repair erosion damage, and flow subsided by February 13, 2017. Due to this high flow event, turbidity and TOC data are examined at the GKWTP and SRWTP for any impacts.

Participating Water Agency Intake Data

Selected data from the four existing intakes; WDCWA's RWTF, City of West Sacramento's GKWTP, City of Sacramento's SRWTP, and the FRWA Intake Diversion for SCWA's VSWTP, has been summarized and is included in the summary tables below. **Tables 3-2** through **3-5**, show the summary statistics for each selected constituent. **Table 3-6** shows the annual monitoring conducted by EBMUD at the FRWA Intake. **Table 3-7** shows the weekly monitoring conducted at EBMUD's Clay Station PP during the nine months (April through December) in 2015 that EBMUD was taking water from the Folsom South Canal (FSC). Water quality samples were also taken at EBMUD's Lafayette 1 Aqueduct on May 6, 2015, as shown in **Table 3-8.**

Table 3-2
Raw Water Quality Summary for Selected Constituents
Woodland Davis Clean Water Agency – RWTF, 2016-2019

Parameter	Units	Minimum	Maximum	Average	Median	95th Percentile
Turbidity	NTU	5.8	74.2	21.0	14.8	51.1
E. coli	MPN/100mL	1	613	40	10.9	127.8
TOC	mg/L	1.1	3.7	1.8	1.8	3.3
Alkalinity	mg/L-CaCO3	45	93	66.2	64	86

Table 3-3
Raw Water Quality Summary for Selected Constituents
City of West Sacramento – GKWTP, 2015-2019

Parameter	Units	Minimum	Maximum	Average	Median	95th Percentile
Turbidity[1]	NTU	4.4	95.8	23.2	15.8	71.1
E. coli	MPN/100mL	<1	579	27.3	6.3	104.6
Thiobencarb[2]	µg/L	<0.2	0.13	<0.2	<0.2	<0.2
TOC	mg/L	0.7	4.7	2.0	1.7	4.2
Alkalinity	mg/L-CaCO3	28	89	59.3	57.5	83.1
Aluminum	µg/L	60	1,900	423	278	1,101
Iron	µg/L	140	3,700	824	400	2,935

[1] Monthly average was used for statistic
[2] Data presented from special rice season monitoring program

Table 3-4
Raw Water Quality Summary for Selected Constituents
City of Sacramento – SRWTP, 2015-2019

Parameter	Units	Minimum	Maximum	Average	Median	95th Percentile
Turbidity[1]	NTU	3.4	85.6	14.8	8.6	46.8
E. coli	MPN/100mL	2	1,414	60.6	12.6	310.5
Thiobencarb[2]	µg/L	<0.2	0.12	<0.2	<0.2	<0.2
TOC	mg/L	1.2	3.9	1.9	1.8	3.4
Alkalinity	mg/L-CaCO3	28	71	49	49.5	67.9
Aluminum	µg/L	<50	7,532	458.5	210.9	2,180
Iron	µg/L	105.7	13,847	684.5	317.5	2,419.1

[1] Monthly average was used for statistics
[2] Data presented from special rice season monitoring program

Table 3-5
Raw Water Quality Summary for Selected Constituents
FRWA Intake - VSWTP, 2015-2019

Parameter	Units	Minimum	Maximum	Average	Median	95th Percentile
Turbidity[1]	NTU	2.6	61.2	13.8	10.6	32.9
E. coli	MPN/100mL	ND	4,600	119.3	20	700
TOC	mg/L	1.2	2.8	1.7	1.6	2.7
Alkalinity	mg/L-CaCO3	35	81	56.9	53	80
Aluminum	µg/L	66	800	314.4	120	738
Iron	µg/L	130	1,200	502	230	1,120

[1] Sample from VSWTP Influent, monthly average was used for statistics

Table 3-6
Raw Water Quality Summary for Selected Constituents
EBMUD at FRWA Intake, 2015-2019

Parameter	Units	Number of Samples	Minimum	Maximum	Average	Median
Turbidity	NTU	5	4.4	17	8.9	7.7
E. coli	MPN/100mL	9	7.8	800	120.9	33
TOC	mg/L	5	1.5	1.7	1.6	1.6
Aluminum	µg/L	5	366	1,330	651	587
Iron	µg/L	5	331	1,340	768.6	716
Manganese	µg/L	5	18.2	35.8	25.1	23.9
Thiobencarb	µg/L	6	0.028	0.064	0.026	0.018

Table 3-7
Raw Water Quality Summary for Selected Constituents
EBMUD at Clay Station PP, April to December 2015

Parameter	Units	Number of Samples	Minimum	Maximum	Average	Median
E. coli	MPN/100mL	37	<10	110	19.5	10
Aluminum	µg/L	33	7.3	271	38	15.7
Iron	µg/L	33	23.1	381	57	35.1
Manganese	µg/L	33	2.7	41.6	11.5	11

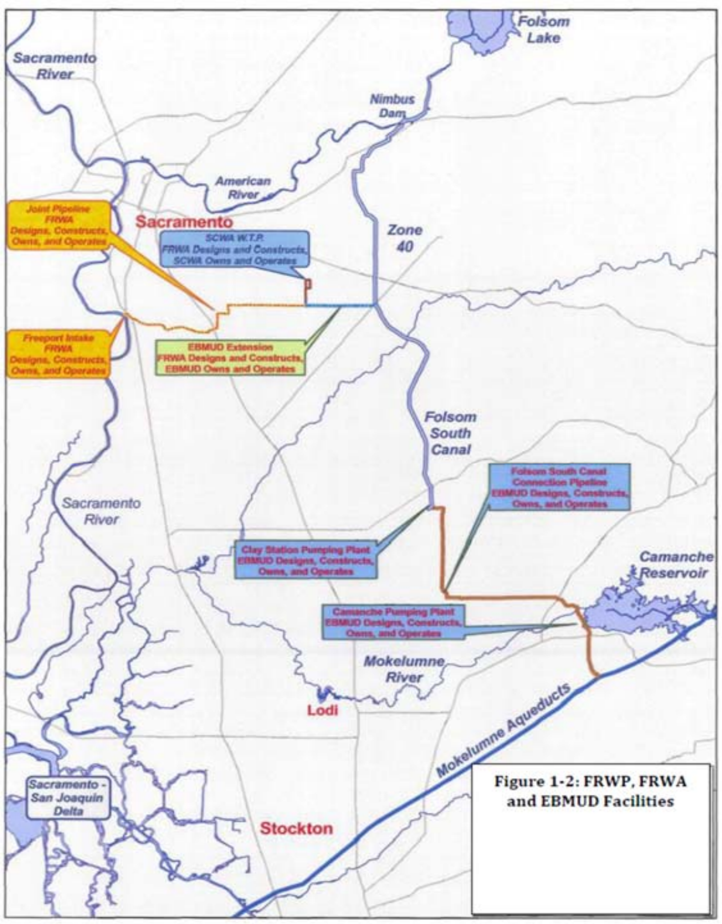
Table 3-8
Raw Water Quality Summary for Selected Constituents
EBMUD at Lafayette 1 Aqueduct, 2015

Parameter	Units	Lafayette Aqueduct 5/6/2015
Turbidity	NTU	1.7
TOC	mg/L	1.8
Aluminum	µg/L	68.5
Iron	µg/L	84.9
Manganese	µg/L	18.4

As shown in **Figure 3-3,** the Clay Station PP is located at the terminus of the Folsom South Canal. The Clay Station PP lifts water from the Folsom South Canal into the Folsom South Canal Connection (FSCC) Pipeline. The Camanche Pumping Plant lifts water from the FSCC pipeline into the three Mokelumne Aqueducts. Mokelumne 1 and 2 Aqueducts join to become Lafayette 1 Aqueduct. (Mokelumne 3 Aqueduct becomes Lafayette 2 Aqueduct). It was confirmed that Sacramento River water via the FSCC was delivered to EBMUD through Mokelumne Aqueducts 1 and 2 from April 15 to October 12, 2015. Sacramento River water via the FSCC was also delivered to EBMUD through Mokelumne 3 Aqueduct from October 23, 2015 to December 21, 2015.

Additionally, it is important to keep in mind that water at the Clay Station PP and Lafayette 1 Aqueduct is not entirely representative of Sacramento River water. In addition to the substantial settling of particulates and natural die-off of coliform that occurs through the transmission pipelines to the Folsom South Canal, the water is then blended with the American River water that is in the FSC and then again with the water in the Mokelumne Aqueducts. According to EBMUD, turbidity is typically reduced by 80 to 95 percent and coliform concentration decreased by one order of magnitude between the Sacramento River and Clay Station PP (April 1, 2016 letter from EBMUD to Robert Brownwood, DDW).

Figure 3-3. EBMUD Facilities



SELECTED CONSTITUENT REVIEW

This section contains a general discussion of selected water quality constituents and the reasons why they were selected for further evaluation. The constituents selected for further review in this section include turbidity, microbiological constituents (*E. coli*, *Cryptosporidium*, *Giardia*), TOC, detectable volatile organic compounds (VOCs) and synthetic organic compounds (SOCs), PFAS, and other detectable Title 22 inorganic constituents of interest (iron, aluminum, and manganese). The constituents' general characteristics, seasonal and historical trends, and significance with respect to existing and potential future regulations are presented, along with data analysis and review. Additional evaluation of these constituents, with respect to treated water quality and regulatory compliance, is presented in **Section 5**.

The constituents selected for further review were selected based on several criteria including existing or upcoming regulatory standards, critical operational evaluation parameters, and relevance to significant potential contaminating activities. These items are discussed in the background section for each constituent. **Table 3-9** shows the relationship between potential contaminating activities and water quality constituents.

Table 3-9
Relationship Between Potential Contaminating Activities and Water Quality

Activity	Turbidity	Microbiological Constituents	TOC	VOCs/ SOCs	Aluminum/ Iron/ Manganese
Agricultural Drainage	√	√	√	√	√
Livestock	√	√	√		
Forest Activities	√	√	√	√	√
River Corridor and River Recreation	√	√	√	√	
Stormwater and Urban Runoff	√	√	√	√	√
Industrial NPDES Dischargers				√	√
Wastewater	√	√	√	√	√
Watershed Spills	√	√	√	√	

Turbidity

General Characteristics and Background

Turbidity is the measurement of light scatter in water and provides a measure of the degradation of clarity in water. Clarity is typically degraded by suspended colloids and fine suspended solids such as clay, organic particulates, and microorganisms such as *Giardia* and *Cryptosporidium*, if present. Turbidity is measured to evaluate the efficiency of the treatment process at removing these particles and also to comply with regulatory requirements.

Turbidity was selected for further evaluation since most utilities optimize pretreatment processes to maximize turbidity removal in order to reduce the potential for pathogens, such as *Giardia* and *Cryptosporidium*, in treated drinking water. Turbidity is monitored throughout each of the water treatment plants to ensure that particles are removed. Turbidity has been assumed to be an indicator for the presence of *Giardia* and C*ryptosporidium*. However, turbidity alone may be a poor predictor of microbiological quality.

Current drinking water regulations require that the combined filtered effluent be less than 0.3 nephelometric turbidity units (NTU) in 95 percent of measurements and that the turbidity never exceed 1 NTU. Continuous turbidity monitoring for individual filters is required, and performance triggers exist for them. Turbidity has also been indirectly regulated in drinking water as part of the Filter Backwash Rule. This rule requires that recycled waste streams return to the plant headworks upstream of all chemical feed systems and recommends return at a controlled, small percentage of total flow (less than 10 percent) to ensure that chemical feed is adjusted for blended water quality, including potential increases in turbidity caused by recycle streams.

High turbidity levels in surface water sources, such as rivers and lakes, are typically the result of erosion and sediment transport during precipitation and high flow events, and are undesirable because high turbidity can mask the presence of harmful pathogens. The principal source of turbidity is general watershed runoff, and can also be contributed by other potential contaminating activities such as agricultural drainage, urban runoff, and wastewater, if not properly managed. It is common for turbidities to vary seasonally as a result of precipitation and flow. It has also been found that the presence of suspended matter can interfere with disinfection of microorganisms.

Evaluation

Turbidity has been selected for evaluation not only because it is a regulated constituent, but also because it is commonly used as an indicator of general water quality and overall plant performance. The raw water range, average, and median have been summarized for each water treatment plant in **Table 3-10**. **Section 5** includes graphs for raw, settled, and treated water turbidity over time for each water treatment plant.

For GKWTP, SRWTP, and VSWTP, monthly averages of the peak daily raw water turbidities were calculated. Monthly averages for RWTF were calculated from the daily median raw water turbidity. Based on the monthly averages of daily data, the median raw water turbidities at RWTF, GKWTP, SRWTP, and VSWTP were 14.8, 15.8, 8.6, and 10.6 NTU, respectively. Monthly average raw water turbidity levels at RWTF was 10 NTU or less 21 percent of the time, GKWTP was 10 NTU or less 30 percent of the time, SRWTP was 10 NTU or less 65 percent of the time, and VSWTP was 10 NTU or less 42 percent of the time.

Table 3-10
Raw Water Turbidity Summary Statistics, NTU, 2015-2019

Monitoring Site	Range	Average	Median
RWTF[1]	5.8 – 74.2	21.0	14.8
GKWTP	4.4 – 95.8	23.2	15.8
SRWTP	3.4 – 85.6	14.8	8.6
VSWTP	2.6 – 61.2	13.8	10.6

[1] Data from July 2016 to December 2019

It is typical for turbidity levels in the Lower American River to be lower than those in the Sacramento River, due to the low turbidities coming out of Folsom Dam. Since the SRWTP is just downstream of the confluence of the two river systems, the water treatment plant diverts water that may not be fully mixed with the Sacramento River making the SRWTP turbidity levels lower than the GKWTP and RWTF levels upstream.

The VSWTP influent sample is collected at the end of the 13 mile pipeline transporting water from the FRWA Intake on the Sacramento River to the VSWTP, and turbidities at the VSWTP influent are lower than at the FRWA intake due to substantial sedimentation in the pipeline.

Time-series plots were developed for daily raw water turbidity and Sacramento River flow over the reporting period for GKWTP and SRWTP (**Figure 3-4**). This figure shows that there is a correlation between river flow and raw water turbidity, therefore supporting the finding that turbidity levels in the river increase during the wet season (late fall to early spring). **Figure 3-4** also shows the extended period of higher flows during the spring of 2017 due to the Oroville Spillway failure. As shown in **Figure 3-3**, the peak flow at Verona reached 80,000 cubic feet per second (cfs) on February 11, 2017 and the raw water turbidity at GKWTP reached 218.3 NTU. The turbidity peak on February 11, 2017 was also short lived, as turbidity decreased to 138 NTU by the following day. Turbidity also peaked at 402 NTU on January 19, 2019, and 789 NTU on February 9, 2015. The turbidity peaks at GKWTP on these dates were likely due to generally high flow in the Sacramento River, with flows at 49,800 cfs on January 19, 2019 and 29,800 cfs on February 9, 2015 (a flash storm during an extended drought increased flow rapidly from 9,510 cfs on February 6, 2015). High turbidities in the winter of 2018 to 2019 were also likely impacted by the post-fire runoff from the Carr Fire which burned in November 2018. Over the reporting period, the highest monthly average for raw water turbidity for RWTF, GKWTP and VSWTP occurred in February 2019. SRWTP was not in service in February 2019.

In addition, raw water turbidity also peaks during high precipitation, as illustrated in **Figure 3-5**. Precipitation data was obtained for the CDEC CSU station. Generally, low precipitation in drier years (2015, 2016, 2018) results in lower turbidities and higher precipitation in wetter years (2017 and 2019) results in higher turbidities as shown in **Table 3-11.** SRWTP turbidity data was not evaluated as the plant is typically shut down during the winter and VSWTP turbidity data is collected at the plant influent, and not representative of Sacramento River conditions.

Figure 3-4. Sacramento River Flow at Verona vs. Turbidity At GKWTP and SRWTP, 2015-2019

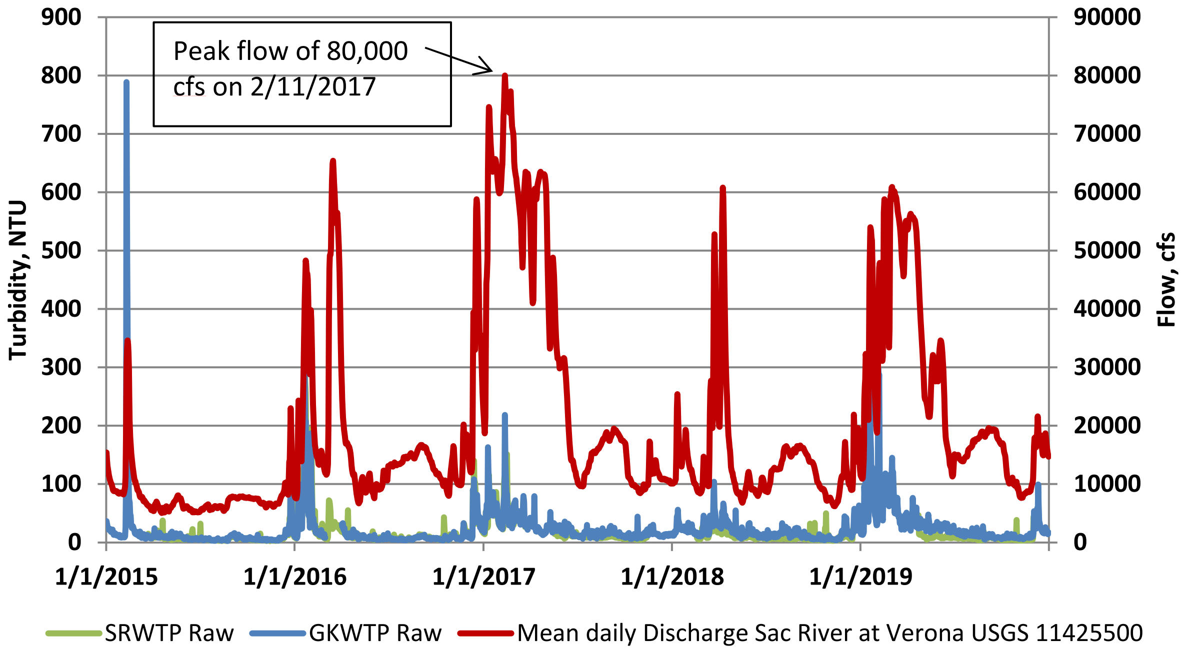
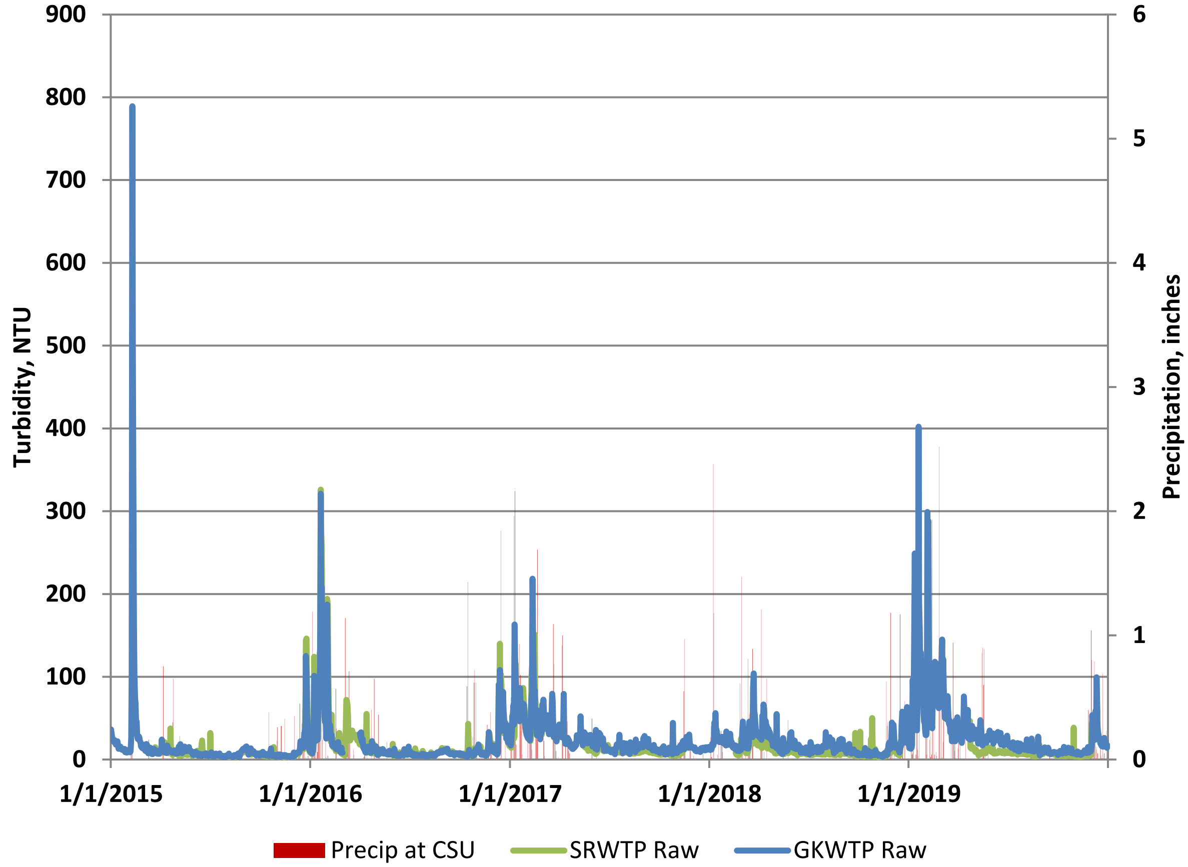


Table 3-11
Raw Water Turbidities (NTU) by Year and Water Year Classification (Sacramento Basin) for RWTF and GKWTP

	2015 Critical	2016 Below Normal	2017 Wet	2018 Below Normal	2019 Wet
RWTF	No data	13.2	21.5	16.0	29.4
GKWTP	16.9	19.3	26.6	18.7	34.3

Figure 3-5. Precipitation and Raw Water Turbidity at GKWTP and SRWTP



As shown in **Table 3-12**, a comparison of monthly average raw water turbidity from the current study period (2015 to 2019) to the previous watershed sanitary survey study periods was conducted. **Table 3-12** indicates that average and median values for WDCWA, GKWTP and FRWA increased from the previous 5 year period, while SRWTP averages and medians decreased. This decrease could be related to the influence of the Lower American River on the SRWTP.

Table 3-12
Historic and Current Raw Water Turbidity Data, NTU

Monitoring Site	Average			Median		
	2005-2009	2010-2014	2015-2019	2005-2009	2010-2014	2015-2019
WDCWA	-	17.3	21.0[3]	-	8.9	14.8[3]
GKWTP	23.6	19.4	23.2	15.2	12.3	15.8
SRWTP	17.3	16.8	14.8	11.7	10	8.6
FRWA Intake for VSWTP	11.2[1]	10.0[2]	13.8	8.8[1]	8.3[2]	10.6

[1] Data from April 2005 to January 2007
[2] Data from September 2011 to December 2014
[3] Data from July 2016 to December 2019

Summary of Results

- Median raw water turbidities (based on monthly averages of peak daily turbidity) at RWTF, GKWTP, SRWTP, and VSWTP were 14.8, 15.8, 8.6, and 10.6 NTU, respectively.
- Generally, monthly median turbidities are greater than 10 NTU for RWTF and GKWTP, and less than 10 NTU for SRWTP and VSWTP. The median turbidity levels at SRWTP are generally lower than GKWTP, due to the influence of the lower turbidity Lower American River.
- Average values are higher than median values, indicating the influence of peak turbidity value events.
- Peak raw water turbidity levels are related to high river flow, likely caused by both upstream sources (such as reservoir releases) and precipitation.
- RWTF highest monthly average was 74.2 NTU in February 2019.
- GKWTP highest monthly average was 95.8 NTU in February 2019.
- SRWTP highest monthly average was 85.6 NTU in January 2016.
- VSWTP highest monthly average was 61.2 NTU in February 2019.

Microbiological Constituents

General Characteristics and Background

The major microbiological constituents of concern include *E. coli*, *Giardia lamblia*, and *Cryptosporidium parvum*. Generally speaking, pathogenic organisms carried by mammalian species may be infectious to humans although this depends on the species of microorganism. Pathogens infecting other types of animals, such as birds and reptiles, are usually not infectious to humans. However, some types of animals, such as birds, may be vectors for human pathogens. Each of these constituents was identified for further evaluation because they are currently regulated. The presence of these constituents in the raw water governs the overall treatment requirements for the water treatment plants, though detected pathogens and pathogen indicators may not be capable of infecting humans.

Fecal coliform and *E. coli* have been used to indicate the potential presence of pathogenic microorganisms in source waters. Although coliform levels do not correlate well with pathogenic microorganisms, they continue to be used as indicators due to the lack of affordable and reliable direct analytical methods for detecting pathogens. Potential sources of coliform bacteria in the Sacramento River watershed include general watershed runoff, agricultural drainage, livestock, recreation, wastewater, urban runoff, homeless populations, and watershed spills. Coliform levels in treated water are currently regulated directly through the Total Coliform Rule, to ensure the effectiveness of the disinfection process throughout the distribution system. Treated water is discussed in **Section 5**.

Giardia lamblia is a species of the protozoa genus *Giardia* that infects humans and can cause the gastrointestinal disease giardiasis. *Giardia* is found in the environment as a cyst from the feces of humans and animals; both wild and domestic animals may be hosts. Sources close to waterbodies have the most potential to introduce viable cysts to the source water. Cysts may be destroyed naturally in the environment by desiccation and/or heat. The cysts are effectively inactivated using chlorine disinfection. The detectability of *Giardia* has been greatly improved with USEPA Method 1623, which is better able to establish concentrations, but still does not determine viability. *Giardia* may be carried in urban runoff and wastewater sources or may be contributed directly as a result of body-contact recreation or human or animal defecation, including both wild and domestic animals.

Giardia lamblia is currently regulated by the Surface Water Treatment Rule (SWTR) and the Interim Enhanced Surface Water Treatment Rule (IESWTR). Surface water supplies must provide for 3-log reduction of *Giardia* through physical removal and chemical inactivation. Additional reduction may be required for impaired water supplies. The DDW guidance provides that 3-log reduction is appropriate when monthly median levels of total coliform are less than 1,000 most probable number per 100 milliliters (MPN/100mL), fecal coliform or *E. coli* levels are less than 200 MPN/100mL, or when directly measured confirmed *Giardia* levels are less than 0.01 cysts per liter.

Cryptosporidium parvum is a species of the protozoa genus *Cryptosporidium* that infects humans and can cause the gastrointestinal disease cryptosporidiosis. *Cryptosporidium* is found in the environment as an oocyst principally from the feces of domestic animals, although both wild and domestic animals are known to be hosts. Like *Giardia*, *Cryptosporidium* oocysts may be destroyed naturally in the environment by desiccation and/or heat. Once in the source water, however, viable oocysts are very resistant to traditional chemical inactivation using chlorine. Stronger disinfectants such as ozone or ultraviolet (UV) light are required to inactivate these pathogens. The detectability of *Cryptosporidium* has been greatly improved with USEPA Methods 1622 and 1623, which are able to establish true concentrations, but still do not determine viability. *Cryptosporidium* may be carried in urban runoff and wastewater sources or may be contributed directly as a result of body-contact recreation or animal defecation, including both wild and domestic animals.

Cryptosporidium is currently regulated through the IESWTR and the Long Term 1 ESWTR (LT1ESWTR), which require 2-log reduction, and the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) which potentially requires additional log action based on source water monitoring results for *Cryptosporidium*. Under the IESWTR (applicable to public water systems serving at least 10,000 population) and LT1ESWTR (applicable to public water systems serving fewer than 10,000 population) well-operated conventional and direct water treatment plants are granted a 2-log removal credit for *Cryptosporidium* if they meet all treated water turbidity standards. The LT2ESWTR (applicable to all public water systems) further regulates *Cryptosporidium* and requires additional action (treatment or protection) if the source water quality is determined to be impaired based on the required direct *Cryptosporidium* monitoring of the source (as discussed in **Appendix C**), if running annual average levels are greater than 0.075 oocysts per liter.

DDW also developed the *Cryptosporidium* Action Plan (CAP) in the mid-1990s to address *Cryptosporidium* while Federal regulations were being formed. The CAP identified recommended turbidity limits for settled water, treated water, and recycled water in lieu of treated water *Cryptosporidium* levels. The CAP was developed to help utilities optimize treatment processes to ensure maximum removal of *Cryptosporidium* oocysts and reduce the risk of waterborne illness. This plan was intended for utilities with over 1,000 service connections.

Evaluation for E. coli

A Recreational Beneficial Use Assessment was conducted by the Regional Board during the summer of 2018. *E. coli* samples were collected from 11 sites on the Lower Sacramento River and two sites on the Lower American River to determine if the USEPA Recreational Water Quality Criterion was being met.

As shown in **Table 3-13,** only one site, the American River at the Sacramento River confluence exceeded USEPA's *E. coli* geomean of 126 MPN/100mL. Therefore, the Regional Board does not plan to continue monitoring this stretch of the Sacramento River for *E. coli.* Due to the limited number of samples for this study, the study data will not be compared to the weekly data collected by the participating water agencies.

Table 3-13
2018 Recreational Beneficial Use Assessment Study for Lower Sacramento River

Map #	Station Name	# of Samples Taken	Sample Minimum (MPN/100 mL)	Sample Maximum (MPN/100 mL)	# of samples > STV Criteria *(>320 MPN/100 mL)*	# of Geometric Means Calculated	Average Geometric Mean (MPN/100 mL)	# of Geometric Means > Criteria *(>100 MPN/100 mL)*
1	Sacramento River downstream of Freeport Bridge	10	5.2	13.4	0	5	6.9	0
2	Sacramento River at Freeport Regional Water Intake Facility	10	6.3	16.9	0	5	10.7	0
3	Sacramento River at Garcia Bend Park	10	4.1	28.1	0	5	11.5	0
4	Sacramento River at North Pocket Area	10	7.4	40.2	0	5	13.8	0
5	Sacramento River at Sacramento Yacht Club	10	11.0	65.7	0	5	19.6	0
6	Sacramento River at Miller Regional Park	9	9.7	34.5	0	5	20.1	0
7	Sacramento River at Sacramento Marina	10	6.3	488.4	1	5	50.4	0
8	Sacramento River at Old Sacramento	9	7.5	58.6	0	4	22.6	0
9	Sacramento River at Matsui Waterfront Park	10	5.2	45.7	0	5	17.4	0
10	Sacramento River upstream of American River Confluence	10	4.1	2419.6	1	5	24.3	0
11	Sacramento River at Sand Cove Park	10	2.0	26.5	0	5	13.9	0
12	American River-Sacramento River Confluence	10	26.9	1986.3	4	5	311.0	5
13	American River at Discovery Park	10	7.4	137.6	0	5	32.6	0
	Watershed Totals	**128**	**2.0**	**2419.6**	**6**	**64**	**42.7**	**5**

GKWTP, SRWTP, and VSWTP monitor for *E. coli* on a weekly basis. RWTF monitors *E. coli* on a monthly basis. Another time-based monitoring program is the CDWR CMP monitoring program, which collects samples on a quarterly basis (February, May, August, and November). The CDWR CMP monitoring sites located on the Sacramento River are all upstream of the participating water agencies. As shown in **Table 3-14,** the median and average *E. coli* data for the CDWR CMP monitoring sites appear to decrease from upstream to downstream (from Balls Ferry to Verona).

Data collected by the participating water agencies is shaded in **Table 3-14**. The median *E. coli* at RWTF was 10.9 MPN/100mL, the median *E. coli* at GKWTP was 6.3 MPN/100mL, the median *E. coli* at SRWTP was 12.6 MPN/100mL, and the median *E. coli* at Freeport (based on SCWA VSWTP) was 20 MPN/100mL. Overall, median levels of *E. coli* are low throughout the watershed, with an increase in levels through the Sacramento metropolitan area, potentially contributed by local precipitation and urban runoff discharges.

Table 3-14
Raw Water *E. coli* Data, MPN/100mL, 2015-2019

Monitoring Site	Number of Samples	Range	Average	Median
Balls Ferry[1]	11	7.5 - 178	52.2	39.3
Bend Bridge[1]	11	12.1 – 172.2	44.4	27.2
Red Bluff[1]	12	6.3 – 135.4	42.2	32.2
Woodson Bridge (Vina)[1]	12	13.4 – 2,419.6	239.2	21.5
Hamilton City[1]	12	4.1 – 2,419.6	253.1	57.7
Colusa[1]	11	1 – 66.3	17.4	12.2
Above CBD[1]	10	2 – 224.7	28.9	8.3
Below Knights Landing[1]	11	2 – 155.3	21.9	7.5
Verona[1]	9	2 – 35.5	15.5	17
RWTF	34	1 - 613	40	10.9
GKWTP	183	ND – 579	27.3	6.3
SRWTP	216	2 – 1,430	60.6	12.6
FRWA Intake for VSWTP	260	ND- 4,600	120.2	20

[1] CDWR CMP Monitoring

E. coli data from RWTF had no occurrences above 1,000 MPN/100mL and only two occurrences above 200 MPN/100mL, as shown in **Figure 3-6**. The WDCWA *E. coli* data was more limited than the other participating water agency datasets, with a total of only 34 samples.

Figure 3-7 shows that the GKWTP had no *E. coli* occurrences above 1,000 MPN/100mL.

Figure 3-6. *E. coli* Levels at RWTF, 2017-2019

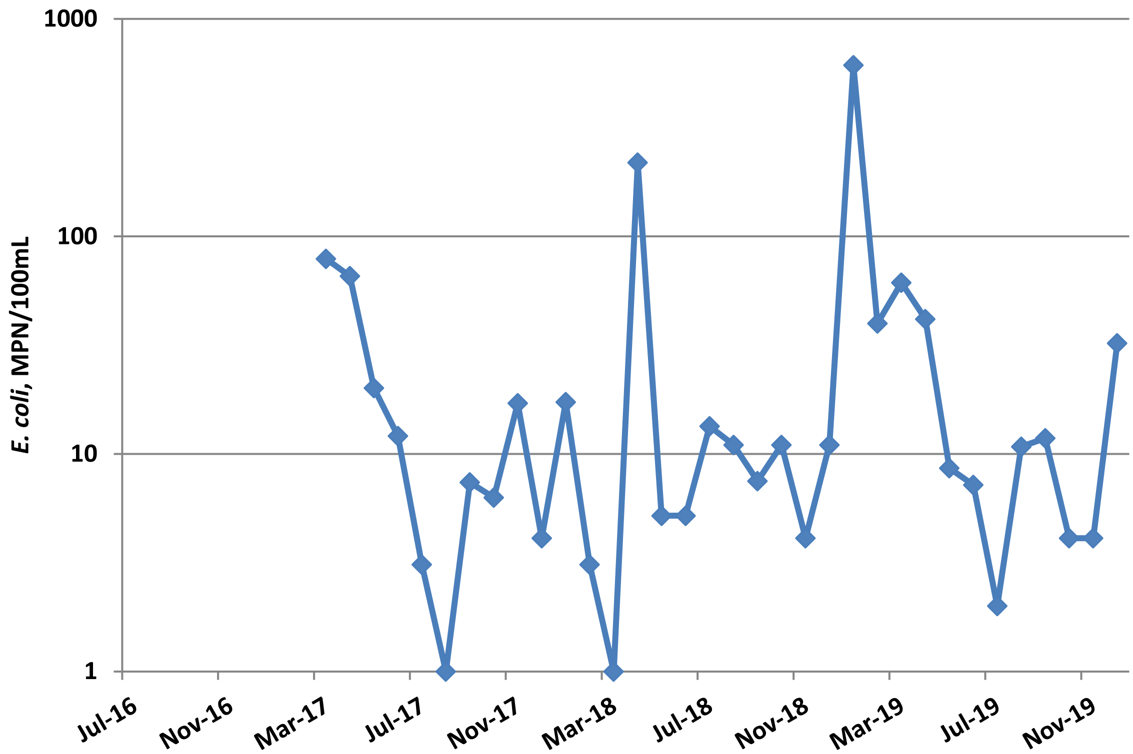


Figure 3-7. *E. coli* Levels at GKWTP, 2015-2019

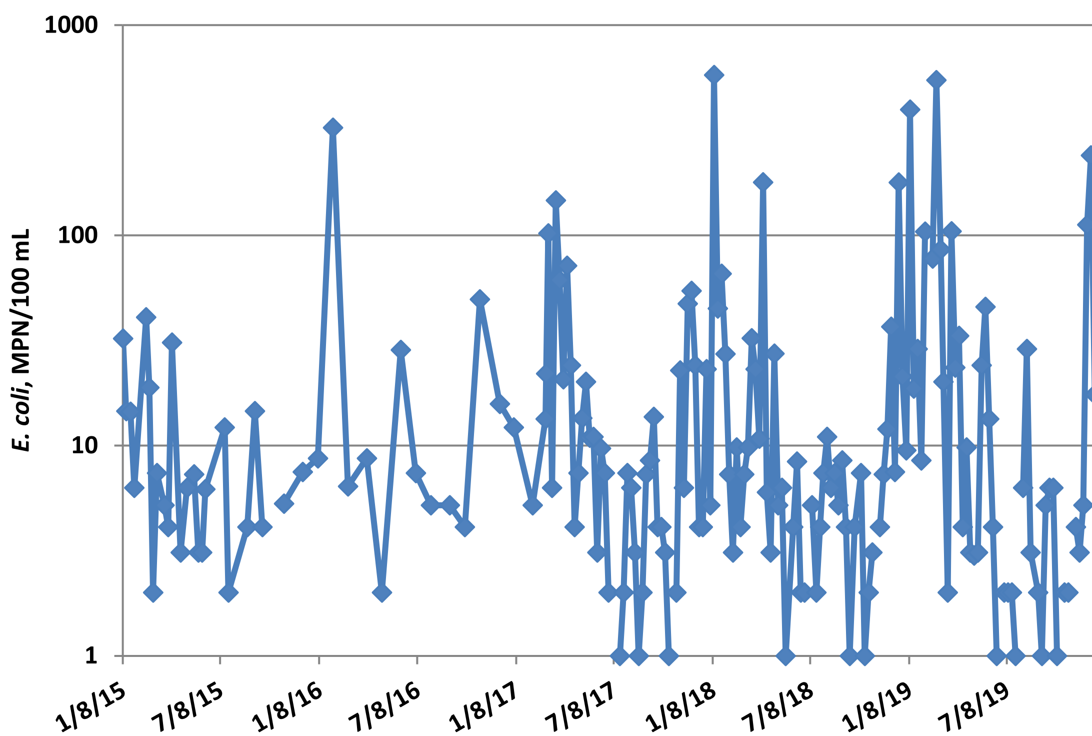
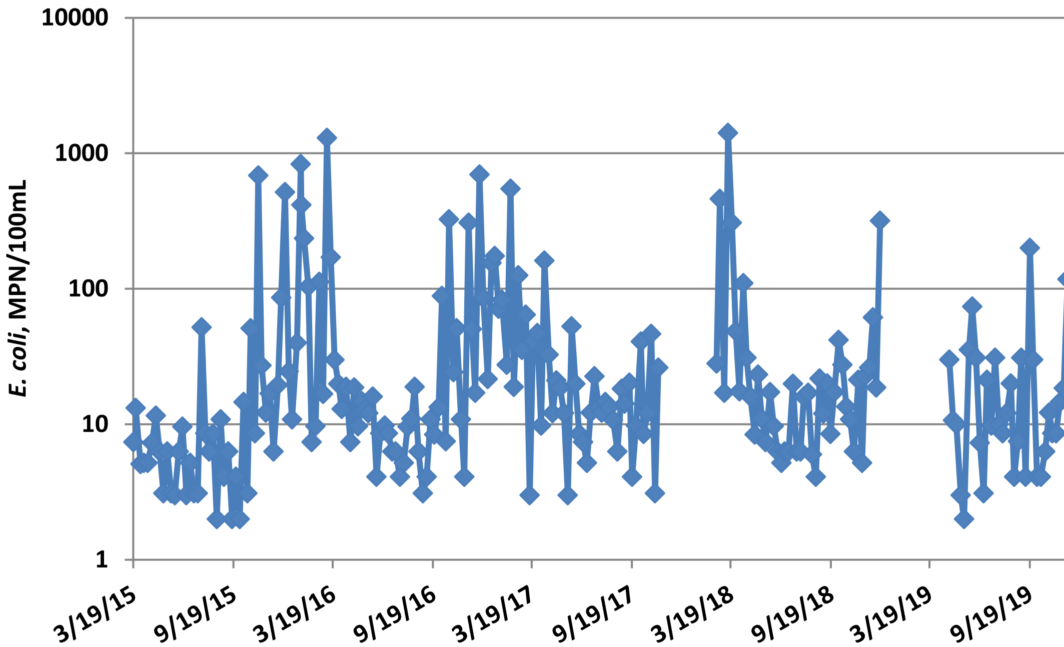


Figure 3-8 shows that the SRWTP had two occurrences above 1,000 MPN/100mL. The GKWTP had five *E. coli* occurrences above 200 MPN/100mL, while the SRWTP had fifteen *E. coli* occurrences above 200 MPN/100mL. This explains why the 95th percentile for the GKWTP is 104.6 MPN/100mL, and the 95th percentile for the SRWTP is much higher, at 310 MPN/100mL. The higher levels at SRWTP could be caused by the influence of the American River and local runoff, discharges, or wastewater spills between GKWTP and SRWTP.

Figure 3-8. *E. coli* Levels at SRWTP, 2015-2019



E. coli data from the FRWA Intake for VSWTP had four occurrences above 1,000 MPN/100mL and 30 occurrences above 200 MPN/100mL, as shown in **Figure 3-9**.

A comparison of *E. coli* levels from the current study period (2015 through 2019) to the previous two watershed sanitary survey study periods (2010 through 2014 and 2005 through 2009) was conducted. **Table 3-15** shows that the average and median values for the RWTF, GKWTP, and SRWTP slightly decreased from 2010-2014 to 2015-2019. However, the average and median values for VSWTP measured at the FRWA Intake increased slightly from 2010-2014 to 2015-2019.

Figure 3-9. *E. coli* Levels at FRWA Intake for VSWP, 2015-2019

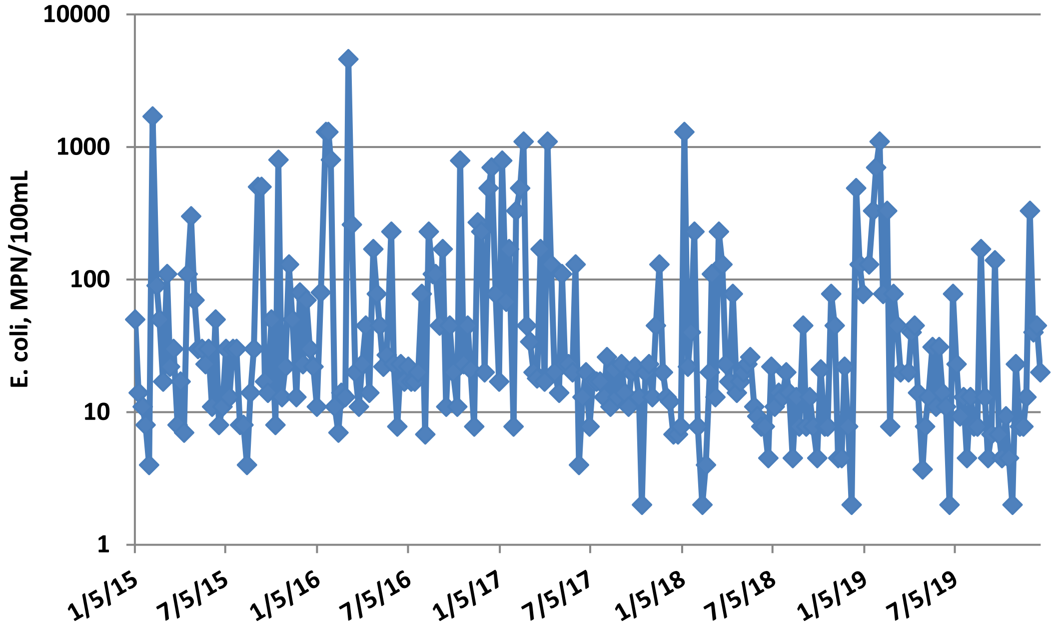


Table 3-15
Historic and Current *E. coli* Data, MPN/100mL

Monitoring Site	Average			Median		
	2005-2009	2010–2014	2015-2019	2005-2009	2010-2014	2015-2019
RWTF	-	117[3]	40[4]	-	17[3]	10.9[4]
GKWTP	48	45.5	27.3	7	7.9	6.3
SRWTP	115	114	60.6	13	14	12.6
FRWA Intake for VSWTP	44.6[1]	78.5[2]	120.2	11[1]	13[2]	20

[1] Data from April 2005 to January 2007
[2] Data from September 2011 to December 2014
[3]Data from January 2010 to February 2012
[4]Data from March 2017 to December 2019

Monthly medians for *E. coli* were also examined, as DDW can require an additional log reduction for *Giardia* and viruses if the monthly median for *E. coli* is consistently greater than 200 MPN/100mL. **Tables 3-16** through **3-19** provide a summary of the raw water monthly median *E. coli* data for RWTF, GKWTP, SRWTP, and FRWA Intake for VSWTP. The tables also show that the peaks in *E. coli* occur during the wet season, from winter to early spring. RWTF had two out of 34 *E. coli* monthly medians at or greater than 200 MPN/100mL, with one sample collected per month. There was only one monthly median *E. coli* value at or greater than 200 MPN/100mL at the GKWTP out of 60 samples, in February 2016. There were two monthly median *E. coli* values at or greater than 200 MPN/100mL at the SRWTP out of 52 months, in January 2016 and February 2018. The FRWA Intake for VSWTP had five *E. coli* medians at or greater than 200 MPN/100mL in September 2015, January 2016, December 2016, February 2017 and February 2019.

Table 3-16
WDCWA –RWTF
Raw Water Monthly Median *E. coli* (MPN/100mL)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2017			78.9	65.7	20.1	12.1	3.1	1.0	7.4	6.3	17.1	4.1
2018	17.3	3.1	1.0	218.7	5.2	5.2	13.4	11.0	7.5	11.0	4.1	11.0
2019	613.1	39.8	61.3	41.7	8.6	7.2	2.0	10.8	11.8	4.1	4.1	32.3

Table 3-17
City of West Sacramento – GKWTP
Raw Water Monthly Median *E. coli* (MPN/100mL)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2015	14.6	29.9	5.2	4.1	6.3	4.7	7.1	4.1	9.4	<1	5.3	7.5
2016	8.7	325.5	6.4	8.7	2.0	28.5	7.4	5.2	5.2	4.1	49.6	15.8
2017	12.2	5.2	41.7	22.4	11.0	5.3	0.5	3.1	7.9	2.1	22.8	13.6
2018	44.9	5.7	16.5	8.4	5.8	3.1	3.1	7.4	4.1	2.6	5.7	29.1
2019	18.7	91.0	52.9	16.7	3.1	4.1	2.0	6.3	3.6	2.0	3.6	112.4

Table 3-18
City of Sacramento – SRWTP
Raw Water Monthly Median *E. coli* (MPN/100mL)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2015	N/O	N/O	10.3	5.2	4.7	4.7	5.2	7.4	4.1	11.6	22	24.6
2016	235.9	56.9	29.9	15.9	13.1	8.6	5.8	8.7	9.7	56.5	50.4	53.7
2017	119.1	76.7	41	22.4	18.7	8.0	12.8	13.4	12	12.1	26.2	N/O
2018	N/O	244.6	178.4	24.3	11	6.3	6.3	11.6	14.7	13.5	22.0	61.6
2019	N/O	N/O	N/O	30	10	19.2	10	9.8	30.5	6.3	16.6	N/O

N/O - Not operational

Table 3-19
Sacramento County Water Agency – FRWA Intake for VSWTP
Raw Water Monthly Median *E. coli* (MPN/100mL)

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2015	13	70	22	64	30	11	30	8	258.5	31.5	36	30
2016	690	12.5	20	34	36	23	18.5	110	45	22	45	284
2017	119	330	27	75	23	16.5	17	13	17	20	32.5	9.4
2018	40	4	110	20	20	7.8	14	13	10	7.8	13.3	68.9
2019	130	204	32.5	30	11	12.5	13	10.4	9.9	4.5	10.4	42.5

Overall, the DDW thresholds are met in nearly all months for the water treatment plants, and the current 3/4-log reduction requirement for *Giardia* and viruses appears to continue to be appropriate.

Summary of Results for E. coli

- Median *E. coli* values range from 10.9 MPN/100mL at RWTF, 6.3 MPN/100mL at GKWTP, to 12.6 MPN/100mL at SRWTP, and 20 MPN/100mL at FRWA Intake (VSWTP).
- Average and median *E. coli* values generally appear to increase from upstream to downstream. As expected, average *E. coli* values are much higher than the median, indicating the influence of peak events. There is a higher peaking effect seen downstream, when comparing levels at GKWTP and SRWTP.
- The peak levels occur during the wet season (December to February), which are also periods of higher flow from upstream and local urban runoff and discharges.
- A comparison of *E. coli* levels from the current study period (2015 to 2019) to the previous watershed sanitary survey study period (2010 to 2014) was conducted. Averages and medians for the RWTF, GKWTP, and SRWTP slightly decreased from 2010-2014 to 2015-2019. However, the averages and median at FRWA Intake for VSWTP increased slightly from 2010-2014 to 2015-2019.
- The DDW thresholds are met in nearly all months for the water treatment plants, and the current 3/4-log reduction requirement for *Giardia* and viruses appears to continue to be appropriate.

Evaluation for Giardia and Cryptosporidium

During the period of study, the City of West Sacramento, City of Sacramento, SCWA, and EBMUD completed the second round of monitoring for LT2ESWTR. WDCWA initially began sampling for the second round of LTESWTR in September 2018, but due to sampling issues, they postponed the start date to February 2020. Therefore, the WDCWA does not have LT2ESWTR monitoring included in this report.

The number of detections and maximum running annual average is reported for the City of West Sacramento's GKWTP, City of Sacramento's SRWTP, and SCWA/EBMUD's FRWA Intake in **Table 3-20**. SCWA and EBMUD shared the monitoring data at the FRWA Intake. Each agency conducted monthly monitoring over a 24 month time period, also specified in the table. All three participating water agencies had *Cryptosporidium* maximum running annual averages (RAAs) below the Bin 2 threshold of 0.075 oocysts/L. The maximum RAAs for *Giardia* were higher, but are below levels of concern.

Table 3-20
Summary of Round 2 LT2ESWTR Monitoring

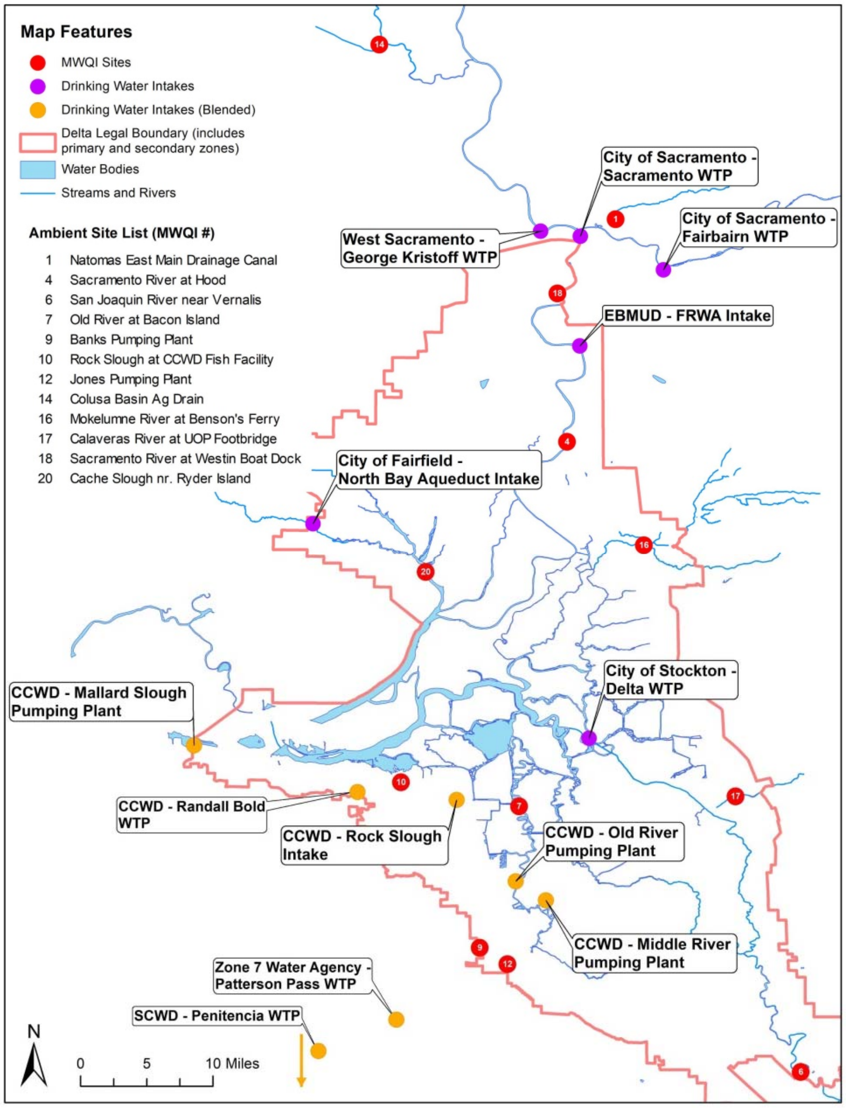
Location	LT2 Monitoring Time Period	*Cryptosporidium*		*Giardia*	
		# of Detects	Max. RAA, oocysts/L	# of Detects	Max. RAA, cysts/L
GKWTP	October 2015-September 2017	0	0	3	0.022
SRWTP	April 2015- March 2017	1	0.017	4	0.033
SCWA and EBMUD	May 2015-April 2017	1	0.015	2	0.042

The Delta Regional Monitoring Program (RMP) Pathogen Study also collected monthly data for *Cryptosporidium* and *Giardia* in ambient source waters from April 2015 to March 2017. The City of West Sacramento, City of Sacramento, and EBMUD submitted their Round 2 LT2ESWTR data which is included in the Final October 2018 report. Although many of the RMP monitoring sites are in the Delta, there are two other monitoring sites above Freeport: Colusa Basin Ag Drain and Sacramento River at Westin Boat Dock, as shown in **Figure 3-10**. Colusa Basin Ag Drain is above the WDCWA intake and the Westin Boat Dock is on the mainstem Sacramento River upstream of the FRWA intake, but downstream of the SRWTP intake. Over the 24 month period, no *Cryptosporidium* was detected at either site. *Giardia* was detected on seven occasions at the Colusa Basin Ag Drain for a maximum RAA of 0.42 cysts/L. This RAA of this agricultural drainage is much higher than any of the concentrations reported in **Table 3-20**. *Giardia* was detected on five occasions at the Westin Boat Dock for a maximum RAA of 0.025 cysts/L, which is consistent with the participating water agencies' data also on the mainstem Sacramento River.

Summary of Results for Giardia and Cryptosporidium

- There continue to be generally low concentrations of presumed *Giardia* and *Cryptosporidium* in the Sacramento River. The highest concentration of *Giardia* was found in agricultural drainage at the Colusa Basin Ag Drain site, with a maximum RAA of 0.42 cysts/L.
- In the Sacramento River, the detection frequency of presumptive *Giardia* is more frequent compared to the detection frequency of presumed *Cryptosporidium*.

Figure 3-10. Map of Monitoring Sites for Delta RMP Pathogen Study



Source: Delta RMP, Pathogen Study Final Report

Total Organic Carbon

General Characteristics and Background

Disinfection By-Products (DBPs) are formed when disinfectants added to water react with naturally occurring organic matter or other constituents, such as bromide. These are discussed further in **Appendix C**. Since the Sacramento River upstream of Freeport does not have consistently detectable levels of bromide, total organic carbon (TOC) is the key precursor for DBPs. Potential sources of these organic precursors are plant matter, animal matter (including pets, livestock, and wild and feral animals), and soil, which can be contributed by general watershed runoff, urban runoff, recreation, wastewater sources, as well as additional natural sources such as wildlife and in-stream growth, in the Sacramento River watershed. The most common DBPs are total trihalomethanes (TTHM), which can cause liver, kidney, or central nervous system problems, as well as an increased risk of getting cancer. Other DBPs, including haloacetic acids (HAA5), are suspected mutagens and teratogens.

The Stage 1 Disinfectants/Disinfection Byproduct (D/DBP) Rule requires varying levels of TOC removal if the source water TOC concentrations exceed 2 milligrams per liter (mg/L) and a utility implements conventional filtration. TOC was a selected constituent for further evaluation due to its importance in the formation of DBPs and also as a general indicator of organic contamination in water.

Evaluation

Raw water TOC data was provided by WDCWA, the cities of West Sacramento and Sacramento, and SCWA, and was also obtained from the CDWR CMP ambient monitoring program. **Table 3-21** provides a summary of TOC data collected by the WTPs.

Table 3-21
Raw Water TOC Levels (mg/L), 2015-2019

Monitoring Site	# of Samples	Range	Average	Median	95th percentile
RWTF[1]	34	1.1 – 3.8	1.8	1.8	3.3
GKWTP	60	0.7 – 4.7	2.0	1.7	4.2
SRWTP	48	1.2 – 3.9	1.9	1.8	3.4
FRWA Intake for VSWTP	20	1.2 – 2.8	1.7	1.6	2.7

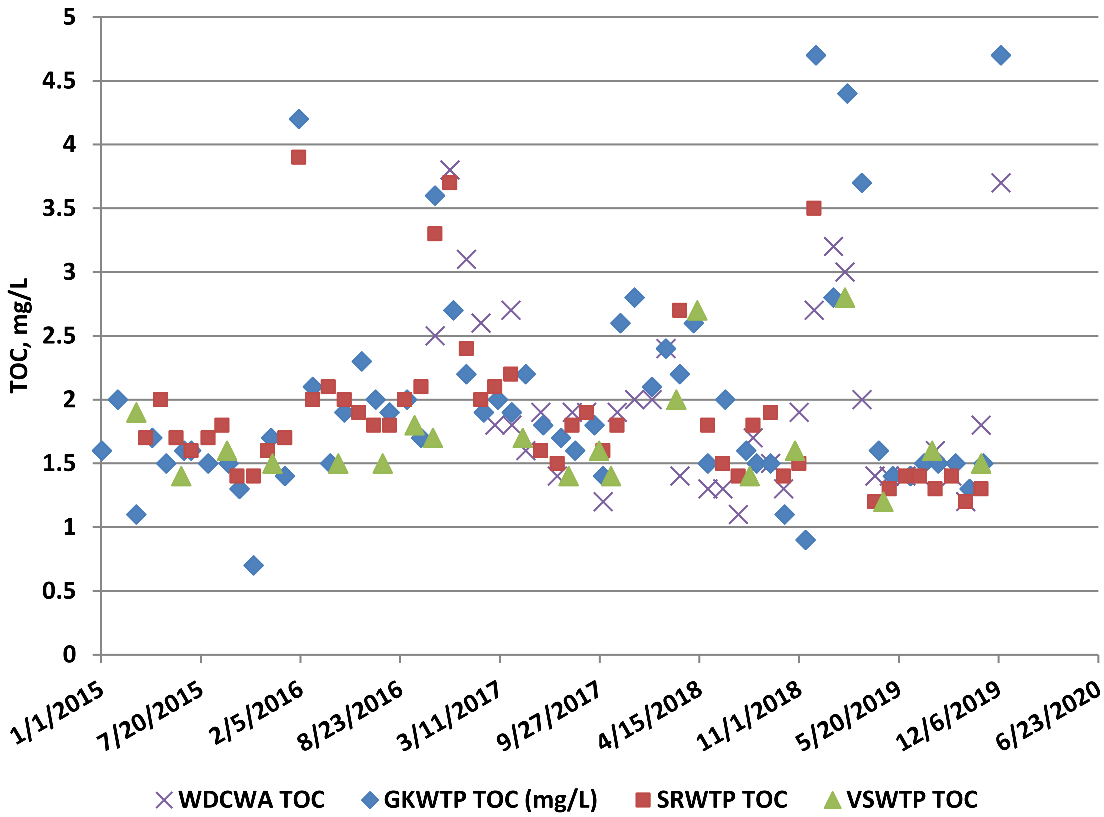
[1] Based on data collected from November 2016 to December 2019

Figure 3-11 shows TOC at the plant influent for the GKWTP, SRWTP, and FRWA Intake for VSTWP from 2015 through 2019, as well as data from RWTF from 2016 through 2019. There does not appear to be an increasing trend over time at these locations.

As discussed in previous watershed sanitary surveys, TOC peaks occur during periods of precipitation and periods of higher flow. **Figure 3-11** shows peak TOC levels occurring during the wet season (October through April). The highest GKWTP TOC concentration was 4.7 mg/L in December 2018 and December 2019, the highest SRWTP TOC concentration was 3.9 mg/L in February 2016, and the highest TOC concentration at WDCWA's RWTF was 3.8 mg/L in December 2016. TOC was never higher than 2.8 mg/L at the FRWA Intake for VSWTP over the reporting period.

It was difficult to correlate the Oroville Spillway failure high flow event on February 11, 2017 to TOC data, since TOC data is collected monthly by GKWTP and SRWTP. For example, GKWTP raw water TOC was 1.9 mg/L on February 7, 2017, and 2 mg/L on March 7, 2017. SRWTP raw water TOC was 2.0 mg/L on February 1, 2017 and 2.1 mg/L on March 1, 2017. There is limited ability to draw conclusions regarding the impact since there were generally precipitation and high flows and there was no targeted monitoring data collected.

Figure 3-11. TOC in Sacramento River for RWTF, GKWTP, SRWTP, and FRWA Intake for VSWTP, 2015-2019



Overall, TOC peaks are higher at GKWTP, as compared to the SRWTP. The lower levels at SRWTP are likely caused by the influence of the Lower American River (which has lower organic carbon content) on the diverted water.

Over the reporting period, the percent occurrence of TOC below 2.0 mg/L or less at WDCWA's RWTF is 68 percent of the time. At GKWTP, the percent occurrence of TOC below 2.0 mg/L is 62 percent. Note that it is difficult to compare the WDCWA data to the GKWTP, as WDCWA collected about half of the number of samples collected by GKWTP, as the facility began operating in mid-2016. At SRWTP, the percent occurrence of TOC below 2.0 mg/L or less is 68 percent of the time. At the FRWA Intake/VSWTP, the occurrence of TOC below 2.0 mg/L or less is 85 percent of the time. Similarly, it is difficult to compare SRWTP and SCWA TOC data, as the SRWTP monitors monthly, and SCWA monitors quarterly. SCWA collects samples typically in February, April, July and October (due to system operations that keep the plant offline during December and January), which can miss the higher TOC peaks in December and January. (Note: SCWA received a waiver in January 2014 per Section 64534.6 (b) of Article 3, Chapter 15.5, Division 4, Title 22 to begin quarterly monitoring for TOC and alkalinity.)

Table 3-22 provides a summary of the TOC collected by the CDWR CMP monitoring program. The DWR monitoring program begins far upstream in the Sacramento River watershed, and ends at Verona (just downstream of the confluence of Feather and Sacramento Rivers). Examination of the median TOC levels shows that TOC begins to increase between Colusa and the Above CBD monitoring site, and continues to further increase downstream to Verona. The CDWR CMP monitoring only covers years 2015 to 2017, as no samples were collected in 2018 and 2019 due to contracting issues between DWR and the Central Valley Regional Water Quality Control Board (Regional Board).

Table 3-22
TOC Levels in Sacramento River Watershed (mg/L), 2015-2017
DWR Coordinated Monitoring Program

Locations Along Sacramento River	# of Samples	Range	Average	Median
Balls Ferry	11	0.5 – 2.2	1.3	1.3
Bend Bridge	11	0.6 – 2.7	1.3	1.3
Red Bluff	12	0.6 – 1.5	1.3	1.4
Vina Bridge near Corning	12	0.6 – 4.7	1.5	1.3
Hamilton City	12	0.6 – 5.1	1.8	1.5
Colusa	11	0.6 – 2.0	1.3	1.3
Above CBD	11	0.7 – 4.1	1.7	1.5
Below Knights Landing	11	0.8 – 4.6	1.9	1.8
Verona (after confluence with Feather River)	10	1 – 2.6	1.9	1.9

Since the CDWR CMP monitoring program also samples sloughs and tributaries leading into the Sacramento River, these were further investigated as potential sources of TOC between Colusa and Verona.

There are four slough/drains/tributaries that enter the Sacramento River between Colusa and Verona: 1) Butte Slough near Meridian, 2) Colusa Basin Drain near Knights Landing, 3) Sutter Bypass at RD1500, and 4) Feather River. Out of these four tributaries, the three agricultural drains have the highest concentrations of TOC. The highest TOC levels were found in Colusa Basin Drain near Knights Landing, with a median TOC level of 7.4 mg/L and ranging from 5.2 to 9.9 mg/L. High TOC levels were also found in Butte Slough and Sutter Bypass, with medians of 6.2 and 4.3 mg/L, respectively.

Unfortunately, there are no monitoring locations (either river or tributary) between the CDWR CMP monitoring site at Verona and the WDCWA Intake, just upstream of Veterans Bridge.

As shown in **Table 3-23**, a comparison of TOC levels from the current study period (2015 through 2019) to the previous watershed sanitary survey study periods was conducted. **Table 3-23** indicates that the GKWTP median and the WDCWA median decreased from the previous 5 year period. Medians and averages for SCWA and SRWTP are similar to the previous 5 year period.

Table 3-23
Historic and Current TOC Data, mg/L

Monitoring Site	Average				Median			
	2000-2004	2005-2009	2010-2014	2015 – 2019	2000-2004	2005-2009	2010-2014	2015 – 2019
WDWCA			2.5	1.8[1]			2.1	1.9[1]
GKWTP	2.30	2.37	2.01	2.0	2.00	2.30	1.7	1.2
SRWTP	1.53	1.75	1.9	1.9	1.30	1.50	1.6	1.8
SCWA			1.8[2]	1.7			1.5[2]	1.6

[1] Based on data collected from November 2016 to December 2019
[2] Based on data collected from September 2011 to December 2014

Summary of Results

- Average TOC levels along the Sacramento River range from 1.8 mg/L at WDCWA's RWTF, 2.0 mg/L at GKWTP, 1.9 mg/L at SRWTP, and 1.7 mg/L at FRWA Intake/VSWTP. It should be noted that the number of samples collected at each location varied widely.
- Peaks in TOC are likely due to a number of factors potentially including: high precipitation events, high outflow from upstream reservoirs, and agricultural drainage waters. The highest RWTF TOC concentration was 3.8 mg/L in December 2016, the highest GKWTP TOC concentration was 4.7 mg/L in December 2018 and 2019, the highest SRWTP TOC concentration was 3.9 mg/L in February 2016, and the highest FRWA Intake/VSWTP TOC concentration was 2.8 mg/L in February 2019.
- Using CDWR CMP data, TOC increases between Colusa to Verona appear to be contributed to by elevated levels of TOC from large agricultural drains (Butte Slough, Colusa Basin Drain, and Sutter Bypass). The Colusa Basin Drain had the highest TOC concentrations, with levels ranging from 5.2 to 9.9 mg/L, with a median of 7.4 mg/L. A decrease in peak TOC levels from GKWTP to SRWTP is likely caused by the influence of the American River (which has lower levels of TOC).

Detectable Volatile and Synthetic Organic Compounds of Interest

General Characteristics and Background

Most VOCs and SOCs are formulated for, or are by-products from, industrial, agricultural, and urban uses and activities. Pesticides are a main subgroup of the SOCs, which are man-made compounds used for agriculture and urban application. Some current use pesticides have been regulated by the Phase I, II, and V regulations, but many have not. These USEPA regulations updated National Interim Primary

Drinking Water Regulations for VOCs and SOCs in the late 1980s and early 1990s; they are discussed further in **Appendix C**.

Thiobencarb is of special interest because it has been historically detected in the Sacramento River in the spring. It is used as a pre-emergent pesticide for rice crops, and it is typically applied in the spring. It is biodegradable within weeks. This is discussed more extensively in **Section 4**. Of special interest are low levels of thiobencarb, below levels of human health concern, because it can cause taste problems in treated water; thiobencarb has a secondary MCL that is much lower than the primary MCL.

Evaluation

As part of the Rice Pesticide Program, discussed in **Section 4**, the Cities of West Sacramento and Sacramento participate in a voluntary spring season thiobencarb monitoring program with the California Rice Commission. The cities' intakes are sampled periodically during the spring application season to coordinate with the rice growers sampling efforts in their agricultural drainages. For the Sacramento River the water quality objectives that apply include the primary MCL of 70 micrograms per liter (µg/L) and the secondary MCL of 1 µg/L. For the agricultural drainages there is a Performance Goal of 1.5 µg/L that applies. This section discusses the detections at the drinking water treatment plants, while agricultural monitoring data is further discussed in **Section 4**.

There were several detections of thiobencarb in the raw water at the GKWTP and SRWTP; however, none were detected above the primary MCL of 70 µg/L or the secondary MCL of 1 µg/L. The causes of increased detections in each year are examined in **Section 4**. At GKWTP, thiobencarb was detected once at 0.1 µg/L in 2015, eighteen times in 2016 with detectable levels ranging from 0.01 to 0.13 µg/L, no detections in 2017 and 2018, and four detections in 2019 ranging from 0.052 to 0.13 µg/L. At SRWTP, thiobencarb was detected fourteen times in 2016 with detectable levels ranging from 0.014 to 0.12 µg/L, no detections in 2017 and 2018, and two detections in 2019 at 0.057 µg/L and 0.13 µg/L. As noted in **Section 4**, this study period had increasing detections of thiobencarb in the agricultural drainages with 2016 having the highest concentration of thiobencarb detected in the agricultural drainages, at 11 µg/L, and 11 percent of samples exceeding the Performance Goal.

Throughout the period of study there were no detections of any other VOCs or SOCs with MCLs monitored at RWTP, GKWTP, SRWTP, and FRWA Intake/VSWTP.

Summary of Results

- Over the reporting period, the only VOCs or SOCs detections at SRWTP, GKWTP, RWTF, and FRWA Intake/VSWTP were low level detects of thiobencarb at GKWTP and SRWTP. All levels were below the primary and secondary MCLs.

Specialty Monitoring

Per- and Polyfluoroalkyl Substances

General Characteristics and Background

PFAS are a large group of human-made substances that do not occur naturally in the environment and are resistant to heat, water, and oil. PFAS have been used extensively in surface coating and protectant formulations due to their unique ability to reduce the surface tension of liquids. Perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two types of PFAS that are no longer manufactured or imported into the United States. However, manufacturers are developing replacement technologies in the PFAS family by substituting longer-chain substances with shorter-chain substances.

Exposure to PFOA and PFOS can cause adverse health effects, including harm to a developing fetus or infant, immune system and liver effects, and cancer. While consumer products are a large source of exposure to these chemicals, drinking water has become an increasing concern due to their persistence in the environment and their tendency to accumulate in groundwater.

In August 2019, DDW established Notification Levels at concentrations of 6.5 nanograms per liter (ng/L) for PFOS and 5.1 ng/L for PFOA. Notification Levels are a non-regulatory, precautionary health-based measure for concentrations in drinking water that warrant notification and further monitoring and assessment. Public water systems are encouraged to test their water for contaminants with Notification Levels. Each constituent with a Notification Level has an associated Response Level that requires action by a public water system if it is exceeded. The Response Levels for PFOS and PFOA are 40 ng/L and 10 ng/L, respectively. Compliance is based on a running four quarter average.

DDW also has requested that the Office of Environmental Health Hazard Assessment (OEHHA) develop public health goals (PHGs) for both PFOA and PFOS, the next step in the process of establishing regulatory standards, or MCLs, in drinking water. Other PFAS chemicals may be considered later, either individually or grouped, as data permits. These are discussed further in **Appendix C**.

Evaluation

The City of Sacramento monitored for PFAS in both raw and treated water in 2019. As shown in **Table 3-24,** all of the 18 PFAS compounds monitored using EPA Method 537.1 were non-detectable in raw and treated water. SCWA monitored for PFAS in the VSWTP influent in June 2019. All of the 18 PFAS compounds monitored using EPA Method 537.1 were non-detectable, but no results were provided for 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid and 4,8-Dioxa-3H-perfluorononanoic acid.

Table 3-24
PFAS Monitoring for SRWTP (µg/L)

Analyte	Abbreviation	MRL	SRWTP Tap 1 Raw	SRWTP Tap 13 Treated	SRWTP Tap 1 Raw	SRWTP Tap 13 Treated	SRWTP Tap 1 Raw	SRWTP Tap 13 Treated
			05/15/19	05/15/19	08/13/19	08/13/19	11/04/19	11/04/19
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	0.002	na	na	ND	ND	ND	ND
4,8-dioxa-3H-perfluorononanoic acid	ADONA	0.002	na	na	ND	ND	ND	ND
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	0.002	na	na	ND	ND	ND	ND
Hexafluoropropylene oxide dimer acid	HFPO-DA	0.005	na	na	ND	ND	ND	ND
N-ethyl Perfluorooctanesulfonamidoacetic acid	NEtFOSAA	0.002	ND	ND	ND	ND	ND	ND
N-methyl Perfluorooctanesulfonamidoacetic acid	NMeFOSAA	0.002	ND	ND	ND	ND	ND	ND
Perfluorobutanesulfonic acid	PFBS	0.002	ND	ND	ND	ND	ND	ND
Perfluorodecanoic acid	PFDA	0.002	ND	ND	ND	ND	ND	ND
Perfluorododecanoic acid	PFDoA	0.002	ND	ND	ND	ND	ND	ND
Perfluoroheptanoic acid	PFHpA	0.002	ND	ND	ND	ND	ND	ND
Perfluorohexanesulfonic acid	PFHxS	0.002	ND	ND	ND	ND	ND	ND
Perfluorohexanoic acid	PFHxA	0.002	ND	ND	ND	ND	ND	ND
Perfluorononanoic acid	PFNA	0.002	ND	ND	ND	ND	ND	ND
Perfluorotetradecanoic acid	PFTA	0.002	ND	ND	ND	ND	ND	ND
Perfluorotridecanoic acid	PFTrDA	0.002	ND	ND	ND	ND	ND	ND
Perfluoroundecanoic acid	PFUnA	0.002	ND	ND	ND	ND	ND	ND
Perfluorooctanesulfonic acid	PFOS	0.002	ND	ND	ND	ND	ND	ND
Perfluorooctanoic acid	PFOA	0.002	ND	ND	ND	ND	ND	ND

na – not analyzed
ND – Non Detect

Summary of Results

Based on 2019 monitoring conducted by the City of Sacramento and SCWA for Sacramento River water, all PFAS compounds monitored using EPA Method 537.1 were non-detectable. PFAS data was not available from the City of West Sacramento or WDCWA.

Detectable Title 22 Constituents of Interest

A review of the Consumer Confidence Reports (CCRs) and Public Health Goal (PHG) Reports was conducted for each participating water agency to identify detectable constituents of interest in the source water. This review resulted in the selection of three metals for additional evaluation: iron, aluminum, and manganese.

General Characteristics and Background

Aluminum is of concern in drinking water because of potential implications to human health. Iron and manganese were selected because they are detectable and they have an aesthetic impact on water quality. All are naturally occurring constituents, but can be elevated from high runoff in the watershed, agricultural drainage, urban runoff, wastewater, industrial dischargers, and mines. Also, there is evidence that wildfire impacts can result in runoff that has higher concentrations of inorganic compounds such as these metals.

Aluminum has a primary MCL of 1,000 µg/L and a secondary MCL of 200 µg/L. Iron and manganese have secondary MCLs of 300 µg/L and 50 µg/L, respectively.

Evaluation for Iron and Aluminum

Available raw water total aluminum and iron levels were evaluated for GKWTP, SRWTP, and the FRWA Intake. WDCWA's RWTF has treated water data only. Raw water data is summarized in **Tables 3-25 and 3-26**, which also includes data from the CDWR CMP.

Median aluminum and iron concentrations are above their respective secondary MCLs of 200 µg/L and 300 µg/L at GKWTP, SRWTP and FRWA intake (EBMUD data). Interestingly, data collected by EBMUD at the FRWA intake is much higher than the data collected by SCWA. It should be noted that SCWA and EBMUD sample annually for iron and aluminum at the FRWA intake, with EBMUD typically sampling in May and SCWA collecting in September. Therefore, the higher concentrations reflected in EBMUD's data may be reflective of the timing of the sampling.

Table 3-25
Aluminum Levels in Sacramento River, µg/L, 2015-2019

Monitoring Site	# of Samples	Range, µg/L	Average, µg/L	Median, µg/L
Balls Ferry	11	34.7 - 311	144	154
Bend Bridge	11	25.3 - 366	167.8	143
Red Bluff	12	32.4 - 761	159.2	99.3
Vina Bridge (Corning)	12	20.3 – 1,650	306.3	86.7
Hamilton City	12	18.9 – 1,960	354.9	92.2
Colusa	11	14.8 - 293	105.5	92.3
Above CBD	11	24.2 - 410	143.4	106
Below Knights Landing	11	36.9 - 362	152.1	124
Verona (after confluence with Feather River)	9	26.4 - 350	138.5	94.1
GKWTP	18	60 – 1,900	423	278
SRWTP	112	< 50 – 7,532	458.5	210.9
FRWA Intake - SCWA	5	66 - 800	314.4	120
FRWA Intake -EBMUD	5	366 – 1,330	651	587

Note: Data from DWR sites collected from January 2015-December 2017

Table 3-26
Iron Levels in Sacramento River, µg/L, 2015-2019

Monitoring Site	# of Samples	Range, µg/L	Average, µg/L	Median, µg/L
Balls Ferry	11	37.1 - 293	148.5	128
Bend Bridge	11	33.6 - 356	158.7	146
Red Bluff	12	52.5 - 729	169.2	105
Vina Bridge (Corning)	12	40.7 – 1,790	327.5	108
Hamilton City	12	36.9 – 2,100	376.4	98.8
Colusa	11	33.4 - 318	135.5	112
Above CBD	11	42.1 - 493	182.4	135
Below Knights Landing	11	73.4 - 542	221.4	192
Verona (after Feather River confluence)	10	67.6 - 418	213.0	191.5
GKWTP	18	140 – 3,700	824	400
SRWTP	112	105.7 – 13,847	684.5	317.5
FRWA Intake - SCWA	5	130 - 1200	502	230
FRWA Intake - EBMUD	5	331 – 1,340	768.6	716

Note: Data from DWR sites collected from January 2015-December 2017

When looking more carefully at the iron and aluminum levels for GKWTP, it can be seen that peaks occurred in January 2019. This was a peak storm period that followed the Carr Fire, which caused significant burn damage near Lake Oroville.

As shown in **Tables 3-27 and 3-28,** the current medians for iron and aluminum are all lower compared to the 2015 Update (2010 through 2014 data period), except for SRWTP. This may be because SWRTP collected 5 raw samples for iron and aluminum from 2010 to 2014, yet collected 112 samples from 2015 to 2019.

Table 3-27
Historic Aluminum Levels in Sacramento River, µg/L

Monitoring Site	Average		Median	
	2010–2014	2015- 2019	2010-2014	2015-2019
GKWTP	775	423	500	278
SRWTP	150	458.5	129	210.9
FRWA Intake for VSWTP	237.5	314.4	170	120
FRWA Intake for EBMUD	3,050	651	1,320	587

Table 3-28
Historic Iron Levels in Sacramento River, µg/L

Monitoring Site	Average		Median	
	2010–2014	2015- 2019	2010-2014	2015-2019
GKWTP	1,046	824	670	400
SRWTP	264	684.5	297	317.5
FRWA Intake for VSWTP	360	502	260	230
FRWA Intake for EBMUD	2,281	786.6	1,056	716

Due to the prevalence of aluminum and iron levels above the secondary MCL, a closer examination of upstream water quality data was conducted. Data collected by the CDWR CMP monitoring program was evaluated in **Tables 3-25 and 3-26**. During 2010 to 2014, there was an increase of both aluminum (approximately 300 percent) and iron (approximately 400 percent) levels measured between Hamilton City and Below Knights Landing. For 2015 through 2017, there is still an increase between Hamilton City and Below Knights Landing, but much less, about a 34 percent increase for aluminum and 94 percent increase for iron. However, years 2018 and 2019 were not sampled. Since the CDWR CMP monitoring program also samples sloughs and tributaries leading into the Sacramento River, these were examined as potential sources of iron and aluminum in the 2015 Update.

There are four slough/drains/tributaries which enter the Sacramento River from Colusa to Verona: 1) Butte Slough near Meridian, 2) Colusa Basin Drain near Knights Landing, 3) Sutter Bypass at RD1500, and 4) Feather River. Aluminum and iron levels in the Colusa Basin Drain were the highest, with a 2015-2017 median of 439 µg/L for aluminum and 824 µg/L for iron. Iron levels in Butte Slough and Sutter Bypass were also above or near the secondary MCL, with a median of 544 µg/L (Butte Slough) and 265 µg/L (Sutter Bypass). The current 2015-2017 medians for aluminum were below the secondary MCL at Butte Slough and Sutter Bypass, but the 2010-2014 medians were above the secondary MCL. All three of these waterbodies are dominated by agricultural drainage and contribute iron and aluminum to the Sacramento River.

Similar to the 2015 Update, the median values for iron and aluminum again increase from Verona to GKWTP. The median value for aluminum at Verona increased from 94.1 µg/L to 278 µg/L at GKWTP. Similarly, median iron levels at Verona increased from 191.5 µg/L to 400 µg/L at GKWTP.

This 2020 Update was unable to identify any additional water quality sampling programs in the Sacramento River between Verona and Veterans Bridge. A review of potential discharges along this reach of the river revealed the Natomas Cross Canal and RD1000 pumping plants. The Natomas Cross Canal may be contributing contaminants, including metals, to the Sacramento River as it carries a mixture of stormwater, agricultural drainage, treated wastewater, permitted discharges, and groundwater. RD1000 discharges include agricultural and urban runoff.

Summary of Results for Iron and Aluminum

- Median aluminum and iron concentrations are above their respective secondary MCLs of 200 µg/L and 300 µg/L at GKWTP, SRWTP and FRWA intake (EBMUD data).
- Except for SRWTP, the current medians for iron and aluminum are all lower compared to the 2015 Update covering years 2010 through 2014. The City of Sacramento collected a significantly higher number of samples during 2015 through 2019 (112), as compared to 2010 through 2014 (5).
- Based on the CDWR CMP data, aluminum and iron concentrations increase from the upper watershed to Below Knights Landing. Elevated levels of aluminum and iron were found in agricultural drainage tributaries to the Sacramento River, including; Butte Slough, Colusa Basin Drain, and Sutter Bypass. Colusa Basin Drain had the highest iron and aluminum levels of the three drains.
- Median iron and aluminum levels continue to increase downstream of Verona, from Verona to GKWTP. Potential sources could be the Natomas Cross Canal or RD1000 discharges.
- Although levels in the source water can be elevated, RWTF, GKWTP, SRWTP, and VSWTP are able to currently treat total iron and aluminum to either non-detectable or detectable at very low levels in treated water.

Evaluation for Manganese

Available raw water total manganese levels were evaluated for GKWTP, SRWTP, and the FRWA Intake. WDCWA's RWTF has treated water data only. Raw water data is summarized in **Table 3-29**, which also includes data from the CDWR CMP. Median and average levels of manganese were below the secondary MCL for the GKWTP, SRWTP and the FRWA Intake. It should be noted that all treated water samples for the RWTF, SRWTP, GKWTP, and VSWTP were non-detectable (with a detection limit of 20 µg/L), except for one sample collected on July 5, 2016 at GKWTP. However, the treated water sample result was 148 µg/L, and the raw water sample was 14.7 µg/L, indicating that the samples were likely switched.

Table 3-29
Manganese Levels in Sacramento River, µg/L, 2015-2019

Monitoring Site	# of Samples	Range, µg/L	Average, µg/L	Median, µg/L
Balls Ferry	11	2.1 – 27.7	7.2	4.8
Bend Bridge	11	2.1 – 13.4	5.9	4.4
Red Bluff	12	2.0 – 31.1	7.1	4.5
Vina Bridge (Corning)	12	2.9 – 51.9	13.5	6.9
Hamilton City	12	2.7 – 59.6	15.1	5.4
Colusa	11	2.4 - 29	10.0	6.2
Above CBD	11	4.6 – 28.5	12.5	11.2
Below Knights Landing	11	8.5 – 121.4	29.2	21.8
Verona (after confluence with Feather River)	10	8.5 – 35.8	23.9	26.7
GKWTP	50	<20 - 190	41.1	29
SRWTP	111	<20 – 330	25.4	21.9
FRWA Intake - SCWA	5	11 - 50	24.4	16

A review of the data shows that, similar to aluminum to iron, manganese increases from Colusa to Verona. A detailed examination of manganese levels in the sloughs and tributaries leading into the Sacramento River between Hamilton City and Verona was not completed, as individual samples collected by the participating water agencies are generally below the secondary MCL. The upstream sources of manganese are unknown at this time, but likely include sources similar to iron and aluminum.

Summary of Results for Manganese

Average and median manganese levels in the Sacramento River upstream of the GKWTP are higher than those downstream at SRWTP and the FRWA Intake. The upstream sources of manganese are unknown at this time, but could include sources similar to iron and aluminum. Currently, the RWTF, GKWTP, SRWTP, and VSWTP are able to treat the source water to meet the manganese secondary MCL.

This section contains an evaluation of the eight watershed potential contaminant sources selected for review for the 2020 Update. Each contaminant source is presented to include background, seasonal patterns, related constituents, presence in the watershed, regulation and management, water quality issues and data review, and Sacramento River Source Water Protection Program activities. The potential contaminating activities that were selected for review as part of the 2020 Update include:

- Agricultural drainage,
- Livestock, including rangeland, dairies, and poultry,
- Forest activities, including timber harvesting and wildfires,
- River corridor and river recreation, including homeless/illegal camping,
- Stormwater and urban runoff,
- Industrial National Pollutant Discharge Elimination System (NPDES) permitted facilities,
- Wastewater facilities, and
- Watershed spills.

In addition, four special topics were identified for investigation and brief summary. This included; projected population growth in the watershed, Central Valley Regional Water Quality Control Board's (Regional Board) selected policies and programs, potential future Central Valley water system operational modifications and impacts, and permitted outdoor cannabis cultivation. These topics are summarized only for informational purposes.

It should be noted that there are other potential contaminating activities in the watershed, such as wildlife and mining, which have been assessed previously and were not specifically included in this 2020 Update due to their historically stable nature. If significant water quality impacts were identified in **Section 3** that could be related to one of these potential contaminating activities, then they were noted as potential contributory sources. General watershed runoff is discussed through the presentation of the potential contaminating activities that may impact the quality of the runoff.

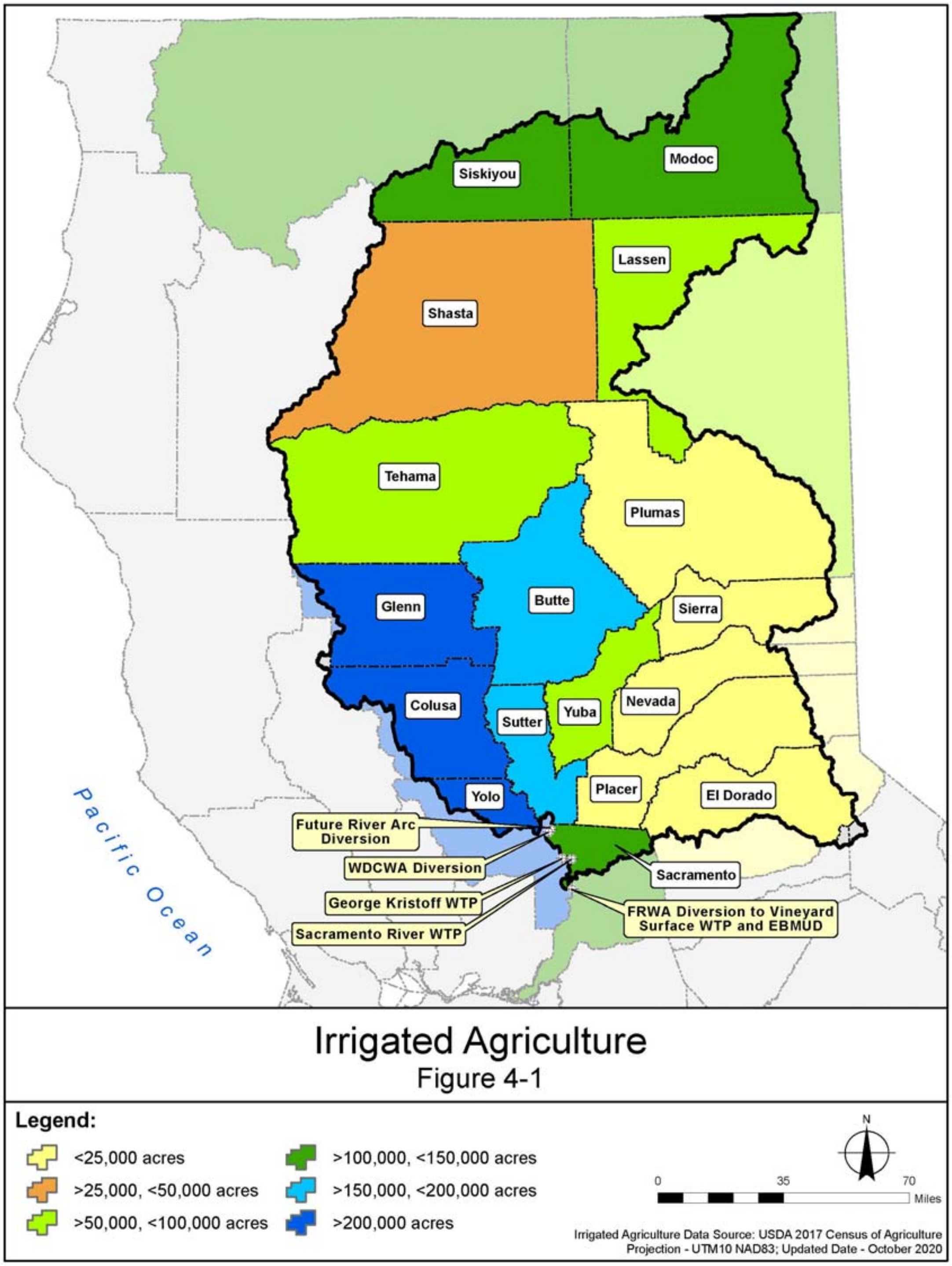
The reader is also referred to the Watershed Map, **Figure 2-1,** which provides information on selected activities in the watershed. For assistance with abbreviations and acronyms, the reader is referred to the List of Abbreviations at the front of the Report.

AGRICULTURAL DRAINAGE

Background

Irrigated agriculture continues to be a dominant type of land use in the Sacramento Valley. The total irrigated acreage in the watershed in 2017 was approximately 1.77 million acres, and is shown on **Figure 4-1**. This represents a six percent reduction in overall acreage between 2012 and 2017, and an eight percent reduction in the past 10 years. Irrigated agriculture occurs upstream of all existing intakes and proposed diversions covered in this study. It is discussed separately for rice, crops other than rice, and pastureland. Information on agricultural drainage has been obtained from reports from the Rice Pesticide Program (RPP) and the Irrigated Lands Regulatory Program (ILRP).

Figure 4-1. Irrigated Agriculture



Rice

Rice has been the principal crop of source water quality interest to date, since it is a water intensive crop and produces large quantities of drainage water. In 2017, there were approximately 430,000 acres of rice farmland in the Sacramento Valley; this was a 22 percent reduction from 2012 likely due to the extended drought that reduced water availability. The term rice discussed in this report includes all varieties, except wild rice which is regulated separately; see Crops Other than Rice below. Drainage from rice fields may carry pesticides and be a source of other constituents like microbials, solids, metals, and total organic carbon (TOC). A wide variety of pesticides are used on rice, and these can be detectable in the major agricultural drainages and the Sacramento River. The rice herbicide thiobencarb has a secondary drinking water standard, in addition to its primary drinking water standard, as it can react with chlorine to cause taste and odor problems in the treated water, even at ultra-low levels. Weed resistance to long-used pesticides (especially thiobencarb), and the phase out of molinate use, has led to different application combinations of old and new pesticides to achieve weed control. Propanil continues to be a chief feature of sequential herbicide combinations for water grass control, and clomazone and triclopyr are used as molinate replacements.

In addition, standing water has been used during the study period to decompose rice stubble following the harvest, and this affects solids and TOC levels in the drainage waters released during winter and spring months (and also levels of microorganisms as these flooded fields become wildfowl habitat). Finally, urbanization of the land on the east side of the river discharging to the City of West Sacramento's George Kristoff Water Treatment Plant (GKWTP) and the City of Sacramento's Sacramento River Water Treatment Plant (SRWTP) protection zones continues to reduce the amount of rice drainage within the protection zone.

The regulatory arena is dominated by the Regional Board's RPP and ILRP water quality order for Sacramento Valley Rice Growers, and it is discussed further below.

Crops Other than Rice

Drainage from other types of crops may carry pesticides and be a source of other constituents like microbials, solids, metals, and TOC. In 2017, other agriculture accounted for nearly 1.1 million acres in the watershed and is stable since the 2015 Update. Dominant other crops are deciduous orchards, grains other than rice, wild rice, and row crops.

Pesticides are used on other crops, including organophosphate pesticides typically used on orchards during the dormant spray season (typically January and/or February). Some of these pesticides are regulated in drinking water and have been monitored at the drinking water intakes, as well by ambient monitoring programs; they have been detected in the Sacramento River and tributaries, but when detected are usually well below primary drinking water standards.

Similar to rice, the Regional Board implements an ILRP water quality order for other Growers in the Sacramento Valley Watershed, discussed below. Also of note are the Total Maximum Daily Loads (TMDLs) being set by the Regional Board for priority watersheds, i.e., those water bodies listed under Section 303(d) of the Clean Water Act (CWA). A TMDL exists for diazinon and chlorpyrifos levels in various waterbodies throughout the Sacramento Valley, based on impact to aquatic life. Currently, the Regional Board is working on developing three additional Basin Plan Amendments related to pesticides as well. These TMDLs are discussed below.

Pastureland

Pastureland is irrigated rangeland and represents about 0.24 million acres in the watershed, again stable since the 2015 Update. The counties with the greatest amount of irrigated pastureland are furthest from the drinking water intakes; Siskiyou, Modoc, Lassen, and Shasta. Discharges from pasturelands may carry *Cryptosporidium*. Calves are known to be able to transmit *Cryptosporidium*, and there are a large number of cattle (just under 500,000) in the Sacramento River watershed, although calves are only seasonally present in rangeland operations. Most rangeland in the Sacramento Valley consists of beef cattle on private, irrigated lands.

Irrigated pastureland is included in the ILRP, as part of the Growers in the Sacramento Valley Watershed order. Non-irrigated rangeland mostly occurs higher in the watershed on public United States Forest Service (USFS) and US Bureau of Land Management (USBLM) lands and is managed under lease conditions set by those agencies; this is discussed further under the Livestock subsection below.

Seasonal Patterns

Rice

Rice cultivation is predictable in its relative timing, although weather can greatly affect the individual season, including the need for and timing of herbicide applications. Typically, the rice fields are prepared in early spring (March) and then flooded in late spring (April/May). During field flooding is when most weed and insect control occurs. In continuously flooded fields, an early season herbicide application is typically followed by a second herbicide application. The fields are flooded through the summer months, with drainage typically occurring in late summer (August/September) prior to harvest. The fields are then flooded during the winter months to allow for waterfowl habitat and rice stubble decay, with a second drain in late winter (February) prior to the planting preparation season. During the two drainage periods, in late summer and late winter, it is expected that the flows would have the highest levels of organic carbon associated with solids loading.

Crops Other than Rice

Organophosphate pesticides, including chlorpyrifos and diazinon, are dormant season sprays and are typically applied to orchards in January and February. Other pesticides are applied to the orchard and row crops during the irrigation season, which can vary from March through October. It is expected that storm runoff would be largely responsible for contribution of solids, specifically organic carbon, since irrigation season agricultural management practices do not typically result in runoff, except for wild rice crops that utilize flooded fields.

Pastureland

Spring is calving season and therefore is the time of peak risk of infected herds and also still a time when oocysts likely survive well. Early summer can also result in oocysts being contributed from young calves as they graze with cows. Peak *Cryptosporidium* shedding occurs within a very limited group of calves (two months of age[1]), and therefore manure management for the young is of far more importance than manure management for adult animals. Since transport of *Cryptosporidium* overland is inefficient in most pasture environments, pastureland located proximally to rivers and tributaries is of primary concern. Survival of oocysts is also likely affected by seasonal temperature. Research shows that when the temperature of a cow fecal pat exceeds 104°F the *Cryptosporidium* will die within a matter of hours[1]. When air temperatures exceed 78°F, a fecal pat in direct sunlight will achieve the required 104°F. The killing rate declines as the temperature or sunlight exposure declines so that fecal pats deposited in winter (January through April) may provide temperature conditions that allow for oocysts survival for 90 plus days. It is expected that storm runoff would be largely responsible for contribution of solids, specifically organic carbon, since agricultural management practices do not typically result in runoff.

Related Constituents

Rice Pesticides

Due to increased weed resistance, as well as regulatory limitations, a broader slate of pesticides is being used to address weeds and pests. Thiobencarb continues to be a key herbicide for rice growers, with use increasing significantly during the study period. There was a more than doubling of annual thiobencarb application between 2013 and 2017. Propanil, copper sulfate, sodium carbonate peroxyhydrate, triclopyr, and clomazone are other top herbicides used during the study period. In general, stewardship efforts by the rice industry and educational organizations, regulatory programs, and conditions such as weather, pesticide application methods, and water management practices should contribute to reduced frequency and concentration of

[1] University of California Agriculture and Natural Resources, California Rangeland Watershed Laboratory, Department of Plant Sciences, University of California at Davis. www.Rangelandwatersheds.ucdavis.edu/MWQIC/MWQIC/Indicators_Crypto_window.html. May 13, 2015.

pesticides in the Sacramento River and agricultural drainages. However, the trend of increased thiobencarb levels in agricultural drains has persisted.

The pesticides used on commercial rice greater than 1,000 pounds of active ingredient in the counties in the Sacramento River Watershed are shown in **Table 4-1**, in order of use in 2017. The California Department of Pesticide Regulation (DPR) prepares annual summaries of pesticide use as reported to county agricultural commissioners and provides the data on their website. The most recent year of data is from 2017.

Table 4-1
Rice Pesticides Used in Sacramento River Watershed[1] (pounds)

Pesticide	2013	2014	2015	2016	2017	Trend
Propanil	2,387,053	1,885,646	1,688,496	2,237,619	1,628,793	Decreasing
Copper sulfate, pentahydrate	1,178,493	1,357,553	1,048,073	1,042,253	1,040,481	Stable
Thiobencarb	283,454	370,706	521,915	696,341	599,902	Increasing
Sodium carbonate peroxyhydrate	162,936	269,788	147,009	150,745	99,263	Decreasing
Triclopyr, triethylamine salt	68,888	59,669	50,665	71,187	52,877	Decreasing
Clomazone	127,621	100,450	76,981	83,573	49,038	Decreasing
Azoxystrobin	43,778	38,305	38,267	41,898	34,823	Decreasing
Sodium chlorate	21,706	6,953	9,767	34,278	25,173	Increasing
Sulfuryl fluoride	4,098	6,478	3,826	11,585	21,929	Increasing
Cyhalofop butyl	20,321	13,022	12,068	22,421	14,231	Decreasing
Benzobicyclon	-	-	-	-	12,819	New
Glyphosate, isopropylamine and potassium salts	5,223	8,552	5,464	15,309	8,572	Increasing
Methoxyfenozide	-	-	355	5,104	7,380	Emergency Use
Lambda-cyhalothrin	5,198	4,289	6,524	5,674	5,864	Stable
Pendimethalin	3,846	3,127	7,027	4,796	5,527	Increasing
Penoxsulam	3,962	4,352	3,810	5,136	4,770	Increasing
Sodium hypochlorite	745	124	2,515	2,139	3,760	Increasing
Bispyribac-sodium	4,031	3,414	3,738	4,562	3,183	Decreasing
Carfentrazone-ethyl	1,496	3,492	4,009	5,078	3,157	Increasing
Halosulfuron-methyl	105	142	424	1,089	2,970	Increasing
Imazosulfuron	1,882	1,592	2,067	2,487	2,558	Increasing
Diflubenzuron	75	72	102	162	1,554	Increasing
2,4-D, dimethylamine salt	1,446	820	734	219	1,084	Decreasing

[1]Based on California Department of Pesticide Regulation Pesticide Use Reporting Database for 17 Counties in Sacramento River Watershed for rice (may be an overestimate as not all of counties located in watershed)

There were an additional 25 pesticides that were used during 2017, but they were only applied sporadically or at relatively small amounts (less than a thousand pounds per year). All pesticides used since 2013 are provided in **Appendix D**. This shows that more pesticides are being used on rice crops over the study period. Overall, the decrease in the total amount of pesticides used on rice crops between 2013 and 2017 (an average of 4.0 million pounds per year for a 15 percent reduction), does not match the reduction in rice acreage of 22 percent over the same period.

Thiobencarb use increased significantly between 2013 and 2017, more than doubling in pounds applied annually. It is possible that this is a result of the extended drought that occurred, as water was required to be held longer on fields allowing growers to easily meet the higher thiobencarb holding times. The data show that propanil (herbicide), clomazone (herbicide), and triclopyr (herbicide) had decreasing trends since the 2015 Update report. However, the amount of pesticide used can vary significantly from year to year depending on weather and pest conditions. Azoxystrobin (fungicide) applications have generally reduced during the study period also, but can still have years with higher values (such as 2016). Several new pesticides have been introduced and are being used substantially. The new pesticide benzobicyclon saw maximum permitted application in 2017. Also used in emergency since 2015 was methoxyfenozide, to control army worm invasions.

The majority of pesticides used on rice in the Sacramento River watershed do not have current drinking water standards. Many of these have health thresholds prepared by United States Environmental Protection Agency (USEPA) or the United States Geological Survey (USGS) and provide insight on concentrations of potential concern.

Other Pesticides

Pesticides are also applied to other, non-rice, irrigated crops in the watershed. Annually, there are over 400 pesticides used at some amount in the Sacramento River watershed. The list of all pesticides applied at more than one hundred pounds during any year of the study period is provided in **Appendix D**, there are 279. There are 193 pesticides that were applied at more than one thousand pounds during any year of the study period. The top 50 pesticides and nine other pesticides with interesting annual application, used on other crops in the counties in the Sacramento River Watershed, are shown in **Table 4-2**, in order of use in 2017.

In 2017, the total pounds of pesticides applied in Sacramento River watershed counties exceeded 10 million. That is a 13 percent increase between 2013 and 2017. During the same period the acreage of non-rice crops remained stable.

The data show that all but one of the top ten used pesticides on non-rice crops are stable or increasing in use over the study period; glyphosate (herbicide), copper products (pesticide or fungicide), 1,3-dichloropropene (fumigant, nematicide), mancozeb (fungicide), chloropicrin (pesticide), ziram (fungicide), chlorothalonil (fungicide), pendimethalin (herbicide), and paraquat dichloride (herbicide). Only methyl bromide (pesticide) use was decreasing over the study period.

Similar to rice, the majority of pesticides used on non-rice crops in the Sacramento River watershed do not have current drinking water standards. Many of these have health thresholds prepared by USEPA or USGS that can provide insight on concentrations of potential concern.

Table 4-2
Commonly Used Pesticides in the Sacramento River Watershed[1] (pounds)

Chemical Name	2013	2014	2015	2016	2017	Trend
GLYPHOSATE, All	1,525,209	1,505,525	1,785,368	1,809,238	1,685,919	Stable
COPPER, All	1,030,627	913,631	1,103,834	1,371,051	1,610,532	Increasing
1,3-DICHLOROPROPENE	628,617	714,109	1,239,775	618,375	1,008,630	Increasing
METHYL BROMIDE	1,200,348	1,066,997	951,135	973,574	830,633	Decreasing
MANCOZEB	417,140	444,007	464,369	560,293	654,944	Increasing
CHLOROPICRIN	669,676	687,363	752,055	582,790	623,333	Stable
ZIRAM	317,533	314,014	363,851	352,438	437,869	Increasing
CHLOROTHALONIL	245,807	296,345	249,806	286,707	276,832	Stable
PENDIMETHALIN	166,535	148,658	218,378	208,462	215,960	Increasing
PARAQUAT DICHLORIDE	111,763	130,711	185,894	179,382	189,847	Increasing
OXYFLUORFEN	147,295	84,520	139,946	145,887	151,060	Stable
SULFURYL FLUORIDE	173,888	118,985	153,092	145,925	141,150	Decreasing
GLUFOSINATE-AMMONIUM	3,873	14,086	71,269	104,272	137,577	Increasing
BORIC ACID	41,061	85,660	92,306	92,423	85,412	Increasing
CHLORPYRIFOS	137,031	153,254	143,539	102,350	85,076	Decreasing
2,4-D, All	117,003	93,098	127,115	105,122	78,406	Decreasing
S-METOLACHLOR	58,311	66,269	62,090	81,529	77,973	Increasing
ETHEPHON	47,732	44,701	57,384	56,075	77,112	Increasing
ALUMINUM PHOSPHIDE	32,908	24,006	14,131	10,996	71,197	Increasing
CALCIUM HYPOCHLORITE	82,504	107,295	120,122	111,902	64,852	Decreasing
ORYZALIN	98,390	86,828	84,048	66,012	60,022	Decreasing
BIFENAZATE	10,203	8,192	14,994	33,466	55,364	Increasing
NALED	30,986	55,272	45,349	52,204	54,228	Increasing
PROPICONAZOLE	15,769	21,028	22,844	33,163	52,414	Increasing
DIAZINON	23,401	23,966	28,136	26,953	51,953	Increasing
TRIFLURALIN	49,990	53,996	57,837	63,966	50,190	Stable
POTASSIUM BICARBONATE	15,366	15,950	15,015	20,544	47,110	Increasing
IMIDACLOPRID	11,419	16,708	26,234	28,815	47,056	Increasing
CAPTAN	22,338	23,349	63,531	100,454	46,644	Increasing
METAM-SODIUM	244,383	227,065	256,678	199,407	40,269	Decreasing
BIFENTHRIN	34,587	32,360	59,898	36,798	39,540	Stable
ENDOTHALL, All	19,999	22,854	25,117	27,157	34,687	Increasing
METHOXYFENOZIDE	13,586	15,188	21,740	28,136	33,126	Increasing
AZOXYSTROBIN	12,083	16,140	21,858	22,067	32,175	Increasing
HEXAZINONE	40,487	21,704	48,406	36,457	31,801	Decreasing
TRICLOPYR, All	36,810	38,890	47,648	39,691	30,368	Decreasing
ETHALFLURALIN	48,646	35,728	24,651	34,403	29,343	Decreasing

Table 4-2 Cont'd
Commonly Used Pesticides in the Sacramento River Watershed[1] (pounds)

Chemical Name	2013	2014	2015	2016	2017	Trend
METOLACHLOR	35,374	43,210	47,816	43,340	28,606	Decreasing
SODIUM CHLORATE	22,246	19,986	12,933	22,482	28,002	Increasing
DIURON	51,273	29,062	40,840	42,363	27,449	Decreasing
POTASSIUM PHOSPHITE	1,317	8,163	2,201	6,807	27,430	Increasing
CYPRODINIL	8,974	17,783	17,039	17,800	24,323	Increasing
PYRACLOSTROBIN	16,541	24,001	24,688	20,335	19,574	Increasing
BORAX	34,691	11,476	10,548	86,701	19,555	Decreasing
CHLORANTRANILIPROLE	7,574	8,267	11,861	14,555	19,269	Increasing
FLUOPYRAM	1,862	6,722	8,882	12,254	17,798	Increasing
THIOPHANATE-METHYL	4,244	5,187	5,955	9,908	17,760	Increasing
CARBARYL	27,321	26,362	31,125	22,013	17,702	Decreasing
BUPROFEZIN	834	7,401	9,983	7,894	17,357	Increasing
TEBUCONAZOLE	3,416	5,111	9,305	17,243	17,286	Increasing
MCPA	30,465	22,245	27,634	31,211	16,853	Decreasing
BOSCALID	23,370	29,745	22,073	18,848	16,125	Decreasing
SIMAZINE	42,088	19,785	25,685	26,733	15,938	Decreasing
PERMETHRIN	26,816	23,691	52,917	24,139	12,920	Decreasing
MALATHION	27,190	16,637	14,104	9,173	10,902	Decreasing
DICHLOBENIL	988	26,348	2,938	2,126	5,885	Increasing
DIMETHOATE	15,858	28,012	15,800	9,831	5,825	Decreasing
CHLORPROPHAM	26,468	3,351	2,743	4,531	3,038	Decreasing
POTASSIUM N-METHYLDITHIOCARBAMATE	124,764	150,993	57,107	-	-	Decreasing

[1]Based on California Department of Pesticide Regulation Pesticide Use Reporting Database for 17 Counties in Sacramento River Watershed for rice (may be an overestimate as not all of counties located in watershed)

Total Organic Carbon

Because agricultural drainage comes off of irrigated cropland and through earthen canals and ditches, it has organic content. Standing water, suspended sediment, fecal waste, and decomposing vegetation all contribute to TOC levels.

Giardia and Cryptosporidium

Although *Giardia* and *Cryptosporidium* can come from a variety of animal populations, loading from cattle is a source of key interest. In the Western United States studies have shown that about 19 percent of cattle are infected with *Giardia* and about four percent are infected with *Cryptosporidium*[2]. According to the University of California, California Rangeland Watershed Laboratory, an infected calf can shed upwards of

[2] University of California Agriculture and Natural Resources, California Rangeland Watershed Laboratory, Department of Plant Sciences, University of California at Davis. www.Rangelandwatersheds.ucdavis.edu/MWQIC/MWQIC/Indicators_Giardia_window.html. May 13, 2015.

10,000,000 *Cryptosporidium* oocysts per gram of feces and up to 1,000,000 *Giardia* cysts per gram of feces. Loading is a function of animal density, or stocking rates, timing of grazing, and infection rate among the herd. Calves from one to four months contribute over 99 percent of oocysts shed by cattle. Given the low ratio of calves and their geographic spread, it may be that grazing cattle populations do not spread *Cryptosporidium* as readily as dairy cattle. *Giardia* and *Cryptosporidium* survive well in cool, moist environments and can be transported overland. However, freeze-thaw cycles reduce survivability. Overland transport may be required which will reduce the viability of oocysts; studies show that grassland buffers can capture up to 99.9 percent of oocysts[3].

Presence in the Watershed and Protection Zones

The major agricultural drainage canals on the valley floor are: Colusa Basin Drain, Butte Slough, Sacramento Slough, and the Natomas East Main Drainage Canal. The outfall for the Natomas East Main Drainage Canal is in the protection zone, while the other three are on the northern boundary of it. The Natomas East Main Drainage Canal carries significant amounts of urban runoff and treated wastewater as well. Rice field drainage is also discharged directly to the Sacramento River and the Feather/Bear River systems. The Feather/Bear River system flows into the Sacramento River at River Mile 80. Within the protection zone, agricultural drainage from Reclamation District (RD) 1000, which is responsible for the drainage system in the Natomas Basin, discharges to the Sacramento River both through direct outfalls and through the Natomas Cross Canal, Natomas Main Drainage Canal, and the Natomas East Main Drainage Canal.

There are four drains that discharge to the Sacramento River upstream of the GKWTP between the intake at River Mile 62.5 and the Feather River confluence at River Mile 80. These drains discharge from the east side of the river as follows:

- River Mile 66 – RD1000 Pumping Plant 3, from the urbanizing Natomas area.
- River Mile 70 – RD1000 Pumping Plant 5, from the area near the Sacramento International Airport, which is mostly agricultural (rice) but is also urbanizing.
- River Mile 75 – RD1000 Pumping Plant 2, from north of the airport in a currently agricultural area (rice).
- River Mile 79 – Natomas Cross Canal from western Placer, south Sutter, and north Sacramento counties with a blend of watershed runoff, agricultural drainage, urban runoff, and treated wastewater effluent.

Agricultural drainage on the west side of the protection zone drains into the Tule Canal and the Yolo Bypass, therefore it is not of concern.

The dominant crops of interest to this study grown in the Sacramento River watershed are rice, deciduous orchards, and pastureland. The acreage of these crops in 2007, 2012, and 2017 is shown in **Tables 4-3** through **4-5,** as well as the percent change in acreage over the five and ten year periods. This information is collected by the

[3] www.Rangelandwatersheds.ucdavis.edu/MWQIC/MWQIC/Indicators_Crypto_window.html

California Department of Food and Agriculture once every five years and reported to the United States Department of Agriculture (USDA). The 2017 data are presented since they are the most recent data available.

Table 4-3
Irrigated Rice Acreage, 2007, 2012, and 2017

County	Irrigated Rice				
	2007	2012	2017	5 Year Change	10 Year Change
Butte	97,845	94,546	74,115	-22%	-24%
Colusa	147,817	153,224	125,348	-18%	-15%
El Dorado	-	-	-	-	-
Glenn	93,817	94,330	81,735	-13%	-13%
Lassen	-	[D]	-	-	-
Modoc	-	[D]	[D]	-	-
Nevada	-	-	-	-	-
Placer	9,313	9,373	5,815	-38%	-38%
Plumas	-	-	-	-	-
Sacramento	5,114	2,040	3,170	55%	-38%
Shasta	-	-	260	-	-
Sierra	-	-	-	-	-
Siskiyou	-	[D]	[D]	-	-
Sutter	99,284	121,035	87,093	-28%	-12%
Tehama	915	1,551	899	-42%	-2%
Yolo	29,675	36,341	25,191	-31%	-15%
Yuba	33,399	34,303	24,516	-29%	-27%
TOTAL	**517,179**	**546,743**	**428,142**	**-22%**	**-17%**

Based on information from the USDA website: www.nass.usda.gov
[D] Data withheld to avoid disclosing information for an individual farm

Table 4-4
Irrigated Orchards, 2007, 2012, and 2017

County	Irrigated Orchards				
	2007	2012	2017	5 Year Change	10 Year Change
Butte	86,490	91,648	108,709	19%	26%
Colusa	51,853	58,306	76,318	31%	47%
El Dorado	3,239	3,370	3,861	15%	19%
Glenn	70,663	93,129	111,054	19%	57%
Lassen	189	[D]	122	-	-35%
Modoc	52	[D]	14	-	-73%
Nevada	383	498	638	28%	67%
Placer	1,306	1,501	2,266	51%	74%
Plumas	-	-	24	-	-
Sacramento	28,752	28,348	40,105	41%	39%
Shasta	1,253	1,463	1,498	2%	20%
Sierra	[D]	[D]	[D]	-	-
Siskiyou	146	[D]	162	-	11%
Sutter	65,029	71,855	72,450	1%	11%
Tehama	35,529	46,096	45,320	-2%	28%
Yolo	34,460	49,383	76,737	55%	123%
Yuba	23,532	28,572	36,624	28%	56%
TOTAL	**402,876**	**474,169**	**575,902**	**21%**	**43%**

Based on information from the USDA website: www.nass.usda.gov
[D] Data withheld to avoid disclosing information for an individual farm

Table 4-5
Irrigated Pastureland, 2007, 2012, and 2017

County	Irrigated Pastureland				
	2007	2012	2017	5 Year Change	10 Year Change
Butte	9,306	5,941	4,740	-20%	-49%
Colusa	8,595	8,812	6,444	-27%	-25%
El Dorado	5,278	2,460	874	-64%	-83%
Glenn	13,331	15,493	23,014	49%	73%
Lassen	32,064	31,690	22,554	-29%	-30%
Modoc	37,592	28,780	35,937	25%	-4%
Nevada	4,856	4,088	3,516	-14%	-28%
Placer	15,079	6,643	8,810	33%	-42%
Plumas	13,512	9,037	9,531	5%	-29%
Sacramento	11,267	8,422	11,040	31%	-2%
Shasta	30,375	19,910	26,803	35%	-12%
Sierra	5,386	7,820	8,019	3%	49%
Siskiyou	53,624	56,395	39,718	-30%	-26%
Sutter	8,514	4,302	3,507	-18%	-59%
Tehama	24,535	25,012	18,360	-27%	-25%
Yolo	8,530	6,855	7,036	3%	-18%
Yuba	10,030	15,780	5,642	-64%	-44%
TOTAL	**291,874**	**257,440**	**235,545**	**-9%**	**-19%**

Based on information from the USDA website: www.nass.usda.gov
[D] Data withheld to avoid disclosing information for an individual farm

For rice, acreage increased slightly from 2007 to 2012, but there was a significant decrease of 22 percent in the total acreage of rice planted over the 2012 to 2017 period. This results in a long term decreasing acreage trend for rice in the Sacramento Valley of 17 percent over ten years. Most of that decrease occurred in Butte, Colusa, Glenn, Sutter, and Yuba counties. Decreases were seen in all rice growing watershed counties.

Orchard acreage increased 18 percent in the 2007 to 2012 period, and saw an even more significant increase of 21 percent in the total acreage of orchards planted over the 2012 to 2017 period. This results in a long term increasing acreage trend for orchards in the Sacramento Valley of 43 percent over 10 years. The largest increases were seen in Butte, Colusa, Glenn, and Yolo counties. All watershed counties, except Modoc, saw an increase in orchard growing.

Pastureland acreage decreased eight percent in the 2007 to 2012 period, and saw an additional nine percent reduction from 2012 to 2017. This results in a long term decreasing acreage trend for pastureland in the Sacramento Valley of 19 percent over 10 years. The greatest reductions in acreage were in Lassen and Siskiyou counties. All watershed counties, except Glenn, saw a decrease in pastureland.

Regulation and Management

There are two main regulatory programs related to agricultural drainage in the watershed, the RPP and the ILRP, as summarized in **Table 4-6**. In addition, the development of Basin Plan Amendments and TMDLs has set more stringent standards on non-point sources.

Table 4-6
Regulatory Overview
Agricultural Drainage in the Sacramento River Watershed

RICE
Rice Pesticide Program
Industry group: California Rice Commission (CRC)
The RPP prohibits discharge of rice field drainage unless specific management practices are implemented, e.g. holding water on fields to allow for pesticide dissipation, seepage management, and aerial drift control. In recent years, additional management practices for the forthcoming rice season have been worked out between the CRC and the Regional Board. The RPP originally covered five rice pesticides – only one of which (thiobencarb) is currently addressed through this program.
Discharges from Irrigated Lands Regulatory Program
Order No. R5-2014-0032-02: Waste Discharge Requirements for Sacramento Valley Rice Growers
Third-party Entity: CRC
The Sacramento Valley Rice Growers Order was developed to comply with the long-term ILRP. It was expanded from the interim Rice Waiver Program to include discharges to groundwater, as well as surface water. Many of the program requirements will remain the same as the Rice Waiver Program, with key changes made to focus efforts on areas with high threats to water quality, increase grower accountability, require growers to conduct evaluations of management practices, develop regional water quality management plans, monitor to fill data gaps, and to select pesticides for monitoring using a defined prioritization process. This Order was adopted in 2014 and effective for the 2015 growing season.
IRRIGATED CROPS OTHER THAN RICE (INCLUDES WILD RICE AND PASTURELAND)
Discharges from Irrigated Lands Regulatory Program
Order No. R5-2014-0030-07: Waste Discharge Requirements for Growers within the Sacramento River Watershed That are Members of a Third-Party Group (Sacramento River Watershed)
Third-party Entity: Northern California Water Association (NCWA)
The Sacramento River Watershed Order was developed to comply with the long-term ILRP. It was expanded from the Interim Sacramento Valley Water Quality Coalition (SVWQC) Program to include discharges to groundwater, as well as surface water. Many of the program requirements will remain the same as the SVWQC Program, with key changes made to focus efforts on areas with high threats to water quality, increase grower accountability, require growers to conduct evaluations of management practices, develop regional water quality management plans, monitor to fill data gaps, and to select pesticides for monitoring using a defined prioritization process. This Order was adopted in 2014 and effective for the 2015 growing season.

Rice Pesticide Program

The purpose of the RPP is to reduce discharges of specified rice pesticides (molinate, carbofuran, thiobencarb, malathion, and methyl parathion) into surface waters leading to the Sacramento River, only one of which (thiobencarb) is still heavily used for rice. Carbofuran and molinate are no longer allowed for use on rice, while malathion and methyl parathion have been replaced by newer pesticides. Performance Goals were set for these five pesticides in freshwater habitat, including agricultural drains. This included: carbofuran – 0.4 micrograms per liter (µg/L), malathion – 0.1 µg/L, methyl parathion – 0.13 µg/L, molinate – 10 µg/L, and thiobencarb – 1.5 µg/L. In addition, there are water quality objectives for these constituents set at their primary, or secondary, maximum contaminant levels for drinking water. The RPP began in 1983 as part of regulatory requirements set by the Regional Board. It is now jointly administered by the Regional Board and the DPR. DPR provides permit conditions for the County Agricultural Commissioners (CAC) who issue permits and conduct field work. This program prohibits discharge of rice field drainage unless specific management practices are implemented including; holding water on fields to allow for pesticide dissipation, seepage management, and aerial drift control.

The CRC acts as the lead agency for the rice growers' regulatory compliance. During the study period the management practices and monitoring program for the forthcoming rice season were worked out between the CRC and the Regional Board. The most current order is Resolution R5-2010-9001, Rice Pesticides Program – Control of Rice Pesticides. The Resolution included a few new changes to the program:

- A label amendment from the registrant to reflect the hold time in the permit conditions and to revise the application rate for a new granular formulation of thiobencarb product,
- Increase the funding for county surveillance at non-traditional hours at double the level for 2009 and increase the area of surveillance to other counties not previously funded, and
- Provide additional outreach to applicators and to staff of companies selling and distributing thiobencarb.

The participating water agencies have provided stakeholder input to the annual approval process through discussion with the CRC and Regional Board, submittal of comments, and by verbal input at the Regional Board fall stakeholder coordination meeting.

The RPP tracks program implementation. As part of the annual report prepared to summarize the activities for that year, there is documentation of key issues or conditions that affected the concentrations of pesticides entering adjacent waterways. Some of the key issues or conditions that have occurred during the study period, 2015 through 2019, include the following:

- Extended drought resulting in increased use of thiobencarb, significant increases in acreage treated, and higher concentrations in agricultural drains.
- Non-compliance with waterhold requirements, aerial drift, and seepage contributing to Performance Goal exceedances.
- Addition of special monitoring sites to assist with identification of areas with non-compliant growers.
- Continued education and outreach efforts to growers, thiobencarb distributors, and applicators and funding for increased surveillance inspections.
- Increased measures related to permit restrictions for habitually non-compliant growers and voluntary thiobencarb acreage application limitations.

Under the RPP, approved management practices for rice growers consist of:

- Required water holding periods for applied irrigation water for each pesticide; thiobencarb – 19 to 30 days, molinate - 28 days, carbofuran - 28 days, and methyl parathion - 24 days. There is a recommended holding time for malathion - 4 days. These hold times are reduced for closed water management systems that recirculate flows: thiobencarb – 6 days, molinate – 8 days.
- Seepage control, which includes conducting seepage inspections and requiring compaction of borders surrounding rice fields. Also providing “Seepage Water Management”, a voluntary guideline developed by the University of California Division of Agriculture and Natural Resources, to growers. Seepage inspections now focus on areas of known problems.
- Drift control for aerial application, which includes use of drift control agents, specified application nozzles, wind speeds, downwind buffer zones, buffer zones in proximity to the Sacramento River, etc.
- Formation of the Storm Event Work Group (SEWG) to identify and recommend mitigation measures to improve compliance in the event of a severe storm event. A Communications Plan was developed to communicate on storm situations and required sampling. This was initiated in 2004 and includes notification to the cities of West Sacramento and Sacramento and the Freeport Regional Water Authority (FRWA).
- Mandatory stewardship program for growers, pest control advisors and applicators using thiobencarb (which initially began as a voluntary program).
- Additional resources provided to some CACs for field inspections.

A summary of the RPP activities over the last five years is shown in **Table 4-7**.

During the last study period, 2010 through 2014, the average acreage treated annually was 75,706 with an average of 265,577 pounds of thiobencarb applied annually. During this study period, 2015 through 2019, the average acreage treated annually was 169,221 with an average of 617,632 pounds of thiobencarb applied annually. That represents a 123 percent increase in acreage treated and a 132 percent increase in pounds applied. These are very significant increases in thiobencarb use in the watershed.

Table 4-7
Rice Production Activities Summary, 2015 - 2019[1]

	2015	2016	2017	2018	2019
Acreage in rice production	375,000	559,582	503,964	520,000	526,547
Inspections (total)	3,477	3,130	3,081	1,927	2,292
Number of Reported Emergency Releases	0	0	2 (Butte/ Colusa Counties)	0	0
Acreage treated with Thiobencarb	144,552	191,414	155,430	164,535	190,173
Pounds Thiobencarb applied[2]	521,915	696,341	599,902	590,000	680,000

[1]Based on information from CRC Rice Pesticide Program Annual Reports, 2015 – 2019.
[2]DPR Pesticide Use Report for 2015 – 2017, estimates based on acreage for 2018 – 2019.

A review of the Annual Reports to the Regional Board indicates that there were exceedences of the Performance Goals in every year from 2015 through 2019, but no exceedences of the water quality objectives at the GKWTP or SRWTP. However, there were low level detects of thiobencarb at GKWTP in 2015 (0.1 µg/L), 2016 (0.13 µg/L), and 2019 (0.13 µg/L) and at SRWTP in 2016 (0.12 µg/L) and 2019 (0.085 µg/L). The Performance Goal exceedences were mostly found in Colusa Basin Drain and its tributaries, although there was one in Butte Slough in 2017. Here is a summary of the Performance Goal exceedences:

- 2015 - five exceedences, with a maximum detection of 5.25 µg/L.
- 2016 - six exceedences, with a maximum detection of 11 µg/L.
- 2017 - eight exceedences, with a maximum detection of 2.8 µg/L.
- 2018 - one exceedence, with a value of 1.7 µg/L.
- 2019 - eight exceedences, with a maximum detection of 2.7 µg/L.

The County Agricultural Commissioners issued Agricultural Civil Penalties (ACP) to several rice growers through the study period, for violations related to seepage, water holds, and application/mixing. The number of ACPs per year were; 2016 – 2, 2016 – 7, 2017 – 5, 2018 – 2, and 2019 - 2.

Irrigated Lands Regulatory Program

The Regional Board first adopted the Conditional Waiver of Waste Discharge Requirements (WDRs) for Discharges from Irrigated Lands in July 2003 (R5-2003-0105). This Order was updated by R5-2006-0053, and extended by R5-2011-0032. This was an interim program until a long-term program was developed. Dischargers had the option of obtaining individual permits or joining a coalition.

In 2014 the Regional Board finalized and adopted the ILRP as the long-term solution for irrigated agricultural discharges, which replaced the Conditional Waivers. The ILRP includes new orders that generally continue many of the requirements of the Conditional

Waivers, but were expanded to include protections for both surface water and groundwater and provide a more structured framework for implementation. Individual orders and coalition orders are available. Two coalition orders were adopted by the Regional Board for coalitions in the Sacramento River Watershed: R5-2014-0030 – Waste Discharge Requirements General Order for Growers within the Sacramento River Watershed That are Members of a Third-Party Group (Sacramento River Watershed) and R5-2014-0032 – Waste Discharge Requirements General Order for Sacramento Valley Rice Growers (Sacramento Valley Rice Growers). These orders were effective for the 2015 growing season and they are briefly summarized in **Table 4-6**. In addition to the two Third-Party Orders in the watershed, there is a General Order for Growers Not Participating in a Third-Party Group (Order R5-2013-0100). An individual farmer could voluntarily enroll this way or the Regional Board could require enrollment in the event of failure of an individual to meet the Third-Party Order requirements. Permit conditions are farm-specific, so they are typically more stringent than the Third-Party Orders. Currently, there are no individual Orders in the Sacramento River watershed so it is of limited importance.

Each WDR includes a Monitoring and Reporting Program (MRP) that provides the guidelines for how that work shall be conducted over time. This includes timelines for submittal requirements under the WDR. The monitoring program defined in the ILRP is a representative monitoring program where waterbodies are sampled at sites that represent large areas of agricultural activity, rather than edge-of-field discharge monitoring. Currently, the State Water Resources Control Board (State Board) is requiring the Regional Board to convene an Expert Panel to determine if the representative monitoring program for one of the ILRP WDRs (East San Joaquin Parties Coalition) is conceptually sufficient to identify discharge characteristics of agricultural drainage and possible degradation impacts. The results of this evaluation may cause future revisions to the MRPs of other ILRP WDRs.

The selection of which pesticides to monitor as part of each WDR is governed by the Regional Board's Pesticide Evaluation Protocol (PEP), published in November 2016. The PEP was developed in a workgroup process that included the Regional Board, dischargers, and other stakeholders (including the Sacramento River Source Water Protection Program [SRSWPP] and the California Department of Pesticide Regulation). The PEP provides guidance on how to evaluate pesticides that are used on irrigated agricultural lands and to identify those that warrant surface water monitoring under the ILRP. The protocol includes step-by-step instructions and attachments (i.e., list of pesticides with reference values, list of degradates, and groups). The human health reference value for the listed pesticides was limited to Maximum Contaminant Levels (MCLs) and Numeric Criteria for Priority Toxic Pollutants. For some constituents that didn't have adopted numeric criteria, they set trigger limits based on the application of California Notification Levels (NLs) or Archived Advisory Levels (AALs), USEPA Health Advisories (HAs), or USEPA Human Health Benchmarks for Pesticides (HHBPs). It should be noted that not all current use pesticides are included on the list of pesticides to be considered in the PEP and not all HHBPs were applied as trigger limits.

If a water quality objective or water quality trigger limit is exceeded twice in a three year period at a site, then a Management Plan (MP) is triggered. The MP must include enhanced monitoring to verify the existence of an exceedence and confirm that irrigated agriculture is the source or cause of the exceedence. If so, then the Third-Party entity must prepare an MP to eliminate the exceedence.

Sacramento Valley Rice Growers

The Sacramento Valley Rice Growers Program WDR Order (R5-2014-0032-02) covers rice field discharges under the ILRP and addresses selected constituents not covered by the RPP. This program is also administered by the CRC. Authority to approve the program was delegated to the Regional Board Executive Officer and did not require the same approval process as the RPP.

The CRC has limited submittal requirements under the ILRP WDR. An Annual Monitoring Report (AMR) is due by December 31st each year which also includes the proposed monitoring plan for the upcoming season, as well as the Farm Evaluation summary. The Regional Board provides a review and approval letter for each AMR.

There have been two minor modifications to the WDR, R5-2015-0115 (clarifying that farmer designees could attend outreach events) and R5-2019-0001 (in response to State Board Order WQ-2018-0002, adding precedential requirements largely related to groundwater and nitrate). The Regional Board anticipates an update to the WDR in April 2021 to incorporate the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) Basin Plan Amendment requirements, including the Secondary Maximum Contaminant Level Guidance Policy.

The CRC has not triggered any new MPs under the current WDR, so no submittals or summary reports are required. The existing MP for dissolved oxygen was last updated in 2015.

Constituents monitored were specified in the MRP and vary by year. Generally, the following constituents were monitored annually; flow, temperature, turbidity, pH, dissolved oxygen, toxicity, total dissolved solids, conductivity, hardness, turbidity, and TOC. There was very limited pesticide monitoring conducted during the study period, the CRC chooses two per year based on the PEP.

- In 2015 and 2016 monitoring was conducted for clomazone and propanil. This data is discussed in the Water Quality Issues and Data Review below.
- In 2017 and 2018 monitoring was conducted for penoxsulam and bensulfuron-methyl. In addition, a new use pesticide and its primary metabolite were sampled as well; benzobicyclon and metabolite B. This data is discussed in the Water Quality Issues and Data Review below.
- In 2019 monitoring was conducted for bispyribac-sodium and penoxsulam. The new pesticide monitoring for benzobicyclon and metabolite B were continued. This data is discussed in the Water Quality Issues and Data Review below.

Sacramento River Watershed

The Sacramento River Watershed Order (R5-2014-0030-07) covers all non-rice irrigated crops in the Sacramento Valley, including wild rice and pastureland. The Sacramento River Watershed Order was divided into ten sub-watersheds. Each sub-watershed represented a unique geographic region delineated by hydrologic features, as well as political boundaries. The drainages in each sub-watershed were prioritized according to the presence of irrigated agriculture, major crop types, pesticide use, the presence of impaired water bodies, and other factors.

The Sacramento River Watershed Order has more extensive submittal requirements than the Sacramento Valley Rice Growers Order. An AMR is due by May 1st each year. A monitoring plan update is due by August 1st each year. There are numerous Management Plans in place for Sacramento River Watershed Order, so there is a Comprehensive Surface Water Quality Management Plan as well as annual Management Plan Progress Reports that are due by May 1st each year. In addition, a Farm Evaluation Update must be submitted annually by May 1st. The Regional Board usually provides a review and approval letter for each document, however these are typically posted well after their due dates.

There have been seven modifications to the WDR. This includes:

- R5-2015-0088 (allowing participation in the Delta Regional Monitoring Program and extending the deadline for the groundwater management plan)
- R5-2015-0115 (clarifying that farmer designees could attend outreach events)
- R5-2016-0014 (extending the deadline for the nitrogen management plan)
- R5-2016-0015 (clarifications for wetlands and irrigated pastureland)
- R5-2014-0030 (revisions to the monitoring and reporting program related to Delta Monitoring Program, May 2017); the MRP was reduced in February 2016 related to Delta and TMDL monitoring
- R5-2019-0001 (in response to State Board Order WQ-2018-0002, adding precedential requirements largely related to groundwater and nitrate)
- R5-2014-0030 (revisions to the monitoring and reporting program related to the groundwater assessment reports, February 2020)

The Regional Board anticipates an update to the WDR in April 2021 to incorporate the CV-SALTS Basin Plan Amendment requirements, including the Secondary Maximum Contaminant Level Guidance Policy. The Regional Board is also currently investigating the possibility of moving irrigated pastureland out of the Sacramento River Watershed Order. They are preparing a report and expect to have a determination on how to proceed later in 2020.

The Sacramento River Watershed Order has a coalition specific MRP as part of the WDR that has been used and updated throughout the study period. The Sacramento River Watershed Order's MRP was designed to evaluate the causes or contributions of aquatic toxicity in receiving waters, and includes source identification, management practice implementation, evaluation effectiveness, and monitoring. Each year a specific monitoring plan is submitted that complies with the requirements of the MRP and other Executive Orders approved by the Regional Board. The selection of which pesticides to monitor is governed by the Regional Board's PEP, as described previously.

Historic monitoring results showed that production practices impact surface water primarily through winter storm runoff and irrigation return flows. Winter storm runoff can transport: pesticides applied to dormant orchards; sediment, which may contain dissolved nutrients or pesticides; and fecal waste and nutrients from pasture and confined animal facilities. Irrigation return flows can transport pesticides applied before irrigation; sediment (with pesticides/nutrients also) from tilled fields (row/field crops); and dissolved salts.

The AMRs from the study period were reviewed, and provided below is a summary of the key data highlights. There were no major water quality problems identified, but that is likely due to the limited data collected and compared with human health thresholds. Pesticides were analyzed in individual water column samples collected throughout the watershed. The number of exceedences of pesticide water quality objectives in water courses entering the Sacramento River or its tributaries upstream of the Sacramento River at Freeport varied between years. The pesticide monitoring results are summarized later in Water Quality Issues and Data Review. There were very few pesticide detections of concern for drinking water upstream of the FRWA diversion location. Only a few were at a level of interest for drinking water. Most of these samples were isolated and non-repeating, indicating that it was a localized issue.

- 2015: Diuron – two detects, both below 2.2 μg/L, USEPA HA Cancer 10^{-6} = 2 μg/L (ILRP Trigger Limit is 2 μg/L, based on USEPA HA)
- 2015: Malathion – one detect at 0.0174 μg/L, Basin Plan prohibits any detection, AAL = 160 μg/L (ILRP Trigger Limit is no-detect based on Basin Plan Amendment-Acute)
- 2018: Mancozeb – one detect in Lower Honcut Creek, 1.3j μg/L, USEPA HHBP Cancer 10^{-6} = 0.532 μg/L, even though detect exceeded USEPA HHBP there was no discussion since this isn't an adopted or unadopted trigger limit as per the ILRP PEP
- 2019: Oxyfluorfen – six detects at five sites, 0.0098j - 0.92 μg/L, USEPA HHBP Cancer 10^{-6} = 0.437 μg/L, even though one detect exceeded USEPA HHBP there was no discussion since this isn't an adopted or unadopted trigger limit as per the ILRP PEP

For other constituents, there were exceedences of adopted Basin Plan objectives and advisory limits for a wide variety of constituents, including arsenic and *Escherichia coli (E. coli)* bacteria throughout the watershed. Arsenic and *E. coli* data are summarized later in Water Quality Issues and Data Review.

To address water quality exceedances, the Sacramento River Watershed Order developed a Management Plan in 2009, which was converted into the Comprehensive

Surface Water Quality Management Plan (CSQMP) in 2015 under the new WDR. The CSQMP was last updated in September 2016 and approved by the Regional Board in November 2016. Implementation of the CSQMP is the primary mechanism for addressing exceedances observed in the Coalition's surface water monitoring. The Sacramento River Watershed Order has the option to update the CSQMP annually or submit individual SQMP for each MP. Since 2016 the Sacramento River Watershed Order has determined to submit individual SQMPs instead of updating the CSQMP. Each year the Sacramento River Watershed Order submits a Management Plan Progress Report (MPPR) also that summarizes all MP activities. Activities conducted to implement the Management Plan included addressing exceedances of objectives for registered pesticides, completion of source evaluations for pesticides and toxicity, development of management practice implementation goals, and monitoring. Additional implementation for pesticides included evaluation of pesticide application data, identification of potential sources, and determination of likely agricultural sources.

General educational outreach was conducted in all sub-watersheds throughout the study period. The Coalition's targeted outreach approach is to focus on the growers with fields directly adjacent to or near the actual waterway of concern. The Coalition will work with the sub-watershed groups to implement a Response Plan framed around a three-tiered approach that is consistent with the MRP. Also, a Communications Report has been developed to enhance coordination between the various program entities.

Total Maximum Daily Loads

Section 303(d) of the CWA requires states to develop a list of impaired water bodies and a priority ranking for addressing impairments. This list is updated every two years. Impairments are addressed by developing TMDLs for that water body. Any constituent could be selected for a TMDL, if water quality segments are impaired.

There are four TMDLs established for pesticides in the watershed. Three are for diazinon and chlorpyrifos, based on aquatic toxicity: the Sacramento and Feather Rivers, six Sacramento area urban creeks, and the Sacramento-San Joaquin River Basins. One is for pyrethroids, also based on toxicity: Central Valley.

A TMDL is implemented through a Basin Plan Amendment to include site-specific numerical objectives, water quality management strategies to reduce runoff, monitoring, and a plan to reduce levels in the water bodies. The Regional Board has worked the TMDLs into existing regulatory programs, such as the ILRP. Two TMDLs became effective during the study period.

The Sacramento-San Joaquin River Basins Diazinon and Chlorpyrifos TMDL, Resolution R5-2014-0041, was adopted by the Regional Board on March 28, 2014. At the time of adoption, there were 43 segments Section 303(d)-listed for diazinon and chlorpyrifos. The amendment removed 11 water bodies from that list after finding they no longer exceeded water quality standards. The Resolution established numeric water quality objectives for diazinon and chlorpyrifos in the remaining 32 water bodies in the

Central Valley that are still in exceedance of water quality standards. The Resolution also establishes a pesticide control program and monitoring requirements that will ensure that the numeric water quality objectives will be achieved. This Basin Plan Amendment was approved by the State Board in June 2015, the Office of Administrative Law (OAL) in March 2017, and the USEPA in August 2017. The Amendment is now fully approved and effective as of August 16, 2017.

The Regional Board reevaluated the regulatory approach in developing a pyrethroid pesticide control program and held Board workshops during the summer and fall of 2016. A Board hearing regarding the proposed Amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins for the Control of Pyrethroid Pesticide Discharges (Amendment) occurred on June 8, 2017. At the hearing, Resolution R5-2017-0057 was adopted. The amendment includes TMDLs for nine urban water bodies already listed as impaired, 'category 4b' demonstrations for five listed water bodies receiving agricultural discharges (i.e. demonstrations that the Board's existing regulatory programs adequately address impairments in agricultural water bodies), and a conditional prohibition of discharges that would apply basin-wide. The Basin Plan Amendment was approved by the State Board in July 2018, the OAL in February 2019, and the USEPA in April 2019. The Amendment is now fully approved and effective as of April 2019.

There are two 303(d) listings in the Sacramento River watershed of interest:

- Central Valley Diuron TMDL – This program focused on diuron in Central Valley 303(d) listed waterbodies including Stony Creek, Comanche Creek and Main Drainage Canal in the Sacramento Valley. A review of the current water quality information indicates that the ILRP is effectively addressing all diuron impairments. In 2014, the waterbodies in the Sacramento Valley were all proposed for de-listing from the 303(d) list category. This delisting was approved by Regional Board Resolution No. R5-2016-0083 on December 5, 2016. Following this approval, the State Board signed a resolution approving the updated 303(d) list for the 2014-2016 California Integrated Report. On April 6, 2018, the USEPA approved California's 2014-2016 303(d) list of impaired waters, replacing the 2012 list and officially removing the waterbodies in the Sacramento Valley. Due to the removal of these waterbodies from the list of impaired waters, the Regional Board is no longer planning on developing a Central Valley Diuron TMDL and Basin Plan Amendment.
- Central Valley Organochlorine Pesticide TMDL – This program continues to be on hold and is being re-evaluated. There has been no action since late 2010.

University of California Cooperative Extension

The University of California Cooperative Extension (UCCE) has branches in every county in California. This includes the nine counties on the Sacramento Valley floor where significant agriculture occurs in close proximity to the participating water agencies' intakes. Academic advisors work with farmers to implement more-efficient growing methods, solve pest management problems and develop smart water-use strategies. Each UCCE branch has various targeted agricultural practices that they support, depending on the primary agriculture in the county.

Butte County, Colusa/Glenn/Yolo counties, and Sutter/Yuba counties UCCE offices have rice programs that assist farmers. Together, they work as the Agronomy Research and Information Center for Rice. The purpose of the rice program is to develop research and share information related to growers' needs on weed and pest management, fertilization, straw management, water quality, and more. The UCCE branches publish a regular newsletter, "Rice Briefs", "Rice Leafs", or "Rice Notes", for rice growers, and conduct an annual rice grower meeting in January, an annual rice field day at the Rice Experiment Station in August, and periodic rice production workshops.

UCCE staff from all nine counties in the Sacramento Valley participate in the Sacramento Valley Orchard Source, which supports farmers in the entire region. They provide support on crop management and cultivation. The UCCE program provides evapotranspiration reports and pest reports for farmers and hosts education outreach events.

Sacramento/Yolo counties together is the Capitol Corridor UCCE and they also provide support for vegetable crops. They conduct research on cultivation, disease management, and processing.

California Rice Experiment Station

The California Rice Experiment Station is owned by California Cooperative Rice Research Foundation, a private, non-profit research foundation, and members are California rice growers. The primary objective of the Station is the development of improved rice varieties and agronomic management systems (breeding) for California rice growers to maximize yield/quantity and minimize environmental impact. The Rice Breeding Program is key to developing seeds which are resistant to stem rot, sheath spot, blast, and Bakanae disease. A secondary objective is to assist with industry research with support to the University of California and USDA. In the 2015 to 2019 period, research was conducted related to: breeding and pathology (disease resistance). The Station is also co-host to the Annual Rice Field Day with UCCE and USDA that provides information on fertilization, weed management, and regulatory programs (RPP and ILRP).

United States Department of Agriculture

The USDA has two services that implement assistance programs for farmers and ranchers. One is the Farm Service Agency (FSA) and the other is the Natural Resources Conservation Service (NRCS).

The FSA implements numerous voluntary programs for farmers and ranchers related to conservation.

- Conservation Reserve Program – This program provides yearly rental payments to farmers/ranchers in exchange for removing environmentally sensitive land from agricultural production and planting species to improve environmental quality.
- Conservation Reserve Enhancement Program – This program is an offshoot of Conservation Reserve Program that targets high-priority conservation issues identified by government and non-governmental organizations. Farm land that falls under these conservation issues is removed from production in exchange for annual rental payments.
- Emergency Conservation Program – This program provides funding and technical assistance for farmers and ranchers to restore farmland damaged by natural disasters and for emergency water conservation measures in severe droughts.
- Emergency Forest Restoration Program – This program is very similar to the Emergency Conservation Program as it provides funding to restore privately owned forests damaged by natural disasters.
- Farmable Wetlands Program – This program is designed to restore wetlands and wetland buffer zones that are farmed. Farmers and ranchers receive annual rental payments in return for restoring wetlands and establishing plant cover.
- Grassland Reserve Program – This program works to prevent grazing and pasture land from being converted into cropland or used for urban development. In return for voluntarily limiting the future development of their land, farmers receive a rental payment.
- Source Water Protection Program – This program is designed to protect surface and ground water used as drinking water by rural residents. The program targets states based on their water quality and population.

The NRCS implements multiple voluntary programs on financial, technical, and easement assistance basis for farmers and ranchers related to conservation.

Financial Programs:

- Environmental Quality Incentives Program – This is a program that provides financial and technical support to farmers and ranchers to promote agricultural production and improve environmental quality. This includes the Conservation Innovation Grant Program and the National Water Quality Initiative (NWQI). Cost shares from the NRCS are 50 to 90 percent.
- Conservation Stewardship Program – This program provides financial and technical support to farmers and ranchers to help conserve and enhance soil, water, air, and habitat on working lands for selected watersheds. Payments are based on conservation performance, with higher payment for higher performance.
- Agricultural Management Assistance – This program helps agricultural producers use conservation to manage risks.
- Regional Conservation Partnership Program (RCPP) – This program promotes coordination of NRCS conservation activities with partners to implement projects that demonstrate innovative solutions to conservation challenges and provide

measurable improvements and outcomes tied to the resource concerns they seek to address. This was expanded in 2018 to include drinking water source protection.

Of special interest is the 2018 Farm Bill which formally acknowledged source water protection as a goal of the NRCS conservation programs and turned RCPP into a standalone program with its own funding, $300 million annually. Ten percent of this funding must be allocated to drinking water source protection. The source water protection funds can be accessed most easily through NWQI and RCPP. Through the RCPP, NRCS may award up to 15 Alternative Funding Arrangement projects, which are more grant-like and rely more on partner co-investment to implement conservation activities. RCPP now has two funding pools; Critical Conservation Areas (50 percent of funding) and a State/Multistate pool (50 percent of funding). RCPP partners must develop and report on environmental outcomes. The Sacramento River watershed is included in the Western Waters Critical Conservation Area, with priority on habitat, water quantity, and water quality degradation. RCPP projects include conservation activities implemented by farmers, ranchers, and forest landowners. Each State was required to identify local priority areas for drinking water protection by September 30, 2020. California was expected to include several small watersheds within the Sacramento River as local priority areas.

Technical Programs:

- Conservation Technical Assistance Program – This program is available to any group or individual interested in conserving our natural resources and sustaining agricultural production in this country. This program functions through a national network of locally-based, professional conservationists located in nearly every county of the United States. This assistance may be in the form of resource assessment, practice design, resource monitoring, or follow-up of installed practices. This program does not include financial or cost-share assistance, but may lead to participation in other USDA financial or easement assistance programs. This assistance can help land users:
    - Maintain and improve private lands and their management
    - Implement better land management technologies
    - Protect and improve water quality and quantity
    - Maintain and improve wildlife and fish habitat
    - Enhance recreational opportunities on their land
    - Maintain and improve the aesthetic character of private land
    - Explore opportunities to diversify agricultural operations and
    - Develop and apply sustainable agricultural systems

Easement Programs:

- Agricultural Conservation Easement Program – This program provides financial and technical assistance to help conserve agricultural lands and wetlands and their related benefits.
- Healthy Forests Reserve Program – This program helps landowners restore, enhance and protect forestland resources on private lands through easements and financial assistance. Through the program, landowners promote the recovery of

endangered or threatened species, improve plant and animal biodiversity and enhance carbon sequestration.

Water Quality Issues and Data Review

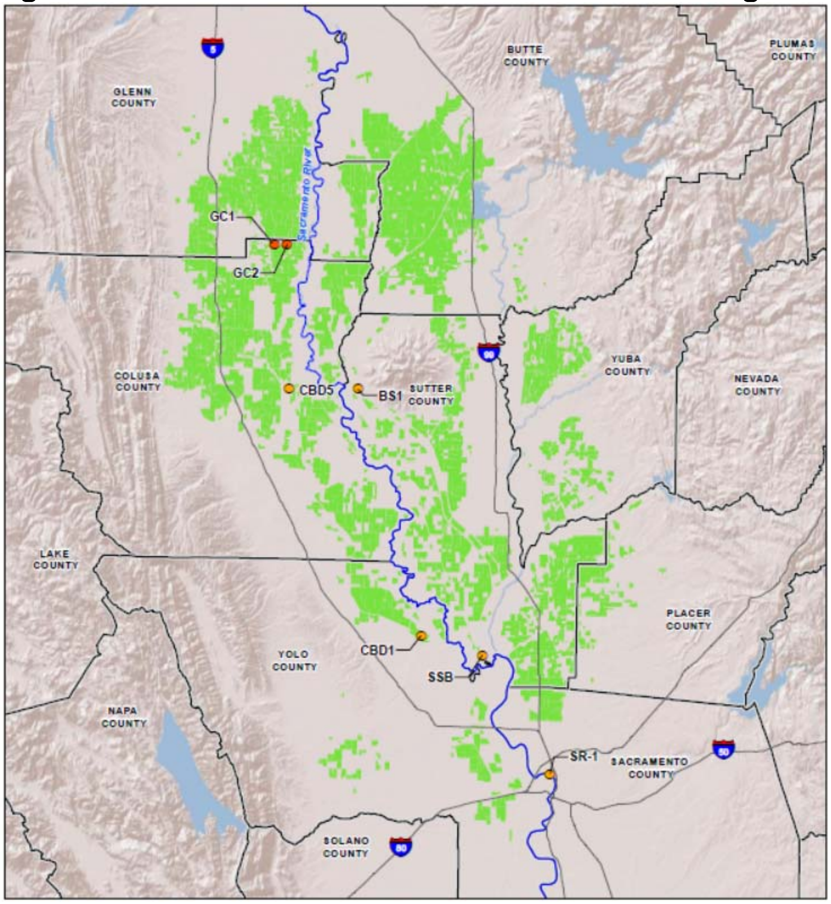
Rice Pesticide Program

The RPP monitored seven ambient sites for the rice herbicide thiobencarb during the study period: Colusa Basin Drain near Highway 20 in Colusa County (CBD5), Butte Slough (BS1), Sacramento River at Village Marina (SR1), Colusa Basin Drain above Knights Landing (CBD1), Sacramento Slough Bridge near Karnak (SSB), Norman Road at Willow Creek (GC1), and Norman Road at Colusa Basin Drain (GC2). See **Figure 4-2** for the RPP locations provided by the CRC. Sites GC1 and GC2 were specialty monitoring sites upstream of CBD5 that assisted with locating the sources of thiobencarb discharge. In addition, the cities of Sacramento (SRR) and West Sacramento (WSR) monitor raw water at their respective water treatment plant intakes during late spring and early summer for the rice herbicides as part of a special rice season monitoring program. The CRC's SR1 is a river monitoring site is located near Dwyer's Happy Landing (River Mile 61.5), between the GKWTP and SRWTP intakes.

Table 4-8 provides a summary of the number of ambient samples (representing agricultural drainage) above the performance goals set by the Regional Board for thiobencarb, 1.5 µg/L. **Table 4-8** shows that in all years during the study period there were exceedences of the performance goals for thiobencarb in the agricultural drains. There were no exceedences in the Sacramento Slough and only one in the Butte Slough. There were frequent, and often very high, exceedences in the Colusa Basin Drain. The CRC attributes these exceedences to a variety of causes, specifically thiobencarb transport from early releases, drift during application, and seepage through levees. The CAC issued penalties in each year of the study period, as discussed previously. Specialty monitoring was conducted upstream of CBD5 to better understand which growers were possibly contributing to the exceedences.

Table 4-9 provides a 15 year history of the maximum detect in the agricultural drainage sites (CDB5, BS1, CBD1, and SSB), as well as the percent of individual samples each season that met the performance goal of 1.5 µg/L for thiobencarb. It can be seen that the rate of compliance were the lowest during this study period. The peak values have been increasing, as high as 11 µg/L in 2016, and the percent of samples achieving the performance goal has decreased also, as low as 86 percent in 2019.

Figure 4-2. California Rice Commission Monitoring Sites



Source: CRC 2017 RPP Annual Monitoring Report

Table 4-8
Rice Pesticide Program Ambient Samples Exceeding Thiobencarb Performance Goal (1.5 µg/L)

Sample Site	2015	2016	2017	2018	2019
CBD5	5 (1.89 µg/L on May 19) (5.25 µg/L on May 21) (2.41 µg/L on May 26) (1.94 µg/L on May 28) (1.56 µg/L on June 2)	4 (1.9 µg/L on May 17) (1.5 µg/L on May 19) (11 µg/L on May 24) (2.2 µg/L on May 26)	2 (1.8 µg/L on May 23) (1.8 µg/L on May 30)	1 (1.7µg/L on May 29)	3 (2.3 µg/L on May 14) (2.3 µg/L on May 21) (1.7 µg/L on May 30)
BS1	0	0	1 (1.8 µg/L on May 23)	0	0
CBD1	1 (1.53 µg/L on May 26)	3 (3.2 µg/L on May 24) (2.8 µg/L on May 26) (1.7 µg/L on June 7)	1 (1.8 µg/L on June 1)	0	5 (2.7 µg/L on May 21) (1.6 µg/L on May 28) (2.0 µg/L on May 30) (1.9 µg/L on June 4) (1.7 µg/L on June 11)
SSB	0	0	0	0	0

Table 4-9
Rice Pesticide Program Ambient Samples Meeting Thiobencarb Performance Goal

Season	Maximum Detect (µg/L)	Percent of Samples Lower than Performance Goal
2005	0.67	100%
2006	0.97	100%
2007	0.76	100%
2008	1.99	97%
2009	1.84	95%
2010	1.8	98%
2011	1.42	100%
2012	1.23	100%
2013	3.97	96%
2014	3.81	95%
2015	5.25	90%
2016	11	89%
2017	1.8	91%
2018	1.7	99%
2019	2.7	86%

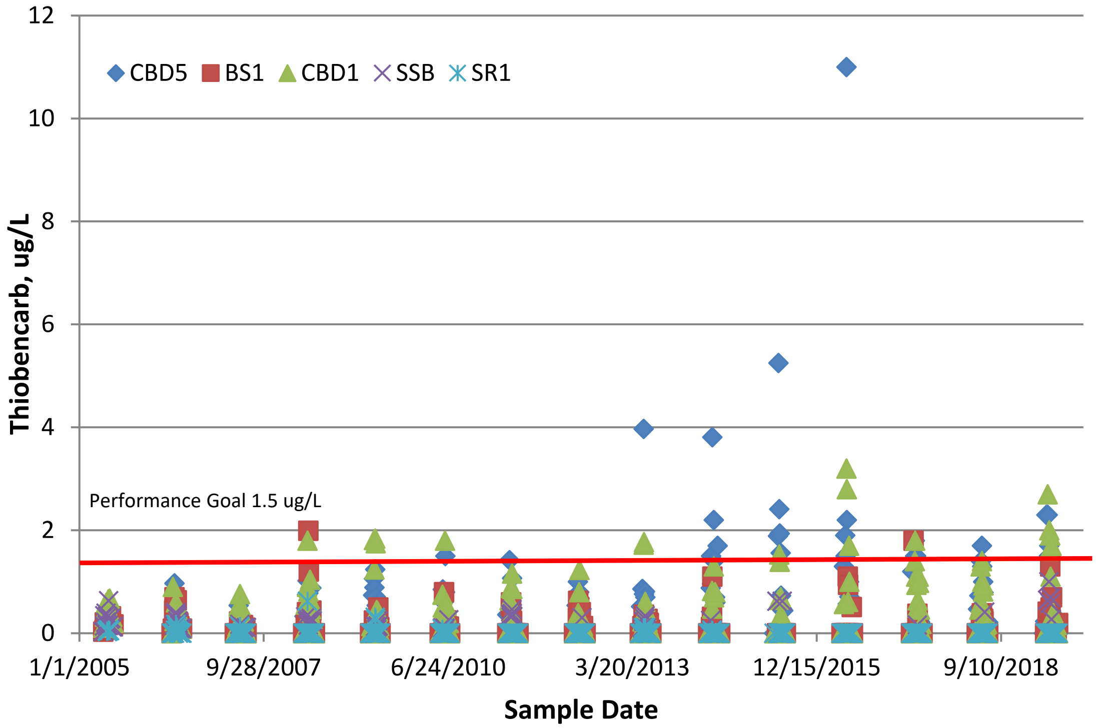
Figure 4-3 provides a graph of thiobencarb levels in the agricultural drains during the study period at the RPP monitoring sites, with the thiobencarb performance goal shown. It can be seen that the higher peaks seen at the end of the last study period continued during this study period. There are more frequent detections and excursions over the performance goal of 1.5 µg/L, in agricultural drainage samples, during the study period.

Table 4-10 provides a summary of the maximum raw water levels in the Sacramento River at the CRC SR1 site and at the water treatment plant intakes for thiobencarb. The detection limit at the CRC's SR1 site is significantly higher than the detection limit implemented by the participating water utilities, thus resulting in no detections. Detects at the GKWTP and SRWTP typically coordinated, with the SRWTP levels lower due to additional time for degradation. The peak detects at the GKWTP intake in 2015, 2016, and 2019 correlate in time with the higher detections in Colusa Basin Drain.

Table 4-10
Rice Pesticide Program
Peak Raw Water Treatment Plant Thiobencarb Levels (µg/L)

Sample Site	2015	2016	2017	2018	2019
SR1	<0.5	<0.5	<0.5	<0.5	<0.5
WSR (GKWTP)	0.1 (May 27)	0.13 (June 2)	<0.1	<0.2	0.13 (May 27)
SRR (SRWTP)	<0.1	0.12 (June 1)	<0.1	<0.2	0.085 (May 29)

Figure 4-3. RPP Thiobencarb Data, 2005 – 2019



Sacramento Valley Rice Growers

The ILRP Sacramento Valley Rice Growers Order includes a wider array of constituents than the RPP and a broader geographic region. Monitoring data during the study period was available for TOC, turbidity, and pesticides through the California Environmental Data Exchange Network (CEDEN) only through 2018. Some additional data was obtained from the ILRP Annual Monitoring Reports.

Table 4-11 presents the summary of detectable turbidity in agricultural drainage from rice fields during the study period. **Table 4-12** presents the summary of detectable TOC. It can be seen that generally speaking, agricultural drainage from rice is high in solids loading. The median value of turbidity at all but one site, Sacramento Slough, is at or above 20 nephelometric turbidity units (NTU). Values were highest during critical and below normal precipitation years. This is higher than the typical turbidity values at the participating water agencies' intakes as described in **Section 3**. In addition, the solids appear to be organic in nature due to very high levels of TOC. The median values ranged from 6 to 9.4 milligrams per liter (mg/L), which is three to five times higher than the median value of the mainstem Sacramento River, with peaks during May and June. It is clear that agricultural drainage from rice fields is contributing solids and organic carbon to the Sacramento River.

Table 4-11
Sacramento Valley Rice Growers Order
ILRP Turbidity Monitoring (NTU), 2013 – 2016

Site	Minimum	Maximum	Average	Median
Butte Slough at Pass Road	14.8	95.54	39.6	29.4
Cherokee Canal; upstream site for BS1	1.07	66.3	22.8	19.8
Colusa Basin Drain #5 (CBD5)	18.9	127.6	53.2	38.7
Colusa Basin Drain above Knights Landing (CBD1)	5.24	273.5	54.4	36.6
Lurline Creek; upstream site for CBD5	15.8	106.8	41.8	33.4
Obanion Outfall at DWR PP at Obanion Road	6.17	62.17	27.4	22.5
Sacramento Slough near Karnak (SS1)	6.08	58.15	19.2	13.8

Table 4-12
Sacramento Valley Rice Growers Order
ILRP TOC Monitoring (mg/L), 2013 – 2016

Site	Minimum	Maximum	Average	Median
Butte Slough at Pass Road	3.1	12	7.9	7.0
Cherokee Canal; upstream site for BS1	6.6	13	9.5	9.4
Colusa Basin Drain #5 (CBD5)	4.5	14	8.2	6.8
Colusa Basin Drain above Knights Landing (CBD1)	3.7	15	8.6	8.9
Lurline Creek; upstream site for CBD5	6	10	7.8	8.1
Obanion Outfall at DWR PP at Obanion Road	5.4	7.9	6.6	6.6
Sacramento Slough near Karnak (SS1)	3.7	11	6.8	6.0

As weed resistance increases, it is likely that growers will use more sophisticated application patterns, resulting in a broader array of pesticides applied at lower levels. Very few of the newer use rice pesticides have drinking water standards at this time. Pesticide registration information indicates that degradation should be significant in reducing the concentration of these constituents in the Sacramento River. Collection of water quality data under the ILRP's Sacramento Valley Rice Growers Order provides more information on a few additional pesticides. As described previously, there is limited pesticide monitoring conducted by the CRC through the ILRP.

The Sacramento Valley Rice Growers Order sampled for six pesticides (clomazone, propanil, bensulfuron methyl, penoxsulam, bispyribac-sodium, and benzobicyclon) and one metabolite (metabolite B) in the agricultural drains during the study period. Clomazone and propanil were analyzed in 2015 and 2016. Clomazone was detectable up to 12 µg/L, well below its USEPA Chronic HHBP of 5,400 µg/L, and propanil was detectable up to 9.5 µg/L, below its USEPA Chronic HHBP of 60 µg/L. Bensulfuron methyl was analyzed in 2017 and 2018 and was always non-detectable. Bispyribac-sodium was analyzed in 2019 with a peak detect of 0.9 µg/L, well below its USEPA Chronic HHBP of 600 µg/L. Penoxsulam was analyzed in 2017, 2018, and 2019 with peak detects of 0.35 µg/L, well below its USEPA Chronic HHBP of 941 µg/L. Benzobicyclon and metabolite B were analyzed in 2017, 2018, and 2019.

Benzobicyclon was always non-detectable, while metabolite B had a peak detect of 2.3 µg/L. There are no human health thresholds for either of these constituents so it is unclear if there is risk associated with these results.

Sacramento River Watershed Order

Similar to rice crops, it is likely that growers use a broader array of pesticides and very few of the newer use pesticides have drinking water standards at this time. Pesticide registration information indicates that degradation should be significant in reducing the concentration of these constituents in the Sacramento River and is supported by the low levels detected in the existing data.

Provided below is a summary of the key detectable pesticides, as well as information on arsenic, *E. coli,* and organic carbon sampling results. The discussion below includes information on water quality objectives exceedences for pesticides based on program requirements, as well as information on respective drinking water human health levels for purposes of this study. The monitoring site locations were evaluated to determine which sites were discharging to the Sacramento River, or a tributary, upstream of the FRWA Intake diversion based on information in various Sacramento River Watershed Order program documents and other mapping sources. Each year data typically is collected from 10 monthly events and two storm events.

<u>2015 Annual Monitoring Report (October 2014 – September 2015)</u>

- In the Sacramento Valley watershed upstream of the FRWA Intake diversion there were 12 detectable pesticides, see below.
    - Only seven of these have trigger limits identified in the ILRP.
    - Of the seven with trigger limits, four were detectable above those trigger limits (chlorpyrifos, dichlorvos, diuron, and malathion).
    - Only one of the pesticides (diuron) was detected at the associated human health threshold. These pesticides were detected throughout the watershed, in various waterbodies.
        - Carbaryl – 3 detects, all below 0.5 µg/L, USEPA HA Cancer 10^{-6} = 40 ug/L (ILRP Trigger Limit is 2.53 µg/L based on USEPA NAWQC)
        - Chlorpyrifos – 12 detects, all below 0.75 µg/L, USEPA HA Lifetime = 2 µg/L (ILRP Trigger Limit is 0.015 µg/L based on Basin Plan-Chronic)
        - Dichlorvos – 1 detect at 0.35 µg/L, USEPA HHBP Chronic = 3 µg/L (ILRP Trigger Limit is 0.015 µg/L based on Basin Plan-Chronic)
        - Diflubenzuron – 1 detect at 1.3 µg/L, USEPA HHBP Chronic = 100 µg/L (No ILRP Trigger Limit)
        - Diuron – 2 detects, both below 2.2 µg/L, USEPA HA Cancer 10^{-6} = 2 µg/L (ILRP Trigger Limit is 2 µg/L, based on USEPA HA)
        - Hexazinone – 1 detect at 35 µg/L, USEPA HA Lifetime = 400 µg/L (No ILRP Trigger Limit)

        - Malathion – 1 detect at 0.0174 µg/L, Basin Plan prohibits any detection, AAL = 160 µg/L (ILRP Trigger Limit is non-detect [ND] based on Basin Plan Amendment-Acute)
        - Methomyl – 1 detect at 0.073 µg/L, USEPA HA Lifetime = 200 µg/L (ILRP Trigger Limit is 0.52 µg/L based on USEPA NAWQC)
        - Naled – 1 detect at 0.35 µg/L, USEPA HHBP Chronic = 10 µg/L (No ILRP Trigger Limit)
        - Oryzalin – 2 detects, both below 0.5 µg/L, USEPA HHBP Cancer 10^{-6} = 4.11 µg/L (No ILRP Trigger Limit)
        - Oxyfluorfen – 17 detects, all below 0.25 µg/L, USEPA HHBP Cancer 10^{-6} = 0.437 µg/L (No ILRP Trigger Limit)
        - Simazine – 1 detect at 0.24 µg/L, Primary MCL = 4 µg/L (ILRP Trigger Limit is 4 µg/L based on Primary MCL)

<u>2016 Annual Monitoring Report (October 2015 – September 2016)</u>

- In the Sacramento Valley watershed upstream of the FRWA Intake diversion there were only five detectable pesticides, see below, which may be attributable to the significantly reduced monitoring effort in terms of number of pesticides and number of samples.
    - Only three of these have trigger limits identified in the ILRP; carbaryl, chlorpyrifos, and diuron.
    - Of the three with trigger limits, one was detectable above those trigger limits (chlorpyrifos).
    - These pesticides were detected throughout the watershed, in various waterbodies.
        - Carbaryl – 1 detect, 0.05 µg/L, USEPA HA Cancer 10^{-6} = 40 µg/L (ILRP Trigger Limit is 2.53 µg/L based on USEPA NAWQC)
        - Chlorpyrifos – 5 detects, all below 0.15 µg/L, USEPA HA Lifetime = 2 µg/L (ILRP Trigger Limit is 0.015 µg/L based on Basin Plan-Chronic)
        - Diuron – 1 detect, 0.22 µg/L, USEPA HA Cancer 10^{-6} = 2 µg/L (ILRP Trigger Limit is 2 µg/L, based on USEPA HA)
        - Oryzalin – 2 detects, both below 0.4 µg/L, USEPA HHBP Cancer 10^{-6} = 4.11 µg/L (No ILRP Trigger Limit)
        - Oxyfluorfen – 3 detects, all below 0.1 µg/L, USEPA HHBP Cancer 10^{-6} = 0.437 µg/L (No ILRP Trigger Limit)

<u>2017 Annual Monitoring Report (October 2016 – September 2017)</u>

- In the Sacramento Valley watershed upstream of the FRWA Intake diversion there were only four detectable pesticides, see below, which may be attributable to the significantly reduced monitoring effort in terms of number of pesticides and number of samples (only 34 samples from six sites were collected for a total of 376 pesticide results).
    - Only one of these has a trigger limit identified in the ILRP; dichlorvos. It was detected above the trigger limit (CalEPA Cancer Potency Factor of 0.085 µg/L), but was below the HHBP Lifetime of 3 µg/L.

- These pesticides were detected throughout the watershed, in various waterbodies.
  - Dichlorvos – 2 detects in Pine Creek, 0.5 and 0.41 µg/L, Trigger Limit for CalEPA Cancer Potency Factor = 0.085 µg/L, USEPA HHBP Lifetime = 3 µg/L
  - Metolachlor – 2 detects in Pine Creek, 1.3 and 1.5 µg/L, USEPA HA Lifetime = 700 µg/L (No ILRP Trigger Limit)
  - Naled – 2 detects in Pine Creek, 0.5 and 0.41 µg/L, USEPA HHBP Lifetime = 10 µg/L (No ILRP Trigger Limit)
  - Oxyfluorfen – 2 detects in Gilsizer Slough, 0.12 and 0.11 µg/L, USEPA HHBP Cancer 10^{-6} = 0.437 µg/L (No ILRP Trigger Limit)

2018 Annual Monitoring Report (October 2017 – September 2018)

- In the Sacramento Valley watershed upstream of the FRWA Intake diversion there were 17 detectable pesticides, see below.
  - The report claims that only two of these have trigger limits identified in the ILRP; chlorpyrifos and diazinon. However, they did not apply the Primary MCL of 70 ug/L for 2,4-D (dichlorophenoxy acid, 2,4-). Both were detected at least once above their respective trigger limits, but were below the human health thresholds (chlorpyrifos USEPA HA Lifetime of 2 µg/L and diazinon USEPA HA Lifetime 1 µg/L). One additional pesticide, mancozeb, was detected above its HHBP but was not discussed since it is not an ILRP Trigger Limit.
  - These pesticides were detected throughout the watershed, in various waterbodies.
    - Bifenthrin – 19 detects at seven sites, 0.0001j – 0.0027 µg/L, USEPA HHBP Acute = 70 µg/L (No ILRP Trigger Limit)
    - Chlorpyrifos – 1 detect in Gilsizer Slough, 0.023 µg/L, USEPA HA Lifetime = 2 µg/L (ILRP Trigger Limit is 0.015 µg/L based on Basin Plan-Chronic)
    - Diazinon – 1 detect in Gilsizer Slough, 0.15 µg/L, USEPA HA Lifetime = 1 ug/L, DDW Notification Level 1.2 µg/L
    - Dichlorophenoxy acid, 2,4- (2,4-D) – 4 detects at three sites, 0.5j – 0.61j µg/L, CA Primary MCL = 70 µg/L (No ILRP Trigger Limit is incorrect)
    - Diuron – 2 detects in Lower Snake River, 0.2j – 0.37 µg/L, USEPA HA Cancer 10^{-6} = 2 µg/L (ILRP Trigger Limit is 2 µg/L, based on USEPA HA)
    - Esfenvalerate/Fenvalerate – 7 detects at three sites, 0.0002j – 0.0016 µg/L, USEPA HHBP Lifetime = 12 µg/L (No ILRP Trigger Limit)
    - Ethalfluralin – 2 detects at two sites, 0.0030 – 0.0045 µg/L, USEPA HHBP Cancer 10^{-6} = 0.36 µg/L (No ILRP Trigger Limit)
    - Glyphosate – 1 detect in Lower Snake River, 2.6j µg/L, Primary MCL = 700 µg/L

- Imidacloprid – 4 detects at three sites, 0.0047 – 0.0197 μg/L, USEPA HHBP Lifetime = 360 μg/L (Missing from all trigger limit tables)
- Lambda-cyhalothrin – 13 detects at seven sites, 0.0002j – 0.027 μg/L, USEPA HHBP Lifetime = 6 μg/L (No ILRP Trigger Limit)
- Mancozeb – 1 detect in Lower Honcut Creek, 1.3j μg/L, HHBP Cancer 10^{-6} = 0.532 μg/L, this detect exceeds the USEPA HHBP however_no discussion since this isn't an adopted or unadopted trigger limit as per the ILRP PEP (No ILRP Trigger Limit)
- Metolachlor – 2 detects in Pine Creek, 1.3 and 1.4 μg/L, USEPA HA Lifetime = 700 μg/L (No ILRP Trigger Limit)
- Metribuzin – 1 detect in Sacramento Slough, 0.34j μg/L, USEPA HA Lifetime = 70 μg/L (No ILRP Trigger Limit)
- Oxyfluorfen – 6 detects at five sites, 0.08j and 0.015j μg/L, USEPA HHBP Cancer 10^{-6} = 0.437 μg/L (No ILRP Trigger Limit)
- Permethrin – 1 detect in Pit River, 0.0021j μg/L, USEPA HHBP Cancer 10^{-6} = 3.344 μg/L (No ILRP Trigger Limit)
- Propiconazole – 1 detect in Lower Snake River, 0.02 μg/L, USEPA HHBP Lifetime = 600 μg/L (No ILRP Trigger Limit)
- Simazine – 3 detects in Lower Snake River, 0.52 – 0.91 μg/L, Primary MCL = 4 μg/L

<u>2019 Annual Monitoring Report (October 2018 – September 2019)</u>

- In the Sacramento Valley watershed upstream of the FRWA Intake diversion there were 16 detectable pesticides, see below.
  - The report claims that only three of these have trigger limits identified in the ILRP, diuron, glyphosate, and malathion, plus the trigger limits for pyrethroids. However, they did not apply the primary MCL of 70 μg/L for 2,4-D (dichlorophenoxy acid, 2,4-). Bifenthrin, cyfluthrin, cypermethrin, lambda-cyhaolthrin, malathion, and permethrin were detected at least once above their trigger limits. None of these were above the human health thresholds. However, one additional pesticide, oxyfluorfen, was detected above the USEPA HHBP but was not discussed since it is not an ILRP Trigger Limit.
  - These pesticides were detected throughout the watershed above the FRWA Intake diversion, in various waterbodies.
    - Acetemiprid – 1 detect in Freshwater Creek, 0.0622 μg/L, USEPA HHBP Lifetime = 450 μg/L (No ILRP Trigger Limit)
    - Bifenthrin – 39 detects at eight sites, 0.1j – 7 nanograms per liter (ng/L), USEPA HHBP Acute = 70 μg/L (No ILRP Trigger Limit)
    - Cyfluthrin – 1 detect in Pine Creek, 15 ng/L, USEPA HHBP Lifetime = 150 μg/L (No ILRP Trigger Limit)
    - Cypermethrin – 4 detects at three sites, 0.2j – 1.5 ng/L, USEPA HHBP Acute = 150 μg/L (No ILRP Trigger Limit)
    - Cyprodinil – 3 detects at two sites, 0.008j – 0.06 μg/L, USEPA HHBP Lifetime = 170 μg/L (No ILRP Trigger Limit)

- Diuron – 2 detects at two sites, 0.24 – 0.32 µg/L, USEPA HA Cancer 10^{-6} = 2 µg/L (ILRP Trigger Limit is 2 µg/L, based on USEPA HA)
- Esfenvalerate/Fenvalerate – 11 detects at six sites, 0.2j – 8 ng/L, USEPA HHBP Lifetime = 12 µg/L (No ILRP Trigger Limit)
- Ethalfluralin – 2 detects at two sites, 0.0066 – 0.0083 µg/L, USEPA HHBP Cancer 10^{-6} = 0.36 µg/L (No ILRP Trigger Limit)
- Glyphosate – 3 detects at two sites, 4.1j – 27 µg/L, Primary MCL = 700 µg/L
- Imidacloprid – 15 detects at seven sites, 0.00377j – 0.141 µg/L, USEPA HHBP Lifetime = 360 µg/L (No ILRP Trigger Limit)
- Lambda-cyhalothrin – 21 detects at eight sites, 0.2j – 13 ng/L, USEPA HHBP Lifetime = 6 µg/L (No ILRP Trigger Limit)
- Malathion – 1 detect in Pit River, 0.04j µg/L, DDW Archived Advisory Level = 160 µg/L (technically any detect is an exceedance as per prohibition on discharge in Basin Plan)
- Oxyfluorfen – 6 detects at five sites, 0.0098j - 0.92 µg/L, USEPA HHBP Cancer 10^{-6} = 0.437 µg/L, this detect exceeds the USEPA HHBP however_no discussion since this isn't an adopted or unadopted trigger limit as per the ILRP PEP (No ILRP Trigger Limit)
- Permethrin – 1 detect in Anderson Creek, 110 ng/L, USEPA HHBP Cancer 10^{-6} = 3.344 µg/L (No ILRP Trigger Limit)
- Propiconazole – 3 detects at two sites, 0.03 – 0.35 µg/L, USEPA HHBP Lifetime = 600 µg/L (No ILRP Trigger Limit)
- Pyraclostrobin – 1 detect in Walker Creek, 0.071 µg/L, USEPA HA Lifetime = 220 µg/L (No ILRP Trigger Limit)

In 2015, arsenic was only monitored at one location upstream of the FRWA Intake diversion, the Lower Snake River, and ranged from 11-13 µg/L, above the Primary MCL of 10 µg/L. This triggered additional monitoring at the site. For data collected between 2013 and 2019 at the Lower Snake River the average and median values for arsenic were both less than 8 µg/L. The Coalition claims that agriculture is likely not responsible for the arsenic detections and no MP is in place for this site.

E. coli was analyzed in 159 samples at 20 sites in 2015, with 57 of those samples greater than the recreational limit of 235 most probable number per 100 milliliters (MPN/100 mL). *E. coli* was analyzed in 43 samples at 11 sites in 2016, with eight of those samples upstream of FRWA Intake diversion greater than the recreational limit. *E. coli* was analyzed in 38 samples at 12 sites in 2017, with 15 of the exceedences at six sites upstream of the FRWA Intake diversion. *E. coli* was analyzed in 134 samples at 18 sites, with 29 of the exceedences at sites upstream of the FRWA Intake diversion. *E. coli* was analyzed in 140 samples at 18 sites, with 45 of those samples greater than the recreational limit. These detects occur throughout the watershed. The Coalition has seen this same trend for many years and attributes the detections to non-agricultural activities in the watershed and does limited management for this constituent.

TOC and dissolved organic carbon (DOC) has been sampled at various sites throughout the watershed at varying periods and frequencies. TOC and DOC available data for sites upstream of the FRWA Intake diversion from October 2012 through June 2013 was available electronically through CEDEN and used to calculate statistics.

- Individual TOC sample results ranged from 0.94 to 40 mg/L, with an average of 5.1 mg/L and a median of 4.1 mg/L.
- Individual DOC sample results ranged from 0.9 to 22.2 mg/L, with an average of 4.6 mg/L and a median of 3.8 mg/L.
- A set of 65 paired TOC/DOC samples indicates that organic carbon is almost entirely present as DOC, with a median percent DOC of 97 percent.
- When comparing median values of TOC the lowest levels (less than 3 mg/L) are found in waterbodies in the upper portions of the Sacramento Valley, such as North Canyon Creek, Freshwater Creek, Lower Lassen Creek, and Pine Creek. Waterbodies with moderate levels of TOC (between 3 and 6 mg/L) included Lower Snake River, Coon Creek, Anderson Creek, Lower Honcut Creek, Sacramento Slough, and Gilsizer Slough. Waterbodies with the highest levels of TOC (greater than 6 mg/L) included Pit River, Colusa Basin Drain, Pine Creek, Walker Creek, and the Middle Fork Feather River.

Sacramento River Source Water Protection Program Activities

The Sacramento River Source Water Protection Program (SRSWPP) agencies have conducted a significant amount of outreach and activity related to agricultural discharge (both rice and other crops) over the past five years. Efforts were related to rice pesticides stewardship, general pesticide tracking, and agricultural discharges, as described below. Several of the documents are provided as samples in **Appendix D**.

The SRSWPP last conducted a Pesticide Prioritization for rice pesticides in September 2013 and one for non-rice pesticides in October 2013, which included evaluations of which pesticides to create a prioritized pesticide tracking list. This included a detailed review of pesticide use and drinking water threshold values, both of which have changed for many of the current use pesticides. The evaluation for rice pesticides indicated that thiobencarb and propanil were the highest priority pesticides. Other pesticides that topped the priority list included copper sulfate, lambda-cyhalothrin, cyhalofop butyl, sodium chlorate, triclopyr, pendimethalin, 2,4-D, and azoxystrobin. The evaluation for non-rice pesticides indicated that 1,3-dichloropropene and metam sodium were the highest priority pesticides. Other pesticides that topped the priority list included mancozeb, potassium N-Methyl dithiocarbamate, oxyfluorfen, ethalfluralin, chlorpyrifos, oryzalin, iprodione, diazinon, propargite, and simazine.

Rice Pesticides Stewardship Program

The SRSWPP agencies have provided significant stakeholder involvement, technical evaluations, and tracking work as part of the RPP.

- The Cities of Sacramento and West Sacramento continued annual special rice season intake monitoring for thiobencarb at the GKWTP and SRWTP intakes. The water agencies also received RPP monitoring results from the CRC and Valent.
- Reviewed the CRC RPP Annual Reports. Conducted scientific evaluation of annual RPP thiobencarb monitoring data, in the context of previous monitoring data and other relevant information. Developed and sent comments on the Annual Report to the Water Board.
- Attended RPP annual coordination meetings with the CRC and Regional Board.
- Completed a scientific assessment of rice pesticide management practices. Reviewed proposed management practices and made recommendations to Regional Board about the proposed practices in light of lessons from recent monitoring data and the RPP annual Stakeholder meeting.
- Conducted outreach to UCCE to review emerging trends in pesticide usage.

General Pesticides Tracking

- Submitted comments on a wide variety of USEPA proposals related to pesticide use and registration and tracked information, such as:
    - Submitted comments to require disclosure of pesticide inert ingredients like water pollutants, requesting that drinking water protection be a recognized basis for disclosure.
    - Tracked pesticide registration and registration review schedules for rice pesticides and other priority pesticides. Track changes in allowable pesticide use resulting from actions initiated by agencies other than USEPA, such as court decisions and pesticide consultations with US Fish and Wildlife Service under the Endangered Species Act. Review documents related to consultation on six herbicides in the Sacramento River watershed.
    - Tracked USEPA registration status and plans for upcoming reviews of pesticide priorities.
    - Tracked new pesticide registrations and changes in allowable pesticide uses for rice. Assessed outcomes of comments and identified and sought resolution to public noticing problem.
    - Tracked USEPA methodologies and policies for evaluation of the importance of pesticide uses for drinking water quality.
    - Tracked new pesticide registrations and changes in allowable pesticide uses for rice.
    - Obtained information about USEPA's HHBPs.
    - Tracked USEPA scientific method revisions for estimating spray drift to surrounding surface waters, which will improve the accuracy of USEPA's

modeling and correct a long-standing gap in USEPA's estimation procedures.
- o Tracked new scientific information that can help USEPA in developing improved approaches to source water protection, including discoveries of rice pesticides in air and rain.

- Tracked and provided comments to DPR on a wide variety of projects and proposals related to pesticide use and registration, such as:
  - o DPR's surface water regulatory concept. DPR revised its approach, which initially considered only aquatic life protection, to address both drinking water quality protection and aquatic life.
  - o Tracked progress of DPR's surface water protection regulations and overall regulatory approach for surface water quality protection. DPR is seeking to enhance its surface water monitoring program to provide better data about potential pesticides water quality problems. DPR is interested in the water agencies' input on monitoring priorities for source water protection.
  - o Tracked other DPR regulatory proposals, including changes in enforcement regulations.
  - o Reviewed DPR scientific documents related to new rice pesticides.
  - o Tracked DPR development of pesticide monitoring priorities.

- Regional Board Tracking - Tracked basin plan amendments, including TMDLs, that are in development related to pesticides or other constituents of interest for the Sacramento River watershed.

Agricultural Discharges

- Conducted outreach and coordination with Regional Board staff and agricultural coalition staff on the implementation of the Long Term ILRP, including review of Board Resolutions, WDRs, Staff Reports, and coalition templates.
- Provided comment to the State Board on the Eastern San Joaquin Parties Expert Panel review of the monitoring program.
- Participated in the ILRP Pesticide Evaluation Advisory Workgroup to develop process for selecting pesticides for monitoring and review under the WDRs.
- Reviewed the Sacramento River Watershed Order Annual Reports.
- Reviewed of the CRC's Rice Waiver Program Annual Reports.
- Participation in the Regional Board stakeholder group for the Municipal and Domestic Water Supply (MUN) Beneficial Use Project for the Sacramento Publicly Owned Treatment Works (POTWs) and Region-Wide, including review and comment on numerous documents.
- Prepared updates on a variety of regulatory management programs related to agricultural activities in the watershed, including: Pesticide TMDL Update, Dairy Update, and Department of Pesticide Regulation Surface Water Regulations Update.

LIVESTOCK

Background

In this report, livestock includes rangeland cattle and dairy cattle. There is a sizeable livestock population in the watershed, especially rangeland grazing cattle. Cattle are a known host for *Cryptosporidium parvum* and *Giardia*. Just one infected animal can shed a large number of *Cryptosporidium parvum* oocysts and *Giardia* cysts. Although there are far fewer dairy cattle in the watershed than rangeland cattle, calves are present year-round in dairies; calves are known to be able to transmit *Cryptosporidium*, and a single infected calf can shed millions of oocysts. Dairies are considered a concentrated animal feeding operation (CAFO). The cattle population is upstream of all the existing water treatment plant intakes, and the potential future RiverArc Project diversion, so the potential for *Cryptosporidium parvum* or *Giardia* loading from livestock is of equal importance to all participating water agencies. Although livestock can contribute other constituents, this evaluation focuses on *Cryptosporidium* and *Giardia* due to the distance between the water treatment plants and the potential sources of other constituents of interest such as TOC.

In addition, information on commercial poultry operations is provided since the Regional Board has recently adopted an NPDES permit related to their management. Commercial poultry is not expected to be a significant concern to source water quality due to the nature of the facilities.

Information for this section was obtained from several agencies' websites and from discussions with personnel from the State Board and the Regional Board.

Seasonal Patterns

The risk of loading viable *Cryptosporidium parvum* oocysts and *Giardia* cysts into the river system from cattle in the watershed appears to be highest during storm events. Runoff from animal feeding operations (AFOs), such as dairies, is prohibited and would likely only occur during storm events. This is when an AFO's waste management system is vulnerable to exceeding its capacity and spilling into nearby watercourses. Storms also will cause sheet flow over rangeland areas that can pick up fecal matter from grazing livestock. Storm runoff from rangeland grazing areas is more likely to carry *Cryptosporidium parvum* during the calving season since calves are more likely to be infected with the pathogen than adult cows. Spring is calving season and therefore is the time of peak risk of infected herds and also still a time when oocysts likely survive well. Early summer can also result in oocysts being contributed from young calves as they graze with cows.

Peak *Cryptosporidium* shedding occurs within a very limited group of calves (two months of age[4]), and therefore manure management for the young is of far more importance than manure management for adult animals. Since transport of *Cryptosporidium* overland is inefficient in most range environments, rangeland located proximally to rivers and tributaries is of primary concern. Survival of oocysts is also likely affected by seasonal temperature. Research shows that when the temperature of a cow fecal pat exceeds 104°F the *Cryptosporidium* will die within a matter of hours[5]. When air temperatures exceed 78°F, a fecal pat in direct sunlight will achieve the required 104°F. The killing rate declines as the temperature or sunlight exposure declines so that fecal pats deposited in winter (January through April) may provide temperature conditions that allow for oocysts survival for 90 plus days.

Giardia and *Cryptosporidium* survive well in cool, moist environments and can be transported overland. However, freeze-thaw cycles reduce survivability. Overland transport may be required which will reduce the viability of oocysts; studies show that grassland buffers can capture up to 99.9 percent of oocysts[6].

Another source is created when ranchers use check dams on small watercourses to create waterholes for grazing livestock. Ranchers typically release the boards on these check dams in anticipation of storm events, to prevent flooding of the rangeland upstream of the check dam. Close proximity of fecal waste to water bodies would reduce the opportunity for desiccation, which can cause inactivation of oocysts.

Pesticides applied to rangeland are typically applied from late spring through fall, essentially during the dry season. This should reduce the likelihood that the pesticides are transported to receiving waters.

Poultry operations have the potential to contribute manure to receiving waters, which is a source of solids, organic carbon, and microbiological constituents. Since most poultry operations are indoors, seasonality would not be a significant influence. However, management of manure onsite would be important, as it could be vulnerable to stormwater runoff if it was not managed properly. Most commercial poultry operations manage manure either by off-site transport and disposal or land application as fertilizer.

High levels of coliform in the Sacramento River appear to be associated with precipitation and high river flows, as discussed in **Section 3**. Even though coliform are not considered a good indicator for *Cryptosporidium* and *Giardia*, the bacteria data available for the river system supports the theory that storm events are the time of highest risk with respect to microbial contaminants. There is no similar correlation for *Cryptosporidium* and *Giardia* data, which possibly indicates that insufficient data exists to consistently connect the source impact to water quality. The highest use pesticides, 2,4-D, glyphosate, and triclopyr, have not been detected at the water treatment plants, as discussed in **Sections 3 and 5**.

[4] University of California Agriculture and Natural Resources, California Rangeland Watershed Laboratory, Department of Plant Sciences, University of California at Davis. www.Rangelandwatersheds.ucdavis.edu/MWQIC/MWQIC/Indicators_Crypto_window.html. May 13, 2015.
[5] www.Rangelandwatersheds.ucdavis.edu/MWQIC/MWQIC/Indicators_Crypto_window.html

Related Constituents

Giardia and Cryptosporidium

Although *Giardia* and *Cryptosporidium* can come from a variety of animal populations, loading from cattle is a source of key interest. In the Western United States studies have shown that about 19 percent of cattle are infected with *Giardia* and about four percent are infected with *Cryptosporidium*[6]. According to the University of California, California Rangeland Watershed Laboratory, an infected calf can shed upwards of 10,000,000 *Cryptosporidium* oocysts per gram of feces and up to 1,000,000 *Giardia* cysts per gram of feces. Loading is a function of animal density, or stocking rates, timing of grazing, and infection rate among the herd. Calves from one to four months contribute over 99 percent of oocysts shed by cattle. Given the low ratio of calves to adults in grazing cattle as compared to dairy cattle, as well as their geographic spread, it may be that grazing cattle populations do not spread *Cryptosporidium* as readily as dairy cattle. Current studies suggest that the daily contact between a calf and a carrier mother results in an initial infection that is then spread between calves through calf play. Therefore, dairies are expected to have greater opportunity for spreading infection than rangeland cattle.

Poultry can be infected by *Giardia* and *Cryptosporidium*, but infection rates are generally low. A study from China showed that more chickens were infected with *Giardia* (8.25 percent) than *Cryptosporidium* (2.43 percent)[7].

Pesticides

Ranchers use selected pesticides to manage irrigated pastureland and non-irrigated rangeland. Invasive weed management typically includes chemical treatment, only applied in spot treatments as needed, during the spring and fall. The most commonly used pesticides are 2,4-D, glyphosate, MCPA, and triclopyr. 2,4-D and glyphosate are regulated constituents with primary drinking water standards, 70 µg/L and 0.7 mg/L respectively. MCPA and triclopyr do not have primary drinking water standards, but MCPA has a USEPA Lifetime Health Advisory of 30 µg/L and triclopyr has a USEPA Lifetime HHBP of 300 µg/L.

A review of the 2017 DPR Pesticide Use Report showed no pesticides in use by poultry operations.

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[6] University of California Agriculture and Natural Resources, California Rangeland Watershed Laboratory, Department of Plant Sciences, University of California at Davis. www.Rangelandwatersheds.ucdavis.edu/MWQIC/MWQIC/Indicators_Giardia_window.html. May 13, 2015.
[7] Cao S, Xu M, Jiang Y, Liu H, Yuan Z, Sun L, Cao J, Shen Y. Prevalence and Genetic Characterization of *Cryptosporidium, Giardia* and *Enterocytozoon* in Chickens From Ezhou, Hubei, China. Front Vet Sci. 2020 Jan 31;7:30. doi: 10.3389/fvets.2020.00030. PMID: 32083107; PMCID: PMC7005591.

Presence in Watershed and Protection Zones

The total livestock population, including both rangeland and dairy cows, was over 480,000 in 2017, as shown in **Table 4-13**. This is almost the same as reported in 2012, with a one percent increase over the five-year period from 2012 to 2017. This ends the decreasing trend that has been occurring for several decades. The counties with the largest populations continue to be Glenn, Modoc, Siskiyou, and Tehama. The majority of cattle and calves in Sacramento County are located outside of the watershed upstream of the FRWA Intake diversion. Some counties saw increases, while others saw decreases in inventory.

Table 4-13
Inventory of Livestock[1], 2007, 2012, and 2017

County	Cattle and Calves [1]				
	2007	2012	2017	5 Year Change	10 Year Change
Butte	15,930	14,282	14,246	0%	-11%
Colusa	16,501	14,757	17,065	16%	3%
El Dorado	6,738	8,134	6,281	-23%	-7%
Glenn	62,012	62,329	62,123	0%	0%
Lassen	45,051	40,820	38,630	-5%	-14%
Modoc	59,174	51,705	59,392	15%	0%
Nevada	5,615	4,778	4,108	-14%	-27%
Placer	16,996	12,873	16,095	25%	-5%
Plumas	13,350	17,022	14,269	-16%	7%
Sacramento	71,205	56,213	55,235	-2%	-22%
Shasta	39,212	35,122	37,068	6%	-5%
Sierra	3,467	9,383	4,813	-49%	39%
Siskiyou	56,535	53,944	49,271	-9%	-13%
Sutter	7,868	6,616	6,875	4%	-13%
Tehama	58,444	61,785	65,335	6%	12%
Yolo	21,570	14,756	14,370	-3%	-33%
Yuba	14,050	12,647	15,440	22%	10%
TOTAL	**513,718**	**477,166**	**480,616**	**1%**	**-6%**

Based on information from the USDA website: www.nass.usda.gov.
Data reported are inventory numbers and do not reflect livestock sold off during the course of the year.
[1]Includes rangeland and dairy cattle

The majority of dairies in the watershed are in Glenn County, with some also in Tehama and Yuba counties, see **Table 4-14**. None of these are in the protection zones. Most of the dairies in the Sacramento River watershed are classified as small CAFOs. These number of dairy cattle was significantly reduced, 30 percent less, over the study period. The largest reduction was seen in Glenn and Tehama counties. The numbers obtained indicate that dairy operations in the Sacramento Valley are limited and not increasing, and that rangeland cattle are by far the most numerous livestock in the watershed.

Table 4-14
Inventory of Dairy Cows, 2007, 2012, and 2017

County	Dairy Cows[1]				
	2007	2012	2017	5 Year Change	10 Year Change
Butte	[D]	427	[D]	-	-
Colusa	[D]	102	80	-22%	-
El Dorado	5	27	36	33%	620%
Glenn	22,499	20,463	15,533	-24%	-31%
Lassen	65	48	22	-54%	-66%
Modoc	15	[D]	[D]	-	-
Nevada	21	58	21	-64%	0%
Placer	[D]	[D]	946	-	-
Plumas	[D]	[D]	[D]	-	-
Shasta	38	192	64	-67%	68%
Sierra	0	[D]	-	-	-
Siskiyou	1,100	970	1,193	23%	8%
Sutter	[D]	6	5	-17%	-
Tehama	3,381	5,741	3,249	-43%	-4%
Yolo	[D]	[D]	[D]	-	-
Yuba	3,258	2,719	[D]	-	-
TOTAL	**30,382**	**30,753**	**21,149**	**-31%**	**-30%**

Based on information from the USDA website: www.nass.usda.gov.
[1] All or most of the dairies in Sacramento County are in the south county area - outside of the watershed upstream of the FRWA Intake diversion. Sacramento County numbers were excluded from the total.
[D] Data withheld to avoid disclosing information for an individual farm

There is limited use of pesticides on rangelands in the watershed. In 2017 there were only 11 applied, for a total of 1,720 pounds. Only three were applied at more than 100 pounds, as shown in **Table 4-15**. These amounts provide very limited risk.

Table 4-15
Rangeland Pesticides Applied

Pesticide	2017, pounds
2,4-D	840.7
Glyphosate	405.7
Triclopyr	335.5

Poultry operations occur in all counties within the watershed, but are generally small operations. Most of these birds are maintained on farms with fewer than 400 poultry in inventory, relatively small facilities. Placer County has three farms with greater than 400 poultry in inventory, Sacramento County has two farms, Siskiyou County has one, Tehama County has one, and Yolo County has 10. The farms in Sacramento and Yolo counties are likely located outside of the watershed upstream of the FRWA Intake diversion. No pesticides are reported for poultry application.

The total layer poultry population was approximately 75,000 in 2017, as shown in **Table 4-16**. This is significantly higher than reported in 2012, with a 32 percent increase over the five-year period from 2012 to 2017. The majority of poultry in Sacramento and Yolo counties are located outside of the watershed upstream of the FRWA Intake diversion. The largest increases were seen in Placer and Tehama counties.

Table 4-16
Inventory of Poultry[1], 2007, 2012, and 2017

County	Poultry [1]		
	2012	2017	5 Year Change
Butte	4,963	5,543	12%
Colusa	250	599	140%
El Dorado	5,506	6,396	16%
Glenn	1,531	1,895	24%
Lassen	1,191	837	-30%
Modoc	923	1,194	29%
Nevada	5,156	3,743	-27%
Placer	4,925	9,244	88%
Plumas	733	966	32%
Sacramento	3,484	7,420	113%
Shasta	6,453	6,893	7%
Sierra	166	26	-84%
Siskiyou	3,672	4,251	16%
Sutter	968	627	-35%
Tehama	5,131	10,692	108%
Yolo	9,162	12,324	35%
Yuba	2,879	2,714	-6%
TOTAL	**57,093**	**75,364**	**32%**

Based on information from the USDA website: www.nass.usda.gov.
[1] Poultry represents number of layers

Regulation and Management

Rangeland

Runoff from rangeland is considered a non-point source of pollution and it is covered under the State Board's Non-Point Source (NPS) Program. As for all non-point sources under this program, the state has a three-tiered approach to regulation:

- Tier 1: Self-determined implementation – non-regulated management practices.
- Tier 2: Regulatory based encouragement – conditional waiver of WDRs.
- Tier 3: Effluent limitations and enforcement actions - WDRs.

In order to address rangeland issues in California, the Rangeland Management Advisory Committee (RMAC) was created. This committee is comprised of livestock industry and public members. The RMAC advises the California Department of Forestry and Fire Protection (CalFIRE) Board of Forestry on issues related to rangeland management. The RMAC worked with the State Board to create a rangeland water quality management program to comply with Tier 1 for the NPS program.

Federal lands owned by the USFS and the USBLM continue to be used extensively for rangeland grazing. Grazing on these lands is governed by the Water Quality Management Plan (WQMP) for National Forest System Lands in California. This was developed in 2000 and includes standards and guidelines to meet the CWA and California Standards. This program focuses on range management through best management practices (BMPs). This includes range analysis and planning, grazing permits, and rangeland improvements as necessary. In January 2020 the USBLM announced the intent to prepare environmental documentation to revise the agency's grazing regulations.

The State Board began development of a statewide waiver for USFS (including timber harvest, roads, range, recreation, and fuel management) in 2009 in order to streamline management policies state-wide for non-point source activities. A proposed Resolution was prepared in 2011 to cover the USFS statewide activities under one order, but it has not yet been finalized or adopted. As part of the resolution development, the USFS worked in collaboration with the State Board and Regional Boards to develop a new Water Quality Management Handbook (WQMH) to address control of nonpoint source pollution generated by various activities on National Forest System lands in California. The WQMH was adopted by the USFS in May 2011 with revised management practices to improve water quality protection related to the activities prioritized in the proposed statewide order. Some key new provisions include road, range, and recreation management policies; BMPs with adaptive management; and an expanded monitoring program.

In September 2015, the State Board adopted Resolution No. 2015-0062. This instructed staff to engage with the University of California to update tools and documents related to grazing BMPs and water quality. In accordance with this instruction, the State Board is developing a non-regulatory guidance document on livestock grazing management in California. This will be completed through an update to the 1995 Rangeland Water Quality Management Program, see discussion below. In 2020 the State Board is seeking public input on water quality impacts of grazing and BMPs. It is expected that a new Statewide Grazing Guidance will be drafted and available for public feedback in the fall 2020 or early 2021.

The Central Valley Regional Board and the Lahontan Regional Board are working together with USFS and USBLM to develop an NPS permit to ensure regulatory compliance and water quality protection on USFS and BLM managed lands. Land management activities that may be regulated under the proposed NPS permits include timber harvest and vegetation management, transportation management, recreation facilities management, wildfire management and recovery, and restoration activities. The two Regional Boards are working together to maximize consistency and facilitate implementation across approximately 20 million combined acres of federally managed lands. Ultimately each Water Board will adopt its own permit, however the goal is for the permitting approach – including the permitted activities, goals, milestones, and outcomes – to be similar.

Rangeland Water Quality Management Program

The Rangeland Water Quality Management Program (RWQMP), developed in 1995 by the UCCE, the Cattlemen's Association, and the USDA's NRCS for the State Board as a Tier 1 approach, continues to be used as a voluntary management program for privately owned rangeland. The heart of the program was a series of short courses given to ranchers to help them develop and implement water quality management plans at their ranch. This included grazing and irrigation management practices to improve runoff quality. The last workshop was in 2009 and over 1,000 ranchers, covering over 2 million acres, took the course. The course is administered on the University of California (UC) Rangelands website.

Dairies

Historically, dairies were required to confine all waste, washwater, and storm runoff that contacts animal waste on site under Section 15 of the California Code of Regulation; discharge to receiving waters is prohibited. Some of the very large dairies and dairies with known problems were required to obtain individual permits under the Regional Board's WDRs Program, which covers discharges to land. There are five dairies located upstream of Sacramento which are still covered under individual WDRs, as shown in **Table 4-17**.

Table 4-17
Individually Permitted Dairies[1]

County	Name and Permit Number	Animal Count	Waste Management	Violations (Past 5 Years)	Enforcement Orders (Past 5 Years)
Tehama	Alston Farms Dairy No. 2 R5-2010-0012	850 animals	Lagoon, land application	0	0
Tehama	Masami Cattle Ranch 94-023	3,000 animals	Ponds, land application	0	0
Glenn	Henry Jongsma & Son Dairy R5-2007-0102	1,990 animals	Ponds, land application	1	1
Glenn	Greenwood Dairy R5-2008-0122	2,912 animals	Ponds, land application	1	1
Glenn	JG Weststeyn Dairy R5-2009-0082	2,800 animals	Lagoon, land application	8	5

[1] Data from the California Integrated Water Quality System Database

In May 2007, the Regional Board adopted Order No. R5-2007-0035, WDRs General Order for Existing Milk Cow Dairies. It was modified in 2009 (R5-2009-0029), and then reissued in 2013 (R5-2013-0122). This includes 36 dairies in the study area, with just under 20,000 head permitted, as shown in **Table 4-18**. Also shown are enforcement actions and violations.

Table 4-18
General Order for Existing Milk Cow Dairies[1]

Facility Name	County	# Enforcement Actions within 5 years	# Violations within 5 years
CSU Chico Dairy Facility	Butte	0	0
Sierra Rose Dairy	Butte	2	2
Alston Farms Dairy 1	Glenn	0	0
Alves Dairy	Glenn	1	1
Amaral Dairy	Glenn	0	0
Chris Verboom Dairy	Glenn	0	0
Couto Dairy	Glenn	0	0
Creek Dairy	Glenn	0	0
Frank J. Borges Dairy North	Glenn	2	2
Goedhart Dairy	Glenn	1	1
Hillside Farms	Glenn	1	1
JSJ Dairy	Glenn	2	2
Leo Martin Dairy	Glenn	0	0
MTSJ Dairy/ Maarten Poldervaart Dairy	Glenn	1	1
Nick Beglinger Dairy	Glenn	0	0
Paul Schmidt Dairy	Glenn	0	0
Pedrozo Dairy	Glenn	0	0
Pinheiro & Deniz Dairy	Glenn	0	0
Schager Dairy	Glenn	0	0
Silveira Dairy / Creekside Farms	Glenn	1	1
Silveira Jerstein Dairy	Glenn	1	1
Van Tol Dairy No 2	Glenn	1	1
Vogts Holstein Dairies #1	Glenn	1	1
Zuppan Dairy	Glenn	1	1
Top Of The Line Dairy	Placer	1	1
Former Van Warmerdam Dairy	Sutter	0	0
Belo Dairy	Tehama	0	0
Bob Fumasi Dairy	Tehama	0	0
Brentwood Farms Dairy	Tehama	0	0
Duivenvoorden Farms	Tehama	0	0
Ferreira & Son Dairy	Tehama	0	0
Smith Family Dairy	Tehama	1	1
Vogts Dairy #3	Tehama	0	0
Staas Farms	Yuba	1	1
Staas Farms, Inc.	Yuba	1	1
Tollcrest Dairy	Yuba	2	2

[1] Data from the California Integrated Water Quality System Database

The key components of the Existing Milk Cow Dairies Order are:

- Prohibition of discharge of waste and/or stormwater to surface water,
- Prohibition of animals entering surface water within the confinement areas,
- Requirement to retain waste and stormwater onsite for a 25 year, 24-hour event,
- Requirement for development of an Existing Conditions Report,
- Requirement for development of a Waste Management Plan by 2011,
- Requirement for development of a Nutrient Management Plan by 2012 if they apply waste to land,

- Requirement to conduct monitoring if wastewater is released to surface water, and
- A 50 percent fee reduction if complete certification through the Dairy Quality Assurance Program (DQAP).

In addition to the Existing Milk Cow Dairies Order, the Regional Board has developed WDRs for dairy manure digesters that are not covered under that Order. This includes independent digesters (R5-2010-0130) and centralized digesters (R5-2011-0039). These programs relate to the digesting of dairy manure and then land application and are protective of surface water. A query of the California Integrated Water Quality System (CIWQS) did not identify any permits in the watershed.

The Regional Board adopted a NPDES permit for existing CAFOs (operating as of October 17, 2005) in 2010 (R5-2010-0118) and modified it in 2011 (R5-2011-0091). This is implementation of the Federal CAFO law. This applies to large CAFOs (>700 herd) and with the potential to discharge to surface water. This is a separate permit than the Existing Milk Cow Dairies Order discussed above. A query of CIWQS did not identify any permits in the watershed. Since no dairy in the Central Valley applied for coverage under this permit, the order was rescinded by the Regional Board in February 2020 (R5-2020-0012). Any dairy wishing to discharge to surface water would be required to obtain an individual NPDES permit.

The Regional Board adopted a WDRs General Order for Confined Bovine Feeding Operations in 2017 (R5-2017-0058). This order applies to facilities that have more than 6,000 pounds of animal weight for more than 45 days per year, such as beef cattle stockyards, finishing yards, and/or auction yards; calf ranches; dairy heifer operations; and veal calf facilities. The order prohibits discharge of manure or stormwater from these production facilities. This includes 11 facilities in the watershed, as shown in **Table 4-19**.

Table 4-19
General Order for Confined Bovine Feeding Operations[1]

Facility Name	County	CAFO Population	# Enforcement Actions within 5 years	# Violations within 5 years
Martin Dairy	Tehama	99	0	0
Vogt's Holstein Dairies #2	Glenn	99	0	0
Broken Box Ranch	Colusa	1,510	0	0
Couto Dairy #2	Glenn	120	0	0
Lowe Cattle Company Inc.	Glenn	3,230	0	0
Mendes Farms	Glenn	0	0	0
Miller Ranch	Glenn	75	0	0
Orland Livestock Commission Yard	Glenn	3,300	0	0
Modoc Auction Yard	Modoc	1,000	0	0
Grant Amen Feedlot	Shasta	75	0	0
Todd Stegall Bull Development Facility	Tehama	400	0	0

[1] Data from the California Integrated Water Quality System Database

The Dairy Quality Assurance Program

The DQAP was formed in 1997 as a voluntary program, sponsored by the State Board, the California Department of Food and Agriculture, and the UCCE, to assist dairy owners to comply with regulations and improve sanitary conditions at dairies. In 1999 the Environmental Stewardship Module was established to educate producers on air and water quality. Over 1,800 producers in the Central Valley have completed the program and been certified. The certification is valid for five years and the components include:

- Attendance at a 6-hour education short course on farm management.
- Development of an individual Farm Management Plan.
- Third party evaluation, conducted by California Department of Food and Agriculture inspectors who have received additional training from UC Davis and the Regional Board. Over 800 evaluations have been completed.

Once a dairy operator completes all three of these components, a certification is issued. The DQAP has been incorporated into the Regional Board permitting process, through a 50 percent fee reduction for Environmental Stewardship certification, which has contributed to the success of the program.

Commercial Poultry Operations

The Regional Board adopted a WDRs General Order for Poultry Operations in 2016 (R5-2016-0087-01). This order applies to facilities that have more than 2,000 pounds of animal weight for year round operations. This covers indoor operations only, not outdoor or pasture poultry. The order prohibits discharge of manure or stormwater from these production facilities. It also sets guidelines for pond design/management, production areas, land application areas, and composting areas. This includes 3 facilities in the watershed, as shown in **Table 4-20**.

Table 4-20
Poultry Operations Under General Order[1]

Facility Name	County	CAFO Population	# Enforcement Actions within 5 years	# Violations within 5 years
Catlett Ranch	Placer	188,640	0	0
Tenborg Ranch	Placer	175,382	0	0
Koehn Organic	Tehama	20,000	0	0

[1] Data from the California Integrated Water Quality System Database

University of California Cooperative Extension

The UCCE Sierra Foothill Research and Extension Center is located east of Marysville and conducts research on various topics, including grazing. Current and recent research focuses on rangeland watershed and water quality management, invasive species management, native plant conservation and restoration, as well as cattle production and health. In addition, the UCCE county offices provide support to ranchers and farmers.

University of California at Davis

The University of California's Division of Agricultural and Natural Resources also hosts two programs through the College of Agriculture and Environmental Science: the California Rangeland Watershed Laboratory (CRWL) and the California Rangelands Research and Information Center (CRRIC). These both have informative websites. The CRWL conducts extensive research coordination, while the CRRIC focuses more on public outreach and information sharing. This includes the Rustici Rangeland Science Symposium, held in 2013, 2014, and 2015, to discuss rangeland management and water quality. Updates on applied research findings from the Sierra Foothill Research and Extension Center and strategies to ranchers are presented. These also provide a short course on grazing management for ranchers.

United States Department of Agriculture

The USDA has two services that implement assistance programs for farmers and ranchers. One is the FSA and the other is the NRCS. These were previously described in the Agricultural Drainage section.

Water Quality Issues and Data Review

Section 3 presented a discussion of ambient levels of *Cryptosporidium* and *Giardia* in the focus area. The data continues to show a small number of presumptively positive samples for both protozoa, and low average levels. The GKWTP sampled between 2015 and 2017 for both protozoa. There were no positive detects for *Cryptosporidium*. There were three samples with detects of *Giardia* and all occurred in winter months (November 2015, October 2016, and January 2017), with a maximum running annual average of 0.022 cysts per liter. Each of these sample dates occurred on a wet weather event, or the day after one. Winter months are when rangeland cattle and dairy cattle are projected to have the potential to impact source water quality, so it is possible that the detects of protozoa may be related to livestock in the watershed. There are other sources to consider as well.

There were no detections of pesticides at any of the water treatment plants intakes.

Sacramento River Source Water Protection Program Activities

During the study period, the SRSWPP agencies tracked rangeland and dairy management programs from the Regional Board and developed informational updates. This included a review of the new regulatory programs as well as tracking general compliance with the Orders.

FOREST ACTIVITIES

Since much of the upper watershed is covered by coniferous forest and a large portion of the upper watershed is part of National and State Forests, the activities occurring on these lands are critical to the long-term quality of the water supply. This study identified timber harvesting, including pesticide use, and large wildfires as activities of significant interest and these are discussed below.

Timber Harvesting

Background

Timber harvesting activities can impact ambient water quality directly and indirectly. Direct impacts include development and use of dirt roads, water crossings used to assist timber removal, and the use of pesticides for silviculture or revegetation. Indirect impacts include increased access for other forest users, increased soil erosion, and increased nutrient loading to the tributary waterways. The USFS and the State Board agree that the most important source of pollution in the forests is the timber harvesting road system. Timber harvesting can occur on both public and private lands and is regulated separately based on type of ownership.

Seasonal Patterns

Timber harvesting activities occur throughout much of the year, depending on the location of the harvest. For locations below the normal snowline, tree felling and removal can occur almost any time of year. It is easier to complete prior to the wet season, but these activities can be conducted during the winter. For locations above the normal snowline, tree felling historically occurred during the summer months, after snow melted and access roads were cleared. This would allow removal of the timber prior to the next wet season. More recently, and with the increased use of helicopter removal, tree felling has extended into the fall. Trees are cut down and brought to a removal landing site. The trees can then be removed from the landing into the winter months.

Related Constituents

The primary concerns associated with timber harvesting are the potential for increased erosion and the subsequent increase in solids loading to receiving waters, resulting in higher turbidity, TOC, and nutrients. Another concern is the use of pesticides and herbicides in silviculture and revegetation programs.

A recent study showed that timber harvesting activities can double the amount of sediment transported to receiving waters, especially in the first years after harvest[8]. It

[8] Safeeq M., Grant G., Lewis S., Hayes S.. Disentangling effects of forest harvest on long-term hydrologic and sediment dynamics, western Cascades, Oregon . Journal of Hydrology, Volume 580, January 2020. 124259.

also showed that the strategies to limit ground disturbance during timber harvesting are very effective at reducing impacts, such as suspending logs, avoiding heavy machinery, and implementing mulching and mastication.

Presence in the Watershed and Protection Zones

As described in **Section 2,** much of the upper Sacramento River watershed, above the major reservoirs, is covered with coniferous forest. Harvesting activities can occur in much of the upper watershed, but these activities occur more commonly in those locations greater than 3,000 feet of elevation. Timber harvesting on federal lands is regulated by the USFS and by the CalFIRE on state and private lands. These agencies do not track statistics on the quantity of acres actually harvested in a timely manner, so there are limited means to accurately estimate this activity in the watershed. Beginning in the mid-1990s, there was a significant shift away from timber harvest on federal lands to harvesting on state and private lands. However, due to the extended drought during the study period and the presence of bark beetles throughout the forested area there has been substantial tree mortality on both public and private lands in the watershed. This has significantly increased timber harvesting to remove these dead trees and reduce the fuel load associated with wildfire risk. In addition, there have been numerous large wildfires in the watershed, discussed in the Wildfires subsection below, that have warranted salvage timber harvesting operations.

According to CIWQS, there were 1,487 Timber Harvest Plans (THPs) permitted to harvest in watershed counties during the study period, in three Regional Board jurisdictions under 11 different WDRs General Orders. Fourteen counties had timber harvesting of some amount. A summary of the number of approved THPs under each WDR is provided in **Table 4-21** and a summary of the number of approved THPs in each county is provided in **Table 4-22**. The majority of the THPs approved were from the Central Valley Regional Board and those WDRs General Orders are discussed below.

Table 4-21
Number of THPs Approved by Order, 2015 - 2019[1]

Order Number	Number of THPs Approved
No Order	22
R1-2004-0030	64
R1-2010-0029	7
R1-2013-0005	1
R1-2014-0011	20
R1-2015-0021	17
R5-2010-0022	53
R5-2014-0144	478
R5-2017-0061	778
R6T-2007-0008	2
R6T-2009-0029	20
R6T-2014-0030	25

[1] Data from the California Integrated Water Quality System Database

Table 4-22
Number of THPs Approved by Watershed Counties, 2015 - 2019[1]

Order Number	Number of THPs Approved
Butte	154
Colusa	2
El Dorado	71
Lassen	77
Modoc	45
Nevada	50
Placer	62
Plumas	145
Sacramento	1
Shasta	527
Sierra	42
Siskiyou	220
Tehama	64
Yuba	26

[1] Data from the California Integrated Water Quality System Database

A majority of the timber harvesting is conducted in the upper reaches of the watershed, such as Shasta and Siskiyou counties, upstream of the major reservoirs.

A review of the DPR Pesticide Use database was conducted to identify which pesticides are used on forested lands, as well as to approximate the amount of pesticides applied in the Sacramento River watershed for this use. **Table 4-23** presents a summary of the pesticide use information from 2013 through 2017 for forested lands. There has been a 30 percent reduction in pesticides applied over the study period, to just over 150,000 pounds in 2017.

There are only six pesticides used greater than 1,000 pounds annually. The highest use pesticide on forested lands is glyphosate (herbicide), followed by hexazinone, imazapyr, triclopyr, oxyfluorfen (all herbicides), and borax (insecticide). The use statistics for borax and 2,4-D show significant decreasing trends. Of the top six pesticides used on forested lands, only glyphosate has a drinking water MCL, at 70 µg/L. There is a USEPA Lifetime Health Advisory for hexazinone (400 µg/L) and all the other listed pesticides have USEPA HHBPs, except borax. Imazapyr and triclopyr have USEPA Lifetime HHBPs, 16,000 and 300 µg/L respectively. Oxyfluorfen has a USEPA 10^{-6} Cancer HHBP of 0.437 µg/L.

Regulation and Management

As mentioned previously, there are two separate, parallel regulatory programs for timber harvesting. The USFS governs timber harvesting on federal lands according to the Forest Service Directives and the Land Management Plan for the region, while CalFIRE governs timber harvesting on state and private lands according to the California Forest Practice Act of 1973 and subsequent Forest Practice Rules. These programs are discussed separately. In addition, as of 2003 all timber harvesting operations must obtain coverage under the General permit from the Regional Board (as discussed below).

Table 4-23
DPR Pesticide Use Reporting for Forested Lands, Pounds Applied

Pesticide	2013	2014	2015	2016	2017
GLYPHOSATE	135,968	121,937	114,487	135,454	105,591
HEXAZINONE	24,585	16,104	38,597	25,607	26,970
IMAZAPYR	15,160	20,982	11,777	14,221	11,243
TRICLOPYR	9,663	11,910	10,351	8,325	4,325
OXYFLUORFEN		24	2,716	9,184	3,615
BORAX	31,783	5,981	1,737	1,157	2,517
AMINOPYRALID	1,809	4,005	754	4,995	905
CLOPYRALID	14	263	395	346	827
2,4-D	5,195	4,557	2,671	2,735	525
DISODIUM OCTABORATE TETRAHYDRATE			192	346	507
PENOXSULAM			57	194	76
SULFOMETURON-METHYL	4				32
ESFENVALERATE	4	7	6	6	4
STRYCHNINE	6	6	8	18	1
(S)-VERBENONE					<1
(Z)-9-DODECENYL ACETATE	<1	<1	<1		
ATRAZINE	489	67	298		
CAPSICUM OLEORESIN		<1			
CHLOROPICRIN	88				
CHLORSULFURON			<1		
IMIDACLOPRID				3	
LAMBDA-CYHALOTHRIN	<1	<1	3		
METHYL BROMIDE	179				
ORYZALIN	40	46	31		
PERMETHRIN	1	3	2		

Of note is a significant new California law that took effect recently. Assembly Bill 904 was adopted in October 2013, and amended by Assembly Bill 2239 in August 2014, which added new text to the Forest Practice Act creating a new category of timberland management. This added a “Working Forest Management Plan” to allow large landowners, up to 15,000 acres, to prepare a non-expiring plan for creating a sustainable yield from an uneven aged timber stand. This essentially removes the requirement for specific timber harvest plans from these landowners.

US Forest Service

The USFS implements a Strategic Plan every five years, most recently for Fiscal Years (FY) 2015 – 2020. In this plan are strategic objectives for management of the National Forests. This includes an objective to provide abundant clean water, with understanding the importance of National Forests as the headwaters of many water supplies. The USFS has developed the Forests to Faucets 2.0, to use Geographic Information Systems (GIS) data to display the forested landscapes, as 12-digit HUC that are most important to surface drinking water and display the extent to which they are threatened by development, insects and disease, and wildland fires. The tool also projects the degree to which a water source is vulnerable to future reductions in water supply due to climate change. This data set is available for downloading and more detailed review. The data shows that the Sacramento River is a very important source of surface drinking water that is vulnerable in the upper watershed to insects and wildfires, and the lower watershed to development.

The USFS requires proposed harvesters to submit a THP, prepared by a Registered Professional Forester (RPF), in accordance with the Forest Service Manual, Chapter 1921. The THP must substantially meet the intent of the National Environmental Policy Act (NEPA) procedures as a complete discovery document. The THPs are reviewed by the USFS, as well as the Regional Board, for possible impacts to receiving waters. This includes road construction, road abandonment, and water crossings. The USFS has several key rules for timber harvesting on public lands.

- No irreversible damage to soil slope or watershed conditions allowed
- Waterbodies must be protected from blockage, sediment, or temperature impacts
- Clear cutting is only allowed if it is the optimum method for forest health to create an even-aged forest
- Only trees of 30-inch diameter or greater (at breast height) can be harvested
- Maximum size limit for harvest is 40 to 60 acres in California
- No herbicide application is allowed
- Thinning from below is the preferred harvest method
- Revegetation plan is required and must be restocked within five years

In addition, most National Forests in the watershed implement fuel reduction and forest health projects (including timber harvesting) on an on-going basis to enhance watershed conditions. Timber harvesting is used as part of silviculture, the treatment needs for the forest, to ensure the long-term health of the resources. All trees must be marked for harvesting, road inspections must be conducted, and a fire plan must be submitted before operations begin.

California Department of Forestry and Fire Protection

In 2008, the Farm Bill required each State to prepare a Forest Action Plan by 2010 and update it every five years thereafter. The purpose was to conserve and manage forests, protect them from threats, and increase public benefit. This was incorporated into California's existing requirements for assessing the conditions of the forest and range lands, into the California Forest Action Plan. The goal of this document is to improve forest health and community protection as well as preserve and enhance the forests. This is implemented through BMPs by the CalFIRE and DPR.

The CalFIRE requires proposed harvesters to submit a THP, prepared by a RPF. The THP must substantially meet the intent of the California Environmental Quality Act (CEQA) procedures as a complete discovery document. THPs are valid to be operated on for five years, and then an owner may apply once for a two-year extension on the THP (as per Assembly Bill 1492, approved in September 2012). The THPs are reviewed by CalFIRE, as well as the Regional Board, for possible impacts to receiving waters and cumulative impacts to the area. This includes road construction, road abandonment, and water crossings. New "Road Rules" took effect in January 2015 to further protect the watershed from road construction and use activities. THPs include:

- Checklist of proposed activities
- Description of proposed harvest area, method for harvest, season of operations
- Assessment of:
    - Road Construction
    - Erosion Control
    - Stream Protection
    - Protection of Unstable Areas
    - Hazard and Fire Control
    - Cumulative Impacts
    - Archaeology
- Revegetation Plan (Restocking for Industrial Permittees)
- Pre-harvest on-site inspection by CalFIRE and other related state regulatory agencies (conducted for 95 percent of THPs).

CalFIRE has expanded the THP exemptions during the study period in order to expedite removal of dangerous fuels. This includes a Notice of Exemption, Notice of Emergency for Fuel Hazard Reduction, Substantially Damaged Timberland Exemption, Structure Protection Exemption, and Drought Mortality Exemption. These can be applied for as special requests if a harvester meets the specific criteria for each exemption. The Forest Practice Rules still apply, and there are still limits on using heavy equipment and placing roads on slopes under these exemptions from THPs. These applications are reviewed within five days of submittal and are effective for up to one year. Post-fire exemptions are used broadly on private lands, removing significant timber and often without Regional Board review since the exemptions are acted upon so quickly.

Central Valley Regional Water Quality Control Board

In January 2003, the Regional Board adopted the Conditional Waiver of Waste Discharge Requirements Related to Timber Harvest Activities. The Conditional Waiver was subsequently renewed by the Regional Board in 2010 (R5-2010-0022) and modified by the State Board in 2011 (Order WQ 2011-0014 DWQ) to simplify the enrollment process. The Conditional Waiver was renewed by Order R5-2014-0144 in December 2014 as it was expiring. It was replaced during the study period with Order R5-2017-0061, which is a WDRs General Order for Discharges Related to Timberland Management Activities for Non-Federal and Federal Lands. The scope of the WDRs was expanded to include all timberland management activities, not just timber harvesting so that even Working Forest Management Plan operators must comply with the WDRs.

The WDRs apply to all federal and state lands. The WDRs specify eligibility criteria and conditions that must be met in order to qualify. The WDRs include eight categories of permittees, each with a specific set of eligibility criteria and conditions. Three categories are related to emergency notices approved by either CalFIRE or USFS, and the permittees are automatically enrolled; the other five categories require the permittee to submit a Notice of Intent (NOI) prior to initiating activities. The WDRs also contain monitoring (implementation, forensic, and effectiveness) and reporting conditions, which vary according to category, and they include investigations of impacts to waterbodies. The Regional Board has developed guidance documents to assist with implementation of the WDRs, specifically related to monitoring requirements.

State Water Resources Control Board

The State Board began development of a statewide waiver for USFS (including timber harvest, roads, range, recreation, and fuel management) in 2009 in order to streamline management policies state-wide for non-point source activities. A proposed Resolution was prepared in 2011 to cover the USFS statewide activities under one order, but it has not yet been finalized or adopted. As part of the resolution development, the USFS worked in collaboration with the State Board and Regional Boards to develop a new WQMH to address control of nonpoint source pollution generated by various activities on National Forest System lands in California. The WQMH was adopted by the USFS in May 2011 with revised management practices to improve water quality protection related to the activities prioritized in the proposed statewide order. Some key new provisions include road, range, and recreation management policies; BMPs with adaptive management; and an expanded monitoring program.

In September 2015, the State Board adopted Resolution No. 2015-0062. This instructed staff to engage with the University of California to update tools and documents related to grazing BMPs and water quality. In accordance with this instruction, the State Board is developing a non-regulatory guidance document on livestock grazing management in California. This will be completed through an update to the 1995 Rangeland Water Quality Management Program, see discussion below. In 2020 the State Board is seeking public input on water quality impacts of grazing and BMPs. It is expected that a new Statewide Grazing Guidance will be drafted and available for public feedback in the fall 2020 or early 2021.

The Central Valley Regional Board and the Lahontan Regional Board are working together with USFS and USBLM to develop an NPS permit to ensure regulatory compliance and water quality protection on USFS and BLM managed lands. Land management activities that may be regulated under the proposed NPS permits include timber harvest and vegetation management, transportation management, recreation facilities management, wildfire management and recovery, and restoration activities. The two Regional Boards are working together to maximize consistency and facilitate implementation across approximately 20 million combined acres of federally managed lands. Ultimately each Water Board will adopt its own permit, however the goal is for the permitting approach – including the permitted activities, goals, milestones, and outcomes – to be similar.

Water Quality Issues and Data Review

A review of the ambient water quality for the water treatment plants in **Section 3** for turbidity and TOC continues to show that the water treatment plants show a distinct seasonal trend with most peaks occurring during the wet weather season, associated with high precipitation and high river flow events. This could be contributed to by timber harvesting and associated activities, such as storm runoff from dirt access roads and watercrossings. It should be noted that most of the water treatment plant intakes are downstream of reservoirs that serve to buffer many water quality impacts downstream, including turbidity.

As noted in **Sections 3** and **5**, there were again no detects of pesticides in the source or treated water for any water treatment plants. Also, there are no nutrient water quality concerns either at this time.

Wildfires

Background

Another potential contaminating activity associated with forests is wildfires. The loss of ground cover, the chemical transformation of soil, and the reduction in soil infiltration rates all increase the likelihood of erosion and hydrophobic soils. These all can contribute to increased solids in the receiving water and an increase in the turbidity of the raw water at the water treatment plants, especially from the first rains after significant wildfires.

It should be noted that in the western United States, a common wildfire fighting practice is to implement the use of aerial application of fire retardants. There is a variety of fire retardants used, but they are primarily 85 percent water and 15 percent ingredients. The active ingredients account for 60 to 90 percent of the ingredients and are typically inorganic fertilizers, such as ammonia sulfate and ammonia polyphosphates. The remaining inactive ingredients are thickeners, such as guar gum and clay, and corrosion inhibitors. The purpose of the retardant is to slow the rate of fire spread by cooling and coating fuels. These are typically applied in front of the fire as a suppression tactic, most often on ridge tops and near fire breaks. The fire breaks can sometimes include aquatic breaks such as rivers, streams and lakes.

Seasonal Patterns

Wildfires can be caused by several activities, including naturally induced (such as lightning), human induced (arson or accident), and loss of control of a prescribed burn. Conditions that contribute to a wildfire include dry, tinder wood; heavy fuel loads; warm, dry weather; and wind. These conditions typically occur during the late summer and fall in the Sacramento River watershed, but can occur during the late spring and early summer as well. Climate change, combined with an extended drought, beetle infestation and overgrown forests, is contributing to increased wildfire activity in the watershed during the past decade.

The impacts of wildfires on water quality are usually not seen at the time of the fire but rather later, during the following wet season, when precipitation falls on the recently burned area causing erosion. However, the dry season is extending further into the fall resulting in significant wildfire events closer to the onset of winter rains so the timespan between burn events and rainfall events may be reduced. It has been documented by the USGS that fire impacts to source water quality can be seen for up to 15 years after the event.

Related Constituents

Since erosion is the key concern associated with wildfires, turbidity, organic carbon, nutrients, and total dissolved solids are the key constituents of concern. In addition to these, it is possible that the increased soil erosion in the Sacramento River watershed could also increase the levels of metals (such as aluminum, iron, and manganese) and possibly organic compounds (such as pesticides) in the source water. A recent study shows that in burn areas that runoff has higher rates of dissolved organic carbon due to transformation of carbon compounds[9]. Depending on their use and proximity to water bodies, retardants may result in water quality impacts since they contain active ingredients. As the wildland/urban interface continues to expand there is increased potential for wildfires to involve residential and commercial facilities as well. This would increase the exposure to a wider array of potential contaminants.

Presence in the Watershed and Protection Zones

There were 22 wildfires greater than 1,000 acres that burned either entirely or partially in the watershed during the study period, as shown in **Table 4-24**. These wildfires burned a total of over 1.04 million acres. The top five fires were greater than 50,000 acres each and together burned over 900,000 acres total, or 87 percent of the total burn area.

The most intense burn period was June through December 2018, when 14 wildfires occurred throughout the watershed burning over 960,000 acres, nearly 92 percent of the total burn over the entire study period.

The top three wildfires were the Ranch, Carr, and Camp fires and all three burned in the second half of 2018. Together they accounted for over 790,000 acres burned. The Ranch Fire was only partially located within the Sacramento River watershed, while the Carr and Camp fires were located entirely within the watershed. All three wildfires will be discussed further.

[9] Hohner, Summers, Rosario-Ortiz. Laboratory simulation of postfire effects on conventional drinking water treatment and disinfection byproduct formation. AWWA WaterScience. 2019, e1155.

Table 4-24
Wildfires Greater than 1,000 Acres in the Sacramento River Watershed, 2015 - 2019

Name	County	Location	Acreage	Dates	Jurisdiction
Ranch Fire (Mendocino Complex	Colusa/ Glenn	off Highway 20 near Potter Valley, northeast of Ukiah	410,203	July 27, 2018 - January 4, 2019	USFS Mendocino National Forest
Carr Fire	Shasta/ Trinity	Hwy 299 and Carr Powerhouse Rd, Whiskeytown	229,651	July 23, 2018 - January 4, 2019	CalFire/USFS/NPS Whiskeytown National Recreation Area
Camp Fire	Butte	Pulga Road at Camp Creek Road near Jarbo Gap	153,336	November 8-25, 2018	CalFire/Butte County Sheriff Department, Paradise Police Department, USFS
Delta Fire	Shasta/ Trinity	I-5 and Lamoine, 2 miles NW of Lakehead	63,311	September 5, 2018 - January 4, 2019	USFS Shasta-Trinity National Forest
Walker Fire	Plumas	Indian Creek and Beckworth Genesee Road, east of Genesee	54,612	September 4 - October 24, 2019	USFS Plumas National Forest
Hirz Fire	Shasta	off Gilman and Moore Creek Campground, east of Lakehead	46,150	August 9, 2018 - January 4, 2019	USFS Shasta-Trinity National Forest
Stone Fire	Modoc	Big Canyon, 10 miles SW of Canby	39,387	August 15, 2018 - January 4, 2019	Modoc National Forest
Red Bank Fire	Tehama	Off Hammer Loop Road and Petty John Road, West of Red Bluff	8,838	September 5-13, 2019	CalFire
Trailhead Fire	Placer/ El Dorado	Todd Valley/MFAR	5,646	June 28 - July 18, 2016	ENF/CalFire
South Fire	Tehama	Southeast aspect of Tomhead Mountain, South of Platina	5,332	September 5 - December 2, 2019	Shasta Trinity National Forest
Sun Fire	Tehama	Hwy 36 and Sunriver Road, east of Red Bluff	3,889	October 7, 2018 - January 4, 2019	CalFire
Lane Fire	Tehama	Off Hwy 36 in Paynes Creek	3,716	June 23, 2018 - January 4, 2019	CalFire
Apple Fire	Tehama	Off Apple Rd & Paskenta Rd, west of Corning	2,956	June 9, 2018 - January 4, 2019	CalFire

Table 4-24 Cont'd
Wildfires Greater than 1,000 Acres in the Sacramento River Watershed, 2015 - 2019

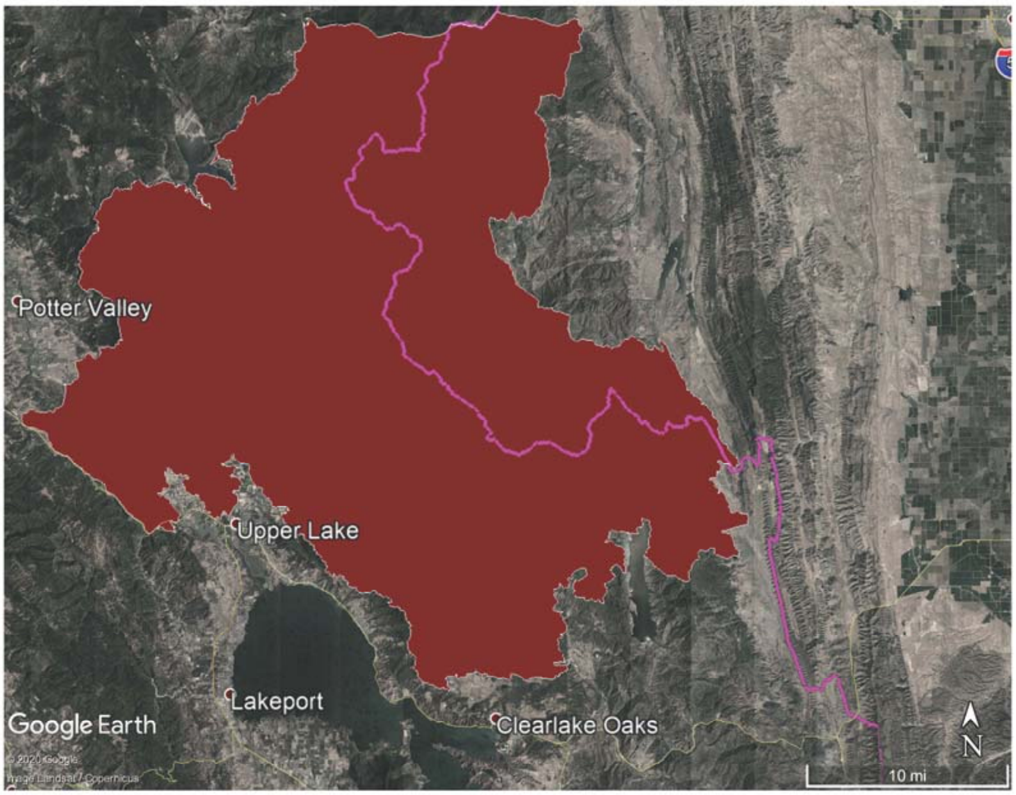
Name	County	Location	Acreage	Dates	Jurisdiction
Soup Complex	Modoc	Soup Springs, 12 miles east of Likely	2,652	September 17 - October 13, 2016	Modoc National Forest
Sand Fire	Yolo	Guinda	2,512	June 8-17, 2019	CalFire
Chrome Fire	Glenn	Hwy 162 and Forest Hwy 7, north of Elk Creek	2,290	June 9, 2018 - January 4, 2019	CalFire
Hat Fire	Shasta	Hwy 299 east and Fish Hatchery rd, northeast of Burney	1,900	August 8, 2018 - January 4, 2019	CalFire
Creek Fire	Shasta	Clear Creek Rd & American Rd, west of Redding	1,678	June 24, 2018 - January 4, 2019	CalFire/City of Redding Fire Department
West Butte Fire	Sutter	North Butte Rd & West Butte Rd, northeast of Colusa	1,350	June 8-17, 2019	Sutter County Fire Department
Butte Fire	Sutter	Pass Road and W Butte Road, 9 miles northwest of Yuba City	1,200	July 31, 2018 - January 4, 2019	Sutter County Fire Protection District
North Fire	Placer	North Fork Campground, south of Emigrant Gap	1,120	September 3, 2018 - January 4, 2019	Tahoe National Forest
Lumpkin Fire	Butte	Off Lumpkin Road and Forbestown Road, Robinson Mill	1,042	September 11-17, 2015	CalFire
		Total Acreage	**1,042,771**		

Ranch Fire

The Ranch Fire was located north of Clear Lake and only partially located within the Sacramento River watershed (the eastern portion of the burn area). The fire boundary is shown on **Figure 4-4**. The fire began on July 27, 2018 and burned over 410,000 acres. The portion of the burn in the Sacramento River watershed was an undeveloped area that drains to East Park Reservoir, then to Stony Gorge Reservoir, then to Black Butte Lake, then to Stony Creek and enters the Sacramento River below Hamilton.

There were no specific monitoring programs to assess the impact of the Ranch Fire.

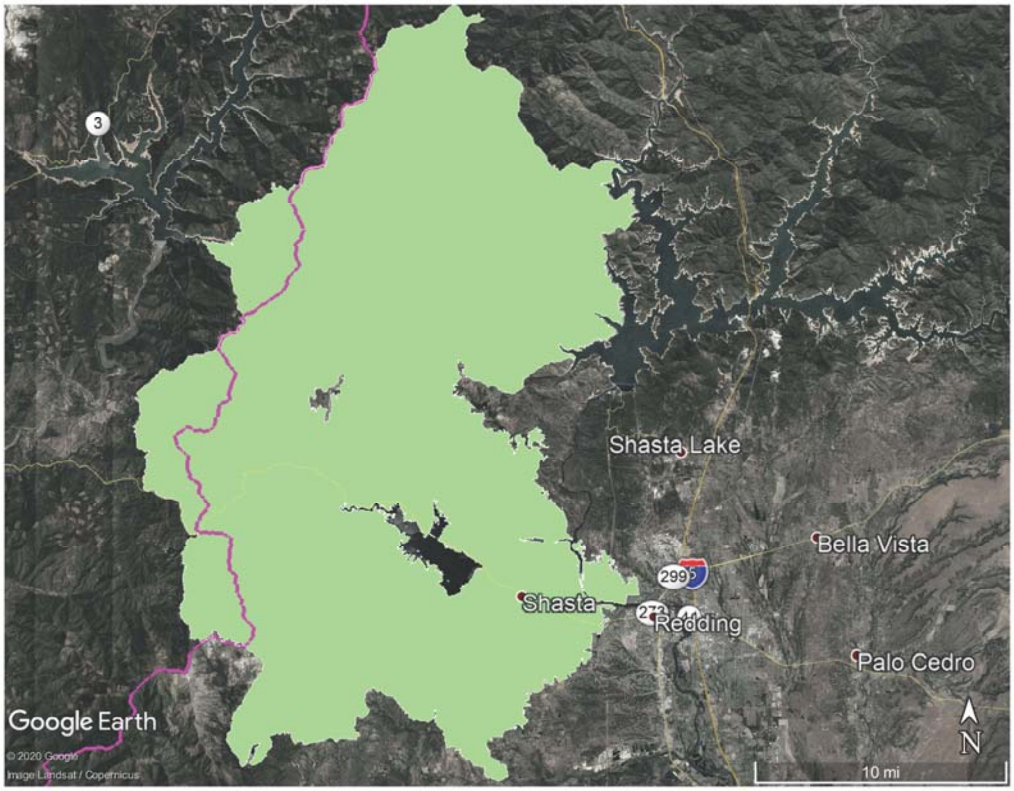
Figure 4-4. Ranch Fire Boundary



Carr Fire

The Carr Fire was located west of Redding, near Whiskeytown Reservoir. The fire boundary is shown on **Figure 4-5**. The fire began on July 23, 2018 and actively burned nearly 230,000 acres through August 30, 2018, although was not considered over until the end of the burn season on January 4, 2019. The burn area includes both developed areas near Redding and undeveloped forest lands. The fire burned around Lake Shasta and Whiskeytown Reservoir, west toward Trinity Reservoir and Lake Lewiston, as well as along the Sacramento River and Clear Creek.

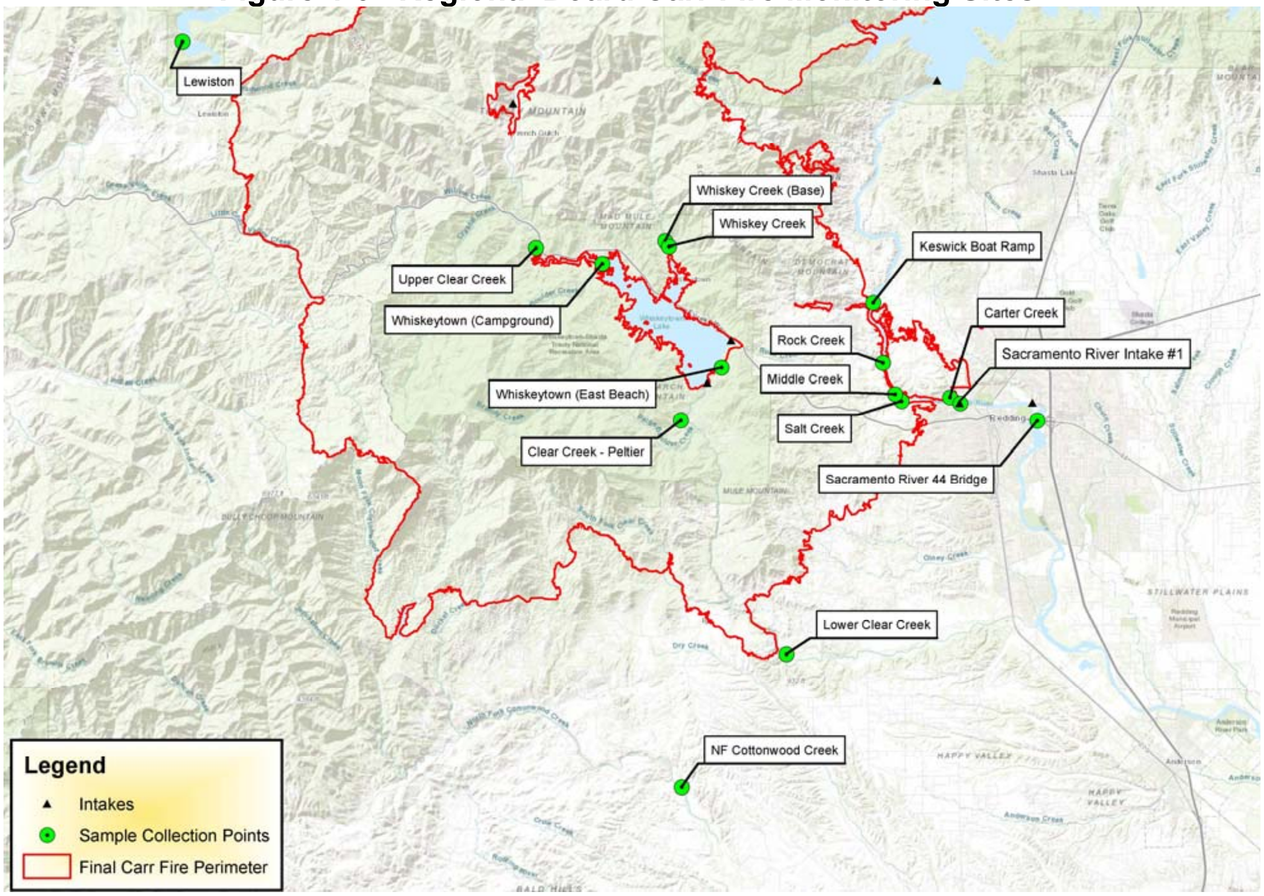
Figure 4-5. Carr Fire Boundary



As follow up to the wildfire, a sampling effort was conducted by the Regional Board, which monitored portions of the Trinity River, Whiskeytown Lake, and Sacramento River watersheds as shown in **Figure 4-6.** Samples were collected from September 2018 to March 2019, with a final sample in January 2020. Samples were collected for general chemistry, nutrients, TOC, metals, and polycyclic aromatic hydrocarbons (PAHs). All PAHs were non-detect, except for a single detection of chrysene at 0.011 µg/L at Clear Creek Peltier Valley Road Bridge.

Three samples at Upper Clear Creek (December 2018, January 2019, January 2020), one sample at Whiskey Creek (January 1, 2019), one sample at Rock Creek (January 2020), one sample at Middle Creek (January 2020), one sample at Salt Creek (January 2020), and one sample at Carter Creek (January 2020) exceeded the primary MCL for total aluminum of 1,000 µg/L, with concentrations ranging from 1,210 to 6,300 µg/L. However, the concentration of total aluminum in the Sacramento River at 44 Bridge in January 2020 was 103 µg/L, and 193 µg/L at Sacramento River Intake #1, which are both below the secondary MCL for aluminum.

Figure 4-6. Regional Board Carr Fire Monitoring Sites



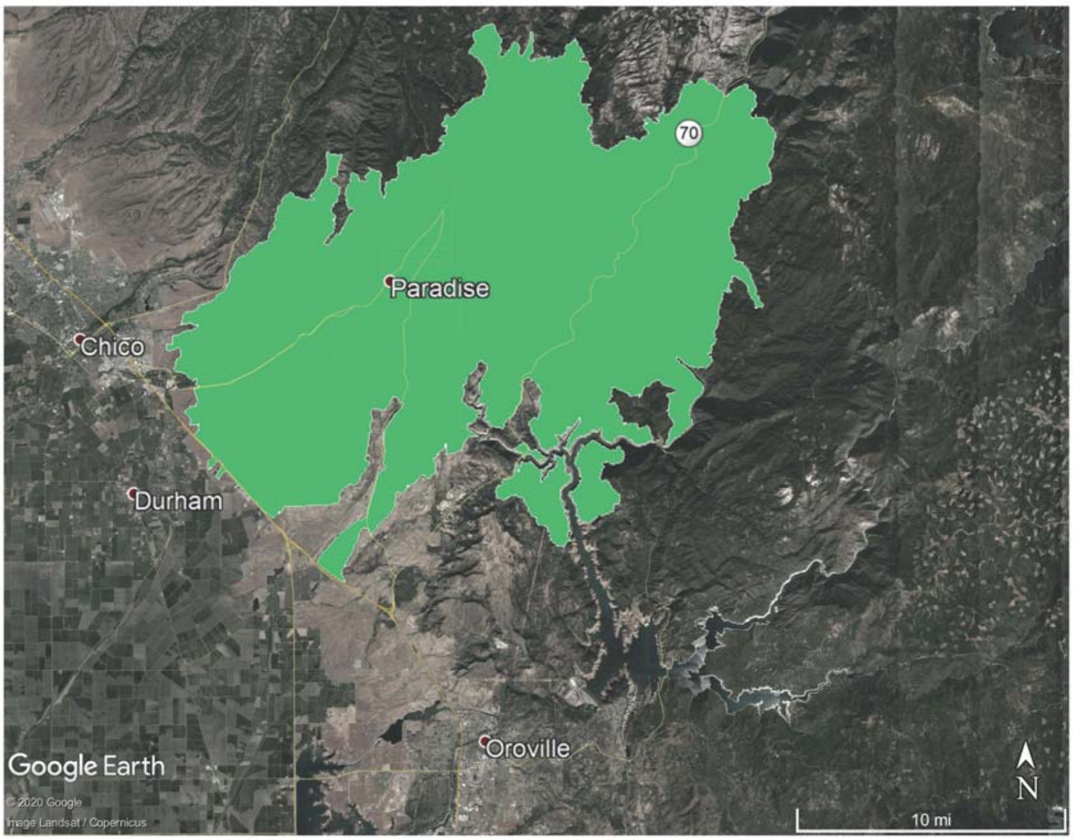
There were also numerous detections of total iron above the secondary MCL of 300 µg/L at various sampling locations. With peak concentrations of 6,030 µg/L at Upper Clear Creek in January 2019, 7,370 µg/L at Whiskey Creek in January 2019, 2,040 µg/L at Rock Creek in January 2020, 5,030 µg/L at Middle Creek in January 2020, 4,100 µg/L at Salt Creek in January 2020, and 5,330 µg/L at Carter Creek in January 2020. However, the concentration of total iron in the Sacramento River at 44 Bridge in January 2020 was 103 µg/L, and 259 µg/L at Sacramento River Intake #1, which are both below the secondary MCL for iron.

In addition to the Regional Board monitoring program the State Board, Division of Drinking Water (DDW) Lassen District Field Office worked with local water utilities to conduct additional monitoring at the local water treatment plant intakes between October 2018 and April 2019. The findings of that investigation were that water quality impacts were not as severe as anticipated. Turbidity and TOC increased during the initial first flush rain events and peaked through the winter storms, but generally trended down over the study period.

Camp Fire

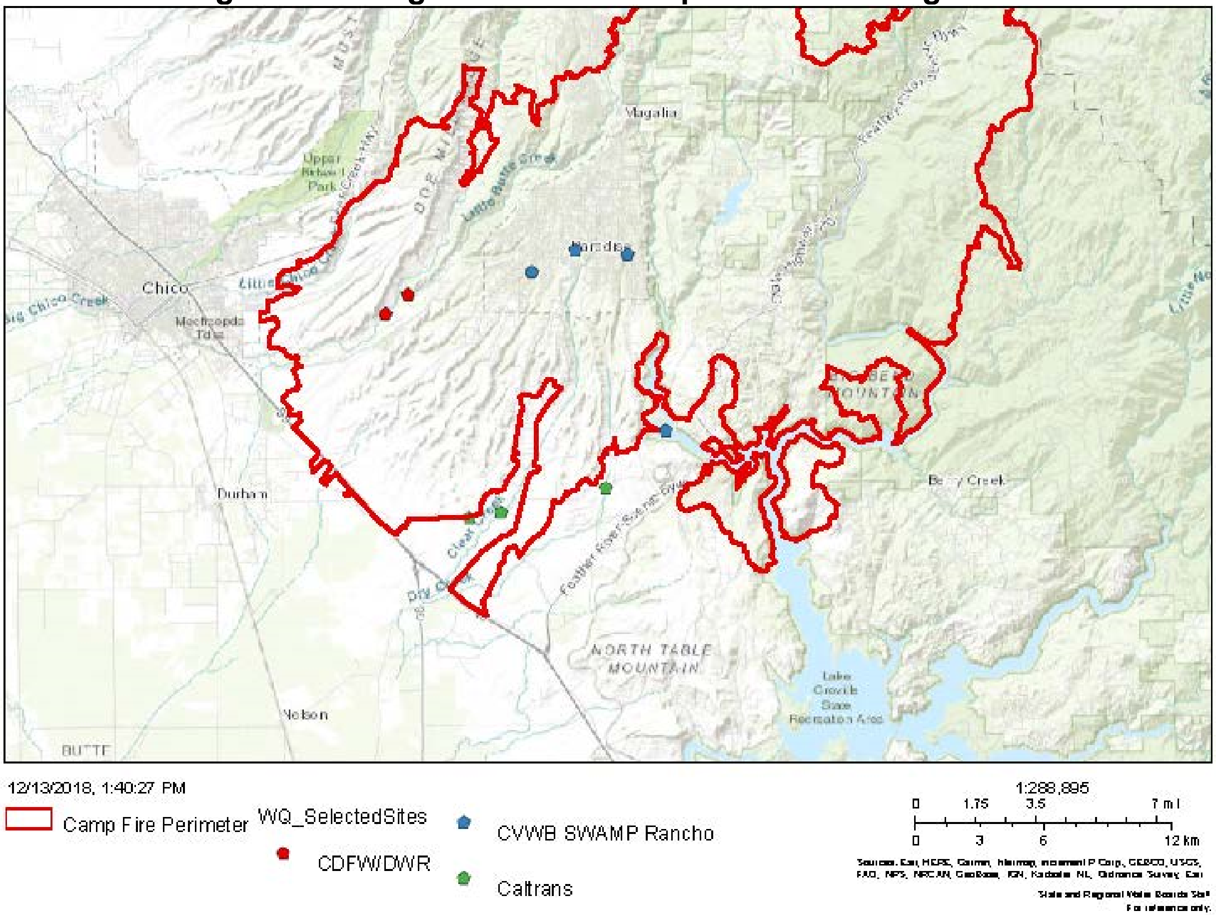
The Camp Fire was located north of Oroville and east of Chico. The fire boundary is shown on **Figure 4-7**. The fire began on November 8, 2018 and burned over 150,000 acres through November 25, 2018. The burn area includes both developed areas, including the entire community of Paradise, and undeveloped forest lands. The fire burned north of Lake Oroville, as well as along the Feather River and Butte Creek. The fire resulted in the destruction of at least 13,972 residences, 528 commercial buildings, and 4,293 other minor structures, in addition to 88 fatalities.

Figure 4-7. Camp Fire Boundary



This fire occurred very late in the wildfire season so the monitoring work related to the Carr fire was already underway. The Regional Board decided to implement another monitoring program at this site, due to the unprecedented nature of the wildland/urban interface burn resulting in so much residential and commercial loss. Six monthly sample events were planned at 10 sites, from December 2018 through May 2019. **Figure 4-8** presents the monitoring site locations. The analysis included nutrients, metals, PAHs, and other general water quality constituents.

Figure 4-8. Regional Board Camp Fire Monitoring Sites



The December 2018 sample results showed generally low turbidity, metals, and PAHs with the exception of high aluminum levels above the primary MCL. January 2019 results showed continued low levels of turbidity, the detectability of PAHs, and more widespread detectability of high levels of aluminum. February 2019 results indicated high levels of turbidity as well as aluminum, but PAH was no longer detectable. March 2019 results showed reducing levels of turbidity, but a return of PAH. More significantly, aluminum, antimony, cadmium, lead, and selenium were all detectable above their primary MCLs, especially in the waterbodies downstream of the burned urban area around Paradise.

Regulation and Management

Wildfire response and management is led either by the USFS or by CalFIRE, depending on the fire location. The agencies usually end up working together on larger fires, along with local fire agencies. Once a fire is controlled and extinguished, a detailed field survey is conducted to assess the damage. On federal lands, typically a report is prepared which summarizes the location and extent of burn damage. The report also outlines recommended actions to implement to restore the vegetation, if appropriate.

Revegetation is only recommended for severe burn areas where natural reforestation is unlikely.

California Forest Improvement Program

CalFIRE has continued implementation of a fuels reduction program funded by Proposition 40, the California Clean Water, Clean Air, Safe Neighborhood Parks, and Coastal Protection Act of 2002. The goal of the program is to reduce wildland fuel loadings that pose a threat to watershed resources and water quality. Non-federal lands in fifteen Sierra Nevada counties are eligible for the program. A large portion of the Sacramento River watershed has been ranked as high priority. The county lands have been prioritized for risk, but projects outside of the priority areas will be considered for funding as long as the applicant can demonstrate the project's watershed and/or water quality protection values. Participants can be reimbursed up to 90 percent for the costs of forest improvement and fuel reduction, such as management plans, site preparation, tree purchase and planting, timber stand improvements, habitat improvements, and land conservation practices. Applicants must have 20 to 5,000 acres, and reimbursements cannot exceed $50,000.

Guidelines for Aerial Delivery of Retardants and Foam Near Waterways

The use of approved long-term retardants in wildland fire suppression is standard in fire management and planning. The retardants are most often delivered in fixed or rotor-wing aircraft. A current list of qualified products and approved uses is listed on the USFS Wildland Fire Chemical Systems website (http://www.fs.fed.us/rm/fire). According to the USFS, the fire retardant commonly used is Phos-Check. The use of fire retardants can impact water quality if chemicals are accidentally dropped into a water body, or if heavy rains occur before the product has had time to naturally degrade.

Post-fire water quality monitoring for streams near four wildfires showed that aerial application of fire retardant near but not into streams had minimal effect on surface water quality (Crouch et al, 2006). Ammonia and phosphorus from the burning of wood and other organics in burn area streams where fire retardant was not used were found in concentrations similar to those found in area where fire retardant was aerially applied.

The National Interagency Fire Center has developed *Interagency Standards for Fire and Fire Aviation Operations* which are annually revised. The *Interagency Standards for Fire and Fire Aviation Operations* states, references, or supplements policy for the USBLM, the USFS, the U.S. Fish and Wildlife Service, and the National Park Service. Regarding the use of fire retardants, the Aerial Application Guidelines are to “avoid aerial or ground application of retardant or foam within 300 feet of waterways.” (http://www.fire.blm.gov/Standards/redbook.htm). This policy was recently upheld in a December 2011 Record of Decision, Nationwide Aerial Application of Fire Retardant on National Forest System Land, USFS.

Water Quality Issues and Data Review

A review of the ambient water quality for the water treatment plants in **Section 3** for turbidity and TOC shows that the water treatment plants show a distinct seasonal trend with most peaks occurring during the wet weather season, when precipitation and river flow are higher. Woodland Davis Clean Water Agency's (WDCWA) Regional Water Treatment Facility (RWTF), GKWTP, and Sacramento County Water Agency's Vineyard Surface Water Treatment Plant (VSWTP) showed evidence of impacts from the severe burn period during the summer and fall of 2018. Peak TOC and turbidity levels occurred between December 2018 and March 2019. TOC peaked at 4.7 mg/L at GKWTP in December 2018 and monthly average turbidity peaked at 95.8 NTU at GKWTP in February 2019. The SRWTP was offline for maintenance during most of this period.

Sacramento River Source Water Protection Program Activities

The upper watershed is most vulnerable to wildfires. These wildfires have the potential to impact source water quality. However, there is limited ability for the participating water agencies to conduct any source water protection efforts other than tracking efforts of government entities to respond to wildfires and implement policies and plans to reduce risk of wildfire.

RIVER CORRIDOR AND RIVER RECREATION

Background

River recreation includes body and non-body contact activities. Body contact recreation, such as swimming, wading, and rafting, is allowed on all major reservoirs and river reaches in both the Sacramento and American river watersheds. The number of body contact recreationalists will be far less than the estimated number of annual recreationalists. Much of the recreational use is associated with non-body contact recreation including on-shore activities such as fishing, hiking, biking, in-line skating, walking, dog-walking, or picnicking and in-river activities such as boating. Activities occurring within the river corridor can lead to illegal dumping, such as abandoned boats or other trash.

Another river corridor activity of interest to source water quality is illegal camping and homelessness. There is a continuous, though shifting, population of homeless people and illegal encampments in the river corridors for the Lower Sacramento River and Lower American River. The illegal camps become littered with debris, garbage, sewage, litter, used toilet paper, human waste, discarded syringes, food wrappers, old clothes, etc. and are a potential source of contamination in the watershed.

Seasonal Patterns

Recreation in the watershed can occur throughout the year, but is most significant during the summer months between Memorial Day and Labor Day. Recreation on the Sacramento River in the protection zones is largely limited to activities involving limited or no body contact, such as power boating, jet skiing, and on-shore fishing.

Recreation on the Lower American River near Discovery and Tiscornia parks is comprised of both body and non-body contact types. Swimming, rafting, and wading are common throughout the summer months, with peaks around weekends and holidays. Many people living near the American River Parkway use it regularly for on-shore activities, like dog-walking.

Illegal camping and homelessness are a storm source with the principal concern being wash off caused by rain runoff that may pick up waste from the camps. The illegal camping is typically located within the flood plain. For this reason, the principal concern is that contaminants associated with the sites, including human waste, may be washed off during storm events and transported to the Sacramento and American rivers.

Related Constituents

Body contact recreation in general has long been known to be a source of pathogen contamination, resulting partly from personal sanitary conduct and partly from a natural shedding process. Pathogens shed by recreationalists include bacteria, viruses, and protozoa. Moreover, because their origin is human, microorganisms shed by recreationalists are transmissible to other humans. Boaters could dump sewage waste into the river rather than use a sewage pumpout. Non-body contact could result in a wide variety of constituents, including pet fecal waste. Illegal dumping could result in discharge of a wide variety of constituents, including petroleum products.

Illegal camps are of potential concern as a source of fecal waste as well. The waste may have a disproportionately high load of disease-causing organisms since, as noted in the Sacramento County and Cities Board on Homelessness' Five Year Plan, there is "substantial documentation of high incidence of diseases among the homeless population." The illegal camps may also include other illegal trash that could contribute a wide array of contaminants and have potential for initiating fires.

Presence in the Watershed and Protection Zones

The Sacramento River is heavily used for power boating, jet skiing, water skiing, and fishing. Recreational use is not controlled or tracked on the river. There are multiple access points at marinas, boat launches, recreational areas, and private docks along the length of the river. Non-body contact recreation occurs all along the river system. Illegal dumping, such as boat abandonment, could occur anywhere along the reach. Restrooms are located at marinas and at public parks along the river, but there are no floating restrooms along this reach of the Sacramento River.

Marinas

There are 12 marinas on the Sacramento River between Freeport and the Feather River confluence. These facilities are listed in upstream to downstream order in **Table 4-25**. In addition, there is a fuel dock at Steamboat Landing near River Mile 59. Also, there are 38 floating restrooms located on lakes in the upper portions of the watershed.

Table 4-25
Marinas on the Sacramento River

Facility/River Mile	Activities/Waterside Facilities	Owner
Verona Village River Resort 6485 Garden Highway, Nicolaus River Mile 80	Berths, restrooms, store, camping, restaurant	Private
Alamar Marina 5999 Garden Highway, Sacramento River Mile 71	25 Berths, fuel, restrooms, restaurant	Private
Metro Marina/Swabbies on the River 5871 Garden Highway, Sacramento River Mile 71	13 Berths, sewage pumpout[1], restrooms, restaurant, store, camping	Private
Harry's Marina 1951 Garden Highway, Sacramento River Mile 62.5	Berths, boat launch, restrooms, camping	Private
River View Marina 1801 Garden Highway, Sacramento River Mile 62	88 Berths, sewage pumpout[1,2], restrooms, store, restaurant	Private
Virgin Sturgeon Marina 1951 Garden Highway, Sacramento River Mile 61.5	Berths, restrooms, restaurant	Private
Riverbank Marina 1371 Garden Highway, Sacramento River Mile 61	175 Berths, sewage pumpout[1,2], restrooms, restaurant	Private
Sacramento Marina Front Street, Sacramento River Mile 58	475 Berths, boat launch, sewage pumpout[1,2], restrooms, fuel, store	Public
Sacramento Yacht Club 3365 S. River Rd, West Sacramento River Mile 55.5	>100 Berths, restrooms, sewage pumpout	Private
Sherwood Harbor Marina 3505 S. River Road, West Sacramento River Mile 54.5	130 Berths, sewage pumpout[1], fuel, shower facilities, restrooms, camping, store	Private
Stan's Yolo Marina 31070 S. River Rd, Clarksburg River Mile 50	48 Berths, fuel	Private
Freeport Marina 8250 Freeport Blvd, Sacramento River Mile 46	50 Berths, sewage pumpout[1,2], restaurant, store, restrooms	Private

[1]Pumpout available for public use.
[2]No charge to use pumpout

Overnight Boats

Overnight boats are frequently anchored near the mouth of the American River. The cities of Sacramento and West Sacramento have ordinances that prohibit unseaworthy boats from anchoring in the river, limit the time of anchoring, and provide for the removal of all derelict boats. The ordinance and subsequent enforcement and removal have been effective at ensuring these boats are managed to protect water quality. Under current law, police officers must have probable cause to board a boat, such as observing a dumping incident. This probable cause rarely occurs.

Body Contact Recreation

Body contact recreation on the Lower American River at Tiscornia Park and Discovery Park consists primarily of rafting/kayaking, swimming from shore, and swimming associated with overnight boats. Swimming from shore occurs at various locations, the main ones on the Sacramento River are Sand Cove Park (River Mile 62) and Elkhorn Regional Park (River Mile 70). Neither facility monitors use statistics.

Sacramento County Department of Regional Parks manages the American River Parkway, including Discovery Park on the north side of the river, as well as the Elkhorn Boat Launch Facility. The City of Sacramento Department of Parks and Recreation manages Tiscornia Park on the south side of the American River, as well as Sand Cove, Miller, Chicory Bend, and Pocket Area parks on the Sacramento River. There are fewer restrooms in the downstream section of the American River Parkway as there have been problems in the past with vandalism of restrooms in this area.

Illegal Camping/Homeless

There are known illegal camping areas within the levees on both the east and west sides of the Sacramento River and along the Lower American River. Illegal camps are created largely in the American River Parkway, mostly downstream of the Business 80 bridge crossing, close to social services in downtown Sacramento. Many of the camps are located near the river. On the Sacramento River, there has been illegal camping in West Sacramento around the Lighthouse Marina area.

The number of homeless people has stabilized to around 200 to 400 living in the furthest downstream three-mile reach of the Lower American River, and this population is predominantly a service-resistant population. There is a “no-alcohol” area from the Capital City Freeway Bridge crossing to Discovery Park. Sacramento County Director of Regional Parks has noted that alcohol is destroyed on scene after citations are issued. Sacramento County Park Rangers also cite individuals for other code violations and arrest those with outstanding warrants.

There are County and City ordinances which ban illegal camping in the American River Parkway (discussed later); enforcement of these ordinances within the American River Parkway was primarily completed by Sacramento County park Rangers, supported at times by the City of Sacramento Park Services and other law enforcement, during the study period. Illegal encampments on public property were posted with notices to vacate, and occupants were forced to move so the encampment area could be cleaned. In 2017, Sacramento County approved a $5 million plan to increase patrols along the American River Parkway and provide additional camp clean up.

There is other land within the floodplain which is either owned by the City of Sacramento or privately owned where homeless populations illegally camp. Most of the camps are located in close proximity to the river. The City of Sacramento Park Services enforced illegal camping bans on City or privately owned lands within the City limits located within the American River floodplain, but which are not officially Parkway designated lands.

In late 2018 a court ruling (Martin v. City of Boise) determined that it is unconstitutional for local governments to cite or arrest a homeless person for sleeping, sitting, or lying outside in public places if there is no available shelter. The City and County of Sacramento ceased issuing citations for illegal camping in late 2018, as well as ceased posting encampments with notices to vacate, but continued their enforcement of other code violations associated with homeless encampments, such as dumping, fires, drug possession, or other offenses. However, the decision does not permit a homeless person to indefinitely reside at a single location on public property, and the decision does not preclude enforcement to avoid or mitigate determinantal consequences associated with homeless encampments, such as: accumulated debris, environmental degradation, and health and public safety issues including degradation of public infrastructure such as levees. Starting in 2019, encampments that were found to be creating these negative impacts to the environment and public health and safety were posted with notices to vacate, so that the areas could be cleaned and degradation to public infrastructure could be repaired.

The Sacramento Housing and Redevelopment Agency, in partnership with Sacramento Steps Forward, conducts "Point-in-Time" (PIT) Homeless Counts every other year in Sacramento County. The 2019 PIT Count conducted for Sacramento County reported 5,570 individuals experience homelessness on a single night. Only 30 percent of homeless individuals were considered sheltered at the time of the report. This represents an over 50 percent increase in overall homelessness since the last count was conducted in 2017. **Table 4-26** presents the findings from the 2013 through 2019 reports.

Table 4-26
Homeless Count Results

Category	2013	2015	2017	2019
Sheltered	1,752	1,711	1,613	1,670
Unsheltered	786	1,111	2,052	3,900
Total Homeless	2,583	2,822	3,665	5,570

According to the PIT Count the number of chronically homeless has grown consistently between 2013 and 2019. At the time of the 2019 count, approximately 70 percent of homeless individuals were unsheltered, which reflects an increase from 2017 when 56 percent of homeless were unsheltered. Some portion of the unsheltered homeless resides in the river corridor in illegal camps. The 2019 report indicates that most of the homeless population in Sacramento County is of local origin, 93 percent. The report also indicates that a higher than historic number of families are included in the unsheltered category.

The Yolo County Homeless and Poverty Action Coalition also conducts homeless counts annually throughout the County, including in the City of West Sacramento. The 2017 count showed there were 459 homeless in the City of West Sacramento, and 209 of those were unsheltered. This is more than double the PIT counts conducted in 2015. Fifty-three percent were identified as being chronically homeless. Only a portion of the unsheltered homeless reside in the river corridor. Yolo County estimates that 20 percent of the unsheltered homeless reside outdoors.

Regulation and Management

Law enforcement personnel from the Sutter County, Yolo County, and Sacramento County Sheriff's Offices, as well as the cities of Sacramento and West Sacramento Police Department, patrol the river. Local law enforcement officers also have control over recreational users in areas within their agency's jurisdiction and up to 500 feet from the high waterline in any agency's jurisdiction.

Local parks and recreation department personnel can enforce park rules at recreational areas under the jurisdiction of that agency. In the protection zones, this includes:

- Yolo County Parks Department - Elkhorn Regional Park.
- Sacramento County Department of Regional Parks - Elkhorn Boat Launch and the American River Parkway.
- City of Sacramento Parks and Recreation Department - Sand Cove Park, Tiscornia Park, Chicory Bend Park, Miller Park, and Pocket Area Parks.

County of Sacramento

The County of Sacramento is the owner and operator of the American River Parkway, as well as the Elkhorn Boat Launch Facility. The Department of Regional Parks has the responsibility for operation and maintenance of these parks and their facilities. The American River Parkway Plan was most recently updated in 2008. Sacramento County implemented Measure A in 2009, which is a new sales tax (0.5 percent) for roadway and transit improvements. This will be effective through 2039. The County receives monies from this fund for improvements to the American River Parkway bike path, but no projects to date have been near Discovery Park.

Sacramento County has an ordinance related to vessel mooring and sanitation. This ordinance can be enforced by the Sheriff, Environmental Management, Code Enforcement, and Peace Officers. Chapter 6.42 – Vessel Sanitation and Mooring Ordinance requires a permit issued by the Sheriff for any vessel to be moored, anchored, grounded, placed or otherwise located in any waterway of Sacramento County for a period exceeding fourteen (14) days. The long-term permit is only valid for 30 days in a 60 day period. The vessel must have a sanitation device, be seaworthy, and not obstruct any waterway. An inspection must also be conducted in order to obtain the permit.

There is a County (Title 8.36) ordinance which bans illegal, or public, camping within County limits. This is enforced by Sacramento County Park Rangers. All static camps on County property are dismantled and occupants are forced to move. In the American River Parkway (specifically the property owned by Sacramento County), park rangers clean up the camps and also direct County Sheriff work crews in cleanup efforts. “Grabber sticks” are used to pick up toilet paper where possible, but human waste and decomposing paper are left on the ground due to health and aesthetic concerns with close handling of the waste. The County budget for funding work associated with camp cleanup efforts varies greatly annually.

In conjunction with public, private and community partners, Sacramento County prepared the Sacramento County Homeless Plan in December 2018 to identify key needs and propose strategies to address and reduce homelessness in Sacramento County. The plan allows Sacramento County to participate in California No Place Like Home (NPLH) funding. NPLH funding supports new permanent supportive housing developments for persons with serious mental illness who are also experiencing homelessness. The plan is jointly sponsored by the County Executive, Department of Human Assistance, and Department of Health Services. The process engaged a variety of stakeholders to identify core needs and gaps, inventory current efforts underway, and help establish goals and strategies to impact homelessness and make it non-recurring.

The plan includes the following key elements:

- Describe the magnitude of homelessness and chronic homelessness, characteristics of the homeless population, and special needs of the NPLH target population,
- Inventory existing efforts and partners in ending homelessness,
- Describes resources currently invested in addressing and ending homelessness and identify critical gaps, and
- Lay out County and stakeholder plans to address unmet needs in key focus areas

Over the study period Sacramento County has implemented a variety of activities to help manage the homeless crisis, including activities related to mental health and housing solutions;

- Mental health crisis residential centers - The County has invested nearly $6 million to open three centers that will reduce reliance on hospitalization and emergency room use.
- Collaboration with law enforcement – The County has invested $1 million for in-the-field coordination with law enforcement to direct persons with mental illness to appropriate services rather than emergency rooms.
- Mental health urgent care center – With a capacity to service 300-400 people, this will offer a better alternative to hospitalization and emergency room use.
- Residential drug abuse treatment and detoxification – The County is pursuing a major new federal waiver that will pay for increased capacity for these service programs. With more services, individuals who are homeless and have substance abuse issues will be more likely to stabilize so they can achieve and maintain successful housing.
- Increasing capacity at the Mental Health Treatment Center – The County is implementing increased options such as sub-acute residential treatment beds and an off-site criminal justice trial competency restoration program. These options will open up inpatient mental health treatment beds for individuals who would otherwise be on the street or in hospital emergency rooms.
- Mental health services to children – The County is working to expand short-term residential treatment for foster children to implement the statewide Child Welfare Continuum of Care reform program. This will enable the County to place foster children in foster homes as expeditiously and safely as possible and increase their likelihood for long-term success, preventing future homelessness.
- Full-service re-housing shelter – This will provide 24-hour dormitory-style shelter for up to 75 people, with accommodations for partners, possessions, and pets, mental health and substance abuse services, and re-housing assistance.
- Flexible supportive re-housing services – The County will target individuals and families experiencing long-term homelessness who frequently utilize costly services (such as behavioral health, emergency response, or jail), but who could, with the right assistance, stabilize in permanent supportive housing.
- Redesigned family shelter system – The County is changing its investment plan to provide up to 33 families each night a safe place to stay and receive services toward stable permanent housing.
- Transitional housing – This will provide safe shelter to high-risk, unsheltered families who cannot be diverted from homelessness immediately, while assisting them in finding housing.

Sacramento County Department of Regional Parks

Sacramento County Parks Department manages two of the river corridor activities: pet waste and illegal camping. There have been no changes to either the 2002 River Corridor Management Plan or the 2006 American River Parkway Plan which guide the ongoing activities in the parkway. The Lower American River Task Force prepared the River Corridor Management Plan (RCMP) in 2002 to provide guidance for management along this reach of the river. In 2015 a Draft Three Year Action Plan to update the RCMP was prepared and outlines goals to reduce human waste produced by illegal camping. Additionally, the updated 2008 American River Parkway Plan provides additional guidelines for the preservation, recreational use, development and administration of the parkway.

Sacramento County Park Rangers are organized so that each Ranger has ownership and provides stewardship of a particular area of the American River Parkway. Rangers are available by email if someone wants to communicate a concern or an issue or point out a problem along their section of the Parkway.

The Sacramento County Parks Department implemented the Pups on the Parkway program in 2003, now expanded to include all parks and known as Pups in the Park. There are 17 pet waste stations along the American River Parkway. The American River Parkway Foundation has served as the program administrator and coordinator for purchasing stations and Mutt Mitts®, which are installed and maintained by the County Parks Department. Funding is provided by several participating water agencies, including the City of Sacramento and Sacramento County Water Agency. The American River Parkway Foundation distributed 65,000 Mutt Mitts® in 2019 to pet waste stations in the area. County Park Ranger staff included water quality stewardship messages (including dog waste pickup) on County message boards installed along the Parkway. Stations with Mutt Mitts® can be found at the following locations along the American River Parkway:

- Paradise Beach
- Howe Ave. (North)
- Howe Ave. (South)
- Kadema Drive
- Watt Ave. (North)
- Watt Ave. (South)
- Estates Drive
- Jacob Lane
- Mira Del Rio Dr. (Gristmill)
- William B. Pond Park
- River Bend Park
- Sarah Court
- Ancil Hoffman Park
- Rossmoor Bar
- Sacramento Bar
- Upper Sunrise Blvd. River Access
- Gold River (near mile 21)
- Sailor Bar

In the American River Parkway (specifically the property owned by Sacramento County), Park Rangers clean up the illegal camps and direct County Sheriff work crews in cleanup efforts. “Grabber sticks” are used to pick up toilet paper where possible, but human waste and decomposing paper are left on the ground due to health and aesthetic concerns with close handling of the waste. In January of 2017, the

Sacramento County Regional Parks introduced the Park Resource Team (PRT), as part of a $5 million, multi-year plan, to reduce illegal camping and other crime within County Parks and along the American River Parkway. The PRT consists of a crew of five park rangers and four maintenance staff that focus on the impacts of illegal camping, crime and overall trash removal. The rangers are engaged in law enforcement efforts along the American River Parkway while the maintenance staff works to remove debris that accumulates after flood events and due to illegal dumping. The large amount of waste is the result of the increased homeless population in the Sacramento area.

Sacramento County Parks Department now tracks monthly, and then compiles annual, statistics for ranger activity including citations for illegal camping. The locations of citations are not specified, so this occurs throughout the County. During 2015, 1,278 occupied camps were cited with 817 camps noticed to vacate within 48 hours. During 2016, 1,066 occupied camps were cited with 1,652 camps cleaned and removed. During 2017, 1,453 occupied camps were cited with 1,849 camps cleaned and removed. **Table 4-27** presents a summary of the number of occupied illegal camps that were cited, noticed to vacate, and how much debris removal occurred (post January 2018). Some of the cleared camps involved work crews of significant size.

Table 4-27
Sacramento County Department of Regional Parks
Illegal Camping Statistics

Year	No. Camps Cleared	No. Citations Issued	Tons Debris Removed
2018	5,639	2,074	1,612
2019	5,294	-	1,397.5

Sacramento County Stormwater Quality Program

The Sacramento County Stormwater Quality Program established in 2006 a program called “Scoop the Poop” aimed at effectively managing pet waste that may contribute to increased pollutant levels in urban streams and the American River. The program was developed to manage and reduce improper disposal of pet waste in public parks and recreational areas. The “Scoop the Poop” program provides convenient pet waste bag locations in various public parks that are stocked with plastic grocery bags by members of the community. The goal is to encourage environmental stewardship and community cooperation in facilitating proper waste management in local parks. These community maintained bag locations can be found in several recreation and park districts within Sacramento County, including Arcade Creek, Arden Manor, Arden Park, Mission Oaks, and Rio Linda/Elverta.

City of Sacramento

The City of Sacramento is the owner and operator of numerous parks located along the Sacramento River, from Sand Cove to the Pocket Area. Key parks for body-contact recreation are Sand Cove and Tiscornia, located between GKWTP and SRWTP. Although there is heavy use in the summer season, there are no restrooms at either of these sites. Further downstream is Miller Regional Park, with limited body-contact recreation, which does have restroom facilities.

The City of Sacramento has an ordinance (Title 8.112 – Boating) that establishes rules related to vessels in the waterway. The Sacramento City Police Department enforces the ordinance. Three key provisions include:

- Once notified, an owner/operator must remove any non-seaworthy vessel within 48 hours.
- If a vessel sinks, an owner/operator must mark it with a buoy.
- The maximum time to moor or anchor in a waterway is 96 consecutive hours. After this time the vessel must be moved to a marina/berth/slip/wharf or leave the City limits for 24 hours prior to returning to the waterway.

There is a City (Chapter 15.52) ordinance which bans illegal, or public, camping within City limits. This is enforced by the City of Sacramento Park Services, but involvement is limited to the City or the privately owned lands located within the American River floodplain within the City limits.

The City of Sacramento has a Homeless Services Coordinator that works in the City Manager's Office. The coordinator oversees approximately $2.5 million of general funded contracts to non-profit providers of outreach, shelter and permanent housing; works with Sacramento City Council, Fire, and Police departments to address needs of homeless; and works with regional partners (Sacramento County, Sacramento Housing Authority, and Sacramento Steps Forward) on policy and program development.

City of Sacramento Housing

In September of 2017, the Sacramento City Council voted to open an emergency shelter for the winter months that would accommodate up to 200 people nightly. This was in response to the growing unsheltered homeless population that was estimated by the 2017 PIT Count to have increased by 85 percent since 2015. The shelter is by referral only. Therefore, the City's Police IMPACT Team (See City of Sacramento Police Department below) and outreach partners through the City's Pathways to Health and Home Program must first identify people in need of shelter and arrange for intake. The shelter operates 24 hours a day, seven days a week and was originally set to close in March 2018, but was approved to stay open through May 31, 2018 with additional funding.

On April 23, 2019, City Council approved more than $23 million in funding to open a 180-bed temporary homeless shelter at the Capitol Park Hotel downtown. The city will be reimbursed for the full $13 million by Mercy Housing at the end of the 18 months the shelter is open, before Mercy converts it to permanent supportive housing. The city has previously committed to spending about $14 million to open a shelter on Cal Expo property at the southeast end of Ethan Way; a 12-bed shelter for youth in midtown; single family home shelters for youth; adding triage services to existing services; hiring more city homeless staff; and a downtown streets team for cleanup, the staff report said. The city will also spend about $1 million in private funds to open four single-family home shelters with five beds each.

City of Sacramento Whole Person Care Pilot Program

This is a statewide pilot program for vulnerable Medi-Cal patients to improve the health outcomes and reduce utilization of high-cost services. The City of Sacramento began implementing a five year pilot program in January 2017 to improve outreach to individuals in need, assess care and housing needs, and provide services. The planning is complete and service delivery began in January 2018 and was continued through December 2020.

City of Sacramento Police Department

The City of Sacramento Police Department (SPD) is a critical component of the City of Sacramento's approach to managing homelessness. The SPD has created the IMPACT team to provide outreach and engagement services throughout the City of Sacramento. They are the City of Sacramento's initial point of contact with chronic homeless living on the streets. The team seeks out and engages chronically homeless persons and, for those who are willing, gets them in contact with service providers who can provide housing and other services. The teams work together to assess the homeless person's problems, and identify how to help them from a range of solutions. Whether their homelessness had been caused by loss of income, psychological problems, substance abuse, lack of job training, or other problems, multiple options are available to assist each person. The IMPACT team consists of two areas of focus: Mobile Crisis Support Team (on-scene crisis response team) and Homeless Outreach Team (HOT).

The SPD published metrics associated with law enforcement related to homeless from July 2017 through April 2019. This presents a monthly summary of enforcement statistics, including illegal camping enforcements and homeless camp trash removal. **Table 4-28** provides monthly statistics, which encompasses the entire City limits. It is uncertain how much is directly attributable to the Sacramento River Watershed, but the general scope of the local law enforcement effort is evident with 178 camps closed and over 10,000 cubic yards of trash removed.

Yolo County

Yolo County is the lead agency managing the homeless issue in Yolo County, including the City of West Sacramento. They are responsible for conducting the PIT counts, preparing a strategy for management, and implementing funds.

Table 4-28
City of Sacramento Police Department, Illegal Camping Metrics, July 2017–April 2019

Year	Month	# Illegal Camping Enforcements	Cubic Yards Trash Removal
2017	July	17	441
2017	August	7	589
2017	September	0	692
2017	October	5	768
2017	November	5	515
2017	December	8	602
2018	January	11	703
2018	February	27	480
2018	March	26	319
2018	April	9	343
2018	May	12	474
2018	June	8	525
2018	July	10	428
2018	August	11	447
2018	September	11	380
2018	October	0	377
2018	November	0	315
2018	December	0	358
2019	January	4	273
2019	February	3	281
2019	March	4	815
2019	April	0	619
TOTAL		**178**	**10,744**

Yolo County, in cooperation with the Cities of Davis, West Sacramento, Winters, and Woodland, has developed a 10 Year Plan to End Homelessness in Yolo County. Some key actions of the plan are:

- Create and expand housing resource centers in each City.
- Identify and access funding for extremely affordable permanent housing and services to access and maintain housing.
- Increase availability and access to mental health and substance use services.
- Make transportation assistance available to improve access to services and employment opportunities.

Similar to Sacramento County, Yolo County has also prepared a County Plan to Address Homelessness (January 2019) to allow them to participate in the NPLH Program. This is a coordinated effort between the County and the major cities in the County, including the City of West Sacramento.

City of West Sacramento

The City of West Sacramento also has an ordinance (Title 8.40 – Pollution and Anchorage of Vessels) that establishes rules related to vessels in the waterway. The

City of West Sacramento Police Department enforces the ordinance. There are two key provisions:

- Once notified, an owner/operator must remove any non-seaworthy vessel within 48 hours.
- No anchoring or mooring any vessel on any waterway in one location for more than six hours a day for a total of 30 or more days in any 90-day period without a long-term anchorage permit.
- Long-term anchorage (greater than 90 days) permits are only issued to vessels with a sanitation device and require the operator to log sanitation, with sewage pumpout every four days.

The City of West Sacramento enacted a “No Camping” ordinance in the late 1990s and began conducting enforcement sweeps on a regular basis. The Code Enforcement Department of the Police conducts annual sweeps. Throughout the year, staff visit the known illegal camping areas, including the Lighthouse Marina area, to assess the populations. Once a significant population has developed, staff posts a 72-hour notice to vacate. Bags are provided for illegal campers to remove their belongings. Persons remaining in the camps are cited, and all belongings are removed. Camps are cleaned up by Public Works Department personnel. Cleanup includes identification and removal of the bathroom area as well as all litter and debris. After the camps are cleaned, staff trim all trees to eight feet above the ground to prevent low-lying canopies.

The City of West Sacramento prepared a Homeless Action Plan in 2013. The City of West Sacramento Police Department has a Homeless Coordinator who works with the homeless population to obtain services for the unsheltered population. In addition, the Mercy Coalition of West Sacramento has provided winter warming stations as well.

United States Environmental Protection Agency

There are now two USEPA general vessel permits: the Vessel General Permit (VGP) and the small Vessel General Permit (sVGP). Recreational vessels as defined in section 502(25) of the CWA are not subject to these permits. As part of the NPDES program, USEPA regulates incidental discharges from the normal operations of vessels under the CWA, Section 402. This includes ballast water, bilge water, gray water, and anti-fouling paints.

The VGP was renewed in 2013 and it regulates discharges incidental to the normal operation of commercial vessels greater than 79 feet in length operating in a capacity as a means of transportation. The VGP includes general effluent limits applicable to all discharges: general effluent limits applicable to 27 specific discharge streams; narrative water-quality based effluent limits for seven categories of contaminants; inspection, monitoring, recordkeeping, and reporting requirements; and additional requirements applicable to certain vessel types. The sVGP was adopted in 2014 and essentially has the same requirements as the VGP, but for vessels less than 79 feet in length.

Since the majority of vessels on the Sacramento and American rivers in the vicinity of the drinking water intakes are recreational vessels, the VGP and sVGP do not apply.

State Water Resources Control Board

Marinas and recreational boating are considered non-point sources of pollution. Regulation and management falls under the State Board Non-Point Source Program. Management has focused on Tier 1; as discussed under Rangeland, this means that implementation is met through implementation of self-determined non-regulated management practices. The State Board adopted the "Policy for Implementation and Enforcement of the Non-Point Source Pollution Control Program" in 2004. The Policy covered marinas and indicated that a non-voluntary Clean Marina Program would be developed to include 26 BMPs as well as monitoring. This was subsequently revised to continue to be a voluntary program.

The CWA prohibits untreated vessel discharges in US waters, and the Porter Cologne Act prohibits untreated sewage discharges throughout the state. The Regional Boards have the primary authority and responsibility in California for enforcing these acts, but they do not have the resources to operate a program to inspect or enforce their authority with respect to acts of dumping from boats.

Central Valley Regional Water Quality Control Board

The Regional Board adopted the 2014-2016 Integrated Report in December 2016, which included a new 303(d) listing for indicator bacteria on the Lower American River due to elevated concentrations from the Safe-to-Swim summer sampling program. This listing is based on exceedences of the USEPA 2012 Recreation Water Quality Criteria for protection of water contact recreation. This was approved by the State Board in October 2017 and the USEPA in April 2018. The Regional Board listing is a Category 5A, which means a TMDL must be developed and it is scheduled for completion by 2027. The sources are listed as "unknown" so the Regional Board must develop an understanding of the possible sources of the impairment as part of the TMDL development. To date, the Regional Board has not initiated the TMDL process for the new indicator bacteria listing on the Lower American River.

In September 2017, the Regional Board received complaints from the public regarding homeless encampments and associated trash/debris along the Lower American River and its tributaries. The complaints included concern that this trash/debris would be transported into the river system during wet weather.

The Regional Board initiated a monitoring program to investigate indicator bacteria in the Lower American River. In April 2018, the Regional Board announced that they had begun weekly monitoring for *E. coli* at nine sites on the Lower American River on January 11, 2018. Three of those sites are located near or above the EA Fairbairn WTP; Lower Sunrise Area (Sunrise Bridge crossing), River Bend Park (downstream of Ancil Hoffman Park), Howe Avenue (Howe Avenue Bridge crossing), and Paradise

Beach (just below the EA Fairbairn WTP intake), while the others are located further downstream.

Table 4-29 presents a summary of the *E. coli* data for the Lower American River sites through September 2020. Only one site, the Confluence, had a median value above the recreation-based water quality objective of 235 MPN/100 mL and the advanced drinking water treatment trigger of 200 MPN/100 mL. It can be seen that the *E. coli* levels range significantly, with individual results at or below the recreation-based water quality objective and the advanced drinking water treatment trigger for sites at or upstream of Camp Pollock. It can also be seen that there is an increase in average and median *E. coli* concentrations from upstream to downstream. The highest median values occur at Confluence and Discovery Park, where there is heavy recreational use and contribution of urban runoff. The next highest concentrations are at North 10th Street and Sutter's Landing Park, which could be influenced by river corridor activities such as pet waste, illegal camping/homelessness, urban runoff, and septic systems.

Table 4-29
Regional Board *E. coli* Monitoring on the Lower American River
January 2018 – September 2020

Site[1]	*E. coli* (MPN/100 mL)				
	No. Samples	Minimum	Maximum[2]	Average	Median
Lower Sunrise Area	117	5.2	2419.6	63.2	27.2
River Bend Park	113	6.3	325.5	41.6	28.2
Howe Avenue	125	8.5	1119.9	64.1	34.5
Paradise Beach	126	6.3	410.6	41.6	24.8
Sutter's Landing Park	130	6.1	2419.6	175.5	42.8
Camp Pollock	121	4.1	1299.7	82.4	37.9
North 10th Street	128	4.1	1986.3	181.7	58.7
Discovery Park	126	3.1	2419.6	318.0	94.7
Confluence	126	12.0	2419.6	853.0	435.9

[1] Lower Sunrise Area, River Bend Park, and Howe Avenue are upstream of Fairbairn WTP Intake, all others downstream
[2] Method upper limit for reporting is 2419.6 MPN/100 mL

Further investigation of the data was conducted to look at the seasonality of the data. **Figures 4-9 and 4-10** present the individual *E. coli* results over the study period for the sites at or upstream of EA Fairbairn WTP and downstream of EA Fairbairn WTP, respectively. The data was evaluated for recreation period (May through September) and non-recreation period (October through April). It was found that all the sites upstream of EA Fairbairn WTP as well as Sutter's Landing and Camp Pollock had higher median values during the non-recreation period (October through April), while the three sites in the lowest reach of the American River had higher recreation period medians (North 10th Street, Discovery Park, and Confluence).

Figure 4-9. *E. coli* (MPN/100 mL) Data At or Upstream of EA Fairbairn WTP

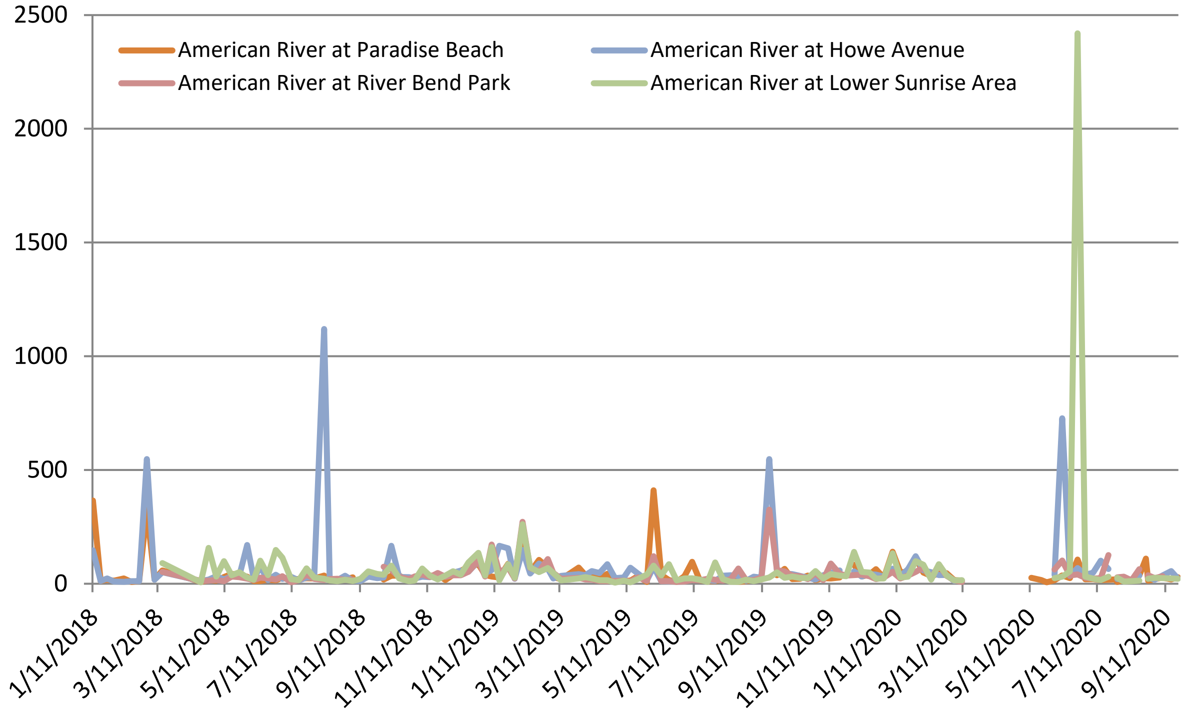
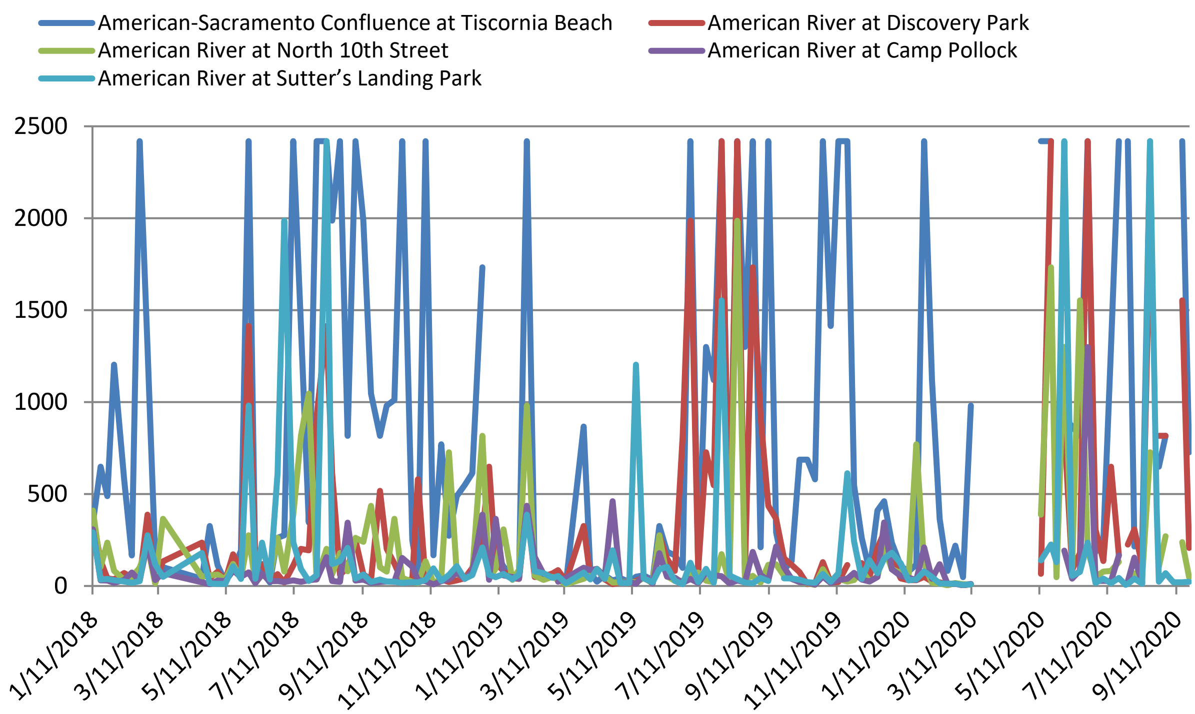


Figure 4-10. *E. coli* (MPN/100 mL) Data Downstream of EA Fairbairn WTP



In addition to the weekly *E. coli* monitoring, the Regional Board is conducting a Bacteria Study for the Lower American River to better characterize fecal bacteria and identify sources (August 2019). The purpose of the study is to verify impairment, characterize spatial and temporal trends, identify sources of fecal bacteria, assess the risks to public health, and determine management actions needed to address the impairment.

The study includes continued monitoring of *E. coli* along the Lower American River and a companion microbial source tracking (MST) phased study to identify the specific sources of fecal pollution in different reaches of the river to determine if the bacteria are from human, dog, or bird sources. Historic data indicates that the majority of samples above the recreational water quality objective were on the lower three miles of the river, below Sutter's Landing. The MST phased study will focus on sources in the lowest reach of the river. The project is being funded by Regional Board in partnership with Sacramento Regional County Sanitation District, Sacramento Stormwater Quality Partnership (SSQP) member agencies, and Sacramento County Department of Regional Parks.

The MST study includes multiple phases of work and is expected to last four years, including the lower six miles of the river below Paradise Beach. Phase 1 sampling is being conducted weekly during dry weather conditions, May/June through September, at 10 sites along the Lower American River between Paradise Beach and Sutter's Landing and two urban runoff discharge sites (D5 Outfall for Strong Ranch Slough/Chicken Ranch Slough and Sump 10). The sites on the Lower American River were targeted to potential source areas and are shown on **Figure 4-11**. Phase 1 was initiated in late 2019, resulting in seven samples collected, and continued in 2020 with an additional 23 samples collected. The data will include *E. coli* and MST results. MST samples are frozen to be batched as a group at the end of the year and will be analyzed for human, dog, and bird species. A summary is expected in late 2020 or early 2021. The results of Phase 1 will determine the future activities of the source identification study.

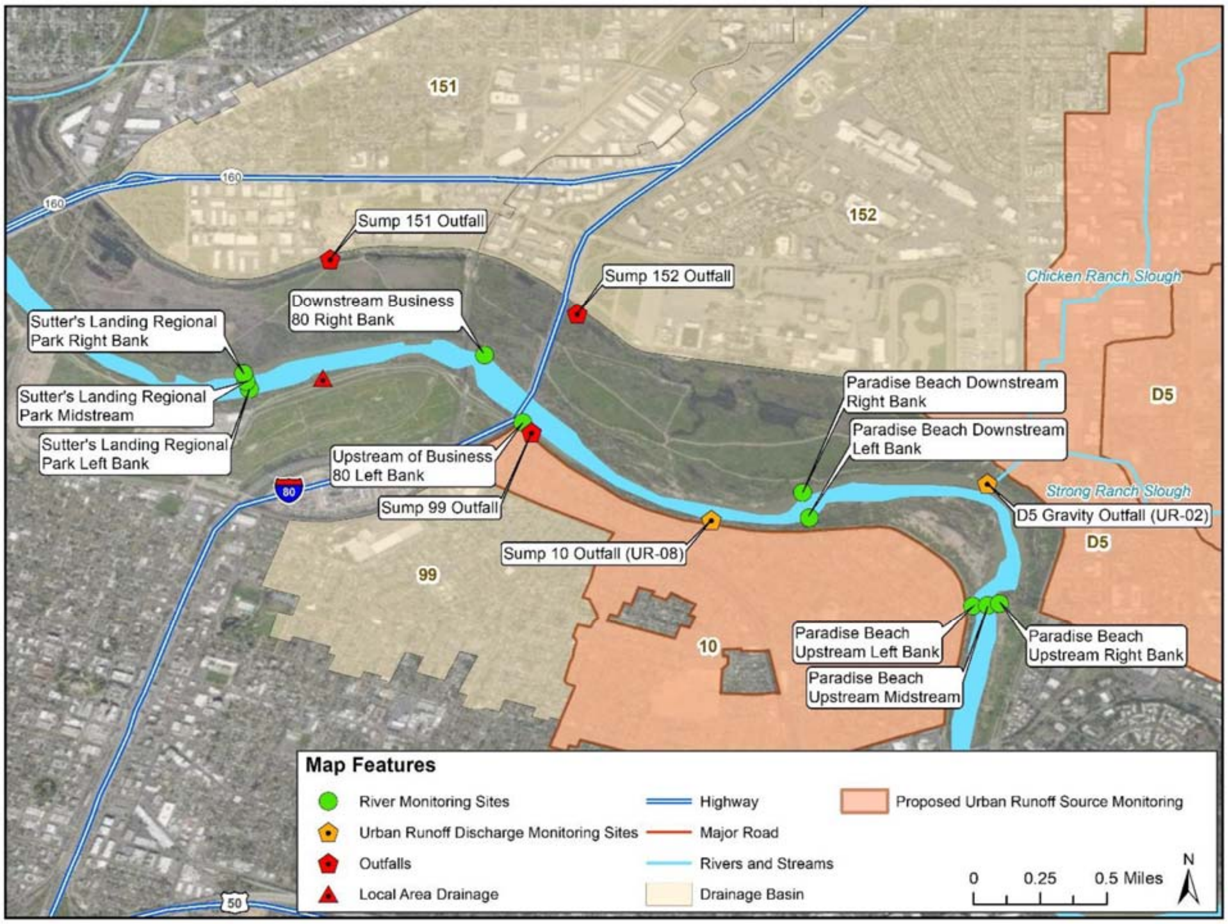
California State Parks, Division of Boating and Waterways

The California State Parks, Division of Boating and Waterways (DBW) has one grant funding program to assist with abandoned recreational vessels and marine debris. Grants are awarded annually to local public agencies. This is the Surrendered and Abandoned Vessel Exchange (SAVE) program. This program only covers recreational vessels. It manages the Abandoned Watercraft Abatement Fund (AWAF) and Vessel Turn-in-Program (VTIP), described below.

- Abandoned Watercraft Abatement Fund (AWAF) - This program provides local agencies grant funding for the abatement, removal, storage, and disposal of abandoned, wrecked, and dismantled vessels in waterbodies. Three local agencies participate in the Sacramento River watershed: Butte County Sheriff, Sacramento County Sheriff, and Sacramento City Police. Ten percent matching funds are required. They typically receive funding to remove from one to four boats per year. Most are located in the Delta. The cost for removal and disposal is quite high for submerged boats, around $200 per lineal foot of boat.

- Vessel Turn-in-Program (VTIP) - This program targets boat owners who don't want boats any longer and provides them an opportunity to surrender their boats to a local agency instead of abandoning them. It requires a ten percent matching fund. One local agency participates in the Sacramento River watershed: Sacramento County Sheriff.

Figure 4-11. MST Phase 1 Sample Sites



California Coastal Commission/Division of Boating and Waterways

The Boating Clean and Green Campaign (Campaign) is a statewide boater educational and technical assistance program. The Campaign has been conducted by the California Coastal Commission (CCC) since 1997, and as of March 2006 the Campaign has been led by the DBW, with assistance and support provided by the CCC.

Since the Campaign's inception, the California Integrated Waste Management Board, the National Oceanic and Atmospheric Administration and the USEPA have provided funding. The Campaign assisted Contra Costa County to develop and implement its boating program called "Keep the Delta Clean. You Play in it, You Drink it too!". The Campaign has four major components as follows.

- Networking. As part of its efforts to promote clean and safe boating, the Campaign facilitates the California Clean Boating Network (CCBN). The CCBN consists of a collaboration of government, environmental, business, boating, and academic organizations working to increase and improve clean boating education efforts in California. This includes a website that provides a marina GIS database and listing of pumpout stations.
- Research. For the last several years, the Campaign has developed research to better orient its educational messages, develop outreach materials, and identify and promote environmental services for boaters statewide.
- Technical Assistance. Identifying and promoting environmental services for boaters (sewage and bilge pumpouts, oil absorbent distribution and collection, used oil and household hazardous waste collection centers), assisting marinas and local governments in identifying the need and installing pollution prevention services for boaters, and participating at conferences and trade shows.
- Education and Outreach. The Campaign is focused on a multi-faceted outreach strategy to target boat shows and events, marine supply stores and word-of-mouth to reach boaters. This also includes the CCBN's "The Changing Tides" newsletter and the Clean Marina Toolkit. The Campaign trains Dock Walkers to do face-to-face boater education.

Clean Marinas California Program

This is an independent organization for education and outreach to marinas and yacht clubs; it is administered by the Marina Recreation Association. This program was created in San Diego County in response to potential regulatory action by the Regional Board. It became a statewide program in 2007 and there are currently 127 marinas certified through the program. This is an all-voluntary program that encourages the use of BMPs to prevent and reduce pollution.

The program provides a Program Manual with BMPs related to a variety of issues, including boat sewage discharge, waste management, hazardous materials, and storm runoff. Marina owners are provided a checklist to assist as they educate, train and encourage boaters and employees to protect the environment and water quality through the routine use of these BMPs. A review of each facility is performed by an independent team to determine that day-to-day activities and operations are enhancing the environment and water quality. Those meeting the Program standard and implementing a pledge to continue the use of these BMPs receive a Clean Marina designation.

There is a website, www.cleanmarina.org. There are currently three marinas in the watershed which are certified through the program: two at Lake Oroville (since 2006) and the Sacramento Marina (since 2008).

Sacramento Steps Forward

Sacramento Steps Forward is a non-profit organization that partners with the City and County of Sacramento to create a strategic plan to address homelessness in the Sacramento region. The Sacramento Housing and Redevelopment Agency created Sacramento Steps Forward to manage work efforts to implement the *10 Year Plan to End Homelessness in Sacramento County*. The Plan describes innovative new strategies to address chronic homelessness. The essential components of the Plan to solving the problems of homelessness are:

- Housing First
- Outreach and Central Intake
- Prevention
- Leadership
- Evaluation and Reporting to the Community

Sacramento Steps Forward works with the City and County and private businesses to find long term solutions for chronically and temporarily homeless; offers emergency shelter, housing assistance, food, health care, transportation, and employment assistance; hosts the winter sanctuary; and conducts the biennial point in time homeless counts and interviews. This includes overseeing approximately $18 million in federal funding for housing and service programs for homeless. The winter sanctuary provides rotating winter shelter at houses of worship mid-November through March, with an average of 450 to 550 guests per season.

The Homeless Housing, Assistance and Prevention (HHAP) program was signed into law on July 31, 2019 by Governor Gavin Newsom and is being administered by the California Homeless Coordinating and Financing Council. HHAP is a $650 million one-time block grant that provides local jurisdictions with funds to support regional coordination and expand or develop local capacity to address their immediate homelessness challenges. Agencies in the Sacramento region that will receive HHAP allocations including the Continuum of Care, City of Sacramento, and County of Sacramento.

Water Quality Issues and Data Review

Water quality data collected to date indicate that pathogen levels (specifically *Giardia* and *Cryptosporidium*) at the drinking water diversions are low and infrequently detected. When detected, the levels were relatively low. Data presented in **Section 3** show that the number of pathogens potentially contributed by recreational users or the homeless population and/or fate and transport dynamics are not sufficient to result in routinely measurable levels at the intakes.

The most frequent and more significant *E. coli* peaks at the water treatment plants occur during the winter months, as discussed in **Section 3**. A comparison of peak coliform levels and peak local precipitation at the water treatment intakes show that high coliform levels are frequently associated with high precipitation and high flow events in the winter months. This is not likely associated with river recreation, but may be associated with illegal camping/homelessness.

Sacramento River Source Water Protection Program Activities

The "Keep Our Waters Clean" (KOWC) campaign continues to increase awareness among local recreationalists about drinking water sources and the use of sewage pumpouts and restrooms. This program is run by the City of Sacramento Department of Utilities on behalf of a group of water agencies and other local organizations along the Sacramento and American rivers. The program was started in 2000 along the Sacramento River and was extended to the Folsom Lake and the Lower American River. Agency sponsors during the study period include the cities of Sacramento and West Sacramento, East Bay Municipal Utility District (EBMUD), and Sacramento County Water Agency (SCWA), among others.

The program utilizes several means of sharing information with recreationalists including; maps of sewage pumpout and restroom locations, brochures, promotional items, and participation in local outreach events. The program also creates partnerships with other organizations including other counties and jurisdictions, State and County Parks, educational outlets, boating and rafting businesses, and local marinas to help distribute information.

Program updates during the study period include:

- Updated website (https://www.cityofsacramento.org/Utilities/Water/Keep-Our-Waters-Clean),
- GIS map from 2014 that shows boat launch locations, public restrooms, marinas, pumpout stations, used oil filter drop off locations, and pet waste stations,
- Social media outreach via the Facebook KOWC page (since 2009) https://www.facebook.com/keepourwatersclean, as well as Twitter (since 2014) and Instagram (since 2018),
- On-line radio ads, and
- Educational presentations at educational outlets such as the Effie Yeaw Nature Center and Sacramento Zoo.

"Pups in the Park" continues to increase awareness among local dog owners about the use of pet waste stations. This program is run by the American River Parkway Foundation, and financially supported by several of the participating water agencies. This includes pet waste stations, filled with waste collection bags, located throughout Sacramento County parks, including along the American River Parkway. County Parks staff report that approximately 65,000 Mutt Mitts® are used per year, and they believe the stations have provided a significant reduction in presence of dog waste in the Parkway.

STORMWATER AND URBAN RUNOFF

Background

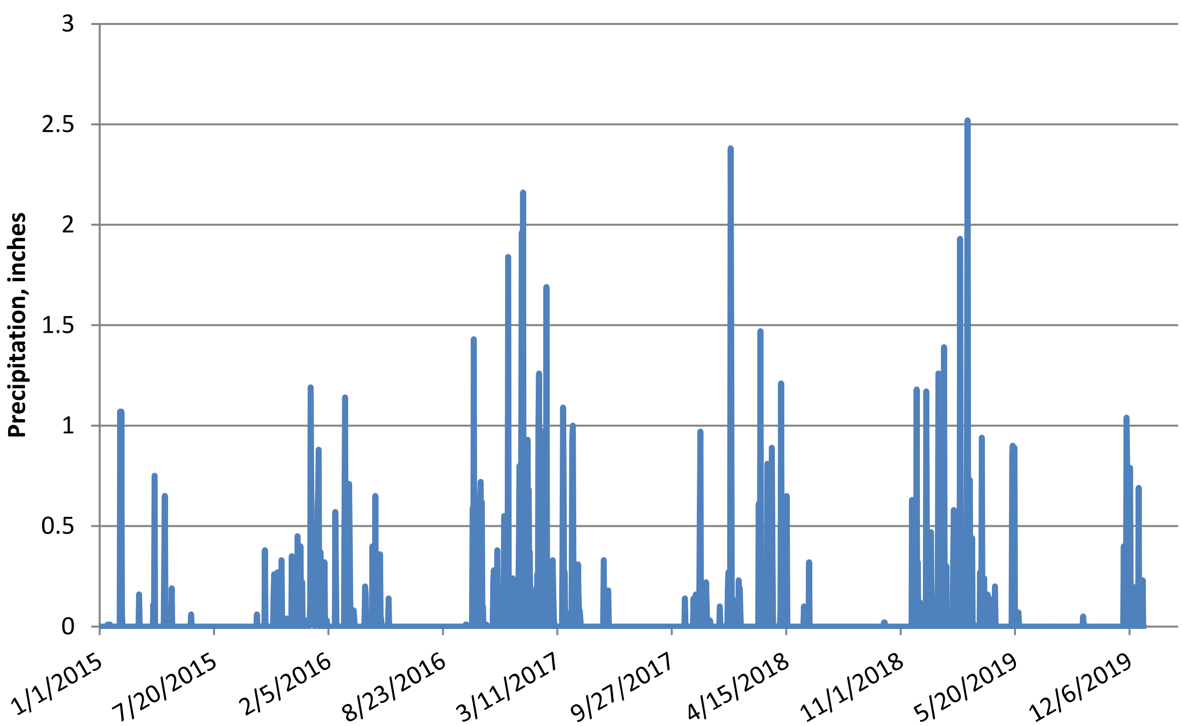
The entire watershed contributes stormwater runoff during the wet weather months and much of the greater Sacramento metropolitan area discharges urban runoff to the Sacramento and American Rivers year-round. With the urbanization of outlying areas, the volume of urban runoff in the rivers may continue to increase in future years. Upstream urban areas, including Roseville, Auburn, Yuba City, Chico, and Redding, also discharge urban runoff to the rivers.

Urban runoff is currently of greater interest to the cities of Sacramento and West Sacramento and the FRWA Intake diversion, than to the potential future RiverArc Project and WDCWA diversions since they are located upstream of the Sacramento metropolitan area. However, this may change with future growth and changes in the watershed.

Seasonal Patterns

Stormwater runoff occurs from land seasonally, generally during and after precipitation events. In the Sacramento River watershed these generally occur between October and April, as shown in **Figure 4-12**.

Figure 4-12. Daily Precipitation at CSU Monitoring Site, 2015 - 2019



Urban runoff occurs on a year-round basis and includes wet and dry weather flows. Wet weather runoff resulting from seasonal storms is of relatively short duration and can have highly variable pollutant concentrations. Because of the high degree of imperviousness and the efficiency of the drainage systems, urban areas generally generate higher per acre volumes of runoff than undeveloped or agricultural lands. Dry weather runoff reaching surface waters is referred to as "non-stormwater discharges"; it results from activities such as lawn irrigation and washing activities including street, sidewalk, parking lot, building, and car washing.

Related Constituents

Stormwater and urban runoff is one of several sources of microorganisms, turbidity, and TOC. It can contain volatile organic compounds (VOCs) and synthetic organic compounds (SOCs). Urban runoff is generally associated with anthropogenic sources of increased runoff volume in urbanized land use areas. With higher volumes of runoff, some constituents can be present at higher than background concentrations. The relative impact of stormwater and urban runoff depends on a number of watershed factors, as well as the timing of wet weather events.

Data on general stormwater runoff indicate that the watershed conditions and precipitation event type have a strong influence on the amount and quality of the runoff. For example, stormwater from agricultural fields will vary depending on agrarian practices, while runoff from undeveloped lands could be impacted from wildfires or other uses.

Data on urban runoff discharges indicate that the runoff can have highly variable turbidity and organic carbon concentrations, is a source of indicator bacteria, and is a source of other constituents such as pesticides, metals, and organic compounds. Limited data on *Giardia* and *Cryptosporidium* levels in Sacramento urban runoff showed few protozoa detections in dry weather runoff and generally low level detections in wet weather runoff with the exception of high protozoa levels in urban runoff from an early season storm, first-flush event.

Presence in the Watershed and Protection Zones

Although stormwater and urban runoff occurs throughout the entire watershed, this section focuses on the permitted discharge of stormwater and urban runoff through State Board and Regional Board regulatory programs. The State Board's CIWQS database was queried to identify the number of currently active stormwater permittees in the watershed in the various programs.

In the Sacramento River watershed there are two NPDES Municipal Stormwater Phase I permits that manage urban runoff; the Region-Wide General Permit for Discharges from Municipal Separate Storm Sewer Systems and the Statewide California Department of Transportation (Caltrans). The new Region-Wide General Permit Phase I NPDES permit has replaced the Sacramento Stormwater Quality Partnership (SSQP)

NPDES permit and each participant now is an enrollee with an individual permit. The SSQP participants, cities of Sacramento, Folsom, Citrus Heights, and Rancho Cordova, as well as Sacramento County, are individually responsible for compliance but continue to work together on some aspects of the SSQP, including: Monitoring and Target Pollutant Program, Regional Public Outreach Program, Regional Commercial/Industrial Program, New Development Element, and the Reasonable Assurance Analysis.

Under the new Municipal Stormwater Phase II Permit, there are 36 city, county, or census designated places identified in the watershed, a decrease of six since the 2015 Update. **Table 4-30** provides a summary of all of the designated Phase II permittees located within the Sacramento River watershed upstream of the FRWA Intake diversion.

Table 4-30
Phase II Stormwater Permittees in the Sacramento River Watershed[1]

County, City, or Census Designated Place	County, City, or Census Designated Place
Anderson	Oroville
Auburn	Paradise
Butte County	Placer County
California Exposition and State Fair	Placerville
California Department of Corrections – California Medical Facility	Red Bluff
California Department of Corrections – California State Prison	Redding
California Department of Corrections – Folsom State Prison	Rocklin
California National Guard	Roseville
California State University Chico	Shasta County
California State University Sacramento	Shasta County Fairgrounds (27th Ag District)
Chico	Shasta Lake
Colusa County	Silver Dollar Fairgrounds (3rd Ag District)
El Dorado County	Sutter County
Grass Valley	West Sacramento
Lincoln	Yolo County
Live Oak	Yuba County
Loomis	Yuba City
Marysville	Yuba Sutter County Fairgrounds (13th Ag District)

[1] Data obtained from the California Integrated Water Quality System

There are 828 NPDES permit enrollees under the State Board's Industrial General Permit Order located throughout the watershed. A list is provided in **Appendix D**. Four hundred-fifty of these facilities are located in the seven counties in the Near-Intake Protection Zones (Sacramento, El Dorado, Placer, Yolo, Yuba, Sutter, and Colusa).

Under the State Board's Construction General Permit program there are 2,225 NPDES permit enrollees located throughout the watershed. A list is provided in **Appendix D**. Fifteen hundred of those facilities are located in the seven counties in the Near-Intake Protection Zones (Sacramento, El Dorado, Placer, Yolo, Yuba, Sutter, and Colusa).

Caltrans also had 75 individual NPDES permits under the State Board's Construction General NPDES Permit program in the watershed during the study period. These numbers change frequently as construction projects open and close. A list is provided in **Appendix D**. Twenty-five of these facilities are located in the seven counties in the Near-Intake Protection Zones (Sacramento, El Dorado, Placer, Yolo, Yuba, Sutter, and Colusa).

Regulation and Management

In 1972, The Federal Water Pollution Control Act (also referred to as the CWA) was amended to provide that the discharge of pollutants to waters of the United States from any point source is unlawful, unless the discharge is in compliance with an NPDES permit. The 1987 amendments to the CWA added section 402(p) which directs that stormwater discharges are point source discharges and establishes a framework for regulating municipal and industrial stormwater discharges under the NPDES program. On November 16, 1990, the USEPA promulgated final regulations that established the stormwater permit requirements.

NPDES permits are required for discharges from a municipal separate storm sewer system (MS4). The USEPA developed its stormwater regulation in two phases. The Phase I regulation was promulgated in 1990 for cities or contiguous unincorporated urban areas with populations greater than 100,000. The Phase II regulation was promulgated in 1999 for cities and other contiguous areas with populations less than 100,000. USEPA defined MS4 to include road systems owned by states which are in an area with a population greater than 100,000. MS4 permits do not establish numeric effluent limitations for stormwater, although the permits do include receiving water limits. Therefore, implementation of the stormwater management programs to the Maximum Extent Practicable (MEP) is considered compliance with the MS4 discharge permits and limits. Also, wasteload allocations can be included in permits to protect receiving waters through the TMDL process required by the CWA.

The federal regulations also specified a requirement for stormwater permits from 10 categories of industry, as well as construction activities equal or greater than one acre.

Municipal Stormwater Program

Both the Phase I and Phase II stormwater regulations require municipalities to reduce urban runoff pollution to the MEP through implementation of control measures known as BMPs. Management programs must include public education, pollution prevention and good housekeeping for municipal operations, implementation of new development BMPs, erosion and sediment control measures at construction sites, and control of illicit discharges. Phase I and Phase II programs must also include control programs for select industrial/commercial sites. Both the Phase I and II regulations provide the regulated municipalities with the flexibility to make their own selection of BMPs in designing their own individual programs. Although the entire slate of program elements (new development BMPs, municipal activities [street sweeping], etc.) is designed to improve water quality, program elements of special interest to downstream drinking water agencies are the construction site element, illicit discharges element, new development element, and the public outreach element. Phase I permittees now submit an NOI to comply with a Regional General NPDES permit (R5-2016-0040-ms4), while Phase II permittees submit a NOI to comply with a Statewide General NPDES permit (WQO 2013-0001-DWQ).

In April 2015 the State Board adopted Resolution 2015-0019, which was an Amendment to the Water Quality Control Plan for Ocean Waters of California (Ocean Plan) to Control Trash and Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California (collectively referred to as "the Trash Amendments"). The Trash Amendments apply to all Phase I and II permittees under the NPDES municipal separate storm sewer systems (MS4) permits and include:

- establishment of a narrative water quality objective for trash,
- corresponding applicability,
- establishment of a prohibition on the discharge of trash,
- implementation requirements for permitted storm water and other discharges,
- a time schedule for compliance, and
- a framework for monitoring and reporting requirements.

Sacramento Stormwater Quality Partnership

The greater Sacramento metropolitan area (including portions of the cities of Sacramento, Folsom, Citrus Heights, and Rancho Cordova, as well as the urban unincorporated area of Sacramento County) discharges urban runoff to the American and Sacramento River systems. There are 55 direct discharge points within the City of Sacramento, plus additional discharges from the County of Sacramento and other private or industrial sites upstream, to the American and Sacramento rivers. A few of the drainage basins with direct discharge are relatively small, self-contained basins. Many, however, include multiple sub-basins and/or a network of urban creeks.

Management of Sacramento area urban runoff began in 1989 as a cooperative effort between Sacramento County, the City of Sacramento, and the smaller cities within the County to address stormwater pollution through a county-wide NPDES Phase I stormwater permit. The permit is renewed every five years. During the study period, the SSQP was permitted under three different orders; Order No. R5-2008-0142, Order No. R5-2015-0023, and General Order No. R5-2016-0040-ms4. Regional activities for the SSQP include the Monitoring Program, the Target Pollutant Program, Regional New Development Program, Regional Public Outreach, the Regional Commercial/Industrial Program, and Overall Program Effectiveness Assessments.

Order No. R5-2015-0023 was a Limited-Term NPDES permit that expired on October 17, 2016 and contained many of the same provisions as the previous order. The Monitoring and Reporting Program (MRP) of Order R5-2015-0023 included provisions that allowed the SSQP to participate in the Delta RMP and “request a reduction in some of the local water quality monitoring specified in the MRP". The local water quality monitoring defined in the MRP includes river, urban tributary, and urban discharge monitoring. The MRP allowed the SSQP to propose an alternative monitoring plan for urban tributary and discharge monitoring that allowed modifications to the monitoring locations, sampling method and frequency, and constituents with Executive Officer approval. In August 2015, the Regional Board Executive Officer approved a reduction in local water quality monitoring (only applied to river and urban tributary monitoring) conducted by the SSQP in exchange for Delta Regional Monitoring Program (RMP) participation and funding. Participation in the Delta RMP also required approval from the Delta RMP Steering Committee. The approval included discontinuation of all river sample sites and a reduction in urban tributary monitoring frequency to once per five years for three sites (FY2017/2018 and every three years thereafter). Also in August 2015, the Regional Board Executive Officer approved the SSQP FY2015/2016 Alternative Monitoring Plan, as allowed in the MRP. Per the approved Alternative Monitoring Plan, a reduction in Willow Creek and Laguna Creek monitoring frequency was approved for one year with implementation of a continuous sensor pilot study at Arcade Creek. In place of monitoring of Sump 111 and Strong Ranch Slough, a continuous sensor pilot study was approved at Natomas Basin No. 4. Once the FY2015/2016 Alternative Monitoring Plan was completed, the SSQP continued long-term monitoring at five-year intervals at the three urban tributary sites (Arcade, Willow, and Laguna creeks), and two out of three years for the three urban discharge sites (Sump 111, Strong Ranch Slough, and Natomas Basin No. 4).

The Region-Wide Stormwater Permit for all Phase I permittees in the Central Valley, Order No. R5-2016-0040-ms4, became effective October 1, 2016. All of the SSQP permittees submitted NOIs in November 2016 and have converted to this new region-wide permit. Each permittee must meet all the requirements of the General Order. The new order requires each permittee to develop a Storm Water Management Plan (SWMP) and corresponding Work Plan that utilizes the pollutant prioritization approach, or else a prescriptive approach will apply. The process consists of six overarching steps: assessment, prioritization, development/modification, implementation, effectiveness assessment and reporting, and adaptive management. The SWMP will continue to include similar elements as previously addressed: illegal connections/illicit discharges, construction runoff, industrial/commercial runoff, public involvement, and planning and land management. Monitoring requirements will be site-specific and consider historical monitoring data. Permittees outside the legal Delta are encouraged to participate in the Delta RMP.

The permittees submitted a Reasonable Assurance Analysis in July 2019 to identify the highest priority water quality constituents (PWQCs) within its jurisdictional runoff area that will be addressed by the SWMP, it has not yet been approved by the Regional Board. Permittees are required to submit annual reports, as well as a mid-term report in year 3 and an end-term report in year 5 of the permit. The 2016-2019 Mid-Term Report was submitted in November 2019.

The SSQP permittees developed a Stormwater Quality Improvement Plan (SQIP) that describes the stormwater pollution prevention activities to be undertaken. This includes permittee specific elements such as construction activities, illegal discharges, industrial activities, municipal operations, outreach, and new development. The SQIP also includes joint activities, including: target pollutant reduction strategies, a water quality monitoring program, special studies, regional public outreach and education, a regional commercial/industrial program, new development program, and program effectiveness evaluation. The permittees last revised their SQIP in 2009, with modifications in subsequent Annual Reports and Workplans. The permittees expect to update this SQIP based on the Reasonable Assurance Analysis and submit it as the SWMP under the new NPDES permit.

The SSQP completed its Stormwater Quality Design Manual in July 2018.[10] Planning jurisdictions in the Sacramento County area began implementing these new development and redevelopment standards on July 1, 2018 to incorporate low impact development (LID), hydromodification, and trash control measures. These design standards are expected to decrease runoff generated and the export of contaminants from new development and redevelopment projects and mitigate contaminants' loading for many constituents when compared to previous land use.

The BMPs of particular interest to source water quality are:

- BMPs that seek to address pollutants at the sources, such as eliminating spills and dumping through storm drain marking, public outreach, and an illicit discharge program.
- BMPs that provide education: stormwater compliant pressure washer program through the Business Environmental Resource Center, recreational behavior through the Keep Our Waters Clean campaign, general behavior through regional media campaigns, Creek Week, Our Water Our World, and Water Smart Car Wash.
- BMPs that address fecal waste: an illicit connection program, pet waste public education and programs to maintain dog waste dispenser stations in parks developed in coordination with parks and recreation departments and districts, inspection of kennel facilities, street sweeping, and sump cleaning. This includes funding of the "Pups in the Park" and "Scoop the Poop" pet waste cleanup programs.
- BMPs that address TOC: detention basins, bioretention planters, and grassy swales; street sweeping; sump cleaning; erosion and sediment control at construction sites; public education for landscape management (River Friendly Landscaping and Rain Garden rebate programs); and containerization of green waste in many parts of the greater Sacramento urban area. The City of Sacramento includes mandated containerized yard waste collection with loose-in-the-street pickup during the fall leaf season (November 1 through January 30) each year.
- Other BMPs to reduce constituents in urban runoff through watershed-based public education and outreach include promotion of proper pet waste disposal and use of less toxic pesticides via television ads, radio ads, online ads and billboards,

[10] http://www.beriverfriendly.net/docs/files/File/SWQ_Design%20Manual_FINAL%202018_w%20Fig_w%20App.pdf

participation in the Sacramento Area Creek's Council Annual Creek Week events, four workshop events focused on the use of less toxic pesticides, and funding school education programs, including the awarding-winning "Splash."
- Implementation of new development, as well as redevelopment, source controls, treatment controls, hydromodification management measures, and LID BMPs. The goal of the source control measures is to prevent pollutants from contacting site runoff, while the treatment controls treat and remove pollutants from site runoff. LID measures are designed to help reduce the site runoff volume and supplement the hydromodification management measures, which are designed to attenuate the increased site runoff and discharge it to the receiving water body at a controlled rate. An example of LID implementation is a joint project with California State University Sacramento to retrofit areas of the campus with LID measures and river friendly landscaping.
- Funding of Community Action Grants to projects whose goal is to improve the quality of local creeks, rivers and watersheds within the City of Sacramento. This establishes working partnerships with the local community, fosters environmental stewardship to assist in meeting pollution prevention goals, and targets teachers, neighborhood and volunteer groups, environmental organizations, and other non-profit associations. Sacramento County has a similar grant program that provides financial assistance to schools within the unincorporated County.

The target pollutant reduction program has led to creation of reduction strategies for several constituents including sediment, pesticides, mercury, lead, copper, and pathogen indicators. These remain in place under the new NPDES permit. Sediment control is a key strategy for controlling sediment bound pollutants, including metals, and sediment is addressed through new development standards, construction BMPs, street sweeping, and basin/drain cleaning. A Partnership Sediment Strategy was finalized in 2012. In 2004 a Fecal Waste Reduction Strategy was completed which continues to be implemented. Efforts have included implementation of BMPs that help to eliminate or reduce fecal matter in the storm drain system, including investigation and elimination of sanitary sewer cross connections, control of sanitary sewer overflows, street sweeping, and cleaning of the storm drainage system infrastructure; prohibition of discharges of pet waste into the storm drain; inspection of kennels for appropriate waste handling procedures; outreach to increase appropriate disposal of pet waste; and workgroup meetings to review current status of coliform/pathogen control efforts in the state. A comprehensive Pesticides Plan, approved in 2006, continues to be implemented, which includes education and outreach related to integrated pest management and initiatives to better protect urban water bodies through more effective regulation of pesticides at the state and national level.

The permittees ceased river monitoring during the study period and reduced urban tributary (creek) and urban runoff discharge monitoring under the NPDES permit required joint monitoring program. Urban tributary monitoring included sampling at two urban creeks in the watershed (Willow Creek and Arcade Creek) in FY2014/2015, FY2015/2016, and FY2017/2018. Constituents of interest include *E. coli*, TOC/DOC, metals, organics, and pesticides. Three urban runoff sites were also monitored in the watershed (Strong Ranch Slough, Sump 111, and Natomas Basin 4) in FY2015/2016 through FY2018/2019. Constituents of interest include *E. coli*, TOC/DOC, metals, organics, and pesticides. The urban tributary and urban runoff data is discussed further in the Water Quality Issues and Data Review subsection.

The Statewide Trash Provisions implementation is large effort for all participants and was started in 2018. Each agency submitted an individual Trash Implementation Plan, but have yet to be approved by the Regional Board.

A review of the State Board's Stormwater Multiple Application and Report Tracking System (SMARTS) database showed that there only one violation issued in the past five years for any SSQP permittees, the City of Citrus Heights was late in submitting one report.

Caltrans

The entire watershed encompasses numerous state highways and roads that are regulated for stormwater discharge by the State Board. Caltrans Districts 2 and 3 are located within the watershed. Generally, road drainage is diverted locally to receiving waters.

In 1996, Caltrans requested that the State Board consider adopting a single NPDES permit for stormwater discharges from all Caltrans properties, facilities, and activities that would cover both the MS4 requirements and the statewide Construction General Permit requirements. The federal regulations allow for the issuance of system-wide MS4 NPDES permits. Caltrans stormwater was then regulated under State Board Order No. 99-06-DWQ, beginning July 1999. The permit does not establish numeric effluent limitations for stormwater. Therefore, this permit allows Caltrans to implement BMPs to comply with the requirements of this permit. Caltrans has a Storm Water Management Plan (SWMP) that it implements statewide.

USEPA Region 9 audited Caltrans' Stormwater Management Program in October 2009. As a result of that audit, the USEPA issued a Findings of Violation and Order for Compliance to Caltrans requesting substantial changes to its program in October 2010. In response, Caltrans prepared a revised 2003 SWMP (CTSW-RT-11-286.19.1) and submitted it to USEPA on March 1, 2011. Caltrans also received a renewal of its statewide NPDES permit on September 19, 2012. This Permit became effective in July 2013 (2012-0011-DWQ). Caltrans revised its program in 2013 to accommodate the requirements of the new Permit, and modified the measureable goals and reporting process accordingly. The permit has been amended four times by different Executive Orders or Water Quality Orders (2014-0006-EXEC, 2014-0077-DWQ, 2015-0036-EXEC, and 2017-0026-EXEC), each was relatively minor in nature.

The key components of the Caltrans SWMP, originally created in 2003 and updated in July 2012, include:

- Vegetation Control Program
- Storm Water System Management
- Accidental Spills
- Illicit Connection/Illegal Discharge Detection
- Characterization of Discharges
- Maintenance Facilities – Pollution Prevention Programs
- Training and Public Education – Employees, Contractors, General Public (Don't Trash California and Adopt-A-Highway)
- Region Specific Concerns

Caltrans has adopted the California Stormwater Quality Association approach to assessing program effectiveness, which has six outcome levels. Caltrans conducted an effectiveness assessment for each program element. District 3 has an Annual Report and Plan that they use to implement the SWMP.

A review of the State Board's SMARTS database showed that there were no violations or enforcement actions issued by the Regional or State Board in the past five years for the Caltrans Phase I permit, but there were 4 violations for various Caltrans construction projects under the State Board's Construction General Permit Order.

Phase II MS4s

There are 36 current Phase II MS4 systems in the watershed, including the City of West Sacramento and Yolo County. It should be noted that West Sacramento urban runoff mostly drains to the Ship Channel, Toe Drain, or Yolo Bypass. Only two pump stations discharge to the Sacramento River: Lighthouse and Raley pump stations. Little to no drainage from Yolo County enters the watershed upstream of Freeport.

In 2003, smaller urban areas came under a Statewide General Permit for Phase II stormwater permits (Water Quality Order No. 2003-0005-DWQ). Phase II permittees implement urban stormwater management programs similar to, but on a smaller scale than, the Phase I permittees. The Phase II program focuses on implementation of BMPs, including implementation of treatment BMPs in new development. A monitoring program was not required for most permittees. Areas that were required to monitor include those with high population, high growth rate, or a discharge to a sensitive water body. There was no required monitoring in the Sacramento River watershed. Under this program, each of these entities was required to develop and implement a SWMP to manage the stormwater program. These entities implemented their SWMP using existing programs and ordinances (such as a grading ordinance) to the extent possible, but expanded the programs as necessary to cover all aspects of the SWMP. Each program element has specific control measures the entity identified for implementation, and those are largely efforts that were already on-going through various departments.

A SWMP has six key components;

- Public Education and Outreach: Ensure greater public support and knowledge of stormwater issues in the implementation of the SWMP.
- Public Participation and Involvement: Provide the public with a way to contribute an active role in the development of better stormwater management and become more informed on stormwater issues.
- Illicit Discharge Detection and Elimination: Intended to minimize discharges into the stormwater system that are not stormwater, and reduce and eliminate pollutants entering the stormwater system and any receiving waters.
- Construction Site Runoff Control: Minimize polluted stormwater from construction activities.
- Post-Construction Run-Off Control: Minimize impact to stormwater caused by development and redevelopment. Planning and design to minimize pollutants in any run-off.
- Pollution Prevention/Good Housekeeping: Reduction in the volume and type of stormwater and surface run-off that enters the stormwater system in the operation and maintenance of municipal activities.

The Statewide Phase II General Permit expired on May 1, 2008, and the State Board re-issued the permit until a new permit was adopted. This permit was revised in 2013 with Water Quality Order No. 2013-0001-DWQ, adopted on February 5, 2013 and effective July 1, 2013. The new Phase II MS4 Permit was effective during this study period. This permit generally has more extensive requirements than the previous permit, and a few significant items are:

- SWMPs will no longer be required; dischargers will use guidance documents developed by the Regional Board,
- Development of a program effectiveness evaluation,
- Requirements focus on water quality issues post-construction,
- Encourages the use of low impact development,
- Targets high priority waterbodies,
- Dischargers will use the SMARTS database for data management which will increase availability of public reports,
- Dischargers must submit boundary and outfall maps, and
- Water quality monitoring requirements for population greater than 50,000, waterbodies with a TMDL or a CWA Section 303(d) impairment listing with urban runoff listed as a source, and areas of special biological significance. There are none in the Sacramento River watershed.

A review of the SMARTS database showed that the only violations issued in the past five years for any Phase II permittee in the Sacramento River Watershed were related to submittal of late reports.

Construction Stormwater Program

The NPDES General Permit for Discharges of Storm Water Associated with Construction Activity is the Construction General Permit (Order 2009-0009-DWQ), which was subsequently amended twice by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ. This dictates that any development project that disturbs one or more acres of land will be subject to the requirements of this permit. Some of the construction activities subject to this permit include: clearing, grading, excavation, stockpiling, vertical structures, landscaping, and/or linear projects (i.e. wet and dry utilities). The permit provides an exclusion for projects that are considered regular maintenance activities, such as linear projects in already developed areas and relining of existing wet utility lines and/or roadway resurfacing projects and projects that discharge to combined sewer systems (application to the central City of Sacramento). This permit was set to expire in 2014, but has been administratively extended until a new order can be adopted. In 2012 the State Board proposed amendments to the Construction General Permit. Those have not been finalized or adopted.

The permit requires each project to assess its risk level to water quality based on the project's sediment discharge risk and the receiving water risk. The permit establishes three risk levels with different monitoring and sampling requirements. The permit also establishes numeric effluent parameters for discharges of risk levels 2 and 3: Numeric Action Levels (NAL) and Numeric Effluent Limitations (NEL) for pH and turbidity. The limitations for pH and turbidity at Risk Level 3 / Linear Underground/Overhead Project Type 3 construction sites contained in Order 2009-0009-DWQ are no longer in effect. These were removed on December 27, 2011 in accordance with a judgment by the Superior Court, under Order No. 2012-0006-DWQ.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter; existing and proposed buildings, lots, roadways, storm water collection and discharge points; general topography both before and after construction; and drainage patterns across the project. The SWPPP must list BMPs the discharger will use to protect stormwater runoff and the placement of those BMPs. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

A review of the State Board's SMARTS databased showed that there were many violations and enforcement orders issued in the past five years in the Central Valley to the Construction Order permittees. It could not be readily determined how many of those were located in the Sacramento River watershed. The majority of these were related to late submittal or deficient annual reporting. Also, there was some identification of deficient BMPs, notices of non-compliance, and notices of violation.

Industrial Stormwater Program

Federal regulations require that stormwater associated with industrial activity that discharges either directly to surface waters or indirectly through municipal separate storm sewers must be regulated by an NPDES permit. The regulations allow states to issue general permits or individual permits to regulate stormwater discharges. The State Board issued the first Statewide General Permit on November 19, 1991, and then amended it in 1992 and 1997 (Order No. 97-03-DWQ). In 2014 the State Board adopted an updated General Permit for Stormwater Associated with Industrial Activity (Order 2014-0057-DWQ). In 2018 the State Board amended the General Permit in accordance with Order 2015-0122-DWQ to incorporate federal testing methodology, TMDL implementation requirements, and incentivization for storm water capture and use.

The basis of this program is implementation of BMPs to prevent discharge of pollutants. The General Permit generally requires facility operators to:

- Eliminate unauthorized non-stormwater discharges;
- Develop and implement a SWPPP; and
- Perform monitoring of stormwater discharges and authorized non-stormwater discharges. This includes two events per year for total suspended solids (TSS), oil and grease, and pH. Monitoring for additional parameters is based on the Standard Industry Code of the facility and the results of a pollutant source assessment.

Significant changes in the Industrial General Permit include:

- Electronic Reporting Requirements; requires Dischargers to submit and certify all reports electronically via the SMARTS database.
- Minimum BMPs: requires Dischargers to implement a set of minimum BMPs.
- Conditional Exclusion - No Exposure Certification; applies USEPA Phase II regulations regarding a conditional exclusion for facilities that have no exposure of industrial activities and materials to storm water.
- Notice of Non-Applicability: allows industrial facilities to submit a Technical Report claiming either they have designed their facility to contain storm water so that there is no discharge of storm water to waters of the United States or their facility is not hydrologically connected to waters of the United States.
- Training Expectations and Roles: requires that Dischargers have appropriately trained personnel implementing this General Permit's requirements at each facility.
- NALs and NAL Exceedances: contains two types of NAL exceedances: (1) an annual NAL and (2) an instantaneous maximum NAL. Instantaneous maximum NALs are only for total suspended solids and oil and grease.
- Exceedence Response Actions (ERA): requires Dischargers to develop and implement ERAs, when an annual NAL or instantaneous maximum NAL exceedance occurs during a reporting year.
- CWA section 303(d) Impairment and TMDLs: requires a Discharger to monitor additional parameters if the discharge(s) from its facility contributes pollutants to receiving waters that are listed as impaired for those pollutants.

- Design Storm Standards for Treatment Control BMPs: includes design storm standards for Dischargers implementing treatment control BMPs.
- Qualifying Storm Event (QSE): defines a QSE as a precipitation event that produces a discharge for at least one drainage area and is preceded by 48 hours with no discharge from any drainage area.
- Sampling Protocols: requires Dischargers to collect samples during scheduled facility operating hours from each drainage location within four hours of either the start of the discharge or the start of scheduled facility operating hours if the QSE occurred in the previous twelve hours.
- Compliance Groups: allows the formation of Compliance Groups and Compliance Group Leaders. Dischargers participating in a Compliance Group are required to sample twice a year at each facility.
- Discharges to Ocean Waters: Dischargers with ocean-discharging outfalls subject to model monitoring provisions of the California Ocean Plan shall develop and implement a monitoring plan in compliance with the monitoring requirements established pursuant to Water Code section 13383.

A review of the State Board's SMARTS database showed that there were many violations and enforcement orders issued in the past five years in the Central Valley to Industrial Order permittees. It could not be readily determined how many of those were located in the Sacramento River watershed. The majority of these were related to late submittal or deficient annual reporting. Also, there was some identification of missing SWPPPs.

Total Maximum Daily Loads

There are four TMDLs established for pesticides in the watershed. Three are for diazinon and chlorpyrifos, based on aquatic toxicity: the Sacramento and Feather Rivers, six Sacramento area urban creeks, and the Sacramento-San Joaquin River Basins. One is for pyrethroids, also based on toxicity: Central Valley. These were discussed previously in the Agriculture Regulation and Management subsection. These would all apply for urban runoff as well. A TMDL is implemented through a Basin Plan Amendment to include site-specific numerical objectives, water quality management strategies to reduce runoff, monitoring, and a plan to reduce levels in the water bodies. The Regional Board has worked the TMDLs into existing regulatory programs, such as the stormwater permits.

Water Quality Issues and Data Review

Constituents include general parameters, nutrients, organic carbon, metals, bacteria, pesticides, and selected VOCs and SOCs. The SSQP presents the data in their annual Urban Tributary Monitoring Report and Urban Discharge Monitoring Report. Detections above water quality objectives are not violations of an MS4 permit. These exceedences require follow-up by the permittees to determine if urban runoff is contributing to the exceedence and if so, to identify control measures to address the exceedences unless measures are already in place.

Urban tributary monitoring included sampling at two urban creeks in the watershed (Willow Creek and Arcade Creek) in FY2014/2015, FY2015/2016, and FY2017/2018. Constituents of interest include *E. coli*, TOC/DOC, metals, organics, and pesticides. The urban tributary monitoring resulted in high levels of some drinking water constituents that were present, with peaks of *E. coli*, organic carbon, and iron that can be significant. The urban tributary sites with detects above water quality objective levels are not permit violations, but are of interest.

FY2014/2015 –

- Willow Creek
  - *E. coli*, four samples, 220 – 49,000 MPN/100 mL
  - Total organic carbon, four samples, 2.8 – 7.4 mg/L
  - Total Iron, four samples, 585 – 4,400 µg/L
- Arcade Creek
  - *E. coli*, three samples, 17,000 – 54,000 MPN/100 mL
  - Total organic carbon, three samples, 6 - 17 mg/L
  - Total Iron, three samples, 707 – 3,540 µg/L

FY2015/2016 –

- Arcade Creek
  - *E. coli*, four samples, 78 – 160,000 MPN/100 mL
  - Total organic carbon, four samples, 4.9 - 51 mg/L
  - Total Iron, four samples, 574 – 2,040 µg/L

FY2017/2018 –

- Willow Creek
  - *E. coli*, four samples, 45 – 1,300 MPN/100 mL
  - Total organic carbon, four samples, 2.4 – 6.8 mg/L
  - Total Iron, four samples, 530 – 2,200 µg/L

Urban runoff monitoring included samples at three urban runoff discharge sites in the watershed (Strong Ranch Slough, Sump 111, and Natomas Basin 4) in FY2015/2016 through FY2018/2019. Constituents of interest include *E. coli*, TOC/DOC, metals, organics, and pesticides. The urban runoff monitoring resulted in high levels of some drinking water constituents that were present, with peaks of *E. coli*, organic carbon, and iron that can be significant. The urban runoff sites with detects above water quality objective levels are not permit violations, but are of interest.

FY2015/2016 –

- Natomas Basin 4
  - *E. coli*, four samples, 170 – 540,000 MPN/100 mL
  - Total organic carbon, four samples, 3.9 - 24 mg/L
  - Total Iron, four samples, 190 - 287 µg/L

FY2016/2017 -

- Sump 111
  - *E. coli*, four samples, 200 – 240,000 MPN/100 mL
  - Total organic carbon, one sample, 95 mg/L
  - Total Iron, four samples, 540 – 2,000 µg/L
- Strong Ranch Slough
  - *E. coli*, four samples, 4,600 – 350,000 MPN/100 mL
  - Total organic carbon, two samples, 34 - 140 mg/L
  - Total Iron, four samples, 240 – 6,400 µg/L
- Natomas Basin 4
  - *E. coli*, four samples, 78 – 54,000 MPN/100 mL
  - Total organic carbon, one sample, 75 mg/L
  - No total iron reported

FY2017/2018 –

- Sump 111
  - *E. coli*, four samples, 320 – 2,300 MPN/100 mL
  - Total organic carbon, four samples, 4.1 - 37 mg/L
  - Total Iron, four samples, 430 – 1,500 µg/L
- Strong Ranch Slough
  - *E. coli*, four samples, 4,900 – 13,000 MPN/100 mL
  - Total organic carbon, four samples, 4.9 - 25 mg/L
  - Total Iron, four samples, 800 – 3,700 µg/L
- Natomas Basin 4
  - *E. coli*, four samples, 20 – 28,000 MPN/100 mL
  - Total organic carbon, four samples, 5.7 - 27 mg/L
  - Total Iron, four samples, 130 – 580 µg/L

FY2018/2019 –

- Sump 111
  - *E. coli*, four samples, 2,200 – 92,000 MPN/100 mL
  - Total organic carbon, four samples, 3.5 - 21 mg/L
  - Total Iron, four samples, 150 – 1,000 µg/L
- Strong Ranch Slough
  - *E. coli*, four samples, 540 – 54,000 MPN/100 mL
  - Total organic carbon, four samples, 4.4 - 16 mg/L
  - Total Iron, four samples, 240 – 2,100 µg/L
- Natomas Basin 4
  - *E. coli*, four samples, 210 – 92,000 MPN/100 mL
  - Total organic carbon, four samples, 7.3 - 15 mg/L
  - Total Iron, four samples, 120 – 420 µg/L

Sacramento River Source Water Protection Program Activities

The City of Sacramento and SCWA's source water protection and stormwater program staff coordinate and share information on an on-going basis.

INDUSTRIAL NPDES DISCHARGERS

Overall, the relative risk for the Sacramento River drinking water supply from industrial dischargers is low due to regulation and management. Facilities that are located closer to the drinking water intakes, have higher discharge flows, contain constituents at higher levels, or are waived from meeting water quality objectives are dischargers of most interest.

Background

Industrial dischargers are potential contaminant sources for the drinking water supply since they discharge treated waste flows from industrial facilities to receiving waters. Industrial discharges may include flow-through water used during processing, a waste stream generated at the facility, or stormwater runoff from the facility. This includes several Superfund Sites located in the watershed. Superfund is the name given to the environmental program that the USEPA established to address abandoned hazardous waste sites. It is also the name of the fund established by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The funding under this Act allows the USEPA to clean up such sites and to compel responsible parties to perform cleanups or reimburse the government for USEPA-led cleanups. The Superfund cleanup process is complex and involves many steps to assess sites, place them on the National Priorities List, and establish and implement appropriate cleanup plans. This is a long-term cleanup process.

Seasonal Patterns

The timing of discharge from industrial facilities varies depending on the type of industrial activity. Some facilities have consistent flow throughout the year, such as mines, water treatment plants, groundwater extraction and treatment facilities, and geothermal projects. Other facilities have discharges that peak seasonally depending on their activity, such as processing facilities for produce, wood, and fish; cooling systems; and stormwater facilities.

Related Constituents

The constituents discharged are dependent on the type of industry or hazardous waste site and the source of the flow. This can range from general physical parameters to VOCs and SOCs.

Presence in the Watershed and Protection Zones

Currently, there are 44 NPDES permits for various industrial facilities within the Sacramento River watershed, an increase of four from the 2015 Update. Many of the facilities listed are the same as the ones from the 2015 Update, and several others were discovered during this evaluation that are either new or existing facilities. See **Appendix D** for a detailed listing.

The types of industrial facilities in the study area have generally remained the same since 1995. Thirty-eight of the NDPES permitted facilities are located in the study area upstream of the City of West Sacramento's GKWTP and WDCWA's RWTF, and six of the NPDES permitted facilities are located between GKWTP intake and the FRWA Intake diversion. These facilities discharge either to the Sacramento or American rivers, or a tributary.

The 38 facilities located upstream of GKWTP and RWTF intakes include;

- fourteen fish hatcheries/ concentrated aquatic animal production (CAAP) facilities,
- nine mines,
- seven wood/paper industries,
- three treated groundwater discharges,
- one quarries,
- one water treatment plant,
- one wood-fired electrical generating facility,
- one olive processing facility, and
- one geothermal projects.

The six facilities located between GKWTP and FRWA intakes include;

- two fish hatcheries/CAAP facilities,
- two Superfund sites' groundwater extraction and treatment systems,
- one stormwater permit for Aerojet Rocketdyne, and
- one mine.

After a review of the 44 NPDES permitted facilities, three industrial facilities were selected for a detailed investigation. These facilities were selected based on a number of factors including: discharge of constituents of interest for drinking water, proximity to drinking water intakes, facility regulatory compliance history, and historical significance from the previous inventory completed in the 2015 Update. The three facilities are located between GKWTP and FRWA Intake diversion: Sterling Caviar, Former McClellan Air Force Base (AFB), and Aerojet Rocketdyne (both treated groundwater and stormwater).

Regulation and Management

Industrial dischargers are regulated by the Regional Board through NPDES permits, some through General Orders and others through Individual Orders. Final effluent limits are set if there is reasonable potential for that constituent to violate a water quality objective or standard in the receiving water. In general, the facilities were in compliance with the terms of their NPDES permit, with few effluent violations noted.

Sterling Caviar

Sterling Caviar operates a concentrated aquatic animal production facility (fish farm) located in Elverta, California. The facility is composed of main production tanks, intermediate grow-out tanks, and nursery tanks. Process water is groundwater obtained from four wells located near the facility. The process water is recycled five times by the facility and then discharged to the Betts-Kismat-Silva (BKS) preserve wetlands, which are constructed wetlands that were developed by the Natomas Basin Conservancy (NBC). The permitted discharge flow from Sterling Caviar is 3.67 million gallons per day (mgd).

The NBC retains and uses approximately 80 percent of the Sterling Caviar discharge in the summer months and 20 percent of the water in the winter months. Currently, excess water not used is discharged via one of two outfalls to the drainage and conveyance system of the Natomas Basin controlled by the Natomas Mutual Water Company (NMWC) and Reclamation District 1000 (RD 1000). According to the Regional Board, once the discharge enters the Natomas Basin it is comingled with other sources and is reused five to six times for agricultural purposes. Water is discharged from the Natomas Basin during flood season, typically October to April, when RD 1000 pumps the water out of the basin into the Sacramento River either via Natomas Cross Canal or Natomas East Main Drainage Canal. The Natomas Cross Canal enters the Sacramento River near the confluence with the Feather River while the Natomas East Main Drainage Canal enters the Sacramento River near the confluence with the American River. The discharge from RD 1000 is otherwise exempt from the NPDES program as it has been determined to be predominantly agricultural stormwater.

Regulatory Background

On March 15, 2007 the Regional Board adopted Order R5-2007-0012 that prescribed waste discharge requirements. A Cease and Desist Order (CDO) (R5-2007-0013) was also issued in 2007 to allow for interim effluent limitations for arsenic, nitrate (as N), and manganese. The facility was to work towards a long-term solution to lower arsenic, nitrate, and manganese in their discharge with a target date to comply with the final effluent limitations of March 1, 2012. This Order included discharge of up to 3.67 mgd of treated wastewater.

On July 20, 2011 Sterling Caviar submitted a letter requesting an extension of the interim effluent limits from the March 1, 2012 deadline to March 1, 2015. Sterling Caviar conducted water quality monitoring and evaluated project alternatives and concluded that treatment for removal of arsenic and manganese to meet the final effluent limitations would not be economically feasible. It was determined that the most cost-effective solution would be to reuse their discharge for irrigation of an agricultural crop.

Sterling Caviar requested an additional three years to establish contracts with an outside party, secure necessary permits, and develop the agricultural operation. The Regional Board found that Sterling Caviar demonstrated due diligence to comply with the final effluent limits and develop a compliance alternative that will maximize the beneficial reuse of water and reduce/eliminate a surface water discharge. Therefore, the Regional Board amended CDO R5-2007-0013 as Order R5-2012-0007 to extend the date to comply with the final arsenic, manganese, and nitrate effluent limitations until March 1, 2015. Sterling Caviar was to continue to submit annual progress reports and an Agricultural Operation Workplan/Schedule by September 1, 2012.

In July 2013, Sterling Caviar submitted a letter informing the Regional Board of a proposed project consisting of the construction of an onsite aquaponics agricultural operation (Aquaponics Farm) that would reuse treated effluent from the facility for irrigation of food crops. In September 2013 the Aquaponics Farm obtained regulatory coverage under the ILRP and joined the Sacramento Valley Water Quality Coalition. By December 2013, Sterling Caviar had ceased discharging to surface water, and the entire flow was being reused by the Aquaponics Farm as a flow-through system. In August 2014, Sterling Caviar notified the Regional Board that the aquaponics facility would be phased out and was no longer operating. The primary reason for the lack of success was the Sterling Caviar effluent did not contain sufficient nitrogen, requiring expensive addition of fertilizer. Therefore, in August 2014, Sterling Caviar subcontracted with an environmental engineering company to evaluate additional compliance alternatives.

In March 2015, the Regional Board adopted CDO No. R5-2015-0042 to extend the interim limits for arsenic and manganese (for a second time) through March 1, 2017. Sterling Caviar completed several operational changes and facility upgrades that resulted in compliance with the final nitrate limits. This CDO also required a report "demonstrating full compliance with final effluent limitations for arsenic and manganese" by March 1, 2017. Some of the alternatives being considered included:

- MUN Beneficial Use De-Designation
- Sale of Water to Natomas Mutual Water Company
- Basin Plan Exception for Manganese
- State Implementation Plan Exception for Arsenic and Variance for Manganese

Order R5-2016-0026 was adopted in April 2016, and became effective June 1, 2016, replacing Order R5-2007-0012. This order removed effluent limitations for chloride, nitrate and formaldehyde. It also added a maximum daily effluent limitation for arsenic and manganese. These updated effluent limitations are shown in **Table 4-31**.

Table 4-31
Sterling Caviar Effluent Limitations as Outlined in Order R5-2016-0026

Parameter	Units	Average Monthly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
pH	Standard units	-	-	6.5	8
Arsenic	µg/L	10	18	-	-
Manganese	µg/L	50	80	-	-

Sterling Caviar did not meet the requirements of CDO No. R5-2015-0042 by March 1, 2017 so on April 18, 2017 the Regional Board issued a notice of violation, stating "Sterling Caviar LLC is subject to a discretionary penalty of over $48,000 for failure to submit the technical report." On April 20, 2017 the Regional Board received a response letter from Sterling Caviar, stating that a variance request for manganese would be prepared for submittal. Although a variance request was made, it was not granted by the Regional Board.

On December 8, 2017 the Regional Board adopted Order R5-2017-0122 to replace Order R5-2016-0026 and rescind CDO No. R5-2015-0042. This order eliminated the effluent limits for manganese and significantly increased the effluent limits for arsenic, as explained below. The permit does require influent wells and facility effluent to be monitored quarterly for arsenic and manganese, both total and dissolved concentrations.

Manganese

The Fact Sheet for the Proposed Order incorrectly presents the Secondary MCL for Manganese as 50 µg/L based on dissolved metal (IV.C.3.a.v, p.F-28), and indicates that DDW has advised that dissolved fraction is fully protective of the MUN beneficial use. This is inconsistent with a recent DDW Memorandum to Regional Board (Darrin Polhemus, DDW, Sampling and Compliance with MCLs when Applying Them as Objectives in Wastewater Regulatory Program – Revised, December 6, 2017). That memorandum does not endorse the use of dissolved metals analysis, rather it states that Regional Board could authorize, "…tests other than 'total', such as other methods using variations of filtered samples, where they have been analyzed for their appropriateness."

Sterling Caviar conducted a special study where total and dissolved metals were sampled bi-weekly in the discharge leaving the facility and in effluent leaving the BKS wetlands from January to June 2017. Based on the dissolved manganese results of this study the Regional Board found "the discharge does not have reasonable potential to cause or contribute to an exceedance of the secondary MCL in the receiving water." There was no consideration of the total manganese concentrations. Therefore, it was determined by Regional Board staff that water quality-based effluent limitations for manganese are not needed and they are removed from the adopted order.

Arsenic

Based on a provision in the State Implementation Policy section 1.4.4, intake water credits can be applied when developing water quality based effluent limitations. Page F-30 of Order R5-2017-0122 states that "the Central Valley Water Board recognizes that the background arsenic concentrations in the groundwater used to supply the facility also exceeds the primary MCL." Pages F-30 to F-35 of Order R5-2017-0122 provide a detailed explanation that this facility meets all of the conditions and the

Regional Board believes that intake water credits would apply. The order presented a determination that the receiving water is the same as the intake water (Section 1.4.4 (3)), which appears to be questionable since they do not consider all the downstream receiving waters only the first receiving water that is the wetland that the discharge creates. In addition, the groundwater containing the metals would not have created the wetlands if it were not for the extraction by Sterling Caviar so it is questionable whether Section 1.4.4 (5) has been met. Therefore, water intake credits were considered in setting the effluent limitations for arsenic.

Monitoring Data

CEDEN was queried to obtain available monitoring data for arsenic and manganese. The analysis focuses on total concentrations, as those are what apply to drinking water standards.

Manganese

Total manganese results for the facility effluent were available from August 2010 through May 2020, except for 2017 – 2019. The individual samples ranged from 35.7 to 160 µg/L, with an average of 85.4 µg/L and a median of 75.9 µg/L. Annual averages were calculated, as comparable with drinking water standard compliance. Those annual averages ranged from 59.7 µg/L to 140 µg/L, with a median value of 82 µg/L. The majority of effluent samples, 90 percent, exceed the secondary MCL of 50 µg/L.

A special study was conducted in 2020 to compare quarterly results for total and dissolved manganese in the source wells and the effluent. The source wells had between 57 and 82 percent dissolved manganese and the effluent had between 43 and 52 percent dissolved manganese.

Arsenic

Total arsenic results for the facility effluent were available from August 2010 through July 2016. The individual samples ranged from 2 to 14 µg/L, with an average of 9.2 µg/L and a median of 10.2 µg/L. Annual averages were calculated, as comparable with drinking water standard compliance. Those annual averages ranged from 4.8 µg/L to 14 µg/L, with a median value of 9.8 µg/L. About half of effluent samples exceed the primary MCL of 10 µg/L.

Additional total arsenic data was collected between March 2018 and May 2020 for the effluent and source wells on a quarterly basis. The effluent samples ranged from 9.7 to 11 µg/L, with an average of 10.4 µg/L and a median of 10.5 µg/L. The source well median values ranged from 9.8 to 15.5 µg/L.

McClellan Air Force Base

The former McClellan AFB includes 3,452 acres and is located approximately eight miles northeast of downtown Sacramento in North Highlands. The site was historically used as a plane cleanup and decommissioning facility. The AFB was officially closed on July 13, 2001. Clean-up of the base is currently supervised by the Department of Defense (DOD) Installation and Restoration Program, and is being directed by the United States Department of the Air Force (Air Force). As McClellan AFB is a Federal Superfund site, it must meet the CERCLA requirements. According to the Air Force, they do not have to comply with the specific terms of any permit issued by the Regional Board since they are a DOD facility.

The SRSWPP has conducted significant tracking of this facility during the study period and prepared a summary of activities most recently in June 2020. This is provided in **Appendix D** for more details on the facility, monitoring data, and regulation.

Previously, the facility had an individual NPDES permit issued by the Regional Board for groundwater extraction, treatment, and discharges to surface water and was in compliance with the terms of the NPDES permit. Generally, the Air Force was conducting all of the monitoring required by the NPDES permit for VOCs, hexavalent chromium, 1-4-dioxane, and other general parameters at the Groundwater Treatment System (GWTS). In 2019, the Regional Board determined that the GWTS discharge met required conditions for approval under the General Order for Limited Threat Discharges to Surface Water (Limited Threat General Order), as a Tier 2 discharge. The Limited Threat General Order R5-2016-0076-059 and NPDES permit No. CAG995002 became effective on November 1, 2019, and the previous NPDES Order R5-2014-0055 was rescinded.

The influent and effluent monitoring for the GWTS required for the 2019 Limited Threat General Order is similar to the 2014 NPDES permit, except:

- 1,4-dioxane is no longer required to be monitored in the GWTS influent and effluent;
- Effluent limitations for hexavalent chromium were removed, but it will continue to be monitored annually in the GWTS influent and monthly in the GWTS effluent;
- Effluent monitoring for dissolved oxygen, pH and temperature have been reduced from monthly to quarterly.

Under the Limited Threat General Order the GWTS effluent continues to be monitored monthly for nine VOCs and hexavalent chromium, but annual monitoring for 1-4-dioxane was discontinued on November 1, 2019. The GWTS influent continues to be monitored annually for hexavalent chromium and nine VOCs, but annual monitoring for 1,4-dioxane was discontinued on November 1, 2019. The Air Force is not required to regularly sample for perchlorate, perfluorinated compounds (PFCs) and 1,2,3-trichloropropane (1,2,3-TCP) at the GWTS.

Sampling for PFCs and 1,2,3-TCP was requested in an August 2017 letter to the Air Force from the Regional Board. The Air Force conducted quarterly sampling for PFCs and 1,2,3-TCP of the GWTS effluent for approximately one year only, from August 2017 to October 2018. The Air Force has not sampled for PFCs and 1,2,3-TCP in the GWTS effluent since October 2018. However, the Regional Board has conducted limited sampling for PFCs and 1,2,3-TCP in 2020.

The Regional Board also collects annual samples for perchlorate, 1-4-dioxane, and hexavalent chromium when funds are available. Unfortunately, funds were not available to conduct annual testing in June 2019. Annual samples for 2020 were collected on March 5, 2020. The Regional Board also sampled for PFCs in 2017, 2018, 2020 and 1,2,3-TCP in 2018 and 2020.

Five-Year Review

The Fifth Five-Year Review for McClellan AFB was completed in September 2019 by the Air Force. Similar to the previous 2014 Five-Year Review, the Executive Summary states that the remedy is functioning as intended by the Groundwater VOC Record of Decision (ROD) and the non-VOC ROD amendment. Hydraulic control of VOC plumes has been achieved and is being maintained, and contaminant mass is being removed by the groundwater remedy. There were a few report recommendations to note:

- Continue to monitor for PFCs in groundwater to define the extent of contamination, and determine if any PFCs should be added to the list of non-VOC constituents of concern as part of the non-VOC ROD Amendment to be remediated. Results were not available until after the June 30, 2018 cutoff date for data review. This issue will be evaluated during the next Five-Year Review.
- Conduct an evaluation to determine whether 1,2,3-TCP exceeds the MCL of 0.005 µg/L. If necessary, update the groundwater treatment plant Operations and Maintenance Manual and the VOC ROD Amendment to include 1,2,3-TCP.

Groundwater Treatment System and Water Quality Data

The GWTS is treating approximately 1,400 gallons per minute (gpm) of groundwater pulled from 80 extraction wells. The treatment system consists of a 64,000-gallon influent tank, an air stripping tower to remove VOCs (capacity of 2,000 gpm up to 167 µg/L of trichloroethylene [TCE]), six 20,000-pound liquid-phase granular activated carbon (GAC) vessels (not currently utilized due to the low influent VOC concentration), and one ion exchange resin vessel (60 cubic-foot) to remove hexavalent chromium. The ion exchange system can treat a slipstream (part of the flow) of the total flow after the air stripper. However, the Regional Board indicated that as of September 2018, the ion exchange system is not currently being used because the hexavalent chromium influent concentrations are consistently below 10 µg/L without treatment.

The treated groundwater is discharged at two locations, with one discharge point (No. 001) to Magpie Creek and another discharge point (No. 002) to Beaver Pond (a wetlands area adjacent to Don Julio Creek which is tributary to Magpie Creek). Discharge point 001 is the primary discharge location. Magpie Creek is tributary to the Magpie Creek Diversion, which is tributary to Robla (Rio Linda) Creek, which is tributary to the Natomas East Main Drainage Canal, which drains to the Sacramento River under the majority of hydrologic conditions, but can discharge to the Lower American River just upstream of the confluence under high flow scenarios. The permitted daily average discharge flow from Discharge Point No. 001 shall not exceed 2.88 mgd. The permitted flow for Discharge Point No. 002 is 0.144 mgd. The total combined daily average discharge flow from Discharge Point Nos. 001 and 002 shall not exceed 2.88 mgd. The GWTS is configured to allow for discharge to the municipal sewer system if there is potential to exceed limitations or if the effluent quality is uncertain.

Under the Limited Threat General Order and the previous 2014 NPDES permit, there are no discharge limits for 1,4-dioxane or perchlorate. According to the Regional Board, this is because the maximum effluent concentrations of 1,4-dioxane are less than the ROD cleanup level of 6.1 µg/L and perchlorate concentrations are low as well.

Hexavalent Chromium

The Air Force samples the GWTS effluent monthly for hexavalent chromium. From the monthly data collected from January 2008 to March 2020, there have been fourteen effluent samples with levels of 10 µg/L or greater, with the highest sample at 11 µg/L in May 2013. It should be noted that hexavalent chromium is detected each month in the effluent, but it is usually below 10 µg/L.

VOCs

As stated earlier, the VOC constituents of concern in the groundwater are TCE, tetrachloroethylene (PCE), 1,2-dichloroethane, cis-1,2-dichloroethene, 1,1-dichloroethane, 1,1-dichloroethene, vinyl chloride, and 1,1,1-trichloroethane. PCE and TCE are the most common VOCs detected in the influent groundwater. According to the Air Force's consultant, VOCs have been non-detect (ND) in the effluent since at least 2008.

1,4-dioxane

The Air Force provided 1,4-dioxane data for 137 GWTS effluent samples collected from January 2003 to December 2008. The average concentration for 1,4-dioxane in those samples was 1.6 µg/L, ranging from ND to 3.9 µg/L. They also provided one sample in the GWTS effluent for 2013 at 2.7 µg/L. A review of 1,4-dioxane data provided by the Regional Board for GWTS effluent samples, collected from January 2009 through July 2013, identified a range from 0.93 to 3.5 µg/L. The majority of these samples are higher than the current DDW Notification Level of 1 µg/L.

Perchlorate

The Air Force previously indicated that the highest recorded level for perchlorate in the GWTS effluent since monitoring began in 2007 was 3.5 µg/L. A recent April 2019 email from the Air Force indicated that the 2007 sample result is the only perchlorate sample taken from the GWTS effluent by the Air Force. The Regional Board samples for perchlorate periodically but they were only able to readily provide information on five data points; perchlorate was detected at 0.67 µg/L in the GWTS effluent in 2007, and was ND in June 2014, June 2016 and June 2018, with a reporting limit of 2 µg/L. Perchlorate was also ND in June 2017 and March 2020, with a reporting limit of 4 µg/L.

Perfluorinated Compounds

In May 2016, the USEPA released lifetime Health Advisories for PFOA and PFOS at 70 ng/L, either individually or in combination with each other if both are present. DDW issued Notification Levels for both constituents in August 2019,at 5.1 ng/L for PFOA and 6.5 ng/L for PFOS. In February 2020, DDW set Response Levels of 10 ng/L for PFOA and 40 ng/L for PFOS.

The Air Force began evaluating PFCs at the McClellan site, and conducted a "Perfluorinated Compounds Preliminary Assessment" in August 2016. The purpose of the assessment was to determine whether and where aqueous film-forming foam (AFFF) containing PFCs was stored, handled, used or released at McClellan. AFFF containing PFCs were used at McClellan for extinguishing petroleum fires, firefighting training activities, and in aircraft hangar fire suppression systems. A Site Investigation Report, "Perfluorinated Compounds Determined at Multiple BRAC Bases Site Investigation Report Project No. PRJY20147242" (known as the 2016 Site Investigation), was completed in August 2016 that focused on the presence of PFCs in sediment, groundwater, and surface water near the former fire-fighting training area AOC313P. There were surface water samples collected which had PFOA and PFOS concentrations above the 70 ng/L Health Advisory. Conclusions from the 2016 Site Investigation report are that "past fire-fighting training practices using AFFF at AOC313P likely contributed to PFCs detected in samples collected at and downstream of the site. Specifically, AFFF discharged to soil at AOC313P appears to have infiltrated from surface soil to underlying groundwater and migrated downgradient in groundwater." Additionally, PFCs in surface soil also appears to have migrated off site in surface water runoff, entered drainage systems, and this sediment in the drainage ditches continues to be a potential source of PFCs to surface water. According to the Regional Board, the Air Force will need to do a Remedial Investigation (RI) Report based on the Site Investigation Findings, however, because of the national funding priorities and lack of an MCL, there is currently not a schedule for when the RI will be conducted. The GWTS Effluent was sampled for PFCs in 2017 and 2018 and PFOA results were above the new Notification Level of 5.1 ng/L.

1,2,3-trichloropropane (1,2,3-TCP):

One sample was collected at the GWTS effluent on June 13, 2018 and March 5, 2020 by the Regional Board for 1,2,3-TCP. Both sample results were ND with a reporting limit of 0.0050 µg/L. Samples were collected quarterly by the Air Force for one year, from 2017 to 2018. The Air Force collected GWTS effluent samples in August 2017, October 2017, January 2018, April 2018, July 2018, and October 2018. All results were ND with a method detection limit of 0.0021 µg/L, except for the April 2018 sample that was 0.0034J µg/L. The MCL for 1,2,3-TCP is 0.005 µg/L, so all results are below the MCL.

Aerojet Rocketdyne

The Aerojet Rocketdyne site covers 5,900 acres and is located near Rancho Cordova, California about one half mile south of the American River. Aerojet Rocketdyne has developed, manufactured, and tested liquid and solid rocket motors as well as rocket propellants, agricultural chemicals, and pharmaceuticals since the 1950's. Aerojet Rocketdyne ceased industrial operations at the Rancho Cordova site in December 2019. Groundwater contamination has been defined in a number of discrete plumes on and off-site. **Table 4-32** provides a list of the principal contaminants in the groundwater, their associated sources and human health thresholds, and their drinking water treatability. The City of Sacramento has conducted significant tracking of this facility during the study period and prepared a summary of activities most recently in September 2020. This is provided in **Appendix D** for more details on the facility, monitoring data, and regulation. Provided below are some key highlights related to the discharge to surface water.

Cleanup efforts at the site are jointly administered by the USEPA, the Regional Board, and the Department of Toxic Substances Control (DTSC) for soil contamination sites. The USEPA has classified the site as a Superfund Site and divided the site into operating units (OUs) and the remedies for each have been prioritized to capture and treat contaminated groundwater to try and minimize the migration of contamination off the site. Soon, the remediation will include larger efforts to remove and reduce contamination in the source areas of the site. A key component of the groundwater remedy is to extract contaminated groundwater, treat it, and then discharge it to surface water.

The Regional Board has adopted two NPDES permits for the Aerojet Rocketdyne site that discharge to the Lower American River; the Groundwater Extraction and Treatment (GET) System and the Stormwater System.

Table 4-32
Principal Groundwater Contaminants at the Aerojet Rocketdyne Superfund Site

Contaminant	Source	MCL, µg/L	PHG, µg/L	Groundwater Treatment at Aerojet Rocketdyne	Conventional Water Treatment Effectiveness[1]
Perchlorate - Inorganic anion	Component of solid rocket propellant	6	1	Biological reduction and ion exchange reduce perchlorate to <4 µg/L	Not effective
N-nitrosomodimethylamine – Semi volatile organic compound	Combustion product of liquid rocket fuel	0.01 [2]	0.003	UV light/peroxide oxidation removes NDMA to < 0.002 µg/L	Not effective
1,4-dioxane	Stabilizer in solvents	1 [2]	None [3]	UV light/peroxide oxidation removes 1,4-dioxane to < 3 µg/L	Not effective
Trichloroethylene (TCE)	Solvent	5	1.7	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
Tetrachloroethylene (PCE)	Solvent	5	0.06	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
1,1-dichloroethene (1,1-DCE)	Solvent	6	10	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
cis-1,2 – dichloroethene (1,2-DCE)	Solvent	6	13	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
trans-1,2 – dichloroethene (1,2-DCE)	Solvent	10	50	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
1,1-dichloroethane (1,1-DCA)	Solvent	5	3	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
1,2-dichloroethane (1,2-DCA)	Solvent	0.5	0.4	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113)	Solvent	1,200	4,000	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
Carbon tetrachloride (CCl4)	Solvent, refrigerant, propellant	0.5	0.1	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
Chloroform	Solvent	80 [4]	0.4	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
Vinyl chloride	VOC degradation product	0.5	0.05	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal

Table 4-32 Cont'd
Principal Groundwater Contaminants at the Aerojet Rocketdyne Superfund Site

Contaminant	Source	MCL, µg/L	PHG, µg/L	Groundwater Treatment at Aerojet Rocketdyne	Conventional Water Treatment Effectiveness[1]
Perfluorooctanoic acid (PFOA)	Surfactant and fire-fighting foam	0.0051 [2,5]	None [6]	GAC, ion exchange, and/or membrane could be considered if necessary	Not effective
Perfluorooctane sulfonate (PFOS)	Surfactant and fire-fighting foam	0.0065 [2,5]	None [6]	GAC, ion exchange, and/or membrane could be considered if necessary	Not effective

MCL – Maximum Contaminant Level: Primary MCLs are set as close to the Public Health Goals (PHGs), or MCLGs, as is economically and technologically feasible.

PHG – Public Health Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health.

USEPA Health Advisory - The concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure

[1] Effectiveness of Volatile Organic Compounds (VOCs) based on AWWA Water Quality and Treatment 4th Edition

[2] DDW Notification Level

[3] DDW Response Level for 1,4-dioxane set at 35 µg/L, USEPA Lifetime Health Advisory set at 200 µg/L

[4] The MCL is 80 µg/L for the sum of total trihalomethanes (as disinfection by-products) chloroform, dibromochloromethane, bromodichloromethane, and bromoform.

[5] DDW Notification Levels for PFOA/PFOS were updated in August 2019

[6] DDW Response Level for PFOA set at 0.01 µg/L and PFOS set at 0.04 µg/L, USEPA Lifetime Health Advisories set at 0.070 µg/L (either individually or combined)

Groundwater Plume Interaction with Lake Natoma

The 2018 Annual Report for Perimeter Groundwater Operable Unit, specifically Zone 4, determined that the monitoring wells in the northeast portion of the site indicated that there was possible gap in containment from the movement of the groundwater contamination plume north toward Lake Natoma, beyond the current extent of the extraction wells. Aerojet prepared an investigation of the region to determine if there was movement of the plume north toward Lake Natoma and potential migration from groundwater to surface water. It was determined that the groundwater in Layers D and E may coalesce and intersect with the bottom of Lake Natoma. This means that the groundwater is discharging to Lake Natoma nearly half the time and it averages about 4 percent of the Lake Natoma outflow.

Aerojet conducted a mass discharge evaluation assuming that groundwater is discharging to Lake Natoma. The evaluation found that the projected concentrations were orders of magnitude below the risk-based screening levels for perchlorate and N-nitrosodimethylamine (NDMA) and therefore determined that the groundwater is not a significant risk to surface water (Lake Natoma/Lower American River). It should be noted that there was no water quality data collected to validate or calibrate any of the predicted concentrations, and there was no comparison of receiving water monitoring data from the NPDES permit monitoring either.

Perfluorinated Compounds

In June 2016, Regional Board staff conducted testing for perfluorinated compounds at Aerojet Rocketdyne's GET AB and GET E/F facilities. GET AB was found to have PFOS and PFOA concentrations at 3 ng/L, in both the influent and effluent. GET E/F had PFOS detects of 74 ng/L in the influent and 96 ng/L in the effluent. GET E/F had PFOA detects of 33 ng/L in the influent and 24 ng/L in the effluent. Currently, both constituents have a USEPA Lifetime Health Advisory of 70 ng/L and DDW Notification Levels (PFOA – 5.1 ng/L and PFOS – 6.5 ng/L). The Regional Board directed Aerojet Rocketdyne to conduct quarterly monitoring of perfluorinated compounds in January 2018 to confirm the initial data results at the GET facilities.

The data results show that PFOA levels at the influent and effluent of GET E/F are generally at or below the detection limit for reporting (DLR) of 2 ng/L. GET AB has slightly higher influent levels of PFOA, with an average of 7.8 ng/L, but the effluent levels are generally below the DLR with the exception of the April 2019 result at 2.2 ng/L. This is below the DDW Notification Level of 5.1 ng/L.

The data results show that PFOS levels at the influent of GET E/F are detectable, with an average influent concentration of 4.7 ng/L, below the DDW Notification Level of 6.5 ng/L. GET E/F effluent levels are generally at or below the DLR of 2 ng/L. It also shows that the influent levels at GET AB are very high averaging 162 ng/L, well above the DDW Notification Level of 6.5 ng/L. However, the effluent levels are generally non-detectable with the exception of the April 2019 result at 2.8 ng/L – still below the DDW

Notification Level. It is likely that the ion exchange units at both GET facilities are reducing the concentrations of PFOA and PFOS.

The only PFC that is detectable in the effluents of GET E/F and GET AB is perfluorohexanoic acid (PFHxA). This is generally detectable in both effluents, usually below 10 ng/L. The influent concentrations are generally not very high, but the ion exchange and GAC treatment processes don't appear to have good efficiency (<50 percent) for removal of this PFC. There is currently no advisory level for this PFC, but it may be included in future regulations of PFCs.

Aerojet plans to continue monitoring of the PFCs at the GETs and monitoring wells. GET AB and White Rock GET will be monitored monthly, both influent and effluent, for at least one year or a complete ion exchange resin cycle. This will allow them to determine if the perchlorate cycle adequately covers PFCs as well. ARGET, Sailor Bar Park, GET EF, and GET J will be monitored quarterly for influent and effluent. Aerojet will also investigate the removal of PFHxA through ion exchange at GET AB to see why it is breaking through earlier. Monitoring wells will be monitored quarterly to ensure containment, including; two in Layer B, 12 in Layer C, seven in Layer D, and four in Layer E. There has been no monitoring of Alder Creek and none is planned, even though the highest concentrations are in the groundwater along Alder Creek and groundwater seeps are known to occur in the area.

Groundwater Extraction and Treatment System NPDES

The Regional Board manages the NPDES permit for treated groundwater discharged to the Lower American River. There are 14 GET facilities operated by Aerojet Rocketdyne, and 10 of these discharge to the Lower American River (American River Groundwater Extraction and Treatment (ARGET), GET E/F, GET J, GET K-A, GET L-A, GET L-B, AC-6 Well, AC-23 Well, GET AB, and White Rock GET). These are listed in **Table 4-33**.

The current NPDES GET permit, Order No. R5-2017-0095, was issued on August 11, 2017 and replaced Order No. R5-2014-0126. The Order continues to permit treatment and discharge of over 50 mgd of groundwater to surface water. The permit includes nearly 48 mgd of treated groundwater discharging to the American River or its tributaries. Key terms of the permit include:

- Revision to the effluent limit for perchlorate at GET E/F from 4 and 6 µg/L (average monthly and maximum daily) to 6 and 10 µg/L, based on conversion from Technology Based Effluent Limit to Water Quality Based Effluent Limit,
- Removal of Well 4665 as a direct discharge point (now flows go to GET J),
- Increased discharge flow at White Rock GET (1.3 to 2.04 mgd),
- Identification of best available technologies and effluent goals for all the major contaminants (which Aerojet must operate facilities to try and meet), and
- Addition of perfluorinated compounds to the GET E/F and GET AB influent and effluent quarterly monitoring requirements.

Table 4-33
Aerojet Rocketdyne GET Facilities Summary

Operating Unit	Name of Facility	Target Contaminants	Treatment Processes[1]	Permit Flow	Discharge Location
Western Groundwater – OU3	GET E/F[2]	Perchlorate, NDMA, VOCs	Bioreactor/sand filtration (biological reduction), H_2O_2/UV, Ion Exchange, Air Stripping	11.52 mgd	Buffalo Creek/ American River
	GET J[3]	Perchlorate, NDMA, VOCs	Bag Filters, Ion Exchange, O_3/UV, GAC	6.75 mgd	Buffalo Creek/ American River
	GET K-A	NDMA, VOCs, Perchlorate	Basket Strainers, H_2O_2/UV, Ion Exchange	5.11 mgd	American River
	GET LB (Bajamont)	NDMA, VOCs	Bag Filter, UV	1.44 mgd	American River
	GET LA (Ancil Hoffman)	NDMA	Bag Filter, H_2O_2/UV	2.88 mgd	American River/ Irrigation
Perimeter Groundwater – OU5	GET AB	Perchlorate, NDMA, VOCs	Bag Filters, Ion Exchange, H_2O_2/UV, Air Stripping	5.76 mgd	Buffalo Creek/ American River or Aerojet Industrial Supply[4]
	White Rock	Perchlorate, VOCs	Bag Filters, Ion Exchange, Air Stripping, UV/H2O2 (added 2020)	2.88 mgd	Buffalo Creek/ American River or Morrison Creek
	ARGET[5]	VOCs, 1,4-Dioxane, Perchlorate	HiPOx (H2O2/Ozone), Ion Exchange, Air Stripping	5.04 mgd	Buffalo Creek/ American River
Golden State Water Company -	AC-6	Perchlorate	Ion Exchange	1.08 mgd	American River
	AC-23 (removed 2020)	Perchlorate	Ion Exchange	3.17 mgd	Boyd Station Channel/ American River
Industrial Cooling Tower -	Building 20-019	None	None	0.0008 mgd	Buffalo Creek
All Areas -	Low Threat Discharges	Varies	Treatment if Practical	No Limit	Any

[1] All media filtration beds have pre-filters.
[2] Now includes flows from GET E/F Sprayfield and Propellant Burn Area (PBA) and Inactive Rancho Cordova Test Site (IRCTS), treatment expanded for perchlorate removal by ion exchange.
[3] Now includes flows from Well 4665.
[4] Up to 1,200 gpm can be supplied to the Aerojet Industrial System (expected to be decreased to 500 gpm for fire system needs now that industrial operations are ceased).
[5] Now includes flows from GET D, treatment expanded for perchlorate removal by ion exchange.

The permit requires Aerojet Rocketdyne to provide notification to applicable downstream water agencies within 24-hours after Aerojet Rocketdyne has received information that its discharge exceeds effluent limitations, or if operational monitoring of the treatment facilities indicates that there is a potential for effluent limitations to be exceeded.

The treated groundwater discharges generally meet the NPDES permit effluent limits, which the Regional Board set at or below the DDW MCLs or Notification Levels. During the study period there were numerous violations of the NPDES permit effluent limits. These are presented in **Table 4-34**.

Stormwater System NPDES

NPDES permit Order No. R5-2013-0156 covers stormwater discharges from the site, a small amount of operational and process water, and industrial supply excess flows. This permit expired in 2018 but was administratively extended to allow Aerojet to close its industrial operations. In December 2019 Aerojet ceased industrial operations at the Rancho Cordova site thereby eliminating the need for an individual NPDES permit for stormwater discharges. In May 2020 the Regional Board confirmed that the industrial discharge points had been terminated and determined to rescind the NPDES permit on June 4, 2020 (R5-2020-0036). During the study period the Stormwater NPDES permit was active so a discussion is provided below.

The majority of the stormwater flows go directly into infiltration zones not directly connected to surface waters. These flows discharge to Alder and Buffalo creeks as well as local drainages to the American River. Flows from GET AB effluent discharge to Buffalo Creek upstream of West Lake, while effluent discharge from GET E/F, ARGET, and GET J all enter Buffalo Creek below West Lake and have higher likelihood of discharge to the Lower American River throughout the year. Four of the six discharge points have effluent limitations associated with them. Stormwater was historically collected on-site and stored in one of five impoundments on the Aerojet site. Water was kept in the impoundments for evaporation and percolation, such as West Lake, but it could be discharged to one of the receiving waters on the property if inflows exceed the storage capacity. During the study period there were five discharges (January 2017, January 2017, February 2017, March 2017, and February 2019). These retention basins collect and hold the runoff and act to reduce suspended materials and sediments. Although these discharges are infrequent, they can last for several days and have discharged up to 14 million gallons of stormwater. Since October 2008 there have been no violations of the permit.

Table 4-34
Effluent Limit Violations For Aerojet NPDES GET, 2015 - 2019

Date	Location	Description
3/7/2018	M-001 (ARGET Effluent)	Trichloroethene Daily Maximum limit is 0.7 µg/L and reported value was 2.4 µg/L.
1/3/2018	M-001 (ARGET Effluent)	Trichloroethene Maximum Daily (MDEL) limit is 0.5 µg/L and reported value was 2.0 µg/L.
1/31/2017	M-002 (GET E/F Effluent)	N-Nitrosodimethylamine Monthly Average limit is 2 ng/L and reported value was 4.4 ng/L.
1/31/2017	M-007 (GET KA Effluent)	Trichloroethene Monthly Average limit is 0.5 mg/L and reported value was 0.91 mg/L.
1/3/2017	M-007 (GET KA Effluent)	Trichloroethene Daily Maximum limit is 0.7 mg/L and reported value was 0.91 mg/L.
12/7/2016	M-005 (GET J Effluent)	Trichloroethene Daily Maximum limit is 0.7 µg/L and reported value was 0.75 µg/L.
8/31/2016	M-018 (Well 4665 Effluent)	N-Nitrosodimethylamine Monthly Average limit is 0.007 ng/L and reported value was 0.012 ng/L.
8/3/2016	M-018 (Well 4665 Effluent)	N-Nitrosodimethylamine Daily Maximum limit is 0.010 ug/L and reported value was 0.012 ug/L
8/3/2016	M-018 (Well 4665 Effluent)	N-Nitrosodimethylamine Monthly Average limit is 0.007 ng/L and reported value was 0.012 ng/L
6/2/2016	M-002 (GET E/F Effluent)	Acetaldehyde Daily Maximum limit is 5 ug/L and reported value was 7.1 ug/L.
5/31/2016	M-017 (White Rock GET Effluent)	Trichloroethene Monthly Average limit is 0.5 ug/L and reported value was 11.56 ug/L.
5/31/2016	M-017 (White Rock GET Effluent)	cis-1,2-Dichloroethene Monthly Average limit is 0.5 ug/L and reported value was 2 ug/L.
5/10/2016	M-017 (White Rock GET Effluent)	Trichloroethene Daily Maximum limit is 0.7 ug/L and reported value was 23 ug/L.
5/10/2016	M-017 (White Rock GET Effluent)	cis-1,2-Dichloroethene Daily Maximum limit is 0.7 ug/L and reported value was 3.9 ug/L.
11/30/2015	M-016 (GET AB Effluent)	N-Nitrosodimethylamine Monthly Average (Mean) limit is 0.002 ug/L and reported value was 0.0416 ug/L.
11/23/2015	M-016 (GET AB Effluent)	N-Nitrosodimethylamine Daily Maximum limit is 0.01 ug/L and reported value was 0.110 ug/L.
11/4/2015	M-016 (GET AB Effluent)	N-Nitrosodimethylamine Daily Maximum limit is .01 ug/L and reported value was .015 ug/L.
1/29/2015	M-002 (GET E/F Effluent)	Acetaldehyde Monthly Average limit is 5 ug/L and reported value was 7.5 ug/L.
1/7/2015	M-002 (GET E/F Effluent)	Acetaldehyde Daily Maximum limit is 5 ug/L and reported value was 13 ug/L.
1/7/2015	M-002 (GET E/F Effluent)	Formaldehyde Daily Maximum limit is 50 ug/L and reported value was 53 ug/L.
1/7/2015	M-016 (GET AB Effluent)	N-Nitrosodimethylamine Monthly Average limit is 0.002 ug/L and reported value was 0.00325 ug/L.

Order No. R5-2013-0156 revised the projected flows in Buffalo Creek (due to the GET discharges) to be more consistent and likely not held in the impoundments as significantly as previous. This was due to the increased flows in Buffalo Creek from the GET AB discharge, upstream of West Lake. There were two new discharge locations in the revised permit, 004A and 004B, for excess industrial supply water (which included treated groundwater from GET AB effluent). They both discharge directly into Buffalo Creek, but are both located upstream of the two receiving water sites (RSW001 and

RSW002) and therefore there was no monitoring site upstream of them. Both of these discharge points are characterized as excess water not needed by the Discharger's industrial processes. The permit did not limit the volume of the discharge flow at these sites, but implied a nominal flow. Limited flows at these discharge points was contrary to the possible GET NPDES permit scheme (designed to reduce groundwater recharge of treated effluent) of GET AB waters being purposefully sent through the industrial supply system and discharged at these two downstream locations to avoid infiltration in the upper reaches of Buffalo Creek. Neither one of these discharge points (004A and 004B) had effluent limits associated with it in the stormwater NPDES permit; they were assumed to be in compliance under the GET AB effluent.

Under the stormwater NPDES permit, Aerojet was required to monitor four discharge locations around the property for a variety of constituents, including perchlorate, during discharge events. Aerojet was also required to monitor five receiving water locations on Buffalo and Alder creeks during those discharge events. Perchlorate has been detected in Buffalo Creek upstream of the impoundments, as well as in Alder Creek. The source of perchlorate is uncertain, but could include GET facility discharge, surface scouring to both creeks, and possible upwelling of shallow groundwater contamination to Alder Creek via seeps. The permit included an effluent limitation for a maximum daily value of 6 µg/L of perchlorate, set at the current primary MCL for perchlorate. By limiting the discharge effluent to the MCL, it reduced the likelihood of detectable perchlorate in the American River from this source from their regular operations due to dilution. However, this did not preclude detection from occurring, such as under high discharge concentrations or low flow scenarios in the Lower American River. The permit required Aerojet Rocketdyne to notify the City of Sacramento before beginning discharge from the storm water detention basins. Notifications were made and received by a similar process as described for the GET facilities, and the City received notification from Aerojet for all five discharges during the study period.

Although industrial operations have ceased, there is still sitewide runoff on the property. During significant rainfall events, stormwater flows are collected and discharged via Alder and Buffalo Creeks to the American River. Aerojet operated two large retention ponds to hold flows from Buffalo Creek, but these will be removed as part of sitewide redevelopment. The Regional Board staff have indicated that the stormwater monitoring during the wet season for perchlorate will be incorporated into the Superfund monitoring program. At the request of the Regional Board, replacement monitoring for the Alder Creek perchlorate monitoring has been prepared as a supplemental monitoring program within the general Superfund monitoring program. Aerojet will continue to monitor and this will be included in the Annual Reports. This monitoring will include general constituents as well to assist with identifying the overall quality of the water and the possible source (i.e. runoff versus groundwater seeps). It does not include NDMA or PFCs at this time. The monitoring program includes response actions if perchlorate is detected above the MCL.

A review of the CIWQS monthly eSMR report was conducted to evaluate the water quality monitoring data for the receiving water sites associated with the Aerojet stormwater permit. Four sites were monitored monthly for a handful of constituents, including perchlorate. The four sites include; RSW001 – Buffalo Creek upstream of the Detention Basins, RSW002 – Administrative Ditch Prior to Buffalo Creek, RSW004u – Alder Creek Upstream at Prairie City Road, and RSW004d – Alder Creek Downstream near Folsom Boulevard. For the Buffalo Creek monitoring sites, perchlorate was non-detectable at the RSW001 and RSW002 sites. For the Alder Creek monitoring sites, there were no detects of perchlorate at RSW004u. Perchlorate was detectable at the RSW004d site in 13 of 24 samples, ranging from 2.2 – 14 µg/L, with an overall average of 4 µg/L.

This data continues to confirm that there is definitely a source of perchlorate tributary to Alder Creek downstream of Prairie City Road, which could be upwelling groundwater and/or Aerojet stormwater runoff. Detects of perchlorate occurred during all seasons, with the highest concentrations occurring during the summer months when stormwater runoff is at its lowest. Regional Board staff has conducted several additional sampling events along Alder Creek to try and identify a potential source, but there has been no success.

Water Quality Issues and Data Review

The key constituents of interest for these industrial facility discharges include selected metals, VOCs, 1,4-dioxane, NDMA, and perchlorate. The discharge data for the selected sites was presented above and showed that some of the discharges had levels above the drinking water standards which could potentially impact source water quality.

A review of Consumer Confidence Reports (CCRs) for the participating water agencies was conducted and presented in **Section 3**. This review indicated that the existing water treatment plants have had no reported detections of metals, VOCs, 1,4-dioxane, NDMA, or perchlorate at levels of concern in their treated water. An investigation on the source water levels of aluminum, iron, and manganese was also conducted in **Section 3**. On occasion, levels of aluminum and iron can be well above their respective primary and secondary MCLs in the Sacramento River. Although levels in the source water can be elevated, aluminum, iron, and manganese, have been either non-detectable or detectable at very low levels in treated water from the water treatment plants.

Sacramento River Source Water Protection Program Activities

The participating water agencies have conducted follow-up tracking and outreach on the following sites:

- McClellan AFB was tracked annually, including contact with Regional Board staff and McClellan staff and consultants.
- Empire Mine State Historic Park was tracked to follow implementation of advanced treatment process and NPDES permit modification.

- Sterling Caviar was tracked to follow potential rescission of surface water discharge and modifications to the NPDES permit.
- Aerojet Rocketdyne was tracked continuously by the City of Sacramento, including on-going discharge notifications. This included coordination with Regional Board staff and Aerojet Rocketdyne staff. Key activities included review and comment on USEPA and Regional Board regulatory documents, follow up on discharge violations, tracking of the Community Advisory Group, site visits, and updates to the Summary Sheet, Fact Sheet, and Action Plan for Aerojet. Information from the tracking efforts is shared with other applicable water agencies downstream of the Aerojet discharges.

WASTEWATER FACILITIES

Background

Wastewater is known to contain pathogenic microorganisms. Wastewater treatment plants remove and/or inactivate some, though not all, of these organisms through various treatment processes. Secondary treatment of domestic sewage is expected to remove 75 to 99 percent of enteric viruses[11], 85 to 99 percent of heterotrophic bacteria[12], and 92[13] percent of *Giardia* cysts. Wastewater discharges occur throughout the watershed. The largest discharges to surface waters are located near the Sacramento metropolitan area as shown on the Watershed Map; see **Figure 2-1**.

Spills of raw or partially treated wastewater can occur from collection systems and from wastewater treatment plants. A sanitary sewer overflow (SSO) is any overflow, spill, release, discharge, or diversion of untreated or partially treated wastewater from a sanitary sewer collection system. Major causes of SSOs include grease, root and debris blockages; sewer line flood damage; manhole structure failures; vandalism; pump station mechanical failures; power outages; excessive storm or groundwater inflow/infiltration; sanitary sewer age; improper construction; lack of proper operation and maintenance; insufficient capacity; and contractor-caused damage. Spills of raw or partially treated wastewater occur due to equipment malfunctions or operator errors at wastewater treatment plants. Spills also occur during storm events when stormwater infiltrates a wastewater collection system and when the capacity of the wastewater treatment plant is exceeded.

Seasonal Patterns

Municipal wastewater treatment plants discharge throughout the year. All of the collection systems in the watershed are separated sewer systems, except the City of Sacramento Combined Sewer System. During high flow events, typically during the wet

[11] National Research Council, 1998. Issues in Potable Reuse: The Viability of Augmenting Drinking Water Supplies with Reclaimed Water. National Academy Press.
[12] Chauret, C. et al., 1999. Fate of *Cryptosporidum oocypts*, *Giardia cysts*, and microbial indicators during wastewater treatment and anaerobic sludge digestion. Canadian Journal of Microbiology, 45: 257-262.
[13] www.Rangelandwatersheds.ucdavis.edu/MWQIC/MWQIC/Indicators_Giardia_window.html.

season, discharge of treated, partially treated, and untreated sewage can occur. This can happen from permitted treatment plants or from backups in the collection systems caused by blockages or breaks. The City of Sacramento operates a Combined Sewer System. This is a collection system which contains both stormwater and wastewater. The system is described in more detail later, but it does not typically discharge to the Sacramento River. It is designed to send its collections to the Sacramento Regional County Sanitation District (Regional San) Regional Wastewater Treatment Plant (Regional Plant) under most conditions, and to store some excess volume if the conveyance capacity to the Regional Plant is exceeded. If storage capacity is reached during a storm event, primary treated and disinfected effluent from the treatment plants will occur, typically for just a few hours, until sufficient storage capacity is reestablished to accommodate the remaining volume from the storm event. During rare high intensity and/or long duration storm events, when conveyance, storage, and treatment capacities are exceeded, discharge of untreated combined sewage can also occur.

Related Constituents

Wastewater is a blend of sewage, washwater from showers, kitchens, etc., and any effluent from industrial facilities within the sewer collection system. Potential contaminants of concern in wastewater include microbial pathogens (such as bacteria, viruses, and protozoa), inorganics (such as metals and nutrients), TOC, VOCs, and SOCs. Many types of industrial effluent discharges are regulated by the wastewater treatment plants and must meet effluent limits set, including pretreatment if necessary.

Presence in the Watershed and Protection Zones

Table 4-35 provides a list of the existing wastewater treatment plants located downstream of major reservoirs, along with the current design capacity. All the facilities obtained a new NPDES permit during the study period, except City of Shasta Lake Wastewater Treatment Facility (WWTF). Five facilities were moved to the new General Order for Municipal Wastewater Dischargers that Meet Objectives/Criteria at the Point of Discharge to Surface Water (R5-2017-0085-01): Williams Wastewater Treatment Plant (WWTP), Dry Creek WWTP, Pleasant Grove WWTP, Lake Wildwood WWTP, and Lake of the Pines WWTP.

During the study period two small facilities converted to land disposal: Lake California WWTP and City of Biggs WWTP. In addition, Placer County Sewer Maintenance District No. 1 WWTP was decommissioned and flows are now sent to the City of Lincoln Wastewater Treatment and Reclamation Facility (WWTRF), which was expanded. The City of Colusa WWTP and Lake Wildwood WWTP were upgraded from secondary to tertiary treatment. The Lake Wildwood WWTP design flow was reduced from 1.12 to 0.69 mgd (average dry weather flow). The Linda County Water District WWTP increased design flow from 5 to 6.7 mgd. The Thunder Valley Casino WWTP was upgraded and capacity was reduced from 0.875 to 0.7 mgd.

Table 4-35
Wastewater Treatment Plants in the Sacramento River Watershed[1]

County	Facility Name	City	2015 Design Flow (mgd) [2]	Level of Treatment Provided
Shasta	Clear Creek WWTP	Redding	8.8	Advanced Secondary
Shasta	Stillwater WWTF	Anderson	3.4	Advanced Secondary
Shasta	Anderson WPCP	Anderson	2	Advanced Secondary
Shasta	Cottonwood WWTP	Cottonwood	0.43	Advanced Secondary
Shasta	City of Shasta Lake WWTF	Shasta Lake	1.3	Advanced Secondary
Tehama	Red Bluff WWTP	Red Bluff	2.5	Advanced Secondary
Tehama	Corning WWTP	Corning	1.4	Secondary
Tehama	Mineral WWTP	Mineral	0.07	Advanced Secondary
Butte	Chico WPCP	Chico	12	Secondary
Butte	Oroville Region WWTP	Oroville	6.5	Advanced Secondary
Glenn	Willows WWTP	Willows	1.2	Secondary
Colusa	Williams WWTP	Williams	0.5	Tertiary
Colusa	City of Colusa WWTP	Colusa	0.7	Tertiary
Sutter	City of Live Oak WWTP	Live Oak	1.4	Tertiary
Sutter	City of Yuba City WWTF	Yuba City	10.5	Secondary
Sutter	Linda County Water District WWTP	Marysville	6.7	Tertiary
Yuba	Olivehurst Public Utilities District WWTP	Olivehurst	3	Tertiary
Yuba	Hammonton Gold Village WWTP	Smartville	0.026	Tertiary
Nevada	Lake Wildwood WWTP	Lake Wildwood	0.69	Tertiary
Nevada	City of Nevada City WWTP	Nevada City	0.69	Tertiary
Nevada	City of Grass Valley WWTP	Grass Valley	2.78	Tertiary
Nevada	Cascade Shores WWTP	Nevada City	0.026	Tertiary
Nevada	Lake of the Pines WWTP	Lake of the Pines	0.72	Tertiary
Placer	City of Auburn WWTP	Auburn	1.67	Tertiary
Placer	Thunder Valley Casino WWTP	Lincoln	0.7	Tertiary
Placer	City of Lincoln WWTRF	Lincoln	5.9	Tertiary
Placer	Pleasant Grove WWTP	Roseville	12	Tertiary
Placer	Dry Creek WWTP	Roseville	18	Tertiary
Sacramento	City of Sacramento Combined Wastewater Collection System	Sacramento	380 [3]	Primary or Untreated
Sacramento	Sacramento Regional County Sanitation District Regional WWTP	Elk Grove	181	Secondary[4]

[1]This list represents only those Municipal NPDES Facilities in the Sacramento River Watershed Downstream of Major Reservoirs
[2] Represents permitted average dry weather flow as per the current NPDES permits
[3] Represents permitted treated flow. Discharges from this facility are prohibited during dry weather
[4] Currently under compliance schedule to construct tertiary treatment and implement seasonal effluent limits
(WWTP – wastewater treatment plant, WWTF – wastewater treatment facility, WPCP – water pollution control plant, WWTRF – wastewater treatment and reclamation facility)

There are 110 sanitary sewer collection systems in the watershed, as per the CIWQS database. The list of these is provided in **Appendix D**. A summary of the number of systems per watershed county is provided in **Table 4-36**. Any of these collection systems has the potential to have an overflow and release untreated wastewater into the receiving water.

Table 4-36
Sanitary Sewer Collection Systems in
Sacramento River Watershed Counties

County	Number	County	Number
Butte	11	Sacramento	12
Colusa	4	Shasta	10
El Dorado	6	Sierra	2
Glenn	3	Siskiyou	3
Lassen	3	Sutter	5
Modoc	3	Tehama	5
Nevada	9	Yolo	2
Placer	13	Yuba	6
Plumas	13	-	-

A review of the enforcement orders for the wastewater treatment facilities from the Regional Board was conducted. Numerous facilities had discharge violations, typically related to pH, coliform, chlorine residual, disinfection byproducts, and nitrate. Implementation of the California Toxics Rule for chronic toxicity in the water quality effluent limitations for wastewater treatment plants is difficult for many of these facilities. A general approach that the Regional Board is to issue Time Schedule Orders, which implement interim permit standards and allow the dischargers more time to comply or to prepare constituent specific Pollution Prevention Plans in lieu of meeting the more stringent standards.

A review of CIWQS for category 1 SSOs, those that reach surface water, was conducted. This indicates that 41 of the sanitary sewer collection systems had at least one SSO. A summary of the systems, number of SSOs, and total volume of wastewater to reach surface water is provided in **Table 4-37**. It can be seen that nearly 6 million gallons of untreated wastewater was discharged in the watershed during the study period.

The largest volume was reported by Mount Shasta Collection System (CS). Upon reviewing the files, the volume was primarily related to a single event that discharged 2.69 million gallons to Cold Creek on January 2, 2017 due to a pipeline failure. This was upstream of Lake Shasta and unlikely to cause a defined impact to the participating water agencies’ intakes. The second largest volume was reported by the City of Placerville Hangtown Creek CS. Upon reviewing the files, the volume was related to two events in February 2017 that discharged 1.18 million gallons to Hangtown Creek due to mainline clog. This is upstream of Folsom Lake and unlikely to cause a defined impact to the participating water agencies’ intakes.

Table 4-37
Category 1 SSO Summary, 2015 - 2019

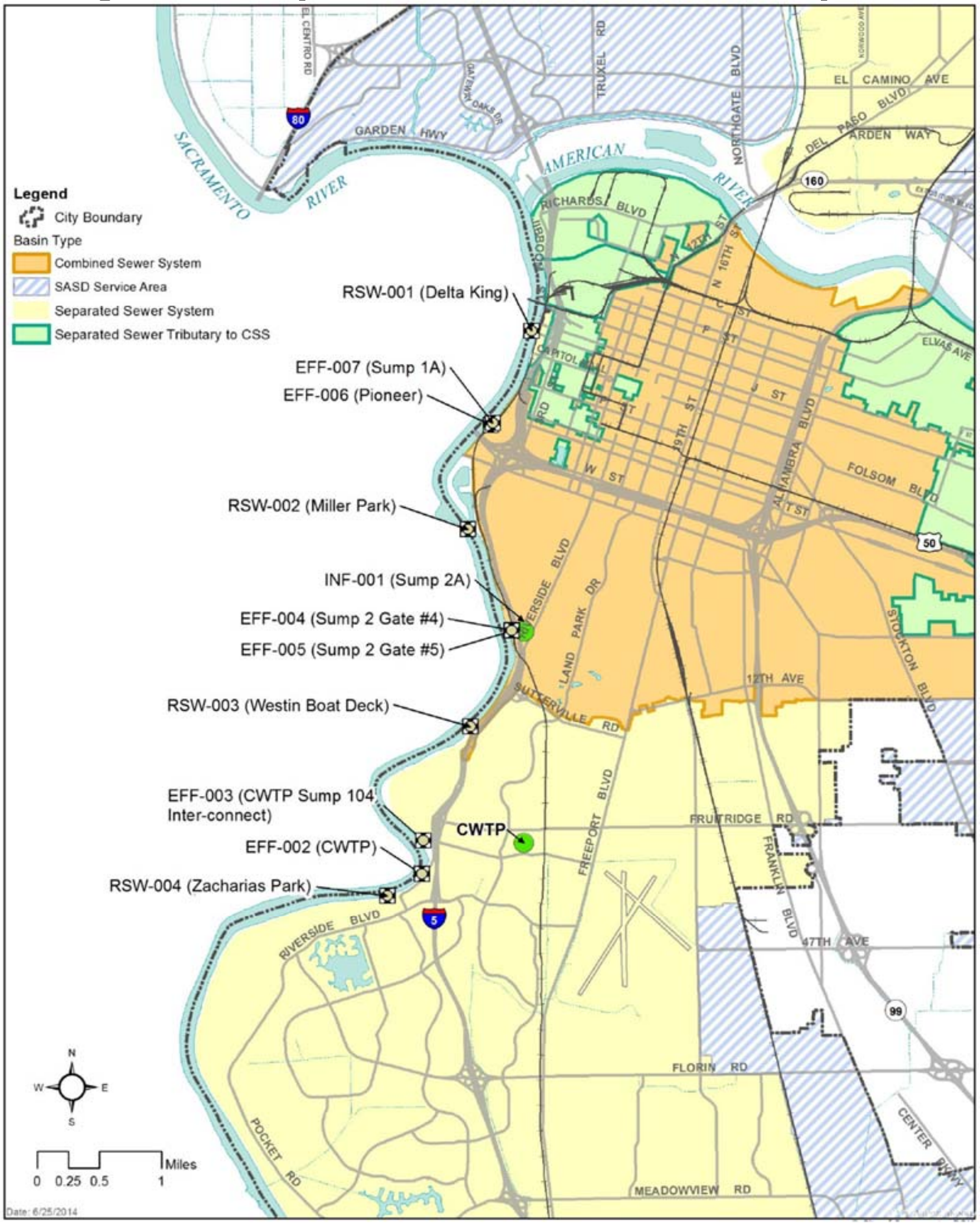
Collection System	Total Number of SSOs	Total Volume (gallons) Reach Surface Water
Mt Shasta CS	13	2,786,285
Hangtown Creek CS	28	1,269,626
Sacramento Area Sewer District CS	210	759,385
Oroville CS	2	150,200
Colfax CS	2	123,197
Redding City CS	12	105,803
East Quincy Services District CS	4	86,130
Red Bluff CS	12	61,250
Plumas Eureka Estates CS	4	57,600
Lake California CS	4	54,000
Cottonwood CS	2	50,200
South Placer Mud CS	9	42,238
Shasta Lake CS	4	36,706
Portola CS	3	36,400
Auburn Lk Trls Onsite WW Disp CS	1	27,200
City of Sacramento Utilities CS	6	22,381
Sewer Maintenance District No. 1 CS	9	22,081
Chico CS	3	14,405
Deer Creek CS	15	14,399
Grass Valley City CS	15	9,655
Sewer Maintenance District No. 2 CS	5	7,770
El Dorado Hills CS	6	7,186
Lake of The Pines CS	1	5,840
City Of Auburn CS	4	5,670
Lake Wildwood CS	3	2,780
Nevada City CS	6	2,773
Corning Indust/Domestic CS	3	2,000
Sacramento Regional CS	1	1,413
City Of Folsom CS	6	892
Lincoln CS	1	800
Delleker CS	1	500
Williams CS	1	300
California State University, Sacramento CS	3	200
California State Prison, Sacramento CS	1	130
Folsom State Prison CS	2	80
Soda Springs CS	1	50
Quincy CS	1	35
Mountain Lakes Estates CS	1	20
City Of Live Oak CS	1	10
Dry Creek CS	1	7
Maxwell PUD CS	1	2
TOTAL	**435**	**5,767,599**

Since most of these discharges are further upstream, located outside of the protection zones, only the City of Sacramento's Combined Sewer System, the Regional San's Regional Plant, and the Sacramento Area Sewer District collection system, were selected for detailed review in this section.

Combined Sewer System for the City of Sacramento

The City of Sacramento operates its Combined Sewer System (CSS) in compliance with a NPDES permit issued to the City of Sacramento by the Regional Board. During the study period the City was discharging under Order No. R5-2015-0045. The CSS only covers a portion of the City, as shown in **Figure 4-13**. The NPDES permit specifies operating parameters, effluent limits for certain constituents (solids, pH, chlorine residual, coliform, temperature, chlorpyrifos, diazinon, and mercury), and monitoring requirements. The CSS contains both urban runoff and wastewater.

Figure 4-13. City of Sacramento Combined Sewer System



Source: R5-2015-0045

Both urban runoff and wastewater contribute to the CSS. The ratio of urban runoff to wastewater within the CSS changes continuously, primarily because the volume of urban runoff changes continuously. A very important characteristic of the CSS is that discharges occur only as a result of high intensity and/or long duration storm events creating an especially high volume of urban runoff. Thus, during discharge events, the volume of wastewater relative to urban runoff can be low. Another factor that influences the ratio of urban runoff to wastewater is the practice of pumping out the collection system to the degree possible in anticipation of major storm events; this may also reduce the volume of wastewater relative to urban runoff during discharge events.

The CSS consists of four main facilities to manage the combined sewage: Sumps 1/1A, Sumps 2/2A, the Pioneer Reservoir Treatment Plant, and the Combined Wastewater Treatment Plant (CWTP). The CSS conveys the first 60 mgd to the Regional Plant for secondary treatment prior to discharge to the Sacramento River. During the study period 95 percent of CSS flows were treated at the Regional Plant. Conservation efforts related to water use have significantly reduced the volume of CSS flows, with the total volume of combined sewer overflows (CSOs) from the CSS down 42 percent over the past 26 years.

When a storm occurs that results in flows exceeding the 60 mgd conveyance capacity to Regional San's Regional Plant, the City of Sacramento will commence storage of excess flows at its various treatment and storage facilities. Once the storage capacity is reached, both the CWTP and Pioneer Reservoir facilities can provide primary treatment and disinfection for up to 130 mgd and 250 mgd, respectively. Both treatment facilities have permitted discharge outfalls to the Sacramento River. As flows increase and once treatment capacity limits for Pioneer Reservoir and CWTP are reached, flows above 250 mgd (and up to 450 mgd) are routed through Pioneer Reservoir for at least partial primary treatment and then discharge to the Sacramento River. During extreme high flow conditions, which occur extremely infrequently, discharges of untreated combined wastewater may occur at Sumps 2/2A and at the Sump 1A bypass.

The City of Sacramento is current implementing the McKinley Water Vault Project, due online in 2021, which will provide an additional 6 million gallons of temporary storage to manage peak flows.

The City of Sacramento was issued an Administrative Civil Liability (ACL) during the study period, R5-2015-0534, in 2015 for violations related to pH.

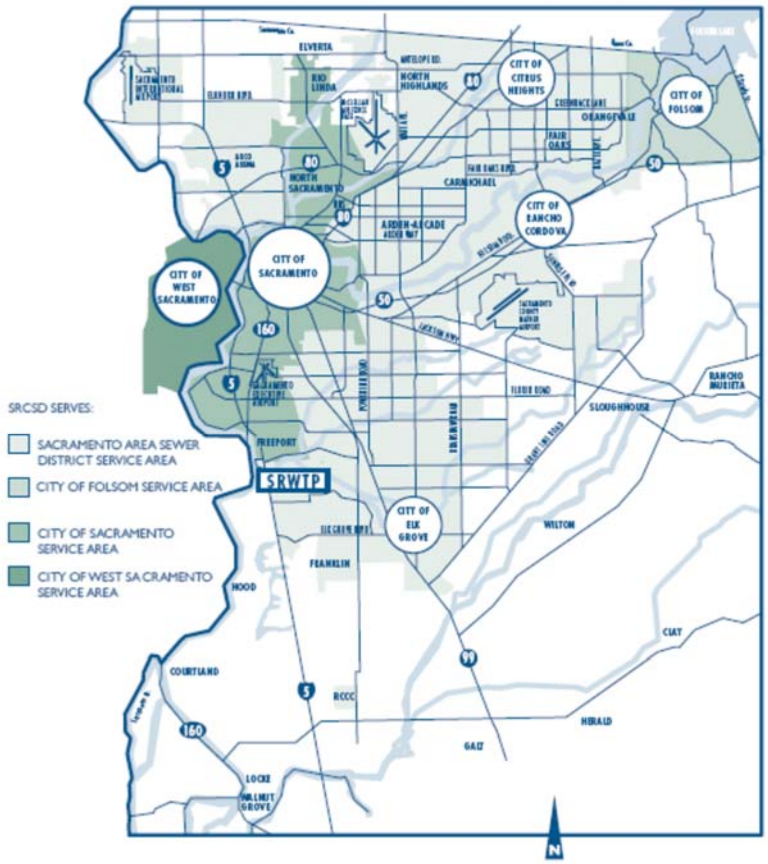
Regional San Regional Wastewater Treatment Plant

Regional San operates Regional Plant in compliance with NPDES permit Order No. R5-2016-0020-01. The effluent pipe for the Regional San Regional Plant is located approximately at River Mile 45.5 on the Sacramento River, just approximately 1.7 miles downstream of the FRWA Intake diversion. Although this is located downstream of the FRWA Intake diversion, it is possible for the discharge to reach the intake location during an extreme reverse flow event.

In January 2004 the Regional San, FRWA, and SCWA adopted the Principles of Agreement (POA). Two elements of the POA are that FRWA and Regional San will (1) model the effect of FRWA's intake operations on the Regional San's effluent diversions and (2) work to reduce the potential to divert diluted Regional Plant effluent while meeting water delivery objectives. The agencies have developed a communications plan to allow for effective coordination of operations.

The Regional Plant currently provides secondary treatment using a high purity oxygen activated sludge treatment process. The collection system services most of the Sacramento metropolitan area, approximately 300 square miles. **Figure 4-14** provides a schematic of the collection system that feeds the Regional Plant, including the contribution from the City of West Sacramento.

Figure 4-14. Regional Plant Collection System



Sacramento Area Sewer District

Sacramento Area Sewer District (SASD) owns and operates a wastewater collection system that serves the urbanized areas of unincorporated Sacramento County as well as some additional areas within the cities of Rancho Cordova and Sacramento, covering an area of more than 250 square miles. The collection system conveys an average of 165 million gallons of wastewater per day through more than 3,000 miles of pipe with approximately 100 miles of interceptor pipelines to the Regional Plant.

The SASD collection system is regulated by State Board Order No. 2006-0003-DWQ, see discussion in Regulation and Management subsection. SASD is responsible for compliance with the WDRs and must operate and maintain its sewage collection system to prevent sanitary sewer overflows and spills. As per CIWQS, SASD had 161 Category 1 SSOs reported during the study period, with a total discharge volume to surface water of nearly 710,000 gallons. Many of those discharges were small in nature, with 102 SSOs that were less than 1,000 gallons that reached surface water. There were 34 SSOs with volumes between 1,000 and 5,000 gallons that reached surface water. There were 25 SSOs that were greater than 5,000 gallons that reached surface water; a summary of those spills is provided in **Table 4-38**. The exact location of the SSOs could not be identified based on information in CIWQS, so some of these discharged to waterbodies downstream of the Sacramento River at Freeport.

Table 4-38
Category 1 SSOs Greater than 5,000 Gallons for SASD (gallons), 2015-2019

Date	Total Spill Volume	Volume Reach Surface Water
1/4/2015	26,130	26,030
10/17/2015	188,125	188,125
2/7/2016	5,640	5,430
8/29/2016	21,600	21,600
12/24/2016	9,840	9,293
1/8/2017	22,750	22,750
1/10/2017	48,551	48,548
1/10/2017	31,182	31,182
1/10/2017	22,561	22,561
1/10/2017	12,305	12,304
1/10/2017	10,001	10,000
2/6/2017	14,950	14,898
2/7/2017	7,128	7,127
2/9/2017	6,710	6,710
2/20/2017	17,885	17,885
2/20/2017	6,180	6,175
4/10/2017	14,880	14,878
6/30/2017	5,733	5,726
1/9/2018	6,187	5,887
11/30/2018	10,873	9,973
2/2/2019	8,878	8,854
2/26/2019	22,845	22,842
3/27/2019	10,487	9,771
4/6/2019	17,427	13,949
12/9/2019	66,190	41,631

SASD was issued an ACL in 2017 (R5-2017-0503) as a settlement agreement for discharges of untreated wastewater. This included one significant discharge to Arcade Creek in 2015, as well as numerous other spills between 2012 and 2016. This resulted in a fee of over $100,000 and a supplemental environmental project in an equal amount.

Regulation and Management

National Pollutant Discharge Elimination System

Direct discharges of wastewater to surface water are regulated by the Regional Board through the NPDES permit system. A discharge is regulated through requirements to meet effluent discharge limits and receiving water limits. Effluent limits are typically site specific, but usually include biochemical oxygen demand, total suspended solids, settleable matter, total coliform levels, and chlorine residual. Receiving waters are typically monitored upstream and downstream of the discharge for constituents such as pH, dissolved oxygen, ammonia, temperature, turbidity, and electrical conductivity. NPDES Permits issued by the Regional Board for wastewater treatment plant discharges contain standard provisions that prohibit the discharge of wastewater that has not been treated to the level required by the permit. The standard provisions also require that the discharger provide safeguards, such as alternate power supplies and emergency storage basins, to prevent discharges of untreated or partially treated wastewater in the event of an electrical power failure. Upon request of the Regional Board, a discharger must file a report on the measures to prevent and clean up spills.

In August 2008 the Regional Board issued Spill Reporting Procedures for wastewater treatment plant spills. This was issued to ensure consistency in notification procedures with the State Board Order for Sanitary Sewer Systems. This requires facilities to notify the California Office of Emergency Services (Cal OES), the local health department, and the Regional Board within two hours of a spill or discharge. The spill notification must be certified within 24 hours, and a written report documenting the event must be submitted to the Regional Board within five days.

Combined Sewer System for the City of Sacramento

The City of Sacramento operates a CSS year-round that conveys domestic and commercial wastewater and stormwater runoff from downtown Sacramento, East Sacramento, and Land Park areas. The City operated the CSS in compliance with NPDES permit Order No. R5-2015-0045. The NPDES Permit specifies operating parameters, effluent limits, and monitoring requirements. The CSS has a normal dry weather flow that ranges from 15 to 18 mgd.

The permit has limited water quality monitoring requirements. Routine monitoring included; effluent monitoring during discharge events for total suspended solids, pH, dissolved oxygen, fecal coliform, chlorine residual, mercury, chlorpyrifos, diazinon, and ammonia. Also, the effluent must be monitored annually for priority pollutants, including VOCs, pesticides, metals, and nutrients. The City of Sacramento is participating in the Delta RMP, in lieu of some routine sample collection requirements.

CSO discharges occurred during the study period, as shown in **Table 4-39**. There were no untreated CSO discharges during the study period.

Table 4-39
City of Sacramento CSS Discharges, 2015 - 2019

Date	Discharge Location	Type Discharge	Discharge Volume (million gallons)
2/6/2015	Pioneer	Treated	32.5
2/8/2015	Pioneer	Treated	58.4
1/5/2016	Pioneer	Treated	24.9
1/5/2016	CWTP	Treated	6.9
1/5/2016	CWTP	Treated	0.9
3/5-6/16	Pioneer	Treated	41.3
3/12/2016	Pioneer	Treated	22.9
10/16/2016	Pioneer	Treated	15.7
12/15/2016	Pioneer	Treated	65
12/15/2016	CWTP	Treated	13.75
1/8/2017	Pioneer	Treated	166
1/8/2017	CWTP	Treated	28.7
1/10-11/17	Pioneer	Treated	128.86
1/10/2017	CWTP	Treated	31.3
1/20/2017	Pioneer	Treated	25.6
2/6-7/17	Pioneer	Treated	104
2/7/2017	CWTP	Treated	12.4
2/8/2017	Pioneer	Treated	12.5
2/9/2017	Pioneer	Treated	17.1
2/20/2017	Pioneer	Treated	93
2/20/2017	CWTP	Treated	67.3
3/22/2017	Pioneer	Treated	21
4/7/2017	Pioneer	Treated	12.8
1/8-9/18	Pioneer	Treated	199.8
1/8-9/18	CWTP	Treated	35.4
3/1/2018	Pioneer	Treated	29.4
11/29/2018	Pioneer	Treated	18
12/17/2018	Pioneer	Treated	20.08
1/6/2019	Pioneer	Treated	30.5
1/16/2019	Pioneer	Treated	54
1/16/2019	CWTP	Treated	16.5
2/13-14/19	Pioneer	Treated	130
2/26/2019	Pioneer	Treated	156
2/26/2019	CWTP	Treated	61
5/16/2019	CWTP	Treated	15.34
12/2/2019	Pioneer	Treated	48.95

As per CIWQS, there were nine violations to the permit, the City of Sacramento was issued one ACL (Order No. R5-2015-0534) for discharge violations between 2012 and 2016. These violations were related to pH.

The basic management parameters for the City of Sacramento's CSS during large, high-intensity storm events are as follows:

1. When storm events that could cause CSS discharges are anticipated, the City of Sacramento pumps down the system as much as possible, sending existing flow within the collection system to the Regional San Regional Plant. This practice

minimizes the ratio of wastewater relative to urban runoff; implementation of this practice has resulted in measurable decreased levels of TSS and settleable solids in CSS discharges. This practice also maximizes available storage in the collection system.

2. A baseline CSS flow of 60 mgd is conveyed throughout the storm event to the Regional Plant where it receives primary and secondary treatment, chlorination, and dechlorination before discharge to the Sacramento River downstream of the Freeport Bridge.

3. When CSS flows exceed the baseline 60 mgd to the Regional Plant, the City initially commences storage of excess flows within the collection system. Once the collection system storage reaches operational storage capacity, CWTP is filled. This sequence of operations is followed by the wastewater flows being diverted to Pioneer Reservoir and/or remote CSS storage for later transmission to the Regional Plant. Sumps 1/1A/1B can be used to pump up to 200 mgd to Pioneer Reservoir. Storage capacity is as follows:

   - CWTP - 7 million gallons (mg)
   - CWTP In-line Storage – 2.5 mg
   - Pioneer Reservoir - 23 mg
   - Pioneer Interceptor In-line Storage - 5 mg
   - Remote CSS storage in collection system – 10.6 mg

4. When CSS flows exceed the baseline 60 mgd to the Regional Plant and the storage capacity at Pioneer Reservoir, CWTP, and collection system storage is exceeded, up to 250 mgd can be treated at Pioneer Reservoir with primary treatment, chlorination, and dechlorination and then discharged to the Sacramento River at the Pioneer Reservoir location.

5. When CSS flows exceed the baseline 60 mgd to the Regional Plant, the storage capacity at Pioneer Reservoir, CWTP, and collection system storage, and the Pioneer treatment capacity of 250 mgd, up to 130 mgd can be treated at the CWTP with primary treatment, chlorination, and dechlorination and then discharged to the Sacramento River at the CWTP location. Sludge removal is also provided at CWTP. CWTP Basins can also be used to store up to 9.5 mg of flow. The Pioneer facility can discharge up to 450 mgd, but at flows above 250 mgd only partial primary treatment is proved.

6. When the volume of CSS flows exceeds all of the capacities described above, the flow can be discharged as untreated CSOs to the Sacramento River at the Sump 2/2A or Sump 1/1A Pioneer Bypass locations.

An important characteristic of the CSS discharges is the fact that discharges do not occur during the initial period of storm-induced runoff, and all non-wet weather stormwater flows receive full secondary treatment at the Regional Plant. A dye dispersion tracer study was conducted in 1991 by the City of Sacramento to evaluate how the CSS flow discharges from the CWTP mix with the Sacramento River. The results showed that discharges from the CSS are fully mixed with the Sacramento River about 9,000 feet (about 1.7 miles) downstream of the CWTP discharge location. The total distance from the CWTP to the FRWA Intake diversion is nearly seven river miles, so the CSS discharge would be expected to be fully mixed more than five river miles upstream of the FRWA Intake diversion. The City provides direct notification to FRWA and other downstream water utilities when there are discharges from the CSS to the Sacramento River.

Regional San Regional Wastewater Treatment Plant

The Regional Plant has a treatment capacity of 181 mgd. The effluent is located about 300 feet downstream of the Freeport Bridge, and downstream of all the participating agencies. Discharge of treated wastewater effluent is limited to the condition that a dilution ratio of 14:1 be met in the Sacramento River, or a minimum flow of 1,300 cfs. The Regional Plant continuously monitors flow in the Sacramento River and their effluent, and then uses a 60-minute average dilution ratio for compliance. In the event that discharge cannot occur, the effluent is diverted to onsite storage basins. Diversion can occur during any year, but has most commonly occurred during drought years and in the spring and summer months. There are times where the flow down the Sacramento River is overwhelmed by high tides from the Delta resulting in a reverse flow effect. This could result in the discharge effluent from the Regional Plant moving upstream toward the FRWA Intake diversion.

The Regional Plant is operated throughout the year. Regional San operates the Regional Plant in compliance with a NPDES permit issued by the Regional Board, Order No. R5-2016-0020-01. Effluent discharge limits are set for a wide variety of constituents, including; conventional pollutants, non-conventional pollutants, and priority pollutants. Interim effluent limits exist through 2021 for biochemical oxygen demand, total suspended solids, ammonia, chlorine residual, and total coliform. The effluent is monitored for all constituents with effluent limits, with frequencies ranging from continuous to monthly. Effluent characterization monitoring is also required for an expanded list of constituents, monitoring monthly every other year.

The Regional Plant currently consists of mechanical bar screens, aerated grit removal, primary sedimentation, pure oxygen activated sludge aeration, secondary clarification, chlorine disinfection with de-chlorination, and a diffuser for river discharge. Solids handling consists of dissolved air flotation thickeners, gravity belt thickeners, anaerobic digesters and sludge stabilization basins with disposal on-site through land application or biosolids recycling facility.

The Regional Plant will be modified in the future by;

- Replacement of the existing pure oxygen biological treatment facilities with biological nutrient removal (BNR) air activated treatment facilities capable of removing ammonia and nitrate nitrogen,
- Addition of tertiary treatment in the form of filtration with granular media filters, and
- Increase in storage facilities.

The Regional Plant will continue to be staffed and operated 24 hours per day and will consist of mechanical bar screening, aerated grit handling, grit classifiers that wash and dewater grit, covered primary sedimentation tanks, primary effluent peak-shaving facilities, BNR air activated sludge treatment, nitrifying sequencing batch reactor for treating high ammonia concentration waste streams from solids storage basins and biosolids reclamation facility, secondary sedimentation, granular media filtration, disinfection with chlorine liquid, and de-chlorination with sodium bisulfite.

The BNR activated sludge treatment facilities will be designed to process up to 330 mgd. Flows in excess of 330 mgd will be stored in peak-shaving storage facilities and returned for processing through the activated sludge treatment facilities when capacity is available. All wastewater will receive secondary treatment through the BNRs. The tertiary filters will be designed to process flows up to 217 mgd. Order No. R5-2016-0020-01 implements seasonal disinfection requirements, as follows:

- May – 31 October. The Facility will be operated to meet Title 22 or equivalent disinfection criteria.
- November – 30 April (commences 1 November 2023); i. When discharge to the river is 217 mgd, or less: The entire treated effluent discharge will be filtered (tertiary filtration of BNR effluent to comply with Title 22 or equivalent disinfection criteria) or ii. When discharge to the river exceeds 217 mgd, discharge flows to the river up to 217 mgd will be filtered, and remaining wastewater will not be filtered. Filtered and non-filtered wastewater will be combined prior to disinfection by the chlorination/de-chlorination facilities.

As per CIWQS, there were 21 violations to the permit during the study period. These were related to effluent limit violations for ammonia, electrical conductivity, acute toxicity and copper, as well as deficient reporting and monitoring and onsite spills.

Sanitary Sewer Overflow Program

To provide a consistent, statewide regulatory approach to address SSOs, the State Board adopted Statewide General WDRs for Sanitary Sewer Systems, Water Quality Order No. 2006-0003-DWQ (Sanitary Sewer Order) on May 2, 2006, including an MRP. The MRP for the Order was amended in 2008 (2008-2002-EXEC) to clarify deficiencies in timely notification. The MRP was amended again in 2013 to further improve the program (2013-0058-EXEC).

The Sanitary Sewer Order was developed in accordance with California Water Code Section 13271 and prohibits any SSO that results in a discharge of untreated or partially treated wastewater to waters of the United States and any SSO that results in a discharge of untreated or partially treated wastewater that creates a nuisance as defined in California Water Code Section 13050(m). Enrollees shall take all feasible steps and necessary remedial actions to 1) control or limit the volume of untreated or partially treated wastewater discharged, 2) terminate the discharge, and 3) recover as much of the wastewater discharged as possible for proper disposal, including any wash down water. This includes public notification to protect the public from exposure to the SSO for any spills that potentially affect public health or reach waters of the United States.

The Sanitary Sewer Order and its amendments require public agencies that own or operate sanitary sewer systems to develop and implement sewer system management plans (SSMPs) and report all SSOs to the State Board's online SSO database. SSOs in the Central Valley have been uploaded to the State Board's online CIWQS database since September 2007.

The Sanitary Sewer Order and its amendments require the owners and operators of sanitary sewer systems to take all feasible steps to eliminate SSOs and to develop and implement a system-specific SSMP. SSMPs must include provisions to provide proper operation and maintenance while considering risk management and cost. The SSMP must contain a spill response plan that establishes standard procedures for immediate response to an SSO in a manner designed to minimize water quality impacts and potential nuisance conditions. The SSMPs must be updated every five years, as well as internal audits conducted every two years. If there are significant changes to the SSMP then it must be recertified by the enrollee.

Notification Requirements

When a spill of untreated or partially treated wastewater occurs, the owner or operator of the collection system or wastewater treatment plant is required to provide notice of the spill to the California State Warning Center when certain criteria are met, and they must provide updates if there are substantial changes to the spill report.

A key requirement of the Sanitary Sewer Systems Order is that SSOs must be entered into the State Board's CIWQS Online SSO database. The Central Valley region began reporting in September 2007. Under the initial Order, there were Category 1 and Category 2 spills. Category 1 spills were wastewater spills equal to or greater than 1,000 gallons, all wastewater spills that enter a drainage channel or surface water, or wastewater discharge to a stormdrain that was not fully captured and returned to the sanitary sewer system. Category 1 SSOs were to be reported to the online SSO database as soon as possible but no later than three business days after the SSO was detected. Category 2 spills were all other wastewater spills.

Under the 2013 MRP amendments, there are now three categories of SSOs: Category 1 – wastewater spills of any volume that reach surface water or an MS4 that are not fully captured and returned to the sanitary sewer system, Category 2 – wastewater spills of 1,000 gallons or greater that don't reach surface water, Category 3 – all other wastewater spills. Currently, all Category 1 SSOs must have a draft report submitted by the enrollee via the CIWQS Online SSO Database within three business days of them becoming aware of the SSO and certified within 15 calendar days of SSO end date. In addition, Category 1 SSOs greater than 1,000 gallons must be verbally notified to Cal OES within two hours of the enrollee being aware of the spill. Finally, for Category 1 spills larger than 50,000 gallons a written technical report must be submitted to the CIWQS Online SSO Database within 45 days of the spill.

Water Quality Issues and Data Review

The most significant wastewater constituents of interest to source water are microbial constituents, specifically *E. coli, Giardia,* and *Cryptosporidium*. A summary of these constituents in the source water during the study period was presented in **Section 3**. Since the SRWTP and FRWA Intake diversion/VSWTP are located at or below the wastewater discharges of interest, data review will be focused on those facilities.

The detects of *Cryptosporidium* at the SRWTP and VSWTP occurred in November and December 2015, and did not correlate to any wastewater discharge events. The detects of *Giardia* at the SRWTP and VSWTP occurred in August and November 2015, and January, September, and October 2016. Only the October 17, 2016 detect of 0.4 cysts per liter correlated to the CSS treated discharge from Pioneer reservoir of 15.7 million gallons on October 16, 2016. The *E. coli* was also elevated on this date at VSWTP, at 700 MPN/100 mL.

At the SRWTP there were two months with median *E. coli* values greater than 200 MPN/100 mL, January 2016 and February 2018. These did not correlate with any significant spills, greater than 5,000 gallons, from SASD.

At the VSWTP there were five months with median *E. coli* values greater than 200 MPN/100 mL, September 2015, January 2016, December 2016, February 2017, and February 2019. There were no CSS discharges or SASD spills during September 2015. The other four months had either or both, as shown in **Table 4-40**.

Sacramento River Source Water Protection Program Activities

As part of the operation of the FRWA Intake diversion and VSWTP, SCWA and EBMUD coordinate reverse flow condition operations closely with the City of Sacramento and Regional San.

The SRSWPP voluntary spill notification program in the Sacramento River watershed includes direct contact with, and obtaining voluntary notification from, wastewater agencies in the event of a potentially significant discharge (greater than 1,000 gallons) to the Sacramento River. This has been very effective at providing advance notification. This is discussed below in the Watershed Spills section.

Table 4-40
FRWA Intake for VSWTP Monthly Medians and Wastewater Discharges

Month	FRWA Intake for VSWTP *E. coli* (MPN/100 mL) MM	SASD Untreated SSOs (gallons)	CSS Treated Discharges (million gallons)
January 2016	690	-	Pioneer – 24.9 CWTP -7.8
December 2016	284	9,293	Pioneer – 65 CWTP – 13.75
February 2017	330	52,795	Pioneer – 226.6 CWTP – 79.7
February 2019	204	-	Pioneer – 286 CWTP - 61

WATERSHED SPILLS

Background

A hazardous material spill or leak into the river system could occur as a result of a vehicular traffic accident, railroad accident, pipeline leak or spill, wastewater treatment plant spill, or other incident. In the event of a leak or spill, timely notification is critical to ensure that the water treatment plant operators are provided with sufficient time and information to best respond to potential treatment concerns or plan measures to protect the water supply. Formal notification to potentially impacted water utilities is provided by DDW, if DDW is apprised of a hazardous material spill with risk to drinking water through the Cal OES State Warning Center. The Sacramento River Water Utilities have established voluntary direct notification agreements and procedures to create additional assurance that each of the water treatment plants will receive notification in the event of a spill upstream of its intake. Spills from wastewater treatment and collection systems are discussed further in the Wastewater subsection later.

Seasonal Patterns

Spills associated with vehicular traffic, railroads, and pipelines could occur at any time of the year. Sewage spills typically occur during wet weather as a result of capacity exceedences or power outages affecting wastewater treatment plant operations, but they can also occur during other seasons. Wastewater treatment plants and collection system pipelines are present in the watershed, see discussion in the Wastewater section previously for more details.

Related Constituents

The most common spills are related to sewage or oil and petroleum products. Therefore, typical constituents of concern range from microbial constituents (i.e. viruses, pathogens, *Giardia, Cryptosporidium*) to VOCs and hydrocarbons. However, hazardous materials emergencies can involve a virtually infinite number of chemicals or chemical combinations.

Presence in the Watershed and Protection Zones

There are a tremendous number of roadways in the watershed, many of which cross either the rivers, creeks, or canals associated with the Sacramento River water supply. The main truck transportation routes through the watershed are Interstate 5 in the north-south direction and Interstate 80 and Highway 50 in the east-west direction, as shown on **Figure 2-1**. There is almost no restriction on transport of hazardous materials in the watershed. The greatest threat is near bridge crossings because of the immediate potential for spilled material to enter the river or canal system. There is also concern for the levee roads located along various reaches of the protection zones.

Union Pacific Rail Road (UPRR) and BNSF Railway Company own and operate the railroad tracks throughout Northern California. Both railroad lines are allowed to transport hazardous materials as long as they follow the Federal Department of Transportation guidelines for the transportation of hazardous materials. This includes Bakken crude oil transported into California via rail. Spills could occur at any time, and at any location.

Kinder Morgan owns a petroleum product pipeline that crosses the Sacramento River just downstream of the SRWTP and the petroleum product pipelines that cross the American River.

The SRSWPP conducts an annual review of spills that were reported to the Cal OES in the seven counties upstream of the FRWA Intake diversion, including Sacramento, Placer, El Dorado, Yolo, Sutter, Yuba, and Colusa counties. The annual reports were reviewed and it was found that there were 86 spills in 2015, 146 spills in 2016, 193 spills in 2017, 146 in 2018, and 152 in 2019 that reached receiving waters. A complete list of all the Cal OES-reported spill events in the near intake zone during the study period is provided in **Appendix D**. Sixty-one of these were identified as potentially significant, but only 22 of those were unrelated to sewage and these are highlighted below.

- September 13, 2015: CalFIRE Camino District reported a drop of 600 gallons of fire retardant during a wildfire fight that partially hit Georgetown Creek in El Dorado County, upstream of Folsom Lake. There was no reported cleanup or specific information on fire-fighting chemical used.
- May 10, 2016: A vehicle collision in Williams resulted in a truck carrying 5,000 gallons of liquid aqua ammonia leaking into Central Canal, and then into the

Sacramento River. Colusa County Sheriff was the responder and there was no reported cleanup.

- July 8, 2016: Ampac Fine Chemicals (located on the Aerojet property in Rancho Cordova) reported a loading error that resulted in approximately 15 gallons of ethyl acetate discharging to the ground, and potentially into the American River.
- May 25, 2017: A private citizen in Sacramento reported an individual dumping 1,000 gallons of a gas/water into a storm drain, and then into the Sacramento River. This call was made directly to the National Response Center, then to OES.
- September 7, 2017: The Marysville Police Department reported a vehicular accident of a truck carrying 1,000 gallons of diesel fuel on Highway 20 in Yuba County. This is adjacent to the Yuba River.
- January 7, 2018: AMPAC Fine Chemicals location in Rancho Cordova has a storage tote of toluene spill, which resulted in discharge to an onsite pond. Approximately 200 gallons were discharged. All the material was reportedly captured and contained prior to leaving the premises.
- March 22, 2018: El Dorado Irrigation District (EID) had a distribution system failure that resulted in discharge of 75,297 gallons of treated drinking water into Folsom Lake.
- March 26, 2018: Trade Mark Associates discharged 17,952 gallons of pool water and red dye into Dry Creek as it was being drained.
- April 18, 2018: EID had another distribution system failure that resulted in discharge of 165,000 gallons of treated drinking water into Mound Springs Creek, which is tributary to the American River.
- May 27, 2018: The Grass Valley Control Center reported discharge of an unknown amount of firefighting flows from a wood chip pile burn. There were no known or documented hazard materials, just water and organic matter.
- June 4, 2018: California Highway Patrol (CHP) reported a vehicular accident that resulted in a tanker truck carrying 800 gallons of jet fuel to turn over and leak; it was unknown the quantity released and likelihood of reaching a surface water.
- June 16, 2018: CHP reported a vehicular accident that resulted in a rupture to a saddle tank of a tractor trailer releasing approximately 70 gallons of fuel to the bank of the Sacramento River.
- July 8, 2018: The National Response Center (NRC) reported a sinking vessel along Garden Highway north of Sacramento with approximately 15 gallons of fuel on board.
- July 11, 2018: The California Department of Fish and Wildlife reported the discovery of multiple barrels of used motor oil abandoned on Natomas Road. It appeared that there was limited material spill, less than one gallon.
- November 2, 2018: UPRR and Kinder Morgan Pipeline reported that a contractor had drilled a hole into the fuel pipeline in the vicinity of Tahoe Ave in Roseville. It was estimated that 424 gallons of fuel leaked out of the pipeline to the surrounding soils.
- November 5, 2018: The City of Loomis reported discovery of illegally dumped mixed dirt materials near Sucker Ravine Creek, tributary to the Sacramento River.

- January 2, 2019: Sacramento Regional Fire and Emergency Communications Center reported a home-made airplane had crashed into the American River leaking an unknown amount of fuel into the waterway.
- January 14, 2019: CHP reported an overturned tanker truck carrying aviation fuel along Interstate 80, east of Dutch Flat. It was unknown how much fuel had leaked, which was tributary to an unnamed creek tributary to the American River.
- June 30, 2019: The Sacramento International Airport reported discharge of an unknown amount of aviation fuel from an airplane, up to 4,700 gallons.
- August 5, 2019: CHP reported a vehicular fire that resulted in a tanker truck carrying several hundred gallons of diesel that leaked into storm drain.
- October 11, 2019: UPRR reported a leaking fuel car between Roseville and Reno, along Interstate 80 with the loss of 1,600 gallons of fuel.
- October 21, 2019: CHP reported a vehicular accident that resulted in a rupture to a saddle tank of a tractor trailer releasing approximately 500 to 600 gallons of fuel to the bank of the Sacramento River.

Regulation and Management

UPRR inspects the train tracks regularly and conducts inspections whenever a problem is detected. There have also been improvements to the train tracks in areas where there have been historical problems, such as in the mountains along the American River, Feather River, and Sacramento River.

The California Department of Forestry and Fire Protection, Office of the State Fire Marshal, Pipeline Safety Division currently regulates the safety of intrastate hazardous liquid transportation pipelines. Staff inspect pipeline operators to ensure compliance with federal and state pipeline safety laws and regulations. The Division is also responsible for the investigation of all spills, ruptures, fires, or pipeline incidents. California pipeline safety standards exceed the minimum federal standards by mandating that a pipeline system be hydrostatically tested before initial operation begins; they must then be tested at least every five years by an independent third-party approved by the Division, provided the pipeline is newer than 1971. In these hydrostatic tests the hazardous liquid is removed from the pipe and replaced with water. The pipe is then pressurized to 125 percent of the maximum pipeline operating pressure and held for eight hours. Testing results are submitted to the Division for review and concurrence. Tests are randomly witnessed by Division engineers. In certain cases, the Division has approved the use of internal inspection tools "smart pigs" in lieu of hydrostatic testing. In these cases, the test results are also submitted to the Division for review and concurrence. Kinder Morgan has installed cathodic protection on each of these pipelines. The lines are inspected regularly and are also inspected whenever a problem is detected or construction occurs near the pipelines. Kinder Morgan monitors the pipelines for spills by checking for pressure changes along the pipeline and also by comparing flow in and flow out. If these show discontinuities, the pipeline is inspected. Senate Bill (SB) 295 was recently passed and requires an annual inspection of all pipelines beginning January 2017. Assembly Bill (AB) 864 was recently passed and requires all intrastate hazardous liquid pipelines to have auto-shutoff systems to reduce accidental releases.

When a hazardous material spill or leak of a reportable quantity occurs, notification to emergency response agencies is required by state and federal law. In California, Cal OES Hazardous Materials Section coordinates statewide implementation of hazardous materials accident prevention and emergency response programs for all types of hazardous materials incidents and threats. In response to any hazardous materials emergency, the Section staff is called upon to provide state and local emergency managers with emergency coordination and technical assistance.

A sewage spill is required to be reported if 1,000 gallons or more are released, and any amount that reaches a water of the United States. An oil or petroleum product spill is required to be reported if 42 gallons or more are released to land, and any amount that reaches a water of the United States. Any other hazardous material spill is required to be reported if there is a reasonable belief that the release poses a significant present or potential hazard to human health and safety, property, or the environment.

Notification must also be made to the Cal OES State Warning Center for the following:

- Discharges that may threaten or impact water quality.
- Discharges of any hazardous substances or sewage, into or on any waters of the state.
- Discharges or threatened discharges of oil in marine waters.
- Discharges of oil or petroleum products, into or on any waters of the state.
- Any spill or other release of one barrel (42 gallons) or more of petroleum products at a tank facility.
- Hazardous Liquid Pipeline releases and every rupture, explosion or fire involving a pipeline.
- Any found or lost radioactive materials.

Other considerations for reporting to Cal OES State Warning Center include discharges such as:

- Biological agents;
- Infectious wastes;
- Industrial and Agricultural chemicals (pesticides, herbicides, fungicides, etc.);
- Explosives; or
- Air contaminants.

Hazardous Materials Incidents are Classified in the following descriptions, consistent with *NFPA 471: Recommended Practice for Responding to Hazardous Materials Incidents (1997 Edition)*:

- Level One Incident (Minor): An incident that can be easily handled using resources immediately available to first responders having jurisdiction. Significant human health and safety and/or environmental issues do not arise.
- Level Two Incident (Moderate): An incident that is beyond the capabilities of a local jurisdiction that may require the use of mutual aid, either for operational assistance or logistical support. A declaration of a local emergency may be issued, a Governor's Proclamation may be issued, and the local Emergency Operations Center (EOC) may be partially or fully activated. Human health and safety and/or the environment are affected.
- Level Three Incident (Major – Catastrophic): An incident that significantly exceeds local capabilities. Considerable environmental and/or public health impacts have occurred or are expected. A local emergency is usually declared; a Governor's Proclamation may be issued, along with a request for a Presidential Declaration; and the local EOC and the State Operations Center are fully activated.

When a hazardous material spill or leak occurs, it is the owner's or operator's responsibility to notify the local designated emergency response agency, which is called the Certified Unified Program Agency (CUPA), as well as the Cal OES. There are four CUPAs governing discharges that enter the watershed: El Dorado County Environmental Management, Placer County Environmental Health, City of Roseville Fire Department, and Sacramento County Environmental Management Department. They are responsible for the following local "unified programs":

- Hazardous Materials Release Response Plans and Inventories
- California Accidental Release Prevention Program
- Underground Storage Tank Program
- Aboveground Petroleum Storage Act Program
- Hazardous Waste Generator and Onsite Hazardous Waste Treatment (tiered permitting) Programs
- California International Fire Code: Hazardous Material Management Plans and Hazardous Material Inventory Statements
- Hazardous waste generator regulation, including most of the state's "tiered permit" requirements.
- California Accidental Release Prevention program.

Cal OES Oil by Rail

Historically oil has come into California for refining by marine vessels. California is the third-largest refining state in the US. Cal OES expects a significant increase in the quantity of oil being delivered in to California by rail. The oil is coming from increased drilling in Canada and North Dakota. Cal OES projects quantities between 150 and 200 million barrels annually. The oil being shipped from Canada and North Dakota, specifically the Bakken Shale production area, is unique in that it is highly flammable "light" crude oil, known as Bakken Crude oil. There have been numerous rail accidents associated with the Bakken Shale that have been more devastating due to the flammable nature of the oil. This quality of the Bakken Crude oil has raised concern over the potential for increased risk of derailments, explosions, fires, accidental releases, and the potential for crimes and terrorist acts.

The US Department of Transportation issued an Emergency Order (DOT-OST-2014-0067) in May 2014 that requires transporters to provide notification to States if they intend to ship greater than 1,000,000 gallons of Bakken Shale through them. The transporters are required to disclose the number of trains, per week, per county. The Cal OES, Fire and Rescue Branch, Hazardous Materials Section manages California's Oil by Rail program and receives these notifications. Cal OES has identified all the possible oil by rail routes in the State and the location of the various types of certified Hazardous Materials teams that could respond to an incident. These are shown in **Figure 4-15**.

There are two transporters in the Sacramento River watershed: UPRR and BNSF Railway Company. Cal OES then shares the notifications with the public and first responders by posting on its website. First responders are required to be prepared for any emergency incidents. To date, there have been a few notifications provided to Cal OES for the railway lines in Northern California. Notifications are not required for smaller loads (less than 1,000,000 gallons) or blended oils, so it is uncertain how accurate and effective the notification requirement is.

Cal OES State Warning Center

There is a 24-hour telephone number for the Cal OES State Warning Center. The Cal OES State Warning Center is a single point of notification for all state agencies, as well as federal and local agencies. When spill information is received, the Cal OES State Warning Center will assign a spill control number to the incident that can be used to track various activities associated with the incident.

At a minimum, the Cal OES State Warning Center is looking for this information:

- Who is making the notification and who is the responsible party, if different - name, address, and phone number;
- Where did the release occur? (exact location, address, and county)
- What was the material involved in the release/threatened release?
- What was the quantity released/threatened to be released?
- What are the potential hazards presented by this release/potential release, if known?
- How did the release happen?
- Whether or not a body of water is affected.
- Local agencies that are on-scene and/or notified.
- What containment and/or cleanup actions have been taken?

Figure 4-15. Cal OES Oil By Rail Routes and Hazardous Materials Teams

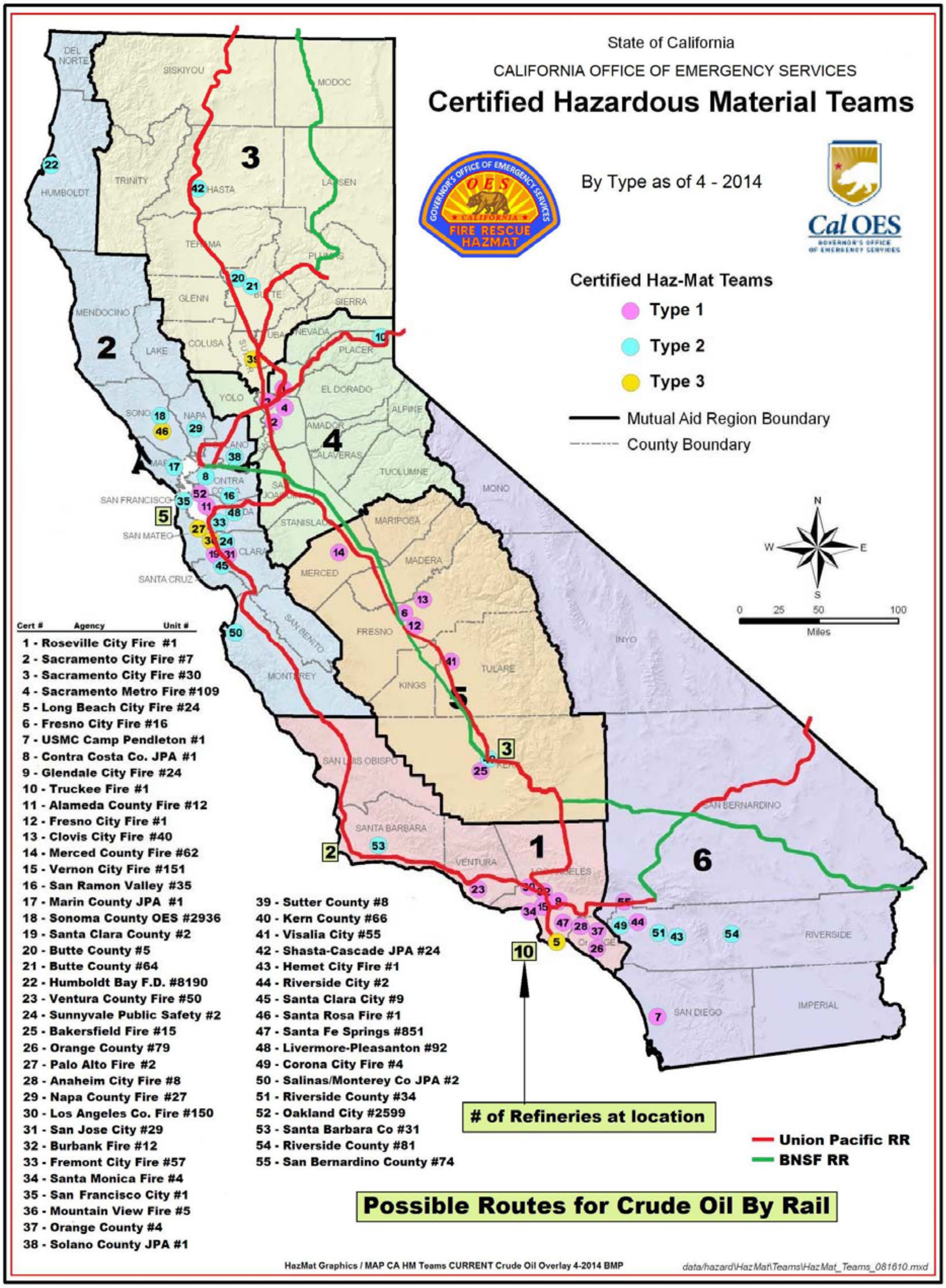


Figure 4-16 illustrates the decision-making process for determining emergency response notification requirements if an incident occurs. **Figure 4-17** illustrates the decision-making process for notification, and the list of agencies that are contacted by the Cal OES State Warning Center. It should be noted that in the event of a hazardous materials incident, the Cal OES State Warning Center can also assist responding agencies in contacting other response agencies during business hours and after-hours.

Figure 4-16. Cal OES State Warning Center Notification Determination

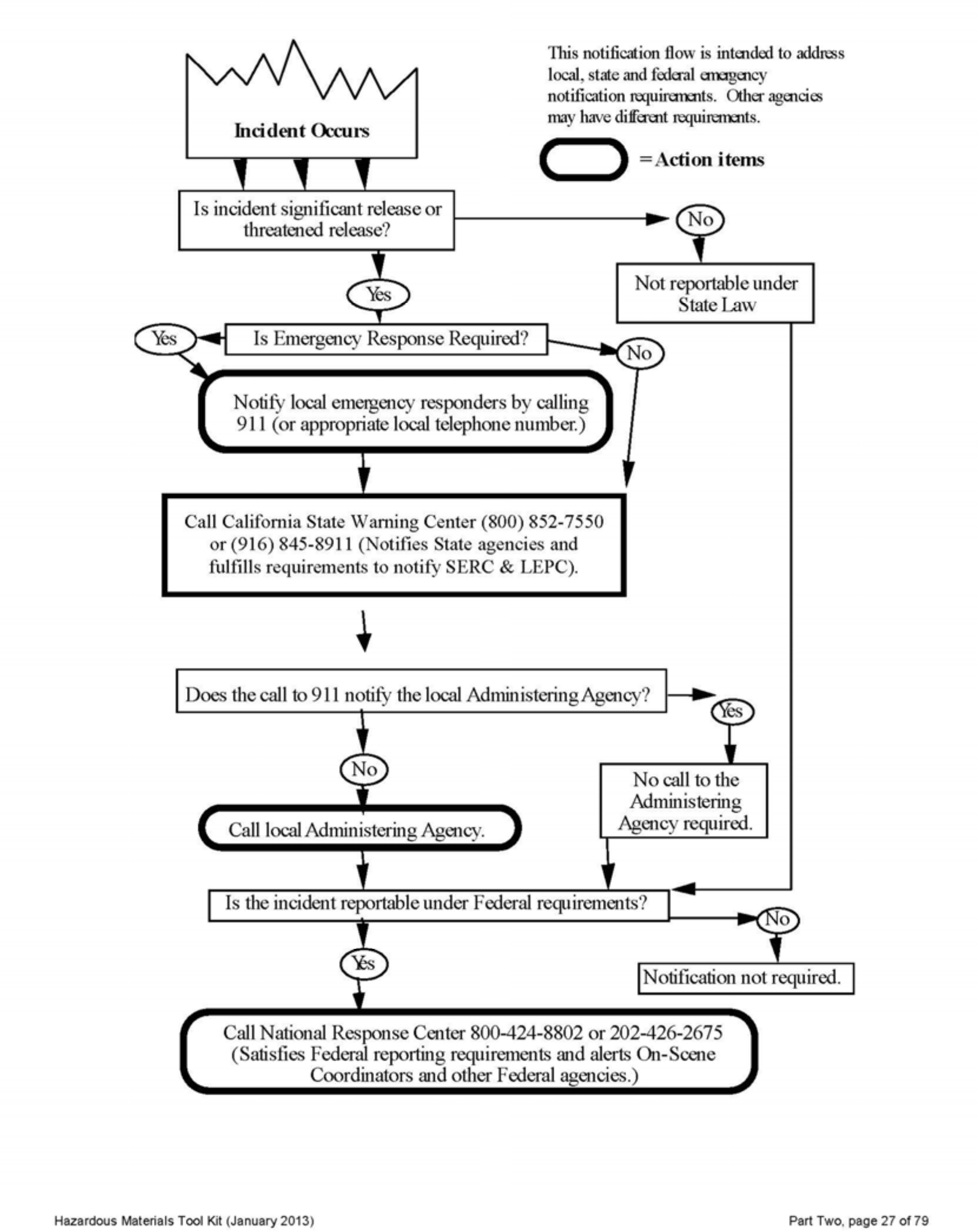
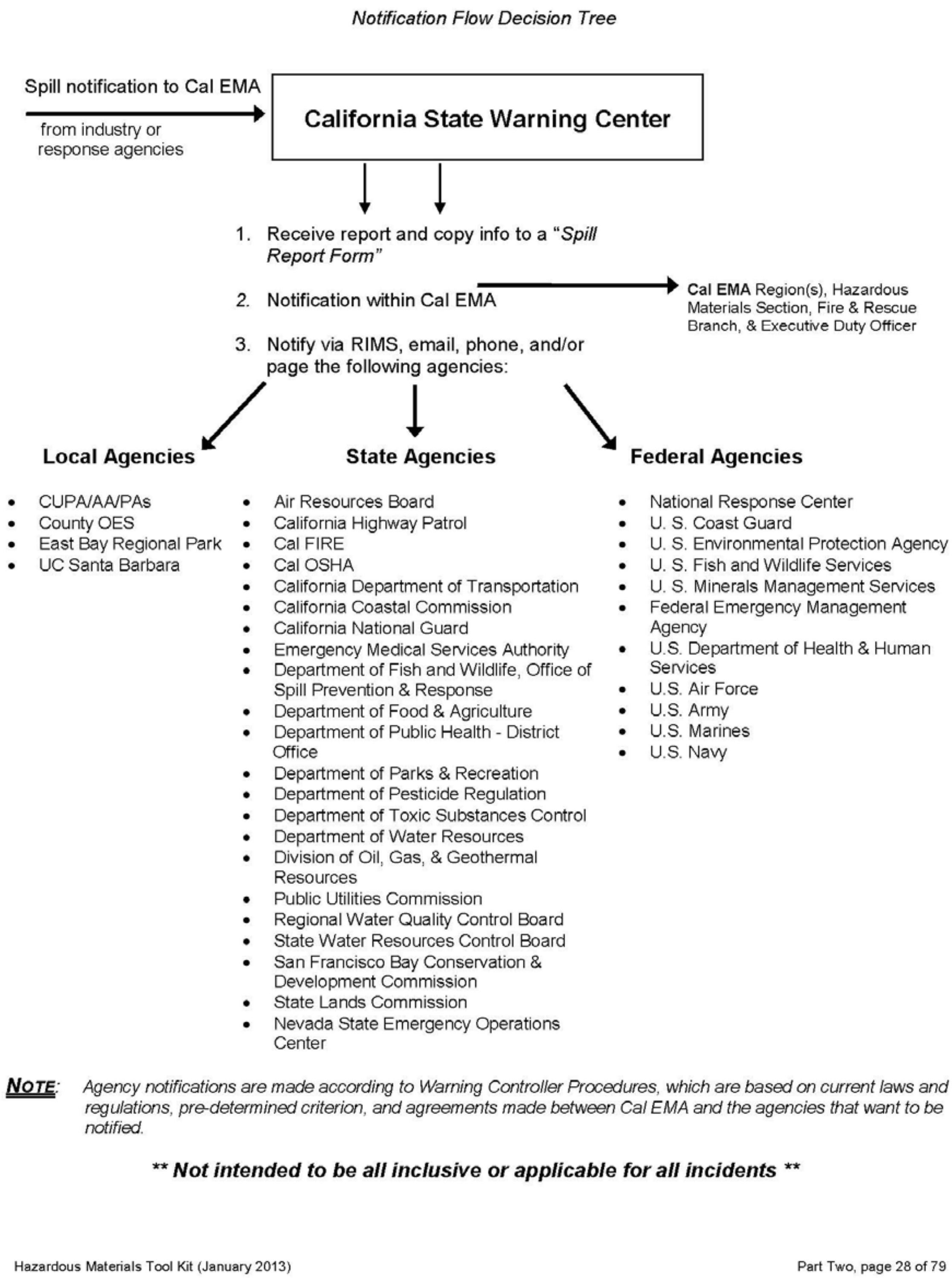


Figure 4-17. Cal OES State Warning Center Notification Flow Decision Tree



Notification Flow Decision Tree

Spill notification to Cal EMA

from industry or response agencies

California State Warning Center

1. Receive report and copy info to a "*Spill Report Form*"
2. Notification within Cal EMA → **Cal EMA** Region(s), Hazardous Materials Section, Fire & Rescue Branch, & Executive Duty Officer
3. Notify via RIMS, email, phone, and/or page the following agencies:

Local Agencies

- CUPA/AA/PAs
- County OES
- East Bay Regional Park
- UC Santa Barbara

State Agencies

- Air Resources Board
- California Highway Patrol
- Cal FIRE
- Cal OSHA
- California Department of Transportation
- California Coastal Commission
- California National Guard
- Emergency Medical Services Authority
- Department of Fish and Wildlife, Office of Spill Prevention & Response
- Department of Food & Agriculture
- Department of Public Health - District Office
- Department of Parks & Recreation
- Department of Pesticide Regulation
- Department of Toxic Substances Control
- Department of Water Resources
- Division of Oil, Gas, & Geothermal Resources
- Public Utilities Commission
- Regional Water Quality Control Board
- State Water Resources Control Board
- San Francisco Bay Conservation & Development Commission
- State Lands Commission
- Nevada State Emergency Operations Center

Federal Agencies

- National Response Center
- U. S. Coast Guard
- U. S. Environmental Protection Agency
- U. S. Fish and Wildlife Services
- U. S. Minerals Management Services
- Federal Emergency Management Agency
- U.S. Department of Health & Human Services
- U.S. Air Force
- U.S. Army
- U.S. Marines
- U.S. Navy

NOTE: *Agency notifications are made according to Warning Controller Procedures, which are based on current laws and regulations, pre-determined criterion, and agreements made between Cal EMA and the agencies that want to be notified.*

***** Not intended to be all inclusive or applicable for all incidents *****

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State Board/Regional Board

There are three main functions for the Regional Board in spill events as follows.

Notification Requirements for Cal OES Notification to the State Board/Regional Board: Immediate verbal notification is required by the Cal OES State Warning Center to the Regional Board of all hazardous materials spills that enter or threaten to enter in, or on, any waters of the state.

Follow-up Reports: A Damage Assessment Report or Remedial Action Plan may be required of the responsible party. The responsible party will also report accumulated petroleum and heavy metal concentrations in drainage systems to the Cal OES State Warning Center via written follow-up reports.

Capabilities and Limitations: Support functions include the following:
- Conduct water sampling, analysis, and monitoring activities to assist in hazardous materials release evaluation and mitigation.
- In cooperation with DTSC, designate sites for disposal of hazardous materials.
- Assist DDW in advising water users of potential adverse impacts of a spill.

State Board, Division of Drinking Water

DDW has statutory responsibility for the regulation of public water systems to ensure that drinking water is safe, wholesome, and potable. In the event of a hazardous materials spill or threatened release which affects a public water system or source of drinking water such as a lake, river, or aqueduct, the State Board is notified of the impact to the source. Generally, Cal OES makes this determination if Section 2.k. "Drinking Water Impacted" is reported as "Yes" by the notifying entity on the Hazardous Materials Spill Report. (Often, this is reported as "Unknown".) The State Board would then notify the Regional DDW Duty Officer of the spill. The Regional DDW Duty Officer then notifies the DDW District Engineer for the impacted source. The District Engineers have call down lists to assist with notifying DDW staff engineers and water utilities. District Engineers will work with the water utility to prevent contamination of the water system. The District Engineers will also issue recommendations to the public in coordination with the utility and local health department to prevent use of contaminated water.

Notification Requirements for Cal OES Notification to DDW: Immediate verbal notification is required for radioactive material incidents; releases involving a public water system or drinking water source; releases affecting a food, drug, medical device, cosmetic, or bottled water manufacturer or wholesaler; or significant releases affecting a large population or involving deaths, serious injuries, evacuations or in-place sheltering.

Response Information Management System (RIMS)

Cal OES developed the RIMS as part of the development of the State's Standardized Emergency Management System (SEMS). This was developed in response to the US Department of Homeland Security's National Incident Management System (NIMS). NIMS was developed so responders from different jurisdictions and disciplines can work together better to respond to natural disasters and emergencies, including acts of terrorism. NIMS benefits include:

- Unified approach to incident management;
- Standard command and management structures; and
- Emphasis on preparedness, mutual aid, and resource management.

The purpose of RIMS is to provide a single point for tracking the status and progress of hazardous materials spills statewide; this is the Spill/Release Reporting notification website. Only registered users can input data into the website, but anyone can access the website to review current or archived Cal OES cases. The current cases can be accessed at:

http://w3.calema.ca.gov/operational/malhaz.nsf/$defaultview

California Department of Fish and Wildlife (DFW)

DFW's Office of Spill Prevention and Response (OSPR) is the state's lead for response to oil spills in its inland and marine waters. In 2014, Governor Brown expanded the OSPR program to cover all state surface waters, including inland waters, at risk of oil spills from any source, including pipelines, production facilities, and the increasing shipments of oil transported by railroads. Senate Bill 861 authorized the expansion and provided the additional statutory and regulatory authority, for the prevention, preparedness and response activities in the new inland areas of responsibility.

Geographic Response Plans (GRPs) are being developed by OSPR for inland waters in conjunction with other federal, state, and local government, industry and other partners for priority inland waters of the state with higher risk of an oil spill. GRP's will be driven by access to sites along river systems and lakes where response activities are feasible. The GRPs include response strategies, response methods, and shoreline countermeasures to be used to rapidly and efficiently address actual and threatened oil spill releases. The intention is that GRPs will be vetted through the regional Local Emergency Planning Committees (LEPCs) comprised of industry representatives, federal, State, and local government agencies, public health agencies, tribal representatives and other stakeholders, and may utilize local subcommittees to the LEPCs to provide further input and review of the GRPs. OSPR staff have communicated with water utilities to ensure that they are aware of intake locations and have direct means of communication in the event of a spill impact the source water.

A GRP has been prepared for the North Fork of the American River (February 2020) and for the Upper Sacramento River (March 2020). OSPR is currently preparing one for the Lower Sacramento River and then will also do one for the Lower American River and plans to include information on the participating water agencies' intakes.

Water Quality Issues and Data Review

A review of the available water quality data, as presented in **Sections 3** and **5** showed that detections of organic constituents in ambient samples did not coincide with the watershed spills in the RIMS website. Also, none of the water treatment plants had detects of organic constituents. A separate discussion was presented in the Wastewater section previously for the wastewater related spill events.

Sacramento River Source Water Protection Program Activities

Because the potential for spills exists, the cities of West Sacramento and Sacramento, SCWA, and EBMUD have established their own voluntary spill notification program consisting of direct notification and inter-notification agreements, internal procedures for routing of spill information, and internal response procedures. WCDWA joined the program in 2015. The City of Sacramento, SCWA, and EBMUD also conduct a voluntary spill notification program for the Lower American River, along with Carmichael Water District.

Establishing direct notification agreements with upstream CUPAs and various other emergency response agencies provide additional opportunity for the water treatment plants to receive timely notification in the event of a spill upstream of their intakes. These notification agreements are voluntary and extend upstream on the Sacramento River to Colusa and Sutter Counties and include all CUPAs on the American River system, except El Dorado County Environmental Management Department. This program also includes voluntary direct notification agreements with other upstream facilities that are potential responsible parties for a spill incident such as wastewater treatment plants and wastewater collection systems with facilities along the river system. State and Sacramento County parks and recreation departments and water related agencies with field staff who may observe contamination from hazardous spills have also agreed to provide notification.

The Lower American River and Sacramento River Voluntary Spill Notification programs conduct an annual review of their program. This includes; updating contacts for all of the emergency response, wastewater, and other notifying agencies on the Emergency Notification Charts, dry runs, and a table top exercise for the Lower American River and Sacramento River water utilities. They also coordinate with the American River Water Utilities Voluntary Spill notification program. As part of the agreements with Placer County Office of Emergency Services, Sacramento City Fire and Police Departments, Sacramento Regional Fire/EMS Communications Center Dispatch, and Caltrans, maps were developed to assist those agencies in determining if a spill was located in the areas of concern for the participating water utilities.

The City of Sacramento has created a River Travel Time tool to assist in roughly estimating travel times for spills on the Lower American River and Sacramento River. The tool materials can also be used to estimate concentrations and provide resources for response. Outreach was conducted to the National Oceanic and Atmospheric Administration to obtain a better understanding of available travel time models for the Sacramento Valley.

In addition, the City of Sacramento has developed numerous documents and tools for its water treatment plant operators to assist in locating spills, waterways, and wastewater treatment plants, as well as responding to spill events. This included a potential contaminating activity table and associated map for the near-intake protection zones, updated table and map of wastewater dischargers in the Sacramento Valley, and a written summary for water treatment plant operators to locate a wastewater spill or SSO in the watershed. The City of Sacramento shares various information with other Sacramento and American River water utilities.

SPECIAL TOPICS

Population Growth

Growth trends were examined in order to identify the potential long-term impacts of growth on the related potential contaminant sources being investigated. The estimated total population of the counties in the Sacramento River watershed was over 3.26 million in 2019, up four percent over the study period. Much of the growth has occurred as extensions of existing urban areas.

The total population of the counties in the Sacramento River watershed for 2009, 2014, and 2019 is shown in **Table 4-41.** Overall, there was a four percent increase in population in the past five years (2014 – 2019), which was a higher growth rate than the previous five year period (2009 – 2014). The greatest decreases were seen in the mountain counties: Lassen, Modoc, Plumas, Shasta, Sierra, and Siskiyou. These counties are furthest from the intakes and above the major reservoirs. The greatest increases were seen in Placer and Sacramento counties. These counties are closest to the intakes.

Table 4-41
Population Change in Watershed Counties[1]

County	Jan-09	Jan-14	Jan-19	Five Year Change	Ten Year Change
Butte	220,748	223,606	226,466	1%	3%
Colusa	21,997	21,759	22,117	2%	1%
El Dorado	180,185	182,419	191,848	5%	6%
Glenn	29,239	28,465	29,132	2%	0%
Lassen	35,550	32,036	30,150	-6%	-15%
Modoc	9,698	9,623	9,602	0%	-1%
Nevada	98,718	98,077	98,904	1%	0%
Placer	339,577	368,141	396,691	8%	17%
Plumas	20,632	19,889	19,779	-1%	-4%
Sacramento	1,433,187	1,468,877	1,546,174	5%	8%
Shasta	183,023	179,253	178,773	0%	-2%
Sierra	3,358	3,209	3,213	0%	-4%
Siskiyou	45,973	44,819	44,584	-1%	-3%
Sutter	96,554	96,029	97,490	2%	1%
Tehama	62,836	63,738	64,387	1%	2%
Yolo	200,709	209,183	222,581	6%	11%
Yuba	72,900	73,868	77,916	5%	7%
TOTAL	**3,054,884**	**3,122,991**	**3,259,807**	**4%**	**7%**

[1] Based on data from the California Department of Finance

Table 4-42 provides information on population projections by the Department of Finance through 2060. The population of the counties within the watershed is projected to increase approximately 26 percent, to nearly 4.14 million, during the next 40 years. These projections have been revised down from the projections in the 2015 Update. The trends for population change are the same as above, with decreases in mountain counties and increases in Valley counties in closer proximity to the participating water agencies' intakes.

This increasing human population in the watershed will likely mean an increasing urbanization of the watershed as well as the potential for new industrial discharges. The change in land use may be significant in terms of the potential contaminating activities and resultant impact on source water quality. It is uncertain as to whether this shift will result in quantifiable changes in source water quality. Most of the potential contaminating activities in the watershed are regulated now, so that should minimize the impact of growth. As development occurs in the middle and upper watershed it will be important for upstream communities to implement measures to protect water quality, such as those identified in the Phase II MS4 permits like source controls, encouraging low impact development, and potentially implementing hydromodification management.

Table 4-42
Population Projections for the Watershed Through 2060

County	2020	2030	2040	2050	2060	Net Change
Butte	217,769	239,784	260,890	284,915	317,729	46%
Colusa	22,593	23,671	24,598	24,854	24,798	10%
El Dorado	193,098	207,496	213,033	210,986	214,614	11%
Glenn	29,348	30,476	30,795	30,717	31,101	6%
Lassen	30,065	29,422	27,379	25,264	23,549	-22%
Modoc	9,475	9,335	9,004	8,659	8,591	-9%
Nevada	98,710	99,505	97,057	93,113	92,757	-6%
Placer	400,434	456,935	511,683	556,006	604,522	51%
Plumas	18,997	18,600	17,397	16,558	16,639	-12%
Sacramento	1,567,975	1,697,555	1,799,258	1,876,422	1,939,608	24%
Shasta	177,925	180,103	182,059	184,670	191,472	8%
Sierra	3,115	3,009	2,829	2,692	2,711	-13%
Siskiyou	43,956	42,924	41,290	39,814	39,447	-10%
Sutter	105,747	121,376	133,610	143,827	157,991	49%
Tehama	65,885	68,681	70,558	71,673	74,474	13%
Yolo	223,612	237,591	253,965	268,394	278,952	25%
Yuba	79,290	89,339	99,755	109,850	122,028	54%
Watershed	**3,287,994**	**3,555,802**	**3,775,160**	**3,948,414**	**4,140,983**	**26%**

[1] Based on data from the California Department of Finance

Central Valley Regional Water Quality Control Board Policies and Programs

There are three Regional Board policies or programs that are currently of key interest to drinking water utilities: the Drinking Water Policy for Surface Waters of the Delta and Its Upstream Tributaries, the MUN Beneficial Use De-Designation Programs, and CV-SALTS. Each of these has the opportunity to affect the management of receiving waters in the Central Valley, which could then result in impacts to source water quality. Some of the participating water agencies have been acting as stakeholders in the development of these policies or programs to ensure the long-term protection of the MUN Beneficial Use.

Drinking Water Policy for Surface Waters of the Delta and Its Upstream Tributaries

The Regional Board has adopted the Basin Plan Amendment to Establish a Drinking Water Policy for Surface Waters of the Delta and Its Upstream Tributaries (Drinking Water Policy). This policy was developed as required by the CALFED ROD for the Programmatic Environmental Impact Report/Environmental Impact Statement (EIR/EIS). Many constituents that threaten drinking water supplies are addressed in the Basin Plans, so this policy focused on high priority constituents that were not addressed: salt (including bromide), nutrients, organic carbon, and pathogens such as *Cryptosporidium* and *Giardia*. In 2010, the Regional Board directed staff to focus the policy on organic carbon, *Cryptosporidium,* and *Giardia* as the other constituents were being addressed in other programs.

The Drinking Water Policy addresses organic carbon by modifying the Basin Plan to clarify the existing water quality objective for chemical constituents with a footnote stating that the existing objective applies to drinking water chemical constituents, such as organic carbon. During the course of work to develop the policy, source control evaluations were conducted based on 2011 permit conditions for publicly owned treatment works, urban runoff, and irrigated agriculture. These indicated that concentrations of organic carbon at public water system intakes are not projected to increase through the 2030 planning horizon.

The Drinking Water Policy addresses pathogens by establishing a new narrative water quality objective for *Cryptosporidium* and *Giardia* to protect the public water system component of the MUN beneficial use. This narrative water quality objective for *Cryptosporidium* and *Giardia* is only applied within the Sacramento-San Joaquin Delta and its tributaries below the first major dams. Compliance with this objective will be assessed at existing and new public water system intakes.

The Drinking Water Policy requires an Implementation Program for the proposed narrative water quality objective for *Cryptosporidium* and *Giardia* that describes the actions that the Regional Board will take to maintain existing water quality if trigger values for *Cryptosporidium* are exceeded at water treatment plant intakes and the impacted water agency requests Regional Board action. **Table 4-43** shows the 2013 Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) bin classifications and the 80 percent trigger levels.

Table 4-43
***Cryptosporidium* Ambient Trigger Exceedence**

Bin	Maximum Running Annual Average (oocysts/L)	80 Percent Trigger (oocysts/L)
1	< 0.075	0.06
2	0.075 to < 1.0	0.80
3	1.0 to < 3.0	2.40

If *Cryptosporidium* monitoring data from an existing public water system intake indicate that the maximum running annual average (MRAA) has reached 80 percent of the next highest bin, as existed in 2013, the affected public water system may request that the Regional Board initiate an investigation. If the affected public water system requests assistance, the Regional Board should coordinate with DDW, the affected public water system, and potential sources to assess the data and evaluate the need to conduct source evaluations and implement control options.

As discussed in **Section 3**, the Regional Board conducted protozoa monitoring as part of the Delta RMP Pathogen Study in April 2015 through May 2017. This included two sites in the Sacramento River watershed upstream of the FRWA Intake diversion. No *Cryptosporidium* was detected at either site. *Giardia* was detected at high levels in the

Colusa Basin Ag Drain (MRAA of 0.42 cysts per liter) and at lows levels in the Sacramento River near the Westin Boat Dock (MRAA of 0.025 cysts per liter).

MUN Beneficial Use De-Designation Programs

The State Board Sources of Drinking Water Policy (Resolution No. 88-63) designates the MUN beneficial use to all water bodies unless they are specifically listed in the Basin Plan as water bodies that are not designated with MUN. Beneficial uses are designated by the State and Regional Boards to receiving waters to protect the use of the waterbody for that purpose. The MUN use is defined as; "*Uses of water for community, military, or individual water supply systems, including, but not limited to, drinking water supply.*" The State Board defines the principal issues for municipal water quality as protection of public health, the aesthetic acceptability of water, and economic impacts of treatment and quality[14].

The Policy does contain exceptions to remove the MUN designation, including;

- Sources with high total dissolved solids, untreatable contamination, or low yield,
- Surface waters designed or modified to collect or treat municipal or industrial wastewaters, process waters, mining wastewaters, or stormwater runoff, and
- Surface waters designed or modified for the primary purpose of conveying or holding agricultural drainage waters.

The second two exceptions also require "…that the discharge from such systems is monitored to assure compliance with all relevant water quality objectives as required by the Regional Boards". In order to utilize the exception the Basin Plans require ". . . a formal Basin Plan amendment and public hearing, followed by approval of such an amendment by the State Board and the Office of Administrative Law." There had been no use of these exceptions in the Sacramento River watershed upstream of the FRWA Intake diversion. The Basin Plans state that waters designated for MUN Beneficial Use must not exceed the Title 22 MCLs for all primary and secondary standards.

Four WWTPs in the Sacramento Valley, which discharge to agricultural drains, were having difficulty in meeting NPDES permits with limits for the MUN beneficial use so the Regional Board determined to use the third exception to de-designate the MUN beneficial use from the effluent receiving waters. The Regional Board adopted Order No. R5-2015-0022, which was subsequently approved by the State Board, OAL, and USEPA and became effective, to amend the Basin Plan to remove the MUN designation from 12 waterbodies associated with the four WWTPs discharges. The Order de-designated MUN beneficial use but did not include any new monitoring requirements, rather it relies on existing programs to assess downstream impacts. The SRSWPP assessed the quality and quantity of the four WWTPs discharges included in the Order determined that there was a low likelihood of a significant impact to source water quality of the Sacramento River; however, the SRSWPP provided significant comment to the

[14] http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/planningtmdls/basinplan/web/bp_ch2.shtml

Regional Board on a variety of concerns on the Order because of the Regional Board's plan to use the approach as a template for a region-wide MUN de-designation process.

The Regional Board adopted Order No. R5-2017-0088 in August 2017 to amend the Basin Plan to establish a region-wide MUN beneficial use evaluation process in agriculturally dominated surface water bodies. The intent of the Order is to remove the MUN beneficial use designation from as many as 6,000 waterbodies in the Central Valley, as well as the application of associated water quality objectives. The order was never approved by the State Board and no action has been taken. Currently, the Regional Board intends to reinitiate the process and create a new Basin Plan Amendment with a modified approach. This is expected to be initiated in late 2020 or early 2021.

The Order established three items:

- A region-wide process for evaluating the appropriate MUN beneficial use designations and associated water quality objectives in Ag dominated surface water bodies;
- Implementation and monitoring requirements when the MUN beneficial use is de-designated or refined in Ag dominated surface water bodies; and
- A Limited-MUN (LMUN) beneficial use that would apply to Ag dominated water bodies that have inherent limiting conditions such as low or intermittent flows and/or elevated natural background constituent concentrations.

The Order added a standardized region-wide process to the Basin Plans to guide the Regional Board's evaluation of appropriate MUN beneficial use designations and associated water quality objectives in agriculturally dominated surface water bodies, and set implementation provisions related to this process. The Order included a water body categorization approach, which uses a flowchart, to distinguish between those water bodies that have been constructed or modified for the primary purpose of conveying Ag drainage (C1,M1), those water bodies that have been constructed or modified to convey Ag supply water (C2, M2), natural water bodies dominated by agricultural operations (B1, B2), and those water bodies encompassed in a permanent or seasonally closed controlled recirculating basin. The Order utilized, where appropriate, the Sources of Drinking Water Policy Exception 2b to de-designate the MUN beneficial use. Agricultural drainage was defined as water leaving an agricultural field either from irrigation practices or precipitation.

The Order also established a "Limited Municipal and Domestic Supply" (LMUN) beneficial use and associated narrative water quality objective for agriculturally dominated water bodies that do not meet the Sources of Drinking Water Policy exceptions, but that have inherent limiting conditions, such as low or intermittent flows and/or elevated natural background constituent concentrations.

- Limited Municipal and Domestic Supply (LMUN) Beneficial Use Definition – Uses of water for municipal and domestic supply in agriculturally dominated water bodies where the use is limited by water body characteristics such as intermittent flow, management to maintain intended agricultural use and/or constituent concentrations in the water body.

- Limited Municipal and Domestic Supply (LMUN) Water Quality Objectives - Water quality and downstream beneficial uses will be protected consistent with the state antidegradation policy.

Central Valley Salinity Alternatives for Long-Term Sustainability

The purpose of the CV-SALTS program is to develop a Central Valley Wide Salt and Nitrate Management Plan to incorporate into the Basin Plan. The constituents of primary concern in the program include salts and nutrients, which are not currently of priority concern for surface water diverted from the Sacramento River for the participating water agencies. However, as part of developing salt and nitrate management efforts the Regional Board decided to consider evaluation of the applicability of the secondary drinking water standards to discharges as part of the Basin Plan. Since salt and nitrate are not constituents of primary concern for the participating water agencies', this discussion focuses on the revisions to the Basin Plan related to non-salinity secondary MCLs.

The Regional Board adopted Order No. R5-2018-0034 in May 2018, which included a Salt and Nitrate Management Plan and other modifications to the Basin Plan related to the CV-SALTS effort. This was conditionally approved by the State Board in October 2019 and approved by OAL in January 2020. The portions of the Order related to surface water, specifically those items related to the secondary MCLs, must be approved by the USEPA before they can be implemented. The USEPA has not yet approved the Order. Once approval is received, then the surface water components will be effective.

The significant Basin Plan revisions related to non-salinity secondary MCLs include:

- Addition of text to indicate that application of secondary MCLs as water quality objectives without filtration may not be appropriate.
- Allow compliance with secondary MCL water quality objectives based on an annual average result.
- Addition of new guidance on how to apply the secondary MCL water quality objectives -
    - This allows pre-filtering samples with a 1.5 micron pore filter prior to analysis for total metals analysis (aluminum, copper, iron, manganese, silver, and zinc) as well as color and turbidity.
    - The pre-filter is intended to approximate the level of treatment provided to drinking water. There was no scientific support for this pore size so the Regional Board allows for revision in the future if evidence is presented that supports another filter size (pending public review and DDW approval).

Potential Future Central Valley Water System Operational Modifications

There are a number of projects and activities that could affect water system operations in the Central Valley. These are of interest because the water system operations results in direct impacts to source water quality in the Sacramento River. Some of the participating water agencies have been tracking these topics and prepared periodic updates on their status and potential for input.

For example, climate change directly affects the storage volume of a reservoir, and changes are underway to reoperate reservoirs as a way to adapt to the changing climate. The planning for a new off-site reservoir and expansion of current reservoirs are other ways in which water agencies are preparing for climate change. Other external factors that may affect water system operations are regulatory requirements in the Delta that could translate to operational changes upstream. This section examines the following issues and their impact to reservoir storage and operations:

- Loss of Seasonal Storage
- Reoperational Strategies
- Folsom Dam Water Control Manual
- Folsom Dam Raise Project
- Bay Delta Plan Update
- Sites Reservoir

In general, reoperational strategies for the Central Valley water system, Folsom Dam Water Control Manual, Folsom Dam Raise, and Sites Reservoir will provide more reservoir storage for American and Sacramento River water users. Climate change will negatively impact water users and the upcoming flow requirements for the Sacramento River (Bay Delta Plan Update) could negatively impact water users. All of these have the potential to impact source water quality, depending on how they are implemented.

Loss of Seasonal Storage

Recent studies conducted for California's Fourth Climate Change Assessment and for the California Department of Water Resources (DWR) 2019 Climate Change Vulnerability Study have modeled climate change impacts on reservoir storage. California's Fourth Climate Change Assessment estimated that under current management practices, Shasta and Oroville will have roughly one-third less water by the end of century. A research project conducted for the Fourth Assessment concluded that the North of Delta (NOD) reservoirs (Shasta, Trinity, Oroville, and Folsom) will have less storage than current by 2050. (The percent storage decrease depends on the percent change in air temperature and the percent change in precipitation). For example, if there were 2°C of warming but no change in precipitation, there would be a 20 percent decrease in NOD carryover (end of September) storage and a 5 percent decrease in NOD April storage. Carryover storage is impacted more than April storage. Within the 95 percent confidence level, NOD carryover storage ranges from -55 percent to +5 percent by 2050.

Reoperational Strategies

DWR has conducted various feasibility studies to identify potential options for reoperation of the state's flood protection and water supply systems that will optimize the use of existing facilities and groundwater storage capacity. The studies incorporated appropriate climate change scenarios and conditions. The three phases for the preliminary planning were:

- Phase 1 – Plan of Study (Completed 2011)
- Phase 2 – Strategies Formulation and Refinement (Completed 2014)
- Phase 3 – Assessment of Reoperation Strategies (Completed August 2017)

However, the overall conclusions from the Phase 3 Study were:

- Reoperating Oroville, Shasta, and McClure individually would have limited benefits, mainly because the reservoirs already are significantly optimized to meet existing flood and regulatory requirements and contractual commitments.
- Even combining the reoperation of Lake Shasta and Lake Oroville together (strategy 6) only increased Folsom Lake average annual end of September storage by three percent.
- Operating the State Water Project and Central Valley Project as a single project would provide incremental water supply reliability and ecosystem restoration benefits; combined average annual water deliveries could increase by 100 to 150 thousand acre-feet.
- Reoperation benefits were evaluated under existing and new Delta conveyance, and under current and projected future climatic conditions. Projected benefits of reoperation under these scenarios were similar.

There were four main recommendations for future work in the Phase 3 report which were: 1) Evaluate potential for using flood water for managed groundwater recharge on farmland and working landscapes for flood protection, drought preparedness, aquifer remediation, and ecosystem restoration, 2) Evaluate existing flood operating rules of the reservoirs under changing hydrology, 3) Assess feasibility of existing reservoir spillways and outlets to pass floodwater safely with changing hydrology (i.e. Oroville Dam), and 4) Identify system reoperation implementation challenges and opportunities.

For the first recommendation, DWR completed a preliminary study on the Merced River and New Exchequer Dam to determine the potential to capture high flow events for groundwater recharge. Merced Irrigation District's (MID) Main Canal and other existing infrastructure provide an opportunity to divert flood flows off the Merced River to agricultural land within MID's boundaries. Initial estimates indicate as much as 25,000 acres of land within MID's boundaries are suitable for groundwater recharge. Additionally, the Merced River Flood-MAR study includes scenarios of reoperating Lake McClure which includes modifications of flood control curves. The Merced River Flood-MAR study is ongoing and will likely be completed in the spring of 2021.

For recommendations 2 through 4, DWR is working with Yuba Water Agency, UC San Diego, Scripps Institute of Oceanography, and the Center for Western Weather and Water Extremes to assess the potential of forecast-informed reservoir operations (FIRO) for new Bullards Bar Reservoir and Lake Oroville. FIRO researches opportunities to improve reservoir operations and reduce flood risks by improving weather and runoff forecasts. In December 2019, researchers launched the first trial radiosonde from Marysville, which was lifted 80,000 feet into the atmosphere by a weather balloon to measure air temperature, pressure, moisture, wind direction and speed. All of these parameters will assist in predicting atmospheric rivers. On the ground, six monitoring stations to measure hydrological data and soil moisture sensors (to understand the relationship between ground saturation and runoff) will be installed in the Yuba-Feather watershed. From this research, Yuba Water Agency and DWR plan to work with the United States Army Corps of Engineers (USACE) to develop new adaptive operational procedures for managing flood flows. **Figure 4-18** shows a timeline for the project. Additionally, Yuba Water Agency is planning to construct a new high-capacity, low-level outlet (secondary spillway) to allow larger releases of water in the early stages of a storm event.

Figure 4-18. FIRO Project for New Bullards Bar Reservoir and Lake Oroville

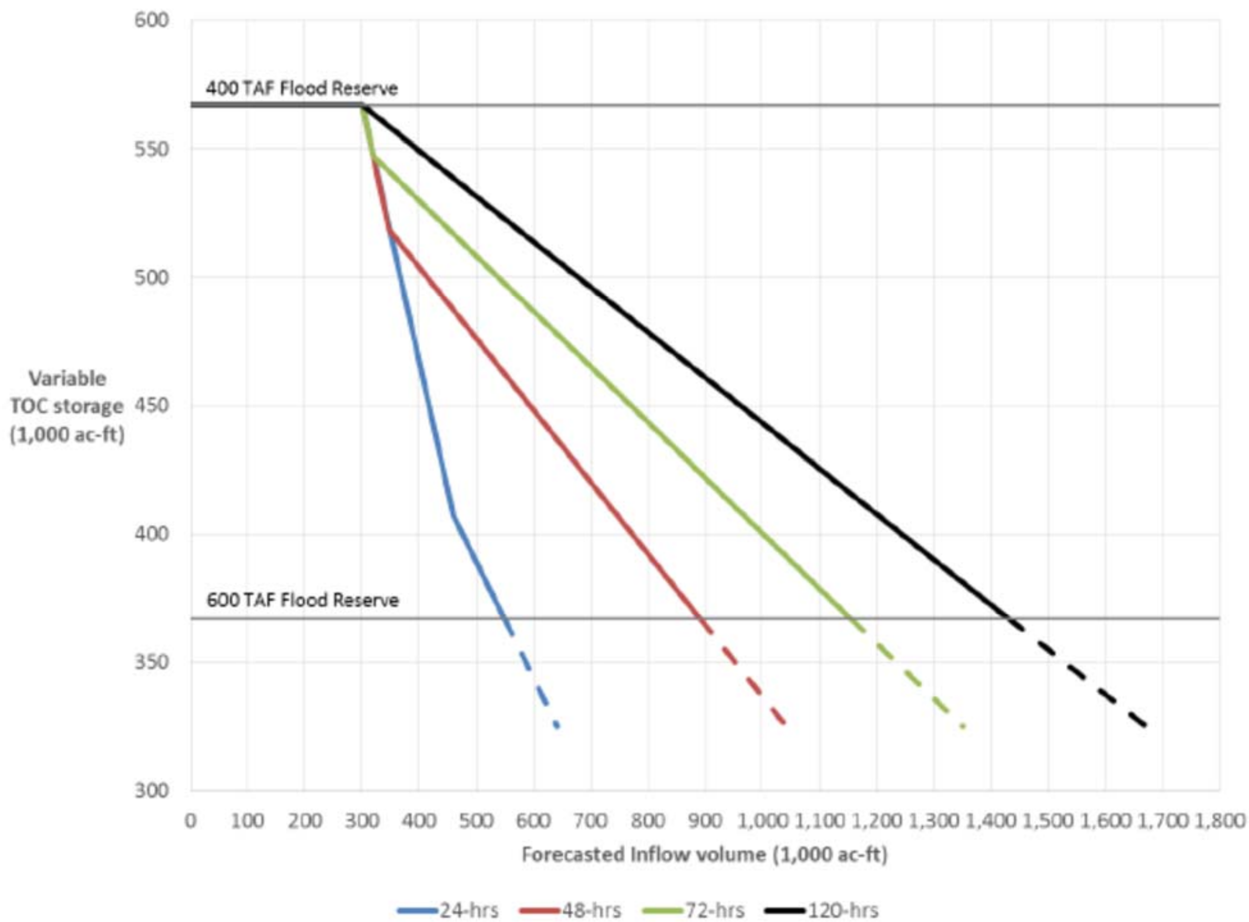
It is likely that DWR will continue to expand their efforts on reoperational strategies for reservoirs, especially as the January 2020 Draft Water Resilience Portfolio has action item 27.3 “In cooperation with the USACE and reservoir owners, evaluate the potential for implementing forecast-informed reservoir operations in coastal and inland watersheds where improved weather forecasting capabilities would allow reservoir operators to improve flood control and water supply storage.”

Folsom Dam Water Control Manual

The Folsom Dam Water Control Manual was signed on June 12, 2019. With the new manual in place, the US Bureau of Reclamation (USBR) officially has the operational flexibility to increase water storage in the spring and to reduce downstream flood risk by using the latest forecasting technology. With the auxiliary spillway 50 feet lower in elevation, this makes large flood releases possible since operators do not need to wait until the water rises high enough to reach Folsom Dam’s main gates.

With forecast informed operations, the amount of space needed to be reserved for flood conservation storage is based on inflow forecasts issued by the California-Nevada River Forecast Center (CNRFC). The CNRFC operates a precipitation runoff model of the watershed upstream of Folsom Lake. (The model is updated with observed data including measured precipitation, current storage levels at headwater reservoirs, and current inflow into the lake.) Every six hours, the operators at Folsom will receive four forecast volumes for the 24 hour, 48 hour, 72 hour, and 120 hours durations. Once received, the forecast volume is located on the x-axis and the corresponding Top of Conservation (ToC) is located on the y-axis on **Figure 4-19**. This exercise is completed for each of the four forecast volumes, and the lowest ToC is adopted as the ToC. If the reservoir is above the ToC, the required release is computed. The intended effect of this approach is to initiate releases greater than inflow in advance of the main storm event.

Figure 4-19. Forecast-Based Drawdown Relationships for Folsom Lake



The benefit to Folsom users is that the storage is allowed to be at the highest level permitted by the Water Control Diagram (or lowest flood reserve), avoiding unnecessary releases downstream. By storing more water in November through April, this implies better availability of water to meet summer water delivery obligations and higher Folsom Reservoir releases through the summer.

Folsom Dam Raise Project

The Folsom Dam Raise Project involves raising the eight earthen dikes located around Folsom Lake (such as Granite Bay and Beals Point) by adding rock and soil to the earthen dikes. This will add more protection during high wind and wave events. The main concrete portion of the dam is already higher than the earthen dikes. Its height will not need increasing, but the project includes putting new seals on the top row of spill gates to allow the dam to hold more water. The dam will be 3.5 feet taller and will add an additional 43,000 acre-feet of water storage capacity. The project is expected to be completed in 2025 and has an authorized cost of $373 million.

The new lower Folsom Spillway and the added dike height are expected to make the dam stronger as well as more flexible to operate.

Bay Delta Plan Update

The State Board is updating the 2006 Bay-Delta Plan in two phases: the first focusing on San Joaquin River flows and South Delta salinity and the second focused on the Sacramento River and its tributaries. In December 2018, the State Board adopted Plan amendments to update water quality objectives for San Joaquin River flows and South Delta salinity. These Plan amendments established an objective to maintain unimpaired flow of 40 percent, within an adaptive range of 30 to 50 percent, for San Joaquin tributaries from February through June of each year.

The State Board has not yet adopted Plan amendments for the Sacramento River and its tributaries, but issued a Framework in July 2018 which proposed a 55 percent average unimpaired flow, within a range of 45 to 65 percent for the Delta and the Sacramento River and its tributaries.

In November 2019, DWR released a Draft EIR for the long-term operation of the State Water Project (SWP), and the Final EIR was completed in March 2020. This document identifies potential operational changes to protect species and manage the SWP based on real-time conditions in the Delta ecosystem, including additional flows dedicated to the environment. (It is thought that the Draft EIR was primarily needed to address the Incidental Take Permit needed for Endangered Species, but the Draft EIR also provides a path forward to address the proposed 55 percent average unimpaired flow objective).

Background

The Current 2006 Bay-Delta Plan is implemented by a limited subset of water users, on a limited subset of streams, for only parts of the year. Implementation of the current Bay-Delta Plan has failed to protect fish and wildlife that require protection throughout the watershed and throughout the year.

As documented in the State Board's July 2018 Framework, the proposed objective for Delta inflow is: maintain inflows from the Sacramento/Delta tributaries at 55 percent of unimpaired flow, within an allowed adaptive range of 45 to 65 percent of unimpaired flow. Unimpaired flow is the flow that would accumulate in surface waters in response to rainfall and snowmelt and flow downstream if there were no reservoirs or diversions to change the quantity, timing, and magnitude of flows. It differs from natural flow because unimpaired flow is the flow that occurs at a specific location under the current configuration of channels, levees, floodplain, wetlands, deforestation and urbanization.

The proposed starting point for the percent of unimpaired flow is 55 percent, based on a minimum 7-day running average, measured at the confluence of the tributary. An inflow of 55 percent of unimpaired flow is generally the level at which there is marked expected improvements in protection of fish and wildlife. These improvements are greater at 65 percent, however at this level conservation of cold water resources in reservoirs in reservoirs becomes more challenging and water supply costs increase substantially. It is important to note that inflow and cold water habitat protection are intricately linked since releases from reservoirs to meet instream flow requirements early in the year can reduce the volume of cold water remaining to keep temperature requirements later in the year. (For example, flows to aid in smolt migration in the spring can impinge on cold water flows necessary to adult spawning and later for protecting eggs).

The Delta inflow objective is proposed to apply throughout the watershed, including on upstream tributaries, and on all of the Sacramento/Delta tributaries that support or contribute to the protection of anadromous fish species. “All water users throughout the Sacramento/Delta watershed, including diverters upstream of dams and in the Delta, would be subject to the proposed flow, cold water habitat, and Delta outflow requirement for the Sacramento/Delta watershed (with the exception of de minimis diversions)”. Compliance points are proposed to be established at the confluence of tributaries with the Sacramento River; for the Cosumnes, Calaveras, and Mokelumne rivers at the confluence with the Delta; and on the mainstream of the Sacramento River on the confluence with the Delta. Intermediate compliance points could also be established as necessary to ensure that the narrative is met and that necessary flow contributions from various stretches of tributaries and the mainstem Sacramento River are achieved.

The proposed program of implementation will provide two paths: a default path absent a voluntary agreement, or a voluntary path that could be implemented through voluntary agreements. While enhanced flows are the principle means proposed to implement the updated objectives, other non-flow measures are also needed that could be implemented through voluntary agreements including measures to address barriers to fish passage, habitat loss, predation, increased water temperature, contaminants and other conditions. Such voluntary agreements can provide large-scale benefits (like habitat restoration) that will amplify the ecological benefit beyond what the State Board can require through flow and water project operations alone. The majority of water agencies favor the voluntary agreement approach, and voluntary agreements are currently being discussed with the State Board.

Current Efforts

In response to the Incidental Take Permit required for endangered species, DWR released a Draft EIR for the long-term operation of the SWP in November 2019. The preferred alternative includes a “block” of water for summer or fall Delta outflow (to be released from Oroville) and additional spring maintenance flows. There are also a number of non-flow voluntary agreements being proposed, which would augment Delta outflow, particularly in the spring.

The American River water agencies submitted a comment letter on January 6, 2020 to DWR on the Draft EIR. In summary, the letter stated that extensive comments on the Draft EIR’s lack of analyses concerning Folsom Reservoir and the Lower American River would have been provided, but were not, due to the inclusion of the following two aspects in the Draft EIR:

- DWR’s acceptance of measures that the American River agencies, along with the USBR have proposed to protect Folsom Reservoir Storage and the Lower American River’s Chinook salmon and steelhead populations. Specifically, the modeling conducted by DWR in the Draft EIR included operational rules for Folsom Reservoir and recently-issued biological opinions.
- DWR’s indication that it will not seek contribution from the Central Valley Project – and therefore from Folsom Reservoir for increased streamflows that may be needed by an incidental take permit issued under the California Endangered Species Act.

Due to these measures, the update of the Bay-Delta Plan and the associated Incidental Take Permit will not impact Folsom Reservoir operations or storage.

Sites Reservoir

Sites Reservoir will be an off-stream storage facility, located 10 miles west of the town of Maxwell in rural Glenn and Colusa counties. Sites Reservoir does not rely on snow-melt but captures winter runoff from uncontrolled streams below the existing reservoirs in the Sacramento Valley. It is important to note that the reservoir will capture and store storm-related runoff and flood flows in the Sacramento River after all other water rights and regulatory requirements are met; it is uncertain what the quality of the stored water will be and how it will change during storage and prior to release back to the Sacramento River system. Therefore, Sites Reservoir is unique in that it is adapted to address changes in climate, such as earlier timing of runoff and more precipitation falling as rain versus snow. Water would be released in critical and dry years for environmental use and for California communities.

Sites Reservoir will be operated in conjunction with other California reservoirs, and is the only proposed storage facility that will help with statewide operational effectiveness of the State Water Project and the Central Valley Project.

Sites Reservoir will increase Northern California's water storage capacity by up to 15 percent. It will store 500,000 acre-feet annually, on average, or up to 700,000 acre-feet in drier periods. Up to half of the project's annual water supplies (250,000 to 300,000 acre-feet) will be provided for environmental flows, which will help to improve conditions for Delta smelt, help preserve cold-water pools in Lake Shasta later into the summer months to support salmon development, spawning and rearing, and provide habitat for migratory birds and other species.

The Sites Project Authority, a joint powers authority comprised of 11 Sacramento Valley entities, will govern, manage and operate the project. The Sites Project Authority is currently advancing the project's environmental review and permitting, along with preliminary design and operations planning. A Draft EIR was prepared by the Sites Project Authority and the USBR in 2017, with the public comment period ending in January 2018.

In 2018, the project was awarded $816 million in funding from California's Proposition 1 water bond, and secured a $449 million investment from the USDA. At the end of 2019, the federal government also approved around $10 million for the project. Sites Reservoir was also included as an action item in the January 2020 Water Resilience Portfolio, released by the California Natural Resources Agency, California Environmental Protection Agency, and Department of Food and Agriculture.

Outdoor Cannabis Cultivation

Cannabis (also referred to as marijuana) cultivation is a new topic to the watershed sanitary surveys, driven by the increased presence of outdoor cultivation in the watershed and the potential for contribution of solids, fertilizers, and pesticides to source water from this activity. This subsection focuses on outdoor cultivation since it has the highest potential to impact source water quality. Due to the infancy of regulatory programs and the potential expansion of this activity in the watershed, it is likely that this activity could be considered for review again in the next Update.

Regulatory Background

Medical marijuana use was approved in California in 1996 under Proposition 215, which amended Health and Safety Code (HSC), Section 11362.5. The intent of this regulation was to allow individuals to grow small amounts of marijuana for their personal medical use. There was no approval of recreational use or commercial grow. Unfortunately, lack of specificity in the rule led to misuse and confusion and an increase in the illegal cultivation of cannabis.

SB 420 was passed in 2003 to clarify the provisions and intent of Proposition 215 and establish that the California Department of Public Health would issue medical marijuana use identification cards, by adding new HSC Sections 11362.7-11362.83.

ABs 243 and 266 and SB 643 were all passed in October 2015, known collectively as the Medical Marijuana Regulation and Safety Act (MMRSA) to further regulate the process/procedures of medical marijuana cultivation, manufacturing, dispensing, distribution, transportation. This expanded and added new HSC Sections, as well as Water Code Section 13276. MMRSA established the California Bureau of Medical Cannabis Regulation in the Department of Consumer Affairs (to license distributors, dispensaries, and transportation). MMRSA identified the California Department of Food and Agriculture as the licensor of cultivators (through County Agricultural Commissioners). Finally, MMRSA identified the State Board as responsible for developing guidelines for the California Department of Food and Agriculture on the diversion and use of water for cannabis cultivation. Ten grades of cultivator licenses were established in the regulations, based on location (indoor or outdoor), light sensitivity, and grow size. The regulations also required counties to pass ordinances by March 1, 2016 if they wanted to establish local controls over MMRSA items. The two upper watershed counties, Placer and El Dorado, passed ordinances to establish local control.

Assembly Bill 21 was adopted in February 2016 to formalize the cultivation requirements and Senate Bill 837 was adopted in June 2016 to revise all references to “marijuana” to “cannabis” for consistency in the regulations.

In November 2016, California voters approved Proposition 64 that allowed recreational use of cannabis for adults over 21 year of age. Subsequent to the legalization of recreational use of cannabis, California has developed an extensive program of regulation and licensing for the cultivation, manufacturing, distribution, testing, and retail sales of cannabis. This discussion only considers the legal cultivation of cannabis. This includes personal use cultivation and commercial cultivation, which is regulated through the CalCannabis program as discussed below.

It should be noted that substantial illegal cannabis cultivation has been occurring in the watershed for many years, primarily in the upper watershed where there is significant open space and access to water. Illegal cannabis cultivation is not included in any management program, and is addressed by law enforcement. Each watershed county ordinance passed includes the identification of the county code enforcement officer as the primary mechanism to file complaints related to illegal cannabis cultivation. The sheriff departments in all watershed counties will support the code enforcement divisions.

Seasonal Patterns

Outdoor cannabis is cultivated in the watershed similar to other agricultural crops. Cannabis can be grown on either natural soil or in pots of pre-made or commercial soil. To generate optimum quantities of tetrahydrocannabinol (THC)-containing resin, the plant needs fertile soil and long hours of daylight. This means THC production for outdoor growth occurs optimally anywhere within 35° of the equator, which includes much of the Sacramento River watershed.

In the Sacramento River watershed outdoor growers typically plant seeds in mid-April, late May, or early June to provide plants a full four to nine months of growth. Plants require large amounts of water during the growth phase. Harvest is usually between mid-September and early October.

Related Constituents

Potential source water quality impacts caused by growers that engage in activities that can negatively impact receiving waters include: grading, terracing, dam, and road construction, causing erosion and sediment deposition in streams; illegal use of rodenticides, fungicides, herbicides and insecticides; use of soil amendments and fertilizers in situations where run-off to surface waters may occur; discarding of trash and haphazard management of human waste; substandard storage of hazardous materials such as diesel and gasoline; and unauthorized diversion of water from streams.

Pesticides must be approved by USEPA and DPR for use on a specific crop such as cannabis. None are currently approved since there is a federal ban on marijuana use. MMRSA charged the DPR with identifying pesticides for use on cannabis and the associated safe levels on harvested cannabis leaf, but DPR cannot do this since it conflicts with federal statutes. Pesticides registered for use on “unspecified green plants” can be used on cannabis. DPR published a fact sheet on pesticides that can be legally applied to cannabis and it primarily included food grade products, such as essential oils. Home use of pesticides does not require a cultivator license from the California Department of Food and Agriculture, only commercial cultivators require a County Agricultural Commissioner to issue an operator identification (if allowed by local ordinances). Obviously, illicit activities will not have permits either.

Pesticides most frequently found associated with illegal cannabis cultivation are Round Up (glyphosate) and carbofuran.

Presence in the Watershed and Protection Zones

Cannabis cultivation can only legally occur on private lands, it is illegal and prohibited to cultivate on public lands, such as the National Forests. However, USFS and county law enforcement confirm that there are numerous illegal commercial grow operations within the National Forests. Essentially, cannabis cultivation can occur anywhere in the watershed where water and sunlight are available.

Medicinal and adult personal cannabis cultivation can occur in any county in the watershed. Only two counties in the Sacramento River watershed allow commercial cultivation: Nevada and Yolo. It should be noted that the majority of Yolo County is not tributary to the Sacramento River upstream of the FRWA Intake diversion.

Regulation and Management

California

CalCannabis Cultivation Licensing is a division of the California Department of Food and Agriculture, which licenses commercial cannabis cultivation facilities in California. It issues licenses for cultivators for both adult and medicinal permits. It only issues permits in counties where it is legal to commercially cultivate cannabis (Nevada, Yolo, and Trinity). Cultivation licenses can be for either medicinal or adult use, indoor or outdoor cultivation, and can be for facilities that either cultivate, propagate, or process cannabis. CalCannabis works with the State Board and the California Department of Fish and Wildlife in permitting cultivators.

The State Board is responsible for developing requirements for the diversion of water and discharge of waste associated with cannabis cultivation activities. In order to achieve this, they adopted a Cannabis Cultivation Policy in Resolution 2017-0063. The Cannabis Policy established principles and guidelines for cannabis cultivation activities to protect water quality and instream flows. The purpose of the Cannabis Policy is to ensure that the diversion of water and discharge of waste associated with cannabis cultivation does not have a negative impact on water quality, aquatic habitat, riparian habitat, wetlands, and springs. In February 2019 the State Board updated the Cannabis Cultivation Policy by adopting Resolution 2019-0007. The updates were focused on requirements related to tribal buffers, indoor cultivation sites, onstream reservoirs, and winterization requirements.

The Cannabis Cultivation Policy requirements related to discharge of wastes associated with cannabis cultivation are implemented through the State Board Cannabis Cultivation NPDES General Order, adopted by the State Board (Order 2017-0023-DWQ) on October 17, 2017. There were 215 permittees under this Order in the Sacramento River watershed, mostly in Nevada and Sacramento counties. A list is provided in **Appendix D**. When the Cannabis Cultivation Policy was updated, Order 2017-0023-DWQ was terminated and replaced with Order 2019-0001-DWQ. There are 329 permittees under this Order in the Sacramento River watershed, this includes most permittees from the previous order and the majority of the new permittees were in Nevada County. A list is provided in **Appendix D**.

The Order covers all commercial and personal outdoor cultivation. It includes a tiered permitting approach (Tier 1 less than 1 acre and Tier 2 greater than 1 acre), and includes exemptions for small personal and commercial outdoor cultivation (<2,000 square feet [sf]). Orders are risk-based, accounting for size of cultivation, slope of disturbed area, and proximity to a waterbody. The Cannabis Cultivation Policy includes many BMPs and prohibitions on cultivation that are intended to protect water quality.

In addition, the State Board and DFW have identified priority watersheds for inspections. This includes the Yuba River, Butte Creek, Deer Creek, and Dry Creek within the Sacramento River watershed. These are of special environmental concern and are at increased risk of environmental impacts due to cannabis cultivation activities. The State Board has indicated that the priority watersheds will be those with a high concentration of non-compliant cultivators with the potential to cause serious environmental impact.

The Regional Board passed NPDES General Order No. R5-2015-0113 for Waste Discharges Associated with Cannabis Cultivation in 2015, prior to development of the CalCannabis program and State Board Order. There were 42 permittees in this program in the Sacramento River watershed, mostly in Nevada and Yolo counties. A list is provided in **Appendix D**. The Order was rescinded in June 2019 (R5-2019-0062) and all permittees were transitioned to State Board Order 2017-0023-DWQ.

US Forest Service

Since it is illegal to cultivate cannabis on public lands, the USFS does not have any management structure to prevent or minimize impacts of outdoor cultivation. All response efforts are law enforcement abatement efforts. The USFS Patrol Captain works with county sheriffs and the US Drug Enforcement Agency.

In the National Forest the primary type of outdoor cannabis cultivator is a drug-trafficking organization. These grow operations occur in the Sacramento watershed and are primarily illegal commercial operations conducted by criminal gangs. Typically, these grow operations are identified either by recreationalists or helicopter fly-overs conducted in the spring and early summer. They are usually located in an isolated canyon with southern exposure. Once law enforcement finds the grow operation, the plants are eradicated, any individuals present are taken into custody, and the scope of site contamination is assessed. Generally, these sites are contaminated with a variety of pesticides, fertilizers, and other waste that must be remediated.

Counties

Nevada County permits commercial cannabis cultivation under Section L-II 3.30, Commercial Cannabis Cultivation. At this time it applies only to medicinal commercial cultivation, not adult personal use. Outdoor commercial cultivation can only occur on parcels greater than two acres and has limitations on the number of plants cultivated. A Commercial Cannabis Cultivation License from CalCannabis is required. The ordinance specifically prohibits discharge from the site and has fencing and setback requirements.

Yolo County permits commercial cannabis cultivation under Title 5, Chapter 20, Marijuana Cultivation. This ordinance requires applicants to also comply with the requirements of the Regional Board Order No. R5-2015-0113 (which has been rescinded) and have a Commercial Cannabis Cultivation License from CalCannabis. Outdoor cultivation is limited to 43,560 square feet. The ordinance has fencing and setback requirements.

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SECTION 5 – INDIVIDUAL INTAKE LOCATION COMPLIANCE EVALUATIONS

The purpose of this section is to evaluate the existing water treatment plants using Sacramento River water for their compliance with existing drinking water regulations. **Appendix B** provides the Regulatory Framework used as the basis for evaluation and provides details on the selected existing drinking water regulations highlighted below**. Appendix C** contains a summary of the data provided by each of the participating water utilities. For assistance with abbreviations and acronyms, the reader is referred to the List of Abbreviations at the front of the Report.

There are four existing intakes and associated water treatment plants within the study area: the Woodland-Davis Clean Water Agency's (WDCWA) Regional Water Treatment Facility (RWTF), the City of West Sacramento's George Kristoff Water Treatment Plant (GKWTP), the City of Sacramento's Sacramento River Water Treatment Plant (SRWTP), and the Freeport Regional Water Authority (FRWA) intake which serves the Sacramento County Water Agency's (SCWA) Vineyard Surface WTP (VSWTP) and provides additional source water to East Bay Municipal Utility District (EBMUD). There is a potential future intake and associated water treatment plant being planned within the study area, called the RiverArc Project. Out of the participating agencies for this report, the participating agencies for the RiverArc Project are the Placer County Water Authority (PCWA), City of Sacramento, and SCWA. These are discussed beginning with the most upstream diversion point and then moving downstream.

Highlights of Selected Existing Drinking Water Regulations

NIPDWR and Phase I, II, and V Regulations. Sets Maximum Contaminant Levels (MCLs) for many inorganic chemicals (IOCs), synthetic organic compounds (SOCs), and volatile organic compounds (VOCs).

Surface Water Treatment Rule (SWTR). Sets minimum 3/4-log reduction requirement for *Giardia* and viruses, respectively. Sets turbidity requirements, which have since been tightened by the Interim Enhanced Surface Water Treatment Rule.

Interim Enhanced SWTR (IESWTR), Long Term 1 ESWTR (LT1ESWTR) and Filter Backwash Rule. IESWTR applies to systems serving at least 10,000 population and LT1ESWTR applies to smaller systems. Sets minimum 2-log reduction requirement for *Cryptosporidium*. Requires continuous monitoring of individual filter effluents (IFE) and combined filter effluent (CFE). Tightened treated water turbidity requirements: CFE < 0.3 nephelometric turbidity unit (NTU) in 95 percent of monthly measurements, and not to exceed 1 NTU. Requires recycling of all return flows to the headworks, upstream of chemical feed.

Stage 1 Disinfectants/Disinfection By-Product (D/DBP) Rule. Sets a treatment technology for DBP precursor removal (enhanced coagulation) based on source water total organic carbon (TOC) levels. Varying levels of removal, or alternative compliance, are required if the source water concentrations are > 2 milligrams per liter (mg/L). Set MCLs for total trihalomethanes (TTHM) and haloacetic acids (HAA5) at 80 and 60 micrograms per liter (µg/L), respectively, in the distribution system as system-wide running annual average (RAA), but these were superseded by the Stage 2 D/DBP Rule.

Long Term 2 Enhanced SWTR (LT2ESWTR). Requires *Cryptosporidium*, or *Escherichia coli (E. coli)* source water monitoring depending on system size, including a second confirmation round. Source water bin classification to be dependent on monitoring results. If running annual average *Cryptosporidium* value is > 0.075 oocysts per liter (/L), bin classification will require additional action (which could be additional log reductions or other actions, including source water protection). Also requires disinfection profiling and benchmarking if system plans to make a significant change to disinfection.

Stage 2 D/DBP Rule. Requires compliance with distribution system MCLs for TTHM and HAA5 to be based on locational running annual average (LRAA). Under Stage 2, compliance is based on LRAA of 80 and 60 µg/L. Initial Distribution System Evaluation was completed to identify long term routine monitoring locations. Compliance schedules depend on system size and source type. For combined distributions systems, all systems will be on schedule of earliest system. Operational evaluations are required if projected DBP levels exceed the MCLs.

RIVERARC PROJECT

Potential Future System Description

Project collaborators for the RiverArc Project are California American Water, City of Sacramento, PCWA, and SCWA. Diversions from the Sacramento River will occur through the Natomas Mutual Water Company's existing (NMWC) Pritchard Lake intake, located near River Mile 75. Diversions will occur in wet years to offset water currently diverted from the American River and will also recharge groundwater basins directly or in-lieu (by using surface water instead of pumping groundwater). Raw water will be transported east through a new pipeline to a new water treatment plant, and treated water will be distributed through new and existing pipelines to local water agencies.

As of the writing of this report, the projected start date for Phase 1 is expected to be in 2025. Phase 1 (2025 to 2035) consists of upgrading the NMWC diversion facility, a 72 inch raw water pipeline, a 30 million gallons per day (mgd) water treatment plant, and a 60 to 72 inch treated water pipeline. Phase 2 (2035 to 2045) would upgrade the water treatment plant to 55 mgd and would also include additional treated water pipelines. Phase 3 (2045 to 2055) would complete the regional water bank infrastructure that provides a statewide benefit.

There is no water quality information at the proposed diversion site to report for the 2015 through 2019 study period. The closest participating water agency monitoring site is at WDCWA's intake.

Significant Potential Contaminating Activities in Protection Zone

The protection zone for this diversion location has been identified as the Sacramento River from River Mile 75 to 85, as well as the Feather River from the confluence with the Sacramento River up to River Mile 5. The Sacramento River has levees on both sides, including the Fremont Weir (which leads to the Yolo Bypass) on the right bank of the river between River Miles 81.5 and 84. Sacramento Slough enters from the left bank at River Mile 80.5, and during flood periods the Sutter Bypass can drain into the Sacramento River, and then on to the Yolo Bypass, between River Miles 80 and 84. The Feather River has a levee on the left bank, but is not leveed along its right bank. There is a levee on the west side of the Sutter Bypass, which is adjacent to the Feather River, so it allows only the lands located in the bypass to drain into the Feather River under normal flow conditions. During flood periods, the Feather River and the Sutter Bypass can be contiguous. This is shown on the inset map of the Watershed Map, see **Figure 2-1**.

This area is largely agricultural and rural, with limited urban or industrial development at this time. There are limited recreational uses of the river, primarily power boating and on-shore and boat fishing. There is only one active marina, located near River Mile 80 (Verona Village). The Rio Ramaza Marina at River Mile 76 has been permanently closed at this time. Verona Village does not offer a fueling station or sewage pumpout. There are several major agricultural drains discharging to the river in this reach, including: the Sacramento Slough (River Mile 80.5), the Natomas Cross Canal (River Mile 79 – which includes discharges from Reclamation District (RD) 1001 in Sutter County and RD1000 in Natomas Basin [Pumping Plants 4 and 6]), and RD1000 direct discharge (Pumping Plant 2 at River Mile 75). The Sutter and Yolo Bypasses cross the Sacramento River between River Miles 80 and 84.

WOODLAND-DAVIS CLEAN WATER AGENCY DIVERSION

System Description

The WDCWA is a new surface water supply project that diverts up to approximately 46,100 acre-feet per year from the Sacramento River. WDCWA owns the Regional Water Treatment Facility (RWTF) which became operational in July 2016. The RWTF is operated by Jacobs Engineering. Treated surface water is provided to the City of Woodland, the City of Davis, and the University of California at Davis (UC Davis).

The new intake location is at River Mile 70.5, which is just upstream of the Interstate 5 bridge crossing, Veterans Bridge. The new 400 cubic feet per second (cfs) intake is a joint project between WDCWA and RD 2035. Out of the 400 cfs, 320 cfs is allocated to RD 2035, and 80 cfs to WDCWA. The intake facility includes a sediment control system to prevent the long-term accumulation of fine silts and sands on the floor of the wet-well and a log boom to protect the structure from floating debris. Fish screens are horizontally oriented with 1.75 millimeter (mm) slot size.

The current capacity of the RWTF is 30 mgd, with 18 mgd provided in one pipeline for the City of Woodland, and 12 mgd provided in one pipeline for the City of Davis, with 1.2 mgd of the 12 mgd allocated to UC Davis. It is expected that this capacity will be sufficient through 2035 for all agencies.

The RWTF is a conventional water treatment plant employing Actiflo® ballasted flocculation. Ferric chloride is added to the influent water and then mixed using a hydraulic jet mixer. The coagulated water then enters one of three Actiflo® clarification basins. The water is then routed to an ozone chamber, and then to the five dual media filters that have 12 inches of sand and 42 inches of granular activated carbon (GAC). Chlorine is only used at the clearwell. The finished water pump station has different pH, orthophosphate concentration, and chlorine residual for the Cities of Davis and Woodland.

Significant Potential Contaminating Activities in Protection Zone

The protection zone for this diversion location has been identified as the Sacramento River from River Mile 70.5 to 82, as well as the Feather River from the confluence with the Sacramento River up to River Mile 2. The Sacramento River has levees on both sides, including the Fremont Weir (which leads to the Yolo Bypass) on the right bank of the river upstream of River Mile 81.5. Sacramento Slough enters from the left bank at River Mile 80.5, and during flood periods the Sutter Bypass can drain into the Sacramento River, and then on to the Yolo Bypass, upstream of River Mile 80. The Feather River has a levee on the left bank, but is not leveed along its right bank. There is a levee on the west side of the Sutter Bypass, which is adjacent to the Feather River, so it allows only the lands located in the bypass to drain into the Feather River under normal flow conditions. During flood periods, the Feather River and the Sutter Bypass can be contiguous. This is shown on the inset map of the Watershed Map, see **Figure 2-1**.

This area is largely agricultural and rural, with limited urban or industrial development at this time. There are limited recreational uses of the river, primarily power boating and on-shore and boat fishing. There are three marinas: one near River Mile 80 (Verona Village), and two near River Mile 70.5 (Alamar and Metro). The Rio Ramaza Marina, located near River Mile 76, has been permanently closed. Fuel is available at the Metro Marina and a sewage pumpout is available at the Alamar Marina. There are several major agricultural drains discharging to the river in this reach, including: the Sacramento Slough (River Mile 80.5), the Natomas Cross Canal (River Mile 79 – which includes discharges from RD1001 in Sutter County and RD1000 in Natomas Basin [Pumping Plants 4 and 6]), and RD1000 direct discharge (Pumping Plant 2 at River Mile 75). The Sutter and Yolo Bypasses cross the Sacramento River between River Miles 80 and 84.

Treated Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each during the period of study.

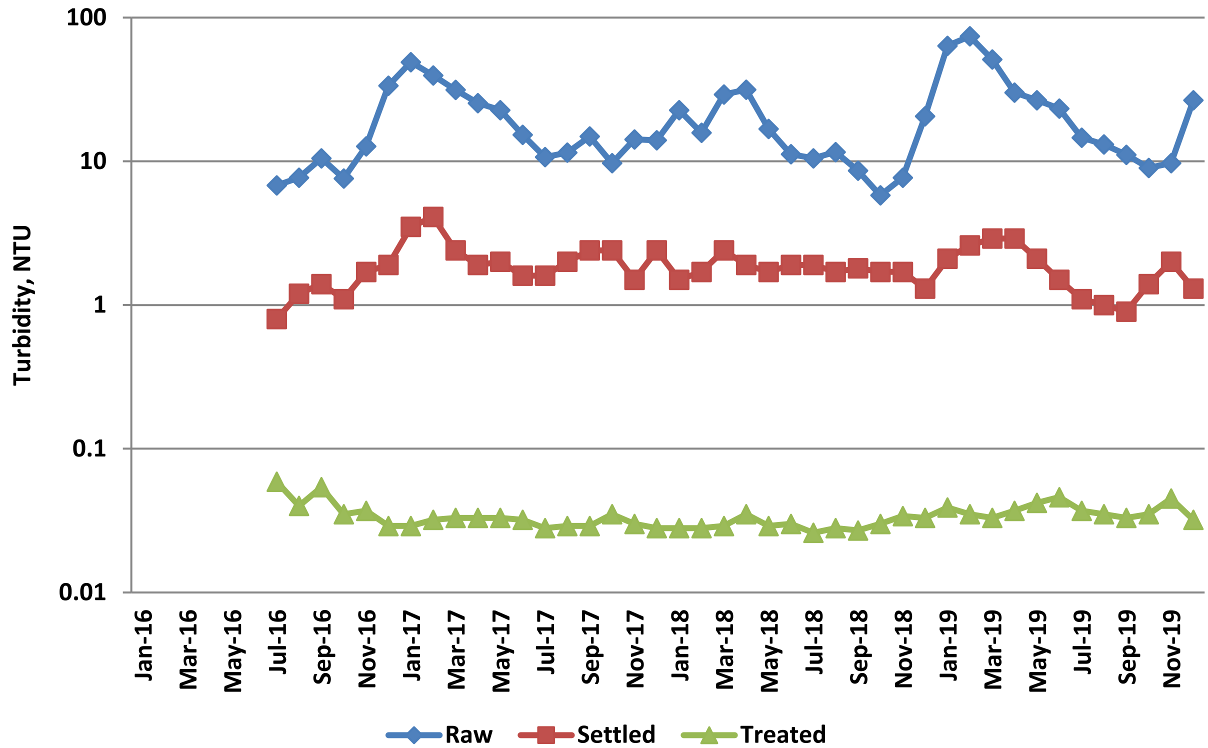
Turbidity

The monthly turbidity reports submitted to the State Water Resources Control Board Division of Drinking Water (DDW) were reviewed as part of this analysis. These report the four-hour turbidity measurements of the combined filter effluent (CFE), as well as the median daily influent, grab daily settled, and median daily recycled water turbidities.

A statistical assessment of electronic data at the RWTF from July 2016 through December 2019 shows that the average of the median daily raw water turbidity was 21.0 nephelometric turbidity units (NTU), average of the daily grab settled water turbidity was 1.88 NTU, and the average of the daily average CFE turbidity was 0.034 NTU. The overall treatment process had an average solids removal of 99.8 percent, well above the required 80 percent. However, the average percent solids removal from raw to settled was 88.1 percent, with settled water turbidities less than 2 NTU occurring only

64 percent of the time. **Figure 5-1** shows a time series plot of raw, settled and average treated daily water turbidities. The RWTF easily met all current treated water turbidity standards.

Figure 5-1. RWTF, Raw, Settled, and Treated Water Turbidities, 2016 – 2019



Microbiological Constituent Review

Treated water from the RWTF is delivered to the City of Davis, City of Woodland, and UC Davis for distribution. Each conducts individual monthly coliform analysis and is responsible for individual compliance in their distribution systems.

The City of Davis performed monthly distribution system coliform analysis from 2015 through 2019. A review of the City of Davis' Consumer Confidence Reports (CCRs) shows that the monthly percent positive for total coliform was always less than five percent. Therefore, during the period of study, the City of Davis was always in compliance with the Total Coliform Rule.

The City of Woodland performed monthly distribution system coliform analysis from 2015 through 2019. A review of the City of Woodlands' CCRs does not report information about the monthly percent positive for total coliform. Therefore, it is assumed that there were no detections during the period of study, and the City of Woodland was always in compliance with the Total Coliform Rule.

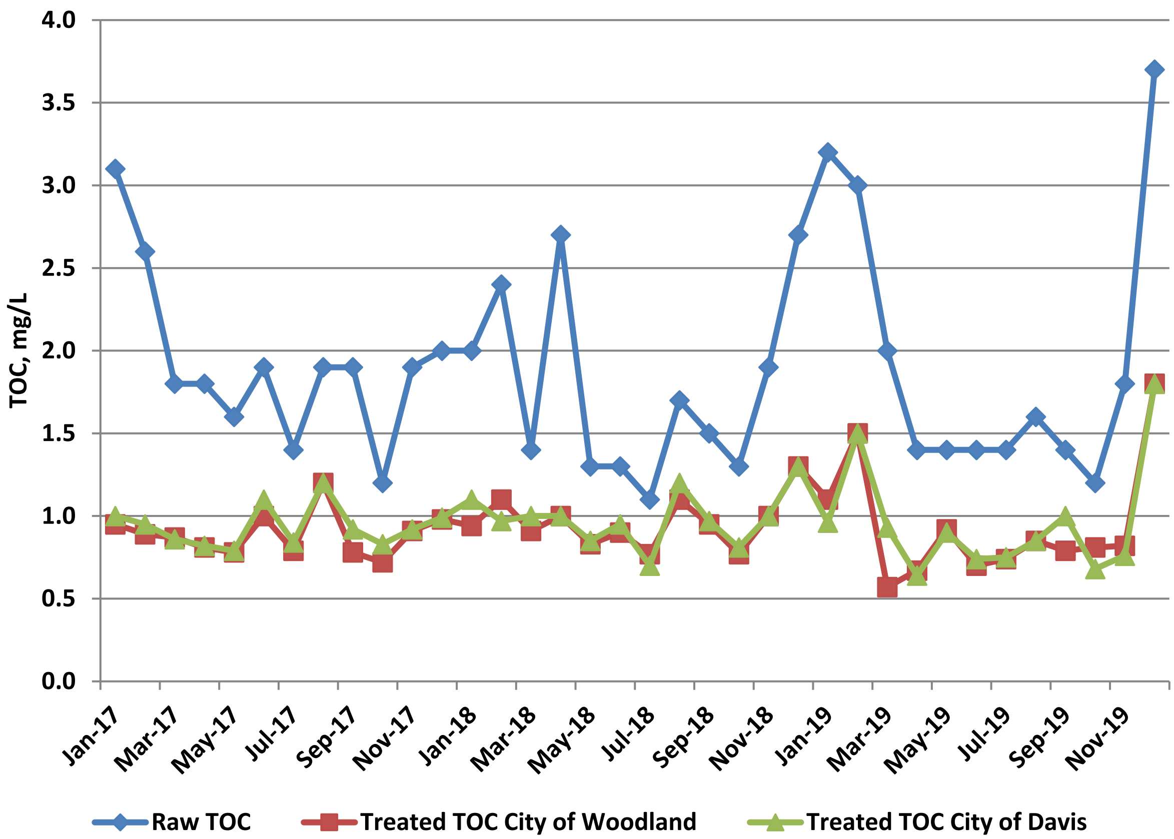
UC Davis performed monthly distribution system coliform analysis from 2015 through 2019. A review of UC Davis' CCRs shows that the monthly percent positive for total coliform was always less than five percent, with the exception of 2018. In September 2018, nine out of forty routine total coliform samples reported positive for total coliform and negative for fecal coliform. Follow-up samples taken the next day reported negative for total coliform and fecal coliform. DDW issued a Total Coliform Rule violation. UC Davis believes that the sample bottles were contaminated and the results should be dismissed. DDW did not rescind the violation.

Disinfection By-Products

DBP Precursors

WDCWA monitors alkalinity and TOC levels in its raw and treated monthly at the RWTF in order to determine TOC removal compliance. WDCWA collects treated water TOC samples in both the City of Davis and the City of Woodland pipelines, as shown in **Figure 5-2.** WDCWA indicated that they would likely change to a single sample collected at the combined filter effluent in the near future.

Figure 5-2. RWTF, Raw, Settled, and Treated Water TOC, 2017 – 2019



Source water TOC levels at the RWTF were less than 2.0 mg/L 68 percent of the time from 2016 to 2019. Treated water TOC levels at RWTF were less than 2.0 mg/L 100 percent of the time from 2016 to 2019. The average raw TOC level at RWTF was 2.0 mg/L and the average treated TOC level was 0.9 mg/L for the City of Woodland, and 1.0 mg/L for the City of Davis, which equates to 51 to 52 percent TOC removal, respectively.

Based on the enhanced coagulation removal requirements set forth in the Stage 1 D/DBP Rule, the source water TOC and source water alkalinity levels typically result in either 25 or 35 percent TOC removal required. A review of raw and treated TOC monthly samples shows that the RWTF may comply with the Stage 1 D/DBP Rule by either achieving the required percent TOC removal or using the alternative compliance criterion 2 for treated water TOC running annual average (RAA), calculated quarterly, less than 2.0 mg/L. Over the reporting period of 38 months from November 2016 to December 2019, there were no months when the treated water TOC was greater than 2.0 mg/L.

Stage 2 D/DBP Rule

As treated water from the RWTF goes to three retail systems (Cities of Woodland, Davis, and UC Davis), each of these systems is evaluated individually for disinfection byproducts (DBPs) under the Stage 2 D/DBP Rule.

City of Davis

Water from the RWTF began entering the City of Davis' distribution system in June 2016, and by October 2016 the distribution system was 100 percent surface water. The City of Davis' surface water allotment is 10.2 mgd. The City uses surface water as the primary source and supplements with groundwater when demand is over 10.2 mgd. In 2018, surface water accounted for 80 percent of the total amount of water that was consumed.

The City of Davis has collected both TTHM and HAA5 data for its distribution system. Originally, there were two Stage 2 D/DBP Rule monitoring sites and these were expanded in 2016 to nine sites, to incorporate the new RWTF treated water supply. The following statistics are based on the nine revised Stage 2 D/DBP Rule monitoring sites. It should be noted that beginning in 2019, the number of monitoring sites was reduced to four (sites SS-012, SS-017, SS-024 and SS-036). The City of Davis requested the reduction in sites from DDW, as the local running annual average (LRAA) for TTHM and HAA were less than fifty percent of the MCLs.

Since the City of Davis started receiving treated water from the RWTF through December 2019, individual TTHM samples ranged from 1.7 to 39 μg/L, with an average value of 16.8 μg/L. **Figure 5-3** shows the quarterly averages, which shows that in any given year, the June sample has the lowest TTHM of all quarters. This reflects the use of groundwater during periods of higher demand. As the City of Davis distribution system can be a mixture of groundwater and treated surface water, this causes variation in TTHM levels.

Figure 5-3. City of Davis Distribution System Stage 2 D/DBP Rule TTHM Quarterly Averages, 2016-2019

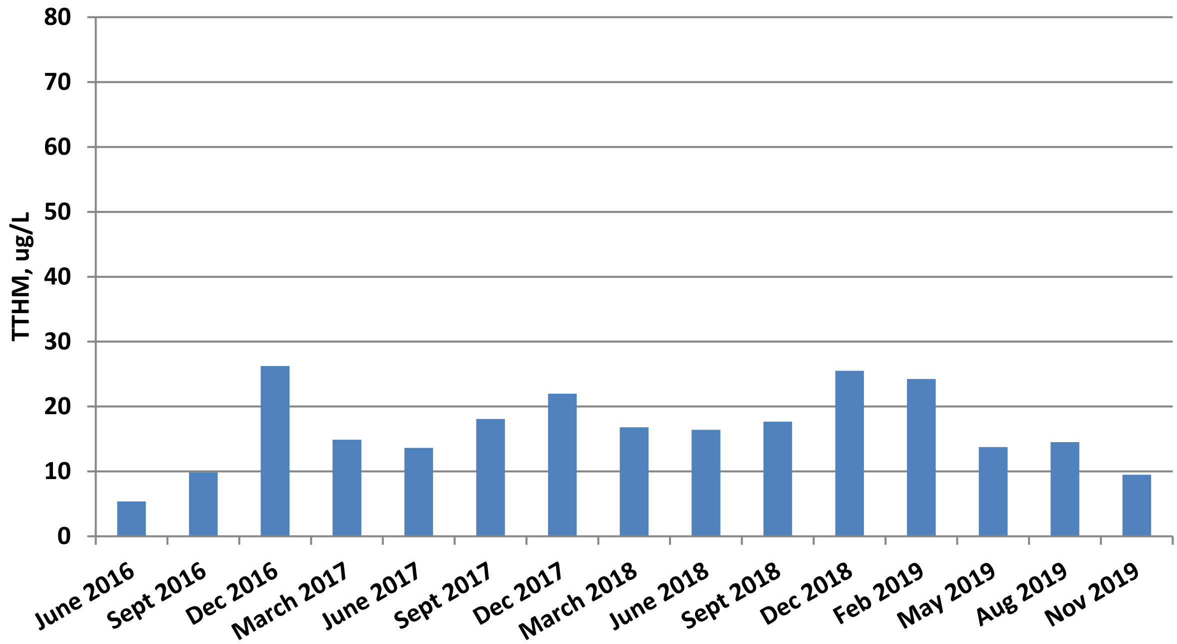
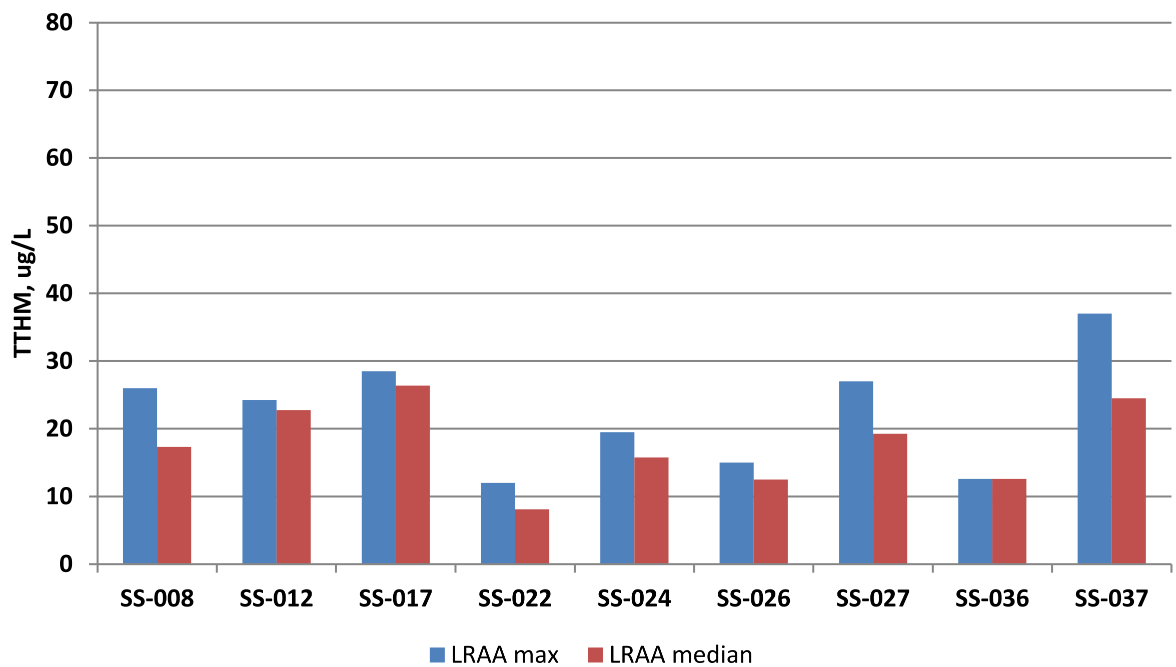


Figure 5-4 presents the TTHM LRAA maximum and median values for all sites. The LRAAs ranged from 6.3 to 37 µg/L, with site SS-037 having the highest LRAA at 37 µg/L. All LRAAs were well below the current MCL of 80 µg/L.

Figure 5-4. City of Davis Distribution System Stage 2 D/DBP Rule TTHM LRAAs, 2016-2019



Since the City of Davis started receiving treated water from the RWTF through December 2019, the individual HAA5 samples ranged from 0 to 13 μg/L, with an average value of 5.1 μg/L. **Figure 5-5** shows the quarterly averages, which show no seasonal trend. As the City of Davis distribution system can be a mixture of groundwater and treated surface water, this causes variation in HAA5 levels.

Figure 5-5. City of Davis Distribution System Stage 2 D/DBP Rule HAA5 Quarterly Averages, 2016-2019

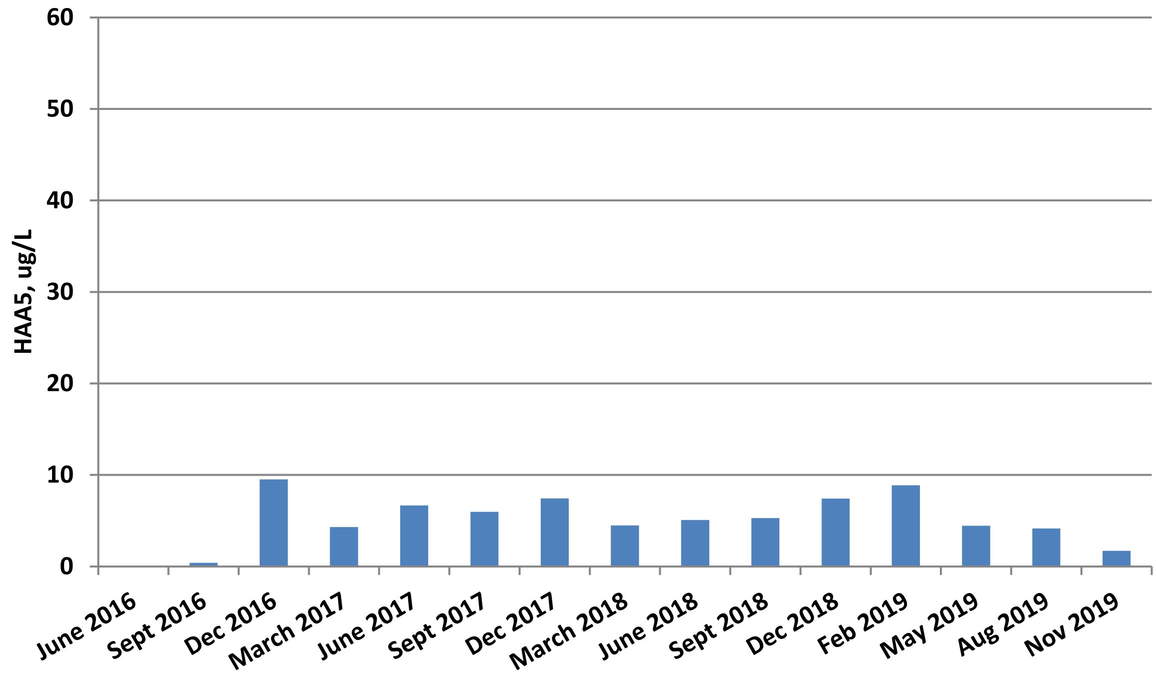


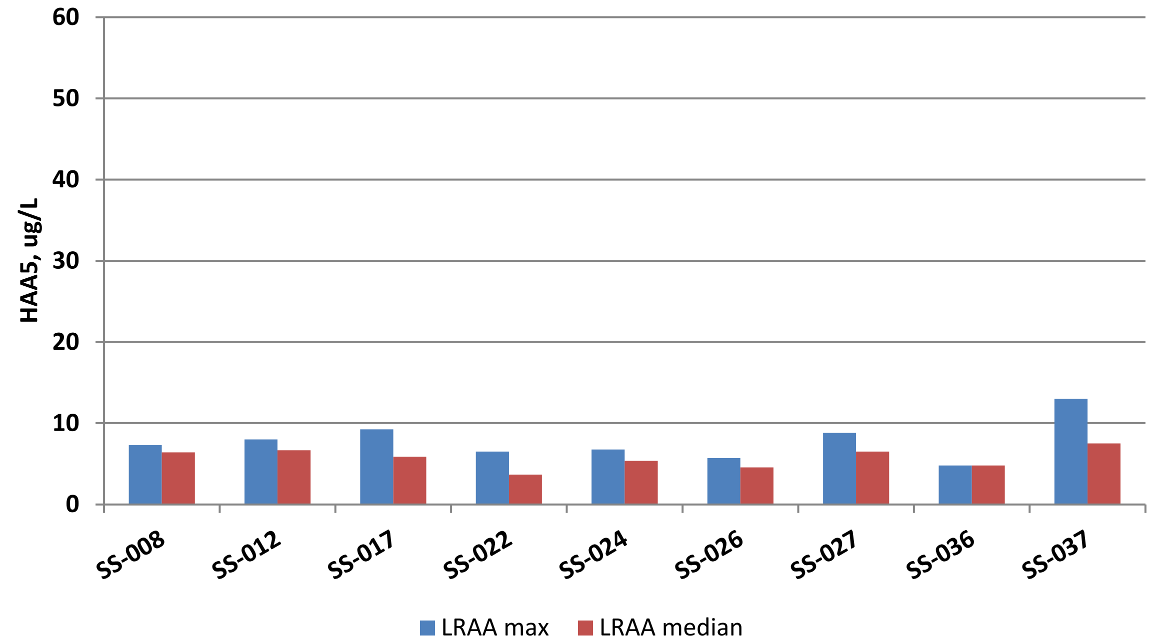
Figure 5-6 presents the HAA5 LRAA maximum and median values for all sites. The LRAAs ranged from 1.8 to 13 μg/L, with site SS-037 having the highest LRAA at 13 μg/L. All LRAAs were well below the current MCL of 60 μg/L.

City of Woodland

Water from the RWTF began entering the City of Woodland's distribution system in June 2016, and the distribution system was 100 percent surface water by November 2016. The 2017 CCR states that the City's drinking water was 100 percent treated surface water in 2017. Groundwater is considered a backup supply. As a side note, surface water is also stored in the City's three aquifer storage and recovery wells for use in summer months to supplement water from WDCWA.

The City of Woodland has collected both TTHM and HAA5 data for its distribution system. The single Stage 2 D/DBP Rule monitoring site was expanded in 2016 to eight sites, to incorporate the new RWTF treated water supply. The following statistics are based on the eight revised Stage 2 D/DBP Rule monitoring sites.

Figure 5-6. City of Davis Distribution System Stage 2 D/DBP Rule HAA5 LRAAs, 2016-2019



Since the City of Woodland started receiving treated water from the RWTF through December 2019, the individual TTHM samples ranged from 3.6 to 35 µg/L, with an average value of 13.9 µg/L. **Figure 5-7** shows the quarterly averages, which show no clear seasonal trend. As the City of Woodland distribution system can be a mixture of groundwater and treated surface water, this causes variation in TTHM levels.

Figure 5-7. City of Woodland Distribution System Stage 2 D/DBP Rule TTHM Quarterly Averages, 2016-2019

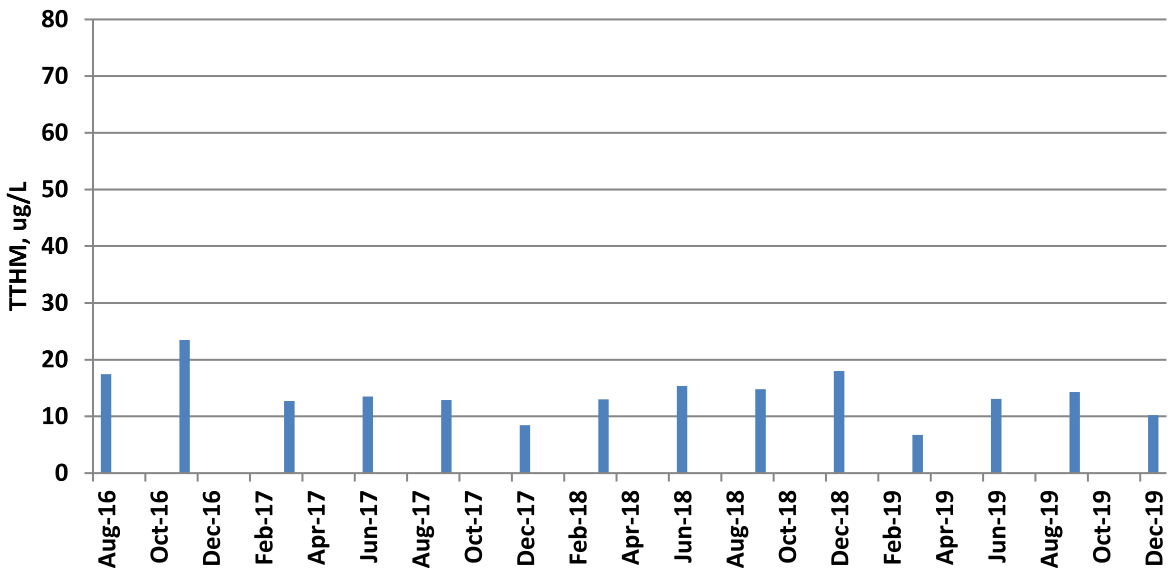
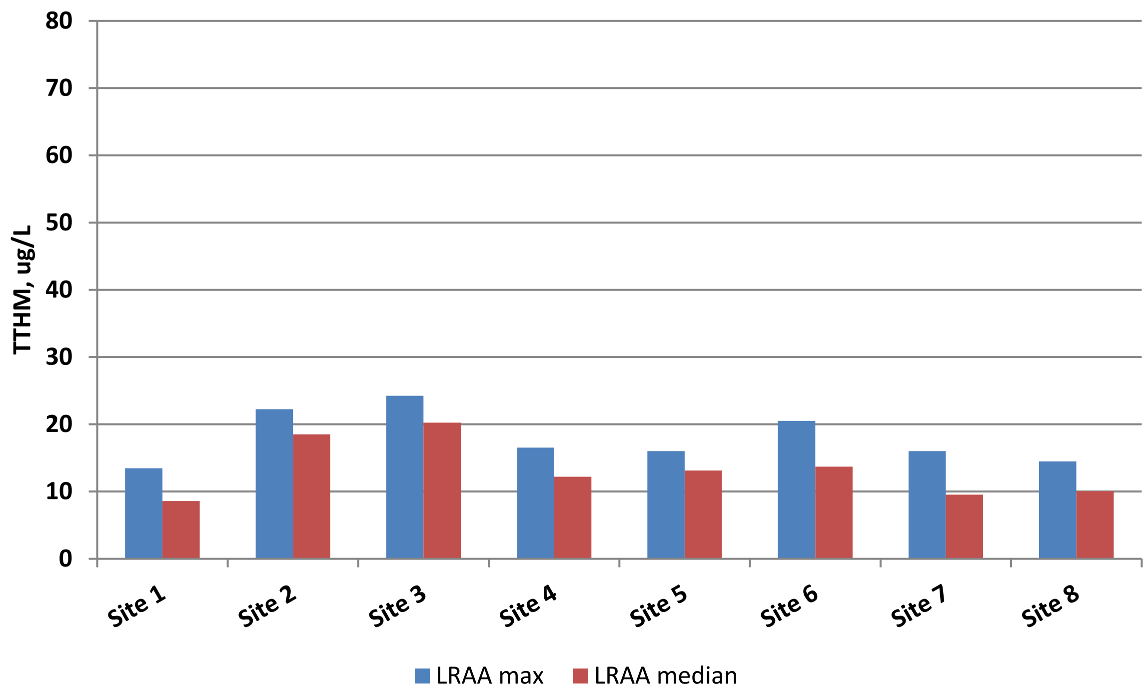


Figure 5-8 presents the TTHM LRAA maximum and median values for all sites. The LRAAs ranged from 6.7 to 24.3 µg/L, with site 3 having the highest LRAA at 24.3 µg/L. All LRAAs were well below the current MCL of 80 µg/L.

Figure 5-8. City of Woodland Distribution System Stage 2 D/DBP Rule TTHM LRAAs, 2016-2019



Since the City of Woodland started receiving treated water from the RWTF through December 2019, the individual HAA5 samples ranged from 0 to 25 µg/L, with an average value of 4.1 µg/L. **Figure 5-9** shows the quarterly averages, which show no seasonal trend. As the City of Woodland distribution system can be a mixture of groundwater and treated surface water, this causes variation in HAA5 levels.

Figure 5-10 presents the HAA5 LRAA maximum and median values for all sites. The LRAAs ranged from 1.5 to 9.6 µg/L, with site 3 having the highest LRAA at 9.6 µg/L. All LRAAs were well below the current MCL of 60 µg/L.

Figure 5-9. City of Woodland Distribution System Stage 2 D/DBP Rule HAA5 Quarterly Averages, 2016-2019

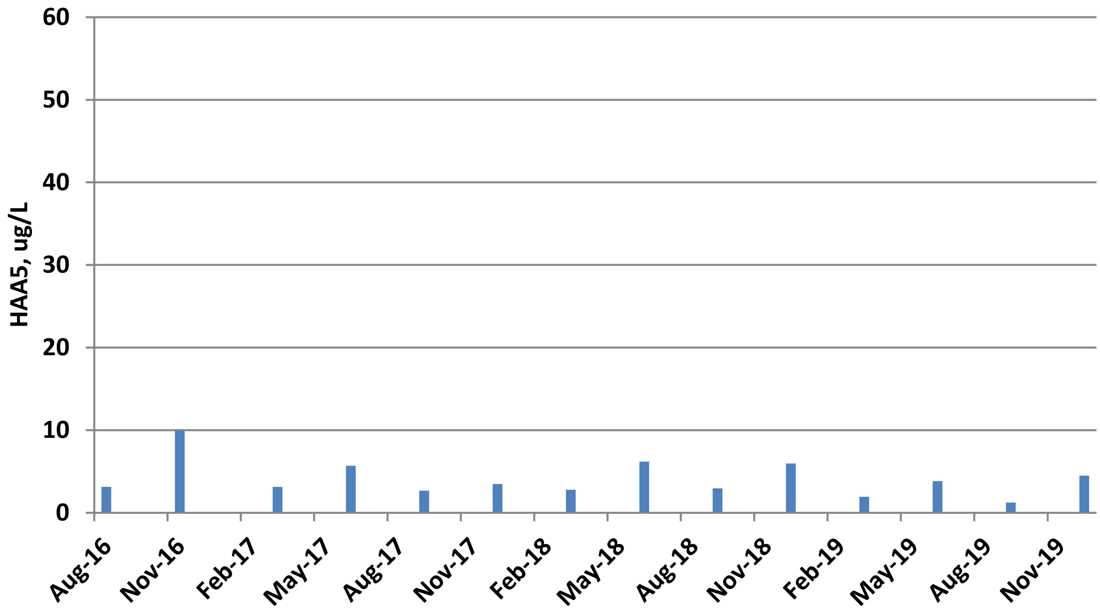
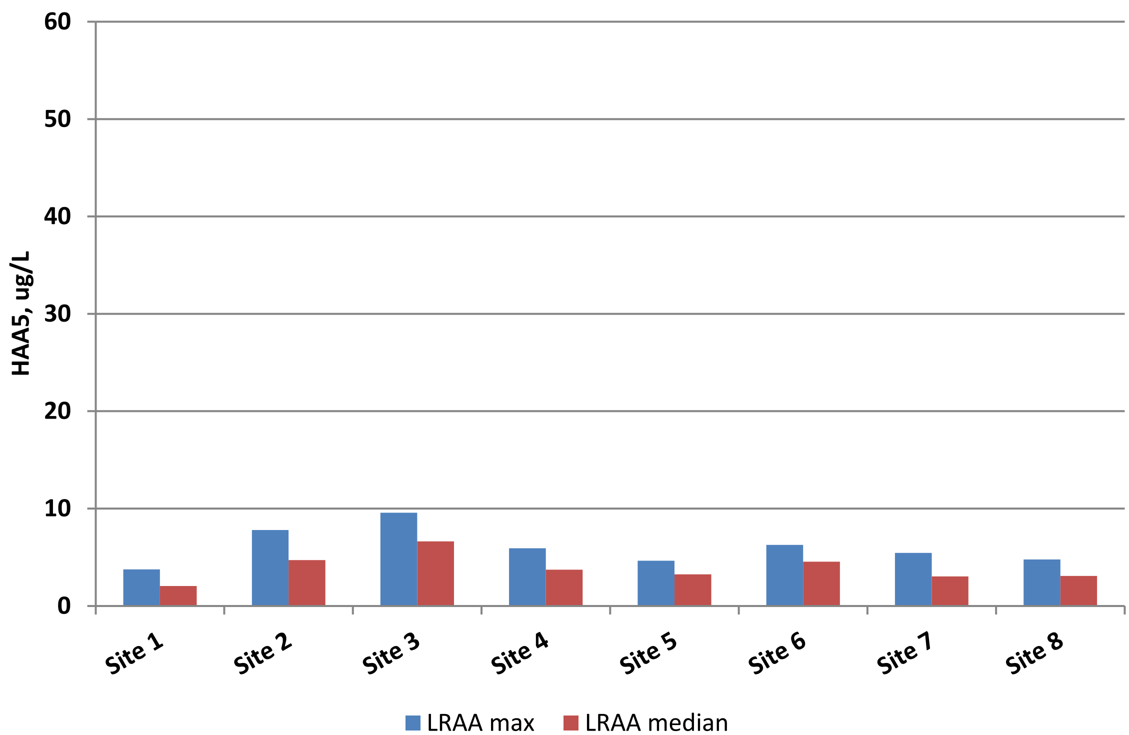


Figure 5-10. City of Woodland Distribution System Stage 2 D/DBP Rule HAA5 LRAAs, 2016-2019



UC Davis

Water from the RWTF began entering the UC Davis distribution system in July 2017. Similar to the Cities of Davis and Woodland, surface water is a primary supply, with groundwater as a backup supply.

UC Davis has collected both TTHM and HAA5 data for its distribution system. The original two Stage 2 D/DBP Rule monitoring sites were revised in 2018, to four new sites to incorporate the new RWTF treated water supply. In 2019, the number of sites was increased to six sites to include all storage facilities and historic distribution sample locations.

The following statistics are based on the six revised Stage 2 D/DBP Rule monitoring sites and the original two sites sampled in August 2017, since RWTF water was in the distribution system at that time.

Since UC Davis started receiving treated water from the RWTF through December 2019, the individual TTHM samples ranged from 0 to 39 µg/L, with an average value of 20.3 µg/L. **Figure 5-11** shows the quarterly averages, which show no clear seasonal trend. As the UC Davis distribution system can be a mixture of groundwater and treated surface water, this causes variation in TTHM levels.

Figure 5-11. UC Davis Distribution System Stage 2 D/DBP Rule TTHM Quarterly Averages, 2017-2019

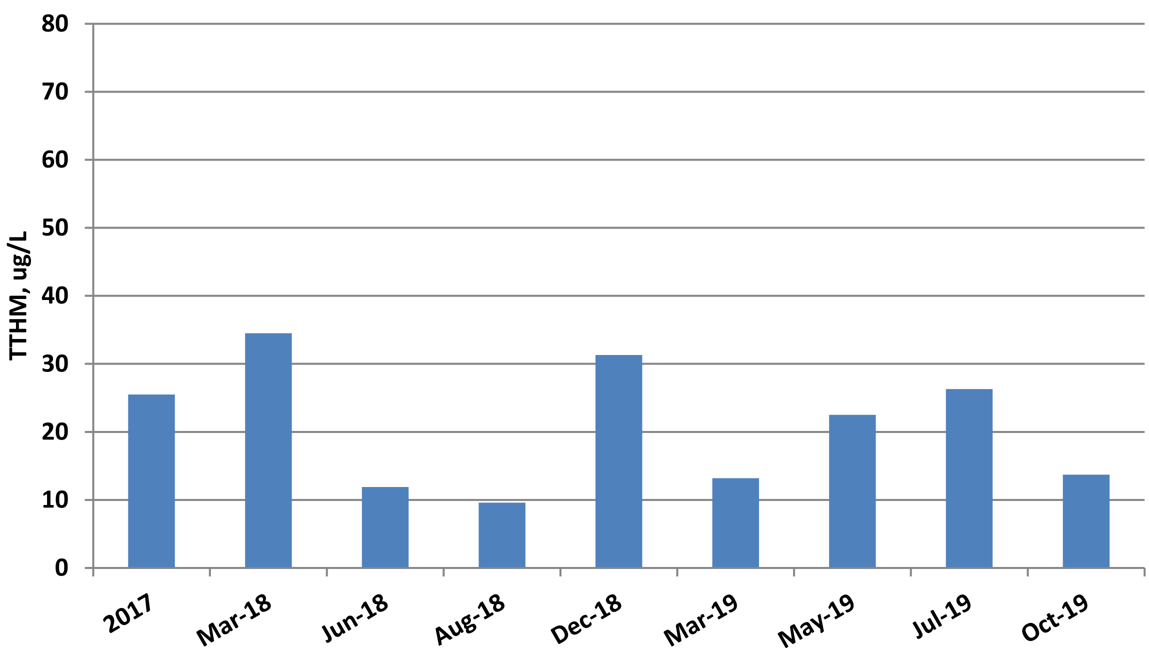
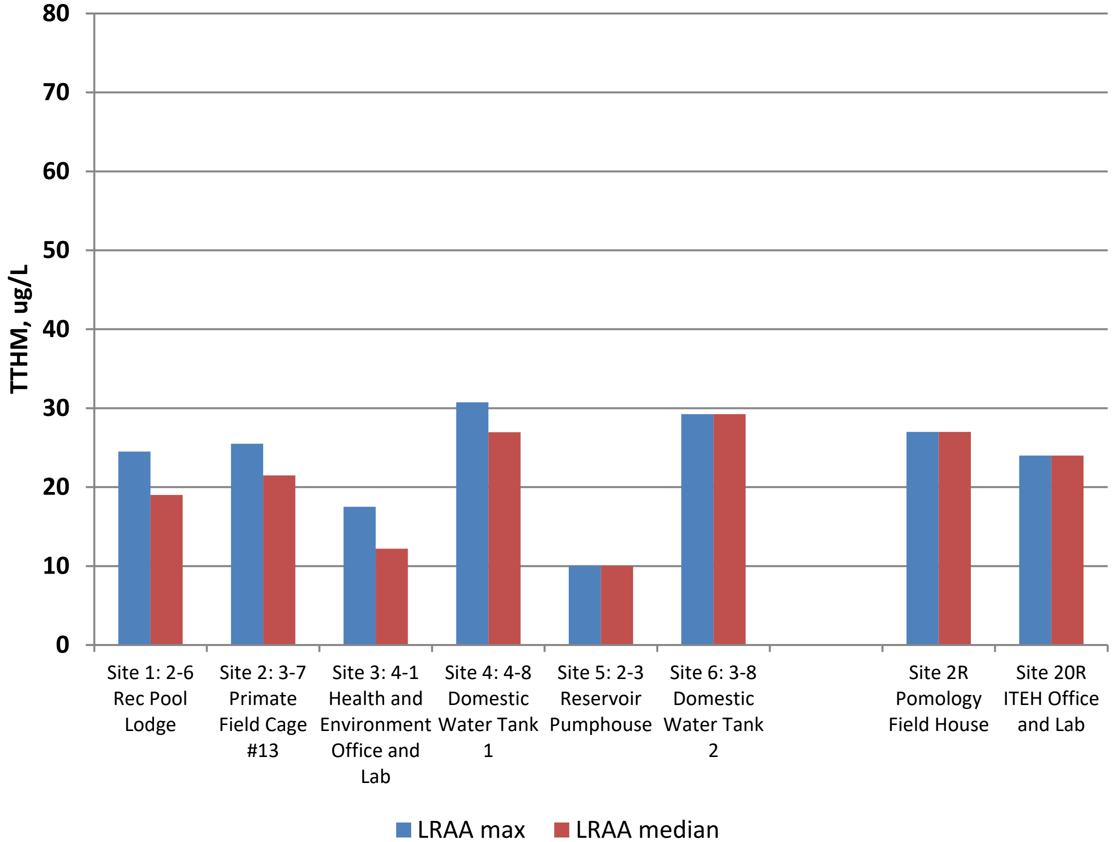


Figure 5-12 presents the TTHM LRAA maximum and median values for all sites. The LRAAs ranged from 8 to 31 µg/L, with site 4 Domestic Water Tank 1 having the highest LRAA at 31 µg/L. All LRAAs were well below the current MCL of 80 µg/L.

Figure 5-12. UC Davis Distribution System Stage 2 D/DBP Rule TTHM LRAAs, 2017-2019



Since UC Davis started receiving treated water from the RWTF through December 2019, the individual HAA5 samples ranged from 0 to 16 µg/L, with an average value of 7.4 µg/L. **Figure 5-13** shows the quarterly averages, which show no seasonal trend. As the UC Davis distribution system can be a mixture of groundwater and treated surface water, this causes variation in HAA5 levels.

Figure 5-14 presents the HAA5 LRAA maximum and median values for all sites. The LRAAs ranged from 3 to 11 µg/L, with site 4 Domestic Water Tank 1 having the highest LRAA at 11 µg/L. All LRAAs were well below the current MCL of 60 µg/L.

Figure 5-13. UC Davis Distribution System Stage 2 D/DBP Rule HAA5 Quarterly Averages, 2017-2019

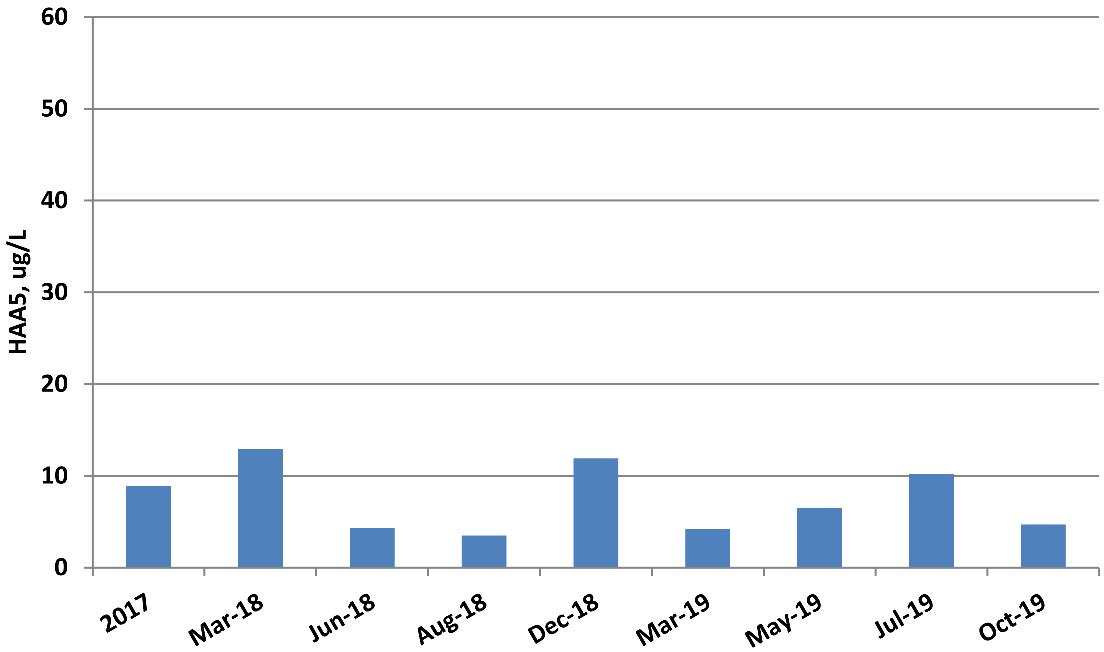
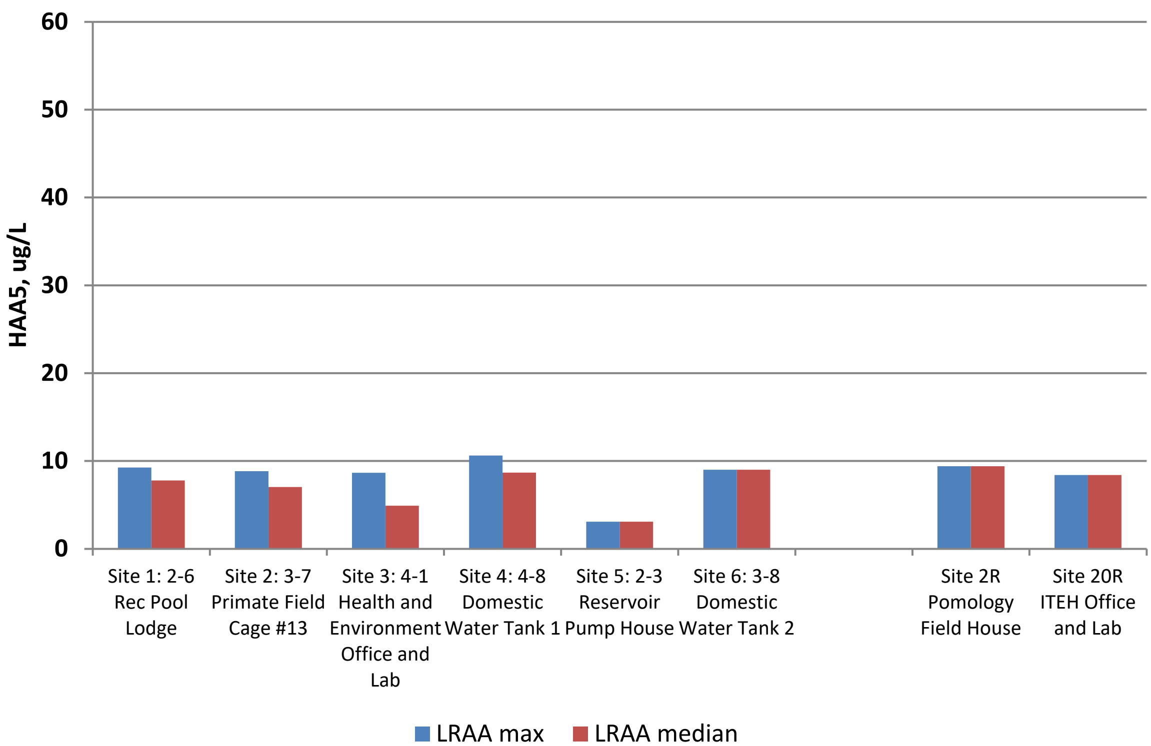


Figure 5-14. UC Davis Distribution System Stage 2 D/DBP Rule HAA5 LRAAs, 2017-2019



Unregulated Contaminant Monitoring Rule

As a wholesaler, WDCWA had no monitoring requirements under the Fourth round of the Unregulated Contaminant Monitoring Rule (UCMR4). Each agency was required to implement UCMR4 monitoring requirements individually, these are discussed below.

City of Davis

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from May to August 2018 at the entry point to the distribution system (treated water from the RWTF). All sample results were non-detect.

The 17 required constituents were also monitored quarterly at the entry point to the distribution system from March to December 2018. All sample results were non-detect except manganese which ranged from 40 to 740 μg/L, most results were over the Secondary MCL of 50 μg/L. These results were shared with UC Davis as they share the same entry point from WDCWA.

Three brominated haloacetic acid groups (HAA5, HAA9 and HAA6Br) were monitored in the distribution system from March to December 2018 as shown in **Table 5-1.**

Table 5-1
Results from UCMR4 Monitoring for City of Davis, Distribution System

Location	HAA5 Average, μg/L	HAA6Br Average, μg/L	HAA9 Average, μg/L
Sampling Station 037	7.3	6.8	12.7
Sampling Station 008	4.5	5.0	8.4
Sampling Station 012	5.6	5.9	10.0
Sampling Station 017	5.5	5.9	10.2
Sampling Station 022	3.8	3.6	6.6
Sampling Station 024	4.8	4.7	8.6
Sampling Station 026	4.7	4.7	8.6
Sampling Station 027	5.5	5.8	10.1

UC Davis

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from May to August 2019 at the entry point to the distribution system (treated water from the RWTF). All sample results were non-detect.

These results were the same as the City of Davis as they share the same entry point from WDCWA.

Three brominated haloacetic acid groups (HAA5, HAA9 and HAA6Br) were monitored in the distribution system from March to December 2018 as shown in **Table 5-2.**

Table 5-2
Results from UCMR4 Monitoring for UC Davis, Distribution System

Location	HAA5 Average, µg/L	HAA6Br Average, µg/L	HAA9 Average, µg/L
Site 20R (ITEH Office/Lab)	3.3	2.4	5.0
Site 2R (Pomology Fieldhouse)	5.0	4.4	8.6

City of Woodland

The City of Woodland is in the process of completing biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin as well as quarterly monitoring for 17 required constituents at the entry point to the distribution system.

Three brominated haloacetic acid groups (HAA5, HAA9 and HAA6Br) were monitored in the distribution system from March to December 2018 as shown in **Table 5-3.**

Table 5-3
Results from UCMR4 Monitoring for City of Woodland, Distribution System

Location	HAA5 Average, µg/L	HAA6Br Average, µg/L	HAA9 Average, µg/L
SS#1 - N. Ashley Ave.	5.3	5.5	9.4
SS#10 - E. Beamer @ Underpass	4.3	4.3	7.9
SS#13 - Across from 1036 Farnham	4.4	4.5	8.2
SS#14 - Walgreens Warehouse	3.8	3.9	7.1
SS#3 - Woodland Memorial Hospital	4.7	5.0	8.7
SS#5 - City Park	4.9	5.2	8.7
SS#7 - Cline Park	10.0	3.7	13.0
SS#8 - Hollister Rd. @ Beamer Park	5.0	4.6	8.9

Giardia/Virus/*Cryptosporidium* Reduction Requirements

WDCWA initially began sampling for the second round of LTESWTR in September 2018, but due to sampling issues, the start date was postponed to February 2020. Therefore, WDCWA does not have a second round of LT2ESWTR monitoring data included in this report.

The first round of LT2ESWTR monitoring was conducted from August 2009 through August 2011. WDCWA received a letter from DDW in May 2012, indicating a Bin 1 classification.

In addition, the raw water sampling conducted at the new intake during this study period included *Escherichia coli* (*E. coli*) monitoring. *E. coli* levels ranged from 1 to 613 most probable number per 100 milliliters (MPN/100 mL), with an average of 40 MPN/100 mL and a median of 10.9 MPN/100 mL between 2016 and 2019. Only three percent of individual samples exceeded 200 MPN/100 mL, and two of the 34 monthly medians exceeded the threshold. This data continues to support the appropriateness of 3/4-log reduction for *Giardia* and viruses.

The RWTF currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with ozone provides 0.5-log credit for *Giardia* and 2.0-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the Surface Water Treatment Rule (SWTR) and Interim Enhanced SWTR (IESWTR).

Regulatory Compliance Evaluation

WDCWA has been monitoring the raw and treated water for the RWTF for Title 22 compliance constituents. **Table 5-4** lists the existing drinking water regulations and a compliance evaluation for these standards. The RWTF is currently in compliance with current requirements.

Table 5-4
Regulatory Compliance Evaluation
WDCWA RWTF

	Targeted Compounds	Key Issues Compliance Status
Existing Regulations		
Phase I, II, and V	IOCs, VOCs, SOCs	No MCLs exceeded based on review of the CCRs.
SWTR	Microbial and Turbidity	Data continue to support 3/4—log reduction requirement for *Giardia*/viruses. All operations, monitoring and reporting requirements are met, and all treated water turbidity standards are met.
Interim/Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Long Term 2 ESWTR	Microbial	Completed first round source water monitoring and received Bin 1 classification from DDW. Conducting second round of monitoring in 2020.
Stage 1 D/DBP Rule	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, alternative compliance criterion met and enhanced coagulation not required.
Stage 2 D/DBP Rule	Disinfectants and Disinfection By-Products	Current TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (< 80/60 μg/L, respectively) and standards are met.

CITY OF WEST SACRAMENTO GEORGE KRISTOFF WATER TREATMENT PLANT

System Description

The City of West Sacramento owns and operates the GKWTP, which treats Sacramento River water diverted at River Mile 62.5 near the Interstate 80 bridge crossing. The GKWTP and intake have a capacity of 58 mgd and are expandable to 72 mgd. The GKWTP has recently been operated between 5 and 27 mgd. The current average monthly winter flow is 7 mgd, and the average monthly summer flow is 13 mgd.

GKWTP is a conventional water treatment plant employing Actiflo® ballasted flocculation. Polyaluminum chloride (PAC), aluminum sulfate (coagulants) and anionic polymer binding agent are added to the influent water. The coagulants are mixed using flash mixing in a small basin. The coagulated water then enters one of two Actiflo® clarification basins where the sand and the polymer binding agent are added. During the summer, the water is pre-chlorinated prior to the Actiflo® process. However, during winter, water is pre-chlorinated prior to filtration depending on TOC levels. The Actiflo® process uses ballasted flocculation via the addition of microsand to enhance the flocculation and settling of floc. The Actiflo® basins operate at surface loading rates up to 30 gallons per minute per square foot (gpm/sf) and therefore occupy much less space than a conventional flocculation/sedimentation basin. The space savings offered by Actiflo® was a primary reason for its selection at the GKWTP site due to limited available space. The basins are equipped with mixers, sand feeders, tube settlers, sand/sludge recirculation pumps and sand separators, and are considered more mechanically-intensive than conventional clarification processes.

The clarified water is then filtered through eight gravity-flow dual-media filters. These filters have a four-foot deep bed of GAC over 12-inches of sand using a gravel-less underdrain system. GAC was installed as the primary filter media instead of anthracite to protect against possible seasonal taste and odor events caused by thiobencarb, which can be present at the intake location due to rice farming practices in the watershed. The GAC filters also act as a barrier against emergency situations including accidental chemical spills in the river. The filters are backwashed with air and water. The filters have filter-to-waste capabilities. Dirty backwash water and sludge are handled in the plant's old flocculation/sedimentation basins, with recycle water returned ahead of the flash mix system.

The filtered water is post-chlorinated for disinfection credit, and corrosion control is implemented by the use of caustic soda to try and maintain pH at 8.5 in the distribution system. There are eight million gallons (mg) of storage on the plant site, including disinfection contact time, and an additional 10 mg in the distribution system.

Highlights of Changes Since 2015 Update

Since the 2015 Update, the chlorine system was converted from gas to 12.5 percent sodium hypochlorite.

Significant Potential Contaminating Activities in Protection Zone

The protection zone for this diversion location has been identified as the Sacramento River from River Mile 62.5 to the confluence with the Feather River at River Mile 80. The Sacramento River has levees on both sides. This is shown on the inset map of the Watershed Map, see **Figure 2-1**.

The area nearest the intake is recently developing urban land use, while the area north of Sacramento International Airport is still largely agricultural and rural, with limited urban or industrial development. The bridge crossing for Interstate 80 is located just downstream of the intake. There are limited recreational uses of the river, primarily power boating and on-shore and boat fishing. Elkhorn Regional Park is located upstream and provides boat launch and permanent toilet facilities. There are four marinas: one near River Mile 80 (Verona Village), and two near River Mile 70.5 (Alamar and Metro), and one near River Mile 62.5 (Harry's). The Rio Ramaza Marina, located near River Mile 76, has been permanently closed. Fuel is available at the Metro Marina and a sewage pumpout is available at the Alamar Marina. There are several major agricultural drains discharging to the river in this reach, including: the Sacramento Slough (River Mile 80.5), the Natomas Cross Canal (River Mile 79 – which includes discharges from RD1001 in Sutter County and RD1000 in Natomas Basin [Pumping Plants 4 and 6]), and RD1000 direct discharges (Pumping Plant 2 at River Mile 75, Pumping Plant 5 at River Mile 70, and Pumping Plant 3 at River Mile 66). It should be noted that RD1000 Pumping Plant 5 includes urban runoff from the Sacramento International Airport and Pumping Plant 3 includes urban runoff from the City and County of Sacramento.

Treated Water Quality Summary

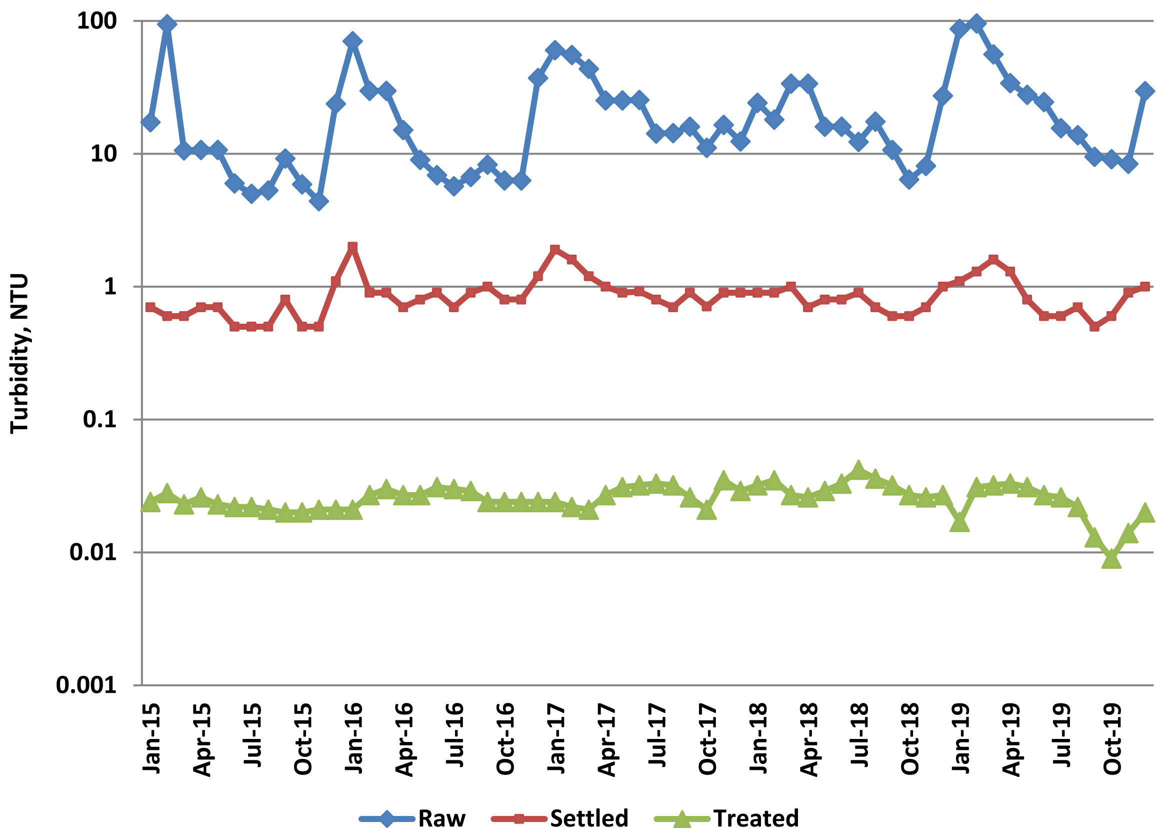
Below is a discussion of each of the constituents of interest and any notable compliance issues for each during the period of study.

Turbidity

The monthly turbidity reports submitted to DDW were reviewed as part of this analysis. These report the four-hour turbidity measurements of the CFE, as well as peak daily influent, peak daily settled, and peak daily recycled water turbidities.

A statistical assessment of electronic data at the GKWTP from January 2015 through December 2019 shows that the average of the daily peak raw water turbidity was 23.2 NTU, average of the daily peak settled water turbidity was 0.87 NTU, and the average of the daily average CFE turbidity was 0.026 NTU. The overall treatment process had an average solids removal of 99.9 percent, well above the required 80 percent. The average percent solids removal from raw to settled was 94.1 percent, with settled water turbidities less than 2 NTU occurring 98 percent of the time. **Figure 5-15** shows a time series plot of peak raw, settled and average treated daily water turbidities. The GKWTP easily met all current treated water turbidity standards.

Figure 5-15. GKWTP, Raw, Settled, and Treated Water Turbidities, 2015 – 2019



Microbiological Constituent Review

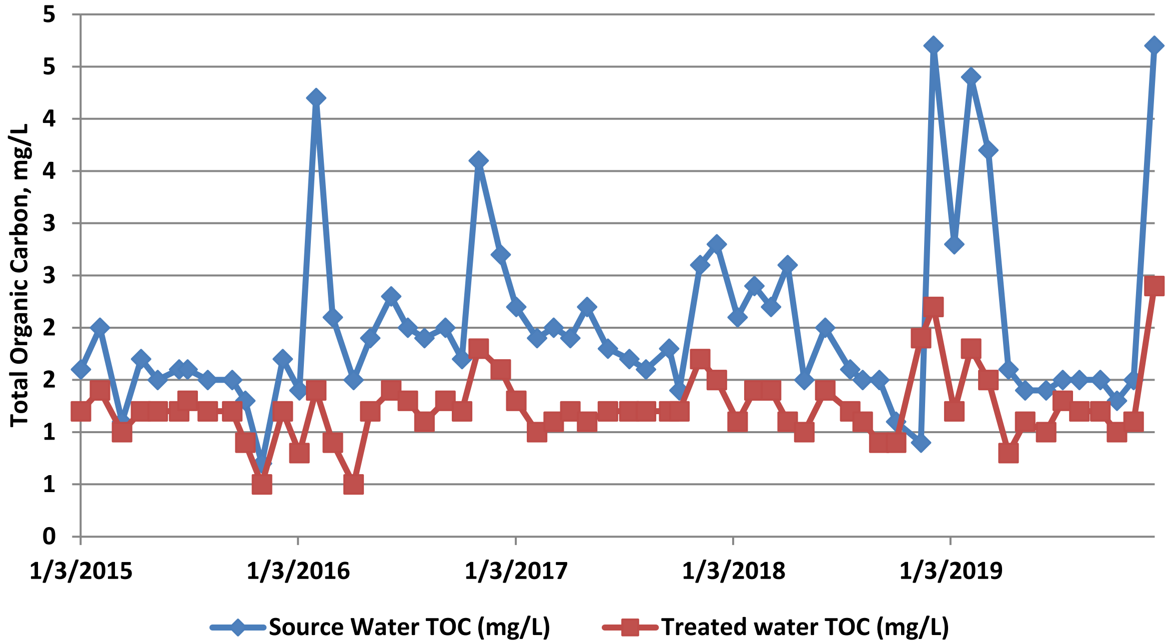
The City of West Sacramento performed monthly distribution system coliform analysis from 2015 through 2019. A review of the City of West Sacramento's CCRs shows that the monthly percent positive for total coliform was always less than five percent. Therefore, during the period of study, the City of West Sacramento was always in compliance with the Total Coliform Rule.

Disinfection By-Products

<u>*DBP Precursors*</u>

The City of West Sacramento monitors alkalinity and TOC levels in its raw water and TOC levels in its treated water monthly in order to determine TOC removal compliance. **Figure 5-16** shows a time series plot of raw and treated water TOC at GKWTP.

Figure 5-16. GKWTP, Raw and Treated Water TOC, 2015 – 2019



Source water TOC levels at GKWTP were less than 2.0 mg/L in 62 percent of the samples from 2015 to 2019, as compared with 65 percent of the samples from 2010 to 2014. Treated water TOC levels at GKWTP were less than 2.0 mg/L 97 percent of the time from 2015 to 2019, as compared with 88 percent of the time from 2010 to 2014. The average raw and treated water TOC levels at GKWTP were 2.0 mg/L and 1.2 mg/L, respectively, equating to 36 percent average removal. Based on the enhanced coagulation removal requirements set forth in the Stage 1 D/DBP Rule, the source water TOC and source water alkalinity levels typically result in either 25 or 35 percent TOC removal required. Occasionally, 45 percent TOC removal is required when source water TOC levels exceed 4.0 mg/L and raw water alkalinity is less than 60 mg/L as $CaCO_3$,

A review of raw and treated TOC monthly samples shows that the GKWTP may comply with the Stage 1 D/DBP Rule by either achieving the required percent TOC removal or using the alternative compliance criterion 2 for treated water TOC RAA, calculated quarterly, less than 2.0 mg/L. Over the reporting period of 60 months from 2015 to 2019, there were only two months (December 2018 and December 2019) when the treated water TOC was greater than 2.0 mg/L. During these months, the required TOC removal was met and therefore the system was in compliance.

Stage 2 D/DBP Rule

The City of West Sacramento converted to eight Stage 2 D/DBP Rule monitoring sites in October 2013. Over the study period, 2015 through 2019, the individual TTHM samples ranged from 18 to 104 µg/L, with an average value of 45.6 µg/L. **Figure 5-17** shows the quarterly averages since 2013, which shows that TTHMs tend to be highest in July and October. In July 2015, the quarterly average was 80.5 µg/L.

Figure 5-17. City of West Sacramento Distribution System Stage 2 D/DBP Rule TTHM Quarterly Averages, 2013-2019

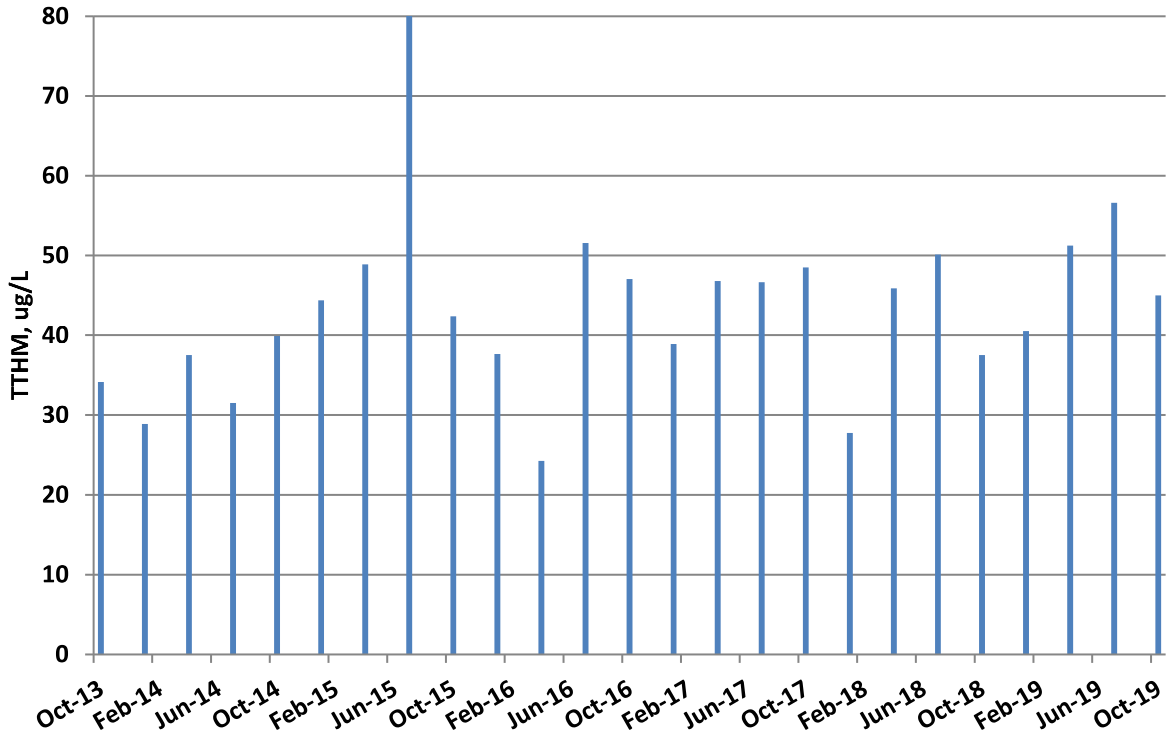


Figure 5-18 presents the TTHM LRAA maximum and median values for all sites. Over the study period the LRAAs ranged from 29.9 to 71.7 µg/L, with site 4 (Bridgeway Lakes Storage Reservoir) having the highest LRAA at 71.7 µg/L. All LRAAs were well below the current MCL of 80 µg/L.

According to City of West Sacramento staff, the Bridgeway Lakes Storage Reservoir is the site furthest from the GKWTP. Additionally, it is located in an area with newer housing developments; the City of West Sacramento has determined that the water demand from the Bridgeway Lakes Storage Reservoir was not as high as expected, and therefore the water can be prone to long detention times.

Over the study period, the individual HAA5 samples ranged from 10 to 61 µg/L, with an average value of 24.9 µg/L. **Figure 5-19** shows the quarterly averages since 2013, and there are no apparent seasonal trends.

Figure 5-18. City of West Sacramento Distribution System Stage 2 D/DBP Rule TTHM LRAAs, 2015-2019

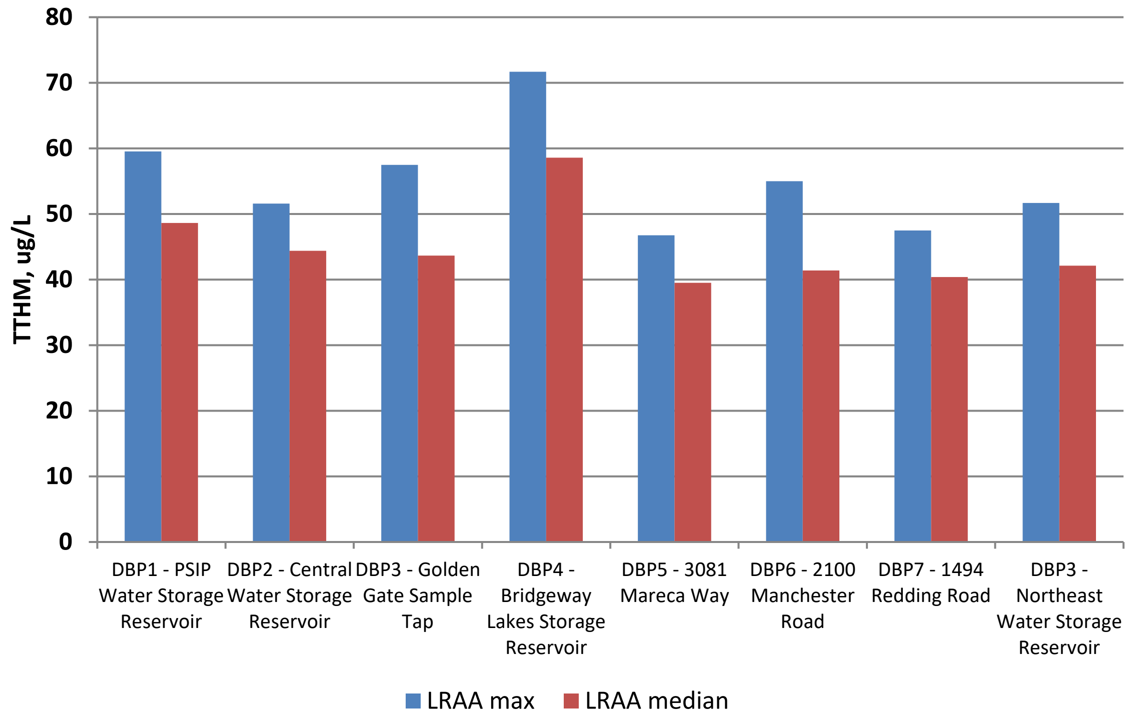


Figure 5-19. City of West Sacramento Distribution System Stage 2 D/DBP Rule HAA5 Quarterly Averages, 2013-2019

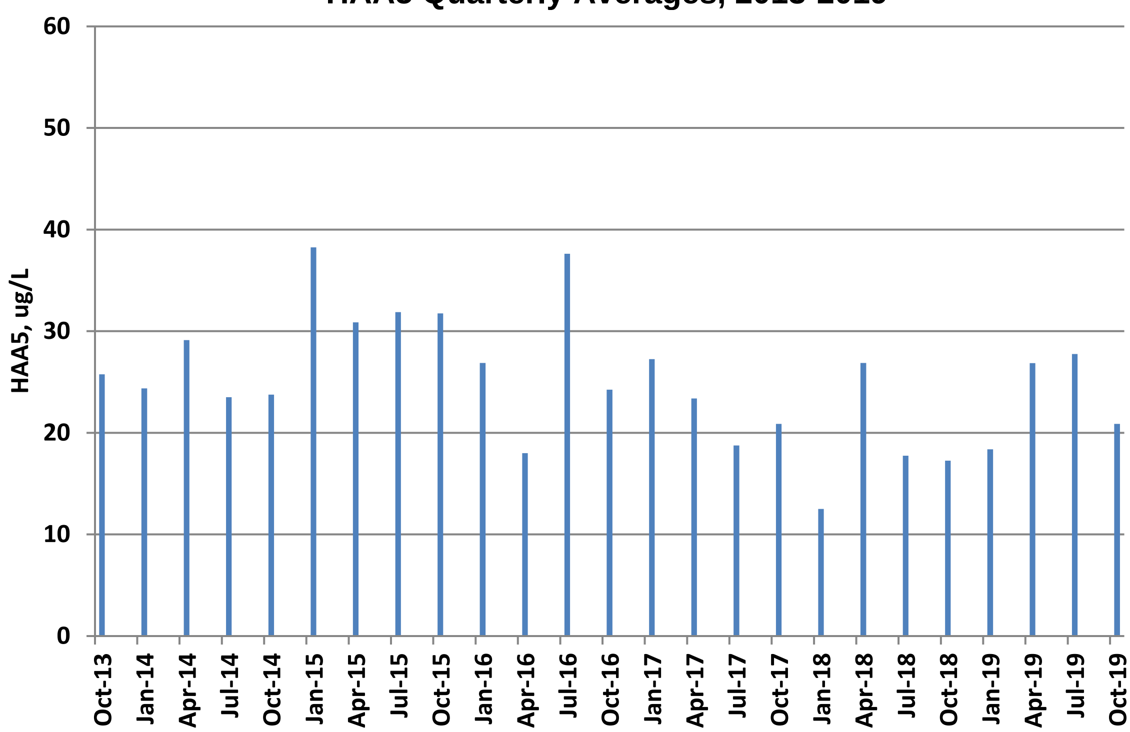
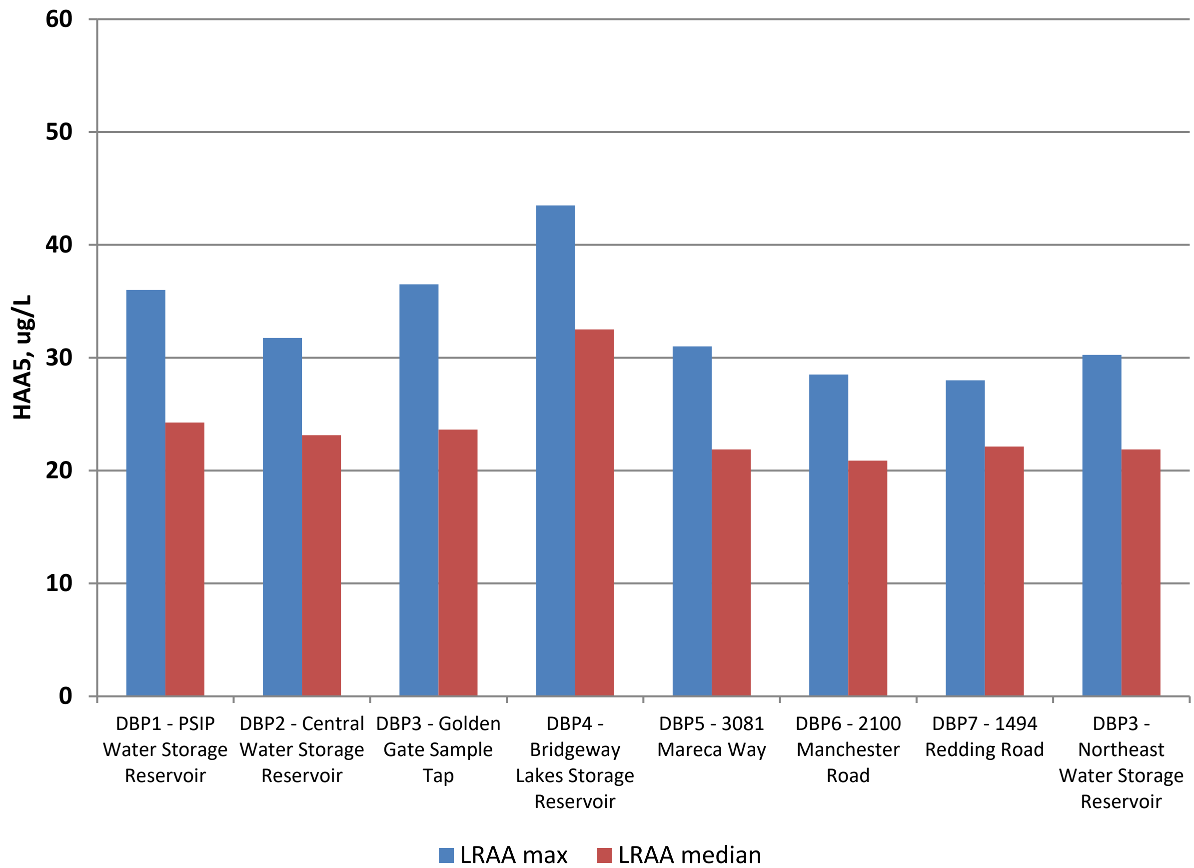


Figure 5-20 presents the HAA5 LRAA maximum and median values for all sites. Over the study period HAA5 LRAAs ranged from 15 to 43.5 µg/L, with site 4 (Bridgeway Lakes Storage Reservoir) having the highest LRAA at 43.5 µg/L. All LRAAs were well below the current MCL of 60 µg/L.

Figure 5-20. City of West Sacramento Distribution System Stage 2 D/DBP Rule HAA5 LRAAs, 2015-2019



It is difficult to compare data from the 2010-2014 to 2015-2019 time period as the number of DBP sampling sites expanded from four sites to eight sites in 2013, and five out of the eight sites were new or replacements. In addition, a major drought occurred during that study period which significantly affected source water quality.

Generally, as shown in **Figures 5-17 and 5-19**, there does not appear to be an increase in TTHM or HAA5 from 2013 to 2019. Additionally, the 2013 to 2014 TTHM average was 34.4 µg/L and the 2015 to 2019 TTHM average was 45.6 µg/L. The 2013 to 2014 HAA5 average was 25.3 µg/L and the 2015 to 2019 HAA5 average was 24.9 µg/L.

Unregulated Contaminant Monitoring Rule

UCMR 3

Third round UCMR (UCMR3) sampling was conducted in March, June, September, and December 2015, and all perfluorinated compounds and organics at the entry point to the distribution system were non-detectable. Additionally, only chromium, hexavalent chromium, strontium, and vanadium at the entry point to the distribution system were found to be detectable, at very low levels as shown in **Table 5-5**.

Table 5-5
Results of UCMR3 Monitoring for City of West Sacramento, Entry Point to Distribution System

Constituent	Result, µg/L
Total Chromium	<0.2 - 0.3
Hexavalent Chromium	0.18 – 0.27
Vanadium	2.4 – 3.3
Strontium	76 - 130

UCMR 4

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from July to October 2018 at the entry point to the distribution system. All sample results were non-detect.

The 17 required constituents were also monitored quarterly at the entry point to the distribution system, representing treated water, from January to October 2018. All sample results were non-detect except manganese which ranged from 40 to 115 µg/L, which was near or above the Secondary MCL of 50 µg/L.

Three brominated haloacetic acid groups (HAA5, HAA9 and HAA6Br) were monitored in the distribution system from January to October 2018 as shown in **Table 5-6.**

Table 5-6
UCMR4 Monitoring for City of West Sacramento Distribution System

Location	HAA5 Average, µg/L	HAA6Br Average, µg/L	HAA9 Average, µg/L
DBP1 - PSIP Water Storage Reservoir	20.1	4.0	23.9
DBP2 - Central Water Storage Reservoir	22.0	3.0	25.1
DBP4 - Bridgeway Lakes Storage Reservoir	27.7	4.1	31.7
DBP5 - 3081 Mareca Way	15.4	3.4	18.7
DBP6 - 2100 Manchester Road	15.2	3.1	18.1
DBP7 - 1494 Redding Road	16.5	3.2	19.6
DBP8 - Northeast Water Storage Reservoir	17.9	3.3	21.1
DPB3 - Marshall and G	20.1	3.9	23.8

Giardia/Virus/*Cryptosporidium* Reduction Requirements

Based on the *E. coli*, *Giardia*, and *Cryptosporidium* data presented in **Section 3**, 3/4/2-log reduction of *Giardia*/virus/*Cryptosporidium* continue to be appropriate reduction requirements for GKWTP. Out of 60 months from 2015 to 2019, there was only one *E. coli* monthly median at or higher than 200 MPN/100mL.

GKWTP currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with free chlorine provides 0.5-log credit for *Giardia* and 2.0-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR and IESWTR.

The City of West Sacramento has a Bin 1 classification based on *Cryptosporidium* monitoring data for the second round of LT2ESTWR monitoring. Therefore, no additional plant improvements are anticipated at this time to meet future regulations.

Regulatory Compliance Evaluation

The City of West Sacramento has been monitoring the raw and treated water for GKWTP for Title 22 compliance constituents. **Table 5-7** lists the existing drinking water regulations and a compliance evaluation for these standards at GKWTP. West Sacramento is currently in compliance with current requirements and is expected to be in compliance with near-term requirements.

Table 5-7
Regulatory Compliance Evaluation
City of West Sacramento – GKWTP

	Targeted Compounds	Key Issues Compliance Status
Existing Regulations		
Phase I, II, and V	IOCs, VOCs, SOCs	No MCLs exceeded based on review of the CCRs.
SWTR	Microbial and Turbidity	Data continue to support 3/4—log reduction requirement for *Giardia*/viruses. All operations, monitoring and reporting requirements are met, and all treated water turbidity standards are met.
Interim/Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Long Term 2 ESWTR	Microbial	*Cryptosporidium* data collected and resulted in Bin 1 classification for both Round 1 and 2, with no additional action required.
Stage 1 D/DBP Rule	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, alternative compliance criterion is met and enhanced coagulation not required.
Stage 2 D/DBP Rule	Disinfectants and Disinfection By-Products	Current TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (< 80/60 µg/L, respectively) and standards are met.

CITY OF SACRAMENTO SACRAMENTO RIVER WATER TREATMENT PLANT

System Description

The City of Sacramento owns and operates the SRWTP, which treats Sacramento River water diverted at River Mile 60 immediately downstream of the confluence with the American River. The SRWTP has a capacity of 160 mgd. A rehabilitation construction project was completed in 2016 to bring the plant capacity to the permitted capacity of 160 mgd. The current average winter flow is approximately 35 mgd, and the current average summer flow is approximately 60 mgd. The SRWTP is a conventional water treatment plant. The influent water is pre-chlorinated for disinfection and pre-treatment. Aluminum sulfate is added as a coagulant and a nonionic polymer is added to the flocculation basins.

The SRWTP has four separate but identical process basins. Basins 1 and 2 were built in 2003 and Basins 3 and 4 were built in 2016. The water is flocculated in four-stages and each basin uses vertical-shaft flocculators. Each basin uses two parallel horizontal-flow clarifiers with a surface-loading rate of 1.0 gpm/sf. A nonionic polymer can be added to the settled water as a filter aid.

The settled water is applied to sixteen separate gravity-flow, deep, dual-media filters. The deep filters consist of 30 inches of anthracite over 12 inches of sand. The filters use a "gravel-less" underdrain system with nozzles and a lower plenum, and are backwashed with air and water. The newer filters are permitted to filter up to 8.0 gpm/sf.

All of the filters have filter-to-waste and are typically backwashed approximately every 72 hours. All filter backwash water is sent to the filter washwater lagoons for settling and then returned to the raw water channel downstream of the grit basins and upstream of the flash mix system. The maximum return recycle flow rate is typically limited to no more than 10 percent of plant flow.

After filtration, the water is chlorinated for disinfection, and the pH is adjusted with lime. Contact time for disinfection (CT) is also calculated throughout the plant. The three clearwells at the water treatment plant provide 17.3 mg of storage, including disinfection contact time. The distribution system has an additional 45 mg of storage.

In 2016, a solids management system was installed which consists of gravity thickeners, homogenizing tanks, and centrifuge tanks that process sludge from the sedimentation and filter wash water basins. The system effectively reduces the moisture content of the sludge. Large concrete basins are used to store processed sludge (wet solids), for decanting purposes during maintenance operations, and/or during emergency plant operations. Decant from the thickeners is recycled to the filter wash water lagoons, which is then returned to the head of the plant. Once the processed sludge is dried, it is hauled offsite to a landfill, which typically occurs twice a year. Prior to 2016, sludge was spread out to dry in lagoons.

A phased expansion of the SRWTP is currently being planned to meet projected growth. This will likely include a new intake on the Sacramento River, or a modification of the existing intake.

Highlight of Changes Since 2015 Update

- As stated above, a rehabilitation construction project was completed in 2016. As a result, there are now four identical treatment trains with a total design capacity of 160 mgd. The following modifications were also completed:
  - Updated the sludge dewatering process by adding three centrifuge pumps and related equipment to help expedite sludge drying and removal.
  - Replaced the High Service Pump Station.
  - Installed eight new filters to replace 16 filters that were built in the 1920's and 1930's.
  - Added vortex breakers to the intake structure to help reduce pump cavitation during low river levels.

Significant Potential Contaminating Activities in Protection Zone

The protection zone for this diversion location has been identified as the Sacramento River from River Mile 60 to the confluence with the Feather River at River Mile 80 and the Lower American River to Nimbus Dam. Both rivers have levees on both sides. This is shown on the inset map of the Watershed Map, see **Figure 2-1**. Since this study focuses on the Sacramento River, and the American River has a separate Watershed Sanitary Survey, this study only evaluates the part of the Lower American River near the confluence with the Sacramento River.

The area nearest the intake on the Sacramento and American Rivers is urban, while the area north of Sacramento International Airport remains largely agricultural and rural, with limited urban or industrial development. There are several bridge crossings in the protection zone (Interstate 5, Interstate 80, and several along the Lower American River). Recreational uses on the Sacramento River are mostly limited to power boating and on-shore and boat fishing. There is swimming at Sand Cove Park, just downstream of GKWTP. Elkhorn Regional Park is located upstream and provides boat launch and permanent toilet facilities. There are seven marinas: one near River Mile 80 (Verona Village), two near River Mile 70.5 (Alamar and Metro), one near River Mile 62.5 (Harry's), and three between River Miles 61 and 62 (Riverview, Virgin Sturgeon, and Riverbank). The Rio Ramaza Marina at River Mile 75 has been permanently closed. Fuel is available at the Metro Marina and sewage pumpouts are available at the Alamar, Riverview, and Riverbank marinas. Recreational use on the American River is centered on the American River Parkway, and includes boating, fishing, and body contact recreation. Discovery Park is a popular beach area along with other stretches of the river, while rafting occurs along the length of the American River. There are several major agricultural drains discharging to the river in this reach including: the Sacramento

Slough (River Mile 80.5), the Natomas Cross Canal (River Mile 79 – which includes discharges from Reclamation District (RD) 1001 in Sutter County and RD1000 in Natomas Basin [Pumping Plants 4 and 6]), and RD1000 direct discharges (Pumping Plant 2 at River Mile 75, Pumping Plant 5 at River Mile 70, Pumping Plant 3 at River Mile 66, and Pumping Plant 1 at River Mile 61). It should be noted that RD1000 Pumping Plant 5 includes urban runoff from the Sacramento International Airport and Pumping Plants 1 and 3 include urban runoff from the City and County of Sacramento. There are significant amounts of urban runoff from the Sacramento urban area, as well as some permitted industrial waste discharge, entering the river directly via sumps and indirectly via the Natomas East Main Drainage Canal at River Mile 60.5 and the Lower American River. Also, in the area along the Sacramento River between GKWTP and SRWTP and along the Lower American River there are known areas of illegal camping in the river corridor.

Treated Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each during the period of study.

Turbidity

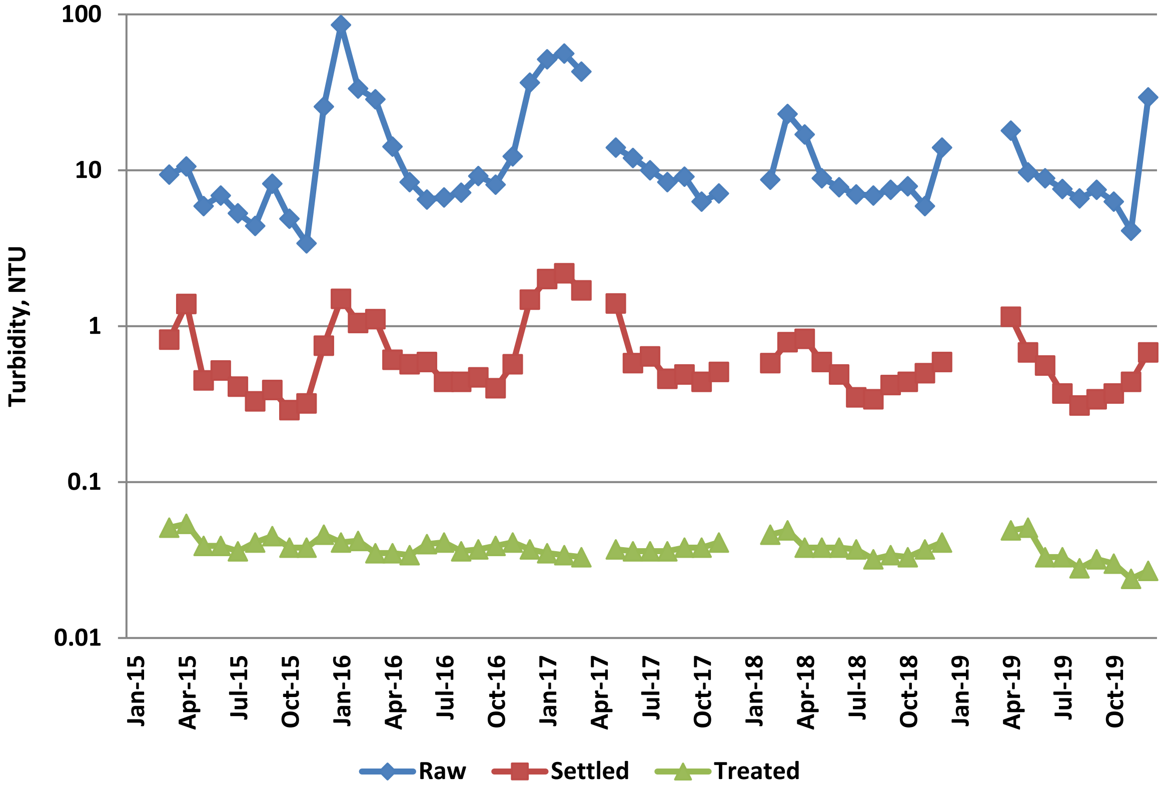
The monthly turbidity reports submitted to DDW were reviewed as part of this analysis. These report the four-hour turbidity measurements of the CFE, as well as peak daily influent, peak daily settled, and peak daily recycled water turbidities.

A statistical assessment of electronic data at the SRWTP from January 2015 through December 2019 shows that the average of the daily peak raw water turbidity was 14.8 NTU, average of the daily peak settled water turbidity was 0.695 NTU, and the average of the daily average CFE turbidity was 0.038 NTU. The overall treatment process had an average solids removal of 99.7 percent, well above the required 80 percent. The average percent solids removal from raw to settled was 94.1 percent, with settled water turbidities less than 2 NTU occurring 98 percent of the time. **Figure 5-21** shows a time series plot of peak raw, settled, and average treated daily water turbidities. The SRWTP easily met all current treated water turbidity standards.

Microbiological Constituent Review

The City of Sacramento performed monthly distribution system coliform analysis from 2015 through 2019. A review of the 2015 to 2019 City of Sacramento's CCRs shows that the monthly percent positive for total coliform was always less than five percent, with the exception of 2015. The 2015 CCR noted that one routine sample was positive for *E. coli*. However, there was no MCL violation as the detection was not confirmed by three repeat samples taken in accordance with the Total Coliform Rule. Therefore, during the period of study, the City of Sacramento was always in compliance with the Total Coliform Rule.

Figure 5-21. SRWTP, Raw, Settled, and Treated Water Turbidities, 2015 - 2019



Disinfection By-Products

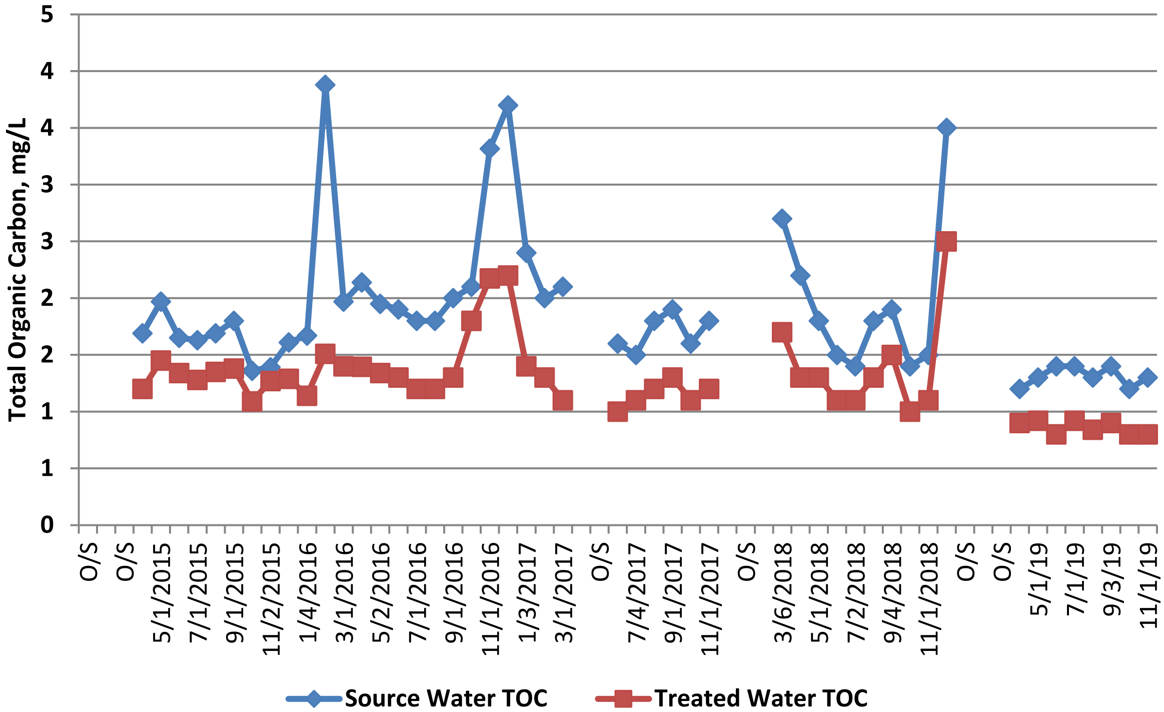
DBP Precursors

The City of Sacramento monitors alkalinity and TOC levels in its raw water and TOC levels in its treated water monthly in order to determine TOC removal compliance. **Figure 5-22** shows a time series plot of raw and treated water TOC at SRWTP.

Source water TOC levels at SRWTP were less than 2.0 mg/L 75 percent of the time from 2010 to 2014, as compared with 68 percent of the time from 2015 to 2019. Treated water TOC levels at SRWTP were less than 2.0 mg/L 94 percent of the time from 2010 to 2014, as compared with 93 percent of the time from 2015 to 2019.

The average raw and treated water TOC levels at SRWTP were 1.9 mg/L and 1.3 mg/L, respectively, equating to 25 percent average removal. Based on the enhanced coagulation removal requirements set forth in the Stage 1 D/DBP Rule, the source water TOC and source water alkalinity levels typically result in either 25 or 35 percent TOC removal required.

Figure 5-22. SRWTP, Raw and Treated Water TOC, 2015 – 2019



A review of raw and treated TOC monthly samples shows that the SRWTP may comply with the Stage 1 D/DBP Rule by either achieving the required percent TOC removal or using the alternative compliance criterion 2 for treated water TOC less than 2.0 mg/L. Over the reporting period of 60 months from 2015 to 2019, there were only three months (November and December 2016 and December 2018) when the treated water TOC was greater than 2.0 mg/L. During these months, SRWTP was required to demonstrate the required percent TOC removal. In November 2016, the required percent TOC removal was 35 percent and 34.4 percent was achieved. In December 2016, the required percent TOC removal was 25 percent and 40.5 percent was achieved. In December 2018, the required percent TOC removal was 35 percent and 28.6 percent was achieved. Even though the TOC percent removal ratio was less than 1.0 in November 2016 and December 2018, compliance with the enhanced coagulation requirement is based on a running annual average, calculated quarterly, so the SRWTP met the standard over the year.

Stage 2 D/DBP Rule

The City of Sacramento converted to twelve Stage 2 D/DBP monitoring sites in January 2011. Nine out of the twelve sites are applicable to the SRWTP. Sites 4N12, 3S6 and 3SB generally do not represent treated water from the SRWTP. Over the study period, the individual TTHM samples ranged from non-detect (ND) to 80 µg/L, with an average value of 51 µg/L. **Figure 5-23** shows the quarterly averages since 2011, and shows that TTHMs tend to be highest in April and July.

Figure 5-23. City of Sacramento Distribution System Stage 2 D/DBP Rule TTHM Quarterly Averages, 2011-2019

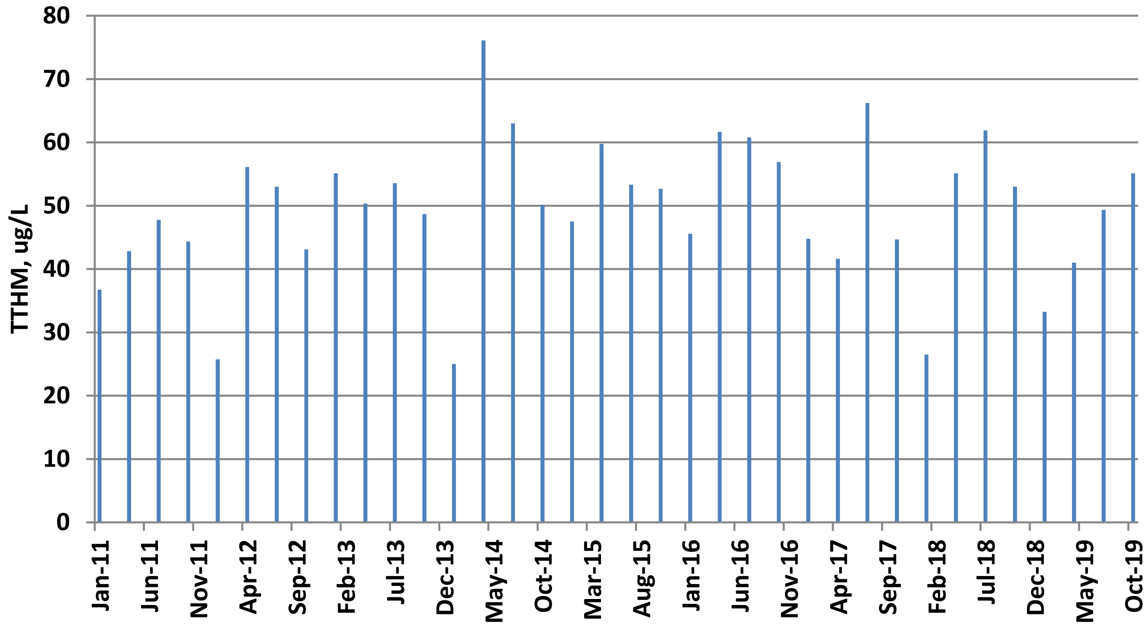
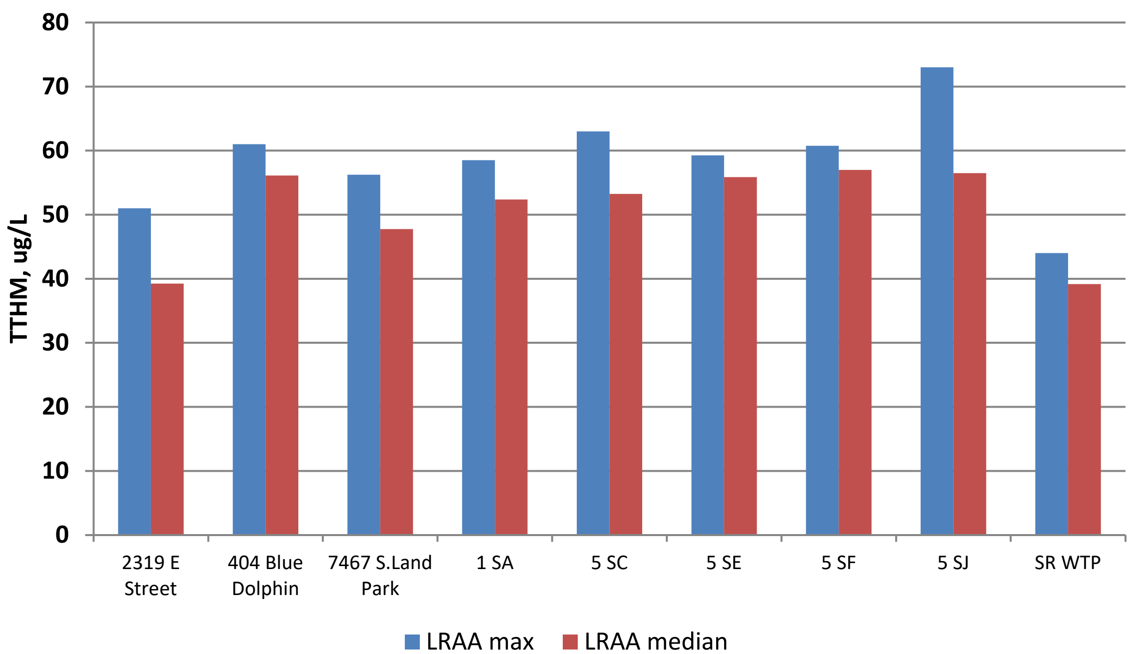


Figure 5-24 presents the TTHM LRAA maximum and median values for all sites during the study period. TTHM LRAAs ranged from 26.5 to 73 µg/L, with site 5SJ having the highest LRAA at 73 µg/L, all at or below the current MCL of 80 µg/L.

Figure 5-24. City of Sacramento Distribution System Stage 2 D/DBP Rule TTHM LRAAs, 2015-2019



Over the study period, the individual HAA5 samples ranged from ND to 58 µg/L, with an average value of 30 µg/L. **Figure 5-25** shows the quarterly averages since 2011, and shows that HAA5s tend to be highest in January and April.

Figure 5-25. City of Sacramento Distribution System Stage 2 D/DBP Rule HAA5 Quarterly Averages, 2011-2019

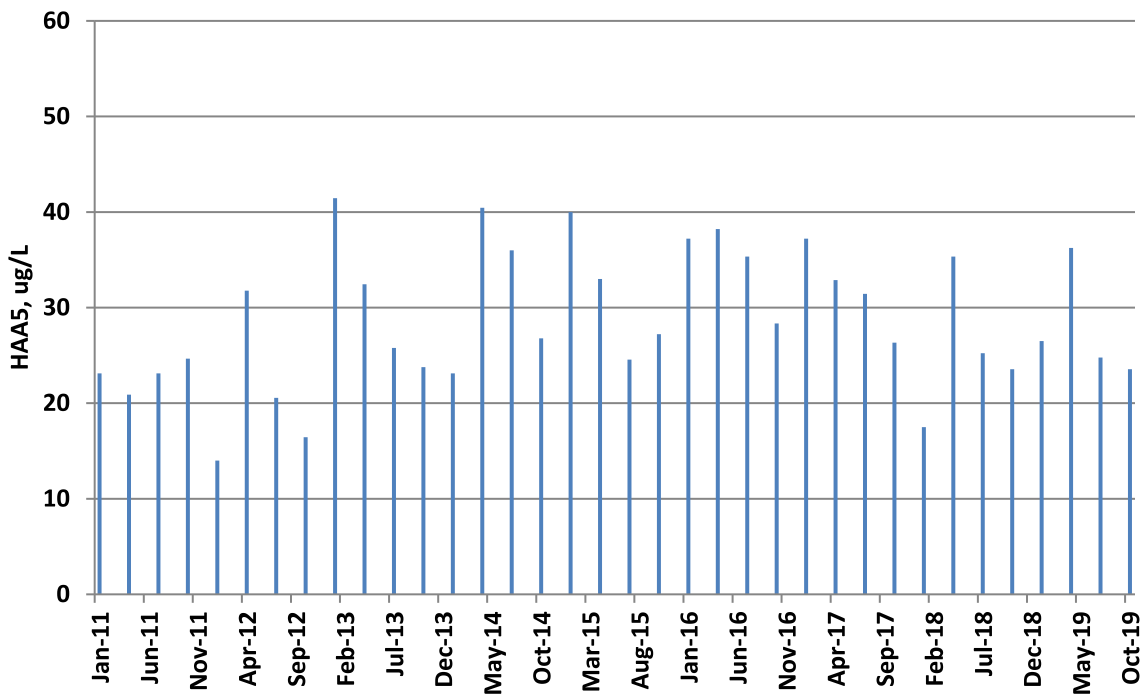
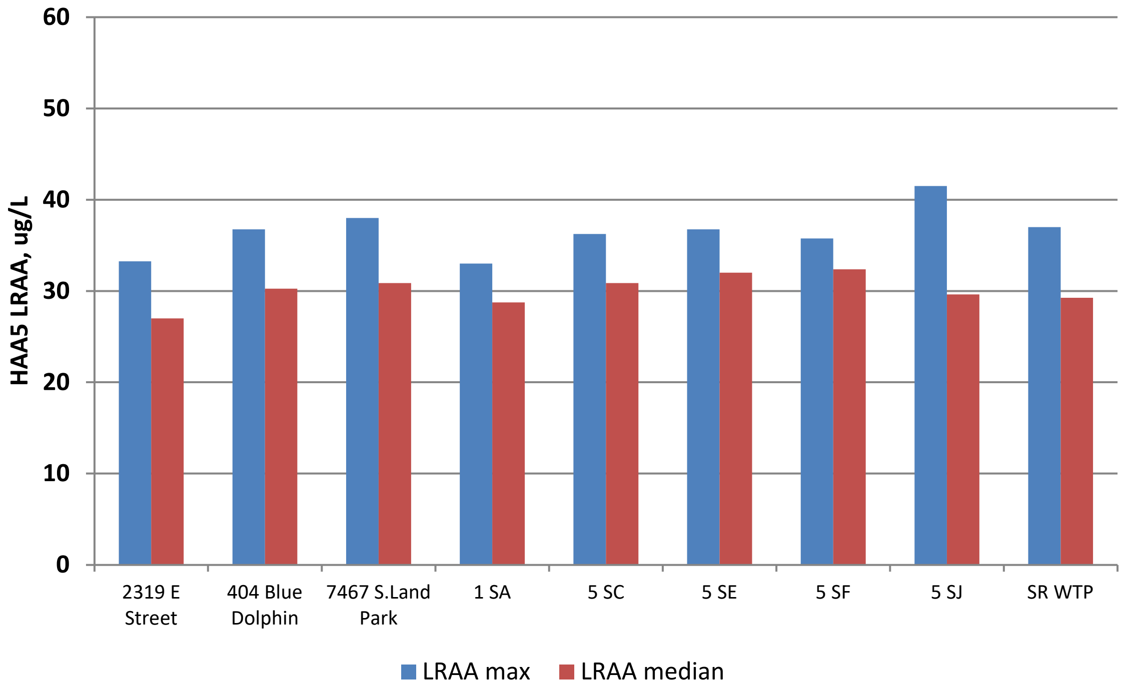


Figure 5-26 presents the HAA5 LRAA maximum and median values for all sites during the study period. HAA5 LRAAs ranged from 16.5 to 41.5 µg/L, with site 5SJ having the highest LRAA at 41.5 µg/L. All LRAAs were well below the current MCL of 60 µg/L.

Generally, as shown in **Figures 5-23 and 5-25**, there does not appear to be an increase in TTHM or HAA5 from 2011 to 2019. Additionally, the 2011 to 2014 TTHM average was 48 µg/L and the 2015 to 2019 TTHM average was 51 µg/L. The 2011 to 2014 HAA5 average was 27 µg/L and the 2015 to 2019 HAA5 average was 30 µg/L.

Figure 5-26. City of Sacramento Distribution System Stage 2 D/DBP Rule HAA5 LRAAs, 2015-2019



Unregulated Contaminant Monitoring Rule

UCMR 4

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from May to August 2018 at the entry point to the distribution system (representing treated water). All sample results were non-detect.

Three brominated haloacetic acid groups (HAA5, HAA9 and HAA6Br) were monitored in the distribution system in 2019. Total HAA9 ranged from 5.0 to 30 µg/L, with an average of 24 µg/L, total HAA6Br ranged from 1.0 to 3.6 µg/L, with an average of 2.1 µg/L, and total HAA5 ranged from 4.2 to 28 µg/L, with an average of 22 µg/L.

The City of Sacramento began monitoring for the 17 required constituents at the entry point to the distribution system in 2020.

***Giardia*/Virus/*Cryptosporidium* Reduction Requirements**

Based on the *E. coli*, *Giardia*, and *Cryptosporidium* data presented in **Section 3**, 3/4/2-log reduction of *Giardia*/virus/*Cryptosporidium* continue to be appropriate reduction requirements for SRWTP. Out of 52 months from 2015 to 2019, there were only two *E. coli* monthly medians at or higher than 200 MPN/100mL at the SRWTP.

SRWTP currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with free chlorine provides 0.5-log credit for *Giardia* and 2.0-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR and IESWTR.

The City of Sacramento has a Bin 1 classification based on *Cryptosporidium* monitoring data for the second round of LT2ESTWR. Therefore, no additional plant improvements are anticipated at this time to meet future regulations.

Regulatory Compliance Evaluation

The City of Sacramento has been monitoring the raw and treated water for the SRWTP for Title 22 compliance constituents. **Table 5-8** lists the existing drinking water regulations and a compliance evaluation for these standards at SRWTP. SRWTP is currently in compliance with current requirements and is expected to be in compliance with near-term requirements.

Table 5-8
Regulatory Compliance Evaluation
City of Sacramento – SRWTP

	Targeted Compounds	**Key Issues Compliance Status**
Existing Regulations		
Phase I, II, and V	IOCs, VOCs, SOCs	No MCLs exceeded based on review of the CCRs.
SWTR	Microbial and Turbidity	Data continue to support 3/4—log reduction requirement for *Giardia*/viruses. All operations, monitoring and reporting requirements are met, and all treated water turbidity standards are met.
Interim/Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards are met. 2-log reduction credit for *Cryptosporidium* is applicable.
Long Term 2 ESWTR	Microbial	*Cryptosporidium* data collected and resulted in Bin 1 classification for both Round 1 and 2, with no additional action required.
Stage 1 D/DP Rule	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, an alternative compliance criterion is met and enhanced coagulation not required.
Stage 2 D/DBP Rule	Disinfectants and Disinfection By-Products	Current TTHM/HAA5 LRAA's for Stage 2 data are below drinking water standards(<80/60 µg/L, respectively) and all standards are met.

FRWA INTAKE DIVERSION

This section evaluates the FRWA Intake Diversion and its associated facilities. This diversion delivers water directly to SCWA's VSWTP as well as to EBMUD for mixing with other source waters in their terminal reservoirs in the Bay Area prior to treatment or direct treatment at the Walnut Creek WTP in 2015, as discussed below.

System Description

FRWA is a joint-powers authority formed by SCWA and EBMUD to operate an untreated water delivery system from the Sacramento River. FRWA constructed a 185 mgd intake at River Mile 47, along with over 17 miles of 84-inch, 72-inch and 66-inch raw water pipeline, as part of the municipal water supply project. SCWA is able to receive up to 100 mgd at the VSWTP located at the intersection of Florin Road and Knox Road, approximately 13.5 miles from the intake. The VSWTP has an initial capacity of 50 mgd, with provisions for expansion to 100 mgd. The average daily flow in the winter is 6.5 mgd and 25.4 mgd in the summer, based on 2018 and 2019 production data. The VSWTP became operational in September 2011, and SCWA distributes its treated surface water from the VSWTP within its North and Central Services Areas. Both of these areas also use groundwater, and groundwater will continue to be used as a peaking and supplemental supply according to SCWA's conjunctive use program.

EBMUD

The withdrawal of water by EBMUD from the Sacramento River is determined by EBMUD in accordance with its entitlement to Project Water Service of the Central Valley Project under its Long Term Renewal Contract with the United States Bureau of Reclamation (USBR). Under this contract, EBMUD is entitled to take delivery of 133 thousand acre-feet (TAF) in a water year, when the March 1st forecast of the October 1st total system storage, as revised monthly through May 1st, is below 500,000 acre-feet (AF), based on a 50 percent exceedance. In most years EBMUD will not divert Sacramento River, and SCWA will be the only user of water during these periods.

EBMUD can receive up to 100 mgd of untreated water at the Folsom South Canal (FSC), approximately 16.3 miles from the intake. EBMUD blends this water from the FSC into its raw water supply system (the Mokelumne Aqueducts) and is stored in San Pablo and Upper San Leandro Reservoirs. Originally, this blended source water was only intended for treatment at its Sobrante and Upper San Leandro surface water treatment plants. Both of these water treatment plants have conventional filtration, and permitted design capacities of 60 mgd.

EBMUD Board of Directors declared a Stage 4 Critical Drought on April 14, 2015 and authorized a plan to increase the supplemental supply annual capacity from 65 TAF to 100 TAF. The supplemental supply of 65 TAF is normally treated by the EBMUD's two conventional water treatment plants, Upper San Leandro and Sobrante as discussed above. In order to increase the supplemental supply from 65 TAF to 100 TAF the following was required in 2015:

- San Pablo WTP would need to be put into operation from current standby mode. This water treatment plant provides conventional treatment for water stored in San Pablo Reservoir.
- Water from FSC would be delivered to Briones Reservoir to store additional supply.
- One or more of the in-line water treatment plants: Walnut Creek WTP, Lafayette WTP, and Orinda WTP would treat FSC water.

A letter from DDW to EBMUD dated August 17, 2015 approved all elements of the plan discussed above. DDW reviewed pilot testing conducted by EBMUD in 2015, which demonstrated that FSC water (without blending) could be treated to the same levels of turbidity and particle removal as the Mokelumne supply. On October 22, 2015 DDW further clarified that FSC water could be treated at all inline filtration plants (Orinda, Lafayette, and Walnut Creek WTPs). It should be noted that although this approval was given by DDW in 2015, the approval was only to address the drought situation at the time. Although EBMUD did seek a permit amendment in April 2016 to allow EBMUD's three in-line water treatment plants to treat FSC water in the future, DDW did not issue a revised permit. Therefore, EBMUD's three in-line treatment plants do not currently have a permit to treat FSC water.

After receiving approval, the Walnut Creek WTP treated 100 percent FSC water for 30 days from September 15 to October 15, 2015 for half of the water treatment plant (north side). The south side of the water treatment plant treated Mokelumne water during the 30 days. Walnut Creek WTP effluent was sampled once for regulated inorganics and once for regulated secondary standards. Results met all primary and secondary MCLs. Similarly, the distribution system was in compliance with the Total Coliform Rule, SWTR, and Stage 2 D/DBP Rule in the fourth quarter of 2015, which was sampled in October when the north side of the Walnut Creek WTP was treating FSC water (EBMUD Engineering Report, March 2016).

FSC water was also delivered to Briones Reservoir from October to December 2015, as shown in **Table 5-9.** The Orinda WTP treated a blend of FSC, Pardee, and local watershed runoff during this time.

Table 5-9
Water Volumes (AF) Diverted from FRWA Intake to Folsom South Canal and to EBMUD Facilities, 2015 - 2019

Month	FSC	San Pablo Reservoir	USL Reservoir	Walnut Creek WTP	Briones Reservoir
April 2015	4,023	2,391	1,632		
May 2015	8,445	2,795	5,650		
June 2015	8,117	2,738	5,379		
July 2015	6,903	1,335	5,568		
Aug. 2015	6,035	726	5,309		
Sept. 2015	8,127	5,344	1,754	1,029	
Oct. 2015	5,476	4,128		824	524
Nov. 2015	7,099	2,535			4,564
Dec. 2015	3,704	626			3,078
Total	57,930	22,619	25,292	1,853	8,166

SCWA

SCWA's VSWTP is a conventional surface water treatment plant with dual media filters. The water may be pre-oxidized with potassium permanganate. Aluminum chlorohydrate is used as the primary coagulant. Chemicals are mixed via pumped diffusion injection in the flash mix system. Water flows to three parallel flocculation/sedimentation basins. The flocculators have variable speed vertical shaft drives. Water is filtered by eight dual media filters which have 12 inches of sand and 48 inches of anthracite. Filters are backwashed based on turbidity or head loss, and backwash water is sent to two washwater basins. After returning to service, the water is filtered-to-waste until turbidity levels are acceptable. Settled backwash water is treated in a clarifier basin, and the decant is returned upstream of chemical flash mix. After filtration, the water is chlorinated for disinfection and the pH adjusted with caustic soda.

Highlights of Changes Since 2015 Update

Since the 2015 Update, there have been no significant changes to the FRWA Intake or VSWTP. In 2015 EBMUD received approval from DDW to utilize the Sacramento River source differently than originally approved, with water now allowed to be stored in more terminal reservoirs and used for direct application at several of their Bay Area in-line water treatment plants.

Significant Potential Contaminating Activities in Protection Zone

The protection zone for this diversion location has been identified as the Sacramento River from River Mile 47 to the confluence with the Feather River at River Mile 80 and the Lower American River to Nimbus Dam. Both rivers have levees on both sides. This is shown on the inset map of the Watershed Map, see **Figure 2-1**. Since this study focuses on the Sacramento River, and the American River has a separate Watershed Sanitary Survey, this study only evaluates the part of the Lower American River at the confluence with the Sacramento River.

The area nearest the intake on the Sacramento and American Rivers is urban, while the area north of Sacramento International Airport remains largely agricultural and rural, with limited urban or industrial development. There are several bridge crossings in the protection zone (Interstate 5, Interstate 80, I Street, and Tower). Recreational uses on the Sacramento River are mostly limited to power boating and on-shore and boat fishing. There is swimming at Sand Cove Park, just downstream of GKWTP. Elkhorn Regional Park is located upstream and provides boat launch and permanent toilet facilities. There are 11 marinas; one near River Mile 80 (Verona Village), two near River Mile 70.5 (Alamar and Metro), one near River Mile 62.5 (Harry's) three between River Miles 61 and 62 (Riverview, Dwyer's Happy Landing, and Riverbank), one at River Mile 58 (Sacramento), two near River Mile 55 (Sacramento Yacht Club and Sherwood Harbor), and one at River Mile 50 (Stan's Yolo). Rio Ramaza Marina located near River Mile 76 has been permanently closed. Fuel is available at Metro, Sacramento, Sherwood Harbor, and Stan's Yolo marinas, as well as at Steamboat Landing near River Mile 59. Sewage pumpouts are available at the Alamar, Riverview, Riverbank, Sacramento, Sacramento Yacht Club, and Sherwood Harbor marinas. Recreational use on the American River is centered on the American River Parkway, and includes boating, fishing, and body contact recreation. Discovery Park is a popular beach area along with other stretches of the river, while rafting occurs along the length of the American River. There are several major agricultural drains discharging to the river in this reach, including: the Sacramento Slough (River Mile 80.5), the Natomas Cross Canal (River Mile 79 – which includes discharges from RD1001 in Sutter County and RD1000 in Natomas Basin [Pumping Plants 4 and 6]), and RD1000 direct discharges (Pumping Plant 2 at River Mile 75, Pumping Plant 5 at River Mile 70, Pumping Plant 3 at River Mile 66, and Pumping Plant 1 at River Mile 61). It should be noted that RD1000 Pumping Plant 5 includes urban runoff from the Sacramento International Airport and Pumping Plants 1 and 3 include urban runoff from the City and County of Sacramento. There are significant amounts of urban runoff from the Sacramento urban area, as well as some permitted industrial waste discharge, entering the river directly via sumps and indirectly via the Natomas East Main Drainage Canal at River Mile 60.5 and the Lower American River. There are potential discharges from the City of Sacramento Combined Sewer System. Also, in the area between GKWTP and SRWTP and along the Lower American River there are known areas of illegal camping in the river corridor.

Low river flows, exaggerated by the recent drought, can lead to Sacramento River reverse flow conditions. If reverse flow conditions are severe enough, the FRWA Intake has to be shut down in order to avoid urban runoff from Sump 28 and treated wastewater flows from the downstream Sacramento Regional Wastewater Treatment Plant entering the FRWA Intake.

Treated Water Quality Summary

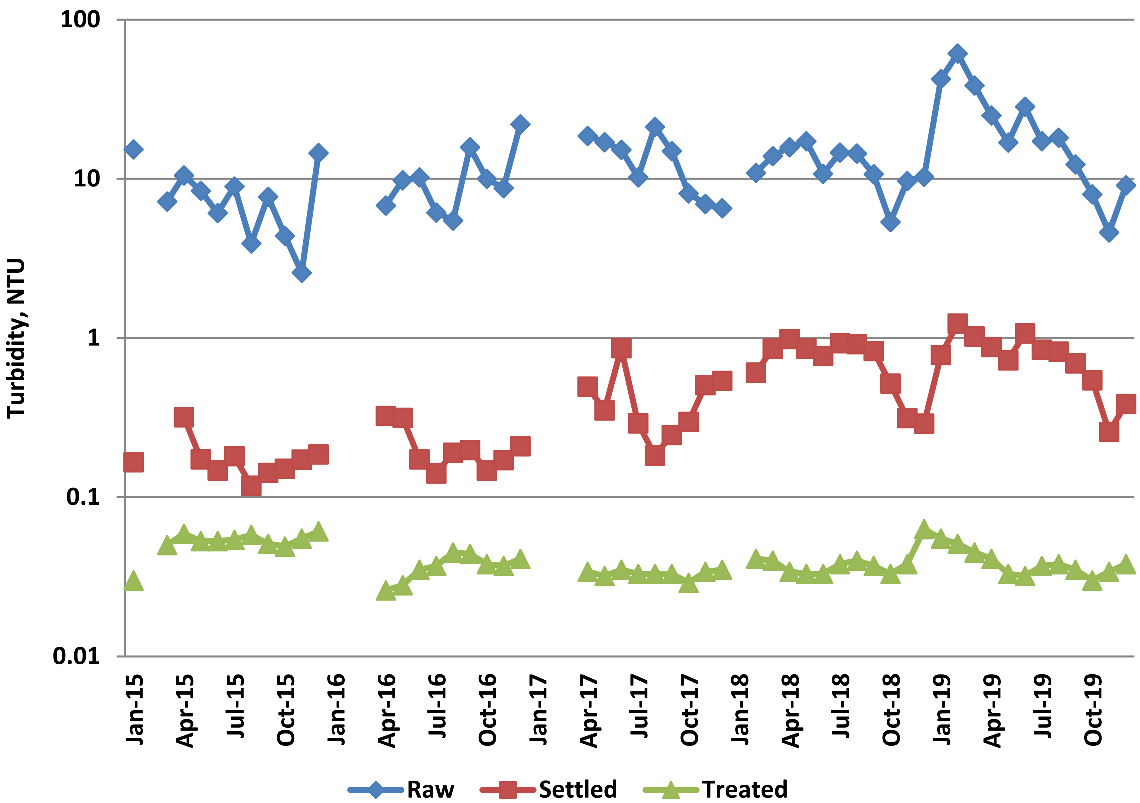
Below is a discussion of each of the constituents of interest and any notable compliance issues for each during the period of study.

Turbidity

The monthly turbidity reports submitted to DDW were reviewed as part of this analysis. These report the four-hour turbidity measurements of the CFE, as well as peak daily influent, peak daily settled, and peak daily recycled water turbidities.

A statistical assessment of electronic data at the VSWTP from January 2015 through December 2019 shows that the average of the daily peak raw water turbidity was 13.8 NTU, average of the daily peak settled water turbidity was 0.48 NTU, and the average of the daily average CFE turbidity was 0.040 NTU. The overall treatment process had an average solids removal of 99.7 percent, well above the required 80 percent. The average percent solids removal from raw to settled was 96.1 percent, with settled water turbidities less than 2 NTU occurring 100 percent of the time. **Figure 5-27** shows a time series plot of peak raw, settled and average treated daily water turbidities. The VSWTP easily met all current treated water turbidity standards.

Figure 5-27. VSWTP, Raw, Settled, and Treated Water Turbidities, 2015 - 2019



Microbiological Constituent Review

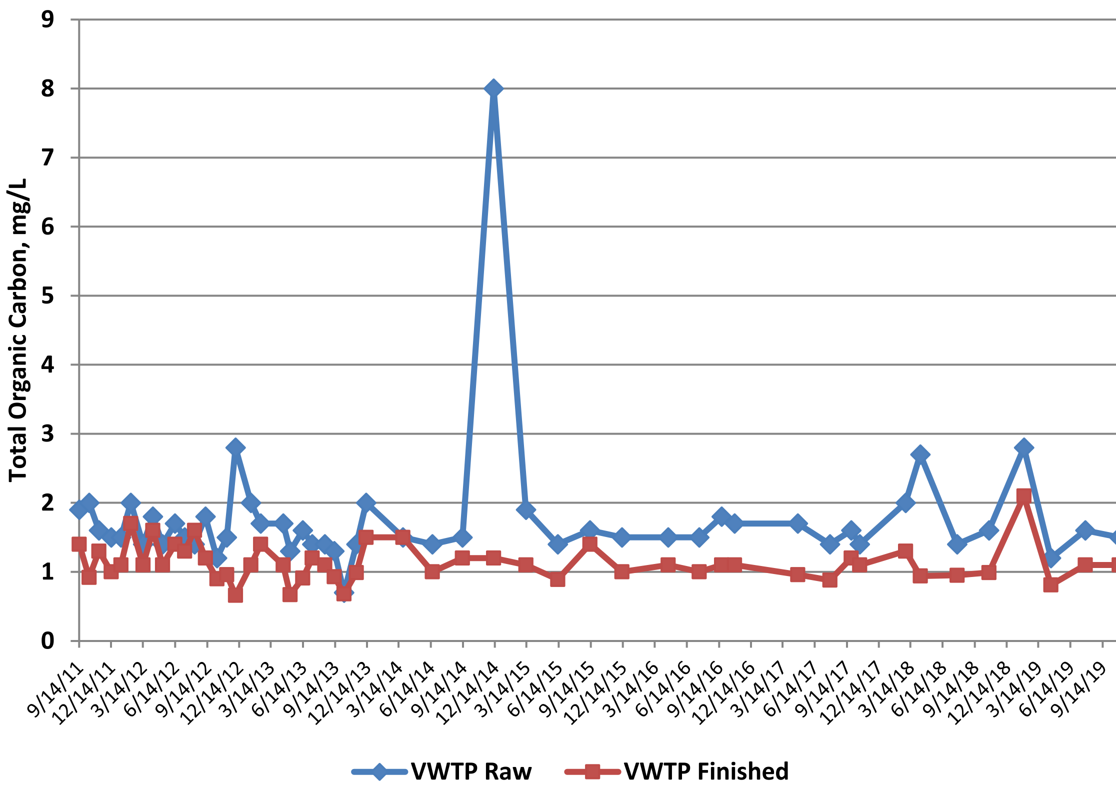
SCWA performed monthly distribution system coliform analysis from 2015 through 2019. A review of the 2015 to 2019 SCWA CCRs shows that the monthly percent positive for total coliform was always less than five percent. Therefore, during the period of study, SCWA was always in compliance with the Total Coliform Rule.

Disinfection By-Products

DBP Precursors

SCWA monitors alkalinity and TOC levels in its raw water and TOC levels in its treated water monthly in order to determine TOC removal compliance. The average raw and treated water TOC levels at VSWTP were 1.7 mg/L and 1.1 mg/L, respectively, equating to 34 percent average removal. **Figure 5-28** shows a time series plot of raw and treated water TOC at VSWTP since 2011.

Figure 5-28. VSWTP, Raw and Treated Water TOC, 2011 – 2019



Source water TOC levels at VSWTP were less than 2.0 mg/L 85 percent of the time from 2015 to 2019, as compared with 84 percent of the time from 2010 to 2014. Treated water TOC levels at VSWTP were less than 2.0 mg/L 100 percent of the time for 2010 to 2014, as compared with 95 percent of the time from 2015 to 2019.

A review of raw and treated TOC monthly samples shows that the VSWTP may comply with the Stage 1 D/DBP Rule by either achieving the required percent TOC removal or using the alternative compliance criterion 2 for treated water TOC less than 2.0 mg/L. Over the reporting period of 60 months from 2015 to 2019, there was only one month (February 2019) when the treated water TOC was greater than 2.0 mg/L. For this month, the required TOC removal of 25 percent was met and therefore the system was in compliance.

Stage 2 D/DBP Rule

SCWA has collected both TTHM and HAA5 data for its distribution system. Water from the VSWTP began entering the Laguna/Vineyard distribution system on September 8, 2011. As part of the Stage 2 D/DBP Rule, the SCWA samples quarterly for TTHM and HAA5 at eight sites. The original eight Stage 2 D/DBP Rule monitoring sites were revised in late 2012, to incorporate the new VSWTP source water. The following statistics are based on the eight revised Stage 2 D/DBP Rule monitoring sites. It was not possible to distinguish sites that are primarily surface water only, as the mixture of treated surface water and groundwater in the distribution system varies by seasonal demand. For example, during periods of increased demand (late April through October) surface water from VSWTP was expected to stay closest to the VSWTP. Conversely, during periods of low demand (November through mid-April), surface water would move further through the system.

Over the study period, the individual TTHM samples ranged from 0 to 60 µg/L, with an average of 27 µg/L. **Figure 5-29** shows the quarterly averages since 2013, which show no seasonal trend. As the SCWA distribution system is a mixture of groundwater and treated surface water, this causes variation in TTHM levels.

Figure 5-29. SCWA Distribution System Stage 2 D/DBP Rule TTHM Quarterly Averages, 2013-2019

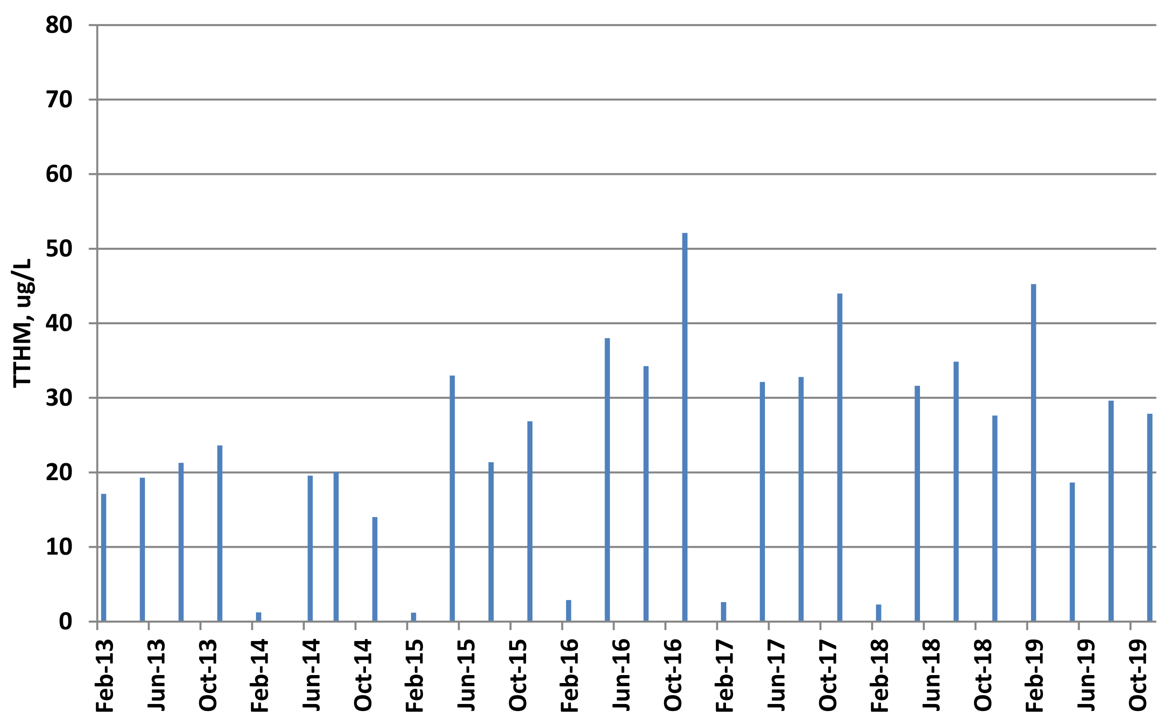
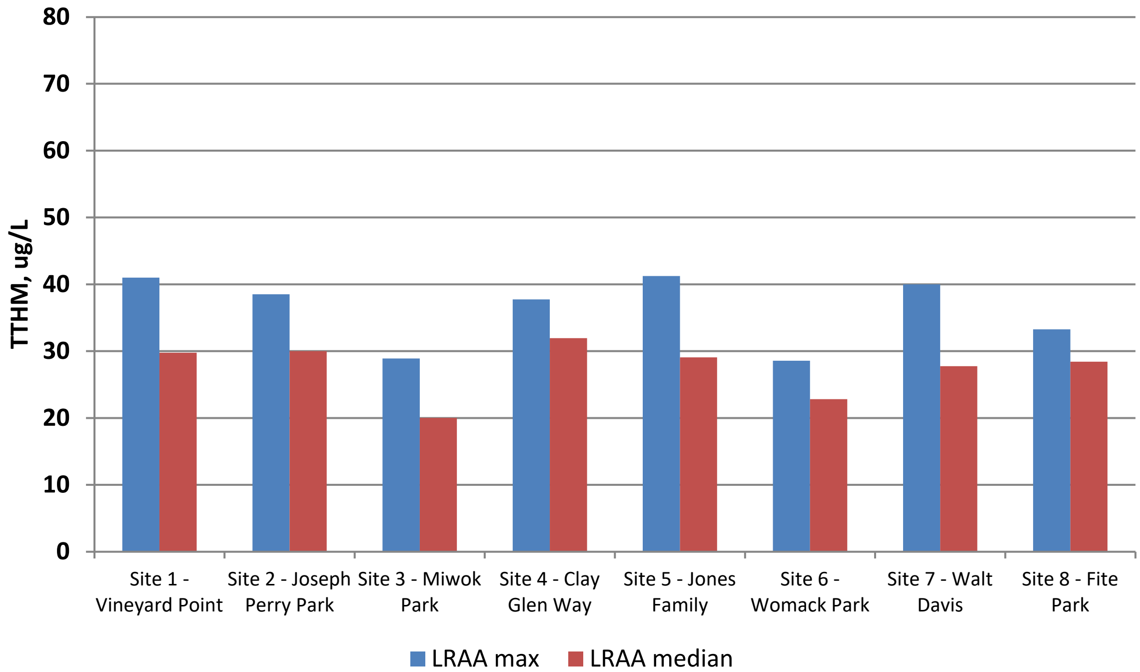


Figure 5-30 presents the TTHM LRAA maximum and median values for all sites during the study period. TTHM LRAAs ranged from 11.7 to 41.3 µg/L, with site 5 (Jones Family) having the highest LRAA at 41.3 µg/L. All LRAAs were below the current MCL of 80 µg/L.

Figure 5-30. SCWA Distribution System Stage 2 D/DBP Rule TTHM LRAAs, 2015-2019



Over the study period, the individual HAA5 samples ranged from 0 to 39 µg/L, with an average of 15.5 µg/L. **Figure 5-31** shows the quarterly averages since 2013, which show no seasonal trend. As the SCWA distribution system is a mixture of groundwater and treated surface water, causing variation in HAA5 levels.

Figure 5-32 presents the HAA5 LRAA maximum and median values for all sites during the study period. HAA5 LRAAs ranged from 5.8 to 24.8 µg/L with site 1 (Vineyard Point) having the highest LRAA at 24.8 µg/L. All LRAAs are well below the current MCL of 60 µg/L.

Figure 5-31. SCWA Distribution System Stage 2 D/DBP Rule HAA5 Quarterly Averages, 2013-2019

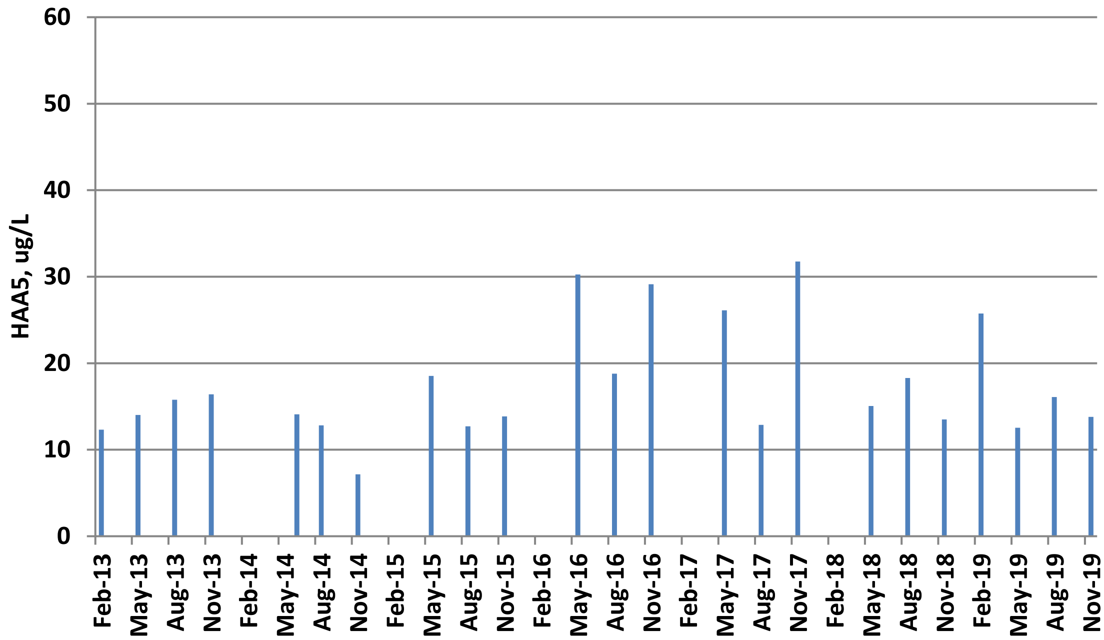
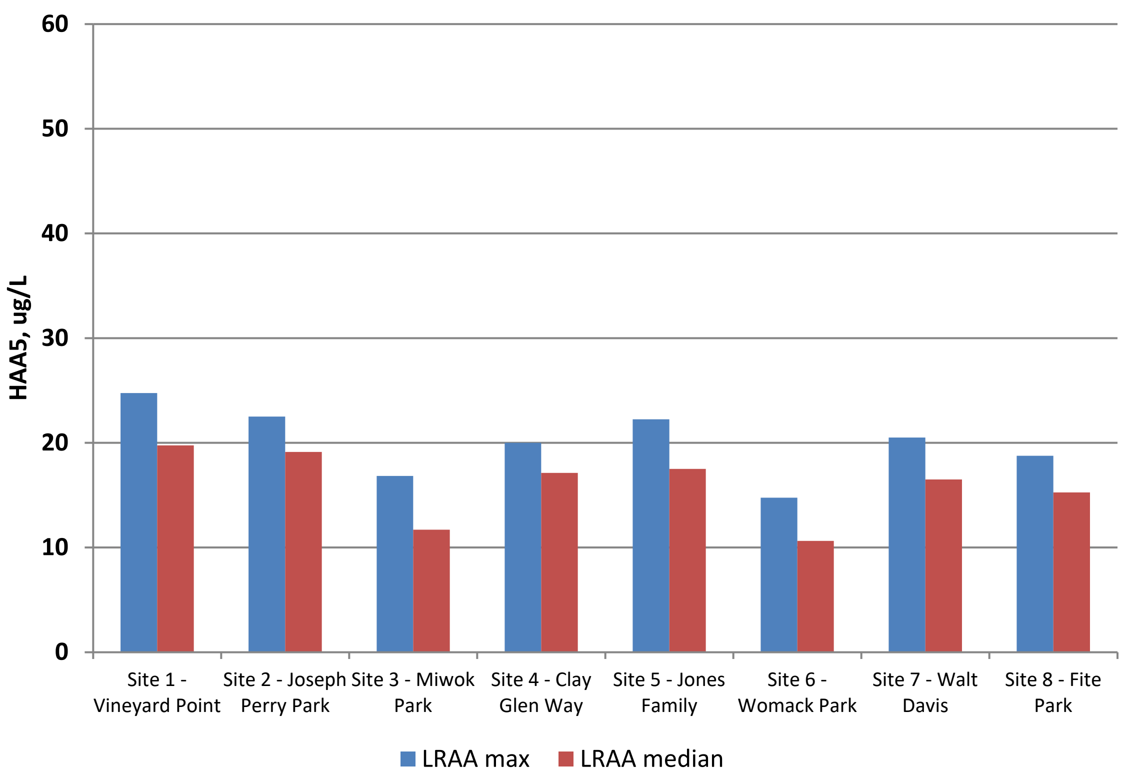


Figure 5-32. SCWA Distribution System Stage 2 D/DBP Rule HAA5 LRAAs, 2015-2019



As shown in **Figure 5-29 and 5-31**, there appears to be an increase in TTHM and HAA5 from 2013 to 2019. The 2013 to 2014 TTHM average was 17 µg/L, as compared with the 2015 to 2019 TTHM average of 27 µg/L. The 2013 to 2014 HAA5 average was 11.6 µg/L, as compared with the 2015 to 2019 HAA5 average of 15.5 µg/L. According to SCWA, this was due to more surface water being treated in recent years.

Unregulated Contaminant Monitoring Rule

UCMR 4

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from April to October 2018 at the entry point to the distribution system (representing treated water). All sample results were non-detect.

The 17 required constituents were also monitored quarterly at the entry point to the distribution system from December 2018 to September 2019. All sample results were non-detect, except manganese was detected once at 120 µg/L (above the secondary MCL of 50 µg/L.

Three brominated haloacetic acid groups (HAA5, HAA9 and HAA6Br) were monitored in the distribution system from December 2018 to September 2019 as shown in **Table 5-10.**

Table 5-10
Results from UCMR4 Monitoring for SCWA Distribution System

Location	HAA5 Average, µg/L	HAA6Br Average, µg/L	HAA9 Average, µg/L
DBP Site 1 – Vineyard Point	15.0	2.1	17.1
DBP Site 2 – Joseph Perry Park	15.5	2.2	17.7
DBP Site 3 – Miwok Park	7.6	2.8	10.0
DBP Site 4 – Clay Glen Way	10.7	4.1	14.1
DBP Site 5 – Jones Family	12.0	1.9	13.9
DBP Site 6 – Womack Park	7.8	3.1	10.3
DBP Site 7 – Walt Davis	12.3	2.3	14.6
DBP Site 8 – Fite Park	11.9	3.5	14.8

***Giardia*/Virus/*Cryptosporidium* Reduction Requirements**

Based on the *E. coli*, *Giardia*, and *Cryptosporidium* data presented in **Section 3**, 3/4/2-log reduction of *Giardia*/virus/*Cryptosporidium* continue to be appropriate reduction requirements for VSWTP. Out of 60 months from January 2015 to December 2019, the FRWA Intake had five *E. coli* medians at or greater than 200 MPN/100mL in September 2015, January 2016, December 2016, February 2017 and February 2019.

The VSWTP currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with free chlorine provides 0.5-log credit for *Giardia* and 2.0-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR and IESWTR.

The VSWTP has a Bin 1 classification based on *Cryptosporidium* monitoring data for the second round of LT2ESTWR. Therefore, no additional plant improvements are anticipated at this time to meet future regulations.

Regulatory Compliance Evaluation

SCWA has been monitoring the raw and treated water for the VSWTP for Title 22 compliance constituents. **Table 5-11** lists the existing drinking water regulations and a compliance evaluation for these standards at VSWTP. VSWTP is currently in compliance with current requirements and is expected to be in compliance with near-term requirements.

Table 5-11
Regulatory Compliance Evaluation
SCWA – VSWTP

	Targeted Compounds	Key Issues Compliance Status
Existing Regulations		
Phase I, II, and V	IOCs, VOCs, SOCs	No MCLs exceeded based on review of the CCRs.
SWTR	Microbial and Turbidity	Data continue to support 3/4—log reduction requirement for *Giardia*/viruses. All operations, monitoring and reporting requirements are met, and all treated water turbidity standards are met.
Interim/Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards are met. 2-log reduction credit for *Cryptosporidium* is applicable.
Long Term 2 ESWTR	Microbial	*Cryptosporidium* data collected and resulted in Bin 1 classification for both Round 1 and 2, with no additional action required.
Stage 1 D/DP Rule	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, alternative compliance criterion met and enhanced coagulation not required.
Stage 2 D/DBP Rule	Disinfectants and Disinfection By-Products	Current TTHM/HAA5 LRAA's for Stage 2 data are below drinking water standards(<80/60 µg/L, respectively) and all standards met.

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This section consists of a discussion of the key findings for this 2020 Update and a list of recommendations. Significant changes over the past five years are summarized at the beginning of this section.

SIGNIFICANT CHANGES SINCE 2015 UPDATE

During the past five years, new information has been generated that was used to evaluate source water quality, treatment capabilities, and potential contaminating activities. There have also been new or improved watershed management programs and activities that have been implemented which may be expected to protect and possibly improve source water quality. This new information, which is summarized below, was obtained and evaluated for this 2020 Update.

- The scope of interest for this 2020 Update includes the potential future RiverArc Project diversion. This project is in the early stages of planning, but expects to utilize an existing Natomas Mutual Water Company (NMWC) intake structure on the Sacramento River near Pritchard Lake and treat water at a central Regional Water Treatment Plant east of Sacramento International Airport.
- The new Woodland-Davis Clean Water Agency (WDCWA) diversion and Regional Water Treatment facility (RWTF) began operations in July 2016.
- The City of West Sacramento's George Kristoff Water Treatment Plant (GKWTP converted primary disinfectant from chlorine gas to sodium hypochlorite.
- The City of Sacramento's Sacramento River Water Treatment Plant (SRWTP) completed a major rehabilitation construction project in 2016 to bring the plant capacity to the permitted capacity of 160 million gallons per day (mgd). The SRWTP has four separate but identical process basins, with Basins 3 and 4 built in 2016. This included sludge dewater process update, the high service pump station replacement, new filters installation, and vortex breakers addition to the intake structure.
- The Freeport Regional Water Authority (FRWA) intake, which supplies Sacramento County Water Agency's (SCWA) Vineyard Surface Water Treatment Plant (VSWTP) and the East Bay Municipal Utility District (EBMUD) raw water supply system, did not undergo any changes. EBMUD has worked to expand their ability to store and treat Sacramento River water.
- The California Department of Water Resources Sacramento River Coordinated Monitoring Program (CDWR CMP) conducted monitoring for total organic carbon (TOC), metals, and *Escherichia coli* (*E. coli).*
- The Delta Regional Monitoring Program (RMP) program conducted a two year pathogen study to coordinate with the *Cryptosporidium* monitoring requirements of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) Round 2.
- A Recreational Beneficial Use Assessment was conducted by the Central Valley Regional Water Quality Control Board (Regional Board) on the Lower Sacramento River during the summer of 2018. *E. coli* samples were collected from 11 sites on

the Lower Sacramento River and two sites on the Lower American River and determined that the United States Environmental Protection Agency (USEPA) Recreational Water Quality Criterion was being met on the Lower Sacramento River.

- There were two significant watershed conditions of interest that had the potential to impact source water quality: the drought from the previous study period continued through 2015, as well as below normal water years in 2016 and 2018, and the Lake Oroville spillway failed in February 2017.
- Data indicate that turbidity levels in the Sacramento River were higher during this study period than the last study period for the RWTF, GKWTP, and VSWTP, while they were lower at the SRWTP. This likely shows the influence of the Lower American River on the SRWTP and reflects water system operations (i.e., timing of releases from Folsom Lake).
- Data indicate that *Giardia* and *Cryptosporidium* levels in the Sacramento River continue to be low and support 3/4/2-log reduction requirements under the Surface Water Treatment Rules (SWTRs). Monitoring conducted by the Delta RMP indicate that the Colusa Basin Drain has much higher concentrations of protozoa and is a source to the Sacramento River.
- Data continue to indicate that there is a significant increase in TOC levels in the Sacramento River between Colusa and Verona. Agricultural drains entering in this reach of the river have higher levels of TOC than the mainstem. TOC levels in the source water during this study period were substantially similar to the last study period. Treated water TOC levels at the water treatment plants stabilized during this study period.
- The only Title 22 regulated organic detected at the water treatment plants was thiobencarb, which was detected at ultra-low levels as part of the Rice Pesticide Program (RPP) specialty monitoring program. There was a significant increase in the number of detections, all of which are well below the secondary Maximum Contaminant Level (MCL) of 1 microgram per liter (µg/L). These detections correlated to substantially increased detections in the upstream agricultural drainages.
- The City of Sacramento and SCWA conducted monitoring for per- and polyfluoroalkyl substances (PFAS) in 2019 and all were non-detect. These are emerging contaminants of interest and there are potential sources in the watershed.
- Data indicate that iron and aluminum levels in the Sacramento River at the water treatment plants exceeds the secondary MCLs. Similar to TOC, the levels increase between Colusa and Verona and agricultural drains have substantially higher levels than the mainstem.
- The Regional Board implemented the long-term management program for agricultural drainage; the Irrigated Lands Regulatory Program (ILRP). This includes issuance of two coalition group orders in the Sacramento Valley; one for rice crops and one for all other irrigated crops.

- Overall, there was a six percent reduction in the acreage of irrigated agriculture in the Sacramento River watershed, continuing the decreasing trend from the last study period. This included a 22 percent reduction in the acreage of rice grown in the Sacramento Valley during the study period, likely contributed to by the extended drought and decreased water availability. In contrast, the increasing trend for orchard acreage continued with a 21 percent increase during the study period. Pastureland acreage continued its slow decline with a nine percent decrease.
- The Regional Board approved the Pesticides Evaluation Protocol (PEP) in November 2016 that formalized the process for the ILRP enrollees to select pesticides to monitor. This only utilizes MCLs, Notification Levels, Archived Advisory Levels, USEPA Health Advisories, and selected USEPA Human Health Benchmarks for Pesticides as trigger limits.
- Although the rice planted acreage decreased during the study period, there was not a commensurate decrease in the amount of pesticides applied. There was only a 15 percent reduction in total pesticides applied. However, it should be noted that thiobencarb use doubled between 2013 and 2017, largely due to agricultural practices during the extended drought. During the study period there were more frequent detections of thiobencarb in agricultural drains and at higher concentrations than the previous study period. There were also low detections at the raw water at GKWTP and SRWTP in 2015, 2016, and 2019; all were below levels of human health concern and below the secondary drinking water standard. In addition, a new pesticide, benzobicyclon, was introduced in 2017 and used at maximum capacity in the Sacramento River watershed through 2019.
- There is a broader spectrum of pesticides used on a wide variety of non-rice crops, over 400. Few pesticides were monitored in the Sacramento River watershed upstream of FRWA Intake diversion due to the ILRP PEP, approximately 30 per year. Four were detected above human health thresholds; diuron, malathion, mancozeb, and oxyfluorfen. None of these have a primary MCL.
- The 2018 Farm Bill expressly recognizes drinking water source water protection as a goal of United States Department of Agriculture (USDA) conservation programs. This includes funding set aside for these programs and water utilities may participate in joint programs with farmers and ranchers.
- The overall livestock population in the Sacramento River watershed remained stable during the study period, but this included a significant reduction (31 percent) in dairy cows. In addition, regulation and management efforts continued for both rangeland and dairy livestock.
- Commercial poultry operations are now regulated by the Regional Board to prevent discharge to receiving waters. There are limited facilities in the Sacramento River watershed.
- Forest activities, including timber harvesting and wildfires, was investigated in this 2020 Update. Timber harvesting operations are substantial and occur primarily in the upper watershed. Wildfires occur throughout the watershed, and can be substantial and severe resulting in immediate and long-term impacts on source

water quality. There were 22 wildfires over 1,000 acres burning over 1 million acres of land in the Sacramento River watershed during the study period. The Regional Board conducted receiving water monitoring after the Carr and Camp Fires in 2018 and 2019.

- Public education related to recreation has continued through “Keep Our Waters Clean” and the “Pups in the Park” campaigns.
- The homeless population has increased substantially in the near intake protection zone, nearly doubling the number of total homeless and quadrupling the number of unsheltered homeless. Strong management programs in both Sacramento and Yolo counties continue efforts to assist unsheltered homeless.
- In 2018 the Regional Board initiated an effort to confirm and address fecal bacteria contamination of the Lower American River by implementing a bacterial monitoring program, including a microbial source tracking study.
- Stormwater and urban runoff management continued under the National Pollutant Discharge Elimination System (NPDES) permit program, including updates to the Phase 1 NPDES permits in the Central Valley.
- Three municipal wastewater treatment plants (WWTP) ceased discharging during the study period, two were upgraded to tertiary treatment, and five were moved into a General Order NPDES permit.
- Population growth in the watershed has slowed again. Over the past five years most growth occurred in or near the Sacramento metropolitan area. Increases in population may lead to an increasing urbanization of the watershed as well as land use changes.
- Regional Board programs and policies are increasingly impacting the Municipal (MUN) beneficial use, and may not be sufficiently addressing long-term, downstream protections.
- There are several key activities underway that may have the potential to impact how the Central Valley water supply system is operated. Any operational modifications to reservoir storage and river flows have a high likelihood of impacting the source water quality of the Sacramento River.
- Outdoor cannabis cultivation has been legalized due to changes in State regulations. Both personal and commercial cultivation is allowed in portions of the Sacramento River watershed, and is governed by County ordinances. Commercial cultivation is limited. Outdoor cultivation is managed through State Water Resources Control Board (State Board) and California Department of Fish and Wildlife permits.

KEY FINDINGS AND CONCLUSIONS

The key findings and conclusions for this report are organized as they pertain to Sacramento River water quality, treatment and treated water quality regulatory compliance, and watershed contaminant sources.

Sacramento River Water Quality

Overall, the Sacramento River continued to provide good quality raw water. The raw water can currently be treated to meet all drinking water standards using conventional water treatment processes. There are no long-term constituent trends prevalent in the raw water that necessitate special treatment processes at this time. Key findings for each of the constituents of interest are presented below.

Turbidity

The turbidity levels are seasonally variable, with the highest levels occurring during the wet season, typically in January and February. Turbidity appears to be related to high river flow caused by upstream sources, as well as local precipitation, for the water treatment plants. Turbidity data at RWTF and GKWTP are comparable; therefore the potential future RiverArc Project diversion is likely to have similar turbidity levels. The turbidity levels at SRWTP are generally lower than GKWTP, likely due to the influence of the Lower American River. Average turbidity data at the FRWA Intake for VSWTP is lower than the other water treatment plants, likely due to sedimentation occurring at the FRWA Intake and in the 13 mile transmission pipeline to the water treatment plant site. Overall turbidity levels at RWTF, GKWTP, and VSWTP were higher during this study period, as compared with the previous study period, while the SRWTP was lower during this study period. Most of the peak turbidity values at the water treatment plants occurred during February 2019, except that the SRWTP was off-line, and this was a peak storm event period following the significant wildfire burn period of June through November 2018.

Coliform

Average and median *Escherichia coli* (*E. coli)* levels increase with travel downstream. The large difference between the median and average values at each site indicates that there are high outlying values, or peak events. Higher coliform peak concentrations are seen downstream (more peaking effect). Elevated levels of coliform occur during the winter months at all monitoring sites. The highest levels occur during high precipitation events, which are the periods of high flow from the main stem river and tributaries as well as local discharges from precipitation events. Overall, the *E. coli* levels were lower at the RWTF, GKWTP, and SRWTP during this study period, as compared with the previous study period, with median levels less than 13 most probable number per 100 milliliters (MPN/100 mL). However, *E. coli* levels were higher at the VSWTP during this study period with median levels at 20 MPN/100 mL. In almost all cases, the monthly medians at RWTF, GKWTP, SRWTP, and VSWTP are less than 200 MPN/100 mL. Generally, the monthly medians that exceeded this threshold occurred during the wet weather months.

Giardia/Cryptosporidium

There continue to be limited detections of *Giardia* and *Cryptosporidium* in the Sacramento River water. *Giardia* is detected more frequently, and at higher concentrations, than *Cryptosporidium*. GKWTP, SRWTP, and FRWA Intake all conducted Round 2 monitoring for the LT2ESWTR between 2015 and 2017. There were only two detects of *Cryptosporidium* (one each at SRWTP and FRWA Intake) and nine detects of *Giardia* (three at GKWTP, four at SRWTP, and two at FRWA Intake). The maximum running annual average (RAA) for *Cryptosporidium* (0.017 oocysts per liter at SRWTP) was well below the Bin 2 threshold of 0.075 oocysts per liter. The maximum RAA for *Giardia* (0.042 cysts per liter at FRWA Intake) was below levels of concern. The Regional Board's Delta RMP Pathogen Study included two sample sites in the Sacramento River watershed upstream of the FRWA Intake diversion; Colusa Basin Agricultural Drainage and the Sacramento River at the Westin Boat Dock (between SRWTP and VSWTP). No *Cryptosporidium* was detected at either site. *Giardia* was detected in five samples at the Westin Boat Dock site with a maximum RAA of 0.025 cysts per liter, similar to the water treatment plants' data. *Giardia* was detected in seven samples in the Colusa Basin Agricultural Drainage site with a maximum RAA of 0.42 cysts per liter, much higher than the mainstem data.

Total Organic Carbon

All water treatment plants had median raw water TOC levels less than 2 milligrams per liter (mg/L). The average values of TOC were equal to or higher than the median values at all sites. Raw water TOC levels are higher at the GKWTP than the SRWTP, likely due to the influence of the Lower American River on the Sacramento River water downstream of the confluence of the rivers. TOC levels are seasonally variable, with the highest levels during the wet season (late fall to early spring). The CDWR CMP data show that there are significant increases in TOC along the Sacramento River between Colusa and Verona, where three large agricultural drains enter the river (Butte Slough, Colusa Basin Drain, and Sacramento Slough). The highest levels were seen in the Colusa Basin Drain, with a median value of 7.4 mg/L. Median raw water levels at RWTF and GKWTP were lower during this study period than the 2015 Update, while median levels at the SRWTP and VSWTP were higher.

Volatile and Synthetic Organic Compounds

Other than the low level detection of the rice herbicide thiobencarb, there were no other reported detections of any volatile organic compounds (VOCs) or synthetic organic compounds (SOCs) in the raw water at the existing water treatment plants. The GKWTP and SRWTP specialty RPP monitoring resulted in detects of thiobencarb in raw water in 2015, 2016, and 2019, with a maximum detected value of 0.13 micrograms per liter (µg/L), below the secondary MCL of 1 µg/L.

Specialty Monitoring

Per- and polyfluoroalkyl substances (PFAS) are a large group of human-made substances that do not occur naturally in the environment and are resistant to heat, water, and oil, including perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). In August 2019 the State Board Division of Drinking Water (DDW) established Notification Levels at concentrations of 6.5 nanograms per liter (ng/L) for PFOS and 5.1 ng/L for PFOA. Notification Levels are a non-regulatory, precautionary health-based measure for concentrations in drinking water that warrant notification and further monitoring and assessment. Public water systems are encouraged to test their water for contaminants with Notification Levels. DDW also has requested that the Office of Environmental Health Hazard Assessment (OEHHA) develop public health goals (PHGs) for both PFOA and PFOS, the next step in the process of establishing regulatory standards, or MCLs, in drinking water. In advance of these potential regulations the City of Sacramento and SCWA tested their Sacramento River water sources and treated water for all PFAS compounds monitored using EPA Method 537.1. All results for both were non-detect.

Aluminum/Iron/Manganese

Raw water levels of iron and aluminum can be well above their respective primary and/or secondary MCLs in the Sacramento River. The GKWTP median values were lower for both aluminum and iron during this study period, but still at levels of interest. The CDWR CMP collected quarterly samples from 2015 through 2017 along the Sacramento River. A review of the data continues to show that aluminum and iron levels increase downstream of Colusa. Butte Slough, Colusa Basin Drain, and Sutter Bypass all enter downstream of Colusa and have recorded very high levels of aluminum and iron. Another increase from Verona to GKWTP is not well understood, but could be related to the Natomas Cross Canal or Reclamation District (RD) 1000 discharges into the Sacramento River. Peak values occurred in January 2019, which was a peak storm period that followed the intense wildfire burn period from June through November 2018.

Total manganese levels in raw water can also be found above its secondary MCL, but the average and median values were below the secondary MCL at all sites in the Sacramento River watershed. Peaks were seen as high as 330 µg/L. The CDWR CMP also collected data for manganese and the same trend was seen for manganese as iron and aluminum, so the same sources are likely contributing manganese as well but at lower overall levels.

Treatment and Treated Water Quality Regulatory Compliance

The RWTF, GKWTP, SRWTP, and VSWTP are currently in compliance with all existing drinking water regulations. All participating water agencies implement conventional filtration processes and meet all current drinking water standards, including MCLs and treatment technology requirements. The water treatment plant associated with the potential future RiverArc Project diversion will be designed to meet all drinking water standards. Below is a summary of the key treatment and regulatory compliance topics.

Turbidity Reduction Requirements

The water treatment plants achieve excellent suspended solids removal. The solids removal through sedimentation ranges from 88.1 percent at the RWTF to 96.1 percent at the VSWTP. The average combined filter effluent turbidities ranged from 0.026 nephelometric turbidity units (NTU) at GKWTP to 0.04 NTU at VSWTP. The overall percent solids removed ranged from 99.7 percent at SRWTP and VSWTP to 99.9 at GKWTP. Treated water turbidity at RWTF, GKWTP, SRWTP, and VSWTP meets the Interim Enhanced Surface Water Treatment Rule (IESWTR) standards, and all plants have a 2-log reduction credit for *Cryptosporidium*.

Giardia/Virus/Cryptosporidium Reduction Requirements

Monthly median *E. coli* values are less than 200 MPN/100 mL in almost all cases at all four existing water treatment plants, and *Giardia* maximum RAA levels have been low; therefore, the source water microbial data support that 3/4-log reduction requirements for *Giardia* and viruses continue to be appropriate. Existing data for *Cryptosporidium* maximum RAA levels have put RWTF, GKWTP, SRWTP, and VSWTP, in the Bin 1 classification. Therefore, all water treatment plants should continue to, or plan to, provide 3/4/2-log reduction for *Giardia*/virus/*Cryptosporidium*.

Total Organic Carbon Reduction Requirements

The TOC levels in the raw water were substantially similar to the previous study period. The percent of monthly raw water samples less than 2 mg/L varied: 68 percent at RWTF, 62 percent at GKWTP, 68 percent at SRWTP, and 85 percent at VSWTP. The percent of monthly treated water samples less than 2 mg/L varied also: 100 percent at RWTF, 97 percent at GKWTP, 93 percent at SRWTP, and 100 percent at VSWTP. RWTF and VSWTP met the alternative compliance criterion for treated water TOC in all months. GKWTP had two months with treated water TOC greater than 2 mg/L and SRWTP had three months with treated water TOC greater than 2 mg/L, but the RAA for both facilities was always in compliance with the alternative compliance criterion.

Disinfection By-Products Requirements

Distribution system levels for total Trihalomethanes (TTHM) and haloacetic acids (HAA5) are less than their respective MCLs of 80 and 60 µg/L, expressed as locational running annual averages (LRAAs), for the distribution systems associated with RWTF (as measured by the City of Woodland, City of Davis, and the University of California at Davis), GKWTP, SRWTP, and VSWTP. A review of the quarterly averages shows that only one quarter (GKWTP distribution system, July 2015) exceeded 80 µg/L for TTHMs, just at 80.5 µg/L. There are no clear trends in the data as most of the distribution systems are impacted by other sources or operational parameters that impact the treated water quality.

Watershed Contaminant Sources

There are numerous types of potential contaminating activities in the watershed. Eight activities were selected for evaluation in this report based on constituents of interest, proximity to protection zones, and/or predominance in the watershed. The key findings for each of these activities are provided below.

Agricultural Drainage

The acreage of irrigated agriculture in the Sacramento Valley decreased again, six percent, in the past five years to approximately 1.77 million acres. The acreage of rice production accounts for approximately 25 percent of that land, and it saw a decrease of 22 percent between 2012 and 2017. Orchards now account for the largest share of the land at 32 percent, and have seen a 21 percent increase between 2012 and 2017. Pastureland accounts for approximately 13 percent, and has seen a 9 percent decrease in acreage over the five year period. The remaining acreage is row crops and wetlands.

There were low level detections of the rice herbicide thiobencarb at the GKWTP and SRWTP intakes in 2015, 2016, and 2019 as part of the RPP special rice season monitoring program, but these did not exceed the secondary MCL of 1 µg/L. There was a high and persistent trend of thiobencarb detections in the agricultural drainages during the study period, with results up to 11 µg/L and 26 detects above the Performance Goal of 1.5 µg/L. There is a trend of broader pesticide use on rice crops due to increased weed resistance. Pesticide use on rice decreased 15 percent during this study period; this is not commensurate with the 22 percent reduction in land planted in rice. However, despite overall reductions in pesticide use, thiobencarb use more than doubled over the study period. The RPP has continued with generally the same management measures, with additional efforts to address the increased levels in the agricultural drains.

The Regional Board continued to implement the long-term ILRP, under two Orders affecting coalition groups formed in the Sacramento Valley – one for rice, the Sacramento Valley Rice Growers Order, and one for all other irrigated agriculture, the Growers within the Sacramento River Watershed that are Members of a Third-Party Group (Sacramento River Watershed) Order. The ILRP adopted the PEP to assist coalitions with selection of pesticides to be monitored and this has resulted in fewer pesticides being monitored and limited the application of human health thresholds that are not drinking water standards. The Sacramento Valley Rice Growers sampled for turbidity and TOC and found high levels of both in rice drainage, with median turbidity levels above 20 NTU and median TOC values ranging from 6 to 9.4 mg/L. Six rice pesticides were sampled during the study period and most were detectable, but at levels below human health thresholds. There are no thresholds for the new pesticide benzobicyclon and its metabolite B. The Sacramento River Watershed Order sampled for a wider suite of pesticides, over 20, and most were not detectable at levels of concern. There were results for diuron, malathion, mancozeb, and oxyfluorfen that were above their respective human health thresholds. *E. coli* continues to be persistent at high levels in agricultural drainage as well, but the Coalition does not believe that agricultural activities are the source. Arsenic was detectable above the primary MCL in the Lower Snake River. The median TOC level was 4.1 mg/L and the median dissolved organic carbon (DOC) level was 3.8 mg/L, with paired samples showing 97 percent of organic carbon present in the dissolved fraction. The highest levels of TOC were found in the waterbodies in the Sacramento Valley and the lowest levels were in the upper watershed.

Livestock

The overall population of cattle remained stable in the watershed over the past five years. The number of dairy cattle in the watershed reduced 31 percent and now only account for 4.3 percent of the total watershed cattle population, primarily in Glenn and Tehama counties. Commercial poultry operations include a relatively small number of animals and farms in the Sacramento River watershed. Most of these are small farms with fewer than 400 animals, while there are 17 farms greater than 400 animals. There is limited use of pesticides related to any type of livestock operations.

The Regional Board issues individual NPDES and general order NPDES permits to dairies, depending on size. There are five individual NPDES permits and 36 General Dairy Order enrollees in the Sacramento River watershed. The Dairy Quality Assurance Program (DQAP) has been incorporated into the General Dairy Order as an elective education program for dairies on protecting water quality. There is a new NPDES permit for Confined Bovine Feeding Operations, such as stockyards and cattle yards, established in 2017 that has 11 facilities enrolled. In addition, there is a new NPDES permit for Poultry Operations that has three enrollees. All of these permits specifically prohibit discharges to surface waters and address manure handling, management, and application.

The Central Valley Regional Board is working with the Lahontan Regional Board to develop a Waiver of Waste Discharge Requirements (WDRs) for nonpoint sources on federal lands. This would include grazing. The WDRs is expected to include best management practices (BMPs) that would ensure protection of source water quality.

Forest Activities

Timber harvesting can occur on both public and private lands and is regulated separately. Timber harvesting on federal lands is regulated by the United States Forest Service (USFS), and on state and private lands by the California Department of Forestry and Fire Protection (CalFIRE). There has been a significant increase in fuel reduction and vegetation management by the USFS and private landowners due to the significant tree mortality associated with the drought and bark beetle infestation. The Regional Board's General Order for Timberland Management Activities was revised and continues to require BMPs and protection of surface water bodies. There were nearly 1,500 timber harvest plans implemented during the study period in the Sacramento River watershed counties, with the majority in the upper watershed. Anyone conducting harvest activities, except those emergency or special exemptions, must apply for coverage under the Order. The Order also contains monitoring and reporting conditions. Other than the herbicide glyphosate, there is limited use of pesticides on forested lands.

The Central Valley Regional Board is working with the Lahontan Regional Board to develop WDRs for nonpoint sources on federal lands. This would include timber harvesting. The WDRs is expected to include BMPs that would ensure protection of source water quality.

Wildfires cause the loss of ground cover, the chemical transformation of soil, and the reduction in soil infiltration rates; these all increase the likelihood of erosion and hydrophobic soils contributing to increased solids in the receiving water, resulting in an increase in the turbidity, organic carbon, metals, and nutrients of the raw water at the water treatment plants. There were 22 wildfires greater than 1,000 acres during the study period. Combined, these fires burned over 1 million acres. The top five fires all burned greater than 50,000 acres each and combined for over 900,000 acres. Fourteen of the fires occurred during the second half of 2018 (June through December) and accounted for 960,000 acres, or 92 percent of the total burn area for the study period. This included the Ranch, Carr, and Camp fires. The Regional Board implemented post-fire monitoring programs for both the Carr and Camp fires in the downstream receiving waters. The data showed significant increases in turbidity and TOC in the first flush storm events, which decreased over time, and elevated levels of metals, including aluminum and iron well above the MCLs.

River Corridor and River Recreation

Extensive recreation occurs in the river and within the river corridor along the Lower Sacramento and American Rivers. It is not possible to quantify the number of users, or the type of recreation that specifically occurs. There are still 12 marina facilities located in the protection zones, with an additional fuel dock identified at Steamboat Landing. Various participating agencies have continued to sponsor the public education campaigns “Keep Our Waters Clean” to encourage use of restrooms and sewage pumpouts and “Pups in the Park” to encourage use of pet waste pickup bags. The cities of Sacramento and West Sacramento and Sacramento County have continued enforcement of derelict boat removal. Sacramento County, the City of Sacramento, and the City of West Sacramento all require a permit and inspection for boats moored for extended periods of time.

Homeless populations in the Sacramento metropolitan area have increased tremendously over the study period. Yolo County estimates a doubling of homeless numbers between 2015 and 2017, but a low percent are expected to be unsheltered in the river corridor. Sacramento County also saw a doubling of homeless numbers during the study period, but they also saw a near quadrupling of unsheltered homeless numbers. Illegal camping still occurs in the river corridor along the Lower American River Parkway and in West Sacramento in the Lighthouse Marina area. Legal challenges to the ability to enforce illegal camping ordinances in 2018 have reduced the number of citations issued locally. Sacramento County Department of Regional Parks has continued to clean illegal camp sites, removing 1,612 tons of debris in 2018 and 1,397.5 tons of debris in 2019. The City of Sacramento Police Department has also tracked metrics on the cubic yards of debris removed from illegal camping sites, with over 10,000 cubic yards removed between July 2017 and April 2019. Sacramento City and County, as well as the City of West Sacramento and Yolo County, continue to work on creating housing for the homeless and reduce the number of unsheltered homeless.

The Regional Board continued their monitoring program to investigate bacteria in the Lower American River. The weekly *E. coli* monitoring continues to show the highest concentrations in the lowest three miles of the American River, near the confluence with the Sacramento River. These sites had higher median levels during the dry weather period, unlike the upper portion of the Lower American River which has higher levels during wet weather. The Regional Board, in conjunction with other local entities, is implementing a Bacteria Study to verify the impacts and conduct a microbial source tracking study to allow for development of a strategy to address the bacterial contamination.

Stormwater and Urban Runoff

Stormwater and urban runoff can occur throughout the watershed. The urbanization of the watershed upstream of the Sacramento metropolitan area will change the amount, type, quality, and timing of runoff. The State Board and Regional Board permit runoff through a variety of NPDES permits. There are two municipal NPDES permit programs (Phase I and II), an Industrial NPDES permit program, and a Construction NPDES permit program.

In the Sacramento River watershed there are two NPDES Stormwater Phase I permits; the Region-Wide General Permit for Discharges from Municipal Separate Storm Sewer Systems and the Statewide California Department of Transportation (Caltrans). The Region-Wide General Permit is a replacement for the Sacramento Stormwater Quality Partnership (SSQP) Permit for the Sacramento metropolitan urban area. Each participating agency is now enrolled individually, but the SSQP continues many of its cooperative elements. This includes an urban discharge and urban tributary monitoring program and this data continues to show the potential water quality impact that urban runoff can have on ambient water quality. Levels of contaminants in urban tributaries and in the urban runoff discharges can be higher than some of the respective water quality objectives, including *E. coli*, organic carbon, and iron. Studies show that new development areas have discharges with significantly lower levels of pollutants than older development areas. The SSQP implements an extensive pollution reduction program that addresses constituents of interest for source water protection, including illegal discharges, fecal waste, sediment, TOC, and pesticides. Caltrans continues to implement a statewide Stormwater Management Plan to reduce the impacts of highway runoff on local receiving waters. Caltrans also enrolled 75 sites in the Construction Stormwater Program, with 25 of those located in the seven counties in the protection zones.

Small cities and urban areas continue to be regulated under the Phase II Stormwater Program. Under the Phase II Stormwater Program, Stormwater Management Plans were implemented with specific BMPs to minimize pollution, including implementation of treatment BMPs in new development. Monitoring was not required for any Phase II permittees in the Sacramento River watershed.

An inventory was obtained from the California Integrated Water Quality System (CIWQS) to identify the Industrial Stormwater Permittees in the watershed, resulting in 828 sites. Four hundred-fifty of these are located within the seven counties in the protection zones. An inventory was also obtained from CIWQS of the Construction Stormwater Program resulted in identification of 2,225 sites. Fifteen hundred of these are located within the seven counties in the protection zones.

Industrial NPDES Dischargers

There were 44 Industrial NPDES permitted facilities identified and three of these were prioritized for discussion, including: Sterling Caviar, Former McClellan Air Force Base (AFB), and Aerojet Rocketdyne (both treated groundwater and stormwater).

Sterling Caviar has had complex NPDES permitting over the study period. The primary water quality concerns are related to elevated levels of arsenic and manganese in the effluent, due to the use of local groundwater as a source. In December 2017 the Regional Board adopted a new NPDES permit that significantly relaxed permit effluent limits for both constituents, actually removing manganese, based on questionable implementation details related to data interpretation. Monitoring data is still being collected for both constituents and is expected to be considered when the permit is renewed in 2022.

McClellan AFB was operating under an individual NPDES permit, but was converted to a low threat General Order NPDES permit during the study period. The facility is a groundwater extraction and treatment (GET) system to address groundwater contamination issues at the site. The primary constituents of interest include VOCs, hexavalent chromium, 1,4-dioxane, 1,2,3-trichloropropane, and most recently PFAS. Despite 1,4-dioxane being detectable above the DDW Notification Level, it is not addressed in the most recent permit. PFOA has been detected in the GET effluent above its DDW Notification Level.

Aerojet Rocketdyne has two individual NPDES permits; one for sitewide stormwater runoff related to industrial operations and one for the GET facilities. Aerojet Rocketdyne officially closed industrial operations in December 2019, so the sitewide stormwater NPDES was rescinded in July 2020. During the study period it was operating normally and monitoring data reveals the detectability of perchlorate in Alder Creek, but does not identify any specific source of contamination. The GET NPDES permit includes 10 GET facilities that discharge nearly 50 mgd of treated groundwater to the Lower American River. There is a wide array of constituents addressed, but the key contaminants include VOCs, perchlorate, 1,4-dioxane, N-nitrosodimethylamine, and most recently PFAS. The GET facilities generally perform well and meet permit effluent limitations. There is new concern related to the PFAS, specifically high levels of PFOA and PFOS, and the potential for migration of groundwater plumes into Lake Natoma.

Wastewater Facilities

There are 30 NPDES permitted wastewater facilities in the watershed at or upstream of the FRWA Intake diversion. During the study period three facilities were closed, two were upgraded to tertiary treatment, two had capacity decreased, and one had capacity slightly increased. A review of enforcement orders shows generally good compliance, with most violations related to pH, coliform, chlorine residual, disinfection byproducts, and nitrate.

There are 110 sanitary sewer collection systems in the Sacramento River watershed. Collection system spills, known as sanitary sewer overflows (SSOs), can occur in any collection system and contain raw sewage. The spills of greatest concern are those that reach the receiving water and have substantial volume. During the study period, 41 collection systems had Category 1 SSOs for a total of nearly 5.8 million gallons (mg). Two single events accounted for 67 percent of this volume; both occurred upstream of major reservoirs (Mount Shasta above Lake Shasta and City of Placerville above Folsom Lake). The Sacramento Area Sewer District (SASD) had 25 SSOs greater than 5,000 gallons that reached surface water.

The City of Sacramento's combined sewer system (CSS) has continued to have fewer number of discharges of combined sewer overflows (CSOs). There were no untreated CSO discharges. The Sacramento Regional County Sanitation District (Regional San) operates the Regional Wastewater Treatment Plant (Regional Plant). Discharge is still prohibited during negative downstream flow times, in addition to discharge only when minimum dilution of 14:1 (or river flow of 1,300 cubic feet per second [cfs]) is met. Regional San discharge permit was renewed in 2016 and the new permit requires the Regional Plant be modified to add tertiary treatment and implement seasonal disinfection requirements.

Bacteria and protozoa monitoring at the VSWTP potentially correlate to the City of Sacramento's CSS discharges and SSOs. SCWA and EBMUD have operational agreements with the City of Sacramento and Regional San regarding notification of events potentially impacting source water quality.

Watershed Spills

Cal OES continues operation of the Response Information Management System (RIMS) as part of the State's Standardized Emergency Management System (SEMS). The purpose of RIMS is to provide a single point for statewide tracking of the status and progress of hazardous materials spills information. This can be accessed on-line to view information on current and archived hazardous materials spills.

A review of the Cal OES Hazardous Spill Database for the seven counties located in the protection zones showed over 700 spill events that reached surface water. Of this, there were 22 not related to sewage that were potentially significant, including fire-fighting chemicals, petroleum products, and water discharges. The participating water agencies did not receive notification from DDW for most of these events. There appears to be a significant gap in communication between Cal OES and DDW.

The Sacramento River Source Water Protection Program (SRSWPP) has continued to implement a voluntary spill notification and response program to help enhance timely direct notification of hazardous spills upstream of the water treatment plants.

The California Department of Fish and Wildlife is implementing Geographical Response Plans to manage response actions for inland water petroleum spills. One has been completed for the North Fork of the American River and the Upper Sacramento River and one is currently being prepared for the Lower Sacramento River. This includes notification to impacted drinking water utilities.

RECOMMENDATIONS

A final objective of this report is to identify appropriate watershed management actions that may assist in protecting and possibly improving source water quality. **Table 6-1** presents the recommendations developed for this 2020 Update, listed by subject area and not by priority.

Development of recommendations for watershed management actions that are economically feasible and within the authority of the participating water agencies to implement is critical. Of importance is to target potential contaminating activities that may be most likely to affect source water quality, such as activities located in the protection zones or activities that are predominant in the watershed. Some recommendations provide for information tracking, which will facilitate updating management actions as needed.

Recommendations apply to all participating water agencies, unless noted, and may be implemented by them as they have resources available. However, since PCWA is not currently using the Sacramento River supply none of these recommendations specifically apply to them at this time. These recommendations could be implemented by individual agencies, or as part of the SRSWPP.

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Table 6-1
2020 Update Recommendations

Recommendation	Basis for Recommendation	Notes
Water Quality and Treatment		
Continue to optimize treatment and distribution, especially during times of reduced source water quality or increased source water vulnerability (i.e. peak storm events, high river flows, unusual reservoir release patterns, irrigation drainage periods, post-wildfire runoff periods, hazardous materials spill events, and sanitary sewer overflow events).	Based on source water quality, optimization is especially important during wet weather. It may also be useful during other periods of potentially reduced water quality that can occur during first flush storm events, agricultural practice discharges, spill events, water system operational variances, and peak recreational periods.	WDCWA should also consider specific optimization of pre-treatment to increase solids removal. FRWA should continue to optimize during City of Sacramento Combined Sewer System treated/untreated discharge events and Sacramento River reverse flow conditions.
Ensure that *Giardia* and *Cryptosporidium* are analyzed as part of the second round of LT2ESWTR monitoring.	*Cryptosporidium* is required under the LT2ESWTR to determine Bin classification, but it is important to have *Giardia* to determine overall level of treatment.	Only applicable to WDCWA.
Complete Unregulated Contaminant Monitoring Rule (UCMR) 4 monitoring requirement.	UCMR 4 required monitoring has been initiated or completed by all the participating water agencies.	Only applicable to the City of Sacramento and WDCWA.
Consider per- and polyfluoroalkyl substances (PFAS) raw water monitoring in advance of potential drinking water standard.	PFAS are an emerging constituent of interest and may be regulated in the future. There are potentials sources in the Sacramento River watershed.	Only applicable to the WDCWA and City of West Sacramento.
Consider water treatment plants conduct quarterly aluminum and iron raw water monitoring to coordinate with the Department of Water Resources (DWR) to allow for source isolation along Lower Sacramento River.	Aluminum and iron continue to be detected in the Lower Sacramento River at levels above the secondary Maximum Contaminant Levels (MCLs).	
Consider verification/further evaluation of other sources of organic carbon and metals between Verona and GKWTP intake (i.e., the Natomas Cross Canal and Reclamation District 1000 discharges).	This 2020 Update was not able to identify and evaluate sufficient data to be certain of the changes in water quality between Verona and the WDCWA on the Sacramento River and suggests further investigation to find potential sources.	
Consider requesting DWR to add Natomas Cross Canal to the DWR Sacramento River Coordinated Monitoring Program.	This drain into the Lower Sacramento River carries a large amount of drainage water, including agricultural drainage and urban runoff, which may be the source of contaminants.	
Discontinue special investigation of raw water manganese in watershed sanitary survey updates.	The raw water manganese investigation did not show levels above the Secondary MCL.	

Table 6-1 Cont'd
2020 Update Recommendations

Recommendation	Basis for Recommendation	Notes
Source Water/Watershed Contaminant Sources		
Consider participating in the Rice Pesticide Program (RPP) seasonal monitoring for raw water thiobencarb.	The WDCWA is located upstream of the current participants, GKWTP and SRWTP, and is expected to have higher source water concentrations of thiobencarb due to degradation impacts. This data would identify potential detects of interest or confirm that the Sacramento River Municipal and Domestic Supply (MUN) use is being met.	Only applicable to WDCWA.
Continue to, or consider, supporting the Keep Our Waters Clean.	This local public education program related to recreation provides tremendous benefit and covers several watershed contaminant sources.	Continue to be applicable to: City of West Sacramento, City of Sacramento, SCWA, and EBMUD. Consider applicability to: WDCWA
Continue to, or consider, supporting the Pups in the Park campaign.	This local public education program related to pet waste reduces fecal waste in the watershed.	Continue to be applicable to: Sacramento and SCWA. Consider applicability to: EBMUD
Continue participation in the Sacramento River Voluntary Spill Notification Program. Consider options to improve formal notification via Office of Emergency Services (OES) and Division of Drinking Water (DDW).	This program provides annual updates, communication charts, an annual program review, and operator training to ensure that the water treatment plants receive early notification to allow for spill response planning. A review of data reporting indicates a low response rate of applicable formal notifications via the OES/DDW procedure.	
Continue to track Aerojet and act as an active stakeholder for permitting.	The Aerojet Groundwater Extraction and Treatment Systems NPDES continues to be expanded with up to 48 mgd discharging to the Lower American River. There are a broad suite of contaminants and there have been exceedences of effluent limits.	Only applicable to City Sacramento, SCWA, and EBMUD.
Continue to coordinate with Sacramento Regional County Sanitation District and City of Sacramento on operations agreements and notifications.		Only applicable to SCWA and EBMUD.

Table 6-1 Cont'd
2020 Update Recommendations

Recommendation	Basis for Recommendation	Notes
Watershed Contaminant Sources		
Through the Sacramento River Source Water Protection Program, or individual agency activities, continue to, or consider: 1. Continue to/consider participating as an active stakeholder in Central Valley Regional Board management programs (NPDES Tracking, Region-Wide MUN De-designation, CVSALTS Secondary MCL Implementation, ILRP, RPP, Lower American River Microbial Evaluations, Non-Point Source Program, etc.). 2. Continue to track Sterling Caviar NPDES Permit as will be one of the first renewals impacted by the new Secondary MCL Policy from CVSALTS. 3. Continue tracking water system operational programs to ensure that drinking water quality impacts are being addressed (i.e. Delta Conveyance Project, DWR Reoperation Study, Folsom Joint Federal Project, and USBR Basin Study). 4. Continue to track selected NPDES dischargers (such as McClellan) and act as an active stakeholder for permitting. 5. Consider contacting State Board about Cannabis Priority Watersheds to better understand criteria and why American River/Bear River are not included. 6. Consider coordinating with DPR/USEPA to request preparation of human health thresholds for benzobicyclon and metabolite B. 7. Consider coordinating with State Conservationist/State Technical Committee to better understand SWP Funding Opportunities from 2018 Farm Bill.	The development of this voluntary program by the water agencies has proven to be a highly effective tool for prioritizing on-going source water protection activities, as well as achieving the most benefits with the limited resources available.	Applicable to: WDCWA, City of West Sacramento, City of Sacramento, and SCWA. Consider applicability to: EBMUD

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APPENDIX A

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APPENDIX B

REGULATORY FRAMEWORK

REGULATORY FRAMEWORK

This Framework provides a review of current and anticipated drinking water regulations related to surface water systems as promulgated by the United States Environmental Protection Agency (USEPA) and the California State Water Resources Control Board's Division of Drinking Water (DDW). Anticipated regulations were limited to those projected to be implemented within five years. Under the provisions of the Safe Drinking Water Act (SDWA), the DDW has the primary enforcement responsibility (referred to as "primacy"). The Health and Safety Code of the California Administrative Code establishes DDW's authority and stipulates drinking water quality and monitoring standards. To maintain primacy, a state's drinking water regulations can be no less stringent than the federal standards (a state's regulations can be more stringent).

The USEPA and DDW establish primary regulations for the control of contaminants that affect public health and secondary regulations for compounds that affect the taste or aesthetics of drinking water. For each contaminant that is regulated, the USEPA is required to establish a maximum contaminant level (MCL) or a treatment technique (TT) to limit the level of these compounds in drinking waters. USEPA is also required to recommend a Best Available Technology (BAT) for removal of each contaminant during treatment.

In March 2010 the USEPA announced that they would be implementing a new regulatory strategy for drinking water. There are four major components to the strategy:

- Regulate contaminants as groups,
- Foster development of new drinking water treatment technologies,
- Use authority of multiple statutes to protect drinking water, and
- Partner with states to share data.

CURRENT REGULATIONS

The most significant drinking water quality regulations applied to surface water supplies are shown in **Table 1**. **Attachment 1** contains a summary of each of the contaminants currently regulated in drinking water by either the USEPA or the DDW. The attachment identifies the regulation and the MCL or the TT associated with each of the contaminants listed. There are numerous constituents which only have a California drinking water standard or a more stringent California drinking water standard, so the regulation is indicated as DDW. The following is a general discussion of the requirements of the regulations listed in **Table 1**.

NIPDWR

Prior to the establishment of the USEPA, the US Public Health Service had established 22 drinking water standards. These standards were adopted by the USEPA as National Interim Primary Drinking Water Regulations (NIPDWR) by the SDWA. These contaminants have been updated or replaced by subsequent regulations.

Table 1
Summary of Current Major Federal and State Drinking Water Quality Regulations Related to Surface Water

Regulation	Year of Promulgation	Number of Contaminants	Targeted Contaminants
National Interim Primary Drinking Water Regulations (NIPDWR)	1975-1981	7	Trihalomethanes, Arsenic, Radiologicals
Phase I Regulations	1987	8	VOCs
Phase II Regulations	1991	36	VOCs, SOCs, and IOCs
Phase V Regulations	1992	23	VOCs, SOCs, and IOCs
Surface Water Treatment Rule (SWTR)	1989	5	Microbiological and Turbidity
Total Coliform Rule (TCR)	1989	2	Microbiological
Lead and Copper Rule (LCR)	1991/2003 [1]	2	Lead and Copper
Drinking Water Source Assessment and Protection Program	1996	-	Source Water Protection
Contaminant Candidate List 1/First Regulatory Determination	1998/2003	60	Microbial and Chemical
Stage 1 Disinfectants/Disinfection By-Products (D/DBP) Rule	1998/2006 [1]	14	D/DBPs and Precursors
Interim Enhanced Surface Water Treatment Rule (IESWTR)	1998/2007 [1]	2	Microbiological and Turbidity, Systems >10,000
Radionuclides Rule	2000/2006 [1]	4	Radionuclides
Arsenic Rule	2001/2008 [1]	1	Arsenic
Filter Backwash Recycling Rule	2001/2007 [1]	-	Microbiological and Turbidity
Stage 2 D/DBP Rule	2006/2012[1]	9	DBPs
Long Term 2 ESWTR	2006	1	*Cryptosporidium*
Unregulated Contaminant Monitoring Rule 2	2006	25	Chemical and Microbiological
CA Public Notification Requirements	2006	None	None
CA Secondary Drinking Water Standards	2006	25	Human Welfare/Aesthetics
CA Perchlorate Regulation	2007	1	Perchlorate
Contaminant Candidate List 2/ Second Regulatory Determination	2005/2008	51/11	Chemical
CA Waterworks Standard	2008	None	None
Endocrine Disrupters Screening Program	2009/2010	134	Endocrine Disrupters

Table 1 Cont'd
Summary of Current Major Federal and State Drinking Water Quality Regulations Related to Surface Water

Contaminant Candidate List 3/ Third Regulatory Determination	2009/2016	116/5	Chemical and Microbiological
Six-Year Review	2017	-	-
Unregulated Contaminant Monitoring Rule 3	2012	30	Chemical and Biological
Revised Total Coliform Rule	2012	3	Microbiological
CA Hexavalent Chromium Regulation [2]	2014	1	Hexavalent Chromium
Contaminant Candidate List 4/Fourth Regulatory Determination	2016/2020	109/8	Chemical and Microbiological
Unregulated Contaminant Monitoring Rule 4	2016	30	Chemical and Microbiological
CA 1,2,3-Trichloropropane Regulation	2017	1	1,2,3-Trichloropropane

[1] California Adoption of Federal Rule
[2] California Repealed the Hexavalent Chromium Regulation in September 2017 and is currently under reconsideration

Phase I Regulations

The Phase I Regulations were finalized in July 1987 and compliance for large utilities was required by January 1989. The Phase I Regulations included MCLs for eight volatile organic compounds (VOCs) and required utilities to collect quarterly samples from each source water supply for one year. After one year, utilities could qualify for reduced monitoring based on the first year monitoring results (one sample every three years). The Phase I Regulations also included monitoring requirements for unregulated contaminants. All systems were required to monitor for a minimum of 34 unregulated volatile organic contaminants; two additional contaminants if the system is determined vulnerable; and 15 additional contaminants at the State's discretion.

Phase II Regulations

The Phase II Regulations were proposed in May 1989 and finalized in July 1991. Monitoring under the Phase II Regulations was required to begin in January 1993. The Phase II Regulations established MCLs for 36 contaminants (7 inorganic constituents (IOCs), 10 VOCs, and 19 synthetic organic compounds (SOCs), plus nitrate, nitrite, and total nitrate and nitrite) and TT requirements for two additional treatment additives (polymers). In order to simplify the increasing number of monitoring requirements, the Standardized Monitoring Framework (SMF) was developed. The SMF is based on a nine-year cycle divided into three, three-year monitoring periods. Under the new monitoring schedule, initial monitoring, baseline monitoring, reduced monitoring, and increased monitoring requirements were established.

Phase V Regulations

The Phase V Regulations were proposed in July 1990 and finalized in July 1992. The SMF was incorporated into the Phase V Regulations with the first compliance period for large utilities beginning January 1994. Phase V established regulations for 23 contaminants including 22 from the original list of 83 included in the 1986 SDWA Amendments (originally included a proposal for sulfate that was not included in the final Phase V regulations). The 23 Phase V contaminants include five IOCs, three VOCs, and 15 SOCs. The MCL for nickel, 0.1 milligrams per liter (mg/L), was remanded in February 1995 by the US Court of Appeals for the District of Columbia Circuit. The USEPA is required to reconsider the nickel MCL Goal (MCLG) and the MCL, but no action was ever taken.

Surface Water Treatment Rule

The Surface Water Treatment Rule (SWTR) was promulgated to control the levels of turbidity, *Giardia lamblia*, viruses, *Legionella*, and heterotrophic plate count bacteria in U.S. drinking waters. Many of the detailed requirements of this regulation were enhanced or superseded by the Interim and Long Term 2 Enhanced Surface Water Treatment Rules described later.

The California SWTR requires all utilities utilizing a surface water supply or a groundwater supply under the influence of a surface water supply, to provide adequate disinfection and, under most conditions, to provide filtration. Exemptions from filtration of surface water supplies are provided in rare occasions where the source water supply meets extremely rigid requirements for water quality and the utility possesses control of the watershed.

General Requirements

The SWTR includes the following general requirements to minimize human exposure to microbial contaminants in drinking water.

- Utilities are required to achieve at least 99.9 percent removal and/or inactivation of *Giardia lamblia* cysts (3-log removal) and a minimum 99.99 percent removal and/or inactivation of viruses (4-log removal). The required level of removal/inactivation must occur between the point where the raw water ceases to be influenced by surface water runoff to the point at which the first customer is served.
- The disinfectant residual entering the distribution system must not fall below 0.2 mg/L for more than 4 hours during any 24-hour period.

- A disinfectant residual must be detectable in 95 percent of distribution system samples. A heterotrophic plate count (HPC) concentration of less than 500 colonies per milliliter (/mL) can serve as a detectable residual if no residual is measured.
- Each utility must perform a watershed sanitary survey at least every five years.

Removal Credit

The level of physical removal credit given a utility for both *Giardia lamblia* and viruses is determined by the type of treatment process used. For a conventional water treatment plant, the SWTR provides a 2.5-log removal credit for *Giardia lamblia* and a 2.0-log removal credit for viruses. Alternative treatment technologies are awarded removal credit from DDW based on performance tests.

Disinfection Credit

Disinfection during conventional treatment (assuming all operational criteria and performance standards are met and the plant receives 2.5-log credit for physical removal of *Giardia* and 2.0-log credit for physical removal of viruses), must achieve 0.5-log inactivation of *Giardia lamblia* and 2.0-log inactivation of viruses. To determine the inactivation of *Giardia lamblia* and viruses achieved at a treatment plant, the SWTR established the concept of disinfection contact time (CT). CT is the product of the concentration of disinfectant remaining at the end of a treatment process ("C" in mg/L) and the contact time in which 10 percent of the water passes through the treatment process ("T" or "T_{10}" in minutes). The contact time in which 10 percent of the water travels through a unit process can be conservatively estimated from DDW guidelines or more accurately determined by conducting a tracer study. The USEPA Guidance Manual to the SWTR includes tables that identify the log removal of both *Giardia lamblia* and viruses achieved for a calculated CT value based on the type of disinfectant, the water temperature, and pH.

Total Coliform Rule

The Total Coliform Rule (TCR) was promulgated by the USEPA in June 1989 with compliance required eighteen months after promulgation (January 1991). DDW promulgated the Total Coliform Rule in January 1992 and the Rule went into effect on May 1, 1992. The Revised Total Coliform Rule is discussed later and supersedes some parts of this rule. Under the TCR, utilities must submit a monitoring plan to the DDW for approval. The plan must provide for representative sampling of the distribution system (including all pressure zones and reservoir areas), describe any sample rotations proposed and include a statement that the sample collector has been trained. The total number of samples and frequency of sampling required is dependent on the population served by the utility. For all but the smallest utilities, weekly sampling is required. If any sample is coliform-positive, two actions must be taken within 24 hours of notification to DDW of the positive result:

- A set of repeat samples must be collected. The location of the repeat samples must include the tap that tested positive, and one upstream and downstream location, both of which must be within five service connections of the positive sample location. If one or more of the repeat samples tests positive for the presence of coliforms, an additional set of repeat samples must be taken. This process continues until all of the samples are total coliform-negative or an MCL has been violated.
- The sample must be analyzed for the presence of fecal coliform or *E. coli*.

The previous coliform standard was a density based standard, which had been in place since 1914 under the Interstate Quarantine Act and subsequently modified through 1974. This was replaced by a presence/absence regulation. There are three potential scenarios in which an MCL is violated. These scenarios consist of the following:

- For utilities that analyze less than 40 samples per month, no more than 1 monthly sample may be coliform-positive (this includes repeat samples). If more than 1 monthly sample is coliform-positive then an MCL has been violated. For >40 samples per month collected, an MCL has been violated if more than 5.0% are positive.
- Utilities are in violation of an MCL if an original sample is fecal coliform/*E. coli*-positive <u>and</u> any repeat sample is total, fecal, or *E. coli*-positive.
- Utilities are in violation of an MCL if an original sample is total coliform-positive <u>and</u> any repeat sample is fecal coliform/*E. coli*-positive.

Furthermore, there are two conditions that result in a “Significant Rise in Bacterial Count” classification. This condition is not considered a violation of an MCL; however, it does require notification to DDW. The two conditions that result in this classification are listed below:

- An initial sample that is total coliform-positive is determined to be either fecal coliform or *E. coli*.-positive, as well.
- At least two repeat samples are total coliform-positive but neither sample is fecal coliform or *E. coli*-positive.

Best Available Technology

The TCR includes a list of four preventative measures a utility can institute to minimize the presence of coliforms in the distribution system. These four items include the following:

- Ensure proper well protection.
- Maintain of a minimum 0.2 mg/L disinfectant residual through the entire distribution system.

- Institute a distribution system maintenance program including:
  - appropriate pipe replacement and repair procedures,
  - flushing program,
  - proper operation and maintenance of distribution system reservoirs, and
  - maintenance of a positive water pressure throughout system.
- Provide adequate filtration and disinfection treatment processes.

Lead and Copper Rule

The Lead and Copper Rule (LCR) was promulgated by the USEPA on June 7, 1991. The objective of the LCR is to minimize the corrosion of lead and copper-containing plumbing materials in public water systems (PWS) by requiring utilities to optimize treatment for corrosion control. The LCR establishes “action levels” in lieu of MCLs for regulating the levels of both lead and copper in drinking water. The action level for lead was established at 0.015 mg/L while the action level for copper was set at 1.3 mg/L. The compliance for these action levels is based on results from first-flush distribution system samples at sites selected to meet the LCR requirements. An action level is exceeded when greater than 10 percent of samples collected from the sampling pool contain lead levels above 0.015 mg/L or copper levels above 1.3 mg/L. Unlike an MCL, a utility is not out of compliance with the LCR when an action level is exceeded. Exceedance of an action level requires a utility to take additional steps to reduce lead and copper corrosion in the distribution system. In addition, there is a California state secondary standard, of 1.0 mg/L, for copper that requires monitoring in the source and treated water separately.

In October 1999, USEPA made minor revisions to the LCR to clarify the original rule, streamline implementation, promote consistent national implementation, and reduce the reporting requirements. The revisions do not include any changes to the action levels for lead and copper. The revisions include requiring monitoring for public water systems with optimized corrosion control, which was inadvertently left out of the original LCR. The revisions also include changing the definition of the word “control” in the LCR to only require public water systems to replace lines that it owns or has authority to replace to protect the water quality. The revisions allow systems with low lead and copper tap levels to reduce the number and frequency of sample collection sooner. Finally, there are numerous modifications to the system reporting requirements to minimize the reporting burden.

In 2004 and 2007 the USEPA made several more minor revisions to the LCR, including a requirement to include lead health effects language in the annual Consumer Confidence Report. This was summarized in a Guidance Document in 2008, Lead and Copper Rule: Public Education & Other Public Information Requirements for Community Water Systems.

In February 2016, in response to the Flint, Michigan water quality crisis, the USEPA sent a letter to State Water Division Managers to clarify tap sample collection procedures under the LCR.

Drinking Water Source Assessment and Protection Program

The 1996 SDWA Amendments included a requirement for States to develop a program to assess sources of drinking water and encourage States to establish protection programs. California developed the Drinking Water Source Assessment and Protection (DWSAP) Program in response to this requirement. When bringing a new source into service, a source assessment must be conducted as part of the permitting process.

In November 1999, USEPA gave final approval of the DWSAP Program as California's source water assessment and protection program. The State Department of Health Services (DHS, previous name for DDW) was responsible for the completion of all assessments by May 2003. Water systems that planned to conduct their own assessments were required to submit their final assessments to DHS no later than December 31, 2002.

Once an original assessment is performed for a source water, DDW recommends that the assessment be reviewed every five years. If conditions have changed that might impact the overall ranking of potential contaminating activities (presence in watershed/source water or change to treatment), then a water utility could consider updating the assessment. A completed assessment is required to obtain and continue to obtain chemical monitoring waivers for source waters.

There are eight components identified by California which are required as part of its DWSAP Program. The following is summary of the components, from the perspective of preparation by a water system.

- Source Identification: Systems must locate the source using Global Positioning System.
- Delineation of the Watershed and the Near Intake Zones: Surface water systems must delineate the watershed contributing to the source and may, optionally, identify the near intake zones which are close to the point of diversion where contaminant activities may have a greater influence.
- Evaluation of the Physical Barrier Effectiveness: Surface water systems must complete the forms developed by the State to determine the effectiveness of the natural physical barriers for preventing contaminants from entering the source.
- Identification of Potential Contaminating Activities (PCAs): Surface water systems must develop an inventory of PCAs within the near intake zone or the entire watershed. The PCAs on the inventory must then be ranked for risk using the table from the DWSAP guidance.

- Perform a Vulnerability Assessment: Systems must perform a vulnerability assessment for each PCA identified. This assessment is based on the risk ranking, location, and the physical barrier effectiveness. After assessment, the PCAs are prioritized.
- Develop an Assessment Map: Systems must develop an assessment map, at a minimum using USGS quad maps 7.5 minute series. The map must show the location of the source, the watershed or recharge area, the near intake zones, and the location of the PCAs.
- Prepare a Drinking Water Source Assessment Report: Systems must prepare a report on the assessment to submit to the State for review. The report must include the assessment map, the methods used to locate the source, the recharge area delineation calculations, the physical barrier effectiveness forms, the potential contaminating activity forms, and the vulnerability assessment forms.
- Include a Summary of the Report in the Annual Consumer Confidence Report: Systems must provide a vulnerability summary of the assessment identifying PCAs to which the system is most vulnerable, as well as other information, to include in the annual Consumer Confidence Report. A summary of the assessment must be available upon request, and the report must also be available to the public for review.

The DWSAP guidance encourages voluntary source water protection program development and implementation following completion of the DWSAPs. There are some loan and grant funds available to assist with these programs. The Source Water Protection Program components have been highlighted by the State and include: public involvement, report review, initiation of protection measures, and information transfer to the public.

Contaminant Candidate List 1 (CCL1)

The 1996 Safe Drinking Water Act Amendments provided a list of chemical and microbial contaminants for possible future regulation. Every five years the USEPA is required to update the list, select at least five constituents for evaluation, and determine whether to regulate. The regulations will be determined based on risk assessment and cost-benefit considerations and on minimizing overall risk.

The USEPA selected 60 constituents, including 10 microbial and 50 chemical constituents, to evaluate as part of the first listing in 1998. The USEPA evaluated nine contaminants for possible regulatory determination; *Acanthamoeba*, Aldrin, dieldrin, hexachlorobutadiene, manganese, metribuzin, naphthalene, sodium, and sulfate. The USEPA determined in 2003 not to regulate any of those selected.

Stage 1 Disinfectants and Disinfection By-Products Rule

The purpose of the Stage 1 Disinfectants/Disinfection By-Product (D/DBP) Rule is "… to minimize risks from disinfection by-products and still maintain adequate control over microbial contamination." DDW adopted this regulation in 2012 without any significant variation from the Federal rule. The Stage 2 D/DBP Rule is discussed later and supersedes some parts of this rule.

Maximum Residual Disinfectant Level Goals

The USEPA set maximum residual disinfectant level goals (MRDLGs) for chlorine, chloramines, and chlorine dioxide. These are shown in **Table 2**.

Table 2
Maximum Residual Disinfectant Level Goals

Disinfectant	Goal
Chlorine	4 mg/L as Cl_2
Chloramines	4 mg/L as Cl_2
Chlorine Dioxide	0.8 mg/L as ClO_2

The MRDLGs are set at levels for which no known or anticipated adverse health effects occur. These goals are non-enforceable health goals based only on health effects and exposure information.

Maximum Residual Disinfectant Levels

The Stage 1 D/DBP Rule established maximum residual disinfectant levels (MRDLs) for chlorine, chloramines, and chlorine dioxide. These are shown in **Table 3**.

Table 3
Maximum Residual Disinfectant Levels

Disinfectant	Level
Chlorine	4.0 mg/L as Cl_2
Chloramines	4.0 mg/L as Cl_2
Chlorine Dioxide	0.8 mg/L as ClO_2

Chlorine

The residual disinfectant level must be monitored at the same points in the distribution system and at the same time as when sampling for total coliforms. Compliance with the MRDL will be based on the running annual average of the monthly average of all samples, computed quarterly. Operators may increase the residual chlorine level in the distribution system above the MRDL if necessary to protect public health from acute microbiological contamination problems including: distribution line breaks, storm runoff events, source water contamination, or cross-connections.

Chloramines

The residual disinfectant level must be monitored at the same points in the distribution system and at the same time as when sampling for total coliforms. Compliance with the MRDL will be based on the running annual average of the monthly average of all samples, computed quarterly. Operators may increase the residual chloramine level in the distribution system above the MRDL if necessary to protect public health from acute microbiological contamination problems including: distribution line breaks, storm runoff events, source water contamination, or cross-connections.

Chlorine Dioxide

Systems that use chlorine dioxide must measure the residual disinfectant level at the entrance to the distribution system on a daily basis. Non-compliance with the MRDL can result in acute or non-acute violations. If the daily sample at the entrance exceeds the MRDL, then the system is required to take three additional samples in the distribution system on the next day as described below. If any samples collected the second day in the distribution system exceed the MRDL, or if the distribution system samples were not collected, the system will be in acute violation of the MRDL. If only the sample collected at the entrance to the distribution system exceeds the MRDL on the second day, or if the entrance sample was not collected, the system will be in a non-acute violation of the MRDL.

Follow up monitoring in the distribution system will be governed by the type of residual disinfectant used. Systems using chlorine as a residual disinfectant and operating booster stations after the entrance to the distribution system must take three samples in the distribution system; one close to the first customer, one at an average residence time, and one at the maximum residence time. Systems using chlorine dioxide or chloramines as a residual disinfectant or chlorine without operating booster stations after the entrance to the distribution system must take three samples in the distribution system as close as possible to the first customer at intervals of not less than six hours.

Operators may not increase the residual chlorine dioxide level in the distribution system above the MRDL under any circumstances.

Maximum Contaminant Level Goals (MCLGs) for Trihalomethanes, Haloacetic Acids, Chlorite, and Bromate

The USEPA set MCLGs for four trihalomethanes, three haloacetic acids, chlorite, and bromate. These are shown in **Table 4**.

The MCLGs are set at levels for which no known or anticipated adverse health effects occur. These goals are non-enforceable health goals based only on health effects and exposure information.

Table 4
Maximum Contaminant Level Goals

Disinfection By-Product	MCLG
Bromodichloromethane	0 mg/L
Dibromochloromethane	0.06 mg/L
Bromoform	0 mg/L
Chloroform	0.07 mg/L
Monochloroacetic Acid	0.07 mg/L
Dichloroacetic Acid	0 mg/L
Trichloroacetic Acid	0.02 mg/L
Chlorite	0.8 mg/L
Bromate	0 mg/L

Maximum Contaminant Levels for TTHM, HAA5, Chlorite, and Bromate

The Stage 1 D/DBP Rule set MCLs for Total Trihalomethanes (TTHM), five haloacetic acids (HAA5), chlorite, and bromate. These are shown in **Table 5**.

Table 5
Maximum Contaminant Levels

Contaminant	Level
TTHM[1]	0.080 mg/L
HAA5[2]	0.060 mg/L
Chlorite	1.0 mg/L
Bromate	0.010 mg/L

[1]TTHM includes chloroform, bromodichloromethane, dibromochloromethane, and bromoform.
[2] HAA5 includes mono, di and tri-chloroacetic acids and mono and di-bromoacetic acids.

Total Trihalomethanes and Haloacetic Acids

TTHMs and HAA5 are formed when disinfectants react with naturally occurring organic matter in water. All systems must monitor the distribution system for TTHMs and HAA5. Compliance for surface water, GWUDIS and groundwater systems with population greater than 10,000 is based on the running annual average of quarterly averages of all samples taken in the distribution system, computed quarterly.

Chlorite

Chlorite is produced when chlorine dioxide reacts with naturally-occurring organic material. Systems using chlorine dioxide for disinfection are required to conduct sampling for chlorite. Systems are required to monitor chlorite on a daily basis at the point of entry to the distribution system. If chlorite is detected at levels greater than 1.0 mg/L at the entrance to the distribution system, then additional distribution system monitoring is required the following day. Systems must monitor three locations in the distribution system (at the same time): close to the first customer, representative of average residence time, and representative of maximum residence time, on a monthly basis.

Bromate

Bromate is produced when ozone reacts with naturally occurring bromide. Systems using ozone for disinfection are required to conduct sampling for bromate. Systems must collect one sample per month at the entrance to the distribution system while the ozonation system is operating under normal conditions. Compliance with the MCL is based on a running annual average, computed quarterly, of monthly samples.

Treatment Technique for Disinfection By-Product Precursors

The USEPA requires systems that have surface water or groundwater under the direct influence of surface water (GWUDIS) as a supply that use conventional filtration treatment are required to remove specific amounts of organic material by implementing a treatment technique, either by enhanced coagulation or enhanced softening, unless a system meets alternative criteria. The percent of removal required depends on source water total organic carbon (TOC) and alkalinity. **Table 6** provides a summary of the removal requirements.

Compliance with this treatment technique must be calculated on a quarterly basis, once 12 months of data are available. Each month the system must calculate percent actual TOC removal, determine the percent required TOC removal (from above), and calculate the removal ratio (must be greater than 1.0).

Table 6
TOC Removal Requirements (Percent)

	Alkalinity, mg/L as $CaCO_3$		
TOC, mg/L	0 – 60	> 60 – 120	> 120
> 2.0 - 4.0	35.0	25.0	15.0
> 4.0 - 8.0	45.0	35.0	25.0
> 8.0	50.0	40.0	30.0

In lieu of calculating the removal ratio, systems have the opportunity to be granted a 1.0 for the monthly removal ratio if they meet one of the four following conditions, regardless of the calculated removal ratio:

- Remove greater than or equal to 10 mg/L of magnesium hardness (as $CaCO_3$),
- Raw water TOC is less than 2.0 mg/L,
- Raw water or treated water specific UV absorbance (SUVA) is less than or equal to 2.0 L/mg-m, or
- Treated water alkalinity is less than 60 mg/L (only for systems practicing enhanced softening).

The USEPA has also provided alternative compliance criteria from the treatment technique requirements. Utilities will not be required to achieve the specified TOC removals provided one of the following conditions is met:

- Source water TOC is less than 2.0 mg/L,
- Treated water TOC is less than 2.0 mg/L,
- Source water TOC is less than 4.0 mg/L, source water alkalinity is greater than 60 mg/L, and distribution system TTHM is less than 0.04 mg/L and HAA5 is less than 0.03 mg/L,
- Distribution system TTHM is less than 0.04 mg/L and HAA5 is less than 0.03 mg/L and only chlorine is used for primary disinfection and distribution system residual,
- Source water SUVA, prior to any treatment, is less than or equal to 2.0 L/mg-m, or
- Treated water SUVA is less than or equal to 2.0 L/mg-m.

Interim Enhanced Surface Water Treatment Rule

The Interim ESWTR applies to public water systems (PWSs) that use surface water or GWUDIS and serve > 10,000 population. The purpose of this regulation is "… to improve control of microbial pathogens, including specifically *Cryptosporidium*, in drinking water; and address risk trade-offs with disinfection by-products." When the DDW adopted this regulation in 2007, it included several more detailed regulatory requirements than the Federal version.

Cryptosporidium

The rule set an MCLG for the protozoan genus *Cryptosporidium* of zero (0). Since there was not a reliable means for monitoring this constituent in the drinking water at the time of promulgation, a treatment technique requirement was established in lieu of setting an MCL. The treatment technique requires a 2.0-log (99 percent) *Cryptosporidium* removal or control for PWSs that are currently required to filter under the existing SWTR. This removal must be achieved between the raw water intake and the first customer.

The rule provides that systems with conventional or direct filtration water treatment plants will be granted the 2.0-log removal credit, provided turbidity requirements are met for the existing SWTR (1.0/5.0 nephelometric turbidity units [NTU], 95th percentile and never to exceed) and the combined filter effluent requirements for this rule (0.3/1.0 NTU, 95th percentile and never to exceed).

The rule also provides that systems with slow sand or diatomaceous earth filtration water treatment plants will be granted the 2.0-log removal credit, provided turbidity requirements are met for the existing SWTR (1.0/5.0 NTU). For systems applying to use an "alternative filtration technology", the system must show that the treatment, in combination with disinfection, consistently achieves 99.9 percent removal/inactivation of *Giardia*, 99.99 percent removal/inactivation of viruses, and 99 percent removal of *Cryptosporidium*.

Turbidity

For surface water and GWUDIS systems that are required to filter their source water under the existing SWTR, that employ conventional or direct filtration for treatment, the combined filter effluent turbidity requirements have been tightened. For alternative filtration technologies, the State set turbidity performance requirements at a level that, in combination with disinfection, will consistently achieve 99.9 percent removal/inactivation of *Giardia*, 99.99 percent removal/inactivation of viruses, and 99 percent removal of *Cryptosporidium*.

The combined filter effluent (CFE) turbidity must be less than 0.3 NTU in at least 95 percent of monthly measurements. The CFE may never exceed 1 NTU (based on four hour measurements) and may not exceed 1 NTU for more than 1 continuous hour based on more frequent measurements (at least recorded every 15 minutes for conventional and direct filtration plants). The CFE turbidity shall not exceed 1.0 NTU for more than eight hours (based on 15-minute measurements). Monthly reports must show total number of measurements taken and have two options for value reporting:

- Report the number of 15-minute measurements and show the 50th, 90th, 95th, 98th, and 99th percentiles and report all measurements greater than 1.0 NTU.
- Report 4 hour measurements and also provide the number of 15-minute measurements that month, the number and percent of those 15-minute measurements less than or equal to 0.3 NTU, and show all 15-minute measurements greater than 0.3 NTU.

The rule requires continuous, on-line measurement of turbidity for each individual filter effluent (IFE) for conventional and direct filtration plants. These data must be recorded every 15 minutes also. Systems with two or fewer filters may conduct continuous monitoring of the CFE turbidity in lieu of individual monitoring. IFE turbidity levels shall be monitored and the following conditions will require DDW reporting and self-assessment activities:

- Report IFE turbidity if greater than 1.0 NTU in two consecutive measurements, 15 minutes apart anytime during filter run
- Report IFE turbidity if greater than 0.3 NTU in two consecutive measurements, 15 minutes apart during the first 60 minutes of filter operation
- Conduct Filter Self-Assessment if IFE turbidity greater than 1.0 NTU in two consecutive measurements, 15 minutes apart anytime during filter run, for three consecutive months
- Conduct Comprehensive Performance Evaluation if IFE turbidity greater than 2.0 NTU in two consecutive measurements, 15 minutes apart anytime during filter run, for two consecutive months

DDW has added several other requirements to the rule including:

- All filters shall be visually inspected once per year as part of the operations plan based on DDW guidance.
- On-line turbidimeters shall be manually verified once per month for combined filter effluent and once per month for individual filter effluent.
- Turbidity shall be recorded and reported for sedimentation effluent at least once per day.
- Flow rate and turbidity shall be recorded and reported for recycled backwash water at least once per day.
- System must report turbidity data to the State within 10 days after the end of each month.

Disinfection Profiling and Benchmarking

The purpose of the disinfection profiling and benchmarking is to develop a process to assure that there is no significant reduction in microbial protection as a result of significant disinfection process modifications to meet the new MCLs for TTHMs and HAA5 from the Stage 1 D/DBP Rule, or subsequent MCLs.

Initial profiling was required for surface water systems if their annual average TTHM levels were greater than or equal to 80 percent of the new MCL (0.064 mg/L) or annual average HAA5 levels were greater than or equal to 80 percent of the new MCL (0.048 mg/L).

The initial disinfection profile was developed using a minimum of one year of weekly *Giardia lamblia* log inactivation. The month with the lowest average log inactivation was identified as the critical period or benchmark. When only one year of data was used, the benchmark inactivation was the same as the critical period. When multiple years of data were used, the benchmark inactivation was the average of the critical period from each year.

After the initial profiling and benchmarking was complete, a utility submitted it to the State as part of the sanitary survey (see description below). If a utility decides to make changes to the disinfection practices, then the utility must consult with the State to ensure that microbial protection is not compromised. Changes that would require a benchmark analysis include; changes in the point of disinfection, the type of disinfectant, the disinfection process, or any other modification identified by the State.

Finished Water Reservoirs

Under this rule, surface water and GWUDIS systems must cover all new treated water reservoirs, holding tanks, and other storage facilities.

Sanitary Surveys

Primacy states, such as California, must now conduct sanitary surveys for all surface water and GWUDIS systems, regardless of size. This is not the same as the watershed sanitary survey requirements, which is a water system requirement. The sanitary surveys must be conducted every three years for community water systems (CWS) and every five years for non-community water systems (NCWS). DDW may grant a waiver to water utilities and perform the sanitary survey every five years if the system has outstanding performance based on previous sanitary surveys. DDW must determine how outstanding performance will be evaluated to allow for the reduced frequency of the sanitary survey.

The sanitary surveys must meet the eight components of the 1995 USEPA/State Guidance. These components include: source assessment (DDW typically uses watershed sanitary surveys for compliance with this component); treatment; distribution system; finished water storage; pumps, pumping facilities and controls; monitoring and reporting (including data verification); system management and operation; and operator compliance with state requirements. Disinfection profiling must also be evaluated if required.

Radionuclides

The USEPA published the Final Radionuclides Rule on December 8, 2000. The Rule applies to all CWSs. It included several new standards including:

- Set the Gross Alpha, Gross Beta and Photon, Combined Radium (226/228), and Uranium MCLGs at zero.
- Set the Gross Alpha MCL at 15 picoCuries per liter (pCi/L).
- Set the Gross Beta and Photon MCL at 4 millirems per year (mrem/yr).

- Set the Combined Radium MCL at 5 pCi/L.
- Set the Uranium MCL at 30 micrograms per liter (µg/L).

The Rule requires all initial monitoring to be collected at the entry point to the distribution system (EPDS). It also clarified that Gross Beta and Photon are only required to be monitored by vulnerable systems. The frequency of repeat monitoring is determined by the initial one year of quarterly monitoring results.

- Sample results less than the detection limit for reporting (DLR), then 1 sample every 9 years.
- Sample results less than half the MCL, then 1 sample every 6 years.
- Sample results less than the MCL, then 1 sample every 3 years.

Arsenic Rule

The Final Arsenic Rule was promulgated by the USEPA on January 22, 2001, to be effective January 23, 2006. The Rule sets an MCLG of 0 mg/L and an MCL of 0.010 mg/L (10 µg/L) for arsenic. DDW adopted a regulation with the same standard in 2008. The California Office of Environmental Health Hazard Assessment (OEHHA) has developed a Public Health Goal (PHG) for arsenic of 4 nanograms per liter (ng/L), equal to 0.004 µg/L.

Surface water systems are required to collect an annual sample. If sample results are greater than the MCL, then quarterly sampling is triggered. Waivers are available with three rounds of monitoring with results less than the MCL. With a waiver, sampling can be reduced to once every nine years.

USEPA is considering a revision to the MCL pending an updated human health assessment, as discussed below in the Anticipated Future Regulations section.

Filter Backwash Recycling Rule

The Final Filter Backwash Recycling Rule applies to all PWSs that use surface water and employ conventional or direct filtration and recycle water within the treatment plant. The DDW incorporated this rule into its adoption of the IESWTR.

This requires all recycle streams to pass through all treatment processes; therefore all streams need to be returned prior to chemical addition and coagulation. Also, each system must notify DDW in writing that they practice recycling. This notification must include a plant schematic that shows the type and location of recycle streams, typical recycle flow data, highest plant flow in the previous year, design flow of the plant, and DDW approved operating capacity.

Each system must collect and maintain the following information: copy of recycle notice to DDW, list of all recycle flows and frequency, average and maximum backwash flow rate and duration, typical filter run length and how determined, type of recycle treatment, and data on recycle treatment facilities.

DDW has added several other requirements to the rule including:

- Raw water shall be sampled for total coliform and either fecal coliform or *E. Coli* at least once per month.
- Chlorine residual shall be confirmed in 95 percent of distribution samples every month.

Stage 2 Disinfectants and Disinfection By-Products Rule

The Stage 2 D/DBP Rule was published in January 2006 and adopted by DDW in 2012. It applies to public water systems (PWSs) that are community water systems (CWSs) or non-transient non-community water systems (NTNCWs) that add a primary or residual disinfectant other than ultraviolet light or deliver water that has been treated with a primary or residual disinfectant other than ultraviolet light.

The key provision in this rule is the change in calculating the maximum contaminant level (MCL). Under the State 1 D/DBP Rule compliance with the MCL was calculated using a running annual average (RAA) to average compliance samples from all distribution system sampling locations. Under Stage 2 D/DBPR, the MCL is calculated using locational running annual averages (LRAAs). PWSs must maintain the LRAA for each compliance sampling location at or below 0.080 mg/L total trihalomethanes (TTHM) and 0.060 mg/L haloacetic acids (HAA5). All systems, including consecutive systems, must comply with the MCLs for TTHM and HAA5 LRAA using compliance sampling locations identified from their Initial Distribution System Evaluation (IDSE) Final Report.

In May 2012 DDW adopted the Stage 2 D/DBP Rule as a marked up version of the existing regulatory code to incorporate the federal requirements into State code.

Initial Distribution System Evaluation

An IDSE was to be performed to identify locations with representative high TTHM and HAA5 concentrations throughout a system's retail distribution system. The IDSE results were used in conjunction with the Stage 1 D/DBPR compliance monitoring to identify and select Stage 2 D/DBPR routine compliance monitoring locations. There were four IDSE options:

- Standard monitoring program

- System specific study [based on TTHM and HAA5 monitoring] and modeling requirements
- Obtaining a 40/30 waiver
- Obtaining a very small system waiver

For systems electing the Standard Monitoring Program, both the timing and number of IDSE monitoring were based on the retail population served by the individual public water system(s) and the source water type (either surface water or groundwater).

The timing of when the IDSE must be completed was based on either an individual system's retail population or, in the case of a combined distribution system, the retail population served by the largest system in that combined system. Combined distribution systems include water systems that receive fully treated water from another water system. The system providing the water was the wholesaler and the system receiving the water was the consecutive system. Since this rule included specific monitoring requirements for both wholesale and consecutive systems, USEPA developed guidance materials to assist combined systems and encouraged coordinating the timing of sample collection for those consecutive systems to enable data assessment. Those systems determined to be large, >100,000 population, were required to submit their IDSE plans under Schedule 1, by October 1, 2006. Schedule 2 systems, those between 50,000 and 100,000 population, had plans due April 1, 2007. Schedule 3 systems, those between 10,000 and 50,000 population, had plans due October 1, 2007. Schedule 3 systems, those less than 10,000 population, had plans due April 1, 2008.

The numbers of IDSE samples in the standard monitoring option were based on each individual system's retail population and the source water type, with the number ranging from 2 to 40. The frequency of sample collection also depended on the retail population and source water type, either one annual, four quarterlies, or six every 60 days.

Compliance Monitoring

Compliance with the Stage 2 D/DBPR is based on calculating a LRAA, where compliance means maintaining the annual average at each routine sampling location in the distribution system at or below 0.080 mg/L and 0.060 mg/L for TTHM and HAA5, respectively. This is in lieu of the RAA MCL calculation under the Stage 1 D/DBPR that averaged observed values across distribution system compliance sampling locations. Monitoring for the LRAA will occur at routine sampling locations identified in the IDSE Final Report at specific frequencies based on system population. In addition, water systems must submit a new Monitoring Plan for routine sampling which identifies the location, timing, and frequency of sample collection as well as the methodology for determining compliance with the MCLs. The number of routine sites for compliance monitoring is based on retail population and source water type, ranging from 2 to 20.

The frequency also depends on retail population and source water type, with small systems only required to monitor annually and large systems monitoring quarterly.

If a water system is required to conduct quarterly monitoring, it must make compliance calculations at the end of the fourth calendar quarter that follows the compliance date (based on system size and designation in their IDSE Report and updated Monitoring Plan) and at the end of each subsequent quarter (or earlier if the LRAA calculated based on fewer than four quarters of data would cause the MCL to be exceeded regardless of the monitoring results of subsequent quarters). If the system is required to conduct monitoring at a frequency that is less than quarterly, it must make compliance calculations beginning with the first compliance sample taken after the compliance date.

Operational Evaluation Levels

The Stage 2 D/DBPR includes the concept of "operational evaluation levels." Operational evaluation levels trigger a system to evaluate system operational practices and identify opportunities to reduce DBP concentrations in the distribution system in order to reduce the potential the system will exceed the MCL. The Stage 2 D/DBPR operational evaluation levels are identified using the system's Stage 2 D/DBPR compliance monitoring results.

The operational evaluation includes an examination of system treatment and distribution operational practices, including changes in sources or source water quality, storage tank operations, and excess storage capacity, which may contribute to high TTHM and HAA5 formation. Systems must also identify what steps could be considered to minimize future operational evaluation level exceedences.

Operational Evaluation Levels
(calculated at each monitoring location)

IF (Q1 + Q2 + 2Q3)/4 > MCL,
then the system must conduct an operational evaluation

where
Q3 = current quarter measurement
Q2 = previous quarter measurement
Q1 =quarter before previous quarter measurement
MCL=Stage 2 MCL for TTHM (0.080 mg/l) **or**
Stage 2 MCL for HAA5 (0.060 mg/L)

Minimum Reporting Levels for DBPs

The rule establishes regulatory minimum reporting limits (MRLs) for compliance reporting of DBPs by public water systems. These regulatory MRLs also define the minimum concentrations that must be reported as part of the Consumer Confidence Reports. Beginning April 1, 2007 water systems must report all quantitative data results that have concentrations above the MRL. This includes both compliance data, such as routine or increased DBP monitoring, as well as additional data collected by water systems, such as IDSE monitoring, operational evaluation assessment data, and treatment technique compliance data (for precursors).

Maintain TOC < 4 mg/L for Reduced TTHM and HAA5 Monitoring

In order to qualify for reduced routine compliance monitoring for TTHM and HAA5, subpart H systems (i.e., systems that use surface water supplies or ground water under direct influence of surface water) not monitoring to demonstrate compliance with TOC removal requirements of Stage 1 D/DBPR (i.e., plants that are not conventional filtration designs) must take monthly TOC samples every 30 days at a location prior to any treatment, beginning April 1, 2008 or earlier, if specified by the state. The source water TOC running annual average must be <4.0 mg/L (based on the most recent four quarters of monitoring) on a continuing basis at each treatment plant to reduce or remain on reduced monitoring for TTHM and HAA5. After demonstration of TOC level, the system may reduce monitoring to every 90 days.

Systems on a reduced monitoring schedule may remain on that reduced schedule as long as the average of all samples taken in the year (for systems which must monitor quarterly) or the result of the sample (for systems which must monitor no more than frequently than annually) is no more than 0.060 mg/L and 0.045 mg/L for TTHMs and HAA5, respectively.

Long Term 2 Enhanced Surface Water Treatment Rule

The Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) was published by the USEPA in early January 2006 in the Federal Register. This regulation applies to all public water systems that use surface water or ground water under the direct influence of surface water (GWUDI).

The LT2ESWTR includes variable deadlines that are dependent on population served. Some systems serving more than 100,000 people were required to submit detailed monitoring plan submissions under LT2ESWTR by July 1, 2006. The USEPA provided an overview of key monitoring, reporting, and compliance milestones under both rules.

The requirements for filtered and unfiltered systems are different. This section summarizes only the requirements for filtered systems.

Source Water Monitoring

Filtered systems were not required to conduct source water monitoring if the system provided a total of at least 5.5-log of treatment for *Cryptosporidium.* Otherwise, PWSs using surface water or GWUDI were required to monitor their source water (i.e., the influent water entering the treatment plant) monthly for 24 months to determine a maximum running annual average *Cryptosporidium* level. As described in the next section, monitoring results determined the extent of *Cryptosporidium* action requirements under the LT2ESWTR. Large systems also monitored for *E. coli* and turbidity at the same time in source water.

Systems adhered to their sampling plan and reported results no later than 10 days after the end of the first month following the month when the sample was collected. All systems serving at least 10,000 people reported the results from the initial source water monitoring to USEPA electronically using the Central Data Exchange (CDX) website. Submission of historical (grandfathered) data was allowed if it met the quality assurance and quality control requirements specified in the rule.

Systems serving less than 10,000 persons could use *E. coli* as a surrogate indicator for *Cryptosporidium.* However, if the *E. coli* levels were sufficiently high, these systems then undertook *Cryptosporidium* monitoring. The trigger level for *Cryptosporidium* monitoring was originally set at *E. coli* levels above 10 most probable number per 100 milliliters (MPN/100 mL) for a lake or reservoir source and 50 MPN/100 mL for a flowing stream. In 2010, based on data submitted by large systems, the USEPA revised the trigger threshold to 100 MPN/100 mL for all surface water supplies[1].

The rule also includes a provision for all systems to conduct a second round of source water monitoring (either *Cryptosporidium* or *E. coli)* for all systems. This second round of sampling was required at least six years following bin classification for the source water, beginning in 2016 for most large water systems.

Analytical Method

Systems must analyze for *Cryptosporidium* using either USEPA Method 1623 or Method 1622. Systems must analyze at least a 10 L sample, a packed pellet volume of at least 2 mL, or enough volume to clog two filters. The rule contains specific quality assurance and quality control requirements. Only USEPA approved laboratories can perform the *Cryptosporidium* sample analysis. Analytical methods are also specified for turbidity and *E. coli* measurements required by the rule.

Sampling

Filtered systems serving at least 10,000 people sampled their source water for *Cryptosporidium*, *E. coli*, and turbidity at least monthly for 24 months. Filtered systems serving fewer than 10,000 people sampled their source water for *E. coli* at least once

[1] USEPA Memorandum, "OGWDW Review of Small System Monitoring Requirements Under the Long Term 2 Enhanced Surface Water Treatment Rule", February 4, 2010.

every two weeks for 12 months. Filtered systems serving fewer than 10,000 people with the initial *E. coli* annual mean *E. coli* concentration greater than 100 *E. coli MPN*/100 mL then sampled their source water for *Cryptosporidium* at least twice per month for 12 months. These small systems could also elect to skip the *E. coli* monitoring and instead conduct *Cryptosporidium* monitoring at least monthly for 24 months.

Systems collected samples within a five-day period around the scheduled date. If an extreme condition or situation existed that could pose danger to the sample collector, or that could not be avoided and caused the system to be unable to sample, the system sampled as close to the scheduled date as was feasible unless the state approved an alternative sampling date. The system submitted an explanation for the delayed sampling date to the state concurrent with the shipment of the sample to the laboratory. If a system was unable to report a valid analytical result for a scheduled sampling date due to equipment failure, loss of or damage to the sample, failure to comply with the analytical method requirements, including the quality control requirements, or the failure of an approved laboratory to analyze the sample, then the system collected a replacement sample.

Replacement samples could not be collected later than 21 days after receiving information that an analytical result could not be reported for the scheduled date, unless the system demonstrated that collecting a replacement sample within this time frame was not feasible or the state approved an alternative re-sampling date. The system submitted an explanation for the delayed sampling date to the state concurrent with the shipment of the sample to the laboratory. Systems that failed to meet these criteria for any source water sample revised their sampling schedules to add dates for collecting all missed samples. Systems submitted the revised schedule to the state for approval prior to when the system began collecting the missed samples.

Monitoring Location

Systems collected samples for each plant that treats a surface water or GWUDI source. Where multiple plants draw water from the same influent, such as the same pipe or intake, the state could approve one set of monitoring results to be used for all plants. Systems collected source water samples prior to chemical treatment, such as coagulants, oxidants and disinfectants. The state could approve a system to collect a source water sample after chemical treatment. To grant this approval, the state determined that collecting a sample prior to chemical treatment was not feasible for the system and that the chemical treatment was unlikely to have a significant adverse effect on the analysis of the sample. Systems that recycled filter backwash water collected source water samples prior to the point of filter backwash water addition. Specific requirements were included for bank filtration and other special cases.

A system that began using a new source of surface water or GWUDI after the system was required to begin monitoring must monitor the new source on a schedule the state approves.

Monitoring and Treatment Compliance Dates

Starting dates for monitoring were staggered by system size, with smaller systems beginning monitoring after larger systems. Milestones for monitoring, reporting, and compliance occur first for very large systems (≥100,000 persons), then systems serving 50,000 - 99,999 persons, followed by systems serving 10,000 - 49,999 persons, and finally systems serving fewer than 10,000. Populations were based on retail population served.

Bin Classification Table for Filtered Systems

Filtered water systems were classified in one of four categories or bins based on their monitoring results. The rule specifies several calculation procedures depending on how many samples were collected or if the sample frequency was not consistent.

Additional action for *Cryptosporidium* (beyond 3.0-log reduction awarded for conventional filtration or 2.5-log reduction for direct filtration) is based on source water concentrations of the protozoa and the type of treatment implemented at the plant. If the maximum running annual average (MRAA) is less than 0.075 oocysts/L, the source is assigned Bin 1 classification and no additional action is required. If the MRAA is greater than or equal to 0.075 oocysts/L, then various levels of action are required based on the Bin classification and the treatment type. **Table 7** provides a summary of those action requirements.

Calculating Bin Placement

- Total of at least 48 samples. The bin concentration is equal to the arithmetic mean of all sample concentrations.
- Total of at least 24 samples, but not more than 47 samples. The bin concentration is equal to the highest arithmetic mean of all sample concentrations in any 12 consecutive months during which *Cryptosporidium* samples were collected (maximum running annual average).
- For systems that serve fewer than 10,000 people and monitor for *Cryptosporidium* for only one year (i.e., collect 24 samples in 12 months), the bin concentration is equal to the arithmetic mean of all sample concentrations.
- For systems with plants operating only part of the year that monitor fewer than 12 months per year under § 141.701(e), the bin concentration is equal to the highest arithmetic mean of all sample concentrations during any year of *Cryptosporidium* monitoring.

Table 7
Treatment Requirements by Bin Classification

Bin Classification	*Cryptosporidium* Concentration [1] (oocysts/L)	Filtration Treatment			
		Conventional filtration (including softening)	Direct Filtration	Slow Sand or Diatomaceous Earth Filtration	Alternative Filtration Technology
Bin 1	<0.075	No additional treatment	No additional treatment	No additional treatment	No additional treatment
Bin 2	0.075 – 1.0	1-log	1.5-log	1-log	As determined by State
Bin 3	1.0 – 3.0	2-log[1]	2.5-log[1]	2-log[1]	As determined by State[2]
Bin 4	>3.0	2.5-log[1]	3-log[1]	2.5-log[1]	As determined by State[2]

[1]Represents the maximum running annual average over compliance period
[2]Systems must achieve at least 1-log through ozone, chlorine dioxide, UV, membranes, bag/cartridge filters, or bank filtration.

Conventional filtration systems classified in Bins 2, 3 and 4 must provide 1.0 to 2.5-log additional action for *Cryptosporidium*. Systems will select from a wide range of treatment and management strategies in the "microbial toolbox" to meet their additional action requirements. Systems classified in Bin 3 and Bin 4 must achieve at least 1 log of additional treatment using either one or a combination of the following: bag filters, bank filtration, cartridge filters, chlorine dioxide, membranes, ozone, or ultraviolet (UV) light.

Microbial Toolbox

PWSs can achieve additional *Cryptosporidium* treatment credit through implementing pretreatment processes, such as pre-sedimentation or bank filtration, by developing a watershed control program, and by applying additional treatment steps like ozone, chlorine dioxide, UV, and membranes. In addition, PWSs can receive a higher level of credit for existing treatment processes through achieving superior filter effluent turbidity or through a demonstration of performance. Taken as a whole, this list of control options is termed the "microbial toolbox." PWSs may use one or more tools to accumulate the needed treatment credits to meet the treatment requirement associated with their bin classification.

UV Dose Table

Systems receive *Cryptosporidium*, *Giardia lamblia*, and virus treatment credits for ultraviolet (UV) light reactors by achieving the UV dose values described in the rule. Systems must validate and monitor UV reactors to demonstrate that they are achieving a particular UV dose value for treatment credit. UV reactor validation must occur at full-scale using a test microbe with quantified dose-response characteristics using low-pressure mercury lamps. Validation must include operating conditions of flow rate, UV intensity as measured by a UV sensor, and UV lamp status, as well as other considerations including lamp fouling and inlet/outlet hydraulics. To receive treatment credit for UV light, systems must treat at least 95 percent of the water delivered to the public during each month by UV reactors operating within validated conditions for the required UV dose.

CT Tables

CT is the product of the disinfectant contact time (T, in minutes) and disinfectant concentration (C, in milligrams per liter). Systems with treatment credit for chlorine dioxide or ozone must calculate CT at least once each day, with both C and T measured during peak hourly flow. Systems with several disinfection segments in sequence may calculate and sum the CT for each segment, where a disinfection segment is defined as a treatment unit process with a measurable disinfectant residual level and a liquid volume. Systems receive the *Cryptosporidium* treatment credit by meeting the corresponding CT value for the applicable water temperature specified in CT tables specified in the rule.

Open Finished Water Reservoirs

Up to now, regulations required PWSs to cover all new storage facilities for finished water but did not address existing uncovered finished water storage facilities. Under the LT2ESWTR, PWSs using uncovered finished water storage facilities must either cover the storage facility, treat the storage facility discharge to achieve inactivation and/or removal of 4-log virus, or develop and implement a risk mitigation plan.

Microbial Profiling and Benchmarking

After the first round of source water monitoring if a water system plans to make a significant change to its disinfection practice, they must develop a disinfection profile and calculate disinfection benchmarks for *Giardia lamblia* and viruses. The same process should be used as outlined in Guidance under the IESWTR. Significant changes to disinfection practice are defined as follows:

- Changes to the point of disinfection;
- Changes to the disinfectant(s) used in the treatment plant;
- Changes to the disinfection process; or
- Any other modification identified by the state as a significant change to disinfection practice.

Unregulated Contaminant Monitoring Rule 2

The Unregulated Contaminant Monitoring Rule 2 (UCMR2) required “treated” water monitoring of specified unregulated constituents. The Rule was promulgated on January

4, 2007. The purpose was to assist the USEPA to collect information about contaminants present in drinking water supplies that were unregulated. The UCMR2 was comprised of three lists, or groups, of monitoring. List 1 required CWSs and NTNCWs serving greater than 10,000 to conduct “treated” water monitoring of specified unregulated constituents. A select group of 800 systems serving less than 10,000 were also required to conduct the monitoring. List 2 required only large systems, serving greater than 100,000, to conduct “treated” water monitoring of specified unregulated constituents.

- List 1 - 10 constituents, two methods, sampling was conducted between January 2008 and December 2010, surface water quarterly for one year, groundwater semi-annual for one year, sampled at entry point to distribution system only.
  - 2,2',4,4'- tetrabromodiphenyl ether (BDE-47), 2,2',4,4',5-pentabromodiphenyl ether (BDE-99), 2,2',4,4',5,5'-hexabromobiphenyl (HBB), 2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153), 2,2',4,4',6-pentabromodiphenyl ether (BDE-100), Dimethoate, Terbufos sulfone, 1,3-dinitrobenzene, 2,4,6-trinitrotoluene (TNT), Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX).
- List 2 - 15 constituents, three methods, sampling was conducted between January 2008 and December 2010, surface water quarterly for one year, groundwater semi-annual for one year, sampled at entry point to distribution system for all constituents and also at distribution system maximum residence time for the six nitrosamines (all under one method).
  - N-nitrosodiethylamine (NDEA), N-nitrosodimethylamine (NDMA), N-nitroso-di-n-butylamine (NDBA), N-nitroso-di-n-propylamine (NDPA), N-nitrosomethylethylamine (NMEA), N-nitrosopyrrolidine (NPYR), Acetochlor ethane sulfonic acid (ESA), Acetochlor oxanilic acid (OA), Alachlor ESA, Alachlor OA, Metolachlor ESA, Metolachlor OA, Acetochlor, Alachlor, Metolachlor.

Analytical work was to be completed using a USEPA approved UCMR2 laboratory and data was to be submitted to the USEPA via the on-line CDX system. The USEPA assigned specific dates for sampling conducted by each water agency. The List 1 and List 2 constituents were monitored concurrently. Systems finalized their sampling inventory with the USEPA and had the opportunity to revise the sampling schedule through CDX. Some large systems that have multiple ground water entry points to the distribution system (EPTDSs) were allowed to monitor at representative entry point(s) rather than at each EPTDS with submittal of approval documentation or approval of proposed alternate sampling plan.

California Public Notification Requirements

These requirements were finalized and effective in September 2006. They apply to all PWSs. DDW revised the existing requirements by modifying the format substantially, and not necessarily the content. DDW revised public notification into three Tiers.

1. Tier 1 violations are the most serious (fecal/*E.coli* positive distribution system samples, nitrate/nitrite MCL exceedances without resampling, turbidity violations without DDW notification, or other emergency short-term exposure health advisories). These violations will require mass public notification within 24 hours.
2. Tier 2 violations are the less serious (other MCL violations, bacterial monitoring/testing errors). These violations require mass public notification within 30 days and must run for at least seven days. If the violation continues, the notification shall be repeated every 3 months.
3. Tier 3 violations are the least serious (other monitoring violations, testing procedure violations). These violations require mass public notification within one year and must run for at least seven days. If the violation continues, the notification shall be repeated annually. A detailed list of items to be included in public notifications is provided in the final rule.

There are new requirements, similar to the Consumer Confidence Report, such as foreign language translations, revised health effects text, submittal of certification to DDW within 10 days of public notification, and notification retention for up to three years. In April 2018, DDW published guidance for Tier 1 violations, Unsafe Water Notification Guidance.

California Secondary Drinking Water Standards

These Standards were finalized and effective in September 2006. They apply to all PWSs. DDW revised several secondary drinking water standards and clarified monitoring and compliance requirements. Corrosivity was removed from the list of secondary MCLs and pH was added.

Systems may obtain a waiver for treatment (up to nine years) to meet the secondary MCLs, and the process to obtain that waiver was clarified and detailed. Only sources with levels less than three times the MCLs may apply and must include:

- System complaint log
- Engineering report on treatment feasibility
- Results of customer survey
- Report of public meeting

The rule also clarifies that a source exceeding a secondary MCL may be used for standby or to meet peak demands if the use of the source is metered, it is only used less than five consecutive days or maximum 15 days per year, a PWS provides public notice prior to use if feasible, the use of the source is disclosed in the CCR, and the system is flushed to minimize the impact of the source.

California Perchlorate Regulation

DDW developed a primary MCL for perchlorate in drinking water in July 2007. DDW set the MCL for perchlorate at 6 µg/L, based on the PHG for perchlorate at that time of 6 µg/L, set by OEHHA in March 2004. The regulation requires all sources to be monitored for perchlorate two times in one year, once during the vulnerable period (May through September) and once five to seven months earlier or later. Historic data collected after January 1, 2001 was allowed to be grandfathered if it met all the sampling and quality assurance and quality control requirements of the regulation.

OEHHA revised the PHG down to 1 µg/L in February 2015 (discussed further below in the Other Drinking Water Thresholds section). Given the number of detections in water supplies and the reduction in the PHG to take into account infant exposures, DDW has determined to examine the perchlorate detections and the drinking water sources involved, and to develop a cost benefit analysis of a possible MCL revision. This is discussed later in the Anticipated Future Regulations section.

Contaminant Candidate List 2 (CCL2)

For the second round of the Contaminant Candidate review process, the USEPA opted to use the remaining constituents from the CCL1 as the second list for evaluation. Beginning in 2006, from this list of 51 constituents, 42 chemical and 9 microbial, the USEPA was to select at least five to determine whether to regulate. Eleven constituents were selected for determination, several of which were already regulated in California. USEPA published a Final Regulatory Determination in July 2008 and determined not to regulate any of the eleven constituents due to their lack of presence at levels of public health concern in public water systems. USEPA did determine that updated Health Advisories were warranted for seven of the constituents; including both dacthal acid degradates, as shown on **Table 8**.

If a contaminant is determined to need regulation, the standard shall be promulgated within 18 months of the determination. The regulations are determined based on risk assessment and cost-benefit considerations and on minimizing overall risk. Regulations must be based on best available, peer-reviewed science and data from best available methods. If regulated, the standard will take effect three years later. For each new regulation, the USEPA is required to identify affordable technologies that will achieve compliance for small systems.

As part of the Regulatory Determination, USEPA also requested more information on perchlorate and MTBE in order to make those regulatory determinations. In February

2011 the USEPA determined that perchlorate did warrant regulation in drinking water, however this regulatory determination was revised in June 2020 when the USEPA determined not to set a federal regulation for perchlorate. A revised risk assessment for MTBE was expected in 2011 however it has not yet been completed. A regulatory determination will be made after that is complete.

Table 8
Contaminant Candidate List 2

Constituent	USEPA Regulate?	DDW Regulate?	Updated Health Advisory?
Boron	No	NL	Yes
Dacthal mono and di-acid degradates	No	No	Yes
1,1-dichloro-2,2-bis(p-chlorophenyl) ethylene (DDE)	No	No	No
1,3-dichloropropene	No	MCL	Yes
2,4-dinitrotoluene	No	No	Yes
2,6-dinitrotoluene	No	No	Yes
s-ethyl propylthiocarbamate (EPTC)	No	No	No
Fonofos	No	No	No
Terbacil	No	No	No
1,1,2,2-tetrachloroethane	No	MCL	Yes

California Waterworks Standard

This was finalized by DDW in February 2008 and effective on March 9, 2008. It applies to all PWSs. The previous requirements were modified substantially in format, and somewhat in content. The definitions were expanded and detailed. Permit requirements for new sources and systems, as well as amendments, were organized and detailed. This also included a list of actions that require a permit amendment. There is now a requirement for a source capacity planning study for any anticipated water system expansion. The study shall present information on expected growth, water demands, and water supplies for a ten-year projection in a report to DDW. An Urban Water Management Plan can also meet these requirements.

Significant detail has been added for new well siting, construction and permit application. All technical sections of the Standards, related to design, installation, and operation, were updated, and many were expanded or had detail added.

The additives section was expanded to include indirect additives. Indirect additives, including chemical, material, lubricant, or product in the production, treatment or distribution of drinking water that will result in its contact with the drinking water including process media (carbon, sand), protective materials (coatings, linings, liners), joining and sealing materials (solvent cements, welding materials, gaskets, lubricating oils), pipes and related products (pipes, tanks, fittings), and mechanical devices used in treatment/transmission/distribution systems (valves, chlorinators, separation membranes), must be tested and certified as meeting the specifications of American National Standard Institute/NSF International (ANSI/NSF) 61.

If a water system is determined by DDW to have a deficiency in operations, the water system may be required to develop and submit a Water System Operations and Maintenance Plan. Detailed requirements for the plan are provided.

Endocrine Disrupters Screening Program

This is a monitoring program through the USEPA Office of Science that was finalized in April 2009. This program only applies to pesticide manufacturers, importers, and potentially users. The USEPA developed criteria for screening endocrine disrupters to identify priority chemicals. USEPA will implement the workplan by using assays in a two-tiered screening and testing process (Endocrine Disrupters Screening Program):

- Through Tier 1 screening, USEPA will identify chemicals with the potential to interact with the endocrine system. The purpose of Tier 1 screening is to identify chemicals that have the potential to interact with the three hormonal pathways in the body's endocrine system – estrogen, androgen, and thyroid pathways. Eleven assays, five in vitro (cell) and six in vivo (live animal) were used to determine whether these chemicals interact with these three hormone pathways.
- Through Tier 2 testing, USEPA will determine the endocrine-related effects caused by each chemical and obtain information about effects at various doses.

USEPA will use this two-tiered approach to gather information needed to identify endocrine-active substances and take appropriate action. The initial list of 67 chemicals considered for Tier 1 screening is primarily pesticides – both active ingredients and inerts. In December 2007, USEPA issued draft procedures for the initial screening. For active ingredients, test orders will be sent to technical registrants and for inert ingredients, test orders will be sent to manufacturers, importers, and potentially users of chemicals on the list. Some of these constituents are already regulated in drinking water and some are on the CCL3 (see discussion below).

A second list of chemicals for Tier 1 screening was published in November 2010. The list of 134 chemicals includes pesticides, two perfluorocarbon compounds (PFCs), and three pharmaceuticals (erythromycin, nitroglycerin, and quinoline). This list also contains other chemicals, such as those used for industrial manufacturing processes, plasticizers, or in the production of pharmaceutical and personal care products (PPCPs).

The USEPA received information requests for Tier 1 between October 2011 and February 2012. In May 2014 the USEPA removed hydrazine and hydrochlorofluorocarbon from the list of chemicals for screening. A Comprehensive Management Plan was developed in 2012 and updated in February 2014. It is anticipated that the screening and testing will be completed by 2021. USEPA released Tier 1 screening results for 52 chemicals in June 2015. Twenty chemicals showed no evidence for potential interaction with any endocrine pathways, and USEPA concluded that another 14 chemicals do not pose a risk based on other information. Therefore, of the 52 chemicals evaluated, 18 chemicals will undergo further testing under Tier 2. Only five are of consideration for human health impact; cypermethrin, DCPA, dimethoate, linuron, and metribuzin.

In June 2015, USEPA proposed to modify the screening process to include the use of a high throughput assay (robot) and a computational model to identify a chemical's ability to interact with the endocrine system. This would replace three of the 11 current assays in the Tier 1 battery (related to estrogen receptors). The USEPA is hoping to replace the other eight assays in the future. This alternative method will accelerate the pace of screening, reduce costs, and reduce animal testing. Additional testing for chemicals under Tier 2 is needed in order to fully understand impacts the chemical has on the endocrine system. It should be noted that a result indicating potential should not be construed as meaning that USEPA has concluded that the chemical is an endocrine disruptor. The following chemicals will undergo Tier 2 testing:

- Carbaryl
- Chlorothalonil
- Cypermethrin*
- DCPA*
- Dichlobenil
- Dimethoate*
- Flutolanil
- Folpet
- Iprodione
- Linuron*
- Metalaxyl
- Metribuzin*
- Myclobutanil
- O-phenylphenol
- PCNB
- Propargite
- Propiconazole
- Tebuconazole

*Potential Human Health Impacts

Through Tier 2, USEPA will determine the endocrine-related effects caused by each chemical and obtain information about effects at various doses. USEPA is projecting a refined list of constituents of interest between 2014 and 2019 (through implementation of the Tier 2 assay and testing process), with a final list of constituents of concern and associated doses by the end of 2021.

Program funding has stalled under the current administration and the timeline for further activities is uncertain.

Contaminant Candidate List 3 (CCL3)

This is the third list developed by USEPA, as described previously under CCL2, to determine whether additional constituents need to be regulated in drinking water. The process used to draft this list was different than that implemented to develop the first and second CCLs. This process involved development of a “universe” of potential chemicals and then screening that list down based on health effects and occurrence in drinking water supplies.

The final list for the CCL3 was published in September 2009 and focused on chemicals that are toxic and have potential to be present in drinking water supplies. This included 116 constituents, 104 chemicals and 12 microbiological contaminants. USEPA is required to select at least five constituents from the list to make regulatory determinations. In June 2011, the USEPA identified a short list of 32 constituents for the CCL3 that were assessed for determinations and in October 2014 announced preliminary regulatory determination for five constituents, including four determinations not to regulate and one to regulate (strontium).

In January 2016, USEPA published its final Third Regulatory Determination and determined not to regulate dimethoate, 1,3-dinitrobenzene, terbufos, and terbufos sulfone. USEPA delayed the final regulatory determination on strontium to consider additional data and decide whether there is a meaningful opportunity for health risk reduction by regulating strontium in drinking water. The draft Fourth Regulatory Determination, discussed below, provides additional insight on the continued delay for strontium regulation.

Six-Year Review

In January 2017, the USEPA published its Third Six-Year Review of the National Primary Drinking Water Regulations. This is an assessment of the existing 88 regulations to determine if any of the current standards are in need of a detailed analysis for possible regulatory revision. The USEPA determined that 80 of the 88 existing standards are acceptable as they stand. This includes fluoride, which was previously identified for potential revision, so the USEPA will not be pursuing any changes to the fluoride MCL at this time. Eight constituents are candidates for possible regulatory revision. This includes five under the SWTRs (viruses, heterotrophic bacteria, *Legionella*, *Giardia*, and *Cryptosporidium*) and three under the D/DBPRs (chlorite, TTHM, and HAA5). The USEPA has not yet convened any workgroups on these regulatory reviews. This will initiate a process for detailed analyses in four categories to determine if the current standards should be revised. The analyses include:

- Health effects assessment
- Analytical and treatability feasibility assessment
- Occurrence assessment
- Cost and benefit assessment

The Fourth Six-Year Review was initiated by USEPA in October 2018 and results are expected to be available by January 2023.

Unregulated Contaminant Monitoring Rule 3

The goal of the Unregulated Contaminant Monitoring Program is to generate national occurrence data for CCL contaminants (and other selected contaminants) that can be used to make future regulatory determinations under the Safe Drinking Water Act. The third Unregulated Contaminant Monitoring Rule (UCMR3) was outlined in April 2010 and formally proposed in March 2011. The final rule was published in April 2012.

Sampling for the UCMR 3 occurred from 2013 through 2015. The monitoring included 30 contaminants (28 chemicals and 2 viruses) under three lists. Nineteen of the target contaminants are from the CCL3 that was finalized in September 2009. The eleven chemicals included in UCMR3 that were not part of CCL3 are chromium, chromium 6, testosterone, 4-androstene-3,17-dione, chlorodifluoromethane, bromodichloromethane, noroviruses, and four perfluorinated chemicals; perfluorobutane sulfonic acid (PFBS), perfluoroheptanoic acid (PFHpA), perfluorohexane sulfonic acid (PFHxS), and perfluoronanoic acid (PFNA).

- Assessment Monitoring (List 1 Contaminants) applies to all PWSs serving more than 10,000 people and 800 representative PWSs serving 10,000 or fewer people. These constituents were required to be monitored in the Entry Point to the Distribution System (EPDS), and the six metals and chlorate were also to be monitored at the maximum detention time in the distribution system.

  - Method 522 (GC/MS) for 1,4-dioxane;
  - Method 524.3 (GC/MS) for seven VOCs: 1,1-dichloroethane, 1,2,3-trichloropropane, 1,3-butadiene, bromochloromethane, chlorodifluoromethane, chloromethane, and methyl bromide;
  - Method 200.8 (ICP/MS) for five metals: cobalt, molybdenum, strontium, chromium, and vanadium;
  - Method 218.7 (IC/UV) for chromium 6;
  - Method 300.1 (IC) for chlorate; and

  - Method 537 Rev1.1 for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), PFNA, PFHxS, PFHpA, and PFBS.

- Screening Survey (List 2 Contaminants) applies to all PWSs serving more than 100,000 people, 320 representative PWSs serving 10,001 to100,000 people, and 480 representative PWSs serving 10,000 or fewer people. These constituents were to be monitored at the EPDS.

  - Method 539 (LC/MS/MS) for seven hormones: 17-alpha-ethynylestradiol, 17-beta-estradiol, equilin, estriol, estrone, testosterone, and 4-androstene-3,17-dione.

- Pre-Screen Testing (List 3 Contaminants) applies to USEPA-selected 800 representative PWSs serving 1,000 or fewer people that do not disinfect. These PWSs with wells that are located in areas of karst or fractured bedrock were required to participate in monitoring for two List 3 viruses during a 12-month period from January 2013 through December 2015. These constituents were to be monitored at the EPDS.

  - Method 1615 for viruses; enteroviruses and noroviruses; and
  - Bacterial Indicators; total coliforms, *E. coli*, bacteriophage, *Enterococci*, and aerobic spores.

Changes from the UCMR2 included adding PWSs that rely on 100 percent purchased water (consecutive systems), clarifying the terms of representative groundwater sampling, and updated reporting elements.

Revised Total Coliform Rule

The USEPA published revisions to the TCR (RTCR) in February 2013. There were also some minor revisions published in February 2014. These revisions apply to all PWSs. There were numerous changes to the original TCR, but the key topics included:

- Removal of MCLG and MCL of zero for total coliform,
- Establish MCLG and MCL of zero of *E. coli,*
- Total coliform will serve as an indicator or potential contamination into the distribution system, with detects requiring assessments to determine if any sanitary defects exist and correct them (find and fix strategy),
- *E. coli* MCL violation will result in a requirement to conduct an assessment and correct any sanitary defects found,
- Minor revisions of routine and repeat monitoring requirements to match newer Groundwater Rule requirements (related to water quality and system performance), and

- Opportunity for increased flexibility in repeat monitoring for total coliform positive to better increase options for verifying and identifying extent of fecal contamination.

Provided below are some additional details of the regulation related to the MCLs, monitoring, reporting, and public notification.

Coliform Treatment Technique

Under the RTCR there will no longer be a monthly MCL violation for multiple total coliform detections. This became effective on April 1, 2016. Instead, USEPA replaced the MCLG and MCL for total coliforms with a treatment technique for coliforms that requires assessment and corrective action. A PWS that exceeds a specified frequency of total coliform occurrence must conduct an assessment to determine if any sanitary defects exist (a sanitary defect is defined by the RTCR as a “defect that could provide a pathway of entry for microbial contamination into the distribution system or that is indicative of a failure or imminent failure of a barrier that is already in place”); if any are found, the system must correct them. In addition, under the treatment technique requirements, a PWS that incurs an *E. coli* MCL violation must conduct an assessment and correct any sanitary defects found.

A PWS that exceeds a specified frequency of coliform occurrence must conduct a Level 1 or Level 2 assessment to determine if any sanitary defect exists and, if found, to correct the sanitary defect. A Level 2 assessment requires a more in-depth and comprehensive review of the PWS compared to a Level 1. PWSs are required to correct all sanitary defects found through either a Level 1 or Level 2 assessment. Systems should ideally be able to correct any sanitary defects found in the assessment within 30 days and report that correction on the assessment form.

Level 1 treatment technique triggers:

- For systems taking 40 or more samples per month, the PWS exceeds 5.0 percent total coliform-positive samples for the month; or
- For systems taking fewer than 40 samples per month, the PWS has two or more total coliform-positive samples in the same month; or
- The PWS fails to take every required repeat sample after any single routine total coliform-positive sample.

Level 2 treatment technique triggers:

- The PWS has an *E. coli* MCL violation (see below for a description of what constitutes an *E. coli* MCL violation); or
- The PWS has a second Level 1 treatment technique trigger within a rolling 12-month period, unless the initial Level 1 treatment technique trigger was based on exceeding the allowable number of total coliform-positive samples, the State has determined a likely reason for the total coliform-positive samples that caused the

initial Level 1 treatment technique trigger, and the State establishes that the system has fully corrected the problem; or
- For PWSs with approved reduced annual monitoring, the system has a Level 1 treatment technique trigger in two consecutive years.

At a minimum, both Level 1 and 2 assessments must include review and identification of the following elements:
- Atypical events that may affect distributed water quality or indicate that distributed water quality was impaired;
- Changes in distribution system maintenance and operation that may affect distributed water quality, including water storage;
- Source and treatment considerations that bear on distributed water quality, where appropriate;
- Existing water quality monitoring data; and
- Inadequacies in sample sites, sampling protocol, and sample processing.

Level 1 Assessment:

A Level 1 assessment must be conducted when a PWS exceeds one or more of the Level 1 treatment technique triggers specified previously. Under the rule, this self-assessment consists of a basic examination of the source water, treatment, distribution system and relevant operational practices. The PWS should look at conditions that could have occurred prior to and caused the total coliform-positive sample. Example conditions include treatment process interruptions, loss of pressure, maintenance and operation activities, recent operational changes, etc. In addition, the PWS should check the conditions of the following elements: sample sites, distribution system, storage tanks, source water, etc. These assessments can be completed by the water system.

Level 2 Assessment:

A Level 2 assessment must be conducted when a PWS exceeds one or more of the Level 2 treatment technique triggers specified previously. It is a more comprehensive examination of the system and its monitoring and operational practices than the Level 1 assessment. The level of effort and resources committed to undertaking a Level 2 assessment is commensurate with the more comprehensive investigation and review of available information, and engages additional parties and expertise relative to the Level 1 assessment. Level 2 assessments must be conducted by a party approved by the State: the State itself, a third party, or the PWS where the system has staff or management with the required certification or qualifications specified by the State. If the PWS or a third party conducts the Level 2 assessment, the PWS or third party must follow the State requirements for conducting the Level 2 assessment. The PWS must also comply with any expedited actions or additional actions required by the State in the case of an *E. coli* MCL violation.

USEPA published a draft Guidance Manual for completion of the Level 1 and 2 Assessments, which was replaced by an Interim Final in September 2014. The Assessments must include a list of sanitary defects/significant deficiencies or a statement of none found, a description of the corrective actions taken, and a list of additional corrective actions proposed.

Coliform Treatment Technique Violation

A system incurs a coliform treatment technique violation when any of the following occurs:

- A system fails to conduct a required assessment within 30 days of notification of the system exceeding the trigger.
- A system fails to correct any sanitary defect found through either a Level 1 or 2 assessment within 30 days or in accordance with State-derived schedule.
- A seasonal system fails to complete a State-approved start-up procedure prior to serving water to the public.

These violations would result in a Tier 2 Public Notification.

***E. coli* MCL**

Systems are required to meet an MCL for *E. coli*, as demonstrated by required monitoring. USEPA also established an MCLG of zero. These are both effective on April 1, 2016. The MCL for *E. coli* is based on the monitoring results for total coliforms and *E. coli*.

E. coli MCL Violation

A system incurs an *E. coli* MCL violation if any of the following occurs:

- A routine sample is total coliform-positive and one of its associated repeat samples is *E. coli*-positive.
- A routine sample is *E. coli*-positive and one of its associated repeat samples is total coliform-positive.
- A system fails to take all required repeat samples following a routine sample that is positive for *E. coli*.
- A system fails to test for *E. coli* when any repeat sample tests positive for total coliforms.

These violations result in a Tier 1 Public Notification. Although not explicitly stated, as a logical consequence of the second condition, a system also violates the MCL when an *E. coli*-positive routine sample is followed by an *E. coli*-positive repeat sample because *E. coli* bacteria are a subset of total coliforms.

Monitoring and Reporting Requirements

The RTCR specifies the frequency and timing of the microbial testing by water systems based on population served, system type, and source water type. The RTCR links monitoring frequency to compliance monitoring results and system performance. It provides criteria that well-operated small systems must meet to qualify for and stay on reduced monitoring. It requires increased monitoring for high-risk small systems with unacceptable compliance history. It also requires some new monitoring requirements for seasonal systems.

Monitoring Violation

A system incurs a monitoring violation when any of the following occurs:
- A system fails to take every required routine or additional routine sample in a compliance period.
- A system fails to test for *E. coli* following a routine sample that is total coliform-positive.

Reporting Violation

A system incurs a reporting violation when any of the following occurs:
- A system fails to timely submit a monitoring report or a correctly completed assessment form after it properly monitors or conducts an assessment by the required deadlines. The PWS is responsible for reporting this information to the State regardless of any arrangement with a laboratory.
- A system fails to timely notify the State following an *E. coli*-positive sample.
- A seasonal system fails to submit certification of completion of State-approved start-up procedure.

Public Notification Requirements

The rule continues to require public notification (PN) when there is a potential health threat as indicated by monitoring results, and when the system fails to identify and fix problems as required. The RTCR eliminates PN requirements based only on the presence of total coliforms. Instead, the RTCR requires PN when an *E. coli* MCL violation occurs, indicating a potential health threat, or when a PWS fails to conduct the required assessment and corrective action.

USEPA is requiring a Tier 1 PN for an *E. coli* MCL violation, Tier 2 PN for a treatment technique violation for failure to conduct assessments or corrective actions, and a Tier 3 PN for a monitoring violation or a reporting violation.
DDW had two years to adopt a similar version of this regulation. Compliance with this federal regulation began on April 1, 2016. At the time of preparation of this Regulatory

Framework, DDW is still preparing a draft regulation package for an upcoming public comment period.

The California Consumer Confidence Report Guidance for Water Suppliers was modified to remove the reporting requirements for total coliform, modify reporting requirements for *E. coli*, and modify health effects language.

California Hexavalent Chromium Regulation

DDW published a Final Hexavalent Chromium Regulation in May 2014 with an MCL of 10 µg/L; effective July 1, 2014. This was based on the OEHHA PHG of 0.02 µg/L, which was finalized in July 2011. It was repealed on September 11, 2017 and the MCL is no longer in effect. DDW was directed by the Courts to reconsider the "Economic Feasibility" of hexavalent chromium treatment and set a new standard. This is discussed further below in Anticipated Future Regulations section.

Chromium (VI), or hexavalent chromium, has primarily been found in groundwater supplies in California. Chromium (VI) causes acute gastritis when ingested in high doses and is an established human lung carcinogen when inhaled.

USEPA is also investigating the need for a hexavalent chromium MCL and is working on a human health assessment, as discussed below in the Anticipated Future Regulations section.

In a parallel effort, the USEPA recommended that water systems conduct enhanced monitoring for hexavalent chromium. For surface waters this included quarterly sampling of the raw water, the entry point to the distribution system, and a maximum residence time location in the distribution system.

Contaminant Candidate List 4 (CCL4)

The USEPA published a final list of the fourth CCL in November 2016. See **Attachment 2** for a list of constituents on the Final CCL4. This list includes 109 constituents; 97 chemicals and 12 microbiological contaminants. The CCL4 is largely comprised of the same constituents on the CCL3, except the following; manganese and nonylphenol were added and perchlorate, strontium, dimethoate, 1,3-dinitrobenzene, terbufos, and terbufos sulfone were removed. Additionally, three constituents were removed from the draft list since they are cancelled pesticides; disulfoton, fenamiphos, and molinate.

The USEPA initiated the fourth Regulatory Determination process in May 2018 and published a Draft Fourth Regulatory Determination for the CCL4 in March 2020, with the final expected by January 2021. It includes determinations for eight constituents and updates on three additional constituents. The USEPA has determined not to regulate

1,1-dichloroethane, acetochlor, methyl bromide, metolachlor, nitrobenzene, and RDX. In addition, USEPA provided an update on; strontium, 1,4-dioxane, and 1,2,3-trichloropropane. A strontium regulatory determination continues to be delayed to allow for consideration of additional studies. No determinations will be made for 1,4-dioxane (no meaningful opportunity for public health risk reduction) and 1,2,3-trichloropropane (limited analytical methods). USEPA determined that PFOS and PFOA warrant regulation, and potentially other per- and poly-fluoroalkyl substances (PFAS) too.

In October 2018 the USEPA issued a request for CCL5 nominations and the draft list is expected in late-2020 or early 2021 with a final by July 2022.

Unregulated Monitoring Contaminant Rule 4

The goal of the Unregulated Contaminant Monitoring Program is to generate national occurrence data for CCL contaminants (and other selected contaminants) that can be used to make future regulatory determinations under the Safe Drinking Water Act. This is the Fourth Round of the UCMR, promulgated in December 2016. The list includes 30 constituents, monitored between 2018 and 2020. Monitoring is conducted only for List 1 Contaminants, by both large PWSs (serving more than 10,000 people) and randomly selected small PWSs (serving 10,000 or fewer people).

- Cyanotoxin Monitoring: Ten constituents are monitored in the Entry Point to the Distribution System (EPDS) monthly over a four month consecutive period.

    - Method EPA 544 for microcystin-LA, microcystin-LF, microcystin-LR, microcystin-LY, microcystin-RR, microcystin-YR, nodularin;
    - Method EPA 545 for anatoxin-a, cylindrospermopsin; and
    - Method EPA 546 for total microcystins.

- Additional Chemicals: 22 constituents (including two surrogates) are monitored at the specified sites quarterly over a 12 month consecutive period.

    - Method EPA 200.8 for manganese and germanium (at EPDS).
    - Method EPA 525.3 for alpha-hexachlorocyclohexane, chlorpyrifos, dimethipin, ethoprop, oxyfluorfen, profenofos, tebuconazole, total permethrin, tribufos (at EPDS).
    - Method EPA 552.3 for HAA5, HAA6Br, HAA9 (at Stage 2 D/DBP Sites).
    - Method EPA 541 for 1-butanol, 2-methoxyethanol, 2-propen-1-ol (at EPDS).
    - Method EPA 530 for butylated hydroxyanisole, o-toluidine, quinoline (at EPDS).
    - Method EPA 300.0 for bromide (in source water coordinated with EPA 552.3).

- Standard Method 5310 for TOC (in source water coordinated with EPA 552.3).

USEPA anticipates the fifth round (UCMR5) to be proposed in the fall 2020 and a final by November 2021, with monitoring between 2023 and 2025. As per the USEPA PFAS Action Plan 2020 Update this will include PFAS.

California 1,2,3-Trichloropropane Regulation

1,2,3-Trichloroproane (1,2,3- TCP) is a manmade, chlorinated hydrocarbon that is very stable in the environment. It is found at industrial or hazardous waste sites and has been used as a cleaning and degreasing solvent and also is associated with pesticide products. 1,2,3-TCP causes cancer in laboratory animals and probably carcinogenic to humans.

In 1999, DDW published a Notification Level of 0.005 μg/L for 1,2,3-TCP due to detections in groundwater in Southern California. It was included in the California Unregulated Monitoring Requirements in 2001 and was detected throughout the state. DDW requested OEHHA to publish a Public Health Goal in 2004 and it was finalized in 2009 at 0.0007 μg/L.

DDW determined that an MCL was warranted for 1,2,3-TCP in 2016. A regulatory package was prepared and a primary MCL was adopted for 1,2,3-TCP at 0.000005 mg/L (0.005 μg/L) in December 2017. Initial quarterly monitoring requirements for surface water supplies were effective January 2018.

OTHER DRINKING WATER THRESHOLDS

In addition to regulatory standards, there are several other drinking water thresholds that should be discussed. This includes USEPA Health Advisories, USEPA Human Health Benchmarks for Pesticides, California Notification Levels and Archived Advisory Levels, and OEHHA Public Health Goals.

USEPA Health Advisories

The USEPA Office of Water Office of Science and Technology has developed Health Advisories for other constituents in drinking water that are not currently regulated. These are non-enforceable levels which can provide guidance to water systems on the potential risk to public health. USEPA has conveniently compiled Federal drinking water standards, including Health Advisories, into a reference handbook (USEPA 2012). The reference handbook includes acute and chronic risk for cancer and non-cancer health effects. (http://water.epa.gov/action/advisories/drinking/upload/dwstandards2012.pdf) In 2015 USEPA added Health Advisories for two cyanotoxins and in 2016 for two perfluoroalkyl substances, as described below.

Cyanotoxins

USEPA published 10-day Health Advisories (HA) for microcystin and cylindrospermopsin in June 2015. The HAs for children less than six years old are microcystin at 0.3 µg/L and cylindrospermopsin at 0.7 µg/L. The HAs for older children and adults are microcystin at 1.6 µg/L and cylindrospermopsin at 3.0 µg/L.

USEPA also released "Health Effects Support Documents" for microcystin, cylindrospermopsin and a third cyanotoxin, anatoxin-a. At this time, USEPA has determined that there is not sufficient data to develop a Health Advisory for anatoxin-a. In addition, USEPA released a document "Recommendations for Public Water Systems to Manage Cyanotoxins in Drinking Water." All three of these cyanotoxins are listed on the CCL3 and CCL4, for consideration of potential future regulation. They were also included in the UCMR4.

Perfluoroalkyl Substances

USEPA published lifetime Health Advisories for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS) in November 2016. The HA is 0.070 µg/L, either individually or combined. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 0.070 µg/L HA. This health advisory level offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water.

PFOA and PFOS were both listed on the CCL3 and CCL4, for consideration of potential future regulation, and included in the UCMR3. The draft Fourth Regulatory Determination has determined to regulate both constituents, as discussed previously.

USEPA Human Health Benchmarks for Pesticides

For those pesticides without drinking water standards or Health Advisories, USEPA Office of Pesticide Programs has developed Human Health Benchmarks for use by the states and water systems in water quality management. The USEPA developed human health benchmarks for 394 pesticides to enable others to better determine whether the detection of a pesticide in drinking water or source waters for drinking water may indicate a potential health risk and to help them prioritize monitoring efforts. These values, which are periodically updated, are available on the Internet (http://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home:3921856313509). The benchmarks originally include acute and chronic non-cancer endpoints, and USEPA updated the benchmarks in 2017 to include cancer risk benchmarks.

California Notification Levels and Archived Advisory Levels

DDW and OEHHA establish health-based Notification Levels (NLs) for contaminants that have no MCLs but, are thought to pose a risk to drinking water supplies. OEHHA develops recommended NLs when requested by the State Water Resources Control Board (State Board)/DDW, and then the State Board/DDW will establish a final NL. NLs and Archived Advisory Levels (AALs) have been established in response to detection in drinking water supplies or in anticipation of possible contamination. Chemicals for which NLs or AALs are established may eventually be regulated by MCLs. When NLs are exceeded, the drinking water system is required to notify the local governing body of the local agency in which the users of the drinking water reside. DDW also recommends that the utility also inform its customers and consumers about the presence of the contaminant and about the health concerns associated with its exposure. Response Levels (RLs) are levels of the contaminant at which State Board/DDW recommends the drinking water system take the affected water source out of service under the Health and Safety Code §116455. These levels range from 10 to 100 times the notification level depending on the chemical. If the drinking water system does not take the source out of service, more extensive public notification is required.

To date, 40 of the 95 chemicals for which NLs or AALs have been established, are now regulated by MCLs. In December 2017 1,2,3-Trichloropropane had a primary MCL established so its NL was removed from the list. Of the remaining 55 chemicals, 31 currently have NLs, as shown in **Table 9**, and 24 are chemicals with AALs, as shown in **Table 10**.

In July 2018 DDW adopted new NLs for PFOA and PFOS in response to the new USEPA Health Advisories set at 14 nanograms per liter (ng/L) for PFOA and 13 ng/L for PFOS, based on risk assessments from New Jersey. OEHHA conducted a review of human health risk and recommended in August 2019 that the NLs be revised down to the lowest level at which they can be reliably detected in drinking water using currently available and appropriate technologies. This is based on cancer and noncancer effects on the liver and immune system. After independent review of the available information on the risks, DDW established final NLs at 6.5 ng/L for PFOS and 5.1 ng/L for PFOA. The Response Level (RL) was set at 70 ng/L for each constituent, but was revised downward in February 2020 (PFOA 10 ng/L and PFOS 40 ng/L) following the revision to the NLs.

In February 2020, the State Board/DDW asked OEHHA to develop recommended NLs for seven per- and polyfluoroalkyl substances (PFAS) that have been detected in California drinking water supplies. OEHHA is beginning work on these NL recommendations immediately.

Table 9
DDW Drinking Water Notification Levels

Chemical	Notification Level (milligrams per liter)	Response Level (milligrams per liter)
Boron	1	10
n-Butylbenzene	0.26	2.6
sec-Butylbenzene	0.26	2.6
tert-Butylbenzene	0.26	2.6
Carbon disulfide	0.16	1.6
Chlorate	0.8	8
2-Chlorotoluene	0.14	1.4
4-Chlorotoluene	0.14	1.4
Diazinon	0.0012	0.012
Dichlorodifluoromethane (Freon 12)	1	10
1,4-Dioxane	0.001	0.035
Ethylene glycol	14	140
Formaldehyde	0.1	1
HMX	0.35	3.5
Isopropylbenzene	0.77	7.7
Manganese	0.5	5
Methyl isobutyl ketone (MIBK)	0.12	1.2
Naphthalene	0.017	0.17
N-Nitrosodiethyamine (NDEA)	0.00001	0.0001
N-Nitrosodimethylamine (NDMA)	0.00001	0.0003
N-Nitrosodi-n-propylamine (NDPA)	0.00001	0.0005
Perfluorooctanoic acid (PFOA)	0.0000051	0.00001
Perfluorooctane sulfonic acid (PFOS)	0.0000065	0.00004
Propachlor	0.09	0.9
n-Propylbenzene	0.26	2.6
RDX	0.0003	0.03
Tertiary butyl alcohol (TBA)	0.012	1.2
1,2,4-Trimethylbenzene	0.33	3.3
1,3,5-Trimethylbenzene	0.33	3.3
2,4,6-Trinitrotoluene (TNT)	0.001	0.1
Vanadium	0.05	0.5

*MCL Currently in Development

Table 10
DDW Drinking Water Archived Advisory Levels

Chemical	Archived Advisory Level (milligrams per liter)	Response Level (milligrams per liter)
Aldicarb	0.007	0.07
Aldrin	0.000002	0.0002
Baygon	0.03	0.3
a-Benzene Hexachloride	0.000015	0.0015
b-Benzene Hexachloride	0.000025	0.0025
Captan	0.015	1.5
Carbaryl	0.7	7
Chloropicrin	0.05	0.5
Chlorpropham (CIPC)	1.2	12
1,3-Dichlorobenzene	0.6	6
Dieldrin	0.000002	0.0002
Dimethoate	0.001	0.01
2,4-Dimethylphenol	0.1	1
Diphenamide	0.2	2
Ethion	0.004	0.04
Malathion	0.16	1.6
N-Methyl dithiocarbamate (Metam sodium)	0.00019	0.019
Methylisothiocyanate	0.19	1.9
Methyl Parathion	0.002	0.02
Parathion	0.04	0.4
Pentachloronitrobenzene	0.02	0.2
Phenol	4.2	42
2,3,5,6-Tetrachloroterephthalate	3.5	35
Trithion	0.007	0.07

California Public Health Goals

OEHHA is responsible for development of risk assessments for drinking water contaminants and publication of PHGs. These values represent the level below which there is no expected or known risk to human health for non-carcinogens. For cancer-causing chemicals, the PHG is set at the one-in-a-million risk level. These are reviewed periodically and updated as appropriate. Currently, there are 93 PHGs as shown in **Attachment 3**. OEHHA must develop a PHG before DDW can set a California MCL for a contaminant for the first time, or in agreement with adoption of a federal standard. The MCL must be as close as possible to the PHG, considering cost and feasibility of treatment. PHG are revised periodically. Whenever a PHG is updated, DDW must re-evaluate the current MCL.

In March 2019, OEHHA published a Draft Proposed Updated PHG for DBCP which would increase the PHG slightly from 0.0017 µg/L to 0.002 µg/L. It is unlikely to result in a change to the current MCL. This is not yet final.

In October 2019, OEHHA announced the initiation of PHG assessments for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). These final PHGs were set in August 2019 and a public review draft assessment is expected in 2020.

In January 2020, OEHHA published draft PHGs for Five Haloacetic Acids (HAA5). This proposes to set individual PHGs for monochloroacetic acid (53 µg/L), dichloroacetic acid (0.2 µg/L), trichloroacetic acid (0.1 µg/L), monobromoacetic acid (25 µg/L), and dibromoacetic acid (0.03 µg/L). These are based on a variety of cancer and toxicity endpoints. These are very low levels and if finalized the State Board/DDW will need to consider if the current HAA5 MCL is sufficient or if a new MCL is needed, or if individual MCLs are warranted.

In February 2020, OEHHA published final PHGs for Total Trihalomethanes. This set individual PHGs for chloroform (0.4 µg/L), bromoform (0.5 µg/L), dibromochloromethane (DBCM – 0.1 µg/L), and bromodichloromethane (BDCM – 0.06 µg/L). These are very low levels and now the State Board/DDW will need to consider if the current TTHM MCL is sufficient or if a new MCL is needed, or if individual MCLs are warranted.

In March 2020, OEHHA announced it would begin development of a PHG for 1,4-dioxane at the request of the State Board/DDW. This already has a NL of 1 µg/L. OEHHA also announced that at the request of the State Board/DDW they would begin an update to the n-nitrosodimethylamine (NDMA) PHG. The current PHG is 0.003 µg/L.

ANTICIPATED FUTURE REGULATIONS

The USEPA and DDW are developing new drinking water regulations. The major anticipated future regulations that are projected to impact surface water supplies within the next five years are shown in **Table 11,** and those regulations are discussed below. It should be noted that there are other constituents of public interest on the drinking water horizon, such as cyanotoxins and pharmaceutical compounds. However, the human health impacts of these constituents are not well understood yet and there is no specific regulatory path for them at this time so they are not specifically addressed in this section (cyanotoxins and pharmaceutical compounds are indirectly discussed previously in the Endocrine Disrupters Screening Program and the Contaminant Candidate List subsections).

Table 11
Summary of Anticipated Major Federal and State Drinking Water Quality Regulations for Surface Water Supplies

Regulation	Year Projected[1]	Number of Contaminants	Targeted Contaminants
USEPA Long Term Revisions to the Lead and Copper Rule	2019/2020	2	Lead and Copper
USEPA Perchlorate Regulation	2019/2020	1	Perchlorate
USEPA cVOCs Regulation	2022/2023	Up to 16	Carcinogenic VOCs
USEPA PFAS Regulation	Unknown	Up to 9	PFAS
USEPA Hexavalent Chromium Regulation	Unknown	1	Hexavalent Chromium
USEPA Arsenic Regulation Review	Unknown	1	Arsenic
CA Revised Total Coliform Rule	2020	3	Microbial
CA Lead and Copper Rule Revisions	2020/2021	2	Lead and Copper
CA Cross Connection Control Program	2020	None	None
CA Revised Perchlorate DLR/MCL	2020/2022	1	Perchlorate
CA Reconsidered Hexavalent Chromium MCL	2020/2021	1	Hexavalent Chromium
CA Microplastics Regulation	2020/2021	1	Microplastics

[1] Draft/Final Rule Dates

USEPA Long Term Revisions to the Lead and Copper Rule

The goal for the Long-Term Revisions to the Lead and Copper Rule is to improve public health protection by making substantive changes based on topics that were identified in the 2004 National Review, and to streamline the rule requirements. In November 2019 the USEPA published the Proposed Long Term Revisions to the Lead and Copper Rule (LCR Revisions) and this is expected to be finalized by late 2020. This will apply to all community water systems and non-transient non-community water systems. The proposed LCR Revisions maintain the current Maximum Contaminant Level Goal (MCLG) of zero and the Action Level of 15 µg/L. The proposed rule requires a more comprehensive response at the action level and introduces a trigger level of 10 µg/L (also based on the 90th percentile) that requires more proactive planning in communities with lead service lines. The approach focuses on these key areas:

- All water systems prepare and update a lead service line (LSL) inventory and are required to “find-and-fix” the causes of elevated levels, exceeding the Action Level.

- All water systems prepare a LSL Replacement Plan. Require water systems to replace the water system-owned portion of an LSL when a customer chooses to replace their customer-owned portion of the line. Also require water systems to conduct outreach and initiate lead service line replacement programs when lead levels are above the proposed trigger level of 10 µg/L. Require systems that are above 10 µg/L but at or below 15 µg/L to work with their state to set an annual goal for replacement. Systems that are above 15 µg/L will be required to replace a minimum of three percent of the number of LSLs annually. Prevents systems from avoiding lead service line replacements (LSLR) by "testing out" through sampling. Systems must have an LSL Replacement Plan within three years of final rule. Small systems that exceed the trigger and action levels will have flexibility with respect to treatment and lead service line replacement actions.
- Revise requirements for corrosion control treatment (CCT) based on tap sampling results. Establishes a new trigger level of 10 µg/L. At this trigger level, systems that currently treat for corrosion would be required to re-optimize their existing treatment. Systems that do not currently treat for corrosion would be required to conduct a corrosion control study so that the system is prepared to respond quickly when necessary.
- Improve tap sampling procedures by requiring wide-mouth bottles for collection and prohibiting flushing and cleaning or removing faucet aerators before sampling. Changing the criteria for selecting homes where samples are taken to require sampling in homes with lead service lines. And, systems with higher levels of lead will sample more frequently.
- Water systems must execute Tier 1 Public Notification requirements for exceedence of lead Action Level and implement expanded risk communication requirements.
- Require systems to notify customers of an action level exceedance within 24 hours at their residence and require that systems make the LSL inventory publicly available and conduct regular outreach to homeowners with LSLs.
- Community water systems (CWS) must sample drinking water outlets schools and child care facilities served by the system (20 percent annually). The system would be required to provide the results and information about the actions the school or child care facility can take to reduce lead in drinking water.

USEPA Perchlorate Regulation

The USEPA determined not to develop a regulation for perchlorate in June 2020. A proposed rule was published in June 2019 and a final Rule was legally obligated by June 19, 2020.

An external peer review was completed in April 2018. A proposed rule for public review and comment was published in June 2019. The proposed rule established an MCL/MCLG for perchlorate at 56 µg/L, and asked input on three alternate regulatory strategies; MCL/MCLG 18 µg/L, MCL/MCLG 90 µg/L, and withdrawal of regulatory determination. USEPA signed a withdrawal of the regulatory determination for perchlorate on June 18, 2020 and as such, no federal regulation will be set. The USEPA determined that State regulations of perchlorate provided sufficient protection and that a federal standard was unnecessary to reduce risk further.

USEPA Carcinogenic VOC Regulation

As part of the new Drinking Water Strategy USEPA announced that it will move forward with development of regulatory standards for a group of carcinogenic VOCs. A draft rule was projected for early 2015, with a final in 2016, but it has been delayed possibly until 2022 or later. These are largely industrial contaminants and include 16 VOCs, eight of which are already regulated so this Rule may result in lower values for MCLs. The regulated list includes; TCE, PCE, benzene, carbon tetrachloride, 1,2-dichloroethane, 1,2-dichloropropane, dichloro-methane, and vinyl chloride. The unregulated list includes; aniline, benzyl chloride, 1,3-butadiene, 1,1-dichloroethane, nitrobenzene, methyl oxirane, 1,2,3-trichloropropane, and urethane.

USEPA PFAS Regulation

As discussed previously, the USEPA announced in the Draft Fourth Regulatory Determination in February 2020 that they intended to develop MCLs for PFOA and PFOS, and potentially other PFAS. This is not yet final and no timeline has been developed yet.

In February 2019 the USEPA published a PFAS Action Plan that identified a strategy for moving forward with management of PFAS in drinking water. In February 2020 the USEPA published an Update to the PFAS Action Plan that included the following commitments; development of MCLs for PFOA/PFOS, inclusion of PFAS on the UCMR5, analytical method development, possibly developing Clean Water Act water quality criteria for PFAS, and including PFAS at Federal Cleanup Sites.

USEPA Hexavalent Chromium Regulation

USEPA began a review of the health effects of hexavalent chromium following the 2008 release of toxicity studies by the Department of Health and Human Service's National Toxicology Program. In September, 2010, USEPA released a draft of the scientific human health assessment for public comment and external peer review. The Integrated Risk Information System (IRIS) has an outdated Oral Reference Dose for hexavalent chromium so USEPA is working to update the human health risk assessment.

IRIS published health information for hexavalent chromium in April and August 2014, and hosted public science meetings in June and October 2014. A *Systematic Review Protocol for the Hexavalent Chromium IRIS Assessment* (Preliminary Assessment Materials) was released in March 2019, as well as held a public science meeting in April

2019. The risk assessment is undergoing agency and interagency review and there is no official schedule identified for the final hexavalent chromium human health assessment out for peer review or public comment, but may occur in fiscal year 2021/2022. USEPA will review the final assessment once it is available and consider all other relevant information to determine if a new drinking water regulation for hexavalent chromium, or a revision to the current total chromium standard, is warranted. Any revisions would need to be adopted by State Board/DDW and may impact development of a new standard in California.

USEPA recommended that water systems voluntarily implement enhanced monitoring for hexavalent chromium (as discussed previously).

USEPA Arsenic Regulation Review

USEPA IRIS initiated an update to the human health risk assessment for arsenic in 2003. Similar to hexavalent chromium, IRIS published health information for arsenic in April 2014 and hosted a public science meeting in June 2014. An *Updated Problem Formulation and Systematic Review Protocol for the Inorganic Arsenic IRIS Assessment* was released in May 2019, followed by a public meeting in July 2019. The risk assessment is undergoing agency and interagency review and there is no specific schedule identified for the final arsenic human health assessment to be out for peer review or public comment, although it is anticipated in fiscal year 2021/2022.

This review has preliminarily indicated that the human health risks from arsenic may be broader and more significant than previously analyzed. Bladder and lung cancer risks are higher than previously thought, cardiovascular impacts are greater than previously quantified, and impacts on diabetes and intellect are now being identified. It is possible that arsenic is as significant as lead is for impacts to intellect development.

Once USEPA finalizes an updated risk assessment, then it is possible that a revision to the primary MCL may be required. In addition, OEHHA could trigger a review of the current PHG for arsenic. Either case could result in a revision to the current primary MCL for arsenic.

California Revised Total Coliform Rule

In response to the Federal Revised Total Coliform Rule, California must revise its version of the Total Coliform Rule in Title 22. However, the draft regulations were not adopted in time to correspond with the Federal rule requirements. Beginning April 1, 2016, all public water systems were required to comply with California’s existing Total Coliform Rule and the new requirements in the Federal Revised TCR. DDW published a proposed Revised TCR for public review in October 2020. A major component of the rule package would be the elimination of the total coliform MCL and identification of the “find and fix” approach.

State Board/DDW has prepared proposed language that includes all the requirements of the Federal rule, which were effective April 1, 2016, as well as additional state-only requirements. The key state-only requirements include:

- Requirements for bacteriological monitoring of a groundwater (not Ground Water Under the Direct Influence of Surface Water (GWUDI)) source that is treated with a primary or residual disinfectant on a continuous basis and for revising bacteriological sample siting plans to include the source sample sites;
- Requirements for public water systems on reduced bacteriological monitoring to return to routine bacteriological monitoring;
- Requirements for coliform density determinations of total coliforms and *E. coli*, if directed by the State Board;
- For public water systems collecting one sample per month, eliminating the need to submit a monthly summary of a bacteriological monitoring result, and clarifying the minimum monthly summary elements for public water systems collecting more than one sample per month;
- Requirements for a report and corrective action when monitoring results indicate a possible significant rise in bacterial count; and
- Requirements for seasonal system start-up procedure components, actions to be taken prior to serving water to the public, and a provision allowing an alternative to certain start-up procedure components.

California Lead and Copper Rule Revisions

DDW is planning to update the Lead and Copper regulations to incorporate recent Federal clarifications to the rule and State laws, as follows.

In late February 2016, USEPA encouraged States to enhance the oversight of implementation and enforcement of drinking water regulations, including the Lead and Copper Rule. This included specific recommendations on the need to address lead action level exceedances, to fully implement and enforce the Lead and Copper Rule, to enhance public transparency and public access to data and compliance information, and to leverage additional funding sources to address aging infrastructure needs. At the same time, USEPA also clarified tap sampling procedures for the Lead and Copper Rule, with specific recommendations for removal and cleaning of aerators, pre-stagnation flushing, and sample bottle configuration. The memo includes a revised version of Suggested Directions for Homeowner Tap Sample Collection Procedures.

Senate Bill 1398 became effective January 1, 2017, as amended by Senate Bill 427, and requires CWSs to compile an inventory of known lead user service lines in use in its distribution system and identify areas that may have lead user service lines in use in its distribution system by July 1, 2018. Additional actions are required by July 1, 2020, including a timeline for replacing known LSLs.

In early 2017, DDW and Local Primacy Agencies issued amendments to the domestic water supply permits of approximately 1,200 CWSs so that public and private schools could request assistance from their CWS to conduct water sampling for lead and receive technical assistance if an elevated lead sample is found. In addition, Assembly Bill 746 was published on October 12, 2017, effective January 1, 2018, and requires CWSs to test lead levels, by July 1, 2019, in drinking water at all California public, K-12 school sites that were constructed before January 1, 2010. Sampling is to be paid for by the CWSs and results must be uploaded to the special school reporting tool and included on the annual Consumer Confidence Report. CWSs are encouraged to work with schools to interpret and understand test results. Any detect in a school exceeding the Action Levels requires the CWSs to sample the influent location to the school campus. If exceedances are only related to the school facilities, then the school is responsible for response actions.

California Cross Connection Control Program

This will apply to all PWSs. The State Board/DDW published a draft version of the Proposed Cross Connection Control Rule in 2010. The existing requirements were modified substantially in format, and somewhat in content. In October 2017, Assembly Bill 1671 was adopted which set compliance with this program through a Policy Handbook rather than a regulatory standard. This will prevent the cross connection control program from being a local-mandated criminal program.

This Policy Handbook was due by January 1, 2020, but the State Board/DDW hosted stakeholder workshops in December 2019 to solicit input and it is delayed. They anticipate publication of a draft Policy Handbook in 2020, with public workshops to follow and Board adoption in late summer 2020.

It is unclear what the format of the Policy Handbook will be, but it may include sections on dual plumbed recycled water systems with design and operations criteria. In addition, it may include; definitions, hazard assessment, backflow protection selection criteria and standards, backflow protection installation/ testing/ repairs, additional cross connection control requirements for CWSs, and recordkeeping and public notification. This may also include hazard criteria and appropriate backflow protection, and more details on all sections.

California Revised Perchlorate DLR/MCL

California has an existing Perchlorate MCL of 6 µg/L, a PHG of 1 µg/L (revised down from 6 µg/L in 2015), and a DLR of 4 µg/L. In July 2017, based on the revision to the PHG, State Board/DDW recommended that the DLR for perchlorate be lowered first to determine the frequency of low level detects of perchlorate before moving forward with a revised MCL. In July 2017 DDW recommended lowering the DLR for perchlorate to match the PHG of 1 µg/L. The draft Revised DLR was published by DDW in March

2020, reducing it from 4 μg/L to 2 μg/L. The MCL revision process will be delayed until after the DLR revision process is complete and draft information regarding low-level detects of perchlorate in drinking water sources is available in 2020 and later.

California Reconsidered Hexavalent Chromium Regulation

Hexavalent chromium causes acute gastritis when ingested in high doses and is an established human lung carcinogen when inhaled. Hexavalent chromium is included in the 50 μg/L MCL for total chromium. Senate Bill 541 was passed on October 9, 2001 that required development of a new hexavalent chromium standard for drinking water in California by January 1, 2004. OEHHA published the final PHG for hexavalent chromium in July 2011 at 0.02 μg/L. The State Board/DDW adopted a primary MCL of 10 μg/L in May 2014 that was effective beginning July 1, 2014.

On May 5, 2017 the Superior Court of California ordered State Board/DDW to withdraw the MCL for hexavalent chromium and develop a new MCL. The court's conclusion states the following: "....this case is remanded to the Department with orders to withdraw the current MCL and establish a new MCL. When establishing a new MCL, the Department must comply with the Legislature's directive to consider the economic feasibility of compliance, paying particular attention to small water systems and their users, and to set the MCL as close as economically feasible to the public health goal of 0.02 μg/L." The MCL was formally repealed on September 11, 2017. The State Board/DDW is now in the process of developing a replacement MCL with new economic feasibility criteria. There is no specific timeline identified for reconsideration, but a draft determination could be issued in 2020 with a final to follow in 2021.

The State Board/DDW published a White Paper in February 2020, entitled "Economic Feasibility Analysis in Consideration of a Hexavalent Chromium MCL." This document describes challenges faced by the State Board/DDW in considering economic feasibility during the development of MCLs and concludes there is no simple formula capable of generating an economically feasible MCL. The MCL must be above the DLR, State Board/DDW is required to identify a best available technology(ies), and then the State Board/DDW selects an MCL that is most economically feasible and protective of public health. There is a significant challenge in monetizing health benefits. Also, there are more small systems impacted by hexavalent chromium and the technologies are more advanced than most small systems have in place possibly resulting in water affordability issues. However, the State Board/DDW offers many grant and loan programs for such systems and does not plan to let affordability drive the decision making on statewide public health.

As discussed previously, USEPA IRIS is also preparing a human health assessment for hexavalent chromium which would be used to determine if a federal drinking water standard was necessary, which is not expected before Fiscal Year 2022.

California Microplastics Regulation

Senate Bill 1422 was approved on September 28, 2018 and requires the State Board/DDW to adopt a definition of microplastics in drinking water on or before July 1, 2020, and on or before July 1, 2021, to adopt a standard methodology to be used in the testing of drinking water for microplastics and requirements for accrediting qualified laboratories and four years of testing and reporting of microplastics in drinking water, including public disclosure of those results. This could include setting a NL to assist consumers in interpreting analytical results. The State Board/DDW may do this through development of a Policy Handbook, rather than a specific regulation.

In February 2020 the State Board/DDW published a draft definition of "microplastics" – see below, which was adopted in June 2020.

Proposed Definition of 'Microplastics in Drinking Water'* -
'Microplastics in Drinking Water' are defined as solid[1] polymeric materials[2] to which chemical additives or other substances may have been added, which are particles which have at least two dimensions that are greater than 1 and less than 5,000 micrometers (µm). Polymers that are derived in nature that have not been chemically modified (other than by hydrolysis) are excluded.

*Evidence concerning the toxicity and exposure of humans to microplastics is nascent and rapidly evolving, and the proposed definition of 'Microplastics in Drinking Water' is subject to change in response to new information. The definition may also change in response to advances in analytical techniques and/or the standardization of analytical methods.

ATTACHMENT 1
Summary of Regulated Contaminants

Summary of Contaminants
Currently Regulated by USEPA and DDW

Classification	Contaminant	Regulation	MCL (mg/L)
Inorganics (Section 64432)			
	Aluminum	DDW	1
	Antimony	Phase V	0.006
	Arsenic	Arsenic Rule	0.010
	Barium	DDW	1
	Beryllium	Phase V	0.004
	Cadmium	Phase II	0.005
	Chromium	DDW	0.05
	Copper	LCR	1.3 [1,2]
	Cyanide	Phase V	0.15
	Fluoride	DDW	2
	Lead	LCR	0.015 [1,2]
	Mercury	Phase II	0.002
	Nickel	DDW	0.1 [3]
	Perchlorate	Perchlorate	0.006
	Selenium	Phase II	0.05
	Thalium	Phase V	0.002
Nitrate, Nitrite (Section 64432.1)			
	Nitrate	Phase II	10 as N (45 as NO3)
	Nitrite	Phase II	1 as N
	Nitrate + Nitrite	Phase II	10 (sum as N)
Asbestos (Section 64432.2)			
	Asbestos	Phase II	7 MFL (>10um)
Secondary Standards (Section 64449, Table 64449-A)			
	Aluminum	DDW	0.2
	Color	DDW	15 Units
	Copper	DDW	1
	Foaming Agents	DDW	0.5
	Iron	DDW	0.3
	Manganese	DDW	0.05
	Methyl-tert-butyl-ether (MTBE)	DDW	0.005
	Odor-Threshold	DDW	3 Units
	Silver	DDW	0.1
	Thiobencarb	DDW	0.001
	Turbidity	DDW	5 NTU
	Zinc	DDW	5
Secondary Standards (Section 64449, Table 64449-B)			
	Total Dissolved Solids	DDW	500/1,000/1,500 [4]
	Specific Conductance	DDW	900/1,600/2,200 [4]
	Chloride	DDW	250/500/600 [4]
	Sulfate	DDW	250/500/600 [4]
General Mineral (Section 64449 (c) (2))			
	Bicarbonate	DDW	MO
	Carbonate	DDW	MO
	Hydroxide	DDW	MO
	Alkalinity	DDW	MO
	pH	DDW	MO
	Calcium	DDW	MO
	Magnesium	DDW	MO
	Sodium	DDW	MO
	Hardness	DDW	MO
(Volatile) Organic Chemicals (Section 64444, Table 64444-A (a))			
	Benzene	DDW	0.001
	Carbon Tetrachloride	DDW	0.0005
	o-Dichlorobenzene	Phase II	0.6
	p-Dichlorobenzene	DDW	0.005
	1,1-Dichloroethane	DDW	0.005
	1,2-Dichloroethane	DDW	0.0005
	1,1-Dichloroethylene	DDW	0.006
	cis-1,2-Dichloroethylene	DDW	0.006

Summary of Contaminants
Currently Regulated by USEPA and DDW

Classification	Contaminant	Regulation	MCL (mg/L)
	trans-1,2-Dichloroethylene	DDW	0.01
	Dichloromethane (Methylene chloride)	Phase V	0.005
	1,2-Dichloropropane	Phase II	0.005
	1,3-Dichloropropene	DDW	0.0005
	Ethylbenzene	DDW	0.3
	Methyl-tert-butyl ether (MTBE)	DDW	0.013
	Monochlorobenzene	DDW	0.07
	Styrene	Phase II	0.1
	1,1,2,2-Tetrachloroethane	DDW	0.001
	Tetrachloroethylene	Phase II	0.005
	Toluene	DDW	0.15
	1,2,4-Trichlorobenzene	DDW	0.005
	1,1,1-Trichloroethane	Phase I	0.2
	1,1,2-Trichloroethane	Phase V	0.005
	Trichloroethylene	Phase I	0.005
	Trichlorofluoromethane	DDW	0.15
	1,1,2-Trichloro-1,2,2-Triflouroethane	DDW	1.2
	Vinyl Chloride	DDW	0.0005
	Xylenes (total)	DDW	1.75
(Non-Volatile Synthetic) Organic Chemicals (Section 64444, Table 64444-A (b))			
	Acrylamide	Phase II	TT (PAP)
	Alachlor	Phase II	0.002
	Atrazine	DDW	0.001
	Bentazon	DDW	0.018
	Benzo(a)pyrene	Phase V	0.0002
	Carbofuran	DDW	0.018
	Chlordane	DDW	0.0001
	2,4,-D	Phase II	0.07
	Dalapon	Phase V	0.2
	Dibromochloropropane	Phase II	0.0002
	Di (2-ethylhexyl) Adipate	Phase V	0.4
	Di (2-ethylhexyl) Phthalate	DDW	0.004
	Dinoseb	Phase V	0.007
	Diquat	Phase V	0.02
	Endothall	Phase V	0.1
	Endrin	Phase V	0.002
	Epichlorohydrin	Phase II	TT (PAP)
	Ethylene Dibromide	Phase II	0.00005
	Glyphosate	Phase V	0.7
	Heptachlor	DDW	0.00001
	Heptachlor Epoxide	DDW	0.00001
	Hexachlorobenzene	Phase V	0.001
	Hexachlorocyclopentadiene	Phase V	0.05
	Lindane	Phase II	0.0002
	Methoxychlor	DDW	0.03
	Molinate	DDW	0.02
	Oxamyl	DDW	0.05
	Pentachlorophenol	Phase II	0.001
	Picloram	Phase V	0.5
	PCBs	Phase II	0.0005
	Simazine	Phase V	0.004
	Thiobencarb	DDW	0.07
	Toxaphene	Phase II	0.003
	1,2,3-Trichloropropane	DDW	0.000005
	2,3,7,8-TCDD (Dioxin)	Phase V	3.00E-08
	2,4,5-TP (Silvex)	Phase II	0.05
Natural Radioactivity (Section 64441)			
	Gross Alpha Particle Activity	NPDWR	15 pCi/L
	Combined Radium 226 & 228	NPDWR	5 pCi/L
	Uranium	DDW	20 pCi/L
Man-Made Radioactivity (Section 64443)			
	Tritium	DDW	20,000 pCi/L
	Strontium-90	DDW	8 pCi/L
	Gross Beta Particle Activity	NPDWR	50 pCi/L

Summary of Contaminants
Currently Regulated by USEPA and DDW

Classification	Contaminant	Regulation	MCL (mg/L)
Disinfection By-Products			
	Total Trihalomethanes (Chloroform, Bromoform, Chlorodibromomethane, Bromodichloromethane)	Stage 1 D/DBP Rule	0.08
	Haloacetic Acids 5 (Mono, di, and tri-chloroacetic acid, mono and di-bromoacetic acid)	Stage 1 D/DBP Rule	0.06
	Chlorite	Stage 1 D/DBP Rule	1
	Bromate	Stage 1 D/DBP Rule	0.01
Disinfection By-Product Precursors			
	Total Organic Carbon	Stage 1 D/DBP Rule	TT (% Removal)
Disinfectants			
	Chlorine (as Cl2)	Stage 1 D/DBP Rule	4 [5]
	Chloramines (as Cl2)	Stage 1 D/DBP Rule	4 [5]
	Chlorine Dioxide (as ClO2)	Stage 1 D/DBP Rule	0.8 [5]
Microbial			
	Giardia Lamblia	SWTR	TT (3-log Reduction)
	Legionella	SWTR	TT
	Viruses	SWTR	TT (4-Log Reduction)
	Disinfectant Residual	SWTR	TT (detectable)
	Fecal Coliform	TCR	TT (positive sample)
	E. Coli	TCR/RTCR	TT (positive sample)
	Total Coliform	TCR	TT (<5% mo. samples pos., if >40 samples per month)
	Turbidity	IESWTR	TT (<0.3 in 95% CFE samples, <1 in 100% CFE)
	Cryptosporidium	IESWTR/ LT1ESWTR/ LT2ESWTR	TT (2-log Reduction or higher if trigger above Bin 2)

[1] - Action Level
[2] - Based on 90th Percentile of Tap Water Samples
[3] - DDW MCL, USEPA remanded in 1995
[4] - Recommended/Upper/Short Term MCLs
[5] - Maximum Residual Disinfectant Level (MRDL)

Acronyms:
USEPA - United States Environmental Protection Agency
DDW - California Division of Drinking Water
MCL - Maximum Contaminant Level
NPDWR - National Primary Drinking Water Regulation
LCR - Lead and Copper Rule
MO - Monitored Only
TT - Treatment Technology
PAP - Polymer Addition Practices
D/DBP - Disinfectants and Disinfection By-Products
SWTR - Surface Water Treatment Rule
TCR - Total Coliform Rule
IESWTR - Interim Enhanced Surface Water Treatment Rule
CFE - Combined Filter Effluent
RTCR - Revised Total Coliform Rule

ATTACHMENT 2
Contaminant Candidate List 4

CONTAMINANT CANDIDATE LIST 4

MICROBIAL CONTAMINANTS

Adenovirus
Calicivirus
Campylobacter jejuni
Enterovirus
Escherichia coli (0157)
Helicobacter pylori
Hepatitis A virus
Legionella pneumophila
Mycobacterium avium
Naegleria fowleri
Salmonella enterica
Shigella sonnei

CHEMICAL CONTAMINANTS

Common name--registry name	CASRN
1,1,1,2-Tetrachloroethane	630-20-6
1,1-Dichloroethane[1]	75-34-3
1,2,3-Trichloropropane[2]	96-18-4
1,3-Butadiene	106-99-0
1,4-Dioxane[2]	123-91-1
1-Butanol	71-36-3
17-alpha estradiol	57910
2-Methoxyethanol	109-86-4
2-Propen-1-ol	107-18-6
3-Hydroxycarbofuran	16655-82-6
4,4'-Methylenedianiline	101-77-9
Acephate	30560-19-1
Acetaldehyde	75-07-0
Acetamide	60-35-5
Acetochlor	34256-82-1
Acetochlor ethanesulfonic acid (ESA)	187022-11-3
Acetochlor oxanilic acid (OA)	184992-44-4
Acrolein	107-02-8
Alachlor ethanesulfonic acid (ESA)	142363-53-9
Alachlor oxanilic acid (OA)	171262-17-2
alpha-Hexachlorocyclohexane	319-84-6
Aniline	62-53-3
Bensulide	741-58-2
Benzyl chloride	100-44-7
Butylated hydroxyanisole	25013-16-5
Captan[3]	133-06-2
Chlorate	14866683
Chloromethane (Methyl chloride)	74-87-3
Clethodim	110429-62-4
Cobalt	7440-48-4
Cumene hydroperoxide	80-15-9
Cyanotoxins (3)	
Dicrotophos	141-66-2
Dimethipin	55290-64-7

Common name--registry name	CASRN
Diuron	330-54-1
Equilenin	517099
Equilin	474862
Erythromycin	114078
Estradiol (17-beta estradiol)	50282
Estrinol	50271
Estrone	53167
Ethinyl estradiol (17-alpha ethinyl estradiol)	57636
Ethoprop	13194-48-4
Ethylene glycol[2]	107-21-1
Ethylene oxide	75-21-8
Ethylene thiourea	96-45-7
Formaldehyde[2]	50-00-0
Germanium	7440-56-4
Halon 1011	74975
HCFC-22	75-45-6
Hexane	110-54-3
Hydrazine	302-01-2
Manganese	
Mestranol	72333
Methamidophos	10265-92-6
Methanol	67-56-1
Methyl bromide (Bromomethane)	74-83-9
Methyl tert-butyl ether[1]	1634-04-4
Metolachlor	51218-45-2
Metolachlor ethanesulfonic acid (ESA)	171118-09-5
Metolachlor oxanilic acid (OA)	152019-73-3
Molybdenum	7439-98-7
Nitrobenzene	98-95-3
Nitroglycerin	55-63-0
N-Methyl-2-pyrrolidone	872-50-4
N-nitrosodiethylamine (NDEA) [2]	55-18-5
N-nitrosodimethylamine (NDMA) [2]	62-75-9
N-nitroso-di-n-propylamine (NDPA)	621-64-7
N-Nitrosodiphenylamine	86-30-6
N-nitrosopyrrolidine (NPYR)	930-55-2
Nonylphenol	
Norethindron (19-Noresthisterone)	68224
n-Propylbenzene[2]	103-65-1
o-Toluidine	95-53-4
Oxirane, methyl-	75-56-9
Oxydemeton-methyl	301-12-2
Oxyfluorfen	42874-03-3
Perfluorooctane sulfonic acid (PFOS)	1763231
Permethrin	52645-53-1
PFOA (perfluorooctanoic acid)	335-67-1
Profenofos	41198-08-7
Quinoline	91-22-5
RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine)	121-82-4
Common name--registry name	**CASRN**
sec-Butylbenzene[2]	135-98-8
Tebuconazole	107534-96-3

Tebufenozide	112410-23-8
Tellurium	13494-80-9
Thiodicarb	59669-26-0
Thiophanate-methyl	23564-05-8
Toluene diisocyanate	26471-62-5
Tribufos	78-48-8
Triethylamine	121-44-8
Triphenyltin hydroxide (TPTH)	76-87-9
Urethane	51-79-6
Vanadium[2]	7440-62-2
Vinclozolin	50471-44-8
Ziram	137-30-4

[1]Primary Regulated Chemical in California
[2]Current Notification Level in California
[3]Archived Advisory Level in California

ATTACHMENT 3
OEHHA Public Health Goals

OEHHA PHGs

Chemical	California PHG (ppb)
1,1-Dichloroethane	3
1,1-Dichloroethylene	10
1,1,1-Trichloroethane	1000
1,2-Dibromo-3-chloropropane	0.0017
1,2-Dichloroethane	0.4
1,2-Dichloroethylene, cis	13
1,2-Dichloroethylene, trans	50
1,2-Dichloropropane	0.5
1,1,2-Trichloroethane	0.3
1,1,2,2-Tetrachloroethane	0.1
1,2,3-Trichloropropane	0.0007
1,2,4-Trichlorobenzene	5
1,2-Dichlorobenzene	600
1,3-Dichloropropene (Telone II®)	0.2
1,4-Dichlorobenzene	6
2,4-Dichlorophenoxyacetic acid	20
Alachlor	4
Aluminum	600
Antimony	1
Arsenic	0.004
Asbestos	$7x10^{-6}$ fibers/L
Atrazine	0.15
Barium	2,000
Bentazon	200
Benzene	0.15
Benzo[a]pyrene	0.007
Beryllium	1
Bromate	0.1
Cadmium	0.04
Carbofuran	0.7
Carbon Tetrachloride	0.1
Chlordane	0.03
Chlorite	50
Chlorobenzene	70
Chromium, Hexavalent	0.02
Copper	300
Cyanide	150
Dalapon	790
Dichloromethane	4
Diethylhexyl adipate	200
Diethylhexylphthalate (DEHP)	12
Dinoseb	14
Diquat	6
Endothall	94
Endrin	0.3
Ethylbenzene	300

OEHHA PHGs

Chemical	California PHG (ppb)
Ethylene dibromide (1,2-dibromoethane)	0.01
Fluoride	1,000
Glyphosate	900
Heptachlor	0.008
Heptachlor epoxide	0.006
Hexachlorobenzene	0.03
Hexachlorocyclopentadiene	2
Lead	0.2
Lindane	0.032
Mercury, inorganic	1.2
Methoxychlor	0.09
Methyl tertiary butyl ether (MTBE)	13
Molinate	1
N-Nitrosodimethylamine	0.003
Nickel	12
Nitrate	45,000 as NO_3
Nitrate and Nitrite	10,000 as N
Nitrite	1,000 as N
Oxamyl	26
Pentachlorophenol	0.3
Perchlorate	1
Picloram	166
Polychlorinated Biphenyls (PCBs)	0.09
Radium-226	0.05 pCi/L
Radium-228	0.019 pCi/L
Selenium	30
Silvex	3
Simazine	4
Strontium-90	0.35 pCi/L
Styrene	0.5
2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD)	0.00005 parts per trillion (ppt)
Tetrachloroethylene	0.06
Thallium	0.1
Thiobencarb	42
Toluene	150
Toxaphene	0.03
Trichloroethylene	1.7
Trichlorofluoromethane (Freon 11)	1,300
Trichlorotrifluoroethane (Freon 113)	4,000
Trihalomethanes: Bromodichloromethane	0.06
Trihalomethanes: Bromoform	0.5
Trihalomethanes: Chloroform	0.4
Trihalomethanes: Dibromochloromethane	0.1
Tritium	400 pCi/L
Uranium	0.43 pCi/L

OEHHA PHGs

Chemical	California PHG (ppb)
Vinyl Chloride	0.05
Xylene	1,800

APPENDIX C

PARTICIPATING WATER AGENCY

WATER QUALITY DATA

Woodland Davis Clean Water Agency

	E. Coli	Total Coliform	TOC	Alkalinity	Giardia	Crypto
	MPN/100mL	MPN/100mL	mg/L	mg/L	Cysts/L	Oocysts/L
Jul-16	no data	no data	no data	no data	no data	no data
Aug-16	no data	no data	no data	no data	no data	no data
Sep-16	no data	no data	no data	no data	no data	no data
Oct-16	no data	no data	no data	64	no data	no data
Nov-16	no data	no data	2.5	73	no data	no data
Dec-16	no data	no data	3.8	54	no data	no data
Jan-17	no data	no data	3.1	35	no data	no data
Feb-17	no data	no data	2.6	35	no data	no data
Mar-17	78.9	2419.6	1.8	55	no data	no data
Apr-17	65.7	2419.6	1.8	46	no data	no data
May-17	20.1	2419.6	1.6	50	no data	no data
Jun-17	12.1	2419.6	1.9	61	no data	no data
Jul-17	3.1	1732.9	1.4	60	no data	no data
Aug-17	1.0	1986.3	1.9	64	no data	no data
Sep-17	7.4	2419.6	1.9	69	no data	no data
Oct-17	6.3	980.4	1.2	53	no data	no data
Nov-17	17.1	2419.6	1.9	69	no data	no data
Dec-17	4.1	727.0	2.0	77	no data	no data
Jan-18	17.3	648.8	2.0	86	no data	no data
Feb-18	3.1	218.7	2.4	89	no data	no data
Mar-18	1.0	218.7	1.4	76	no data	no data
Apr-18	218.7	2419.6	2.7	45	no data	no data
May-18	5.2	1119.9	1.3	64	no data	no data
Jun-18	5.2	816.4	1.3	69	no data	no data
Jul-18	13.4	980.4	1.1	63	no data	no data
Aug-18	11.0	1986.3	1.7	84	no data	no data
Sep-18	7.5	1732.9	1.5	84	no data	no data
Oct-18	11.0	1203.3	1.3	64	no data	no data
Nov-18	4.1	1986.3	1.9	81	no data	no data
Dec-18	11.0	1299.7	2.7	93	no data	no data
Jan-19	613.1	2419.6	3.2	65	no data	no data
Feb-19	39.8	1986.3	3.0	75	no data	no data
Mar-19	61.3	1986.3	2.0	56	no data	no data
Apr-19	41.7	1413.6	1.4	53	no data	no data
May-19	8.6	1413.6	1.4	52	no data	no data
Jun-19	7.2	1732.9	1.4	52	no data	no data
Jul-19	2.0	2419.6	1.4	60	no data	no data
Aug-19	10.8	2419.6	1.6	68	no data	no data
Sep-19	11.8	1553.1	1.4	70	no data	no data
Oct-19	4.1	613.1	1.2	55	no data	no data
Nov-19	4.1	1732.9	1.8	60	no data	no data
Dec-19	32.3	1732.9	3.7	82	no data	no data

min	1.0		1.1	45.0	34 samples
max	613.1		3.7	93.0	
ave	40.0		1.8	66.2	
median	10.9		1.8	64.0	
95th	127.83		3.275	86.3	

Treated Water	Woodland				Davis			
	Aluminum	**Iron**	**Manganese**	**TOC**	**Aluminum**	**Iron**	**Manganese**	**TOC**
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jul-16	ND	ND	ND	-	ND	ND	ND	-
Aug-16	ND	ND	ND	-	ND	ND	ND	-
Sep-16	ND	ND	ND	-	ND	ND	ND	-
Oct-16	ND	ND	ND	-	ND	ND	ND	-
Nov-16	ND	ND	ND	-	ND	ND	ND	-
Dec-16	ND	ND	ND	-	ND	ND	ND	-
Jan-17	ND	ND	ND	0.95	ND	ND	ND	1.0
Feb-17	ND	ND	ND	0.89	ND	ND	ND	0.95
Mar-17	ND	ND	ND	0.87	ND	ND	ND	0.86
Apr-17	ND	ND	ND	0.81	ND	ND	ND	0.82
May-17	ND	ND	ND	0.78	ND	ND	ND	0.79
Jun-17	ND	ND	ND	1.0	ND	ND	ND	1.1
Jul-17	ND	ND	ND	0.79	ND	ND	ND	0.84
Aug-17	ND	ND	ND	1.2	ND	ND	ND	1.2
Sep-17	ND	ND	ND	0.78	ND	ND	ND	0.92
Oct-17	ND	ND	ND	0.72	ND	ND	ND	0.83
Nov-17	ND	ND	ND	0.91	ND	ND	ND	0.92
Dec-17	ND	ND	ND	0.98	ND	ND	ND	0.99
Jan-18	ND	ND	ND	0.94	ND	ND	ND	1.1
Feb-18	ND	ND	ND	1.1	ND	ND	ND	0.97
Mar-18	ND	ND	ND	0.91	ND	ND	ND	1.0
Apr-18	ND	ND	ND	1.0	ND	ND	ND	1.0
May-18	ND	ND	ND	0.83	ND	ND	ND	0.85
Jun-18	ND	ND	ND	0.90	ND	ND	ND	0.95
Jul-18	ND	ND	ND	0.77	ND	ND	ND	0.70
Aug-18	ND	ND	ND	1.1	ND	ND	ND	1.2
Sep-18	ND	ND	ND	0.95	ND	ND	ND	0.97
Oct-18	ND	ND	ND	0.77	ND	ND	ND	0.81
Nov-18	ND	ND	ND	1.0	ND	ND	ND	1.0
Dec-18	ND	ND	ND	1.3	ND	ND	ND	1.3
Jan-19	ND	ND	ND	1.1	ND	ND	ND	0.96
Feb-19	ND	ND	ND	1.5	ND	ND	ND	1.5
Mar-19	ND	ND	ND	0.57	ND	ND	ND	0.93
Apr-19	ND	ND	ND	0.67	ND	ND	ND	0.64
May-19	ND	ND	ND	0.92	ND	ND	ND	0.90
Jun-19	ND	ND	ND	0.70	ND	ND	ND	0.74
Jul-19	ND	ND	ND	0.74	ND	ND	ND	0.75
Aug-19	ND	ND	ND	0.85	ND	ND	ND	0.85
Sep-19	ND	ND	ND	0.79	ND	ND	ND	1.0
Oct-19	ND	ND	ND	0.81	ND	ND	ND	0.68
Nov-19	ND	ND	ND	0.82	ND	ND	ND	0.76
Dec-19	ND	ND	ND	1.8	ND	ND	ND	1.8

	Raw TOC	Treated TOC City of Woodland	Treated TOC City of Davis
Nov-16	2.5		
Dec-16	3.8		
Jan-17	3.1	0.95	1.0
Feb-17	2.6	0.89	0.95
Mar-17	1.8	0.87	0.86
Apr-17	1.8	0.81	0.82
May-17	1.6	0.78	0.79
Jun-17	1.9	1.0	1.1
Jul-17	1.4	0.79	0.84
Aug-17	1.9	1.2	1.2
Sep-17	1.9	0.78	0.92
Oct-17	1.2	0.72	0.83
Nov-17	1.9	0.91	0.92
Dec-17	2.0	0.98	0.99
Jan-18	2.0	0.94	1.1
Feb-18	2.4	1.1	0.97
Mar-18	1.4	0.91	1.0
Apr-18	2.7	1.0	1.0
May-18	1.3	0.83	0.85
Jun-18	1.3	0.90	0.95
Jul-18	1.1	0.77	0.70
Aug-18	1.7	1.1	1.2
Sep-18	1.5	0.95	0.97
Oct-18	1.3	0.77	0.81
Nov-18	1.9	1.0	1.0
Dec-18	2.7	1.3	1.3
Jan-19	3.2	1.1	0.96
Feb-19	3.0	1.5	1.5
Mar-19	2.0	0.57	0.93
Apr-19	1.4	0.67	0.64
May-19	1.4	0.92	0.90
Jun-19	1.4	0.70	0.74
Jul-19	1.4	0.74	0.75
Aug-19	1.6	0.85	0.85
Sep-19	1.4	0.79	1.0
Oct-19	1.2	0.81	0.68
Nov-19	1.8	0.82	0.76
Dec-19	3.7	1.8	1.8
average	2.0	0.9	1.0
percent removal		0.52	0.51
min	1.1	0.6	0.6
max	3.8	1.8	1.8

State of California
Drinking Water Program

Department of Health Services

Stage 2 DBP - Quarterly TTHM Report for Disinfection Byproducts Compliance and Operational Evaluation (in µg/L or ppb)

System Name: City of Woodland System No.: 5710006 Year: 2019 Quarter: 4th

Year:	2014				2015				2016				2017				2018				2019			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr
Sample Date (month/date):	2/20	5/22	8/21	11/20	2/19	5/21	8/20	11/19	2/18	4/21	8/29	11/17	3/16	6/15	9/21	12/21	3/15	6/25	9/17	12/4	3/21	6/21	9/23	12/23
Site 1	6.2	7.1	2.1	8.0	4.8	7.6	7.2	7.3	9.8	6.5	21.0	13.0	8.8	11.0	7.0	7.0	8.9	9.0	6.6	15.0	4.8	8.0	6.5	7.4
Site 2											15.0	28.0	15.0	18.0	20.0	12.0	18.0	24.0	24.0	23.0	8.1	18.0	16.0	12.0
Site 3											3.6	30.0	19.0	22.0	26.0	10.0	20.0	25.0	26.0	24.0	10.0	21.0	18.0	14.0
Site 4											6.8	35.0	12.0	11.0	8.1	7.8	12.0	13.0	15.0	15.0	5.8	11.0	17.0	16.0
Site 5											14.0	26.0	12.0	12.0	11.0	8.2	12.0	15.0	15.0	18.0	6.5	13.0	17.0	7.5
Site 6											30.0	25.0	13.0	14.0	15.0	7.8	13.0	15.0	15.0	19.0	6.8	14.0	17.0	8.8
Site 7											26.0	16.0	12.0	10.0	8.1	7.0	10.0	10.0	8.6	14.0	5.7	9.8	12.0	7.5
Site 8											23.0	15.0	10.0	9.9	8.0	7.7	10.0	12.0	8.0	16.0	6.2	10.0	11.0	8.8
Site 9																								
Site 10																								
Site 11																								
Site 12																								
Number of Samples Taken	1	1	1	1	1	1	1	1	1	1	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Stage 2 DBP - Quarterly HAA5 Report for Disinfection Byproducts Compliance and Operational Evaluation (in µg/L or ppb)

System Name: City of Woodland System No.: 5710006 Year: 2019 Quarter: 4th

Year:	2014				2015				2016				2017				2018				2019			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):	2/20	5/22	8/21	11/20	2/19	5/21	8/20	11/19	2/18	4/21	8/29	11/17	3/16	6/15	9/21	12/21	3/15	6/25	9/17	12/4	3/21	6/21	9/23	12/23
Site 1	ND	ND	ND	ND	ND	ND	ND	1.2	2.1	2.2	4.6	6.9	ND	3.5	ND	2.7	ND	3.1	ND	5.1	ND	3.4	ND	4.2
Site 2											2.7	12.0	5.5	6.8	6.9	5.3	5.0	3.4	4.2	6.2	3.2	4.5	ND	4.9
Site 3											ND	13.0	6.0	7.5	4.3	3.9	3.4	25.0	3.1	6.0	4.2	4.2	ND	3.7
Site 4											ND	14.0	3.5	6.2	ND	3.0	4.1	3.0	3.9	5.9	2.1	3.8	3.1	7.6
Site 5											2.1	8.6	3.1	3.7	3.2	3.0	2.7	3.3	3.9	6.3	3.0	3.7	ND	3.9
Site 6											6.3	10.0	3.7	4.4	7.0	4.2	4.4	4.3	2.8	6.7	3.0	3.9	ND	4.4
Site 7											4.7	7.4	3.2	6.5	ND	2.8	2.6	3.6	2.9	5.6	ND	3.5	3.6	3.0
Site 8											4.7	7.5	ND	6.9	ND	2.9	ND	3.9	2.8	5.9	ND	3.6	3.1	4.2
Site 9																								
Site 10																								
Site 11																								
Site 12																								
Number of Samples Taken	1	1	1	1	1	1	1	1	1	1	8	8	8	8	8	8	8	8	8	8	8	8	8	8

Disinfection By-Products - Total Trihalomethanes (in ppb) **City of Davis**

Start

Location	**Date**															
	June 2015	**June 2016**	**Sept 2016**	**Dec 2016**	**March 2017**	**June 2017**	**Sept 2017**	**Dec 2017**	**March 2018**	**June 2018**	**Sept 2018**	**Dec 2018**	**Feb 2019**	**May 2019**	**Aug 2019**	**Nov 2019**
SS-008	*N/A*	4.4	2.5	22	15	16	19	24	18	7.3	18	26	*N/A*	*N/A*	*N/A*	*N/A*
SS-012	1.4	3.9	1.8	32	18	17	24	35	19	19	18	35	25	12	17	12
SS-017	*N/A*	13	9.7	34	24	18	29	37	26	22	21	36	29	20	17	8.3
SS-022	*N/A*	2.3	ND	16	9	7.9	4.7	9.9	7.5	2.9	9.4	12	*N/A*	*N/A*	*N/A*	*N/A*
SS-023	1.5	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
SS-024	*N/A*	6.9	14	39	11	14	14	12	15	14	16	16	27	12	10	8.3
SS-026	*N/A*	4.7	14	13	11	9.2	14	11	11	14	15	15	*N/A*	*N/A*	*N/A*	*N/A*
SS-027	*N/A*	6	11	26	15	15	15	21	13	28	21	27	*N/A*	*N/A*	*N/A*	*N/A*
SS-036	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	16	11	14	9.3
SS-037	*N/A*	1.7	16	28	16	12	25	26	25	24	23	37	*N/A*	*N/A*	*N/A*	*N/A*
	ave	5.3625	9.857143	26.25	14.875	13.6375	18.0875	21.9875	16.8125	16.4	17.675	25.5	24.25	13.75	14.5	9.475

Notes: ND means non-detect

N/A means the sampling station was not used for DBP sampling at that time

ave	16.792233
min	1.7
max	39

Disinfection By-Products - Haloacetic Acids (5) **City of Davis**

Location	**Date**															
	June 2015	**June 2016**	**Sept 2016**	**Dec 2016**	**March 2017**	**June 2017**	**Sept 2017**	**Dec 2017**	**March 2018**	**June 2018**	**Sept 2018**	**Dec 2018**	**Feb 2019**	**May 2019**	**Aug 2019**	**Nov 2019**
SS-008	*N/A*	0	0	8.8	5.3	7.7	6.2	10	4.4	ND	5.3	6.4	*N/A*	*N/A*	*N/A*	*N/A*
SS-012	ND	0	0	10	5.8	8.6	7.6	8.7	5.5	4.9	4.6	7.8	11	3.4	4.4	0
SS-017	*N/A*	0	0	12	7.1	9.2	8.7	7.9	6.3	5.3	4.9	6.1	4.7	5.8	3.2	3
SS-022	*N/A*	0	0	6.6	1.5	5.2	2	4.9	3.1	2.1	3	6.5	*N/A*	*N/A*	*N/A*	*N/A*
SS-023	ND	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
SS-024	*N/A*	0	0	12	2.9	7.1	4.4	5.5	3.9	4.8	4.9	5	12	4.2	4.1	ND
SS-026	*N/A*	0	0	5.8	1.5	3.8	5.7	5.2	2.7	4.6	5.7	5.7	*N/A*	*N/A*	*N/A*	*N/A*
SS-027	*N/A*	0	0	9.9	5	7.4	6	7.8	3.4	6.8	7	8.8	*N/A*	*N/A*	*N/A*	*N/A*
SS-036	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	7.8	4.4	4.9	2.1
SS-037	*N/A*	0	3.2	11	5.4	4.4	7.2	9.5	6.5	7.1	6.9	13	*N/A*	*N/A*	*N/A*	*N/A*
	average	0	0.4	9.5125	4.3125	6.675	5.975	7.4375	4.475	5.0857143	5.2875	7.4125	8.875	4.45	4.15	1.7

Notes: ND means non-detect

N/A means the sampling station was not used for DBP sampling at that time

average	5.122549
min	ND
max	13

State of California
Drinking Water Program

Department of Health Servic

Quarterly TTHM Report for Disinfection Byproducts Compliance (in □g/L or ppb)

System Name: University of California, Davis

Year:	2016	2017	2018				2019				202	
Quarter:	don't		1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.
Sample Date (month/date):	include		3/22	6/26	8/30	12/11	3/5	5/21	7/30	10/10		
Site 1: 2-6 Rec Pool Lodge	2016 data		39	16	21.0	22.0	19.0	14.0	19.00	15.0		
Site 2: 3-7 Primate Field Cage #13	since surface		37	9.2	6.9	33.0	19.0	27.0	23.00	11.0		
Site 3: 4-1 Health and Environment Office and Lab	WDCWA		24	0	0.8	32.0	0.0	16.0	22.0	0.0		
Site 4: 4-8 Domestic Water Tank 1	water added		38	22	9.8	38.0	18.0	31.0	36.0	27.0		
Site 5: 2-3 Reservoir Pumphouse	added						1.0	13.0	22.0	4.1		
Site 6: 3-8 Domestic Water Tank 2	in 7/2017						22.0	34.0	36.0	25.0		
Site 2R Pomology Field House	7.9	27										
Site 20R ITEH Office and Lab	0.55	24										
Site 10												
Site 11												
Site 12	2016	2017	Mar-18	Jun-18	Aug-18	Dec-18	Mar-19	May-19	Jul-19	Oct-19		
Quarterly Average	4.225	25.5	34.5	11.9	9.6	31.3	13.2	22.5	26.3	13.7		
Running Annual Average			N/A	N/A	N/A	21.8	16.5	19.1	23.3	18.9		
Meets Standard?* (check box)			Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐
Number of Samples Taken			4	4	4	4	6	6	6	6	0	0

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571-0009 Year: 2019 Quarter: 4th

20		2021				2022			
3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
	min	0							
	max	39							
	ave	20.32857143							
Yes _ No	Yes No	Yes ☐ No ☐	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No	Yes No
0	0	0	0	0	0	0	0	0	0

System Name: University of California, Davis

Year:	2016	2017	2018				2019				
Quarter:	don't include		1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.
Sample Date (month/date):	2016		3/22	6/26	8/30	12/11	3/5	5/21	7/30	10/10	
Site 1: 2-6 Rec Pool Lodge	data, as		15	5.4	6.9	9.7	9.0	5.5	9.7	6.2	
Site 2: 3-7 Primate Field Cage #13	WDCWA		14	2.8	2.4	12.0	4.8	8.9	9.6	3.5	
Site 3: 4-1 Health and Environment Office and Lab	entered		7.5	<2.0	<2.0	9.8	0.0	4.5	8.1	0.0	
Site 4: 4-8 Domestic Water Tank 1	system in		15	6.8	2.8	16.0	5.3	8.2	13.0	8.2	
Site 5: 2-3 Reservoir Pump House	Jul-17						0.0	3.6	8.7	0.0	
Site 6: 3-8 Domestic Water Tank 2							5.8	8.2	12.0	10.0	
Site 7											
Site 2R Pomology Field House	0	9.4									
Site 20R ITEH Office and Lab	0	8.4									
Site 10											
Site 11											
Site 12	2016	2017	Mar-18	Jun-18	Aug-18	Dec-18	Mar-19	May-19	Jul-19	Oct-19	
Quarterly Average	0	8.9	12.9	4.3	3.5	11.9	4.2	6.5	10.2	4.7	
Running Annual Average			N/A	N/A	N/A	8.1	6.0	6.5	8.2	6.4	
Meets Standard?* (check box)			Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ ☐ No ☐ ☐	Yes ☐ No ☐	Yes ☐ ☐ No ☐ ☐	Yes ☐ No ☐
Number of Samples Taken			4	4	4	4	6	6	6	6	0

571-0009 Year: 2019 Quarter: 4th

2020			2021				2022			
2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
min	0									
max	16									
ave	7.42									
Yes ☐ No ☐	Yes _☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes ☐ No ☐	Yes No	Yes No	Yes No	Yes No
0	0	0	0	0	0	0	0	0	0	0

PWSID	PWSName	Size	FacilityID	FacilityNar	FacilityWat	SamplePoi	SamplePointName	SamplePoi	CollectionDate	SampleID	Contamina	MRL	AnalyticalR	SampleEve	Monitoring
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	3/15/2018	A8B3087-0	HAA5		5	SEH1	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	6/25/2018	A8E2804-0	HAA5		4.05	SEH2	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	9/17/2018	A8H1698-0	HAA5		5.08	SEH3	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	12/4/2018	A8K2247-0	HAA5	5.3025	7.08	SEH4	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	3/15/2018	A8B3087-0	HAA6Br		5.65	SEH1	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	6/25/2018	A8E2804-0	HAA6Br		4.55	SEH2	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	9/17/2018	A8H1698-0	HAA6Br		6.29	SEH3	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	12/4/2018	A8K2247-0	HAA6Br	5.525	5.61	SEH4	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	3/15/2018	A8B3087-0	HAA9		9.55	SEH1	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	6/25/2018	A8E2804-0	HAA9		7.95	SEH2	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	9/17/2018	A8H1698-0	HAA9		8.37	SEH3	AM
CA5710006	City of Woodland	L	91824	SS#1 - N. A	SW	5.71E+09	SS#1 - N. Ashley Ave.	DS	12/4/2018	A8K2247-0	HAA9	9.42	11.81	SEH4	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	3/15/2018	A8B3087-0	HAA5		3.42	SEH1	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	6/25/2018	A8E2804-0	HAA5		4.06	SEH2	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	9/17/2018	A8H1698-0	HAA5		3.36	SEH3	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	12/4/2018	A8K2247-0	HAA5	4.2975	6.35	SEH4	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	3/15/2018	A8B3087-0	HAA6Br		4.53	SEH1	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	6/25/2018	A8E2804-0	HAA6Br		3.27	SEH2	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	9/17/2018	A8H1698-0	HAA6Br		3.48	SEH3	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	12/4/2018	A8K2247-0	HAA6Br	4.275	5.82	SEH4	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	3/15/2018	A8B3087-0	HAA9		6.95	SEH1	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	6/25/2018	A8E2804-0	HAA9		6.87	SEH2	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	9/17/2018	A8H1698-0	HAA9		6.38	SEH3	AM
CA5710006	City of Woodland	L	91829	SS#10 - E. E	SW	5.71E+09	SS#10 - E. Beamer @ Ur	DS	12/4/2018	A8K2247-0	HAA9	7.905	11.42	SEH4	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	3/15/2018	A8B3087-0	HAA5		3.31	SEH1	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	6/25/2018	A8E2804-0	HAA5		4.4	SEH2	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	9/17/2018	A8H1698-0	HAA5		3.41	SEH3	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	12/4/2018	A8K2247-0	HAA5	4.4425	6.65	SEH4	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	3/15/2018	A8B3087-0	HAA6Br		4.48	SEH1	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	6/25/2018	A8E2804-0	HAA6Br		3.5	SEH2	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	9/17/2018	A8H1698-0	HAA6Br		3.71	SEH3	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	12/4/2018	A8K2247-0	HAA6Br	4.455	6.13	SEH4	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	3/15/2018	A8B3087-0	HAA9		6.81	SEH1	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	6/25/2018	A8E2804-0	HAA9		7.4	SEH2	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	9/17/2018	A8H1698-0	HAA9		6.51	SEH3	AM
CA5710006	City of Woodland	L	91830	SS#13 - Acr	SW	5.71E+09	SS#13 - Across from 103	DS	12/4/2018	A8K2247-0	HAA9	8.1875	12.03	SEH4	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	3/15/2018	A8B3087-0	HAA5		2.89	SEH1	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	6/25/2018	A8E2804-0	HAA5		3.51	SEH2	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	9/17/2018	A8H1698-0	HAA5		2.96	SEH3	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	12/4/2018	A8K2247-0	HAA5	3.7775	5.75	SEH4	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	3/15/2018	A8B3087-0	HAA6Br		4.04	SEH1	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	6/25/2018	A8E2804-0	HAA6Br		2.99	SEH2	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	9/17/2018	A8H1698-0	HAA6Br		3.01	SEH3	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	12/4/2018	A8K2247-0	HAA6Br	3.94	5.72	SEH4	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	3/15/2018	A8B3087-0	HAA9		5.97	SEH1	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	6/25/2018	A8E2804-0	HAA9		6.09	SEH2	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	9/17/2018	A8H1698-0	HAA9		5.6	SEH3	AM
CA5710006	City of Woodland	L	91831	SS#14 - Wa	SW	5.71E+09	SS#14 - Walgreens Ware	DS	12/4/2018	A8K2247-0	HAA9	7.095	10.72	SEH4	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	3/15/2018	A8B3087-0	HAA5		4.1	SEH1	AM

CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	6/25/2018	A8E2804-0	HAA5		3.92	SEH2	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	9/17/2018	A8H1698-0	HAA5		4.3	SEH3	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	12/4/2018	A8K2247-0	HAA5	4.7375	6.63	SEH4	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	3/15/2018	A8B3087-0	HAA6Br		4.74	SEH1	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	6/25/2018	A8E2804-0	HAA6Br		4.46	SEH2	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	9/17/2018	A8H1698-0	HAA6Br		5.08	SEH3	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	12/4/2018	A8K2247-0	HAA6Br	5.0125	5.77	SEH4	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	3/15/2018	A8B3087-0	HAA9		7.84	SEH1	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	6/25/2018	A8E2804-0	HAA9		7.46	SEH2	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	9/17/2018	A8H1698-0	HAA9		7.78	SEH3	AM
CA5710006	City of Woodland	L	91825	SS#3 - Woc	SW	5.71E+09	SS#3 - Woodland Memc	DS	12/4/2018	A8K2247-0	HAA9	8.6875	11.67	SEH4	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	3/15/2018	A8B3087-0	HAA5		3.64	SEH1	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	6/25/2018	A8E2804-0	HAA5		4.21	SEH2	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	9/17/2018	A8H1698-0	HAA5		4.78	SEH3	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	12/4/2018	A8K2247-0	HAA5	4.9025	6.98	SEH4	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	3/15/2018	A8B3087-0	HAA6Br		4.49	SEH1	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	6/25/2018	A8E2804-0	HAA6Br		4.37	SEH2	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	9/17/2018	A8H1698-0	HAA6Br		6.09	SEH3	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	12/4/2018	A8K2247-0	HAA6Br	5.1875	5.8	SEH4	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	3/15/2018	A8B3087-0	HAA9		7.13	SEH1	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	6/25/2018	A8E2804-0	HAA9		7.67	SEH2	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	9/17/2018	A8H1698-0	HAA9		8.17	SEH3	AM
CA5710006	City of Woodland	L	91826	SS#5 - City	SW	5.71E+09	SS#5 - City Park	DS	12/4/2018	A8K2247-0	HAA9	8.7425	12	SEH4	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	3/15/2018	A8B3087-0	HAA5		4.25	SEH1	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	6/25/2018	A8E2804-0	HAA5		24.9	SEH2	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	9/17/2018	A8H1698-0	HAA5		3.92	SEH3	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	12/4/2018	A8K2247-0	HAA5	9.9925	6.9	SEH4	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	3/15/2018	A8B3087-0	HAA6Br		4.74	SEH1	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	6/25/2018	A8E2804-0	HAA6Br		0.91	SEH2	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	9/17/2018	A8H1698-0	HAA6Br		3.9	SEH3	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	12/4/2018	A8K2247-0	HAA6Br	3.7425	5.42	SEH4	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	3/15/2018	A8B3087-0	HAA9		8.14	SEH1	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	6/25/2018	A8E2804-0	HAA9		25.81	SEH2	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	9/17/2018	A8H1698-0	HAA9		6.72	SEH3	AM
CA5710006	City of Woodland	L	91827	SS#7 - Cline	SW	5.71E+09	SS#7 - Cline Park	DS	12/4/2018	A8K2247-0	HAA9	13.0225	11.42	SEH4	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	3/15/2018	A8B3087-0	HAA5		4.4	SEH1	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	6/25/2018	A8E2804-0	HAA5		4.74	SEH2	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	9/17/2018	A8H1698-0	HAA5		3.45	SEH3	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	12/4/2018	A8K2247-0	HAA5	5.015	7.47	SEH4	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	3/15/2018	A8B3087-0	HAA6Br		5.1	SEH1	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	6/25/2018	A8E2804-0	HAA6Br		3.62	SEH2	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	9/17/2018	A8H1698-0	HAA6Br		3.72	SEH3	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	12/4/2018	A8K2247-0	HAA6Br	4.5775	5.87	SEH4	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	3/15/2018	A8B3087-0	HAA9		8.4	SEH1	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	6/25/2018	A8E2804-0	HAA9		7.92	SEH2	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	9/17/2018	A8H1698-0	HAA9		6.52	SEH3	AM
CA5710006	City of Woodland	L	91828	SS#8 - Holis	SW	5.71E+09	SS#8 - Hollister Rd. @ B	DS	12/4/2018	A8K2247-0	HAA9	8.8525	12.57	SEH4	AM

PWSID	PWSName	Size	FacilityID	FacilityName	FacilityWater	SamplePoint	SamplePointName	SamplePoint	CollectionDa	SampleID	Contaminant	MRL	MethodID	AnalyticalRe	AnalyticalRe	SampleEvent	MonitoringR	Region	State
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	1-butanol	2	EPA 541	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	1-butanol	2	EPA 541	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	1-butanol	2	EPA 541	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	1-butanol	2	EPA 541	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	2-methoxyethanol	0.4	EPA 541	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	2-methoxyethanol	0.4	EPA 541	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	2-methoxyethanol	0.4	EPA 541	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	2-methoxyethanol	0.4	EPA 541	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	2-propen-1-ol	0.5	EPA 541	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	2-propen-1-ol	0.5	EPA 541	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	2-propen-1-ol	0.5	EPA 541	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	2-propen-1-ol	0.5	EPA 541	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	alpha-hexachlorocyclo	0.01	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	alpha-hexachlorocyclo	0.01	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	alpha-hexachlorocyclo	0.01	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	alpha-hexachlorocyclo	0.01	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	4/11/2018	A8C2309-07	butylated hydroxyanis	0.03	EPA 530	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	butylated hydroxyanis	0.03	EPA 530	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	butylated hydroxyanis	0.03	EPA 530	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	butylated hydroxyanis	0.03	EPA 530	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	chlorpyrifos	0.03	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	chlorpyrifos	0.03	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	chlorpyrifos	0.03	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	chlorpyrifos	0.03	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	dimethipin	0.2	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	dimethipin	0.2	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	dimethipin	0.2	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	dimethipin	0.2	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	ethoprop	0.03	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	ethoprop	0.03	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	ethoprop	0.03	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	ethoprop	0.03	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	germanium	0.3	EPA 200.8	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	germanium	0.3	EPA 200.8	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	germanium	0.3	EPA 200.8	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	germanium	0.3	EPA 200.8	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	manganese	0.4	EPA 200.8	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	manganese	0.4	EPA 200.8	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	manganese	0.4	EPA 200.8	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	manganese	0.4	EPA 200.8	=	0.74	SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	4/11/2018	A8C2309-07	o-toluidine	0.007	EPA 530	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	o-toluidine	0.007	EPA 530	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	o-toluidine	0.007	EPA 530	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	o-toluidine	0.007	EPA 530	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	oxyfluorfen	0.05	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	oxyfluorfen	0.05	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	oxyfluorfen	0.05	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	oxyfluorfen	0.05	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	profenofos	0.3	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	profenofos	0.3	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	profenofos	0.3	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	profenofos	0.3	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	4/11/2018	A8C2309-07	quinoline	0.02	EPA 530	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	quinoline	0.02	EPA 530	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	quinoline	0.02	EPA 530	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	quinoline	0.02	EPA 530	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	tebuconazole	0.2	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	tebuconazole	0.2	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	tebuconazole	0.2	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	tebuconazole	0.2	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	total permethrin	0.04	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	total permethrin	0.04	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	total permethrin	0.04	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	total permethrin	0.04	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	3/14/2018	A8B2310-08	tribufos	0.07	EPA 525.3	<		SEA1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/13/2018	A8E3204-01	tribufos	0.07	EPA 525.3	<		SEA2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	9/12/2018	A8H1578-01	tribufos	0.07	EPA 525.3	<		SEA3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	12/12/2018	A8K0303-01	tribufos	0.07	EPA 525.3	<		SEA4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	5/2/2018	A8D2457-01	anatoxin-a	0.03	EPA 545	<		SEC1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	5/16/2018	A8D2461-01	anatoxin-a	0.03	EPA 545	<		SEC2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/6/2018	A8E3206-01	anatoxin-a	0.03	EPA 545	<		SEC3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/20/2018	A8E3208-01	anatoxin-a	0.03	EPA 545	<		SEC4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	7/5/2018	A8F1247-01	anatoxin-a	0.03	EPA 545	<		SEC5	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	7/18/2018	A8F1249-01	anatoxin-a	0.03	EPA 545	<		SEC6	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	8/1/2018	A8G2169-01	anatoxin-a	0.03	EPA 545	<		SEC7	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	8/15/2018	A8G2170-01	anatoxin-a	0.03	EPA 545	<		SEC8	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	5/2/2018	A8D2457-01	cylindrospermopsin	0.09	EPA 545	<		SEC1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	5/16/2018	A8D2461-01	cylindrospermopsin	0.09	EPA 545	<		SEC2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/6/2018	A8E3206-01	cylindrospermopsin	0.09	EPA 545	<		SEC3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/20/2018	A8E3208-01	cylindrospermopsin	0.09	EPA 545	<		SEC4	AM	9	CA

CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	7/5/2018	A8F1247-01	cylindrospermopsin	0.09	EPA 545	<	SEC5	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	7/18/2018	A8F1249-01	cylindrospermopsin	0.09	EPA 545	<	SEC6	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	8/1/2018	A8G2169-01	cylindrospermopsin	0.09	EPA 545	<	SEC7	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	8/15/2018	A8G2170-01	cylindrospermopsin	0.09	EPA 545	<	SEC8	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	5/2/2018	A8D2457-01	total microcystin	0.3	EPA 546	<	SEC1	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	5/16/2018	A8D2461-01	total microcystin	0.3	EPA 546	<	SEC2	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/6/2018	A8E3206-01	total microcystin	0.3	EPA 546	<	SEC3	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	6/20/2018	A8E3208-01	total microcystin	0.3	EPA 546	<	SEC4	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	7/5/2018	A8F1247-01	total microcystin	0.3	EPA 546	<	SEC5	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	7/18/2018	A8F1249-01	total microcystin	0.3	EPA 546	<	SEC6	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	8/1/2018	A8G2169-01	total microcystin	0.3	EPA 546	<	SEC7	AM	9	CA
CA5710001	City of Davis	L	8	Point of Entry (AM1)	SW	EP008	Shack (Post Chlorination)	EP	8/15/2018	A8G2170-01	total microcystin	0.3	EPA 546	<	SEC8	AM	9	CA

PWSID	PWSName	Size	FacilityID	FacilityName	FacilityWate	SamplePoint	SamplePointName	SamplePoint	CollectionDa	SampleID	Contaminant	MRL	AnalyticalRe:	SampleEvent	MonitoringR	Region	State	SamplePointName
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	3/14/2018	A8B2314-08	HAA5		6.53	SEH1	AM	9	CA	Sampling Statin 037
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	6/13/2018	A8E3202-08	HAA5		5.3	SEH2	AM	9	CA	Sampling Statin 037
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	9/12/2018	A8H1579-08	HAA5		6.1	SEH3	AM	9	CA	Sampling Statin 037
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	12/12/2018	A8K0304-08	HAA5	7.34	11.43	SEH4	AM	9	CA	Sampling Station 008
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	3/14/2018	A8B2314-08	HAA6Br		5.78	SEH1	AM	9	CA	Sampling Station 008
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	6/13/2018	A8E3202-08	HAA6Br		5.66	SEH2	AM	9	CA	Sampling Station 008
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	9/12/2018	A8H1579-08	HAA6Br		6.5	SEH3	AM	9	CA	Sampling Station 012
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	12/12/2018	A8K0304-08	HAA6Br	6.7675	9.13	SEH4	AM	9	CA	Sampling Station 012
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	3/14/2018	A8B2314-08	HAA9		11.38	SEH1	AM	9	CA	Sampling Station 012
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	6/13/2018	A8E3202-08	HAA9		9.66	SEH2	AM	9	CA	Sampling Station 017
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	9/12/2018	A8H1579-08	HAA9		10.9	SEH3	AM	9	CA	Sampling Station 017
CA5710001	City of Davis	L	16	Sampling Station 8	MX	SS008	Sampling Statin 037	DS	12/12/2018	A8K0304-08	HAA9	12.6925	18.83	SEH4	AM	9	CA	Sampling Station 017
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	3/14/2018	A8B2314-01	HAA5		4.39	SEH1	AM	9	CA	Sampling Station 022
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	6/13/2018	A8E3202-01	HAA5		2.51	SEH2	AM	9	CA	Sampling Station 022
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	9/12/2018	A8H1579-01	HAA5		4.8	SEH3	AM	9	CA	Sampling Station 022
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	12/12/2018	A8K0304-01	HAA5	4.525	6.4	SEH4	AM	9	CA	Sampling Station 024
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	3/14/2018	A8B2314-01	HAA6Br		4.35	SEH1	AM	9	CA	Sampling Station 024
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	6/13/2018	A8E3202-01	HAA6Br		2.75	SEH2	AM	9	CA	Sampling Station 024
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	9/12/2018	A8H1579-01	HAA6Br		5.66	SEH3	AM	9	CA	Sampling Station 026
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	12/12/2018	A8K0304-01	HAA6Br	5.0075	7.27	SEH4	AM	9	CA	Sampling Station 026
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	3/14/2018	A8B2314-01	HAA9		7.95	SEH1	AM	9	CA	Sampling Station 026
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	6/13/2018	A8E3202-01	HAA9		4.49	SEH2	AM	9	CA	Sampling Station 027
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	9/12/2018	A8H1579-01	HAA9		9.06	SEH3	AM	9	CA	Sampling Station 027
CA5710001	City of Davis	L	9	Sampling Station 1	MX	SS001	Sampling Station 008	DS	12/12/2018	A8K0304-01	HAA9	8.3925	12.07	SEH4	AM	9	CA	Sampling Station 027
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	3/14/2018	A8B2314-02	HAA5		5.49	SEH1	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	6/13/2018	A8E3202-02	HAA5		4.9	SEH2	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	9/12/2018	A8H1579-02	HAA5		4.14	SEH3	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	12/12/2018	A8K0304-02	HAA5	5.5825	7.8	SEH4	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	3/14/2018	A8B2314-02	HAA6Br		4.81	SEH1	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	6/13/2018	A8E3202-02	HAA6Br		5.92	SEH2	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	9/12/2018	A8H1579-02	HAA6Br		5.12	SEH3	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	12/12/2018	A8K0304-02	HAA6Br	5.8875	7.7	SEH4	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	3/14/2018	A8B2314-02	HAA9		9.51	SEH1	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	6/13/2018	A8E3202-02	HAA9		9.22	SEH2	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	9/12/2018	A8H1579-02	HAA9		7.56	SEH3	AM	9	CA	
CA5710001	City of Davis	L	10	Sampling Station 2	MX	SS010	Sampling Station 012	DS	12/12/2018	A8K0304-02	HAA9	10.0225	13.8	SEH4	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	3/14/2018	A8B2314-03	HAA5		6.33	SEH1	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	6/13/2018	A8E3202-03	HAA5		5.3	SEH2	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	9/12/2018	A8H1579-03	HAA5		4.43	SEH3	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	12/12/2018	A8K0304-03	HAA5	5.54	6.1	SEH4	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	3/14/2018	A8B2314-03	HAA6Br		5.41	SEH1	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	6/13/2018	A8E3202-03	HAA6Br		6.2	SEH2	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	9/12/2018	A8H1579-03	HAA6Br		5.48	SEH3	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	12/12/2018	A8K0304-03	HAA6Br	5.8975	6.5	SEH4	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	3/14/2018	A8B2314-03	HAA9		10.91	SEH1	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	6/13/2018	A8E3202-03	HAA9		9.9	SEH2	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	9/12/2018	A8H1579-03	HAA9		8.31	SEH3	AM	9	CA	
CA5710001	City of Davis	L	11	Sampling Station 3	MX	SS011	Sampling Station 017	DS	12/12/2018	A8K0304-03	HAA9	10.155	11.5	SEH4	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	4/11/2018	A8D0626-01	HAA5		3.13	SEH1	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	6/13/2018	A8E3202-04	HAA5		3.29	SEH2	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	9/12/2018	A8H1579-04	HAA5		3.02	SEH3	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	12/12/2018	A8K0304-04	HAA5	3.785	5.7	SEH4	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	4/11/2018	A8D0626-01	HAA6Br		1.69	SEH1	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	6/13/2018	A8E3202-04	HAA6Br		3.45	SEH2	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	9/12/2018	A8H1579-04	HAA6Br		3.35	SEH3	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	12/12/2018	A8K0304-04	HAA6Br	3.6475	6.1	SEH4	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	4/11/2018	A8D0626-01	HAA9		4.39	SEH1	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	6/13/2018	A8E3202-04	HAA9		5.95	SEH2	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	9/12/2018	A8H1579-04	HAA9		5.5	SEH3	AM	9	CA	
CA5710001	City of Davis	L	12	Sampling Station 4	MX	SS012	Sampling Station 022	DS	12/12/2018	A8K0304-04	HAA9	6.635	10.7	SEH4	AM	9	CA	
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	3/14/2018	A8B2314-05	HAA5		3.86	SEH1	AM	9	CA	
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	6/13/2018	A8E3202-05	HAA5		4.8	SEH2	AM	9	CA	
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	9/12/2018	A8H1579-05	HAA5		4.5	SEH3	AM	9	CA	
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	12/12/2018	A8K0304-05	HAA5	4.7825	5.97	SEH4	AM	9	CA	
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	3/14/2018	A8B2314-05	HAA6Br		4.25	SEH1	AM	9	CA	
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	6/13/2018	A8E3202-05	HAA6Br		4.16	SEH2	AM	9	CA	
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	9/12/2018	A8H1579-05	HAA6Br		4.82	SEH3	AM	9	CA	

CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	12/12/2018	A8K0304-05	HAA6Br	4.725	5.67	SEH4	AM	9	CA
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	3/14/2018	A8B2314-05	HAA9		7.35	SEH1	AM	9	CA
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	6/13/2018	A8E3202-05	HAA9		7.96	SEH2	AM	9	CA
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	9/12/2018	A8H1579-05	HAA9		8.22	SEH3	AM	9	CA
CA5710001	City of Davis	L	13	Sampling Station 5	MX	SS005	Sampling Station 024	DS	12/12/2018	A8K0304-05	HAA9	8.55	10.67	SEH4	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	3/14/2018	A8B2314-06	HAA5		2.7	SEH1	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	6/13/2018	A8E3202-06	HAA5		5.39	SEH2	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	9/12/2018	A8H1579-06	HAA5		5.1	SEH3	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	12/12/2018	A8K0304-06	HAA5	4.7225	5.7	SEH4	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	3/14/2018	A8B2314-06	HAA6Br		3.36	SEH1	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	6/13/2018	A8E3202-06	HAA6Br		4.72	SEH2	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	9/12/2018	A8H1579-06	HAA6Br		5.13	SEH3	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	12/12/2018	A8K0304-06	HAA6Br	4.725	5.69	SEH4	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	3/14/2018	A8B2314-06	HAA9		5.38	SEH1	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	6/13/2018	A8E3202-06	HAA9		9.32	SEH2	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	9/12/2018	A8H1579-06	HAA9		9.13	SEH3	AM	9	CA
CA5710001	City of Davis	L	14	Sampling Station 6	MX	SS006	Sampling Station 026	DS	12/12/2018	A8K0304-06	HAA9	8.555	10.39	SEH4	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	3/14/2018	A8B2314-07	HAA5		3.44	SEH1	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	6/13/2018	A8E3202-07	HAA5		5.3	SEH2	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	9/12/2018	A8H1579-07	HAA5		6.3	SEH3	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	12/12/2018	A8K0304-07	HAA5	5.535	7.1	SEH4	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	3/14/2018	A8B2314-07	HAA6Br		4.11	SEH1	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	6/13/2018	A8E3202-07	HAA6Br		5.69	SEH2	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	9/12/2018	A8H1579-07	HAA6Br		6.32	SEH3	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	12/12/2018	A8K0304-07	HAA6Br	5.755	6.9	SEH4	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	3/14/2018	A8B2314-07	HAA9		6.81	SEH1	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	6/13/2018	A8E3202-07	HAA9		9.69	SEH2	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	9/12/2018	A8H1579-07	HAA9		11.12	SEH3	AM	9	CA
CA5710001	City of Davis	L	15	Sampling Station 7	MX	SS007	Sampling Station 027	DS	12/12/2018	A8K0304-07	HAA9	10.055	12.6	SEH4	AM	9	CA

PWSID	PWSName	Size	FacilityID	FacilityNar	FacilityWa	SamplePoi	SamplePoi	SamplePoi	CollectionDate	SampleID	Contaminant	MRL	AnalyticalF	SampleEve	Monitoring
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	5/9/2019	A9D1381-01	anatoxin-a	0.03	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	5/9/2019	A9D1381-01	cylindrospermopsin	0.09	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	5/9/2019	A9D1381-01	total microcystin	0.3	EPA 546	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	5/21/2019	A9D1383-01	anatoxin-a	0.03	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	5/21/2019	A9D1383-01	cylindrospermopsin	0.09	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	5/21/2019	A9D1383-01	total microcystin	0.3	EPA 546	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	6/4/2019	A9E0527-01	anatoxin-a	0.03	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	6/4/2019	A9E0527-01	cylindrospermopsin	0.09	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	6/4/2019	A9E0527-01	total microcystin	0.3	EPA 546	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	6/17/2019	A9E0530-01	anatoxin-a	0.03	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	6/17/2019	A9E0530-01	cylindrospermopsin	0.09	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	6/17/2019	A9E0530-01	total microcystin	0.3	EPA 546	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	7/6/2019	A9F1194-01	anatoxin-a	0.03	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	7/6/2019	A9F1194-01	cylindrospermopsin	0.09	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	7/6/2019	A9F1194-01	total microcystin	0.3	EPA 546	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	7/16/2019	A9F1195-01	anatoxin-a	0.03	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	7/16/2019	A9F1195-01	cylindrospermopsin	0.09	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	7/16/2019	A9F1195-01	total microcystin	0.3	EPA 546	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	8/1/2019	A9G0752-01	anatoxin-a	0.03	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	8/1/2019	A9G0752-01	cylindrospermopsin	0.09	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	8/1/2019	A9G0752-01	total microcystin	0.3	EPA 546	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	8/13/2019	A9G0753-01	anatoxin-a	0.03	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	8/13/2019	A9G0753-01	cylindrospermopsin	0.09	EPA 545	<	
CA5710009	University of California - Davis	L	90027	WDCWA	SW	5.71E+09	WDCWA	EP	8/13/2019	A9G0753-01	total microcystin	0.3	EPA 546	<	

PWSID	PWSName	Size	FacilityID	FacilityNan	FacilityWat	SamplePoi	SamplePoi	SamplePoi	CollectionDate	SampleID	Contaminant	MRL	MethodID	AnalyticalR	AnalyticalR
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	3/13/2018	A8B2309-02	HAA5		EPA 552.3	=	2.27
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	6/12/2018	A8E1956-02	HAA5		EPA 552.3	=	0
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	9/11/2018	A8H1778-02	HAA5		EPA 552.3	=	0
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	12/11/2018	A8K0300-02	HAA5		EPA 552.3	=	10.73
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	3/13/2018	A8B2309-02	HAA6Br		EPA 552.3	=	1.4
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	6/12/2018	A8E1956-02	HAA6Br		EPA 552.3	=	0
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	9/11/2018	A8H1778-02	HAA6Br		EPA 552.3	=	0
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	12/11/2018	A8K0300-02	HAA6Br		EPA 552.3	=	8.13
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	3/13/2018	A8B2309-02	HAA9		EPA 552.3	=	3.1
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	6/12/2018	A8E1956-02	HAA9		EPA 552.3	=	0
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	9/11/2018	A8H1778-02	HAA9		EPA 552.3	=	0
CA5710009	University of California - Davis	L	91027	Distributio	MX	5.71E+09	Site 20R (IT	DS	12/11/2018	A8K0300-02	HAA9		EPA 552.3	=	16.73

PWSID	PWSName	Size	FacilityID	FacilityNan	FacilityWat	SamplePoi	SamplePoi	SamplePoi	CollectionDate	SampleID	Contaminant	MRL	MethodID	AnalyticalR	AnalyticalR
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	3/13/2018	A8B2309-01	HAA5		EPA 552.3	=	6.07
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	6/12/2018	A8E1956-01	HAA5		EPA 552.3	=	2.22
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	9/11/2018	A8H1778-01	HAA5		EPA 552.3	=	2.02
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	12/11/2018	A8K0300-01	HAA5		EPA 552.3	=	9.8
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	3/13/2018	A8B2309-01	HAA6Br		EPA 552.3	=	5.36
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	6/12/2018	A8E1956-01	HAA6Br		EPA 552.3	=	2.66
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	9/11/2018	A8H1778-01	HAA6Br		EPA 552.3	=	1.95
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	12/11/2018	A8K0300-01	HAA6Br		EPA 552.3	=	7.6
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	3/13/2018	A8B2309-01	HAA9		EPA 552.3	=	10.56
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	6/12/2018	A8E1956-01	HAA9		EPA 552.3	=	4.12
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	9/11/2018	A8H1778-01	HAA9		EPA 552.3	=	3.4
CA5710009	University of California - Davis	L	90127	Distributio	MX	5.71E+09	Site 2R (Po	DS	12/11/2018	A8K0300-01	HAA9		EPA 552.3	=	16.2

City of West Sacramento

George Kristoff Water Treatment Plant

	E. coli Data	
	Combined	
QT	1/8/2015	32.3
	1/14/2015	14.6
	1/22/2015	14.5
	1/29/2015	6.3
	2/20/2015	40.8
	2/26/2015	18.9
	3/5/2015	2
	3/12/2015	7.4
	3/26/2015	5.2
	4/2/2015	4.1
	4/9/2015	30.9
	4/25/2015	3.1
	5/7/2015	6.3
	5/20/2015	7.3
	5/28/2015	3.1
	6/4/2015	3.1
	6/10/2015	6.2
	7/16/2015	12.2
	7/23/2015	2
	8/27/2015	4.1
	9/10/2015	14.6
	9/24/2015	4.1
LT2	10/6/2015	**0**
	11/3/2015	**5.3**
	12/8/2015	**7.5**
	1/5/2016	**8.7**
	2/2/2016	**325.5**
	3/1/2016	**6.4**
	4/5/2016	**8.7**
	5/3/2016	**2**
	6/7/2016	**28.5**
	7/5/2016	**7.4**
	8/2/2016	**5.2**
	9/6/2016	**5.2**
	10/4/2016	**4.1**
	11/1/2016	**49.6**
	12/8/2016	**15.8**
	1/3/2017	**12.2**
	2/7/2017	**5.2**
Coliert	3/3/2017	13.4
	3/4/2017	22
	3/8/2017	102.2
	3/15/2017	6.3

3/22/2017	146.7
3/29/2017	61.3
4/5/2017	20.7
4/12/2017	71.7
4/19/2017	24.1
4/26/2017	4.1
5/3/2017	7.4
5/10/2017	13.5
5/17/2017	20.1
5/24/2017	10.9
5/31/2017	11
6/7/2017	3.1
6/14/2017	9.7
6/21/2017	7.4
6/28/2017	2
7/5/2017	0
7/12/2017	0
7/19/2017	1
7/26/2017	2
8/2/2017	7.4
8/9/2017	6.3
8/16/2017	3.1
8/23/2017	1
8/30/2017	2
9/6/2017	7.3
9/13/2017	8.5
9/20/2017	13.7
9/27/2017	4.1
10/4/2017	4.1
10/11/2017	3.1
10/18/2017	1
10/25/2017	0
11/1/2017	2
11/8/2017	22.8
11/15/2017	6.3
11/22/2017	47.3
11/29/2017	54.5
12/6/2017	24.1
12/13/2017	4.1
12/20/2017	4.1
12/27/2017	23.1
1/3/2018	5.2
1/10/2018	579.4
1/17/2018	44.9
1/24/2018	65.7
1/31/2018	27.3
2/7/2018	7.3

2/14/2018	3.1
2/21/2018	9.8
2/28/2018	4.1
3/7/2018	7.3
3/14/2018	9.8
3/21/2018	32.4
3/28/2018	23.1
4/4/2018	10.8
4/11/2018	178.9
4/18/2018	6
4/25/2018	3.1
5/2/2018	27.4
5/9/2018	5.2
5/16/2018	6.3
5/23/2018	1
6/6/2018	4.1
6/13/2018	8.4
6/20/2018	2
6/27/2018	2
7/4/2018	0
7/11/2018	5.2
7/19/2018	2
7/26/2018	4.1
8/1/2018	7.4
8/8/2018	11
8/15/2018	6.3
8/22/2018	7.4
8/29/2018	5.2
9/5/2018	8.5
9/12/2018	4.1
9/19/2018	1
9/28/2018	4.1
10/10/2018	7.4
10/17/2018	1
10/24/2018	2
10/31/2018	3.1
11/7/2018	0
11/14/2018	4.1
11/21/2018	7.3
11/28/2018	12
12/5/2018	36.8
12/12/2018	7.5
12/19/2018	178.5
12/26/2018	21.3
1/2/2019	9.5
1/9/2019	396.8
1/16/2019	18.7

1/23/2019	28.8
1/30/2019	8.5
2/6/2019	104.3
2/13/2019	0
2/20/2019	77.6
2/27/2019	547.5
3/7/2019	85.7
3/12/2019	20.1
3/20/2019	2
3/27/2019	104.6
4/3/2019	23.5
4/10/2019	33.3
4/17/2019	4.1
4/24/2019	9.8
5/1/2019	3.1
5/8/2019	3
5/15/2019	3.1
5/22/2019	24.1
5/29/2019	45.7
6/5/2019	13.4
6/12/2019	4.1
6/19/2019	1
6/26/2019	
7/3/2019	2
7/10/2019	2
7/17/2019	2
7/24/2019	1
7/31/2019	0
8/7/2019	6.3
8/14/2019	28.8
8/21/2019	3.1
9/4/2019	2
9/11/2019	1
9/18/2019	5.2
9/25/2019	6.3
10/2/2019	6.3
10/9/2019	1
10/16/2019	0
10/23/2019	2
10/30/2019	2
11/6/2019	0
11/13/2019	4.1
11/20/2019	3.1
11/27/2019	5.2
12/4/2019	112.4
12/11/2019	240
12/18/2019	17.5

12/25/2019

min	0
max	579.4
average	27.31366
median	6.3
95thpercentile	104.57

George Kristoff Water Treatment Plant

LT2 Monitoring program , October 2015 - September 2017											
Date	*Sacramento River, Sample ID*	*Sample Volume examined, Liter*	*Giardia cysts, per Liter*	*Crypto oocysts, per Liter*	*Turbidity, NTU*	*Total Coliform*	*Fecal*	*E. Coli*	*Units*	*Method*	*Prep.*
10/6/2015	Raw Water	11.25	0	0	4.1	**>200.5**	**--**	**<1.0**	MPN/100ml	SM 9223B	Qtray 2000 18
11/3/2015	Raw Water	10.25	1	0	5.6	**>200.5**	**--**	**5.3**	MPN/100ml	SM 9223B	Qtray 2000 18
12/8/2015	Raw Water	10.50	0	0	4.2	**>200.5**	**--**	**7.5**	MPN/100ml	SM 9223B	Qtray 2000 18
1/5/2016	Raw Water	10.75	0	0	7.2	**>200.5**	**--**	**8.7**	MPN/100ml	SM 9223B	Qtray 2000 18
2/2/2016	Raw Water	11.00	0	0	116.0	**>2419.2**	**--**	**325.5**	MPN/100ml	SM 9223B	Qtray 2000 18
3/1/2016	Raw Water	11.00	0	0	8.4	**>200.5**	**--**	**6.4**	MPN/100ml	SM 9223B	Qtray 2000 18
4/5/2016	Raw Water	11.00	0	0	18.0	**>200.5**	**--**	**8.7**	MPN/100ml	SM 9223B	Qtray 2000 18
5/3/2016	Raw Water	11.25	0	0	5.5	**613.1**	**--**	**2**	MPN/100ml	SM 9223B	Qtray 2000 18
6/7/2016	Raw Water	11.50	0	0	4.1	**>2419.2**	**--**	**28.5**	MPN/100ml	SM 9223B	Qtray 2000 18
7/5/2016	Raw Water	11.00	0	0	4.8	**1553.1**	**--**	**7.4**	MPN/100ml	SM 9223B	Qtray 2000 18
8/2/2016	Raw Water	10.75	0	0	4.3	**>2419.2**	**--**	**5.2**	MPN/100ml	SM 9223B	Qtray 2000 18
9/6/2016	Raw Water	8.10	0	0	8.5	**2419.6**	**--**	**5.2**	MPN/100ml	SM 9223B	Qtray 2000 18
10/4/2016	Raw Water	11.00	1	0	4.5	**770.1**	**--**	**4.1**	MPN/100ml	SM 9223B	Qtray 2000 18
11/1/2016	Raw Water	11.00	0	0	9.3	**2419.6**	**--**	**49.6**	MPN/100ml	SM 9223B	Qtray 2000 18
12/8/2016	Raw Water	11.25	0	0	8.6	**866.4**	**--**	**15.8**	MPN/100ml	SM 9223B	Qtray 2000 18
1/3/2017	Raw Water	11.25	2	0	16.2	**1986.3**	**--**	**12.2**	MPN/100ml	SM 9223B	Qtray 2000 18
2/7/2017	Raw Water	11.00	0	0	19.8	**866.4**	--	**5.2**	MPN/100ml	SM 9223B	Qtray 2000 18
3/7/2017	Raw Water	10.75	0	0	44.3	**1119.9**	--	**10.9**	MPN/100ml	SM 9223B	Qtray 2000 18
4/4/2017	Raw Water	10.75	0	0	25.5	**980.4**	--	**9.8**	MPN/100ml	SM 9223B	Qtray 2000 18
5/2/2017	Raw Water	11.25	- *	0	65.5	**1986.3**	--	**13**	MPN/100ml	SM 9223B	Qtray 2000 18
6/6/2017	Raw Water	11.25	0	0	9.7	**1732.9**	--	**6.3**	MPN/100ml	SM 9223B	Qtray 2000 18
7/11/2017	Raw Water	10.75	0	0	7.6	**2419.6**	--	**7.5**	MPN/100ml	SM 9223B	Qtray 2000 18
8/8/2017	Raw Water	10.75	0	0	6.8	**1046.2**	--	**5.2**	MPN/100ml	SM 9223B	Qtray 2000 18
9/5/2017	Raw Water	10.75	0	0	11.0	**> 2419.6**	--	**16**	MPN/100ml	SM 9223B	Qtray 2000 18

Note
* sample was damaged at FGL Lab

	Source water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated water TOC (mg/L)
1/3/2015	83	1.6	1.2
2/4/2015	88	2.0	1.4
3/13/2015	85	1.1	1.0
4/14/2015	73	1.7	1.2
5/12/2015	54	1.5	1.2
6/17/2015	57	1.6	1.2
7/1/2015	50	1.6	1.3
8/4/2015	58	1.5	1.2
9/14/2015	64	1.5	1.2
10/6/2015	60	1.3	0.9
11/3/2015	58	0.7	0.5
12/8/2015	65	1.7	1.2
1/5/2016	68	1.4	0.8
2/2/2016	53	4.2	1.4
3/1/2016	62	2.1	0.9
4/5/2016	58	1.5	0.5
5/3/2016	55	1.9	1.2
6/7/2016	54	2.3	1.4
7/5/2016	46	2.0	1.3
8/2/2016	51	1.9	1.1
9/6/2016	71	2.0	1.3
10/4/2016	60	1.7	1.2
11/1/2016	55	3.6	1.8
12/8/2016	75	2.7	1.6
1/3/2017	53	2.2	1.3
2/7/2017	36	1.9	1.0
3/7/2017	52	2	1.1
4/4/2017	48	1.9	1.2
5/2/2017	48	2.2	1.1

6/6/2017	45	1.8	1.2
7/12/2017	68	1.7	1.2
8/9/2017	55	1.6	1.2
9/17/2017	67	1.8	1.2
10/4/2017	44	1.4	1.2
11/8/2017	59	2.6	1.7
12/6/2017	71	2.8	1.5
1/10/2018	50	2.1	1.1
2/7/2018	89	2.4	1.4
3/7/2018	68	2.2	1.4
4/4/2018	57	2.6	1.1
5/2/2018	65	1.5	1.0
6/6/2018	68	2.0	1.4
7/18/2018	61	1.6	1.2
8/8/2018	69	1.5	1.1
9/5/2018	67	1.5	0.9
10/3/2018	55	1.1	0.9
11/14/2018	72	0.9	1.9
12/5/2018	79	4.7	2.2
1/9/2019	60	2.8	1.2
2/6/2019	50	4.4	1.8
3/7/2019	47	3.7	1.5
4/10/2019	52	1.6	0.8
5/8/2019	48	1.4	1.1
6/12/2019	28	1.4	1.0
7/10/2019	58	1.5	1.3
8/7/2019	54	1.5	1.2
9/11/2019	48	1.5	1.2
10/9/2019	50	1.3	1.0
11/6/2019	56	1.5	1.1
12/11/2019	55	4.7	2.4

min	28.0	0.7	0.5
max	89.0	4.7	2.4
average	59.3	2.0	1.2
median	57.5	1.7	1.2
95th percentile	83.1	4.21	1.805

Quarterly results for Aluminun Iron and Manganese

			7/1/15	10/6/15	12/8/15
Manganese Raw water, total ICAP/MS water	ppb			17.00	20.00
Manganese Treated water, Total ICAP/MS water	ppb			0.772	ND
Total Recoverable Aluminum, Raw water	ppb		60	316	
Total Recoverable Aluminum, Treated water	ppb			50	
Total Recoverable Iron, Raw water	ppb		140	260.00	
Total Recoverable Iron, Treated water	ppb			ND	

		1/5/16	2/6/16	3/1/16	4/5/16	5/3/16	6/7/16	7/5/16	8/2/16	9/6/16	10/4/16	11/1/16	12/8/16
Manganese Raw water, total ICAP/MS water	ppb	15.1	116.0	13.1	31.6	30.0	20.0	14.7	20.0	ND	11.6	20.0	20.0
Manganese Treated water, Total ICAP/MS water	ppb	0.6	4.3	1.2	2.2	ND	ND	148.0	ND	ND	0.9	ND	ND
Total Recoverable Aluminum, Raw water	ppb	190.0			250.0			100.0			100.0		
Total Recoverable Aluminum, Treated water	ppb	10.0			20.0			100.0			40.0		
Total Recoverable Iron, Raw water	ppb	210.0			490.0			190.0			140.0		
Total Recoverable Iron, Treated water	ppb	60.0			ND			30.0			ND		

		1/10/17	2/7/17	3/7/17	4/4/17	5/2/17	6/6/17	7/12/17	8/9/17	9/5/17	10/5/17	11/8/17	12/7/17
Manganese Raw water, total ICAP/MS water	ppb	22.8	20.0	50.0	52.7	190.0	20.0	17.0	53.0	68.0	14.0	36.0	40.0
Manganese Treated water, Total ICAP/MS water	ppb	1.4	ND	ND	1.3	ND	ND	ND	ND	ND	ND	ND	ND
Total Recoverable Aluminum, Raw water	ppb	100.0			930.0			240.0			350.0		
Total Recoverable Aluminum, Treated water	ppb	20.0			20.0			78.0			50.0		
Total Recoverable Iron, Raw water	mg/L	0.3			1.5			0.4			0.7		
Total Recoverable Iron, Treated water	mg/L	ND			ND			ND			ND		

		1/10/18	2/8/18	3/7/18	4/4/18	5/2/18	6/6/18	7/11/18	8/8/18	9/5/18	10/3/18	11/7/18	12/5/18
Manganese Raw water, total ICAP/MS water	ppb	27.0	52.0	30.0	88.0	46.0	26.0	13.7	36.8	35.7	16.0	15.5	53.8
Manganese Treated water, Total ICAP/MS water	ppb	ND	3.4	ND	ND	ND	ND	0.5	ND	ND	ND	ND	ND
Total Recoverable Aluminum, Raw water	ppb	1900.0			960.0			255.9			61.6		
Total Recoverable Aluminum, Treated water	ppb	20.0			22.0			42.8			35.4		
Total Recoverable Iron, Raw water	mg/L	2.8			1.5			0.3			0.3		
Total Recoverable Iron, Treated water	mg/L	ND			ND			ND			ND		

		1/9/19	2/6/19	3/6/19	4/10/19	5/8/19	6/12/19	7/10/19	8/7/19	9/11/19	10/9/19	11/6/19	12/11/19
Manganese Raw water, total ICAP/MS water	mg/L	0.095	0.120	0.082	0.048	0.044	0.047	0.023	0.034	0.028	0.018	0.014	0.130
Manganese Treated water, Total ICAP/MS water	mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Recoverable Aluminum, Raw water	mg/L	0.3			0.9			0.3			0.3		
Total Recoverable Aluminum, Treated water	mg/L	ND			ND			0.1			ND		
Total Recoverable Iron, Raw water	mg/L	3.7			1.1			0.4			0.4		
Total Recoverable Iron, Treated water	mg/L	0.1			ND			ND			ND		

State of California | **Stage 2 DBPR** | Department of Health Services

Drinking Water Program

Quarterly TTHM Report for Disinfection Byproducts Compliance (in µg/L or ppb)

System Name: City of West Sacramento 2016 Quarter: 1 st

Year:	2015				2016				2017				2018				2019			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):	1/6	4/8	7/1	10/5	1/4	4/5	7/5	10/4	1/3	4/4	7/12	10/4	1/3	5/11	7/11	10/3	1/9	4/10	7/10	10/9
DBP1 - PSIP Water Storage Reservoir	47.0	54.0	82.8	54.3	45.7	21.8	62.0	59.3	39.1	54.4	50.0	52.0	28.0	55.0	49.0	46.0	44.0	47.0	58.0	48.0
DBP2 - Central Water Storage Reservoir	41.0	45.0	79.9	40.4	29.1	24.0	44.8	45.1	36.7	47.8	50.0	54.0	25.0	48.0	60.0	38.0	36.0	43.0	61.0	46.0
DBP3 - Golden Gate Sample Tap	51.0	57.0	76.8	43.6	52.5	24.3	44.6	41.1	41.6	50.5	44.0	36.0	27.0	46.0	40.0	42.0	44.0	52.0	50.0	41.0
DBP4 - Bridgeway Lakes Storage Reservoir	62.0	62.0	90.1	50.9	83.7	23.3	66.9	64.6	55.6	55.0	55.0	50.0	39.0	55.0	67.0	44.0	60.0	68.0	69.0	60.0
DBP5 - 3081 Mareca Way	40.0	43.0	66.8	35.0	28.1	27.0	39.2	36.8	39.8	43.3	42.0	38.0	26.0	41.0	40.0	31.0	37.0	55.0	54.0	41.0
DBP6 - 2100 Manchester Road	38.0	41.0	104.0	37.0	18.2	22.5	41.7	41.0	30.9	42.6	44.0	80.0	26.0	37.0	35.0	31.0	33.0	44.0	52.0	42.0
DBP7 - 1494 Redding Road	39.0	46.0	68.3	36.6	18.1	26.9	48.3	41.5	33.7	41.2	42.0	38.0	27.0	49.0	52.0	31.0	32.0	53.0	53.0	43.0
DBP3 - Northeast Water Storage Reservoir	37.0	43.0	76.7	41.1	25.9	24.3	65.2	47.1	34.0	39.7	46.0	40.0	24.0	36.0	58.0	37.0	38.0	48.0	56.0	39.0

State of California **Stage 2 DBPR** Department of Health Services

Drinking Water Program

Quarterly HAA5 Report for Disinfection Byproducts Compliance (in µg/L or ppb)

System Name: City of West Sacramento Quarter: ________

Year:	2015				2016				2017				2018				2019			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):	1/6	4/8	7/1	10/5	1/4	4/5	7/5	10/4	1/3	4/4	7/12	10/4	1/10	4/4	7/11	10/3	1/9	4/10	7/10	10/9
DBP1 - PSIP Water Storage Reservoir	40.0	33.0	38.0	33.0	33.0	19.0	36.0	26.0	28.0	23.0	20.0	21.0	12.0	31.0	20.0	19.0	18.0	25.0	31.0	23.0
DBP2 - Central Water Storage Reservoir	34.0	31.0	31.0	31.0	19.0	17.0	36.0	23.0	23.0	22.0	24.0	21.0	10.0	25.0	22.0	18.0	16.0	25.0	30.0	22.0
DBP3 - Golden Gate Sample Tap	47.0	34.0	30.0	35.0	39.0	19.0	39.0	23.0	35.0	23.0	16.0	18.0	13.0	31.0	13.0	18.0	20.0	27.0	25.0	16.0
DBP4 - Bridgeway Lakes Storage Reservoir	61.0	39.0	34.0	40.0	58.0	21.0	41.0	33.0	41.0	23.0	24.0	22.0	21.0	38.0	26.0	20.0	32.0	40.0	33.0	30.0
DBP5 - 3081 Mareca Way	34.0	28.0	35.0	27.0	20.0	20.0	36.0	23.0	26.0	25.0	16.0	18.0	12.0	20.0	14.0	15.0	15.0	26.0	24.0	16.0
DBP6 - 2100 Manchester Road	29.0	27.0	30.0	28.0	12.0	16.0	38.0	22.0	19.0	24.0	16.0	29.0	11.0	21.0	13.0	15.0	12.0	20.9	25.0	21.0
DBP7 - 1494 Redding Road	30.0	24.0	28.0	30.0	13.0	19.0	37.0	20.0	23.0	25.0	16.0	20.0	11.0	25.0	14.0	16.0	17.0	28.0	27.0	18.0
DBP3 - Northeast Water Storage Reservoir	31.0	31.0	29.0	30.0	21.0	13.0	38.0	24.0	23.0	22.0	18.0	18.0	10.0	24.0	20.0	17.0	17.0	23.0	27.0	21.0

CITY OF SACRAMENTO
UTILITIES Department, WATER QUALITY LABORATORY

2015 RICE HERBICIDE ANALYSIS

SRR-SACRAMENTO RIVER WTP INTAKE
WSR-BRYTE BEND WTP INTAKE

DATE	Thiobencarb WSR UG/L	Thiobencarb SRR UG/L	% SACTO. RIVER AT SRR INTAKE
22-Apr-15	<0.1	<0.1	100
29-Apr-15	<0.1	<0.1	74.0
6-May-15	<0.1	<0.1	70.0
13-May-15	<0.1	<0.1	73.1
14-May-15	<0.1	<0.1	76.6
19-May-15	<0.1	NA	78.8
20-May-15	<0.1	<0.1	100
21-May-15	<0.1	<0.1	88.6
5/25/2015[a]	<0.1	<0.1	84.7
26-May-15	<0.1	<0.1	75.5
27-May-15	0.1	<0.1	76.6
28-May-15	<0.1	<0.1	77.9
2-Jun-15	<0.1	<0.1	77.9
3-Jun-15	<0.1	<0.1	81.9
4-Jun-15	<0.1	<0.1	86.3
10-Jun-15	<0.1	<0.1	67.8
11-Jun-15	<0.1	<0.1	96.2
17-Jun-15	<0.1	<0.1	48.8
18-Jun-15	<0.1	<0.1	28.8
24-Jun-15	<0.1	<0.1	79.1
1-Jul-15	<0.1	<0.1	77.4

[a] WSR Sample taken at Crawdad's
All Samples are analyzed by BSK.

DATE	Thiobencarb WSR UG/L	Thiobencarb SRR UG/L	% SACTO. RIVER AT SRR INTAKE
20-Apr-16	<0.1	<0.1	61.5
27-Apr-16	<0.1	<0.1	65.2
4-May-16	<0.1	<0.1	67.0
11-May-16	0.039	0.030	74.8
12-May-16	0.039	0.026	75.8
17-May-16	0.031	NA	NA
18-May-16	0.053	0.015	75.0
19-May-16	0.028	0.017	77.4
24-May-16	0.022	0.014	56.6
25-May-16	0.041	0.025	64.8
26-May-16	0.093	0.058	65.6
30-May-16	0.026	0.029	78.9
31-May-16	0.048	0.032	77.8
1-Jun-16	0.10	0.12	83.2
2-Jun-16	0.13	0.11	77.3
7-Jun-16	0.051	0.032	80.3
8-Jun-16	0.052	0.025	80.4
9-Jun-16	0.058	0.018	79.0
15-Jun-16	0.012	<0.1	71.1
16-Jun-16	0.010	<0.1	60.1
22-Jun-16	0.018	<0.1	66.1

CITY OF SACRAMENTO
UTILITIES Department, WATER QUALITY LABORATORY

2017 RICE HERBICIDE ANALYSIS

SRR-SACRAMENTO RIVER WTP INTAKE
WSR-BRYTE BEND WTP INTAKE

DATE	Thiobencarb WSR UG/L	Thiobencarb SRR UG/L	% SACTO. RIVER AT SRR INTAKE
3-May-17	<0.1	<0.1	98.2
10-May-17	<0.1	<0.1	78.4
17-May-17	<0.1	<0.1	70.6
18-May-17	<0.1	<0.1	65.9
23-May-17	<0.1	<0.1	56.9
24-May-17	<0.1	<0.1	54.5
25-May-17	<0.1	<0.1	56.2
29-May-17	<0.1	<0.1	64.5
30-May-17	<0.1	<0.1	67.0
31-May-17	<0.1	<0.1	63.4
1-Jun-17	<0.1	<0.1	64.7
5-Jun-17	<0.1	*	NA
6-Jun-17	<0.1	<0.1	54.7
7-Jun-17	<0.1	<0.1	56.4
8-Jun-17	<0.1	<0.1	53.4
13-Jun-17	<0.1	**	77.2
14-Jun-17	<0.1	<0.1	62.6
15-Jun-17	<0.1	<0.1	62.6
21-Jun-17	<0.1	<0.1	88.9
22-Jun-17	<0.1	<0.1	89.9
28-Jun-17	<0.1	<0.1	87.8
29-Jun-17	<0.1	<0.1	86.5
3-Jul-17	<0.1	<0.1	80.2

* No sample taken
** Residual chlorine present, did not analyze.

2018 RICE HERBICIDE ANALYSIS

SRR-SACRAMENTO RIVER WTP INTAKE
WSR-GEORGE KRISTOFF (BRYTE BEND) WTP INTAKE

DATE	Thiobencarb WSR UG/L	Thiobencarb SRR UG/L	% SACTO. RIVER AT SRR INTAKE
18-Apr-18	<0.2	<0.2	58.2
25-Apr-18	<0.2	<0.2	70.9
2-May-18	<0.2	<0.2	77.0
9-May-18	<0.2[a,b]	<0.2[a,b]	79.6
10-May-18	<0.2	<0.2	88.1
15-May-18	<0.2	<0.2	87.3
16-May-18	<0.2	<0.2	87.3
17-May-18	<0.2	<0.2	75.0
22-May-18	<0.2	<0.2	86.2
23-May-18	<0.2	<0.2	78.5
24-May-18	<0.2	<0.2	82.5
28-May-18	<0.2	<0.2	84.4
29-May-18	<0.2	<0.2	74.8
30-May-18	<0.2	<0.2	87.5
31-May-18	<0.2	<0.2	88.8
4-Jun-18	<0.2	<0.2	78.8
5-Jun-18	<0.2	<0.2	90.8
6-Jun-18	<0.2	<0.2	86.8
7-Jun-18	<0.2	<0.2	85.8
13-Jun-18	<0.2[c]	<0.2[c]	87.0
14-Jun-18	<0.2[c]	<0.2[c]	82.5
20-Jun-18	<0.2	<0.2	85.5
21-Jun-18	<0.2[c]	<0.2[c]	88.6
27-Jun-18	<0.2[c]	<0.2[c]	83.5
28-Jun-18	<0.2[c]	<0.2[c,d]	82.0
3-Jul-18	<0.2	<0.2	74.2

[a] Concentration estimated.
[b] Sample was reanalyzed on 6/11/18 and was out of holding time. Recoveries of LCSDs are out of the top control limit.
[c] Sample was analyzed outside of holding time. Waiting for contract lab to verify.
[d] Concentration estimated. Internal standard recoveries did not meet method acceptance criteria.

2019 RICE HERBICIDE ANALYSIS

SRR-SACRAMENTO RIVER WTP INTAKE
WSR-GEORGE KRISTOFF (BRYTE BEND) WTP INTAKE

DATE	Thiobencarb WSR, μg/L	Thiobencarb SRR, μg/L	% SACTO. RIVER AT SRR INTAKE
1-May-19	<0.2	<0.2	64.2
8-May-19	<0.2	<0.2	53.8
9-May-19	<0.2	<0.2	48.6
14-May-19	<0.2[N1]	<0.2	52.9
15-May-19	<0.2	<0.2	51.8
16-May-19	<0.2	<0.2	56.5
21-May-19	<0.2	<0.2	46.2
22-May-19	<0.2	<0.2	50.1
23-May-19	<0.2	<0.2	32.1
27-May-19	0.13[J]	<0.2	53.3
28-May-19	0.095[J]	<0.2	57.4
29-May-19	0.052[J]	0.085[J]	61.9
30-May-19	0.100[J]	0.057[J]	58.3
4-Jun-19	<0.2	<0.2	64.9
5-Jun-19	<0.2	<0.2	55.9
6-Jun-19	<0.2 [D1]	<0.2	61.1
11-Jun-19	<0.2	<0.2	49.2
12-Jun-19	<0.2	<0.2	51.0
13-Jun-19	<0.2	<0.2	56.7
19-Jun-19	<0.2	<0.2	77.6
20-Jun-19	<0.2	<0.2	78.4
26-Jun-09	<0.2	<0.2	73.8
27-Jun-19	<0.2	<0.2	73.1
2-Jul-19	<0.2	<0.2	74.8
9-Jul-19	<0.2*	<0.2	*
16-Jul-19	<0.2	<0.2	75.9

J= Analyte detected at or greater than the MDL and less than the MRL
D1 = Sample required dilution due to matrix
N1 = Sample was filtred prior to analysis.
*West Sacramento was inadvertently not collected on 07/09/2019 and was collected on 07/10/2019 instead. Unable to perform % SRWTP calculation due to lack of paired upstream conductivity samples.

750 Royal Oaks Drive, Suite 100
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Tel: (626) 386-1100
Fax: (626) 386-1101
1 800 566 LABS (1 800 566 5227)

AT-1807

Laboratory Report

for

City of West Sacramento
400 North Harbor Blvd
West Sacramento, CA 95605
Attention: Ryan Radford
Fax: 916-373-9727

Date of Issue
11/06/2015

EUROFINS EATON ANALYTICAL

M5B: Magnolia Busse

Project Manager

ORELAP 4034

Report: 559334
Project: SPECIAL
Group: Algal Tox

* Accredited in accordance with TNI 2009 and ISO/IEC 17025:2005.
* Laboratory certifies that the test results meet all **TNI 2009 and ISO/IEC 17025:2005** requirements unless noted under the individual analysis.
* Following the cover page are State Certification List, ISO 17025 Accredited Method List, Acknowledgement of Samples Received, Comments, Hits Report, Data Report, QC Summary, QC Report and Regulatory Forms, as applicable.
* Test results relate only to the sample(s) tested.
* This report shall not be reproduced except in full, without the written approval of the laboratory.

eurofins | Eaton Analytical

STATE CERTIFICATION LIST

State	Certification Number	State	Certification Number
Alabama	41060	**Mississippi**	Certified
----------	--------	**Montana**	Cert 0035
Arizona	AZ0778	**Nebraska**	Certified
Arkansas	Certified	**Nevada**	CA00006-2015
California-Monrovia-ELAP	2813	**New Hampshire ***	2959
California-Colton- ELAP	2812	**New Jersey ***	CA 008
California-Folsom- ELAP	2820	**New Mexico**	Certified
California-Fresno- ELAP	2966	**New York ***	11320
Colorado	Certified	**North Carolina**	06701
Connecticut	PH-0107	**North Dakota**	R-009
Delaware	CA 006	**Oregon (Primary AB) ***	**ORELAP 4034**
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Hawaii	Certified	**South Dakota**	Certified
Idaho	Certified	**Tennessee**	TN02839
Illinois *	200033	**Texas ***	T104704230-14-7
Indiana	C-CA-01	**Utah ***	CA000062015-8
Kansas *	E-10268	**Vermont**	VT0114
Kentucky	90107	**Virginia ***	460260
Louisiana *	LA150018	**Washington**	C838
Maine	CA0006	**West Virginia**	9943 C
Maryland	224	**Wisconsin**	998316660
Commonwealth of Northern Marianas Is.	MP0004	**Wyoming**	8TMS-L
Massachusetts	M-CA006	**EPA Region 5**	Certified
Michigan	9906	**Los Angeles County Sanitation Districts**	10264

* NELAP/TNI Recognized Accreditation Bodies

ISO 17025 Accredited Method List

The tests listed below are accredited and meet the requirements of ISO 17025 as verified by the ANSI-ASQ National Accreditation Board/ANAB.

Refer to Certificate and scope of accreditation (AT 1807) found at: http://www.eatonanalytical.com

SPECIFIC TESTS	METHOD OR TECHNIQUE USED	Environ-mental (Drinking Water)	Environ-mental (Waste Water)	Water as a Component of Food and Bev/Bev/ Bottled Water
1,4-Dioxane	EPA 522	x		x
2,3,7,8-TCDD	Modified EPA 1613B	x		x
Acrylamide	In House Method (2440)	x		x
Alkalinity	SM 2320B	x	x	x
Ammonia	EPA 350.1		x	x
Ammonia	SM 4500-NH3 H		x	x
Anions and DBPs by IC	EPA 300.0	x	x	x
Anions and DBPs by IC	EPA 300.1	x		x
Asbestos	EPA 100.2	x	x	
Bicarbonate Alkalinity as HCO3	SM 2320B	x	x	x
BOD / CBOD	SM 5210B		x	x
Bromate	In House Method (2447)	x		x
Carbamates	EPA 531.2	x		x
Carbonate as CO3	SM 2330B	x	x	x
Carbonyls	EPA 556	x		x
COD	EPA 410.4 / SM 5220D		x	
Chloramines	SM 4500-CL G	x	x	x
Chlorinated Acids	EPA 515.4	x		x
Chlorinated Acids	EPA 555	x		x
Chlorine Dioxide	SM 4500-CLO2 D	x		x
Chlorine -Total/Free/ Combined Residua	SM 4500-Cl G	x	x	x
Conductivity	EPA 120.1		x	
Conductivity	SM 2510B	x	x	x
Corrosivity (Langelier Index)	SM 2330B	x		x
Cryptosporidium	EPA 1622, 1623	x		x
Cyanide, Amenable	SM 4500-CN G	x	x	
Cyanide, Free	SM 4500CN F	x	x	x
Cyanide, Total	EPA 335.4	x	x	x
Cyanogen Chloride (screen)	In House Method (2470)	x		x
Diquat and Paraquat	EPA 549.2	x		x
DBP/HAA	SM 6251B	x		x
Dissolved Oxygen	SM 4500-O G		x	x
DOC	SM 5310C	x		x
E. Coli	(MTF/EC+MUG)	x		x
E. Coli	CFR 141.21(f)(6)(i)	x		x
E. Coli	SM 9223		x	
E. Coli (Enumeration)	SM 9221B.1/ SM 9221F	x		x
E. Coli (Enumeration)	SM 9223B	x		x
EDB/DCBP	EPA 504.1	x		
EDB/DBCP and DBP	EPA 551.1	x		x
EDTA and NTA	In House Method (2454)	x		x
Endothall	EPA 548.1	x		x
Endothall	In-house Method (2445)	x		x
Enterococci	SM 9230B	x	x	
Fecal Coliform	SM 9221 E (MTF/EC)	x		
Fecal Coliform	SM 9221C, E (MTF/EC)		x	
Fecal Coliform (Enumeration)	SM 9221E (MTF/EC)	x		x
Fecal Coliform with Chlorine Present	SM 9221E		x	
Fecal Streptococci	SM 9230B	x	x	
Fluoride	SM 4500-F C	x	x	x
Giardia	EPA 1623	x		x
Glyphosate	EPA 547	x		x
Gross Alpha/Beta	EPA 900.0	x	x	x
Gross Alpha Coprecipitation	SM 7110 C	x	x	x
Hardness	SM 2340B	x	x	x
Heterotrophic Bacteria	In House Method (2439)	x		x
Heterotrophic Bacteria	SM 9215 B	x		x
Hexavalent Chromium	EPA 218.6	x	x	x

SPECIFIC TESTS	METHOD OR TECHNIQUE USED	Environ-mental (Drinking Water)	Environ-mental (Waste Water)	Water as a Component of Food and Bev/Bev/ Bottled Water
Hexavalent Chromium	EPA 218.7	x		x
Hexavalent Chromium	SM 3500-Cr B		x	
Hormones	EPA 539	x		x
Hydroxide as OH Calc.	SM 2330B	x		x
Kjeldahl Nitrogen	EPA 351.2		x	
Legionella	CDC Legionella	x		x
Mercury	EPA 245.1	x	x	x
Metals	EPA 200.7 / 200.8	x	x	x
Microcystin LR	ELISA (2360)	x		x
NDMA	EPA 521	x		x
Nitrate/Nitrite Nitrogen	EPA 353.2	x	x	x
OCL, Pesticides/PCB	EPA 505	x		x
Ortho Phosphate	EPA 365.1	x	x	x
Ortho Phosphate	SM 4500P E			x
Ortho Phosphorous	SM 4500P E	x		
Oxyhalides Disinfection Byproducts	EPA 317.0	x		x
Perchlorate	EPA 331.0	x		x
Perchlorate (low and high)	EPA 314.0	x		x
Perfluorinated Alkyl Acids	EPA 537	x		x
pH	EPA 150.1	x		
pH	SM 4500-H+B	x	x	x
Phenylurea Pesticides/ Herbicides	In House Method, based on EPA 532 (2448)	x		x
Pseudomonas	IDEXX Pseudalert (2461)	x		x
Radium-226	GA Institute of Tech	x		x
Radium-228	GA Institute of Tech	x		x
Radon-222	SM 7500RN	x		x
Residue, Filterable	SM 2540C	x	x	x
Residue, Non-filterable	SM 2540D		x	
Residue, Total	SM 2540B		x	x
Residue, Volatile	EPA 160.4		x	
Semi-VOC	EPA 525.2	x		x
Semi-VOC	EPA 625		x	x
Silica	SM 4500-Si D	x	x	
Silica	SM 4500-SiO2 C	x	x	
Sulfide	SM 4500-$S^{=}$ D		x	
Sulfite	SM 4500-SO^{3}B	x	x	x
Surfactants	SM 5540C	x	x	x
Taste and Odor Analytes	SM 6040E	x		x
Total Coliform (P/A)	SM 9221 A, B	x		x
Total Coliform (Enumeration)	SM 9221 A, B, C	x		x
Total Coliform / E. coli	Colisure (2346)	x		x
Total Coliform	SM 9221B		x	
Total Coliform with Chlorine Present	SM 9221B		x	
Total Coliform / E.coli (P/A and Enumeration)	SM 9223	x		x
TOC	SM 5310C	x	x	x
TOX	SM 5320B		x	
Total Phenols	EPA 420.1		x	
Total Phenols	EPA 420.4	x	x	x
Total Phosphorous	SM 4500 P E		x	
Turbidity	EPA 180.1	x	x	x
Turbidity	SM 2130B	x	x	
Uranium by ICP/MS	EPA 200.8	x		x
UV 254	SM 5910B	x		
VOC	EPA 524.2/EPA 524.3	x		x
VOC	EPA 624		x	x
VOC	EPA SW 846 8260	x		x
VOC	In House Method (2411)	x		x
Yeast and Mold	SM 9610	x		x

Eurofins Eaton Analytical

Acknowledgement of Samples Received

Addr:	**City of West Sacramento** 400 North Harbor Blvd West Sacramento, CA 95605	Client ID: Folder #: Project: Sample Group:	WSACRAMENTO 559334 SPECIAL Algal Tox
Attn: Phone:	Ryan Radford 916-617-4736	Project Manager: Phone:	Magnolia Busse 916-605-3387

The following samples were received from you on **October 23, 2015** at **11:46**. They have been scheduled for the tests listed below each sample. If this information is incorrect, please contact your service representative. Thank you for using Eurofins Eaton Analytical.

Sample #	Sample ID	Sample Date
201510230226	Sacramento River Raw	10/22/2015 1015
	@LCMS-ALGALTOX - LOW @SPME	

Test Description

@LCMS-ALGALTOX - LOW -- Algal-toxins by LCMS Low

@SPME -- Taste and Odor Compounds

750 Royal Oaks Drive, Suite 100, Monrovia, CA 91016 Tel (626) 386-1100 Fax (626) 386-1101 http://www.EatonAnalytical.com

559334

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CHAIN OF CUSTODY RECORD

750 Royal Oaks Drive, Suite 100
Monrovia, CA 91016-3629

Phone: 626 386 1100
Fax: 626 386 1101

800 566 LABS (800 566 5227)

Website: www.EatonAnalytical.com

EUROFINS EATON ANALYTICAL USE ONLY:

LOGIN COMMENTS:

SAMPLES CHECKED AGAINST COC BY: SV

SAMPLES LOGGED IN BY: JS

SAMPLE TEMP RECEIVED AT:

SAMPLES REC'D DAY OF COLLECTION? [X] (check for yes)

[X] Northern California IR Gun ID = 402A (Observation= 5.8 °C) (Corr.Factor 0.0 °C) (Final = 5.8 °C)

[X] Monrovia IR Gun ID = 461A (Observation= 0.9 °C) (Corr.Factor -0.1 °C) (Final = 0.8 °C)

Compliance Acceptance Criteria: (Chemistry 4 ± 2 °C) (Microbiology < 10 °C)

TYPE OF ICE: Real X Synthetic ___ No Ice ___ **CONDITION OF ICE:** Frozen X Partially Frozen ___ Thawed ___ N/A ___

METHOD OF SHIPMENT: Pick-Up / Walk-In / FedEx / UPS / DHL / Area Fast / Top Line / Other: ON-TRAC RD 10/23/15

TO BE COMPLETED BY SAMPLER:

COMPANY/AGENCY NAME: City of West Sacramento		**PROJECT CODE:** SPECIAL
EEA CLIENT CODE: WSACRAMENTO	**COC ID:**	**SAMPLE GROUP:** Algal Tox

COMPLIANCE SAMPLES [ ] (check for yes) - Requires state forms [ ]

NON-COMPLIANCE SAMPLES [x] (check for yes)

REGULATION INVOLVED: ___ (eg. SDWA, NPDES, etc.)

Type of samples (circle one): ROUTINE SPECIAL CONFIRMATION

SEE ATTACHED KIT ORDER FOR ANALYSES [ ] (check for yes), OR

List ALL ANALYSES REQUIRED (enter number of bottles sent for each test for each sample)

TAT requested: rush by adv notice only STD X 1 wk ___ 3 day ___ 2 day ___ 1 day ___

SAMPLE DATE	SAMPLE TIME	SAMPLE ID	CLIENT LAB ID	MATRIX *	FIELD DATA	FIELD DATA	Microcystin	Geosmin	MIB	Anatoxin	Cyclospermopsin										SAMPLER COMMENTS
10-22-15	1015	Sacramento River Raw	WSacramento	RW			X	X	X	X	X										

OCT 23 2015 1146

Victor Plascencia
Eurofins Eaton Analytical

*** MATRIX TYPES:** **RSW** = Raw Surface Water, **RGW** = Raw Ground Water, **CFW** = Chlor(am)inated Finished Water, **FW** = Other Finished Water, **SEAW** = Sea Water, **WW** = Waste Water, **BW** = Bottled Water, **SW** = Storm Water, **SO** = Soil, **SL** = Sludge, **O** = Other - Please Identify

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
SAMPLED BY		Ryan Radford	City of W. Sac	10-22-15	1015
RELINQUISHED BY		Ryan Radford	"	10-22-15	1110
RECEIVED BY		Sarah Vang	EEA	10/22/15	1110
RELINQUISHED BY		Sarah Vang	EEA	10/22/15	1600
RECEIVED BY		R. Ornelas	EEA	10/23/15	1028

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INTERNAL CHAIN OF CUSTODY RECORD

COMPANY NAME / EEA CLIENT CODE:	PROJECT CODE:
MEZA - AZ	

SAMPLE TEMP RECEIVED: **SAMPLES REC'D DAY OF COLLECTION?** ☐

IR Gun ID = 461A (Observation= 0.4 °C) (Corr.Factor -0.1 °C) (Final = 0.3 °C)

TYPE OF ICE: Real X Synthetic ____ No Ice ____ **CONDITION OF ICE:** Frozen X Partially Frozen ____ Thawed ____ N/A ____

METHOD OF SHIPMENT: Pick-Up / Walk-In / FedEx / UPS / DHL / Area Fast / Top Line / Other: ________

Compliance Acceptance Criteria:

1) Chemistry: ≤6°C, not frozen (NELAP) (if received after 24 hrs of sample collection)

2) Microbiology, Distribution: < 10°C, not frozen (can be ≥10°C if received on ice the same day as sample collection, within 8 hours)

3) Microbiology, Surface Water: < 10°C (if received after 2 hours of sample collection)

If over temp is not confirmed, then record each temperature of each quadrant

1 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)	2 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)
3 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)	4 = (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)

4) UCMR3 : (non-GLEC) **524.3:** (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)

522: (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)

≤ 10°C if received within 48 hours of sample collection (not the same business day); ≤ 6°C if received after 48 hours of sample collection. Measure temperature for each method above.

5) LT2: Giardia /Cryptosporidium: <20 °C, not frozen (received after 8 hours of sample collection).

E. Coli: < 10°C, not frozen (if received after 2 hours of sample collection)

Giardia/Crypto: (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)

E.Coli: (Observation= ____ °C) (Corr.Factor ____ °C) (Final = ____ °C)

Note: If samples are over temp, let the ASMs know. ASMs will determine whether to proceed with analysis or not.

	SIGNATURE	PRINT NAME	COMPANY/TITLE	DATE	TIME
RECEIVED BY:	[signature]	R. DANG	Eurofins Eaton Analytical	10/23/15	1130

QA FO 0083 (QA FO-FRM5504) (10/15/15) Ver 1

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wgt(lbs): 20
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Tel: (626) 386-1100
Fax: (626) 386-1101
1 800 566 LABS (1 800 566 5227)

City of West Sacramento
Ryan Radford
400 North Harbor Blvd
West Sacramento, CA 95605

Flags Legend:

R7 - LFB/LFBD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.

The Comments Report may be blank if there are no comments for this report.

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Laboratory Hits
Report: 559334

City of West Sacramento
Ryan Radford
400 North Harbor Blvd
West Sacramento, CA 95605

Samples Received on:
10/23/2015 11:46

Analyzed	Analyte	Sample ID	Result	Federal MCL	Units	MRL
	201510230226	**Sacramento River Raw**				
11/03/2015 22:20	Anatoxin a		0.060		ug/L	0.02
10/28/2015 22:41	Geosmin		5.7		ng/L	3
10/28/2015 22:41	Methylisoborneol		6.3		ng/L	5

SUMMARY OF POSITIVE DATA ONLY

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Laboratory Data Report: 559334

City of West Sacramento
Ryan Radford
400 North Harbor Blvd
West Sacramento, CA 95605

Samples Received on:
10/23/2015 11:46

Prepared	Analyzed		QC Ref #	Method	Analyte	Result	Units	MRL	Dilution
Sacramento River Raw (201510230226)						**Sampled on 10/22/2015 1015**			
		SM 6040E - Taste and Odor Compounds							
10/28/2015	10/28/2015	22:41	870208	(SM 6040E)	Geosmin	5.7 (R7)	ng/L	3	1
10/28/2015	10/28/2015	22:41	870208	(SM 6040E)	Methylisoborneol	6.3	ng/L	5	1
10/28/2015	10/28/2015	22:41	870208	(SM 6040E)	Isobutyl methoxypyrazine	109	%		1
10/28/2015	10/28/2015	22:41	870208	(SM 6040E)	Isopropyl methoxypyrazine	130	%		1
		LC-MS-MS - Algal-toxins by LCMS Low							
	11/03/2015	22:20	871336	(LC-MS-MS)	Anatoxin a	0.060	ug/L	0.02	1
	11/03/2015	22:20	871336	(LC-MS-MS)	Cylindrospermopsin	ND	ug/L	0.05	1
	11/03/2015	22:20	871336	(LC-MS-MS)	Microcystin-LA (MC-LA)	ND	ug/L	0.1	1
	11/03/2015	22:20	871336	(LC-MS-MS)	Microcystin-LF (MC-LF)	ND	ug/L	0.1	1
	11/03/2015	22:20	871336	(LC-MS-MS)	Microcystin-LR (MC-LR)	ND	ug/L	0.1	1
	11/03/2015	22:20	871336	(LC-MS-MS)	Microcystin-LY (MC-LY)	ND	ug/L	0.1	1
	11/03/2015	22:20	871336	(LC-MS-MS)	Microcystin-RR (MC-RR)	ND	ug/L	0.1	1
	11/03/2015	22:20	871336	(LC-MS-MS)	Microcystin-YR (MC-YR)	ND	ug/L	0.1	1
	11/03/2015	22:20	871336	(LC-MS-MS)	Nodularin (NOD)	ND	ug/L	0.1	1

Rounding on totals after summation.
(c) - indicates calculated results

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City of West Sacramento

QC Ref # 870208 - Taste and Odor Compounds | **Analysis Date: 10/28/2015**

201510230226	Sacramento River Raw	Analyzed by: KDT

QC Ref # 871336 - Algal-toxins by LCMS Low | **Analysis Date: 11/03/2015**

201510230226	Sacramento River Raw	Analyzed by: ARH

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Laboratory QC
Report: 559334

City of West Sacramento

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
QC Ref# 870208 - Taste and Odor Compounds by SM 6040E						**Analysis Date: 10/28/2015**			
LCS1	Geosmin		10	12.1	ng/L	121	(75-125)		
LCS2	Geosmin		10	9.70	ng/L	97	(75-125)	20	22
MBLK	Geosmin			<3	ng/L				
MRL_CHK	Geosmin		3	4.01	ng/L	134	(50-150)		
MS_201509170365	Geosmin	ND	10	13.1	ng/L	111	(70-130)		
MSD_201509170365	Geosmin	ND	10	11.7	ng/L	97	(70-130)	20	11
LCS1	Isobutyl methoxypyrazine (I)			75.3	%	75	(50-150)		
LCS2	Isobutyl methoxypyrazine (I)			91.7	%	92	(50-150)		
MBLK	Isobutyl methoxypyrazine (I)			128	%	128	(50-150)		
MRL_CHK	Isobutyl methoxypyrazine (I)			117	%	117	(50-150)		
MS_201509170365	Isobutyl methoxypyrazine (I)			101	%	101	(50-150)		
MSD_201509170365	Isobutyl methoxypyrazine (I)			107	%	107	(50-150)		
LCS1	Isopropyl methoxy pyrazine (S)			114	%	114	(70-130)		
LCS2	Isopropyl methoxy pyrazine (S)			97.1	%	97	(70-130)		
MBLK	Isopropyl methoxy pyrazine (S)			122	%	122	(70-130)		
MRL_CHK	Isopropyl methoxy pyrazine (S)			104	%	104	(70-130)		
MS_201509170365	Isopropyl methoxy pyrazine (S)			115	%	115	(70-130)		
MSD_201509170365	Isopropyl methoxy pyrazine (S)			104	%	104	(70-130)		
LCS1	Methylisoborneol		10	12.1	ng/L	121	(75-125)		
LCS2	Methylisoborneol		10	10.6	ng/L	107	(75-125)	20	12
MBLK	Methylisoborneol			<5	ng/L				
MRL_CHK	Methylisoborneol		3	2.96	ng/L	99	(50-150)		
MS_201509170365	Methylisoborneol	ND	10	14.6	ng/L	144	(70-130)		
MSD_201509170365	Methylisoborneol	ND	10	13.6	ng/L	133	(70-130)	20	7.8
QC Ref# 871336 - Algal-toxins by LCMS Low by LC-MS-MS						**Analysis Date: 11/03/2015**			
LCS1	Anatoxin a		0.2	0.231	ug/L	116	(70-130)		
LCS2	Anatoxin a		0.2	0.203	ug/L	101	(70-130)	30	13
MBLK	Anatoxin a			<0.01	ug/L				
MRL_CHK	Anatoxin a		0.02	0.0210	ug/L	105	(50-150)		
MS_201510230226	Anatoxin a	0.060	0.2	0.229	ug/L	85	(70-130)		
MSD_201510230226	Anatoxin a	0.060	0.2	0.267	ug/L	103	(70-130)	30	15
LCS1	Cylindrospermopsin		0.5	0.550	ug/L	110	(70-130)		
LCS2	Cylindrospermopsin		0.5	0.541	ug/L	108	(70-130)	30	1.6
MBLK	Cylindrospermopsin			<0.025	ug/L				
MRL_CHK	Cylindrospermopsin		0.05	0.0440	ug/L	88	(50-150)		
MS_201510230226	Cylindrospermopsin	ND	0.5	0.378	ug/L	76	(70-130)		

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
RPD not calculated for LCS2 when different a concentration than LCS1 is used.
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level).
(S) - Indicates surrogate compound.
(I) - Indicates internal standard compound.

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Laboratory QC
Report: 559334

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City of West Sacramento

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
MSD_201510230226	Cylindrospermopsin	ND	0.5	0.391	ug/L	78	(70-130)	30	3.4
LCS1	Microcystin-LA (MC-LA)		0.5	0.586	ug/L	117	(70-130)		
LCS2	Microcystin-LA (MC-LA)		0.5	0.622	ug/L	124	(70-130)	30	6.0
MBLK	Microcystin-LA (MC-LA)			<0.05	ug/L				
MRL_CHK	Microcystin-LA (MC-LA)		0.05	0.0670	ug/L	134	(50-150)		
MS_201510230226	Microcystin-LA (MC-LA)	ND	0.5	0.622	ug/L	116	(70-130)		
MSD_201510230226	Microcystin-LA (MC-LA)	ND	0.5	0.649	ug/L	122	(70-130)	30	4.3
LCS1	Microcystin-LF (MC-LF)		0.5	0.513	ug/L	103	(60-140)		
LCS2	Microcystin-LF (MC-LF)		0.5	0.549	ug/L	110	(60-140)	30	6.8
MBLK	Microcystin-LF (MC-LF)			<0.05	ug/L				
MRL_CHK	Microcystin-LF (MC-LF)		0.05	0.0570	ug/L	114	(50-150)		
MS_201510230226	Microcystin-LF (MC-LF)	ND	0.5	0.384	ug/L	77	(60-140)		
MSD_201510230226	Microcystin-LF (MC-LF)	ND	0.5	0.459	ug/L	92	(60-140)	30	18
LCS1	Microcystin-LR (MC-LR)		0.5	0.512	ug/L	102	(70-130)		
LCS2	Microcystin-LR (MC-LR)		0.5	0.494	ug/L	99	(70-130)	30	3.6
MBLK	Microcystin-LR (MC-LR)			<0.05	ug/L				
MRL_CHK	Microcystin-LR (MC-LR)		0.05	0.0540	ug/L	108	(50-150)		
MS_201510230226	Microcystin-LR (MC-LR)	ND	0.5	0.438	ug/L	80	(70-130)		
MSD_201510230226	Microcystin-LR (MC-LR)	ND	0.5	0.400	ug/L	72	(70-130)	30	9.1
LCS1	Microcystin-LY (MC-LY)		0.5	0.600	ug/L	120	(70-130)		
LCS2	Microcystin-LY (MC-LY)		0.5	0.601	ug/L	120	(70-130)	30	0.17
MBLK	Microcystin-LY (MC-LY)			<0.05	ug/L				
MRL_CHK	Microcystin-LY (MC-LY)		0.05	0.0450	ug/L	90	(50-150)		
MS_201510230226	Microcystin-LY (MC-LY)	ND	0.5	0.646	ug/L	129	(70-130)		
MSD_201510230226	Microcystin-LY (MC-LY)	ND	0.5	0.649	ug/L	130	(70-130)	30	0.46
LCS1	Microcystin-RR (MC-RR)		0.5	0.556	ug/L	111	(70-130)		
LCS2	Microcystin-RR (MC-RR)		0.5	0.599	ug/L	120	(70-130)	30	7.5
MBLK	Microcystin-RR (MC-RR)			<0.05	ug/L				
MRL_CHK	Microcystin-RR (MC-RR)		0.05	0.0610	ug/L	122	(50-150)		
MS_201510230226	Microcystin-RR (MC-RR)	ND	0.5	0.554	ug/L	106	(70-130)		
MSD_201510230226	Microcystin-RR (MC-RR)	ND	0.5	0.538	ug/L	103	(70-130)	30	2.9
LCS1	Microcystin-YR (MC-YR)		0.5	0.451	ug/L	90	(70-130)		
LCS2	Microcystin-YR (MC-YR)		0.5	0.515	ug/L	103	(70-130)	30	13
MBLK	Microcystin-YR (MC-YR)			<0.05	ug/L				
MRL_CHK	Microcystin-YR (MC-YR)		0.05	0.0630	ug/L	126	(50-150)		
MS_201510230226	Microcystin-YR (MC-YR)	ND	0.5	0.514	ug/L	103	(70-130)		
MSD_201510230226	Microcystin-YR (MC-YR)	ND	0.5	0.400	ug/L	80	(70-130)	30	25
LCS1	Nodularin (NOD)		0.5	0.443	ug/L	89	(70-130)		

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
RPD not calculated for LCS2 when different a concentration than LCS1 is used.
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level).
(S) - Indicates surrogate compound.
(I) - Indicates internal standard compound.

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Laboratory QC
Report: 559334

City of West Sacramento

QC Type	Analyte	Native	Spiked	Recovered	Units	Yield (%)	Limits (%)	RPDLimit (%)	RPD%
LCS2	Nodularin (NOD)		0.5	0.436	ug/L	87	(70-130)	30	1.6
MBLK	Nodularin (NOD)			<0.05	ug/L				
MRL_CHK	Nodularin (NOD)		0.05	0.0500	ug/L	100	(50-150)		
MS_201510230226	Nodularin (NOD)	ND	0.5	0.403	ug/L	81	(70-130)		
MSD_201510230226	Nodularin (NOD)	ND	0.5	0.493	ug/L	99	(70-130)	30	20

Spike recovery is already corrected for native results.
Spikes which exceed Limits and Method Blanks with positive results are highlighted by Underlining.
Criteria for MS and Dup are advisory only, batch control is based on LCS. Criteria for duplicates are advisory only, unless otherwise specified in the method.
RPD not calculated for LCS2 when different a concentration than LCS1 is used.
RPD not calculated for Duplicates when the result is not five times the MRL (Minimum Reporting Level).
(S) - Indicates surrogate compound.
(I) - Indicates internal standard compound.

Location	Date	Anatoxin-A, ug/L	Cylindrospermopsin, ug/L	Microcystin-LA, ug/L	Microcystin-LF, ug/L	Microcystin-LR, ug/L	Microcystin-LY, ug/L	Microcystin-RR, ug/L	Microcystin-YR, ug/L	Geosmin, ng/L	Methylisoborneol, ng/L
West Sac	6/9/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	6/16/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	6/30/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<5
West Sac	7/7/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	7/14/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	7/21/2016	0.075	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	7/28/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	3.1	<5
West Sac	8/4/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	8/11/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	NA	NA
West Sac	8/19/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	8/25/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8	<5
West Sac	9/1/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	9/8/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	9/15/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	9/22/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	9/29/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6.7	5
West Sac	10/6/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	10/13/2016	0.033	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
West Sac	10/27/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	4.8	<5

George Kristoff Water Treatment Plant

29-Oct-18	LC-MS-MS - Algal-toxins by LCMS Low									SM 6040E - Taste and Odor Compounds			
	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	%	%
Date	Anatoxin a	Cylindrospermopsin	Microcystin-LA (MC-LA)	Microcystin-LF (MC-LF)	Microcystin-LR (MC-LR)	Microcystin-LY (MC-LY)	Microcystin-RR (MC-RR)	Microcystin-YR (MC-YR)	Nodularin (NOD)	Geosmin	Methylisoborneol	Isobutyl methoxypyrazine	Isopropyl methoxypyrazine
6/6/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
6/13/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
6/20/2018	ND	ND	ND (V1)	ND	ND (LE, V1)	ND	ND	ND	ND	ND (R7)	ND	100	106
6/27/2018	ND	ND	ND	ND	ND (V1)	ND	ND	ND	ND				
7/2/2018	ND	ND	ND	ND	ND	ND (R7)	ND	ND	ND				
7/11/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
7/18/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
7/25/2018	ND (LK)	ND	ND	ND	ND	ND	ND	ND	ND	Lab. misplaced samples			
8/1/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
8/8/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
8/15/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.6	ND	134	109
8/22/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
8/29/2018	ND	ND	ND	ND	ND (LK)	ND (V1)	ND	ND	ND				
9/5/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
9/12/2018	ND	ND	ND	ND (V1)	ND	ND	ND	ND	ND				
9/18/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.2	ND	126	106
9/26/2018	ND	ND	ND	ND	ND (V1)	ND	ND	ND	ND				
10/3/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
10/10/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				
10/17/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	121	92
10/24/2018	ND	ND	ND	ND	ND	ND	ND	ND	ND				

George Kristoff Water Treatment Plant

2019	LC-MS-MS - Algal-toxins by LCMS Low										SM 6040E - Taste and Odor Compounds			
	RL 0.03 ppb	RL 0.09 ppb	RL 0.080 ppb	RL 0.060 ppb	RL 0.020 ppb	RL 0.0090 ppb	RL 0.0060 ppb	RL 0.020 ppb	RL 0.0050 ppb	Acceptable range: 60-130 %	MRL 5.0 ppb	MRL 1.0 ppb		
	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB		PPB	PPB	%	%
Date	Anatoxin-a	Cylindrospermopsin	Microcystin-LA	Microcystin-LF	Microcystin-LR	Microcystin-LY	Microcystin-RR	Microcystin-YR	Nodularin-R	Surrogate: Ethylated MC-LR-d5	Geosmin	2-Methylisoborneol (MIB)	Isobutyl methoxypyrazine	Isopropyl methoxypyrazin
7/10/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	64				
7/17/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	66	1.6	ND		
7/24/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	53				
7/31/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	85				
8/7/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	84				
8/14/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	77				
8/21/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	76				
8/28/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	77				
9/4/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	77				
9/11/2019	ND	ND												
9/18/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	69				
9/25/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	84				
10/2/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	83				
10/9/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	77				
10/16/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	72				
10/23/2019	ND	ND	ND	ND	ND	ND	ND	ND	ND	72				
10/30/2019														

PWSID	PWSName	Size	FacilityID	FacilityName	FacilityWaterTyp	SamplePointID	SamplePointName	SamplePoi	CollectionDate	SampleID	Contaminant	MRL	MethodID	AnalyticalR
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	1-butanol	2	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	1-butanol	2	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	1-butanol	2	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	2-methoxyethanol	0.4	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	2-methoxyethanol	0.4	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	2-methoxyethanol	0.4	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	2-propen-1-ol	0.5	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	2-propen-1-ol	0.5	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	2-propen-1-ol	0.5	EPA 541	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	alpha-hexachlorocyclohexane	0.01	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	alpha-hexachlorocyclohexane	0.01	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	alpha-hexachlorocyclohexane	0.01	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	alpha-hexachlorocyclohexane	0.01	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	butylated hydroxyanisole	0.03	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	5/16/2018	2.02E+11	butylated hydroxyanisole	0.03	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	11/28/2018	2.02E+11	butylated hydroxyanisole	0.03	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	chlorpyrifos	0.03	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	chlorpyrifos	0.03	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	chlorpyrifos	0.03	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	chlorpyrifos	0.03	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	dimethipin	0.2	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	dimethipin	0.2	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	dimethipin	0.2	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	dimethipin	0.2	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	ethoprop	0.03	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	ethoprop	0.03	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	ethoprop	0.03	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	ethoprop	0.03	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	germanium	0.3	EPA 200.8	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	germanium	0.3	EPA 200.8	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	germanium	0.3	EPA 200.8	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	germanium	0.3	EPA 200.8	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	manganese	0.4	EPA 200.8	=
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	manganese	0.4	EPA 200.8	=
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	manganese	0.4	EPA 200.8	=
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	manganese	0.4	EPA 200.8	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	o-toluidine	0.007	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	5/16/2018	2.02E+11	o-toluidine	0.007	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	11/28/2018	2.02E+11	o-toluidine	0.007	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	oxyfluorfen	0.05	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	oxyfluorfen	0.05	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	oxyfluorfen	0.05	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	oxyfluorfen	0.05	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	profenofos	0.3	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	profenofos	0.3	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	profenofos	0.3	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	profenofos	0.3	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	quinoline	0.02	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	5/16/2018	2.02E+11	quinoline	0.02	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	11/28/2018	2.02E+11	quinoline	0.02	EPA 530	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	tebuconazole	0.2	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	tebuconazole	0.2	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	tebuconazole	0.2	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	tebuconazole	0.2	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	total permethrin	0.04	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	total permethrin	0.04	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	total permethrin	0.04	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	total permethrin	0.04	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	1/12/2018	2.02E+11	tribufos	0.07	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	4/4/2018	2.02E+11	tribufos	0.07	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.02E+11	tribufos	0.07	EPA 525.3	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.02E+11	tribufos	0.07	EPA 525.3	<

PWSID	PWSName	Size	FacilityID	FacilityName	FacilityWaterTyp	SamplePointID	SamplePointName	SamplePoi	CollectionDate	SampleID	Contaminant	Average	AnalyticalR
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	1/10/2018	2.01801E+11	HAA5		11.966
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	1/10/2018	2.01801E+11	HAA5		11.056
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	4/4/2018	2.01804E+11	HAA5		30.9
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	7/27/2018	2.01807E+11	HAA5		26
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	10/3/2018	2.0181E+11	HAA5	20.0844	20.5
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	1/10/2018	2.01801E+11	HAA6Br		4.606
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	1/10/2018	2.01801E+11	HAA6Br		4.4
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	4/4/2018	2.01804E+11	HAA6Br		3.08
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	7/27/2018	2.01807E+11	HAA6Br		4.44
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	10/3/2018	2.0181E+11	HAA6Br	3.9652	3.3
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	1/10/2018	2.01801E+11	HAA9		16.116
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	1/10/2018	2.01801E+11	HAA9		15.01
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	4/4/2018	2.01804E+11	HAA9		33.98
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	7/27/2018	2.01807E+11	HAA9		30.44
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002901	DBP1 - PSIP Water Storage Reservoir	DS	10/3/2018	2.0181E+11	HAA9	23.8692	23.8
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	4/4/2018	2.01804E+11	HAA5		24.8
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	7/11/2018	2.01807E+11	HAA5		23
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	10/3/2018	2.0181E+11	HAA5	22.03333	18.3
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	4/4/2018	2.01804E+11	HAA6Br		2.93
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	7/11/2018	2.01807E+11	HAA6Br		3.1
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	10/3/2018	2.0181E+11	HAA6Br	3.043333	3.1
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	4/4/2018	2.01804E+11	HAA9		27.73
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	7/11/2018	2.01807E+11	HAA9		26.1
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002902	DBP2 - Central Water Storage Reservoi	DS	10/3/2018	2.0181E+11	HAA9	25.07667	21.4
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	1/10/2018	2.01801E+11	HAA5		22.052
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	4/4/2018	2.01804E+11	HAA5		37.8
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	7/11/2018	2.01807E+11	HAA5		26
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	10/3/2018	2.0181E+11	HAA5	27.713	25
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	1/10/2018	2.01801E+11	HAA6Br		5.373
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	4/4/2018	2.01804E+11	HAA6Br		3.95
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	7/11/2018	2.01807E+11	HAA6Br		3.5
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	10/3/2018	2.0181E+11	HAA6Br	4.05575	3.4
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	1/10/2018	2.01801E+11	HAA9		26.973
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	4/4/2018	2.01804E+11	HAA9		41.75
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	7/11/2018	2.01807E+11	HAA9		29.5
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002904	DBP4 - Bridgeway Lakes Storage Reserv	DS	10/3/2018	2.0181E+11	HAA9	31.65575	28.4
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	1/10/2018	2.01801E+11	HAA5		11.525
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	4/4/2018	2.01804E+11	HAA5		19.8
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	7/27/2018	2.01807E+11	HAA5		16.53
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	10/3/2018	2.0181E+11	HAA5	15.43875	13.9
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	1/10/2018	2.01801E+11	HAA6Br		4.367
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	4/4/2018	2.01804E+11	HAA6Br		2.69
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	7/27/2018	2.01807E+11	HAA6Br		4.42
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	10/3/2018	2.0181E+11	HAA6Br	3.44425	2.3
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	1/10/2018	2.01801E+11	HAA9		15.427
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	4/4/2018	2.01804E+11	HAA9		22.49
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	7/27/2018	2.01807E+11	HAA9		20.62
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002905	DBP5 - 3081 Mareca Way	DS	10/3/2018	2.0181E+11	HAA9	18.68425	16.2
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	1/10/2018	2.01801E+11	HAA5		10.792
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	4/4/2018	2.01804E+11	HAA5		21.03
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	7/11/2018	2.01807E+11	HAA5		15.1
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	10/3/2018	2.0181E+11	HAA5	15.1555	13.7
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	1/10/2018	2.01801E+11	HAA6Br		4.435
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	4/4/2018	2.01804E+11	HAA6Br		2.73
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	7/11/2018	2.01807E+11	HAA6Br		2.8
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	10/3/2018	2.0181E+11	HAA6Br	3.06125	2.28
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	1/10/2018	2.01801E+11	HAA9		14.775
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	4/4/2018	2.01804E+11	HAA9		23.76
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	7/11/2018	2.01807E+11	HAA9		17.9
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002906	DBP6 - 2100 Manchester Road	DS	10/3/2018	2.0181E+11	HAA9	18.10375	15.98
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	1/10/2018	2.01801E+11	HAA5		9.991
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	4/4/2018	2.01804E+11	HAA5		24.7
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	7/11/2018	2.01807E+11	HAA5		15.1
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	10/3/2018	2.0181E+11	HAA5	16.54775	16.4
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	1/10/2018	2.01801E+11	HAA6Br		4.362
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	4/4/2018	2.01804E+11	HAA6Br		2.92
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	7/11/2018	2.01807E+11	HAA6Br		2.8
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	10/3/2018	2.0181E+11	HAA6Br	3.1955	2.7
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	1/10/2018	2.01801E+11	HAA9		13.922
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	4/4/2018	2.01804E+11	HAA9		27.62
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	7/11/2018	2.01807E+11	HAA9		17.9
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002907	DBP7 - 1494 Redding Road	DS	10/3/2018	2.0181E+11	HAA9	19.6355	19.1
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	1/10/2018	2.01801E+11	HAA5		10.261
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	4/4/2018	2.01804E+11	HAA5		23.3
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	7/11/2018	2.01807E+11	HAA5		20.6
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	10/3/2018	2.0181E+11	HAA5	17.91525	17.5
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	1/10/2018	2.01801E+11	HAA6Br		4.539
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	4/4/2018	2.01804E+11	HAA6Br		2.74
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	7/11/2018	2.01807E+11	HAA6Br		3
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	10/3/2018	2.0181E+11	HAA6Br	3.29475	2.9
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	1/10/2018	2.01801E+11	HAA9		14.319
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	4/4/2018	2.01804E+11	HAA9		26.04
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	7/11/2018	2.01807E+11	HAA9		23.6
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002908	DBP8 - Northeast Water Storage Reser	DS	10/3/2018	2.0181E+11	HAA9	21.08975	20.4
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	1/10/2018	2.01801E+11	HAA5		13.338
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	4/4/2018	2.01804E+11	HAA5		30.5
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	7/26/2018	2.01807E+11	HAA5		16.64
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	10/3/2018	2.0181E+11	HAA5	20.1195	20
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	1/10/2018	2.01801E+11	HAA6Br		4.7
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	4/4/2018	2.01804E+11	HAA6Br		3.2
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	7/26/2018	2.01807E+11	HAA6Br		4.5
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	10/3/2018	2.0181E+11	HAA6Br	3.875	3.1
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	1/10/2018	2.01801E+11	HAA9		17.58
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	4/4/2018	2.01804E+11	HAA9		33.7
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	7/26/2018	2.01807E+11	HAA9		20.8
CA571000:	City of West Sacramento	L	92900	Distribution Sys	SW	5710002903	DPB3 - Marshall and G	DS	10/3/2018	2.0181E+11	HAA9	23.795	23.1

CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.01807E+11	anatoxin-a	0.03	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.01807E+11	cylindrospermopsin	0.09	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/2/2018	2.01807E+11	total microcystin	0.3	EPA 546	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/18/2018	2.01807E+11	anatoxin-a	0.03	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/18/2018	2.01807E+11	cylindrospermopsin	0.09	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	7/18/2018	2.01807E+11	total microcystin	0.3	EPA 546	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	8/8/2018	2.01808E+11	anatoxin-a	0.03	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	8/8/2018	2.01808E+11	cylindrospermopsin	0.09	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	8/8/2018	2.01808E+11	total microcystin	0.3	EPA 546	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	8/22/2018	2.01808E+11	anatoxin-a	0.03	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	8/22/2018	2.01808E+11	cylindrospermopsin	0.09	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	8/22/2018	2.01808E+11	total microcystin	0.3	EPA 546	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	9/5/2018	2.01809E+11	anatoxin-a	0.03	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	9/5/2018	2.01809E+11	cylindrospermopsin	0.09	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	9/5/2018	2.01809E+11	total microcystin	0.3	EPA 546	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	9/19/2018	2.01809E+11	anatoxin-a	0.03	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	9/19/2018	2.01809E+11	cylindrospermopsin	0.09	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	9/19/2018	4072206	total microcystin	0.3	EPA 546	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.0181E+11	anatoxin-a	0.03	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	2.0181E+11	cylindrospermopsin	0.09	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/3/2018	4084086	total microcystin	0.3	EPA 546	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/17/2018	2.0181E+11	anatoxin-a	0.03	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/17/2018	2.0181E+11	cylindrospermopsin	0.09	EPA 545	<
CA571000	City of West Sacramento	L	91801	Sacramento Riv	SW	5710001801	EP #2 - Sacramento River Treated	EP	10/17/2018	4097776	total microcystin	0.3	EPA 546	<

City of Sacramento

Sacramento River Water Treatment Plant

CollectDate	SampleNumber	Site	Param	Result	Results_Units	CustomerID	ProjectID
19-Mar-15	15031903-01	SRWTP Tap 01 (Raw)	E. Coli	7.4	MPN	R PLANT	SR WEEKLY MICRO
23-Mar-15	15032305-01	SRWTP Tap 01 (Raw)	E. Coli	13.2	MPN	R PLANT	SR WEEKLY MICRO
01-Apr-15	15040107-01	SRWTP Tap 01 (Raw)	E. Coli	5.1	MPN	R PLANT	SR WEEKLY MICRO
07-Apr-15	15040714-01	SRWTP Tap 01 (Raw)	E. Coli	5.2	MPN	R PLANT	SR WEEKLY MICRO
14-Apr-15	15041406-01	SRWTP Tap 01 (Raw)	E. Coli	5.2	MPN	R PLANT	SR WEEKLY MICRO
22-Apr-15	15042209-01	SRWTP Tap 01 (Raw)	E. Coli	7.3	MPN	R PLANT	SR WEEKLY MICRO
29-Apr-15	15042909-01	SRWTP Tap 01 (Raw)	E. Coli	11.6	MPN	R PLANT	SR WEEKLY MICRO
06-May-15	15050605-01	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	R PLANT	SR WEEKLY MICRO
13-May-15	15051302-01	SRWTP Tap 01 (Raw)	E. Coli	3.1	MPN	R PLANT	SR WEEKLY MICRO
20-May-15	15052101-01	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	R PLANT	SR WEEKLY MICRO
27-May-15	15052705-01	SRWTP Tap 01 (Raw)	E. Coli	3.1	MPN	R PLANT	SR WEEKLY MICRO
03-Jun-15	15060305-01	SRWTP Tap 01 (Raw)	E. Coli	3	MPN	R PLANT	SR WEEKLY MICRO
10-Jun-15	15061009-01	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	R PLANT	SR WEEKLY MICRO
17-Jun-15	15061705-01	SRWTP Tap 01 (Raw)	E. Coli	9.6	MPN	R PLANT	SR WEEKLY MICRO
24-Jun-15	15062503-01	SRWTP Tap 01 (Raw)	E. Coli	3	MPN	R PLANT	SR WEEKLY MICRO
01-Jul-15	15070108-01	SRWTP Tap 01 (Raw)	E. Coli	5.2	MPN	R PLANT	SR WEEKLY MICRO
08-Jul-15	15070808-01	SRWTP Tap 01 (Raw)	E. Coli	3.1	MPN	R PLANT	SR WEEKLY MICRO
15-Jul-15	15071506-01	SRWTP Tap 01 (Raw)	E. Coli	3.1	MPN	R PLANT	SR WEEKLY MICRO
22-Jul-15	15072205-01	SRWTP Tap 01 (Raw)	E. Coli	52	MPN	R PLANT	SR WEEKLY MICRO
29-Jul-15	15072905-01	SRWTP Tap 01 (Raw)	E. Coli	8.6	MPN	R PLANT	SR WEEKLY MICRO
05-Aug-15	15080602-01	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	R PLANT	SR WEEKLY MICRO
12-Aug-15	15081204-01	SRWTP Tap 01 (Raw)	E. Coli	8.5	MPN	R PLANT	SR WEEKLY MICRO
19-Aug-15	15081907-01	SRWTP Tap 01 (Raw)	E. Coli	2	MPN	R PLANT	SR WEEKLY MICRO
26-Aug-15	15082603-01	SRWTP Tap 01 (Raw)	E. Coli	10.9	MPN	R PLANT	SR WEEKLY MICRO
01-Sep-15	15090109-01	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN	R PLANT	SR WEEKLY MICRO
09-Sep-15	15090906-01	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	R PLANT	SR WEEKLY MICRO
16-Sep-15	15091606-01	SRWTP Tap 01 (Raw)	E. Coli	2	MPN	R PLANT	SR WEEKLY MICRO
23-Sep-15	15092306-01	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN	R PLANT	SR WEEKLY MICRO
30-Sep-15	15093004-01	SRWTP Tap 01 (Raw)	E. Coli	2	MPN	R PLANT	SR WEEKLY MICRO
07-Oct-15	15100713-01	SRWTP Tap 01 (Raw)	E. Coli	14.6	MPN	R PLANT	SR WEEKLY MICRO
14-Oct-15	15101407-01	SRWTP Tap 01 (Raw)	E. Coli	3.1	MPN	R PLANT	SR WEEKLY MICRO
20-Oct-15	15102009-01	SRWTP Tap 01 (Raw)	E. Coli	51.2	MPN	R PLANT	SR WEEKLY MICRO
28-Oct-15	15102806-01	SRWTP Tap 01 (Raw)	E. Coli	8.6	MPN	R PLANT	SR WEEKLY MICRO
03-Nov-15	15110305-01	SRWTP Tap 01 (Raw)	E. Coli	686.7	MPN	R PLANT	SR WEEKLY MICRO
09-Nov-15	15110907-01	SRWTP Tap 01 (Raw)	E. Coli	27.2	MPN	R PLANT	SR WEEKLY MICRO
17-Nov-15	15111701-01	SRWTP Tap 01 (Raw)	E. Coli	12.2	MPN	R PLANT	SR WEEKLY MICRO
24-Nov-15	15112404-01	SRWTP Tap 01 (Raw)	E. Coli	16.9	MPN	R PLANT	SR WEEKLY MICRO
01-Dec-15	15120103-01	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	R PLANT	SR WEEKLY MICRO
09-Dec-15	15120902-01	SRWTP Tap 01 (Raw)	E. Coli	19.5	MPN	R PLANT	SR WEEKLY MICRO
15-Dec-15	15121503-01	SRWTP Tap 01 (Raw)	E. Coli	86.2	MPN	R PLANT	SR WEEKLY MICRO
22-Dec-15	15122206-01	SRWTP Tap 01 (Raw)	E. Coli	517.2	MPN	R PLANT	SR WEEKLY MICRO
29-Dec-15	15122902-01	SRWTP Tap 01 (Raw)	E. Coli	24.6	MPN	R PLANT	SR WEEKLY MICRO
04-Jan-16	16010404-01	SRWTP Tap 01 (Raw)	E. Coli	10.9	MPN	R PLANT	SR WEEKLY MICRO
13-Jan-16	16011302-01	SRWTP Tap 01 (Raw)	E. Coli	39.9	MPN	R PLANT	SR WEEKLY MICRO
20-Jan-16	16012005-02	SRWTP Tap 01 (Raw)	E. Coli	833	MPN	TCR	PLANT RAW
21-Jan-16	16012103-01	SRWTP Tap 01 (Raw)	E. Coli	416	MPN	R PLANT	SR WEEKLY MICRO
26-Jan-16	16012607-01	SRWTP Tap 01 (Raw)	E. Coli	235.9	MPN	R PLANT	SR WEEKLY MICRO
03-Feb-16	16020309-01	SRWTP Tap 01 (Raw)	E. Coli	104	MPN	R PLANT	SR WEEKLY MICRO
09-Feb-16	16020906-01	SRWTP Tap 01 (Raw)	E. Coli	7.4	MPN	R PLANT	SR WEEKLY MICRO
16-Feb-16	16021607-01	SRWTP Tap 01 (Raw)	E. Coli	9.7	MPN	R PLANT	SR WEEKLY MICRO
23-Feb-16	16022304-01	SRWTP Tap 01 (Raw)	E. Coli	112.6	MPN	R PLANT	SR WEEKLY MICRO
01-Mar-16	16030103-01	SRWTP Tap 01 (Raw)	E. Coli	16.8	MPN	R PLANT	SR WEEKLY MICRO
08-Mar-16	16030805-01	SRWTP Tap 01 (Raw)	E. Coli	1299.7	MPN	R PLANT	SR WEEKLY MICRO
15-Mar-16	16031506-01	SRWTP Tap 01 (Raw)	E. Coli	171	MPN	R PLANT	SR WEEKLY MICRO
22-Mar-16	16032207-01	SRWTP Tap 01 (Raw)	E. Coli	29.9	MPN	R PLANT	SR WEEKLY MICRO
29-Mar-16	16032908-01	SRWTP Tap 01 (Raw)	E. Coli	19.9	MPN	R PLANT	SR WEEKLY MICRO
04-Apr-16	16040406-01	SRWTP Tap 01 (Raw)	E. Coli	13	MPN	R PLANT	SR WEEKLY MICRO
12-Apr-16	16041206-01	SRWTP Tap 01 (Raw)	E. Coli	18.9	MPN	R PLANT	SR WEEKLY MICRO
20-Apr-16	16042008-01	SRWTP Tap 01 (Raw)	E. Coli	7.4	MPN	R PLANT	SR WEEKLY MICRO
27-Apr-16	16042705-01	SRWTP Tap 01 (Raw)	E. Coli	18.7	MPN	R PLANT	SR WEEKLY MICRO
04-May-16	16050406-01	SRWTP Tap 01 (Raw)	E. Coli	9.7	MPN	R PLANT	SR WEEKLY MICRO
11-May-16	16051106-02	SRWTP Tap 01 (Raw)	E. Coli	14.8	MPN	TCR	PLANT RAW
18-May-16	16051811-02	SRWTP Tap 01 (Raw)	E. Coli	13.1	MPN	TCR	PLANT RAW
23-May-16	16052306-02	SRWTP Tap 01 (Raw)	E. Coli	12.1	MPN	TCR	PLANT RAW
31-May-16	16053111-02	SRWTP Tap 01 (Raw)	E. Coli	16	MPN	TCR	PLANT RAW
07-Jun-16	16060705-02	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN	TCR	PLANT RAW
14-Jun-16	16061403-02	SRWTP Tap 01 (Raw)	E. Coli	8.6	MPN	TCR	PLANT RAW
22-Jun-16	16062210-02	SRWTP Tap 01 (Raw)	E. Coli	9.8	MPN	TCR	PLANT RAW
28-Jun-16	16062807-02	SRWTP Tap 01 (Raw)	E. Coli	8.6	MPN	TCR	PLANT RAW
06-Jul-16	16070611-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
12-Jul-16	16071106-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
20-Jul-16	16072009-02	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN	TCR	PLANT RAW
27-Jul-16	16072706-02	SRWTP Tap 01 (Raw)	E. Coli	5.2	MPN	TCR	PLANT RAW
03-Aug-16	16080309-02	SRWTP Tap 01 (Raw)	E. Coli	9.6	MPN	TCR	PLANT RAW
10-Aug-16	16081005-02	SRWTP Tap 01 (Raw)	E. Coli	11	MPN	TCR	PLANT RAW
16-Aug-16	16081607-02	SRWTP Tap 01 (Raw)	E. Coli	18.9	MPN	TCR	PLANT RAW
23-Aug-16	16082304-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
31-Aug-16	16083109-02	SRWTP Tap 01 (Raw)	E. Coli	3.1	MPN	TCR	PLANT RAW
07-Sep-16	16090708-02	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN	TCR	PLANT RAW
14-Sep-16	16091405-02	SRWTP Tap 01 (Raw)	E. Coli	10.9	MPN	TCR	PLANT RAW
21-Sep-16	16092110-02	SRWTP Tap 01 (Raw)	E. Coli	8.4	MPN	TCR	PLANT RAW
29-Sep-16	16092902-02	SRWTP Tap 01 (Raw)	E. Coli	13.4	MPN	TCR	PLANT RAW
05-Oct-16	16100505-02	SRWTP Tap 01 (Raw)	E. Coli	88.6	MPN	TCR	PLANT RAW

12-Oct-16	16101204-02	SRWTP Tap 01 (Raw)	E. Coli	7.5	MPN	TCR	PLANT RAW
18-Oct-16	16101803-02	SRWTP Tap 01 (Raw)	E. Coli	325.5	MPN	TCR	PLANT RAW
26-Oct-16	16102601-02	SRWTP Tap 01 (Raw)	E. Coli	24.3	MPN	TCR	PLANT RAW
01-Nov-16	16110105-02	SRWTP Tap 01 (Raw)	E. Coli	51.2	MPN	TCR	PLANT RAW
09-Nov-16	16110901-02	SRWTP Tap 01 (Raw)	E. Coli	10.9	MPN	TCR	PLANT RAW
15-Nov-16	16111505-02	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN	TCR	PLANT RAW
23-Nov-16	16112305-02	SRWTP Tap 01 (Raw)	E. Coli	307.6	MPN	TCR	PLANT RAW
29-Nov-16	16112901-02	SRWTP Tap 01 (Raw)	E. Coli	50.4	MPN	TCR	PLANT RAW
05-Dec-16	16120503-02	SRWTP Tap 01 (Raw)	E. Coli	17.1	MPN	TCR	PLANT RAW
13-Dec-16	16121305-02	SRWTP Tap 01 (Raw)	E. Coli	697	MPN	TCR	PLANT RAW
20-Dec-16	16122004-02	SRWTP Tap 01 (Raw)	E. Coli	85.7	MPN	TCR	PLANT RAW
28-Dec-16	16122803-02	SRWTP Tap 01 (Raw)	E. Coli	21.6	MPN	TCR	PLANT RAW
04-Jan-17	17010403-02	SRWTP Tap 01 (Raw)	E. Coli	155.3	MPN	TCR	PLANT RAW
10-Jan-17	17011003-02	SRWTP Tap 01 (Raw)	E. Coli	175	MPN	TCR	PLANT RAW
17-Jan-17	17011703-02	SRWTP Tap 01 (Raw)	E. Coli	71.2	MPN	TCR	PLANT RAW
23-Jan-17	17012302-02	SRWTP Tap 01 (Raw)	E. Coli	83	MPN	TCR	PLANT RAW
01-Feb-17	17020101-02	SRWTP Tap 01 (Raw)	E. Coli	27.5	MPN	TCR	PLANT RAW
08-Feb-17	17020801-02	SRWTP Tap 01 (Raw)	E. Coli	547.5	MPN	TCR	PLANT RAW
14-Feb-17	17021403-02	SRWTP Tap 01 (Raw)	E. Coli	18.9	MPN	TCR	PLANT RAW
22-Feb-17	17022204-02	SRWTP Tap 01 (Raw)	E. Coli	125.9	MPN	TCR	PLANT RAW
01-Mar-17	17030108-02	SRWTP Tap 01 (Raw)	E. Coli	35.4	MPN	TCR	PLANT RAW
08-Mar-17	17030805-02	SRWTP Tap 01 (Raw)	E. Coli	64.5	MPN	TCR	PLANT RAW
15-Mar-17	17031508-02	SRWTP Tap 01 (Raw)	E. Coli	3	MPN	TCR	PLANT RAW
21-Mar-17	17032101-02	SRWTP Tap 01 (Raw)	E. Coli	41	MPN	TCR	PLANT RAW
29-Mar-17	17032903-02	SRWTP Tap 01 (Raw)	E. Coli	47.2	MPN	TCR	PLANT RAW
05-Apr-17	17040502-02	SRWTP Tap 01 (Raw)	E. Coli	9.8	MPN	TCR	PLANT RAW
11-Apr-17	17041108-02	SRWTP Tap 01 (Raw)	E. Coli	161.6	MPN	TCR	PLANT RAW
19-Apr-17	17041905-02	SRWTP Tap 01 (Raw)	E. Coli	32.7	MPN	TCR	PLANT RAW
26-Apr-17	17042603-02	SRWTP Tap 01 (Raw)	E. Coli	12.1	MPN	TCR	PLANT RAW
03-May-17	17050301-02	SRWTP Tap 01 (Raw)	E. Coli	21.1	MPN	TCR	PLANT RAW
10-May-17	17051004-02	SRWTP Tap 01 (Raw)	E. Coli	18.7	MPN	TCR	PLANT RAW
17-May-17	17051702-02	SRWTP Tap 01 (Raw)	E. Coli	12.1	MPN	TCR	PLANT RAW
24-May-17	17052403-02	SRWTP Tap 01 (Raw)	E. Coli	3	MPN	TCR	PLANT RAW
31-May-17	17053102-02	SRWTP Tap 01 (Raw)	E. Coli	52.8	MPN	TCR	PLANT RAW
07-Jun-17	17060705-02	SRWTP Tap 01 (Raw)	E. Coli	19.9	MPN	TCR	PLANT RAW
14-Jun-17	17061406-02	SRWTP Tap 01 (Raw)	E. Coli	8.5	MPN	TCR	PLANT RAW
21-Jun-17	17062106-02	SRWTP Tap 01 (Raw)	E. Coli	7.4	MPN	TCR	PLANT RAW
28-Jun-17	17062808-02	SRWTP Tap 01 (Raw)	E. Coli	5.2	MPN	TCR	PLANT RAW
05-Jul-17	17070506-02	SRWTP Tap 01 (Raw)	E. Coli	12.2	MPN	TCR	PLANT RAW
12-Jul-17	17071204-02	SRWTP Tap 01 (Raw)	E. Coli	22.6	MPN	TCR	PLANT RAW
20-Jul-17	17072002-02	SRWTP Tap 01 (Raw)	E. Coli	13.4	MPN	TCR	PLANT RAW
25-Jul-17	17072505-02	SRWTP Tap 01 (Raw)	E. Coli	12.2	MPN	TCR	PLANT RAW
01-Aug-17	17080107-02	SRWTP Tap 01 (Raw)	E. Coli	14.6	MPN	TCR	PLANT RAW
08-Aug-17	17080805-02	SRWTP Tap 01 (Raw)	E. Coli	13.4	MPN	TCR	PLANT RAW
15-Aug-17	17081503-02	SRWTP Tap 01 (Raw)	E. Coli	10.8	MPN	TCR	PLANT RAW
23-Aug-17	17082307-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
31-Aug-17	17083105-02	SRWTP Tap 01 (Raw)	E. Coli	18.3	MPN	TCR	PLANT RAW
05-Sep-17	17090504-02	SRWTP Tap 01 (Raw)	E. Coli	14.2	MPN	TCR	PLANT RAW
14-Sep-17	17091406-02	SRWTP Tap 01 (Raw)	E. Coli	20.3	MPN	TCR	PLANT RAW
19-Sep-17	17091910-02	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN	TCR	PLANT RAW
26-Sep-17	17092620-02	SRWTP Tap 01 (Raw)	E. Coli	9.8	MPN	TCR	PLANT RAW
05-Oct-17	17100504-02	SRWTP Tap 01 (Raw)	E. Coli	40.8	MPN	TCR	PLANT RAW
10-Oct-17	17101002-02	SRWTP Tap 01 (Raw)	E. Coli	8.5	MPN	TCR	PLANT RAW
17-Oct-17	17101704-02	SRWTP Tap 01 (Raw)	E. Coli	12.1	MPN	TCR	PLANT RAW
24-Oct-17	17102403-02	SRWTP Tap 01 (Raw)	E. Coli	46.5	MPN	TCR	PLANT RAW
31-Oct-17	17103101-02	SRWTP Tap 01 (Raw)	E. Coli	3.1	MPN	TCR	PLANT RAW
06-Nov-17	17110601-02	SRWTP Tap 01 (Raw)	E. Coli	26.2	MPN	TCR	PLANT RAW
21-Feb-18	18022106-02	SRWTP Tap 01 (Raw)	E. Coli	28.1	MPN	TCR	PLANT RAW
27-Feb-18	18022705-01	SRWTP Tap 01 (Raw)	E. Coli	461.1	MPN	TCR	PLANT RAW
07-Mar-18	18030704-01	SRWTP Tap 01 (Raw)	E. Coli	17.1	MPN	TCR	PLANT RAW
14-Mar-18	18031401-01	SRWTP Tap 01 (Raw)	E. Coli	1413.6	MPN	TCR	PLANT RAW
21-Mar-18	18032102-01	SRWTP Tap 01 (Raw)	E. Coli	308	MPN	TCR	PLANT RAW
28-Mar-18	18032803-01	SRWTP Tap 01 (Raw)	E. Coli	48.7	MPN	TCR	PLANT RAW
04-Apr-18	18040403-01	SRWTP Tap 01 (Raw)	E. Coli	17.5	MPN	TCR	PLANT RAW
11-Apr-18	18041111-01	SRWTP Tap 01 (Raw)	E. Coli	110	MPN	TCR	PLANT RAW
17-Apr-18	18041701-01	SRWTP Tap 01 (Raw)	E. Coli	31	MPN	TCR	PLANT RAW
24-Apr-18	18042403-01	SRWTP Tap 01 (Raw)	E. Coli	16	MPN	TCR	PLANT RAW
02-May-18	18050209-01	SRWTP Tap 01 (Raw)	E. Coli	8.4	MPN	TCR	PLANT RAW
08-May-18	18050803-01	SRWTP Tap 01 (Raw)	E. Coli	23.3	MPN	TCR	PLANT RAW
15-May-18	18051506-01	SRWTP Tap 01 (Raw)	E. Coli	11	MPN	TCR	PLANT RAW
22-May-18	18052204-02	SRWTP Tap 01 (Raw)	E. Coli	7.4	MPN	TCR	PLANT RAW
30-May-18	18053007-02	SRWTP Tap 01 (Raw)	E. Coli	17.3	MPN	TCR	PLANT RAW
06-Jun-18	18060607-02	SRWTP Tap 01 (Raw)	E. Coli	9.7	MPN	TCR	PLANT RAW
13-Jun-18	18061301-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
20-Jun-18	18062001-02	SRWTP Tap 01 (Raw)	E. Coli	5.2	MPN	TCR	PLANT RAW
26-Jun-18	18062604-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
03-Jul-18	18070307-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
11-Jul-18	18071106-02	SRWTP Tap 01 (Raw)	E. Coli	19.9	MPN	TCR	PLANT RAW
18-Jul-18	18071802-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
25-Jul-18	18072503-02	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
31-Jul-18	18073104-02	SRWTP Tap 01 (Raw)	E. Coli	16	MPN	TCR	PLANT RAW
08-Aug-18	18080901-02	SRWTP Tap 01 (Raw)	E. Coli	17.1	MPN	TCR	PLANT RAW
15-Aug-18	18081503-03	SRWTP Tap 01 (Raw)	E. Coli	6	MPN	TCR	PLANT RAW
22-Aug-18	18082201-02	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN	TCR	PLANT RAW

29-Aug-18	18083001-02	SRWTP Tap 01 (Raw)	E. Coli	21.8	MPN	TCR	PLANT RAW
05-Sep-18	18090504-03	SRWTP Tap 01 (Raw)	E. Coli	12	MPN	TCR	PLANT RAW
12-Sep-18	18091203-02	SRWTP Tap 01 (Raw)	E. Coli	20	MPN	TCR	PLANT RAW
18-Sep-18	18091804-01	SRWTP Tap 01 (Raw)	E. Coli	8.5	MPN	TCR	PLANT RAW
25-Sep-18	18092503-01	SRWTP Tap 01 (Raw)	E. Coli	17.3	MPN	TCR	PLANT RAW
03-Oct-18	18100303-03	SRWTP Tap 01 (Raw)	E. Coli	41.9	MPN	TCR	PLANT RAW
10-Oct-18	18101003-02	SRWTP Tap 01 (Raw)	E. Coli	27.5	MPN	TCR	PLANT RAW
17-Oct-18	18101703-01	SRWTP Tap 01 (Raw)	E. Coli	13.5	MPN	TCR	PLANT RAW
24-Oct-18	18102405-02	SRWTP Tap 01 (Raw)	E. Coli	10.9	MPN	TCR	PLANT RAW
31-Oct-18	18103104-01	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN	TCR	PLANT RAW
08-Nov-18	18110802-03	SRWTP Tap 01 (Raw)	E. Coli	21.3	MPN/100mL	TCR	PLANT RAW
15-Nov-18	18111503-01	SRWTP Tap 01 (Raw)	E. Coli	5.2	MPN/100mL	TCR	PLANT RAW
20-Nov-18	18112003-01	SRWTP Tap 01 (Raw)	E. Coli	22.6	MPN/100mL	TCR	PLANT RAW
28-Nov-18	18112805-01	SRWTP Tap 01 (Raw)	E. Coli	26.2	MPN/100mL	TCR	PLANT RAW
05-Dec-18	18120501-01	SRWTP Tap 01 (Raw)	E. Coli	61.6	MPN/100mL	TCR	PLANT RAW
11-Dec-18	18121104-01	SRWTP Tap 01 (Raw)	E. Coli	18.7	MPN/100mL	TCR	PLANT RAW
18-Dec-18	18121803-01	SRWTP Tap 01 (Raw)	E. Coli	318	MPN/100mL	TCR	PLANT RAW
24-Apr-19	19042402-01	SRWTP Tap 01 (Raw)	E. Coli	30	MPN/100mL	TCR	PLANT RAW
01-May-19	19050101-03	SRWTP Tap 01 (Raw)	E. Coli	10.7	MPN/100mL	R PLANT	WEEKLY
07-May-19	19050702-03	SRWTP Tap 01 (Raw)	E. Coli	10	MPN/100mL	R PLANT	WEEKLY
15-May-19	19051404-04	SRWTP Tap 01 (Raw)	E. Coli	3	MPN/100mL	R PLANT	WEEKLY
21-May-19	19052101-03	SRWTP Tap 01 (Raw)	E. Coli	2	MPN/100mL	R PLANT	WEEKLY
30-May-19	19053002-03	SRWTP Tap 01 (Raw)	E. Coli	35.5	MPN/100mL	R PLANT	WEEKLY
05-Jun-19	19060501-01	SRWTP Tap 01 (Raw)	E. Coli	74	MPN/100mL	R PLANT	WEEKLY
12-Jun-19	19061202-01	SRWTP Tap 01 (Raw)	E. Coli	31	MPN/100mL	R PLANT	WEEKLY
19-Jun-19	19061803-03	SRWTP Tap 01 (Raw)	E. Coli	7.3	MPN/100mL	R PLANT	WEEKLY
26-Jun-19	19062501-04	SRWTP Tap 01 (Raw)	E. Coli	3.1	MPN/100mL	R PLANT	WEEKLY
02-Jul-19	19070201-02	SRWTP Tap 01 (Raw)	E. Coli	21.3	MPN/100mL	R PLANT	WEEKLY
10-Jul-19	19070905-03	SRWTP Tap 01 (Raw)	E. Coli	9.8	MPN/100mL	R PLANT	WEEKLY
17-Jul-19	19071606-01	SRWTP Tap 01 (Raw)	E. Coli	31	MPN/100mL	R PLANT	WEEKLY
24-Jul-19	19071906-03	SRWTP Tap 01 (Raw)	E. Coli	10	MPN/100mL	R PLANT	WEEKLY
31-Jul-19	19072510-04	SRWTP Tap 01 (Raw)	E. Coli	8.6	MPN/100mL	R PLANT	WEEKLY
07-Aug-19	19080603-01	SRWTP Tap 01 (Raw)	E. Coli	12.1	MPN/100mL	R PLANT	WEEKLY
15-Aug-19	19081303-04	SRWTP Tap 01 (Raw)	E. Coli	20	MPN/100mL	R PLANT	WEEKLY
21-Aug-19	19082003-01	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN/100mL	R PLANT	WEEKLY
28-Aug-19	19082705-04	SRWTP Tap 01 (Raw)	E. Coli	7.5	MPN/100mL	R PLANT	WEEKLY
03-Sep-19	19083008-01	SRWTP Tap 01 (Raw)	E. Coli	31	MPN/100mL	T22	TOC
11-Sep-19	19091003-04	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN/100mL	R PLANT	WEEKLY
19-Sep-19	19091901-01	SRWTP Tap 01 (Raw)	E. Coli	200	MPN/100mL	R PLANT	WEEKLY
25-Sep-19	19092402-04	SRWTP Tap 01 (Raw)	E. Coli	30	MPN/100mL	R PLANT	WEEKLY
02-Oct-19	19100103-01	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN/100mL	R PLANT	WEEKLY
09-Oct-19	19100706-03	SRWTP Tap 01 (Raw)	E. Coli	4.1	MPN/100mL	R PLANT	WEEKLY
17-Oct-19	19101414-01	SRWTP Tap 01 (Raw)	E. Coli	6.3	MPN/100mL	R PLANT	WEEKLY
24-Oct-19	19102109-03	SRWTP Tap 01 (Raw)	E. Coli	12.2	MPN/100mL	R PLANT	WEEKLY
30-Oct-19	19102803-01	SRWTP Tap 01 (Raw)	E. Coli	8.6	MPN/100mL	R PLANT	WEEKLY
06-Nov-19	19110405-03	SRWTP Tap 01 (Raw)	E. Coli	8.6	MPN/100mL	R PLANT	WEEKLY
13-Nov-19	19111303-01	SRWTP Tap 01 (Raw)	E. Coli	14.6	MPN/100mL	R PLANT	WEEKLY
20-Nov-19	19111807-03	SRWTP Tap 01 (Raw)	E. Coli	18.5	MPN/100mL	R PLANT	WEEKLY
27-Nov-19	19112503-01	SRWTP Tap 01 (Raw)	E. Coli	117.8	MPN/100mL	R PLANT	WEEKLY

min	2
max	1413.6
average	60.6051
median	12.6
95Th percentile	310.5

CollectDate	Site	Analyte	ReportResult	ReportUnits
15-Apr-15	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
14-May-15	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Jun-15	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Jul-15	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
17-Aug-15	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Sep-15	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Oct-15	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
16-Nov-15	SRWTP Tap 01 (Raw)	Cryptosporidium	0.2	oocysts/L
15-Dec-15	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
14-Jan-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
16-Feb-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Mar-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
14-Apr-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
16-May-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Jun-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
14-Jul-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Aug-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Sep-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
17-Oct-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Nov-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Dec-16	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
17-Jan-17	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Feb-17	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Mar-17	SRWTP Tap 01 (Raw)	Cryptosporidium	<0.1	oocysts/L
15-Apr-15	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
14-May-15	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Jun-15	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Jul-15	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
17-Aug-15	SRWTP Tap 01 (Raw)	Giardia	0.1	cysts/L
15-Sep-15	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Oct-15	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
16-Nov-15	SRWTP Tap 01 (Raw)	Giardia	0.1	cysts/L
15-Dec-15	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
14-Jan-16	SRWTP Tap 01 (Raw)	Giardia	0.1	cysts/L
16-Feb-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Mar-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
14-Apr-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
16-May-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Jun-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
14-Jul-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Aug-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Sep-16	SRWTP Tap 01 (Raw)	Giardia	0.2	cysts/L
17-Oct-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Nov-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Dec-16	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
17-Jan-17	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Feb-17	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L
15-Mar-17	SRWTP Tap 01 (Raw)	Giardia	<0.1	cysts/L

Sample Date[1]	Source Water Alkalinity (mg/L)	Source Water TOC	Treated Water TOC	TOC Percent Removal Achieved[2] (%)	TOC Percent Removal Required[3] (%)	Assigned Value [optional; complete box below if used]	TOC Percent Removal Ratio[4]
O/S							
O/S							
O/S							
4/1/2015	70	1.7	1.2	29.0	25.0		1.16
5/1/2015	50	2.0	1.5	26.4	35.0	1.00	1.00
6/1/2015	57	1.7	1.3	18.8	35.0	1.00	1.00
7/1/2015	52	1.6	1.3	21.5	35.0	1.00	1.00
8/4/2015	50	1.7	1.4	20.1	35.0	1.00	1.00
9/1/2015	70	1.8	1.4	23.3	25.0	1.00	1.00
10/1/2015	62	1.4	1.1	19.9	25.0	1.00	1.00
11/2/2015	64	1.4	1.3	8.7	25.0	1.00	1.00
12/1/2015	71	1.6	1.3	19.9	25.0	1.00	1.00
1/4/2016	64	1.7	1.1	31.7	25.0		1.27
2/1/2016	45	3.9	1.5	61.1	35.0		1.75
3/1/2016	53	2.0	1.4	28.9	35.0	1.00	1.00
4/1/2016	55	2.1	1.4	34.7	35.0	1.00	1.00
5/2/2016	49	2.0	1.3	31.3	35.0	1.00	1.00
6/1/2016	51	1.9	1.3	31.6	35.0	1.00	1.00
7/1/2016	35	1.8	1.2	33.3	35.0	1.00	1.00
8/1/2016	41	1.8	1.2	33.3	35.0	1.00	1.00
9/1/2016	59	2.0	1.3	35.0	35.0		1.00
10/3/2016	42	2.1	1.8	14.3	35.0	1.00	1.00
11/1/2016	60	3.3	2.2	34.4	35.0		0.98
12/1/2016	62	3.7	2.2	40.5	25.0		1.62
1/3/2017	53	2.4	1.4	41.7	35.0		1.19
2/1/2017	49	2.0	1.3	35.0	35.0		1.00
3/1/2017	32	2.1	1.1	47.6	35.0		1.36
O/S							
O/S							
6/1/2017	34	1.6	1.0	37.5	35.0		1.07
7/4/2017	47	1.5	1.1	26.7	35.0	1.00	1.00
8/3/2017	43	1.8	1.2	33.3	35.0	1.00	1.00
9/1/2017	50	1.9	1.3	31.6	35.0	1.00	1.00
10/3/2017	36	1.6	1.1	31.3	35.0	1.00	1.00
11/1/2017	41	1.8	1.2	33.3	35.0		0.95
O/S							
O/S							
O/S							
3/6/2018	60	2.7	1.7	37.0	35.0		1.06
4/2/2018	42	2.2	1.3	40.9	35.0		1.17
5/1/2018	43	1.8	1.3	27.8	35.0	1.00	1.00
6/1/2018	53	1.5	1.1	26.7	35.0	1.00	1.00
7/2/2018	51	1.4	1.1	21.4	35.0	1.00	1.00
8/1/2018	56	1.8	1.3	27.8	35.0	1.00	1.00
9/4/2018	60	1.9	1.5	21.1	35.0	1.00	1.00
10/1/2018	48	1.4	1.0	28.6	35.0	1.00	1.00
11/1/2018	48	1.5	1.1	26.7	35.0	1.00	1.00
12/1/2018	60	3.5	2.5	28.6	35.0		0.82
O/S							
O/S							
O/S							
4/2/19	28	1.2	0.9	25.00%			
5/1/19	38	1.3	0.9	29.23%			
6/3/19	33	1.4	0.8	42.86%			
7/1/19	41	1.4	0.9	34.29%			
8/1/19	40	1.3	0.8	35.38%			
9/3/19	41	1.4	0.9	35.71%			
10/1/19	38	1.2	0.8	33.33%			
11/1/19	43	1.3	0.8	38.46%			
O/S	O/S	O/S	O/S				

min	28.0	1.2	0.8	0.3
max	71.0	3.9	2.5	61.1
average	49.4	1.9	1.3	25.1
median	49.5	1.8	1.3	28.2
95th percentile	67.9	3.435705		

CollectDate	SampleNumber	Site	Aluminum	Iron	Manganese	ReportingUnits	CustomerID	ProjectID
19-Mar-15	15031902-01	SRWTP Tap 01 (Raw)	426.9	690.5	39.0	ppb	R PLANT	SR WEEKLY CHEM
01-Apr-15	15040106-01	SRWTP Tap 01 (Raw)	406.4	554.3	28.8	ppb	R PLANT	SR WEEKLY CHEM
07-Apr-15	15040703-01	SRWTP Tap 01 (Raw)	353.3	355.8	21.1	ppb	R PLANT	SR WEEKLY CHEM
14-Apr-15	15041408-01	SRWTP Tap 01 (Raw)	319.6	406.6	22.4	ppb	R PLANT	SR WEEKLY CHEM
22-Apr-15	15042204-01	SRWTP Tap 01 (Raw)	189.4	258.7	25.4	ppb	R PLANT	SR WEEKLY CHEM
29-Apr-15	15042910-01	SRWTP Tap 01 (Raw)	274.6	324.1	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
06-May-15	15050602-01	SRWTP Tap 01 (Raw)	222.4	253.5	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
13-May-15	15051305-01	SRWTP Tap 01 (Raw)	212.3	275.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
20-May-15	15052004-01	SRWTP Tap 01 (Raw)	269.1	311.6	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
27-May-15	15052704-01	SRWTP Tap 01 (Raw)	253.7	325.0	20.7	ppb	R PLANT	SR WEEKLY CHEM
03-Jun-15	15060303-01	SRWTP Tap 01 (Raw)	516.6	608.9	39.0	ppb	R PLANT	SR WEEKLY CHEM
10-Jun-15	15061005-01	SRWTP Tap 01 (Raw)	159.0	190.0	21.5	ppb	R PLANT	SR WEEKLY CHEM
17-Jun-15	15061706-01	SRWTP Tap 01 (Raw)	286.7	316.4	28.6	ppb	R PLANT	SR WEEKLY CHEM
24-Jun-15	15062504-01	SRWTP Tap 01 (Raw)	286.6	354.8	29.0	ppb	R PLANT	SR WEEKLY CHEM
01-Jul-15	15070110-01	SRWTP Tap 01 (Raw)	209.4	246.1	20.4	ppb	R PLANT	SR WEEKLY CHEM
08-Jul-15	15070805-01	SRWTP Tap 01 (Raw)	244.0	251.8	20.1	ppb	R PLANT	SR WEEKLY CHEM
15-Jul-15	15071508-01	SRWTP Tap 01 (Raw)	139.1	177.6	21.5	ppb	R PLANT	SR WEEKLY CHEM
22-Jul-15	15072302-01	SRWTP Tap 01 (Raw)	349.0	244.9	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
29-Jul-15	15072906-01	SRWTP Tap 01 (Raw)	362.5	216.8	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
05-Aug-15	15080601-01	SRWTP Tap 01 (Raw)	141.3	180.1	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
11-Aug-15	15081105-01	SRWTP Tap 01 (Raw)	112.0	147.6	< 20.0	ppb	T22	PLANT ANNU
12-Aug-15	15081206-01	SRWTP Tap 01 (Raw)	139.0	195.1	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
19-Aug-15	15081906-01	SRWTP Tap 01 (Raw)	105.9	171.7	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
26-Aug-15	15082602-01	SRWTP Tap 01 (Raw)	181.3	253.9	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Sep-15	15090108-01	SRWTP Tap 01 (Raw)	299.9	419.0	27.4	ppb	R PLANT	SR WEEKLY CHEM
09-Sep-15	15090902-01	SRWTP Tap 01 (Raw)	311.0	453.4	28.4	ppb	R PLANT	SR WEEKLY CHEM
16-Sep-15	15091607-01	SRWTP Tap 01 (Raw)	107.1	157.7	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
23-Sep-15	15092305-01	SRWTP Tap 01 (Raw)	280.3	380.3	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
30-Sep-15	15093003-01	SRWTP Tap 01 (Raw)	128.1	191.3	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
07-Oct-15	15100703-01	SRWTP Tap 01 (Raw)	154.7	226.8	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Oct-15	15101406-01	SRWTP Tap 01 (Raw)	132.9	193.7	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
20-Oct-15	15102010-01	SRWTP Tap 01 (Raw)	201.3	278.5	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
28-Oct-15	15102804-01	SRWTP Tap 01 (Raw)	298.7	382.9	23.9	ppb	R PLANT	SR WEEKLY CHEM
03-Nov-15	15110304-01	SRWTP Tap 01 (Raw)	259.0	349.7	24.8	ppb	R PLANT	SR WEEKLY CHEM
09-Nov-15	15110903-01	SRWTP Tap 01 (Raw)	165.0	299.9	25.4	ppb	R PLANT	SR WEEKLY CHEM
17-Nov-15	15111703-01	SRWTP Tap 01 (Raw)	148.8	273.6	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
24-Nov-15	15112402-01	SRWTP Tap 01 (Raw)	64.0	169.8	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Dec-15	15120102-01	SRWTP Tap 01 (Raw)	205.0	326.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
09-Dec-15	15120903-01	SRWTP Tap 01 (Raw)	366.0	531.0	24.5	ppb	R PLANT	SR WEEKLY CHEM
15-Dec-15	15121501-01	SRWTP Tap 01 (Raw)	926.0	1222.0	42.6	ppb	R PLANT	SR WEEKLY CHEM
22-Dec-15	15122204-01	SRWTP Tap 01 (Raw)	1930.0	2397.0	86.9	ppb	R PLANT	SR WEEKLY CHEM
29-Dec-15	15122903-01	SRWTP Tap 01 (Raw)	585.9	796.1	26.4	ppb	R PLANT	SR WEEKLY CHEM
04-Jan-16	16010403-01	SRWTP Tap 01 (Raw)	236.9	326.8	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
13-Jan-16	16011301-01	SRWTP Tap 01 (Raw)	724.8	932.0	29.4	ppb	R PLANT	SR WEEKLY CHEM
20-Jan-16	16012003-01	SRWTP Tap 01 (Raw)	7532.1	13847.1	330.3	ppb	R PLANT	SR WEEKLY CHEM
26-Jan-16	16012605-01	SRWTP Tap 01 (Raw)	3605.8	5170.3	117.9	ppb	R PLANT	SR WEEKLY CHEM
03-Feb-16	16020307-01	SRWTP Tap 01 (Raw)	761.2	1297.8	61.9	ppb	R PLANT	SR WEEKLY CHEM
09-Feb-16	16020905-01	SRWTP Tap 01 (Raw)	289.8	538.3	37.6	ppb	R PLANT	SR WEEKLY CHEM
16-Feb-16	16021605-01	SRWTP Tap 01 (Raw)	234.1	425.8	36.2	ppb	R PLANT	SR WEEKLY CHEM
23-Feb-16	16022303-01	SRWTP Tap 01 (Raw)	1316.3	1834.9	183.4	ppb	R PLANT	SR WEEKLY CHEM
01-Mar-16	16030106-01	SRWTP Tap 01 (Raw)	137.4	222.2	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
08-Mar-16	16030803-01	SRWTP Tap 01 (Raw)	421.4	906.2	72.5	ppb	R PLANT	SR WEEKLY CHEM
15-Mar-16	16031505-01	SRWTP Tap 01 (Raw)	815.1	1071.0	43.8	ppb	R PLANT	SR WEEKLY CHEM
22-Mar-16	16032206-01	SRWTP Tap 01 (Raw)	1311.5	1643.1	43.5	ppb	R PLANT	SR WEEKLY CHEM
29-Mar-16	16032907-01	SRWTP Tap 01 (Raw)	274.1	514.6	40.0	ppb	R PLANT	SR WEEKLY CHEM
04-Apr-16	16040405-01	SRWTP Tap 01 (Raw)	265.7	365.5	33.1	ppb	R PLANT	SR WEEKLY CHEM
12-Apr-16	16041204-01	SRWTP Tap 01 (Raw)	381.3	555.9	22.4	ppb	R PLANT	SR WEEKLY CHEM
20-Apr-16	16042004-01	SRWTP Tap 01 (Raw)	148.5	235.9	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
27-Apr-16	16042704-01	SRWTP Tap 01 (Raw)	101.1	239.2	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
04-May-16	16050405-01	SRWTP Tap 01 (Raw)	124.7	193.5	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
11-May-16	16051110-01	SRWTP Tap 01 (Raw)	161.5	332.6	37.3	ppb	R PLANT	SR WEEKLY CHEM

18-May-16	16051809-01	SRWTP Tap 01 (Raw)	114.5	248.2	28.6	ppb	R PLANT	SR WEEKLY CHEM
23-May-16	16052303-01	SRWTP Tap 01 (Raw)	179.3	248.7	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
31-May-16	16053107-01	SRWTP Tap 01 (Raw)	182.3	248.5	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
07-Jun-16	16060709-01	SRWTP Tap 01 (Raw)	63.8	139.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Jun-16	16061405-01	SRWTP Tap 01 (Raw)	133.1	223.4	22.9	ppb	R PLANT	SR WEEKLY CHEM
22-Jun-16	16062203-01	SRWTP Tap 01 (Raw)	116.2	231.5	21.9	ppb	R PLANT	SR WEEKLY CHEM
28-Jun-16	16062804-01	SRWTP Tap 01 (Raw)	100.1	210.7	20.8	ppb	R PLANT	SR WEEKLY CHEM
06-Jul-16	16070603-01	SRWTP Tap 01 (Raw)	67.4	149.6	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
12-Jul-16	16071204-01	SRWTP Tap 01 (Raw)	156.7	248.1	30.6	ppb	R PLANT	SR WEEKLY CHEM
20-Jul-16	16072006-01	SRWTP Tap 01 (Raw)	95.4	187.7	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
27-Jul-16	16072705-01	SRWTP Tap 01 (Raw)	225.1	325.3	23.9	ppb	R PLANT	SR WEEKLY CHEM
02-Aug-16	16080203-03	SRWTP Tap 01 (Raw)	71.6	105.7	< 20.0	ppb	T22	PLANT ANNU
03-Aug-16	16080306-01	SRWTP Tap 01 (Raw)	212.3	290.8	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
10-Aug-16	16081006-01	SRWTP Tap 01 (Raw)	124.1	235.4	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
16-Aug-16	16081605-01	SRWTP Tap 01 (Raw)	65.8	141.6	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
23-Aug-16	16082305-01	SRWTP Tap 01 (Raw)	145.7	257.7	29.7	ppb	R PLANT	SR WEEKLY CHEM
01-Sep-16	16090101-01	SRWTP Tap 01 (Raw)	592.5	847.8	39.5	ppb	R PLANT	SR WEEKLY CHEM
07-Sep-16	16090711-01	SRWTP Tap 01 (Raw)	234.0	403.4	31.4	ppb	R PLANT	SR WEEKLY CHEM
14-Sep-16	16091403-01	SRWTP Tap 01 (Raw)	186.0	314.9	22.0	ppb	R PLANT	SR WEEKLY CHEM
21-Sep-16	16092108-01	SRWTP Tap 01 (Raw)	118.0	255.7	24.6	ppb	R PLANT	SR WEEKLY CHEM
29-Sep-16	16092904-01	SRWTP Tap 01 (Raw)	174.3	320.1	22.2	ppb	R PLANT	SR WEEKLY CHEM
03-Oct-16	16100402-01	SRWTP Tap 01 (Raw)	178.4	271.1	< 20.0	ug/L	MISCGOV	1ST RAIN
05-Oct-16	16100503-01	SRWTP Tap 01 (Raw)	97.8	187.7	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
12-Oct-16	16101206-01	SRWTP Tap 01 (Raw)	227.5	514.2	28.3	ppb	R PLANT	SR WEEKLY CHEM
18-Oct-16	16101806-01	SRWTP Tap 01 (Raw)	79.8	186.6	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
26-Oct-16	16102604-01	SRWTP Tap 01 (Raw)	209.1	346.3	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Nov-16	16110109-01	SRWTP Tap 01 (Raw)	230.0	460.3	28.9	ppb	R PLANT	SR WEEKLY CHEM
09-Nov-16	16110903-01	SRWTP Tap 01 (Raw)	81.4	231.4	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
15-Nov-16	16111503-01	SRWTP Tap 01 (Raw)	68.5	201.5	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
23-Nov-16	16112303-01	SRWTP Tap 01 (Raw)	254.5	559.2	44.4	ppb	R PLANT	SR WEEKLY CHEM
29-Nov-16	16112902-01	SRWTP Tap 01 (Raw)	166.3	386.4	23.8	ppb	R PLANT	SR WEEKLY CHEM
13-Dec-16	16121304-01	SRWTP Tap 01 (Raw)	3301.6	5974.2	176.9	ppb	R PLANT	SR WEEKLY CHEM
17-Jan-17	17011704-01	SRWTP Tap 01 (Raw)	2551.3	2446.2	58.8	ppb	R PLANT	SR WEEKLY CHEM
14-Feb-17	17021402-01	SRWTP Tap 01 (Raw)	2743.6	3485.7	85.6	ppb	R PLANT	SR WEEKLY CHEM
08-Mar-17	17030808-01	SRWTP Tap 01 (Raw)	2486.8	2540.8	57.4	ppb	R PLANT	SR WEEKLY CHEM
21-Mar-17	17032103-01	SRWTP Tap 01 (Raw)	901.5	1043.2	32.9	ppb	R PLANT	SR WEEKLY CHEM
18-May-17	17051804-01	SRWTP Tap 01 (Raw)	217.1	318.1	25.0	ppb	R PLANT	SR WEEKLY CHEM
14-Jun-17	17061412-01	SRWTP Tap 01 (Raw)	367.1	586.9	47.1	ppb	R PLANT	SR WEEKLY CHEM
12-Jul-17	17071207-01	SRWTP Tap 01 (Raw)	123.8	211.5	21.9	ppb	R PLANT	SR WEEKLY CHEM
02-Aug-17	17080206-04	SRWTP Tap 01 (Raw)	66.3		< 20.0	ppb	T22	PLANT ANNU
02-Aug-17	17080302-04	SRWTP Tap 01 (Raw)		460.0		ppb	T22	PLANT ANNU
08-Aug-17	17080802-01	SRWTP Tap 01 (Raw)	124.0	195.9	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
19-Sep-17	17091908-01	SRWTP Tap 01 (Raw)	331.5	560.4	21.8	ppb	R PLANT	SR WEEKLY CHEM
05-Oct-17	17100507-01	SRWTP Tap 01 (Raw)	284.5	413.2	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
20-Oct-17	17102004-01	SRWTP Tap 01 (Raw)	234.5	370.3		ug/L	MISCGOV	1ST RAIN
17-Nov-17	17111701-01	SRWTP Tap 01 (Raw)	206.7	457.8	35.9	ppb	R PLANT	SR WEEKLY CHEM
13-Dec-17	17121307-01	SRWTP Tap 01 (Raw)	175.3	311.6	25.1	ppb	R PLANT	SR WEEKLY CHEM
14-Mar-18	18031402-01	SRWTP Tap 01 (Raw)	165.7	373.3	33.9	ug/L	R PLANT	SR WEEKLY CHEM
07-Aug-18	18080701-04	SRWTP Tap 01 (Raw)	< 50.0	109.2	< 20.0	ug/L	T22	PLANT ANNU
07-Aug-18	18080705-04	SRWTP Tap 01 (Raw)				ug/L	T22	PLANT ANNU
04-Oct-18	18100401-01	SRWTP Tap 01 (Raw)	125.4	208.8	< 20.0	ug/L	MISCGOV	1ST RAIN
04-Oct-18	18100401-02	SRWTP Tap 01 (Raw)	93.0	168.8	< 20.0	ug/L	MISCGOV	1ST RAIN
06-Aug-19	19080503-05	SRWTP Tap 01 (Raw)		442.1	22.0	ug/L	T22	PLANT ANNU
06-Aug-19	19080503-05A	SRWTP Tap 01 (Raw)	329.6			ug/L	T22	PLANT ANNU
19-Mar-15	15031902-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Apr-15	15040106-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
07-Apr-15	15040703-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Apr-15	15041408-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
22-Apr-15	15042204-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
29-Apr-15	15042910-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
06-May-15	15050602-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
13-May-15	15051305-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM

20-May-15	15052004-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
27-May-15	15052704-02	SRWTP Tap 13 (Treated)	86.3	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
03-Jun-15	15060303-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
10-Jun-15	15061005-02	SRWTP Tap 13 (Treated)	86.4	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
17-Jun-15	15061706-02	SRWTP Tap 13 (Treated)	71.9	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
24-Jun-15	15062504-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Jul-15	15070110-02	SRWTP Tap 13 (Treated)	61.7	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
08-Jul-15	15070805-02	SRWTP Tap 13 (Treated)	106.6	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
15-Jul-15	15071508-02	SRWTP Tap 13 (Treated)	71.7	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
22-Jul-15	15072302-02	SRWTP Tap 13 (Treated)	247.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
29-Jul-15	15072906-02	SRWTP Tap 13 (Treated)	256.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
05-Aug-15	15080601-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
11-Aug-15	15081105-02	SRWTP Tap 13 (Treated)	63.2	< 100.0	< 20.0	ppb	T22	PLANT ANNU
12-Aug-15	15081206-02	SRWTP Tap 13 (Treated)	55.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
19-Aug-15	15081906-02	SRWTP Tap 13 (Treated)	63.7	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
26-Aug-15	15082602-02	SRWTP Tap 13 (Treated)	68.4	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Sep-15	15090108-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
09-Sep-15	15090902-02	SRWTP Tap 13 (Treated)	53.6	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
16-Sep-15	15091607-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
23-Sep-15	15092305-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
30-Sep-15	15093003-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
07-Oct-15	15100703-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Oct-15	15101406-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
20-Oct-15	15102010-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
28-Oct-15	15102804-02	SRWTP Tap 13 (Treated)	57.2	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
03-Nov-15	15110304-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
09-Nov-15	15110903-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
17-Nov-15	15111703-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
24-Nov-15	15112402-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Dec-15	15120102-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
09-Dec-15	15120903-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
15-Dec-15	15121501-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
22-Dec-15	15122204-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
29-Dec-15	15122903-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
04-Jan-16	16010403-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
13-Jan-16	16011301-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
20-Jan-16	16012003-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
26-Jan-16	16012605-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
03-Feb-16	16020307-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
09-Feb-16	16020905-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
16-Feb-16	16021605-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
23-Feb-16	16022303-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Mar-16	16030106-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
08-Mar-16	16030803-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
15-Mar-16	16031505-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
22-Mar-16	16032206-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
29-Mar-16	16032907-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
04-Apr-16	16040405-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
12-Apr-16	16041204-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
20-Apr-16	16042004-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
27-Apr-16	16042704-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
04-May-16	16050405-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
11-May-16	16051110-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
18-May-16	16051809-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
23-May-16	16052303-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
31-May-16	16053107-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
07-Jun-16	16060709-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Jun-16	16061405-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
22-Jun-16	16062203-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
28-Jun-16	16062804-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
06-Jul-16	16070603-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
12-Jul-16	16071204-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM

20-Jul-16	16072006-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
27-Jul-16	16072705-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
02-Aug-16	16080203-04	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	T22	PLANT ANNU
03-Aug-16	16080306-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
10-Aug-16	16081006-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
16-Aug-16	16081605-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
23-Aug-16	16082305-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Sep-16	16090101-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
07-Sep-16	16090711-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Sep-16	16091403-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
21-Sep-16	16092108-02	SRWTP Tap 13 (Treated)	50.8	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
29-Sep-16	16092904-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
05-Oct-16	16100503-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
12-Oct-16	16101206-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
18-Oct-16	16101806-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
26-Oct-16	16102604-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
01-Nov-16	16110109-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
09-Nov-16	16110903-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
15-Nov-16	16111503-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
23-Nov-16	16112303-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
29-Nov-16	16112902-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
13-Dec-16	16121304-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
17-Jan-17	17011704-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Feb-17	17021402-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
08-Mar-17	17030808-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
21-Mar-17	17032103-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
18-May-17	17051804-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Jun-17	17061412-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
12-Jul-17	17071207-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
02-Aug-17	17080206-05	SRWTP Tap 13 (Treated)	< 50.0		< 20.0	ppb	T22	PLANT ANNU
02-Aug-17	17080302-05	SRWTP Tap 13 (Treated)		<100		ppb	T22	PLANT ANNU
08-Aug-17	17080802-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
19-Sep-17	17091908-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
05-Oct-17	17100507-02	SRWTP Tap 13 (Treated)	90.9	< 100.0	< 20.0	ppb	R PLANT	SR WEEKLY CHEM
14-Mar-18	18031402-02	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ug/L	R PLANT	SR WEEKLY CHEM
07-Aug-18	18080701-05	SRWTP Tap 13 (Treated)	< 50.0	< 100.0	< 20.0	ug/L	T22	PLANT ANNU
07-Aug-18	18080705-05	SRWTP Tap 13 (Treated)				ug/L	T22	PLANT ANNU
06-Aug-19	19080503-06	SRWTP Tap 13 (Treated)		< 100.0	< 20.0	ug/L	T22	PLANT ANNU
06-Aug-19	19080503-06A	SRWTP Tap 13 (Treated)	< 50.0			ug/L	T22	PLANT ANNU

	Year:	2015				2016				2017				2018				2019			
	Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Sample Date:	01/06/15	04/07/15	07/07/15	10/06/15	01/05/16	04/05/16	07/05/16	10/04/16	01/03/17	04/04/17	07/03/17	10/02/17	01/02/18	04/02/18	07/02/18	10/01/18	01/02/19	04/02/19	07/01/19	10/01/19
Total Trihalomethanes (TTHMs) [µg/L]																					
Quarterly Result:	2319 E Street	42	62	44	56	32	52	51	41	0	43	64	49	0	13	48	45	28	39	46	48
	404 Blue Dolphin	57	63	55	52	58	64	57	60	63	46	60	39	29	76	57	56	39	39	50	61
	7467 S.Land Park	45	58	46	41	41	64	64	53	44	38	62	37	28	56	60	58	26	30	51	57
	1 SA	67	56	53	46	45	65	58	54	53	51	75	55	27	53	58	55	27	45	44	56
	3 S 6	42	64	72	58	42	60	71	62	32	42	67	44	29	49	59	61	32	41	59	62
Site:	3 SB	48	62	73	63	55	59	78	70	59	42	78	50	28	66	72	57	35	42	62	67
	4 N12	14	45	59	55	52	56	50	12	1	2	38	13	0	4	45	28	2	2	34	23
	5 SC	55	64	52	48	46	59	67	73	53	39	72	40	27	63	68	58	34	46	52	57
	5 SE	49	62	61	63	41	64	67	53	49	44	76	43	35	59	73	64	41	44	48	53
	5 SF	45	64	61	63	49	64	64	64	51	42	72	46	40	68	73	54	43	45	52	50
	5 SJ	20	69	70	73	65	73	80	74	59	30	68	54	26	62	79	49	28	40	65	74
	SR WTP	O/S	40	38	32	33	50	39	40	31	O/S	47	39	O/S	46	41	38	O/S	O/S	36	40
Haloacetic Acids (HAA5) [µg/L]																					
Quarterly Result:	2319 E Street	44	40	20	29	26	34	34	27	0	38	35	34	0	9	29	28	30	40	24	24
	404 Blue Dolphin	42	28	23	24	46	35	37	29	41	28	31	29	19	43	23	24	31	35	26	22
	7467 S.Land Park	44	30	26	28	37	38	38	30	46	30	29	22	22	41	26	22	20	29	23	26
	1 SA	47	24	23	28	32	31	37	28	36	30	31	28	18	39	23	24	27	36	26	25
	3 S 6	38	56	40	32	33	54	42	34	32	38	43	29	26	29	33	43	32	39	39	33
Site:	3 SB	42	46	37	31	45	43	39	37	28	39	40	30	25	25	27	36	29	38	37	29
	4 N12	10	20	20	24	39	26	26	4	0	0	15	6	0	0	16	10	0	0	18	8
	5 SC	42	30	24	27	37	37	38	31	39	34	34	26	19	45	25	23	28	42	26	23
	5 SE	43	31	29	28	37	39	35	26	47	39	31	24	24	41	27	22	28	35	24	21
	5 SF	40	38	26	28	37	39	33	27	44	39	31	22	21	41	25	23	28	35	24	19
	5 SJ	18	42	30	28	58	43	36	29	40	25	31	23	17	25	25	24	20	38	29	27
	SR WTP	O/S	34	20	25	25	48	30	28	42	O/S	30	29	O/S	34	24	22	O/S	O/S	21	25

Legend:

O/S: SRWTP Out of service for annual maintenance.

Analyte	Abbrevation	Units	MRL	NL Before 8/22/19	NL After 8/22/19	Source: / Collect Time:	Q2 2019 SRWTP Tap 1 Raw (3410020-007) 5/15/19 9:23	Q2 2019 SRWTP Tap 13 Treated (3410020-008) 5/15/19 9:28	Q3 2019 SRWTP Tap 1 Raw (3410020-007) 8/13/19 10:55	Q3 2019 SRWTP Tap 13 Treated (3410020-008) 8/13/19 10:50	DDW reduces NL to 6.5 ppt for PFOS and 5.1 ppt for PFOA effective 8/22/2019	Q4 2019 SRWTP Tap 1 Raw (3410020-007) 11/4/19 11:05	Q4 2019 SRWTP Tap 13 Treated (3410020-008) 11/4/19 11:00
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	11Cl-PF3OUdS	µg/L	0.002	na	na		na	na	ND	ND		ND	ND
4,8-dioxa-3H-perfluorononanoic acid	ADONA	µg/L	0.002	na	na		na	na	ND	ND		ND	ND
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	9Cl-PF3ONS	µg/L	0.002	na	na		na	na	ND	ND		ND	ND
Hexafluoropropylene oxide dimer acid	HFPO-DA	µg/L	0.005	na	na		na	na	ND	ND		ND	ND
N-ethyl Perfluorooctanesulfonamidoacetic acid	NEtFOSAA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
N-methyl Perfluorooctanesulfonamidoacetic acid	NMeFOSAA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorobutanesulfonic acid	PFBS	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorodecanoic acid	PFDA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorododecanoic acid	PFDoA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluoroheptanoic acid	PFHpA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorohexanesulfonic acid	PFHxS	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorohexanoic acid	PFHxA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorononanoic acid	PFNA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorotetradecanoic acid	PFTA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorotridecanoic acid	PFTrDA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluoroundecanoic acid	PFUnA	µg/L	0.002	na	na		ND	ND	ND	ND		ND	ND
Perfluorooctanesulfonic acid	PFOS	µg/L	0.002	0.013	0.0065		ND	ND	ND	ND		ND	ND
Perfluorooctanoic acid	PFOA	µg/L	0.002	0.014	0.0051		ND	ND	ND	ND		ND	ND
Sum of detected PFOS + PFOA:							0	0	0	0		0	0
DOES PFOS + PFOA SUM EXCEED RL OF 0.070 µg/L?							*NO*	*NO*	*NO*	*NO*		*NO*	*NO*

LEGEND:

Red Text	0.020	Exceeds respective NL or RL
Blue Fill		PFOS and PFOA results; subject to NL and RL

CITY OF SACRAMENTO
UTILITIES Department, WATER QUALITY LABORATORY

2015 RICE HERBICIDE ANALYSIS

SRR-SACRAMENTO RIVER WTP INTAKE
WSR-BRYTE BEND WTP INTAKE

DATE	Thiobencarb WSR UG/L	Thiobencarb SRR UG/L	% SACTO. RIVER AT SRR INTAKE
22-Apr-15	<0.1	<0.1	100
29-Apr-15	<0.1	<0.1	74.0
6-May-15	<0.1	<0.1	70.0
13-May-15	<0.1	<0.1	73.1
14-May-15	<0.1	<0.1	76.6
19-May-15	<0.1	NA	78.8
20-May-15	<0.1	<0.1	100
21-May-15	<0.1	<0.1	88.6
5/25/2015[a]	<0.1	<0.1	84.7
26-May-15	<0.1	<0.1	75.5
27-May-15	0.1	<0.1	76.6
28-May-15	<0.1	<0.1	77.9
2-Jun-15	<0.1	<0.1	77.9
3-Jun-15	<0.1	<0.1	81.9
4-Jun-15	<0.1	<0.1	86.3
10-Jun-15	<0.1	<0.1	67.8
11-Jun-15	<0.1	<0.1	96.2
17-Jun-15	<0.1	<0.1	48.8
18-Jun-15	<0.1	<0.1	28.8
24-Jun-15	<0.1	<0.1	79.1
1-Jul-15	<0.1	<0.1	77.4

[a] WSR Sample taken at Crawdad's
All Samples are analyzed by BSK.

DATE	Thiobencarb WSR UG/L	Thiobencarb SRR UG/L	% SACTO. RIVER AT SRR INTAKE
20-Apr-16	<0.1	<0.1	61.5
27-Apr-16	<0.1	<0.1	65.2
4-May-16	<0.1	<0.1	67.0
11-May-16	0.039	0.030	74.8
12-May-16	0.039	0.026	75.8
17-May-16	0.031	NA	NA
18-May-16	0.053	0.015	75.0
19-May-16	0.028	0.017	77.4
24-May-16	0.022	0.014	56.6
25-May-16	0.041	0.025	64.8
26-May-16	0.093	0.058	65.6
30-May-16	0.026	0.029	78.9
31-May-16	0.048	0.032	77.8
1-Jun-16	0.10	0.12	83.2
2-Jun-16	0.13	0.11	77.3
7-Jun-16	0.051	0.032	80.3
8-Jun-16	0.052	0.025	80.4
9-Jun-16	0.058	0.018	79.0
15-Jun-16	0.012	<0.1	71.1
16-Jun-16	0.010	<0.1	60.1
22-Jun-16	0.018	<0.1	66.1

CITY OF SACRAMENTO
UTILITIES Department, WATER QUALITY LABORATORY

2017 RICE HERBICIDE ANALYSIS

SRR-SACRAMENTO RIVER WTP INTAKE
WSR-BRYTE BEND WTP INTAKE

DATE	Thiobencarb WSR UG/L	Thiobencarb SRR UG/L	% SACTO. RIVER AT SRR INTAKE
3-May-17	<0.1	<0.1	98.2
10-May-17	<0.1	<0.1	78.4
17-May-17	<0.1	<0.1	70.6
18-May-17	<0.1	<0.1	65.9
23-May-17	<0.1	<0.1	56.9
24-May-17	<0.1	<0.1	54.5
25-May-17	<0.1	<0.1	56.2
29-May-17	<0.1	<0.1	64.5
30-May-17	<0.1	<0.1	67.0
31-May-17	<0.1	<0.1	63.4
1-Jun-17	<0.1	<0.1	64.7
5-Jun-17	<0.1	*	NA
6-Jun-17	<0.1	<0.1	54.7
7-Jun-17	<0.1	<0.1	56.4
8-Jun-17	<0.1	<0.1	53.4
13-Jun-17	<0.1	**	77.2
14-Jun-17	<0.1	<0.1	62.6
15-Jun-17	<0.1	<0.1	62.6
21-Jun-17	<0.1	<0.1	88.9
22-Jun-17	<0.1	<0.1	89.9
28-Jun-17	<0.1	<0.1	87.8
29-Jun-17	<0.1	<0.1	86.5
3-Jul-17	<0.1	<0.1	80.2

* No sample taken
** Residual chlorine present, did not analyze.

2018 RICE HERBICIDE ANALYSIS

SRR-SACRAMENTO RIVER WTP INTAKE
WSR-GEORGE KRISTOFF (BRYTE BEND) WTP INTAKE

DATE	Thiobencarb WSR UG/L	Thiobencarb SRR UG/L	% SACTO. RIVER AT SRR INTAKE
18-Apr-18	<0.2	<0.2	58.2
25-Apr-18	<0.2	<0.2	70.9
2-May-18	<0.2	<0.2	77.0
9-May-18	<0.2[a,b]	<0.2[a,b]	79.6
10-May-18	<0.2	<0.2	88.1
15-May-18	<0.2	<0.2	87.3
16-May-18	<0.2	<0.2	87.3
17-May-18	<0.2	<0.2	75.0
22-May-18	<0.2	<0.2	86.2
23-May-18	<0.2	<0.2	78.5
24-May-18	<0.2	<0.2	82.5
28-May-18	<0.2	<0.2	84.4
29-May-18	<0.2	<0.2	74.8
30-May-18	<0.2	<0.2	87.5
31-May-18	<0.2	<0.2	88.8
4-Jun-18	<0.2	<0.2	78.8
5-Jun-18	<0.2	<0.2	90.8
6-Jun-18	<0.2	<0.2	86.8
7-Jun-18	<0.2	<0.2	85.8
13-Jun-18	<0.2[c]	<0.2[c]	87.0
14-Jun-18	<0.2[c]	<0.2[c]	82.5
20-Jun-18	<0.2	<0.2	85.5
21-Jun-18	<0.2[c]	<0.2[c]	88.6
27-Jun-18	<0.2[c]	<0.2[c]	83.5
28-Jun-18	<0.2[c]	<0.2[c,d]	82.0
3-Jul-18	<0.2	<0.2	74.2

[a] Concentration estimated.

[b] Sample was reanalyzed on 6/11/18 and was out of holding time. Recoveries of LCSDs are out of the top control limit.

[c] Sample was analyzed outside of holding time. Waiting for contract lab to verify.

[d] Concentration estimated. Internal standard recoveries did not meet method acceptance criteria.

2019 RICE HERBICIDE ANALYSIS

SRR-SACRAMENTO RIVER WTP INTAKE
WSR-GEORGE KRISTOFF (BRYTE BEND) WTP INTAKE

DATE	Thiobencarb WSR, μg/L	Thiobencarb SRR, μg/L	% SACTO. RIVER AT SRR INTAKE
1-May-19	<0.2	<0.2	64.2
8-May-19	<0.2	<0.2	53.8
9-May-19	<0.2	<0.2	48.6
14-May-19	<0.2[N1]	<0.2	52.9
15-May-19	<0.2	<0.2	51.8
16-May-19	<0.2	<0.2	56.5
21-May-19	<0.2	<0.2	46.2
22-May-19	<0.2	<0.2	50.1
23-May-19	<0.2	<0.2	32.1
27-May-19	0.13[J]	<0.2	53.3
28-May-19	0.095[J]	<0.2	57.4
29-May-19	0.052[J]	0.085[J]	61.9
30-May-19	0.100[J]	0.057[J]	58.3
4-Jun-19	<0.2	<0.2	64.9
5-Jun-19	<0.2	<0.2	55.9
6-Jun-19	<0.2 [D1]	<0.2	61.1
11-Jun-19	<0.2	<0.2	49.2
12-Jun-19	<0.2	<0.2	51.0
13-Jun-19	<0.2	<0.2	56.7
19-Jun-19	<0.2	<0.2	77.6
20-Jun-19	<0.2	<0.2	78.4
26-Jun-09	<0.2	<0.2	73.8
27-Jun-19	<0.2	<0.2	73.1
2-Jul-19	<0.2	<0.2	74.8
9-Jul-19	<0.2*	<0.2	*
16-Jul-19	<0.2	<0.2	75.9

J= Analyte detected at or greater than the MDL and less than the MRL
D1 = Sample required dilution due to matrix
N1 = Sample was filtred prior to analysis.
*West Sacramento was inadvertently not collected on 07/09/2019 and was collected on 07/10/2019 instead. Unable to perform % SRWTP calculation due to lack of paired upstream conductivity samples.

Location	Date	Anatoxin-A (µg/L)	Cyanobacteria (Presence/Absence)	Cylindrospermopsin (µg/L)	Microcystin-LA (µg/L)	Microcystin-LF (µg/L)	Microcystin-LR (µg/L)	Microcystin-LY (µg/L)	Microcystin-RR (µg/L)	Microcystin-YR (µg/L)	Nodularin (µg/L)
SRWTP Centre of Grit Basin	6/25/2015	<1		<0.1	<0.1		<0.1		<0.1	<0.1	
SRWTP Side of Grit Basin	6/25/2015	<1		<0.1	<0.1		<0.1		<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/13/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 12 (Treated)	8/13/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	9/10/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	9/10/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	9/16/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	9/16/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	9/23/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	9/23/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	9/30/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	9/30/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	10/7/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	10/7/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
FRWA	10/13/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VSWTP	10/13/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VSWTP Clearwell	10/13/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	10/14/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	10/14/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
WSR WTP Intake Raw	10/15/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
FRWA	10/20/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VSWTP	10/20/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VSWTP Clearwell	10/20/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	10/21/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	10/21/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
WSR WTP Intake Raw	10/22/2015	0.06		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
FRWA	10/27/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VSWTP	10/27/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	10/28/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	10/28/2015	0.06		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
FRWA	11/3/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VSWTP	11/3/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	11/4/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	11/4/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
FRWA	11/10/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VSWTP	11/10/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EAFWTP Tap 01 (Raw)	11/11/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	11/11/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
FRWA	11/17/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	11/17/2015		Presence								
VSWTP	11/17/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	11/18/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
FRWA	11/24/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	11/24/2015		Presence								
VSWTP	11/24/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
SRWTP Tap 01 (Raw)	11/25/2015	<0.02		<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Location	Date	Anatoxin-A, ug/L	Cylindrospermopsin, ug/L	Microcystin-LA, ug/L	Microcystin-LF, ug/L	Microcystin-LR, ug/L	Microcystin-LY, ug/L	Microcystin-RR, ug/L	Microcystin-YR, ug/L	Geosmin, ng/L	Methylisoborneol, ng/L
SRWTP Tap 1	6/8/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
SRWTP Tap 1	6/21/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
SRWTP Tap 1	6/22/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
SRWTP Tap 1	6/29/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
SRWTP Tap 1	7/6/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
SRWTP Tap 1	7/13/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
SRWTP Tap 1	7/20/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<3	<5
SRWTP Tap 1	7/27/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
SRWTP Tap 1	8/3/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1		
SRWTP Tap 1	8/10/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	0.24		
SRWTP Tap 1	8/17/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<3	8.6
SRWTP Tap 1	8/24/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.3	14
SRWTP Tap 1	8/31/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8.9	9.4
SRWTP Tap 1	9/7/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6.8	7.2
SRWTP Tap 1	9/14/2016	0.044	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	6.9	7.5
SRWTP Tap 1	9/21/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	8.7	7
SRWTP Tap 1	9/28/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	7.7	6.9
SRWTP Tap 1	10/5/2016	0.026	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
SRWTP Tap 1	10/12/2016	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA
SRWTP Tap 1											
SRWTP Tap 1											

Site	CollectDate	Geosmin, ng/L	Methylisoborneol, ng/L	Anatoxin-A, ug/L	Cylindrospermopsin, ug/L	Nodularins, ng/L	Microcystin-LA, ug/L	Microcystin-LF, ug/L	Microcystin-LR, ug/L	Microcystin-LY, ug/L	Microcystin-RR, ug/L	Microcystin-YR, ug/L	Notes
EAFWTP Tap 01 (Raw)	8/13/2015	4.5	8.3	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/10/2015	8.6	5.2	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/10/2015	4.8	6.1	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/16/2015	10	6.6	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/16/2015	3.1	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/23/2015	9.7	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/23/2015	3.8	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/30/2015	17	5.8	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/30/2015	3.3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	10/7/2015	24	6.4	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	10/7/2015	4.4	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-FRWA	10/13/2015	8.8	6	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-VSWTP	10/13/2015	3.8	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	10/14/2015	25	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	10/14/2015	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	10/15/2015	5.6	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-FRWA	10/20/2015	10	6.9	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-VSWTP	10/20/2015	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	10/21/2015	26	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	10/21/2015	7.3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	10/22/2015	5.7	6.3	0.06	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-FRWA	10/27/2015	7.8	5.3	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-VSWTP	10/27/2015	6.3	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	10/28/2015	18	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	10/28/2015	8.2	5.3	0.06	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-FRWA	11/3/2015	6.4	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-VSWTP	11/3/2015	3.8	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	11/4/2015	15	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	11/4/2015	10	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-FRWA	11/10/2015	7.1	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-VSWTP	11/10/2015	7.5	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	11/11/2015	16	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	11/11/2015	12	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-FRWA	11/17/2015	6.6	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-VSWTP	11/17/2015	4.5	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	11/18/2015	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-FRWA	11/24/2015	10	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County-VSWTP	11/24/2015	6.1	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	11/25/2015	16	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	6/6/2016	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Woodland-Davis	6/7/2016	7.1	3.9	<0.15	<0.05	<0.15	NA	NA	NA	NA	NA	NA	
EAFWTP Tap 01 (Raw)	6/8/2016	<3	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	6/8/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	6/9/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	6/13/2016	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	6/15/2016	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	data neither in original report nor in LIMs
SRWTP Tap 01 (Raw)	6/15/2016	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	data neither in original report nor in LIMs
West Sac	6/16/2016	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	6/20/2016	<3	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	6/20/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	6/21/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	no pdf for data; collection date not on schedule
SRWTP Tap 01 (Raw)	6/21/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	no pdf for data; collection date not on schedule
EAFWTP Tap 01 (Raw)	6/22/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	6/22/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	6/23/2016												missing data, scheduled for sampling on this date
County	6/27/2016	3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	6/27/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	6/29/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	6/29/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	6/30/2016	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	7/4/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
County	7/5/2016	<3	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	7/6/2016	<3	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	7/6/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	7/7/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	7/11/2016	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	

EAFWTP Tap 01 (Raw)	7/11/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
Woodland-Davis	7/12/2016	4.6	4.7	<0.15	<0.05	<0.15	NA	NA	NA	NA	NA	NA	
EAFWTP Tap 01 (Raw)	7/13/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	7/13/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	7/14/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	7/18/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	7/18/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	7/20/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	7/20/2016	<3	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	7/21/2016	NA	NA	0.075	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	7/25/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	7/25/2016	NA	NA	0.022	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	7/27/2016	NA	NA	0.028	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	7/27/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	7/28/2016	3.1	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	8/1/2016	<3	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/1/2016	NA	NA	0.03	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	8/3/2016	<3	<5	0.07	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/3/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	8/4/2016	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	8/8/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/8/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	8/10/2016	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	
SRWTP Tap 01 (Raw)	8/10/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	0.24	
Woodland-Davis	8/10/2016	16.2	12.2	<0.15	<0.05	<0.15	NA	NA	NA	NA	NA	NA	
West Sac	8/11/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	
County	8/15/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/15/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	8/17/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/17/2016	<3	8.6	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	8/18/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	8/22/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/22/2016	<3	12	0.029	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	8/24/2016	NA	NA	0.049	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/24/2016	5.3	14	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	8/25/2016	8	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	8/29/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	0.11	
EAFWTP Tap 01 (Raw)	8/29/2016	NA	NA	0.046	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	8/31/2016	6	22	0.18	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/31/2016	8.9	9.4	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	9/1/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/5/2016	5.2	13	0.085	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
County	9/6/2016	7.9	6.8	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.2	
EAFWTP Tap 01 (Raw)	9/7/2016	NA	NA	0.023	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/7/2016	6.8	7.2	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	9/8/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	9/12/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/12/2016	11	20	0.096	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	9/14/2016	NA	NA	0.13	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/14/2016	6.9	7.5	0.044	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	9/15/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	9/19/2016	6.2	5.5	0.031	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/19/2016	9.7	17	0.12	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
Woodland-Davis	9/20/2016	12.7	6.2	<0.15	<0.05	<0.15	NA	NA	NA	NA	NA	NA	
EAFWTP Tap 01 (Raw)	9/21/2016	NA	NA	0.079	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/21/2016	8.1	7	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	9/22/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	9/26/2016	9.1	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/26/2016	12	8.6	0.023	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
EAFWTP Tap 01 (Raw)	9/28/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/28/2016	7.7	6.9	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	9/29/2016	6.7	5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	10/3/2016	4.6	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	10/3/2016	7.2	<5	0.036	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
SRWTP Tap 01 (Raw)	10/5/2016	NA	NA	0.026	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
West Sac	10/6/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	10/10/2016	NA	NA	0.022	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
County	10/11/2016	14	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	

SRWTP Tap 01 (Raw)	10/12/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Woodland-Davis	10/12/2016	10.2	7.6	<0.15	<0.05	<0.15	NA	NA	NA	NA	NA	NA	
West Sac	10/13/2016	NA	NA	0.033	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	10/17/2016	4.3	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	10/17/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
West Sac	10/20/2016												missing data, scheduled for sampling on this date
County	10/24/2016	4.3	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	10/24/2016	NA	NA	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	collection date not on schedule
West Sac	10/27/2016	4.8	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	10/31/2016	3.4	<5	<0.02	<0.05	NA	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	5/22/2017	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	6/6/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	6/8/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	6/8/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	6/13/2017	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	6/15/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	6/15/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	6/20/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	6/22/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	6/22/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	6/27/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	6/29/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	6/29/2017	<3.0	<5.0	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	7/4/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	7/6/2017	<3.0	<5.0	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	7/6/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	7/11/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	Geosmin and Methylisoborneol suppose to be on this date
EAFWTP Tap 01 (Raw)	7/13/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	7/13/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	7/18/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	7/20/2017	<3.0	<5.0	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	7/20/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	7/25/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	7/27/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	7/27/2017	<3.0	7.9	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	8/1/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/3/2017	<3.0	<5.0	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/3/2017	<3.0	7.4	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	8/8/2017	<3	8.5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/10/2017	<3.0	5.7	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/10/2017	<3.0	<5.0	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/11/2017	<3.0	<5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	not on original report; data in LIMs
County	8/15/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/17/2017	3.3	<5.0	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/17/2017	<3.0	<5.0	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	8/22/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/24/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/24/2017	<3.0	<5.0	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	8/29/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	8/31/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	8/31/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	9/5/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/7/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/7/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	9/12/2017	<3	<5	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/14/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/14/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	9/19/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/21/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/21/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
County	9/26/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
EAFWTP Tap 01 (Raw)	9/28/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
SRWTP Tap 01 (Raw)	9/28/2017	NA	NA	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	

CollectDate	Site	Anatoxin-A µg/L	Cylindrospermopsin µg/L	Microcystin-LA µg/L	Microcystin-LF µg/L	Microcystin-LR µg/L	Microcystin-LY µg/L	Microcystin-RR µg/L	Microcystin-YR µg/L	Nodularin µg/L
5/24/2018	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
5/24/2018	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/6/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/7/2018	EAFWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6/7/2018	SRWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6/12/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/13/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/14/2018	EAFWTP Tap 01 (Raw)	0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6/14/2018	SRWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6/20/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/21/2018	EAFWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6/21/2018	SRWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
6/26/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/27/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/28/2018	SRWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7/2/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/3/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/5/2018	EAFWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7/5/2018	SRWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7/10/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/11/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/12/2018	EAFWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7/12/2018	SRWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7/17/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/18/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/19/2018	EAFWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7/19/2018	SRWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7/25/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/26/2018	EAFWTP Tap 01 (Raw)	<0.02	<0.05	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7/26/2018	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/31/2018	Sac. County Settled	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/31/2018	Sac. County Finished	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/31/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/1/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/2/2018	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/2/2018	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/2/2018	SRWTP Tap 09 (Filter Effluent)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/2/2018	SRWTP Tap 13 (Treated)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/7/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/8/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/9/2018	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/9/2018	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/14/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/15/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/16/2018	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

8/16/2018	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/21/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/22/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/23/2018	EAFWTP Tap 01 (Raw)	0.05	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/23/2018	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/28/2018	Sac. County Intake Meter Vault	0.032	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/29/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/30/2018	EAFWTP Tap 01 (Raw)	0.10	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/30/2018	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/4/2018	Sac. County Intake Meter Vault	0.029	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/6/2018	EAFWTP Tap 01 (Raw)	0.10	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/6/2018	SRWTP Tap 01 (Raw)	0.04	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/6/2018	Sac. County Settled	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/6/2018	Sac. County Finished	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/11/2018	Sac. County Settled	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/11/2018	Sac. County Finished	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/11/2018	Sac. County Intake Meter Vault	0.028	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/12/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/13/2018	EAFWTP Tap 01 (Raw)	0.10	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/13/2018	SRWTP Tap 01 (Raw)	0.089	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/18/2018	Sac. County Settled	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/18/2018	Sac. County Finished	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/18/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/18/2018	Sac. County Intake Meter Vault	0.031	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/20/2018	EAFWTP Tap 01 (Raw)	0.12	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/20/2018	SRWTP Tap 01 (Raw)	0.064	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/25/2018	Sac. County Settled	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/25/2018	Sac. County Finished	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/25/2018	Sac. County Intake Meter Vault	0.038	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/26/2018	West Sacramento Raw	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/27/2018	EAFWTP Tap 01 (Raw)	0.084	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/27/2018	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/2/2018	Sac. County Settled	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/2/2018	Sac. County Finished	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/2/2018	Sac. County Intake Meter Vault	0.028	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/4/2018	EAFWTP Tap 01 (Raw)	0.039	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/4/2018	SRWTP Tap 01 (Raw)	0.064	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/10/2018	West Sacramento	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/11/2018	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/11/2018	SRWTP Tap 01 (Raw)	0.021	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/16/2018	Sac. County Settled	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/16/2018	Sac. County Finished	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/16/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/17/2018	West Sacramento	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/23/2018	Sac. County Settled	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/23/2018	Sac. County Finished	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
10/23/2018	Sac. County Intake Meter Vault	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

LC-MS-MS - Algal-toxins by LCMS Low										
CollectDate	Site	Anatoxin-A µg/L	Cylindrospermopsin µg/L	Microcystin-LA µg/L	Microcystin-LF µg/L	Microcystin-LR µg/L	Microcystin-LY µg/L	Microcystin-RR µg/L	Microcystin-YR µg/L	Nodularin µg/L
6/6/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/6/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/13/2019	EAFWTP Tap 01 (Raw)	0.021	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/13/2019	SRWTP Tap 01 (Raw)	0.022	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/20/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/20/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/27/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
6/27/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/4/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/4/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/11/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/11/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/18/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/18/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/25/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
7/25/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/1/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/1/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/8/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/8/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/15/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/15/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/22/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/22/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/29/2019	EAFWTP Tap 01 (Raw)	0.028	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
8/29/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/5/2019	EAFWTP Tap 01 (Raw)	0.025	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/5/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/12/2019	EAFWTP Tap 01 (Raw)	0.025	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/12/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/19/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/19/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/26/2019	EAFWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
9/26/2019	SRWTP Tap 01 (Raw)	< 0.02	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Date Collected	Site	Param	Result	Units
5/1/2019	SRWTP Treated (Lab Tap #13)	Anatoxin-a	<0.03	µg/L
5/1/2019	SRWTP Treated (Lab Tap #13)	Cylindrospermopsin	<0.09	µg/L
5/1/2019	SRWTP Treated (Lab Tap #13)	Total Microcystins	<0.3	µg/L
5/15/2019	SRWTP Treated (Lab Tap #13)	Anatoxin-a	<0.03	µg/L
5/15/2019	SRWTP Treated (Lab Tap #13)	Cylindrospermopsin	<0.09	µg/L
5/15/2019	SRWTP Treated (Lab Tap #13)	Total Microcystins	<0.3	µg/L
6/5/2019	SRWTP Treated (Lab Tap #13)	Anatoxin-a	<0.03	µg/L
6/5/2019	SRWTP Treated (Lab Tap #13)	Cylindrospermopsin	<0.09	µg/L
6/5/2019	SRWTP Treated (Lab Tap #13)	Total Microcystins	<0.3	µg/L
6/19/2019	SRWTP Treated (Lab Tap #13)	Anatoxin-a	<0.03	µg/L
6/19/2019	SRWTP Treated (Lab Tap #13)	Cylindrospermopsin	<0.09	µg/L
6/19/2019	SRWTP Treated (Lab Tap #13)	Total Microcystins	<0.3	µg/L
7/2/2019	SRWTP Treated (Lab Tap #13)	Anatoxin-a	<0.03	µg/L
7/2/2019	SRWTP Treated (Lab Tap #13)	Cylindrospermopsin	<0.09	µg/L
7/2/2019	SRWTP Treated (Lab Tap #13)	Total Microcystins	<0.3	µg/L
7/17/2019	SRWTP Treated (Lab Tap #13)	Anatoxin-a	<0.03	µg/L
7/17/2019	SRWTP Treated (Lab Tap #13)	Cylindrospermopsin	<0.09	µg/L
7/17/2019	SRWTP Treated (Lab Tap #13)	Total Microcystins	<0.3	µg/L
8/1/2019	SRWTP Treated (Lab Tap #13)	Anatoxin-a	<0.03	µg/L
8/1/2019	SRWTP Treated (Lab Tap #13)	Cylindrospermopsin	<0.09	µg/L
8/1/2019	SRWTP Treated (Lab Tap #13)	Total Microcystins	<0.3	µg/L
8/14/2019	SRWTP Treated (Lab Tap #13)	Anatoxin-a	<0.03	µg/L
8/14/2019	SRWTP Treated (Lab Tap #13)	Cylindrospermopsin	<0.09	µg/L
8/14/2019	SRWTP Treated (Lab Tap #13)	Total Microcystins	<0.3	µg/L

Sacramento County Water Agency

Vineyard Water Treatment Plant

Sample	Collected	Result
Freeport Intake	1/5/15	50
Freeport Intake	1/12/15	14
Freeport Intake	1/20/15	11
Freeport Intake	1/26/15	8
Freeport Intake	2/2/15	4
Freeport Intake	2/9/15	1700
Freeport Intake	2/17/15	90
Freeport Intake	2/23/15	50
Freeport Intake	3/2/15	17
Freeport Intake	3/10/15	110
Freeport Intake	3/16/15	22
Freeport Intake	3/23/15	30
Freeport Intake	3/31/15	8
Freeport Intake	4/6/15	17
Freeport Intake	4/13/15	7
Freeport Intake	4/20/15	110
Freeport Intake	4/27/15	300
Freeport Intake	5/4/15	70
Freeport Intake	5/11/15	30
Freeport Intake	5/19/15	30
Freeport Intake	5/26/15	23
Freeport Intake	6/1/15	30
Freeport Intake	6/8/15	11
Freeport Intake	6/15/15	50
Freeport Intake	6/22/15	8
Freeport Intake	6/29/15	11
Freeport Intake	7/6/15	30
Freeport Intake	7/13/15	13
Freeport Intake	7/20/15	30
Freeport Intake	7/27/15	30
Freeport Intake	8/3/15	8
Freeport Intake	8/10/15	8
Freeport Intake	8/17/15	4
Freeport Intake	8/24/15	14
Freeport Intake	8/31/15	30
Freeport Intake	9/8/15	500
Freeport Intake	9/15/15	500
Freeport Intake	9/22/15	17
Freeport Intake	9/28/15	14
Freeport Intake	10/5/15	50
Freeport Intake	10/13/15	8
Freeport Intake	10/19/15	800
Freeport Intake	10/26/15	13
Freeport Intake	11/2/15	22
Freeport Intake	11/9/15	130
Freeport Intake	11/16/15	50
Freeport Intake	11/24/15	13
Freeport Intake	12/1/15	80
Freeport Intake	12/7/15	23
Freeport Intake	12/14/15	70
Freeport Intake	12/21/15	30
Freeport Intake	12/28/15	22
Freeport Intake	1/4/16	11
Freeport Intake	1/12/16	80
Freeport Intake	1/22/16	1300
Freeport Intake	1/27/16	1300
Freeport Intake	2/1/16	800
Freeport Intake	2/9/16	11
Freeport Intake	2/16/16	7
Freeport Intake	2/22/16	14
Freeport Intake	3/1/16	13
Freeport Intake	3/7/16	4600
Freeport Intake	3/14/16	260
Freeport Intake	3/21/16	20
Freeport Intake	3/28/16	11
Freeport Intake	4/4/16	23
Freeport Intake	4/11/16	45

Freeport Intake	4/18/16	14
Freeport Intake	4/26/16	170
Freeport Intake	5/3/16	78
Freeport Intake	5/9/16	45
Freeport Intake	5/16/16	22
Freeport Intake	5/23/16	27
Freeport Intake	6/1/16	230
Freeport Intake	6/6/16	23
Freeport Intake	6/13/16	7.8
Freeport Intake	6/20/16	23
Freeport Intake	6/27/16	17
Freeport Intake	7/5/16	22
Freeport Intake	7/11/16	17
Freeport Intake	7/18/16	17
Freeport Intake	7/25/16	20
Freeport Intake	8/1/16	78
Freeport Intake	8/8/16	6.8
Freeport Intake	8/15/16	230
Freeport Intake	8/23/16	110
Freeport Intake	8/29/16	110
Freeport Intake	9/6/16	45
Freeport Intake	9/12/16	170
Freeport Intake	9/19/16	11
Freeport Intake	9/26/16	45
Freeport Intake	10/3/16	20
Freeport Intake	10/11/16	11
Freeport Intake	10/17/16	790
Freeport Intake	10/24/16	23
Freeport Intake	11/1/16	45
Freeport Intake	11/7/16	21
Freeport Intake	11/14/16	7.8
Freeport Intake	11/21/16	270
Freeport Intake	11/28/16	230
Freeport Intake	12/5/16	20
Freeport Intake	12/13/16	490
Freeport Intake	12/19/16	700
Freeport Intake	12/27/16	78
Freeport Intake	1/3/17	17
Freeport Intake	1/9/17	790
Freeport Intake	1/17/17	68
Freeport Intake	1/23/17	170
Freeport Intake	2/1/17	7.8
Freeport Intake	2/6/17	330
Freeport Intake	2/14/17	490
Freeport Intake	2/21/17	1100
Freeport Intake	2/27/17	45
Freeport Intake	3/6/17	34
Freeport Intake	3/13/17	20
Freeport Intake	3/20/17	18
Freeport Intake	3/27/17	170
Freeport Intake	4/4/17	17
Freeport Intake	4/10/17	1100
Freeport Intake	4/17/17	130
Freeport Intake	4/24/17	20
Freeport Intake	5/3/17	14
Freeport Intake	5/9/17	110
Freeport Intake	5/15/17	23
Freeport Intake	5/22/17	23
Freeport Intake	5/30/17	20
Freeport Intake	6/5/17	130
Freeport Intake	6/12/17	4
Freeport Intake	6/19/17	13
Freeport Intake	6/26/17	20
Freeport Intake	7/3/17	7.8
Freeport Intake	7/10/17	17
Freeport Intake	7/17/17	17
Freeport Intake	7/24/17	17
Freeport Intake	8/1/17	13

Freeport Intake	8/7/17	26
Freeport Intake	8/14/17	11
Freeport Intake	8/21/17	21
Freeport Intake	8/28/17	13
Freeport Intake	9/5/17	23
Freeport Intake	9/11/17	14
Freeport Intake	9/19/17	11
Freeport Intake	9/25/17	20
Freeport Intake	10/2/17	22
Freeport Intake	10/10/17	13
Freeport Intake	10/16/17	2
Freeport Intake	10/23/17	20
Freeport Intake	10/30/17	23
Freeport Intake	11/6/17	13
Freeport Intake	11/13/17	45
Freeport Intake	11/20/17	130
Freeport Intake	11/27/17	20
Freeport Intake	12/4/17	13
Freeport Intake	12/11/17	12
Freeport Intake	12/18/17	6.8
Freeport Intake	12/27/17	6.8
Freeport Intake	1/2/18	7.8
Freeport Intake	1/9/18	1300
Freeport Intake	1/16/18	22
Freeport Intake	1/22/18	40
Freeport Intake	1/29/18	230
Freeport Intake	2/5/18	7.8
Freeport Intake	2/14/18	2
Freeport Intake	2/21/18	4
Freeport Intake	3/1/18	20
Freeport Intake	3/5/18	110
Freeport Intake	3/12/18	13
Freeport Intake	3/19/18	230
Freeport Intake	3/26/18	130
Freeport Intake	4/2/18	23
Freeport Intake	4/9/18	17
Freeport Intake	4/16/18	78
Freeport Intake	4/24/18	14
Freeport Intake	5/1/18	17
Freeport Intake	5/7/18	20
Freeport Intake	5/15/18	23
Freeport Intake	5/21/18	26
Freeport Intake	5/29/18	11
Freeport Intake	6/4/18	9.3
Freeport Intake	6/12/18	7.8
Freeport Intake	6/19/18	7.8
Freeport Intake	6/26/18	4.5
Freeport Intake	7/2/18	22
Freeport Intake	7/9/18	11
Freeport Intake	7/17/18	14
Freeport Intake	7/24/18	13
Freeport Intake	8/1/18	20
Freeport Intake	8/7/18	14
Freeport Intake	8/14/18	4.5
Freeport Intake	8/21/18	13
Freeport Intake	8/27/18	7.8
Freeport Intake	9/4/18	45
Freeport Intake	9/10/18	7.8
Freeport Intake	9/17/18	13
Freeport Intake	9/24/18	7.8
Freeport Intake	10/2/18	4.5
Freeport Intake	10/9/18	21
Freeport Intake	10/17/18	7.8
Freeport Intake	10/23/18	7.8
Freeport Intake	10/30/18	78
Freeport Intake	11/6/18	45
Freeport Intake	11/13/18	4.5
Freeport Intake	11/20/18	4.5

Freeport Intake	11/26/18	22
Freeport Intake	12/3/18	7.8
Freeport Intake	12/10/18	2
Freeport Intake	12/19/18	490
Freeport Intake	12/26/18	130
Freeport Intake	1/2/19	78
Freeport Intake	1/7/19	0.00
Freeport Intake	1/14/19	130
Freeport Intake	1/22/19	330
Freeport Intake	1/28/19	700
Freeport Intake	2/4/19	1100
Freeport Intake	2/11/19	78
Freeport Intake	2/19/19	330
Freeport Intake	2/25/19	7.8
Freeport Intake	3/4/19	78
Freeport Intake	3/11/19	45
Freeport Intake	3/18/19	20
Freeport Intake	3/25/19	0.00
Freeport Intake	4/3/19	20
Freeport Intake	4/9/19	40
Freeport Intake	4/15/19	45
Freeport Intake	4/22/19	14
Freeport Intake	5/1/19	3.7
Freeport Intake	5/6/19	7.8
Freeport Intake	5/13/19	13
Freeport Intake	5/21/19	31
Freeport Intake	5/28/19	11
Freeport Intake	6/3/19	31
Freeport Intake	6/10/19	14
Freeport Intake	6/17/19	11
Freeport Intake	6/24/19	2
Freeport Intake	7/1/19	78
Freeport Intake	7/8/19	23
Freeport Intake	7/15/19	9.3
Freeport Intake	7/22/19	13
Freeport Intake	7/29/19	4.5
Freeport Intake	8/5/19	13
Freeport Intake	8/12/19	7.8
Freeport Intake	8/19/19	7.8
Freeport Intake	8/26/19	170
Freeport Intake	9/3/19	13
Freeport Intake	9/9/19	4.5
Freeport Intake	9/16/19	6.8
Freeport Intake	9/23/19	140
Freeport Intake	10/1/19	6.8
Freeport Intake	10/7/19	4.5
Freeport Intake	10/15/19	9.3
Freeport Intake	10/21/19	4.5
Freeport Intake	10/28/19	2
Freeport Intake	11/4/19	23
Freeport Intake	11/12/19	7.8
Freeport Intake	11/19/19	7.8
Freeport Intake	11/25/19	13
Freeport Intake	12/2/19	330
Freeport Intake	12/9/19	40
Freeport Intake	12/16/19	45
Freeport Intake	12/23/19	20
		0.00
		4600.00
	ave	119.30
	median	20.00
	95th	700.00

Sacramento County Water Agency (SCWA)
LT2 Bin Concentration Calculation -
(For Systems With Plants Operating Only Part Of The Year That Monitor Fewer Than 12 Months Per Year)

PWS ID	3410029-096
Facility ID	WS Sacramento River/FRWA Intake Sample Tap
Analytical Method Number	EPA 1623 (Crypto/Giardia) and E.coli (SM9223B)
Method Type	EPA
Source Type	Flowing Stream
Number of Samples	17

Sample Count	Collection Date/Time	Login Date/Time	Sample Type	Sample Volume Filtered (L)	Was 100% Of Filtered Volume Examined?	Filter Type	Turbidity NTU	Arrival Temp (C)	Crypto Number of Oocysts Counted	Giardia Number of Oocysts Counted	E. coli/100ml	Sample Volume Spiked	Estimated Number Of Oocysts Spiked	Crypto Concentration (oocysts/L)	Arithmetic Mean During Years 2015, 2016, and 2017	Comments
1	5/19/15 7:50 AM	5/20/15 9:20 AM	Field	11.00	YES	Envirochek HV	4.7	8.5	0	0	57.3			0		
2	6/17/2015 8:00AM	6/18/2015 9:50AM	Matrix Spike	11.00	YES	Envirochek HV	4.5	13.6	59	82	50.0	11.0	100/100	-		59% Cryto Recovery 7.4% Giardia Recovery
2	6/17/2015 8:00AM	6/18/2015 9:50AM	Field	11.00	YES	Envirochek HV	4.5	13.6	0	0	50.0			0		E.coli from 6/15/15 sample
3	7/14/2015 8:20AM	7/15/2015 9:50AM	Field	11.25	YES	Envirochek HV	4.5	10	0	0	6.2			0		
4	8/17/2015 9:00AM	8/18/2015 9:25AM	Field	11.00	YES	Envirochek HV	3.5	7.4	0	0	3.0			0		
5	9/15/2015 8:30AM	9/16/2015 9:55AM	Field	11.00	YES	Envirochek HV	3.2	9.3	0	0	9.7			0		
6	10/19/2015 9:15AM	10/20/2015 9:05AM	Field	11.00	YES	Envirochek HV	2.9	11	0	0	800.0			0		
7	11/16/2015 8:30AM	11/17/2015 10:25AM	Field	11.00	YES	Envirochek HV	4.1	3.2	0	1	33.1			0		
8	12/14/2015 12:30PM	12/15/2015 10:13AM	Field	11.00	YES	Envirochek HV	10.5	5.7	2	0	70.0			0.182	0.0227	
9	4/18/2016 9:05AM	4/19/2016 9:25AM	Field	11.00	YES	Envirochek HV	8.5	8.7	0	0	13.4			0		
10	5/16/2016 10:50AM	5/17/2016 9:35AM	Field	11.00	YES	Envirochek HV	7.4	7.4	0	0	20.1			0		
11	6/13/2016 9:20AM	6/14/2016 9:20AM	Field	10.00	YES	Envirochek HV	7.5	11.7	0	0	3.1			0		
12	7/20/2016 10:30AM	7/21/2016 8:55AM	Field	10.25	YES	Envirochek HV	7.3	9.3	0	0	8.5			0		Resample - Previous LT2 Crypto sample was under volume
13	8/15/2016 8:15AM	8/16/2016 9:30AM	Field	10.00	YES	Envirochek HV	7.6	15.9	0	0	16.1			0		
14	9/19/2016 8:00AM	9/20/2016 9:31AM	Field	10.00	YES	Envirochek HV	4.1	7.1	0	0	12.0			0		
15	10/17/2016 8:30AM	10/18/2016 9:15AM	Field	9.75	YES	Envirochek HV	4.1	5.1	0	4	275.5			0		
16	11/14/2016 9:45AM	11/15/2016 9:00AM	Field	9.75	YES	Envirochek HV	4.9	9.2	0	0	7.8			0		
17	12/19/2016 10:45AM	12/20/2016 10:55AM	Field	10.50	YES	Envirochek HV	48	6.4	0	0	700.0			0	0	
18	4/20/2017 12:00PM	4/21/2016 9:00AM	Field	9.60	YES	Envirochek HV	16.7	7.9	0	0	36.4			0	0	

LT2 Bin Concentration: Highest Year Mean - 2015 (oocyst/L)	0.0227

Bin Classification - from 141.710(c)	1

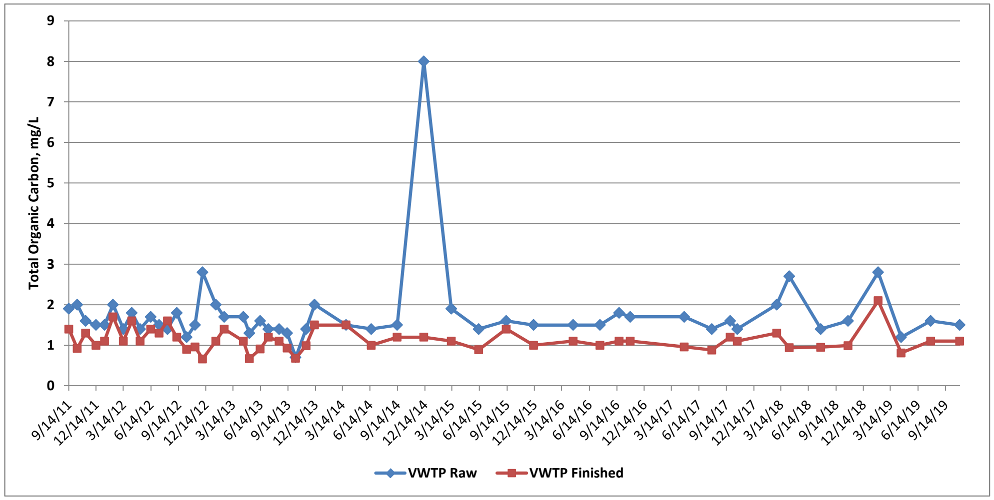
TOC

Date	VWTP Raw	VWTP Finished	
9/14/11	1.9	1.4	
10/12/11	2	0.92	
11/9/11	1.6	1.3	
12/14/11	1.5	1.0	
1/11/12	1.5	1.1	
2/8/12	2	1.7	
3/14/12	1.4	1.1	
4/11/12	1.8	1.6	
5/9/12	1.4	1.1	
6/13/12	1.7	1.4	
7/11/12	1.5	1.3	
8/8/12	1.4	1.6	
9/8/12	1.8	1.2	
10/11/12	1.2	0.9	
11/8/12	1.5	0.96	
12/3/12	2.8	0.66	
1/16/13	2	1.1	
2/13/13	1.7	1.4	
4/18/13	1.7	1.1	
5/8/13	1.3	0.67	
6/13/13	1.6	0.91	
7/10/13	1.4	1.2	
8/15/13	1.4	1.1	
9/11/13	1.3	0.93	
10/9/13	0.7	0.68	
11/13/13	1.4	0.99	
12/11/13	2	1.5	
3/26/14	1.5	1.5	
6/18/14	1.4	1	
9/12/14	1.5	1.2	
12/10/14	8	1.2	
3/12/15	1.9	1.1	0.421053
6/11/15	1.4	0.89	0.364286
9/11/2015	1.6	1.4	0.125
12/11/15	1.5	1	0.333333
4/21/16	1.5	1.1	0.266667
7/19/16	1.5	1	0.333333
9/21/2016	1.8	1.1	0.388889
10/28/16	1.7	1.1	0.352941
4/26/17	1.7	0.96	0.435294
7/27/2017	1.4	0.88	0.371429
9/26/2017	1.6	1.2	0.25
10/20/17	1.4	1.1	0.214286
2/28/18	2	1.3	0.35
4/11/18	2.7	0.94	0.651852
7/25/18	1.4	0.95	0.321429
10/24/18	1.6	0.99	0.38125
2/1/19	2.8	2.1	0.25
4/19/19	1.2	0.81	0.325
7/26/19	1.6	1.1	0.3125
10/31/19	1.5	1.1	0.266667
min	1.2	0.81	0.125
max	2.8	2.1	0.651852
ave	1.69	1.106	0.33576
median	1.6	1.1	0.333333
95th	2.705		

Note treated water sample for 2/1/19 was actually collected on 1/18/2019

Al, Fe, Mn

Date	Description	Analyte	Units	Raw	Treated	
9/11/2015 9:37	Aluminum, CA DW ICP	Aluminum	mg/L	0.096	96	ND
9/21/2016 9:00	Aluminum, CA DW ICP	Aluminum	mg/L	0.8	800	ND
9/26/2017 11:05	Aluminum, CA DW ICP	Aluminum	mg/L	0.49	490	ND
9/26/2018 10:48	Aluminum, CA DW ICP	Aluminum	mg/L	0.066	66	ND
10/31/2019 10:30				0.12	120	ND
				average	314.4	
				median	120	
				95th	738	
9/11/2015 9:37	Iron, CA DW ICP	Iron	mg/L	0.15	150	ND
9/21/2016 9:00	Iron, CA DW ICP	Iron	mg/L	1.2	1200	ND
9/26/2017 11:05	Iron, CA DW ICP	Iron	mg/L	0.8	800	ND
9/26/2018 10:48	Iron, CA DW ICP	Iron	mg/L	0.13	130	ND
10/31/2019 10:30				0.23	230	ND
				average	502	
				median	230	
				95th	1120	
9/11/2015 9:37	Manganese, CA DW ICP	Manganese	mg/L	0.016	16	ND
9/21/2016 9:00	Manganese, CA DW ICP	Manganese	mg/L	0.05	50	ND
9/26/2017 11:05	Manganese, CA DW ICP	Manganese	mg/L	0.031	31	ND
9/26/2018 10:48	Manganese, CA DW ICP	Manganese	mg/L	0.014	14	ND
10/31/2019 10:30				0.011	11	ND
				average	24.4	
				median	16	



Quarterly TTHM Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: SCWA - Laguna / Vineyard / CCE / Grantline 99 System No.: 3410029 Year: 2017 Quarter: 4TH

Year:	2013				2014				2015			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):	Feb-13	May-13	Aug-13	Nov-13	Feb-14	Jun-14	Aug-14	Nov-14	Feb-15	May-15	Aug-15	Nov-15
Site 1 - Vineyard Point	25.0	27.0	32.0	33.0	0.0	49.0	33.0	32.0	1.2	36.0	41.0	32.0
Site 2 - Joseph Perry Park	23.0	18.0	22.0	23.0	0.0	26.0	18.0	10.0	0.0	33.0	25.0	31.0
Site 3 - Miwok Park	20.0	6.3	3.3	17.0	1.3	4.8	6.3	12.0	0.6	20.0	14.0	22.0
Site 4 - Clay Glen Way	20.0	25.0	28.0	25.0	2.1	21.0	29.0	13.0	0.0	34.0	20.0	41.0
Site 5 - Jones Family	10.0	20.0	21.0	23.0	0.0	15.0	17.0	9.1	0.0	30.0	15.0	23.0
Site 6 - Womack Park	13.0	15.0	11.0	17.0	4.3	9.8	22.0	13.0	5.8	38.0	18.0	9.8
Site 7 - Walt Davis	11.0	24.0	26.0	28.0	1.2	19.0	16.0	11.0	0.0	33.0	20.0	20.0
Site 8 - Fite Park	15.0	19.0	27.0	23.0	0.9	12.0	19.0	12.0	2.0	40.0	18.0	36.0
ave	17.1	19.3	21.3	23.6	1.2	19.6	20.0	14.0	1.2	33.0	21.4	26.9
	Feb-13	May-13	Aug-13	Nov-13	Feb-14	Jun-14	Aug-14	Nov-14	Feb-15	May-15	Aug-15	Nov-15
Site 9												
Site 10												
Site 11												
Site 12												
Quarterly Average	4146.0	4156.9	4167.9	4179.2	4168.2	4196.7	4203.2	4207.0	4204.7	4242.2	4240.9	4255.1
Running Annual Average	16.3	18.0	17.2	4162.5	4168.0	4178.0	4186.8	4193.8	4202.9	4214.3	4223.7	4235.7
Meets Standard?* (check box)	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐
Number of Samples Taken	10	10	10	10	10	10	10	10	10	10	10	10

Year:	2016				2017			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):	Feb-16	May-16	Aug-16	Nov-16	Feb-17	May-17	Aug-17	Nov-17
Site 1 - Vineyard Point	0.7	40.0	43.0	60.0	0.8	33.0	40.0	44.0
Site 2 - Joseph Perry Park	0.0	41.0	48.0	56.0	0.0	32.0	37.0	41.0
Site 3 - Miwok Park	2.3	40.0	10.0	54.0	3.6	25.0	33.0	46.0
Site 4 - Clay Glen Way	5.5	40.0	36.0	54.0	3.3	35.0	46.0	45.0
Site 5 - Jones Family	0.6	39.0	38.0	49.0	0.0	31.0	39.0	35.0
Site 6 - Womack Park	6.3	27.0	27.0	45.0	7.3	35.0	7.4	50.0
Site 7 - Walt Davis	3.5	42.0	39.0	47.0	2.3	33.0	28.0	44.0
Site 8 - Fite Park	4.1	35.0	33.0	52.0	3.6	33.0	32.0	47.0
ave	2.9	38.0	34.3	52.1	2.6	32.1	32.8	44.0
	Feb-16	May-16	Aug-16	Nov-16	Feb-17	May-17	Aug-17	Nov-17
Site 9								
Site 10								
Site 11								
Site 12								
Quarterly Average	4242.7	4283.3	4289.1	4314.4	4279.1	4314.5	4324.3	4343.6
Running Annual Average	4245.2	4255.5	4267.5	4282.4	4291.5	4299.3	4308.1	4315.4
Meets Standard?* (check box)	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐
Number of Samples Taken	10	10	10	10	10	10	10	10

Year:	2018				2019			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):	Feb-18	May-18	Aug-18	Nov-18	Feb-19	May-19	Aug-19	Nov-19
Site 1 - Vineyard Point	1.6	34.0	37.0	31.0	60.0	31.0	40.0	33.0
Site 2 - Joseph Perry Park	0.0	37.0	42.0	23.0	52.0	25.0	39.0	29.0
Site 3 - Miwok Park	2.8	11.0	8.8	30.0	32.0	7.0	17.0	19.0
Site 4 - Clay Glen Way	5.2	34.0	43.0	28.0	46.0	19.0	29.0	33.0
Site 5 - Jones Family	0.5	40.0	46.0	24.0	55.0	24.0	41.0	31.0
Site 6 - Womack Park	4.0	27.0	14.0	29.0	38.0	7.2	20.0	15.0
Site 7 - Walt Davis	2.0	46.0	48.0	28.0	38.0	21.0	24.0	28.0
Site 8 - Fite Park	2.2	24.0	40.0	28.0	41.0	15.0	27.0	35.0
ave	2.3	31.6	34.9	27.6	45.3	18.7	29.6	27.9
	Feb-18	May-18	Aug-18	Nov-18	Feb-19	May-19	Aug-19	Nov-19

2013-2014 ave of ind samples	17.0
2015-2019 ave of ind samples	27.0
2015-2019 min	0.0
max	60.0

Identify the sample locations in the table below.

Site	Sample Location
1	Vineyard Point Apartments
2	Joseph Perry Park
3	Miwok Park
4	8710 Clay Glen Way
5	Jones Family Park
6	Womack Park
7	Walt Davis Park
8	Fite Park

Comments: ** N/A **

1/9/2018

STATE WATER RESOURCES CONTROL BOARD

DIVISION OF DRINKING WATER

Quarterly HAA5 Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: SCWA - Laguna / Vineyard / CCE / Grantline 99 System No.: 3410029 Year: 2017 Quarter: 4TH

Year:	2013				2014				2015				2016			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):	Feb-13	May-13	Aug-13	Nov-13	Feb-14	Jun-14	Aug-14	Nov-14	Feb-15	May-15	Aug-15	Nov-15	Feb-16	May-16	Aug-16	Nov-16
Site 1 - Vineyard Point	21.0	18.0	22.0	22.0	0.0	31.0	21.0	16.0	0.0	23.0	26.0	21.0	0.0	32.0	26.0	39.0
Site 2 - Joseph Perry Park	9.4	15.0	21.0	18.0	0.0	20.0	17.0	7.7	0.0	21.0	18.0	22.0	0.0	32.0	24.0	34.0
Site 3 - Miwok Park	16.0	4.7	2.3	11.0	0.0	3.5	5.2	6.0	0.0	9.3	7.8	11.0	0.0	32.0	4.3	31.0
Site 4 - Clay Glen Way	14.0	16.0	19.0	19.0	0.0	17.0	14.0	6.2	0.0	20.0	11.0	13.0	0.0	32.0	20.0	28.0
Site 5 - Jones Family	8.7	18.0	20.0	18.0	0.0	14.0	14.0	5.0	0.0	19.0	9.2	15.0	0.0	33.0	20.0	31.0
Site 6 - Womack Park	8.7	9.5	5.9	9.2	0.0	5.5	8.4	5.0	0.0	19.0	10.0	2.9	0.0	20.0	15.0	15.0
Site 7 - Walt Davis	7.7	16.0	18.0	18.0	0.0	14.0	11.0	5.8	0.0	19.0	12.0	12.0	0.0	34.0	21.0	27.0
Site 8 - Fite Park	13.0	15.0	18.0	16.0	0.0	7.8	12.0	5.6	0.0	18.0	7.6	14.0	0.0	27.0	20.0	28.0
average	12.3	14.0	15.8	16.4	0.0	14.1	12.8	7.2	0.0	18.5	12.7	13.9	0.0	30.3	18.8	29.1
	Feb-13	May-13	Aug-13	Nov-13	Feb-14	Jun-14	Aug-14	Nov-14	Feb-15	May-15	Aug-15	Nov-15	Feb-16	May-16	Aug-16	Nov-16
Site 9																
Site 10																
Site 11																
Site 12																
Quarterly Average	4141.7	4152.1	4162.9	4172.7	4167.1	4191.8	4196.7	4200.8	4203.6	4229.2	4233.1	4243.4	4240.1	4276.3	4275.2	4293.7
Running Annual Average	10.9	12.5	12.8	4157.3	4163.7	4173.6	4182.1	4189.1	4198.2	4207.6	4216.7	4227.3	4236.4	4248.2	4258.8	4271.3
Meets Standard?* (check box)	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐
Number of Samples Taken	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10

Year:	2017				2018				2019			
Quarter:	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.
Sample Date (month/date):	Feb-17	May-17	Aug-17	Nov-17	Feb-18	May-18	Aug-18	Nov-18	Feb-19	May-19	Aug-19	Nov-19
Site 1 - Vineyard Point	0.0	27.0	17.0	33.0	0.0	21.0	23.0	16.0	39.0	20.0	24.0	16.0
Site 2 - Joseph Perry Park	0.0	28.0	15.0	33.0	0.0	17.0	23.0	12.0	32.0	17.0	23.0	16.0
Site 3 - Miwok Park	0.0	19.0	13.0	32.0	0.0	5.4	5.0	14.0	18.0	5.0	9.2	9.8
Site 4 - Clay Glen Way	0.0	27.0	17.0	33.0	0.0	16.0	22.0	15.0	25.0	12.0	13.0	16.0
Site 5 - Jones Family	0.0	27.0	16.0	27.0	0.0	19.0	23.0	12.0	34.0	17.0	23.0	15.0
Site 6 - Womack Park	0.0	27.0	0.0	32.0	0.0	12.0	7.4	13.0	17.0	4.4	8.6	6.6
Site 7 - Walt Davis	0.0	27.0	11.0	30.0	0.0	20.0	24.0	13.0	22.0	15.0	11.0	14.0
Site 8 - Fite Park	0.0	27.0	14.0	34.0	0.0	10.0	19.0	13.0	19.0	9.9	17.0	17.0
average	0.0	26.1	12.9	31.8	0.0	15.1	18.3	13.5	25.8	12.5	16.1	13.8
	Feb-17	May-17	Aug-17	Nov-17	Feb-18	May-18	Aug-18	Nov-18	Feb-19	May-19	Aug-19	Nov-19
Site 9												
Site 10												
Site 11												
Site 12												
Quarterly Average	4276.7	4309.1	4306.4	4332.6								
Running Annual Average	4280.5	4288.7	4296.5	4306.2								
Meets Standard?* (check box)	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐	Yes ☑ No ☐								
Number of Samples Taken	10	10	10	10								

2013-2014 ave of ind samples 11.6

2015-2019 ave of ind samples 15.5

2015-2019 min 0.0

max 39.0

Identify the sample locations in the table below.

Site	Sample Location
1	Vineyard Point Apartments
2	Joseph Perry Park
3	Miwok Park
4	8710 Clay Glen Way
5	Jones Family Park
6	Womack Park
7	Walt Davis Park
8	Fite Park

Comments: ** N/A **

1/9/2018

SACRAMENTO COUNTY

SCWA 2019-2020 PFAS & PFOS Monitoring Program Summary of Hits

12/4/19			Required Quarterly Testing for PFAS & PFOS by EPA Method 537.1 or EPA Method 537 Revision 1.1																					
				Sample ID			Perfluorinated Compounds by LC-MS/MS																	
Sample Date	Time	Quarter	Report #	Well 02 - Tolenas - Raw	Well 21 - Bethel Temple - Raw	Well 73 - East Park	11-Chloroeicosafluoro-3-oxaundecanes ulfonic acid	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	9-Chlorohexadecafluoro-3-oxanone-1-s ulfonic acid	Hexafluoropropylene oxide dimer acid (HFPO-DA)	NEtFOSAA	NMeFOSAA	Perfluoro-1-butanesulfonic acid (PFBS)	Perfluoro-1-hexanesulfonic acid (PFHxS)	Perfluoro-1-octanesulfonic acid (PFOS)	Perfluorododecanoic acid (PFDoA)	Perfluoro-n-decanoic acid (PFDA)	Perfluoro-n-heptanoic acid (PFHpA)	Perfluoro-n-hexanoic acid (PFHxA)	Perfluoro-n-nonanoic acid (PFNA)	Perfluoro-n-octanoic acid (PFOA)	Perfluorotetradecanoic acid (PFTeDA)	Perfluorotridecanoic acid (PFTrDA)	Perfluoroundecanoic acid (PFUnA)
5/21/2019	9:25 AM	1	A9E2947	✔			ND	ND	ND	ND	ND	ND	ND	1.4	2.8	ND	ND	ND	ND	ND	2.2	ND	ND	ND
8/13/2019	9:35 AM	2	S9H0225	✔			ND	ND	ND	ND	ND	ND	ND	1.5	2.8	ND	ND	ND	ND	ND	2.3	ND	ND	ND
11/7/2019	11:15 AM	3	S9K0125	✔			ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5/21/2019	8:25 AM	1	A9E2947		✔		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8/13/2019	10:19 AM	2	S9H0225		✔		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11/7/2019	9:16 AM	3	S9K0125		✔		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5/21/2019	10:12 AM	1	A9E2953			✔	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
8/15/2019	11:07 AM	2	S9H0256			✔	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
11/7/2019	12:08 PM	3	S9K0127			✔	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

APV Order No. : 01 -09-19M-003-3410002
Well 02 - Tolenas - Raw - 3410002-001
Well 21 - Bethel Temple - Raw - 3410002-012

LAG/VIN Order No. 01-09-19M-009-3410029
Well 73 - East Park - 3410029-026

SCWA 2015-2019 Algal Toxins Monitoring Program Summary of Hits and Results

23-Jan-20				Algal-toxins by LCMS Low																		SPME - Taste and Odor Compounds			
				Sample ID								PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	NG/L	NG/L	%	%
Sample Date	Time	Laboratory	Report #	FRWA Site	Settled Water	Finished Water	FRWA Intake Meter Vault	Basin 2 Online	Sacramento River	VSWTP	VSWTP Clear Well	Anatoxin a (MRL = 0.02)	Cylindrospermopsin (MRL = 0.05)	Microcystin-LA (MC-LA) (MRL = 0.1)	Microcystin-LF (MC-LF) (MRL = 0.1)	Microcystin-LR (MC-LR) (MRL = 0.1)	Microcystin-LY (MC-LY) (MRL = 0.1)	Microcystin-RR (MC-RR) (MRL = 0.1)	Microcystin-YR (MC-YR) (MRL = 0.1)	Microcystin/Nod. (MRL = 0.1)	Saxitoxin	Geosmin (MRL = 3)	Methylisoborneol (MRL = 5)	Isobutyl methoxypyrazine	Isopropyl methoxypyrazine
Sample Year 2015																									
10/13/2015	9:50 AM	Eurofins	556989	✔								ND	ND	ND (R7)	ND	ND (R7)	ND	ND	ND	ND		8.8	6.0	93.0	92.0
10/13/2015	8:45 AM	Eurofins	556989							✔		ND	ND	ND (R7)	ND	ND (R7)	ND	ND	ND	ND		3.8	ND	97.0	94.0
10/13/2015	9:00 AM	Eurofins	556989								✔	ND	ND	ND (R7)	ND	ND (R7)	ND	ND	ND	ND		ND	ND	132.0	120.0
10/20/2015	11:55 AM	Eurofins	558899							✔		ND	ND	ND	ND (R7)	ND	ND	ND	ND	ND		ND	ND	93.0	78.0
10/20/2015	12:05 PM	Eurofins	558899								✔	ND	ND	ND	ND (R7)	ND	ND	ND	ND	ND		ND	ND	54.0	123.0
10/20/2015	12:45 PM	Eurofins	558899	✔								ND	ND	ND	ND (R7)	ND	ND	ND	ND	ND		10.0	6.9	71.0	119.0
10/27/2015	7:45 AM	Eurofins	559889							✔		ND	ND	ND	ND	ND	ND	ND	ND	ND		6.3	ND (R7)	101.0	115.0
10/27/2015	8:30 AM	Eurofins	559889	✔								ND	ND	ND	ND	ND	ND	ND	ND	ND		7.8	5.3 (R7)	97.0	111.0
11/3/2015	7:00 AM	Eurofins	560870							✔		ND	ND	ND	ND	ND	ND	ND	ND	ND (R5)		3.8 (R7)	ND (R5)	124.0	114.0
11/3/2015	8:00 AM	Eurofins	560870	✔								ND	ND	ND	ND	ND	ND	ND	ND	ND (R5)		6.4 (R7)	ND	123.0	84.0
11/10/2015	7:00 AM	Eurofins	562108							✔		ND	ND	ND	ND	ND	ND	ND	ND	ND		7.5	ND (R7)	74.0	103.0
11/10/2015	8:00 AM	Eurofins	562108	✔								ND	ND (M2)	ND (M2)	ND	ND	ND (M2)	ND	ND	ND (M2)		7.1	ND (R7)	91.0	107.0
11/17/2015	7:45 AM	Eurofins	563043							✔		ND	ND	ND	ND	ND	ND	ND	ND	ND		4.5	ND	108.0	105.0
11/17/2015	1:00 PM	Eurofins	563043	✔								ND	ND	ND	ND	ND	ND	ND	ND	ND		6.6 (R7)	ND (R7)	129.0	114.0
11/24/2015	7:00 AM	Eurofins	564171							✔		ND	ND	ND	ND	ND	ND	ND	ND	ND		6.1	ND	105.0	99.0
11/24/2015	8:30 AM	Eurofins	564171	✔								ND	ND	ND	ND	ND	ND	ND	ND	ND		10.0	ND	102.0	90.0
Sample Year 2016																									
6/6/2016	8:15 AM	Eurofins	594044						✔			ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND (LK)	128.0	113.0
6/13/2016	9:00 AM	Eurofins	595516						✔			ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	132.0	72.0
6/20/2016	1:10 & 1:15 PM	Eurofins	596602						✔			ND	ND	ND	ND	ND	ND	ND	ND	NA		ND	ND	98.0	93.0
6/27/2016	9:00 AM	Eurofins	597580						✔			ND	ND	ND	ND	ND	ND	ND	ND	ND		3.0	ND	106.0	100.0
7/5/2016	8:55 AM	Eurofins	598614						✔			ND	ND	ND	ND	ND	ND (LE)	ND	ND	NA		ND	ND	104.0	100.0
7/11/2016	9:30 AM	Eurofins	599571						✔			ND	ND	ND	ND	ND	ND (LE)	ND	ND	ND		ND (LE, L1, BF)	ND (R7)	114.0	86.0
7/18/2016	9:00 AM	Eurofins	600948						✔			ND	ND	ND	ND (LE)	ND	ND	ND	ND	NA		NA	NA	NA	NA
7/25/2016	9:30 AM	Eurofins	602418						✔			ND	ND	ND	ND (LE)	ND	ND	ND	ND	NA		NA	NA	NA	NA
8/1/2016	8:30 AM	Eurofins	603311						✔			ND	ND	ND	ND	ND	ND	ND	ND	NA		ND (M1)	ND (M1)	113.0	97.0
8/29/2016	9:00 AM	Eurofins	608286						✔			ND	ND	ND	ND	ND	ND	ND	0.11	NA		NA	NA	NA	NA
9/6/2016	8:15 AM	Eurofins	609617						✔			ND	ND (LK, V1)	ND	ND (V1)	ND	ND	ND	ND	NA		7.9	6.8	85.0	74.0
9/12/2016	9:00 AM	Eurofins	610651						✔			ND	ND	ND	ND	ND	ND (R6)	ND	ND	NA		NA	NA	NA	NA
9/19/2016	8:02 AM	Eurofins	611923						✔			0.031	ND	ND	ND	ND	ND	ND	ND	NA		6.2	5.5 (R7)	118.0	88.0
9/26/2016	8:00 AM	Eurofins	613231						✔			ND	ND	ND	ND	ND	ND	ND	ND	NA		9.1	ND	139.0	124.0
10/3/2016	8:45 AM	Eurofins	614341						✔			ND	ND	ND	ND	ND	ND	ND	ND	NA		4.6 (R7)	ND	146.0	76.0
10/11/2016	8:30 AM	Eurofins	616213						✔			ND	ND	ND	ND	ND	ND	ND	ND	NA		14	ND	78.0	110.0
10/17/2016	8:30 AM	Eurofins	617325						✔			ND	ND	ND	ND	ND	ND	ND	ND	NA		4.3	ND	145.0	80.0
10/24/2016	8:15 AM	Eurofins	618543						✔			ND	ND	ND (LK)	ND	ND (LE)	ND (LK)	ND	ND (LE)	NA		4.3	ND	94.0	116.0
10/31/2016	9:10 AM	Eurofins	619727						✔			ND	ND	ND	ND	ND	ND	ND	ND	NA		3.4	ND	106.0	96.0
Sample Year 2017																									
6/6/2017	11:00 AM	Eurofins	664945						✔			ND	ND	ND	ND (MD)	ND	ND	ND	ND	ND		NA	NA	NA	NA
6/13/2017	9:21 AM	Eurofins	666353						✔			ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	141.0	95.0
8/8/2017	8:00 AM	Eurofins	678151						✔			ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	8.5	84.0	96.0
8/22/2017	9:15 AM	Eurofins	681397						✔			ND	ND	ND	ND	ND	ND (LK)	ND	ND	ND		NA	NA	NA	NA
8/29/2017	9:00 AM	Eurofins	682908						✔			ND	ND	ND	ND	ND (V1)	ND (V1)	ND	ND	ND		NA	NA	NA	NA
9/12/2017	9:45 AM	Eurofins	686111						✔			ND	ND	ND	ND	ND	ND	ND	ND	ND		ND	ND	105.0	75.0
Sample Year 2018																									
6/12/2018	10:05 AM	Eurofins	743878						✔			ND	ND	ND	ND	ND	ND	ND	ND	ND		3.6	ND	98.0	99.0
6/26/2018	9:30 AM	Eurofins	746631						✔			ND	ND	ND	ND	ND (V1)	ND	ND	ND	ND		NA	NA	NA	NA
7/10/2018	9:00 AM	Eurofins	748914						✔			ND	ND	ND	ND	ND	ND	ND	ND	ND		ND (R7)	ND (R7)	91.0	90.0
7/24/2018	9:30 AM	Eurofins	751975						✔			0.021	ND	ND	ND	ND (V1)	ND	ND	ND	ND (V1)		NA	NA	NA	NA
8/14/2018	12:45 PM	Eurofins	756277						✔			ND	ND	ND (LK)	ND (R6)	ND	ND (R6)	ND	ND	ND		3.3 (R7)	ND	113.0	108.0
8/28/2018	11:00 AM	Eurofins	758990						✔			0.032	ND	ND	ND (LE)	ND	ND	ND	ND	ND		NA	NA	NA	NA
9/4/2018	8:40 AM	Eurofins	760235						✔			0.029	ND	ND	ND	ND	ND	ND	ND	ND		NA	NA	NA	NA
9/11/2018	10:25 AM	Eurofins	761586				✔					0.028	ND	ND	ND	ND	ND	ND	ND	ND		5.2	ND (M1)	120.0	101.0
9/11/2018	10:35 AM	Eurofins	761586					✔				0.046	ND	ND	ND	ND	ND	ND	ND	ND		NA	NA	NA	NA
9/18/2018	9:35 AM	Eurofins	763088				✔					0.031	ND	ND	ND	ND	ND	ND	ND	ND		NA	NA	NA	NA
9/25/2018	7:05 AM	Eurofins	764481		✔							ND	ND	ND	ND	ND (V1)	ND	ND	ND	ND		NA	NA	NA	NA
9/25/2018	8:50 AM	Eurofins	764481			✔						ND	ND	ND	ND	ND (V1)	ND	ND	ND	ND		NA	NA	NA	NA
9/25/2018	9:50 AM	Eurofins	764481				✔					0.038	ND	ND	ND	ND (V1)	ND	ND	ND	ND		NA	NA	NA	NA
10/2/2018	8:35 AM	Eurofins	765801				✔					0.028	ND	ND	ND	ND	ND	ND	ND	ND		NA	NA	NA	NA
10/9/2018	9:10 AM	Eurofins	767127				✔					ND	ND	ND	ND	ND	ND	ND	ND	ND		4.8 (R7)	ND	127.0	100.0
10/9/2018	9:10 AM	Eurofins	767127				✔					NA	NA	NA	NA	NA	NA	NA	NA	NA		3.4 (R7)	ND	122.0	115.0

23-Jan-20				Algal-toxins by ELISA Method																		SM 6040E - Taste and Odor Compounds			
				Sample ID								PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	PPB	NG/L	NG/L	%	%
Sample Date	Time	Laboratory	Invoice No.	FRWA Site	Settled Water	Finished Water	FRWA Intake Meter Vault	Basin 2 Online	VSWTP	VSWTP	VSWTP Clear Well	Anatoxin a (MRL = 0.02)	Cylindrospermopsin (MRL = 0.05)	Microcystin-LA (MC-LA) (MRL = 0.1)	Microcystin-LF (MC-LF) (MRL = 0.1)	Microcystin-LR (MC-LR) (MRL = 0.1)	Microcystin-LY (MC-LY) (MRL = 0.1)	Microcystin-RR (MC-RR) (MRL = 0.1)	Microcystin-YR (MC-YR) (MRL = 0.1)	Microcystin/Nod. (MRL = 0.1)	Saxitoxin	Geosmin (MRL = 3)	Methylisoborneol (MRL = 5)	Isobutyl methoxypyrazine	Isopropyl methoxypyrazine
Sample Year 2019																									
7/2/2019	9:00 AM	Bend Genetics	SA1905	✔								ND	ND	NA	NA	NA	NA	NA	NA	0.16	ND	NA	NA	NA	NA

Flags Legend per Eurofins Laboratory Reports:

BF - Target analyte detected in method blank is at or above the method acceptance limits, but below the method reporting limit (MRL) and analyte not present in the sample.
L1 - The associated blank spike recovery was above laboratory acceptance limits.
LE - MRL Check recovery was above laboratory acceptance limits.
LK - The associated blank spike recovery was above method acceptance limits. This target analyte was not detected in the sample.
M1 - Matrix spike recovery was high; the associated blank spike recovery was acceptable.
M2 - Matrix spike recovery was low; the associated blank spike recovery was acceptable.
MD - Matrix spike recovery was low; the associated blank spike recovery was acceptable. MS/MSD RPD met acceptance criteria.
NA - Samples not analyzed.
R5 - MS/MSD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
R6 - LFB/LFBD RPD exceeded the method acceptance limit. Recovery met acceptance criteria.
R7 - LFB/LFBD RPD exceeded the laboratory acceptance limit. Recovery met acceptance criteria.
V1 - CCV recovery was above method acceptance limits. This target analyte was not detected in the sample.

Notes Legend per Bend Genetics Laboratory Reports:

NA - Samples not analyzed.
U - Undetected

SamplePointName	SamplePoi	CollectionDate	SampleID	Contaminant	Monitorin	Average
DBP - Site 1 - Vineyard Point	DS	12/18/2018	A8K1251-01	HAA5	0.35	
DBP - Site 1 - Vineyard Point	DS	3/26/2019	A9B1475-01	HAA5	20	
DBP - Site 1 - Vineyard Point	DS	7/5/2019	A9E0755-01	HAA5	17.5	
DBP - Site 1 - Vineyard Point	DS	9/12/2019	A9G4153-01	HAA5	22	14.9625
DBP - Site 1 - Vineyard Point	DS	12/18/2018	A8K1251-01	HAA6Br	0	
DBP - Site 1 - Vineyard Point	DS	3/26/2019	A9B1475-01	HAA6Br	2.9	
DBP - Site 1 - Vineyard Point	DS	7/5/2019	A9E0755-01	HAA6Br	2.25	
DBP - Site 1 - Vineyard Point	DS	9/12/2019	A9G4153-01	HAA6Br	3.3	2.1125
DBP - Site 1 - Vineyard Point	DS	12/18/2018	A8K1251-01	HAA9	0.35	
DBP - Site 1 - Vineyard Point	DS	3/26/2019	A9B1475-01	HAA9	22.9	
DBP - Site 1 - Vineyard Point	DS	7/5/2019	A9E0755-01	HAA9	19.75	
DBP - Site 1 - Vineyard Point	DS	9/12/2019	A9G4153-01	HAA9	25.3	17.075
DBP - Site 2 - Joseph Perry Park	DS	12/18/2018	A8K1251-02	HAA5	0.28	
DBP - Site 2 - Joseph Perry Park	DS	3/26/2019	A9B1475-02	HAA5	20	
DBP - Site 2 - Joseph Perry Park	DS	6/27/2019	A9E0755-02	HAA5	19.8	
DBP - Site 2 - Joseph Perry Park	DS	9/12/2019	A9G4153-02	HAA5	22	15.52
DBP - Site 2 - Joseph Perry Park	DS	12/18/2018	A8K1251-02	HAA6Br	0	
DBP - Site 2 - Joseph Perry Park	DS	3/26/2019	A9B1475-02	HAA6Br	2.8	
DBP - Site 2 - Joseph Perry Park	DS	6/27/2019	A9E0755-02	HAA6Br	2.6	
DBP - Site 2 - Joseph Perry Park	DS	9/12/2019	A9G4153-02	HAA6Br	3.4	2.2
DBP - Site 2 - Joseph Perry Park	DS	12/18/2018	A8K1251-02	HAA9	0.28	
DBP - Site 2 - Joseph Perry Park	DS	3/26/2019	A9B1475-02	HAA9	22.8	
DBP - Site 2 - Joseph Perry Park	DS	6/27/2019	A9E0755-02	HAA9	22.4	
DBP - Site 2 - Joseph Perry Park	DS	9/12/2019	A9G4153-02	HAA9	25.4	17.72
DBP - Site 3 - Miwok Park	DS	12/18/2018	A8K1251-03	HAA5	8.18	
DBP - Site 3 - Miwok Park	DS	3/26/2019	A9B1475-03	HAA5	12.2	
DBP - Site 3 - Miwok Park	DS	6/27/2019	A9E0755-03	HAA5	5.19	
DBP - Site 3 - Miwok Park	DS	9/12/2019	A9G4153-03	HAA5	4.92	7.6225
DBP - Site 3 - Miwok Park	DS	12/18/2018	A8K1251-03	HAA6Br	4.42	
DBP - Site 3 - Miwok Park	DS	3/26/2019	A9B1475-03	HAA6Br	2.5	
DBP - Site 3 - Miwok Park	DS	6/27/2019	A9E0755-03	HAA6Br	1.97	
DBP - Site 3 - Miwok Park	DS	9/12/2019	A9G4153-03	HAA6Br	2.17	2.765
DBP - Site 3 - Miwok Park	DS	12/18/2018	A8K1251-03	HAA9	11.92	
DBP - Site 3 - Miwok Park	DS	3/26/2019	A9B1475-03	HAA9	14.7	
DBP - Site 3 - Miwok Park	DS	6/27/2019	A9E0755-03	HAA9	6.77	
DBP - Site 3 - Miwok Park	DS	9/12/2019	A9G4153-03	HAA9	6.67	10.015
DBP - Site 4 - Clay Glen Way	DS	12/18/2018	A8K1251-04	HAA5	8.16	
DBP - Site 4 - Clay Glen Way	DS	3/26/2019	A9B1475-04	HAA5	11.92	
DBP - Site 4 - Clay Glen Way	DS	6/27/2019	A9E0755-04	HAA5	9.66	
DBP - Site 4 - Clay Glen Way	DS	9/12/2019	A9G4153-04	HAA5	13.02	10.69
DBP - Site 4 - Clay Glen Way	DS	12/18/2018	A8K1251-04	HAA6Br	4.21	
DBP - Site 4 - Clay Glen Way	DS	3/26/2019	A9B1475-04	HAA6Br	4.19	
DBP - Site 4 - Clay Glen Way	DS	6/27/2019	A9E0755-04	HAA6Br	3.13	
DBP - Site 4 - Clay Glen Way	DS	9/12/2019	A9G4153-04	HAA6Br	4.79	4.08
DBP - Site 4 - Clay Glen Way	DS	12/18/2018	A8K1251-04	HAA9	11.61	
DBP - Site 4 - Clay Glen Way	DS	3/26/2019	A9B1475-04	HAA9	15.49	
DBP - Site 4 - Clay Glen Way	DS	6/27/2019	A9E0755-04	HAA9	12.23	
DBP - Site 4 - Clay Glen Way	DS	9/12/2019	A9G4153-04	HAA9	16.89	14.055
DBP - Site 5 - Jones Family	DS	12/18/2018	A8K1251-05	HAA5	0.24	
DBP - Site 5 - Jones Family	DS	3/26/2019	A9B1475-05	HAA5	13.4	
DBP - Site 5 - Jones Family	DS	6/27/2019	A9E0755-05	HAA5	12.5	
DBP - Site 5 - Jones Family	DS	9/12/2019	A9G4153-05	HAA5	22	12.035
DBP - Site 5 - Jones Family	DS	12/18/2018	A8K1251-05	HAA6Br	0	
DBP - Site 5 - Jones Family	DS	3/26/2019	A9B1475-05	HAA6Br	1.99	
DBP - Site 5 - Jones Family	DS	6/27/2019	A9E0755-05	HAA6Br	2.03	
DBP - Site 5 - Jones Family	DS	9/12/2019	A9G4153-05	HAA6Br	3.4	1.855
DBP - Site 5 - Jones Family	DS	12/18/2018	A8K1251-05	HAA9	0.24	
DBP - Site 5 - Jones Family	DS	3/26/2019	A9B1475-05	HAA9	15.39	
DBP - Site 5 - Jones Family	DS	6/27/2019	A9E0755-05	HAA9	14.53	
DBP - Site 5 - Jones Family	DS	9/12/2019	A9G4153-05	HAA9	25.4	13.89
DBP - Site 6 - Womack Park	DS	12/18/2018	A8K1251-06	HAA5	1.81	
DBP - Site 6 - Womack Park	DS	3/26/2019	A9B1475-06	HAA5	12.33	
DBP - Site 6 - Womack Park	DS	6/27/2019	A9E0755-06	HAA5	6.26	
DBP - Site 6 - Womack Park	DS	9/12/2019	A9G4153-06	HAA5	10.72	7.78
DBP - Site 6 - Womack Park	DS	12/18/2018	A8K1251-06	HAA6Br	2.49	
DBP - Site 6 - Womack Park	DS	3/26/2019	A9B1475-06	HAA6Br	3.59	
DBP - Site 6 - Womack Park	DS	6/27/2019	A9E0755-06	HAA6Br	2.42	
DBP - Site 6 - Womack Park	DS	9/12/2019	A9G4153-06	HAA6Br	3.78	3.07
DBP - Site 6 - Womack Park	DS	12/18/2018	A8K1251-06	HAA9	3.78	
DBP - Site 6 - Womack Park	DS	3/26/2019	A9B1475-06	HAA9	15.49	
DBP - Site 6 - Womack Park	DS	6/27/2019	A9E0755-06	HAA9	8.22	
DBP - Site 6 - Womack Park	DS	9/12/2019	A9G4153-06	HAA9	13.78	10.3175
DBP - Site 7 - Walt Davis	DS	12/18/2018	A8K1251-07	HAA5	0.52	
DBP - Site 7 - Walt Davis	DS	3/26/2019	A9B1475-07	HAA5	14	
DBP - Site 7 - Walt Davis	DS	6/27/2019	A9E0755-07	HAA5	15.9	
DBP - Site 7 - Walt Davis	DS	9/12/2019	A9G4153-07	HAA5	18.9	12.33
DBP - Site 7 - Walt Davis	DS	12/18/2018	A8K1251-07	HAA6Br	0.31	
DBP - Site 7 - Walt Davis	DS	3/26/2019	A9B1475-07	HAA6Br	2.6	
DBP - Site 7 - Walt Davis	DS	6/27/2019	A9E0755-07	HAA6Br	2.79	
DBP - Site 7 - Walt Davis	DS	9/12/2019	A9G4153-07	HAA6Br	3.3	2.25
DBP - Site 7 - Walt Davis	DS	12/18/2018	A8K1251-07	HAA9	0.83	
DBP - Site 7 - Walt Davis	DS	3/26/2019	A9B1475-07	HAA9	16.6	
DBP - Site 7 - Walt Davis	DS	6/27/2019	A9E0755-07	HAA9	18.69	
DBP - Site 7 - Walt Davis	DS	9/12/2019	A9G4153-07	HAA9	22.2	14.58

DBP - Site 8 - Fite Park	DS	12/18/2018	A8K1251-08	HAA5	1.97	
DBP - Site 8 - Fite Park	DS	3/26/2019	A9B1475-08	HAA5	11.7	
DBP - Site 8 - Fite Park	DS	6/27/2019	A9E0755-08	HAA5	12.68	
DBP - Site 8 - Fite Park	DS	9/12/2019	A9G4153-08	HAA5	21.1	11.8625
DBP - Site 8 - Fite Park	DS	12/18/2018	A8K1251-08	HAA6Br	1.9	
DBP - Site 8 - Fite Park	DS	3/26/2019	A9B1475-08	HAA6Br	3.88	
DBP - Site 8 - Fite Park	DS	6/27/2019	A9E0755-08	HAA6Br	3.21	
DBP - Site 8 - Fite Park	DS	9/12/2019	A9G4153-08	HAA6Br	4.95	3.485
DBP - Site 8 - Fite Park	DS	12/18/2018	A8K1251-08	HAA9	3.43	
DBP - Site 8 - Fite Park	DS	3/26/2019	A9B1475-08	HAA9	15.08	
DBP - Site 8 - Fite Park	DS	6/27/2019	A9E0755-08	HAA9	15.41	
DBP - Site 8 - Fite Park	DS	9/12/2019	A9G4153-08	HAA9	25.45	14.8425

Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	1-butanol	2	EPA 541	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	2-methoxyethanol	0.4	EPA 541	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	2-propen-1-ol	0.5	EPA 541	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	alpha-hexachlorocyclohexane	0.01	EPA 525.3	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	butylated hydroxyanisole	0.03	EPA 530	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	chlorpyrifos	0.03	EPA 525.3	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	dimethipin	0.2	EPA 525.3	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	ethoprop	0.03	EPA 525.3	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	germanium	0.3	EPA 200.8	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	manganese	0.4	EPA 200.8	=
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	o-toluidine	0.007	EPA 530	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	oxyfluorfen	0.05	EPA 525.3	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	profenofos	0.3	EPA 525.3	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	quinoline	0.02	EPA 530	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	tebuconazole	0.2	EPA 525.3	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	total permethrin	0.04	EPA 525.3	<
Entry Point to Dist. System	EP	12/27/2018	A8L3173-01	tribufos	0.07	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	1-butanol	2	EPA 541	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	2-methoxyethanol	0.4	EPA 541	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	2-propen-1-ol	0.5	EPA 541	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	alpha-hexachlorocyclohexane	0.01	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	butylated hydroxyanisole	0.03	EPA 530	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	chlorpyrifos	0.03	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	dimethipin	0.2	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	ethoprop	0.03	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	germanium	0.3	EPA 200.8	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	manganese	0.4	EPA 200.8	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	o-toluidine	0.007	EPA 530	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	oxyfluorfen	0.05	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	profenofos	0.3	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	quinoline	0.02	EPA 530	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	tebuconazole	0.2	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	total permethrin	0.04	EPA 525.3	<
Entry Point to Dist. System	EP	3/19/2019	A9B1471-01	tribufos	0.07	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	1-butanol	2	EPA 541	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	2-methoxyethanol	0.4	EPA 541	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	2-propen-1-ol	0.5	EPA 541	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	alpha-hexachlorocyclohexane	0.01	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	butylated hydroxyanisole	0.03	EPA 530	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	chlorpyrifos	0.03	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	dimethipin	0.2	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	ethoprop	0.03	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	germanium	0.3	EPA 200.8	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	manganese	0.4	EPA 200.8	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	o-toluidine	0.007	EPA 530	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	oxyfluorfen	0.05	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	profenofos	0.3	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	quinoline	0.02	EPA 530	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	tebuconazole	0.2	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	total permethrin	0.04	EPA 525.3	<
Entry Point to Dist. System	EP	6/20/2019	A9E0770-01	tribufos	0.07	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	1-butanol	2	EPA 541	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	2-methoxyethanol	0.4	EPA 541	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	2-propen-1-ol	0.5	EPA 541	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	alpha-hexachlorocyclohexane	0.01	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	butylated hydroxyanisole	0.03	EPA 530	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	chlorpyrifos	0.03	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	dimethipin	0.2	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	ethoprop	0.03	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	germanium	0.3	EPA 200.8	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	manganese	0.4	EPA 200.8	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	o-toluidine	0.007	EPA 530	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	oxyfluorfen	0.05	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	profenofos	0.3	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	quinoline	0.02	EPA 530	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	tebuconazole	0.2	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	total permethrin	0.04	EPA 525.3	<
Entry Point to Dist. System	EP	9/12/2019	A9G4151-01	tribufos	0.07	EPA 525.3	<

PWSName	SystemSize	FacilityID	FacilityName	FacilityType	FacilityWaterType	SamplePointID	SamplePointName	SamplePointType	SampleEvent	MonitoringCode	SampleCollectionDate	MethodCode	AnalyteCode	AnalyteName
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC1	AM3	4/10/2018	EPA 545	3302	cylindrospermopsin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC1	AM3	4/10/2018	EPA 545	3311	anatoxin-a
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC1	AM3	4/10/2018	EPA 546	3301	total microcystin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC2	AM3	4/25/2018	EPA 545	3302	cylindrospermopsin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC2	AM3	4/25/2018	EPA 545	3311	anatoxin-a
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC2	AM3	4/25/2018	EPA 546	3301	total microcystin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC3	AM3	5/8/2018	EPA 545	3302	cylindrospermopsin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC3	AM3	5/8/2018	EPA 545	3311	anatoxin-a
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC3	AM3	5/8/2018	EPA 546	3301	total microcystin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC4	AM3	5/22/2018	EPA 545	3302	cylindrospermopsin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC4	AM3	5/22/2018	EPA 545	3311	anatoxin-a
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC4	AM3	5/22/2018	EPA 546	3301	total microcystin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC5	AM3	6/13/2018	EPA 545	3302	cylindrospermopsin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC5	AM3	6/13/2018	EPA 545	3311	anatoxin-a
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC5	AM3	6/13/2018	EPA 546	3301	total microcystin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC6	AM3	6/26/2018	EPA 545	3302	cylindrospermopsin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC6	AM3	6/26/2018	EPA 545	3311	anatoxin-a
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC6	AM3	6/26/2018	EPA 546	3301	total microcystin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC7	AM3	7/10/2018	EPA 545	3302	cylindrospermopsin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC7	AM3	7/10/2018	EPA 545	3311	anatoxin-a
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC7	AM3	7/10/2018	EPA 546	3301	total microcystin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC8	AM3	7/24/2018	EPA 545	3302	cylindrospermopsin
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC8	AM3	7/24/2018	EPA 545	3311	anatoxin-a
SCWA - Laguna/Vineyard	L	96	SWTP	TP	SW	3410029096	Entry Point to Dist. System	EP	SEC8	AM3	7/24/2018	EPA 546	3301	total microcystin

East Bay Municipal Utility District

Freeport Regional Water Authority Diversion

Sample	L197265-1	L197735-1	L197830-1	L198125-1	L198125-2	L198131-1	L198145-1	L198533-1	L199254-1	L199168-1	L199285-1	L199727-1	L200564-1	L200740-1	L201158-1	L202045-1	L202046-1	L201938-1	L202
Collectdate	3/24/2015 10:21	4/15/2015 10:05	4/21/2015 10:15	5/6/2015 9:00	5/6/2015 9:30	5/6/2015 9:40	5/6/2015 10:25	5/19/2015 7:50	6/15/2015 8:00	6/17/2015 8:00	6/24/2015 11:00	7/14/2015 8:20	8/17/2015 9:00	8/25/2015 11:30	9/15/2015 8:30	10/19/2015 9:15	10/19/2015 9:20	10/19/2015 12:00	11/16/2
Site	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRAMENTO RIV	WS SACRA RIV
Locator	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INTAKE SAMP TAP	FRWA INT TAP
ClientID	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 0110005-022	SWQCB 01 022
Comments	VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 200 mL; Sample Vol. for PCR: 100 mL [to SCRIPPS]; Sample Vol. for CPLM: 100 mL (SD-1); +HOLD for Replicate	LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 6.02 NTU; Turbidity bottle in case field turbidity not measured.	VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 130 mL; Sample Vol. for PCR: 65 mL [to SCRIPPS]; Sample Vol. for CPLM: 65 mL (SD-1); +HOLD for Replicate	FRWA Intake Annual; +FLD DATA: pH = 7.83. Extract 508A within HOLDTIME (Results of 508-PCBS will determine if analysis to proceed)	FRWA Intake Annual; Subcontracted Analyses	FRWA Intake Sampling per DPH Title 22 for 0110005-022 EDT reporting;	VELIGERS Total TOW Volume: _2000_Liters; DOLPHIN cup vol. _100_ mL; Sample Vol. for PCR: 50 mL [to SCRIPPS]; Sample Vol. for CPLM: _50_ mL (SD-1); +HOLD for Replicate	LT2 (round 2); FRWA represents supplemental source for EBMUD's San Pablo & Upper San Leandro Reservoirs, and SCWA; +FLD DATA: Turbidity = 4.7 NTU;	LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; SCWA data links to L199168 LT2 data since origianl sample did not meet temperature upon receipt for E. coli	LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 4.5 NTU; Extra CUB10 for Crypto matrix spike See L199254 for valid E. coli result done by SRCSD	VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 200 mL; Sample Vol. for PCR: 100 mL [to SCRIPPS]; Sample Vol. for CPLM: 100 mL (SD-1); +HOLD for Replicate	LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 4.5 NTU	LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 3.5 NTU	VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 300 mL; Sample Vol. for PCR: 150 mL [to SCRIPPS]; Sample Vol. for CPLM: 150 mL (SD-1); +HOLD for Replicate	LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 3.2 NTU	LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 2.9 NTU	LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; Resample of L202045-1 since E.coli sample not received at compliant temperature. Product changed per sublab report 10/27/15	VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 200 mL; Sample Vol. for PCR: 100 mL [to SCRIPPS]; Sample Vol. for CPLM: 100 mL (SD-1); +HOLD for Replicate	LT2 (round represents supplemer for San Pal Upper San Reservoirs, DATA: Turl 4.1 NTU
EPA 100.1: EPA 100.2																			
ASBESTOS (MFL)	no data	no data	no data	no data	0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 1613																			
2,3,7,8-TETRACHLORODIBENZO DIOXIN (pg/L	no data	no data	no data	no data	ND 0.177	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 1623																			
CRYPTOSPORIDIUM OOCYSTS (#/L)	no data	< 0.1	no data	no data	no data	no data	no data	< 0.1	no data	< 0.1	no data	< 0.1	< 0.1	no data	< 0.1	< 0.1	no data	no data	<
CRYPTOSPORIDIUM OOCYSTS PER SAMPLE (#	no data	0	no data	no data	no data	no data	no data	0	no data	0	no data	0	0	no data	0	0	no data	no data	
GIARDIA CYSTS (#/L)	no data	< 0.1	no data	no data	no data	no data	no data	< 0.1	no data	< 0.1	no data	< 0.1	< 0.1	no data	< 0.1	< 0.1	no data	no data	
GIARDIA CYSTS PER SAMPLE (#/sample)	no data	0	no data	no data	no data	no data	no data	0	no data	0	no data	0	0	no data	0	0	no data	no data	
NUMBER OF FILTERS (units)	no data	1	no data	no data	no data	no data	no data	1	no data	1	no data	1	1	no data	1	1	no data	no data	
OPR CRYPTO RESULTS (%)	no data	28	no data	no data	no data	no data	no data	70	no data	66	no data	69	81	no data	79	69	no data	no data	
OPR GIARDIA RESULTS (%)	no data	57	no data	no data	no data	no data	no data	79	no data	32	no data	17	81	no data	80	80	no data	no data	
OPR METHOD BLANK RESULTS ()	no data	0	no data	no data	no data	no data	no data	0	no data	0	no data	0	0	no data	0	0	no data	no data	
PELLET VOLUME (mL)	no data	0.5	no data	no data	no data	no data	no data	0.6	no data	0.6	no data	0.6	1	no data	0.4	0.5	no data	no data	
RESUSPENDED CONCENTRATION VOLUME (m	no data	5	no data	no data	no data	no data	no data	5	no data	5	no data	5	5	no data	5	5	no data	no data	
SAMPLE VOLUME EXAMINED (L)	no data	10.75	no data	no data	no data	no data	no data	11	no data	10.5	no data	11.25	10.5	no data	10.75	10.75	no data	no data	
SAMPLE VOLUME FILTERED (L)	no data	10.75	no data	no data	no data	no data	no data	11	no data	10.5	no data	11.25	10.5	no data	10.75	10.75	no data	no data	
EPA 200.7																			
ALUMINUM (ug/L)	no data	no data	no data	459	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CALCIUM (ug/L)	no data	no data	no data	10600	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
COPPER (ug/L)	no data	no data	no data	U 5.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
IRON (ug/L)	no data	no data	no data	366	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
MAGNESIUM (ug/L)	no data	no data	no data	6050	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
MANGANESE (ug/L)	no data	no data	no data	18.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SODIUM (ug/L)	no data	no data	no data	7370	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ZINC (ug/L)	no data	no data	no data	1.78	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 200.8																			
ANTIMONY (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ARSENIC (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BARIUM (ug/L)	no data	no data	no data	24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BERYLLIUM (ug/L)	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CADMIUM (ug/L)	no data	no data	no data	0.043	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHROMIUM (ug/L)	no data	no data	no data	1.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
LEAD (ug/L)	no data	no data	no data	0.73	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
NICKEL (ug/L)	no data	no data	no data	1.6	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SELENIUM (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SILVER (ug/L)	no data	no data	no data	U 0.02	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
THALLIUM (ug/L)	no data	no data	no data	U 0.051	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 218.6																			
HEXAVALENT CHROMIUM (ug/L)	no data	no data	no data	no data	J 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 245.1																			
MERCURY (ug/L)	no data	no data	no data	U 0.04	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 300.1																			
CHLORIDE (mg/L)	no data	no data	no data	5.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
FLUORIDE (mg/L)	no data	no data	no data	0.054	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
NITRATE AS N (mg/L)	no data	no data	no data	0.08	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
NITRITE AS N (mg/L)	no data	no data	no data	0.0084	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SULFATE (mg/L)	no data	no data	no data	5.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 314.0																			
PERCHLORATE (ug/L)	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 504.1																			
DIBROMOCHLOROPROPANE (ug/L)	no data	no data	no data	U 0.002	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYLENE DIBROMIDE (ug/L)	no data	no data	no data	U 0.002	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 508																			
AROCLOR 1016 (ug/L)	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1221 (ug/L)	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1232 (ug/L)	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1242 (ug/L)	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1248 (ug/L)	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1254 (ug/L)	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1260 (ug/L)	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TOTAL PCB'S (ug/L)	no data	no data	no data	no data	U 0.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 508A																			
DECACHLOROBIPHENYL (ug/L)	no data	no data	no data	Q	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 515.3																			
(2,4,5-TRICHLOROPHENOXY)ACETIC ACID (ug/	no data	no data	no data	U 0.082	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
(2,4-DICHLOROPHENOXY)ACETIC ACID (ug/L)	no data	no data	no data	U 0.056	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC AC	no data	no data	no data	U 0.063	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
3,5-DICHLOROBENZOIC ACID (ug/L)	no data	no data	no data	U 0.025	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d

4-(2,4-DICHLOROPHENOXY)BUTANOIC ACID (	no data	no data	no data	U 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
4-NITROPHENOL (ug/L)	no data	no data	no data	U 0.075	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ACIFLUORFEN (ug/L)	no data	no data	no data	U 0.028	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BENTAZON (ug/L)	no data	no data	no data	U 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLORAMBEN (ug/L)	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DACTHAL (DCPA) (ug/L)	no data	no data	no data	U 0.05	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DALAPON (ug/L)	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DICAMBA (ug/L)	no data	no data	no data	U 0.036	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DICHLOROPHENYLACETIC ACID (% recovery)	no data	no data	no data	100	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DICHLORPROP (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DINOSEB (ug/L)	no data	no data	no data	U 0.057	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PENTACHLOROPHENOL (ug/L)	no data	no data	no data	U 0.014	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PICLORAM (ug/L)	no data	no data	no data	U 0.022	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 524.2																			
1,1,1,2-TETRACHLOROETHANE (ug/L)	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1,1-TRICHLOROETHANE (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1,2,2-TETRACHLOROETHANE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (u	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1,2-TRICHLOROETHANE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1-DICHLORO-2-PROPANONE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1-DICHLOROETHANE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1-DICHLOROETHENE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1-DICHLOROPROPENE (ug/L)	no data	no data	no data	U 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2,3-TRICHLOROBENZENE (ug/L)	no data	no data	no data	U 0.24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2,3-TRICHLOROPROPANE (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2,4-TRICHLOROBENZENE (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2,4-TRIMETHYLBENZENE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2-DICHLOROBENZENE (ug/L)	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2-DICHLOROETHANE (ug/L)	no data	no data	no data	U 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2-DICHLOROPROPANE (ug/L)	no data	no data	no data	U 0.15	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,3,5-TRIMETHYLBENZENE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,3-DICHLOROBENZENE (ug/L)	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,3-DICHLOROPROPANE (ug/L)	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,4-DICHLOROBENZENE (ug/L)	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1-CHLOROBUTANE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
2-BUTANONE (ug/L)	no data	no data	no data	U 0.43	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
2-HEXANONE (ug/L)	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
2-NITROPROPANE (ug/L)	no data	no data	no data	U 0.77	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
4-BROMOFLUOROBENZENE (% recovery)	no data	no data	no data	91	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
4-METHYL-2-PENTANONE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ACETONE (ug/L)	no data	no data	no data	1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ACRYLONITRILE (ug/L)	no data	no data	no data	U 0.45	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALLYL CHLORIDE (ug/L)	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BENZENE (ug/L)	no data	no data	no data	U 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMOBENZENE (ug/L)	no data	no data	no data	U 0.16	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMOCHLOROMETHANE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMODICHLOROMETHANE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMOFORM (ug/L)	no data	no data	no data	U 0.31	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMOMETHANE (ug/L)	no data	no data	no data	U 0.55	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CARBON DISULFIDE (ug/L)	no data	no data	no data	U 0.44	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CARBON TETRACHLORIDE (ug/L)	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROACETONITRILE (ug/L)	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROBENZENE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROETHANE (ug/L)	no data	no data	no data	U 0.38	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROFORM (ug/L)	no data	no data	no data	U 0.15	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROMETHANE (ug/L)	no data	no data	no data	U 0.15	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CIS-1,2-DICHLOROETHENE (ug/L)	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CIS-1,3-DICHLOROPROPENE (ug/L)	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
D4-1,2-DICHLOROBENZENE (% recovery)	no data	no data	no data	95.6	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIBROMOCHLOROMETHANE (ug/L)	no data	no data	no data	U 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIBROMOCHLOROPROPANE (ug/L)	no data	no data	no data	U 0.28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIBROMOMETHANE (ug/L)	no data	no data	no data	U 0.28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DICHLORODIFLUOROMETHANE (ug/L)	no data	no data	no data	U,N 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIISOPROPYL ETHER (ug/L)	no data	no data	no data	U 0.29	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYL BENZENE (ug/L)	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYL ETHER (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYL-T-BUTYL ETHER (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYLENE DIBROMIDE (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYLMETHACRYLATE (ug/L)	no data	no data	no data	U 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
FLUOROTRICHLOROMETHANE (ug/L)	no data	no data	no data	U,N 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEXACHLOROBUTADIENE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEXACHLOROETHANE (ug/L)	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
IODOMETHANE (ug/L)	no data	no data	no data	U 0.69	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ISOPROPYLBENZENE (ug/L)	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
M+P XYLENES (ug/L)	no data	no data	no data	U 0.37	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHYL-T-BUTYL ETHER (ug/L)	no data	no data	no data	U 0.39	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHYLACRYLATE (ug/L)	no data	no data	no data	U 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHYLACRYLONITRILE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHYLENE CHLORIDE (ug/L)	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHYLMETHACRYLATE (ug/L)	no data	no data	no data	U 0.28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
N-BUTYLBENZENE (ug/L)	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
N-PROPYLBENZENE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
NAPHTHALENE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
NITROBENZENE (ug/L)	no data	no data	no data	U 1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
O-CHLOROTOLUENE (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
O-XYLENE (ug/L)	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
P-CHLOROTOLUENE (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
P-ISOPROPYLTOLUENE (ug/L)	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PENTACHLOROETHANE (ug/L)	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SEC-BUTYLBENZENE (ug/L)	no data	no data	no data	U 0.69	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SEC-DICHLOROPROPANE (ug/L)	no data	no data	no data	U 0.24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
STYRENE (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TERT-AMYL METHYL ETHER (ug/L)	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TERT-BUTYL ALCOHOL (ug/L)	no data	no data	no data	U 1.7	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d

TERT-BUTYLBENZENE (ug/L)	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TETRACHLOROETHENE (ug/L)	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TETRAHYDROFURAN (ug/L)	no data	no data	no data	U 0.54	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TOLUENE (ug/L)	no data	no data	no data	U 0.16	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TOTAL 1,3-DICHLOROPROPENES (ug/L)	no data	no data	no data	U 0.41	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TOTAL XYLENES (ug/L)	no data	no data	no data	U 0.55	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRANS-1,2-DICHLOROETHENE (ug/L)	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRANS-1,3-DICHLOROPROPENE (ug/L)	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRANS-1,4-DICHLORO-2-BUTENE (ug/L)	no data	no data	no data	U,N 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRICHLOROETHENE (ug/L)	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
VINYL CHLORIDE (ug/L)	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 524.4																			
1,1,1,2-TETRACHLOROETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1,1-TRICHLOROETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1,2,2-TETRACHLOROETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (u	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1,2-TRICHLOROETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1-DICHLOROETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1-DICHLOROETHENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,1-DICHLOROPROPENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2,3-TRICHLOROBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2,3-TRICHLOROPROPANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2,4-TRICHLOROBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2,4-TRIMETHYLBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2-DICHLOROBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2-DICHLOROETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,2-DICHLOROPROPANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,3,5-TRIMETHYLBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,3-DICHLOROBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,3-DICHLOROPROPANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1,4-DICHLOROBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
1-CHLOROBUTANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
4-BROMOFLUOROBENZENE (% recovery)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALLYL CHLORIDE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMOBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMOCHLOROMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMODICHLOROMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMOFORM (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMOMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CARBON DISULFIDE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CARBON TETRACHLORIDE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROFORM (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CIS-1,2-DICHLOROETHENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CIS-1,3-DICHLOROPROPENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
D3-METHYL-T-BUTYL-ETHER (% recovery)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
D4-1,2-DICHLOROBENZENE (% recovery)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIBROMOCHLOROMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIBROMOCHLOROPROPANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIBROMOMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DICHLORODIFLUOROMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIISOPROPYL ETHER (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYL BENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYL ETHER (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYL-T-BUTYL ETHER (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYLENE DIBROMIDE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETHYLMETHACRYLATE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
FLUOROTRICHLOROMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEXACHLOROBUTADIENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEXACHLOROETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
IODOMETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ISOPROPYLBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
M+P XYLENES (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHYL-T-BUTYL ETHER (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHYLENE CHLORIDE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
N-BUTYLBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
N-PROPYLBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
NAPHTHALENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
O-CHLOROTOLUENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
O-XYLENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
P-CHLOROTOLUENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
P-ISOPROPYLTOLUENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PENTACHLOROETHANE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SEC-BUTYLBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
STYRENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TERT-AMYL METHYL ETHER (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TERT-BUTYL ALCOHOL (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TERT-BUTYLBENZENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TETRACHLOROETHENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TETRAHYDROFURAN (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TOLUENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TOTAL 1,3-DICHLOROPROPENES (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TOTAL XYLENES (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRANS-1,2-DICHLOROETHENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRANS-1,3-DICHLOROPROPENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRICHLOROETHENE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
VINYL CHLORIDE (ug/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 525.2																			
1,3-DIMETHYL-2-NITROBENZENE (% recovery)	no data	no data	no data	110	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
2,4-DINITROTOLUENE (ug/L)	no data	no data	no data	U 0.026	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
2,6-DINITROTOLUENE (ug/L)	no data	no data	no data	U 0.019	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
4,4'-DDD (ug/L)	no data	no data	no data	U 0.022	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d

4,4'-DDE (ug/L)	no data	no data	no data	U 0.026	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
4,4'-DDT (ug/L)	no data	no data	no data	U 0.023	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ACENAPHTHYLENE (ug/L)	no data	no data	no data	U 0.037	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALACHLOR (ug/L)	no data	no data	no data	U 0.021	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALDRIN (ug/L)	no data	no data	no data	U 0.011	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALPHA BHC (ug/L)	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALPHA ENDOSULFAN (ug/L)	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ANTHRACENE (ug/L)	no data	no data	no data	U 0.043	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1016 (ug/L)	no data	no data	no data	U 0.51	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1221 (ug/L)	no data	no data	no data	U 0.51	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1232 (ug/L)	no data	no data	no data	U 0.51	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1242 (ug/L)	no data	no data	no data	U 0.51	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1248 (ug/L)	no data	no data	no data	U 0.51	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1254 (ug/L)	no data	no data	no data	U 0.51	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
AROCLOR 1260 (ug/L)	no data	no data	no data	U 0.51	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ATRAZINE (ug/L)	no data	no data	no data	U 0.027	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BENZO(A)ANTHRACENE (ug/L)	no data	no data	no data	U 0.017	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BENZO(A)PYRENE (ug/L)	no data	no data	no data	U 0.011	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BENZO(B)FLUORANTHENE (ug/L)	no data	no data	no data	U 0.014	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BENZO(GHI)PERYLENE (ug/L)	no data	no data	no data	U 0.016	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BENZO(K)FLUORANTHENE (ug/L)	no data	no data	no data	U 0.013	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BETA BHC (ug/L)	no data	no data	no data	U 0.02	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BETA ENDOSULFAN (ug/L)	no data	no data	no data	U 0.019	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BIS(2-ETHYLHEXYL)ADIPATE (ug/L)	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BIS(2-ETHYLHEXYL)PHTHALATE (ug/L)	no data	no data	no data	JB 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BROMACIL (ug/L)	no data	no data	no data	U 0.018	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BUTACHLOR (ug/L)	no data	no data	no data	U 0.027	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
BUTYLBENZYL PHTHALATE (ug/L)	no data	no data	no data	JB 0.11	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLORDANE (ug/L)	no data	no data	no data	U 0.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLORDANE-ALPHA (ug/L)	no data	no data	no data	U 0.018	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLORDANE-GAMMA (ug/L)	no data	no data	no data	U 0.018	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROBENZILATE (ug/L)	no data	no data	no data	U 0.048	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLORONEB (ug/L)	no data	no data	no data	U 0.053	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHLOROTHALONIL (ug/L)	no data	no data	no data	U 0.033	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CHRYSENE (ug/L)	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CIS-PERMETHRIN (ug/L)	no data	no data	no data	U 0.048	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
D10-PYRENE (% recovery)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
D12-PERYLENE (% recovery)	no data	no data	no data	98	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DCPA (ug/L)	no data	no data	no data	U 0.029	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DELTA BHC (ug/L)	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DI-N-BUTYL PHTHALATE (ug/L)	no data	no data	no data	JB 0.049	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIBENZO(A,H)ANTHRACENE (ug/L)	no data	no data	no data	U 0.014	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIELDRIN (ug/L)	no data	no data	no data	U 0.023	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIETHYL PHTHALATE (ug/L)	no data	no data	no data	U 0.014	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIMETHOATE (ug/L)	no data	no data	no data	U 0.039	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
DIMETHYL PHTHALATE (ug/L)	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ENDOSULFAN SULFATE (ug/L)	no data	no data	no data	U 0.036	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ENDRIN (ug/L)	no data	no data	no data	U 0.032	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ENDRIN ALDEHYDE (ug/L)	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPTC (ug/L)	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ETRIDIAZOLE (ug/L)	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
FLUORENE (ug/L)	no data	no data	no data	U 0.022	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
GAMMA BHC (ug/L)	no data	no data	no data	U 0.017	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEPTACHLOR (ug/L)	no data	no data	no data	U 0.0061	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEPTACHLOR EPOXIDE (ug/L)	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEXACHLOROBENZENE (ug/L)	no data	no data	no data	U 0.018	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEXACHLOROCYCLOPENTADIENE (ug/L)	no data	no data	no data	U 0.019	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
HEXAZINONE (ug/L)	no data	no data	no data	U 0.036	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
INDENO(1,2,3-CD)PYRENE (ug/L)	no data	no data	no data	U 0.013	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ISOPHORONE (ug/L)	no data	no data	no data	U 0.011	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHOXYCHLOR (ug/L)	no data	no data	no data	U 0.011	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METOLACHLOR (ug/L)	no data	no data	no data	U 0.023	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METRIBUZIN (ug/L)	no data	no data	no data	U 0.026	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
MOLINATE (ug/L)	no data	no data	no data	U 0.027	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PENTACHLOROPHENOL (ug/L)	no data	no data	no data	U 0.11	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PHENANTHRENE (ug/L)	no data	no data	no data	U 0.015	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PROMETRYN (ug/L)	no data	no data	no data	U 0.022	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PROPACHLOR (ug/L)	no data	no data	no data	U 0.014	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PYRENE (ug/L)	no data	no data	no data	U 0.031	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SIMAZINE (ug/L)	no data	no data	no data	U 0.029	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TERBACIL (ug/L)	no data	no data	no data	U 0.033	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
THIOBENCARB (ug/L)	no data	no data	no data	U 0.018	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TOXAPHENE (ug/L)	no data	no data	no data	U 0.51	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRANS-PERMETHRIN (ug/L)	no data	no data	no data	U 0.02	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRIFLURALIN (ug/L)	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRIPHENYL PHOSPHATE (% recovery)	no data	no data	no data	130	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 531.1																			
3-HYDROXYCARBOFURAN (ug/L)	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALDICARB (ug/L)	no data	no data	no data	U 0.41	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALDICARB SULFONE (ug/L)	no data	no data	no data	U 0.45	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALDICARB SULFOXIDE (ug/L)	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CARBARYL (ug/L)	no data	no data	no data	U 0.75	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
CARBOFURAN (ug/L)	no data	no data	no data	U 0.39	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHIOCARB (ug/L)	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
METHOMYL (ug/L)	no data	no data	no data	U 0.28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
OXAMYL (ug/L)	no data	no data	no data	U 0.42	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PROPOXUR (ug/L)	no data	no data	no data	U 0.49	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 547																			
GLYPHOSATE (ug/L)	no data	no data	no data	U 2.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 548.1																			
ENDOTHALL (ug/L)	no data	no data	no data	U 1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 549.2																			
DIQUAT (ug/L)	no data	no data	no data	U 0.29	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
PARAQUAT (ug/L)	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d

EPA 900.0																			
GROSS ALPHA MDA95 (pCi/L)	no data	no data	no data	no data	0.888	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
GROSS BETA MDA95 (pCi/L)	no data	no data	no data	no data	1.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIONUCLIDES: ALPHA (pCi/L)	no data	no data	no data	no data	2.48	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIONUCLIDES: ALPHA COUNTING ERROR (p	no data	no data	no data	no data	+/- 1.31	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIONUCLIDES: BETA (pCi/L)	no data	no data	no data	no data	1.37	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIONUCLIDES: BETA COUNTING ERROR (p(	no data	no data	no data	no data	+/- 1.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 903.0,903.1, 904.0																			
RADIUM 226 (pCi/L)	no data	no data	no data	no data	0	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIUM 226 COUNTING ERROR (pCi/L)	no data	no data	no data	no data	+/- 0.402	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIUM 226 MDA95 (pCi/L)	no data	no data	no data	no data	0.47	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIUM 228 (pCi/L)	no data	no data	no data	no data	0	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIUM 228 COUNTING ERROR (pCi/L)	no data	no data	no data	no data	+/- 0.525	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
RADIUM 228 MDA95 (pCi/L)	no data	no data	no data	no data	0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 905.0																			
STRONTIUM 90 (pCi/L)	no data	no data	no data	no data	0	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
STRONTIUM 90 COUNTING ERROR (pCi/L)	no data	no data	no data	no data	+/- 0.324	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
STRONTIUM 90 MDA95 (pCi/L)	no data	no data	no data	no data	0.546	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 906.0																			
TRITIUM (pCi/L)	no data	no data	no data	no data	218	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRITIUM COUNTING ERROR (pCi/L)	no data	no data	no data	no data	+/- 263	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TRITIUM MDA95 (pCi/L)	no data	no data	no data	no data	434	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
EPA 908.0																			
URANIUM (pCi/L)	no data	no data	no data	no data	0	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
URANIUM COUNTING ERROR (pCi/L)	no data	no data	no data	no data	+/- 0.355	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
URANIUM MDA95 (pCi/L)	no data	no data	no data	no data	0.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
JOHNSON 1995																			
CORBICULA (#/100 L)	U 0.3	no data	U 0.3	no data	no data	no data	U 0.3	no data	no data	no data	U 0.3	no data	no data	U 0.3	no data	no data	no data	U 0.3	no d
DREISSENA VELIGERS (#/100 L)	U 0.3	no data	U 0.3	no data	no data	no data	U 0.3	no data	no data	no data	U 0.3	no data	no data	U 0.3	no data	no data	no data	U 0.3	no d
PER SUBCONTRACT LABORATORY REPORT																			
DATA TRANSMITTAL ()				no data															
SAMPLER PROVIDED FIELD MEASUREMENTS																			
PH (pH units)	no data	no data	no data	7.83	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TURBIDITY (NTU)	no data	6.02	no data	no data	no data	no data	no data	4.7	no data	4.5	no data	4.5	3.5	no data	3.2	2.9	no data	no data	
SIO METHOD																			
DREISSENA BUGENSIS (QUAGGA) (none)	A	no data	A	no data	no data	no data	A	no data	no data	no data	A	no data	no data	A	no data	no data	no data	A	no d
DREISSENA POLYMORPHA (ZEBRA) (none)	A	no data	A	no data	no data	no data	A	no data	no data	no data	A	no data	no data	A	no data	no data	no data	A	no d
DREISSENA VELIGERS (none)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM2120B																			
COLOR (color unit)	no data	no data	no data	10	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM2130B																			
TURBIDITY (NTU)	no data	no data	no data	5.6	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM2150B																			
NO ODOR OBSERVED (Panelists)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
NUMBER ANALYZING SAMPLE (Panelists)	no data	no data	no data	no data	no data	1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ODOR CHARACTERIZATION (SEE COMMENT) (	no data	no data	no data	no data	no data	1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
TEMPERATURE (deg C)	no data	no data	no data	no data	no data	23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
THRESHOLD ODOR NUMBER (TON)	no data	no data	no data	no data	no data	1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM2320B																			
ALKALINITY: TOTAL AS CACO3 (mg/L)	no data	no data	no data	58	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM2320B-1997																			
ALKALINITY: BICARBONATE (mg/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALKALINITY: CARBONATE (mg/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALKALINITY: HYDROXIDE (mg/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM2340C																			
HARDNESS: TOTAL AS CACO3 (mg/L)	no data	no data	no data	53	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM2510B																			
CONDUCTIVITY (umhos/cm)	no data	no data	no data	129	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM2540C																			
TOTAL DISSOLVED SOLIDS (mg/L)	no data	no data	no data	100	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM3114B																			
ARSENIC (ug/L)	no data	no data	no data	1.7	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SELENIUM (ug/L)	no data	no data	no data	U 0.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM4500-CN C, E																			
CYANIDE: TOTAL (mg/L)	no data	no data	no data	U 0.003	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM4500-CO2 D																			
ALKALINITY: BICARBONATE (mg/L)	no data	no data	no data	58	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALKALINITY: CARBONATE (mg/L)	no data	no data	no data	U 0.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
ALKALINITY: HYDROXIDE (mg/L)	no data	no data	no data	U 0.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM5310C																			
TOTAL ORGANIC CARBON (mg/L)	no data	no data	no data	1.5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM5540C																			
MBAS (mg/L)	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SM9221B																			
TOTAL COLIFORMS (MPN/100 mL)	no data	no data	no data	70	no data	no data	no data	no data	1100	no data	no data	no data	no data	no data	no data	no data	5000	no data	no d
SM9221F																			
E. COLI (MPN/100 mL)	no data	no data	no data	33	no data	no data	no data	no data	50	no data	no data	no data	no data	no data	no data	no data	800	no data	no d
SM9223B																			
E. COLI (MPN/100 mL)	no data	45	no data	no data	no data	no data	no data	57.3	no data	LA	no data	6.2	3	no data	9.7	LA	no data	no data	
TOTAL COLIFORMS (MPN/100 mL)	no data	H 1400	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d
SRL 524M-TCP																			
1,2,3-TRICHLOROPROPANE (ng/L)	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no d

Qualifiers:
N - Spike recovery outside of control limits
B - Analyte detected in method blank
< - Less than
Q - Data not suitable for regulatory compliance reporting
ND - Not detected at the Method Detection Limit
U - Analyte not detected
LA - Lost analysis
D - Surrogate spike outside of control limits

596-1 015 8:30 MENTO AKE SAMP 110005- 2); FRWA tal source blo & Leandro ; +FLD bidity =	L203119-1 12/14/2015 12:30 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 10.5 NTU. Colilert sample reported frozen when recieved at BIOVIR per JLIM.	L203244-1 12/14/2015 12:30 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; Resample of L203119-1 since E.coli sample not received at compliant temperature. Analysis performed by SRCSD.	L203088-1 12/14/2015 12:40 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 200 mL; Sample Vol. for PCR: 100 mL [to SCRIPPS]; Sample Vol. for CPLM: 100 mL (SD-1); +HOLD for Replicate	L205397-1 4/12/2016 9:45 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual; +FLD DATA: pH = 8.07 . Acid Container ID# 1314383	L205403-1 4/12/2016 9:59 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 Annual T22 per DDW; Sample submitted directly to Caltest by SWQ	L205397-2 4/12/2016 10:04 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual; Subcontracted Analyses	L205417-1 4/12/2016 14:11 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 200 mL; Sample Vol. for PCR: 100 mL [to SCRIPPS]; Sample Vol. for CPLM: 100 mL (SD-1); +HOLD for Replicate	L205522-1 4/18/2016 9:05 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 8.5 NTU; Extra CUB10 for Crypto matrix spike	L206108-1 5/16/2016 10:50 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 7.4 NTU	L206717-1 6/13/2016 9:20 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 7.5 NTU	L206921-1 6/22/2016 10:08 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake T22 Annuals, Follow-ups to L205397	L206921-2 6/22/2016 10:14 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake T22 Annuals, Follow-ups to L205397; Subcontracted Analyses	L207541-1 7/20/2016 10:30 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); Resample of L207441-1 for C/G due to low sample volume, E.coli resample due to accidental disposal of sample. FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; Field Turbidity = 7.3 NTU	L208053-1 8/15/2016 8:15 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 7.6 NTU	L208737-1 9/19/2016 8:00 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 4.1 NTU	L209428-1 10/17/2016 8:30 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 4.1 NTU	L210031-1 11/14/2016 9:45 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 9.9 NTU; E.coli sample received frozen, analysis canceled 11/15/16 (see L210474-1)	L210474-1 11/14/2016 9:45 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); Replacement sample for L210031-1. Analyzed by Sacramento Regional County Sanitation District	L210729-1 12/19/2016 10:45 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 48.0 NTU	L213372-1 4/20/2017 12:00 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 LT2 (round 2); FRWA represents supplemental source for San Pablo & Upper San Leandro Reservoirs; +FLD DATA: Turbidity = 16.7 NTU
lata	no data	no data	no data	no data	no data	< 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	ND 0.157	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
0.1	0.2	no data	no data	no data	no data	no data	no data	< 0.1	< 0.1	< 0.1	no data	no data	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	no data	< 0.1	< 0.1
0	2	no data	no data	no data	no data	no data	no data	0	0	0	no data	no data	0	0	0	0	0	no data	0	0
0.1	< 0.1	no data	no data	no data	no data	no data	no data	< 0.1	< 0.1	< 0.1	no data	no data	< 0.1	< 0.1	< 0.1	0.4	< 0.1	no data	< 0.1	< 0.1
1	0	no data	no data	no data	no data	no data	no data	0	0	0	no data	no data	0	0	0	4	0	no data	0	0
1	1	no data	no data	no data	no data	no data	no data	1	1	1	no data	no data	1	1	1	1	1	no data	1	1
71	75	no data	no data	no data	no data	no data	no data	73	56	59	no data	no data	69	82	61	77	74	no data	81	82
70	73	no data	no data	no data	no data	no data	no data	86	64	72	no data	no data	68	64	54	70	81	no data	76	51
0	0	no data	no data	no data	no data	no data	no data	0	0	0	no data	no data	0	0	0	0	0	no data	0	0
0.8	0.8	no data	no data	no data	no data	no data	no data	0.9	1	1	no data	no data	1	0.7	0.5	0.5	0.4	no data	1	1
5	5	no data	no data	no data	no data	no data	no data	5	5	5	no data	no data	5	5	5	5	5	no data	5	5
10	10	no data	no data	no data	no data	no data	no data	10	9.5	10	no data	no data	10.25	10	10	9.75	9.75	no data	10.5	9.6
10	10	no data	no data	no data	no data	no data	no data	10	9.5	10	no data	no data	10.25	10	10	9.75	9.75	no data	10.5	9.6
lata	no data	no data	no data	716	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	12100	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 5.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	716	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	B 5950	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	23.9	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	6910	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	3.53	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	0.029	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	1.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	0.38	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	2.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.041	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	J 0.21	no data	no data	no data	no data	no data	J 0.19	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.04	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	4.9	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	0.051	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	0.12	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.0005	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	6.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.003	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.003	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	LA	no data	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	LA	no data	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	LA	no data	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	LA	no data	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	LA	no data	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	LA	no data	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	LA	no data	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	LA	no data	no data	no data	no data	no data	U 0.3	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.082	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.056	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.063	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.025	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data

lata	no data	no data	no data	U 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,* 0.075	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.028	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N 0.05	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.036	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	110	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.057	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,* 0.014	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.022	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.15	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N 0.43	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.77	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	78.4	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	0.41	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.45	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.16	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.31	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.55	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.44	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.38	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.15	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.15	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	81.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.29	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.14	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.69	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.21	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.37	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.39	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.26	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.69	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N 1.7	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data

lata	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.54	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.16	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.41	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.19	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.18	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.17	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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lata	no data	no data	no data	100	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.026	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.02	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.023	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data

lata	no data	no data	no data	U 0.026	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.024	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.038	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.022	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.011	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.044	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.027	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.018	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N,* 0.011	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.015	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N 0.017	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.014	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.021	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.02	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.061	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.019	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.027	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.027	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.019	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.019	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.049	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.054	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.033	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.049	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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lata	no data	no data	no data	74	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.029	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.029	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.015	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.024	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.015	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.04	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.036	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.032	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.023	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.018	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.0063	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.0063	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.019	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.02	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.036	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N 0.014	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.011	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.011	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.024	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.026	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.027	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N 0.11	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.016	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.023	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.015	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.031	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.029	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.033	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.019	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.021	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.01	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	D 140	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.41	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.45	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.75	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.39	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.52	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.28	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.42	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.49	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 2.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 1.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N 0.29	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U,N 0.25	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data

lata	no data	no data	no data	no data	no data	0.759	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	1.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0.955	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	+/- 0.823	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	1.24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	+/- 1.05	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	+/- 0.233	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0.47	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0.22	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	+/- 0.533	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0.2	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	+/- 0.516	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0.491	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	89.5	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	+/- 263	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	434	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	+/- 0.434	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	0.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	U 0.3	no data	no data	no data	U 0.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	U 0.3	no data	no data	no data	U 0.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
				no data							no data									
lata	no data	no data	no data	8.07	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
4.1	10.5	no data	no data	no data	no data	no data	no data	8.5	7.4	7.5	no data	no data	7.3	7.6	4.1	4.1	9.9	no data	48	16.7
lata	no data	no data	A	no data	no data	no data	A	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	A	no data	no data	no data	A	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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lata	no data	no data	no data	12	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	7.7	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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lata	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	20	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	ND 1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	59	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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lata	no data	no data	no data	60	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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lata	no data	no data	no data	86	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	1.6	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.3	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.003	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	59	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	U 0.1	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	1.7	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	U 0.03	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	800	no data	170	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	1300	no data	no data
lata	no data	70	no data	23	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	7.8	no data	no data
33.1	LA	no data	no data	no data	no data	no data	no data	13.4	20.1	3.1	no data	no data	8.5	16.1	12	275.5	no data	no data	159.7	36.4
lata	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
lata	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data

L213609-1 5/2/2017 9:25 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual; +FLD DATA: pH = 7.84. Acid Container ID#1387355 (for TOC:TOTAL only) .	L213609-2 5/2/2017 9:52 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual; Subcontracted Analyses	L213639-1 5/2/2017 10:15 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 Annual T22 per DDW; Sample submitted directly to Caltest by SWQ.	L213610-1 5/2/2017 10:41 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 450 mL; Sample Vol. for PCR: 225 mL [to SCRIPPS]; Sample Vol. for CPLM: 225 mL (SD-1); +HOLD for Replicate	L221675-1 5/15/2018 12:30 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual; +FLD DATA: pH = 7.95.	L221675-2 5/15/2018 12:35 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual; Subcontracted Analyses	L221792-1 5/15/2018 12:38 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 Annual T22 per DDW; Sample submitted directly to Caltest by SWQ.	L221677-1 5/15/2018 13:50 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 VELIGERS Total TOW Volume: 2000 Liters; DOLPHIN cup vol. 200 mL; Sample Vol. for PCR: 100 mL [to SCRIPPS]; Sample Vol. for CPLM: 100 mL (SD-1); +HOLD for Replicate	L229247-1 5/29/2019 10:31 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual; +FLD DATA: pH = 7.6.	L229488-1 5/29/2019 10:54 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 Annual T22 per DDW; Sample submitted directly to Caltest by SWQ.	L229247-2 5/29/2019 10:58 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual; Subcontracted Analyses	L230556-1 7/31/2019 8:15 WS SACRAMENTO RIV FRWA INTAKE SAMP TAP SWQCB 0110005-022 FRWA Intake Annual T22 - resample of L229247-1
no data	0.2	no data	no data	no data	0.6	no data	no data	no data	no data	0.2	no data
no data	ND 0.161	no data	no data	no data	ND 0.235	no data	no data	no data	no data	ND 0.36	no data
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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U 4.68	no data	no data	no data	U 4.68	no data	no data	no data	4.95	no data	no data	no data
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3240	no data	no data	no data	6360	no data	no data	no data	4770	no data	no data	no data
9.74	no data	no data	no data	1.74	no data	no data	no data	5.37	no data	no data	no data
U 0.15	no data	no data	no data	U 0.15	no data	no data	no data	U 0.15	no data	no data	no data
0.83	no data	no data	no data	1.6	no data	no data	no data	1.4	no data	no data	no data
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1.5	no data	no data	no data	3.6	no data	no data	no data	2.4	no data	no data	no data
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U 0.0005	no data	no data	no data	0.02	no data	no data	no data	U 0.0023	no data	no data	no data
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U 0.006	no data	no data	no data	U 0.006	no data	no data	no data	no data	no data	U 0.001	no data
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U 0.063	no data	no data	no data	U 0.063	no data	no data	no data	no data	no data	ND 0.099	no data
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U 0.028	no data	no data	no data	U 0.028	no data	no data	no data	no data	no data	no data	no data
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U 0.012	no data	no data	no data	U 0.012	no data	no data	no data	no data	no data	no data	no data
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U 0.036	no data	no data	no data	U 0.036	no data	no data	no data	no data	no data	no data	no data
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U 0.014	no data	no data	no data	U 0.014	no data	no data	no data	no data	no data	ND 0.065	no data
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U 0.11	no data	no data	no data	U 0.11	no data	no data	no data	U 0.097	no data	no data	no data
U 0.1	no data	no data	no data	U 0.1	no data	no data	no data	U 0.11	no data	no data	no data
U 0.13	no data	no data	no data	U 0.13	no data	no data	no data	U 0.13	no data	no data	no data
U 0.11	no data	no data	no data	U 0.11	no data	no data	no data	U 0.12	no data	no data	no data
U 0.099	no data	no data	no data	U 0.099	no data	no data	no data	U 0.079	no data	no data	no data
U 0.1	no data	no data	no data	U 0.1	no data	no data	no data	U 0.13	no data	no data	no data
U 0.21	no data	no data	no data	U 0.21	no data	no data	no data	U 0.12	no data	no data	no data
U 0.18	no data	no data	no data	U 0.18	no data	no data	no data	U 0.14	no data	no data	no data
U 0.093	no data	no data	no data	U 0.093	no data	no data	no data	U 0.075	no data	no data	no data
U 0.17	no data	no data	no data	U 0.17	no data	no data	no data	U 0.22	no data	no data	no data
U 0.096	no data	no data	no data	U 0.096	no data	no data	no data	U 0.096	no data	no data	no data
U 0.015	no data	no data	no data	U 0.015	no data	no data	no data	U 0.072	no data	no data	no data
U 0.13	no data	no data	no data	U 0.13	no data	no data	no data	U 0.082	no data	no data	no data
U 0.074	no data	no data	no data	U 0.074	no data	no data	no data	U 0.11	no data	no data	no data
U 0.056	no data	no data	no data	U 0.056	no data	no data	no data	U 0.07	no data	no data	no data
U 0.064	no data	no data	no data	U 0.064	no data	no data	no data	U 0.071	no data	no data	no data
U 0.074	no data	no data	no data	U 0.074	no data	no data	no data	U 0.071	no data	no data	no data
U 0.047	no data	no data	no data	U 0.047	no data	no data	no data	U 0.064	no data	no data	no data
U 0.036	no data	no data	no data	U 0.036	no data	no data	no data	U 0.07	no data	no data	no data
U 0.11	no data	no data	no data	U 0.11	no data	no data	no data	U 0.076	no data	no data	no data
98.9	no data	no data	no data	105	no data	no data	no data	98.3	no data	no data	no data
U,N 0.34	no data	no data	no data	U 0.34	no data	no data	no data	U 0.36	no data	no data	no data
U 0.044	no data	no data	no data	U 0.044	no data	no data	no data	U 0.054	no data	no data	no data
U 0.21	no data	no data	no data	U 0.21	no data	no data	no data	U 0.11	no data	no data	no data
U 0.24	no data	no data	no data	U 0.24	no data	no data	no data	U 0.15	no data	no data	no data
U 0.12	no data	no data	no data	U 0.12	no data	no data	no data	U 0.09	no data	no data	no data
U 0.25	no data	no data	no data	U 0.25	no data	no data	no data	U,N 0.096	no data	no data	no data
U 0.54	no data	no data	no data	U,N 0.54	no data	no data	no data	U 0.72	no data	no data	no data
U,N 0.057	no data	no data	no data	U 0.057	no data	no data	no data	U 0.072	no data	no data	no data
U 0.034	no data	no data	no data	U 0.034	no data	no data	no data	U 0.14	no data	no data	no data
U 0.05	no data	no data	no data	U 0.05	no data	no data	no data	U 0.085	no data	no data	no data
U 0.096	no data	no data	no data	U 0.096	no data	no data	no data	U 0.11	no data	no data	no data
U 0.16	no data	no data	no data	U 0.16	no data	no data	no data	U 0.3	no data	no data	no data
U 0.17	no data	no data	no data	U 0.17	no data	no data	no data	U 0.14	no data	no data	no data
U 0.065	no data	no data	no data	U 0.065	no data	no data	no data	U 0.099	no data	no data	no data
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U 0.042	no data	no data	no data	U 0.042	no data	no data	no data	U 0.07	no data	no data	no data
U 0.081	no data	no data	no data	U 0.081	no data	no data	no data	U 0.06	no data	no data	no data
U 0.11	no data	no data	no data	U 0.11	no data	no data	no data	U 0.051	no data	no data	no data
U 0.2	no data	no data	no data	U 0.2	no data	no data	no data	U 0.065	no data	no data	no data
U 0.062	no data	no data	no data	U 0.062	no data	no data	no data	U 0.089	no data	no data	no data
U 0.1	no data	no data	no data	U 0.1	no data	no data	no data	U 0.18	no data	no data	no data
U 0.32	no data	no data	no data	E,F 0.38	no data	no data	no data	U,N 0.58	no data	no data	no data
U 0.03	no data	no data	no data	U 0.03	no data	no data	no data	U 0.056	no data	no data	no data
U 0.16	no data	no data	no data	U 0.16	no data	no data	no data	U 0.14	no data	no data	no data
U 0.12	no data	no data	no data	U 0.12	no data	no data	no data	U 0.067	no data	no data	no data
U 0.12	no data	no data	no data	U 0.12	no data	no data	no data	U 0.092	no data	no data	no data
U 0.046	no data	no data	no data	U 0.046	no data	no data	no data	U 0.076	no data	no data	no data
U 0.054	no data	no data	no data	U 0.054	no data	no data	no data	U 0.051	no data	no data	no data
U 0.039	no data	no data	no data	U 0.039	no data	no data	no data	U 0.07	no data	no data	no data
U 0.054	no data	no data	no data	U 0.054	no data	no data	no data	U 0.17	no data	no data	no data
U 0.12	no data	no data	no data	U 0.12	no data	no data	no data	U 0.079	no data	no data	no data
U 0.042	no data	no data	no data	U 0.042	no data	no data	no data	U 0.15	no data	no data	no data
U 0.034	no data	no data	no data	U 0.034	no data	no data	no data	U 0.062	no data	no data	no data
U 0.23	no data	no data	no data	U 0.23	no data	no data	no data	U 0.38	no data	no data	no data
U 0.017	no data	no data	no data	U 0.017	no data	no data	no data	U 0.069	no data	no data	no data
U 0.098	no data	no data	no data	U 0.098	no data	no data	no data	U 0.075	no data	no data	no data
U 0.19	no data	no data	no data	U 0.19	no data	no data	no data	U 0.23	no data	no data	no data
U 0.87	no data	no data	no data	U 0.87	no data	no data	no data	U 0.57	no data	no data	no data
U 0.046	no data	no data	no data	U 0.046	no data	no data	no data	U 0.15	no data	no data	no data
U 0.049	no data	no data	no data	U 0.049	no data	no data	no data	U 0.1	no data	no data	no data
U 0.17	no data	no data	no data	U 0.17	no data	no data	no data	U 0.37	no data	no data	no data
U 0.062	no data	no data	no data	U 0.062	no data	no data	no data	U 0.054	no data	no data	no data
U 0.5	no data	no data	no data	U 0.5	no data	no data	no data	U 0.5	no data	no data	no data
U 0.5	no data	no data	no data	U 0.5	no data	no data	no data	U 0.5	no data	no data	no data
U 0.11	no data	no data	no data	U 0.11	no data	no data	no data	U 0.1	no data	no data	no data
U 0.051	no data	no data	no data	U 0.051	no data	no data	no data	U 0.07	no data	no data	no data
U 0.13	no data	no data	no data	U 0.13	no data	no data	no data	U 0.12	no data	no data	no data
U 0.15	no data	no data	no data	U 0.15	no data	no data	no data	U 0.086	no data	no data	no data
100	no data	no data	no data	94	no data	no data	no data	Q 98	no data	no data	100
U 0.024	no data	no data	no data	U 0.025	no data	no data	no data	Q,U 0.025	no data	no data	U 0.025
U 0.019	no data	no data	no data	U 0.019	no data	no data	no data	Q,U 0.019	no data	no data	U 0.019
U 0.021	no data	no data	no data	U 0.022	no data	no data	no data	Q,U 0.022	no data	no data	U 0.022

U 0.024	no data	no data	no data	U 0.025	no data	no data	no data	Q,U 0.025	no data	no data	U 0.025
U 0.022	no data	no data	no data	U,N 0.023	no data	no data	no data	Q,U 0.023	no data	no data	U 0.023
U 0.035	no data	no data	no data	U 0.036	no data	no data	no data	Q,U 0.036	no data	no data	U 0.036
U 0.021	no data	no data	no data	U 0.021	no data	no data	no data	Q,U 0.021	no data	no data	U 0.021
U 0.011	no data	no data	no data	U 0.011	no data	no data	no data	Q,U 0.011	no data	no data	U 0.011
U 0.012	no data	no data	no data	U 0.012	no data	no data	no data	Q,U 0.012	no data	no data	U 0.012
U 0.012	no data	no data	no data	U 0.012	no data	no data	no data	Q,U 0.012	no data	no data	U 0.012
U 0.041	no data	no data	no data	U 0.042	no data	no data	no data	Q,U 0.042	no data	no data	U 0.042
U 0.49	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data
U 0.49	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data
U 0.49	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data
U 0.49	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data
U 0.49	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data
U 0.49	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data
U 0.49	no data	no data	no data	U 0.5	no data	no data	no data	no data	no data	no data	no data
U 0.025	no data	no data	no data	U 0.026	no data	no data	no data	Q,U 0.026	no data	no data	U 0.026
U 0.017	no data	no data	no data	U 0.017	no data	no data	no data	Q,U 0.017	no data	no data	U 0.017
U 0.011	no data	no data	no data	U 0.011	no data	no data	no data	Q,U,N 0.011	no data	no data	U 0.011
U 0.014	no data	no data	no data	U 0.014	no data	no data	no data	Q,U 0.014	no data	no data	U 0.014
U 0.016	no data	no data	no data	U 0.016	no data	no data	no data	Q,U,N 0.016	no data	no data	U 0.016
U 0.013	no data	no data	no data	U 0.013	no data	no data	no data	Q,U 0.013	no data	no data	U 0.013
U 0.02	no data	no data	no data	U 0.02	no data	no data	no data	Q,U 0.02	no data	no data	U 0.02
U 0.019	no data	no data	no data	U 0.019	no data	no data	no data	Q,U 0.019	no data	no data	U 0.019
U 0.028	no data	no data	no data	JB,N 0.31	no data	no data	no data	Q,U 0.029	no data	no data	U 0.029
JB 0.19	no data	no data	no data	JB 0.22	no data	no data	no data	Q,JB,N 0.35	no data	no data	JB 0.32
U 0.018	no data	no data	no data	U 0.018	no data	no data	no data	Q,U 0.018	no data	no data	U 0.018
U 0.025	no data	no data	no data	U 0.026	no data	no data	no data	Q,U 0.026	no data	no data	U 0.026
JB 0.18	no data	no data	no data	U 0.026	no data	no data	no data	Q,U 0.026	no data	no data	U 0.026
U 0.098	no data	no data	no data	U 0.1	no data	no data	no data	no data	no data	no data	no data
U 0.018	no data	no data	no data	U 0.018	no data	no data	no data	Q,U 0.018	no data	no data	U 0.018
U 0.018	no data	no data	no data	U 0.018	no data	no data	no data	Q,U 0.018	no data	no data	U 0.018
U 0.046	no data	no data	no data	U 0.047	no data	no data	no data	Q,U 0.047	no data	no data	U 0.047
U 0.051	no data	no data	no data	U 0.052	no data	no data	no data	Q,U 0.052	no data	no data	U 0.052
U 0.031	no data	no data	no data	U 0.032	no data	no data	no data	Q,U 0.032	no data	no data	U 0.032
U 0.012	no data	no data	no data	U 0.012	no data	no data	no data	Q,U 0.012	no data	no data	U 0.012
U 0.046	no data	no data	no data	U 0.047	no data	no data	no data	Q,U 0.047	no data	no data	U 0.047
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	100
82	no data	no data	no data	83	no data	no data	no data	Q,D 66	no data	no data	97
U 0.027	no data	no data	no data	U 0.028	no data	no data	no data	Q,U 0.028	no data	no data	U 0.028
U 0.012	no data	no data	no data	U 0.012	no data	no data	no data	Q,U 0.012	no data	no data	U 0.012
U 0.027	no data	no data	no data	U 0.028	no data	no data	no data	Q,U 0.028	no data	no data	JB 0.03
U 0.014	no data	no data	no data	U 0.014	no data	no data	no data	Q,U 0.014	no data	no data	U 0.014
U 0.022	no data	no data	no data	U 0.023	no data	no data	no data	Q,U 0.023	no data	no data	U 0.023
U 0.014	no data	no data	no data	JB 0.03	no data	no data	no data	Q,U 0.014	no data	no data	U 0.014
U 0.037	no data	no data	no data	U 0.038	no data	no data	no data	Q,U 0.038	no data	no data	no data
U 0.0098	no data	no data	no data	U 0.01	no data	no data	no data	Q,U 0.01	no data	no data	U 0.01
U 0.034	no data	no data	no data	U 0.035	no data	no data	no data	Q,U 0.035	no data	no data	U 0.035
U 0.03	no data	no data	no data	U 0.031	no data	no data	no data	Q,U 0.031	no data	no data	U,N 0.031
U 0.028	no data	no data	no data	U 0.029	no data	no data	no data	Q,U 0.029	no data	no data	U 0.029
U 0.0098	no data	no data	no data	U 0.01	no data	no data	no data	Q,U 0.01	no data	no data	U 0.01
U 0.0098	no data	no data	no data	U 0.01	no data	no data	no data	Q,U 0.01	no data	no data	U 0.01
U 0.021	no data	no data	no data	U 0.022	no data	no data	no data	Q,U 0.022	no data	no data	U 0.022
U 0.017	no data	no data	no data	U 0.017	no data	no data	no data	Q,U 0.017	no data	no data	U 0.017
U 0.0059	no data	no data	no data	U 0.006	no data	no data	no data	Q,U 0.006	no data	no data	U 0.006
U 0.0059	no data	no data	no data	U 0.006	no data	no data	no data	Q,U 0.006	no data	no data	U 0.006
U 0.018	no data	no data	no data	U 0.018	no data	no data	no data	Q,U 0.018	no data	no data	U 0.018
U 0.019	no data	no data	no data	U,N 0.019	no data	no data	no data	Q,U 0.019	no data	no data	U 0.019
U 0.034	no data	no data	no data	U 0.035	no data	no data	no data	Q,U 0.035	no data	no data	U 0.035
U 0.013	no data	no data	no data	U 0.013	no data	no data	no data	Q,U,N 0.013	no data	no data	U 0.013
U 0.011	no data	no data	no data	U 0.011	no data	no data	no data	Q,U 0.011	no data	no data	U 0.011
U 0.011	no data	no data	no data	U,N 0.011	no data	no data	no data	Q,U 0.011	no data	no data	U 0.011
U 0.022	no data	no data	no data	U 0.023	no data	no data	no data	Q,U 0.023	no data	no data	U 0.023
U 0.024	no data	no data	no data	U 0.025	no data	no data	no data	Q,U 0.025	no data	no data	U 0.025
U 0.025	no data	no data	no data	U 0.026	no data	no data	no data	Q,U 0.026	no data	no data	U 0.026
U 0.1	no data	no data	no data	U,N 0.1	no data	no data	no data	Q,U 0.1	no data	no data	no data
U 0.015	no data	no data	no data	U 0.015	no data	no data	no data	Q,U 0.015	no data	no data	U 0.015
U 0.021	no data	no data	no data	U 0.022	no data	no data	no data	Q,U 0.022	no data	no data	U 0.022
U 0.014	no data	no data	no data	U 0.014	no data	no data	no data	Q,U 0.014	no data	no data	U 0.014
U 0.029	no data	no data	no data	U 0.03	no data	no data	no data	Q,U 0.03	no data	no data	U 0.03
U 0.027	no data	no data	no data	U 0.028	no data	no data	no data	Q,U 0.028	no data	no data	U 0.028
U 0.031	no data	no data	no data	U 0.032	no data	no data	no data	Q,U 0.032	no data	no data	U 0.032
U 0.018	no data	no data	no data	U 0.018	no data	no data	no data	Q 0.064	no data	no data	U 0.018
U 0.49	no data	no data	no data	U 0.5	no data	no data	no data	Q,U 0.5	no data	no data	U 0.5
U 0.02	no data	no data	no data	U 0.02	no data	no data	no data	Q,U 0.02	no data	no data	U 0.02
U 0.0098	no data	no data	no data	U 0.01	no data	no data	no data	Q,U 0.01	no data	no data	U 0.01
130	no data	no data	no data	120	no data	no data	no data	Q 130	no data	no data	130
no data	U 0.12	no data	no data	no data	U 0.4	no data	no data	no data	no data	U 0.6	no data
no data	U 0.41	no data	no data	no data	U 0.6	no data	no data	no data	no data	U 0.6	no data
no data	U 0.082	no data	no data	no data	U 0.2	no data	no data	no data	no data	U 0.5	no data
no data	U 0.091	no data	no data	no data	U 0.6	no data	no data	no data	no data	no data	no data
no data	J 0.35	no data	no data	no data	U 0.8	no data	no data	no data	no data	U 0.8	no data
no data	U 0.12	no data	no data	no data	U 0.4	no data	no data	no data	no data	U 0.4	no data
no data	no data	no data	no data	no data	U 0.2	no data	no data	no data	no data	U 0.9	no data
no data	U 0.096	no data	no data	no data	U 0.2	no data	no data	no data	no data	U 0.9	no data
no data	U 0.087	no data	no data	no data	U 1	no data	no data	no data	no data	U 0.9	no data
no data	no data	no data	no data	no data	U 0.9	no data	no data	no data	no data	U 0.9	no data
no data	U 3	no data	no data	no data	U 6	no data	no data	no data	no data	U 6	no data
U 1.1	no data	no data	no data	U 1.1	no data	no data	no data	no data	no data	U 20	no data
no data	U 2	no data	no data	no data	U 0.6	no data	no data	no data	no data	U 0.6	no data
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no data	1.09	no data	no data	no data	1.21	no data	no data	no data	no data	1.21	no data
no data	1.05	no data	no data	no data	2.17	no data	no data	no data	no data	0.578	no data
no data	+/- 0.756	no data	no data	no data	+/- 1.15	no data	no data	no data	no data	+/- 0.709	no data
no data	0.524	no data	no data	no data	0	no data	no data	no data	no data	0.392	no data
no data	+/- 0.815	no data	no data	no data	+/- 0.917	no data	no data	no data	no data	+/- 0.881	no data
no data	0	no data	no data	no data	0.015	no data	no data	no data	no data	0	no data
no data	+/- 0.199	no data	no data	no data	+/- 0.051	no data	no data	no data	no data	+/- 0.111	no data
no data	0.363	no data	no data	no data	0.322	no data	no data	no data	no data	0.418	no data
no data	0	no data	no data	no data	0.059	no data	no data	no data	no data	0.089	no data
no data	+/- 0.22	no data	no data	no data	+/- 0.675	no data	no data	no data	no data	+/- 0.624	no data
no data	0.191	no data	no data	no data	0.4	no data	no data	no data	no data	0.4	no data
no data	0.546	no data	no data	no data	U 0.158	no data	no data	no data	no data	0.098	no data
no data	+/- 0.502	no data	no data	no data	+/- 0.22	no data	no data	no data	no data	+/- 0.28	no data
no data	0.491	no data	no data	no data	0.369	no data	no data	no data	no data	0.546	no data
no data	111	no data	no data	no data	0	no data	no data	no data	no data	193	no data
no data	+/- 271	no data	no data	no data	+/- 277	no data	no data	no data	no data	+/- 266	no data
no data	434	no data	no data	no data	434	no data	no data	no data	no data	434	no data
no data	0.166	no data	no data	no data	0	no data	no data	no data	no data	0	no data
no data	+/- 0.326	no data	no data	no data	+/- 0.338	no data	no data	no data	no data	+/- 0.501	no data
no data	0.47	no data	no data	no data	0.47	no data	no data	no data	no data	0.363	no data
no data	no data	no data	no data	no data	no data	no data	< 0.3	no data	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	< 0.3	no data	no data	no data	no data
no data				no data				no data			no data
7.84	no data	no data	no data	7.95	no data	no data	no data	7.6	no data	no data	no data
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no data	no data	no data	A	no data	no data	no data	A	no data	no data	no data	no data
no data	no data	no data	NEG	no data	no data	no data	no data	no data	no data	no data	no data
8	no data	no data	no data	10	no data	no data	no data	6	no data	no data	no data
10	no data	no data	no data	4.4	no data	no data	no data	17	no data	no data	no data
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no data	no data	20	no data	no data	no data	20	no data	no data	20	no data	no data
no data	no data	ND 1	no data	no data	no data	ND 1	no data	no data	ND 1	no data	no data
36	no data	no data	no data	57	no data	no data	no data	46	no data	no data	no data
36	no data	no data	no data	57	no data	no data	no data	46	no data	no data	no data
U 0.1	no data	no data	no data	U 0.1	no data	no data	no data	U 0.1	no data	no data	no data
U 0.1	no data	no data	no data	U 0.1	no data	no data	no data	U 0.1	no data	no data	no data
36	no data	no data	no data	50	no data	no data	no data	44	no data	no data	no data
81.4	no data	no data	no data	129	no data	no data	no data	97.4	no data	no data	no data
62	no data	no data	no data	82	no data	no data	no data	68	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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U 0.0039	no data	no data	no data	U 0.0025	no data	no data	no data	U 0.0012	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
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1.7	no data	no data	no data	1.6	no data	no data	no data	1.6	no data	no data	no data
no data	U 0.03	no data	no data	no data	U 0.03	no data	no data	no data	no data	U 0.03	no data
49	no data	no data	no data	49	no data	no data	no data	130	no data	no data	no data
49	no data	no data	no data	23	no data	no data	no data	33	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
no data	no data	no data	no data	no data	no data	no data	no data	U 0.94	no data	no data	no data

Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8	Col 9	Col 10	Col 11	Col 12	Col 13	Col 14	Col 15
L197857-1	CLAY STN RWPP	INLET WEIR	4/22/2015 9:30	GRAB	RawH2O	ALUMINUM		128	ug/L	7.28	50	1.04	EPA 200.7	7-May-15
L197982-1	CLAY STN RWPP	INLET WEIR	4/29/2015 9:30	GRAB	RawH2O	ALUMINUM		66.2	ug/L	7.28	50	1.04	EPA 200.7	7-May-15
L198129-1	CLAY STN RWPP	INLET WEIR	5/6/2015 9:05	GRAB	RawH2O	ALUMINUM		47.8	ug/L	7.28	50	1.04	EPA 200.7	15-May-15
L198318-1	CLAY STN RWPP	INLET WEIR	5/13/2015 9:10	GRAB	RawH2O	ALUMINUM		40.3	ug/L	7.28	50	1.04	EPA 200.7	2-Jun-15
L198479-1	CLAY STN RWPP	INLET WEIR	5/20/2015 9:30	GRAB	RawH2O	ALUMINUM		42.9	ug/L	7.28	50	1.04	EPA 200.7	2-Jun-15
L198623-1	CLAY STN RWPP	INLET WEIR	5/27/2015 9:05	GRAB	RawH2O	ALUMINUM		80.6	ug/L	7.28	50	1.04	EPA 200.7	5-Jun-15
L198782-1	CLAY STN RWPP	INLET WEIR	6/3/2015 9:30	GRAB	RawH2O	ALUMINUM		47.2	ug/L	7.28	50	1.04	EPA 200.7	16-Jun-15
L198969-1	CLAY STN RWPP	INLET WEIR	6/10/2015 9:15	GRAB	RawH2O	ALUMINUM		17.9	ug/L	7.28	50	1.04	EPA 200.7	1-Jul-15
L199155-1	CLAY STN RWPP	INLET WEIR	6/17/2015 9:15	GRAB	RawH2O	ALUMINUM		9.9	ug/L	7.28	50	1.04	EPA 200.7	1-Jul-15
L199288-1	CLAY STN RWPP	INLET WEIR	6/24/2015 9:15	GRAB	RawH2O	ALUMINUM		12.9	ug/L	7.28	50	1.04	EPA 200.7	1-Jul-15
L199418-1	CLAY STN RWPP	INLET WEIR	7/1/2015 9:30	GRAB	RawH2O	ALUMINUM		15.6	ug/L	7.28	50	1.04	EPA 200.7	6-Jul-15
L199581-1	CLAY STN RWPP	INLET WEIR	7/8/2015 9:15	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	20-Jul-15
L199782-1	CLAY STN RWPP	INLET WEIR	7/15/2015 9:50	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	20-Jul-15
L199956-1	CLAY STN RWPP	INLET WEIR	7/22/2015 9:30	GRAB	RawH2O	ALUMINUM		18.2	ug/L	7.28	50	1.04	EPA 200.7	4-Aug-15
L200114-1	CLAY STN RWPP	INLET WEIR	7/29/2015 9:05	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	4-Aug-15
L200273-1	CLAY STN RWPP	INLET WEIR	8/5/2015 9:15	GRAB	RawH2O	ALUMINUM		112	ug/L	7.28	50	1.04	EPA 200.7	12-Aug-15
L200480-1	CLAY STN RWPP	INLET WEIR	8/12/2015 9:05	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	24-Aug-15
L200622-1	CLAY STN RWPP	INLET WEIR	8/19/2015 9:30	GRAB	RawH2O	ALUMINUM		33.8	ug/L	7.28	50	1.04	EPA 200.7	2-Sep-15
L200768-1	CLAY STN RWPP	INLET WEIR	8/26/2015 9:05	GRAB	RawH2O	ALUMINUM		271	ug/L	7.28	50	1.04	EPA 200.7	16-Sep-15
L200922-1	CLAY STN RWPP	INLET WEIR	9/2/2015 9:30	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	10-Sep-15
L201085-1	CLAY STN RWPP	INLET WEIR	9/10/2015 9:00	GRAB	RawH2O	ALUMINUM		94.6	ug/L	7.28	50	1.04	EPA 200.7	18-Sep-15
L201217-1	CLAY STN RWPP	INLET WEIR	9/16/2015 10:15	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	25-Sep-15
L201379-1	CLAY STN RWPP	INLET WEIR	9/23/2015 9:08	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	2-Oct-15
L201524-1	CLAY STN RWPP	INLET WEIR	9/30/2015 10:10	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	6-Oct-15
L201684-1	CLAY STN RWPP	INLET WEIR	10/7/2015 9:35	GRAB	RawH2O	ALUMINUM	U	7.28	ug/L	7.28	50	1.04	EPA 200.7	29-Oct-15
L202113-1	CLAY STN RWPP	INLET WEIR	10/27/2015 10:10	GRAB	RawH2O	ALUMINUM		14.4	ug/L	7.28	50	1.04	EPA 200.7	2-Nov-15
L202294-1	CLAY STN RWPP	INLET WEIR	11/4/2015 9:10	GRAB	RawH2O	ALUMINUM		10.2	ug/L	7.28	50	1.04	EPA 200.7	12-Nov-15
L202462-1	CLAY STN RWPP	INLET WEIR	11/12/2015 9:25	GRAB	RawH2O	ALUMINUM		22.1	ug/L	7.28	50	1.04	EPA 200.7	3-Dec-15
L202620-1	CLAY STN RWPP	INLET WEIR	11/19/2015 9:45	GRAB	RawH2O	ALUMINUM		24.3	ug/L	7.28	50	1.04	EPA 200.7	3-Dec-15
L202692-1	CLAY STN RWPP	INLET WEIR	11/24/2015 9:40	GRAB	RawH2O	ALUMINUM		11.8	ug/L	7.28	50	1.04	EPA 200.7	11-Dec-15
L202825-1	CLAY STN RWPP	INLET WEIR	12/2/2015 9:25	GRAB	RawH2O	ALUMINUM		10.6	ug/L	7.28	50	1.04	EPA 200.7	11-Dec-15
L202997-1	CLAY STN RWPP	INLET WEIR	12/9/2015 9:15	GRAB	RawH2O	ALUMINUM		15.7	ug/L	7.28	50	1.04	EPA 200.7	18-Dec-15
L203142-1	CLAY STN RWPP	INLET WEIR	12/16/2015 9:30	GRAB	RawH2O	ALUMINUM		39.8	ug/L	7.28	50	1.04	EPA 200.7	6-Jan-16
							min	7.28						
							max	271						
							ave	37.97939						
							median	15.7						
L197857-1	CLAY STN RWPP	INLET WEIR	4/22/2015 9:30	GRAB	RawH2O	E. COLI		24	MPN/100 mL	1			SM9223B	24-Apr-15
L197982-1	CLAY STN RWPP	INLET WEIR	4/29/2015 9:30	GRAB	RawH2O	E. COLI		9.5	MPN/100 mL	1			SM9223B	1-May-15
L198129-1	CLAY STN RWPP	INLET WEIR	5/6/2015 9:05	GRAB	RawH2O	E. COLI		41	MPN/100 mL	10			SM9223B	8-May-15
L198318-1	CLAY STN RWPP	INLET WEIR	5/13/2015 9:10	GRAB	RawH2O	E. COLI		54	MPN/100 mL	1			SM9223B	14-May-15
L198318-2	CLAY STN RWPP	INLET WEIR	5/13/2015 9:15	QCFR	RawH2O	E. COLI		52	MPN/100 mL	10			SM9223B	14-May-15
L198479-1	CLAY STN RWPP	INLET WEIR	5/20/2015 9:30	GRAB	RawH2O	E. COLI		27	MPN/100 mL	1			SM9223B	21-May-15
L198479-2	CLAY STN RWPP	INLET WEIR	5/20/2015 9:35	QCFR	RawH2O	E. COLI		41	MPN/100 mL	10			SM9223B	21-May-15
L198623-1	CLAY STN RWPP	INLET WEIR	5/27/2015 9:05	GRAB	RawH2O	E. COLI		9.7	MPN/100 mL	1			SM9223B	28-May-15
L198623-2	CLAY STN RWPP	INLET WEIR	5/27/2015 9:10	QCFR	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	28-May-15
L198782-1	CLAY STN RWPP	INLET WEIR	6/3/2015 9:30	GRAB	RawH2O	E. COLI		13	MPN/100 mL	1			SM9223B	4-Jun-15
L198782-2	CLAY STN RWPP	INLET WEIR	6/3/2015 9:35	QCFR	RawH2O	E. COLI		20	MPN/100 mL	10			SM9223B	4-Jun-15
L198969-1	CLAY STN RWPP	INLET WEIR	6/10/2015 9:15	GRAB	RawH2O	E. COLI		20	MPN/100 mL	10		10	SM9223B	16-Jun-15
L199155-1	CLAY STN RWPP	INLET WEIR	6/17/2015 9:15	GRAB	RawH2O	E. COLI		20	MPN/100 mL	10		10	SM9223B	18-Jun-15
L199288-1	CLAY STN RWPP	INLET WEIR	6/24/2015 9:15	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	26-Jun-15
L199418-1	CLAY STN RWPP	INLET WEIR	7/1/2015 9:30	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	6-Jul-15
L199581-1	CLAY STN RWPP	INLET WEIR	7/8/2015 9:15	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	10-Jul-15
L199782-1	CLAY STN RWPP	INLET WEIR	7/15/2015 9:50	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	16-Jul-15
L199956-1	CLAY STN RWPP	INLET WEIR	7/22/2015 9:30	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	23-Jul-15
L200114-1	CLAY STN RWPP	INLET WEIR	7/29/2015 9:05	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	30-Jul-15
L200273-1	CLAY STN RWPP	INLET WEIR	8/5/2015 9:15	GRAB	RawH2O	E. COLI		10	MPN/100 mL	10			SM9223B	7-Aug-15
L200480-1	CLAY STN RWPP	INLET WEIR	8/12/2015 9:05	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	14-Aug-15
L200622-1	CLAY STN RWPP	INLET WEIR	8/19/2015 9:30	GRAB	RawH2O	E. COLI		10	MPN/100 mL	10			SM9223B	21-Aug-15
L200768-1	CLAY STN RWPP	INLET WEIR	8/26/2015 9:05	GRAB	RawH2O	E. COLI		5.2	MPN/100 mL	1		1	SM9223B	27-Aug-15
L200922-1	CLAY STN RWPP	INLET WEIR	9/2/2015 9:30	GRAB	RawH2O	E. COLI		10	MPN/100 mL	10			SM9223B	3-Sep-15
L201085-1	CLAY STN RWPP	INLET WEIR	9/10/2015 9:00	GRAB	RawH2O	E. COLI		10	MPN/100 mL	10			SM9223B	11-Sep-15
L201217-1	CLAY STN RWPP	INLET WEIR	9/16/2015 10:15	GRAB	RawH2O	E. COLI		30	MPN/100 mL	10			SM9223B	18-Sep-15
L201379-1	CLAY STN RWPP	INLET WEIR	9/23/2015 9:08	GRAB	RawH2O	E. COLI		10	MPN/100 mL	10			SM9223B	24-Sep-15
L201524-1	CLAY STN RWPP	INLET WEIR	9/30/2015 10:10	GRAB	RawH2O	E. COLI		10	MPN/100 mL	10			SM9223B	1-Oct-15
L201684-1	CLAY STN RWPP	INLET WEIR	10/7/2015 9:35	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	8-Oct-15
L202113-1	CLAY STN RWPP	INLET WEIR	10/27/2015 10:10	GRAB	RawH2O	E. COLI		52	MPN/100 mL	10			SM9223B	28-Oct-15
L202294-1	CLAY STN RWPP	INLET WEIR	11/4/2015 9:10	GRAB	RawH2O	E. COLI		52	MPN/100 mL	10			SM9223B	5-Nov-15
L202462-1	CLAY STN RWPP	INLET WEIR	11/12/2015 9:25	GRAB	RawH2O	E. COLI		110	MPN/100 mL	10			SM9223B	5-Jan-16
L202620-1	CLAY STN RWPP	INLET WEIR	11/19/2015 9:45	GRAB	RawH2O	E. COLI		31	MPN/100 mL	1			SM9223B	20-Nov-15
L202692-1	CLAY STN RWPP	INLET WEIR	11/24/2015 9:40	GRAB	RawH2O	E. COLI		10	MPN/100 mL	10			SM9223B	25-Nov-15
L202825-1	CLAY STN RWPP	INLET WEIR	12/2/2015 9:25	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	3-Dec-15
L202997-1	CLAY STN RWPP	INLET WEIR	12/9/2015 9:15	GRAB	RawH2O	E. COLI	<10	0	MPN/100 mL	10			SM9223B	11-Dec-15
L203142-1	CLAY STN RWPP	INLET WEIR	12/16/2015 9:30	GRAB	RawH2O	E. COLI		41	MPN/100 mL	10			SM9223B	18-Dec-15
							min	<10						

							max	110						
							ave	19.52432						
							median	10						
L197857-1	CLAY STN RWPP	INLET WEIR	4/22/2015 9:30	GRAB	RawH2O	IRON	B	116	ug/L	0.52	100	1.04	EPA 200.7	7-May-15
L197982-1	CLAY STN RWPP	INLET WEIR	4/29/2015 9:30	GRAB	RawH2O	IRON	B	75.2	ug/L	0.52	100	1.04	EPA 200.7	7-May-15
L198129-1	CLAY STN RWPP	INLET WEIR	5/6/2015 9:05	GRAB	RawH2O	IRON		57.1	ug/L	0.52	100	1.04	EPA 200.7	15-May-15
L198318-1	CLAY STN RWPP	INLET WEIR	5/13/2015 9:10	GRAB	RawH2O	IRON		46.7	ug/L	0.52	100	1.04	EPA 200.7	2-Jun-15
L198479-1	CLAY STN RWPP	INLET WEIR	5/20/2015 9:30	GRAB	RawH2O	IRON		54.2	ug/L	0.52	100	1.04	EPA 200.7	2-Jun-15
L198623-1	CLAY STN RWPP	INLET WEIR	5/27/2015 9:05	GRAB	RawH2O	IRON		88.6	ug/L	0.52	100	1.04	EPA 200.7	5-Jun-15
L198782-1	CLAY STN RWPP	INLET WEIR	6/3/2015 9:30	GRAB	RawH2O	IRON		57.9	ug/L	0.52	100	1.04	EPA 200.7	16-Jun-15
L198969-1	CLAY STN RWPP	INLET WEIR	6/10/2015 9:15	GRAB	RawH2O	IRON	B	39.4	ug/L	0.52	100	1.04	EPA 200.7	1-Jul-15
L199155-1	CLAY STN RWPP	INLET WEIR	6/17/2015 9:15	GRAB	RawH2O	IRON	B	30	ug/L	0.52	100	1.04	EPA 200.7	1-Jul-15
L199288-1	CLAY STN RWPP	INLET WEIR	6/24/2015 9:15	GRAB	RawH2O	IRON	B	31	ug/L	0.52	100	1.04	EPA 200.7	1-Jul-15
L199418-1	CLAY STN RWPP	INLET WEIR	7/1/2015 9:30	GRAB	RawH2O	IRON		30.3	ug/L	0.52	100	1.04	EPA 200.7	6-Jul-15
L199581-1	CLAY STN RWPP	INLET WEIR	7/8/2015 9:15	GRAB	RawH2O	IRON	B	26.7	ug/L	0.52	100	1.04	EPA 200.7	20-Jul-15
L199782-1	CLAY STN RWPP	INLET WEIR	7/15/2015 9:50	GRAB	RawH2O	IRON	B	25.2	ug/L	0.52	100	1.04	EPA 200.7	20-Jul-15
L199956-1	CLAY STN RWPP	INLET WEIR	7/22/2015 9:30	GRAB	RawH2O	IRON		27.8	ug/L	0.52	100	1.04	EPA 200.7	4-Aug-15
L200114-1	CLAY STN RWPP	INLET WEIR	7/29/2015 9:05	GRAB	RawH2O	IRON		24.6	ug/L	0.52	100	1.04	EPA 200.7	4-Aug-15
L200273-1	CLAY STN RWPP	INLET WEIR	8/5/2015 9:15	GRAB	RawH2O	IRON		31.5	ug/L	0.52	100	1.04	EPA 200.7	12-Aug-15
L200480-1	CLAY STN RWPP	INLET WEIR	8/12/2015 9:05	GRAB	RawH2O	IRON		28	ug/L	0.52	100	1.04	EPA 200.7	24-Aug-15
L200622-1	CLAY STN RWPP	INLET WEIR	8/19/2015 9:30	GRAB	RawH2O	IRON	B	32	ug/L	0.52	100	1.04	EPA 200.7	2-Sep-15
L200768-1	CLAY STN RWPP	INLET WEIR	8/26/2015 9:05	GRAB	RawH2O	IRON	B	381	ug/L	0.52	100	1.04	EPA 200.7	16-Sep-15
L200922-1	CLAY STN RWPP	INLET WEIR	9/2/2015 9:30	GRAB	RawH2O	IRON	B	29.4	ug/L	0.52	100	1.04	EPA 200.7	10-Sep-15
L201085-1	CLAY STN RWPP	INLET WEIR	9/10/2015 9:00	GRAB	RawH2O	IRON	B	161	ug/L	0.52	100	1.04	EPA 200.7	18-Sep-15
L201217-1	CLAY STN RWPP	INLET WEIR	9/16/2015 10:15	GRAB	RawH2O	IRON	B	23.1	ug/L	0.52	100	1.04	EPA 200.7	25-Sep-15
L201379-1	CLAY STN RWPP	INLET WEIR	9/23/2015 9:08	GRAB	RawH2O	IRON	B	23.1	ug/L	0.52	100	1.04	EPA 200.7	2-Oct-15
L201524-1	CLAY STN RWPP	INLET WEIR	9/30/2015 10:10	GRAB	RawH2O	IRON	B	24.1	ug/L	0.52	100	1.04	EPA 200.7	6-Oct-15
L201684-1	CLAY STN RWPP	INLET WEIR	10/7/2015 9:35	GRAB	RawH2O	IRON	JB	26.2	ug/L	0.52	100	1.04	EPA 200.7	29-Oct-15
L202113-1	CLAY STN RWPP	INLET WEIR	10/27/2015 10:10	GRAB	RawH2O	IRON	JB	35.1	ug/L	0.52	100	1.04	EPA 200.7	2-Nov-15
L202294-1	CLAY STN RWPP	INLET WEIR	11/4/2015 9:10	GRAB	RawH2O	IRON		31.8	ug/L	0.52	100	1.04	EPA 200.7	12-Nov-15
L202462-1	CLAY STN RWPP	INLET WEIR	11/12/2015 9:25	GRAB	RawH2O	IRON		53	ug/L	0.52	100	1.04	EPA 200.7	3-Dec-15
L202620-1	CLAY STN RWPP	INLET WEIR	11/19/2015 9:45	GRAB	RawH2O	IRON		60.9	ug/L	0.52	100	1.04	EPA 200.7	3-Dec-15
L202692-1	CLAY STN RWPP	INLET WEIR	11/24/2015 9:40	GRAB	RawH2O	IRON		45.1	ug/L	0.52	100	1.04	EPA 200.7	11-Dec-15
L202825-1	CLAY STN RWPP	INLET WEIR	12/2/2015 9:25	GRAB	RawH2O	IRON		48.5	ug/L	0.52	100	1.04	EPA 200.7	11-Dec-15
L202997-1	CLAY STN RWPP	INLET WEIR	12/9/2015 9:15	GRAB	RawH2O	IRON		47.7	ug/L	0.52	100	1.04	EPA 200.7	18-Dec-15
L203142-1	CLAY STN RWPP	INLET WEIR	12/16/2015 9:30	GRAB	RawH2O	IRON		68.9	ug/L	0.52	100	1.04	EPA 200.7	6-Jan-16
							min	23.1						
							max	381						
							ave	57.00303						
							median	35.1						
L197857-1	CLAY STN RWPP	INLET WEIR	4/22/2015 9:30	GRAB	RawH2O	MANGANESE		11.4	ug/L	0.104	20	1.04	EPA 200.7	7-May-15
L197982-1	CLAY STN RWPP	INLET WEIR	4/29/2015 9:30	GRAB	RawH2O	MANGANESE		22.9	ug/L	0.104	20	1.04	EPA 200.7	7-May-15
L198129-1	CLAY STN RWPP	INLET WEIR	5/6/2015 9:05	GRAB	RawH2O	MANGANESE		11.2	ug/L	0.104	20	1.04	EPA 200.7	15-May-15
L198318-1	CLAY STN RWPP	INLET WEIR	5/13/2015 9:10	GRAB	RawH2O	MANGANESE		5.59	ug/L	0.104	20	1.04	EPA 200.7	2-Jun-15
L198479-1	CLAY STN RWPP	INLET WEIR	5/20/2015 9:30	GRAB	RawH2O	MANGANESE		5.73	ug/L	0.104	20	1.04	EPA 200.7	2-Jun-15
L198623-1	CLAY STN RWPP	INLET WEIR	5/27/2015 9:05	GRAB	RawH2O	MANGANESE		10.9	ug/L	0.104	20	1.04	EPA 200.7	5-Jun-15
L198782-1	CLAY STN RWPP	INLET WEIR	6/3/2015 9:30	GRAB	RawH2O	MANGANESE		16.6	ug/L	0.104	20	1.04	EPA 200.7	16-Jun-15
L198969-1	CLAY STN RWPP	INLET WEIR	6/10/2015 9:15	GRAB	RawH2O	MANGANESE		15.8	ug/L	0.104	20	1.04	EPA 200.7	1-Jul-15
L199155-1	CLAY STN RWPP	INLET WEIR	6/17/2015 9:15	GRAB	RawH2O	MANGANESE		18.5	ug/L	0.104	20	1.04	EPA 200.7	1-Jul-15
L199288-1	CLAY STN RWPP	INLET WEIR	6/24/2015 9:15	GRAB	RawH2O	MANGANESE		13.1	ug/L	0.104	20	1.04	EPA 200.7	1-Jul-15
L199418-1	CLAY STN RWPP	INLET WEIR	7/1/2015 9:30	GRAB	RawH2O	MANGANESE		11	ug/L	0.104	20	1.04	EPA 200.7	6-Jul-15
L199581-1	CLAY STN RWPP	INLET WEIR	7/8/2015 9:15	GRAB	RawH2O	MANGANESE		11	ug/L	0.104	20	1.04	EPA 200.7	20-Jul-15
L199782-1	CLAY STN RWPP	INLET WEIR	7/15/2015 9:50	GRAB	RawH2O	MANGANESE		10.5	ug/L	0.104	20	1.04	EPA 200.7	20-Jul-15
L199956-1	CLAY STN RWPP	INLET WEIR	7/22/2015 9:30	GRAB	RawH2O	MANGANESE		12.6	ug/L	0.104	20	1.04	EPA 200.7	4-Aug-15
L200114-1	CLAY STN RWPP	INLET WEIR	7/29/2015 9:05	GRAB	RawH2O	MANGANESE		12.8	ug/L	0.104	20	1.04	EPA 200.7	4-Aug-15
L200273-1	CLAY STN RWPP	INLET WEIR	8/5/2015 9:15	GRAB	RawH2O	MANGANESE		16.1	ug/L	0.104	20	1.04	EPA 200.7	12-Aug-15
L200480-1	CLAY STN RWPP	INLET WEIR	8/12/2015 9:05	GRAB	RawH2O	MANGANESE		11.9	ug/L	0.104	20	1.04	EPA 200.7	24-Aug-15
L200622-1	CLAY STN RWPP	INLET WEIR	8/19/2015 9:30	GRAB	RawH2O	MANGANESE		12.8	ug/L	0.104	20	1.04	EPA 200.7	2-Sep-15
L200768-1	CLAY STN RWPP	INLET WEIR	8/26/2015 9:05	GRAB	RawH2O	MANGANESE		24.6	ug/L	0.104	20	1.04	EPA 200.7	16-Sep-15
L200922-1	CLAY STN RWPP	INLET WEIR	9/2/2015 9:30	GRAB	RawH2O	MANGANESE		12.9	ug/L	0.104	20	1.04	EPA 200.7	10-Sep-15
L201085-1	CLAY STN RWPP	INLET WEIR	9/10/2015 9:00	GRAB	RawH2O	MANGANESE		41.6	ug/L	0.104	20	1.04	EPA 200.7	18-Sep-15
L201217-1	CLAY STN RWPP	INLET WEIR	9/16/2015 10:15	GRAB	RawH2O	MANGANESE		7.15	ug/L	0.104	20	1.04	EPA 200.7	25-Sep-15
L201379-1	CLAY STN RWPP	INLET WEIR	9/23/2015 9:08	GRAB	RawH2O	MANGANESE		5.69	ug/L	0.104	20	1.04	EPA 200.7	2-Oct-15
L201524-1	CLAY STN RWPP	INLET WEIR	9/30/2015 10:10	GRAB	RawH2O	MANGANESE		6.86	ug/L	0.104	20	1.04	EPA 200.7	6-Oct-15
L201684-1	CLAY STN RWPP	INLET WEIR	10/7/2015 9:35	GRAB	RawH2O	MANGANESE		5.88	ug/L	0.104	20	1.04	EPA 200.7	29-Oct-15
L202113-1	CLAY STN RWPP	INLET WEIR	10/27/2015 10:10	GRAB	RawH2O	MANGANESE		14.4	ug/L	0.104	20	1.04	EPA 200.7	2-Nov-15
L202294-1	CLAY STN RWPP	INLET WEIR	11/4/2015 9:10	GRAB	RawH2O	MANGANESE		6.79	ug/L	0.104	20	1.04	EPA 200.7	12-Nov-15
L202462-1	CLAY STN RWPP	INLET WEIR	11/12/2015 9:25	GRAB	RawH2O	MANGANESE		4.81	ug/L	0.104	20	1.04	EPA 200.7	3-Dec-15
L202620-1	CLAY STN RWPP	INLET WEIR	11/19/2015 9:45	GRAB	RawH2O	MANGANESE		3.4	ug/L	0.104	20	1.04	EPA 200.7	3-Dec-15
L202692-1	CLAY STN RWPP	INLET WEIR	11/24/2015 9:40	GRAB	RawH2O	MANGANESE		3.19	ug/L	0.104	20	1.04	EPA 200.7	11-Dec-15
L202825-1	CLAY STN RWPP	INLET WEIR	12/2/2015 9:25	GRAB	RawH2O	MANGANESE		3.91	ug/L	0.104	20	1.04	EPA 200.7	11-Dec-15
L202997-1	CLAY STN RWPP	INLET WEIR	12/9/2015 9:15	GRAB	RawH2O	MANGANESE		2.68	ug/L	0.104	20	1.04	EPA 200.7	18-Dec-15
L203142-1	CLAY STN RWPP	INLET WEIR	12/16/2015 9:30	GRAB	RawH2O	MANGANESE		3.78	ug/L	0.104	20	1.04	EPA 200.7	6-Jan-16
							min	2.68						
							max	41.6						

Sample	L198137-1	L198137-3	L200646-1	L200778-1
Collectdate	5/6/2015 11:15	5/6/2015 12:00	8/19/2015 8:20	8/26/2015 8:50
Site	FREEPORT SUPPLY CONV	FREEPORT SUPPLY CONV	FREEPORT SUPPLY CONV	FREEPORT SUPPLY CONV
Locator	LAFAYETTE 1 AQ	LAFAYETTE 1 AQ	LAFAYETTE 1 AQ	LAFAYETTE 1 AQ
ClientID				
Comments	SAC RIVER SUPPLY MONT: PART 3 REQ (Freeport Diversion 2015); +FLD DATA: pH = 7.78 . Extract 508A within HOLDTIME (Results of 508-PCBS will determine if analysis to proceed.)	SAC RIVER SUPPLY MONT: PART 3 REQ (Freeport Diversion 2015); SUBCONTRACT DATA; 508-PCBS for Arochlors and Total PCBs as DCB	Represents FSC post chlorination and dechlorination. Always analyze for microcystin and cylindrospermopsin. +SAVE14 split in SR for in house comparison	Represents FSC post chlorination and dechlorination. Always analyze for microcystin and cylindrospermopsin. +SAVE14 split in SR for in house comparison
EPA 100.1: EPA 100.2				
ASBESTOS (MFL)	no data	< 0.2	no data	no data
EPA 1613				
2,3,7,8-TETRACHLORODIBENZO DIOXIN (pg/L	no data	ND 0.177	no data	no data
EPA 200.7				
ALUMINUM (ug/L)	68.5	no data	no data	no data
CALCIUM (ug/L)	12900	no data	no data	no data
COPPER (ug/L)	U 5.2	no data	no data	no data
IRON (ug/L)	84.9	no data	no data	no data
MAGNESIUM (ug/L)	6000	no data	no data	no data
MANGANESE (ug/L)	18.4	no data	no data	no data
SODIUM (ug/L)	11400	no data	no data	no data
ZINC (ug/L)	2.13	no data	no data	no data
EPA 200.8				
ANTIMONY (ug/L)	U 0.2	no data	no data	no data
BARIUM (ug/L)	25	no data	no data	no data
BERYLLIUM (ug/L)	U 0.03	no data	no data	no data
CADMIUM (ug/L)	0.023	no data	no data	no data
CHROMIUM (ug/L)	0.54	no data	no data	no data
LEAD (ug/L)	0.38	no data	no data	no data
NICKEL (ug/L)	1.1	no data	no data	no data
SILVER (ug/L)	U 0.02	no data	no data	no data
THALLIUM (ug/L)	U 0.051	no data	no data	no data
EPA 218.6				
HEXAVALENT CHROMIUM (ug/L)	no data	J 0.16	no data	no data
EPA 245.1				
MERCURY (ug/L)	U 0.04	no data	no data	no data
EPA 300.1				
CHLORIDE (mg/L)	11	no data	no data	no data
FLUORIDE (mg/L)	0.056	no data	no data	no data
NITRATE AS N (mg/L)	0.0084	no data	no data	no data
NITRITE AS N (mg/L)	U 0.0005	no data	no data	no data
SULFATE (mg/L)	12	no data	no data	no data
EPA 314.0				
PERCHLORATE (ug/L)	U 0.5	no data	no data	no data
EPA 504.1				
DIBROMOCHLOROPROPANE (ug/L)	U 0.002	no data	no data	no data
ETHYLENE DIBROMIDE (ug/L)	U 0.002	no data	no data	no data
EPA 508				
AROCLOR 1016 (ug/L)	no data	U 0.03	no data	no data
AROCLOR 1221 (ug/L)	no data	U 0.03	no data	no data
AROCLOR 1232 (ug/L)	no data	U 0.03	no data	no data
AROCLOR 1242 (ug/L)	no data	U 0.03	no data	no data
AROCLOR 1248 (ug/L)	no data	U 0.03	no data	no data
AROCLOR 1254 (ug/L)	no data	U 0.03	no data	no data
AROCLOR 1260 (ug/L)	no data	U 0.03	no data	no data
TOTAL PCB'S (ug/L)	no data	U 0.3	no data	no data
EPA 508A				
DECACHLOROBIPHENYL (ug/L)	Q	no data	no data	no data
EPA 515.3				
(2,4,5-TRICHLOROPHENOXY)ACETIC ACID (ug/	U 0.082	no data	no data	no data
(2,4-DICHLOROPHENOXY)ACETIC ACID (ug/L)	U 0.056	no data	no data	no data
2-(2,4,5-TRICHLOROPHENOXY)PROPIONIC AC	U 0.063	no data	no data	no data
3,5-DICHLOROBENZOIC ACID (ug/L)	U 0.025	no data	no data	no data
4-(2,4-DICHLOROPHENOXY)BUTANOIC ACID (	U 0.26	no data	no data	no data
4-NITROPHENOL (ug/L)	U,N,* 0.075	no data	no data	no data
ACIFLUORFEN (ug/L)	U 0.028	no data	no data	no data
BENTAZON (ug/L)	U 0.14	no data	no data	no data
CHLORAMBEN (ug/L)	U 0.012	no data	no data	no data
DACTHAL (DCPA) (ug/L)	U 0.05	no data	no data	no data
DALAPON (ug/L)	U 0.25	no data	no data	no data
DICAMBA (ug/L)	U 0.036	no data	no data	no data
DICHLOROPHENYLACETIC ACID (% recovery)	110	no data	no data	no data
DICHLORPROP (ug/L)	U 0.21	no data	no data	no data
DINOSEB (ug/L)	U 0.057	no data	no data	no data
PENTACHLOROPHENOL (ug/L)	U 0.014	no data	no data	no data
PICLORAM (ug/L)	U 0.022	no data	no data	no data
EPA 524.2				
1,1,1,2-TETRACHLOROETHANE (ug/L)	U 0.18	no data	no data	no data

1,1,1-TRICHLOROETHANE (ug/L)	U 0.19	no data	no data	no data
1,1,2,2-TETRACHLOROETHANE (ug/L)	U 0.2	no data	no data	no data
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE (ι	U 0.25	no data	no data	no data
1,1,2-TRICHLOROETHANE (ug/L)	U 0.21	no data	no data	no data
1,1-DICHLORO-2-PROPANONE (ug/L)	U 0.21	no data	no data	no data
1,1-DICHLOROETHANE (ug/L)	U 0.21	no data	no data	no data
1,1-DICHLOROETHENE (ug/L)	U 0.2	no data	no data	no data
1,1-DICHLOROPROPENE (ug/L)	U 0.26	no data	no data	no data
1,2,3-TRICHLOROBENZENE (ug/L)	U 0.24	no data	no data	no data
1,2,3-TRICHLOROPROPANE (ug/L)	U 0.19	no data	no data	no data
1,2,4-TRICHLOROBENZENE (ug/L)	U 0.19	no data	no data	no data
1,2,4-TRIMETHYLBENZENE (ug/L)	U 0.21	no data	no data	no data
1,2-DICHLOROBENZENE (ug/L)	U 0.23	no data	no data	no data
1,2-DICHLOROETHANE (ug/L)	U 0.14	no data	no data	no data
1,2-DICHLOROPROPANE (ug/L)	U 0.15	no data	no data	no data
1,3,5-TRIMETHYLBENZENE (ug/L)	U 0.2	no data	no data	no data
1,3-DICHLOROBENZENE (ug/L)	U 0.23	no data	no data	no data
1,3-DICHLOROPROPANE (ug/L)	U 0.22	no data	no data	no data
1,4-DICHLOROBENZENE (ug/L)	U 0.18	no data	no data	no data
1-CHLOROBUTANE (ug/L)	U 0.21	no data	no data	no data
2-BUTANONE (ug/L)	U 0.43	no data	no data	no data
2-HEXANONE (ug/L)	U 0.25	no data	no data	no data
2-NITROPROPANE (ug/L)	U 0.77	no data	no data	no data
4-BROMOFLUOROBENZENE (% recovery)	90.8	no data	no data	no data
4-METHYL-2-PENTANONE (ug/L)	U 0.2	no data	no data	no data
ACETONE (ug/L)	U 0.35	no data	no data	no data
ACRYLONITRILE (ug/L)	U 0.45	no data	no data	no data
ALLYL CHLORIDE (ug/L)	U 0.17	no data	no data	no data
BENZENE (ug/L)	U 0.14	no data	no data	no data
BROMOBENZENE (ug/L)	U 0.16	no data	no data	no data
BROMOCHLOROMETHANE (ug/L)	U 0.21	no data	no data	no data
BROMODICHLOROMETHANE (ug/L)	7.7	no data	no data	no data
BROMOFORM (ug/L)	U 0.31	no data	no data	no data
BROMOMETHANE (ug/L)	U 0.55	no data	no data	no data
CARBON DISULFIDE (ug/L)	U 0.44	no data	no data	no data
CARBON TETRACHLORIDE (ug/L)	U 0.25	no data	no data	no data
CHLOROACETONITRILE (ug/L)	U 0.23	no data	no data	no data
CHLOROBENZENE (ug/L)	U 0.21	no data	no data	no data
CHLOROETHANE (ug/L)	U 0.38	no data	no data	no data
CHLOROFORM (ug/L)	64	no data	no data	no data
CHLOROMETHANE (ug/L)	U 0.15	no data	no data	no data
CIS-1,2-DICHLOROETHENE (ug/L)	U 0.25	no data	no data	no data
CIS-1,3-DICHLOROPROPENE (ug/L)	U 0.23	no data	no data	no data
D4-1,2-DICHLOROBENZENE (% recovery)	97.8	no data	no data	no data
DIBROMOCHLOROMETHANE (ug/L)	0.63	no data	no data	no data
DIBROMOCHLOROPROPANE (ug/L)	U 0.28	no data	no data	no data
DIBROMOMETHANE (ug/L)	U 0.28	no data	no data	no data
DICHLORODIFLUOROMETHANE (ug/L)	U 0.17	no data	no data	no data
DIISOPROPYL ETHER (ug/L)	U 0.29	no data	no data	no data
ETHYL BENZENE (ug/L)	U 0.18	no data	no data	no data
ETHYL ETHER (ug/L)	U 0.2	no data	no data	no data
ETHYL-T-BUTYL ETHER (ug/L)	U 0.19	no data	no data	no data
ETHYLENE DIBROMIDE (ug/L)	U 0.19	no data	no data	no data
ETHYLMETHACRYLATE (ug/L)	U 0.14	no data	no data	no data
FLUOROTRICHLOROMETHANE (ug/L)	U 0.22	no data	no data	no data
HEXACHLOROBUTADIENE (ug/L)	U 0.2	no data	no data	no data
HEXACHLOROETHANE (ug/L)	U 0.25	no data	no data	no data
IODOMETHANE (ug/L)	U 0.69	no data	no data	no data
ISOPROPYLBENZENE (ug/L)	U 0.21	no data	no data	no data
M+P XYLENES (ug/L)	U 0.37	no data	no data	no data
METHYL-T-BUTYL ETHER (ug/L)	U 0.39	no data	no data	no data
METHYLACRYLATE (ug/L)	U 0.26	no data	no data	no data
METHYLACRYLONITRILE (ug/L)	U 0.2	no data	no data	no data
METHYLENE CHLORIDE (ug/L)	U 0.18	no data	no data	no data
METHYLMETHACRYLATE (ug/L)	U 0.28	no data	no data	no data
N-BUTYLBENZENE (ug/L)	U 0.25	no data	no data	no data
N-PROPYLBENZENE (ug/L)	U 0.2	no data	no data	no data
NAPHTHALENE (ug/L)	U 0.2	no data	no data	no data
NITROBENZENE (ug/L)	U 1	no data	no data	no data
O-CHLOROTOLUENE (ug/L)	U 0.19	no data	no data	no data
O-XYLENE (ug/L)	U 0.18	no data	no data	no data
P-CHLOROTOLUENE (ug/L)	U 0.19	no data	no data	no data
P-ISOPROPYLTOLUENE (ug/L)	U 0.22	no data	no data	no data
PENTACHLOROETHANE (ug/L)	U 0.17	no data	no data	no data
SEC-BUTYLBENZENE (ug/L)	U 0.69	no data	no data	no data
SEC-DICHLOROPROPANE (ug/L)	U 0.24	no data	no data	no data
STYRENE (ug/L)	U 0.19	no data	no data	no data
TERT-AMYL METHYL ETHER (ug/L)	U 0.17	no data	no data	no data
TERT-BUTYL ALCOHOL (ug/L)	U 1.7	no data	no data	no data
TERT-BUTYLBENZENE (ug/L)	U 0.18	no data	no data	no data
TETRACHLOROETHENE (ug/L)	U 0.2	no data	no data	no data
TETRAHYDROFURAN (ug/L)	U 0.54	no data	no data	no data
TOLUENE (ug/L)	U 0.16	no data	no data	no data
TOTAL 1,3-DICHLOROPROPENES (ug/L)	U 0.41	no data	no data	no data
TOTAL XYLENES (ug/L)	U 0.55	no data	no data	no data
TRANS-1,2-DICHLOROETHENE (ug/L)	U 0.19	no data	no data	no data

TRANS-1,3-DICHLOROPROPENE (ug/L)	U 0.18	no data	no data	no data
TRANS-1,4-DICHLORO-2-BUTENE (ug/L)	U 0.2	no data	no data	no data
TRICHLOROETHENE (ug/L)	U 0.17	no data	no data	no data
VINYL CHLORIDE (ug/L)	U 0.22	no data	no data	no data
EPA 525.2				
1,3-DIMETHYL-2-NITROBENZENE (% recovery)	100	no data	no data	no data
2,4-DINITROTOLUENE (ug/L)	U 0.028	no data	no data	no data
2,6-DINITROTOLUENE (ug/L)	U 0.021	no data	no data	no data
4,4'-DDD (ug/L)	U 0.024	no data	no data	no data
4,4'-DDE (ug/L)	U 0.028	no data	no data	no data
4,4'-DDT (ug/L)	U 0.025	no data	no data	no data
ACENAPHTHYLENE (ug/L)	U 0.04	no data	no data	no data
ALACHLOR (ug/L)	U 0.023	no data	no data	no data
ALDRIN (ug/L)	U 0.012	no data	no data	no data
ALPHA BHC (ug/L)	U 0.013	no data	no data	no data
ALPHA ENDOSULFAN (ug/L)	U 0.013	no data	no data	no data
ANTHRACENE (ug/L)	U 0.046	no data	no data	no data
AROCLOR 1016 (ug/L)	U 0.55	no data	no data	no data
AROCLOR 1221 (ug/L)	U 0.55	no data	no data	no data
AROCLOR 1232 (ug/L)	U 0.55	no data	no data	no data
AROCLOR 1242 (ug/L)	U 0.55	no data	no data	no data
AROCLOR 1248 (ug/L)	U 0.55	no data	no data	no data
AROCLOR 1254 (ug/L)	U 0.55	no data	no data	no data
AROCLOR 1260 (ug/L)	U 0.55	no data	no data	no data
ATRAZINE (ug/L)	U 0.029	no data	no data	no data
BENZO(A)ANTHRACENE (ug/L)	U 0.019	no data	no data	no data
BENZO(A)PYRENE (ug/L)	U 0.012	no data	no data	no data
BENZO(B)FLUORANTHENE (ug/L)	U 0.015	no data	no data	no data
BENZO(GHI)PERYLENE (ug/L)	U 0.018	no data	no data	no data
BENZO(K)FLUORANTHENE (ug/L)	U 0.014	no data	no data	no data
BETA BHC (ug/L)	U 0.022	no data	no data	no data
BETA ENDOSULFAN (ug/L)	U 0.021	no data	no data	no data
BIS(2-ETHYLHEXYL)ADIPATE (ug/L)	U 0.032	no data	no data	no data
BIS(2-ETHYLHEXYL)PHTHALATE (ug/L)	JB 0.37	no data	no data	no data
BROMACIL (ug/L)	U 0.02	no data	no data	no data
BUTACHLOR (ug/L)	U 0.029	no data	no data	no data
BUTYLBENZYL PHTHALATE (ug/L)	JB 0.12	no data	no data	no data
CHLORDANE (ug/L)	U 0.11	no data	no data	no data
CHLORDANE-ALPHA (ug/L)	U 0.02	no data	no data	no data
CHLORDANE-GAMMA (ug/L)	U 0.02	no data	no data	no data
CHLOROBENZILATE (ug/L)	U 0.052	no data	no data	no data
CHLORONEB (ug/L)	U 0.057	no data	no data	no data
CHLOROTHALONIL (ug/L)	U 0.035	no data	no data	no data
CHRYSENE (ug/L)	U 0.013	no data	no data	no data
CIS-PERMETHRIN (ug/L)	U,N 0.052	no data	no data	no data
D12-PERYLENE (% recovery)	90	no data	no data	no data
DCPA (ug/L)	U 0.031	no data	no data	no data
DELTA BHC (ug/L)	U 0.013	no data	no data	no data
DI-N-BUTYL PHTHALATE (ug/L)	JB 0.064	no data	no data	no data
DIBENZO(A,H)ANTHRACENE (ug/L)	U 0.015	no data	no data	no data
DIELDRIN (ug/L)	U 0.025	no data	no data	no data
DIETHYL PHTHALATE (ug/L)	U 0.015	no data	no data	no data
DIMETHOATE (ug/L)	U 0.042	no data	no data	no data
DIMETHYL PHTHALATE (ug/L)	U 0.011	no data	no data	no data
ENDOSULFAN SULFATE (ug/L)	U 0.039	no data	no data	no data
ENDRIN (ug/L)	U,N 0.034	no data	no data	no data
ENDRIN ALDEHYDE (ug/L)	U 0.032	no data	no data	no data
EPTC (ug/L)	U 0.011	no data	no data	no data
ETRIDIAZOLE (ug/L)	U 0.011	no data	no data	no data
FLUORENE (ug/L)	U 0.024	no data	no data	no data
GAMMA BHC (ug/L)	U 0.019	no data	no data	no data
HEPTACHLOR (ug/L)	U 0.0066	no data	no data	no data
HEPTACHLOR EPOXIDE (ug/L)	U 0.011	no data	no data	no data
HEXACHLOROBENZENE (ug/L)	U 0.02	no data	no data	no data
HEXACHLOROCYCLOPENTADIENE (ug/L)	U 0.021	no data	no data	no data
HEXAZINONE (ug/L)	U 0.039	no data	no data	no data
INDENO(1,2,3-CD)PYRENE (ug/L)	U 0.014	no data	no data	no data
ISOPHORONE (ug/L)	U 0.012	no data	no data	no data
METHOXYCHLOR (ug/L)	U,N 0.012	no data	no data	no data
METOLACHLOR (ug/L)	U 0.025	no data	no data	no data
METRIBUZIN (ug/L)	U 0.028	no data	no data	no data
MOLINATE (ug/L)	U 0.029	no data	no data	no data
PENTACHLOROPHENOL (ug/L)	U 0.11	no data	no data	no data
PHENANTHRENE (ug/L)	U 0.017	no data	no data	no data
PROMETRYN (ug/L)	U 0.024	no data	no data	no data
PROPACHLOR (ug/L)	U 0.015	no data	no data	no data
PYRENE (ug/L)	U 0.033	no data	no data	no data
SIMAZINE (ug/L)	U 0.031	no data	no data	no data
TERBACIL (ug/L)	U,N 0.035	no data	no data	no data
THIOBENCARB (ug/L)	U 0.02	no data	no data	no data
TOXAPHENE (ug/L)	U 0.55	no data	no data	no data
TRANS-PERMETHRIN (ug/L)	U 0.022	no data	no data	no data
TRIFLURALIN (ug/L)	U 0.011	no data	no data	no data
TRIPHENYL PHOSPHATE (% recovery)	D 140	no data	no data	no data
EPA 531.1				
3-HYDROXYCARBOFURAN (ug/L)	U 0.23	no data	no data	no data

ALDICARB (ug/L)	U 0.41	no data	no data	no data
ALDICARB SULFONE (ug/L)	U 0.45	no data	no data	no data
ALDICARB SULFOXIDE (ug/L)	U 0.22	no data	no data	no data
CARBARYL (ug/L)	U 0.75	no data	no data	no data
CARBOFURAN (ug/L)	U 0.39	no data	no data	no data
METHIOCARB (ug/L)	U 0.52	no data	no data	no data
METHOMYL (ug/L)	U 0.28	no data	no data	no data
OXAMYL (ug/L)	U 0.42	no data	no data	no data
PROPOXUR (ug/L)	U 0.49	no data	no data	no data
EPA 547				
GLYPHOSATE (ug/L)	U 2.1	no data	no data	no data
EPA 548.1				
ENDOTHALL (ug/L)	U 1	no data	no data	no data
EPA 549.2				
DIQUAT (ug/L)	U 0.29	no data	no data	no data
PARAQUAT (ug/L)	U 0.25	no data	no data	no data
EPA 900.0				
GROSS ALPHA MDA95 (pCi/L)	no data	0.896	no data	no data
GROSS BETA MDA95 (pCi/L)	no data	1.25	no data	no data
RADIONUCLIDES: ALPHA (pCi/L)	no data	1.74	no data	no data
RADIONUCLIDES: ALPHA COUNTING ERROR (	no data	+/- 1.14	no data	no data
RADIONUCLIDES: BETA (pCi/L)	no data	1.06	no data	no data
RADIONUCLIDES: BETA COUNTING ERROR (p	no data	+/- 1.1	no data	no data
EPA 903.0,903.1, 904.0				
RADIUM 226 (pCi/L)	no data	0	no data	no data
RADIUM 226 COUNTING ERROR (pCi/L)	no data	+/- 0.371	no data	no data
RADIUM 226 MDA95 (pCi/L)	no data	0.47	no data	no data
RADIUM 228 (pCi/L)	no data	0	no data	no data
RADIUM 228 COUNTING ERROR (pCi/L)	no data	+/- 0.585	no data	no data
RADIUM 228 MDA95 (pCi/L)	no data	0.253	no data	no data
EPA 905.0				
STRONTIUM 90 (pCi/L)	no data	0	no data	no data
STRONTIUM 90 COUNTING ERROR (pCi/L)	no data	+/- 0.334	no data	no data
STRONTIUM 90 MDA95 (pCi/L)	no data	0.546	no data	no data
EPA 906.0				
TRITIUM (pCi/L)	no data	186	no data	no data
TRITIUM COUNTING ERROR (pCi/L)	no data	+/- 263	no data	no data
TRITIUM MDA95 (pCi/L)	no data	434	no data	no data
EPA 908.0				
URANIUM (pCi/L)	no data	0	no data	no data
URANIUM COUNTING ERROR (pCi/L)	no data	+/- 0.409	no data	no data
URANIUM MDA95 (pCi/L)	no data	0.3	no data	no data
GREEN WATER LAB SOP ELISA				
CYLINDROSPERMOPSIN (ug/L)	no data	no data	ND 0.1	ND 0.1
MICROCYSTIN (ug/L)	no data	no data	ND 0.15	ND 0.15
PER SUBCONTRACT LABORATORY REPORT				
DATA TRANSMITTAL ()	no data			
SAMPLER PROVIDED FIELD MEASUREMENTS				
PH (pH units)	7.78	no data	no data	no data
SM2120B				
COLOR (color unit)	6	no data	no data	no data
SM2130B				
TURBIDITY (NTU)	1.7	no data	no data	no data
SM2320B				
ALKALINITY: TOTAL AS CACO3 (mg/L)	58	no data	no data	no data
SM2340C				
HARDNESS: TOTAL AS CACO3 (mg/L)	58	no data	no data	no data
SM2510B				
CONDUCTIVITY (umhos/cm)	159	no data	no data	no data
SM2540C				
TOTAL DISSOLVED SOLIDS (mg/L)	130	no data	no data	no data
SM3114B				
ARSENIC (ug/L)	1.5	no data	no data	no data
SELENIUM (ug/L)	U 0.3	no data	no data	no data
SM4500-CN C, E				
CYANIDE: TOTAL (mg/L)	U 0.003	no data	no data	no data
SM4500-CO2 D				
ALKALINITY: BICARBONATE (mg/L)	58	no data	no data	no data
ALKALINITY: CARBONATE (mg/L)	U 0.1	no data	no data	no data
ALKALINITY: HYDROXIDE (mg/L)	U 0.1	no data	no data	no data
SM5310C				
TOTAL ORGANIC CARBON (mg/L)	1.8	no data	no data	no data
SM5540C				
MBAS (mg/L)	no data	U 0.03	no data	no data

Qualifiers:

N - Spike recovery outside of control limits

< - Less than

Q - Data not suitable for regulatory compliance reporting

ND - Not detected at the Method Detection Limit

U - Analyte not detected

D - Surrogate spike outside of control limits

JB - Estimated value, method blank exceeds 10% of sample concentration

* - Duplicate value outside of control limits

+/- - Radionuclide Counting Error

J - Estimated value, quantitation does not meet SOP criteria

APPENDIX D

WATERSHED CONTAMINANT SOURCES INFORMATION

DPR Rice Pesticide Use Summary

2013 - 2017 Sacramento River Watershed Counties

Pesticide	2013	2014	2015	2016	2017	Change	Trend
Propanil	2,387,053	1,885,646	1,688,496	2,237,619	1,628,793	-32%	Decreasing
Copper sulfate, pentahydrate	1,178,493	1,357,553	1,048,073	1,042,253	1,040,481	-12%	Stable
Thiobencarb	283,454	370,706	521,915	696,341	599,902	112%	Increasing
Sodium carbonate peroxyhydrate	162,936	269,788	147,009	150,745	99,263	-39%	Decreasing
Triclopyr, triethylamine salt	68,888	59,669	50,665	71,187	52,877	-23%	Decreasing
Clomazone	127,621	100,450	76,981	83,573	49,038	-62%	Decreasing
Azoxystrobin	43,778	38,305	38,267	41,898	34,823	-20%	Decreasing
Sodium chlorate	21,706	6,953	9,767	34,278	25,173	16%	Increasing
Sulfuryl fluoride	4,098	6,478	3,826	11,585	21,929	435%	Increasing
Cyhalofop butyl	20,321	13,022	12,068	22,421	14,231	-30%	Decreasing
BENZOBICYCLON					12,819		New
Glyphosate, isopropylamine and potassium salts	5,223	8,552	5,464	15,309	8,572	64%	Increasing
METHOXYFENOZIDE			355	5,104	7,380		Emergency Use
Lambda-cyhalothrin	5,198	4,289	6,524	5,674	5,864	13%	Stable
Pendimethalin	3,846	3,127	7,027	4,796	5,527	44%	Increasing
Penoxsulam	3,962	4,352	3,810	5,136	4,770	20%	Increasing
Sodium hypochlorite	745	124	2,515	2,139	3,760	405%	Increasing
Bispyribac-sodium	4,031	3,414	3,738	4,562	3,183	-21%	Decreasing
Carfentrazone-ethyl	1,496	3,492	4,009	5,078	3,157	111%	Increasing
Halosulfuron-methyl	105	142	424	1,089	2,970	2729%	Increasing
Imazosulfuron	1,882	1,592	2,067	2,487	2,558	36%	Increasing
Diflubenzuron	75	72	102	162	1,554	1972%	Increasing
2,4-D, dimethylamine salt	1,446	820	734	219	1,084	-25%	Decreasing
REYNOUTRIA SACHALINENSIS		408	768	660	857		
(S)-Cypermethrin	1,071	668	586	413	741		
Bensulfuron methyl	2,812	2,312	1,762	1,421	730		
Propiconazole	4,574	3,816	1,161	1,283	668		
Malathion		7	3,384	545	648		
Carbaryl	228	1,054	14,909	3,234	513		
Methyl bromide	10	4	8	82	463		
Trifloxystrobin	4,168	3,382	893	639	227		
GLUFOSINATE-AMMONIUM		6			152		
CAPRIC ACID					144		
METHYL ANTHRANILATE		63	63	69	123		
Orthosulfamuron	304	203	310	608	90		
Paraquat dichloride		178	166	378	35		
Oxyfluorfen	5	14	47	96	25		
BROMACIL					24		
DIURON					24		
BIFENAZATE					16		
DELTAMETHRIN			13	25	16		
S-METHOPRENE					10		
PYRETHRINS				<1	10		
MCPA, DIMETHYLAMINE SALT					6		
CHLORANTRANILIPROLE					2		
IMIDACLOPRID					2		
BETA-CYFLUTHRIN					1		
Clethodim		17	17	1	1		
CLOTHIANIDIN		8	31		<1		
DIPHACINONE					<1		
Esfenvalerate			2		<1		
GIBBERELLINS		<1			<1		
Acephate							
AMITROLE				2			
BIFENTHRIN		3					
BROMADIOLONE		<1					
CHLOROTHALONIL			92				
COPPER HYDROXIDE			59				
COPPER OXYCHLORIDE			66				

DPR Rice Pesticide Use Summary

2013 - 2017 Sacramento River Watershed Counties

Pesticide	2013	2014	2015	2016	2017	Change	Trend
Cyfluthrin	<1			3			
Cypermethrin	42						
DDVP		5		24			
Difenoconazole	16						
DIFETHIALONE		<1					
DODECYL GUANIDINE HYDROCHLORIDE				27			
ETHEPHON		10					
Fenoxaprop-ethyl							
Fenoxaprop-p-ethyl	4	1					
Fluazifop-p-butyl							
FLUBENDIAMIDE			5				
FLUXAPYROXAD				12			
Hexythiazok	28						
Limone							
Mancozeb			99				
METHYLENE BIS(THIOCYANATE)				14			
Metolachlor							
Metribuzin							
ORYZALIN			2	208			
PIPERONYL BUTOXIDE				1			
PYRACLOSTROBIN				12			
PYRAFLUFEN-ETHYL				2			
SIMAZINE				5			
ZINC PHOSPHIDE			1				
TOTAL ANNUAL USE	**4,339,619**	**4,150,710**	**3,658,276**	**4,453,418**	**3,635,235**		

DPR Pesticide Use Summary

2013 - 2017 Non-Rice in Sacramento River Watershed Counties

CHEMICAL_NAME	2013 Annual Applied (lbs)	2014 Annual Applied (lbs)	2015 Annual Applied (lbs)	2016 Annual Applied (lbs)	2017 Annual Applied (lbs)
GLYPHOSATE, All	1,525,209	1,505,525	1,785,368	1,809,238	1,685,919
COPPER, All	1,030,627	913,631	1,103,834	1,371,051	1,610,532
1,3-DICHLOROPROPENE	628,617	714,109	1,239,775	618,375	1,008,630
METHYL BROMIDE	1,200,348	1,066,997	951,135	973,574	830,633
MANCOZEB	417,140	444,007	464,369	560,293	654,944
CHLOROPICRIN	669,676	687,363	752,055	582,790	623,333
ZIRAM	317,533	314,014	363,851	352,438	437,869
CHLOROTHALONIL	245,807	296,345	249,806	286,707	276,832
PENDIMETHALIN	166,535	148,658	218,378	208,462	215,960
PARAQUAT DICHLORIDE	111,763	130,711	185,894	179,382	189,847
OXYFLUORFEN	147,295	84,520	139,946	145,887	151,060
SULFURYL FLUORIDE	173,888	118,985	153,092	145,925	141,150
GLUFOSINATE-AMMONIUM	3,873	14,086	71,269	104,272	137,577
BORIC ACID	41,061	85,660	92,306	92,423	85,412
CHLORPYRIFOS	137,031	153,254	143,539	102,350	85,076
2,4-D, All	117,003	93,098	127,115	105,122	78,406
S-METOLACHLOR	58,311	66,269	62,090	81,529	77,973
ETHEPHON	47,732	44,701	57,384	56,075	77,112
ALUMINUM PHOSPHIDE	32,908	24,006	14,131	10,996	71,197
CALCIUM HYPOCHLORITE	82,504	107,295	120,122	111,902	64,852
ORYZALIN	98,390	86,828	84,048	66,012	60,022
BIFENAZATE	10,203	8,192	14,994	33,466	55,364
NALED	30,986	55,272	45,349	52,204	54,228
PROPICONAZOLE	15,769	21,028	22,844	33,163	52,414
DIAZINON	23,401	23,966	28,136	26,953	51,953
TRIFLURALIN	49,990	53,996	57,837	63,966	50,190
POTASSIUM BICARBONATE	15,366	15,950	15,015	20,544	47,110
IMIDACLOPRID	11,419	16,708	26,234	28,815	47,056
CAPTAN	22,338	23,349	63,531	100,454	46,644
METAM-SODIUM	244,383	227,065	256,678	199,407	40,269
BIFENTHRIN	34,587	32,360	59,898	36,798	39,540
ENDOTHALL, All	19,999	22,854	25,117	27,157	34,687
METHOXYFENOZIDE	13,586	15,188	21,740	28,136	33,126
AZOXYSTROBIN	12,083	16,140	21,858	22,067	32,175
HEXAZINONE	40,487	21,704	48,406	36,457	31,801
TRICLOPYR, All	36,810	38,890	47,648	39,691	30,368
ETHALFLURALIN	48,646	35,728	24,651	34,403	29,343
METOLACHLOR	35,374	43,210	47,816	43,340	28,606
SODIUM CHLORATE	22,246	19,986	12,933	22,482	28,002
DIURON	51,273	29,062	40,840	42,363	27,449
POTASSIUM PHOSPHITE	1,317	8,163	2,201	6,807	27,430
CYPRODINIL	8,974	17,783	17,039	17,800	24,323
PYRACLOSTROBIN	16,541	24,001	24,688	20,335	19,574
BORAX	34,691	11,476	10,548	86,701	19,555
CHLORANTRANILIPROLE	7,574	8,267	11,861	14,555	19,269
FLUOPYRAM	1,862	6,722	8,882	12,254	17,798
THIOPHANATE-METHYL	4,244	5,187	5,955	9,908	17,760
CARBARYL	27,321	26,362	31,125	22,013	17,702
BUPROFEZIN	834	7,401	9,983	7,894	17,357
TEBUCONAZOLE	3,416	5,111	9,305	17,243	17,286
METRIBUZIN	17,545	16,677	20,280	17,837	17,021
MCPA	30,465	22,245	27,634	31,211	16,853
HYDROGEN PEROXIDE	2,712	5,870	6,417	17,115	16,465
BOSCALID	23,370	29,745	22,073	18,848	16,125
IPRODIONE	13,837	14,767	12,131	17,592	15,964
SIMAZINE	42,088	19,785	25,685	26,733	15,938
IMAZAPYR	17,392	23,869	13,465	15,856	14,463
DELTAMETHRIN	674	1,393	1,255	5,588	13,534
HEXYTHIAZOX	6,289	7,763	9,152	7,242	12,996
PERMETHRIN	26,816	23,691	52,917	24,139	12,920

DPR Pesticide Use Summary
2013 - 2017 Non-Rice in Sacramento River Watershed Counties

CHEMICAL_NAME	2013 Annual Applied (lbs)	2014 Annual Applied (lbs)	2015 Annual Applied (lbs)	2016 Annual Applied (lbs)	2017 Annual Applied (lbs)
CLETHODIM	8,222	9,681	10,414	10,893	12,576
PYRIMETHANIL	3,652	6,065	4,801	4,814	12,075
TRIFLOXYSTROBIN	1,739	3,631	5,434	8,316	11,209
SPIRODICLOFEN	420	908	1,719	3,257	11,060
MALATHION	27,190	16,637	14,104	9,173	10,902
FLUXAPYROXAD	377	3,147	9,215	7,202	9,632
PIPERONYL BUTOXIDE	17,038	16,868	14,700	23,448	9,231
ACETAMIPRID	4,473	5,287	7,128	8,692	9,020
ABAMECTIN	4,555	6,322	6,754	6,629	8,936
ESFENVALERATE	7,810	5,808	7,652	6,947	8,642
DISODIUM OCTABORATE TETRAHYDRATE	9,346	11,421	7,563	8,945	8,585
PROPARGITE	9,718	7,312	5,797	8,246	8,114
INDAZIFLAM	3,202	4,472	7,519	7,194	7,673
DIFENOCONAZOLE	5,665	7,210	8,573	7,467	7,670
METCONAZOLE	6,978	7,982	9,574	11,280	7,594
LAMBDA-CYHALOTHRIN	6,883	6,074	7,558	8,248	7,581
4-(2,4-DB), DIMETHYLAMINE SALT	6,373	5,436	8,630	7,287	7,455
AMINOPYRALID, TRIISOPROPANOLAMINE SALT	6,209	8,335	5,902	10,060	7,232
SETHOXYDIM	8,017	8,344	8,476	7,048	7,035
DIQUAT DIBROMIDE	4,690	6,610	10,756	8,854	6,974
FIPRONIL	11,949	10,529	8,013	6,621	6,963
ACROLEIN	12,470	8,297	4,614	7,219	6,616
FLUMIOXAZIN	6,324	5,050	7,898	5,262	6,511
STREPTOMYCIN SULFATE	1,440	869	848	9,561	6,391
DICHLOBENIL	988	26,348	2,938	2,126	5,885
DIMETHOATE	15,858	28,012	15,800	9,831	5,825
UREA DIHYDROGEN SULFATE	2,536	1,489	4,498	2,202	5,701
MEFENOXAM	2,511	2,236	4,528	3,569	5,390
SPIROTETRAMAT	372	1,835	6,584	5,750	5,255
DIGLYCOLAMINE SALT OF 3,6-DICHLORO-O-ANISIC ACID	5,582	3,593	4,348	5,164	5,177
OXYTETRACYCLINE HYDROCHLORIDE	262	-	8	5,675	5,040
PEROXYACETIC ACID	9	7	384	931	4,956
ACEPHATE	3,077	4,624	4,607	4,892	4,841
DITHIOPYR	8,607	7,378	7,756	7,496	4,824
PENTHIOPYRAD	2,357	3,780	5,737	4,730	4,336
ISOXABEN	4,470	4,555	5,818	5,276	4,178
SAFLUFENACIL	2,599	2,860	3,649	3,335	4,111
RIMSULFURON	1,999	2,133	3,666	3,228	4,006
DODINE	335	15,776	12,452	12,058	4,000
GLUTARALDEHYDE	1,240	2,374	2,995	2,768	3,764
ETOXAZOLE	2,232	3,869	5,998	4,178	3,683
BROMOXYNIL OCTANOATE	3,400	4,642	4,845	6,210	3,625
METHOMYL	8,086	7,666	7,200	6,665	3,485
MYCLOBUTANIL	1,829	2,751	2,997	2,005	3,481
KRESOXIM-METHYL	1,371	1,556	1,241	1,741	3,151
MAGNESIUM PHOSPHIDE	5,776	4,314	5,827	5,027	3,083
FOSETYL-AL	4,041	9,379	9,966	1,278	3,045
CHLORPROPHAM	26,468	3,351	2,743	4,531	3,038
HYDROGEN CYANAMIDE	121	-	486	498	2,967
CAPRYLIC ACID	-	-	1,172	4,171	2,937
POLYOXIN D, ZINC SALT	1,751	1,707	1,999	2,682	2,906
SPINETORAM	1,274	2,179	3,676	3,297	2,890
CYFLUMETOFEN	-	-	2,954	2,380	2,850
CYPERMETHRIN	3,205	3,115	2,665	2,970	2,845
PRODIAMINE	3,542	3,649	4,701	3,587	2,723
NAPROPAMIDE	1,903	2,033	2,655	2,008	2,674
MALEIC HYDRAZIDE, POTASSIUM SALT	5,170	4,686	5,515	796	2,640
BETA-CYFLUTHRIN	1,128	4,511	1,819	2,689	2,622

CHEMICAL_NAME	2013 Annual Applied (lbs)	2014 Annual Applied (lbs)	2015 Annual Applied (lbs)	2016 Annual Applied (lbs)	2017 Annual Applied (lbs)
SODIUM BROMIDE	577	1,103	913	2,062	2,563
DINOTEFURAN	161	158	639	1,686	2,536
SODIUM HYPOCHLORITE	1,004	2,495	2,663	2,174	2,432
INDOXACARB	2,506	2,348	2,038	2,899	2,357
CLOPYRALID, All	1,535	2,045	1,739	1,593	2,315
BENTAZON, SODIUM SALT	2,579	2,395	1,406	1,767	2,240
THIAMETHOXAM	771	726	1,726	658	2,240
MANEB	5	828	68	34	2,011
CAPRIC ACID	-	-	798	2,840	2,000
THIRAM	917	392	537	2,638	1,956
DICAMBA, All	4,996	4,741	4,589	4,478	1,886
PHOSMET	318	596	711	1,029	1,812
TEBUTHIURON	1,710	1,722	1,992	1,311	1,796
PROPAMOCARB HYDROCHLORIDE	1,215	989	2,109	1,444	1,581
CLOFENTEZINE	633	718	1,044	707	1,576
CARFENTRAZONE-ETHYL	1,493	1,605	1,625	1,651	1,516
DIMETHENAMID-P	481	1,169	1,452	1,383	1,508
ATRAZINE	2,466	1,330	882	3,027	1,476
QUINOXYFEN	1,629	1,990	3,341	2,343	1,467
FENPROPATHRIN	633	802	1,080	1,177	1,378
FLUPYRADIFURONE	-	-	1,361	1,611	1,334
SULFENTRAZONE	595	951	1,466	2,057	1,321
METRAFENONE	288	1,358	949	1,154	1,306
SPINOSAD	4,587	1,334	1,207	1,280	1,229
PHENOTHRIN	2,657	968	1,623	1,349	1,196
TRIFLUMIZOLE	1,878	1,887	1,752	1,352	1,165
SULFOMETURON-METHYL	1,961	1,615	1,417	916	1,080
PYRETHRINS	2,558	2,109	1,709	2,832	1,045
PCNB	3,235	2,068	912	1,682	1,035
FLUBENDIAMIDE	4,256	4,572	5,536	4,170	1,005
PENOXSULAM	569	399	693	966	984
FENPYROXIMATE	680	730	1,070	1,894	909
S-METHOPRENE	489	467	465	866	904
FENHEXAMID	1,340	1,174	1,222	782	900
FLUDIOXONIL	483	598	512	1,074	888
EPTC	4,264	1,584	1,732	471	886
FLURIDONE	320	433	445	416	858
BROMOXYNIL HEPTANOATE	1,102	1,991	873	840	850
POTASH SOAP	610	379	428	153	829
LIMONENE	850	276	6,535	740	828
ALKYL (50%C14, 40%C12, 10%C16) DIMETHYLBENZYL AMMONIUM CHLORIDE	28	11	36	14	817
PHORATE	369	464	1,445	1,015	812
FLUTOLANIL	636	631	963	866	725
AMINOCYCLOPYRACHLOR	-	140	315	445	719
DIMETHOMORPH	110	429	953	1,934	715
ETHOFUMESATE	606	587	4,476	724	707
OXAMYL	3,405	3,461	2,744	446	689
CHLORSULFURON	655	673	782	810	681
FLUAZIFOP-P-BUTYL	499	817	772	590	680
SODIUM CARBONATE PEROXYHYDRATE	6,759	434	241	565	674
TETRACONAZOLE	732	490	641	307	655
PYRIPROXYFEN	1,124	1,801	2,178	1,013	644
CYFLUTHRIN	617	986	884	1,001	631
2,2-DIBROMO-3-NITRILOPROPIONAMIDE	1,536	1,088	1,828	1,807	627
SPIROMESIFEN	2,384	896	737	722	612
THIOBENCARB	420	5	105	250	593
DDVP	212	334	370	630	588
TRICHLORO-S-TRIAZINETRIONE	359	285	150	231	578
FENAZAQUIN	-	-	-	149	564

CHEMICAL_NAME	2013 Annual Applied (lbs)	2014 Annual Applied (lbs)	2015 Annual Applied (lbs)	2016 Annual Applied (lbs)	2017 Annual Applied (lbs)
POTASSIUM PEROXYMONOSULFATE	1,391	1,507	1,507	1,653	564
IMAZAMOX, AMMONIUM SALT	457	494	558	491	548
THIABENDAZOLE	626	931	809	693	540
MESOTRIONE	34	38	159	224	540
FLUTRIAFOL	-	-	-	10	537
CYFLUFENAMID	48	126	450	382	532
FORMALDEHYDE	1,055	2,660	1,622	573	529
IMAZETHAPYR	282	330	555	433	525
FLUROXYPYR	-	430	209	545	518
TRINEXAPAC-ETHYL	449	517	545	565	513
NAA	462	495	505	520	507
CYMOXANIL	427	195	1,163	599	490
CLOTHIANIDIN	398	1,086	781	537	478
BENSULIDE	519	627	493	508	477
LINURON	936	677	1,187	1,084	470
FAMOXADONE	427	195	723	557	433
FENBUCONAZOLE	632	375	710	81	431
TEMBOTRIONE	44	19	207	186	426
CHLORFENAPYR	3,540	575	2,778	1,431	420
1-BROMO-3-CHLORO-5,5-DIMETHYL HYDANTOIN	1,285	1,045	549	599	417
HYDROPRENE	675	216	294	346	414
ZINC PHOSPHIDE	279	425	1,211	589	403
PACLOBUTRAZOL	390	437	501	598	374
ACETIC ACID	-	0	101	437	364
BETA-CONGLUTIN	-	-	133	20	354
DIFLUBENZURON	458	1,439	1,952	532	349
FORMIC ACID	26	12	2,493	258	338
MSMA	503	717	359	326	331
AMETOCTRADIN	6	10	885	1,243	330
ETOFENPROX	131	415	419	574	315
TCMTB	-	24	227	353	311
THIDIAZURON	87	128	148	133	309
QUINCLORAC	190	218	119	131	287
PROMETRYN	704	-	1,039	722	285
FLONICAMID	160	208	383	307	284
NORFLURAZON	3,315	2,381	3,336	633	282
THYMOL	364	125	117	37	268
HALOSULFURON-METHYL	562	821	343	216	267
BROMACIL	804	703	1,308	733	263
(S)-CYPERMETHRIN	199	597	430	393	260
MCPP	388	405	301	303	259
1,3-DICHLORO-5,5-DIMETHYLHYDANTOIN	652	267	376	388	250
CRYOLITE	1,040	26	14	517	249
PINOXADEN	799	738	623	733	243
FLUENSULFONE	-	-	-	70	238
PRALLETHRIN	3	18	80	232	233
ACEQUINOCYL	-	118	1,379	827	222
DIFLUFENZOPYR, SODIUM SALT	605	204	129	359	221
MEPIQUAT CHLORIDE	65	46	64	106	220
TRIBENURON-METHYL	339	482	390	443	213
OXADIAZON	152	194	784	435	208
FLAZASULFURON	15	40	155	77	206
MECOPROP-P	170	470	1,525	266	195
ALPHA-ISOOCTADECYL-OMEGA-HYDROXYPOLY(OXYETHYLENE)	1,086	154	56	184	186
OXYTETRACYCLINE, CALCIUM COMPLEX	7,552	6,868	8,088	1,105	161
METHYL ISOTHIOCYANATE	-	92	63	77	153
ZOXAMIDE	256	64	72	94	142
XYLENE	5	83	435	223	136

DPR Pesticide Use Summary
2013 - 2017 Non-Rice in Sacramento River Watershed Counties

CHEMICAL_NAME	2013 Annual Applied (lbs)	2014 Annual Applied (lbs)	2015 Annual Applied (lbs)	2016 Annual Applied (lbs)	2017 Annual Applied (lbs)
1,4-DIMETHYLNAPHTHALENE	2,194	1,085	891	660	133
CYCLANILIDE	55	22	20	88	124
CYAZOFAMID	121	83	77	737	114
TRIADIMEFON	239	369	209	230	113
TRALOMETHRIN	-	0	0	0	113
METALDEHYDE	83	130	235	183	109
METHYL ANTHRANILATE	161	91	100	168	108
PYRAFLUFEN-ETHYL	77	88	119	103	104
ACIBENZOLAR-S-METHYL	4	7	10	13	101
1,3-DIBROMO-5,5-DIMETHYLHYDANTOIN	16	518	29	183	98
PYRIDABEN	-	991	523	72	97
FENAMIDONE	174	215	256	167	92
METHOPRENE	166	84	88	95	88
PYMETROZINE	39	55	141	140	86
SODIUM CHLORITE	141	-	1,622	-	75
DAZOMET	4,837	5,501	1,505	3,876	74
FLUAZINAM	3	16	34	187	73
AMINO ETHOXY VINYL GLYCINE HYDROCHLORIDE	110	132	198	94	72
GIBBERELLINS	123	82	53	58	70
POTASSIUM SILICATE	-	48	110	171	64
TRITICONAZOLE	144	152	111	79	50
PROPYZAMIDE	4	69	17	117	45
TAU-FLUVALINATE	152	92	71	158	44
SODIUM CHLORIDE	98	106	106	116	39
PROHEXADIONE-CALCIUM	-	-	1	188	34
METHIOCARB	47	168	39	100	32
EMAMECTIN BENZOATE	46	23	52	109	29
MESOSULFURON-METHYL	174	155	101	54	28
CHLORTHAL-DIMETHYL	591	1,730	627	1,425	22
STRYCHNINE	127	123	46	32	18
MANDIPROPAMID	52	56	216	13	11
SUCROSE OCTANOATE	187	98	200	29	7
METHIDATHION	1,085	691	64	145	4
METHYL PARATHION	3,395	17	28	18	1
RESMETHRIN	3	166	0	0	0
FENBUTATIN-OXIDE	-	-	105	-	0
DICOFOL	347	145	9	-	-
ENDOSULFAN	-	0	875	576	-
POTASSIUM N-METHYLDITHIOCARBAMATE	124,764	150,993	57,107	-	-
PROPANIL	180	272	1,153	462	-
PROPETAMPHOS	1	3,023	0	0	-
S-ABSCISIC ACID	68	57	-	200	-
SODIUM METABORATE	-	1,033	-	240	-
SODIUM METABORATE TETRAHYDRATE	-	582	1,382	1,989	-
TOTAL ANNUAL	**8,832,800**	**8,712,992**	**10,118,752**	**9,709,727**	**10,106,803**

* List includes any pesticide >100 pounds per year 2013 - 2017

City of
SACRAMENTO
Department of Utilities

April 7, 2017
170094:KDM:EC

Ms. Ann Prichard
Pesticide Registration Branch
California Department of Pesticide Regulation (DPR)
P.O. Box 4015
Sacramento, CA 95812
Submitted via email

Subject: Proposed Decision to Register Butte Herbicide Containing New Rice Pesticide Active Ingredient Benzobicyclon – Request that DPR complete its own scientific evaluation of human health (drinking water) risks prior to making its final registration decision

Dear Ms. Prichard:

On behalf of the Sacramento River Source Water Protection Program, thank you for the opportunity to provide input on DPR's scientific evaluation supporting the proposed registration of the first rice pesticide product containing the active ingredient benzobicyclon. The City of Sacramento, City of West Sacramento, and Sacramento County Department of Water Resources sponsor the Sacramento River Source Water Protection Program; this program is coordinated with other agencies that draw their drinking water from the Sacramento River, including East Bay Municipal Utility District (EBMUD), and the Woodland-Davis Clean Water Agency.

The Sacramento River Source Water Protection Program understands that there is a need for alternatives to thiobencarb for weed control in flooded rice fields and appreciate industry efforts to bring alternatives to market. This letter and the questions provided are part of our due diligence to ensure the continued healthfulness of our water supply. We seek to ensure that DPR's scientific experts are confident based on solid scientific evidence that the use of this new pesticide as proposed will be fully safe for public health this year and in the long term. Especially given that the U.S. EPA decision to register benzobicyclon is based on a relatively "close call" with regard to human health risks associated with drinking water exposures, we request that prior to making its registration decision, DPR complete its own scientific evaluation of human health risks from this new rice pesticide, bringing DPR's special California-specific expertise to this important health protection decision for residential human health (drinking water) risks associated with the use of the new active ingredient Benzobicyclon on rice.

The Sacramento River Source Water Protection Program seeks to maintain the high quality of the Sacramento River drinking water supply. It is our responsibility as water utilities to ensure that our water is both healthful and aesthetically pleasing. Because our water supply intakes are downstream of California's primary rice growing area, our source water protection efforts include tracking new rice pesticide registration applications, reviewing EPA's periodic reviews of current rice pesticides, and coordinating with rice growers and pesticide regulators on actions to facilitate protection of surface water.

Over the last two decades, the City of Sacramento and City of West Sacramento have detected the rice pesticides molinate and thiobencarb at our Sacramento River water treatment plant intakes on many occasions. The frequency and detected levels of these rice pesticides have significantly reduced in recent years, and molinate is now phased out. However, the historic presence of these rice pesticides indicates that there are pathways for these and other rice pesticides to enter our water supply.

While our primary concern is potential human health effects to our customers, we also have concerns (based on our experience with thiobencarb) about adverse taste and odor from pesticides and their breakdown products (through degradation and transformation).

DPR has proposed to register the new rice pesticide benzobicyclon. Benzobicyclon would be formulated into an end-use granular product called "Butte Herbicide" that would also include halosulfuron-methyl, a currently registered rice pesticide. Butte Herbicide is designed for aerial application onto flooded rice fields, providing an alternative to thiobencarb for weed control on fields that are not drained for weed control pesticide applications, and offering a new mode of action for weed control. According to the U.S. EPA risk assessment, after benzobicyclon is applied, it relatively rapidly converts into "Metabolite B," which is the chemical form that has the herbicidal function. Metabolite B is persistent, somewhat mobile in water, and is hazardous to humans (particularly infants).

We value and appreciate DPR's long and constructive engagement in the management of rice pesticides to protect surface waters. DPR's scientific investigations and its management actions have been crucial for the protection of our drinking water supply. DPR 's significant role in the development and implementation of the Rice Pesticide Program, including its long involvement in Sacramento Valley rice-pesticide related drinking water quality protection has given it special expertise on the scientific issues around rice pesticides use and transport in the Sacramento Valley watershed.

We understand that U.S. EPA did evaluate human health risks associated with consumption of drinking water downstream of California's rice growing area. There are several assumptions and extrapolations in the U.S. EPA risk assessment that are crucial to the risk calculations for human safety. Some of these are novel, at least for rice pesticides. The U.S. EPA calculation of population-adjusted dose (PAD) for infants <1 year old is 34% of the acute PAD and 41% of the chronic PAD. Small changes in the assumptions and extrapolations could take these values to 1 or higher, which would change the infant health risk conclusion. Prior to making its final registration decision, we request that DPR further review EPA's risk assessment. Two key U.S. EPA documents are enclosed (the Human Health Risk Assessment and the Drinking Water Assessment); the entire set of documents are available in Docket ID # EPA–HQ–OPP–2015–0226 at www.regulations.gov.

Based on our review of the U.S. EPA risk assessments, we have several questions for DPR regarding the scientific methods and the potential implications of data gaps for the U.S. EPA's risk assessment's conclusions, as well as questions about the process for managing the sales cap proposed by U.S. EPA and potential future changes in benzobicyclon registration.

1. U.S. EPA used predictive models to estimate environmental chemistry and fate data for Metabolite B (e.g., Drinking Water Assessment Table 2). We do not know the uncertainties of these values. What is DPR's assessment of the uncertainty of these values and the sensitivity of the risk conclusions (about %aPAD and %cPAD) to these values?

2. U.S. EPA has a very limited data set to characterize the health risks of the primary chemical that would occur in drinking water, Metabolite B (Health Risk Assessment Table 4.5.3). U.S. EPA extrapolated from another similar chemical to develop some of its risk estimates. What is DPR's assessment of the sensitivity of the risk conclusions (about %aPAD and %cPAD) to the selection of

values via this method? Based on other chemicals, can DPR estimate the potential that this extrapolation method may underestimate risks?

3. U.S. EPA used its recently completed updated rice pesticide model (the Pesticides in Flooded Agriculture Model [PFAM]) with the new Sacramento Valley watershed scenario to estimate surface water concentrations of benzobicyclon in this risk assessment. Although the model seems to report estimated in-field pesticide concentrations, it was calibrated and validated with Sacramento valley rice pesticides monitoring data from downstream locations. This may be the reason that U.S. EPA modelers and risk assessors use the modeled concentrations in the risk assessments without assuming further dilution. What is DPR's scientific evaluation of this new model and its application in this risk assessment? Are the U.S. EPA estimated drinking water concentrations appropriate for risk assessment use? Most importantly, what is the potential that the model underestimates pesticide exposure from downstream drinking water consumption?

4. The U.S. EPA risk assessment assumes that one can simply multiply the estimated drinking water concentrations calculated based on 100% rice crop treatment by 10% to obtain estimated drinking water concentration if benzobicyclon is applied on 50,000 rice acres. This assumes that use of benzobicyclon would be evenly distributed throughout the watershed. U.S. EPA modeling also assumes even distribution of applications and discharges throughout the application season, even at this lower application volume.

   Prior monitoring data for another rice pesticide applied to flooded fields (thiobencarb) and analysis by DPR suggested that such pesticides do not have an even usage distribution, and that use in portions of the watershed closest to drinking water intakes may correlate with higher concentrations in the Sacramento River at the drinking water intakes.

   Do DPR scientists believe that the U.S. EPA % crop treated modeling approach appropriately represents exposure to benzobicyclon in downstream drinking water supplies? What is the potential that exposures are underestimated in a manner that could modify risk conclusions?

5. The exposure modeling assumes that there would be zero drift of benzobicyclon, even into channels immediately adjacent to fields, when benzobicyclon is applied

(via air applications) because it is in a granular form. This assumption does not seem, at least on the surface, to be consistent with available evidence:

a. Monitoring data typically show the highest concentrations of rice pesticides occur during the application period.

b. Granular formulations (e.g., Bolero) have been directly associated with drift into surface waters. That drift was the basis for drift controls on rice pesticides that are in California DPR recommended permit conditions.

c. The nature of the granular carrier can be an important factor in drift levels. For example, reformulation of Bolero 10G to reduce "dustiness" coincided with reduced thiobencarb concentrations in both upstream drains and downstream water supplies.

Do DPR scientists believe that the zero-drift approach used by U.S. EPA is appropriate? What is the potential that due to this and other assumptions in the risk assessment exposures are underestimated in a manner that could modify risk conclusions?

6. Given Metabolite B's persistence, it would likely continue to be present in rice fields for multiple years post-application. The year-to-year (perhaps indefinite) increase in field concentrations does not appear to have been addressed in the modeling. How would prior year residues affect second, third, and fourth-year drinking water concentrations?

7. Based on the data available to characterize benzobicyclon and Metabolite B and the design of Sacramento River drinking water treatment systems, we agree with U.S. EPA's assessment that it is appropriate for risk assessment purposes to assume that the total quantity of these two chemicals in source water at a drinking water intake will pass through drinking water treatment processes in our region and would reach a consumer's tap entirely in the form of Metabolite B. U.S. EPA's quantitative risk assessment does not appear to include the assumed 100% conversion of Benzobicyclon to Metabolite B in drinking water systems (i.e., adding the source water Benzobicyclon concentration to the Metabolite B concentration) when estimating consumer drinking water exposure to Metabolite B. Are we reading this correctly? If so, how would using the sum of estimated Benzobicyclon and Metabolite B concentrations modify the risk estimates?

8. What is the potential for adverse taste and odor from Metabolite B and any reaction products that may be formed by drinking water chemical treatment, such as coagulation, disinfection, and fluoridation?

9. Are there any cumulative and potential synergistic effects of exposure to Metabolite B and the co-formulated active ingredient halosulfuron-methyl? Are there any cumulative and potential synergistic effects of exposure to Metabolite B and the multiple other pesticides that may be present in our source waters?

10. Is there a chemical analysis method to measure benzobicyclon in environmental source waters and in disinfected tap water, with reporting limits below estimated drinking water supply concentrations? Could the labs that DPR works with provide this chemical analysis? Are there commercial labs that provide this chemical analysis?

11. Given the uncertainty in certain elements of U.S. EPA's modeling that are crucial to U.S. EPA's risk conclusions about drinking water safety, would DPR request that the registrant conduct monitoring of benzobicyclon and Metabolite B to obtain data to ensure the scientific validity of the assumed maximum concentrations in downstream drinking water sources? Could DPR conduct benzobicyclon monitoring? Could this monitoring be initiated during the first year of benzobicyclon use?

12. In its proposed registration decision, U.S. EPA has stated its intent to ensure that no more than 450,000 pounds of Butte Herbicide would be used in any single year on California rice. Since this sales cap is crucial to the human health risk conclusions, we would like to understand DPR's role in its implementation. Would DPR implement a state-specific similar control? What would happen if another product containing benzobicyclon was also approved for use on rice or another crop in the Sacramento Valley watershed?

13. The risk assessment suggests that the U.S. EPA sales cap could potentially be relaxed based on future scientific investigations of benzobicyclon and Metabolite B human health risks. Would DPR have a formal role in evaluating such future scientific investigations? What would happen if these data show that Metabolite B is more hazardous than estimated in the U.S. EPA risk assessment? What would the process be for evaluating such additional data? Would these data be shared with the downstream drinking water suppliers like ourselves? Would DPR

provide a public participation opportunity for any decisions that it makes based on additional human health hazard data?

If you have any questions on the above, please do not hesitate to contact Elissa Callman at (916) 808-1424. Thank you for the opportunity to provide our input on the proposed registration of the pesticide benzobicyclon for use on rice.

Sincerely,

Sherill Huun

Sherill Huun
Supervising Engineer

ENCLOSURES:
U.S. EPA Benzobicyclon Human Health Risk assessment
U.S. EPA Benzobicyclon Drinking Water Assessment

Cc: Daniel McClure, Central Valley Water Board
Susan Fregien, Central Valley Water Board
Dawit Tadesse, California State Water Resources Control Board
Marylou Verder-Carlos, CDPR
George Farnsworth, CDPR
Pam Wofford, CDPR
Nan Singhasemanon, CDPR
Jennifer Teerlink, CDPR
Ali Rezvani, State Water Resources Control Board, Division of Drinking Water
Patti TenBrook, U.S. EPA Region 9
Ephraim Leon-Guerrero, U.S. EPA Region 9
Bill Busath, City of Sacramento
Dan Sherry, City of Sacramento
Michael Malone, City of Sacramento
David Herrmann, City of Sacramento
Pravani Vandeyar, City of Sacramento
Dan Mount, City of West Sacramento
Chris Kania, City of West Sacramento
Eileen White, EBMUD

Hubert Lai, EBMUD
Forrest Williams, Sacramento County Department of Water Resources
Tom Pasterski, Sacramento County Department of Water Resources
Keith Hall, Sacramento County Department of Water Resources
Carlos Smith, Sacramento County Department of Water Resources
Dennis Diemer, Woodland-Davis Clean Water Agency
Tim Busch, City of Woodland
Kelly Moran, TDC Environmental
Bonny Starr, Starr Consulting

City of
SACRAMENTO
Department of Utilities

December 21, 2017
170759:EC

Sent via e-mail to: commentletters@waterboards.ca.gov

Subject: Comments to A-2239(a)-(c)

Attn: Ms. Jeanine Townsend
Clerk to the Board
State Water Resources Control Board
1001 I Street, 24th Floor (95814)
P.O. Box 100
Sacramento, CA 95812-0100

Dear Ms. Townsend:

On behalf of the Sacramento River Source Water Protection Program (SRSWPP), thank you for the opportunity to provide comments on the Second Staff-Proposed Order for the Review of Waste Discharge Requirements General Order No. R5-2012-0116 for Growers within the Eastern San Joaquin River Watershed that are Members of the Third-Party Group. The SRSWPP is sponsored by the City of Sacramento, City of West Sacramento, the Sacramento County Department of Water Resources and East Bay Municipal Utility District; this program is coordinated with other agencies that draw their drinking water directly from the Sacramento River, including the Woodland-Davis Clean Water Agency. We serve drinking water to more than 1,000,000 people in Northern California.

Watershed management programs are essential for preserving the high quality of the surface water in the Sacramento River watershed. We are providing comment on this Order due to the potential precedential nature of the order towards surface receiving water monitoring programs in other Irrigated Lands Regulatory Program (ILRP) orders in the Sacramento Valley.

Our comments are based upon a review of Second Staff-Proposed Draft Order with focus on Section II.A.7., the surface receiving water monitoring component. This Second Staff-Proposed Order includes specific direction to the State Water Board staff to convene an expert panel process to make recommendations on a framework for surface receiving water monitoring to inform irrigated lands programs statewide.

We support this finding; however, we request that there be some clarifications added to the Proposed Order. We request that the State Water Board consider clarifying the text with the following items: identify a reasonable timeline for the expert panel process, and state that drinking water quality impacts will be specifically included in the panel process and framework development.

We recommend that the State Water Board Order include a specific timeline for implementation of the Expert Panel and its determinations, and we recommend that the timeline begin soon to ensure that any revisions to a monitoring program framework can be developed in a timely manner.

We request that municipal drinking water and human health experts be specifically included in the Expert Panel process. This process will be the primary mechanism for stakeholder input, and the municipal beneficial use is potentially impacted by a wide variety of constituents associated with agricultural discharge (i.e. solids, organic matter, microbiological constituents, nutrients, and pesticides). It is essential that a surface water monitoring framework developed through the Expert Panel process be sufficiently robust to ensure detection of degradation in water quality (as required for compliance with Antidegradation requirements) and in order to address both cumulative effects and drinking water-specific water quality issues.

We have previously participated in the ILRP regulatory process and provided input on the importance of the sufficiency of the monitoring programs' spatial and temporal densities, as well as the list of constituents included in monitoring, in determining the protection of the municipal beneficial use. Monitoring programs are essential to providing the information that allows for identification of type, severity, and potential sources of contamination that management programs would be targeting. The monitoring program must be designed to protect the safety of drinking water (e.g., MUN beneficial use) from the watershed receiving agricultural discharges. This entails a different focus than monitoring focused solely on aquatic life protection. Key questions for the Expert Panel to answer should be expanded to specifically include the MUN beneficial use as a driver in constituent selection, spatial and temporal density, and long-term data evaluation processes.

If you have any questions regarding these comments, please feel free to contact Elissa Callman directly at 916-808-1424.

Sincerely,

Sherill Huun
Supervising Engineer

Cc: Bill Busath, City of Sacramento
Dan Sherry, City of Sacramento
Pravani Vandeyar, City of Sacramento
David Herrmann, City of Sacramento
Chris Kania, City of West Sacramento
Juan Hernandez-Herrera, City of West Sacramento
David Briggs, EBMUD
Hubert Lai, EBMUD
Forrest Williams, Sacramento County Department of Water Resources
Tom Pasterski, Sacramento County Department of Water Resources
Keith Hall, Sacramento County Department of Water Resources
Carlos Smith, Sacramento County Department of Water Resources
Dennis Diemer, Woodland-Davis Clean Water Agency
Tim Busch, City of Woodland
Bonny Starr, Starr Consulting

Is Protecting Aquatic Life from Pesticides Sufficient to Ensure Human Health Protection in Sources of Drinking Water?

Kelly D. Moran, Ph.D., TDC Environmental, LLC

Bonny Starr, P.E., Starr Consulting

October 1, 2018

Abstract

California water and pesticides regulators have long operated under the informal assumption that programs to protect aquatic life from currently used pesticides will also ensure the safety of surface water drinking water sources. This paper examines the scientific validity of this assumption for the agricultural pesticides in California's Central Valley by comparing water quality regulatory values and benchmarks ("reference values") for human health with those for aquatic life. Because numeric water quality criteria and other numeric regulatory values established for water quality protection exist for only a handful of currently used pesticides, the comparison relies heavily on US EPA pesticides human health and aquatic life benchmarks.

For acute endpoints, both human health and aquatic life reference values typically use a one-day exposure time frame, but chronic endpoint exposure periods differ, with aquatic life exposure periods (4 to 60 days) usually shorter than human health exposure periods (annual).

The evaluation looked in detail at 301 agricultural pesticides with human health reference values. Of these 301 pesticides, only 46% had aquatic life reference values that were equal to or lower than the human health reference value. For 54% of these pesticides, either no aquatic life reference value existed or the aquatic life reference value was higher than the human health reference value. In these cases, aquatic life protection actions would not suffice to protect human health.

INTRODUCTION

Drinking water quality protection is among California's highest priorities for its water quality programs. This is evident in the State Water Quality Control Board's (State Water Board's) mission, which is "to preserve, enhance, and restore the quality of California's water resources and drinking water for the protection of the environment, public health, and all beneficial uses, and to ensure proper water resource allocation and efficient use, for the benefit of present and future generations."

California draws its drinking water from both surface waters and groundwater. Protecting these waters from pesticides pollution poses special challenges due the large number of pesticide chemicals, their inherent toxicity, and continual changes in the pesticides used.

Three major Federal laws regulate pesticides in sources of drinking water: the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), and the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). The US Environmental Protection Agency (EPA), which implements all three laws, has never integrated their implementation. Similarly, California EPA, which implements these Federal laws and additional state laws, does not have an integrated implementation framework.

In response to pesticides groundwater pollution, the California legislature passed the Pesticide Contamination Prevention Act, which establishes a special interagency framework for monitoring and management of pesticides in groundwater drinking water sources. Although no special framework exists for management of pesticides in surface water sources of drinking water, California pesticides and water quality regulators have authorities and obligations under both California and Federal law to prevent pesticides pollution of drinking water sources.

According to California Department of Pesticide Regulation (DPR) data, of the >1,000 currently California registered pesticide chemicals,[1] 927 were reported sold in 2015,[2] and about 300 were reported used in volumes >5,000 pounds statewide.[3] Pesticides flow into sources of drinking water from drift, with seepage and discharges from flooded pesticide-treated fields, with runoff from agricultural and urban areas, and in wastewater treatment plant effluent. The human health hazard posed by a pesticide in drinking water depends on two pesticide-specific factors: the pesticide's inherent toxicity and the exposure level.

California water and pesticides regulators have long operated under the informal assumption that programs to protect aquatic life from pesticides will also ensure human health protection in California's surface water sources of drinking water. This paper examines the scientific validity of this assumption for currently used pesticides.

REFERENCE VALUES

Water quality managers generally use available numeric reference values to facilitate determination if a currently used pesticide detected in surface water may indicate a potential human health or aquatic life risk. Comparing the reference values for human health to those for aquatic life provides insights as to whether aquatic-life protection decisions based on available reference values will also suffice to protect human health. Available reference values include regulatory standards and values and US EPA pesticides benchmarks.

Standards for Currently Used Pesticides in Sources of Drinking Water

The Clean Water Act established the national policy prohibiting the discharge of toxic pollutants in toxic amounts. (33 United States Code 1251). To implement this policy, California water quality protection programs have adopted both narrative and numeric standards for pesticides in surface waters. Narrative objectives typically drive implementation of drinking water source protection from pesticides, as numeric water quality criteria and other numeric regulatory values established for human drinking water quality protection exist for only a handful of currently used pesticides.

Ideally, monitoring and management programs would flow directly from the narrative objective, i.e., be based on toxicity measurements. This is impossible in the case of human toxicity. No indicator organisms are available to test the toxicity of drinking water sources to humans. While bioanalytical methods may soon be available to examine one or two modes of toxicity, no method to examine the plethora of human toxicity endpoints is currently reasonably foreseeable. This forces managers to use pesticide-specific values to implement the narrative human toxicity objective.

Tables 1 and 2 summarize the fresh water numeric water quality regulatory values for pesticides currently registered for use in California. These include values adopted under the CWA, the SDWA, and related state laws, but exclude location-specific values that may have been adopted by California Regional Water Quality Control Boards (e.g., water quality objectives, TMDL targets). FIFRA and California pesticides law do not involve the establishment of numeric regulatory values for pesticides in surface water.

Under the CWA, US EPA establishes both human health and aquatic life protection regulatory values for current pesticides in surface water (see Table 1). These include enforceable standards (in bold) and national recommended criteria. CWA human health regulatory values are designed for protection of humans consuming both surface water and organisms that live within surface

[1] DPR 2017. List of "Actively Registered AI's by Common Name." Downloaded August 31, 2017.
[2] DPR 2017. Pounds Sold Report. Year 2016. Generated July 11, 2017.
[3] DPR 2017. Pesticide Use Reporting System. Report generated August 31, 2017.

waters (Human Health columns in Table 1). A separate set of CWA human health regulatory values (not included here) exists for consumption of organisms only from waters that are not sources of drinking water. CWA aquatic life protection values are designed to protect aquatic ecosystems (Aquatic Life columns in Table 1).

The science-based values in Table 1 only have regulatory force when adopted as enforceable standards in state or region-specific regulatory documents. For various legal reasons, US EPA Region 9 established California's CWA pesticides water quality standards in the year 2000 (known as the California Toxics Rule [CTR][4]) (bold values in Table 1). US EPA CWA standards for pesticides chemicals that are not in this regulation and science-based CWA water quality criteria updates since the regulation's adoption are not currently part of California's CWA regulatory program.

Table 1. Clean Water Act Water Quality Criteria for Current Use Pesticides (µg/L)

	Human Health (for consumption of water and organisms)		**Aquatic Life (fresh water)**	
Pesticide	**Current Enforceable (CTR)**	**Current US EPA Recommended**	**Criterion Maximum Concentration (CMC)**	**Criterion Continuous Concentration (CCC)**
1,3-dichloropropene	**10**	0.27	--	--
Acrolein	**320**	3	3	3
Carbaryl	--	--	2.1	2.1
Chlorpyrifos	--	--	0.083	0.041
2,4-D	--	1,300	--	--
Diazinon	--	--	0.17	0.17
Endosulfan	**110**	20	**0.22**	**0.056**
Malathion	--	--	--	0.1
Methyl bromide	**48**	100	--	--
Pentachlorophenol	**0.28**	0.03	**19**	**15**
Phenol	**21,000**	4,000	--	--

Bold Values = Adopted California Regulatory Values from US EPA California Toxics Rule (40 CFR Part 131)
Sources: US EPA National Recommended Water Quality Criteria (https://www.epa.gov/wqc/national-recommended-water-quality-criteria accessed August 2017) and 40 CFR Part 131.

Under the SDWA and under California law, US EPA and the state of California establish human health protection regulatory values for current pesticides in drinking water sources (Table 2). Two types of Federal (SDWA) regulatory values exist: Maximum Contaminant Levels (MCLs) and Health Advisories (HAs).[5] HAs serve as the technical guidance for unregulated drinking water contaminants to assist Federal, State and local officials, and managers of public or community water systems in protecting public health as needed. They are not to be construed as legally enforceable Federal standards.[5] However, they are included in this paper as regulatory levels, because if they are exceeded actions need to be considered to protect public health. In addition to adopting Federal MCLs, California has established additional and more stringent drinking water source regulatory values under state law to address California-specific situations.

[4] 40 CFR Part 131
[5] US EPA 2018. 2018 Edition of the Drinking Water Standards and Health Advisories Tables (EPA 822-F-18-001) https://www.epa.gov/dwstandardsregulations/2018-drinking-water-standards-and-advisory-tables

These values include state-specific MCLs,[6] Notification Levels (NLs),[7] and Archived Advisory Levels (AALs).[8,9]

The relatively small number of SDWA and CWA human health regulatory standards for current use pesticides in surface waters is a direct consequence of differing data requirements for the implementation of the SDWA, CWA, and FIFRA. Pesticide registration data requirements established under FIFRA, though many and expensive for registrants, do not provide sufficient data to meet adopted SDWA and CWA requirements for establishing regulatory standards under those laws. Resource limitations also play a role in the inability of these regulatory programs to keep pace with the changing pesticides market.

Filling the Management Gap – US EPA Human Health Benchmarks for Pesticides

Recognizing the nation's need to identify the potential for current use pesticides to cause human health hazards in drinking water supplies, in the 2010s, US EPA developed Human Health Benchmarks for Pesticides (HHBPs).[10] This represented the first US EPA step toward integration of its SDWA, CWA, and FIFRA implementation programs. These values are designed to fill the gaps in available Safe Drinking Water Act regulatory values. To provide smooth integration with the SDWA, the HHBPs are calculated using the same methods that US EPA uses to calculate SDWA HAs. US EPA updates HHBPs periodically. The most recent update, reflecting 394 HHBPs for pesticides and pesticide degradates was published in January 2017.

Together, the SDWA MCLs, HAs, California regulatory values, and the US EPA HHBPs provide a means to identify potential human health risks in sources of drinking water. Thanks to the development of the HHBPs, most common currently used pesticides now have a science-based drinking water reference value.

US EPA has also developed similar benchmarks for pesticides hazards to aquatic life, the "Aquatic Life Benchmarks for Pesticide Registration" (ALBs).[11] The most recent update, reflecting 584 ALBs for pesticides and pesticide degradates was published in late 2017. Benchmarks do not exist for all pesticides due to lack of relevant toxicity data (e.g., a data gap for aquatic invertebrates), because US EPA has not yet invested in completing the data reviews necessary for development of a benchmark, or because US EPA's evaluation of toxicity data concluded that the chemical is relatively non-toxic.

Despite the general tendency to prioritize aquatic life protection in management approaches, some California agencies do use both sets of benchmarks. For example, California Department of Pesticide Regulation's (DPR's) Surface Water Monitoring Prioritization Model can be run with either set of benchmarks.[12]

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[6] California State Water Resources Control Board Division of Drinking Water 2018. Maximum Contaminant Levels and Regulatory Dates for Drinking Water, U.S. EPA vs. California https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chemicalcontaminants.html

[7] California State Water Resources Control Board Division of Drinking Water 2018. Drinking Water Notification Levels and Response Levels: An Overview https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/NotificationLevels.html

[8] California Department of Public Health (CDPH) 2010. CDPH's Archived Advisory Levels for Drinking Water https://www.waterboards.ca.gov/water_issues/programs/tmdl/records/state_board/2010/ref3729.pdf

[9] While some information sources describe NLs and AALs as non-regulatory, they have regulatory function as exceeding these values requires actions by drinking water suppliers.

[10] US EPA Human Health Benchmarks for Pesticides (web resource) (updated January 2017) https://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home:1871379433268262

[11] US EPA Office of Pesticide Programs Aquatic Life Benchmarks (web resource) (August 2017) https://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home:1871379433268262

[12] DPR 2015. SWPP Monitoring Prioritization Model User Manual (Version 3.0)

Table 2. Safe Drinking Water Act and California State Drinking Water Source Regulatory Standards for Current Pesticides (µg/L)

Pesticide	Primary MCL[a]	Secondary MCL[a]	Health Advisory (Type)[c]	Notification Level	Archived Advisory Level
2,4-D	70	--	300 (10-day) 1,000 (1-day)	--	--
Atrazine	1 (CA)	--		--	--
Captan	--	--		--	15
Carbaryl	--	--	1,000 (1-day) 40 (Cancer)[b]	--	700
Chloropicrin	--	--		--	50
Chlorpropham (CIPC)	--	--		--	1,200
Diazinon	--	--	20 (1-day) 1 (Lifetime)	1.2	--
p-Dichlorobenzene	5 (CA)	--	11,000 (1-day) 75 (Lifetime)	--	--
1,3-Dichloropropene	0.5 (CA)	--	30 (1-day) 0.4 (Cancer)	--	--
Dimethoate	--	--		--	1
Diquat	20	--		--	--
Endothall	100	--	800 (1-day) 50 (Lifetime)	--	--
Formaldehyde	--	--	5,000 (10-day) 10,000 (1-day) 1,000 (Lifetime)	100	--
Glyphosate	700	--	20,000 (1-day)	--	--
Malathion	--	--	200 (1-day) 500 (Lifetime)	--	160
Methylisothiocyanate (degradate)	--	--		--	190
N-methyl dithiocarbamate	--	--		--	0.19
Oxamyl	50 (CA)	--	10 (1-day)	--	--
Pentachloronitrobenzene (PCNB)	--	--		--	20
Pentachlorophenol	1	--	300 (10-day) 1,000 (1-day) 40 (Lifetime) 0.09 (Cancer)	--	--
Phenol	--	--	6,000 (1-day) 2,000 (Lifetime)	--	4,200
Propoxur (Baygon)	--	--	40 (1-day) 3 (Lifetime)	--	30
Simazine	4	--		--	--
Thiobencarb	70 (CA)	1 (CA)		--	--

[a]If both California and Federal MCLs exist and are not identical, the lower value is provided. California MCLs are identified with (CA).
[b]For cancer used 10^{-6} risk for consistency with California laws and regulations (e.g., Proposition 65).
[c]10-day HAs that are identical to 1-day HAs are not noted in this table.
Sources: US EPA 2018. 2018 Edition of the Drinking Water Standards and Health Advisories Tables. EPA 822-F-18-001.; California State Water Board Division of Drinking Water 2018. Drinking Water Notification Levels and Response Levels: An Overview.; CDPH 2010. Archived Advisory Levels for Drinking Water; California State Water Board Division of Drinking Water 2018. Maximum Contaminant Levels and Regulatory Dates for Drinking Water, U.S. EPA vs. California

Time Frames Associated with Human Health and Aquatic Life Reference Values

All water quality standards and benchmarks are derived from toxicity data associated with specific exposure durations. Most standards and benchmarks include an exposure time frame, but some do not. Table 3 summarizes time frames that are specified in association with pesticide water quality standards and benchmarks and (where applicable) time frames used for compliance determination.

Table 3. Time Frames Associated with Pesticide Water Quality Standards and Benchmarks
(Where no specified value, common practice provided in italics)

Category	Acute (Short-Term)	Chronic/Cancer (Long-Term)
Clean Water Act Water Quality Criteria – Aquatic Life	1 hour	4 days
Clean Water Act Water Quality Criteria – Human Health		Not specified *(30 days)*
Maximum Contaminant Level	Any confirmed exceedance*	Annual Average
Health Advisory	1 day or 10 days (specified in listing)	Not specified *(Annual Average)*
Notification Level/Archived Advisory Level	Any confirmed exceedance*	Annual Average
Human Health Benchmarks for Pesticides	1 day	Not specified *(Annual Average)*
Aquatic Life Benchmarks for Pesticide Registration	Not specified *(1 day)*	Not specified *(varies)*

*A confirmed exceedance requires a response action but may not require use of the water source to be discontinued.
Sources: US EPA National Recommended Water Quality Criteria; California Code of Regulations Title 22 Sections 64444 and 64449; US EPA 2018. 2018 Edition of the Drinking Water Standards and Health Advisories Tables. EPA 822-F-18-001.; Drinking Water Notification Levels and Response Levels: An Overview.; CDPH 2010. Archived Advisory Levels for Drinking Water; US EPA Human Health Benchmarks for Pesticides (web resource) (updated January 2017); US EPA Office of Pesticide Programs Aquatic Life Benchmarks (web resource) (August 2017).

Clean Water Act water quality criteria for aquatic life protection specify associated time frames: Criterion Maximum Concentration – 1 hour; Criterion Continuous Concentration – 4 days.[13] Although Clean Water Act human health criteria do not specify implementation time frames, based on EPA guidance, they are implemented based on 30-day averages.[14] These time frames do not directly correlate with the human and aquatic toxicity testing that underlies these values. Anecdotal information suggests that these time frames

"*Although the human health ambient water quality criteria (AWQC) are based on chronic health effects data (both cancer and non-cancer effects), the criteria are intended to also be protective against adverse effects that may reasonably be expected to occur as a result of elevated acute or short-term exposures. That is, through the use of conservative assumptions with respect to both toxicity and exposure parameters, the resulting AWQC should provide adequate protection not only for the general population over a lifetime of exposure, but also for special subpopulations who, because of high water or fish intake rates, or because of biological sensitivities, have an increased risk of receiving a dose that would elicit adverse effects. The Agency recognizes that there may be some cases where the AWQC based on chronic toxicity may not provide adequate protection for a subpopulation at special risk from shorter-term exposures. The Agency encourages States, Tribes, and others employing the 2000 Human Health Methodology to give consideration to such circumstances in deriving criteria to ensure that adequate protection is afforded to all identifiable subpopulations.*"

US EPA (2013) "Human Health Ambient Water Quality Criteria and Fish Consumption Rates: Frequently Asked Questions"

[13] US EPA National Recommended Water Quality Criteria (web resource, August 2017) https://www.epa.gov/wqc/national-recommended-water-quality-criteria
[14] US EPA Office of Water 2010. NPDES Permit Writers' Manual. EPA-833-K-10-001.

were set to be deliberately conservative to be protective and recognizing that most monitoring regimes are not (due to cost) conducted with a frequency and sample duration that reflects actual environmental exposures.

While Federal MCLs and California MCLs, NLs, and AALs are generally implemented on the basis of annual average concentrations, any single confirmed exceedance has consequences. Upon any confirmed exceedance of one of these levels, actions are required, such as increased monitoring or public notification. Significant exceedances and trends suggesting the likelihood of continued exceedances may trigger additional evaluation of source water protection options, treatment options, and potential alternative supplies.

Short-term US EPA Safe Drinking Water Act HAs specify their time frames (1 day or 10 days).[15] Similarly, acute HHBPs have a specified time frame of 1 day. Lifetime and cancer HAs and chronic HHBPs do not have specified time frames. The applicable time frame for these chronic human toxicity values depends on the sensitive life stage that is the basis of the level and may be as short as one year (e.g., infants). Typically, annual average concentrations are compared to these chronic human health reference values. For example, in pesticides risk assessments, US EPA Office of Pesticide Programs (OPP) uses annual mean water concentrations (highest single-year annual mean in 10 years of modeled exposure) to evaluate chronic human health risks from pesticides in drinking water supplies. For cancer risks, longer time frames may be used, such as US EPA OPP's use of the estimated 30-year mean concentration to evaluate drinking water cancer risks.

Aquatic Life Benchmarks for Pesticide Registration do not list specific timeframes.[16] Acute values are usually based on data from short-term tests (i.e., 2-4 days for fish and aquatic invertebrates, up to 10 days for plants). Chronic values are usually based on life-cycle tests with species-specific durations (typically in the range of 10-30 days). Typically, to be protective, time frames used with these values should be no longer than the toxicity test duration, but there are exceptions. For example, US EPA OPP ecological risk assessments use estimated one-day concentrations to evaluate potential acute aquatic toxicity risks – a time frame shorter than most underlying toxicity data – but use 60-day mean concentrations to examine potential chronic risks, which is longer than the exposure period in many chronic toxicity tests.

METHODS

This analysis used as its starting point the Central Valley Water Board list of agricultural pesticides that may be used in California's Central Valley, called the "Irrigated Lands Regulatory Program Pesticides Evaluation Protocol Executive Officer List of Pesticides."[17] This list of 373 pesticides includes pesticides registered in California as of October 31, 2016 that were identified as having potential to be used in agriculture.[18] The list excludes substances considered to be low toxicity, like oils, clays, polymers, sulfur, solvents, soaps, petroleum, biopesticides, most mineral salts, adjuvants, and pheromones. To avoid potentially inaccurate comparisons due to chemical form changes in the environment, 20 metals and inorganic salts were excluded from the analysis. For completeness, the Water Board list was supplemented to add seven pesticides used only on rice (which were omitted from the Water Board list) and six pesticide degradates from the

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[15] US EPA 2018. 2018 Edition of the Drinking Water Standards and Health Advisories Tables. EPA 822-F-18-001.
[16] See footnotes in US EPA Office of Pesticide Programs Aquatic Life Benchmarks https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-and-ecological-risk
[17] Central Valley Water Board 2016. Irrigated Land Regulatory Program. Prioritizing and Selecting Pesticides for Surface Water Monitoring. (ILRP Pesticides Evaluation Protocol.)
[18] Pesticides in the California DPR product/label database with uses in the "agricultural crops" site group category.

Central Valley Water Board Executive Officer List of Degradates[19] that have human health reference values. This process created a list of 366 agricultural pesticides and degradates.

For purposes of this analysis, "reference value" was defined to include CWA, SDWA, and California regulatory values (Tables 1 and 2) supplemented by US EPA pesticides benchmarks.[20] Where multiple values exist for the same pesticide (e.g., the pesticide had values for different types of aquatic organisms or the pesticide had both a California MCL and a US EPA HHBP), the lowest human health value and the lowest aquatic life value were selected.

To address nomenclature inconsistency among reference lists, when no reference value was initially identified, the search was expanded to include synonyms. Two searches for synonyms were done, using DPR's chemical list search tool[21] and the "synonyms" link from the US EPA pesticide search web page.[22]

Available reference values were obtained from these data sources and compiled into a single table (see Table 4, attached).

RESULTS AND DISCUSSION

Human health reference values were identified for 301 of the 366 agricultural pesticides. The remaining 65 pesticides did not have human health reference values and consequently were excluded from further analysis since no comparison would be possible. (Excluded pesticides have brown shading in Table 4).

Table 5 summarizes the outcome of the reference value comparison. Both aquatic life and human health reference values were identified for 235 pesticides; for the remaining 66, no aquatic life reference value was identified.

Table 5. Summary Comparison of Human Health and Aquatic Life Reference Values for Current Use Agricultural Pesticides in California's Central Valley

Category	Number	Fraction of Evaluated Pesticides
Human Health Reference Value, but no Aquatic Life Reference Value	66	22%
Lowest Human Health Reference Value < Lowest Aquatic Life Reference Value	97	32%
Lowest Human Health Reference Value > Lowest Aquatic Life Reference Value	136	45%
Lowest Human Health Reference Value = Lowest Aquatic Life Reference Value	2	1%
Pesticides Evaluated	301	
Pesticides excluded due to lack of human health reference value	*65*	

For 97 of the 235 pesticides, the lowest human health reference value was less than (a lower concentration than) the lowest aquatic life reference value. For 136 pesticides, the lowest aquatic life reference value was less than (a lower concentration than) the lowest human health reference

[19] See Attachment 1 of Central Valley Water Board 2016. Irrigated Land Regulatory Program. Prioritizing and Selecting Pesticides for Surface Water Monitoring.
[20] US EPA 2017 Human Health Benchmarks for Pesticides (web resource) (updated January 2017) https://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home:1871379433268262 ; US EPA 2017 Office of Pesticide Programs Aquatic Life Benchmarks (web resource accessed August 2017) https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/aquatic-life-benchmarks-and-ecological-risk
[21] http://www.cdpr.ca.gov/docs/label/chemcode.htm
[22] http://iaspub.epa.gov/apex/pesticides/f?p=chemicalsearch:1:4374205614359044

value. For two pesticides (Acrolein, Thiobencarb), the lowest human health reference value and the lowest aquatic life reference value were equal.

Only 64% of the pesticides examined had both human health and aquatic life reference values. About 36% of the evaluated pesticides did not have both human health and aquatic life reference values. Agencies that develop these reference values do not automatically develop reference values for every pesticide. Due to resource constraints and data gaps, agencies prioritize their resources toward those pesticides that based on available data appear to pose the greatest hazards to human health or aquatic life. The lack of a reference value might indicate data gaps or it might signal that the pesticide has relatively low toxicity to aquatic life or to humans.

CONCLUSIONS

For the group of agricultural pesticides evaluated, where human health reference values exist (301 pesticides), only 46% had aquatic life reference values that were equal to or lower than the human health reference value. For 54% of these pesticides, either no aquatic life reference value existed or the aquatic life reference value was higher. In these cases, aquatic life protection actions would not suffice to protect human health.

No aquatic life reference value existed for 22% of the pesticides. Pesticides without aquatic life reference values are usually excluded from aquatic life protection management systems due to the lack of a value.

For acute endpoints, both human health and aquatic life reference values typically use a one-day exposure time frame, but chronic endpoint exposure periods differ, with aquatic life exposure periods (4 to 60 days) usually shorter than human health exposure periods (annual). In general, evaluation based on shorter exposure time frames is more protective, suggesting that where aquatic reference values are lower than human health reference values, surface water management for aquatic life protection purposes would suffice to protect drinking water supplies.

For human health standards and benchmarks with unspecified time frames, the common practice of using one day for acute and annual average for chronic appears appropriate for screening-level evaluations. Detailed evaluation of a specific pesticide in comparison to a standard or benchmark without a specified time frame should consider the time frame associated with the toxicity data underlying the pesticide-specific standard or benchmark, particularly in cases potentially leading to management actions (e.g., incidents of measured or projected exceedances).

Table 4. Comparison of Human Health and Aquatic Life Reference Values for Agricultural Pesticides

Pesticide	Lowest Human Ref. Value (ppb)	Human Health Reference Value Type	Human Health Reference Value Endpoint	Lowest Aquatic Ref. Value (ppb)	Aquatic Life Reference Value Type	Aquatic Life Reference Value Endpoint	Notes
Central Valley Water Board Irrigated Lands Regulatory Program Pesticides Evaluation Protocol Executive Officer List of Pesticides							
(S) Cypermethrin (Zeta-Cypermethrin)	150	HHBP	Acute, Children	0.00059	ALB	Invertebrates, Chronic	
1,3-Dichloropropene	0.27	US EPA NRWQC	Cancer	45	ALB	Invertebrates, Acute	HA = 0.4; CA Primary MCL = 0.5; US EPA CTR = 10
1-methylcyclopropene	--						
1-Naphthaleneacetamide	1600	HHBP	Chronic, General Population	--			
2-(2,4-DP), Dimethylamine Salt	--						
2,4-D	70	US EPA Primary MCL		12500	ALB	Fish, Acute	
2,4-D, 2-Ethylhexyl Ester	--						
2,4-D, Butoxyethanol Ester	--						
2,4-D, Diethanolamine Salt	--						
2,4-D, Dimethylamine Salt	--						
2,4-D, Isooctyl Ester	--						
2,4-D, Isopropyl Ester	--						
2,4-D, Triisopropanolamine salt	--						
2,4-DB Acid (2, 4 - DBA)	200	HHBP	Chronic, General Population	932	ALB	Vascular Plant	
2,4-DP-P, Dimethylamine Salt	230	HHBP	Chronic, General Population	77	ALB	Non-Vascular Plant	
2,4-DP-p Isooctyl Ester	230	HHBP	Chronic, General Population	77	ALB	Non-Vascular Plant	
2,4-xylenol	--						
3-chloro-p-toluidine hydrochloride	--						
4-(2,4-DB), Dimethylamine salt (2,4-DB DMAS)	200	HHBP	Chronic, General Population	1567	ALB	Fish, Acute	
4-aminopyridine	--						
Abamectin	3	HHBP	Chronic, General Population	0.17	ALB	Invertebrates, Acute	
Acephate	7.7	HHBP	Chronic, General Population	150	ALB	Invertebrates, Chronic	
Acequinocyl	170	HHBP	Chronic, General Population	0.98	ALB	Invertebrates, Chronic	
Acetamiprid	450	HHBP	Chronic, General Population	2.1	ALB	Invertebrates, Chronic	
Acetic Acid	--						
Acibenzolar-S-methyl	450	HHBP	Chronic, Females 13-49 years	--			
Acrolein	3	US EPA NRWQC		3	US EPA NRWQC	CCC	
Alachlor	2	US EPA Primary MCL		1.64	ALB	Non-Vascular Plant	
ADBAC (registered as four groups of alkyl dimethylbenzyl ammonium chlorides)	2800	HHBP	Chronic, General Population	--			
Aluminum phosphide	72.3	HHBP	Chronic, General Population	--			
Ametoctradin	--						
Amino Ethoxy vinyl glycine hydrochloride	--						
Aminocyclopyrachlor	17900	HHBP	Chronic, General Population	370	ALB	Invertebrates, Chronic	
Aminocyclopyrachlor, potassium salt	17900	HHBP	Chronic, General Population	370	ALB	Invertebrates, Chronic	
Aminopyralid, triisopropanolamine Salt	3000	HHBP	Chronic, General Population	1360	ALB	Fish, Chronic	
Ammonium nonanoate	--						
Ancymidol	--						
Atrazine	1	CA Primary MCL		0.001	ALB	Vascular Plant	
Azoxystrobin	1200	HHBP	Chronic, General Population	44	ALB	Invertebrates, Chronic	
Benefin (Benfluralin)	30	HHBP	Chronic, General Population	1.9	ALB	Fish, Chronic	
Bensulide	30	HHBP	Chronic, General Population	290	ALB	Invertebrates, Acute	
Bentazon, sodium salt	18	CA Primary MCL		4500	ALB	Non-Vascular Plant	
Beta-conglutin	--						
Beta Cyfluthrin	100	HHBP	Acute, Children	0.034	ALB	Fish, Acute	
Bifenazate	60	HHBP	Chronic, General Population	150	ALB	Invertebrates, Chronic	
Bifenthrin	70	HHBP	Acute, Children	0.0013	ALB	Invertebrates, Chronic	
Borax	--						
Boric Acid	--						
Boscalid	1400	HHBP	Chronic, General Population	116	ALB	Fish, Chronic	
Bromacil	70	HA	Lifetime	6.8	ALB	Non-Vascular Plant	
Bromadiolone	--						
Bromethalin	--						
Bromoxynil heptanoate	0.311	HHBP	Cancer	14.5	ALB	Fish, Acute	
Bromoxynil octanoate	0.311	HHBP	Cancer	2.5	ALB	Invertebrates, Chronic	
Buprofezin	21	HHBP	Chronic, General Population	--			
Capric Acid	--						
Caprylic Acid	--						
Captan	15	AAL		13.1	ALB	Fish, Acute	
Carbaryl	40	HA	Lifetime	0.5	ALB	Invertebrates, Chronic	AAL = 700; US NRWQC (aquatic life, CMC & CCC) = 2.1
Carboxin	700	HA	Lifetime	370	ALB	Non-Vascular Plant	
Carfentrazone-ethyl	200	HHBP	Chronic, General Population	--			
Chlorantraniliprole	10100	HHBP	Chronic, General Population	4.5	ALB	Invertebrates, Chronic	
Chlorfenapyr	300	HHBP	Acute, Children & Chronic, General Population	2.915	ALB	Invertebrates, Acute	
Chlorflurenol, methyl ester	600	HHBP	Chronic, General Population	--			
Chlormequat chloride	300	HHBP	General Population	--			
Chlorophacinone	--						
Chloropicrin	50	AAL		5.5	ALB	Fish, Acute	

Table 4. Comparison of Human Health and Aquatic Life Reference Values for Agricultural Pesticides

Pesticide	Lowest Human Ref. Value (ppb)	Human Health Reference Value Type	Human Health Reference Value Endpoint	Lowest Aquatic Ref. Value (ppb)	Aquatic Life Reference Value Type	Aquatic Life Reference Value Endpoint	Notes
Chlorothalonil	1.5	HA	Cancer	0.6	ALB	Invertebrates, Chronic	
Chlorpropham	300	HHBP	Chronic, General Population	--			AAL = 1,200
Chlorpyrifos	2	HA	Lifetime	0.04	ALB	Invertebrates, chronic	US EPA NRWQC (aquatic life, CCC) = 0.041
Chlorsulfuron	300	HHBP	Chronic, General Population	0.35	ALB	Non-Vascular Plant	
Chlorthal-dimethyl	--						
Clethodim	2000	HHBP	Chronic, General Population	2	ALB	Fish, Chronic	
Clofentezine	0.851	HHBP	Cancer	6	ALB	Fish, Chronic	
Clopyralid, monoethanolamine salt	960	HHBP	Chronic, General Population	56500	ALB	Invertebrates, Acute	
Clopyralid, triethylamine salt	960	HHBP	Chronic, General Population	56500	ALB	Invertebrates, Acute	
Clothianidin	630	HHBP	Chronic, General Population	1.1	ALB	Invertebrates, Chronic	
Copper	Metals/Salts Excluded						
Copper ammonium complex	Metals/Salts Excluded						
Copper citrate chelate	Metals/Salts Excluded						
Copper diammonium diacetate complex	Metals/Salts Excluded						
Copper ethanolamine complexes, mixed	Metals/Salts Excluded						
Copper ethylenediamine complex	Metals/Salts Excluded						
Copper gluconate chelate	Metals/Salts Excluded						
Copper hydroxide	Metals/Salts Excluded						
Copper octanoate	Metals/Salts Excluded						
Copper oxide (ous)	Metals/Salts Excluded						
Copper oxychloride	Metals/Salts Excluded						
Copper sulfate (basic)	Metals/Salts Excluded						
Copper sulfate (pentahydrate)	Metals/Salts Excluded						
Copper triethanolamine complex	Metals/Salts Excluded						
Cryolite	--						
Cyantraniliprole	60	HHBP	Chronic, General Population	6.56	ALB	Invertebrates, Chronic	
Cyazofamid	6070	HHBP	Chronic, General Population	53.5	ALB	Fish, Acute	
Cyclanilide	40	HHBP	Chronic, General Population	--			
Cycloate	30	HHBP	Chronic, General Population	1300	ALB	Invertebrates, Acute	
Cyflufenamid	280	HHBP	Chronic, General Population	--			
Cyfluthrin	100	HHBP	Acute, Children	0.0074	ALB	Invertebrates, Chronic	
Cymoxanil	5	HHBP	Chronic, General Population	--			
Cypermethrin	150	HHBP	Acute, Children	0.069	ALB	Invertebrates, Chronic	
Cyprodinil	170	HHBP	Chronic, General Population	8	ALB	Invertebrates, Chronic	
Cyromazine	3000	HHBP	Chronic, General Population	310	ALB	Invertebrates, Chronic	
Daminozide	3.7	HHBP	Cancer	35500	ALB	Invertebrates, Acute	
Dazomet	--						
Dichlorvos (DDVP)	3	HHBP	Chronic, General Population	0.0058	ALB	Invertebrates, Chronic	
Deltamethrin	30	HHBP	Acute, Children	0.0041	ALB	Invertebrates, Chronic	
Desmedipham	300	HHBP	Chronic, General Population	--			
Diazinon	1	HA	Lifetime	0.105	ALB	Invertebrates, Acute	NL = 1.2; US EPA NRWQC (aquatic life CMC & CCC) = 0.17
Dicamba	4000	HA	Lifetime	61	ALB	Non-Vascular Plant	
Dicamba, dimethylamine salt	4000	HA	Lifetime	488500	ALB	Fish, Acute	
Dicamba, sodium salt	4000	HA	Lifetime	17300	ALB	Invertebrates, Acute	
Dichlobenil	60	HHBP	Chronic, General Population	30	ALB	Non-Vascular Plant	
Dicloran (Dichloran)	16	HHBP	Chronic, General Population	--			
DDAC, Didecyl dimethyl ammonium chloride	600	HHBP	Chronic, General Population	--			
Difenoconazole	60	HHBP	Chronic, General Population	5.6	ALB	Invertebrates, Chronic	
Diflubenzuron	100	HHBP	Chronic, General Population	0.00025	ALB	Invertebrates, Chronic	
Diflufenzopyr, sodium salt	1700	HHBP	Chronic, General Population	--			
Diglycolamine Salt of 3,6-Dichloro-o-anisic acid	--						
Dikegulac sodium	--						
Dimethenamid-P	300	HHBP	Chronic, General Population	8.9	ALB	Vascular Plant	
Dimethoate	1	AAL		0.5	ALB	Invertebrates, Chronic	
Dimethomorph	600	HHBP	Chronic, General Population	110	ALB	Invertebrates, Chronic	
Dinotefuran	6000	HHBP	Chronic, General Population	6360	ALB	Fish, Chronic	
Dioctyl dimethyl ammonium chloride	--						
Diphacinone	10	HHBP	Acute, Children	--			
Diphacinone, sodium salt	10	HHBP	Acute, Children	--			
Diphenylamine	600	HHBP	Chronic, General Population	--			

Table 4. Comparison of Human Health and Aquatic Life Reference Values for Agricultural Pesticides

Pesticide	Lowest Human Ref. Value (ppb)	Human Health Reference Value Type	Human Health Reference Value Endpoint	Lowest Aquatic Ref. Value (ppb)	Aquatic Life Reference Value Type	Aquatic Life Reference Value Endpoint	Notes
Diquat Dibromide (Diquat)	20	US EPA Primary MCL		0.75	ALB	Non-Vascular Plant	
Disodium octaborate tetrahydrate	Metals/Salts Excluded						
Dithiopyr	--						
Diuron	2	HA	Cancer	2.4	ALB	Non-Vascular Plant	
Dodine	100	HHBP	Chronic, General Population	0.95	ALB	Non-Vascular Plant	
D-trans allethrin	--						
Emamectin Benzoate	0.48	HHBP	Chronic, General Population	--			
Endosulfan	20	US EPA NRWQC		0.01	ALB	Invertebrates, Chronic	US EPA CTR Human Health = 110; US EPA NRWQC (Aquatic Life, CCC) = FW 0.056; SW = 0.0087
Endothall, dipotassium salt	50	HA	Lifetime	610	ALB	Vascular Plant	US EPA Primary MCL = 100
Endothall, Mono (N,N-dimethylalkylamine) salt	50	HA	Lifetime	2.3	ALB	Invertebrates, Chronic	US EPA Primary MCL = 100
EPTC (Ethyl dipropylthiocarbamate)	300	HHBP	Chronic, General Population	800	ALB	Invertebrates, Chronic	
Esbiothrin	--						
Esfenvalerate	12	HHBP	Acute, Children & Chronic, General Population	0.017	ALB	Invertebrates, Chronic	
Ethalfluralin	0.36	HHBP	Cancer	0.4	ALB	Fish, Chronic	
Ethephon	400	HHBP	Chronic, General Population	2500	ALB	Non-Vascular Plant	
Ethofumesate	2000	HHBP	Chronic, Females 13-49 years	300	ALB	Invertebrates, Chronic	
Ethoprop	1.14	HHBP	Cancer	0.8	ALB	Invertebrates, Chronic	
Etofenprox	240	HHBP	Chronic, General Population	0.17	ALB	Invertebrates, Chronic	
Etoxazole	290	HHBP	Chronic, General Population	0.13	ALB	Invertebrates, Chronic	
Famoxadone	9	HHBP	Chronic, General Population	--			
Fenamidone	181	HHBP	Chronic, General Population	4.7	ALB	Fish, Chronic	
Fenarimol	40	HHBP	Chronic, General Population	100	ALB	Vascular Plant	
Fenazaquin	300	HHBP	Chronic, General Population	--			
Fenbuconazole	8.91	HHBP	Cancer	--			
Fenbutatin-oxide	110	HHBP	Chronic, General Population	0.31	ALB	Fish, Chronic	
Fenhexamid	1100	HHBP	Chronic, General Population	101	ALB	Fish, Chronic	
Fenoxaprop-p-ethyl	16	HHBP	Chronic, General Population	155	ALB	Fish, Acute	
Fenpropathrin	110	HHBP	Acute, Children	0.064	ALB	Invertebrates, Chronic	
Fenpyrazamine	2000	HHBP	Chronic, General Population	11	ALB	Vascular Plant	
Fenpyroximate	300	HHBP	Chronic, General Population	0.016	ALB	Fish, Chronic	
Ferric sodium EDTA	--						
Ferrous sulfate	Metals/Salts Excluded						
Fipronil	1	HHBP	Chronic, General Population	0.011	ALB	Invertebrates, Chronic	
Flazasulfuron	83	HHBP	Chronic, General Population	--			
Flonicamid	300	HHBP	Chronic, General Population	3000	ALB	Invertebrates, Chronic	
Fluazifop-P-Butyl	47	HHBP	Chronic, General Population	203	ALB	Fish, Chronic	
Fluazinam	70	HHBP	Chronic, General Population	0.69	ALB	Fish, Chronic	
Flubendiamide	150	HHBP	Chronic, General Population	41.5	ALB	Invertebrates, Chronic	
Fludioxonil	200	HHBP	Chronic, General Population	19	ALB	Fish, Chronic	
Fluensulfone	200	HHBP	Chronic, General Population	22	ALB	Vascular Plant	
Flumiclorac-pentyl	6000	HHBP	Chronic, General Population	94.5	ALB	Invertebrates, Acute	
Flumioxazin	100	HHBP	Chronic, General Population	0.49	ALB	Non-Vascular Plant	
Fluopicolide	1000	HHBP	Chronic, General Population	1.4	ALB	Vascular Plant	
Fluopyram	77	HHBP	Chronic, General Population	--			
Fluoxastrobin	96	HHBP	Chronic, General Population	--			
Flupyradifurone	500	HHBP	Chronic, General Population	--			
Flurecol-methyl	--						
Fluroxypyr, 1-methylheptyl ester	6000	HHBP	Chronic, General Population	56	ALB	Non-Vascular Plant	
Flurprimidol	300	HHBP	Chronic, General Population	840	ALB	Vascular Plant	
Flutolanil	3000	HHBP	Chronic, General Population	220	ALB	Fish, Chronic	
Flutriafol	300	HHBP	Chronic, General Population	310	ALB	Invertebrates, Chronic	
Fluxapyroxad	130	HHBP	Chronic, General Population	--			
Forchlorfenuron	400	HHBP	Chronic, General Population	--			
Formetanate hydrochloride	2.1	HHBP	Acute, Children	0.5	ALB	Invertebrates, Chronic	
Fosetyl-Al	16000	HHBP	Chronic, General Population	780	ALB	Vascular Plant	
Fosthiazate	6.1	HHBP	Chronic, General Population	61	ALB	Invertebrates, Chronic	
Gamma-Cyhalothrin	6	HHBP	Chronic, General Population	0.00024	ALB	Invertebrates, Acute	
Glufosinate-ammonium	40	HHBP	Chronic, General Population	72	ALB	Vascular Plant	
Glutaraldehyde	--						
Glyphosate	700	US EPA Primary MCL		11900	ALB	Vascular Plant	
Glyphosate, dimethylamine salt	700	US EPA Primary MCL		--			
Glyphosate, isopropylamine salt	700	US EPA Primary MCL		34700	ALB	Fish, Acute	
Glyphosate, monoammonium salt	700	US EPA Primary MCL		--			
Glyphosate, potassium salt	700	US EPA Primary MCL		--			
Halosulfuron-methyl (MON 1200)	600	HHBP	Chronic, General Population	--			
Hexazinone	400	HA	Lifetime	7	ALB	Non-Vascular Plant	
Hexythiazox	160	HHBP	Chronic, General Population	6.1	ALB	Invertebrates, Chronic	
Hydramethylnon	110	HHBP	Chronic, General Population	45	ALB	Fish, Acute	
Hydrogen cyanamide	0.482	HHBP	Cancer	100	ALB	Invertebrates, Chronic	
Imazalil	0.524	HHBP	Cancer	--			

Table 4. Comparison of Human Health and Aquatic Life Reference Values for Agricultural Pesticides

Pesticide	Lowest Human Ref. Value (ppb)	Human Health Reference Value Type	Human Health Reference Value Endpoint	Lowest Aquatic Ref. Value (ppb)	Aquatic Life Reference Value Type	Aquatic Life Reference Value Endpoint	Notes
Imazalil Sulfate	0.524	HHBP	Cancer	--			
Imazamox, ammonium Salt	--						
Imazapyr, isopropylamine salt	16000	HHBP	Chronic, General Population	24	ALB	Non-Vascular Plant	
Imazethapyr	16000	HHBP	Chronic, General Population	59200	ALB	Vascular Plant	
Imazosulfuron	4800	HHBP	Chronic, General Population	1.46	ALB	Non-Vascular Plant	
Imidacloprid	360	HHBP	Chronic, General Population	1.05	ALB	Invertebrates, Chronic	
Indaziflam	100	HHBP	Chronic, General Population	--			
Indoxacarb	100	HHBP	Chronic, General Population	75	ALB	Invertebrates, Chronic	
Ipconazole	96	HHBP	Chronic, General Population	0.18	ALB	Fish, Chronic	
Iprodione	0.729	HHBP	Cancer	120	ALB	Invertebrates, Acute	
Iron Phosphate	Metals/Salts Excluded						
Isofetamid	4900	HHBP	Chronic, General Population	86	ALB	Fish, Chronic	
Isoxaben	300	HHBP	Chronic, General Population	10	ALB	Non-Vascular Plant	
Kresoxim-methyl	11	HHBP	Cancer	29.2	ALB	Vascular Plant	
Lambda-cyhalothrin	6	HHBP	Chronic, General Population	0.002	ALB	Invertebrates, Chronic	
Linuron	49	HHBP	Chronic, General Population	0.09	ALB	Invertebrates, Chronic	
Malathion	160	AAL		0.035	ALB	Invertebrates, Chronic	HA = 200 (1-day and 10 day child); US EPA NRWQC (Aquatic life, CCC) = 0.1
Maleic hydrazide	4000	HA	Lifetime	9600	ALB	Fish, Chronic	
Maleic hydrazide, potassium salt	4000	HA	Lifetime	9600	ALB	Fish, Chronic	
Mancozeb	0.532	HHBP	Cancer	47	ALB	Vascular Plant	
Mandipropamid	300	HHBP	Chronic, General Population	220	ALB	Fish, Chronic	
MCPA, 2-Ethylhexyl ester	30	HA	Lifetime	20	ALB	Vascular Plant	
MCPA, Dimethylamine salt	30	HA	Lifetime	130	ALB	Vascular Plant	
MCPA, Isooctyl ester	30	HA	Lifetime	--			
MCPP-p, dimethylamine salt	300	HHBP	Chronic, General Population	14	ALB	Non-Vascular Plant	
Mecoprop-p	--						
Mefenoxam	474	HHBP	Chronic, General Population	100	ALB	Invertebrates, Chronic	
Mefluidide, diethanolamine salt	96	HHBP	Chronic, General Population	--			
Mepiquat Chloride	1250	HHBP	Chronic, General Population	--			
Mesosulfuron-methyl	9920	HHBP	Chronic, General Population	0.64	ALB	Non-Vascular Plant	
Mesotrione	4500	HHBP	Chronic, General Population	17.7	ALB	Non-Vascular Plant	
Meta-cresol	--						
Metaflumizone	300	HHBP	Chronic, General Population	--			
Metalaxyl	--						
Metaldehyde	600	HHBP	Chronic, General Population	34500	ALB	Fish, Acute	
Metconazole	300	HHBP	Chronic, General Population	--			
Methidathion	9.6	HHBP	Chronic, General Population	0.66	ALB	Invertebrates, Chronic	
Methiocarb	--						
Methomyl	200	HA	Lifetime	0.7	ALB	Invertebrates, Chronic	
Methoxyfenozide	600	HHBP	Chronic, General Population	6.3	ALB	Invertebrates, Chronic	
Methyl anthranilate	--						
Methyl bromide	48	US EPA CTR		1300	ALB	Invertebrates, Acute	US EPA NRWQC Human Health = 100
Methyl-2,7-dichloro-9-hydroxyfluorene-9-carboxylate	--						
Metiram	0.532	HHBP	Cancer	--			
Metolachlor	700	HA	Lifetime	1	ALB	Invertebrates, Chronic	
Metrafenone	1590	HHBP	Chronic, General Population	--			
Metribuzin	70	HA	Lifetime	8.1	ALB	Non-Vascular Plant	
Milbemectin	--						
MSMA	200	HHBP	Chronic, General Population	5630	ALB	Vascular Plant	
Myclobutanil	160	HHBP	Chronic, General Population	830	ALB	Vascular Plant	
N6-benzyl adenine	--						
NAA (Naphthalene Acetic Acid)	1600	HHBP	Chronic, General Population	5100	ALB	Vascular Plant	
NAA Amonium Salt	1600	HHBP	Chronic, General Population	14900	ALB	Non-Vascular Plant	
NAA Ethyl Ester	1600	HHBP	Chronic, General Population	1340	ALB	Fish, Acute	
NAA Potassium Salt	1600	HHBP	Chronic, General Population	5100	ALB	Vascular Plant	
NAA Sodium Salt	1600	HHBP	Chronic, General Population	--			
Naled	10	HHBP	Chronic, General Population	0.045	ALB	Invertebrates, Chronic	
Napropamide	770	HHBP	Chronic, General Population	1100	ALB	Invertebrates, Chronic	
Nicosulfuron	8000	HHBP	Chronic, General Population	43000	ALB	Invertebrates, Chronic	
Nitrapyrin	200	HHBP	Chronic, General Population	--			
N-Octyl bicycloheptene Dicarboximide (MGK-264)	390	HHBP	Chronic, General Population	--			
Norflurazon	96	HHBP	Chronic, General Population	9.7	ALB	Vascular Plant	
Novaluron	70	HHBP	Chronic, General Population	0.03	ALB	Invertebrates, Chronic	
Octyl decyl dimethyl ammonium chloride	--						
Ortho-phenylphenol, sodium salt	--						
Oryzalin	4.11	HHBP	Cancer	42	ALB	Non-Vascular Plant	
Oxadiazon	--						
Oxamyl	10	HA	Acute (1-day), Children	27	ALB	Invertebrates, Chronic	CA Primary MCL = 50
Oxydemeton-methyl	0.6	HHBP	Chronic, General Population	5	ALB	Fish, Chronic	
Oxyfluorfen	0.437	HHBP	Cancer	0.29	ALB	Vascular Plant	
Oxytetracycline hydrochloride	6000	HHBP	Chronic, General Population	47450	ALB	Fish, Acute	
Oxytetracycline calcium complex	3	HHBP	Chronic, General Population	--			

Table 4. Comparison of Human Health and Aquatic Life Reference Values for Agricultural Pesticides

Pesticide	Lowest Human Ref. Value (ppb)	Human Health Reference Value Type	Human Health Reference Value Endpoint	Lowest Aquatic Ref. Value (ppb)	Aquatic Life Reference Value Type	Aquatic Life Reference Value Endpoint	Notes
Paclobutrazol	700	HHBP	Chronic, General Population	8	ALB	Non-Vascular Plant	
Paraquat dichloride	30	HA	Lifetime	71	ALB	Vascular Plant	
PCNB, Pentachloronitrobenzene (Quintozene)	6	HHBP	Chronic, General Population	13	ALB	Fish, Chronic	AAL = 20
Pendimethalin	2000	HHBP	Chronic, General Population	5.2	ALB	Vascular Plant	
Penflufen	2400	HHBP	Chronic, General Population	--			
Penoxsulam	941	HHBP	Chronic, General Population	3	ALB	Non-Vascular Plant	
Penthiopyrad	1700	HHBP	Chronic, General Population	100	ALB	Fish, Chronic	
Permethrin	3.344	HHBP	Cancer	0.0014	ALB	Invertebrates, Chronic	
Peroxyacetic acid	--						
Peroxyoctanoic acid	--						
Phenmedipham	1500	HHBP	Chronic, General Population	--			
d-Phenothrin (Sumithrin)	40	HHBP	Chronic, General Population	0.47	ALB	Invertebrates, Chronic	
Phorate	1.1	HHBP	Chronic, General Population	0.21	ALB	Invertebrates, Chronic	
Phosmet	3	HHBP	Females 13-49 years	0.8	ALB	Invertebrates, Chronic	
Phosphine	--						
Picoxystrobin	290	HHBP	Chronic, General Population	1	ALB	Invertebrates, Chronic	
Pinoxaden	2000	HHBP	Chronic, General Population	1200	ALB	Vascular Plant	
Piperonyl butoxide	992	HHBP	Chronic, General Population	30	ALB	Invertebrates, Chronic	
Polyoxin D, zinc salt	--						
Potassium N-methyldithiocarbamate	0.19	AAL		--			
Prallethrin	50	HHBP	Acute, Children	0.65	ALB	Invertebrates, Chronic	
Prodiamine	--						
Prohexadione calcium	1000	HHBP	Chronic, General Population	12500	ALB	Invertebrates, Chronic	
Prometon	200	HA	Acute (1-day), Children	98	ALB	Non-Vascular Plant	
Prometryn	300	HHBP	Chronic, General Population	1.04	ALB	Vascular Plant	
Propamocarb hydrochloride	770	HHBP	Chronic, General Population	--			
Propargite	0.167	HHBP	Cancer	7	ALB	Invertebrates, Acute	
Propiconazole	600	HHBP	Chronic, General Population	21	ALB	Vascular Plant	
Propionic Acid	--						
Propylene oxide	6	HHBP	Chronic, General Population	42000	ALB	Fish, Acute	
Propylene glycol monolaurate	--						
Pronamide (Propyzamide)	300	HHBP	Acute, Children & Chronic, General Population	600	ALB	Invertebrates, Chronic	
Prothioconazole	60	HHBP	Chronic, General Population	--			
Pymetrozine	2.69	HHBP	Cancer	25	ALB	Invertebrates, Chronic	
Pyraclostrobin	220	HHBP	Chronic, General Population	1.5	ALB	Vascular Plant	
Pyraflufen-ethyl	0.964	HHBP	Cancer	0.89	ALB	Fish, Chronic	
Pyrethrins	280	HHBP	Chronic, General Population	0.86	ALB	Invertebrates, Chronic	
Pyridaben	30	HHBP	Chronic, General Population	0.044	ALB	Invertebrates, Chronic	
Pyridalyl	220	HHBP	Chronic, General Population	2.1	ALB	Invertebrates, Acute	
Pyrimethanil	1100	HHBP	Chronic, General Population	20	ALB	Fish, Chronic	
Pyriproxyfen	2200	HHBP	Chronic, General Population	0.015	ALB	Invertebrates, Chronic	
Pyrithiobac-sodium	--						
Pyroxsulam	6000	HHBP	Chronic, General Population	2.57	ALB	Non-Vascular Plant	
Quinchlorac	2400	HHBP	Chronic, General Population	500	ALB	Vascular Plant	
Quinchlorac, dimethylamine salt	2400	HHBP	Chronic, General Population	500	ALB	Vascular Plant	
Quinoxyfen	1000	HHBP	Chronic, General Population	13	ALB	Fish, Chronic	
Resmethrin	0.5692	HHBP	Cancer	0.14	ALB	Fish, Acute	
Rimsulfuron	755	HHBP	Chronic, General Population	11.6	ALB	Non-Vascular Plant	
S,S,S-tributyl phosphorotrithioate (Tribufos)	0.6	HHBP	Chronic, General Population	1.56	ALB	Invertebrates, Chronic	
Saflufenacil (BAS 800 H)	290	HHBP	Chronic, General Population	42	ALB	Vascular Plant	
Salicyclic acid	--						
Sethoxydim	900	HHBP	Chronic, General Population	210	ALB	Non-Vascular Plant	
Siduron	960	HHBP	Chronic, General Population	6	ALB	Invertebrates, Chronic	
Simazine	4	CA Primary MCL		2.24	ALB	Vascular Plant	
S-methoprene	--						
S-metolachlor	--						
Sodium chlorate	Metals/Salts Excluded						
Sodium cyanide	--						
Sodium metaborate tetrahydrate	Metals/Salts Excluded						
Spinetoram	159	HHBP	Chronic, General Population	--			
Spinosad	159	HHBP	Chronic, General Population	0.6	ALB	Invertebrates, Chronic	
Spirodiclofen	2.15	HHBP	Cancer	1.95	ALB	Fish, Chronic	
Spiromesifen	140	HHBP	Chronic, General Population	0.25	ALB	Invertebrates, Chronic	
Spirotetramat	300	HHBP	Chronic, General Population	100	ALB	Invertebrates, Chronic	
Streptomycin Sulfate	300	HHBP	Chronic, General Population	--			
Strychnine	--						
Sulfentrazone	900	HHBP	Chronic, General Population	28.8	ALB	Non-Vascular Plant	
Sulfometuron Methyl	1760	HHBP	Chronic, General Population	0.45	ALB	Non-Vascular Plant	
Sulfosulfuron	1500	HHBP	Chronic, General Population	1	ALB	Non-Vascular Plant	
Sulfuryl fluoride	500	HHBP	Chronic, General Population	--			
Tau-fluvalinate	30	HHBP	Acute, Children & Chronic, General Population	0.1	ALB	Invertebrates, Chronic	
TCMTB (Busan 72)	60	HHBP	Chronic, General Population	--			
Tebuconazole	190	HHBP	Chronic, General Population	12	ALB	Fish, Chronic	

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Pesticide	Lowest Human Ref. Value (ppb)	Human Health Reference Value Type	Human Health Reference Value Endpoint	Lowest Aquatic Ref. Value (ppb)	Aquatic Life Reference Value Type	Aquatic Life Reference Value Endpoint	Notes
Tebufenozide	120	HHBP	Chronic, General Population	4.3	ALB	Invertebrates, Chronic	
Tebuthiuron	500	HA	Lifetime	50	ALB	non-Vascular Plant	
Tembotrione	3	HHBP	Chronic, General Population	5.2	ALB	Non-Vascular Plant	
Terrazole (Etridiazole)	0.961	HHBP	Cancer	72	ALB	Vascular Plant	
Tetraconazole	47	HHBP	Chronic, General Population	190	ALB	Invertebrates, Chronic	
Tetramethrin	--						
Thiabendazole	210	HHBP	Chronic, General Population	42	ALB	Invertebrates, Chronic	
Thiacloprid	0.788	HHBP	Cancer	0.97	ALB	Invertebrates, Chronic	
Thiamethoxam	77	HHBP	Chronic, General Population	17.5	ALB	Invertebrates, Acute	
Thidiazuron	252	HHBP	Chronic, General Population	--			
Thiencarbazone-methyl	7490	HHBP	Chronic, General Population	0.8	ALB	Non-Vascular Plant	
Thiophanate-methyl	2.76	HHBP	Cancer	930	ALB	Vascular Plant	
Thiram	96	HHBP	Chronic, General Population	21	ALB	Fish, Acute	
Triadimefon	220	HHBP	Chronic, General Population	41	ALB	Fish, Chronic	
Triadimenol	22	HHBP	Chronic, General Population	--			
Triallate	0.446	HHBP	Cancer	14	ALB	Invertebrates, Chronic	
Tribenuron-methyl	50	HHBP	Chronic, General Population	2	ALB	Non-Vascular Plant	
Triclopyr, butoxyethyl ester	--						
Triclopyr, Triethlamine salt	300	HHBP	Chronic, General Population	5900	ALB	Non-Vascular Plant	
Trifloxystrobin	240	HHBP	Chronic, General Population	2.76	ALB	Invertebrates, Chronic	
Triflumizole	74.9	HHBP	Chronic, General Population	33	ALB	Fish, Chronic	
Trifluralin	4	HA	Cancer	1.9	ALB	Fish, Chronic	
Triflusulfuron-methyl	156	HHBP	Chronic, General Population	--			
Trinexapac-Ethyl	2000	HHBP	Chronic, General Population	190	ALB	Non-Vascular Plant	
Triticonazole	1100	HHBP	Chronic, General Population	--			
Uniconazole-P	100	HHBP	Chronic, General Population	--			
Urea dihydrogen sulfate	--						
Zinc phosphide	0.6	HHBP	Chronic, General Population	--			
Zinc sulfate	Metals/Salts Excluded						
Ziram	34	HHBP	Chronic, General Population	4.85	ALB	Fish, Acute	
Zoxamide	3100	HHBP	Chronic, General Population	3.48	ALB	Fish, Chronic	
Other Pesticides and Degradates of High Interest for Drinking Water							
1,2,4-Triazole	30	HHBP	Chronic, General Population	--			
2,6-Dichlorobenzamide (BAM)	29	HHBP	Chronic, General Population	10000	ALB	Fish, Chronic	
Bensulfuron methyl	1000	HHBP	Chronic, General Population	--			
Bispyrabac Sodium	600	HHBP	Chronic, General Population	12	ALB	Non-Vascular Plant	
Carbendazim (MBC)	13.4	HHBP	Cancer	0.99	ALB	Fish, Chronic	
Clomazone	5400	HHBP	Chronic, General Population	167	ALB	Vascular Plant	
Cyhalofop-butyl	60	HHBP	Chronic, General Population	47.4	ALB	Invertebrates, Chronic	
Methyliosthiocyanate (MITC)	190	AAL		25	ALB	Invertebrates, Chronic	
Orthosulfamuron	300	HHBP	Chronic, General Population	0.7	ALB	Non-Vascular Plant	
Propanil	60	HHBP	Chronic, General Population	9.1	ALB	Fish, Chronic	
Thiobencarb	1	CA Secondary MCL		1	ALB	Invertebrates, Chronic	CA Primary MCL = 70
Triazole Acetic Acid	30	HHBP	Chronic, General Population	--			
Triazole alanine	30	HHBP	Chronic, General Population	--			

Yellow Shading - highlights lowest reference value for each chemical (only for chemicals with a human health reference value)
Where multiple reference values exist, the lowest reference value was selected for each category
Analysis excludes metals and salts
Cancer - used 10-6 risk to be consistent with California law and regulations (e.g., Proposition 65)
"--" means no reference value was identified

Reference Values Reviewed:
US EPA Human Health Benchmarks for Pesticides = HHBP
US EPA Aquatic Life Benchmarks for Pesticides = ALB
US EPA Drinking Water Standards and Health Advisories
  Maximum Contaminant Level = US EPA MCL
  Health Advisory = HA
California Drinking Water Regulatory Levels
  CA Maximum Contaminant Level = CA MCL
  AAL = Archived Advisory Level
  NL = CA Notification Level
US EPA-Established California Water Quality Standards
  US EPA California Toxics Rule = US EPA CTR
US EPA National Recommended Water Quality Criteria = US EPA NRWQC
  Criterion continuous concentration = CCC
  Criterion maximum concentration = CMC
  Fresh Water = FW
  Salt Water = SW
Public Health Goals are not included in this analysis.

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R04I025713	Bangor Quarry	5522 LaPorte Rd	Bangor	Butte
5R04I025786	SunWest Milling	507 Bannock St	Biggs	Butte
5R04I000249	Neal Road Recycling and Waste Facility Class III La	1023 NEAL RD	Chico	Butte
5R04I002075	UPS Chico CACHI	401 Otterson Dr	Chico	Butte
5R04I003099	Smuckers Juice Processing WW Ponds	37 Speedway	Chico	Butte
5R04I003206	Chico Municipal Airport	150 Airpark Blvd	Chico	Butte
5R04I010509	A A Concrete Supply Chico	3578 Esplanade	Chico	Butte
5R04I011075	Transdev Services Inc	326 Huss Dr	Chico	Butte
5R04I012784	Chico Scrap Metals Inc	878 E 20th St	Chico	Butte
5R04I014405	Baldwin Contracting Co Chico Y	1764 Skyway	Chico	Butte
5R04I015720	Sierra Nevada Brewing Co	1075 20th St	Chico	Butte
5R04I016186	USA Waste of California Inc	2569 Scott Ave	Chico	Butte
5R04I020287	Chico Terminal	2570 Hegan Lane	Chico	Butte
5R04I021270	Little Chico Creek	Canyon Shadows Rd	Chico	Butte
5R04I022009	Asbury Environmental Services Chico	2549 Scott Ave	Chico	Butte
5R04I022043	Pick N Pull Dismantlers	397 E Park Ave	Chico	Butte
5R04I022971	Asbury Environmental Services Chico II LLC	1618 W 5th St	Chico	Butte
5R04I024533	Fair Street Recycling	2300 Fair Street	Chico	Butte
5R04I024976	Western Woods Inc	275 Sikorsky Ave	Chico	Butte
5R04NEC000232	Estes Express West	2100 Fair Street	Chico	Butte
5R04I026388	FedEx CICA	1330 Fortress Street	Chico	Butte
5R04I027850	Wrex Prod Inc	25 Wrex Ct	Chico	Butte
5R04NEC004515	Odyssey Winery and Vineyards	6237 Cohasset Road	Chico	Butte
5R04NEC005234	Dr Pepper Snapple Group Chico	306 Otterson Drive Suite 10	Chico	Butte
5R04IN601850	Valley Rubber & Gasket Company	11110 Midway	Chico	Butte
5R04IN602904	Pro Aggregate Pinnacle Grinding	3668 Hicks Lane	Chico	Butte
5R04I024626	Basik Recycling Inc	2264 Park Ave	Chico	Butte
5R04I023372	Butte Cnty Yard Chico	20th and Locust	Chico	Butte
5R04I003207	Chico City Municipal Ser Ctr	901 Fir St	Chico	Butte
5R04I024730	California Family Recycling	2565 S Whitman Place	Chico	Butte
5R04NEC004655	Lifetouch School Studios	2860 Fair St	Chico	Butte
5R04IN601623	Mathews Ready Mix Chico	1619 Skyway	Chico	Butte
5R04IN602505	Work Training Center	2255 Fair Street	Chico	Butte
5R04IN602508	Highway 70 Recycling Chico	2565 South Whitma Place	Chico	Butte
5R04IN602507	Basik Recycling	2264 Park Avenue	Chico	Butte
5R04IN602611	Sel Tech	108 Boeing Avenue	Chico	Butte
5R04IN602610	Air Spray USA	77 Piper Avenue	Chico	Butte
5R04I005864	FedEx Freight Durham	700 Keenan Ct	Durham	Butte
5R04I021313	Chico Frito Lay	740 Oro Chico Hwy	Durham	Butte
5R04I021331	Chico Scrap Metal South	766 Oro Chico Hwy	Durham	Butte
5R04I022926	Chico Produce Inc	70 Pepsi Wy	Durham	Butte
5R04NEC000041	Almendra Winery and Distillery	9275 Midway	Durham	Butte
5R04I028448	Old Durham Wood Inc	1156 Oroville Chico Highway	Durham	Butte
5R04I022815	Steel Mill Recyclers	786 Oro Chico Hwy	Durham	Butte
5R04IN600506	ProPacific Fresh	70 Pepsi Way	Durham	Butte
5R04I019732	DJW Truck Dismantlers Hwy 99	1267 State Highway 99	Gridley	Butte
5R04NEC004754	Thiara Brothers Farming Prune	654 Township Rd	Gridley	Butte
5R04I028504	Planet Auto Wholesale & Dismantling	1225 Hwy 99	Gridley	Butte
5R04I024678	Nelson Terminal	1566 Nelson Road	Nelson	Butte
5R04I001553	Recology Butte Colusa Counties	2720 S 5th Ave	Oroville	Butte
5R04I001810	Pacific Coast Producers Inc Oroville Processing Fac	1601 Mitchell Ave	Oroville	Butte
5R04I004410	North State Rendering Tallow Plant	15 Shippee	Oroville	Butte
5R04I004909	Roplast Industries	3155 S 5th Ave	Oroville	Butte
5R04I005004	Oroville Yard	2985 South Fifth Avenue	Oroville	Butte
5R04I009678	Butte Community College District	3536 Buttte Campus Dr	Oroville	Butte
5R04I009782	Lake Oroville Marina LLC dba Bidwell Canyon Mari	801 Bidwell Canyon Road	Oroville	Butte
5R04I017915	Oroville Uion High School Transportation	2139 Washington Ave	Oroville	Butte
5R04I017991	Thermalito Union School District Transportation	1123 Sierra	Oroville	Butte
5R04I021330	Chico Scrap Metal Inc dba NorCal Recyclers	1855 Kusel	Oroville	Butte
5R04I021606	Table Mountain	2216 Table Mountain Blvd	Oroville	Butte
5R04I022689	BCJ Sand Rock Co Chico Pit	4970 Slickens Rd off Wheelock	Oroville	Butte
5R04I023195	Empire Steel	1508 Parker Rd	Oroville	Butte

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R04I023930	Mathews Readymix Oroville Plant	4290 Pacific Heights Rd	Oroville	Butte
5R04I025403	Crown Metals LLC	4801 Feather River Blvd Suite 18	Oroville	Butte
5R04I024529	Nicks Auto Dismantling	4280 Lincoln Blvd	Oroville	Butte
5R04I016040	Mineral Resources LLC	1324 Cherokee	Oroville	Butte
5R04I023332	Graphic Packaging	525 Airport Pkwy	Oroville	Butte
5R04I002694	Setzer Forest Prod	1980 Kusel Rd	Oroville	Butte
5R04I024884	Sierra Silica Resources	650 Georgia Pacific Way	Oroville	Butte
5R04I026511	Oroville Recycle	2825 5th Ave	Oroville	Butte
5R04I026547	DeLallo Italian Foods Inc	1800 Idora Street	Oroville	Butte
5R04NEC003086	LIVE VINE	652 Luds Way	Oroville	Butte
5R04I027197	B&R Auto Wrecking	2815 Feather River Blvd	Oroville	Butte
5R04NEC004516	Chico Metal Finishing Incorporated	3151 Richter Avenue	Oroville	Butte
5R04NEC004768	federal cartridge company	605 oro dam blvd	Oroville	Butte
5R04I028033	Odin Recycle Facility	3000 South 7 Street	Oroville	Butte
5R04NEC004917	Viking Used Auto Parts	4801 Feather River Blvd	Oroville	Butte
5R04I028171	Savior Earth Recycling	2680 S 5th ave	Oroville	Butte
5R04NEC005359	Oroville Landfill Properties Industrial Stormwater	Ophin	Oroville	Butte
5R04NNA000154	Dunstone Quarry	1000 Dunstone Drive	Oroville	Butte
5R04I023335	Highway 70 Recycling	4801 Feather River Blvd #18	Oroville	Butte
5R04I023371	Butte County Yard Orville	9 County Center Dr	Oroville	Butte
5R04I022477	Oroville Pacific Heights	4714 Pacific Heights	Oroville	Butte
5R04I026118	Butte Community College Main Campus	3536 Butte Campus Drive	Oroville	Butte
5R04NEC001524	Oroville City Airport	225 Chuck Yeager Way	Oroville	Butte
5R04I024186	Savior Earth Recycling	2680 5th Ave	Oroville	Butte
5R04I026180	Straw House Cellars	4378 Myvalli Dr	Oroville	Butte
5R04I020964	Oroville Self Serve	2815 Feather River Blvd	Oroville	Butte
5R04I026515	Ron Harmon Mine	1982 Hillcrest Drive	Oroville	Butte
5R04IN601606	Highway 70 Recycling	4801 Feather River Blvd #18	Oroville	Butte
5R04IN601604	Emerald Bay Custom Built Houseboats	4801 Feather River Blvd #16	Oroville	Butte
5R04IN601624	Mathews Ready Mix Oroville	4290 Pacific Heights Road	Oroville	Butte
5R04IN602221	Mathews Readymix	4290 Pacific Heights Road	Oroville	Butte
5R04IN602721	Dunstone Quarry	1000 Dunstone Road	Oroville	Butte
5R04I010256	Paradise Skypark	4405 Airport Rd	Paradise	Butte
5R04I017896	Paradise USD Bus Maintenance Yard	610 Pearson	Paradise	Butte
5R04I019075	Lake Oroville Marina LLC	3428 Pentz	Paradise	Butte
5R04I022379	Northern Recycling and Waste Services	920 American Way	Paradise	Butte
5R04I027982	Slurry Solutions Paradise	951 American Way	Paradise	Butte
5R04I023373	Butte Cnty Yard Paradice	5912 Almond St	Paradise	Butte
5R04I025136	Viking Used Auto Parts	699 B Pearson Road	Paradise	Butte
5R04I003052	Wehah Farm Inc	5370 Church St	Richvale	Butte
5S06I018393	Conrad Forest Products	7085 Eddy Rd C	Arbuckle	Colusa
5S06I020359	ADM Rice Inc	1603 Old Hwy 99 W	Arbuckle	Colusa
5S06NEC004129	The Sun Valley Rice Company LLC	7050 Eddy Road	Arbuckle	Colusa
5S06I028037	Renewable Fiber Inc	7085 Eddy Road	Arbuckle	Colusa
5S06IN604403	Renewable Fiber Inc	7085 Eddy Road	Arbuckle	Colusa
5S06I023975	ThermaSource Cementing Yard	7085 Eddy Road Area G	Arbuckle	Colusa
5S06I001560	Colusa County Airport	2915 Highway 20	Colusa	Colusa
5S06I020441	Premier Mushrooms Inc	2847 Niagara Ave	Colusa	Colusa
5S06I021432	Western Ready Mix Concrete Co Inc	2820 Hwy 20	Colusa	Colusa
5S06I027570	Wilbur Ellis Company LLC Colusa	7254 Farinon Rd	Colusa	Colusa
5S06I003903	Colusa Transportation Department	901 Colus Ave	Colusa	Colusa
5S06I025202	NorCal Recycling & Demolition	541 14th St	Colusa	Colusa
5S06I005371	Colusa Cnty Evans Landfill Tra	Evans Rd 1 2 Mile S Of Meyers	Colusa	Colusa
5S06I026156	PGP International Inc	126 E Main St	Colusa	Colusa
5S06I022929	Colusa Generating Station	4780 Dirks Rd	Maxwell	Colusa
5S06I025081	Maxwell Transfer Station	3852 Old Highway 99W	Maxwell	Colusa
5S06I005372	Colusa Cnty Stonyford Landfill	2 Miles S O Stonyford	Stonyford	Colusa
5S06I000534	Wadham Energy Ltd Part	6247 Myers Rd	Williams	Colusa
5S06I020372	Viking Pools	121 Crawford Rd	Williams	Colusa
5S06I021474	Coach Maintenance Co	2300 Husted Rd	Williams	Colusa
5S06I024811	Ramos Oil Company Williams	1802 Old Hwy 99W	Williams	Colusa
5S06I026827	Morning Star co	2211 Old Highway 99 W	Williams	Colusa

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S06I026978	Williams Redi Mix	1310 Husted Rd	Williams	Colusa
5S06I027043	Big M Automotive	1201 Old Hwy 99W	Williams	Colusa
5S06NEC003394	Tamaki Rice Corporation	1701 Abel Rd	Williams	Colusa
5S06NEC003618	American Commodity Company	6133 Abel Rd	Williams	Colusa
5S06I028327	julio brincats high tech towing dism 26630	1185 freshwater rd williams	Williams	Colusa
5S06NNA000129	Morning Star co	2211 Old Highway 99 W	Williams	Colusa
5S06I016280	Williams Unified Sch Dis Bus Y	Eleventh And B Streets	Williams	Colusa
5S06I021456	Williams Redi Mix	1310 Husted Rd	Williams	Colusa
5S06I023045	Big M Automotive	271 N 7th St	Williams	Colusa
5S09NEC004178	Camino School District	3060 Snows Rd	Camino	El Dorado
5S09I028516	Crystal Basin Cellars	3550 Carson Road	Camino	El Dorado
5S09IN601448	Hangtown Towing		Coloma	El Dorado
5SXXIN601442	7118 McComber Street		Coloma	El Dorado
5S09IN602178	Hangtown Towing		Coloma	El Dorado
5S09I015039	El Dorado Cnty Transit Auth	6565 Commerce Way	Diamond Springs	El Dorado
5S09I016774	Amerals Truck Auto Wrecking Scrap Metals	4468 Forni Rd	El Dorado	El Dorado
5S09I014844	Lilyama Historical Mine	Lilyama Road	El Dorado	El Dorado
5S09I001185	El Dorado Cnty Georgetown Airp	Dry Diggins Road	Georgetown	El Dorado
5S09I002883	Black Oak Mine Sch Dist Trans	6540 Wentworth Springs Rd	Georgetown	El Dorado
5S09I020109	Sliger Mine	1500 Feet S of Sliger Mine Rd &	Greenwood	El Dorado
5S09IN602151	Williamson Number 1 Dam & Reservoir		Greenwood	El Dorado
5S09IN602156	Lewis Ranch THP Construction	z	Greenwood	El Dorado
5S09I001215	El Dorado Cnty Placerville Air	3501 Airport Rd	Placerville	El Dorado
5S09I008022	Hangtown Creek WRF	2300 Coolwater Creek Rd	Placerville	El Dorado
5S09I014311	Boeger Winery	1709 Carson	Placerville	El Dorado
5S09I017872	Mother Lode Usd	3783 Forni Rd	Placerville	El Dorado
5S09I018174	Placerville Union School District	2877 Schnell School Rd	Placerville	El Dorado
5S09I020632	El Dorado Disposal Material Recovery Facility	4100 Throwita Way	Placerville	El Dorado
5S09I020631	El Dorado Disposal Maintenance Shop	3940 Hwy 49	Placerville	El Dorado
5S09I023787	Blain Stumpf Trucking	5661 5637 Davidson Rd	Placerville	El Dorado
5S09I023793	Gold Oak Union School District	4120 Pleasant Valley Rd	Placerville	El Dorado
5S09NEC000338	Lava Cap Winery	2221 Fruitridge Rd	Placerville	El Dorado
5S09I023728	Chili Bar Slate	11380 State Highway 193	Placerville	El Dorado
5S09I022964	Big Cut Mine	2261 Donovan Ranch Rd	Placerville	El Dorado
5S09I001157	El Dorado Cnty CDA Transportation Division	2441 Headington Rd	Placerville	El Dorado
5S09NEC002765	Criag Gillihan Automotive	2561 Blacks Lane	Placerville	El Dorado
5S09I026954	Placerville DMS	1851 Lotus Road	Placerville	El Dorado
5S09I021560	Placerville Bin	4003 Stage Court	Placerville	El Dorado
5S09IN605321	Sierra Rock LLC	1845 Quarry Rd	Placerville	El Dorado
5S09I017873	Pollock Pines School District	2701 Amber Trl	Pollock Pines	El Dorado
5S09I000233	Rescue Unified School District	3880 Green Valley Rd	Rescue	El Dorado
5S09I016274	Marin Quarry	Ice House Rd	Riverton	El Dorado
5S09IN601413	Williamson Number 1 Dam & Reservoir		Sacramento	El Dorado
5S09IN601454	Hahn Ranch	4831 Rock Barn	Shingle Springs	El Dorado
5R11I027672	California Olive Ranch	5945 County Rd 35	Artois	Glenn
5R11I010466	McCorkle Farms Inc	2470 Road WW	Glenn	Glenn
5R11I027562	WilburEllis Company LLC Ord Bend	8168 County Road 33	Glenn	Glenn
5R11NEC001037	Hamilton City Building Lease	555 1st Street	Hamilton City	Glenn
5R11I028185	Hamilton Choice Terminal	Mile marker 169	Hamilton City	Glenn
5R11I001573	Orland Haigh Field	Road P At Rd 200	Orland	Glenn
5R11I010513	Jack L Spence Inc	821 Papst Ave	Orland	Glenn
5R11I019928	Jensen Precast Inc	7210 Highway 32	Orland	Glenn
5R11I021574	Wilbur Ellis Orland Haigh Field Airport	4115 County Rd P	Orland	Glenn
5R11I022273	Nor Cal Enviro Solutions LLC	4383 Co Rd HH	Orland	Glenn
5R11I022307	Decamilla Brothers LLC	717 Tehama St	Orland	Glenn
5R11I022650	Parts R Us	3948 Hwy 99W	Orland	Glenn
5R11I022803	Orland Auto Wreckers	3825 County Road 99 W	Orland	Glenn
5R11I003468	Valley Rock Orland Plant	HWY 32 7266	Orland	Glenn
5R11I024609	Waste Tire Products	3820 Hwy 99 West	Orland	Glenn
5R11I025671	Orland Plant	6415 County Road 7	Orland	Glenn
5R11I026238	United Bark Products LLC	3717 County Rd 99W	Orland	Glenn
5R11I027367	Olson Meat Company	7305 Cutler Ave	Orland	Glenn

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R11I027821	OSG	6535 Road 9	Orland	Glenn
5R11NEC004459	Baugher Ranch Organics	7020 Rd 25	Orland	Glenn
5R11NNA000273	Valley Rock Products	7266 Hwy 32	Orland	Glenn
5R11I019861	Greenwood Dairy	6569 County Road 27	Orland	Glenn
5R11I025261	Haigh Field Airport	County Road P and County Road	Orland	Glenn
5R11NEC004216	Farmers Brewery	880 County Rd WW	Princeton	Glenn
5R11I000338	Willows City	1600 S Tehama	Willows	Glenn
5R11I001601	Willows Glenn Co Airport	State Route 162 at Interstate 5	Willows	Glenn
5R11I001568	Glenn County Class III Landfill Storm Water	5700 County Rd 33	Willows	Glenn
5R11I001938	Johns Manville Willows Facility	5616 County 49	Willows	Glenn
5R11I004040	Western Ready Mix Concrete Co Inc	E End Of Cedar St	Willows	Glenn
5R11I016650	CalPlant 1 LLC	6101 State Hwy 162	Willows	Glenn
5R11I021268	Swift Transportation Co Inc Willows	1475 Hwy 99 W	Willows	Glenn
5R11I027569	Wilbur Ellis Company LLC Willows	6504 County Road 57	Willows	Glenn
5S11IN601343	SWIFT TRANSPORTATION	1475 W HWY 99	Willows	Glenn
5R18I016206	Hayden Hill Mine	Hwy 139	Adin	Lassen
5R18NNA000135	D-Mine	HWY 44	Hat Creek	Lassen
5R18I015832	Westwood Class III Landfill	HWY 36	Westwood	Lassen
5R18I010347	Mt Lassen Power	Mooney	Westwood	Lassen
5R25I025342	Sage Country Recycling	504 W 12th St	Alturas	Modoc
5R25NEC001717	Alturas Disposal	39263 Hwy 299	Alturas	Modoc
5R25NEC003367	UPS Alturas CAATR	205 W 4Th Street	Alturas	Modoc
5R25I022139	Russells Recycling	504 W 12th St	Alturas	Modoc
5R25I026882	Shaw Pit	County Road 48A	Lookout	Modoc
5S29NEC004381	Measurement Specialties	13025 Grass Valley Ave	Grass Valley	Nevada
5S29I001179	Grass Valley Steelcast	145 E Main St	Grass Valley	Nevada
5S29I001343	Grass Valley	11825 La Barr Meadows Rd	Grass Valley	Nevada
5S29I001610	County of Nevada Department of Public Works	12548 Loma Rica Dr	Grass Valley	Nevada
5S29I001722	Nevada County Airport	13083 John Bauer Ave	Grass Valley	Nevada
5S29I002778	Hansen Bros Ent Greenhorn Cree	12865 Mule Canyon Rd	Grass Valley	Nevada
5S29I002931	Hansen Bros Ent Barr Meadows Y	11727 La Barr Meadows Rd	Grass Valley	Nevada
5S29I004364	Durham School Services	10701 E Bennett Rd	Grass Valley	Nevada
5S29I006044	Grass Valley City WWTP	556C Freeman	Grass Valley	Nevada
5S29I009479	UPS Grass Valley CAGVA	12025 Charles Dr	Grass Valley	Nevada
5S29I012647	RDJJB Inc dba Grass Valley Auto Truck Dis	647 E Main St	Grass Valley	Nevada
5S29I013071	Kilroys	12077 State Hwy 49	Grass Valley	Nevada
5S29I014708	Waste Management of Nevada County	13083 Grass Valley Ave	Grass Valley	Nevada
5S29I019611	Empire Mine State Historic Park	10556 E Empire St	Grass Valley	Nevada
5S29I024812	McCourtney Road Landfill	APN 25 120 12 et al	Grass Valley	Nevada
5S29NEC001756	FedEx OVEA	109 Spring Hill Drive	Grass Valley	Nevada
5S29I026856	Rare Earth Landscape Materials	11750 LaBarr Meadows Rd	Grass Valley	Nevada
5S29I026860	A A Concrete Supply Grass Valley	270 Railroad Avenue	Grass Valley	Nevada
5S29I027056	New Leaf Recycling LLC	11452 East Bennett Street	Grass Valley	Nevada
5S29NEC005347	Lucchesi Vineyards & Winery Inc	19698 View Forever Lane	Grass Valley	Nevada
5S29NEC005992	Farlows Scientific Glassblowing Inc	962 Golden Gate Terrace Ste B	Grass Valley	Nevada
5S29NEC006033	Jada Incorporated	179 Clydesdale Court	Grass Valley	Nevada
5S29NEC006083	Old Barn Self Storage	175 Spring Hill Drive	Grass Valley	Nevada
5S29IN604467	Merrill and Sons	12619 Loma Rica Drive	Grass Valley	Nevada
5S29I002779	Hansen Bros Ent	14789 Taylors Crosing Rd	Grass Valley	Nevada
5S29I005634	Grass Valley Ready Mix	Railroad Ave	Grass Valley	Nevada
5S29I025186	Advanced Towing and Recycling Inc	319 Railroad Ave	Grass Valley	Nevada
5S29NEC001442	LANmark Circuits Inc	400 Crown Point Circle	Grass Valley	Nevada
5S29I016986	Waste Management of Nevada County	12301 Loma Rica Dr	Grass Valley	Nevada
5S29NEC001409	Marks Cycle Store	144 Idaho Maryland Road	Grass Valley	Nevada
5S29NEC002528	Lanmark Circuits Inc	400 Crown Point Circle	Grass Valley	Nevada
5S29I021949	Grass Valley Bin	1020 Whispering Pines Ln Ste B	Grass Valley	Nevada
5S29NEC000483	Lucchesi Vineyards & Winery Inc	19698 View Forever Lane	Grass Valley	Nevada
5S29NEC000888	Bent Metal Winery	14364 McCourtney rd	Grass Valley	Nevada
5S29I025353	Grass Valley Recycle	875 Idaho Maryland Rd	Grass Valley	Nevada
5S29I027094	Bear River DMS	12022 La Barr Meadows Road	Grass Valley	Nevada
5S29NEC003053	TE Connectivity	424 Crown Point Circle	Grass Valley	Nevada
5S29I010822	Robinson Enterprises Inc	293 Lower Grass Valley Rd	Nevada City	Nevada

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S29I019386	Whittlesey Recycling	13895 Whittlesey Ln	Nevada City	Nevada
5S29I027233	Red Ledge Mine	Nevada County	Nevada City	Nevada
5S29NEC000271	Norden Yard	Old Highway 40	Norden	Nevada
5S29I004057	Douglas Tarr Bonelli	22800 Pleasant Valley Rd	North San Juan	Nevada
5S29I023628	French Corral Mine	21235 Pleasant Valley Road	North San Juan	Nevada
5S31I001657	Recology Auburn Placer Transfer Station	12305 Shale Ridge Ln	Auburn	Placer
5S31I002506	Morgan Advanced Ceramics Inc	13079 Earhart Ave	Auburn	Placer
5S31I002988	Auburn City Coorporation Yard	11500 Blocker Dr	Auburn	Placer
5S31I002840	Auburn City Airport	New Airport Rd	Auburn	Placer
5S31I009763	Don Robinson Sand Gravel	2145 Grass Valley Hwy	Auburn	Placer
5S31I017901	Mid Placer Pub Schools Tran	13121 Bill Francis Dr	Auburn	Placer
5S31I024920	Aubrurn Recycling and Scrap Metals Inc	350 Sacramento St	Auburn	Placer
5S31NEC000155	Auburn WWTP	10441 Ophir	Auburn	Placer
5S31I026104	Armstrong Technology Inc	12780 Earhart Avenue	Auburn	Placer
5S31I026859	A A Concrete Supply Auburn	890 Grass Valley Highway	Auburn	Placer
5S31NEC003023	Fawnridge Winery	5560 Fawnridge Road	Auburn	Placer
5S31NEC003385	Knee Deep Brewing Company LLC	13395 New Airport Rd	Auburn	Placer
5S31IN602624	Auburn Recycling and Scrap Metals	350 Sacramento Street	Auburn	Placer
5S31I016582	Auburn City Landfill	12305 Shale Ridge Ln	Auburn	Placer
5S31I023693	Bear River Ready Mix	890 Highway 49	Auburn	Placer
5S31I009013	SMD One WWTP	11755 Joeger Rd	Auburn	Placer
5S31I021140	HBE Colfax	44 Central St	Colfax	Placer
5S31I026858	A A Concrete Supply Colfax	212 Railroad Street	Colfax	Placer
5S31I009012	Foresthill Transfer Station	6699 Patent Road	Foresthill	Placer
5S31I017899	Foresthill Union School District	24750 Main St	Foresthill	Placer
5S31I020395	Red Ink Maid & Big Seam Claims	6 Mi Down USFS Hwy 96	Foresthill	Placer
5S31I017903	Eureka Union SD Transportation	5455 Eureka Rd	Granite Bay	Placer
5S31I000725	Alpha Dyno Nobel	3400 Nader Road	Lincoln	Placer
5S31I002525	Rio Bravo Rocklin	3100 Thunder Valley Court	Lincoln	Placer
5S31I006497	Lincoln City Airport	1480 Flightline Dr	Lincoln	Placer
5S31I009014	Western Placer Waste Management Authority	3195 Athens Ave	Lincoln	Placer
5S31I011352	Gladding Mcbean	601 7th St	Lincoln	Placer
5S31I012602	CEMEX	2680 Athens Ave	Lincoln	Placer
5S31I014258	A A Concrete Supply Lincoln	2930 Lesvos Ct	Lincoln	Placer
5S31I017902	Western Placer Unified Sch Dis	2701 Nicolas Rd	Lincoln	Placer
5S31I024749	Green Solutions and More Inc	2915 Lesvos Court	Lincoln	Placer
5S31I024868	Ramos Oil Company Lincoln	1185 Lincoln Blvd	Lincoln	Placer
5S31NEC001643	Lincoln City	1245 Fiddyment Rd	Lincoln	Placer
5S31I025293	Pallets Unlimited LLC	2390 Athens Avenue	Lincoln	Placer
5S31NEC005705	San Jose Die Casting & Machining Corp	600 business park drive	Lincoln	Placer
5S31IN603066	Global Express	2540 Athens Ave	Lincoln	Placer
5S31I006495	Closed Lincoln Landfill	Virginiatown Rd	Lincoln	Placer
5S31I001741	Sierra Pac Ind	1445 Highway 65	Lincoln	Placer
5S31I023993	Lincoln Facility	960 Gladding Road	Lincoln	Placer
5S31I027268	Syar Concrete LLC - Lincoln	960 Gladding Road	Lincoln	Placer
5S31NEC001851	Casque Wines	3273 Swetzer Road	Loomis	Placer
5S31NEC002517	Secret Ravine Vineyards LLC	4390 Gold Trail Way	Loomis	Placer
5S31I028109	New Cal Metals Incorporated	3495 Swetzer Road	Loomis	Placer
5S31NEC005320	LOOMIS BASIN BREWING CO INC	3277 SWETZER ROAD	Loomis	Placer
5S31IN604587	American Die & Rollforming Inc.	3495 Swetzer Road	Loomis	Placer
5S31I004595	Lausmann Lumber & Mldg Co	3370 Rippey Road	Loomis	Placer
5S31I003601	Sierra Auto Dismantlers	3363 Swetzer Rd	Loomis	Placer
5S31I005173	Meadow Vista Transfer Station	2950 Combie	Meadow Vista	Placer
5S31I017900	Placer Hills Union Sch Dist	16801 Placer Hills Rd	Meadow Vista	Placer
5S31I023694	Bear River Aggregates	2701 Combie Rd	Meadow Vista	Placer
5S31I010449	Jim Dobbas Inc	280 Taylor Rd	Newcastle	Placer
5S31I012912	Don Robinson Sand Gravel	9691 Ophir Rd	Newcastle	Placer
5S31I013581	A A Stepping Stone Manufacturing Inc	10291 Ophir Rd	Newcastle	Placer
5S31NEC002596	Hillenbrand Farmhaus Brewery	5100 Virginiatown Rd	Newcastle	Placer
5S31I024627	Gold River Recycling	9390 Old State Highway	Newcastle	Placer
5S31I027077	Newcastle DMS	9700 Hillview Road	Newcastle	Placer
5S31I002072	UPS Rocklin CAROC	2275 Sierra Meadows Dr	Rocklin	Placer

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S31I004286	Pick N Pull Auto Dismantlers	6355 Pacific St	Rocklin	Placer
5S31I009124	JELDWEN Rocklin	3901 Cincinnati Ave	Rocklin	Placer
5S31I012876	Mallard Creek Inc	4095 Duluth Ave	Rocklin	Placer
5S31I018372	Rocklin Unified SD Trans	2225 Corporation Yard Rd	Rocklin	Placer
5S31NEC000752	Fed Ex AUNA	1500 Nichols Dr	Rocklin	Placer
5S31NEC000910	Pac Mdf Prod Inc	4315 Dominguez Rd	Rocklin	Placer
5S31I026249	United Natural Foods Incorporated	1101 Sunset Blvd	Rocklin	Placer
5S31NEC003004	AMR Rocklin	6101 Pacific Street	Rocklin	Placer
5S31NEC003576	MilliporeSigma	6600 Sierra College Blvd	Rocklin	Placer
5S31I027768	United Rentals Rocklin	4700 Pacific Street	Rocklin	Placer
5S31IN604588	EZ-Flo	3640 Cincinnati	Rocklin	Placer
5S31I000782	Sierrapine Rocklin Division	4300 DOMINGUEZ RD	Rocklin	Placer
5S31I015746	Progress Vanguard Corporation	3909 Cincinnati Ave	Rocklin	Placer
5S31IN604747	Moksa Brewing	5860 Pacific Street	Rocklin	Placer
5S31IN605365	Greenheck Fan Company	170 Cyber Court	Rocklin	Placer
5S31NNA363	Greenheck Fan Company	170 Cyber Court	Rocklin	Placer
5S31I001342	Roseville	9800 Del Rd	Roseville	Placer
5S31I001766	AutoGator Roseville	1961 Pfe Rd	Roseville	Placer
5S31I005740	Dry Creek Wwtp	1800 Booth Rd	Roseville	Placer
5S31I010820	Roseville City Corp Yard	2005 Hilltop Cir	Roseville	Placer
5S31I015322	Roseville Yard	1600 VERNON	Roseville	Placer
5S31I017852	Roseville Joint Union High School District Transpor	129 Berry St	Roseville	Placer
5S31I020737	Save Mart Supermarkets	9999 Niblick Dr	Roseville	Placer
5S31I020747	Sims Recycling Solutions INC	8855 Washington Blvd	Roseville	Placer
5S31I021340	Roseville Energy Park	5120 Phillip Rd	Roseville	Placer
5S31I021529	Folsom Ready Mix Inc Plant 4	9700 Del Rd	Roseville	Placer
5S31I022492	Hanford Sand and Gravel Inc	97 Berry St	Roseville	Placer
5S31I023169	TSI Semiconductors America LLC	7501 Foothills Blvd	Roseville	Placer
5S31I024903	Industrial Container Services CA North LLC	749 Galleria Blvd	Roseville	Placer
5S31I004971	Bw Auto Dismantlers	2031 Pfe Rd	Roseville	Placer
5S31I026782	Facility Maintenance Operations Transportation a	8809 Cook Riolo Road	Roseville	Placer
5S31I026994	Lancaster Burns construction inc	8655 Washington Blvd	Roseville	Placer
5S31NEC003219	Pleasant Grove WWTP	5051 Phillip Rd	Roseville	Placer
5S31NEC003666	H B Fuller	10500 Industrial Ave	Roseville	Placer
5S31NEC003797	Advanced Metal Finishing	2130 March Road	Roseville	Placer
5S31NEC004040	Paul Baker Printing	220 Riverside Ave	Roseville	Placer
5S31I028362	Roseville Ready Mix	721 Berry Street	Roseville	Placer
5S31I028493	Erickson Framing CA LLC	8350 Industrial Avenue	Roseville	Placer
5S31NEC005964	Skyline Motorsports	215 kenroy lane unit 9	Roseville	Placer
5S31NEC006067	PASCO scientific	10101 Foothills Blvd	Roseville	Placer
5S31NEC006090	Security Public Storage Roseville	715 Cirby Way	Roseville	Placer
5S31NEC006100	Lambert PGM	911 washington blvd ste 210	Roseville	Placer
5S31NEC006101	Sinister Mfg Company Inc	2025 Opportunity Dr	Roseville	Placer
5S31NEC006196	Security Public Storage Roseville II	851 Galleria Blvd	Roseville	Placer
5S31IN605957	Labur Parts	2100 March Rd	Roseville	Placer
5S31IN603344	Roseville Golfland-Sunsplash	1893 Taylor Road	Roseville	Placer
5S31IN604538	California Bottling Co. Inc.	8250 Industrial Avenue	Roseville	Placer
5S31NNA000447	Groceryworks.com Operating Company 1617	8640 Sierra College	Roseville	Placer
5S31NNA000446	Have Truck will Travel	315 Cedar Street	Roseville	Placer
5S31NNA000490	Gold Country Courier	1420 E Roseville Pkwy #140	Roseville	Placer
5S31NNA000508	Taylor Road Self Storage	3000 Taylor Road	Roseville	Placer
5S31NNA000509	All American Self Storage	3040 TAYLOR ROAD	Roseville	Placer
5S31NNA000507	AAAA Taylor Road Self Storage	3000 Taylor Road	Roseville	Placer
5S31I003707	Hewlett Packard	8000 Foothills Blvd	Roseville	Placer
5S31I011144	Western Placer Waste Management Authority WF	3033 Fiddyment Rd	Roseville	Placer
5S31NEC004513	Labur Parts	2100 March Rd	Roseville	Placer
5S31I021475	Neff Rental	8455 Sierra College Blvd	Roseville	Placer
5S31I004589	Teichert Readymix Roseville Re	721 Berry St	Roseville	Placer
5S31I028484	Skyline Motorsports	215 kenroy lane unit 9	Roseville	Placer
5S31NEC005982	Westpark Storage	4351 Westpark Drive	Roseville	Placer
5S31I004029	Patterson Sand Gravel	8705 Camp Far West Rd	Sheridan	Placer
5S31I023103	Weimar Auto Wreckers	21300 Canyon Way	Weimar	Placer

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R32I023254	Carr Mine	Carr Mine	Butte Meadows	Plumas
5R32I021794	White Cap Ready Mix Chester Plant	400 Black Oak	Chester	Plumas
5R32I022134	Sierra Cascade Aggregate Asphalt Products Inc	6600 Old Ski Rd	Chester	Plumas
5R32I022172	Collins Pine Company	500 Main Street	Chester	Plumas
5R32I025560	Sierra Cascade Aggregate Asphalt Products Inc	952 1st Avenue	Chester	Plumas
5R32I025842	Chester Landfill	County Road 122 off Highway 36	Chester	Plumas
5R32I026505	Feather River Disposal	40 County Road 322	Chester	Plumas
5R32I024250	Willow Creek Borrow Site	1737 Clio State 40a road	Clio	Plumas
5R32IN602261	Willow Creek Borrow Site	Willow Creek	Clio	Plumas
5R32I023298	IMD Recycling Center	73980 Industrial Way	Delleker	Plumas
5R32IN601741	Plumas Sanitaion	73762 Industrial Road	Delleker	Plumas
5R32I002177	CA Engels Mining Co Engels Superior	Diamond Mountain Rd	Greenville	Plumas
5R32I028158	Axles Boneyard LLC	318 Ann St	Greenville	Plumas
5R32I020305	LCS Boneyard	318 Ann St	Greenville	Plumas
5R32I027451	The Boneyard	318 Ann Street	Greenville	Plumas
5R32IN601607	Soper Pit Gravel Mine	Meadow Valley Spanish Creek R	Meadow Valley	Plumas
5R32IN601725	Soper Pit Gravel Processing	Meadow Valley Spanish Creek R	Meadow Valley	Plumas
5R32I011933	Union Pac Railroad Tobin Quarr	24 T24n R6e Se1 Mdbm At Uprr	Portola	Plumas
5R32I017056	White Cap Ready Mix Portola Plant	73880 Hwy 70	Portola	Plumas
5R32I023300	IMD Recycling Center Shop	73836 S Delleker Rd 73980 Indus	Portola	Plumas
5R32I023589	David Lee Humphrey	73830 Delleker Rd	Portola	Plumas
5R32I024622	Rocky Point Borrow Site	Rocky Point Road	Portola	Plumas
5R32I015203	Portola Class III Landfill	Meadow	Portola	Plumas
5R32IN601132	Intermountain Disposal Inc	73986 industrial Road	Portola	Plumas
5R32IN601605	Cresent Tow Portola Shop	73830 Industrial Road	Portola	Plumas
5R32IN601625	Plumas Sanitation	73762 Industrial Way	Portola	Plumas
5R32IN601742	PTL Trans DG Pit	Meadow View Road	Portola	Plumas
5R32I014732	Feather River Disposal	1166 Industrial Way	Quincy	Plumas
5R32I023891	Sierra Concrete	901 Lee Road	Quincy	Plumas
5R32I024819	Wilburn Construction Inc	747 Lee Rd	Quincy	Plumas
5R32I025036	Sierra Pacific Industries Quincy Sawmill	1538 Lee Road	Quincy	Plumas
5R32I025906	Union Pacific Railroad Keddie Yard	Depot Road	Quincy	Plumas
5R32I026126	Spanish Creek Sand & Gravel LLC	900 Spanish Ranch Road	Quincy	Plumas
5R32I024475	American Valley Aviation Inc	550 Orion Wy	Quincy	Plumas
5R32NEC001491	UPS Quincy CAQUN	233 Danny Court	Quincy	Plumas
5R32I023858	Soper Pit	Spanish Ranch Rd	Quincy	Plumas
5R32IN601851	Feather River Materials Shop & Batch Plant	270 Crescent Street	Quincy	Plumas
5R32IN602506	American Valley Aviation	550 Orion Way	Quincy	Plumas
5R32I021495	Sloat Quarry	Sloat McRae Rd 23N08	Sloat	Plumas
5R32I023571	Bar One Ranch Aggregate Mine	St Rte 49 near Cty Rd A 24	Vinton	Plumas
5S34I001480	J W Auto Wreckers	8626 Antelope North Rd	Antelope	Sacramento
5S34I010450	Jim Dobbas Inc	7920 Antelope Rd	Antelope	Sacramento
5S34I017907	Center Unified School District	8408 Watt Ave	Antelope	Sacramento
5S34I022042	Pick N Pull Auto Dismantlers	8640 Antelope N Rd	Antelope	Sacramento
5S34NEC000361	Starr Johnson Wines	5417 Tree Side Drive	Carmichael	Sacramento
5S34I027050	Aba Daba Rents Inc	7448 Auburn Blvd	Citrus Heights	Sacramento
5S34NEC004344	Linmoore Fencing and Iron Works Inc	7512 Watson Way	Citrus Heights	Sacramento
5S34IN604523	Linmoore Fencing Iron Works	7512 Watson Way	Citrus Heights	Sacramento
5S34NEC001661	Fried Chicken People	6543 Coop Lane	Citrus Heights	Sacramento
5S34I017576	Air Blown Concrete	601 W Delano St	Elverta	Sacramento
5S34I016266	Folsom City Corp Yard	Western End Of Leidesdorff St	Folsom	Sacramento
5S34NEC000024	Sake Gekkeikan	1136 Sibley St	Folsom	Sacramento
5S34I026005	VSPOne Optical Technology Centers Sacramento	151 Blue Ravine Road	Folsom	Sacramento
5S34I026399	Agilent Technologies	91 Blue Ravine Rd	Folsom	Sacramento
5S34I000185	Intel Corp Fm4 124	1900 Prairie City Rd	Folsom	Sacramento
5S34I004590	Teichert Folsom Readymix Plant	1209 Levy Rd	Folsom	Sacramento
5S34I017520	Folsom Automall	Auto Mall Drive	Folsom	Sacramento
5S34I027221	VSPOne Optical Technology Centers Sacramento	151 Blue Ravine Road	Folsom	Sacramento
5S34IN604526	Kikkoman Foods Inc	1000 Glenn Dr	Folsom	Sacramento
5S34I007295	Sacramento County North Area Recovery Station	4450 Roseville Rd	North Highlands	Sacramento
5S34I001138	Livingstons Concrete	5416 Roseville Rd	North Highlands	Sacramento
5S34I013755	Dc Metals Recycling	6849 28th St	North Highlands	Sacramento

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34I018204	SJUSD Transportation	3050 Orange Grove Ave	North Highlands	Sacramento
5S34I018621	Security Contractor Services	5339 Jackson St	North Highlands	Sacramento
5S34I019404	US Coast Guard Air Station Sacramento	6037 Price Ave Bldg 1106	North Highlands	Sacramento
5S34I019705	Elite Industrial Coatings Inc	4423 Dudley Blvd	North Highlands	Sacramento
5S34I021305	Southwestern Wire Inc	4318 Dudley Blvd 475E	North Highlands	Sacramento
5S34I025702	Recycling Industries	4741 Watt Avenue	North Highlands	Sacramento
5S34NEC000190	Northrop Grumman Systems Corporation	5441 Luce Avenue	North Highlands	Sacramento
5S34I019428	Sacramento Rental LP	7001 Watt Ave	North Highlands	Sacramento
5S34I026415	AllSacMetals	5340 Roseville Road	North Highlands	Sacramento
5S34I028345	National Construction Rentals	6833 32nd Street	North Highlands	Sacramento
5S34NEC006157	US Coast Guard Air Station Sacramento	6037 Price Ave	North Highlands	Sacramento
5S34NEC006165	Falck Northern California	4604 Roseville Rd	North Highlands	Sacramento
5S34IN600496	GM Construction and Developers Inc	6337 32nd Street	North Highlands	Sacramento
5S34IN601159	SacScrappers	6643 32nd Street	North Highlands	Sacramento
5S34IN604341	J P Auto Parts	7002 30th Street	North Highlands	Sacramento
5S34IN604340	Stan Motor Sports	7301 32nd Street	North Highlands	Sacramento
5S34IN601449	Redmond Inc	3316 Elkhorn	North Highlands	Sacramento
5S34I019079	Greenback Equipment Rentals	9325 Greenback Ln	Orangevale	Sacramento
5S34I003368	SSI Sacramento	12000 Folsom Blvd	Rancho Cordova	Sacramento
5S34I004980	Fair Oaks Wrecking Inc	11350 S Bridge St	Rancho Cordova	Sacramento
5S34I009649	Foremost Interiors Inc	2318 Gold River Rd	Rancho Cordova	Sacramento
5S34I023304	TKO Recycling Inc	11493 Folsom Blvd	Rancho Cordova	Sacramento
5S34NEC000751	Fed Ex MHRA	11140 Sun Center Dr	Rancho Cordova	Sacramento
5S34NEC003963	Philips Volcano	2870 Kilgore Road	Rancho Cordova	Sacramento
5S34I027711	US Auto Parts Inc	4095 Happy Lane	Rancho Cordova	Sacramento
5S34I027907	US Granite	11300 Trade Center Drive Suite I	Rancho Cordova	Sacramento
5S34IN602681	Schools Insurance Authority Group Monitoring Pla	10850 Gold Center Drive Suite 3	Rancho Cordova	Sacramento
5S34IN601163	TKO Recycling	11493 Folsom Blvd	Rancho Cordova	Sacramento
5S34IN604465	US Granite	11300 Trade Center Drive Suite I	Rancho Cordova	Sacramento
5S34I023690	5 Star Auto Sales & Body Shop	10139 Folsom Blvd	Rancho Cordova	Sacramento
5S34IN602193	Home Depot Sunrise Blvd	2756 Sunrise	Rancho Cordova	Sacramento
5S34I001227	CA Dept Corrections Folsom	300 Prison Rd	Represa	Sacramento
5S34I001111	Mauser Aviation Inc	931 E St	Rio Linda	Sacramento
5S34I022392	Rio Linda Facility	831 W Elkhorn Blvd	Rio Linda	Sacramento
5S34I027568	Wilbur Ellis Company LLC Rio Linda Hub	841 W Elkhorn Blvd	Rio Linda	Sacramento
5S34I027596	A1 Recycling Co Inc	2655 Elkhorn Blvd	Rio Linda	Sacramento
5S34NEC004143	Twinrivers Rio Linda Yard	6619 6th Ave	Rio Linda	Sacramento
5S34IN601162	Performance metals Recycling	6833 8th Street	Rio Linda	Sacramento
5S34IN603701	A1 Recycling Inc.	2655 Elkhorn Blvd	Rio Linda	Sacramento
5S34IN604401	Martinez Pallets Inc	6541 26th Street	Rio Linda	Sacramento
5S34I015377	Elkhorn Hot Plant	900 W Elkhorn Blvd	Rio Linda	Sacramento
5S34I013829	A1 Metals Company	2655 Elkhorn Blvd	Rio Linda	Sacramento
5S34I023188	Reclamation District 1001	1959 Cornelius Ave	Rio Oso	Sacramento
5S34I001044	Dan Dukes Trucking Inc	1350 Vinci Ave	Sacramento	Sacramento
5S34I004043	A and M Dismantling Inc	716 Bell Ave	Sacramento	Sacramento
5S34I004438	Martin Sprocket Gear	1199 Vine St	Sacramento	Sacramento
5S34I004106	Sac City Usd Trans	3101 Redding Ave	Sacramento	Sacramento
5S34I004477	Sac City Landfill	20 28th St	Sacramento	Sacramento
5S34I005108	SMM Sacramento	130 N 12th St	Sacramento	Sacramento
5S34I005087	Twin Rivers USD Grand Ave Yard	1400 Grand Ave	Sacramento	Sacramento
5S34I005912	Matheson Postal Servies Inc	455 Bannon St	Sacramento	Sacramento
5S34I005979	FedEx SMFA	3950 Development Dr	Sacramento	Sacramento
5S34I007301	Sacramento County Department of Airports	Sacramento International Airpor	Sacramento	Sacramento
5S34I009681	Keurig Dr Pepper	2670 Land Ave	Sacramento	Sacramento
5S34I012641	Siemens	7464 French Rd	Sacramento	Sacramento
5S34I013314	Subway Truck Parts Inc	903 Del Paso Blvd	Sacramento	Sacramento
5S34I016056	Sac Cnty Corp Yard	4000 Bradshaw Rd	Sacramento	Sacramento
5S34I016140	Central Freight Lines Inc	1621 Main Ave	Sacramento	Sacramento
5S34I017825	Jensen Precast	5400 Raley Blvd	Sacramento	Sacramento
5S34I018864	Raleys Distribution Center	4061 Gateway Park Blvd	Sacramento	Sacramento
5S34I019869	CMH Manufacturing West Inc dba Clayton Sacram	9998 Old Placerville Rd	Sacramento	Sacramento
5S34I020226	Cal Exposition Racing Stables	1600 Exposition Blvd	Sacramento	Sacramento

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5S34I021405	California Mantel and Fireplace Inc	4141 N Freeway Blvd	Sacramento	Sacramento
5S34I021994	UPS Cordova CASMT	3930 Kristi Ct	Sacramento	Sacramento
5S34I022889	Ozark Trucking Inc	4916 Dudley Blvd	Sacramento	Sacramento
5S34I023256	Capital City Recycling Inc	3185 Longview Dr Unit C	Sacramento	Sacramento
5S34I023436	Sun Gro Horticulture Processing	2263 Dean St	Sacramento	Sacramento
5S34I023756	Yellow Cab Co of Sacramento	900 Richards Blvd	Sacramento	Sacramento
5S34I023768	MV Transportation Div 04	10170 Croydon Wy A	Sacramento	Sacramento
5S34I024070	SFPP LP Bradshaw Terminal	2901 Bradshaw Road	Sacramento	Sacramento
5S34I024398	Penske Logistics	4040 Vista Park Court	Sacramento	Sacramento
5S34I024897	Composite Engineering Inc	5381 Raley Blvd	Sacramento	Sacramento
5S34I025207	Blomberg Window Systems	1453 Blair Avenue	Sacramento	Sacramento
5S34NEC000163	Ebara Technologies	51 Main Ave	Sacramento	Sacramento
5S34NEC000333	Atco Rubber Products Sacramento	1701 Diesel Drive	Sacramento	Sacramento
5S34NEC000609	USPS Sacramento VMF	2000 Royal Oaks Dr	Sacramento	Sacramento
5S34NEC000944	Time Printing Solutions Provider	1614 d street	Sacramento	Sacramento
5S34NEC001153	Track Seven Brewing Company Natomas	826 Professor Ln	Sacramento	Sacramento
5S34I002873	Sacramento Regional Transit Distict Light Rail Mai	2700 Academy Way	Sacramento	Sacramento
5S34I026311	FedEx SMFRT	431 Richards Blvd	Sacramento	Sacramento
5S34I026382	Del Paso Auto Dismantlers	1101 del paso blvd	Sacramento	Sacramento
5S34NEC001837	Siemens Industry Inc	5301 Price ave	Sacramento	Sacramento
5S34I026529	Natomas Unified School District	1931 Arena Blvd	Sacramento	Sacramento
5S34I026595	Rudys Metals	750 Richards	Sacramento	Sacramento
5S34I026773	Setzer Forest Products Inc.	7400 San Joaquin Street	Sacramento	Sacramento
5S34NEC002826	Pacific Standard Print	2629 5th Street	Sacramento	Sacramento
5S34I027016	FerrParts Inc	1961 Auburn Blvd	Sacramento	Sacramento
5S34I027217	Revere Packaging	4600 BELOIT DR	Sacramento	Sacramento
5S34NEC003386	United States Cold Storage MP	3936 Dudley Blvd.	Sacramento	Sacramento
5S34NEC003472	Meticulous Manufacturing Inc	161 Commerce Circle Suite B	Sacramento	Sacramento
5S34I027329	Trulite Glass & Aluminum Solutions	180 Main Ave	Sacramento	Sacramento
5S34I027423	Reyes Coca Cola Bottling LLC	4101 Gateway Park Blvd	Sacramento	Sacramento
5S34I027491	Shamrock Foods Company	856 National Drive	Sacramento	Sacramento
5S34I027586	Amazon com Services Inc SMF1	4900 West Elkhorn Boulevard	Sacramento	Sacramento
5S34NEC004710	Best Buy Delivery Pad 2316	5350 Raley Boulevard Suite 110	Sacramento	Sacramento
5S34NEC004862	Omnimax International	1835 Diesel Drive	Sacramento	Sacramento
5S34I028036	California Tile & Granite Corp	9891 Horn Road	Sacramento	Sacramento
5S34I028147	Amazon Environmental Inc	5101 Raley Boulevard	Sacramento	Sacramento
5S34I028168	Pavement Recycling Systems Inc	2150 Bell Ave	Sacramento	Sacramento
5S34NEC005176	SCUSD Transportation Department	7050 San Joaquin Street	Sacramento	Sacramento
5S34I028217	Bell Marine	28 28th St	Sacramento	Sacramento
5S34NEC005257	UPS Supply Chain Solutions CASCE	4512 Harlin Dr	Sacramento	Sacramento
5S34NEC005286	Shred It Sacramento	1227 Striker Avenue Suite 120	Sacramento	Sacramento
5S34I028263	Pick n Pull	4075 Happy Lane	Sacramento	Sacramento
5S34I022750	Fars and Mersal Auto Dismantiling	5325 Dry Creek Rd	Sacramento	Sacramento
5S34NEC005518	AMR Sacramento	1101 Fee Dr	Sacramento	Sacramento
5S34I023074	Office of State Publishing	344 N 7th St	Sacramento	Sacramento
5S34IN600510	Legacy Auto Dismantler	600 Sunbeam Avenue	Sacramento	Sacramento
5S34IN601156	River City Waste Recyclers	721 North B Street	Sacramento	Sacramento
5S34IN604339	US Auto Parts	4095 Happy Lane	Sacramento	Sacramento
5S34IN604608	Visions Paint Recycling Inc	4481 Kilzer Ave	Sacramento	Sacramento
5S34IN604402	Northwest Pallets	4636 Patrol Road	Sacramento	Sacramento
5S34IN604609	Visions Paint Recycling Inc	4105 South Market Court	Sacramento	Sacramento
5S34NNA000082	New Helvetia Brewing Company	1730 Broadway	Sacramento	Sacramento
5S34I022421	Sacramento Area Sewer District SASD	10060 Geothe Rd	Sacramento	Sacramento
5S34I021689	North Country Corporation Yard	5026 Don Julio Blvd	Sacramento	Sacramento
5S34I002852	CA Cascade Industries	7512 14th Ave	Sacramento	Sacramento
5S34NEC000091	Sacramento 2 Sercive Center	777 Arden Way	Sacramento	Sacramento
5S34I021787	Chatfields Auto Dismantlers	1101 Del Paso Blvd	Sacramento	Sacramento
5S34I016969	Natomas Unified Sch Dist Trans	1931 Arena Blvd	Sacramento	Sacramento
5S34I024821	Rudys Metals	325 N 7th Street	Sacramento	Sacramento
5S34I025743	Odwalla Inc	826 National Drive Ste 200	Sacramento	Sacramento
5S34I021141	MM Salvage Inc dba Capitol Imports	4071 Happy Ln	Sacramento	Sacramento
5S34NEC000671	Oak Park Brewing Company	3514 Broadway	Sacramento	Sacramento

WDID	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34I003851	Freeway Auto Wrecking	1961 Auburn Blvd	Sacramento	Sacramento
5S34I026489	Awesome Industries	123 F Street	Sacramento	Sacramento
5S34I025052	BCI Coca Cola Bottling Company of LA	4101 Gateway Park Boulevard	Sacramento	Sacramento
5S34NEC000021	Shamrock Foods Company	856 National Drive	Sacramento	Sacramento
5S34NEC000447	Rubicon Brewing Company	2004 Capitol Avenue	Sacramento	Sacramento
5S34I025110	Intex Forms Inc	9293 Beatty Drive	Sacramento	Sacramento
5S34I026691	Telfer Pavement Technologies LLC	5330 Shelter Road	Sacramento	Sacramento
5S34I021556	BG Delivery System Inc	2549 Harris Ave	Sacramento	Sacramento
5S34I025795	California Cascade Building Materials Inc	7512 14th Avenue	Sacramento	Sacramento
5S34I025268	MDI Forest Products McClellan	Lot 17 McClellan Park	Sacramento	Sacramento
5S34I027906	Visions Recycling Inc	4481 Kilzer ave	Sacramento	Sacramento
5S34I004009	Cordova Truck Dismantlers	4075 Happy Ln	Sacramento	Sacramento
5S34I026243	Silverado Stages Inc	1812 Main Ave	Sacramento	Sacramento
5S34IN601436	Foods Co Rear Parking Lot	Northgate	Sacramento	Sacramento
5S34IN602190	Home Depot Madison Ave	6001 Madison	Sacramento	Sacramento
5S34IN602191	Home Depot Antelope Rd	5859 Antelope	Sacramento	Sacramento
5S34IN602818	Narinder Thandi	3930 El Centro Road	Sacramento	Sacramento
5S34IN604692	Fieldwork Brewing	1805 Capitol Ave	Sacramento	Sacramento
5S34IN604685	California Tile and Granite Corp	9891 Horn Road Suite D	Sacramento	Sacramento
5S34IN604798	Sactown Union Brewery	1210 66th Street Unit B	Sacramento	Sacramento
5R45I002073	UPS Redding Center CARED	6845 Eastside	Anderson	Shasta
5R45I005373	Anderson Landfill	18703 Cambridge	Anderson	Shasta
5R45I011906	Bettendorf Ent Inc	20943 Bettendorf Way	Anderson	Shasta
5R45I016806	Siskiyou Forest Products	6199 Hwy 273	Anderson	Shasta
5R45I020119	Folsom Ready Mix Anderson LLC	19291 Latona	Anderson	Shasta
5R45I020225	Shasta Ranch Aggregate	End of Jensen	Anderson	Shasta
5R45I019734	Clear Creek WWTP	2220 Metz	Anderson	Shasta
5R45I022199	Stillwater Wastewater Treatment Plant	6475 Airport Rd	Anderson	Shasta
5R45I003419	All Car Truck Recycling	19555 Olinda Rd	Anderson	Shasta
5R45NEC003364	UPS Redding CAADR	2065 Alexander Ave	Anderson	Shasta
5R45I018137	Sound Stud	2457 Latona	Anderson	Shasta
5R45I019416	Wilson Industrial Park	Latona Rd Parcel 050 080 052	Anderson	Shasta
5R45I022909	Redding Oil Fuel Transfer Facility	19631 N Hirsch Ct	Anderson	Shasta
5R45I023534	Shasta Renewable Resources	6309 Hwy 273	Anderson	Shasta
5R45IN602113	Dan Langlin Customs	19845 Riverside Ave #C	Anderson	Shasta
5R45IN602114	CH Autotrnds	19845 Riverside Dr #A	Anderson	Shasta
5R45I011011	Ingot Auto Dismantlers	26258 Highway 299e	Bella Vista	Shasta
5R45I021356	Sierra Pacific Industries Burney Division	36336 HWY 299E	Burney	Shasta
5R45I025042	Dicalite Minerals Corporation	36994 Summit Lake Road	Burney	Shasta
5R45NEC003366	UPS Burney CABUR	1049 Main Street	Burney	Shasta
5R45NNA000134	Hat Creek Construction and Material Inc	24339 Highway 89 N	Burney	Shasta
5R45NNA000132	Eastside Aggregate	24339 Highway 89 N	Burney	Shasta
5R45I005567	Burney Mountain Power	37800 Energy	Burney	Shasta
5R45NNA000122	Hidden Valley Aggregate & Packway Materials Cas	22244 Cassel Road	Cassel	Shasta
5R45I025659	Anderson Cottonwood Concrete Products	3119 Tradeway	Cottonwood	Shasta
5R45NEC000014	Fall River Mills Airport	HWY 299E	Fall River Mills	Shasta
5R45I019985	Washington Mine	Scorpion Creek	French Gulch	Shasta
5R45I002913	West Central Landfill	14095 Clear Creek Rd	Igo	Shasta
5R45I013432	Antlers Resort Marina	20679 Antlers	Lakehead	Shasta
5R45I026548	Shasta Marina at Packers Bay	16814 Packers Bay Rd	Lakehead	Shasta
5R45I015577	Shasta Marina Resort	18390 OBRIEN INLET RD	Lakehead	Shasta
5R45I020677	Twin Mine	8103 Millville Plains Rd	Millville	Shasta
5R45I010771	Holiday Harbor Inc	20061 Shasta Caverns	O'brien	Shasta
5R45I002236	Contech Engineered Solutions LLC	2245 Canyon Creek Rd	Redding	Shasta
5R45I004453	Shasta Cnty Schools	1103 Grange Street	Redding	Shasta
5R45I009117	Cook Concrete Prod Inc	5461 Eastside Rd	Redding	Shasta
5R45I010033	Northstate Truck Equipment	17011 Clear Creek Rd	Redding	Shasta
5R45I010782	Jones Valley Resort	22300 Jones Valley Marina	Redding	Shasta
5R45I010881	Bridge Bay Resort Marina	10300 Bridge Bay Rd	Redding	Shasta
5R45I010979	Silverthorn Resort	16250 Silvertorn	Redding	Shasta
5R45I011121	USA Waste of California Inc	8595 Commercial Way	Redding	Shasta
5R45I011829	Redding Lumber Transportation Inc	4301 Eastside Rd	Redding	Shasta

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5R45I012357	Valley Slurry Seal Emultech	7200 Pit Rd	Redding	Shasta
5R45I015067	Pick N Pull Auto Dismantlers	19919 Viking Way	Redding	Shasta
5R45I015948	SST Oil Inc	2370 WYNDHAM LN	Redding	Shasta
5R45I016539	Northstate Recycling formerly Shorts Scrap	2041 Girvan	Redding	Shasta
5R45I017961	Northstate Asphalt	15939 Clear Creek Rd	Redding	Shasta
5R45I020194	LKQ Northern California Redding	2850 Viking Way	Redding	Shasta
5R45I020192	West Valley Sand Gravel	16722 Gas Point Rd	Redding	Shasta
5R45I020605	Abernathy Transfer Station Compost Facility	2255 Abernathy	Redding	Shasta
5R45I021081	Corporation Yard	20055 Viking Wy	Redding	Shasta
5R45I002363	Redding Municipal Airport	6751 Woodrum Cir Ste 200	Redding	Shasta
5R45I002365	Redding City Benton Airport	Airpark Drive	Redding	Shasta
5R45I021842	First Transit Inc 55868	4554 Caterpillar Rd Ste B	Redding	Shasta
5R45I022860	RABA Maintenance Facility	3333 S Market St	Redding	Shasta
5R45I024352	Select Auto and Truck Recyclers	19895 Viking Way	Redding	Shasta
5R45I024882	Fawndale Rock and Asphalt	15380 Fawndale Road	Redding	Shasta
5R45I024887	Lehigh Southwest Cement Co	15390 Wonderland Boulevard	Redding	Shasta
5R45I024919	SWA at Mountain Gate Quarry	20285 Radcliff Rd	Redding	Shasta
5R45I025001	Crystal Creek Aggregate Inc	10936 Iron Mountain Road	Redding	Shasta
5R45I025446	Aggregate Products	17400 Clear Creek Rd	Redding	Shasta
5R45I025448	Hinds Pit	Parcel 208 230 023	Redding	Shasta
5R45I025465	JF Shea Construction Inc	17400 Clear Creek Road	Redding	Shasta
5R45I025661	Shea Sand Gravel	18795 Smith Rd	Redding	Shasta
5R45NEC000005	Smf Inc	4311 Caterpillar Rd	Redding	Shasta
5R45NEC000181	Southern Aluminum Finishing	4356 Caterpillar Rd	Redding	Shasta
5R45I025904	Union Pacific Railroad Redding	1600 Tehama Street	Redding	Shasta
5R45NEC000670	USPS Redding VMF	2440 Larkspur Ln	Redding	Shasta
5R45NEC002605	SECO Manufacturing	4155 Oasis Road	Redding	Shasta
5R45NEC002621	Cycle Salvage	1604 Trinity St	Redding	Shasta
5R45I027422	Reyes Coca Cola Bottling LLC	1580 Beltline Road	Redding	Shasta
5R45I027917	Fedex Freight Redding	8562 Commercial Way	Redding	Shasta
5R45I027921	Clear Creek Concrete Recycling Facility	17091 Clear Creek Road	Redding	Shasta
5R45NEC005304	Record Searchlight	1101 Twinview Boulevard	Redding	Shasta
5R45I016394	Redding Travel Center	19483 Knighton	Redding	Shasta
5R45I017018	Northern Lights Energy	2340 Wyndham Ln	Redding	Shasta
5R45I002152	Shasta College	11555 Old Oregon	Redding	Shasta
5R04I011624	Roy E Ladd Inc Bangor Quarry	1304 East St	Redding	Shasta
5R45NEC001565	Wildcard Brewing Company Inc	9565 Crossroads Drive	Redding	Shasta
5R45I012712	Clayton Ward Recycling	2500 Ellis St	Redding	Shasta
5R45I023881	Bulldog Scrap Metal Recycling	20010 B Viking Way	Redding	Shasta
5R45I006298	BCI Coca Cola Bottling Company of LA	1580 Beltline Rd	Redding	Shasta
5R45I023361	Auto Parts	20134 Accidents Ln	Redding	Shasta
5R45I013334	Bear Gulch Limestone Quarry	Hwy 299 E	Round Mountain	Shasta
5R45I016734	Knauf Insulation Inc	3100 Ashby Road	Shasta Lake	Shasta
5R45I022232	Sierra Pacific Industries Shasta Lake Sawmill	3735 El Cajon Ave	Shasta Lake	Shasta
5R45IN601197	Tenchless Pipe Company	3410 Broze Court	Shasta Lake	Shasta
5R45IN601198	Tenchless Pipe Company	3410 Bronze Court	Shasta Lake	Shasta
5S46I018735	North Fork Mine	North Fork Mine Site	Alleghany	Sierra
5S46I005328	Dickey Exploration Co	1 1 2 Miles Sw Of Alleghany	Alleghany	Sierra
5S46I021436	Telegraph Dutch Mines	Sec 9 T2ON RKE MDB and M	Downieville	Sierra
5S46I025653	Eagle Bird Mine Claim Group	APN 010 010 006 010 010 014	Downieville	Sierra
5S46I020705	Loyalton Landfill	150 Garbage Pit Rd	Loyalton	Sierra
5S46I027560	Loyalton Cogeneration Plant	100 South Railroad Avenue	Loyalton	Sierra
5S46I000246	Sierra Pac Industries	Railroad Avenue	Loyalton	Sierra
5R47I019330	North Dunsmuir Yard	5750 Sacramento Ave	Dunsmuir	Siskiyou
5R47I027736	Dunsmuir Highway BP	Route 5 near Mott Road	Shasta	Siskiyou
5S51I014718	Teichert Ready Mix	7466 Pacific Ave	Pleasant Grove	Sutter
5S51I017176	Sysco Food Services	7062 Pacific Ave	Pleasant Grove	Sutter
5S51I024591	Elite Ready Mix LLC Plant 2	3163 Sankey Road	Pleasant Grove	Sutter
5S51NEC002174	AUTOHUB DISMANTLER	3131 Sankey rd shop 28	Pleasant Grove	Sutter
5S51I028067	Vitaly Yanchuk Alexandr Leahovcenco Alexandru E	3131 SANKEY RD	Pleasant Grove	Sutter
5S51NEC005156	PRECISION AUTO	3131 SANKEY RD # 6	Pleasant Grove	Sutter
5S51NEC005586	Smart auto sales and dismantling	3131 sankey rd unit 38 and 39	Pleasant Grove	Sutter

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5S51NEC005660	pleasant grove auto	3131 sankey road unit 44	Pleasant Grove	Sutter
5S51NEC005762	Autoapart LLC	3131 Sankey Rd Shop 50	Pleasant Grove	Sutter
5S51I011150	3163 LLC	3131 Sankey Rd	Pleasant Grove	Sutter
5S51I001968	Butte Sand and Gravel	10373 S Butte Rd	Sutter	Sutter
5S51NEC000013	Jack L Spence Inc Composting	1601 Southridge Blvd	Sutter	Sutter
5S51I025994	West Butte Quarry	PO Box 749	Sutter	Sutter
5S51I000257	Unity Forest Prod	1162 Putman Ave	Yuba City	Sutter
5S51I003508	Mathews Readymix Inc	249 Lamon Wy	Yuba City	Sutter
5S51I003193	A C Auto Dismantlers	800 Garden Hwy	Yuba City	Sutter
5S51I004478	Bill Amarel Trucking Inc	2260 Oswald Rd	Yuba City	Sutter
5S51I007216	A A Concrete Supply Yuba City	1201 Market St	Yuba City	Sutter
5S51I010756	D H Transportation Inc	586 Franklin Ave	Yuba City	Sutter
5S51I018617	Antonini Enterprises LLC	1258 Obanion Rd	Yuba City	Sutter
5S51I018940	Valley Fine Foods Inc	300 Epley Dr	Yuba City	Sutter
5S51I019044	Orchard Machinery Corporation	2700 Colusa Hwy	Yuba City	Sutter
5S51I019859	Empire Steel	3094 N Township Rd	Yuba City	Sutter
5S51I021314	Yuba City Bin	401 C Burns Dr	Yuba City	Sutter
5S51I024147	Recycling Industries Yuba	140 EPLEY DRIVE	Yuba City	Sutter
5S51I024605	Sutter Energy Center	5029 South Township Road	Yuba City	Sutter
5S51I025530	Yuba City Cogeneration Partner	873 N Walton Ave	Yuba City	Sutter
5S51I026018	STERICYCLE INC	1612 Starr Drive	Yuba City	Sutter
5S51I026051	Yuba City USD	1512 Stewart Road	Yuba City	Sutter
5S51I026169	GREENLEAF Unit 2	875 N Walton Ave	Yuba City	Sutter
5S51NEC001757	FedEx MYVA	857 Gray Avenue	Yuba City	Sutter
5S51NEC002402	YUBA CITY SCRAP AND STEEL INC	1312 GARDEN HWY	Yuba City	Sutter
5S51NEC002688	Tonys California Cold Logistics	700 Jones Street	Yuba City	Sutter
5S51NEC003948	Andean Naturals	1200 Putman Ave	Yuba City	Sutter
5S51I027645	Paperboard Packaging Inc	800 North Walton Avenue	Yuba City	Sutter
5S51NEC005041	Euroland LLC	946 Von Geldern Way	Yuba City	Sutter
5S51I026170	Greenleaf Unit 1	5087 S Township Rd	Yuba City	Sutter
5S51I028292	sunsweet growers inc	901 north walton ave	Yuba City	Sutter
5S51NEC005430	RECYCLING INDUSTRIES INC	389 Wilbur Avenue	Yuba City	Sutter
5S51IN604623	Valley View Foods Inc	7547 Sawtelle Ave	Yuba City	Sutter
5S51IN604622	Sacramento Packing	833 Tudor Road	Yuba City	Sutter
5S51I014470	Calpine Greenleaf Unit One Cog	5087 S Township Rd	Yuba City	Sutter
5S51I017354	Calpine Greenleaf Inc Unit Two	875 N Walton Ave	Yuba City	Sutter
5S51I023885	Dispatch Transportation	753 N George Washington Blvd	Yuba City	Sutter
5S51I024413	Sanchez Truck Repair Inc	20 Wilbur Ave	Yuba City	Sutter
5S51I022547	Sacramento Packing	833 Tudor Rd	Yuba City	Sutter
5S51I006374	First Student Inc 20310	1305 Hassett Ave	Yuba City	Sutter
5S51I017894	YCUSD Transportation Maintenance Facility	1512 Stewart Rd	Yuba City	Sutter
5R52I009913	Corning City Corning Airport	930 N Marguerite Ave	Abbott	Tehama
5R52I021255	711 Pine Creek	517 Roney Trail	Chico	Tehama
5R52I003581	Sierra Pacific Industries Richfield	No End Of Alameda Rd	Corning	Tehama
5R52I011120	USA Waste of California Inc	3281 Highway 99 West	Corning	Tehama
5R52I016256	Corning Travel Center	3524 S HWY 99W	Corning	Tehama
5R52I019158	Corning Wastewater Treatment Plant	25010 Gardiner Ferry Rd	Corning	Tehama
5R52I019512	All Star Auto Recycling	22521 Capay Rd	Corning	Tehama
5R52I020858	Bell Carter Plant 1	1012 Second	Corning	Tehama
5R52I021798	Thomes Creek Rock	6069 Hwy 99 W	Corning	Tehama
5R52I022066	Petro Shopping Center	2151 South Ave	Corning	Tehama
5R52I024259	CORNING OLIVE OIL	721 Fig Lane	Corning	Tehama
5R52I026830	Richfield Metal and Recycling Inc	5550 Grange Road	Corning	Tehama
5R52NNA000269	Sierra Pacific Industries Richfield Division	6260 Alameda Rd	Corning	Tehama
5R52I011979	Bell Carter Plant 2	HWY 99W	Corning	Tehama
5R52I025060	Richfield Recycling Inc	23052 Sonoma Ave	Corning	Tehama
5R52IN601726	PLT Trans DG Pit	76844 Parkside Terrace	Corning	Tehama
5R52IN602366	Corning Olive Oil Company	721 Fig Lane	Corning	Tehama
5R52IN602720	Napa Olive City Auto Parts	2026 Solano Street	Corning	Tehama
5R52I023113	Cottonwood Creek Sand and Gravel	19840 Draper Rd	Cottonwood	Tehama
5R52I001897	Tehama Co Rd Dept Gerber Shop	9380 San Benito	Gerber	Tehama
5R52I027158	B&R Auto Wrecking	7980 State Highway 99W	Gerber	Tehama

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5R52I019749	Truck World Auto & Truck Dismantlers	7980 Hwy 99W	Gerber	Tehama
5R52I011594	Paskenta Sawmill Landfill	Paskenta	Paskenta	Tehama
5R52I000290	Tehama County/City of Red Bluff Sanitary Landfill	19995 Plymire Rd	Red Bluff	Tehama
5R52I000539	Red Bluff City Municipal Airport	1800 Airport Blvd	Red Bluff	Tehama
5R52I005490	Louisiana Pacific Corp I Joist Plant	11500 Reading	Red Bluff	Tehama
5R52I012189	Sierra Pacific Industries Red Bluff Windows West c	11605 Reading Rd	Red Bluff	Tehama
5R52I016917	John Wheeler Logging Inc	13570 Hwy 365	Red Bluff	Tehama
5R52I017116	Sierra Pacific Industries Red Bluff Windows	11400 Reading Road	Red Bluff	Tehama
5R52I017763	Paratransit Services	1509 Schwab St	Red Bluff	Tehama
5R52I018114	Lassen Forest Prod	22829 Casale Rd	Red Bluff	Tehama
5R52I019120	Pactiv LLC	1000 Diamond Ave	Red Bluff	Tehama
5R52I020892	Greenwaste of Tehama	1805 Airport Blvd	Red Bluff	Tehama
5R52I019763	Wal Mart Distribution Ctr 26	10815 HWY 99W	Red Bluff	Tehama
5R52I021754	G R Auto Parts LLC	11095 Hwy 99 W	Red Bluff	Tehama
5R52I021812	Dye Creek Quarry	99999 Hwy 36 E of Tuscan Sprin	Red Bluff	Tehama
5R52I022854	Red Bluff Corp Yard	1055 Kimball Rd	Red Bluff	Tehama
5R52I022901	Waste Water Reclamation Plant	700 Messer Dr	Red Bluff	Tehama
5R52I024433	Evoqua Water Technologies LLC	11711 Reading Road	Red Bluff	Tehama
5R52NEC000344	Red Bluff Class III Landfill	WILLIAMS RD	Red Bluff	Tehama
5R52I022054	Red Bluff Auto Dismantling	20750 Minch Road	Red Bluff	Tehama
5R52I026458	Hess Brothers Auto Dismantling	20722 Walnut St	Red Bluff	Tehama
5R52I020136	Tehama Asphalt Processing Inc	22645 Fisher Rd	Red Bluff	Tehama
5R52I027967	PJ Helicopters	903 Langley Way	Red Bluff	Tehama
5R52I028390	Reynolds Consumer Products Red Bluff	1000 Diamond Ave	Red Bluff	Tehama
5R52NNA000291	Sierra Pacific Industries	11400 Reading Rd	Red Bluff	Tehama
5R52NNA000388	Sierra Pacific Industries Red Bluff Windows East of	11600 Reading Road	Red Bluff	Tehama
5R52I020377	Steve Hill Towing	20795 Dalby Ln	Red Bluff	Tehama
5R52IN602719	Dagorret Recycling	6392 Napa Road	Richfield	Tehama
5R52I020337	Thomas Creek Rock TCR Doyle Site	Hall Rd Thomes Creek	Tehama	Tehama
5R52I021264	Deer Creek	6300 Acorn Hollow Rd	Vina	Tehama
5R52I025920	Carmichael Vina Quarry	Rock Quarry Road	Vina	Tehama
5R52I026538	New Clairvaux Vineyard	26240 Seventh Street	Vina	Tehama
5R52IN602969	New Clairvaux Vineyard	26240 7th Street	Vina	Tehama
5S57I023569	Hess Brothers Auto Dismantling	5550 Grange Rd	Corning	Yolo
5S57I027187	Exclusive Auto Dismantling Group	3400 County Rd 99W	Dunnigan	Yolo
5S57NEC002506	FedEx Ground ZROV	8501 Foothills Blvd	Roseville	Yolo
5S57I023540	Northern Recycling Composting Zamora	11220 County Road 94	Zamora	Yolo
5S57I026479	Crew Wine Company LLC	12300 County Road 92B	Zamora	Yolo
5S58I009991	Beale Air Force Base	9 Ces Cev 6451 B Street	Beale Afb	Yuba
5S58I025918	Sperback Quarry	10163 Spring Valley Road	Browns Valley	Yuba
5S58NEC000384	emerald cove marina	12571 marysville road	Dobbins	Yuba
5S58NEC001070	Lucero Vineyards and Winery	PO Box 244	Dobbins	Yuba
5S58I001223	Recology Yuba Sutter	3001 N Levee Rd	Marysville	Yuba
5S58I002069	UPS Yuba City CAYUB	1470 Furneaux Rd	Marysville	Yuba
5S58I001682	Yuba Cnty Airport	1364 Sky Harbor Dr	Marysville	Yuba
5S58I002442	United Truck Dismantlers	2488 Mcgowan Pkwy	Marysville	Yuba
5S58I018473	Cemex	6124 Avondale Ave	Marysville	Yuba
5S58I021001	Dantoni Pit	7229 Dantoni Rd	Marysville	Yuba
5S58I021576	Silica Resources Inc	4553 Hammonton Rd	Marysville	Yuba
5S58I021883	Western Aggregates LLC	4711 Hammonton Rd	Marysville	Yuba
5S58I025567	Hallwood Plant	8305 Hallwood Blvd	Marysville	Yuba
5S58NEC000015	Yuba Sutter Transit Auth	2100 B St	Marysville	Yuba
5S58I026153	Green Solutions & More Marysville	3712 Feather River Blvd	Marysville	Yuba
5S58I014033	Livingstons Concrete	2572 Rosser Rd	Marysville	Yuba
5S58I021701	Cal Sierra Development Inc	4738 Hammonton Rd	Marysville	Yuba
5S58I026533	Eleanor Plant & Candice Smith	7229 Dantoni Road	Marysville	Yuba
5S58I027787	CTU Precast	4811 Hammonton Smartville Ro	Marysville	Yuba
5S58IN601621	Dry Mix Products	4586 Hammonton Road	Marysville	Yuba
5S58IN602876	CTU Precast	4811 Hammonton Smartville Rd	Marysville	Yuba
5S58I009621	Water Works Manufacturing LLC	3387 Plumas Arboga Rd	Marysville	Yuba
5S58I025827	CTU Precast	4811 Hammonton Smartville Ro	Marysville	Yuba
5S58I026178	Sun Gro Horticulture	2700 Hale Road	Marysville	Yuba

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5S58I017718	Oldcastle Enclosure Solutions	5236 Arboga Rd	Marysville	Yuba
5S58I006972	Nordic Industries Inc	1437 Furneaux Rd	Olivehurst	Yuba
5S58I010755	Naumes Inc Juice Concentrate P	3792 Feather River Blvd	Olivehurst	Yuba
5S58I023983	CTU Precast	1260 Furneaux Rd	Olivehurst	Yuba
5S58I025991	Hawthorne Hydroponics DBA Vermicrop Organics	5050 Arboga Dr	Olivehurst	Yuba
5S58I026219	Packaging Specialists Inc	3663 Feather River Blvd	Olivehurst	Yuba
5S58I026270	American Wood Fibers	4560 skyway	Olivehurst	Yuba
5S58I026517	US Pipe Fabrication	3387 Plumas Arboga Road	Olivehurst	Yuba
5S58I027124	Andersons Pull N Save	4199 Feather River Blvd	Olivehurst	Yuba
5S58I027444	Reyes Coca Cola Bottling LLC	1430 Melody Road	Olivehurst	Yuba
5S58I023614	Century Nationwide Inc	1401 Melody Rd	Olivehurst	Yuba
5S58IN603065	Ace Composites Inc	1394 Sky Harbor Drive	Olivehurst	Yuba
5S58I023826	Shoei Foods USA Inc	1900 Feather River Blvd	Olivehurst	Yuba
5S58I025103	Andersons Pull N Save	4199 Feather River Blvd	Olivehurst	Yuba
5S58I006459	BCI Coca Cola Bottling Company of LA	1430 Melody Rd	Olivehurst	Yuba
5S58I026546	Agra Marketing Group	60 Declaration Drive Ste A	Olivehurst	Yuba
5S58NEC000881	Gideon Beinstock and Saron Rice dba Clos Saron	PO BOX 1004	Oregon House	Yuba
5S58NEC000781	Renaissance Vineyard and Winery Incorporated	12585 Rices Crossing Road	Oregon House	Yuba
5S58I025919	Parks Bar Quarry	7561 CA 20	Smartville	Yuba
5S58I010551	Recology Ostrom Rd	5900 Ostrom Rd	Wheatland	Yuba
5S58I017853	Wheatland Sch Dist	711 Olive St	Wheatland	Yuba
5S58I016156	Tollcrest Dairy	3355 Virginia	Wheatland	Yuba

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R04CN602905	Construction	Zink Road Complaint	Zink Road	Berry Creek	Butte
5R04C370248	Construction	Nathan Clayton	91 Eder Canyon Road	Berry Creek	Butte
5R04C369544	Construction	Benitez Residence	Bell Ranch Road	Berry Creek	Butte
5R04C384253	Construction	SunWest Milling Company	507 Bannock	Biggs	Butte
5R04C386963	Construction	Phase 2 Wastewater Treatment Plant Impr	2865 W Biggs Gridley Rd	Biggs	Butte
5R04C387751	Construction	Gray Lodge Wildlife Area Water Supply Pro	Traynor Lateral and W Liberty Road	Biggs	Butte
5R04C371204	Construction	Gray Lodge WAWSP Phase 1C	Farris Road and Colusa Highway	Biggs	Butte
5R04C371205	Construction	Gray Lodge WAWSP Phase 1A	Belding Lateral Canal	Biggs	Butte
5R04C367879	Construction	North Biggs Estates Subdivision	N end of 2nd Street	Biggs	Butte
5R04W004122	Construction	Oro Quincy Highway Slide Repair	7 County Center Drive	Brush Creek	Butte
5R04C358710	Construction	Skyway Forest Hwy 171	Skyway from Humbug	Butte Meadows	Butte
5R04C329054	Construction	Brown Land Disturbance	4675 Kilkare Ln	Chico	Butte
5R04C367259	Construction	Valley Oak Subdivision	Bruce and Humboldt Road	Chico	Butte
5R04C370049	Construction	Foothill Park East Unit No 6	Champlain Way	Chico	Butte
5R04C370559	Construction	Mountain Vista Phase 1	Eaton Road	Chico	Butte
5R04C370898	Construction	Mariposa Vista Subdivision Unit 2 Phase 6	Wanderer Lane	Chico	Butte
5R04C371145	Construction	Sierra Moon Subdivision	Caribbean Way	Chico	Butte
5R04C376862	Construction	Creekside Landing Units 3_4	Sloat Run	Chico	Butte
5R04C379339	Construction	Village Green Subdivision	Idyllwild Circle	Chico	Butte
5R04C382057	Construction	Lot 46 DeGarmo Terrace	Esplanade	Chico	Butte
5R04C382793	Construction	Salvation Army	567 E 16th Street	Chico	Butte
5R04C383035	Construction	3205 Summit Ridge Terrace	3205 Summit Ridge Terrace	Chico	Butte
5R04C383121	Construction	Domicile II Apartments	2910 Joshua Tree Road	Chico	Butte
5R04C383154	Construction	Mariposa Manor Subdivision	Mariposa Avenue	Chico	Butte
5R04C383224	Construction	Building Permit 3560 Shallow Springs Terra	3560 Shallow Springs Terrace	Chico	Butte
5R04C383249	Construction	Lava Ridge Apartments	Native Oak Drive	Chico	Butte
5R04C383356	Construction	Butte College Welding Building	3536 Butte Campus Drive	Chico	Butte
5R04C383726	Construction	Dinesh Residence	3 summersky commons	Chico	Butte
5R04C383740	Construction	Williams Residence	7 Pinnacle Heights Court	Chico	Butte
5R04C383999	Construction	Siskiyou Science Replacement Building	400 West 1st Street	Chico	Butte
5R04C384058	Construction	Neal Dow Elementary	1420 Neal Dow	Chico	Butte
5R04C384077	Construction	Mandville Park Subdivision	13879 Garner Lane	Chico	Butte
5R04C384196	Construction	Marigold Elementary School	2446 Marigold Avenue	Chico	Butte
5R04C384347	Construction	Extra Storage Chico	2260 Park Avenue	Chico	Butte
5R04C385102	Construction	3228 Summit Ridge Terrace	3228 Summitt Ridge Terrace	Chico	Butte
5R04C385173	Construction	4 Budlee Court	4 Budlee Court	Chico	Butte
5R04C385237	Construction	Carlene Place Subdivision	2890 Carlene Place	Chico	Butte
5R04C385873	Construction	Skyline Luxury Apartments	2580 California Park Drive	Chico	Butte
5R04C377607	Construction	Meriam Park Phase B-1	EAST 20TH and Bruce	Chico	Butte
5R04C385995	Construction	Eaton Ranch II	E Eaton Road	Chico	Butte
5R04C385997	Construction	Eaton Ranch I	E Eaton Road	Chico	Butte
5R04C386168	Construction	7 Matada Court	7 Matada Court	Chico	Butte
5R04C386207	Construction	The Enclave on East	1266 East Avenue	Chico	Butte
5R04C386247	Construction	Meriam	Bruce and 20th	Chico	Butte
5R04C386290	Construction	Benson IMP	5 Matada Court	Chico	Butte
5R04C386286	Construction	1111 W 8th Street Apartments	1111 W 8th Street	Chico	Butte
5R04C386404	Construction	Tuscan Ridge Workers Basecamp	3100 Skyway	Chico	Butte
5R04C386774	Construction	Morseman Estates Subdivision	Morseman Avenue	Chico	Butte
5R04C386795	Construction	Belvedere Heights Subdivision Phase 2 and	Longwood Drive & Dawncrest Drive	Chico	Butte
5R04C386861	Construction	West 11th Avenue Subdivision	521 W 11th Avenue	Chico	Butte
5R04C386872	Construction	Innsbrook Subdivision Phase 2	Degarmo Drive	Chico	Butte
5R04C386955	Construction	Carter House	3164 Shallow Springs Terrace	Chico	Butte
5R04C386986	Construction	Montecito	Esplanade and Shirey Court	Chico	Butte
5R04C387073	Construction	Emma Wilson Elementary School	1530 West 8th Avenue	Chico	Butte
5R04W004184	Construction	SR99 Bikeway Phase 4	411 Main Street	Chico	Butte
5R04C387757	Construction	Drake Estates	Floral	Chico	Butte
5R04C387770	Construction	The Humboldt	1991 Humboldt Road	Chico	Butte
5R04C387828	Construction	Trinity Park Subdivision	2605 Mariposa Avenue	Chico	Butte
5R04C387829	Construction	260 Lockheed Avenue	260 Lockheed Avenue	Chico	Butte
5R04C388633	Construction	Hampton Inn	Springfield Way	Chico	Butte
5R04W004401	Construction	Comanche Creek Greenway Improvement	Meyers and Ivy Street	Chico	Butte
5R04C388958	Construction	Simplicity Village	Notre Dame Blvd	Chico	Butte
5R04W004419	Construction	Esplanade Memorial Ave to Eaton Road	Esplanade	Chico	Butte
5R04C389391	Construction	2861 Beaumont Avenue	2861 Beaumont Avenue	Chico	Butte
5R04C389559	Construction	Crusader Court Subdivision	2255 Ceanothus Avenue	Chico	Butte
5R04C389560	Construction	Creekside Unit 4	Chamberlain Run and Eel River Lane	Chico	Butte
5R04W002573	Construction	Pleasant Valley High School	1475 East Ave	Chico	Butte
5R04W002689	Construction	Chico High School	901 Esplanade	Chico	Butte
5R04W002620	Construction	Surf Thru Chico	2470 Forest Avenue	Chico	Butte
5R04W003131	Construction	Foxffield Circle	3311 Nord Ave	Chico	Butte
5R04W003332	Construction	SR 32 and Bruce	Sierra Sunrise Terrace	Chico	Butte
5R04W003363	Construction	West of 1200 Eaton Rd	Eaton Rd	Chico	Butte
5R04W003705	Construction	East 10th Street Storm Drain Project	East 10th Street	Chico	Butte
5R04W004243	Construction	College Park	Warner Street	Chico	Butte
5R04W004242	Construction	Winslow Residence	13912 Persimmon Lane	Chico	Butte
5R04W004208	Construction	Smith Residence	13930 Persimmon Lane	Chico	Butte
5R04C368889	Construction	Eaton Road Mini Storage	Eaton Road	Chico	Butte
5R04C341750	Construction	Enloe Medical Center	1531 Esplanade	Chico	Butte
5R04C369344	Construction	Butte Premier Physical Therapy	121 Raley Blvd	Chico	Butte
5R04C367153	Caltrans Construction	3E6204 BUT 99 BUTTE CREEK BRIDGE	99 AT BUTTE CREEK JSO ENTLER	Chico	Butte
5R04C365896	Construction	North Butte County Court House	East 20th Street	Chico	Butte
5R04C366281	Construction	Sycamore Glen Subdivision Phase 4	Sweetwater Falls	Chico	Butte

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R04C371208	Construction	Enloe Campus Storm Drain and Street Impr	Enloe Hospital Area	Chico	Butte
5R04C366073	Construction	Innsbrook Subdivision	DeGarmo Drive	Chico	Butte
5R04C370999	Construction	Chrysler Residence	1405 Rim Rock Drive	Chico	Butte
5R04C364851	Construction	Lake Vista Subdivision Phase 3	101 Delaney Drive	Chico	Butte
5R04C370879	Construction	Farmers International	1260 Muir Avenue	Chico	Butte
5R04C369498	Construction	Eaton Village Apartments Phase 2	121 Penzance Avenue	Chico	Butte
5R04C372073	Construction	Vista Terrace	Not Applicable	Chico	Butte
5R04C362530	Construction	State Route 32 Widening Project	SR32 from Fir St to El Monte Ave	Chico	Butte
5R04C371530	Construction	Belvedere Storm Drain Bypass	East 20th Street & Dawncrest Drive	Chico	Butte
5R04C369918	Construction	McMurtry	3209 Shallow Springs Terrace	Chico	Butte
5R04C370654	Construction	Platanitis House	3459 Shallow Springs Terrace	Chico	Butte
5R04C367910	Construction	Lots 39 40 42 and 43 of Rocky Bluff Subdivi	Lava Rock Drive	Chico	Butte
5R04C370762	Construction	Meriam Park Phase 3a	20th street	Chico	Butte
5R04C370426	Construction	Cal Water Station 79 phase 2	2151 Springfield Drive	Chico	Butte
5R04C372952	Construction	Marsh Jr High Multipurpose Building	2253 Humboldt Road	Chico	Butte
5R04C375938	Construction	Centerville Driveway Project	Centerville Road	Chico	Butte
5R04C375754	Construction	Comanche Creek	11301 MIDWAY	Chico	Butte
5R04C371938	Construction	Carriage Park Apartments	Bruce Road	Chico	Butte
5R04C371459	Construction	North Valley Plaza Mall	801 East Avenu	Chico	Butte
5R04C365682	Construction	Sweeney Residence Project	3212 Summit Ridge Terrace	Chico	Butte
5R04C341832	Construction	Shastan Homes at Glenwood Ave	1134 1150 Glenwood Ave	Chico	Butte
5R04C375673	Construction	ULTA Beauty	2186 to 2238 Dr Martin Luther King Jr Pkwy	Chico	Butte
5R04C373826	Construction	Chico Junior High School	280 Memorial Way	Chico	Butte
5R04C376272	Construction	Sanford Manor	Guynn Avenue	Chico	Butte
5R04C373179	Construction	2143 Dacy	6556 Cohasset Road	Chico	Butte
5R04C372802	Construction	Rolling Hills Subdivision Lot 99	801 Whispering Winds Lane	Chico	Butte
5R04C368846	Construction	CSU Taylor II	400 WEst 1st Street	Chico	Butte
5R04C376839	Construction	APN 018-010-135	216 Centennial Avenue	Chico	Butte
5R04C375355	Construction	W Sac Apartments	1217 W Sacramento Avenue	Chico	Butte
5R04C372214	Construction	Estates At Hooker Oak Subdivision	1982 Hooker Oak Avenue	Chico	Butte
5R04C366998	Construction	Bashir Parcel	1 Stoney Meadow Terrace	Chico	Butte
5R04C375995	Caltrans Construction	Flag Canyon Bridge	2707 Norte Dame Blvd	Chico	Butte
5R04C377228	Caltrans Construction	ADA Compliance Improvements	2707 Notre Dame Boulevard	Chico	Butte
5R04C373961	Construction	Eaton Storage Extention	1225 Eaton Road	Chico	Butte
5R04C371111	Construction	Humboldt Trail Estates	1962 Humboldt Road	Chico	Butte
5R04C372996	Construction	Westside Neighborhood	Roycroft Lane	Chico	Butte
5R04C373553	Construction	Hampton Court	2875 Marigold Avenue	Chico	Butte
5R04C373450	Construction	2076 Maas	8980 Cohasset Road	Chico	Butte
5R04C365722	Construction	Mission Vista Hills Subdivision	1 Morning Rose Way	Chico	Butte
5R04C373802	Construction	Lassen Villa Apartments	1080 E Lassen Ave	Chico	Butte
5R04C376914	Construction	CSUC Chiller Plant Expansion	400 W. First Street	Chico	Butte
5R04C378120	Construction	Canyon View	Bruce Road	Chico	Butte
5R04C368840	Construction	The Inn at the Terraces	2950 Sierra Sunrise Terrace	Chico	Butte
5R04C372875	Construction	CHP Chico Area Office	425 Southgate Ct	Chico	Butte
5R04C377408	Construction	Cal Water Station 82 Oak Valley	Bruce and SR 32	Chico	Butte
5R04C377136	Construction	North Cedars Student Apartments	1221 North Cedar Street	Chico	Butte
5R04C376854	Construction	State Route 32 Widening Project Phase 2	State Route 32	Chico	Butte
5R04C375175	Caltrans Construction	Highway 99 Rock Creek Bridge Widening	2707 Notre Dame Blvd	Chico	Butte
5R04C377029	Construction	The Estates At Lindo Channel	1511 Manzanita Avenue	Chico	Butte
5R04C377871	Construction	Surf Thru Car Wash	2470 Forest Avenue	Chico	Butte
5R04C378078	Construction	Lassen Subdivision	216 W. Lassen Avenue	Chico	Butte
5R04C379940	Construction	Faithful Estates	Cactus Ave	Chico	Butte
5R04C381350	Construction	Chico High School Stadium	Warner Street	Chico	Butte
5R04C380566	Construction	River Road Trunk Replacement	4827 River Road	Chico	Butte
5R04C379437	Construction	The Arcadian Courtyard Apartments	249 W 8th Avenue	Chico	Butte
5R04C381710	Construction	Domicile Subdivision	Floral Avenue	Chico	Butte
5R04C381523	Construction	4 & 5 Budlee Court	4 & 5 Budlee Court	Chico	Butte
5R04C380793	Construction	Westside Place Duplexes	1318 Roycroft Lane	Chico	Butte
5R04C376529	Construction	Perry House	3 Pinnacle Heights Court	Chico	Butte
5R04C379389	Caltrans Construction	Butte 191 New Alignment	2707 Notre Dame Blvd	Chico	Butte
5R04C379810	Construction	Nord Avenue Apartments	322 328 332 Nord Avenue	Chico	Butte
5R04C381445	Construction	3265 Siena Ridge Loop	3265 Siena Ridge Loop	Chico	Butte
5R04C378144	Construction	Nord Avenue Student Housing	1118 Nord Avenue	Chico	Butte
5R04C380515	Construction	Harmony Park Subdivision	2655 Cactus Ave.	Chico	Butte
5R04C377977	Construction	Airehart Parcel Map	Bell Road & Jones Avenue	Chico	Butte
5R04C369779	Construction	Sycamore Glen Subdivision Phase 5	Mariposa Avenue	Chico	Butte
5R04C368047	Construction	Wildwood Estates Phase 1 & 1A	Eaton Road	Chico	Butte
5R04C379345	Construction	Draper - Stonehaven	2 Stonehaven Ct	Chico	Butte
5R04C384450	Construction	5th Avenue Parking Lot	West 5th Avenue	Chico	Butte
5R04C372878	Construction	Oak Valley Hwy 32 improvements	Bruce / Yosemite	Chico	Butte
5R04C363811	Construction	Belvedere Heights Subdivision	Bancroft Drive	Chico	Butte
5R04C383000	Construction	Pleasant Valley High School Stadium Renov	1475 East Avenue	Chico	Butte
5R04C383046	Construction	Chico Nissan	575 Manzanita Ave	Chico	Butte
5R04C382642	Construction	Bruce RD and SR 32 Grading	Sierra Sunrise Terrace	Chico	Butte
5R04C382060	Construction	Hopeful Heights	Redding Drive	Chico	Butte
5R04C372739	Construction	Chic Municipal Airport	150 Airpark Blvd	Chico	Butte
5R04C377174	Construction	Fiore Di Monte Apartments	Nord Highway	Chico	Butte
5R04C370218	Construction	Butte Regional Transit Operations Center	326 Huss Drive	Chico	Butte
5R04C382888	Construction	Indigo Lane Commercial Development	Indigo Lane	Chico	Butte
5R04C382527	Construction	Holiday Inn Express	2074 East 20th Street	Chico	Butte
5R04C382457	Construction	Maday House	3155 Summit Ridge Terrace	Chico	Butte
5R04C385978	Construction	Woodbrook Subdivision Phase 2	Whitewood Way	Chico	Butte

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R04C382003	Construction	Chico VA Clinic	1601 Concord Ave	Chico	Butte
5R04C386476	Construction	Humboldt Oaks Apartments	2160 Humboldt Road	Chico	Butte
5R04C380964	Construction	Crossroads Subdivision	Cactus Avenue	Chico	Butte
5R04C383142	Construction	Lots 2 thru 6 Lassen Subdivision	210 W Lassen Avenue	Chico	Butte
5R04C382657	Construction	Burnap Subdivision	3000 Burnap Avenue	Chico	Butte
5R04C382590	Construction	EATON ROAD MINI STORAGE EXPANSION F	Eaton Road	Chico	Butte
5R04C381104	Construction	3556 ShallowSprings Terrace	3556 Shallow SpringsTerrace	Chico	Butte
5R04C377369	Construction	Kangerga Residence	3564 Shallow Springs Terrace	Chico	Butte
5R04C384355	Construction	Ruthie Subdivision	1564 East Avenue	Chico	Butte
5R04C382887	Construction	Loma Vista School	2404 Marigold Avenue	Chico	Butte
5R04C380976	Construction	Shasta Elementary School	169 Leora Ct	Chico	Butte
5R04C376973	Construction	Scarff Residence	11 Pinnacle Heights Court	Chico	Butte
5R04C385910	Construction	Achieve Charter School Temp Campus	1494 East Ave	Chico	Butte
5R04C374842	Construction	Abouesh Residence	3386 Canyon Oaks Terrace	Chico	Butte
5R04C372966	Construction	Schill Subdivision	Nord Hwy	Chico	Butte
5R04C384930	Construction	Westside Flex Houses	1302 Roycroft Lane	Chico	Butte
5R04C384035	Construction	Surf Thru Chico 2	2573 Esplanade	Chico	Butte
5R04C363473	Construction	Creekside Landing Unit 2	Chamberlian Run	Chico	Butte
5R04C387169	Construction	Southeast Trunk Sewer Project 17 A	Between Midway and Estes Road	Chico	Butte
5R04C380796	Construction	Humboldt Oak Apartments	2160	Chico	Butte
5R04C381646	Construction	5th Sun Expansion	495 Ryan Ave	Chico	Butte
5R04CN601845	Construction	yosemite Drive & Hwy 32	1340 Spruce	Chico	Butte
5R04C329983	Construction	Richardson Springs Rd Proj	Richardson Springs Rd	Cohasset	Butte
5R04C371959	Construction	Old Durham Wood Yard	974 Oroville Chico Highway	Durham	Butte
5R04C372917	Construction	Fed Ex Ground	Oro Chico Highway	Durham	Butte
5R04W002506	Construction	Bianchi Farms	936 Nelson Road	Durham	Butte
5R04W003228	Construction	Durham Dayton Highway Channelization	n/a	Durham	Butte
5R04W003721	Construction	New Holland Improvements	9156 Holland Avenue	Durham	Butte
5R04C373671	Construction	Walnut Grove Estates	Goodspeed Street	Durham	Butte
5R04C378344	Construction	Walnut Grove Estates	Goodspeed Street	Durham	Butte
5R04C389541	Construction	Two Rivers Park Phase1	24811 Main Street	Fall River Mills	Butte
5R04C370234	Construction	Lakeview Terrace	Lakeview Terrace	Feather Falls	Butte
5R04C372349	Construction	LOST CREEK DAM CREST MODIFICATIONS	At Lost Creek Reservoir outside the town of Oroville	Forbestown	Butte
5R04C365802	Construction	Eagle Meadows	Colusa Hwy at Jay Dr	Gridley	Butte
5R04C384584	Construction	ARCO AMPM 1646 State Highway 99	1646 State Highway 99	Gridley	Butte
5R04C386928	Construction	Group Housing Development Gridley Site	Independence Place and Elaine Court	Gridley	Butte
5R04W002532	Construction	Gridley WWTP	1150 East Gridley Road	Gridley	Butte
5R04W003605	Construction	East Gridley Rd Larkin Rd Signalization	East Gridley Road	Gridley	Butte
5R04C361216	Construction	Wild Goose Phase 3 Gas Storage Expansior	2780 West Liberty Road	Gridley	Butte
5R04C380499	Construction	Gridley.41984	1513 HWY 99	Gridley	Butte
5R04C370644	Construction	Magalia CA Dollar General	300 ft east of Lakeridge Circle and Skyway Road	Magalia	Butte
5R04C382072	Construction	Graphic Packaging New Warehouse	525 Airport Parkway	O'brien	Butte
5R04C371508	Construction	Oro Lake Congregation of Jehovahs Witnes	1240 10th Street	Oroville	Butte
5R04C375020	Construction	Commercial Development	480 E Oro Dam Blvd	Oroville	Butte
5R04C375802	Construction	Sierra Silica Resources	650 Georgia Pacific Way	Oroville	Butte
5R04C377354	Construction	Table Mountain Roundabout	200 Table Mountain Boulevard	Oroville	Butte
5R04C377679	Construction	Feather River Bluffs	Bluffs Drive	Oroville	Butte
5R04C379806	Construction	Spillways Oroville Emergency Recovery	Oroville Dam Road	Oroville	Butte
5R04C380325	Construction	Table Mountain Substation 500 kV FSC4 &	945 Cottonwood Road	Oroville	Butte
5R04C382402	Construction	Feather River Crossings	355 Oro Dam Blvd	Oroville	Butte
5R04C382601	Construction	13 point 8 kV Transmission and Fiber Optic	Below Oroville Dam	Oroville	Butte
5R04C382828	Construction	Butte Fire Station Unit Headquarters Repla	176 Nelson Ave	Oroville	Butte
5R04C383407	Construction	Kooner Gas Station	Monte Vista and Lincoln	Oroville	Butte
5R04C384659	Construction	Oroville Dam Security Hardening	460 Glen Drive	Oroville	Butte
5R04C385878	Construction	Foothill Estates	Pierpont Drive	Oroville	Butte
5R04C386160	Construction	Sierra Heights Senior Living Community	013 290 048	Oroville	Butte
5R04C386281	Construction	Butte College Kinesiology and Athletic Perf	3536 Butte Campus Drive	Oroville	Butte
5R04C386819	Construction	Oroville Hospital New Tower Addition	2767 Olive Highway	Oroville	Butte
5R04C387454	Caltrans Construction	3H71U4 Hwy 70 Widening	Rte 70 from Palermo Rd to Ophor Rd	Oroville	Butte
5R04C387781	Caltrans Construction	4H8304 Camp Fire Emergency Project	Various	Oroville	Butte
5R04C388093	Construction	Oroville Wildlife Area Interior Channel Brid	1 Pacific Heights Rd	Oroville	Butte
5R04C388319	Construction	2019 Wildfire Risk Mitigation Program Cen	3050 South 5th Avenue	Oroville	Butte
5R04C384364	Construction	Oroville Wildlife Area Flood Stage Reductic	945 Oro Dam Blvd W	Oroville	Butte
5R04C389075	Construction	Loafer Point Boat Ramp Facility Stage 1 Prc	Loafer Creek Road	Oroville	Butte
5R04W002075	Construction	Guidici Ranch	257 Guidici Lane	Oroville	Butte
5R04W002254	Construction	Oakdale Heights Safe Routes to School	Las Plumas Avenue	Oroville	Butte
5R04W003334	Construction	Lime Saddle Parking Lot Expansion	Lime Saddle Road	Oroville	Butte
5R04W003379	Construction	Bidwell Saddle Dam Trailhead Improvemer	Kelly Ridge Road	Oroville	Butte
5R04W003719	Construction	Oakvale Avenue Rehabilitation	Oakvale Ave	Oroville	Butte
5R04W003734	Construction	Butte College Athletics Parking Lot	Butte Campus Drive	Oroville	Butte
5R04W003869	Construction	Linkside Place	980 Cyndi Circle	Oroville	Butte
5R04W004267	Construction	Ishi HIlls MIddle School 2019	1 Ishi Hills Way	Oroville	Butte
5R04CN602980	Construction	Bobby Green	3140 Foothill Blvd	Oroville	Butte
5R04C370771	Construction	Dollar General Oroville CA Olive HWY	5220 Olive HWY	Oroville	Butte
5R04C368702	Construction	Oroville Ford	1350 Oro Dam Boulevard	Oroville	Butte
5R04C370187	Construction	Butte County Hall of Records	155 Nelson Ave	Oroville	Butte
5R04C370546	Construction	East Trunk Line Sewer Replacement Projec	Oroville	Oroville	Butte
5R04C373014	Construction	Metal Works at Feather River Site	Feather River Blvd	Oroville	Butte
5R04C370787	Construction	All Metals Facility Upgrades	600 Ophir Road	Oroville	Butte
5R04C375478	Construction	Mountain View Drive Property APN 06835(	0 Mountain View Drive	Oroville	Butte
5R04C359434	Construction	Ishi Hills Middle School Playfield Project	1 Ishi Hills Way	Oroville	Butte
5R04C367101	Construction	Calle Vista Estates Unit 2 Phase1	20th St and Golden Hills Dr	Oroville	Butte

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R04C374295	Construction	Calle Vista Estates	Vaquero Drive	Oroville	Butte
5R04C378110	Construction	Ag Yard	3536 Butte Campus Drive	Oroville	Butte
5R04C376356	Construction	Butte College Track Improvements	Butte Campus Drive north of Durham Pentz Road	Oroville	Butte
5R04C377078	Construction	Lincoln Blvd Sidewalk Improvements	Between Jefferson St and Arnold Ave	Oroville	Butte
5R04C375093	Construction	1575 3 Oroville Walmart	465 Cal Oak Road	Oroville	Butte
5R04C379855	Construction	Oroville 230kV Transmission Line	Below Oroville Dam	Oroville	Butte
5R04C380388	Construction	Sediment and Debris Removal Thermalito I	100 Thompson Flat Cemetary Road	Oroville	Butte
5R04C379398	Construction	Oroville Dam Emergency Transmission Line	Canyon Dr & Oroville Dam Rd	Oroville	Butte
5R04C382260	Construction	Bidwell Canyon Stage I Boat Ramp Lane Ad	Bidwell Canyon Rd	Oroville	Butte
5R04C379827	Construction	Wellness Clinic for FRTH	5th Avenue	Oroville	Butte
5R04C376394	Construction	Miners Ranch Water Treatment Plant Impr	234 Kelly Ridge Road	Oroville	Butte
5R04C378205	Construction	Siskiyou Grove Estates	Abigail Ln	Oroville	Butte
5R04C385104	Construction	Bidwell Canyon Stage II Improvements	Bidwell Canyon Road	Oroville	Butte
5R04C382545	Construction	Butte County Government Campus Infrastr	County Center	Oroville	Butte
5R04C386102	Construction	Bidwell Canyon Marina Parking Lot Expansi	801 Bidwell Canyon Road	Oroville	Butte
5R04C383140	Construction	Riverbend Park	Montgomery Street	Oroville	Butte
5R04C384769	Construction	Dollar General 19978	2469 Las Plumas Ave	Oroville	Butte
5R04C384784	Construction	stockpile for Dollar General 19978	2469 Las Plumas Ave	Oroville	Butte
5R04C388266	Construction	Ophir Road FDR C Rehabilitation	Ophir Road	Oroville	Butte
5R04C386346	Construction	Bidwell Canyon Campground	Bidwell Canyon Road	Oroville	Butte
5R04C385367	Construction	Olive Grove	51 Hawes Way	Oroville	Butte
5R04CN602509	Construction	APN 030 470 049	Larkin Road	Oroville	Butte
5R04CN602970	Construction	Brian Smart Property	37 Pacific Heights Dr	Oroville	Butte
5R04C381108	Construction	APN 025-340-038	Powerhouse hill road	Palermo	Butte
5R04C377899	Construction	Lynns Plaza	9225 Skyway Road	Paradise	Butte
5R04C383590	Construction	FCI Neal Road Facility	999 Neal Road	Paradise	Butte
5R04C384354	Construction	Woodview Apartments	926 Buschmann Road	Paradise	Butte
5R04C385464	Construction	Camp Fire Emergency Utility Restoration	Skyway Road	Paradise	Butte
5R04C387390	Construction	Butte County Rebuild Bundle	Billie Road	Paradise	Butte
5R04C387494	Construction	Paradise High School	5711 Maxwell Drive	Paradise	Butte
5R04W002727	Construction	Paradise High School Classroom Additions	5911 Maxwell Drive	Paradise	Butte
5R04W003155	Construction	Valley Vista Subdivision	Schmale Lane	Paradise	Butte
5R04W003977	Construction	Bay Area Concrete Recycling Paradise	951 American Way	Paradise	Butte
5R04C369885	Construction	Neal Road Recycling and Waste Facility	1023 Neal Road	Paradise	Butte
5R04C369604	Construction	Paradise Airport Hangar Access Road	4405 Airport Road	Paradise	Butte
5R04C370371	Construction	CA BLM 1840 Butte Creek Bridge	Doe Mill Road	Paradise	Butte
5R04C372087	Construction	Pheasant Ridge Commons	Skyway & Devore Lane	Paradise	Butte
5R04C373435	Construction	Module 5 Phase A Excavation	1023 Neal Road	Paradise	Butte
5R04C377768	Construction	Neal Road Bike Lanes	Neal Road	Paradise	Butte
5R04C374441	Construction	Scott Hanosh and Beau Hunter New Office	6072 Skymeadow Way	Paradise	Butte
5R04C375946	Construction	Eye Life Institute	5889 Clark Road	Paradise	Butte
5R04C384827	Construction	Accelerated Wildfire Rapid Response Regic	Santa Rosa Road	Paradise	Butte
5R04C384633	Construction	Accelerated Wildfire Rapid Response Proje	Clark Road	Paradise	Butte
5R04C386449	Construction	Skyway Site	Skyway	Paradise	Butte
5R04C383988	Construction	PG&E 2018 Gas Transmission Program Cen	Calrose Ave & Richvale Hwy to Norman Rd in Princeton	Richvale	Butte
5R04C375767	Construction	AT&T Communication Line Install Project N	Richvale Highway	Richvale	Butte
5R04C374052	Construction	Rice Cake Expansion	5311 Midway	Richvale	Butte
5R04C369725	Construction	Feather River West Contract D	Feather River West Levee between Thermalito Afterbay to East	Yuba City	Butte
5S06C368444	Construction	Reddington Ranch	Almond Avenue and Hillgate Road	Arbuckle	Colusa
5S06C374666	Construction	Adams Group Solar Farm	7301 John Galt Way	Arbuckle	Colusa
5S06C385270	Construction	Farm Credit Services Colusa Glenn ACA	50 Sunrise Blvd	Colusa	Colusa
5S06C386994	Construction	Compass Club CompassLeaf	Davison Ct	Colusa	Colusa
5S06C387710	Construction	Sunrise Landing 1	50 Sunrise Blvd	Colusa	Colusa
5S06C389213	Caltrans Construction	2F9804 Pavement Rehabilitation on Route	On Rt 20 Near Colusa from Market St to S of Butte Vista Dr	Colusa	Colusa
5S06C372705	Construction	Colusa Basin Mitigation Bank	Abel Rd	Colusa	Colusa
5S06C381420	Construction	PL84-99 Emergency Levee Repair Project	Colusa and Yolo Counties	Colusa	Colusa
5S06C384628	Construction	ACOE Sacramento Levee Repair Site 0561 1	2 locations in Glen County See SWPPP	Colusa	Colusa
5S06C383798	Construction	Bridge Street Colusa R20A	Bridge Street	Colusa	Colusa
5S06C373356	Construction	Glenn Colusa Canal Bridge Replacement	Glenn Colusa Canal and Noel Evan Rd	Delevan	Colusa
5S06W002724	Construction	Emergency Abatement Project	570 Freeman Lane	Grass Valley	Colusa
5S06C371406	Construction	Maxwell Transfer Station	3852 Old Highway 99W	Maxwell	Colusa
5S06C387997	Construction	Delevan Substation Shunt Reactor and Seci	Dirks Road	Stonyford	Colusa
5S06C377902	Construction	Fouts Spring Youth Facility	1333 Fouts Springs Road	Stonyford	Colusa
5S06C375954	Construction	The Morning Star Packing Company	2211 Old Highway 99	Williams	Colusa
5S06C379773	Construction	Love's Travel Stop 652	100 Margurite St	Williams	Colusa
5S06C382492	Construction	Crossings Williams	843 Sierra Oaks Drive	Williams	Colusa
5S06C384152	Construction	Lurline Ave Site	3334 W Hwy 99	Williams	Colusa
5S06C386096	Construction	Williams Elementary School Multi Purpose	1404 E Street	Williams	Colusa
5S06C382870	Construction	Williams Holiday Inn Express	Corner of State Highway 20 and Margurite Street	Williams	Colusa
5S06C385636	Construction	Grocery Outlet	Lot 11 Vada Ct	Williams	Colusa
5S06W002702	Construction	West Williams Community Sewer & Water	6th/7th Street Alley	Williams	Colusa
5S06W004196	Construction	Valley Ranch Subdivision	Heron Way	Williams	Colusa
5S06C373076	Construction	Marguite Street Construction	Margurite Street	Williams	Colusa
5S06C376526	Construction	Sulphur Creek Mining District	3375 Wilbur Springs Rd	Williams	Colusa
5S06C375656	Construction	Green Valley Homes	1042 Golden Valley Drive	Williams	Colusa
5S06C377774	Construction	Stony Creek Senior II	Eastside of Margurite Street	Williams	Colusa
5S06C379763	Construction	Williams Dollar General	None Assigned	Williams	Colusa
5S09C375619	Construction	Early Work Missouri Flat Gold Hill	El Dorado County	Cameron Park	El Dorado
5S09C380933	Construction	La Caille Estates	3552 Resler Way	Cameron Park	El Dorado
5S09C384384	Construction	Delfino Winery	3205 North Canyon Road	Camino	El Dorado
5S09C381274	Construction	Camino Elementary School Improvements	3060 Snows Road	Camino	El Dorado
5S09W003045	Construction	Camino Elementary School Improvements	3060 Snows Rd	Camino	El Dorado

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S09W003754	Construction	El Dorado Trail Extension Los Trampas to H	3200 Verde Robles Drive	Camino	El Dorado
5S09C371071	Construction	SMUD Iowa Hill Drift Tunnel and Geotechn	2009 Chute Camp Road	Camino	El Dorado
5S09C369004	Construction	Marshal Gold State Historic Park	Back Street	Coloma	El Dorado
5S09C378984	Caltrans Construction	0F3104 Bridge Replacement Coloma	7310 HWY 49	Coloma	El Dorado
5S09C379215	Construction	Auburn Lake Trails Water Treatment Plant	3650 Sweetwater Trail	Cool	El Dorado
5S09C369718	Construction	Northside Bikepath Project	State Highway 49 and 193	Cool	El Dorado
5S09C378240	Construction	Auburn Lake Trails	1930 State Highway 190	Cool	El Dorado
5S09C382324	Construction	County of El Dorado Public Safety Facility	200 Industrial Dr	Diamond Springs	El Dorado
5S09C387118	Construction	Diamond Springs Parkway Phase 1A	State Route 49 Pleasant Valley Road to Bradley Drive	Diamond Springs	El Dorado
5S09C387003	Construction	El Dorado Trail Extension	4525 Blanchard Road	Diamond Springs	El Dorado
5S09C364192	Construction	Bradley Road	Bradley Road and Throwita Way	Diamond Springs	El Dorado
5S09C362601	Construction	Region 5S Multi County Broadband Project	9479 N Fort Washington Ste 105	El Dorado	El Dorado
5S09C370588	Construction	Villa Lago	Elmores Way	El Dorado Hills	El Dorado
5S09C375375	Construction	Serrano M2	Western Sierra Drive	El Dorado Hills	El Dorado
5S09C378210	Construction	La Canada Phase 1A	Salmon Falls Road	El Dorado Hills	El Dorado
5S09C379846	Construction	Promontory Multi Use Trail	Crestline Circle	El Dorado Hills	El Dorado
5S09C379880	Construction	Groth Court	508 Groth Court	El Dorado Hills	El Dorado
5S09C381948	Construction	Cypress at Serrano	Hogarth Way	El Dorado Hills	El Dorado
5S09C382416	Construction	The Pavilions at El Dorado Hills	2100 Francisco Drive	El Dorado Hills	El Dorado
5S09C383795	Construction	Hechtman Residence	200 Klee Court	El Dorado Hills	El Dorado
5S09C377755	Construction	ARCO - El Dorado Hills	SW & SE corners of Green Valley RD & Sophia Pkwy	El Dorado Hills	El Dorado
5S09C385056	Construction	Southpointe Meadows	Castec Way	El Dorado Hills	El Dorado
5S09C386224	Construction	Malcom Dixon Road Area of Benefit	Malcom Dixon road	El Dorado Hills	El Dorado
5S09C386805	Construction	Francis Residence	0 Spyglass Ln	El Dorado Hills	El Dorado
5S09C377273	Construction	Serrano Village M2 Unit 3	Western Sierra Way	El Dorado Hills	El Dorado
5S09C389456	Construction	Serrano Village K1 K2 Unit 4	Raphael Drive	El Dorado Hills	El Dorado
5S09W002431	Construction	Ridgeview West Unit 5	Via Treviso	El Dorado Hills	El Dorado
5S09W002981	Construction	Promontory Village 2C	Lafite Court	El Dorado Hills	El Dorado
5S09CN604823	Construction	Mishra Alok	2650 Via Fiori	El Dorado Hills	El Dorado
5S09C365701	Construction	Windsor Point Park Improvements	Schooner Dr and Francisco Dr	El Dorado Hills	El Dorado
5S09C364216	Construction	El Dorado Hills Community Park Improvem	1021 Harvard Way	El Dorado Hills	El Dorado
5S09C372263	Construction	Francisco Drive Right Turn Pocket	Francisco Dr and El Dorado Hills Blvd	El Dorado Hills	El Dorado
5S09C366768	Construction	4845 Gresham Dr	4845 Gresham Dr	El Dorado Hills	El Dorado
5S09C370306	Construction	Serrano Village M2 Phase 1	Western Sierra Drive	El Dorado Hills	El Dorado
5S09C374515	Construction	Watermark El Dorado	Hidden Bridge Road	El Dorado Hills	El Dorado
5S09C369558	Construction	Schwam Residence	201 Klee Court	El Dorado Hills	El Dorado
5S09C374611	Construction	Chartraw Road	Chartraw Road	El Dorado Hills	El Dorado
5S09C368482	Construction	Serrano Village K1&K2 Unit 5b	Da Vinci Drive	El Dorado Hills	El Dorado
5S09C367858	Construction	Treviso II	Via Treviso	El Dorado Hills	El Dorado
5S09C369982	Construction	Promontory Lot D	Southeast of the northerly intx of Sophia Pkwy and Alexandra	El Dorado Hills	El Dorado
5S09C366019	Construction	Promontory Village Center Lot H	Alexandra Drive at Sophia Parkway	El Dorado Hills	El Dorado
5S09C383696	Construction	New residence	415 Salmon Falls Rd	El Dorado Hills	El Dorado
5S09C374384	Construction	Parcel 1	Along Shoreline Drive	El Dorado Hills	El Dorado
5S09C380344	Construction	The Pavilions at El Dorado Hills	Francisco Drive	El Dorado Hills	El Dorado
5S09C374316	Construction	Wilson Estates	Malcom Dixon Road	El Dorado Hills	El Dorado
5S09C384225	Construction	Silva Valley Parkway Class 1 and Class 2 Bik	7141 Silva Valley Parkway	El Dorado Hills	El Dorado
5S09C375683	Construction	Serrano Village M3	Greyson Creek Drive	El Dorado Hills	El Dorado
5S09C371696	Construction	Promontory Village Center Lot 8	Via Treviso	El Dorado Hills	El Dorado
5S09C384418	Construction	New York Creek Trail East Phase 2	6760 Silva Valley Parkway	El Dorado Hills	El Dorado
5S09CN601447	Construction	Promontory Village 5 & stockpi	Se Of Intersection Of Sofia Pk	El Dorado Hills	El Dorado
5S09C374236	Construction	Village 34	Burlond Court	Folsom	El Dorado
5S09C376648	Construction	Missouri Flat Gold Hill Reconductor	El Dorado County	Folsom	El Dorado
5S09C388286	Construction	Flume 47C Replacement	Old Carson Road at El Dorado Ditch	Fresh Pond	El Dorado
5S09C372055	Construction	Garden Valley	15061 Marshall Road	Garden Valley	El Dorado
5S09C389105	Construction	GDPUD 2018 Main Canal Reliability Project	Georgetown Divid Ditch south of Spanish Dry Diggins Rd	Georgetown	El Dorado
5S09C373231	Construction	Dollar General Georgetown	Main Street & Harkness Street	Georgetown	El Dorado
5S09C384831	Construction	Georgetown Divide Water Conservation Su	Various Locations	Georgetown	El Dorado
5S09C375705	Construction	Black Oak Estates Winery	2480 Highway 193	Greenwood	El Dorado
5S09CN602185	Construction	Lewis Ranch THP Construction	z	Greenwood	El Dorado
5S09C382824	Construction	Sunset Campground Rehabilitation Project	Fashoda Way	Kyburz	El Dorado
5S09W004128	Construction	Northshore RV Campground Improvement	Ice House Rd Northwest Shoreline of Loon Lake	Kyburz	El Dorado
5S09C379165	Construction	Flume 10 Collapse	Near Alder Creek Road	Kyburz	El Dorado
5S09C386779	Construction	Bassi Road at Granite Creek Bridge Replace	Bassi Road at Granite Creek	Lotus	El Dorado
5S09C379878	Construction	Thousand Trails- Ponderosa	7291 Highway 49	Lotus	El Dorado
5S09W002667	Construction	Salmon Falls Realignment	Salmon Falls Road	Pilot Hill	El Dorado
5S09C376501	Construction	Salmon Falls Ranch	6685 Salmon Falls Road	Pilot Hill	El Dorado
5S09C377459	Construction	Mountain Enterprises	1851 Lotus Road	Placerville	El Dorado
5S09C377551	Construction	Savidge Property Improvements	5640 Motherlode Drive	Placerville	El Dorado
5S09C382373	Construction	Western Placerville Interchange Phase 2	300 Forni Road	Placerville	El Dorado
5S09C383640	Construction	The Ridge	Winesap Circle	Placerville	El Dorado
5S09C383800	Construction	SLY PARK ROAD AT CLEAR CREEK CROSSIN(	7200 Sly Park Road	Placerville	El Dorado
5S09C385255	Construction	Crossings Phase 2 Rough Grading	Missouri Flat Road at Headingt	Placerville	El Dorado
5S09C386328	Construction	Cooper Residence	3209 Newton Road	Placerville	El Dorado
5S09C386531	Construction	WESTERN EL DORADO RECOVERY SYSTEMS	4100 Throwita Way	Placerville	El Dorado
5S09C387776	Construction	Greenstone Rd at Slate Creek Bridge Repla	4498 Greenstone Road	Placerville	El Dorado
5S09C383487	Construction	Nimanns Auto Touch	200 Briw Ridge Ct	Placerville	El Dorado
5S09W002714	Construction	Cold Springs Road at Mount Shasta Lane R	1500 Cold Springs Road	Placerville	El Dorado
5S09W003093	Construction	Black Lane Road Construction	4020 Blackhawk Lane	Placerville	El Dorado
5S09W003173	Construction	Springlake	Colin Road	Placerville	El Dorado
5S09W003636	Construction	Indian Creek Elementary School	6701 Green Valley Road	Placerville	El Dorado
5S09W003637	Construction	Herbert Green Elementary School	3781 Forni Road	Placerville	El Dorado
5S09C356378	Construction	US50 MO Flat Rd I C Reconstruction Proj Pl	US 50 Missouri Flat Rd Interchange	Placerville	El Dorado

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S09C371605	Construction	El Dorado Trails Project	Forni Road at Ray Lawyer Drive	Placerville	El Dorado
5S09C372778	Construction	Western Slope Boys and Girls Club	2840 Mallard Lane	Placerville	El Dorado
5S09C372264	Construction	Green Valley Road at Weber Creek	Green Valley Road west of Placerville Drive	Placerville	El Dorado
5S09C358240	Construction	Crossings at El Dorado	Headington Rd & Missouri Flat Rd	Placerville	El Dorado
5S09C377603	Construction	Starfield Winery Building	2740 Jacquier Raod	Placerville	El Dorado
5S09C375132	Construction	Blairs Lane Bridge Replacement Project	Blairs Lane	Placerville	El Dorado
5S09C373567	Construction	Eskaton Village Placerville	Blairs Lane and Eskaton Drive	Placerville	El Dorado
5S09C381674	Construction	Hay Ranch Road	5661 Gold Hill Road	Placerville	El Dorado
5S09C381952	Construction	Town Center Force Main Replacement Proj	6100 Mother Lode Dr.	Placerville	El Dorado
5S09C371882	Construction	The Ridge	Winesap Circle	Placerville	El Dorado
5S09C380668	Construction	US 50/Mo Flat 1C	2441 Headington Road	Placerville	El Dorado
5S09C377460	Construction	Mountain Enterprises Fill Site	1851 Lotus Road	Placerville	El Dorado
5S09C382973	Construction	El Dorado Forebay Dam Upgrade	Forebay Road	Pollock Pines	El Dorado
5S09C384430	Construction	Flume 44 Replacement Project	Rock Crusher Road	Pollock Pines	El Dorado
5S09W003647	Construction	Azalea Cove Campground	Ice House Road at Wench Creek Campground	Pollock Pines	El Dorado
5S09W003767	Construction	Gerle Creek Recreation Area Improvement	Wentworth Springs Road and Ice House Road	Pollock Pines	El Dorado
5S09C372818	Construction	Ice House Road	From Wentworth Springs Road to	Pollock Pines	El Dorado
5S09C379363	Construction	Flume 45A Slide 1 2 and 3 Repair	Near Hazel Valley Road	Pollock Pines	El Dorado
5S09C384405	Construction	Upper American River Project Roadway Im	Union Valley Reservoir and Ice House Reservoir	Pollock Pines	El Dorado
5S09C386621	Construction	Upper American River Project Roadway Im	Union Valley Reservoir and Ice House Reservoir	Pollock Pines	El Dorado
5S09C333865	Construction	Silver Springs Bass Lake Rd Rc Alignment Pl	S Of Green Valley Rd N Of Hill Rd	Rescue	El Dorado
5S09C386488	Construction	Silver Springs Unit 1	APN 115 370 04	Rescue	El Dorado
5S09CN605545	Construction	Kanaka Residence	794 Kanaka Valley Road	Rescue	El Dorado
5S09C370082	Construction	Camp 2 Bridge Replacement Project	EID Camp 2 Near Riverton	Riverton	El Dorado
5S09W002903	Construction	La Caille Estates	3552 Resler Way	Shingle Springs	El Dorado
5S09C377828	Construction	Shingle Springs Village Offsite	Shingle Springs Drive	Shingle Springs	El Dorado
5S09C380961	Construction	Echo Summit 1101 Cable Replacement	104 Sierra at Tahoe Road	Twin Bridges	El Dorado
5R11C387364	Construction	Glenn County Landfill Final Closure	5700 County Road 33	Artois	Glenn
5R11C379298	Construction	Glenn County Farm Supply	2929 County Road JJ	Artois	Glenn
5R11C383312	Construction	Glenn County Transfer Station	County Road 33 West of Road D	Artois	Glenn
5R11C375880	Caltrans Construction	Glen I 5 Vertical Clearance	2707 Notre Dame Blvd	Chico	Glenn
5R11C378905	Construction	Hamilton City Revegetation Phase 1	County Road 23	Hamilton City	Glenn
5R11C389125	Construction	Hamilton City Phase 2B Setback Levee Proj	Highway 37	Hamilton City	Glenn
5R11W003939	Construction	Hamilton City Set Back Gates	County Road 23	Hamilton City	Glenn
5R11C372928	Construction	Hamilton City Dollar general	None assigned	Hamilton City	Glenn
5R11C375701	Construction	Hamilton City Setback Levee	County Road 23	Hamilton City	Glenn
5R11C381780	Construction	Hamilton City Facility Renovation	555 West 1st Street	Hamilton City	Glenn
5R11C382595	Construction	HAMILTON CITY FLOOD DAMAGE REDUCTI	Hwy 32	Hamilton City	Glenn
5R11C381435	Construction	HAMILTON CITY COMBINED ECOSYSTEM R	Hwy 32 and Canal Road	Hamilton City	Glenn
5R11C380380	Construction	Benson Estates	Watts Ave	Orland	Glenn
5R11C385851	Construction	Hamilton City Revegetation Phase 2	4646 County Road 203	Orland	Glenn
5R11C386961	Construction	North State Hulling	7559 Highway 32	Orland	Glenn
5R11C387905	Construction	Linwood Park Subdivision	Paigewood Drive	Orland	Glenn
5R11W003230	Construction	Huller Solar	7801 County Rd 9	Orland	Glenn
5R11C374783	Construction	Violich Huller	7801 County Road 9	Orland	Glenn
5R11C374507	Construction	Pilot Travel Center Orland California	County Road HH	Orland	Glenn
5R11C376826	Construction	Villa La Michele III	Jacquelyn drive	Orland	Glenn
5R11W003757	Construction	Farmers Brewing	880 County Road WW	Princeton	Glenn
5R11C381283	Construction	CalPlant I	6101 State Highway 162	Willows	Glenn
5R11C385727	Construction	South Willows Commercial and Industrial C	Tehama Street	Willows	Glenn
5R11C386736	Construction	PG&E 2019 Gas Transmission Program Cen	NW of Rd 35 to Bayliss Blue Gum Rd to Rd 41	Willows	Glenn
5R11W003722	Construction	Murdock Elementary School Relocatable B	655 French St	Willows	Glenn
5R11C368812	Construction	Willows Senior Apartments	Sycamore Street	Willows	Glenn
5R11C370486	Construction	Walden Academy	1129 W Wood Street	Willows	Glenn
5R11C348111	Construction	Weststeyn Farms Dairy	West end of County Rd 65	Willows	Glenn
5R11C375766	Construction	AT&T Communication Line Install Project N	Road V	Willows	Glenn
5R11C372327	Construction	WILLOWS TRACTOR SUPPLY	811 NORTH HUMBOLDT AVENUE	Willows	Glenn
5R11C381246	Construction	Glenn County Rd. 44 Safety Improvement I	Road 44 x Colusa Drain	Willows	Glenn
5R18C386943	Construction	Westwood Fire Station	463 220 County Road A21	Westwood	Lassen
5R18C387664	Construction	East Creek Meadow	Greenville Creek Road	Westwood	Lassen
5R25C386530	Caltrans Construction	02 4F2104 Butte and Ash Creek Bridge Rep	02 MOD 299 PM 1	Adin	Modoc
5R25C387286	Construction	Rush Creek Bridge	County Road 86	Adin	Modoc
5R25C383190	Construction	Modoc Medical Center	Nagel Street	Alturas	Modoc
5R25C384594	Construction	Highway 395 Fiber Project	Highway 395 NE Alturas to Oregon border	Alturas	Modoc
5R25C386977	Construction	Alturas Storage Facility	APN 001030041	Alturas	Modoc
5R25W002323	Caltrans Construction	02 299714 Alturas 299 Improvements	Route 299	Alturas	Modoc
5R25W002927	Construction	Modoc Joint Unified School District	906 West 4th Street	Alturas	Modoc
5R25W003792	Construction	Juniper and Oak Street Rehabilitation Proje	Juniper Street and Oak Street	Alturas	Modoc
5R25C368957	Construction	State Route 395 Left Turn Lane Constructic	State Route 395 5 Miles N of Alturas	Alturas	Modoc
5R25C377387	Construction	Modoc County Road 55	CR 55 Safety Improvement	Alturas	Modoc
5R25C384771	Construction	Alturas Retail Development	NW C Street	Alturas	Modoc
5R25C381009	Construction	Modoc Refuge Trail	Modoc National Wildlife Refuge	Alturas	Modoc
5R25C383976	Caltrans Construction	02 4F77U4 Caldwell Creek Bridge Scour Mi	02 MOD 299 PM 23 1 23 6 24 5 33 5	Canby	Modoc
5S29C387220	Construction	Combie Phase 1 Canal Replacement Projec	26106 Table Meadow Road	Auburn	Nevada
5S29C387495	Construction	Combie Road Corridor Improvements	Combie Road	Auburn	Nevada
5S29C387634	Construction	Higgins Marketplace	10004 Woodridge Drive	Auburn	Nevada
5S29C373239	Construction	Combie Road Rule 20A Project	10226 Combie Road	Auburn	Nevada
5S29C364552	Construction	Cascade Crossing	10400 Combie Road	Auburn	Nevada
5S29C377670	Construction	LOP Wastewater Plant Solar Array Project	10984 Riata Way	Auburn	Nevada
5S29C379045	Construction	Table Meadows Pipeline and Table Meado	Combie Road and Landon Evan Lane	Auburn	Nevada
5S29C379237	Construction	Bear River Siphon	25988 puma Trail	Auburn	Nevada
5S29C385775	Construction	Combie Road Rule 20A Improvements	Combie Road and Highway 49	Auburn	Nevada

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S29C381693	Construction	Timberwood Estates	10639 Brunswick Road	Grass Valley	Nevada
5S29C383533	Construction	Best Trailer	500 Idaho Maryland Road	Grass Valley	Nevada
5S29C384011	Construction	Walsh Built Homes & WalCraft Cabinetry	12481 Charles Drive	Grass Valley	Nevada
5S29C384298	Construction	Blair Industrial Park	12836 Greenhorn Road	Grass Valley	Nevada
5S29C384595	Construction	Newtown Reservoir Cleaning Project	Queen Elizabeth Way	Grass Valley	Nevada
5S29C385197	Construction	Nevada County Operations Center	12350 LaBarr Meadows Road	Grass Valley	Nevada
5S29C387321	Construction	City of Grass Valley WWTP	556 Freeman Lane	Grass Valley	Nevada
5S29C387556	Construction	Remidial Action at Rare Earth Landscape M	12022 La Barr Meadows Road	Grass Valley	Nevada
5S29C387581	Construction	Zap Manufacturing	12615 Charles Drive	Grass Valley	Nevada
5S29C387995	Construction	NID Fill Placement at Nevada County Airpo	13083 John Bauer Avenue	Grass Valley	Nevada
5S29C388080	Construction	The Event Helper	12897 Loma Rica Dr	Grass Valley	Nevada
5S29C388276	Construction	Armstrong Rd and Iron Horse Dr Pipeline	Armstrong Rd and Iron Horse Dr	Grass Valley	Nevada
5S29C385384	Construction	12780 Auburn Rd	16502 McCourtney Rd	Grass Valley	Nevada
5S29C389572	Construction	Gilded Springs	652 Linden Avenue	Grass Valley	Nevada
5S29W002641	Construction	BriarPatch Parking Expansion	290 Sierra College Drive	Grass Valley	Nevada
5S29W003346	Construction	Maben Canal Rehabilitation	Hwy 49 near Lime Kiln Road	Grass Valley	Nevada
5S29C369592	Construction	Grass Valley CA Dollar General	2033 Nevada City Hwy	Grass Valley	Nevada
5S29C369603	Construction	Cunningham Siphon Replacement	Dog Bar Road	Grass Valley	Nevada
5S29C365137	Construction	Dorsey Drive Interchange Project	Dorsey Drive	Grass Valley	Nevada
5S29C373678	Construction	Brewer Road Pipeline	Brewer Road	Grass Valley	Nevada
5S29C371011	Construction	Lot 10 Mountain English Park	12871 Loma Rica Drive	Grass Valley	Nevada
5S29C369036	Construction	Gold Country Village	465 Bennett Street	Grass Valley	Nevada
5S29C369949	Construction	Best Trailer	500 Idaho Maryland Road	Grass Valley	Nevada
5S29C377587	Construction	Goddard Property	17593 State Hwy 174	Grass Valley	Nevada
5S29C377897	Construction	Lodestar-Conestoga Pipeline	Lodestar Drive Conestoga Drive	Grass Valley	Nevada
5S29C378959	Construction	Bear River DMS	12022 La Barr Meadows Road	Grass Valley	Nevada
5S29C376290	Construction	North Star Passive Treatment System	12509 Allison Ranch Road	Grass Valley	Nevada
5S29C380771	Construction	Berriman Ranch	Taylorville Road	Grass Valley	Nevada
5S29C380696	Construction	TSC-Grass Valley	At the intersection of Nevada City Highway and Hubbaard Rd.	Grass Valley	Nevada
5S29C373552	Construction	Yuba River Charter School	Adams Avenue	Grass Valley	Nevada
5S29C376986	Construction	Department of Motor Vehicles	890 Sutton Way	Grass Valley	Nevada
5S29C381394	Construction	River Valley Bank	Brunswick Blvd.	Grass Valley	Nevada
5S29C376326	Construction	Ridge Meadows	161 Upper Slate Creek Road	Grass Valley	Nevada
5S29C373232	Construction	Dollar General Alta Sierra	10166 Alta Sierra Dr	Grass Valley	Nevada
5S29C376251	Construction	Forest Springs MHP	10084 Forest Springs Drive	Grass Valley	Nevada
5S29C384828	Construction	Wildfire Risk Mitigation Region 5S	11425 McCourtney Road	Grass Valley	Nevada
5S29CN601373	Construction	Tyler Property-Magnolia Road	15119 Magnolia	Grass Valley	Nevada
5S29CN601372	Construction	Cole Viet Canal Project	Cole Viet	Grass Valley	Nevada
5S29CN602187	Construction	Tyler Property-Magnolia Road	15119 Magnolia	Grass Valley	Nevada
5S29CN602186	Construction	Cole Viet Canal Project	Cole Viet	Grass Valley	Nevada
5S29C383267	Construction	Berriman Ranch	Tylorville Road	Grass Valley	Nevada
5S29C386789	Construction	Gold Country Senior Apartments Phase 2	115 Union Jack Street	Grass Valley	Nevada
5S29W002469	Construction	Dollar General Rough and Ready	12345 Rough and Ready Hwy	Grass Valley	Nevada
5S29CN605905	Construction	Allen Stinson	12052 Enterprise Mine Road	Nevada City	Nevada
5S29W002782	Construction	Newtwon Road Class II Bike Lane Project	Newtown Road	Nevada City	Nevada
5S29W004166	Construction	Bowman Lake Road	Bowman Lake Road	Nevada City	Nevada
5S29C368065	Construction	Riebes Nevada City Project	Intersection of Hollow Way and Hallwood Lane	Nevada City	Nevada
5S29C373106	Construction	Inn Town Campground	9 Kidder Court	Nevada City	Nevada
5S29C364355	Construction	Harmony Ridge Phase 2	10364 Harmony Ridge Road	Nevada City	Nevada
5S29C376712	Construction	Newtown Canal Encasement	Newtown Road west of Nevada City	Nevada City	Nevada
5S29C376329	Construction	E George to Cascade Shore Tranmission Ma	Banner Lava Cap Road	Nevada City	Nevada
5S29C379596	Construction	South Yuba Canal Landslide Damage Repai	Lowell Hill Road	Nevada City	Nevada
5S29C381266	Construction	Loney Meadow	631 Coyote St	Nevada City	Nevada
5S29C380902	Construction	Ananda Village Future Temple of Light Proj	Assisi Hill Drive	Nevada City	Nevada
5S29C355484	Construction	Town & Country Mini Storage	13270 Gracie Rd	Nevada City	Nevada
5S29C377669	Construction	Ranch Property Ground Fixed Tilt Array	16782 Highway 49	Nevada City	Nevada
5S29C382605	Construction	Ananda Almora Fire Access Road	Almora Road to Sages Road	Nevada City	Nevada
5S29C358560	Construction	Deer Creek Park 2 Unit A	Red Dog Rd	Nevada City	Nevada
5S29C376650	Construction	Salvation Army Camp Del Oro	20864 Rector Road	Nevada City	Nevada
5S29C381209	Construction	Little Deer Creek Restoration	Pioneer Park	Nevada City	Nevada
5S29CN601412	Construction	Nevada City Cottages	Assessors Parcel No 0506027 Ch	Nevada City	Nevada
5S29C378222	Construction	Penn Valley Dual Sewer Force Main Project	Penn Valley Drive	Penn Valley	Nevada
5S29C389475	Construction	Lone Oak Apartments	10584 broken oak court	Penn Valley	Nevada
5S29C373227	Construction	Lake Wildwood Clubhouse	11255 Cottontail Way	Penn Valley	Nevada
5S29C384758	Construction	Dollar General Penn Valley	17652 Penn Valley Drive	Penn Valley	Nevada
5S29C364454	Construction	Donner Summit WWTP Expansion	Sherrit Lane	Soda Springs	Nevada
5S29C387334	Caltrans Construction	4F6004 Donner Pass Barrier Rail Project	D3 Nev Hwy 80 PM 1 to 9	Soda Springs	Nevada
5S31C379601	Construction	Boeger Warehouse	87 apple ct.	Applegate	Placer
5S31C380637	Construction	Briar Meadows Estate	New Airport Road	Auburn	Placer
5S31C382757	Construction	Affordable RV Rentals	1799 Auburn Ravine Road	Auburn	Placer
5S31C374728	Construction	California Construction	12345 Republic Street	Auburn	Placer
5S31C385203	Construction	Vian Properties	2120 Pear Drive	Auburn	Placer
5S31C386510	Construction	Bowman Road Over Union Pacific Railroad	Bowman Road	Auburn	Placer
5S31C386696	Construction	Gateway Court	At The End of Gateway Court	Auburn	Placer
5S31C387132	Caltrans Construction	2F3404 Widen Shoulder on Route 49 in Pla	S of R 49 and 805 Separation to N of Dry Creek Road	Auburn	Placer
5S31C387184	Construction	Nevada Street Pedestrian & Bicycle Faciliti	125 Nevada Street	Auburn	Placer
5S31C387473	Construction	Sunny Creek Estates	Oak Ridge Way	Auburn	Placer
5S31C388130	Construction	Birdsall Road	Birdsall Road	Auburn	Placer
5S31C388504	Construction	CCC Auburn Campus Kitchen Multi Purpose	3710 Christian Valley Road	Auburn	Placer
5S31C386029	Construction	Auburn Creekside	3300 Grass Valley Hwy	Auburn	Placer
5S31C389333	Construction	Wildfire Risk Mitigation Ophir Rd Auburn L	10484 Ophir Rd	Auburn	Placer
5S31W004138	Construction	Ceronix	13350 New Airport Road	Auburn	Placer

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S31CN602673	Construction	Terletskiy Property		Auburn	Placer
5S31CN605919	Construction	Construction	2400 Bell Road	Auburn	Placer
5S31C367606	Construction	Palm Avenue Sidewalk	Palm Avenue	Auburn	Placer
5S31C357957	Construction	Canyon View Watershed Restoration	Section 35 Township 13 N	Auburn	Placer
5S31C372819	Construction	Rock Creek Pad 6	2845 Bell Road	Auburn	Placer
5S31C371960	Construction	Plaza II	1760 Grass Valley Highway	Auburn	Placer
5S31C370954	Construction	Auburn Bluffs Subdivision	Lantern View Drive	Auburn	Placer
5S31C372620	Construction	Placer County Animal Services Center	11232 B Avenue	Auburn	Placer
5S31C376305	Construction	UPRR Roseville Sub 2016 Fiber Project	UPRR Roseville Subdivision	Auburn	Placer
5S31C370781	Construction	Quartz Ridge	200 Silver Bend Way	Auburn	Placer
5S31C373776	Construction	5682 0 Auburn Walmart	1920 Grass Valley Highway	Auburn	Placer
5S31C374525	Construction	Vian Properties	2120 Pear Drive	Auburn	Placer
5S31C371998	Construction	Willow Creek Shopping Center	NWC HWY 49 and Willow Creek Dr	Auburn	Placer
5S31C374770	Construction	Rock Creek Pipeline and Siphon	Shale Ridge Rd to Rock Creek Reservoir	Auburn	Placer
5S31C371089	Construction	Bella Tuscany	Black Oak Road	Auburn	Placer
5S31C375607	Construction	Epperle Corners	Intersection of Auburn Ravine Road and Epperle Lane	Auburn	Placer
5S31C377326	Construction	PG&E Auburn Regional Consolidation Proje	2300 Wilbur Way Auburn CA 95602	Auburn	Placer
5S31C379537	Construction	Bowman Charter School Multipurpose Buil	13777 Bowman Road	Auburn	Placer
5S31C375370	Construction	Auburn RV Resort	NE corner of Hwy80 and Bell Road	Auburn	Placer
5S31C384741	Construction	Rock Creek Pipeline Phase 2	End of Rock Creek Road	Auburn	Placer
5S31C384235	Construction	Auburn Lincoln	13370 Lincoln Way	Auburn	Placer
5S31C376336	Construction	Timberline	2985 Richardson Dr	Auburn	Placer
5S31C377222	Construction	2016 Auburn Wastewater Treatment Plant	10441 Ophir Road	Auburn	Placer
5S31C379624	Construction	State Route 49 Streetscape Improvements	State Route 49	Auburn	Placer
5S31CN601446	Construction	Spanish Corral Lane	2125 Spanish Corral	Auburn	Placer
5S31CN601368	Construction	MultiModal Parking Lot		Auburn	Placer
5S31CN601367	Construction	Haldeman Commercial Business	Auburn-Folsom	Auburn	Placer
5S31CN601366	Construction	Tribute Court Project	Tribute	Auburn	Placer
5S31CN602176	Construction	Spanish Corral Lane	2125 Spanish Corral	Auburn	Placer
5S31CN602175	Construction	Spanish Corral Lane	2125 Spanish Corral	Auburn	Placer
5S31CN602174	Construction	Spanish Corral Lane	2125 Spanish Corral	Auburn	Placer
5S31C384291	Construction	Colfax Hotel	801 South Auburn Street	Colfax	Placer
5S31C387348	Construction	Shadow Wood Place	Kneeland Street	Colfax	Placer
5S31C388163	Construction	Colfax Roundabout	I80 at South Auburn	Colfax	Placer
5S31C372814	Construction	Dollar General Colfax	951 S Auburn Street	Colfax	Placer
5S31C361290	Construction	Bear River Canal Project	Colfax Quad SE Quardrant	Colfax	Placer
5S31C377491	Construction	Lorang Brothers Yard	1223 South Auburn Street	Colfax	Placer
5S31C380670	Construction	Long Ravine Pipeline Replacement	Long Ravine Pipeline near Rollins Lake Road	Colfax	Placer
5S31C382489	Construction	Sierra Oaks Estates	Iowa Hill Road	Colfax	Placer
5S31C384408	Construction	Trinity Pines Catholic Center	28000 Rollins Lake Rd	Colfax	Placer
5S31C376338	Caltrans Construction	1F4004 Interstate 80 Colfax Truck Climbing	33 Depot Street	Colfax	Placer
5S31CN601371	Construction	APN 101-132-38 Colfax	Bunch Creek	Colfax	Placer
5S31CN602184	Construction	APN 101-132-38 Colfax	Bunch Creek	Colfax	Placer
5S31C387658	Construction	Dutch Flat I80 Jet A Fuel Release Remediat	I80 3 tenths miles east of Dutch Flat exit	Dutch Flat	Placer
5S31C376629	Construction	Hell Hole Dam Core Raise Project	Hell Hole Dam Road	Foresthill	Placer
5S31C376964	Construction	American River Headwaters Restoration Pr	North of French meadows reservoir	Foresthill	Placer
5S31C372813	Construction	Dollar General Foresthill	5830 Sunset Drive	Foresthill	Placer
5S31C376628	Construction	Hell Hole Dam Simorg Borrow Site	11 Pines Road and Hell Hole	Foresthill	Placer
5S31C383315	Caltrans Construction	3F4804 Gold Run Rest Area	West bound and East bound Rest Areas	Gold Run	Placer
5S31C376108	Construction	Granite Bay Memory Care	Douglas Blvd	Granite Bay	Placer
5S31C378753	Construction	AFM WORD Center	SE Corner Sierra College Blvd and Nightwatch Dr	Granite Bay	Placer
5S31C381782	Construction	Pond View Office Park	5630 Douglas Boulevard	Granite Bay	Placer
5S31C381824	Construction	4869 and 4879 Cavitt Ranch Place	4869 and 4879 Cavitt Ranch Place	Granite Bay	Placer
5S31C382702	Construction	Barton Ranch	8190 Barton Road	Granite Bay	Placer
5S31C383916	Construction	Colinas Estates	8137 Joe Rodgers Road	Granite Bay	Placer
5S31C384305	Construction	Eureka Granite Bay	Eureka and Auburn Folsom Road	Granite Bay	Placer
5S31C385378	Construction	Wellquest Living of Granite Bay	9747 Sierra College Blvd	Granite Bay	Placer
5S31C387737	Construction	Quarry Ridge Professional Office Park	8495 Berg Street	Granite Bay	Placer
5S31C389114	Construction	White Hawk II	S Douglas Blvd and Seeno Ave	Granite Bay	Placer
5S31CN603988	Construction	Cavitt Ranch Estates	4879 Cavitt Ranch Place	Granite Bay	Placer
5S31CN605434	Construction	Saini Singh	4325 Cavitt Stallman Rd	Granite Bay	Placer
5S31CN605530	Construction	Polo Ranch Place	4424 Polo Ranch Place	Granite Bay	Placer
5S31CN605899	Construction	AJS Parcel	APN 035-050-073-000 Cavitt Stallman Rd	Granite Bay	Placer
5S31C370216	Construction	Enclave	End of Pastor Drive	Granite Bay	Placer
5S31C368733	Construction	Johl Residence	4607 King Ranch Place	Granite Bay	Placer
5S31C373283	Construction	Micherra Place	Eureak Road	Granite Bay	Placer
5S31C371752	Construction	Folsom Dike 1	Granite Bay Recreation Area	Granite Bay	Placer
5S31C366975	Construction	Sierra College Blvd Douglas Blvd Sidewalk	Douglas Blvd and Sierra College Blvd	Granite Bay	Placer
5S31C368484	Construction	The Groves at Granite Bay	Berg Road and Granite Grove Way	Granite Bay	Placer
5S31C368851	Construction	Greyhawk II	Greyhawk Dr at Woodgrove Way	Granite Bay	Placer
5S31C372418	Construction	The Enclave	West of Pastor Drive	Granite Bay	Placer
5S31C374995	Construction	Granite Estates Professional Center	Granite Estates Dr and Douglas Blvd	Granite Bay	Placer
5S31C377122	Construction	Treelake Mini Storage	9970 Hadleigh Drive	Granite Bay	Placer
5S31C378413	Construction	Little Sunshine's Playhouse	5370 Douglas Boulevard	Granite Bay	Placer
5S31C367156	Construction	Auburn Folsom Road Widening North Phas	Auburn Folsom Road	Granite Bay	Placer
5S31C383460	Construction	Eureka at Granite Bay	Wildflow Road	Granite Bay	Placer
5S31C381955	Construction	7850 Bartley CT	7850 Bartley CT	Granite Bay	Placer
5S31C379551	Construction	Rolling Greens	Eureka Road	Granite Bay	Placer
5S31C372669	Construction	UPRR Roseville Subdivision Bridge	Near Kingvale CA	Kingvale	Placer
5S31C368830	Construction	Lincoln Village	2nd 3rd and E Streets	Lincoln	Placer
5S31C373633	Construction	Lakeside 6 Village 2	Venture Drive & Lakeside Blvd	Lincoln	Placer
5S31C379362	Construction	Turkey Creek Estates Phase I	Highway 193	Lincoln	Placer

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S31C380617	Construction	Ridgecrest Drive Twelve Bridges Village 11	East of Twelve Bridges Dr South of Catta Verdera	Lincoln	Placer
5S31C382311	Construction	Lakeside 6 Village 7 & 8	Lincoln Airpark & McClain	Lincoln	Placer
5S31C382846	Construction	Twelve Bridges Village 11	E of Twelve Bridges Dr and S of Ridge Crest Dr	Lincoln	Placer
5S31C383158	Construction	Twelve Bridges Village 1	E Joiner Pkwy & Bella Breeze Dr	Lincoln	Placer
5S31C383498	Construction	Verdera North Tank Number 3	Between Bella Circle Fuente Place and Sierra College Blvd	Lincoln	Placer
5S31C383841	Construction	Lincoln Ranch Self Storage	NE Corner of intersection of Joiner Parkway and Nicolaus Rd	Lincoln	Placer
5S31C383901	Construction	Independence at Lincoln	Nicolaus Road & Waverly Drive	Lincoln	Placer
5S31C384454	Construction	Lincoln Village 2C	Bella Breeze Dr west of E Joiner Pkwy	Lincoln	Placer
5S31C384460	Construction	Twelve Bridges Village 2A	Bella Breeze Drive West of E Joiner Pkwy	Lincoln	Placer
5S31C384489	Construction	Dorado at Twelve Bridges	North of Bella Breeze Drive and Colonnade Drive	Lincoln	Placer
5S31C384565	Construction	Terra Cotta VIllage	610 Twelve Bridges Drive	Lincoln	Placer
5S31C384732	Construction	Lincoln Crossing Village 11	778 Groveland Ln	Lincoln	Placer
5S31C385760	Construction	Western Placer High School	Twelve Bridges and Field Stone Drive	Lincoln	Placer
5S31C386110	Construction	Scott M Leaman Elementary School	Brentford Circle and Caledon Circle	Lincoln	Placer
5S31C386108	Construction	Glen Edwards Middle School Increment 2	204 L Street	Lincoln	Placer
5S31C386129	Construction	Creekside Preserve	Lot 1 of Education Foundation Twelve Bridges	Lincoln	Placer
5S31C386680	Construction	Twelve Bridges Village 10	East of Eastridge Drive	Lincoln	Placer
5S31C386871	Construction	Dowd Road over Markham Ravine	Along Dowd Road South of Nicolaus Road	Lincoln	Placer
5S31C387061	Construction	Lincoln 16	1200 Melody Lane	Lincoln	Placer
5S31C387099	Construction	Oak Tree Lane Widening and Extension	Oak Tree Lane	Lincoln	Placer
5S31C365466	Construction	Twelve Bridges V9U4P1	Gemstone Lane and Beamreach Court	Lincoln	Placer
5S31C387254	Construction	Hidden Hills Subdivision Phase 1	Oak Tree Lane	Lincoln	Placer
5S31C387527	Construction	Lincoln Active Adult Phase 1	1144 Hwy 193	Lincoln	Placer
5S31C387532	Construction	Ferrari Ranch Road Improvements	105 Leavell Lane	Lincoln	Placer
5S31C387528	Construction	Auburn Ravine	105 Leavell Lane	Lincoln	Placer
5S31C387530	Construction	Epick Three Subdivision	105 Leavell Lane	Lincoln	Placer
5S31C387709	Construction	Meadowlands	West of 12th Street and East Avenue intersection	Lincoln	Placer
5S31C387790	Construction	East 10th Street Subdivision	East 10th Street	Lincoln	Placer
5S31C387882	Construction	LaQuinta Inns and Suites	Intersection of Colonnade Drive and Red Rock Road	Lincoln	Placer
5S31C383572	Construction	Club Lincoln Expansion	830 Groveland Lane	Lincoln	Placer
5S31C388155	Construction	John Adams Academy	No recorded address	Lincoln	Placer
5S31C388287	Construction	Highway 65 Self Storage	3201 Industrial Avenue	Lincoln	Placer
5S31C382669	Construction	Cresleigh Grove	Havenwood Drive	Lincoln	Placer
5S31C388862	Construction	Cerrada	750 Groveland Lane	Lincoln	Placer
5S31C388911	Construction	City of Lincoln Waste Water Treatment Pla	1245 Fiddyment Rd	Lincoln	Placer
5S31C376240	Construction	Robert Jimenez Park	778 Groveland Lane	Lincoln	Placer
5S31C384337	Construction	St Joseph Church Parish Hall	280 Oak Tree Lane	Lincoln	Placer
5S31C389313	Construction	Lincoln Meadows	Virginiatown Road & Hungry Hollow Road	Lincoln	Placer
5S31W002119	Construction	Lincoln Boulevard Improvement Project	Lincoln Blvd From 7th Street to McBean Park Drive	Lincoln	Placer
5S31W002708	Construction	McBean Baseball Field	427 A Street	Lincoln	Placer
5S31W002560	Construction	INOB Lincoln	850 Groveland Lane	Lincoln	Placer
5S31W003082	Construction	Lincoln Site	1250 Gladding Rd	Lincoln	Placer
5S31W003549	Construction	Downtown Waterline and Street Replacem	East ave	Lincoln	Placer
5S31C369880	Construction	HOA Club Lincoln	830 Groveland Lane	Lincoln	Placer
5S31C357226	Construction	Lincoln Highlands	NEC of Virginiatown Rd & Liberty Ln	Lincoln	Placer
5S31C366667	Construction	Lincoln Gateway	Crystalwood Circle and Crystalwood Way	Lincoln	Placer
5S31C368714	Construction	Twelve Bridges Village 9 Unit 1	Fantail Lane and Darter Lane	Lincoln	Placer
5S31C364141	Construction	Twelve Bridges Village 9 Unit 3	Culpepper Lane	Lincoln	Placer
5S31C369054	Construction	Lincoln WWTRF	1245 Fiddyment Road	Lincoln	Placer
5S31C373440	Construction	Lincoln Landfill Closure	Virginiatown Road	Lincoln	Placer
5S31C370491	Construction	Coon Creek LLC	5585 Garden Bar Road	Lincoln	Placer
5S31C367862	Construction	Sorrento	Sorrento Pkwy and Marina Grande Way	Lincoln	Placer
5S31C372152	Construction	North Dowd Road Bridge Replacement ove	North Dowd Road	Lincoln	Placer
5S31C369102	Construction	Midwestern Placer Regional Sewer Project	HWY 193	Lincoln	Placer
5S31C374294	Construction	Meadowlands Berm	D Street and 9th Street	Lincoln	Placer
5S31C374186	Construction	500 Business Park Drive	500 Business Park Drive	Lincoln	Placer
5S31C369096	Construction	Village 12 at Verdera	Via Diablo at Vista De Madera	Lincoln	Placer
5S31C371593	Construction	Lincoln WWTP Remedial Grading	WAVERLY DRIVE	Lincoln	Placer
5S31C371955	Construction	Lincoln Stake Center	708 Virginiatown Road	Lincoln	Placer
5S31C376239	Construction	Nathan Dubin	1971 Hamersley Lane	Lincoln	Placer
5S31C377725	Construction	INOB Lincoln	850 Groveland	Lincoln	Placer
5S31C378162	Construction	Lincoln High School	790 J Street	Lincoln	Placer
5S31C372790	Construction	Verdera Village 19	Camino Cielo	Lincoln	Placer
5S31C381530	Construction	Lincoln Lot 302 School Site	SE Corner Calendon Circle & Brentford Circle	Lincoln	Placer
5S31C365661	Construction	Lakeside 6 Village 1	NE of the Intersection of Venture Dr and Lakeside Dr	Lincoln	Placer
5S31C383612	Construction	Education Foundation	Lot 1 of Education Foundation Twelve Bridges	Lincoln	Placer
5S31C383359	Construction	Markham	402 South Brewer Rd	Lincoln	Placer
5S31C375039	Construction	Verdera Village 23	South of Camino Verdera at Paseo Mira Vista	Lincoln	Placer
5S31C370175	Construction	Clover Meadows	821 East Avenue	Lincoln	Placer
5S31C386034	Construction	Bear Court Models	Bear Court	Lincoln	Placer
5S31C383220	Construction	Meadowlands Mass Grading	12th Street & East Avenue	Lincoln	Placer
5S31C383075	Construction	Antonio Mountain Ranch Mitigation Bank	2311 Fiddyment Road	Lincoln	Placer
5S31C372343	Construction	Summer Place Lincoln	NWC Red Rock and Joiner Pkwy	Lincoln	Placer
5S31C382838	Construction	Glen Edwards Middle School Increment 1	204 L Street	Lincoln	Placer
5S31C382728	Construction	Quick Quack Car Wash Lincoln	Sterling Parkway	Lincoln	Placer
5S31C380142	Construction	Bridge Replacement Project Wise Road Ov	0.5 miles east of Garden Bar Road	Lincoln	Placer
5S31C381090	Construction	Lincoln Penryn Pipeline Ph3 and Verdera N	Vista Del Madera	Lincoln	Placer
5S31C383104	Construction	Twelve Bridges	Bella Breeze Drive	Lincoln	Placer
5S31CN601420	Construction	Twelve Bridges South Creek	South Creek	Lincoln	Placer
5S31CN601405	Construction	Meritage 12 Bridges	12 Bridges	Lincoln	Placer
5S31CN601404	Construction	Tewlve Bridges Development	Hwy 65 Twelve Bridges	Lincoln	Placer
5S31CN601364	Construction	Old Brookview Development Site	5th and Savanna	Lincoln	Placer

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S31C367057	Construction	Cherokee Trail Estates	Boyington Road	Loomis	Placer
5S31C383980	Construction	Taylor Road	South from 3883 Taylor Rd	Loomis	Placer
5S31C385959	Construction	UAIC Tribal School	3141 Taylor Road	Loomis	Placer
5S31C386033	Construction	Creekside Lane	Creekside Lane	Loomis	Placer
5S31C387671	Construction	Del Oro High School	3301 Taylor Road	Loomis	Placer
5S31C388527	Construction	Jodi and John Dillon Residence	4320 Champagne Court	Loomis	Placer
5S31W003249	Construction	Loomis RV & Boat	3241 Rippey Road	Loomis	Placer
5S31W003561	Construction	Loomis RV & Boat	3241 Rippey Road	Loomis	Placer
5S31CN604738	Construction	Charley and Erin Bates	8273 Horseshow Bar Road	Loomis	Placer
5S31CN604740	Construction	Bates Residence	8273 Horseshoe Bar Road	Loomis	Placer
5S31CN605697	Construction	Anthony and Susan Wright	6650 Indian Oaks Lane	Loomis	Placer
5S31CN604061	Construction	Residence	9520 Horseshoe Bar Rd	Loomis	Placer
5S31CN604975	Construction	Green Acres	3858 Green Acres Lane	Loomis	Placer
5S31C370233	Construction	Geyer Residence	5511 Sable Ridge Court	Loomis	Placer
5S31C369999	Construction	Loveday Resdience Lot 28 Sierra de Monts	5520 Sable Ridge Court	Loomis	Placer
5S31C366477	Construction	SMD 3 Regional Sewer Project	Auburn Folsom Road	Loomis	Placer
5S31C370500	Construction	Randall Ow Residence Lot 17 Sierra de Mo	615 Blackhawk Court	Loomis	Placer
5S31C374752	Construction	Del Oro Pool and Softball Field	3301 Taylor Road	Loomis	Placer
5S31C374418	Construction	Roseman Residence Lot 19 Sierra de Monts	5305 Montserrat Lane	Loomis	Placer
5S31C375394	Construction	5325 Poppy Ridge Court	5325 Poppy Ridge Court	Loomis	Placer
5S31C376484	Construction	Holt Residence Lot 12 Sierra de Montserra	511 Blackhawk Court	Loomis	Placer
5S31C377770	Construction	AT&T Communication Line Install Project #	Eagle View Ln	Loomis	Placer
5S31C380429	Construction	3264 Taylor Road	3264 Taylor Road	Loomis	Placer
5S31C380322	Construction	Loomis Diversion Trunkline	Various Streets	Loomis	Placer
5S31C386366	Construction	3858 Green Acres Lane	3858 Green Acres Lane	Loomis	Placer
5S31C380093	Construction	Downtown Master Plan Phase 1	Taylor Road and Horseshoe Bar Road	Loomis	Placer
5S31C382949	Construction	LeRoy Residence	4330 Champagne Court	Loomis	Placer
5S31C372627	Construction	Emerzian Residence	3220 Rustic Woods Court	Loomis	Placer
5S31C381161	Construction	5506 Sable Ridge Court	5506 Sable Ridge Court	Loomis	Placer
5S31C385945	Construction	Residence	2385 Creekside Lane	Loomis	Placer
5S31C382243	Construction	Butts Residence	9520 Horseshoe Bar Road	Loomis	Placer
5S31C384896	Construction	Combie Reservoir Sediment Removal Proje	Combie Road	Meadow Vista	Placer
5S31C381663	Construction	Newcastle Storage Yard	223 Taylor ROad	Newcastle	Placer
5S31C386243	Construction	Gold Hill Road over Auburn Ravine	On Gold Hill road over Auburn Ravine	Newcastle	Placer
5S31C389478	Construction	Evans Residence	4915 Lincoln Newcastle Highway	Newcastle	Placer
5S31W003049	Construction	Newcastle Elementary School Phase 1	8951 V	Newcastle	Placer
5S31CN605384	Construction	Billy Wing	7010 Chili Hill Road	Newcastle	Placer
5S31C365743	Construction	Line 173 Newcastle HPR Replacement Proj	Taylor Road	Newcastle	Placer
5S31C365150	Construction	Vista Cielo	NW of intersection of Auburn Folsom Rd and Powerhouse Road	Newcastle	Placer
5S31C370320	Caltrans Construction	3E1004 PLA 80 Bridge Vertical Clearance	Highway 80 Var Locations	Newcastle	Placer
5S31C374212	Construction	Gruber Mountain Estates	Uncle Joes Lane	Newcastle	Placer
5S31C373525	Construction	Brennans Point	2360 Brennans Road	Newcastle	Placer
5S31C376259	Construction	Newcastle Fire Station	9350 Old State Highway	Newcastle	Placer
5S31C386419	Construction	Aspen Project	3050 Aspen Drive	Penryn	Placer
5S31CN605567	Construction	Enlish Colony	1787 English Colony	Penryn	Placer
5S31C383715	Construction	Orchards at Penryn RAW	Penryn Road 1800 feet north of I80	Penryn	Placer
5S31C383200	Construction	Brewer Road Bridge Replacement over Ple	Brewer Road	Pleasant Grove	Placer
5S31C368160	Construction	Lot 2A Sunset West	West Oaks Blvd at Lonetree Blvd	Rocklin	Placer
5S31C372823	Construction	Croftwood 3A 3B	Croftwood Drive and White Chapel Way	Rocklin	Placer
5S31C373490	Construction	Sierra Gateway Apartments	Southeast corner of Rocklin Rd at Sierra College Blvd	Rocklin	Placer
5S31C374818	Construction	Whitney Ranch Phase 2J	Whitney Ranch Parkway	Rocklin	Placer
5S31C377358	Construction	Spring Valley Phase 2	SE of Whitney Ranch Parkway at University Avenue	Rocklin	Placer
5S31C378306	Construction	Ironwood	SW of Painted Pony Ln and West Oaks Blvd	Rocklin	Placer
5S31C374884	Construction	The Goddard School	Wildcat Blvd and Stanford Ranch Rd	Rocklin	Placer
5S31C378661	Construction	Nellia Estates	Lost Ave. near Winding Lane	Rocklin	Placer
5S31C379617	Construction	Quick Quack Car Wash Rocklin	Stanford Rank Road	Rocklin	Placer
5S31C381073	Construction	Canyon View at Whitney Ranch	Golden Trail Street	Rocklin	Placer
5S31C382262	Construction	Wildcat	Wildcat Blvd and Whitney Ranch Pkwy	Rocklin	Placer
5S31C382635	Construction	Whitney Ranch Phase 2J	Whitney Ranch	Rocklin	Placer
5S31C382661	Construction	Whitney Ranch 2018 Grading	Whitney Ranch Parkway	Rocklin	Placer
5S31C382690	Construction	Rocklin Station	4660 Sierra College Boulevard	Rocklin	Placer
5S31C383210	Construction	Villages at Civic Center	Northwest of Lost Ave and Evelyn Ave	Rocklin	Placer
5S31C383903	Construction	Sierra Pine Subdivision	Dominguez Road	Rocklin	Placer
5S31C384013	Construction	Oak Vista	4382 Dias Ln	Rocklin	Placer
5S31C385171	Construction	Granite Terrace	4355 Robinson Way	Rocklin	Placer
5S31C385239	Construction	Park View at Whitney Ranch	Whitney Ranch Parkway and West Oaks Boulevard	Rocklin	Placer
5S31C385502	Construction	Whitney Ranch 42	2800 Broken Bit Lane	Rocklin	Placer
5S31C385709	Construction	Pacific Tech Park	6101 Pacific Street	Rocklin	Placer
5S31C385900	Construction	Whitney Ranch 2019 Grading	Whitney Ranch Pkwy	Rocklin	Placer
5S31C386686	Construction	Whitney Ranch	NE of Painted Pony Ln and Lazy Trail Dr	Rocklin	Placer
5S31C386884	Construction	Rocklin Unified School District New Elemer	2615 Sierra Meadows Drive	Rocklin	Placer
5S31C387011	Construction	Los Cerros	Hillside Drive	Rocklin	Placer
5S31C387231	Construction	California Backyard	Industrial Avenue	Rocklin	Placer
5S31C379329	Construction	West Oaks Self Storage	5800 West Oaks Blvd	Rocklin	Placer
5S31C388138	Construction	Placer Gold Industrial Park Lot 2 and 3 24 H	Cincinnati Avenue	Rocklin	Placer
5S31C388281	Construction	Ruhkala Elementary School	6530 Turnstone Way	Rocklin	Placer
5S31C388441	Construction	Niello Jaguar Land Rover	4545 Granite Drive	Rocklin	Placer
5S31C388665	Construction	Park Drive Self Storage	6025 Park Drive	Rocklin	Placer
5S31C388830	Construction	Whitney Ranch 44B The Ridge	Whitney Ranch Pkwy and Painted Pony Ln	Rocklin	Placer
5S31C388889	Construction	Sierra College Parking Structure	5100 Sierra College Boulevard	Rocklin	Placer
5S31C388989	Construction	Placer Gold Industrial Park Lot 10 11 and C	Cincinnati Avenue	Rocklin	Placer
5S31C389026	Construction	Granite Bluff	5325 Aguilar Road	Rocklin	Placer

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S31C385822	Construction	Nobel Learning Center	5893 Stanford Ranch Road	Rocklin	Placer
5S31C389414	Construction	Eastridge at Whitney Ranch Units 59 and 6	Northeast of Whitney Ranch Parkway and Jamboree Drive	Rocklin	Placer
5S31C366254	Construction	Croftwood Ranch Units 1 & 2	Barton Road and Rocklin Road	Rocklin	Placer
5S31C389515	Construction	WR Unit 63 & 69 2020	Whitney Ranch	Rocklin	Placer
5S31C389516	Construction	WR Unit 64AB 2020	Whitney Ranch	Rocklin	Placer
5S31C389517	Construction	Whitney Ranch Pkwy 2020	Whitney Ranch	Rocklin	Placer
5S31C389538	Construction	WR Unit 60 & 61AB 2020 Spoils Site	Whitney Ranch	Rocklin	Placer
5S31C389577	Construction	Whitney Ranch 51 & 62	Whitney Ranch Pkwy and Lincoln Ext	Rocklin	Placer
5S31W003314	Construction	Placer Gold Industrial Park 24 hr RV Storag	Cincinnati Avenue and Sunset Boulevard	Rocklin	Placer
5S31CN604803	Construction	Residence	2000 Creekside Lane	Rocklin	Placer
5S31C368796	Construction	Rocklin Commons Major F Theater	I80 and Sierra College Blvd	Rocklin	Placer
5S31C369038	Construction	William Jessup University Stockpile	333 Sunset Blvd	Rocklin	Placer
5S31C368899	Construction	Arco AMPM	4280 Sierra College Blvd	Rocklin	Placer
5S31C365239	Construction	Meyers Court Subdivision	Meyers Street	Rocklin	Placer
5S31C365325	Construction	Granite Lakes	Greenbrae Drive	Rocklin	Placer
5S31C372687	Construction	Brighton	NWC Granite Drive and Dominguez Road	Rocklin	Placer
5S31C371029	Construction	BassPro	5472 Crossings Drive	Rocklin	Placer
5S31C372178	Construction	Rocklin Crossings Pad 9	South East Corner of Sierra College Bl and Interstate 80	Rocklin	Placer
5S31C372038	Construction	The Center at Secret Ravine	SE corner of Sierra College Boulevard and Schriber Way	Rocklin	Placer
5S31C369724	Construction	Bass Pro Shops Rocklin	5472 Crossings Drive	Rocklin	Placer
5S31C369672	Construction	University Avenue North	East of Hwy 65 and South of Whitney Ranch Parkway	Rocklin	Placer
5S31C373951	Construction	Pacific Street Bike Lane Project	4226 Pacific Street	Rocklin	Placer
5S31C370009	Construction	University Avenue South	Sunset Blvd at Atherton rd intersection	Rocklin	Placer
5S31C371828	Construction	WJU Dorm	333 Sunset Blvd	Rocklin	Placer
5S31C373878	Construction	Quarry Park Phase 1	4060 Rocklin Road	Rocklin	Placer
5S31C374112	Construction	Rocklin Crossings Major G Green Acres	5436 Crossings Drive	Rocklin	Placer
5S31C366269	Construction	Parkview	Blue Oaks Boulevard and Sonora Pass Way	Rocklin	Placer
5S31C374113	Construction	Rocklin Crossings Pads 13 &14	5414 Crossings Drive	Rocklin	Placer
5S31C363790	Construction	Whitney Ranch Parcel 17	Ranch View and Spring Creek Drive	Rocklin	Placer
5S31C374324	Construction	Audi Rocklin	SWC Granite Drive and Warren Drive	Rocklin	Placer
5S31C370683	Construction	Yankee Hill Unit 6	Northaven Drive at Mockingbird Lane	Rocklin	Placer
5S31C370240	Construction	SR 65 at Whitney Ranch Parkway	SR 65 at Whitney Ranch Parkway	Rocklin	Placer
5S31C376638	Construction	Orchard Creek Business Park	Highway 65 and Whitney Ranch Parkway	Rocklin	Placer
5S31C365711	Construction	Stanford Ranch Parcel 69	Corner of Wildcat Blvd and Bridlewood Dr	Rocklin	Placer
5S31C375342	Caltrans Construction	Placer 193 Curve Improvement	2520 Warren Drive	Rocklin	Placer
5S31C368111	Construction	Bella Vida	4141 Pacific Street	Rocklin	Placer
5S31C368559	Construction	Rocklin Senior Living	West Ranch View Drive	Rocklin	Placer
5S31C372606	Construction	Stanford Ranch Parcel 61	West Stanford Ranch Road	Rocklin	Placer
5S31C375628	Construction	LNG CNG Operations Center	4180 Duluth Avenue	Rocklin	Placer
5S31C376912	Construction	Placer Creek Corporate Center	University Ave south of Whitney Ranch Blvd	Rocklin	Placer
5S31C376744	Construction	Rocklin Crossings Pads 3 4 and 15	Southeast Corner of Sierra College Boulevard	Rocklin	Placer
5S31C368138	Construction	Winding Lane Estates	Winding Lane	Rocklin	Placer
5S31C366654	Construction	Two Oaks	West Oaks Boulevard and West Stanford Ranch Road	Rocklin	Placer
5S31C369458	Construction	Avalon	Rocklin Road at S Grove Street	Rocklin	Placer
5S31C376098	Construction	Divine Truck Facility	Cincinnati Avenue	Rocklin	Placer
5S31C370516	Construction	Whitney Ranch Unit 22	Wildcat Blvd	Rocklin	Placer
5S31C373660	Construction	SierraPine	4300 Domiguez Road	Rocklin	Placer
5S31C374480	Construction	Whitney Ranch 46 A and B	SW of Ranch Veiw Drive and Gray Dawn Drive	Rocklin	Placer
5S31C373260	Construction	Brighton	NWC Granite Drive and Dominguez Rd	Rocklin	Placer
5S31C381385	Construction	Granite Terrace	4355 Robinson Way	Rocklin	Placer
5S31C379501	Construction	Lea Subdivision	6299 Galaxy Lane	Rocklin	Placer
5S31C366797	Construction	Whitney Ranch Ph 2 Mass Grading 46 and ·	Old Ranch House Road	Rocklin	Placer
5S31C377771	Construction	AT&T Communication Line Install Project #	Del Webb Blvd.	Rocklin	Placer
5S31C380569	Construction	Rocklin Crossings Majors E & F	5440 Crossings Drive	Rocklin	Placer
5S31C379458	Construction	Whitney Ranch - University Ave	Univeristy Ave.	Rocklin	Placer
5S31C370729	Construction	Parklands South	SW Intersection of Del Mar Ave and Del Rio Court	Rocklin	Placer
5S31C373873	Construction	Whitney Ranch 46 ABCD Tracts 1 & 2	NE Intersection of Grey Dawn Drive and Creek Hollow Road	Rocklin	Placer
5S31C381963	Construction	Rocklin Adventure Park Site Work	3970 Rocklin Road	Rocklin	Placer
5S31C378164	Construction	Stanford Ranch Congregate Care Facility	West Stanford Ranch Road	Rocklin	Placer
5S31C377251	Construction	Racetrack Road	4765 Racetrack Road	Rocklin	Placer
5S31C380873	Construction	New Fire Station Access Road and Parking	5361 Pacific Street	Rocklin	Placer
5S31C376039	Construction	Los Cerros	Hillside Drive	Rocklin	Placer
5S31C375758	Construction	4410 Granite Drive	1430 Blue Oaks Blvd Ste 190	Rocklin	Placer
5S31C373603	Construction	Parklands North	North of Del Rio Court and West of Del Mar Avenue	Rocklin	Placer
5S31C379723	Construction	Placer Creek Corporate Center Access Roa(	University Ave between Sunset and Whitney Ranch Parkway	Rocklin	Placer
5S31C377876	Construction	Whitney Ranch 41A	Whitney Ranch Parkway & West Oaks Blvd	Rocklin	Placer
5S31C369848	Construction	Whitney Ranch Phase 2C & 2D	Whitney Ranch Parkway	Rocklin	Placer
5S31C379289	Construction	Whitney Ranch 52	West Oak Blvd	Rocklin	Placer
5S31C368035	Construction	Rocklin 60	Sierra College Boulevard and I80	Rocklin	Placer
5S31C383534	Construction	Placer Gold Industrial Park Phase 1A & 1B	Cincinnati Avenue and Sunset Boulevard	Rocklin	Placer
5S31C375929	Construction	Pebble Creek	Sunset Blvd and Stanford Ranch Rd	Rocklin	Placer
5S31C379899	Construction	Winding Lane Estates	Winding Lane at Lost Avenue	Rocklin	Placer
5S31C377511	Construction	Wildcat Subdivision	Wildcat Blvd.	Rocklin	Placer
5S31C387975	Construction	Granite Bluff	5325 Aguilar Road	Rocklin	Placer
5S31C383430	Construction	Granite Bluff	Wildflow Road	Rocklin	Placer
5S31C372402	Construction	Spring Valley Phase 1	West of Bridlewood Drive	Rocklin	Placer
5S31C380510	Construction	Sagora Senior Living	University Avenue Rocklin Ca	Rocklin	Placer
5S31C372710	Construction	Garnet Creek	4200 Granite Drive	Rocklin	Placer
5S31CN601424	Construction	Ace Hardware Expansion	3301 Industrial	Rocklin	Placer
5S31CN601408	Construction	Mill Pond at Taylor Road	Taylor	Rocklin	Placer
5S31C361109	Construction	Church in Roseville	9885 Sierra college Boulevard	Roseville	Placer
5S31C366914	Construction	West Park Phase 3 Village 13	Pleasant Grove Blvd and Westbrook Blvd	Roseville	Placer

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S31C369352	Construction	Morgan Ranch	PFE Road	Roseville	Placer
5S31C369713	Construction	HP Campus Oaks Phased Development Pro	1485 Blue Oaks Boulevard	Roseville	Placer
5S31C370700	Construction	Westpark Phase 4	Pleasant Grove Blvd and Westbrook Blvd	Roseville	Placer
5S31C373273	Construction	Stoneridge 54	Miners Ravine Drive	Roseville	Placer
5S31C373842	Construction	Diamond Creek II	South West of Lavande Dr and Parkside Way	Roseville	Placer
5S31C377331	Construction	Woodbridge Fiddyment F 13B1	Hollis Way at North Hayden Parkway	Roseville	Placer
5S31C377346	Construction	Riolo Vineyard Parcel J	PFE and Walerga Rd	Roseville	Placer
5S31C379028	Construction	Sutter Roseville Medical Center - ED/CC Ex	1 Medical Plaza	Roseville	Placer
5S31C379101	Construction	Westpark 18C/18D	Brookstone Drive and Starsmore Way	Roseville	Placer
5S31C379357	Construction	Roseville Land 80 - Project One	7701 Foothills Boulevard	Roseville	Placer
5S31C379791	Construction	Westbrook Village 7A & 7B	South of Pleasant Grove East of Summarfaire	Roseville	Placer
5S31C380055	Construction	Fiddyment Ph 2	Crawford Parkway and Fiddyment Rd	Roseville	Placer
5S31C380137	Construction	Fiddyment Ranch Apartments	1900 Blue Oaks Blvd	Roseville	Placer
5S31C380148	Construction	Riverside Cirby Medical Office Building	1001 Riverside Ave.	Roseville	Placer
5S31C380575	Construction	3925 Progress Drive	Roseville CA	Roseville	Placer
5S31C381491	Construction	Solaire at Westbrook	SW of Pleasant Grove Blvd and Westbrook Blvd	Roseville	Placer
5S31C382310	Construction	Sierra Vista JM20	6810 Fiddyment Road	Roseville	Placer
5S31C382308	Construction	Sierra Vista JM3	6810 Fiddyment Road	Roseville	Placer
5S31C382307	Construction	Sierra Vista JM2	6810 Fiddyment Road	Roseville	Placer
5S31C382658	Construction	Westbrook Village 4	SW of Westbrook Blvd at Solaire Dr	Roseville	Placer
5S31C383314	Caltrans Construction	0H26U4 HWY 65 Widening	2520 Warren Drive	Roseville	Placer
5S31C383463	Construction	New Sixth High School Campus	High School Road	Roseville	Placer
5S31C383478	Construction	Sikh Temple Roseville	1090 Main Street	Roseville	Placer
5S31C383670	Construction	F9 CD & F8 CD	Fiddyment Road and Crawford Way	Roseville	Placer
5S31C383695	Construction	Downtown Bridges and Trails Improvemen	Dietrich Drive and Park Drive	Roseville	Placer
5S31C384509	Construction	Sierra Vista Phase I	North of Baseline Road	Roseville	Placer
5S31C384833	Construction	Broadstone Holden Independent Living	1035 Roseville Parkway	Roseville	Placer
5S31C385444	Construction	Breton Village	NWCorner of Pleasant Grove and Foothills BLVD Intersection	Roseville	Placer
5S31C385496	Construction	Fiddyment Ranch 7A 7B 9B	South of Holt Pkwy and Schellhous Dr	Roseville	Placer
5S31C385858	Construction	Solaire Phase II	SW of Pleasant Grove Blvd and Daystar Dr	Roseville	Placer
5S31C386003	Construction	Roseville High School Auxiliary Gymnasium	1 Tiger Way	Roseville	Placer
5S31C386084	Construction	415 East Street	415 East Street	Roseville	Placer
5S31C386100	Construction	Walerga Road Over Dry Creek Bridge Repla	Walerga Road	Roseville	Placer
5S31C386119	Construction	Annabelle Ave	none	Roseville	Placer
5S31C386125	Construction	Oakmont of Roseville	2400 Pleasant Grove Blvd	Roseville	Placer
5S31C386175	Construction	RG Phillips F52 Park	1200 Old Coach Drive	Roseville	Placer
5S31C386331	Construction	Sundance Self Storage	SWC Baseline and Brady Road	Roseville	Placer
5S31C386418	Construction	Union Pacific Railroad IWCS Upgrade	9391 Atkinson St	Roseville	Placer
5S31C386414	Construction	Richard and Pauline Roccucci Park W51	2110 Symphony Avenue	Roseville	Placer
5S31C386502	Construction	Main Street Plaza Apartments	300 Washington Blvd	Roseville	Placer
5S31C386523	Construction	Creekview	Cross Blue Oaks Blvd and Westbrook Blvd	Roseville	Placer
5S31C386613	Construction	Pistachio Regional Park	4350 Westpark Drive	Roseville	Placer
5S31C386691	Construction	Federico Phase 1	Westbrook & Pleasant Grove	Roseville	Placer
5S31C386707	Construction	eureka mob	1513 eureka road	Roseville	Placer
5S31C386846	Construction	Sierra Vista Village JM04A Phase 1 and JM(	6810 Fiddyment Road	Roseville	Placer
5S31C379230	Construction	Adventist Health New Campus	North Sunrise Blvd and Eureka Road	Roseville	Placer
5S31C386966	Construction	Placer County Coroner Facility	10951 Veterans Drive	Roseville	Placer
5S31C386988	Construction	Westbrook Phase 3	Pleasant Grove & Santucci	Roseville	Placer
5S31C387069	Construction	Milos Sand and Gravel	1801 PFE Road	Roseville	Placer
5S31C387093	Construction	Living Spaces at Freedom Point	1851 Freedom Way	Roseville	Placer
5S31C387204	Construction	Fiddyment 2J	North of N Hayden Parkway west of Fiddyment Road	Roseville	Placer
5S31C387257	Construction	Harry Crabb Park Phase 2	1000 Scarborough Drive	Roseville	Placer
5S31C387387	Construction	Central Park Phase 3	10200 Fairway Drive	Roseville	Placer
5S31C369499	Construction	Stoneridge Village 11	Miners Ravine Road and Sierra College	Roseville	Placer
5S31C387517	Construction	Placer Vineyards	NW of Walegra Rd and Farrier Way	Roseville	Placer
5S31C387548	Construction	Foothills Blvd & Roseville Pkwy	Foothills Blvd & Roseville Pkwy	Roseville	Placer
5S31C387592	Construction	Solaire in Roseville	4280 Santucci Boulevard	Roseville	Placer
5S31C387616	Construction	Riolo Vineyards Sewer Lift Station	5000 PFE Road	Roseville	Placer
5S31C380412	Construction	AutoNation Roseville Subaru	250 Automall Drive	Roseville	Placer
5S31C379893	Construction	Campus Oaks Apartments	4101 HP Way	Roseville	Placer
5S31C382476	Construction	Freedom Point Retail	4180 4181 4191 4201 Thrive Drive	Roseville	Placer
5S31C388082	Construction	Westbrook Blvd Extension	N of Westbrook Blvd S of Phillip Rd	Roseville	Placer
5S31C379820	Construction	Freedom Point - Bayside	9000 Washington Blvd	Roseville	Placer
5S31C388455	Construction	La Maison II at Diamond Creek	NW of Parksid Way and McCloud Way	Roseville	Placer
5S31C388625	Construction	Riego Creek Elementary School	4351 Crawford Parkway	Roseville	Placer
5S31C388737	Construction	Huntington Senior Apartments	1650 Huntington Drive	Roseville	Placer
5S31C380746	Construction	Villasport Roseville	291 Conference Center Drive	Roseville	Placer
5S31C383461	Construction	The Park at Granite Bay	9480 Sierra College Blvd	Roseville	Placer
5S31C388892	Construction	Sierra Vista CFD Phase 3A	Vista Grande Blvd near Upland Drive	Roseville	Placer
5S31C388947	Construction	Sausalito Walk	SE of Woodcreek Oaks Blvd and Crimson Ridge Way	Roseville	Placer
5S31C389279	Construction	Fiddyment Ranch 11A2 11A3 12	SW of North Hayden Pkwy and Hollis Way	Roseville	Placer
5S31C379819	Construction	Freedom Point - BSO LLC parcels	1730 Washington Blv.d	Roseville	Placer
5S31C389376	Construction	Solaire II	NW and NE of Summerfaire and Earl Rush Drive Intersection	Roseville	Placer
5S31C389427	Construction	Sierra Vista Phase II	N of Baseline Rd and Santucci Blvd	Roseville	Placer
5S31C385595	Construction	Placer County Fairgrounds At The Grounds	800 All American City Blvd	Roseville	Placer
5S31C389532	Construction	Roseville Old Town Lofts	1007 Douglas Boulevard	Roseville	Placer
5S31C389552	Construction	Fiddyment Ranch P3	Crawford Parkway	Roseville	Placer
5S31C389598	Construction	Foothills Industrial Building	10007 Foothills Boulevard	Roseville	Placer
5S31C367839	Construction	West Park 4 Villages 19a 19b 17c 17d 18B :	West of Westpark Drive and South of Phillip Road	Roseville	Placer
5S31W002325	Construction	Roseville Square Smart & Final TI	1159 Roseville Square	Roseville	Placer
5S31W002052	Construction	Fire Station Improvement	Downtown Roseville along Dry Creek	Roseville	Placer
5S31W002579	Construction	Westpark Village 16 Stockpile	Pleasant Grove Blvd	Roseville	Placer

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S31W002834	Construction	Thomastown Builders Office	10608 Industrial Ave	Roseville	Placer
5S31W002729	Construction	Roseville Self Storage	8601 Foothills Boulevard	Roseville	Placer
5S31W002726	Construction	William Hughes Park	Bent Tree Bridge 1600 Parkside Way	Roseville	Placer
5S31W002907	Construction	Adventist Health West	Stone Point Drive and North Sunrise Avenue	Roseville	Placer
5S31W003409	Construction	West Side Tank and Pump Station	4501 Westpark Drive	Roseville	Placer
5S31W003645	Construction	Pedestrian Pathway Project Cook Riolo Roa	Cook Riolo Road	Roseville	Placer
5S31W003672	Construction	TSI Semiconductors	7501 Foothills Blvd	Roseville	Placer
5S31W003547	Construction	Dutch Bros Roseville	715 Sunrise Avenue	Roseville	Placer
5S31W004156	Construction	Huntington Senior Apartments	1650 Huntington Drive	Roseville	Placer
5S31W004287	Construction	Lawton Ave and Los Vegas Ave Entry	Lawton Ave and Los Vegas Ave	Roseville	Placer
5S31CN603668	Construction	Allison Drive	3630 Allison Drive	Roseville	Placer
5S31CN604813	Construction	Residence	3590 Annabelle Avenue	Roseville	Placer
5S31CN605566	Construction	English Colony	1757 English Colony	Roseville	Placer
5S31C370133	Construction	Conference Center Drive	Conference Center Drive	Roseville	Placer
5S31C365297	Construction	Diamond Creek	Lavande Dr South of Parkside Way	Roseville	Placer
5S31C368557	Construction	Lifetime Athletic	1435 East Roseville Parkway	Roseville	Placer
5S31C369875	Construction	Fiddyment Ranch	Hayden Rd and Fiddyment Ranch Rd	Roseville	Placer
5S31C367843	Construction	West Park 4 Major Roads and Swales	West of Westpark Drive and South of Phillip Road	Roseville	Placer
5S31C343746	Construction	Club by Del Webb	SWC of Fiddyment Rd and Village Green Dr	Roseville	Placer
5S31C372155	Construction	Roseville Costco Fueling Station	6720 Stanford Ranch Road	Roseville	Placer
5S31C358831	Construction	Roseville 218	NW of Fiddyment Rd and Hayden Pkwy	Roseville	Placer
5S31C356144	Construction	Morgan Creek II	S of Inter Vineyard Rd & Crowder Ln	Roseville	Placer
5S31C369811	Construction	Walerga Road Tank and Booster Station	9235 Walerga Road	Roseville	Placer
5S31C368074	Construction	Stoneridge East Village 13	Miners Ravine Drive	Roseville	Placer
5S31C373797	Construction	Roseville Aquatic Center Overflow Parking	Woodcreek Oaks Blvd	Roseville	Placer
5S31C370369	Construction	Western Regional Sanitary Landfill	3033 Fiddyment Road	Roseville	Placer
5S31C365927	Construction	Fiddyment Ranch F14A2 and F14B2	North Hyden Pkwy and Fiddyment Road	Roseville	Placer
5S31C371774	Construction	Douglas Substation	90 N Sunrise Ave	Roseville	Placer
5S31C371478	Construction	MODULE 5 LINER SYSTEM AND MODULE 1!	3195 Athens Ave	Roseville	Placer
5S31C371396	Construction	Sutter Roseville Parking Structure II	12 Medical Plaza	Roseville	Placer
5S31C357852	Construction	Crocker Ranch N Village 4	N of Sevilla Dr And E of Adrienne Dr	Roseville	Placer
5S31C373319	Construction	West Park Phase 4 Vil 18E	W of West Park Drive South of Phillip Rd	Roseville	Placer
5S31C370833	Construction	Westbrook Phases 1 and 2	Pleasant Grove Blvd and Westbrook Blvd	Roseville	Placer
5S31C367935	Construction	Paseo Del Norte	SE Corner of Pleasant Grove Blvd and Fiddyment	Roseville	Placer
5S31C371395	Construction	Sutter Roseville MOB 6	8 Medical Plaza Drive	Roseville	Placer
5S31C372331	Construction	Avia	1900 Blue Oaks Blvd	Roseville	Placer
5S31C365284	Construction	WP Vill 22	1381 Village Center Drive	Roseville	Placer
5S31C368085	Construction	Lot 5 Carlsberg Industrial Center	Duluth Avenue	Roseville	Placer
5S31C369324	Construction	Eureka Road Widening	NE Corner of Eureka Rd and Sierra College Blvd	Roseville	Placer
5S31C372830	Construction	Foothills Boulevard and Roseville Parkway	Foothills Boulevard	Roseville	Placer
5S31C371795	Construction	GSA Office Building	8950 Industrial Avenue	Roseville	Placer
5S31C373905	Construction	Top Golf	1700 Freedom Way	Roseville	Placer
5S31C376759	Construction	Shadowbrook Lift Station	400 Forest Knoll	Roseville	Placer
5S31C374216	Construction	Countryhouse Memory Care	8485 Barton Road	Roseville	Placer
5S31C377172	Construction	Placer SPCA	99 Yosemite	Roseville	Placer
5S31C371010	Construction	Eskaton Village Roseville	northwest of the intersection of Blue Oaks Blvd and Diamond	Roseville	Placer
5S31C372972	Construction	NCRSP Parcel 49	Blue Oaks and Washington Blvd and Hwy 65	Roseville	Placer
5S31C370715	Construction	Blue Oaks Commerce Center	8950 Industrial Avenue	Roseville	Placer
5S31C369500	Construction	Stoneridge Village 12	Miners Ravine and Sierra College	Roseville	Placer
5S31C365685	Construction	Stoneridge Parcel 58	3000 Miners Ravine	Roseville	Placer
5S31C374148	Construction	Dry Creek Joint Elementary School District	8809 Cook Riolo Road	Roseville	Placer
5S31C373438	Construction	J R Davis Yard Drainage Repair	9451 Atkinson Street	Roseville	Placer
5S31C373060	Construction	Fiddyment Villages 9A1 and 19A1 and 19B	Hayden Parkway and Fiddyment Road	Roseville	Placer
5S31C375354	Construction	RCSD W70 Elementary School	Brookstone Drive	Roseville	Placer
5S31C372135	Construction	Carrington at West Park	W of West Park Dr and S of Phillip Rd	Roseville	Placer
5S31C378041	Construction	Roseville Self Storage	8601 Foothills Boulevard	Roseville	Placer
5S31C378167	Construction	Church Street Station	Ivy Street and Oakland Avenue	Roseville	Placer
5S31C367785	Construction	Stone Point	East of intersection of Stone Point Drive and North Sunrise Avenue	Roseville	Placer
5S31C376447	Construction	Roseville Road Improvement Project	City Limits north to Cirby Way	Roseville	Placer
5S31C366651	Construction	West Park Village 26	Bob Doyle Drive and Village Green Drive	Roseville	Placer
5S31C380046	Construction	Roller Compacted Concrete Pilot Project	Washington Boulevard and Atkinson Street	Roseville	Placer
5S31C373190	Construction	iFly Roseville	118 Harding Blvd	Roseville	Placer
5S31C378181	Construction	St Clare Parking Lot Expansion and Meditat	1950 Junction Boulevard	Roseville	Placer
5S31C379069	Construction	LOUIS-ORLANDO TRANSFER POINT	8660 AUBURN BLVD	Roseville	Placer
5S31C365923	Construction	Sorrento Village 2 thru 10	Sorrento Pkwy and Ferrari Ranch Rd	Roseville	Placer
5S31C380378	Construction	Laurel T. Stizzo (F-50) Park	4151 Brick Mason Circle	Roseville	Placer
5S31C371556	Construction	Stoneridge 10B	Demartini Dr	Roseville	Placer
5S31C379246	Construction	Playcare Learning Center	4080 Baseline Road	Roseville	Placer
5S31C372536	Construction	Fire Station No.1	10576 Industrial Ave	Roseville	Placer
5S31C377498	Construction	Roseville Medical and Dental Plaza	580 N Sunrise Ave	Roseville	Placer
5S31C375847	Construction	Foothills American Dream	Main & Foothills Blvd	Roseville	Placer
5S31C373388	Construction	Old Auburn Ranch	3170 Old Auburn Road	Roseville	Placer
5S31C378723	Construction	Douglas Substation Rebuild Phase II	90 North Sunrise Avenue	Roseville	Placer
5S31C366728	Construction	Hidden Crossing	Northeast of PFE Road and Walerga Road	Roseville	Placer
5S31C366586	Construction	WestPark Village 15	PleasantGroveBoulevard	Roseville	Placer
5S31C357851	Construction	American Vineyard Village	1671 Vineyard Rd	Roseville	Placer
5S31C363006	Construction	Diamond Creek DC 31	Intersection of Diamond Creek Blvd and Blue Oaks Blvd	Roseville	Placer
5S31C381019	Construction	Placer County Fairgrounds Phase 1B	800 All America City Blvd	Roseville	Placer
5S31C379141	Construction	Baseline Marketplace	5000 Baseline Road	Roseville	Placer
5S31C369649	Construction	Rockwood Subdivision	9755 Sierra College	Roseville	Placer
5S31C376373	Construction	Manchester at Solaire	SE of intersection of Westbrook Blvd and Solaire Drive	Roseville	Placer
5S31C366786	Construction	Fiddyment Ranch Village F16	East of Fiddyment Rd Btwn N Hayden Pkwy and Blue Oaks Blvd	Roseville	Placer

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S31C379867	Construction	District Education Center and New North V	8849 and 8779 Cook Riolo Road	Roseville	Placer
5S31C378940	Construction	Fire Station No.1	80 Lincoln Street	Roseville	Placer
5S31C373492	Construction	Fiddyment Ranch Village 9A Phase 1	5100 Fiddyment Ranch Road	Roseville	Placer
5S31C383570	Construction	Sierra Crossing Park	4251 Brookstone Drive	Roseville	Placer
5S31C383378	Construction	Astill Family Park W50B	1401 Grand Junction Way	Roseville	Placer
5S31C383711	Construction	2018 Roller Compacted Concrete Pavemen	Washington Blvd Atkinson Street Denio Loop Hickory Street	Roseville	Placer
5S31C372975	Construction	Fiddyment Villages 9A2 19A2 19B2	Hayden Parkway & Fiddyment Road	Roseville	Placer
5S31C384040	Construction	Placer County Fairgrounds Carnival Pad	800 All American City Blvd	Roseville	Placer
5S31C372901	Construction	Fiddyment Ranch Village 83 Open Space Bi	Pleasant Grove Creek betwn Fiddyment Rd and Orchard View Rd	Roseville	Placer
5S31C381890	Construction	Sierra Vista CFD Wetlands	6810 Fiddyment Road	Roseville	Placer
5S31C382309	Construction	Sierra Vista JM4	6810 Fiddyment Road	Roseville	Placer
5S31C379145	Construction	Residence Inn by Marriott	1850 Freedom Way	Roseville	Placer
5S31C383404	Construction	Roseville Community Solar Project	5120 Phillip Road	Roseville	Placer
5S31C367840	Construction	Ridgefield Villages 17E 18E 18F	West of Westpark Drive and South of Phillip Road	Roseville	Placer
5S31C372527	Construction	West Park Phase 4 North	West of Westpark Drive and South of Phillips Road	Roseville	Placer
5S31C378045	Construction	623 Vernon	623 Vernon St	Roseville	Placer
5S31C384016	Construction	Roseville	120 Harding Blvd	Roseville	Placer
5S31C383884	Construction	Sierra Gardens Transfer Point	Sierra Gardens Drive	Roseville	Placer
5S31C377686	Construction	Westbrook	Westbrook Boulevard	Roseville	Placer
5S31C373318	Construction	West Park Phase 4 Vil 18A	W of Westpark Dr S of Phillip Rd	Roseville	Placer
5S31C384039	Construction	Nela Luken Park at the Village Center	2350 Pleasant Grove Boulevard	Roseville	Placer
5S31C377039	Construction	Wexford (Westbrook Village 6)	SE of intersection of Pleasant Grove Blvd and Summerfaire Dr	Roseville	Placer
5S31C379557	Construction	Douglas Ridge Indoor Storage	3991 Douglas Boulevard	Roseville	Placer
5S31C385135	Construction	TSI Semiconductors	7501 Foothills Blvd	Roseville	Placer
5S31C379965	Construction	Home2 Suites by Hilton	1900 Freedom Way	Roseville	Placer
5S31C375556	Construction	The Falls Event Center Roseville	240 Conference Center Drive	Roseville	Placer
5S31C379921	Construction	Woodcreek Oaks Boulevard	Woodcreek Oaks Boulevard	Roseville	Placer
5S31C381766	Construction	Sierra Vista CFD	6810 Fiddyment Road	Roseville	Placer
5S31C366853	Construction	Pearl Creek	1298 Antelope Creek Drive	Roseville	Placer
5S31C366614	Construction	Fiddyment Ranch Village 15 A B C	4821 Fiddyment Road Roseville CA 95747	Roseville	Placer
5S31C372537	Construction	Solmere Village 5A 5B	1950 Westbrook Drive	Roseville	Placer
5S31C383546	Construction	Sierra Vista Substation	Westbrook Boulevard	Roseville	Placer
5S31C374809	Construction	West Park Village 24	2151 Pleasant Grove Blvd	Roseville	Placer
5S31C382570	Construction	Westpark Village Center	Pleasant Grove Blvd	Roseville	Placer
5S31C383380	Construction	Manchester II	Pleasnt Grove Blvd & Westbrook Blvd	Roseville	Placer
5S31C385537	Construction	West Park 4 Offsite T Main	Btwn Westbrook Blvd and Westpark Dr	Roseville	Placer
5S31C372401	Construction	Oakbriar F 23	1875 Orchard View Road	Roseville	Placer
5S31C383206	Construction	Westpark Storage	4351 Westpark Drive	Roseville	Placer
5S31C386170	Construction	Diamond Creek	1550 Parkside Way	Roseville	Placer
5S31CN601418	Construction	LINCOLN HILLS SUN CITY STORMW	FIDDYMENT	Roseville	Placer
5S31C377648	Construction	Andressen Road	Andressen Road	Sheridan	Placer
5S31C387740	Construction	Memorial Overland Emigrant Trail	Soda Springs Road	Soda Springs	Placer
5S31W002855	Construction	Royal Gorge Trail	Soda Springs Rd	Soda Springs	Placer
5R32C371415	Construction	Beckwourth Genessee Road 111	Beginning at the town of Beckwourth and proceeding 10 miles north a	Beckwourth	Plumas
5R32C382894	Caltrans Construction	02 1C7504 Yellow Creek Bridge Replaceme	02 PLU 70 PM 14 9	Belden	Plumas
5R32C371891	Construction	UPRR Mile Post 265 Canyon Subdivision	East of Belden Road	Belden	Plumas
5R32C370710	Construction	Gansner Bar Fish Barrier	Caribou Rd and Hwy 70	Belden	Plumas
5R32C386577	Caltrans Construction	020 OH4504 Opapee Curve Improvement	02 PLU 70 PM11 5 11 9	Belden	Plumas
5R32W002914	Caltrans Construction	02 4G2604 HMA Full Depth Reclamation C	HWY 147 in Plumas County PM 0 to 1	Canyondam	Plumas
5R32C383213	Caltrans Construction	02 0E1804 Lake Almanor Spillway Bridge R	02 PLU 89 PM 30 1	Canyondam	Plumas
5R32C356679	Construction	820 Lorraine Dr	820 Lorraine Dr	Chester	Plumas
5R32C371113	Construction	Dock Storage Yard	407 408 411 Peninsula Drive	Chester	Plumas
5R32W002324	Caltrans Construction	02 4F3904 Hamilton Branch	Plumas 147 postmile 8	Chester	Plumas
5R32C367749	Construction	Chester Warner Valley Road	Between Juniper Lake road and	Chester	Plumas
5R32C360351	Construction	Old Red Bluff Road Warner Creek Bridge	MP 12 Chester Warner Valley Road	Chester	Plumas
5R32C378534	Caltrans Construction	02 4e6404 Hamilton Branch Bridge	02 plu 147 8 9 9 3	Chester	Plumas
5R32W004106	Caltrans Construction	02 0H7604 Chilcoot Paving	02 PLU 70 PM 90 3 3 9	Chilcoot	Plumas
5R32W004360	Caltrans Construction	02 0H7604 Chilcoot Paving	02 PLU 70 PM 90 3 3 9	Chilcoot	Plumas
5R32W002643	Construction	Altitude Recreation Center	1402 Great Spirit Rd	Clio	Plumas
5R32C377668	Construction	Altitude Recreation Center	1402 Great Spirit Rd.	Clio	Plumas
5R32C388128	Construction	Crescent Mills Sierra Institute	15690 Highway 89	Crescent Mills	Plumas
5R32C377391	Caltrans Construction	02 0E24U4 Greenville Route 89	02 PLU 89 20 0 20 6	Greenville	Plumas
5R32C383656	Construction	Caribou 2 GF to SC	Feather Canyon Highway	Paxton	Plumas
5R32C373275	Construction	A15	Portola McClears Road	Portola	Plumas
5R32C375049	Construction	AT&T Communication Line Install Project N	State Route 70	Portola	Plumas
5R32C387943	Construction	Lower Bucks Dam Geomembrane Liner	Quincy at Lower Bucks Dam	Quincy	Plumas
5R32C371253	Construction	Irrigation Pond	500 N Mill Creek	Quincy	Plumas
5R32C368636	Construction	Peppard Flat Grading	1506 Peppard Flat Rd	Quincy	Plumas
5R32C368175	Construction	Bucks Lake Road	Half Mile E of Snake Lake Rd	Quincy	Plumas
5R32C341771	Construction	Sierra Park	APN 116 050 034	Quincy	Plumas
5R32C379633	Construction	Bucks Lake PLU411	Bucks Lake Road	Quincy	Plumas
5R32C387263	Construction	OReillys Auto Parts	1750 East Main Street	Quincy	Plumas
5R32C385811	Construction	Quincy Grocery Outlet	1715 E Main Street	Quincy	Plumas
5R32C380806	Construction	Gateway Apartments	E Midas Ave x Pacific Street	Rocklin	Plumas
5R32C381119	Caltrans Construction	02 2C0904 Spring Garden Bridge Widening	02 Plu 70 PM 50 6 51 7	Spring Garden	Plumas
5R32C376299	Construction	Rock Creek Bench Recreational Access	State Highway 70	Storrie	Plumas
5R32C369025	Construction	Mooney Road 5R CR A21	Begin south of Lassen County Line on A25 and	Susanville	Plumas
5S34C372569	Construction	Vineyard Creek Villages 4 and 5 Gerber Cre	South of Florin Rd and East of Hedge Ave	Abbott	Sacramento
5S34C370602	Construction	Barrett Ranch Multi Family Apartments	4850 Antelope Road	Antelope	Sacramento
5S34C375890	Construction	Elverta Park	Southwest of Intersection of Elverta Road and Scotland Drive	Antelope	Sacramento
5S34C381251	Construction	Antelope North Road	8700 Antelope N Road	Antelope	Sacramento
5S34C381305	Construction	Riolo Manor	Cook-Riolo Road	Antelope	Sacramento

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34C384971	Construction	ARCO ampm Watt & Blackfoot	7670 Watt Avenue	Antelope	Sacramento
5S34C385168	Construction	CAN 52 Antelope	7545 Walerga Road	Antelope	Sacramento
5S34C387449	Construction	Gibson Crossing	Elverta Rd & Watt Ave	Antelope	Sacramento
5S34C387533	Construction	Barrett Ranch East	NW of Antelope Rd and Don Julio Blvd	Antelope	Sacramento
5S34W004222	Construction	Burwell Estates	7760 28th Street	Antelope	Sacramento
5S34C369926	Construction	Riolo Manor	8312 Cook Riolo Road	Antelope	Sacramento
5S34C381069	Construction	Gibson Crossing Season Pond Fill	North of Elverta Rd and West of Watt Ave	Antelope	Sacramento
5S34C377698	Construction	Copart	8650 Antelope North Road	Antelope	Sacramento
5S34C384106	Construction	Barrett Ranch East	Antelope Road and Don Julio	Antelope	Sacramento
5S34C381499	Construction	Big Bend Clayton Idle Line Removal	Arden Arcade Area just outside of Sacramento CA	Arden Town	Sacramento
5S34C376760	Construction	Hilltop Center	Bowman Road and Mill Pond Roads	Auburn	Sacramento
5S34C367967	Construction	Fair Oaks Lotus	Fair Oaks Blvd	Carmichael	Sacramento
5S34C377656	Construction	Cypress Place	5413 Cypress Ave	Carmichael	Sacramento
5S34C381683	Construction	Torabian Residence	6019 6115 6121 Kenneth Avenue	Carmichael	Sacramento
5S34C382687	Construction	Carmichael Village Entry	7433 Fair Oaks Blvd	Carmichael	Sacramento
5S34C384701	Construction	5700 Winding Way	5700 Winding Way	Carmichael	Sacramento
5S34C387288	Construction	Mission Manor Townhomes	3532 Mission Ave	Carmichael	Sacramento
5S34C387599	Construction	Our Lady of Assumption	5057 Cottage Way	Carmichael	Sacramento
5S34C389378	Construction	Carmichael MOB	5238 Manzanita Avenue	Carmichael	Sacramento
5S34C389418	Construction	Eskaton Carmichael Assisted Living	3839 Walnut Avenue	Carmichael	Sacramento
5S34C389576	Construction	Weatherstone	8015 Fair Oaks blvd	Carmichael	Sacramento
5S34W002157	Construction	Cameron Ranch Elementary School	4333 Hackberry Lane	Carmichael	Sacramento
5S34W002309	Construction	Eskaton Village	3939 Walnut Avenue	Carmichael	Sacramento
5S34C372406	Construction	Jesuit High School Track and Field Improve	1200 Jacob Lane	Carmichael	Sacramento
5S34C367410	Construction	Jesuit High School Chapel	1200 Jacob Lane	Carmichael	Sacramento
5S34C370737	Construction	Winston Churchill Middle School	4900 Whitney Avenue	Carmichael	Sacramento
5S34C371874	Construction	The Oaks at Carmichael	5741 Winding Way	Carmichael	Sacramento
5S34C374353	Construction	Fair Oaks Boulevard	Landis to Engle	Carmichael	Sacramento
5S34C365673	Construction	Weatherstone	8015 Fair Oaks Boulevard	Carmichael	Sacramento
5S34C370661	Construction	Northridge Grove	5555 Mariposa Avenue	Citrus Heights	Sacramento
5S34C380978	Construction	Quick Quack Citrus Heights	7882 Lichen Drive	Citrus Heights	Sacramento
5S34C382188	Construction	Quantum Care Place CH	6500 Greenback Lane	Citrus Heights	Sacramento
5S34C382191	Construction	Stock Ranch Commercial Center	7000 Auburn Blvd	Citrus Heights	Sacramento
5S34C376287	Construction	Dignity Health MOB	Fountain	Citrus Heights	Sacramento
5S34C384632	Construction	Antelope Arco AmPm Sonic	5873 Antelope Road	Citrus Heights	Sacramento
5S34C388213	Construction	Mitchell Farms	Arcadia Drive and Sunrise	Citrus Heights	Sacramento
5S34C388600	Construction	Mitchell Farms	Arcadia Dr and Sunrise Blvd	Citrus Heights	Sacramento
5S34C389411	Construction	USPI Surgery Center	7435 Stock Ranch Road	Citrus Heights	Sacramento
5S34W002266	Construction	Stock Ranch Plaza	7030 Auburn Boulevard	Citrus Heights	Sacramento
5S34W002187	Construction	Mesa Verde High School	7501 Carriage Drive	Citrus Heights	Sacramento
5S34W002402	Construction	Main Drive Widening Stock Ranch	7030 Auburn Boulevard	Citrus Heights	Sacramento
5S34W003121	Construction	Fried Waiver	658 Chick Place	Citrus Heights	Sacramento
5S34C371646	Construction	Bubbas Car Wash	7411 Greenback Lane	Citrus Heights	Sacramento
5S34C373748	Construction	City Hall Complex Demolition	7115 Greenback Lane	Citrus Heights	Sacramento
5S34C373163	Construction	Rollingwood Sewer Relief Project	Antelope Rd to Treeleaf Way	Citrus Heights	Sacramento
5S34C372651	Construction	Sunrise Blvd Complete Street Phase 3	Sunrise Blvd	Citrus Heights	Sacramento
5S34C373805	Construction	Citrus Heights School	7085 Auburn Boulevard	Citrus Heights	Sacramento
5S34C373029	Construction	Lincoln Oaks Tank and Booster Station	5444 San Juan Avenue	Citrus Heights	Sacramento
5S34C368986	Construction	Watt Communities at Autumnwood	7108 Antelope Road	Citrus Heights	Sacramento
5S34C372959	Construction	Citrus Heights Memory Care	6825 & 6833 Sunrise Blvd	Citrus Heights	Sacramento
5S34C372100	Construction	Capital Nursery Plaza	5410 Sunrise Boulevard	Citrus Heights	Sacramento
5S34C373380	Construction	Citrus Heights City Hall	6350 Fountain Square Drive	Citrus Heights	Sacramento
5S34C341243	Construction	Bella Terra Estates	N Cherry Ave & Excelsior Ave	Citrus Heights	Sacramento
5S34C377231	Construction	Alta Sunrise	5414 Sunrise Blvd	Citrus Heights	Sacramento
5S34C378621	Construction	Sylvan Middle School Demolition	7137 Auburn Boulevard	Citrus Heights	Sacramento
5S34C380614	Construction	Corporation Yard	6230 Sylvan Road	Citrus Heights	Sacramento
5S34C373332	Construction	Applebees Citrus Heights	6900 Auburn Boulevard	Citrus Heights	Sacramento
5S34C381017	Construction	Mariposa Creek	7620 Orange Drive	Citrus Heights	Sacramento
5S34C368359	Construction	MORMON ISLAND AUXILIARY DAM	281 Green Valley Road	El Dorado Hills	Sacramento
5S34C387631	Construction	Air Blown Concrete	7801 El Rio Avenue	Elverta	Sacramento
5S34C369400	Construction	Phase 3 Pond R BKS Habitat Preserve	8701 East Levee Road	Elverta	Sacramento
5S34C374406	Construction	Elverta Maintenance Facility	7940 Sorento Road	Elverta	Sacramento
5S34C365357	Construction	Village at Old Fair Oaks	Orange Ave at Surnrise Blvd	Fair Oaks	Sacramento
5S34C372947	Construction	Hidden Ridge	Ridgegate and Codman Lane	Fair Oaks	Sacramento
5S34C377272	Construction	Gum Ranch Unit No 1	Kenneth Avenue	Fair Oaks	Sacramento
5S34C377481	Construction	Fair Oaks EcoHousing	4025 New York Ave.	Fair Oaks	Sacramento
5S34C377793	Construction	Shadowbrook Gardens	5915 Dewey Drive	Fair Oaks	Sacramento
5S34C378620	Construction	Eastcliff Estates	8035 Archer Avenue	Fair Oaks	Sacramento
5S34C383054	Construction	Bella Vista High School	8301 Madison Avenue	Fair Oaks	Sacramento
5S34C375650	Construction	Meier Estates Subdivision	North Sims Way	Fair Oaks	Sacramento
5S34W002837	Construction	Fruitwood Meadowood	Fruitwood Court	Fair Oaks	Sacramento
5S34C369955	Construction	Fair Oaks Presbyterian Church	11427 Fair Oaks Boulevard	Fair Oaks	Sacramento
5S34C370448	Construction	Davis Ranch	10850 Fair Oaks Blvd	Fair Oaks	Sacramento
5S34C379112	Construction	North Ridge Country Club	7600 Madison Ave	Fair Oaks	Sacramento
5S34C368972	Construction	The Village at Fair Oaks	6800 Madison Avenue	Fair Oaks	Sacramento
5S34C375923	Construction	Traditions II	10941 Fair Oaks Boulevard	Fair Oaks	Sacramento
5S34C380310	Construction	8980 Kruitof Way	8980 Kruitof Way	Fair Oaks	Sacramento
5S34C377453	Construction	Oakmont Fair Oaks	8484 Madison Ave	Fair Oaks	Sacramento
5S34C372229	Construction	Taylor Oak Estates	5232 Buena Vista Ave	Fair Oaks	Sacramento
5S34C369325	Construction	Talmont	Northwest corner of Madison Ave and Kenneth Ave	Fair Oaks	Sacramento
5S34C375178	Construction	Hazel Avenue Phase 2	Curragh Downs to Sunset	Fair Oaks	Sacramento
5S34C373577	Construction	Pendola Estates	8394 Jularick Court	Fair Oaks	Sacramento

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34C388041	Construction	Upper Sailor Bar and Sailor Bar Borrow Site	Below Nimbus Dam on the American River at Hazel Ave	Fair Oaks	Sacramento
5S34C376136	Construction	Talavera Ridge Apartments	Broadstone Parkway and Cavitt Drive	Folsom	Sacramento
5S34C376657	Construction	501 Levy Rd	501 Levy Rd	Folsom	Sacramento
5S34C377963	Construction	Folsom Campus Apartments	NE Willard Drive and Iron Point	Folsom	Sacramento
5S34C378942	Construction	Folsom Plan Area - Russell Ranch Phase 1 E	Placerville Road	Folsom	Sacramento
5S34C379083	Construction	Mangini Ranch Phase I	Scott Road	Folsom	Sacramento
5S34C379231	Construction	Farmhouse at Willow Creek	North of Parkshore Drive	Folsom	Sacramento
5S34C379261	Construction	Sutter Middle School	715 Riley Street	Folsom	Sacramento
5S34C379795	Construction	Harvest Phase 1	East Natoma Street S of Empire Ranch Golf Club	Folsom	Sacramento
5S34C379815	Construction	Folsom Plan Area - Zone 5 Water Tank and	Placerville Road and White Rock Road	Folsom	Sacramento
5S34C379813	Construction	Folsom Plan Area - Russell Ranch Phase 1 C	Placerville Road	Folsom	Sacramento
5S34C380802	Construction	The Pique at Iron Point	Iron Point Road	Folsom	Sacramento
5S34C381818	Construction	Enclave at Folsom Ranch	SE of Scott Road and Alder Creek Parkway	Folsom	Sacramento
5S34C382987	Construction	Broadstone Oaks	2005 Iron Point Road	Folsom	Sacramento
5S34C383031	Construction	Prospect Ridge	535 Levy Road	Folsom	Sacramento
5S34C383186	Construction	White Rock Springs Ranch Phase 1	NE corner of Intersection of White Rock and Placerville Road	Folsom	Sacramento
5S34C383449	Construction	Copperwood Village 9 and Oakleaf Village 8	Northeast of Scott Road and White Rock Road	Folsom	Sacramento
5S34C383504	Construction	Mangini Ranch Villages 1 & 2	N of Mangini Ranch Parkway E of East Bidwell Street	Folsom	Sacramento
5S34C384581	Construction	Revel Folsom	Iron Point Rd & Oak Avenue Pkwy	Folsom	Sacramento
5S34C384611	Construction	Stormwater Basins Restoration Project	Russi Road	Folsom	Sacramento
5S34C384939	Construction	Folsom Lake Boat & RV Storage	7740 Folsom Auburn Road	Folsom	Sacramento
5S34C385422	Construction	Folsom Dam	7794 Folsom Dam Road	Folsom	Sacramento
5S34C385849	Construction	Harvest Phase 2	East Natoma Street S of Empire Ranch Golf Course	Folsom	Sacramento
5S34C386536	Construction	Green Valley Road Widening	Green Valley Road	Folsom	Sacramento
5S34C382460	Construction	The Preserve at the Parkway	Silberhorn Drive	Folsom	Sacramento
5S34C386873	Construction	Ali Hosseini Residence 370 Tobrurry Way	370 Tobrurry Way	Folsom	Sacramento
5S34C386895	Construction	Hamid Hosseini Residence 378 Tobrurry W	378 Tobrurry Way	Folsom	Sacramento
5S34C387168	Construction	Mangini Ranch Phase 2 Cargini	Placerville Road	Folsom	Sacramento
5S34C387423	Construction	White Rock Springs Ranch Phase 2	NE corner of Intersection of White Rock and Placerville Road	Folsom	Sacramento
5S34C387512	Construction	Russell Ranch Phase 3	Placerville Road	Folsom	Sacramento
5S34C387645	Construction	Folsom Career Tech Education Buildings	1655 Iron Point Road	Folsom	Sacramento
5S34C387667	Construction	Mangini Ranch Elementary School	Mangini Parkway	Folsom	Sacramento
5S34C387777	Construction	White Rock Springs Ranch Village 1	Northeast of White Rock Road and Placerville Road	Folsom	Sacramento
5S34C387778	Construction	The Enclave	SE of Scott Road and Alder Creek Parkway	Folsom	Sacramento
5S34C388161	Construction	Iron Ridge at Russell Ranch	Placerville Rd at Alder Creek Pkwy	Folsom	Sacramento
5S34C388162	Construction	Russel Ranch	Alder Creek Parkway	Folsom	Sacramento
5S34C388168	Construction	Brookstone and Waterstone at Mangini Ra	North of Mangini Pkwy at Wildflower Way	Folsom	Sacramento
5S34C388175	Construction	Folosm Dam Raise Dike 8	1 Folsom Point Road	Folsom	Sacramento
5S34C388873	Construction	Mangini Ranch Villages 6 & 7	North of White Rock Rd south of Sparrow Dr and Mangini Pkwy	Folsom	Sacramento
5S34C382235	Construction	Bidwell Pointe	125 E Bidwell St	Folsom	Sacramento
5S34W002537	Construction	Sutter Middle School	715 Riley Street	Folsom	Sacramento
5S34W003178	Construction	Grand Prairie Substation	South of HWY 50 on Placerville Road	Folsom	Sacramento
5S34C366591	Construction	Empire Ranch Village 21	Hana Way and Hildebrand Circle	Folsom	Sacramento
5S34C369376	Construction	Dos Coyotes Trail	13291 Folsom Boulevard	Folsom	Sacramento
5S34C369041	Construction	Santa Juanita Subdivision	Santa Juanita Avenue	Folsom	Sacramento
5S34C369790	Construction	Goddard Day School	Outcropping Way	Folsom	Sacramento
5S34C370146	Construction	Empire Ranch Village 40C	Orenco Circle	Folsom	Sacramento
5S34C369315	Construction	Empire Ranch Village 31	Oliver Court	Folsom	Sacramento
5S34C365242	Construction	Empire Ranch Village 62	Carpenter Hill Road and Hidden Falls Road	Folsom	Sacramento
5S34C370084	Construction	Empire Ranch Village 32	West of Empire Ranch Road	Folsom	Sacramento
5S34C368473	Construction	Estacio Estates	Alayna Way	Folsom	Sacramento
5S34C370877	Construction	Empire Ranch Village 60	Fenceline Drive	Folsom	Sacramento
5S34C364209	Construction	Turnstone	Iron Point Road and McAdoo Road	Folsom	Sacramento
5S34C363466	Construction	The Parkway Lot J The Meadows	Parkway Drive North	Folsom	Sacramento
5S34C370966	Construction	Residences at American River Canyon	Marietta Court & Folsom Auburn Rd	Folsom	Sacramento
5S34C361816	Construction	Johnny Cash Trail Pedestrian Overcrossing	900 Folsom Lake Crossing	Folsom	Sacramento
5S34C374167	Construction	Zone 5 Tank Site Zone 6 Booster Pump Stat	White Rock Road	Folsom	Sacramento
5S34C366077	Construction	The Knolls	Northeasterly corner of E Natoma Street and Green Valley Road	Folsom	Sacramento
5S34C373017	Construction	Empire Ranch Village 61	Fenceline Road	Folsom	Sacramento
5S34C359873	Construction	MIAD KeyBlock	7794 Folsom Dam Road	Folsom	Sacramento
5S34C372132	Caltrans Construction	Route 50 Natoma Overhead	2366 Maritime Drive	Folsom	Sacramento
5S34C376728	Construction	Harvest Subdivision	E. Natoma Street	Folsom	Sacramento
5S34C377377	Construction	Harvest	E Natoma St south of Empire Ranch Golf Club	Folsom	Sacramento
5S34C377993	Construction	Harvest Subdivision	E Natoma Street	Folsom	Sacramento
5S34C356599	Construction	72 Raw Water Bypass Project	7785 Folsom Auburn Road	Folsom	Sacramento
5S34C368309	Construction	Addison Place	SE Corner Sibley and Glenn	Folsom	Sacramento
5S34C373837	Construction	Folsom Dam Phase V Right Bank Stabilizati	Southwest of Folsom Dam	Folsom	Sacramento
5S34C370758	Construction	Commons at Prairie City	Prairie City Rd an Willard Dr	Folsom	Sacramento
5S34C374304	Construction	Life Time	Healthy Way	Folsom	Sacramento
5S34C374235	Construction	Village 35	Bulian Court	Folsom	Sacramento
5S34C380416	Construction	The Pique at Iron Point	2795 Iron Point Road	Folsom	Sacramento
5S34C377791	Construction	Saint John the Baptist	307 Montrose Drive	Folsom	Sacramento
5S34C365784	Construction	The Island	Parkshore Drive	Folsom	Sacramento
5S34C366920	Construction	Folsom Dam Auxiliary Spillway Phase IV	855 Folsom Lake Crossing	Folsom	Sacramento
5S34C380464	Construction	Folsom Dam Access Road Repair	855 Folsom Lake Crossing	Folsom	Sacramento
5S34C373749	Construction	Veranda at Empire Ranch	Gold Links Boulevard	Folsom	Sacramento
5S34C375594	Construction	Vista Del Lago Stadium & Field Houses	1970 Broadstone Parkway	Folsom	Sacramento
5S34C378361	Construction	Water Treatment Plant	194 Randall Drive	Folsom	Sacramento
5S34C377240	Construction	Parkway Village H	Silberhorn Dr between Montmagny Ct and Morningside Dr	Folsom	Sacramento
5S34C376363	Construction	Superior Storage Folsom	7770 Folsom-Auburn Road	Folsom	Sacramento
5S34C375552	Construction	Soil Stockpile Area Parcel 55	Cavitt Drive	Folsom	Sacramento
5S34C379616	Construction	Quick Quack Car Wash Folsom	1750 Cavitt Drive	Folsom	Sacramento

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34C377082	Construction	Orangevale Avenue Bridge Rehabilitation F	Orangevale Avenue Bridge	Folsom	Sacramento
5S34C380535	Construction	Prospect Ridge	535 Levy Road	Folsom	Sacramento
5S34C380185	Construction	Talavara Apartment 72" Drainage Pipe Offs	E Bidwell & Boadstone	Folsom	Sacramento
5S34C380251	Construction	Folsom Corporate Center	2295 Iron Point Rd.	Folsom	Sacramento
5S34C374429	Construction	Lake Natoma Waterfront Trail	Gold Lake Drive	Folsom	Sacramento
5S34C369967	Construction	Sheba Office Park	6609 Folsom Auburn Road	Folsom	Sacramento
5S34C377435	Construction	Johnny Cash Trail - Phase 2	East Natoma Street	Folsom	Sacramento
5S34C377463	Construction	Econome Family Park	1900 Parkway Drive	Folsom	Sacramento
5S34C379084	Construction	Scott Road & Street A Backbone Infrastruct	Scott Road	Folsom	Sacramento
5S34C379812	Construction	Folsom Plan Area - Grand Prairie Road	Placerville Road and White Rock Road	Folsom	Sacramento
5S34C370132	Construction	Parkshore	South of Parkshore Dr between Folsom Blvd and Plaza Dr	Folsom	Sacramento
5S34C379156	Construction	Oak Chan Elementary School Modernizatio	101 Pewter	Folsom	Sacramento
5S34C376597	Construction	Carl Sundahl Elementary Modernization In	9932 Inwood	Folsom	Sacramento
5S34C379082	Construction	Folsom Ranch Offsite Sewer Lift Station Fo	Praire City Road	Folsom	Sacramento
5S34C378943	Construction	FPA US Highway 50 Crossion Pipeline Proje	Placerville Road	Folsom	Sacramento
5S34C362815	Construction	Folsom Bridge Access Road to Piers 2 & 3 8	Folsom Lake Crossing	Folsom	Sacramento
5S34C379585	Construction	Folsom Fire Station 39	Ritchie Street and Empire Ranch Road	Folsom	Sacramento
5S34C382540	Construction	Sutter Middle School Phase 2	715 Riley Street	Folsom	Sacramento
5S34C379816	Construction	Folsom Plan Area - Zone 4-5 Booster Pump	Placerville Road	Folsom	Sacramento
5S34C377962	Construction	Cresleigh Ravine	NW Willard Drive and Iron Point Rd	Folsom	Sacramento
5S34C385561	Construction	Folsom Point Pad F	175 Old Placerville Road	Folsom	Sacramento
5S34C386466	Construction	Folsom Hills Elementary School	106 Manseau Drive	Folsom	Sacramento
5S34C386135	Construction	Reach H Levee Improvement	E Levee Road	Natoma	Sacramento
5S34C377654	Construction	Natomas Central Village N	Hovnanian Drive	Natoma	Sacramento
5S34C378099	Construction	7040 30th Street	7040 30th Street	North Highlands	Sacramento
5S34C378790	Construction	The Church of Evangelist Immanuel	3801 Stephens Drive	North Highlands	Sacramento
5S34W002184	Construction	Futures High School	3701 Stephen Drive	North Highlands	Sacramento
5S34W002307	Construction	NARS Sedimentation Basin Grading Project	4450 Roseville Road	North Highlands	Sacramento
5S34W002610	Construction	Kohler Elementary School	4004 Bruce Way	North Highlands	Sacramento
5S34W002609	Construction	Village Elementary School	6845 Larchmont Drive	North Highlands	Sacramento
5S34W003052	Construction	Maranatha Romanian Baptist Church	3255 Freedom Park Drive	North Highlands	Sacramento
5S34W003608	Construction	Vargas Foam and Trim	6045 34th Street	North Highlands	Sacramento
5S34C371584	Construction	Oakdale Park	3708 Myrtle Avenue	North Highlands	Sacramento
5S34C377815	Construction	Watt Avenue Parking Lot	5945 Watt Avenue	North Highlands	Sacramento
5S34C384376	Construction	Casa Roble High School Admin Student Uni	9151 Oak Ave	Orangevale	Sacramento
5S34C386114	Construction	Gentry Place	9281 Central Ave	Orangevale	Sacramento
5S34C388413	Construction	Maple Hill Lane	6540 Hazel Ave	Orangevale	Sacramento
5S34W002814	Construction	Todd Stables	7798 Cardwell Avenue	Orangevale	Sacramento
5S34CN604815	Construction	Assisted Living Village	6709 Walnut Ave	Orangevale	Sacramento
5S34C367442	Construction	Greenback Assisted Living	8685 Greenback Lane	Orangevale	Sacramento
5S34C358565	Construction	Pringle Estates	5938 Illinois Ave	Orangevale	Sacramento
5S34C340086	Construction	Cresleigh Almondwood	5843 Almond Ave	Orangevale	Sacramento
5S34C368849	Construction	Santa Juanita Estates	6840 Santa Juanita Avenue	Orangevale	Sacramento
5S34C372986	Construction	Almond East	5960 Almond Ave	Orangevale	Sacramento
5S34C371423	Construction	Assisted Living Village	6709 Walnut Avenue	Orangevale	Sacramento
5S34C380871	Construction	Casa Robles High School	9151 Oak Avenue	Orangevale	Sacramento
5S34CN602155	Construction	Cherry Ave	9360 Cherry Ave	Orangevale	Sacramento
5S34C371561	Construction	Rio Del Oro Preliminary Grading and Stock	Whiterock Road	Rancho Cordova	Sacramento
5S34C387246	Construction	Zinfandel Complex Project	Zinfandel Drive and Highway 50	Rancho Cordova	Sacramento
5S34C387649	Construction	Hagan Community Park	2197 Chase Drive	Rancho Cordova	Sacramento
5S34C387759	Construction	Bradshaw Village Parc Phase 1	Old Placerville Road	Rancho Cordova	Sacramento
5S34C388353	Construction	Quick Quack Rancho Cordova	2346 Sunrise Boulevard	Rancho Cordova	Sacramento
5S34W004399	Construction	Kaiser Permanente Rancho Cordova Medic	10725 International Dr	Rancho Cordova	Sacramento
5S34C389369	Construction	Folsom Blvd Streetscape Enhancement Ph	Bradshaw Rd to Horn Rd	Rancho Cordova	Sacramento
5S34C389467	Construction	Townplace Suites by Marriott	11212 Point East Drive	Rancho Cordova	Sacramento
5S34W003830	Construction	Folsom Lake RV	11369 Folsom Blvd	Rancho Cordova	Sacramento
5S34C371157	Construction	Tributary Point Drive	12100 Tributary Point Drive	Rancho Cordova	Sacramento
5S34C371146	Construction	Rivergate Plaza Pad 2 and Frontage	2350 Sunrise Boulevard	Rancho Cordova	Sacramento
5S34C372066	Construction	Rivergate Cordova	2354 Sunrise Boulevard	Rancho Cordova	Sacramento
5S34C370457	Construction	AT&T Parking Lot	12700 Folsom Boulevard	Rancho Cordova	Sacramento
5S34C368768	Construction	Cordova High School Performing Arts Build	2239 Chase Drive	Rancho Cordova	Sacramento
5S34C377186	Construction	Mitigation Planting and Establishment at R	Rossmoor Bar Park at Ambassador Drive and Rossmoor Drive	Rancho Cordova	Sacramento
5S34C373919	Construction	Cordova Creek Naturalization	Rinda Drive	Rancho Cordova	Sacramento
5S34C373601	Construction	American River Pipeline Conveyance Proje	Coloma Road to Landis Avenue	Rancho Cordova	Sacramento
5S34C377611	Construction	Community Education Center	10850 Gadsten Way	Rancho Cordova	Sacramento
5S34C369627	Construction	Rancho Cordova Entertainment LLC	2920 Kilgore Road	Rancho Cordova	Sacramento
5S34C377065	Construction	3068 Kilgore Road	3068 Kilgore Road	Rancho Cordova	Sacramento
5S34C374574	Construction	Hyatt House	11255 Folsom Blvd	Rancho Cordova	Sacramento
5S34C375602	Construction	Cordova High School Gymnasium	2239 Chase Drive	Rancho Cordova	Sacramento
5S34C381458	Construction	10670 International Drive	10670 International Drive	Rancho Cordova	Sacramento
5S34C380768	Construction	Kilgore Road Soccer Complex	3151 Kilgore Road	Rancho Cordova	Sacramento
5S34C376374	Construction	Bridgeway Square Apartments	3175 Data Drive	Rancho Cordova	Sacramento
5S34C369803	Construction	Capital Village Phase 3 and 4	SE corner of International & prospect Park	Rancho Cordova	Sacramento
5S34C384396	Construction	10730 International Drive	10730 International Drive	Rancho Cordova	Sacramento
5S34C384148	Construction	Mills Middle School Softball Fields Modern	10439 Coloma Road	Rancho Cordova	Sacramento
5S34C381225	Construction	Homewood Suites by Hilton	10700 White Rock Road	Rancho Cordova	Sacramento
5S34C383896	Construction	Folsom Blvd Streetscape Enhancement Pha	Folsom Blvd from Horn Rd to Rod Beaudry Dr	Rancho Cordova	Sacramento
5S34C373747	Construction	FSP HCFIP GC	300 Prison Road	Represa	Sacramento
5S34C373746	Construction	SAC HCFIP GC	100 Prison Road	Represa	Sacramento
5S34C387469	Construction	Sri Suru Ravidass Temple	6221 16th Street	Rio Linda	Sacramento
5S34C382020	Construction	Rite Aid and Starbucks	Northwest corner of Rio Linda Blvd and Elkhorn Blvd intersec	Rio Linda	Sacramento
5S34C373634	Construction	Whitney Ranch 47AB	Old Ranch How Road and Ranch View Drive	Rocklin	Sacramento

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34C365042	Construction	Watt Ave at US 50 Interchange	Watt Ave at US 50 Interchange	Rosemont	Sacramento
5S34C382131	Construction	Morgan Creek Residential	Morgan Creek Lane and St Julien Way	Roseville	Sacramento
5S34C380125	Construction	Antelope Creek Flood Control Project Uppe	Antelope Creek	Roseville	Sacramento
5S34C369541	Construction	Palisades Sierra Oaks	Fairgate Road	Sacramento	Sacramento
5S34C321214	Construction	Curtis Park Village Soil Remed	3675 Western Pacific Avenue	Sacramento	Sacramento
5S34C366044	Construction	Former SPTCo Sacramento Railyard	501 Jibboom Street	Sacramento	Sacramento
5S34C369778	Construction	Sacramento ESC	547 L St	Sacramento	Sacramento
5S34C369889	Construction	Patterson Subdivision	4439 Dry Creek Road	Sacramento	Sacramento
5S34C369971	Construction	McKinley Village	Business 80 and A Street	Sacramento	Sacramento
5S34C373135	Construction	Natomas Westshore Village A EJP	Del Paso and El Centro	Sacramento	Sacramento
5S34C373257	Construction	Natomas Field Phases 1A 1B 2 3	SE Corner E Commerce Way at Prosper Road	Sacramento	Sacramento
5S34C373673	Construction	The Hamptons	E Commerce & S of Greg Thatch Cir	Sacramento	Sacramento
5S34C373847	Construction	Palm Avenue Estates	4552 Palm Avenue	Sacramento	Sacramento
5S34C373929	Construction	Del Paso Nuevo Phase 5	Ford Road & Auntine Burney Street	Sacramento	Sacramento
5S34C376288	Construction	Manassero Homes	3111 and 3121 65th Street	Sacramento	Sacramento
5S34C376352	Construction	Sacramento Behavioral Health Hospital	1400 Expo Parkway	Sacramento	Sacramento
5S34C376776	Construction	Pinegold Estates	Pinedale Avenue	Sacramento	Sacramento
5S34C377207	Construction	Natomas Hilton Garden Inn	20 Advantage Court	Sacramento	Sacramento
5S34C377254	Construction	Happy Lane Business Park	3710 Happy Lane	Sacramento	Sacramento
5S34C377267	Construction	Natomas Meadows	NW of N Breezy Meadow Dr and Juneberry Dr	Sacramento	Sacramento
5S34C377437	Construction	Gateway Community Charter School	Grace Ave & May Ave	Sacramento	Sacramento
5S34C377909	Construction	3659 Kiekebusch Ct	3659 Kiekebusch Ct	Sacramento	Sacramento
5S34C377979	Construction	Plaza De La Fuente	749 Estates Drive	Sacramento	Sacramento
5S34C378067	Construction	Sacramento Senior Living	1445 Expo Parkway	Sacramento	Sacramento
5S34C378148	Construction	Willow at Natomas Meadows	SE of Gateway Park Blvd and Del Paso Rd	Sacramento	Sacramento
5S34C378932	Construction	Entrada Sky Park Phase 1	Endeavor Way	Sacramento	Sacramento
5S34C379734	Construction	CSUS Student Union	6000 J Street	Sacramento	Sacramento
5S34C380038	Construction	Sutter Park Neighborhood	5105 F Street	Sacramento	Sacramento
5S34C380071	Construction	California State University Sacramento Par	6000 J. Street	Sacramento	Sacramento
5S34C380166	Construction	Evergreen Phase 2	2310 Evergreen Street	Sacramento	Sacramento
5S34C380169	Construction	University River Village	7901 La Riviera Drive	Sacramento	Sacramento
5S34C380273	Construction	Del Paso Nuevo Phase 6	Hayes Avenue & Alberghini Street	Sacramento	Sacramento
5S34C380675	Construction	The Cottages at Sunset	Sunset Ave & Ward Lane	Sacramento	Sacramento
5S34C380900	Construction	Mystique	3048 Macon Drive	Sacramento	Sacramento
5S34C381159	Construction	Oakmont Senior Living LLC	5301 F Street	Sacramento	Sacramento
5S34C381344	Construction	2440 McClellan Park Drive	2400 McClellan Park Drive	Sacramento	Sacramento
5S34C381400	Construction	Maranatha Romanian Baptist Church	3255 Freedom Park Drive	Sacramento	Sacramento
5S34C381406	Construction	Sacramento MLS Stadium	800 North B Street	Sacramento	Sacramento
5S34C381882	Construction	Catalina	SW of Scordia Wy Po River Wy NW of Po River Wy Natomas Centr	Sacramento	Sacramento
5S34C382124	Construction	Bethel Romanian Baptist Church	5590 Madison Avenue	Sacramento	Sacramento
5S34C382125	Construction	Element Natomas By Westin	3681 North Freeway Blvd	Sacramento	Sacramento
5S34C382577	Construction	River Oaks Phase 1	NE Corner West El Camino Ave at Orchard Lane	Sacramento	Sacramento
5S34C382808	Construction	Parkebridge Phase 2&3	1155 Bridgepointe Way	Sacramento	Sacramento
5S34C382835	Construction	East Commerce Way Del Paso Road Widen	East Commerce Way & Del Paso Road	Sacramento	Sacramento
5S34C382857	Construction	Natomas Townhomes Sacramento	SW of Benefit Way and Commerce Way	Sacramento	Sacramento
5S34C382904	Construction	River Plaza Office Building	2548 River Plaza Drive	Sacramento	Sacramento
5S34C383023	Construction	Dyer Kelly Elementary School Extension	2236 Edison Avenue	Sacramento	Sacramento
5S34C383029	Construction	American Legion High School	3801 Broadway	Sacramento	Sacramento
5S34C383053	Construction	Rio Americano High School	4540 American River Drive	Sacramento	Sacramento
5S34C383159	Construction	TownePlace Suites Hotel	4090 East Commerce Way	Sacramento	Sacramento
5S34C383215	Construction	Wyndham Garden Hotel	2298 Terracina Drive	Sacramento	Sacramento
5S34C383614	Construction	Powerhouse Science Center	400 Jibboom Street	Sacramento	Sacramento
5S34C383673	Construction	Evangelical Baptist Ukrainian Church of Sac	5540 Date Avenue	Sacramento	Sacramento
5S34C383809	Construction	Nations Burger Truxel Road	3500 Truxel Road	Sacramento	Sacramento
5S34C383954	Construction	Church Street Station	Northwest of Rio Linda Blvd and I80	Sacramento	Sacramento
5S34C383958	Construction	Natomas Crossing Quad B	4201 E Commerce Way	Sacramento	Sacramento
5S34C384189	Construction	American River College Liberal Arts Buildin	4700 College Oak Drive	Sacramento	Sacramento
5S34C384310	Construction	Metro Air Park Lot 49	Elverta Road and Metro Air Parkway	Sacramento	Sacramento
5S34C384469	Construction	American River Common Features Natoma	Garden Highway	Sacramento	Sacramento
5S34C384482	Construction	2555 Natomas Parkway	2555 Natomas Parkway	Sacramento	Sacramento
5S34C384466	Construction	Sacramento Commons	1500 7th Street	Sacramento	Sacramento
5S34C384560	Construction	Natomas Crossing Apartments	Areana Bl between Truxel Rd and Innovator Dr	Sacramento	Sacramento
5S34C384571	Construction	Del Paso Manor Elementary School	2700 Maryal Dr	Sacramento	Sacramento
5S34C384615	Construction	NTI no 7062 Freeport and Blair	6240 Freeport Blvd	Sacramento	Sacramento
5S34C384621	Construction	Sacramento Railyards Phase 1A	Railyards Blvd	Sacramento	Sacramento
5S34C384710	Construction	Greenbriar	SW Parcel from E Elkhorn Blvd and Hwy 99	Sacramento	Sacramento
5S34C384819	Construction	Morrison Avenue Estates	30 Morrison Avneue	Sacramento	Sacramento
5S34C384804	Construction	Morey Avenue	51 Morey Avenue	Sacramento	Sacramento
5S34C385207	Construction	Hillsdale Self Storage	5240 Hillsdale Bldvd	Sacramento	Sacramento
5S34C385202	Construction	Truck Service Facility	2024 and 2036 Bell Ave	Sacramento	Sacramento
5S34C385242	Construction	Sacramento Truck Center	171 Harris Avenue	Sacramento	Sacramento
5S34C385256	Construction	SCC Mohr Hall Replacement	3835 Freeport Blvd	Sacramento	Sacramento
5S34C370354	Construction	Live Oak Estates	on Live Oak Avenue	Sacramento	Sacramento
5S34C385351	Construction	Vinci Industrial Park	1400 Vinci Avenue	Sacramento	Sacramento
5S34C385418	Construction	Courtyard Inn	3425 Orange Grove Avenue	Sacramento	Sacramento
5S34C385585	Construction	Parkebridge Phase 1A & 1B	1155 Bridgepointe Way	Sacramento	Sacramento
5S34C385660	Construction	8634 Antelope North Road	8636 Antelope North Road	Sacramento	Sacramento
5S34C385664	Construction	1021 O Street	1021 O Street	Sacramento	Sacramento
5S34C385759	Construction	Twin Rivers Redevelopment	321 Eliza Street	Sacramento	Sacramento
5S34C385804	Construction	Jonas Main Replacement Project	1301 Jonas Ave	Sacramento	Sacramento
5S34C385847	Construction	SCUSD New Central Kitchen Increment 2	7058 San Joaquin Street	Sacramento	Sacramento
5S34C385958	Construction	Amberwood at Natomas Place	SE of Poppy Medow St and S Breezy Meadow Dr	Sacramento	Sacramento

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34C385987	Construction	Blackbird Park Phase 1	3765 Hovnanian Dr	Sacramento	Sacramento
5S34C386367	Construction	Artisans Square	5301 East Commerce Drive	Sacramento	Sacramento
5S34C386440	Construction	The Core Natomas	Orchard Lane	Sacramento	Sacramento
5S34C386447	Construction	Garfield Avenue Bike Ped Connectivity	Whitney Ave to Winding Way	Sacramento	Sacramento
5S34C386609	Construction	Sutter Park	NE of F St and 51st St	Sacramento	Sacramento
5S34C386649	Construction	Parkbridge V1&V2 Takedown 2	1155 Bridgepointe Way	Sacramento	Sacramento
5S34C386790	Construction	Paso Verde K8 School	3883 W Del Paso Rd	Sacramento	Sacramento
5S34C380162	Construction	DelPaso Grocery Outlet	2308 Del Paso Blvd	Sacramento	Sacramento
5S34C386856	Construction	Sacramento State P3 Student Housing	3001 state university drive	Sacramento	Sacramento
5S34C387017	Construction	Rio Linda Bridge Replacement and Main Av	Rio Linda Boulevard and Main Avenue	Sacramento	Sacramento
5S34C387046	Construction	Sacramento Self Storage	500 Leisure Lane	Sacramento	Sacramento
5S34C387134	Caltrans Construction	1F1904 Add Aux Lane in Sacramento	Route 50 from Howe Avenue Overcrossing to sixty five hundred	Sacramento	Sacramento
5S34C387227	Construction	US Foods	4455 Winters Street	Sacramento	Sacramento
5S34C387247	Construction	New Market Drive Extension Project	New Market Dr between Via Ingoglia and Town Center Dr	Sacramento	Sacramento
5S34C387261	Construction	The Retreat at Sacramento	2601 Redding Avenue	Sacramento	Sacramento
5S34C387306	Construction	North Natomas Community Center and Aq	2631 New Market Drive	Sacramento	Sacramento
5S34C387315	Construction	Project E Warehouse	6651 Lindbergh Drive	Sacramento	Sacramento
5S34C387551	Construction	Home2 Suites 65th Street	1865 65th Street	Sacramento	Sacramento
5S34C387571	Construction	Fresenius Kidney Care	7770 Stockton Blvd	Sacramento	Sacramento
5S34C387590	Construction	Parkside Village	Waterman Rd North of Ribera St	Sacramento	Sacramento
5S34C387659	Construction	I5 Metro Air Parkway Interchange	N Bayou Way	Sacramento	Sacramento
5S34C387738	Construction	Homecoming at Creekside South Apt Home	NEC SEC East Commerce Way New Market Drive	Sacramento	Sacramento
5S34C387747	Construction	3rd Street Relief Sewer	3rd Street	Sacramento	Sacramento
5S34C387750	Construction	601 Capitol Mall	601 Capitol Mall	Sacramento	Sacramento
5S34C387792	Construction	Improvements for 4930 Straus Drive	4930 Straus Drive	Sacramento	Sacramento
5S34C387837	Construction	Natomas Rehab Hospital	10 Advantage Ct	Sacramento	Sacramento
5S34C387932	Construction	Central Shops Calreuse	501 Jibboom Street	Sacramento	Sacramento
5S34C388034	Construction	Meadows Park	1700 Terracina Drive	Sacramento	Sacramento
5S34C377548	Construction	H&E Equipment Services	4800 Straus Drive	Sacramento	Sacramento
5S34C388044	Construction	Aloft Sacramento	3041 Advantage Way	Sacramento	Sacramento
5S34C388152	Construction	DGS Printing Plant	344 N 7th Street	Sacramento	Sacramento
5S34C388191	Construction	Project First Base	Powerline Road	Sacramento	Sacramento
5S34C388224	Construction	Fortune Charter School	1204 E Street	Sacramento	Sacramento
5S34C388283	Construction	Cortile at Artisan Square	East Commerce Way	Sacramento	Sacramento
5S34C388349	Construction	John F Kennedy High School Core	6715 Gloria Drive	Sacramento	Sacramento
5S34C388361	Construction	Sacramento Northern Bike Trail	Colfax Street to El Camino Ave and Arcade Creek to North Ave	Sacramento	Sacramento
5S34C388590	Construction	POCKET 69KV CABLE REPLACEMENT PROJE	Florin Road between Gloria Drive & Interstate 5	Sacramento	Sacramento
5S34C388645	Construction	Delta Shores North Satellite Retail	Cosumnes River Blvd & Delta Shores Cir North	Sacramento	Sacramento
5S34C388668	Construction	The Cottages at Laguna	8570 Center Parkway	Sacramento	Sacramento
5S34C388672	Construction	Sacramento Courthouse	500 H Street	Sacramento	Sacramento
5S34C388733	Construction	Sacramento Business Center	3360 El Camino Avenue	Sacramento	Sacramento
5S34C388753	Construction	Fairhaven Skilled Nursing Facility	4360 West 63rd Street	Sacramento	Sacramento
5S34C388800	Construction	Natomas Meadows Bloom	4321 Silver Cedar Lane	Sacramento	Sacramento
5S34C388799	Construction	Ravenna Parkebridge Lot 1	1155 Bridgepointe Way	Sacramento	Sacramento
5S34C388846	Construction	Arden Gateway	1600 Cormorant Way	Sacramento	Sacramento
5S34C385495	Construction	Duckhorn Apartments	Duckhorn Road & Great Egret Way	Sacramento	Sacramento
5S34C389070	Caltrans Construction	4F5804 Elkhorn Safety Roadside Rest Area	Elkhorn Safety Roadside Rest Area	Sacramento	Sacramento
5S34C389104	Construction	Wildflower at Dry Creek	Aurum Park Court	Sacramento	Sacramento
5S34C389112	Construction	Del Campo High School Science and CTE	4925 Dewey Drive	Sacramento	Sacramento
5S34C389232	Construction	Burlington Howe Bout Arden	1596 Ethan Way	Sacramento	Sacramento
5S34C389281	Construction	Storquest SQX National	1315 National Dr	Sacramento	Sacramento
5S34C389300	Construction	Malibu Estates	4552 Palm Ave	Sacramento	Sacramento
5S34C389320	Construction	Bannon Creek School K8 Conversion	2775 Millcreek Drive	Sacramento	Sacramento
5S34C389318	Construction	American Lakes School K8 Conversion	2800 Stonecreek Drive	Sacramento	Sacramento
5S34C389319	Construction	Jefferson Elementary School K8 Conversior	2001 Pebblewood Drive	Sacramento	Sacramento
5S34C389336	Construction	Crescendo Self Storage	8240 Folsom Blvd	Sacramento	Sacramento
5S34C389407	Construction	Arena Seniors Apartments	4431 Truxel Road	Sacramento	Sacramento
5S34C389432	Construction	Arden Middle School	1640 Watt Avenue	Sacramento	Sacramento
5S34C389476	Construction	WEXLER STUDENT HOUSING	6620 and 6800 Folsom Blvd	Sacramento	Sacramento
5S34C389495	Construction	Phase 2A Arden Service Area Pipe and Met	3501 Fair Oaks Blvd	Sacramento	Sacramento
5S34W002025	Construction	Egret Park	5145 Westlake Parkway	Sacramento	Sacramento
5S34W002180	Construction	Woodridge Elementary School	5761 Brett Drive	Sacramento	Sacramento
5S34W002181	Construction	Pioneer Elementary School	5816 Pioneer Way	Sacramento	Sacramento
5S34W002182	Construction	Smythe Academy	700 Dos Rios Street	Sacramento	Sacramento
5S34W002183	Construction	Rio Tierra Junior High School	3201 Northstead Drive	Sacramento	Sacramento
5S34W002196	Construction	Hiram Johnson HS	6879 14th Avenue	Sacramento	Sacramento
5S34W002195	Construction	Isador Cohen	9025 Salmon Falls Drive	Sacramento	Sacramento
5S34W002192	Construction	Sacramento High School	2315 34th Street	Sacramento	Sacramento
5S34W002198	Construction	Tahoe ES	3110 60th Street	Sacramento	Sacramento
5S34W002018	Construction	Regency Lot K	5561 Celebration St	Sacramento	Sacramento
5S34W002177	Construction	Bethel Romanian Church	5590 Madison Avenue	Sacramento	Sacramento
5S34W002207	Construction	Powerhouse Science Center	400 Jibboom Street	Sacramento	Sacramento
5S34W002255	Construction	Main Avenue Elementary School	1400 Main Avenue	Sacramento	Sacramento
5S34W002288	Construction	East Drainage Canal Multi Use Trail	24 indigo oaks court	Sacramento	Sacramento
5S34W002299	Construction	Low Impact Development Stormwater Syst	6000 J Street	Sacramento	Sacramento
5S34W002613	Construction	Grant Union High School	1400 Grand Avenue	Sacramento	Sacramento
5S34W002612	Construction	Martin Luther King Jr Tech Academy	3051 Fairfield Street	Sacramento	Sacramento
5S34W002611	Construction	Babcock Elementary School	2400 Cormorant Way	Sacramento	Sacramento
5S34W002832	Construction	Leataata Floyd ES	401 McClatchy Way	Sacramento	Sacramento
5S34W002866	Construction	Natomas Central Stockpile	Del Paso & El Centro	Sacramento	Sacramento
5S34W002604	Construction	915 Broadway	915 Broadway	Sacramento	Sacramento
5S34W002593	Construction	National Drive Parking Lot	1315 West National Drive	Sacramento	Sacramento

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34W002869	Construction	Metro Airpak - Haul Site	Elverta and Metro Air Park	Sacramento	Sacramento
5S34W002026	Construction	El Camino Ave Phase 2	3800 El Camino Ave	Sacramento	Sacramento
5S34W002885	Construction	Metro Airpark Haul Site	Elverta and Air Parkway	Sacramento	Sacramento
5S34W003170	Construction	Bob	1001 I Street	Sacramento	Sacramento
5S34W003124	Construction	Gramercy Drive Grading	Gramercy Drive	Sacramento	Sacramento
5S34W003140	Construction	Natomas Central Stockpile	Del Paso & El Centro	Sacramento	Sacramento
5S34W003386	Construction	C.K. McClatchy Field	3066 Freeport Blvd	Sacramento	Sacramento
5S34W003176	Construction	Stockpile Site	Metro Airparkway	Sacramento	Sacramento
5S34W003151	Construction	Metro Air Park Stockpile Site	Metro Airparkway	Sacramento	Sacramento
5S34W003153	Construction	Eastern Oak Park Expansion	Eastern Avenue	Sacramento	Sacramento
5S34W003662	Construction	Witter Ranch Elementary School	3790 Poppy Hill Way	Sacramento	Sacramento
5S34W003601	Construction	Babcock Elementary School	2400 Cormorant Way	Sacramento	Sacramento
5S34W003805	Construction	Defense Microelectronic Activity Managem	5584 Patrol Road	Sacramento	Sacramento
5S34W003925	Caltrans Construction	1H3804 Construct Aux Lane on SR 99	SR 99 from I 5 to Elkhorn Blvd	Sacramento	Sacramento
5S34W004116	Construction	Barandas Park Phase 2	2805 Grassland Drive	Sacramento	Sacramento
5S34W004113	Construction	John Cabrillo Elementary School	1141 Seamas Avenue	Sacramento	Sacramento
5S34W004112	Construction	Sam Brannan Middle School	5301 Elmer Way	Sacramento	Sacramento
5S34W003974	Construction	Renn Transportation New Building	4860 Strauss Dr	Sacramento	Sacramento
5S34W004261	Construction	Freeport Septic Conversion Project	Freeport Boulevard	Sacramento	Sacramento
5S34C369412	Construction	Arden Middle School	1640 Watt Avenue	Sacramento	Sacramento
5S34C369660	Construction	Wild Rose Park	Kankakee Drive	Sacramento	Sacramento
5S34C369152	Construction	Dogwood Park	3075 Macon Drive	Sacramento	Sacramento
5S34C366517	Construction	McClellan Business Park IP3	Dudley Blvd	Sacramento	Sacramento
5S34C363858	Construction	6th Street Roads and Walls Project	Sacramento Railyards	Sacramento	Sacramento
5S34C366602	Construction	American River Common Features Site L5	Teichert Avenue	Sacramento	Sacramento
5S34C370110	Construction	John F Kennedy High School	6715 Gloria Drive	Sacramento	Sacramento
5S34C368837	Construction	Park Riviera Place	6655 Park Riviera Way	Sacramento	Sacramento
5S34C372924	Construction	Low Impact Development Stormwater Syst	6000 J Street	Sacramento	Sacramento
5S34C369117	Construction	Guy West Bridge	Guy West Bridge	Sacramento	Sacramento
5S34C368778	Construction	CA3	1625 National Drive	Sacramento	Sacramento
5S34C368250	Construction	4393 0 Sacramento Walmart	4675 Watt Avenue	Sacramento	Sacramento
5S34C361270	Construction	Natomas Field Stockpile Off Haul	Amelia Earhart Avenue at Samuelson Way	Sacramento	Sacramento
5S34C372163	Construction	Carls Jr Sacramento	2280 Arden Way	Sacramento	Sacramento
5S34C361599	Construction	Access improvements from Richards Blvd t	Richards Blvd Jibboom Street Bercut Drive interstate 5	Sacramento	Sacramento
5S34C362793	Construction	BUS MAINTENANCE FACILITY 2	3701 Dudley Blvd	Sacramento	Sacramento
5S34C368307	Construction	Arden Oaks Phase 1 Water Main Replacem	4231 Arden Way	Sacramento	Sacramento
5S34C371019	Construction	North Country Club Estates Phase 4	2701 Lerwick Road	Sacramento	Sacramento
5S34C369671	Construction	4750 Manzanita Way	Sacramento CA 95833	Sacramento	Sacramento
5S34C372957	Construction	American River Common Features WRDA 9	Railroad Drive at Del Paso Boulevard	Sacramento	Sacramento
5S34C371402	Construction	100 Bicentennial Circle	100 Bicentennial Circle	Sacramento	Sacramento
5S34C369872	Construction	ARCF WRDA 1996 Remaining Sites R3A anc	Business 80 at Tribute and Howe Ave at La Riviera	Sacramento	Sacramento
5S34C368990	Construction	The Grove by Campus Crest	3075 Redding Avenue	Sacramento	Sacramento
5S34C368039	Construction	Los Rios American River College Culinary A	4700 College Oak Drive	Sacramento	Sacramento
5S34C367379	Construction	Kuni Chevrolet	2449 Fulton Avenue	Sacramento	Sacramento
5S34C368524	Construction	McDonald	2858FultonAve	Sacramento	Sacramento
5S34C369781	Construction	FLC Rancho Cordova Center	10259 Folsom Blvd	Sacramento	Sacramento
5S34C373250	Construction	1890 Santa Ana Avenue	1890 Santa Ana Avenue	Sacramento	Sacramento
5S34C370652	Construction	Pritchard Lake Pumping Plant	8935 Garden Highway	Sacramento	Sacramento
5S34C370158	Construction	Milargo	6241 Fair Oaks Boulevard	Sacramento	Sacramento
5S34C370956	Construction	North Natomas Regional Park Ph 5 6	2501 New Market Drive	Sacramento	Sacramento
5S34C365733	Construction	Raley & Vinci	Raley Blvd	Sacramento	Sacramento
5S34C369502	Construction	2014 Belcot Road El Camino Avenue and Fu	2100 Fulton Avenue	Sacramento	Sacramento
5S34C372006	Construction	Annette Street and Eastern Avenue	2405 Laredo Road	Sacramento	Sacramento
5S34C372832	Construction	Roseville Road Arcade Creek Bridge Replac	Roseville Road at Arcade Creek	Sacramento	Sacramento
5S34C375800	Construction	SMUD HQ Renovation Project	6201 S Street	Sacramento	Sacramento
5S34C370030	Construction	Florin Plaza	7205 Freeport Blvd	Sacramento	Sacramento
5S34C355120	Construction	Natomas Levee Improvement Prog Phase 2	Natomas Basin	Sacramento	Sacramento
5S34C359132	Construction	Natomas Levee Improvement Program- Ph	Natomas Basin	Sacramento	Sacramento
5S34C357072	Construction	Notamas Levee Improvement Program Pha	Natomas Basin	Sacramento	Sacramento
5S34C370288	Construction	ARCF WRDA 1996 Remaining Sites R7 and I	H Street Bridge Crossing American River	Sacramento	Sacramento
5S34C369158	Construction	29 41 & 45 Morrison Ave	4600 Northgate Blvd Ste 100	Sacramento	Sacramento
5S34C373376	Construction	Candela	150 Candela Circle	Sacramento	Sacramento
5S34C372556	Construction	WINCO Foods	2300 Watt Ave	Sacramento	Sacramento
5S34C366826	Construction	Fairbairn Water Treatment Plant	7501 College Town	Sacramento	Sacramento
5S34C366807	Construction	Sacramento Water Treatment Plants	301 Water St	Sacramento	Sacramento
5S34C373160	Construction	The Railyards Unit 1	0 7th Street	Sacramento	Sacramento
5S34C373050	Construction	The Grove by Campus Crest	3705 Redding Avenue	Sacramento	Sacramento
5S34C376135	Caltrans Construction	03 3F1704 Gore Pave Project	3855 North Freeway Blvd	Sacramento	Sacramento
5S34C375855	Construction	Township 9 Park	611 Riverine Way	Sacramento	Sacramento
5S34C375849	Construction	Kaiser Railyards	Railyard Blvd and 5th Street	Sacramento	Sacramento
5S34C372072	Construction	Riverfront Reconnection	Capitol Mall O St and 2nd St	Sacramento	Sacramento
5S34C371550	Construction	McKinley Village Offsite Project	28th Street Site delayed	Sacramento	Sacramento
5S34C374755	Construction	C Street Business Park	3301 C Street	Sacramento	Sacramento
5S34C377455	Construction	General Services Administration	2800 Cottage Way	Sacramento	Sacramento
5S34C374520	Construction	American River College Athletic Field Impro	4700 College Oak Drive	Sacramento	Sacramento
5S34C374149	Construction	Star Academy Charter School	Prosper Road & Gloster Way	Sacramento	Sacramento
5S34C371961	Construction	Anton Arcade	2134 Butano Drive	Sacramento	Sacramento
5S34C373595	Construction	Fair Oakes Estates	4218 Fair Oaks Boulevard	Sacramento	Sacramento
5S34C360326	Construction	Del Paso Nuevo 4	South Ave and Taylor St	Sacramento	Sacramento
5S34C375553	Construction	2016 Drayton Heights Waterline Replacem	2700 Elvyra Way	Sacramento	Sacramento
5S34C372987	Construction	Westshore	South of Del Paso Road west of Natomas Central Drive	Sacramento	Sacramento
5S34C374340	Construction	US Cold Storage	3932 Dudley Boulevard	Sacramento	Sacramento

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34C372910	Construction	CVS Fair Oaks and Howe	NWC Fair Oaks Blvd and Howe ave	Sacramento	Sacramento
5S34C375676	Construction	Railyards Unit 1	0 7th Street	Sacramento	Sacramento
5S34C377256	Construction	SMF	6900 Aiport BLVD	Sacramento	Sacramento
5S34C371548	Construction	Evergreen Phase 1	2470 Boxwood Street	Sacramento	Sacramento
5S34C379580	Caltrans Construction	03-3F9404 Gore Pave	3855 N Freeway Blvd #120	Sacramento	Sacramento
5S34C367369	Construction	The Welsh Property	Pocket Road	Sacramento	Sacramento
5S34C366935	Caltrans Construction	3797U4 Yol SAC 80 Across The Top	Yolo and Sac Counties in and Near West Sac and Sac from Route 80 and	Sacramento	Sacramento
5S34C373111	Construction	Natomas Westshore Village C G K	Del Paso Blvd and El Centro Road	Sacramento	Sacramento
5S34C374579	Construction	Maita Subaru	2912 Auburn Boulevard	Sacramento	Sacramento
5S34C375141	Construction	Century Theatre Arden Way	1590 Ethan Way	Sacramento	Sacramento
5S34C373121	Construction	Sacramento State University Housing Phase	6000 J Street	Sacramento	Sacramento
5S34C364814	Construction	Marquee	Brando Loop	Sacramento	Sacramento
5S34C375906	Construction	Westlake Charter School	2680 Mabry Drive	Sacramento	Sacramento
5S34C370316	Construction	Unitarian Universalist Society of Sacrament	2425 Sierra Boulevard	Sacramento	Sacramento
5S34C378500	Construction	Natomas Park ES - Phase 2	4700 Crest Drive	Sacramento	Sacramento
5S34C376899	Construction	Rio Americano High School	4540 American River Drive	Sacramento	Sacramento
5S34C370245	Construction	Language Academy of Sacramento	2850 49th Street	Sacramento	Sacramento
5S34C376418	Construction	University Village	27 University Avenue	Sacramento	Sacramento
5S34C376516	Construction	Metro Airpark	4900 W Elkhorn Blvd	Sacramento	Sacramento
5S34C373879	Construction	UC Davis Betty Irene Morre School of Nurs	2470 48th Street	Sacramento	Sacramento
5S34C378507	Construction	Chilis #1586	2033 Arden Way	Sacramento	Sacramento
5S34C375850	Construction	Arden Way Redevelopment	2023 Arden Way	Sacramento	Sacramento
5S34C376100	Construction	Natomas Place Village 6 Phase 2	North Breezy Meadow Drive	Sacramento	Sacramento
5S34C377552	Construction	Sacramento Airport	7201 Earhart Ave.	Sacramento	Sacramento
5S34C378191	Construction	Vacant Parcel	9470 Micron Avenue	Sacramento	Sacramento
5S34C376665	Construction	Sacramento Airport - North Site	6705 Lindbergh Dr	Sacramento	Sacramento
5S34C376664	Construction	Sacramenot Airport - East Site	6705 Lindbergh DR	Sacramento	Sacramento
5S34C374526	Construction	Heritage Park Senior Housing	Natomas Blvd and Rose Arbor Drive	Sacramento	Sacramento
5S34C378894	Construction	Del Paso Sprouts	2490 Del Paso Road	Sacramento	Sacramento
5S34C380306	Construction	Sacramento International Airport Closure c	6900 Airport Boulevard	Sacramento	Sacramento
5S34C381550	Construction	Sacramento Executive Airport Runway 16/:	6151 Freeport Blvd	Sacramento	Sacramento
5S34C375865	Construction	Site 18A	Along Northgate Blvd near Route 160	Sacramento	Sacramento
5S34C373912	Construction	American River Parkway Enhancements at	20 28th Street	Sacramento	Sacramento
5S34C380790	Construction	Robla Creek Woodland Mitigation and Enh	5505 Rio Linda Blvd	Sacramento	Sacramento
5S34C376184	Construction	American River Parkway	American River Parkway at Natomas Park Drive	Sacramento	Sacramento
5S34C381899	Construction	Eastern Oak Park	3127 Eastern Avenue	Sacramento	Sacramento
5S34C370391	Construction	Huntington at Sierra Oaks	361 Munroe Street	Sacramento	Sacramento
5S34C378593	Construction	Comcast Parking Lot	East Commerce Way and Del Paso Road	Sacramento	Sacramento
5S34C379966	Construction	Arden Creek Town Center	3521 Arden Way	Sacramento	Sacramento
5S34C372432	Construction	Natomas Westshore Parcel A	Del Paso Blvd and El Centro Road	Sacramento	Sacramento
5S34C378154	Construction	Aspen at Provance	Van Eyck Way	Sacramento	Sacramento
5S34C372174	Construction	Parkebridge Village 1	Fong Ranch Rd	Sacramento	Sacramento
5S34C382691	Construction	Natomas Place Village 8	Juneberry Drive and N Breezy Meadow Drive	Sacramento	Sacramento
5S34C375477	Construction	Natomas Westshore Village F&Q	Del Paso Blvd and El Centro Road	Sacramento	Sacramento
5S34C375508	Construction	PG&E 2016 Gas Transmission Program Cen	Roseville Road and Palm Avenue	Sacramento	Sacramento
5S34C379716	Construction	USACE Natomas Basin Mitigation Planting ;	Garden Highway and Powerline	Sacramento	Sacramento
5S34C383207	Construction	Morey Place	51 Morey Ave	Sacramento	Sacramento
5S34C383208	Construction	Morrison Avenue Estates	30 Morrison Ave	Sacramento	Sacramento
5S34C375621	Construction	Sutter Memorial Demolition Site	5151 F St	Sacramento	Sacramento
5S34C374300	Construction	Regency Park Lot K	SE of Amazon Avenue and	Sacramento	Sacramento
5S34C376223	Construction	Advanced Healthcare of Sacramento	1411 Expo Parkway	Sacramento	Sacramento
5S34C379706	Construction	Red Lion Demolition	1445 Expo Parkway	Sacramento	Sacramento
5S34C380930	Construction	Cracker Barrel #754	1000 Howe Avenue	Sacramento	Sacramento
5S34C376897	Construction	SPA 1B Pipeline	24th Street	Sacramento	Sacramento
5S34C377040	Construction	Blossom (Natomas Meadows)	SE of Del Paso Road and Gateway	Sacramento	Sacramento
5S34C383247	Construction	The Plaza Private Street	Arena Blvd between Truxel road and Innovator Drive	Sacramento	Sacramento
5S34C375926	Construction	Natomas Charter School	4600 Blackrock Drive	Sacramento	Sacramento
5S34C373925	Construction	Hampton Inn at 65th	1817 65th Street	Sacramento	Sacramento
5S34C383323	Construction	Gateway Park Boulevard Bridge	Gateway Park Boulevard	Sacramento	Sacramento
5S34C382319	Construction	Mather Rails to Trails	Mather Blvd	Sacramento	Sacramento
5S34C383812	Construction	Hiram Johnson High School Stadium Renov	6879 14th Avenue	Sacramento	Sacramento
5S34C382141	Construction	Dyer Kelly Elementary School	2236 Edison Avenue	Sacramento	Sacramento
5S34C380598	Construction	El Camino High School	4300 El Camino Avenue	Sacramento	Sacramento
5S34C383129	Construction	1831 Exposition Blvd and 1600 Challenge \	1831 Exposition Blvd and 1600 Challenge Way	Sacramento	Sacramento
5S34C377244	Construction	UCD Health System North Addition Office E	42nd Avenue & V Street	Sacramento	Sacramento
5S34C371526	Construction	HBA Retail Center	2030 Arden Way	Sacramento	Sacramento
5S34C375739	Construction	Storage Solutions	181 Main Avenue	Sacramento	Sacramento
5S34C381692	Construction	Oakbrook Park	3341 Soda Way	Sacramento	Sacramento
5S34C378965	Construction	Fire Station 15	1640 West El Camino Ave.	Sacramento	Sacramento
5S34C381076	Construction	Mira Loma High School	4000 Edison Avenue	Sacramento	Sacramento
5S34C381075	Construction	Encina High School	1400 Bell Street	Sacramento	Sacramento
5S34C381992	Construction	Woodspring Suites	3845 Rosin Court	Sacramento	Sacramento
5S34C380196	Construction	Niello BMW	1990 & 2020 Fulton Ave	Sacramento	Sacramento
5S34C376101	Construction	Natomas Place Village 5 Phase 2	Breezy Meadow Drive South	Sacramento	Sacramento
5S34C370298	Construction	The Bridge at Jonas	1020 Jonas Ave	Sacramento	Sacramento
5S34C380819	Construction	Cypress Village	SE of Gateway Park Blvd and Del Paso Rd.	Sacramento	Sacramento
5S34C384697	Construction	North Natomas Regional Park Dog Park	2501 New Market Drive	Sacramento	Sacramento
5S34C382981	Construction	SCUSD New Central Kitchen Increment 1	7058 San Joaquin Street	Sacramento	Sacramento
5S34C383739	Construction	Phase 1A Arden Service Area Distribution S	3501 Fair Oaks Blvd	Sacramento	Sacramento
5S34C380411	Construction	St Ignatius New School Construction	3235 Arden Way	Sacramento	Sacramento
5S34C381024	Construction	2016 Parkland Estates Waterline Replacem	Eastern Robertson Marconi Greenwood Ave	Sacramento	Sacramento
5S34C377888	Construction	Natomas Park Drive Apartments	Natomas Park Drive	Sacramento	Sacramento

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S34C381380	Construction	Edison Meadows	3801 Watt Avenue	Sacramento	Sacramento
5S34C384947	Construction	Economy Lot	6300 Aviation Drive	Sacramento	Sacramento
5S34C382982	Construction	SCUSD Transportation Facility	7058 San Joaquin Street	Sacramento	Sacramento
5S34C370973	Construction	Fair Oaks Hills Unit 3	7883 Fair Oaks Boulevard	Sacramento	Sacramento
5S34C383269	Caltrans Construction	0F3514 HWY 51 & 99 Ramps Sac Co	3855 North Freeway Blvd	Sacramento	Sacramento
5S34C379736	Construction	CSUS Science II Building	6000 J Street	Sacramento	Sacramento
5S34C382098	Construction	SMUD HQ Renovation Project	6201 S Street	Sacramento	Sacramento
5S34C379610	Construction	Natomas Westshore Lakeside Parkside	Lentini Way and Bombili Street	Sacramento	Sacramento
5S34C375053	Construction	Natomas Westshore Village H & M	Del Paso & El Centro	Sacramento	Sacramento
5S34C380205	Construction	JMA Natomas Unit 3	Signac Court	Sacramento	Sacramento
5S34C378735	Construction	North Sac Streams Levee Improvement Prc	79 Arcade Blved	Sacramento	Sacramento
5S34C375963	Construction	Village 2 at Natomas Place	SE of Del Paso Rd and Gateway Park Blvd	Sacramento	Sacramento
5S34C383395	Construction	Greer Elementary School	2301 Hurley Way	Sacramento	Sacramento
5S34C382314	Construction	Westlake Village Greens	3604 Bayou Way	Sacramento	Sacramento
5S34C387554	Construction	Medical Office Building Madison Plaza	5220 Manzanita Avenue	Sacramento	Sacramento
5S34C386154	Construction	Sacramento International Airport Runway	6900 Airport Blvd	Sacramento	Sacramento
5S34C376380	Construction	Westshore	S of Del Paso Rd and Hovnanian Dr	Sacramento	Sacramento
5S34CN601419	Construction	James Marshall Elementary Sch	9525 Goethe	Sacramento	Sacramento
5R45C367769	Construction	Anderson Middle School	1646 Ferry Street	Anderson	Shasta
5R45C384107	Construction	Pleasant Hills Phase 2A	Ballentine Drive	Anderson	Shasta
5R45C384313	Construction	Frontier Industrial Park	2000 Frontier Trail	Anderson	Shasta
5R45C385730	Construction	Deschutes Road Widening Project Phase 1	5535 Deschutes Road	Anderson	Shasta
5R45C387944	Construction	Flightine 3	No address	Anderson	Shasta
5R45C388802	Construction	Anderson River Park	21092 Wildcat Canyon Reg Park	Anderson	Shasta
5R45C388326	Construction	Reading Island Side Channel	23001 Ash Creek Road	Anderson	Shasta
5R45C387800	Construction	PARKSIDE GROVE	No Address at this time	Anderson	Shasta
5R45W003034	Construction	Riverside Self Storage	19912 Riverside Avenue	Anderson	Shasta
5R45W004127	Construction	Anderson Landfill	18703 Cambridge Road	Anderson	Shasta
5R45W004248	Construction	Reading Island Phase 2 Side Channel Projec	23001 Ash Creek Road	Anderson	Shasta
5R45C373717	Construction	Wheelabrator Fuel Pile Berm Relocation	20811 Industry Road	Anderson	Shasta
5R45C371363	Construction	Tractor Supply Company Anderson	Marx Way	Anderson	Shasta
5R45C377477	Construction	Coleman Forebay Dredge	Coleman Fish Hatchery Road	Anderson	Shasta
5R45C373168	Construction	Olinda Road Widening	1855 Placer St	Anderson	Shasta
5R45C376426	Construction	B & T Whitehouse Storage #2	7306 Whitehouse Drive	Anderson	Shasta
5R45C379787	Construction	Aiden Park Homes at Skyview Estates	4725 Pleasant Hills Drive	Anderson	Shasta
5R45C379249	Construction	Skyview Estates Lot Grading	Pleasant Hills Drive	Anderson	Shasta
5R45C379493	Construction	Flightline Expansion	6588 Airport Road	Anderson	Shasta
5R45C378304	Construction	diamond street apartments	diamond street	Anderson	Shasta
5R45C368107	Construction	Homewood 3A	None	Anderson	Shasta
5R45C380197	Construction	Anderson Family Health Clinic	2965 East Street	Anderson	Shasta
5R45C387471	Construction	Vang Property Steven Creek Lane	Steven Creek Lane	Bella Vista	Shasta
5R45W002648	Caltrans Construction	McCandless Gulch	Route 299 PM 48	Bella Vista	Shasta
5R45C368515	Caltrans Construction	02 360704 Repair Roadway with Superpave	02 SHA 299 30 3 to 40 7	Bella Vista	Shasta
5R45C377161	Construction	Pit 5 Hillside Stability	Pit 5 Road	Big Bend	Shasta
5R45C381838	Construction	Sierra Pacific Industries Burney Division	36336 Hwy 299	Burney	Shasta
5R45C387575	Construction	Burney Grocery Outlet	None Assigned	Burney	Shasta
5R45C388166	Construction	McArthur Burney Falls Group Campgraoun	24898 State Hwy 89	Burney	Shasta
5R45W002249	Construction	Park Avenue and Tamarack Avenue	20293 Tamarack Avenue	Burney	Shasta
5R45C367167	Construction	Pit 3 Dam Rock Creek Crossing Seismic Upg	FR37NO6	Burney	Shasta
5R45C372661	Construction	Dollar General Burney	37288 State Hwy 299	Burney	Shasta
5R45C372268	Caltrans Construction	02 2E74U4 Hat Creek Curve	Shasta 299 PM 82 to PM 85	Burney	Shasta
5R45C370667	Construction	Mountain View	37571 Mountain View Road	Burney	Shasta
5R45C370675	Construction	Tamarack	20375 Tamarack Ave	Burney	Shasta
5R45C376710	Construction	GT Pipeline L-401 Burney K2 Turbine Repla	Burney Compressor Station	Burney	Shasta
5R45C382975	Caltrans Construction	02 4E0204 Hwy 299 Johnson Park	02 SHA 299 78 75	Burney	Shasta
5R45C374265	Construction	Hat Creek Restoration Project	Hat Creek Powerhouse No 2 Rd	Cassel	Shasta
5R45C378532	Construction	Tract 1894 Utility Improvements	3710 Main Street	Cottonwood	Shasta
5R45C387816	Construction	Cottonwood Red Bluff 60kV Reconductorin	21212 Trefoil Lane	Cottonwood	Shasta
5R45C388199	Construction	Gas Point at Park Drive	3520 Gas Point Road	Cottonwood	Shasta
5R45C388597	Construction	Cottonwood Wastewater Treatment Plant	3425 Live Oak Road	Cottonwood	Shasta
5R45W004433	Construction	Gas Point Road at No Name Ditch	19760 Gas Point Road	Cottonwood	Shasta
5R45W002921	Construction	Utility Improvements at Tract 1894	3710Main Street	Cottonwood	Shasta
5R45W003863	Construction	Gas Point Rd	Gas Point Rd	Cottonwood	Shasta
5R45W004037	Construction	Gas Point at Park Drive Intersection	20599 Gas Point Rd	Cottonwood	Shasta
5R45W003987	Construction	Olinda Road Cycle 5 Road Widening	1855 Placer Street Redding CA 96003	Cottonwood	Shasta
5R45C380584	Construction	Rogers Ranch	15790 Bowman Road	Cottonwood	Shasta
5R45C379450	Construction	LongSpur Park	Sadle Lane	Cottonwood	Shasta
5R45C381555	Construction	Cottonwood Fire Station	SE Corner of 4th and Brusch Streets	Cottonwood	Shasta
5R45C374652	Construction	Foxrun Subdivision Unit 2	Loust Road	Cottonwood	Shasta
5R45C389401	Caltrans Construction	02 4G41U4 Route 5 Sims Crag View Bridge	02 SHA and SIS 5 Var	Dunsmuir	Shasta
5R45W002387	Caltrans Construction	Chain2	Shasta Route 5 PM 66	Dunsmuir	Shasta
5R45C383299	Construction	Pit 1 Powerhouse & Substation 60kV and 2	Pit 1 Powerhouse Hwy 299 East	Fall River Mills	Shasta
5R45C383386	Construction	Mayers Memorial Hospital Expansion	43563 CA299	Fall River Mills	Shasta
5R45C373624	Construction	Fall River Mills Dollar General	43700 E Highway 299	Fall River Mills	Shasta
5R45C370672	Construction	Curve Street	24977 Curve Street	Fall River Mills	Shasta
5R45C371914	Caltrans Construction	02 3E4104 Capstone HWY 299 Buckhorn In	02 SHA 299 0 3 7 1	French Gulch	Shasta
5R45C376429	Construction	West Central Landfill	14095 Clear Creek Rd	Igo	Shasta
5R45C366932	Caltrans Construction	02 378904 Antlers Bridge Replacement Prc	Shasta County Interstate 5 PM 39 to 41	Lakehead	Shasta
5R45C384900	Caltrans Construction	02 4H9204 Delta Fire Emergency Restorati	02 SHA 5 PM 46 5 52 5	Lakehead	Shasta
5R45C380299	Construction	N. Battle Creek Feeder Diversion Dam and	Volta Power House Road	Manton	Shasta
5R45C370665	Construction	44215 Walnut	44215 Walnut Street	Mc Arthur	Shasta
5R45C383769	Construction	Old 44 Drive at Oak Run Creek	23354 Old 44 Drive	Millville	Shasta

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R45C370903	Construction	Shasta Wine Village	Old Oregon Trail	Mountain Gate	Shasta
5R45C386529	Caltrans Construction	02 4F2004 Hat Creek Bridge	02 SHA 44 PM 58 9 60 3	Old Station	Shasta
5R45C382979	Caltrans Construction	02 368414 Stillwater Interchange	02 SHA 44 5 5	Palo Cedro	Shasta
5R45W002147	Construction	Dollar General Store No 15959	21973 Old 44 Drive	Palo Cedro	Shasta
5R45W002621	Construction	Rite Aid Palo Cedro	9372 Deschutes	Palo Cedro	Shasta
5R45C377875	Construction	Rite Aid	9350 Deschutes Road	Palo Cedro	Shasta
5R45C384293	Construction	Gill Light Industrial Development	22099 Palo Way	Palo Cedro	Shasta
5R45C342108	Construction	Brooks Valley Subdivision	Valley Brook Dr N of Valley Ridge Dr	Redding	Shasta
5R45C356276	Construction	Vicotria Dr Fire Access	Vicotria Dr S	Redding	Shasta
5R45C335402	Construction	S 10 04	4090 Eureka Way	Redding	Shasta
5R45C367077	Construction	Highland Park Units 4 5 6 7	Reddington Dr Mill Valley Dr Redding Ca	Redding	Shasta
5R45C372738	Construction	Shastina Ranch Subdivision	5650 Airport Road	Redding	Shasta
5R45C373165	Construction	Stillwater Ranches Subdivision Unit2	Twin Creeks Lane	Redding	Shasta
5R45C377316	Construction	Hope Lane Subdivision Unit 2	19600 Carnegie Drive	Redding	Shasta
5R45C377337	Construction	Salt Creek Heights Subdivision Unit 1	4350 Eureka Way	Redding	Shasta
5R45C378013	Construction	Avalon Storage Phase 2	8645 Airport Rd	Redding	Shasta
5R45C378935	Construction	Churn Creek Market Place	Churn Creek Road	Redding	Shasta
5R45C379772	Construction	CHURN CREEK HEIGHTS	4300 STRATHMORE DR	Redding	Shasta
5R45C379914	Construction	Clover Creek Village	Thomason Trail	Redding	Shasta
5R45C380103	Construction	Shiloh Park Subdivision	2385 Waverly Ave	Redding	Shasta
5R45C381047	Construction	Alize Planned Development	Sutro Mine Rd. & Santa Cruz Dr.	Redding	Shasta
5R45C382664	Construction	Seven Bridges Unit 1	6650 Oasis Road	Redding	Shasta
5R45C383374	Construction	Salt Creek Heights Unit 2 and 3	4402 Eureka Way	Redding	Shasta
5R45C383757	Construction	Sun Oaks Subdivision	3600 Argyle Rd	Redding	Shasta
5R45C383995	Construction	Westside Storage	7190 Pit Rd	Redding	Shasta
5R45C384511	Caltrans Construction	Carr Fire Emergency Restoration	SHA 299 PM 0 to 23 3	Redding	Shasta
5R45C384742	Construction	Wyndham Pointe	2705 Wyndham Lane	Redding	Shasta
5R45C384887	Construction	Highland Park Unit 10	880 Mission De Oro	Redding	Shasta
5R45C384989	Construction	Mt Shasta Mall Renovation	1403 Hilltop Drive	Redding	Shasta
5R45C384995	Construction	Riverway Villas	2375 Star Drive	Redding	Shasta
5R45C385000	Construction	Elk Creek Subdivision	Laver St	Redding	Shasta
5R45C385294	Construction	Redding SC Yard Asphalt and Drainage Rep	3602 Meadow View Drive	Redding	Shasta
5R45C385472	Construction	Shasta County Courthouse	1525 Court Street	Redding	Shasta
5R45C385930	Caltrans Construction	02 4C40V4 RASL	02 SHA 5 PM 3 8 11 7	Redding	Shasta
5R45C385953	Construction	Redding VA Clinic	3455 Knighton Road	Redding	Shasta
5R45C386408	Construction	Enterprise High School Site Improvements	3411 Churn Cr Rd	Redding	Shasta
5R45C386562	Construction	Cascade Substation Rebuild Project	12528 Old Oregon Trail	Redding	Shasta
5R45C386840	Caltrans Construction	02 4F5104 Shasta CRZ	02 SHA 5 PM 0 to 67	Redding	Shasta
5R45C386855	Construction	Stonesfair Subdivision	5500 Shasta View Drive	Redding	Shasta
5R45C386990	Construction	Churn Creek Rd and College View Dr Inters	Churn Creek Road	Redding	Shasta
5R45C386985	Construction	Lockheed Drive	6744 Lockheed Drive	Redding	Shasta
5R45C387371	Construction	Churn Creek Road I5 NB Ramp	4746 Churn Creek Road	Redding	Shasta
5R45C387761	Construction	Airport Road Improvements	8510 Airport Road	Redding	Shasta
5R45C387857	Construction	The Woodlands Phase II	2900 Polk Street	Redding	Shasta
5R45C388043	Construction	Shasta High School Gen 7 STEM Buildings	2500 Eureka Way	Redding	Shasta
5R45C388099	Construction	Home2	5184 Caterpillar Rd	Redding	Shasta
5R45C388117	Construction	Shasta College Regional Safety Project Clas	11555 Old Oregon Trail	Redding	Shasta
5R45C388333	Construction	Hill Country Health and Wellness Center	1201 industrial Street	Redding	Shasta
5R45C388324	Construction	Kennett Court Apartments	1081 Lake Blvd	Redding	Shasta
5R45C388421	Construction	Aspin RV & Mini Storage	1845 aspin avenue	Redding	Shasta
5R45C388467	Construction	Clear Creek Restoration Project	Clear Creek Road	Redding	Shasta
5R45C388739	Construction	Block 7	1407 California St	Redding	Shasta
5R45C387516	Construction	Future Viking Way	20070 Viking Way	Redding	Shasta
5R45C389480	Construction	Downtown Streets Circulation Project	777 Cypress Avenue	Redding	Shasta
5R45W002302	Construction	Buenaventura Blvd Safety Project	Buenaventura Blvd north of Placer St	Redding	Shasta
5R45W002313	Construction	Old Alturas Rd Widening	Old Alturas Rd and Shasta View Dr	Redding	Shasta
5R45W002737	Construction	Churn Cr Rd Widening	660 Churn Cr Rd	Redding	Shasta
5R45W003276	Construction	Highland Park Neighborhood Park	555 Mill Valley Parkway	Redding	Shasta
5R45W003712	Construction	Panda Express	4660 Churn Creek Road	Redding	Shasta
5R45W003680	Construction	Fill at Vistas	555 Quartz Hill Road	Redding	Shasta
5R45W003755	Construction	Shasta College	11555 Old Oregon Trail	Redding	Shasta
5R45W004258	Construction	Riverside Mini Storage	19912 Riverside Avenue	Redding	Shasta
5R45C369953	Construction	Trinity Area Sewer Project	Downtown Redding at various locations	Redding	Shasta
5R45C367782	Construction	Lutz Residence	16495 Valparaiso Way	Redding	Shasta
5R45C372469	Caltrans Construction	02 1H2604 Buckhorn Mountain Emergency	Shasta 299 PM 2 to PM 5	Redding	Shasta
5R45C369787	Construction	RPD Patrol Building	777 Cypress Ave	Redding	Shasta
5R45C370317	Construction	Prestige Storage	1120 Prestige Way	Redding	Shasta
5R45C370404	Construction	Dry Creek Road Widening	Dry Creek Road	Redding	Shasta
5R45C365416	Construction	Palomar at Clover Creek	Incline Way	Redding	Shasta
5R45C371411	Construction	CCWWTP Biosolids Facility	2200 Metz Road	Redding	Shasta
5R45C370814	Construction	North Valley Distributing	3081 Crossroads Drvie	Redding	Shasta
5R45C373086	Construction	Irish Creek Subdivision	APN 203 110 019	Redding	Shasta
5R45C363027	Construction	Buenaventura Park	Lear Way	Redding	Shasta
5R45C370556	Construction	Moores Flour Mill	6150 Shasta View Drive	Redding	Shasta
5R45C370230	Construction	City Lights Development	650 Hilltop Drive	Redding	Shasta
5R45C369736	Construction	Browning Pointe	4255 Alta Campo Drive	Redding	Shasta
5R45C372586	Construction	Hollow Lane Estates by Palomar	11573 Ridgewood Road	Redding	Shasta
5R45C374244	Construction	BLM Redding	6640 lockheed drive	Redding	Shasta
5R45C375941	Construction	Twin View Storage	797 Twin View Blvd	Redding	Shasta
5R45C373200	Construction	Los Robles Estates Phase 2	994 Redwood Boulevard	Redding	Shasta
5R45C373588	Construction	West Central Landfill Leachate Pond	14095 Clear Creek Rd	Redding	Shasta
5R45C374026	Construction	JFK Memorial Drive CR4F009	State Route 299	Redding	Shasta

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R45C376514	Construction	Transfer Station Bale Storage Expansion Pr	2255 Abernathy Lane	Redding	Shasta
5R45C375846	Construction	North Cypress Side Channel Project	50 East Cypress Avenue	Redding	Shasta
5R45C376017	Construction	Lassen Canyon Nursery	5555 Venture Parkway	Redding	Shasta
5R45C369014	Construction	Lithia Toyota of Redding	250 East Cypress Avenue	Redding	Shasta
5R45C374878	Construction	The Woodlands Phase 1	2950 Polk Street	Redding	Shasta
5R45C375242	Construction	Oakmont of Redding	2150 Bechelli Lane	Redding	Shasta
5R45C377655	Construction	Columbia Elementary School	10140 Old Oredgon Trail	Redding	Shasta
5R45C375507	Construction	PG&E 2016 Gas Transmission Program Cen	Freebridge Street to Wonderland Boulevard	Redding	Shasta
5R45C380531	Construction	Redding Courthouse Site Demolition	1525 Court St	Redding	Shasta
5R45C378267	Construction	REU Parking Lot	3611 Avtech Parkway	Redding	Shasta
5R45C377571	Construction	Redding Dollar General Lake Blvd	1350 Lake Blvd	Redding	Shasta
5R45C379992	Construction	Dignity North State Pavilion	Henderson Road	Redding	Shasta
5R45C377872	Construction	Placer St Improvement Project	Placer St between Boston and Highland	Redding	Shasta
5R45C379814	Construction	Prestige RV Storage Phase 3	1110 Prestige Way	Redding	Shasta
5R45C379203	Construction	CaptiveAire Expansion	6856 Lockheed Drive	Redding	Shasta
5R45C376678	Construction	Whispering Woods	Mule Mountain Parkway	Redding	Shasta
5R45C361677	Construction	Turtle Bay Hotel	840 Auditorium Drive	Redding	Shasta
5R45C379618	Construction	Victor Avenue Safety Project	4000 Victor Avenue	Redding	Shasta
5R45C372607	Construction	Premier Oil Change & Wash	100 North Boulder Creek	Redding	Shasta
5R45C379406	Construction	Redding Municipal Airport - west apron & t	6751 Woodrum Circle	Redding	Shasta
5R45C368355	Construction	Hope Lane Subdivision Unit 1	19402 Carnegie Drive	Redding	Shasta
5R45C375751	Construction	Redding Holiday Inn	2240 Hilltop Drive	Redding	Shasta
5R45C383442	Construction	Leonard Propeorty	151 Davis Ridge Rd	Redding	Shasta
5R45C381171	Construction	South Redding Dollar General	None Assigned	Redding	Shasta
5R45C376660	Construction	Waverly Manor Subdivision	6481 Eastside Road	Redding	Shasta
5R45C368535	Construction	Tuscany Villas	1800 Gold Hills Drive	Redding	Shasta
5R45C379191	Construction	Hartnell Self Storage	3220 Middleton Ln	Redding	Shasta
5R45C384809	Construction	Bella Vista Water District	21885 Hidden Acres Rd	Redding	Shasta
5R45C379612	Construction	The Terrace	Shasta View Dr btw Viking & Voltaire	Redding	Shasta
5R45C383219	Construction	Quartz Hill Road Improvement Project	300 Quartz Hill Road	Redding	Shasta
5R45C385611	Construction	Shasta College	11555 Old Oregon Trail	Redding	Shasta
5R45C372274	Construction	Bel Air Estates	907 Fantenell Ct	Redding	Shasta
5R45C384928	Construction	Benton Airpark Taxiway Rehab & Road Ext	2600 Gold Street	Redding	Shasta
5R45C384336	Construction	Benton Landfill	2955 South Street	Redding	Shasta
5R45CN602115	Construction	Mountain Gate CSD Waterline Install	14100 Quail Springs Rd	Redding	Shasta
5R45CN602683	Construction	Hollow Lane Estates	1145 Hilltop	Redding	Shasta
5R45C380629	Construction	Tanks & Pump Stations Replacement Proje	10711 French Alley	Shasta	Shasta
5R45C375996	Caltrans Construction	02 0E0904 Replace Bridge Realign Roadwa	02 SHA 5 R29 75 L	Shasta Lake	Shasta
5R45C379807	Construction	Guidos COnstruction at Oakridge Estates	Craftsman Lane	Shasta Lake	Shasta
5R45C379980	Construction	Keystone Treatment Cell	Lake Shasta	Shasta Lake	Shasta
5R45C382766	Construction	City of Shasta Lake WWTF	3700 Tibbetts Road	Shasta Lake	Shasta
5R45C382933	Construction	Nouvant Homes at Deer Creek Manor Phas	4361 Risstay Way	Shasta Lake	Shasta
5R45C388717	Construction	Gateway Industrial Park Lot 15	APN 064 440 015	Shasta Lake	Shasta
5R45C367159	Construction	Sierra Pacific Industires Inc	3735 El Cajon Ave	Shasta Lake	Shasta
5R45C378892	Construction	Nouvant Homes at Deer Creek Manor	Risstay Avenue	Shasta Lake	Shasta
5R45C379950	Construction	PG&E 2017 Gas Transmission Program Reg	Akrich Street and Virginia Avenue	Shasta Lake	Shasta
5R45C380866	Construction	Shasta Lake City Hall and Community Cent	4477 Main Street	Shasta Lake	Shasta
5R45C382399	Construction	SPI Shasta Lake SWPPP	3735 El Cajon	Shasta Lake	Shasta
5R45C367112	Construction	Windsor Estates Subdivision Phase II Unit 5	APN 075 030 034 West of Windsor Estates	Shasta Lake	Shasta
5R45CN601779	Construction	Shasta Lake Division Sawmill	3735 El Cajon Avenue	Shasta Lake	Shasta
5R45W003625	Construction	Samiret Lane	TBA Samiret Lane	Shingletown	Shasta
5R45C376670	Construction	Inwood Road at South Fork Bear Creek	Inwood Road	Shingletown	Shasta
5R45C380527	Construction	Dollar General Shingletown CA	31300 Highway 44	Shingletown	Shasta
5R45C379327	Caltrans Construction	02 4G4904 Lower Manzanita Higway Realig	02 SHA 44 PM 44 9 45 5	Viola	Shasta
5S46C382805	Construction	Loyalton Landfill	150 Garbage Pit Road	Loyalton	Sierra
5S46C388012	Construction	Sierra Brooks Phase 2 Improvements	Sierra Brooks	Loyalton	Sierra
5S46C381023	Construction	Our House and Log Cabin Sediment Remov	N/A	North San Juan	Sierra
5S46C359376	Construction	Dickey Driveway	25555 Highway 49	Sierra City	Sierra
5S46C375048	Construction	AT&T Communication Line Install A003L6N	State Route 89	Sierraville	Sierra
5R47C383553	Caltrans Construction	02 4G5504 SB Dunsmuir Grade Pavement I	02 SHA 5 2 7	Dunsmuir	Siskiyou
5R47W003196	Caltrans Construction	Dunsmuir Emergency Slide Repair	SIS 5 PM 2.5	Dunsmuir	Siskiyou
5R47C376113	Construction	UPRR Black Butte Subdivision PTC Project	Black Butte Subdivision	Dunsmuir	Siskiyou
5R47C387779	Construction	LSN McCloud Fiber Optic	Ski Park Hwy	Mc Cloud	Siskiyou
5R47W002385	Construction	Wyntoon Leachfield & Wastewater Treatm	1 Wyntood Road	Mc Cloud	Siskiyou
5R47W002889	Construction	McKenzie Butte Road	Forest Road 42N31	Mc Cloud	Siskiyou
5R47C382976	Caltrans Construction	02 4F5504 Mud Creek Bridge Replacement	02 SIS 89 20 9	Mc Cloud	Siskiyou
5R47C383784	Construction	Spring Hill	3139 Spring Hill Drive	Mount Shasta	Siskiyou
5R47C386406	Caltrans Construction	02 4F5404 Route 5 Black Butte Bridge Repl	05 SIS 5 15 90	Mount Shasta	Siskiyou
5R47C369763	Construction	Alma Street	Alma Street	Mount Shasta	Siskiyou
5S51C366923	Caltrans Construction	406604 Sac&Sut 99 Riego Rd Interchange	State Route 99 at Riego Rd	Antelope	Sutter
5S51C367958	Construction	East Nicolaus Substation Reliability Project	El Centro Blvd and East Nicolaus Ave	East Nicolaus	Sutter
5S51C367649	Construction	Sikh Temple Live Oak	10461 Larkin Road	Live Oak	Sutter
5S51C383136	Construction	Kristen Court Apts II & III	N Street	Live Oak	Sutter
5S51C383350	Construction	Pennington Ranch Unit 4	Poplar Way and Luther Rd	Live Oak	Sutter
5S51C388288	Construction	Garden Glen	Tulip Ave & Kola Street	Live Oak	Sutter
5S51C387809	Construction	Reach 25 Pipe Penetration Abandonment F	North of Live Oak East along Riviera Road	Live Oak	Sutter
5S51C370479	Construction	Community Trail Phase 3a	O Steet	Live Oak	Sutter
5S51C371963	Construction	Maple Park phase II	Maple Park	Live Oak	Sutter
5S51C372553	Construction	Live Oak Soccer Park	9150 Linda Street	Live Oak	Sutter
5S51C374032	Construction	Kristen Court Apartments	N Street	Live Oak	Sutter
5S51C376800	Construction	O Street/Kola Street/Skate Park	10220 O Street	Live Oak	Sutter
5S51C381408	Construction	PL 84-89 Fiscal Year 2017 Task Order 1	Sutter County	Live Oak	Sutter

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S51C381668	Construction	Pennington Road Bridge Replacement	Pennington Rd	Live Oak	Sutter
5S51W004298	Construction	P L 84 99 Colusa Site 0544 13 Levee Repair	8585 Commercial Way	Meridian	Sutter
5S51C388558	Construction	SSCS Learning Resource Building	2452 El Centro Blvd	Nichols	Sutter
5S51C366915	Caltrans Construction	1A43A4 SUT 99 Feather River Bridge	In Sutter County Near Nicolaus North of Power Line Rd to S of Laurel Av	Nicolaus	Sutter
5S51C385483	Construction	Micro Paradox	3560 Sankey Rd	Pleasant Grove	Sutter
5S51C370643	Construction	Micro Paradox	3556 Sankey Road	Pleasant Grove	Sutter
5S51C380733	Construction	DWR Emergency Levee Erosion and Stabilit	I70 and I5	Rio Oso	Sutter
5S51C366057	Construction	Knights Road Facility	10982 Knights Road	Robbins	Sutter
5S51C388105	Construction	Sacramento River Bank Protection Project	Feather River Erosion Repair Site River Mile 1 L	Sacramento	Sutter
5S51C383961	Construction	Truck Yard	1200 Acacia Avenue	Sutter	Sutter
5S51C384491	Construction	Natomas Basin Reach D Levee Improvemer	Natomas Cross Canal	Sutter	Sutter
5S51C389289	Construction	Feather River Site 0521	Garden Hwy	Sutter	Sutter
5S51W003254	Construction	Dollar General Sutter CA	1742 Acacia Avenue	Sutter	Sutter
5S51C377473	Construction	QCI Construction Yard	Acacia Avenue	Sutter	Sutter
5S51C380921	Construction	The Ranch at Sutter Buttes	2462 Perry Avenue	Sutter	Sutter
5S51C376737	Construction	Smartville-Nicolaus #2 60kV line Pole Repla	Cornelius Road Pleasant Grove Road Kempton Road Wheatland	Wheatland	Sutter
5S51C374602	Construction	Sikh Temple of Yuba City	1298 South George Washington Boulevard	Yuba City	Sutter
5S51C377123	Construction	Valencia Estates	Tuly Parkway	Yuba City	Sutter
5S51C378427	Construction	John L. Sullivan Chrysler Dodge	950 Harter Pkwy	Yuba City	Sutter
5S51C378702	Construction	Montecito / Kensington Place	2272 Portsmouth Drive	Yuba City	Sutter
5S51C381056	Construction	Pease Substation BAAH	Pease and Tierra Buena Roads	Yuba City	Sutter
5S51C381575	Construction	Tierra Buena Gym	1794 Villa Avenue	Yuba City	Sutter
5S51C381574	Construction	Barry Elementary Gym	1255 Barry Road	Yuba City	Sutter
5S51C384747	Construction	Yuba City Police Department Site Improver	1545 Poole Boulevard	Yuba City	Sutter
5S51C385601	Construction	Faith Court Subdivision	Monroe Road and Faith Court	Yuba City	Sutter
5S51C386643	Construction	Sutter Basin Flood Risk Management Proje	Cypress Avenue	Yuba City	Sutter
5S51C387696	Caltrans Construction	1A9204 Hwy 20 Widening	From Sutter Bypass Bridge to Lytle Road	Yuba City	Sutter
5S51C388150	Construction	Feather River Pkwy Phase II	Highway 20 Bridge over Feather River	Yuba City	Sutter
5S51C388218	Construction	Epley Drive Shop	365 Epley Drive	Yuba City	Sutter
5S51C388610	Construction	PL 84 99 Site 0521 41	Sacramento Ave & Golden State Hwy	Yuba City	Sutter
5S51C381258	Construction	Carriage Square Redevelopment	1280 Bridge Street	Yuba City	Sutter
5S51W002753	Construction	Surf Thru Yuba City	1501 Colusa	Yuba City	Sutter
5S51W002746	Construction	Lassen Business Park	Lassen Blvd	Yuba City	Sutter
5S51W003269	Construction	Yuba City High School Track and Field Renc	850 B Street	Yuba City	Sutter
5S51W004057	Construction	John L Sullivan Dodge Chrysler Expansion	950 Harter Parkway	Yuba City	Sutter
5S51W004174	Construction	Veterans Memorial Circle Parking Lot	NE Corner of Civic Center Blvd and Poole Blvd	Yuba City	Sutter
5S51CN603987	Construction	Sangha Truck and Trailer Repair	909 Oswald Road	Yuba City	Sutter
5S51CN603440	Construction	Montecito	Brighton Way	Yuba City	Sutter
5S51C370267	Construction	Richland Neighborhood Center	488 Garden Highway	Yuba City	Sutter
5S51C368234	Construction	Sierra Central Credit Union1351	1351 Harter Parkway	Yuba City	Sutter
5S51C370607	Construction	2154 Foote	3961 Larkin Road	Yuba City	Sutter
5S51C370174	Construction	Yuba City Raw Water Security Improvemer	701 Northgate Drive	Yuba City	Sutter
5S51C371148	Construction	Twin River Charter School Site	2510 Live Oak Boulevard	Yuba City	Sutter
5S51C368715	Construction	Prop 84 Waterline Extension Project	Franklin Road	Yuba City	Sutter
5S51C369726	Construction	Feather River West Levee Project Contract	Along west Feather River levee	Yuba City	Sutter
5S51C365902	Construction	Feather River West Levee Project Contract	Along West Feather River Levee	Yuba City	Sutter
5S51C373104	Construction	UPRR Mile Post 143 71 Bridge Replacment	Live Oak Blvd	Yuba City	Sutter
5S51C367626	Construction	Yuba City Courthouse	1500 Veterans Memorial Circle	Yuba City	Sutter
5S51C366161	Construction	Yuba City Dodge Chrysler	950 Harter Parkway	Yuba City	Sutter
5S51C374965	Construction	Bridge Street Reconstruction	Bridge Street	Yuba City	Sutter
5S51C326321	Construction	Riverside Meadows	Highway 80 & Feather River Blvd	Yuba City	Sutter
5S51C377943	Construction	Farm Credit West Yuba City	Lassen Blvd. & Tharp Road	Yuba City	Sutter
5S51C379838	Construction	Laurel Avenue Critical Repair Site	Along West Feather Levee Yuba City CA	Yuba City	Sutter
5S51C377694	Construction	Feather River West Levee Project Contract	Along West Feather River Levee	Yuba City	Sutter
5S51C377813	Construction	Surf Thru Car Wash	1501 Colusa Highway	Yuba City	Sutter
5S51C380647	Construction	Hilbers New Office	770 N Walton Ave	Yuba City	Sutter
5S51C380589	Construction	Feather River West Levee Reach 14-16	1441 Garden Highway	Yuba City	Sutter
5S51C378224	Construction	Feather River West Levee Project 5th Stree	Along Feather River West Levee at 5th Street Bridge	Yuba City	Sutter
5S51C333840	Construction	Tres Picos Estates	E Of Stabler Lane And South Of Pease Rd	Yuba City	Sutter
5S51C336413	Construction	Tres Picos Estates West	West Of Stabler Lane & South Of Pease Road	Yuba City	Sutter
5S51C358161	Construction	New Earth Market River Valley Family Fitne	1475 1415 Tharp Rd	Yuba City	Sutter
5S51C381440	Construction	Sangha Trucking	909 Oswald Road	Yuba City	Sutter
5S51C382153	Construction	Rivers Edge Apartments Phase 1	660 Lincoln Road	Yuba City	Sutter
5S51C380869	Construction	Franklin Plaza Phase 2	346 Walton Avenue	Yuba City	Sutter
5S51C377893	Construction	Garden Highway (Epley to Winship)	900 Garden Highway	Yuba City	Sutter
5S51C387627	Construction	PL 84 99 Sutter Yolo Levee Repairs	Sacramento Avenue to Sawtelle Avenue	Yuba City	Sutter
5S51CN601349	Construction	Rio Del Oro Phase 2 Village 14	Hwy 70 North Of Feather River	Yuba City	Sutter
5R52C382980	Caltrans Construction	02 0H2004 Colby Curves Highway Realignm	02 TEH 32 PM 8 6 9 3	Chico	Tehama
5R52C372465	Construction	99W at Thomes Creek	6159 99w	Conejo	Tehama
5R52C367823	Construction	Humboldt Bridge Project	Humboldt Drive and Rancho Tehama Rd	Corning	Tehama
5R52C372012	Construction	Golden West Homes Models	Highway 99W	Corning	Tehama
5R52C383989	Construction	Stonefox Ranch Subdivision Phase 1	Stonefox Street	Corning	Tehama
5R52C384090	Construction	Stonefox Ranch Subdivision Phase 2 3	E Solano Steet	Corning	Tehama
5R52W003550	Construction	Patterson Warehouse	4928 Margurite Avenue	Corning	Tehama
5R52C366122	Construction	Corning Community Park Project	Houghton Ave	Corning	Tehama
5R52C371538	Construction	Dollar General Store No 15653	530 Solano Street	Corning	Tehama
5R52C376875	Construction	Downtown Streetscape Project	Solano St	Corning	Tehama
5R52C378277	Construction	Hart Solar	Gaylord Road	Corning	Tehama
5R52C372287	Construction	2192 Max Ramirez	22189 Samson Ave	Corning	Tehama
5R52C370228	Construction	Stonefox Ranch Subdivision Phase 1	Solano Street	Corning	Tehama
5R52C383913	Construction	Sav Mor Grocery Store Corning	590 Solano Street	Corning	Tehama
5R52W002089	Construction	Bowman Road Safe Routes To School	Bowman Road	Cottonwood	Tehama

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5R52C369990	Construction	Wastewater treatment plant and construct	Dinghy Place and Ventana Drive	Cottonwood	Tehama
5R52C364574	Construction	Bowman Road SF Cottonwood	15929 Bowman Road	Cottonwood	Tehama
5R52C369828	Construction	Polniaszek Trails	18880 Bay Meadows Ln	Cottonwood	Tehama
5R52C381929	Construction	Lake California Side Channel Restoration Pr	Edgewater Drive	Cottonwood	Tehama
5R52C372133	Caltrans Construction	02 4E90U4 HWY 32 CURVE REALIGNMENT	02 TEH 32 5 1 to 6 2	Forest Ranch	Tehama
5R52C381109	Construction	Elder Creek Channel Rehabilitation Project	San Benito Ave and East Chard Avenue	Gerber	Tehama
5R52W002893	Construction	Elder Creek Levee Repair	Unnamed Road	Gerber	Tehama
5R52W002881	Construction	Gerber Intersections	8561 99W	Gerber	Tehama
5R52C387720	Construction	Deer Creek	East of the end of Reed Orchard Road near Vina Tehama Cty	Los Molinos	Tehama
5R52C370599	Construction	Inskip Eagle Canyon Access	North of Manton Road	Manton	Tehama
5R52C373581	Construction	Battle Creek Safety and Facility Access Imp	Manton Rd near Inskip Powerhouse	Manton	Tehama
5R52C374560	Construction	Inskip Diversion Dam and Bank Improveme	South Powerhouse Road	Manton	Tehama
5R52C367144	Caltrans Construction	Deer Creek Curve	Teh32	Mill Creek	Tehama
5R52C387027	Construction	Headquarters Lassen Volcanic National Par	38050 HWY 36E	Mineral	Tehama
5R52C379780	Caltrans Construction	02 4G03U4 Lassen Lodge Highway Realignr	02 Teh 36 PM 75 1 78 4	Mineral	Tehama
5R52C380729	Construction	Black Butte Re-Regulation Basin	Black Butte Reservoir	Orland	Tehama
5R52C373674	Construction	ISHI Conservation Camp	30500 Plum Creek Road	Paynes Creek	Tehama
5R52C380165	Construction	Wild Horse R Ranch Solar	6700 State Highway 36 West	Platina	Tehama
5R52C379404	Construction	Proberta Dollar General	None Assigned	Proberta	Tehama
5R52C355690	Construction	Nine Mile Hill Ranch	Sunset Hills Dr	Red Bluff	Tehama
5R52C380591	Construction	Emerald Kingdom Greenhouse	2100 Montgomery Road	Red Bluff	Tehama
5R52C375831	Construction	Willow Bend Subdivision	Willow Street	Red Bluff	Tehama
5R52C383343	Construction	Red Bluff High School	1260 Union St	Red Bluff	Tehama
5R52C388912	Construction	Edwards Dam	13038 Hwy 99 E	Red Bluff	Tehama
5R52W002765	Construction	Reeds Creek Road @ Pine Creek Bridge	20300 Reeds Creek Road	Red Bluff	Tehama
5R52W003748	Construction	South Jackson Street	S Jackson from Luther to Vista	Red Bluff	Tehama
5R52W004249	Construction	Rio Vista Side Channel Project	190 Agua Verdi Drive	Red Bluff	Tehama
5R52C367145	Caltrans Construction	Baker Road and Hess Maint Station	Tehema County Highway 36 PM 40	Red Bluff	Tehama
5R52C373294	Construction	Family Dentistry	515 Adobe Road	Red Bluff	Tehama
5R52C365339	Construction	Walnut Subdivision	2000 Walnut Street	Red Bluff	Tehama
5R52C374725	Construction	Red Bluff Mill	11400 Reading Road	Red Bluff	Tehama
5R52C373608	Construction	Tehama County Solid Waste Management	20000 Plymire Road	Red Bluff	Tehama
5R52C369530	Construction	1608 2 Red Bluff Walmart	608 Luther Road	Red Bluff	Tehama
5R52C371421	Construction	New Red Bluff Courthouse County of Tehai	1740 Walnut Street	Red Bluff	Tehama
5R52C373489	Construction	UPRR Valley Subdivision PTC Project	UPRR Valley Subdivision	Red Bluff	Tehama
5R52C372941	Construction	JJD Investments LLC site	NW corner of Minch Road/Baker Road	Red Bluff	Tehama
5R52C377215	Construction	Tehama County Library	545 Diamond Avenue	Red Bluff	Tehama
5R52C382977	Caltrans Construction	02 3E7204 Red Bluff CPACP	02 TEH 36 99 PM 42 1 46 0 24 8 24 9	Red Bluff	Tehama
5R52C384327	Caltrans Construction	02 0H1104 Meister Curve Realignment	02 TEH 36 PM 36 4 36 9	Red Bluff	Tehama
5R52C378626	Construction	Red Bluff Former MGP Site	600 Rio Street	Red Bluff	Tehama
5R52C380633	Construction	Conerstone Bank Plaza	500 Riverside Way	Red Bluff	Tehama
5R52C380842	Construction	PJ Helicopters	903 Langley Drive	Red Bluff	Tehama
5R52C377206	Construction	Old Red Bluff Landfill	1700-1900 Baker Road	Red Bluff	Tehama
5R52W002906	Construction	5th and Gyle Road Rehab	5th Street & Gyle Road	Tehama	Tehama
5R52C382858	Construction	VINA HELITACK BASE REPLACE FACILITY	4520 HIGHWAY 99E	Vina	Tehama
5S57C369587	Construction	SMD 1 SEWER PUMP STATION	Northwest Corner of Intersection of	Auburn	Yolo
5S57C381525	Construction	Dunnigan Gateway	County Road 8	Dunnigan	Yolo
5S57C388651	Construction	Dunnigan Wastewater Pond Reconfiguratic	5011 County Road 7	Dunnigan	Yolo
5S57C380088	Construction	CR 99W Bridge Replacement Over Buckeye	County Road 99W	Dunnigan	Yolo
5S57C377767	Construction	Vann Brothers - Dunnigan	County Road 8 and Interstate 5	Dunnigan	Yolo
5S57C365511	Construction	River Landing	1895 Sierra Road	Granite Bay	Yolo
5S57C384116	Construction	Sacramento River West Bank Seepage Miti	Rd 109A	Knights Landing	Yolo
5S57W003615	Construction	Fremont Weir Adult Fish Passage Modificat	Road 107 A	Knights Landing	Yolo
5S57C367899	Construction	AT&T Communication Line Install Project N	Hwy 113	Knights Landing	Yolo
5S57C373649	Construction	Knights Landing Levee Rehabilitation Proje	43900 County Road 16	Knights Landing	Yolo
5S57C375648	Construction	Bullock Bend Mitigation Bank	Road97	Knights Landing	Yolo
5S57C376904	Construction	Wallace Weir Fish Rescue Facility	County Rd 17 / Levee Rd	Knights Landing	Yolo
5S57C379969	Construction	Winters Highlands	Moody Slough Road and Castle View Lane	Yolo	Yolo
5S57C381051	Construction	Woodland Road 17	31905 County Road 17	Yolo	Yolo
5S57C375495	Construction	Gas Transmission Pipeline L407 Pipeline Re	County Road 98 and 16A	Yolo	Yolo
5S57C381046	Construction	Northern Recycling Composting	11220 County Road 94	Zamora	Yolo
5S57W002770	Construction	CR 99W Bridge Replacement at Buckeye Cr	32703 County Road 12	Zamora	Yolo
5S57W003562	Construction	Crew Wine Company Building 5	12300 County Road 92B	Zamora	Yolo
5S58C370684	Construction	Plumas Lakes	1141 Thunder Ranch Way	Arboga	Yuba
5S58C365692	Construction	River Oaks Commercial Site	River Oaks Blvd at Feather River Blvd	Arboga	Yuba
5S58C370464	Construction	Wheeler Ranch Ponds	Ella Road	Arboga	Yuba
5S58C381325	Construction	Temporary Lodging Facility Beale Air Force	6451 B Street	Beale Afb	Yuba
5S58C384393	Construction	Consolidated Warehouse Building Project	Warren Shingle Road	Beale Afb	Yuba
5S58C384616	Construction	Beale Air Force Base Dental Clinic Moderni	NWC Warren Shingle Rd and Camp Beale Hwy	Beale Afb	Yuba
5S58C389410	Construction	Beale AFB F Street Water Main	J Street and Doolittle Drive	Beale Afb	Yuba
5S58C371993	Construction	Distributed Common Ground Station Opera	10763 b Street Building 2142	Beale Afb	Yuba
5S58C382037	Construction	Water Treatment Facility	Doolittle Dr	Beale Afb	Yuba
5S58C380716	Construction	Miller Lake Dam Repair	Beale AFB	Beale Afb	Yuba
5S58C381473	Construction	Repair Upper Blackwelder Dam - Beale AFE	Beale AFB	Beale Afb	Yuba
5S58C372602	Construction	Beale AFB Civil Engineer Administration Op	6451 B Street	Beale Afb	Yuba
5S58C375651	Construction	Common Mission Control Center	5737 C Street	Beale Afb	Yuba
5S58CN605962	Construction	Beale Air Force Base	6451 B Street	Beale Afb	Yuba
5S58C380186	Construction	Browns Valley Fire Station	Marysville Road	Browns Valley	Yuba
5S58C389111	Construction	Dollar General Brownsville	6900 E 2ND ST	Brownsville	Yuba
5S58C370810	Construction	Log Cabin Diversion Dam	N/A	Camptonville	Yuba
5S58C387721	Construction	YWA Power System Headquarters	11074 Halvey Way	Dobbins	Yuba
5S58W002863	Construction	Yuba County Water Agency	12700 Lake Francis Road	Dobbins	Yuba

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S58C381044	Construction	Sierra Vista Subdivision	Habitat Way	Linda	Yuba
5S58C384974	Construction	Oak Grove Subdivision	Oak Park Drive	Linda	Yuba
5S58C385269	Construction	Orchard Phase 6	5515 Sunhaven Street	Linda	Yuba
5S58C386478	Construction	Orchard Two 2 Unit 2A and 2B	River Bank Drive and Cobbler Lane	Linda	Yuba
5S58C388015	Construction	Lindhurst Retail	Lindhurst Avenue	Linda	Yuba
5S58C371457	Construction	Greenfields at Edgewater	River Bank and Gold River Way	Linda	Yuba
5S58C381738	Construction	Edgewater Unit Number 9	Intersection of Sand Dollar Dr and Baywood Way	Linda	Yuba
5S58C365554	Construction	The Grove Apartments	1491 Hammonton Smartsville Rd	Linda	Yuba
5S58C329596	Construction	Montrose at Edgewater	Nw Of Int Of Erle Rd And Griffith Ave	Linda	Yuba
5S58C330434	Construction	The Orchards	W Of Int Of Erle Rd and Griffith Ave N Of Erle Rd	Linda	Yuba
5S58C370280	Construction	Sierra Vista Subdivision	Jana Way	Linda	Yuba
5S58C379547	Construction	North Beale Road - Phase 1 "B"	1500 North Beale Road	Linda	Yuba
5S58C379821	Construction	Orchard	Freestone Drive & Autumn Lane	Linda	Yuba
5S58C369466	Construction	Loma Rica Rd Safety Improvements Project	12433 Loma Rica Road	Loma Rica	Yuba
5S58C376495	Construction	DG Loma Rica CA	11898 Loma Rica Road	Loma Rica	Yuba
5S58W002673	Construction	Butte Fire Center CCC Camp	6640 Steiffer Road	Magalia	Yuba
5S58C380483	Construction	Linda Oak Grove Estates	1668 Oak Park Drive	Marysville	Yuba
5S58C381872	Construction	Erle Road Self Storage Phase 3	5600 Lindhurst Avenue	Marysville	Yuba
5S58C384201	Construction	Wastewater Pump Station and Force Main	Feather River Boulevard	Marysville	Yuba
5S58C386077	Construction	Marysville Ring Levee Phase 2A South	South of 5th Street Bridge	Marysville	Yuba
5S58C386338	Construction	Doolittle Drive 60KV Power Pole Replacem	Doolittle Drive	Marysville	Yuba
5S58C387849	Construction	Valley Sub Mile Post 140 02 Bridge Replace	981 Shad Road	Marysville	Yuba
5S58C388234	Construction	5136 500 Marysville CA Fueling Station	1131 North Beale Road	Marysville	Yuba
5S58C388609	Construction	Marysville Ring Levee Phase 2C	Biz Johnson Road	Marysville	Yuba
5S58C388883	Construction	Surf Thru Car Wash	601 5th Street	Marysville	Yuba
5S58W002122	Construction	Loma Rica Shoulder Widening	Loma Rica Road	Marysville	Yuba
5S58W002754	Construction	FRO Compost Leachate Conveyance and St	3001 N Levee Road	Marysville	Yuba
5S58W003309	Construction	Elre Road Self Storage - Phase 3	5600 Lindhurst Avenue	Marysville	Yuba
5S58W003732	Construction	12th and J Streets Improvement Project	12th and J Street	Marysville	Yuba
5S58W004147	Construction	Seventh Avenue Bicycle Path and Pedestria	7th Avenue	Marysville	Yuba
5S58W004201	Caltrans Construction	0H5104 Remove Thrie Beam Median Barrie	S of Feather River Blvd Undercrossing to Yuba River Bridge	Marysville	Yuba
5S58W004289	Construction	Rancho Rd	3598 Rancho Rd	Marysville	Yuba
5S58C361240	Construction	Rideout Memorial Hospital	726 Fourth Street	Marysville	Yuba
5S58C377983	Construction	Compost Leachate Conveyance and Storag	3001 Levee Road	Marysville	Yuba
5S58C372520	Construction	Yuba County Sheriff Facility Tenant Improv	720 Yuba Street	Marysville	Yuba
5S58C351252	Construction	South Congregation Kingdom Hall Project	2422 Hammonton Smartville Rd	Marysville	Yuba
5S58C376150	Construction	WPIC West Levee Improvement Project	WPIC West Levee	Marysville	Yuba
5S58C382627	Construction	Hallwood	3331 Walnut Avenue	Marysville	Yuba
5S58C373640	Construction	Wastewater Pump Station and Force Main	Feather River Boulevard	Marysville	Yuba
5S58C384821	Construction	Linda County Water District Disposal Pond	Myrna Avenue	Marysville	Yuba
5S58C383537	Construction	Marysville Ring Levee Phase 2A	North of 5th Street Bridge to Station 2018 11	Marysville	Yuba
5S58C387565	Construction	Hallwood	3331 Walnut Avenue	Marysville	Yuba
5S58C373478	Construction	Beale Air Force Base	Beale Air Force Base	Marysville	Yuba
5S58CN601401	Construction	Skyway Business Park	4557 Skyway	Marysville	Yuba
5S58CN601382	Construction	Eugene McMillan Property	10679 Forbestown	Marysville	Yuba
5S58C375447	Construction	Waters Edge	1323 Hidden Creek	Olivehurst	Yuba
5S58C379609	Construction	Wheeler Ranch Phase 1 Unit 2	Empress St and Yarrow St	Olivehurst	Yuba
5S58C382444	Construction	Sonoma Ranch at River Oaks East	Chalice Creek RD and Earhart Way	Olivehurst	Yuba
5S58C383087	Construction	River Oaks East Village 2	North of Chalice Creek Rd and Calabrese Way	Olivehurst	Yuba
5S58C383525	Construction	Feather Glen Phase 1A	East of Arboga Road and Pheasant Run Drive	Olivehurst	Yuba
5S58C385154	Construction	The Orchards Phase 6 Portion	North of Erle Road and Sunhaven Street	Olivehurst	Yuba
5S58C386008	Construction	Draper Ranch Lots 62 63 64 67	Larner Way and Huston Way	Olivehurst	Yuba
5S58C387518	Construction	River Oaks North	N of Sugarstick Dr and Chalice Creek Dr	Olivehurst	Yuba
5S58C387886	Construction	Rio Del Oro Village 16	1845 Broken Bit Drive	Olivehurst	Yuba
5S58C388032	Construction	Cresleigh Plumas Lake	Santa Cruz Lakeport Atherton	Olivehurst	Yuba
5S58C388560	Construction	UPS Yuba City Package Facility	1470 Furneaux Road	Olivehurst	Yuba
5S58W002429	Construction	Bear River Habitat Trail	Algodon Road	Olivehurst	Yuba
5S58W003337	Construction	Lindhurst High School	4446 Olive Avenue	Olivehurst	Yuba
5S58W003765	Construction	Intersection Improvements at Olivehurst A	Olivehurst Avenue	Olivehurst	Yuba
5S58W003809	Construction	Feather River Boulevard Curve Correction I	Feather River Boulevard	Olivehurst	Yuba
5S58W004230	Construction	Olivehurst Linda Little League	1208 Pasado	Olivehurst	Yuba
5S58C370721	Construction	Olivehurst Avenue Rule 20A Project	Olivehurst Avenue	Olivehurst	Yuba
5S58C371152	Construction	Powerline Road Bike Ped Improvements fr	Powerline Rd from 15th Ave to 9th Ave	Olivehurst	Yuba
5S58C371195	Construction	Lots 46 & 47	Long Horn Trail Drive	Olivehurst	Yuba
5S58C370734	Construction	Shoei Foods	1900 Feather River Blvd	Olivehurst	Yuba
5S58C368891	Construction	Feather River Blvd Interchange Project	Feather River Blvd	Olivehurst	Yuba
5S58C370089	Construction	Cobblestone Phase 3	Ivy Hatch Way	Olivehurst	Yuba
5S58C371320	Construction	2586 Rosser Road	2586 Rosser Road	Olivehurst	Yuba
5S58C379089	Construction	Ella Elementary Safe Routes to School Proj	7th Avenue from Olivehurst Avenue to Powerline Road	Olivehurst	Yuba
5S58C374037	Construction	Olivehurst Avenue Complete Streets Projec	Olivehurst Avenue from McGowan Pkwy to 7th Avenue	Olivehurst	Yuba
5S58C378272	Construction	Vermicrop Organics Storm Water Improver	5050 Arboga Rd	Olivehurst	Yuba
5S58C383094	Construction	The Rivers Shopping Center	NE Corner River Oaks & Feather River Parkway	Olivehurst	Yuba
5S58C378046	Construction	Feather Glen Development	1557-1575 Pheasant Run Drive	Olivehurst	Yuba
5S58C378558	Construction	Orchard Glen	Dry Gulch Trail Drive at Morgan Drive	Olivehurst	Yuba
5S58CN601439	Construction	Rio Del Oro Middle School	Zane	Olivehurst	Yuba
5S58C384100	Caltrans Construction	2F5904 Route 20 Smartsville Curve Realign	2060 3rd Street	Oroville	Yuba
5S58W003683	Caltrans Construction	2F590 PreConstruction Archaeological Inve	2060 3rd Street	Oroville	Yuba
5S58W002100	Construction	Hammonton Bluffs	Hammonton Smartsville Road	Smartville	Yuba
5S58C383719	Construction	Yuba Narrows Project	Hydraulic Way	Smartville	Yuba
5S58C387907	Construction	Parking Project 2019	3317 Forty Mile Road	Wheatland	Yuba
5S58C388479	Construction	Recology Ostrom Organics	5900 Ostrom Road	Wheatland	Yuba
5S58W003710	Construction	Enterprise Lay Down Yard	3317 Fourty Mile Road	Wheatland	Yuba

WDID	Type	Site/Facility Name	Site/Facility Address	Site/Facility City	Site/Facility County
5S58C369343	Construction	Sunset Valley Duplexes	Evergreen Drive	Wheatland	Yuba
5S58CN601421	Construction	Premier Grove	500 Wolf	Wheatland	Yuba
5S58C382102	Construction	5th Street Bridge Replacement Project	5th Street	Yuba City	Yuba
5S58C383799	Construction	South of Palermo 115 kV Reinforcement	East of Hwy 70	Yuba City	Yuba
5S58C384799	Construction	Rio Del Oro	1141 Thunder Ranch Way	Yuba City	Yuba
5S58C386269	Caltrans Construction	2F3204 Loma Rica	Yuba County PM 8 to 10	Yuba City	Yuba
5S58C386828	Construction	Rio Del Oro Villages 17 through 20	Plumas Lake Boulevard	Yuba City	Yuba
5S58C387984	Caltrans Construction	1E0604 Simerly Slough	R70 from Binney Junction Underpass to Laurellen Rd	Yuba City	Yuba
5S58C368337	Construction	Heartlands at Plumas Lakes	4282 Fortuna Road	Yuba City	Yuba
5S58C376030	Construction	Hammonton Smartsville Road CR36	CR36 east of Yuba City towards Beale Air Force Base	Yuba City	Yuba
5S58C377818	Construction	Hammonton-Smartsville Rd. Shoulder Wid	Hammonton Smartsville Road	Yuba City	Yuba

Caltrans Stormwater Construction Permits

WDID	Site Name	Site City	Site County
5R04C367153	3E6204 BUT 99 BUTTE CREEK BRIDGE	Chico	Butte
5R04C375995	Flag Canyon Bridge	Chico	Butte
5R04C377228	ADA Compliance Improvements	Chico	Butte
5R04C375175	Highway 99 Rock Creek Bridge Widening	Chico	Butte
5R04C379389	Butte 191 New Alignment	Chico	Butte
5R04C387454	3H71U4 Hwy 70 Widening	Oroville	Butte
5R04C387781	4H8304 Camp Fire Emergency Project	Oroville	Butte
5S06C389213	2F9804 Pavement Rehabilitation on Route 20 in Colusa County	Colusa	Colusa
5S09C378984	0F3104 Bridge Replacement Coloma	Coloma	El Dorado
5R11C375880	Glen I 5 Vertical Clearance	Chico	Glenn
5R25C386530	02 4F2104 Butte and Ash Creek Bridge Replacement	Adin	Modoc
5R25W002323	02 299714 Alturas 299 Improvements	Alturas	Modoc
5R25C383976	02 4F77U4 Caldwell Creek Bridge Scour Mitigation Roadway Rehabilitation	Canby	Modoc
5S29C387334	4F6004 Donner Pass Barrier Rail Project	Soda Springs	Nevada
5S31C387132	2F3404 Widen Shoulder on Route 49 in Placer County	Auburn	Placer
5S31C376338	1F4004 Interstate 80 Colfax Truck Climbing Lane	Colfax	Placer
5S31C383315	3F4804 Gold Run Rest Area	Gold Run	Placer
5S31C370320	3E1004 PLA 80 Bridge Vertical Clearance	Newcastle	Placer
5S31C375342	Placer 193 Curve Improvement	Rocklin	Placer
5S31C383314	0H26U4 HWY 65 Widening	Roseville	Placer
5R32C382894	02 1C7504 Yellow Creek Bridge Replacement	Belden	Plumas
5R32C386577	020 OH4504 Opapee Curve Improvement	Belden	Plumas
5R32W002914	02 4G2604 HMA Full Depth Reclamation Cement and Earthwork	Canyondam	Plumas
5R32C383213	02 0E1804 Lake Almanor Spillway Bridge Replacement	Canyondam	Plumas
5R32W002324	02 4F3904 Hamilton Branch	Chester	Plumas
5R32C378534	02 4e6404 Hamilton Branch Bridge	Chester	Plumas
5R32W004106	02 0H7604 Chilcoot Paving	Chilcoot	Plumas
5R32W004360	02 0H7604 Chilcoot Paving	Chilcoot	Plumas
5R32C377391	02 0E24U4 Greenville Route 89	Greenville	Plumas
5R32C381119	02 2C0904 Spring Garden Bridge Widening	Spring Garden	Plumas
5S34C372132	Route 50 Natoma Overhead	Folsom	Sacramento
5S34C376135	03 3F1704 Gore Pave Project	Sacramento	Sacramento
5S34C379580	03-3F9404 Gore Pave	Sacramento	Sacramento
5S34C366935	3797U4 Yol SAC 80 Across The Top	Sacramento	Sacramento
5S34W003925	1H3804 Construct Aux Lane on SR 99	Sacramento	Sacramento
5S34C387134	1F1904 Add Aux Lane in Sacramento	Sacramento	Sacramento
5S34C387523	0H10U4 I5 Corridor	Sacramento	Sacramento
5S34C383269	0F3514 HWY 51 & 99 Ramps Sac Co	Sacramento	Sacramento
5S34C389070	4F5804 Elkhorn Safety Roadside Rest Area Project	Sacramento	Sacramento
5R45C368515	02 360704 Repair Roadway with Superpave HMA over AB	Bella Vista	Shasta
5R45W002648	McCandless Gulch	Bella Vista	Shasta
5R45C372268	02 2E74U4 Hat Creek Curve	Burney	Shasta
5R45C382975	02 4E0204 Hwy 299 Johnson Park	Burney	Shasta
5R45W002387	Chain2	Dunsmuir	Shasta
5R45C389401	02 4G41U4 Route 5 Sims Crag View Bridge Replacement	Dunsmuir	Shasta
5R45C371914	02 3E4104 Capstone HWY 299 Buckhorn Improvements	French Gulch	Shasta
5R45C366932	02 378904 Antlers Bridge Replacement Project	Lakehead	Shasta

WDID	Site Name	Site City	Site County
5R45C384900	02 4H9204 Delta Fire Emergency Restoration	Lakehead	Shasta
5R45C386529	02 4F2004 Hat Creek Bridge	Old Station	Shasta
5R45C382979	02 368414 Stillwater Interchange	Palo Cedro	Shasta
5R45C372469	02 1H2604 Buckhorn Mountain Emergency Slide Repair	Redding	Shasta
5R45C384511	Carr Fire Emergency Restoration	Redding	Shasta
5R45C385930	02 4C40V4 RASL	Redding	Shasta
5R45C386840	02 4F5104 Shasta CRZ	Redding	Shasta
5R45C375996	02 0E0904 Replace Bridge Realign Roadway	Shasta Lake	Shasta
5R45C379327	02 4G4904 Lower Manzanita Higway Realignment	Viola	Shasta
5R47W003196	Dunsmuir Emergency Slide Repair	Dunsmuir	Siskiyou
5R47C383553	02 4G5504 SB Dunsmuir Grade Pavement Reconstruction	Dunsmuir	Siskiyou
5R47C382976	02 4F5504 Mud Creek Bridge Replacement	Mc Cloud	Siskiyou
5R47C386406	02 4F5404 Route 5 Black Butte Bridge Replacement	Mount Shasta	Siskiyou
5S51C366923	406604 Sac&Sut 99 Riego Rd Interchange	Antelope	Sutter
5S51C366915	1A43A4 SUT 99 Feather River Bridge	Nicolaus	Sutter
5S51C387696	1A9204 Hwy 20 Widening	Yuba City	Sutter
5R52C382980	02 0H2004 Colby Curves Highway Realignment	Chico	Tehama
5R52C372133	02 4E90U4 HWY 32 CURVE REALIGNMENT SMOKEY CREEK	Forest Ranch	Tehama
5R52C367144	Deer Creek Curve	Mill Creek	Tehama
5R52C379780	02 4G03U4 Lassen Lodge Highway Realignment	Mineral	Tehama
5R52C367145	Baker Road and Hess Maint Station	Red Bluff	Tehama
5R52C382977	02 3E7204 Red Bluff CPACP	Red Bluff	Tehama
5R52C384327	02 0H1104 Meister Curve Realignment	Red Bluff	Tehama
5S58W004201	0H5104 Remove Thrie Beam Median Barrier and Install Concrete Median Barrier	Marysville	Yuba
5S58W003683	2F590 PreConstruction Archaeological Investigation	Oroville	Yuba
5S58C384100	2F5904 Route 20 Smartsville Curve Realignment and	Oroville	Yuba
5S58C386269	2F3204 Loma Rica	Yuba City	Yuba
5S58C387984	1E0604 Simerly Slough	Yuba City	Yuba

Industrial NPDES Permits in Sacramento River Watershed

Discharger	Facility Name	Facility Address	County	NPDES #	Effluent Type	Flow	Receiving Water	Facility Type	Latitude N	Longitude W
State of California Dept. of Fish and Game & Department of Water Resources	Feather River Fish Hatchery	5 Table Mountain Boulevard, Oroville	Butte	General Order R5-2014-0161-032	Wastewater	47.3 mgd	Lower Feather River	Fish Hatchery	39.518683	-121.550111
State of California Dept. of Fish and Game & Department of Water Resources	Thermalito Annex Facility	4700 Hwy 99E, Oroville Assessor's Parcel No. 030-320-017 adjacent to western shorline of the Thermalito Annex Facility	Butte	General Order R5-2014-0161-034	Wastewater	7.8 mgd	Thermalito Afterbay, Lower Feather River	Fish Hatchery	39.478764	-121.688528
North Yuba Water District	Forbestown Water Treatment Plant	118 Buckeye Dr. Forbestown, CA 95941	Butte	Order No. R5-2019-0027 NPDES CA0084824	Raw Water and Filter Backwash	0.070 mgd	Unnamed tributary of New York Creek, tributary to Dry Creek, and the Yuba River	Water Treatment Plant	39.514192	121.266688
USBR	Sliger Mine	Sliger Mine Rd/Fox Glove Lane	El Dorado	Order No. R5-2015-0121	Mine Drainage	0.194 mgd	Middle Fork American River	Inactive Mine	38.94551	-120.9329
Lassen Gold Mining, Inc.	Hayden Hill Mine	Hwy 139, Adin	Lassen	Order No. R5-2003-0022	Mine Drainage	Unspecified	Willow Creek/Silva Flat Reservoir	Inactive Mine	40.98525	-120.873811
State of California Dept. of Parks and Recreation	Empire Mine State Historic Park	10791 East Empire St. Grass Valley, CA 95945	Nevada	General Order No. R5-2016-0076-005	Mine Drainage	2.3 mgd	Magenta Drain Channel to South Fork of Wolf Creek	Inactive Mine	39.207761	-121.043585
State of California Dept. of Parks and Recreation	Malakoff Diggins State Historic Park	23579 North Bloomfield Road, Nevada City	Nevada	Order No. R5-2017-0086	Mine Drainage	0.74 mgd	Humbug Creek	Inactive Mine	39.37076	-120.89796
Newmont USA Ltd	North Star Water Treatment Facility	12053 Allison Ranch Rd, Grass Valley	Nevada	General Order R5-2016-0076-001	Mine Drainage	1.04 mgd	Wolf Creek	Inactive Mine	39.185769	-121.0748813
CVIN LLC	Borehole Seep Project	135 Colfax Ave, Grass Valley	Nevada	General Order R5-2016-0076-028	Dewatering	0.013 mgd	Wolf Creek	GW Dewater Site	39.21614	-121.06006
CEMEX Construction	Patterson Sand & Gravel	8705 Camp Far West, Sheridan	Placer	General Order R5-2016-0076-045	Stormwater	1.5 mgd	Lower Bear River	Active Mine	39.02028	-121.34464
Collins Pine Company	Chester Sawmill	500 Main St, Chester	Plumas	Order No. R5-2009-0015	Treated process wastewater	0.36 mgd	Stover Ditch/Lake Almanor	Log storage and handling;saw mill and planing mill	40.303014	-121.241358
Plumas County	Gopher Hill Landfill Leachate Disposal	Snake Lake Rd, Quincy	Plumas	General Order R5-2016-0076-025	Treated Groundwater	0.084 mgd	Spanish Creek	Landfill	39.952112	-121.032033
Sierra Pacific Industries	Quincy Division	1538 Lee Rd, Quincy	Plumas	Order No. R5-2015-0070	Stormwater Runoff and Power Plant Discharge	Unspecified	Mill Creek	Log storage and handling;saw mill and planing mill	39.945525	-120.9128139
Indian Valley Health Care District	Geothermal Space Heating System	184 Hot Springs Rd, Greenville	Plumas	Order R5-2005-0012	Waste Geothermal Fluid	80 gpm	Wolf Creek to Indian Creek to North Fork Feather River	Geothermal Heating Facility	40.13944444	-120.9305556
Sterling Caviar LLC	Sterling Caviar LLC, Elverta	9149 E. Levee Road Elverta, CA 95626	Sacramento	Order No. R5-2016-0026 NPDES CA 0085197	Aquaculture Wastewater	3.67 mgd	BKS preserve wetlands, Reclamation District, Natomas East Main Drain	Concentrated Aquatic Animal Production Facility	38.73402	-121.49238
State of California Dept. of Fish and Game	Nimbus Salmon and Steelhead Hatchery and American River Trout Hatchery	So. Bank of American River, downstream of Hazel Avenue and Lake Natoma in Rancho Cordova	Sacramento	General Order R5-2014-0161-019	Treated flow-through process wastewater	Outfall 001 - 19 mgd Outfall 002 - 3 mgd Outfall 003 - 18 mgd Outfall 004 - nothing for last 6 years	Lower American River	Concentrated Aquatic Animal Production Facility	38.634216	-121.219719
U.S. Dept. of the Air Force, Air Force Real Property Agency	Former McClellan Air Force Base, Groundwater Extraction and Treatment System	4934 Patrol Road, Building 740 McClellan, CA 95652	Sacramento	General Order R5-2016-0076-059	Treated Groundwater	Discharge 001 - 2.88 mgd Discharge 002 - 0.144 mgd	Magpie Creek and Beaver Pond, tributary to Natomas East Main Drainage	Groundwater Extraction and Treatment System	38.65833333	-121.4151667

Industrial NPDES Permits in Sacramento River Watershed

Discharger	Facility Name	Facility Address	County	NPDES #	Effluent Type	Flow	Receiving Water	Facility Type	Latitude N	Longitude W
Aerojet-General Corp.	Interim Groundwater Extraction and Treatment System ARGET, GET E/F, GET H, Interim GET H, GET K, Interim GET K, GET L, GET L1, etc..	Aerojet Rd. Sacramento, CA 95813	Sacramento	Order R5-2017-0095 NPDES CA0083861	Treated Groundwater	12 outfalls - 48 mgd	Various to American River	Groundwater Extraction and Treatment System	39.62533	-121.19754
Aerojet-General Corp.	Sacramento Facility	Aerojet Rd. Rancho Cordova, CA 95670	Sacramento	Order R5-2013-0156 NPDES CA0004111	Stormwater	NA	Buffalo Creek, Alder Creek, tributary to American River	Rocket Manufacturing and Testing	38.62	-121.225
Mt. Lassen Trout Farms and PG&E	Mt. Lassen Trout Farms MillSeat Facility	Assessor's Parcel 096-070-05 and 703-160-01, approximately 2 miles east of Shingletown	Shasta	General Order R5-2014-0161-037	Wastewater from Settling ponds	11.6 mgd maximum	Millseat Creek, tributary to North Fork of Battle Creek	Concentrated Aquatic Animal Production Facility	40.489167	-121.851953
Mt. Lassen Trout Farms and PG&E	Mt. Lassen Trout Farms Volta Facility	Assessor's Parcel 999-019-41, approximately 2 miles north of Manton	Shasta	General Order R5-2014-0161-035	Wastewater from Settling ponds	6.5 mgd maximum	PG&E Cross Country Canal, tributary to South Fork of Battle Creek	Concentrated Aquatic Animal Production Facility	40.460544	-121.868433
State of California Dept. of Fish and Game	Darrah Springs Fish Hatchery	Assessor's Parcel 704-240-03, west of Manton	Shasta	General Order R5-2014-0161-027	Wastewater	26.7 mgd maximum	Darrah Creek and Pacific Power Ditch, both tributary to Coleman Canal, a tributary to Battle Creek	Concentrated Aquatic Animal Production Facility	40.408731	-121.97622
U.S. Dept. of Interior Fish and Wildlife Service	Livingston Stone National Fish Hatchery	16349 Shasta Dam Blvd. Shasta Lake, CA, 1/2 mile downstream of Shasta Dam powerhouse	Shasta	General Order R5-2014-0161-031	Wastewater	7.2mgd	Sacramento River	Concentrated Aquatic Animal Production Facility	40.689929	-122.391684
U.S. Dept. of Interior Fish and Wildlife Service	Coleman Fish Hatchery	Assessor's Parcel 057-540-03, along North Bank of Battle Creek	Shasta	General Order R5-2014-0161-028	Wastewater	78.9 mgd	Battle Creek, tributary to Sacramento River	Concentrated Aquatic Animal Production Facility	40.399026	-122.176143
State of California, Department of Fish and Game and PG&E	Crystal Lake Fish Hatchery	40156 Baum Lake Rd. Cassel, CA	Shasta	General Order R5-2014-0161-030	Wastewater	17.84 mgd	Baum Lake	Concentrated Aquatic Animal Production Facility	40.93187	-121.54672
Sierra Pacific Industries	Shasta Lake Division	3735 El Cajon Ave, Redding Assesor's Parcel 006-030-34 in the city of Shasta Lake	Shasta	Order No. R5-2016-0025 NPDES CA 0081400	Storm Water Runoff from Retention Pond	Not applicable	Churn Creek, tributary to Sacramento River	Log storage and handling;saw mill and planing mill	40.67718	-122.379605
Sierra Pacific Industries	Burney Division	36336 Hwy 299E, Burney	Shasta	Order No. R5-2020-0017	Stormwater	Unspecified	Canyon Creek	Log storage and handling;saw mill and planing mill	40.875	-121.695833
Burney Forest PWR/Shasta Energy	Burney Cogeneration/Saw mill	35586 B Hwy 299E, Burney	Shasta	Order No. R5-2019-0048	Stormwater	Unspecified	Canyon Creek	Log storage and handling;saw mill and planing mill, Electrical Generation	40.87638889	121.7166667
Mining Remedial Recovery Co.	Mammoth, Sutro, Keystone et al	Little Backbone and Squaw Creek, Redding	Shasta	Order No. R5-2002-0153 NPDES CA0081876	Acid mine drainge	0.1 mgd	Spring Creek, approximately 5 miles upstream from Keswick reservoir	Inactive Mine	40.770361	-122.443986
French Gulch Mining Corp	Washington Mine	10583 French Gulch Rd, French Gulch	Shasta	Order No. R5-2016-0091	Stormwater	0.432 mgd	French Gulch to Scorpion Gulch to Clear Creek	Gold Mine	40.718183	-122.681554

Industrial NPDES Permits in Sacramento River Watershed

Discharger	Facility Name	Facility Address	County	NPDES #	Effluent Type	Flow	Receiving Water	Facility Type	Latitude N	Longitude W
Wheelabrator Shasta Energy Co. and Wheelabrator Lassen, Inc.	Wheelabrator Shasta Energy Co. and Wheelabrator Lassen, Inc.	20811 Industry Road Anderson, CA 96007	Shasta	Order No. R5-2019-0070 NPDES CA0081957	Process water, groundwater and Storm Water	4.5 mgd	Anderson Cottonwood Irrigation District Canal, tributary to Cottonwood Creek	Electrical Generation	40.43072	-122.278601
Lazarus Mining LLC	Klondike, Dutch, and Telegraph Tunnel Mines	Section 9, T20N, R10E, MDB&M	Sierra	Order No. R5-2015-0075 NPDES CA0084387	Tunnel Drainage Water	0.30 mgd (average dry flow)	Goodyears Creek, tributary to Yuba River	Industrial Abandoned Mine Operation	39.62907	-120.86136
Original Sixteen to One Mine, Inc.	Sixteen to One Mine	506 Miners St, Alleghany Section 34, T19N, R10E, MDB&M	Sierra	Order No. R5-2015-0002 NPDES CA 0081809	Treated wastewater and mine drainage	0.28 mgd (average dry flow)	Kanaka Creek, tributary to Middle Yuba River, Yuba River, Feather River, Sacramento River	Gold Mine	39.4625	-120.8375
Sierra Minerals LLC	Colombo Mine	Colombo Mine Rd, Sierra City	Sierra	General Order R5-2016-0076-049	Mine Drainage	0.22 mgd	Yuba River	Inactive Mine	39.57229	-120.62241
State of California Dept. of Fish and Game	Mount Shasta Fish Hatchery	3 N Old Stage Rd, Mount Shasta	Siskiyou	General Order R5-2014-0161-033	Wastewater	13.8 mgd maximum	Cold Creek and Big Springs Creek	Concentrated Aquatic Animal Production Facility	41.30903	-122.326613
UPRR	Dunsmuir Railyard	5750 Sacrametno Ave, Dunsmuir	Siskiyou	General Order R5-2016-0076-030	Treated Groundwater	0.05 mgd average	Sacramento River	Railyard	41.212276	-122.270472
California Cedar Products Co.	McCloud Millworks	1/2 Mile Northeast of McCloud	Siskiyou	Order No. R5-2003-0014	Stormwater and Process Water	Unspecified	Squaw Valley Creek	Log storage and handling;saw mill and planing mill	**Use Previous Mark**	
Mt. Lassen Trout Farms and Marion Jones	Mt. Lassen Trout Farms' Willow Springs Facility	Wildcat Rd/Road A6, Manton Assessor's Parcel 011-010-191, approx. 7 miles southwest of Manton	Tehama	General Order R5-2014-0161-036	Wastewater	7.5 mgd	Coleman Canal, tributary to Battle Creek	Concentrated Aquatic Animal Production Facility	40.406142	-121.972606
Mt. Lassen Trout Farms and Leland and Shirley Davis	Mt. Lassen Trout Farms' Jeffcoat West Facility	Assessor's Parcel 11-020-10 approx. 4 miles southwest of Manton	Tehama	General Order R5-2014-0161-039	Wastewater	7 mgd	North Fork of Battle Creek	Concentrated Aquatic Animal Production Facility	40.412894	-121.944144
Mt. Lassen Trout Farms and Leland and Shirley Davis	Mt. Lassen Trout Farms' Jeffcoat East Facility	Assessor's Parcel 11-020-101 approx. 4 miles southwest of Manton	Tehama	General Order R5-2014-0161-038	Wastewater	6.5 mgd	PG&E Eagle Canyon Ditch, trib to South Fork of Battle Creek, Trib to Battle Creek	Concentrated Aquatic Animal Production Facility	40.411683	-121.939608
Mt. Lassen Trout Farms and Dale Family Partnership	Mt. Lassen Trout Farms' Dales Facility	Assessor's Parcel 9-14-11 and 9-19-21, 14 miles east of Red Bluff	Tehama	General Order R5-2014-0161-029	Wastewater	7.5 mgd	Paynes Creek, Tributary to Sacramento River	Concentrated Aquatic Animal Production Facility	40.31735	-122.066797
Mt. Lassen Trout Farms and Fred and Nancy Cline	Mt. Lassen Trout Farms Meadowbrook Facility	28125 Hwy 36E, Red Bluff Assessor's Parcel 11-250-21, 15 miles east of Red Bluff	Tehama	Order No. R5-2004-0150 NPDES CA 0080373	Wastewater	9.0 mgd (max)	Paynes Creek, Tributary to Sacramento River	Concentrated Aquatic Animal Production Facility	40.310556	-121.979167
Reynolds Consumer Producst LLC	Reynolds Molded Pulp Mill	1000 Diamond Ave, Red Bluff Assessor's Parcel 35-08-02 in Section 33, T27N, R3W, MDB&M, approx. 1/2 mile upstream of Red Bluff Diversion Dam	Tehama	Order No. R5-2017-0014 NDPES CA 0004821	Treated wastewater	2.7 mgd	Sacramento River	Converted Paper and Paperboard products	40.15277778	122.2055556
Bell-Carter Olive Co. and City of Corning	Bell Carter Industrial Wastewater Treatment Plant	Gardiner Ferry Road Corning, CA 96021	Tehama	Order No. R5-2015-0030 NPDES CA0083721	Treated food process wastewater	1.4 mgd (daily max);0.75 mgd (annual average)	Treated wastewater goes to City of Corning outfall line, then to Sacramento River	Industrial	39.9162	122.10446

*Source - CIWQS Website and Individual Permits

Task 3c – Sacramento River Other Joint Program Downstream GKWTP: McClellan Air Force Base Update (June 2020)

The former McClellan Air Force Base (AFB) is approximately eight miles northeast of downtown Sacramento in North Highlands. The site was historically used as a plane cleanup and decommissioning facility, so solvents are the primary constituents of concern in the groundwater contamination. The AFB was officially closed on July 13, 2001. Clean-up of the base is currently supervised by the Department of Defense (DOD) Installation and Restoration Program, and is being directed by the United States Department of the Air Force (Air Force).

As McClellan AFB is a Federal Superfund site, it must meet the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) requirements. According to the Air Force, they do not have to comply with the specific terms of any permit issued by the Central Valley Regional Water Quality Control Board (Regional Board) since they are a DOD facility.

Significant Changes Since Last Update

Previously, the facility had an individual National Pollutant Discharge Elimination System (NPDES) permit issued by the Regional Board for groundwater extraction, treatment, and discharges to surface water and was in compliance with the terms of the NPDES permit. Generally, the Air Force was conducting all of the monitoring required by the NPDES permit for volatile organic compounds (VOCs), hexavalent chromium, 1-4-dioxane, and other general parameters at the Groundwater Treatment System (GWTS).

In 2019, the Regional Board determined that the GWTS discharge met required conditions for approval under the General Order for Limited Threat Discharges to Surface Water (Limited Threat General Order), as a Tier 2 discharge. The Limited Threat General Order R5-2016-0076-059 and NPDES permit No. CAG995002 became effective on November 1, 2019, and the previous NPDES Order R5-2014-0055 was rescinded.

The influent and effluent monitoring for the GWTS required for the 2019 Limited Threat General Order is similar to the 2014 NPDES permit, except:

- 1,4-dioxane is no longer required to be monitored in the GWTS influent and effluent;
- Effluent limitations for hexavalent chromium were removed, but it will continue to be monitored annually in the GWTS influent and monthly in the GWTS effluent;
- Effluent monitoring for dissolved oxygen, pH and temperature have been reduced from monthly to quarterly.

More information on why the Regional Board discontinued 1,4-dioxane monitoring is provided below.

Monitoring details are provided below, but in summary under the Limited Threat General Order the GWTS effluent continues to be monitored monthly for nine VOCs and hexavalent chromium, but annual monitoring for 1-4-dioxane was discontinued on November 1, 2019. The GWTS influent continues to be monitored annually for hexavalent chromium and nine VOCs, but annual monitoring for 1,4-dioxane was discontinued on November 1, 2019. The Air Force collects monthly field data for temperature, dissolved oxygen, pH, turbidity and conductivity. The Air Force is not required to regularly sample for perchlorate, perfluorinated compounds (PFCs) and 1,2,3-trichloropropane (1,2,3-TCP) at the GWTS.

Sampling for PFCs and 1,2,3-TCP was requested in an August 2017 letter to the Air Force from the Regional Board. The Air Force conducted quarterly sampling for PFCs and 1,2,3-TCP of the GWTS effluent for approximately one year only, from August 2017 to October 2018. The Air Force has not sampled for PFCs and 1,2,3-TCP in the GWTS effluent since October 2018. However, the Regional Board has conducted limited sampling for PFCs and 1,2,3-TCP in 2020 as described below.

The Regional Board also collects annual samples for perchlorate, 1-4-dioxane, and hexavalent chromium when funds are available. Unfortunately, funds were not available to conduct annual testing in June 2019. Annual samples for 2020 were collected on March 5, 2020. The Regional Board also sampled for PFCs in 2017, 2018, 2020 and 1,2,3-TCP in 2018 and 2020.

Regulatory Background

Final groundwater cleanup levels for VOCs were established in the Final Basewide Groundwater VOC Record of Decision (ROD). It was agreed that a cleanup level of 5 micrograms per liter (µg/L) for trichloroethene (TCE) and tetrachloroethene (PCE) was protective of human health and the environment.

In September 2009 the Air Force issued an Amendment to the Base Groundwater ROD to add the clean-up of groundwater contaminated with non- VOCs at the base. The non-VOCs addressed in the plan are 1,4-dioxane (VOC stabilizer during transport), total and hexavalent chromium (from metal plating shops), and perchlorate (from laboratories). Overall, the ongoing pumping and treatment of groundwater are shrinking the plumes in terms of both aerial extent and concentration (Email communication, Steve Mayer, Air Force, May 2018.)

As part of the ROD Amendment it was decided that the current VOC treatment strategy (extract, treat, and monitor) would be sufficient for non-VOC constituents as well. In order to fully address the non-VOCs contamination on the base, the Air Force installed an additional extraction well. This extraction well is located to address a small plume of hexavalent chromium from a former plating shop. The non-VOC remediation plan indicates that the clean-up will continue until the following Maximum Contaminant Levels (MCLs), or preliminary remediation goal (PRGs), if an MCL does not exist, are met in the groundwater:

- Total chromium to its MCL of 50 µg/L,
- 1,4-dioxane to its PRG of 6.1 µg/L (based on risk to human health),
- Perchlorate to its MCL of 6 µg/L., and
- Hexavalent chromium to its background level of 14 µg/L (added in 2016)

According to the Air Force, levels of perchlorate and 1,4-dioxane are below the clean-up goals in the GWTS influent so no additional treatment technologies are in place to specifically address removal of 1,4-dioxane and perchlorate from the extracted groundwater, rather dilution is relied upon to blend the non-VOC waters to lower concentrations with the VOC waters, which do not have perchlorate or 1,4-dioxane.

Five-Year Review

The Fifth Five-Year Review for McClellan AFB was completed in September 2019 by the Air Force. Similar to the previous 2014 Five-Year Review, the Executive Summary states that the remedy is functioning as intended by the Groundwater VOC ROD and the non-VOC ROD amendment. Hydraulic control of VOC plumes has been achieved and is being maintained, and contaminant mass is being removed by the groundwater remedy. There were a few report recommendations to note:

- Installation of an extraction well to provide hydraulic capture of VOCs in groundwater in the C monitoring zone in OU A Central, as VOCs are not being fully captured. Continue to monitor the VOC plume.
- Continue to monitor for PFCs in groundwater to define the extent of contamination, and determine if any PFCs should be added to the list of non-VOC COCs as part of the non-VOC ROD Amendment to be remediated. Results were not available until after the June 30, 2018 cutoff date for data review. This issue will be evaluated during the next Five-Year Review.
- Conduct an evaluation to determine whether 1,2,3-TCP exceeds the MCL of 0.005 µg/L. If necessary, update the groundwater treatment plant Operations and Maintenance Manual and the VOC ROD Amendment to include 1,2,3-TCP.

The extraction well noted above was completed in April 2020.

Groundwater Treatment System and Water Quality Data

The GWTS is treating approximately 1,400 gallons per minute (gpm) of groundwater pulled from 80 extraction wells. The treatment system consists of a 64,000-gallon influent tank, an air stripping tower to remove VOCs (capacity of 2,000 gpm up to 167 µg/L of TCE), six 20,000-pound liquid-phase granular activated carbon (GAC) vessels (not currently utilized due to the low influent VOC concentration), and one ion exchange resin vessel (60 cubic-foot) to remove hexavalent chromium. The ion exchange system can treat a slipstream (part of the flow) of the total flow after the air stripper. However, the Regional Board indicated that as of September 2018, the ion exchange system is not currently being used because the hexavalent chromium influent concentrations are consistently below 10 μg/L without treatment. The California Toxic Rule (CTR) screening for hexavalent chromium is 11 μg/L. The Regional Board indicated that if the monthly samples in the GTWS effluent indicate an increasing trend, the ion exchange system could be brought back on-line. (Email communication, James Taylor, November 7, 2019).

The treated groundwater is discharged at two locations, with one discharge point (No. 001) to Magpie Creek and another discharge point (No. 002) to Beaver Pond (a wetlands area adjacent to Don Julio Creek which is tributary to Magpie Creek). Discharge point 001 is the primary discharge location. Magpie Creek is tributary to the Magpie Creek Diversion, which is tributary to Robla (Rio Linda) Creek, which is tributary to the Natomas East Main Drainage Canal, which drains to the Sacramento River under the majority of hydrologic conditions, but can discharge to the Lower American River just upstream of the confluence under high flow scenarios. The permitted daily average discharge flow from Discharge Point No. 001 shall not exceed 2.88 mgd. The permitted flow for Discharge Point No. 002 is 0.144 mgd. The total combined daily average discharge flow from Discharge Point Nos. 001 and 002 shall not exceed 2.88 mgd. The GWTS is configured to allow for discharge to the municipal sewer system if there is potential to exceed limitations or if the effluent quality is uncertain.

The Air Force is required under the NPDES permit to monitor the influent to the facility, two effluent sample points, and three receiving water locations. The influent sites are required to be monitored at a minimum of once per year. As shown in **Table 1** effluent limitations for Discharge No. 001 (Magpie Creek) include carbon tetrachloride, dichlorobromomethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethylene, PCE, TCE, vinyl chloride, and cis-1,2-dichloroethylene. The pH also must be kept within the range of 6.5 and 8.5. The effluent limitations for Discharge No. 002 (Beaver Pond and Don Julio Creek) are exactly the same, except the daily average discharge at No. 002 cannot exceed 0.144 mgd. The effluent limitation for hexavalent chromium was not included in the Limited Threat General Order.

Table 1 Effluent Limitations for Discharge No. 001 and 002 and Maximum Contaminant Levels

Parameter	Units	Max. Daily	MCL
Carbon Tetrachloride	μg/L	0.5	0.5
Dichlorobromomethane	μg/L	0.5	80*
1,1-Dichloroethane	μg/L	0.5	5
1,2-Dichloroethane	μg/L	0.5	0.5
1,1-Dichloroethylene	μg/L	0.5	6
Tetrachloroethylene (PCE)	μg/L	0.5	5
Trichloroethylene (TCE)	μg/L	0.5	5
Vinyl Chloride	μg/L	0.5	0.5
Cis-1,2-Dichloroethylene	μg/L	0.5	6

* Regulated as sum of total trihalomethanes

Under the Limited Threat General Order and the previous 2014 NPDES permit, there are no discharge limits for 1,4-dioxane or perchlorate and there were no monitoring requirements for perchlorate. According to the Regional Board, this is because the maximum effluent concentrations of 1,4-dioxane are less than the ROD cleanup level of 6.1 µg/L and perchlorate concentrations are low as well. As discussed earlier, the monitoring requirements for 1,4-dioxane were eliminated in the Limited Threat General Order because 1,4-dioxane currently does not have an established MCL or CTR standard, and is therefore not subject to a NPDES discharge requirements. If a new MCL is established in the future for 1,4-dioxane, the order would be modified when it is renewed. Because the McClellan ROD has an established clean-up level for 1,4-dioxane, the Regional Board will continue to sample the effluent for 1,4-dioxane in the future (Email communication, James Taylor, November 7, 2019). If the effluent sampling shows a reasonable potential to exceed a new 1,4-dioxane MCL, the general order would be revised when it is renewed to establish an effluent limitation.

Although perchlorate has an MCL, the effluent sampling has not shown a reasonable potential to exceed the MCL of 6 µg/L, and so effluent limitations were not established. However, since perchlorate is a COC in the ROD, the Air Force is required to monitor for perchlorate in groundwater monitoring wells and track the cleanup progress.

Hexavalent Chromium

The Air Force samples the GWTS effluent monthly for hexavalent chromium. From the monthly data collected from January 2008 to March 2020, there have been fourteen effluent samples with levels of 10 µg/L or greater, with the highest sample at 11 µg/L in May 2013. It should be noted that hexavalent chromium is detected each month in the effluent, but it is usually below 10 µg/L. (Email from Regional Board, James Taylor, May 2020).

The Regional Board also collected hexavalent chromium samples at the GWTS effluent which were 11.3 µg/L on June 8, 2016, 7.2J µg/L on June 15, 2017, 9.8 µg/L on June 13, 2018, and 10 µg/L on March 20, 2020. The "J" means that the concentration is estimated since the detection occurred below the laboratory's 10 µg/L detection limit. As a reminder, the California MCL for hexavalent chromium, at 10 µg/L, was rescinded in September 2017.

VOCs

As stated earlier, the VOC constituents of concern in the groundwater are TCE, PCE, 1,2-dichloroethane, cis-1,2-dichloroethene, 1,1-dichloroethane, 1,1-dichloroethene, vinyl chloride, and 1,1,1-trichloroethane. PCE and TCE are the most common VOCs detected in the influent groundwater. According to the Air Force's consultant, VOCs have been ND in the effluent since at least 2008 (Email communication, Paul Graff, AECOM, April 2019).

1,4-dioxane

The Air Force provided 1,4-dioxane data for 137 GWTS effluent samples collected from January 2003 to December 2008. The average concentration for 1,4-dioxane in those samples was 1.6 µg/L, ranging from ND to 3.9 µg/L. They also provided one sample in the GWTS effluent for 2013 at 2.7 µg/L. A review of 1,4-dioxane data provided by the Regional Board for GWTS effluent samples, collected from January 2009 through July 2013, identified a range from 0.93 to 3.5 µg/L. The majority of these samples are higher than the current DDW Notification Level of 1 µg/L.

More recent influent and effluent 1,4-dioxane data was obtained from the Air Force as shown in **Table 2.** The data indicate that the GWTS is ineffective at removing 1,4-dioxane, and levels in the effluent continue to be above the DDW Notification Level. The Air Force has not collected 1,4-dioxane data for the GWTS since October 2018.

Table 2. GWTS Influent and Effluent 1,4-dioxane, 2013 to 2018, µg/L

	10/3/13	10/7/14	10/13/15	10/11/16	10/12/17	10/9/18
GWTS Influent	NS	1.9	1.5	1.9	1.1	1.3
GWTS Effluent	2.7	1.6	1.7	1.9	1.3	1.1

Similar results were obtained by the Regional Board; 1,4-dioxane samples at the GWTS effluent in June 2014 and June 2015 were both non-detect (ND), with a reporting limit of 2 µg/L. Samples collected in June 2017 and June 2018 were 1.2 µg/L and 2.1 µg/L, respectively. The most recent sample on March 5, 2020 was ND, with a reporting limit of 1 µg/L.

Perchlorate

The Air Force previously indicated that the highest recorded level for perchlorate in the GWTS effluent since monitoring began in 2007 was 3.5 µg/L. A recent April 2019 email from the Air Force indicated that the 2007 sample result is the only perchlorate sample taken from the GWTS effluent by the Air Force. The Regional Board samples for perchlorate periodically but they were only able to readily provide information on five data points; perchlorate was detected at 0.67 µg/L in the GWTS effluent in 2007, and was ND in June 2014, June 2016 and June 2018, with a reporting limit of 2 µg/L. Perchlorate was also ND in June 2017 and March 2020, with a reporting limit of 4 µg/L. According to the Regional Board, periodic sampling occurs when the Regional Board has sufficient budgeted laboratory sampling money and staff time to perform the sampling and analysis, usually on an annual basis. There was no funding available from 2008 to 2013 and 2019.

Perfluorinated Compounds

In May 2016, the USEPA released lifetime Health Advisories for PFOA and PFOS at 0.070 µg/L (70 nanograms per liter [ng/L]), either individually or in combination with each other if both are present. Although notification and response levels were issued by

DDW in July 2018, both have been lowered since then. In August 2019, notification levels were reduced from 14 to 5.1 ng/L for PFOA and from 13 to 6.5 ng/L for PFOS. In February 2020, DDW set response levels of 10 ng/L for PFOA and 40 ng/L for PFOS. Previously, the response level was 70 ng/L for the total concentration of the two contaminants combined.

The Air Force began evaluating PFCs at the McClellan site, and conducted a "Perfluorinated Compounds Preliminary Assessment" in August 2016. The purpose of the assessment was to determine whether and where aqueous film-forming foam (AFFF) containing PFCs was stored, handled, used or released at McClellan. AFFF containing PFCs were used at McClellan for extinguishing petroleum fires, firefighting training activities, and in aircraft hangar fire suppression systems. The initial assessment focused solely on areas used for fire-fighting training, and determined that AFFF was likely used in fire-fighting training activities between 1977 and 1987, each event using an unknown amount of AFFF. The frequency that firefighting training activities were conducted is not known. Use of AFFF is expected to have released PFCs to surface soil. PFCs released to surface soil would most likely have leached through the soil into groundwater.

A Site Investigation Report, "Perfluorinated Compounds Determined at Multiple BRAC Bases Site Investigation Report Project No. PRJY20147242" (known as the 2016 Site Investigation), was completed in August 2016 that focused on the presence of PFCs in sediment, groundwater, and surface water near the former fire-fighting training area AOC313P. The AOC313P site is about 1.1 acres. There were surface water samples collected which had PFOA and PFOS concentrations above the 70 ng/L health advisory. Detailed information about the AOC313P site investigation was provided in the June 2019 Update.

Conclusions from the 2016 Site Investigation report are that "past fire-fighting training practices using AFFF at AOC313P likely contributed to PFCs detected in samples collected at and downstream of the site. Specifically, AFFF discharged to soil at AOC313P appears to have infiltrated from surface soil to underlying groundwater and migrated downgradient in groundwater." Additionally, PFCs in surface soil also appears to have migrated off site in surface water runoff, entered drainage systems, and this sediment in the drainage ditches continues to be a potential source of PFCs to surface water.

Additional sampling for PFCs continued in 2018, as there were 52 AFFF additional areas identified at McClellan where PFCs were used. The results of this site investigation are summarized in the February 2020 Draft Site Investigation Report for Aqueous Film Forming Foam Areas at Former McClellan Air Force Base. The purpose of the investigation was to determine the presence or absence of PFOA, PFOS, and perfluorobutane sulfonate (PFBS) in the environment related to historical Air Force use of AFFF. Specifically, the investigation was to determine if concentrations of PFOA, PFOS or the sum of both exceed the USEPA health advisory of 70 ng/L; and if PFBS concentrations in groundwater and soil exceed the USEPA regional screening levels of

400,000 ng/L and 1,300,000 micrograms per kilogram respectively. Out of the 52 potential AFFF release areas, 37 areas were determined to have potential or confirmed AFFF releases warranting further investigation. Of these, 33 AFFF areas were combined into eight investigative clusters (Clusters A through H) due to their close proximities. Samples were collected from newly installed and existing groundwater monitoring wells, advancing soil borings, and collecting surface and subsurface soil and sediment samples. As shown in **Table 3,** concentrations of PFOS and PFOA exceeded the 70 ng/L health advisory in Clusters A,D,F,G and H, as well as one boundary well MW-10 located near Magpie Creek.

Table 3. Summary of AFFF Area Groundwater Results for Clusters Exceeding Health Advisory for PFOA and PFOS

Cluster		Number of Samples	Number of Detections	Number of Samples Exceeding Screening Levels	Highest Concentration, ng/L
A	PFOS	14	1	1	3,000
	PFOA	14	1	-	54.6
	PFBS	14	5	-	117
	PFOS+PFOA	14	1	1	3054.6
C	PFOS	15	7	3	1010
	PFOA	15	11	-	32.3
	PFBS	15	14	-	88.5
	PFOS+PFOA	15	11	3	1030.8
F	PFOS	5	1	1	277
	PFOA	5	3	1	2100
	PFBS	5	5	-	2080
	PFOS+PFOA	5	3	2	2100
G	PFOS	10	4	-	23.4
	PFOA	10	6	1	176
	PFBS	10	6	-	67.6
	PFOS+PFOA	10	6	1	176
H	PFOS	12	4	1	295
	PFOA	12	4	1	415
	PFBS	12	5	-	61.3
	PFOS+PFOA	12	5	1	710
Installation Boundary	PFOS	10	4	-	39.7
	PFOA	10	3	-	33.4
	PFBS	10	1	-	23.7
	PFOS+PFOA	10	5	1	73.1

Source: February 2020 Draft Site Investigation report for AFFF Areas, Former McClellan AFB

According to the Regional Board, the Air Force will need to do a Remedial Investigation (RI) Report based on the Site Investigation Findings, however, because of the national funding priorities and lack of an MCL, there is currently not a schedule for when the RI will be conducted. (Email communication, James Taylor, May 2020). The Air Force commented that it could be several years in the future since McClellan is a Category 3 on the National Priority List for PFC issues at closed bases (Email communication, Steven Mayer, May 2020). The Air Force is currently focusing on Category 1 bases. A ROD would then follow the RI to address any PFAS contamination that exceeds cleanup criteria. Category 1 bases have impacted drinking water wells with PFC contamination caused by the Air Force, Category 2 bases have an imminent risk of impacting drinking water wells, and Category 3 have no impact to drinking water wells.

The 2016 Site Investigation also collected samples from the influent and effluent of the GWTS, as shown in **Table 4**. It should be noted that this sampling occurred on March 3, 2015 only. There were two influent samples collected; INF-001 represents groundwater from Operating Unit D and select wells from Operating Unit C, which is representative of the former Fire Training Area, while INF-002 represents all groundwater to the GWTS, which would show the potential of PFCs in groundwater within other areas of McClellan. Interestingly, the maximum concentrations for each of the PFCs (except for PFNA) were detected at INF-002, which would suggest that PFCs are present at other areas in addition to the former Fire Training Area. These maximum concentrations are designated in bold.

Table 4. PFCs in GWTS Influent and Effluent, µg/L collected by Air Force on March 3, 2015

Location	PFBS	PFHpA	PFHxS	PFNA	PFOS	PFOA
Effluent	0.00785J	0.00355J	0.0274	0.00427 U	0.00459J	0.00875
INF-002	0.00883J	0.00394J	0.0289	**0.00442U**	0.00509J	0.00804J
INF-001	**0.0242**	**0.0106**	**0.0838**	0.00431U	**0.0159**	**0.0321**

J = Estimated detect at concentration shown
U = Non-detect at reporting limit shown

In addition to the sampling conducted as part of the 2016 Site Investigation, more recent samples for PFCs were collected by the Air Force from the GWTS effluent quarterly from October 2017 to October 2018, as shown in **Table 5**. (Sampling for PFCs and 1,2,3-TCP was requested in an August 2017 letter from the Regional Board to the Air Force, but no new samples have been collected since October 2018 as they are not required to be monitored regularly by the Air Force.)

It should be noted that the results from the GWTS Effluent in **Table 5** for PFOS and PFOA were below their respective DDW Notification Levels and USEPA Health Advisories effective at the time the sample was taken. However, the highlighted PFOA results in **Table 5** are above the new Notification Level of 5.1 ng/L.

Table 5. PFCs in GWTS Effluent, collected by Air Force, µg/L

PFC	10/25/2017	1/10/2018	4/5/2018	7/12/2018	10/9/2018
PFBS	0.0061J	0.0061J	0.00724	0.00694	0.00552
PFHxA	0.023J	0.0264	0.0241	0.0249	0.0181
PFHpA	0.0039J	0.00405J	0.00393	0.00388	0.00307
PFHxS	0.024J	0.0197	0.0262	0.0242	0.0186
PFOA	0.0069J	0.00460J	0.0082	0.0081	0.00726
PFOS	0.0047J	0.00332J	0.00458	0.00373	0.00369
PFNA	No data	ND	ND	ND	ND
PFDA	No data	ND	ND	ND	ND
PFUnA	No data	ND	ND	ND	ND
PFDoA	No data	ND	ND	ND	ND
PFTrDA	No data	ND	ND	ND	ND
PFTeDA	No data	ND	ND	ND	ND

The Regional Board also collected samples for PFAS on June 15, 2017, June 13, 2018 and March 5, 2020 from the GWTS effluent, as shown in **Table 6.** PFAS analysis conducted in 2017 and 2018 included 12 PFAS compounds including PFOA and PFOS. The 2017 and 2018 results were below the USEPA Health Advisory of 0.070 µg/L as well as below their respective DDW Notification Levels effective at the time the sample was taken. However, the 2020 results for PFOA are above the new notification level of 5.1 ng/L and the new response level of 10 ng/L. PFAS analysis conducted in 2020 included 25 PFAS compounds and all were ND with a reporting limit of 0.0020 µg/L, except for the four PFAS compounds below and PFOA and PFOS in **Table 6:**

- PFBS – 0.0087 µg/L
- PFHpA – 0.0050 µg/L
- PFHxS – 0.028 µg/L
- PHHxA – 0.032 µg/L

Table 6. Results for PFOA and PFOS in GWTS Effluent, collected by Regional Board, µg/L

Date	PFOA	PFOA duplicate	PFOS	PFOS duplicate
6/15/2017	0.0094	0.0095	0.0056	0.0057
6/13/2018	0.0068	0.0071	0.0040	0.0039
3/5/2020	0.010		0.0048	

1,2,3-trichloropropane (1,2,3-TCP):

One sample was collected at the GWTS effluent on June 13, 2018 and March 5, 2020 by the Regional Board for 1,2,3-TCP. Both sample results were ND with a reporting limit of 0.0050 µg/L. Samples were collected quarterly by the Air Force for one year, from 2017 to 2018. The Air Force collected GWTS effluent samples in August 2017, October 2017, January 2018, April 2018, July 2018, and October 2018. All results were ND with a method detection limit of 0.0021 µg/L, except for the April 2018 sample which was 0.0034J µg/L. The MCL for 1,2,3-TCP is 0.005 µg/L, so all results are below the MCL. According to the Regional Board, they have received funding to sample a collection of groundwater wells for any localized plumes of 1,2,3-TCP. This sampling is expected to be conducted by the Air Force in the second and third quarter of 2020. Once that data is available, they will determine if any further effort is needed, such as a Remedial Investigation.

Recommendations

- Track MCL development for 1,4-dioxane, as well as 1,4-dioxane levels in the GWTS effluent samples collected by the Regional Board. Although 1,4-dioxane levels in the GWTS effluent have exceeded the DDW Notification Level, it appears the Regional Board will not include in the NPDES permit until an MCL or Federal remediation goal is established.
- Track MCL development for PFAS, as well as PFAS levels in the GWTS effluent samples collected by the Regional Board. Although PFOA levels in the GWTS effluent have exceeded the new DDW Notification Level of 5.1 ng/L, it appears the Regional Board will not include in the NPDES permit until an MCL or Federal remediation goal is established.
- Consider obtaining more information from Regional Board permitting staff in regards to the process of addressing a new PFAS or 1,4-dioxane MCL in the discharge requirements in the Limited Threat General Order.
- Track perchlorate concentrations in the GWTS effluent.
- Track additional groundwater sampling being conducted in 2020 by the Air Force to investigate 1,2,3-TCP. The next steps could be completing a Remedial Investigation, which could then lead to a ROD amendment to add 1,2,3-TCP as a chemical of concern to the McClellan ROD.
- Keep track of Remedial Investigation for PFCs with Air Force, although it appears to be in the distant future, since McClellan is a Category 3 base. According to the Regional Board, the Remedial Investigation for PFCs would likely come after the Remedial Investigation for 1,2,3-TCP.

References

Perfluorinated Compounds Determined at Multiple BRAC Bases Site Investigation Report Project Former McClellan Air Force Base Project No. PRJY20147242. Submitted by Amec Foster Wheeler, August 2016.

Order R5-2014-0055 NPDES No. CA 0081850 Waste Discharge Requirements for the United States Department of the Air Force, Air Force Real Property Agency Former McClellan Air Force Base Groundwater Extraction and Treatment System Sacramento County.

Fifth Five- Year Review Report for McClellan Air Force Base (AFB), prepared by URS, prepared for Air Force Civil Engineer Center, September 2019

Draft Site Investigation Report for Aqueous Film Forming Foam Areas Former McClellan Air Force Base Prepared for Air Force Civil Engineer Center, Prepared by Aerostar SES, February 2020.

Quarterly Groundwater Treatment Facility Performance Evaluation Report for the first quarter 2020, Contract No. FA8903-09-D-8587/0004, PRJY20127251A, Former McClellan AFB, prepared by URS, prepared for Air Force Civil Engineer Center, April 29, 2020.

Notice of Applicability (NOA) General Waste Discharge Requirements Order R5-2016-0076-01 for Limited Threat Discharges to Surface Water; United States Department of the Air Force, Air Force Civil Engineer Center, Former McClellan Air Force Base (AFB), Groundwater Extraction and Treatment System, Sacramento County. Dated September 29, 2019.

Agency	Facility Name	County	Order No.	# Enforcement Actions within 5 years	# Violations within 5 years
Adin CSD	Adin CS	Modoc	2006-0003-DWQ	0	0
Alturas City	Alturas Municipal CS	Modoc	2006-0003-DWQ	0	0
Anderson City	Anderson CS	Shasta	2006-0003-DWQ	0	0
Arbuckle PUD	Arbuckle CS	Colusa	2006-0003-DWQ	0	0
Auburn City	City Of Auburn CS	Placer	2006-0003-DWQ	1	0
Auburn Valley Community Services District	Auburn Valley Community Services Dist	Placer	2006-0003-DWQ	0	0
Beckwourth CSA	Beckwourth CS	Plumas	2006-0003-DWQ	0	0
Biggs City	Biggs CS	Butte	2006-0003-DWQ	0	0
Butte CSA	Stirling City Ponds CS	Butte	2006-0003-DWQ	0	0
Butte CSA	Butte CSA 21 CS	Butte	2006-0003-DWQ	1	2
Ca Dept of Corrections & Rehabilitation	Folsom State Prison CS	Sacramento	2006-0003-DWQ	0	0
Ca Dept of Corrections & Rehabilitation	California State Prison, Sacramento CS	Sacramento	2006-0003-DWQ	0	0
California Pines CSD	California Pines CSD	Modoc	2014-0153-DWQ	2	2
California State Parks Northern Buttes District	Loafer Creek Campground CS	Butte	2006-0003-DWQ	0	0
Chester PUD	Chester CS	Plumas	2006-0003-DWQ	0	0
Chico City	Chico CS	Butte	2006-0003-DWQ	2	2
Colfax City	Colfax CS	Placer	2006-0003-DWQ	0	0
Colusa City	Colusa CS	Colusa	2006-0003-DWQ	0	0
Corning City	Corning Indust/Domestic CS	Tehama	2006-0003-DWQ	0	0
CSU Sacramento	California State University, Sacramento CS	Sacramento	2006-0003-DWQ	0	0
Donner Summit Public Utilities District	Donner Summit CS	Nevada	2006-0003-DWQ	0	0
Dunsmuir City	Dunsmuir CS	Siskiyou	2006-0003-DWQ	0	0
East Quincy Services District	East Quincy Services District CS	Plumas	2006-0003-DWQ	1	4
El Dorado Irrigation District	Deer Creek CS	El Dorado	2006-0003-DWQ	0	0
El Dorado Irrigation District	Camino Heights CS	El Dorado	2006-0003-DWQ	0	0
El Dorado Irrigation District	Gold Ridge Forest Unit 3 CS	El Dorado	2006-0003-DWQ	0	0
El Dorado Irrigation District	El Dorado Hills CS	El Dorado	2006-0003-DWQ	0	0
Fall River Mills CSD	Fall River Mills CS	Shasta	2006-0003-DWQ	0	0
Folsom City - Environmental & Water Resources Dept	City Of Folsom CS	Sacramento	2006-0003-DWQ	0	0
Georgetown Divide PUD	Auburn Lk Trls Onsite WW Disp CS	El Dorado	2006-0003-DWQ	0	0
Gerber-Las Flores CSD	Gerber CS	Tehama	2006-0003-DWQ	0	0
Gold Mountain CSD	Gold Mountain CS	Plumas	2006-0003-DWQ	0	0
Grass Valley City	Grass Valley City CS	Nevada	2006-0003-DWQ	1	0
Gridley City	Gridley CS	Butte	2006-0003-DWQ	0	0
Grizzly Lake CSD	Crocker Mountain Estates CS	Plumas	2006-0003-DWQ	0	0
Grizzly Lake CSD	Delleker CS	Plumas	2006-0003-DWQ	0	0
Grizzly Ranch CSD	Grizzly Ranch CS	Plumas	2006-0003-DWQ	0	0
Hamilton City CSD	Hamilton City Csd CS	Glenn	2006-0003-DWQ	0	0
Indian Valley CSD	Greenville CS	Plumas	2006-0003-DWQ	0	0
Indian Valley CSD	Taylorsville CS	Plumas	2006-0003-DWQ	0	0
Knights Landing Service Dist	Knights Landing CS	Yolo	2006-0003-DWQ	0	0
Lake Oroville Area Public Utility District	Lake Oroville Area PUD CS	Butte	2006-0003-DWQ	0	0
Lassen Co Waterworks Dist #1	Bieber CS	Lassen	2006-0003-DWQ	0	0
Lincoln City	Lincoln CS	Placer	2006-0003-DWQ	0	0
Linda Cnty Water District	Linda Co Wtr Dist CS	Yuba	2006-0003-DWQ	0	0
Live Oak City	City Of Live Oak CS	Sutter	2006-0003-DWQ	0	0
Loyalton City	Loyalton CS	Sierra	2006-0003-DWQ	0	0
Marysville City	Marysville CS	Yuba	2006-0003-DWQ	1	0
Maxwell PUD	Maxwell PUD CS	Colusa	2006-0003-DWQ	0	0
McCloud Community Services District	McCloud CS	Siskiyou	2006-0003-DWQ	0	0
Mt Shasta City	Mt Shasta CS	Siskiyou	2006-0003-DWQ	4	7
Nevada City	Nevada City CS	Nevada	2006-0003-DWQ	0	0
Nevada CSD No 1	Lake of The Pines CS	Nevada	2006-0003-DWQ	0	0
Nevada CSD No 1	Mountain Lakes Estates CS	Nevada	2006-0003-DWQ	0	0
Nevada CSD No 1	Cascade Shores CS	Nevada	2006-0003-DWQ	0	0
Nevada CSD No 1	Penn Valley CS	Nevada	2006-0003-DWQ	0	0
Nevada CSD No 1	North San Juan CS	Nevada	2006-0003-DWQ	0	0
Nevada CSD No 1	Lake Wildwood CS	Nevada	2006-0003-DWQ	1	0
Olivehurst PUD	Olivehurst CS	Yuba	2006-0003-DWQ	0	0
Orland City	Orland CS	Glenn	2006-0003-DWQ	0	0
Oroville City	Oroville CS	Butte	2006-0003-DWQ	0	0
Patton State Hospital	Patton State Hospital CS	Lassen	2006-0003-DWQ	0	0
Placer Cnty Dept of Facility Services	Sheridan, Zone 6 CS	Placer	2006-0003-DWQ	0	0
Placer Cnty Dept of Facility Services	Livoti, Zone 55	Placer	2006-0003-DWQ	0	0
Placer Cnty Dept of Facility Services	Sunset Whitney, Zone 2A3 CS	Placer	2006-0003-DWQ	0	0
Placer Cnty Dept of Facility Services	SMD No. 2 CS	Placer	2006-0003-DWQ	0	0

Agency	Facility Name	County	Order No.	# Enforcement Actions within 5 years	# Violations within 5 years
Placer Cnty Dept of Facility Services	Dry Creek, Zone 173 CS	Placer	2006-0003-DWQ	0	0
Placer Cnty Dept of Facility Services	SMD No. 3 CS	Placer	2006-0003-DWQ	0	0
Placer Cnty Dept of Facility Services	SMD No. 1 CS	Placer	2006-0003-DWQ	0	0
Placerville City	Hangtown Creek CS	El Dorado	2006-0003-DWQ	1	0
Plumas Eureka CSD	Plumas Eureka Estates CS	Plumas	2006-0003-DWQ	3	3
Portola City	Portola CS	Plumas	2006-0003-DWQ	2	3
Quincy Community Services District	Quincy CS	Plumas	2006-0003-DWQ	0	0
Red Bluff City	Red Bluff CS	Tehama	2006-0003-DWQ	2	3
Redding City	Redding City CS	Shasta	2006-0003-DWQ	3	8
Richvale Sanitary District	Richvale CS	Butte	2006-0003-DWQ	0	0
Rio Alto WD	Lake California CS	Tehama	2006-0003-DWQ	0	0
River Highlands CSD	Hammonton Gold Village CS	Yuba	2006-0003-DWQ	0	0
Roseville City	Dry Creek CS	Placer	2006-0003-DWQ	0	0
Sacramento Area Sewer District	Sacramento Area Sewer District CS	Sacramento	2006-0003-DWQ	3	23
Sacramento City	City of Sacramento Utilities CS	Sacramento	2006-0003-DWQ	0	0
Sacramento City	City of Sacramento Combined CS	Sacramento	2006-0003-DWQ	0	0
Sacramento Cnty Airport System	Sacramento Intl Airport CS	Sacramento	2006-0003-DWQ	0	0
Sacramento Cnty Airport System	Sacramento Executive Airport CS	Sacramento	2006-0003-DWQ	0	0
Sacramento Cnty Dept of Regional Parks	Discovery Park	Sacramento	2006-0003-DWQ	0	0
Sacramento Regional CSD	Sacramento Regional CS	Sacramento	2006-0003-DWQ	0	0
Sewerage Commission Oroville Region	Oroville CS	Butte	2006-0003-DWQ	0	0
Shasta CSA #13	Alpine Meadows/Whispering Wood CS	Shasta	2006-0003-DWQ	0	0
Shasta CSA #17	Cottonwood CS	Shasta	2006-0003-DWQ	0	0
Shasta CSA #8	Palo Cedro CS	Shasta	2006-0003-DWQ	0	0
Shasta Lake City	Shasta Lake CS	Shasta	2006-0003-DWQ	2	4
Shasta Tehama Trinity Joint Community College Dist	Shasta-Tehama-Trinity Joint Community College District CS	Shasta	2006-0003-DWQ	0	0
Sierra Lakes CWD	Soda Springs CS	Sierra	2006-0003-DWQ	0	0
South Placer MUD	South Placer Mud CS	Placer	2006-0003-DWQ	0	0
Sutter Cnty DPW	Rio Ramaza CS	Sutter	2006-0003-DWQ	0	0
Sutter Cnty DPW	Robbins CS	Sutter	2006-0003-DWQ	0	0
Tehama Co SD #1	Mineral CS	Tehama	2006-0003-DWQ	0	0
Thermalito Water & Sewer District	Thermalito Water & Sewer District CS	Butte	2006-0003-DWQ	0	0
UC Davis Health System	UC Davis Health System CS	Sacramento	2006-0003-DWQ	1	0
USDI National Park Service Whiskeytown	Oak Bottom Recreation Area CS	Shasta	2006-0003-DWQ	0	0
USDI National Park Service Whiskeytown	Brandy Creek Recreational Area CS	Shasta	2006-0003-DWQ	0	0
Walker Ranch CSD	Bailey Creek CS	Plumas	2006-0003-DWQ	0	0
West Sacramento City	West Sacramento CS	Yolo	2006-0003-DWQ	0	0
Westwood CSD	Westwood CS	Lassen	2006-0003-DWQ	0	0
Wheatland City	City of Wheatland CS	Yuba	2006-0003-DWQ	0	0
Williams City	Williams CS	Colusa	2006-0003-DWQ	0	0
Willows City	Willows CS	Glenn	2006-0003-DWQ	0	0
Yuba City	Stonegate Village CS	Sutter	2006-0003-DWQ	0	0
Yuba City	Yuba City CS	Sutter	2006-0003-DWQ	0	0
Yuba Cnty Motorplex LLC	Motorplex at Yuba County CS	Yuba	2006-0003-DWQ	0	0

SASD Category 1 SSOs, 2015 - 2019

Date	Total Spill Volume	Volume Reach Surface Water
2015.01.04	26130	26030
2015.01.07	46	41
2015.01.17	3756	3746
2015.02.06	625	624
2015.02.15	4594	4589
2015.02.18	4200	3554
2015.04.06	792	791
2015.04.07	4540	4525
2015.04.07	96	92
2015.05.04	35	25
2015.07.21	3225	2695
2015.09.27	112	108
2015.10.09	336	1
2015.10.17	188125	188125
2015.11.08	905	905
2015.11.09	5	3
2016.01.14	50	46
2016.01.23	1825	1825
2016.01.25	1940	1740
2016.02.03	150	120
2016.02.07	5640	5430
2016.02.21	888	728
2016.03.13	617	612
2016.07.09	314	314
2016.08.11	2	2
2016.08.29	21600	21600
2016.09.10	60	60
2016.09.15	101	101
2016.12.01	467	465
2016.12.10	13	11
2016.12.13	2850	1770
2016.12.24	9840	9293
2016.12.28	800	775
2017.01.05	92	87
2017.01.05	510	358
2017.01.06	677	674
2017.01.07	33	31
2017.01.08	22750	22750
2017.01.08	3460	3457
2017.01.08	431	430
2017.01.08	5882	3071
2017.01.08	460	456
2017.01.09	1151	1031
2017.01.09	59	52
2017.01.10	12305	12304

SASD Category 1 SSOs, 2015 - 2019

Date	Total Spill Volume	Volume Reach Surface Water
2017.01.10	3	2
2017.01.10	4	3
2017.01.10	48551	48548
2017.01.10	22561	22561
2017.01.10	31182	31182
2017.01.10	10001	10000
2017.01.10	4890	4849
2017.01.11	147	98
2017.01.12	17	9
2017.02.06	4	2
2017.02.06	14950	14898
2017.02.07	7128	7127
2017.02.08	375	340
2017.02.09	6710	6710
2017.02.09	761	760
2017.02.19	15	12
2017.02.20	6180	6175
2017.02.20	17885	17885
2017.02.20	3863	3862
2017.02.20	4506	3600
2017.02.20	1300	1298
2017.02.20	571	571
2017.03.24	7	3
2017.03.26	79	55
2017.03.28	48	28
2017.04.10	14880	14878
2017.04.19	840	770
2017.05.09	144	124
2017.05.30	74	26
2017.06.30	5733	5726
2017.09.22	979	949
2017.09.25	1374	1329
2017.10.09	727	696
2017.10.19	100	100
2017.11.16	192	172
2017.12.29	4358	4160
2018.01.01	975	829
2018.01.03	4380	4320
2018.01.09	6187	5887
2018.01.09	550	550
2018.01.10	4162	3862
2018.01.15	2211	2023
2018.01.18	850	381
2018.01.27	884	690
2018.02.21	1152	864

SASD Category 1 SSOs, 2015 - 2019

Date	Total Spill Volume	Volume Reach Surface Water
2018.02.25	115	112
2018.02.25	30	28
2018.03.04	5413	4774
2018.04.01	586	574
2018.04.20	57	43
2018.05.03	1500	1483
2018.05.16	316	310
2018.06.25	636	107
2018.09.03	338	280
2018.09.06	1106	1036
2018.10.06	945	915
2018.10.08	90	60
2018.10.29	200	16
2018.11.03	275	267
2018.11.30	10873	9973
2018.11.30	1428	936
2018.12.09	144	139
2018.12.20	173	171
2019.01.03	513	507
2019.01.06	626	606
2019.01.07	4590	4395
2019.01.20	114	40
2019.02.02	423	284
2019.02.02	45	35
2019.02.02	8878	8854
2019.02.02	252	215
2019.02.08	420	414
2019.02.09	10	10
2019.02.13	220	220
2019.02.14	90	84
2019.02.15	1012	996
2019.02.19	2895	2870
2019.02.22	813	560
2019.02.25	6	3
2019.02.26	22845	22842
2019.02.26	1998	1977
2019.02.27	1981	1980
2019.02.28	2760	2367
2019.02.28	560	454
2019.03.03	7495	367
2019.03.05	3110	2898
2019.03.09	372	276
2019.03.11	245	214
2019.03.24	86	54
2019.03.27	1494	1476

SASD Category 1 SSOs, 2015 - 2019

Date	Total Spill Volume	Volume Reach Surface Water
2019.03.27	131	121
2019.03.27	10487	9771
2019.03.30	4072	3822
2019.04.02	265	263
2019.04.03	3994	3956
2019.04.06	17427	13949
2019.04.07	288	237
2019.04.13	641	488
2019.04.27	271	245
2019.04.29	30	23
2019.05.18	430	290
2019.05.19	400	397
2019.06.08	494	261
2019.06.16	48	23
2019.08.20	1200	1193
2019.08.24	58	29
2019.10.01	395	135
2019.11.29	214	184
2019.12.01	145	128
2019.12.07	67	59
2019.12.09	66190	41631
2019.12.14	1509	1457
2019.12.17	435	347
2019.12.28	162	113
2019.12.30	56	51
2019.12.30	236	190
TOTAL	**762702**	**709946**

Attachment C: Spills in OES Database That Reached Waterway
January - December 2015

#	Incident Date	Location	County	Agency Notifying	Type of Spill	Amount Spilled	Units	Contained Before Enter Waterway?	Waterway Entered	Tributary to
January										
1	1/27/2015	609 L St, Sacramento	Sacramento	Turner Construction	Other	17,160	Gal(s)	No	Storm Drain	Sacramento River
2	1/28/2015	Smiths Flat and Broadway, Placerville	El Dorado	El Dorado Irrigation Dist	Other	Unk	Gal(s)	No	Hangtown Creek	American River
February										
3	2/6/2015	Station# S067: 6937 Landis Ave, Carmichael	Sacramento	Sacramento Area Sewer District	SEWAGE	625	Gal(s)	No	Unnamed Creek	American River
4	2/7/2015	2416 Meadow Lane, Placerville	El Dorado	PG&E	PETROLEUM	10	Gal(s)	Unknown	Storm Drain	American River
5	2/18/2015	4901 Saint Lynn Lane, Carmichael	Sacramento	Sacramento Area Sewer District	SEWAGE	784	Gal(s)	No	Strong Ranch Slough	American River
6	2/23/2015	7845 Sayonara Dr, Citrus Heights	Sacramento	Sac Area Sewer Dist	SEWAGE	11,780	Gal(s)	No	Arcade Creek	Sacramento River
March										
7	3/4/2015	1545 Q Street, Rio Linda	Sacramento	Sacramento Sewer District	SEWAGE	2,000	Gal(s)	No	Tributary of Dry Creek	Sacramento River
8	3/5/2015	951 Blue Ravine Road, Folsom	Sacramento	VSP One	CHEMICAL	Unknown	N/A	No	Storm Drain/Willow Creek	American River
9	3/5/2015	2902 Auburn Blvd, Sacramento	Sacramento	PG & E	PETROLEUM	1	Gal(s)	No	Storm Drain	Sacramento River
10	3/5/2015	36 Derow Ct, Sacramento	Sacramento	Sacramento Sewer Dist	SEWAGE	6,000	Gal(s)	No	Storm Drain	Sacramento River
11	3/7/2015	9342 Purdy Lane, Granite Bay	Placer	Placer County Utilities	SEWAGE	600 (100 g to SW)	Gal(s)	No	Storm Drain/Linda Creek	Sacramento River
12	3/15/2015	297 Westlake, West Sacramento	Yolo	Private Citizen	OTHER	UNK	Unknown	No	Unnamed Pond	Sacramento River
13	3/20/2015	1801 Garden Hwy, Near River View Marina	Sacramento	NRC	PETROLEUM	1	N/A	No	Sacramento River	Sacramento River
14	3/21/2015	Rollins Lake, Colfax	Placer	NRC	PETROLEUM	50 yds x 20'	Sheen	No	Rollins Lake	Sacramento River
15	3/27/2015	Limekiln Rd. x HWY 49, Diamond Springs	El Dorado	District 2 Solid Waste Advisory Committee Member	PETROLEUM	UNK	Gal(s)	No	Weber Creek tributary to the American River	American River
April										
16	4/6/2015	2257 Fair Oaks Blvd, Sacramento	Sacramento	Sacramento Sewer Dist	SEWAGE	792 (724 g to SW)	Gal(s)	No	Chicken Ranch Slough / American River	American River
17	4/7/2015	I-5 SB & Seamas Ave post mile 19.17, Sacramento	Sacramento	CalTrans	PETROLEUM	50	Gal(s)	No	Storm Drain	Sacramento River
18	4/7/2015	NB I-5, Under the Capitol St Overpass, Sacramento	Sacramento	Sac Fire	PETROLEUM	60	Gal(s)	No	Storm Drain	Sacramento River
19	4/7/2015	5700 Primrose Dr., Citrus Heights	Sacramento	Sacramento Area Sewer District	SEWAGE	100 (92 g to SW)	Gal(s)	No	Storm Drain, San Juan Creek	Sacramento River
20	4/7/2015	1530 Fulton Ave., Sacramento	Sacramento	Sacramento Area Sewer	SEWAGE	4540 (4525 g to SW)	Gal(s)	No	Storm Drain, Strong Ranch Slough	American River
21	4/13/2015	7826 Hampton Lane, Citrus Heights	Sacramento	Sacramento Area Sewer District	SEWAGE	1500	Gal(s)	No	Storm Drain/Arcade Creek	Sacramento River
22	4/13/2015	100 Prison Rd, Represa	Sacramento	California State Prison Sacramento	SEWAGE	200 (130 g to SW)	Gal(s)	No	American River	American River
23	4/19/2015	6900 Airport Blvd, Sacramento	Sacramento	Sacramento International Airport Communications Center	PETROLEUM	15-30	Gal(s)	No	Storm Drain/Unknown waterway	Sacramento River
24	4/19/2015	8842 Winding Way, Sacramento	Sacramento	Sacramento Sewer District	SEWAGE	500	Gal(s)	No	Storm Drain/ Pond	American River
25	4/29/2015	Mahogany & Albany Way, Sacramento	Sacramento	NRC	PETROLEUM	Unknown	Unknown	No	Arcade Creek	Sacramento River
26	4/30/2015	Negro Bar State Park, Folsom	Sacramento	Private Citizen	UNKNOWN	100 yds. x 100 yds.	Sheen	No	Lake Natoma	American River
May										
27	5/2/2015	5155 Arden Way, Carmichael	Sacramento	Sacramento County Environmental Management	PETROLEUM	200	Gal(s)	No	Storm Drain	American River
28	5/23/2015	1801 Garden Highway, River View Marina	Sacramento	OSPR	PETROLEUM	Unknown	Sheen	No	Sacramento River	Sacramento River
29	5/27/2015	Sutter Bypass, 1/2 mile upstream of confluence of Sacramento River	Sutter	Citizen	PETROLEUM	Unk	Sheen	No	Sutter Bypass	Sacramento River
30	5/28/2015	River View Marina 1801 Garden Hwy	Sacramento	NRC	PETROLEUM	2 feet	Sheen	No	Sacramento River	Sacramento River
31	5/30/2015	329 Renori Court at Pissca Way, El Dorado Hills	El Dorado	El Dorado Irrigation District	OTHER	15	Gal(s)	No	Storm Drain	American River
June										
32	6/1/2015	MP 106.4 of the Martinez Sub, Roseville	Placer	UPPR	PETROLEUM	UNK	Unknown	No	Storm Drain	Sacramento River
33	6/2/2015	4061 Tildon Dr, Roseville	Placer	Roseville Fire Dept	PETROLEUM	Unknown	Gal(s)	No	Nearby creek	Sacramento River
34	6/2/2015	EB I 80 Just East Of Drum Forebay, Blue Canyon	Placer	CHP Truckee Comm Center	PETROLEUM	200	Gal(s)	No	Canyon Creek	American River
35	6/17/2015	1210 Front St, Sacramento	Sacramento	Private Citizen	PETROLEUM	White Oily Sheen	N/A	No	Sacramento River	Sacramento River
36	6/26/2015	1 mile east of Abel Rd and Wescott Rd, Colusa	Colusa	PG&E	PETROLEUM	10	Gal(s)	No	agricultural drainage ditch	Sacramento River
37	6/29/2015	HWY 193, Northside of Chilibar toward George Town, Left side of road, Placerville	El Dorado	Private Citizen	PETROLEUM	5-20	Gal(s)	No	Unnamed Creek	American River
July										
38	7/5/2015	Union Valley Reservoir, Camino Cove Boat Ramp, Pollock Pines	El Dorado	US Forest Service, El Dorado	PETROLEUM	5-10	Gal(s)	No	Union Valley	American River
39	7/8/2015	9391 Atkinson St, Roseville	Placer	UPRR	OTHER	2	Gal(s)	No	Storm Drain	Sacramento River
40	7/8/2015	9391 Atkinson Street, Roseville	Placer	UPRR	PETROLEUM	Unknwown	Gal(s)	No	Storm Drain	Sacramento River
41	7/9/2015	Sibley Street x Blue Ravine Road, Folsom	Sacramento	City of Folsom Fire Department	PETROLEUM	2	Gal(s)	No	Storm Drain	American River
42	7/15/2015	3651 Winding Creek Way, Arden	Sacramento	PG&E	CHEMICAL	1-2	Gal(s)	No	Strong Ranch Slough	American River
43	7/23/2015	Dolan-Harding Road, Browns Valley	Yuba	Private Citizen	PETROLEUM	Unknown	Gal(s)	No	Storm Drain	Sacramento River
44	7/25/2015	151 Blue Ravine Rd., Folsom	Sacramento	VSP	CHEMICAL	50	Gal(s)	No	Unknown	American River

Attachment C: Spills in OES Database That Reached Waterway
January - December 2015

#	Incident Date	Location	County	Agency Notifying	Type of Spill	Amount Spilled	Units	Contained Before Enter Waterway?	Waterway Entered	Tributary to
45	7/27/2015	1641 JULIESSE STREET, Sacramento	Sacramento	NRC	PETROLEUM	Unknown	Gal(s)	No	Storm Drain	Sacramento River
				August						
46	8/1/2015	High Street and College Way, Auburn	Placer	NRC	PETROLEUM	Unknown	Sheen	No	Auburn Ravine	Sacramento River
47	8/6/2015	Sacramento River at Miller Park Boat Ramp	Sacramento	Sacramento Resident	PETROLEUM	6' x 600'	Sheen	No	Sacramento River	Sacramento River
48	8/9/2015	1040 Marshall Way, Placerville	El Dorado	City of Placerville	SEWAGE	1250	Gal(s)	No	Cedar Ravine Creek	American River
49	8/28/2015	Lake Natoma downstream from Folsom State Prison.	Sacramento	RWQCB	SEWAGE	Unknown	Gal(s)	No	Lake Natoma	American River
50	8/31/2015	9391 Atkinson Street, Roseville Rail Yard	Placer	UPRR	UNKNOWN	100	Gal(s)	No	Storm Drain	Sacramento River
				September						
51	9/1/2015	2915 Lesvos Ct., Lincoln	Placer	Cal FIRE	PETROLEUM	Unknown	Gal(s)	No	Storm Drain	Sacramento River
52	9/2/2015	9391 Atkinson Street, Roseville	Placer	UPRR	PETROLEUM	Unknown	Gal(s)	No	Storm Drain	Sacramento River
53	9/3/2015	Melody & Riverside in the back alley, Roseville	Placer	Sherwin Williams	CHEMICAL	7	Gal(s)	No	Storm Drain	Sacramento River
54	9/7/2015	7570 Red Bud Rd, Granite Bay	Placer	Placer Co Utilities	SEWAGE	2500 (500 g to SW)	Gal(s)	No	Storm Drain	Sacramento River
55	9/7/2015	Old Folsom State Prison (along American River)	Sacramento	Private Citizen	SEWAGE	Unknown	N/A	No	American River	American River
56	9/10/2015	19th x C Street, Sacramento	Sacramento	Blue Diamond Growers	OTHER	40-180	Gal(s)	No	Storm Drain	Sacramento River
57	9/13/2015	Near 4646 Hwy 193, Georgetown	El Dorado	Calfire Camino	CHEMICAL	600	Gal(s)	No	Georgetown Creek SO the Divide Ditch	American River
58	9/17/2015	5500 Price Ave, McClellan AFB	Sacramento	LSI	CHEMICAL	1000	Gal(s)	No	Storm Drain	Sacramento River
59	9/23/2015	20 28th Street, Sacramento	Sacramento	Sacramento City Fire Department	PETROLEUM	20-30	Gal(s)	No	Storm Drain	American River
60	9/25/2015	9477 Greenback Lane, Folsom	Sacramento	Folsom FD	CHEMICAL	30	Gal(s)	No	Storm Drain	American River
61	9/28/2015	10706 Sunrise Riege Circle, Auburn	Placer	City of Auburn	SEWAGE	50 (25 g to SW)	Gal(s)	No	Storm Drain	Sacramento River
62	9/30/2015	Foothills Blvd. x Cirby Way, Roseville	Placer	UPPR	PETROLEUM	50 feet x 100 ft x unknown depth	N/A	No	Storm Drain	Sacramento River
				October						
63	10/1/2015	241 Bancroft Way, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Unknown	Unknown	No	Storm Drain	American River
64	10/7/2015	Willard Road and Iron Point and on Campus Loop Road, Folsom	Sacramento	Intel Corp	PETROLEUM	35	Gal(s)	No	Storm Drain	American River
65	10/11/2015	Loom Lake Boat Ramp, El Dorado	El Dorado	CAL Fire	UNKNOWN	Unknown	Unknown	No	Loon Lake Boat Ramp	American River
66	10/13/2015	300 Prison Rd., Represa	Sacramento	Folsom State Prison	OTHER	1,000,000	Gal(s)	No	American River	American River
67	10/28/2015	3350 Auburn Blvd., Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	4,250	Gal(s)	No	Storm Drain	Sacramento River
68	10/30/2015	Nearest to 337 Placerville Dr., Placerville	El Dorado	El Dorado Irrigation District	OTHER	600,000	Gal(s)	No	Hangtown Creek	American River
69	10/31/2015	140 Canyon Rim Road, Folsom	Sacramento	City of Folsom	SEWAGE	3000 (300 g to SW)	Gal(s)	No	Storm Drain	American River
				November						
70	11/7/2015	Rosen Ct near Luther Rd, Auburn	Placer	Placer Co Utilities	SEWAGE	200	Gal(s)	No	Storm Drain	Sacramento River
71	11/8/2015	5319 Bee Jay Ct, Fair Oaks	Sacramento	Sacramento Sewer District	SEWAGE	1040	Gal(s)	No	Storm Drain	American River
72	11/12/2015	300 Prison Rd, Represa	Sacramento	Folsom Prison	OTHER	60,000	Gal(s)	No	American River	American River
73	11/14/2015	Manzanita at Cypress, Sacramento	Sacramento	NRC	PETROLEUM	5	Gal(s)	No	Storm Drain	Sacramento River
74	11/14/2015	ake, Douglas Blvd Side, 200 yards SE of low water boat ramp, Gr	Placer	CA State Parks	PETROLEUM	N/A	N/A	No	Folsom Lake	American River
75	11/15/2015	South of CR 17 at CR 96, Yolo	Yolo	PG&E	PETROLEUM	1	Gal(s)	No	Storm Drain	Sacramento River
76	11/18/2015	424 Rimmer Ave, Sacramento	Sacramento	Sacramento City Fire	PETROLEUM	50	Gal(s)	No	Storm Drain	Sacramento River
77	11/19/2015	Manhattan Bar Rd near Longview Lane, Auburn	Placer	CA USFWS/ OSPR	PETROLEUM	10-20	Gal(s)	No	Unknown name	Sacramento River
78	11/20/2015	between Dove Dr. and East Garryanna Drive. Belale Air Force Base	Yuba	US Air Force	SEWAGE	500,000	Gal(s)	No	Dry Creek	Sacramento River
79	11/23/2015	11000 Aerojet rd. Bld 4901 Gate 1	Sacramento	Sac. Fire Department	CHEMICAL	2,100	Lbs.	No	Unknown	American River
				December						
80	12/3/2015	I-5 at Fruitridge, Sacramento	Sacramento	CHP	PETROLEUM	20	Gal(s)	No	Storm Drain	Sacramento River
81	12/10/2015	Between B-12 and B-15, B Terminal, SMF	Sacramento	Sacramento Intl Airport Comm Center	CHEMICAL	3-4	Gal(s)	No	Storm Drain	Sacramento River
82	12/13/2015	2760 Swansboro Rd., Placerville	El Dorado	PG&E	PETROLEUM	1	Gal(s)	No	Storm Drain	American River
83	12/24/2015	3390 Meadow Vista Rd, Meadow Vista	Placer	PG&E	PETROLEUM	18	Gal(s)	No	Bear River	Sacramento River
84	12/28/2015	780 Harrington Way, Folsom	Sacramento	Folsom Fire Engine 38	PETROLEUM	35-50	Gal(s)	No	Willow Creek	American River
85	12/28/2015	EB I-80, East of drum Forebay, Blue Canyon	Placer	Truckee CHP	PETROLEUM	25 or less	Gal(s)	No	Canyon Creek	American River
86	12/31/2015	Long -120.751522; Lat: 39.241426, Alta	Placer	PG&E	PETROLEUM	1.5 Tsp	N/A	No	Canyon Creek	American River

Attachment C: Spills in the OES Database
January - December 2016

#	Incident Date	Location	County	Agency Notifying	Type of Spill	Amount Spilled	Units	Contained Before Enter Waterway?	Waterway Entered	Tributary to
January										
1	1/1/2016	39080 South River Road ; near County Road 142	Yolo	CHP Woodland	PETROLEUM	Unknown	-	No	Sacramento River	Sacramento River
2	1/2/2016	7900 Antelope Rd, Roseville	Placer	UPRR	PETROLEUM	1	Qt.(s)	No	Storm Drain	Sacramento River
3	1/3/2016	Tam Oshanter Drive & Saint Andrews Drive, El Dorado Hills	El Dorado	El Dorado Irrigation District	SEWAGE	375	Gal(s)	No	New York Creek	American River
4	1/4/2016	Latitude: 39° 13' 09" N - Longitude: 120° 17' 09" W	Placer	PG&E	PETROLEUM	800'x800'	Sheen	No	Alta Reservoir	American River
5	1/6/2016	I-5 S/B south of J Street, Sacramento	Sacramento	CHP Sacramento	PETROLEUM	100	Gal(s)	No	Storm Drain	Sacramento River
6	1/7/2016	7899 GREENBACK LANE, Sacramento	Sacramento	NRC	PETROLEUM	5	Gal(s)	No	Storm Drain	Sacramento River
7	1/7/2016	1133 Auburn St S, Colfax	Placer	Stationary Engineers Local 39	SEWAGE	Unknown	-	No	Storm Drain	American River
8	1/11/2016	DI 400 Bowers Way, Wheatland	Yuba	City of Wheatland Public Works	PETROLEUM	Unknown	-	No	Storm Drain	Sacramento River
9	1/11/2016	El Dorado Trail, Missouri Flat Rd x Stage Ct., Lat 38 42 08.31N Lon 120 49 06.16 W Elevation 1810ft	El Dorado	Private Citizen	CHEMICAL	Unknown	-	No	Webber Creek	American River
10	1/25/2016	Corner of Indiana Ranch Rd and Forsythe Rd, Dobbins	Yuba	Private Citizen	ANIMAL WASTE	Unknown	-	No	Indiana Creek	Sacramento River
February										
11	2/3/2016	2251 Watt Ave, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	150	Gal(s)	No	Strong Ranch Slough	American River
12	2/3/2016	Aviation Drive at McNair Circle, Sacramento	Sacramento	Sacramento Int Airport	PETROLEUM	60-100	Gal(s)	No	Storm Drain	Sacramento River
13	2/9/2016	West Bound 80, Crystal Springs Off Ramp, Alta	Placer	CHP Truckee	PETROLEUM	150	Gal(s)	No	Storm Drain	American River
14	2/2/2016	Sacramento International Airport	Sacramento	Sac Co So Airport	PETROLEUM	50	Gal(s)	No	Filtration Ponds/ Storm Drain	Sacramento River
March										
15	3/2/2016	4140 Mount Pleasant Road, Lincoln	Placer	Private Citizen	PETROLEUM	Unknown	-	No	Sacramento River	Sacramento River
16	3/6/2016	Yankee Jims Rd at Shirt Tail Canyon Rd, Colfax	Placer	CHP Truckee	PETROLEUM	Unknown	-	No	Shirt Tail Creek	American River
17	3/10/2016	5500 Foothills Garde Ct, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	220	Gal(s)	No	Storm Drain	Sacramento River
18	3/12/2016	Camp Far West Lake, Lincoln	Placer	PG&E	CHEMICAL	15	Gal(s)	No	Camp Hill West Lake	Sacramento River
19	3/13/2016	10401 Rockingham Dr, Rancho Cordova	Sacramento	Sacramento Area Sewer District	SEWAGE	617	Gal(s)	No	Canal / American River	American River
20	3/14/2016	54 Quinns Ln, Colfax	Placer	City of Colfax	SEWAGE	1,000-20,000	Gal(s)	No	Storm Drain	American River
21	3/14/2016	4410 Rocklin Rd, Rocklin	Placer	South Placer Municipal Utility District	SEWAGE	1000	Gal(s)	No	Storm Drain	Sacramento River
22	3/14/2016	100 Yds down stream of Jurgens/Jasper Rd, Roseville	El Dorado	Private Citizen	PETROLEUM	0.5 Mile	Sheen	No	Webber Creek	American River
23	3/18/2016	Los Trampas Dr, Camino	El Dorado	El Dorado Irrigation District	SEWAGE	16	Gal(s)	No	Webber Creek	American River
24	3/20/2016	2929 Routier Rd, Rancho Cordova	Sacramento	Sacramento Area Sewer District	SEWAGE	10,226	Gal(s)	No	Storm Drain	American River
25	3/25/2016	2082 Broadway Court, Placerville	El Dorado	CDFW	PETROLEUM	1	Qt.(s)	No	Hang Town Creek	American River
26	3/26/2016	1245 Fiddyment Rd, Lincoln	Placer	Lincoln Waste Water Treatment and Reclamation Facility	SEWAGE	200,000	Gal(s)	No	Auburn Ravine	Sacramento River
27	3/29/2016	Green Valley Rd at Webber Creek, Placerville	El Dorado	California Fish and Wildlife	PETROLEUM	10	Gal(s)	No	Webber Creek	American River
28	3/30/2016	5301 Elkhorn Blvd, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	5520	Gal(s)	No	Unknown Creek	Sacramento River
April										
29	4/3/2016	711 Church Street, Roseville	Placer	UPRR	PETROLEUM	15	Gal(s)	No	Storm Drain	Sacramento River
30	4/4/2016	10545 Silverwood Way, Roseville	Sacramento	Private Citizen	PETROLEUM	7	Qt.(s)	No	Storm Drain	American River
31	4/6/2016	Throwit Way Road & Truck Street, Rancho Cordova	El Dorado	AM Pacific Engineering	CHEMICAL	Unknown	-	No	Unknown Creek	American River
32	4/17/2016	711 Church Street, Roseville	Placer	UPRR	PETROLEUM	1	Gal(s)	No	Storm Drain	Sacramento River
33	4/19/2016	EB I -80 West of Gilarbi Rd	Placer	CHP	PETROLEUM	13	Gal(s)	No	Storm Drain	Sacramento River
34	4/19/2016	415 P St., Closest Cross Streets 3rd St x 5th St., Sacramento	Sacramento	City of Sacramento Department of Utilities	SEWAGE	3600	Gal(s)	No	Storm Drain	Sacramento River
35	4/20/2016	I-5 NB, 1/4 mile South of Vamora	Yolo	CHP	PETROLEUM	30	Gal(s)	No	Storm Drain	Sacramento River
36	4/27/2016	39deg 8' 59.19" N, 121deg 46' 29.12" W, 1.1 miles due west of 1480 Acacia Rd, Sutter	Sutter	PG&E	OTHER	500	Gal(s)	Yes	Unknown	Sacramento River
37	4/29/2016	100 feet south of Tisdale Boat Ramp	Sutter	CHP	PETROLEUM	Unknown	-	No	Sacramento River	Sacramento River
38	4/30/2016	1050 Fulton Avenue, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	2,400	Gal(s)	No	Storm Drain	Sacramento River
May										
39	5/2/2016	Brisbane Cir x Wyndam Way, El Dorado Hills	El Dorado	El Dorado County Environmental Management	PETROLEUM	10	Gal(s)	No	New York Creek	American River
40	5/3/2016	MP: 104.8 Martinez Sub, 9391 Akinsons Street, J.R Davis Railyard, Roseville	Placer	UPRR	UNKNOWN	800'x40'	Spill	No	Storm Drain	Sacramento River
41	5/5/2016	MP: 104.8 Martinez Sub, 9391 Atkinson, Roseville	Placer	UPRR	PETROLEUM	0.5	Gal(s)	No	Storm Drain	Sacramento River
42	5/5/2016	5458 Bales, Serene Lakes	Placer	Placer Co Environmental Heath	CHEMICAL	Unknown	-	No	Serene Lake	American River
43	5/6/2016	6413 Tupleo Drive, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	6789	Gal(s)	Unknown	Storm Drain	Sacramento River
44	5/9/2016	2829 Clover St, Sacramento	Sacramento	Sac Co Env Health	OTHER	1,000	Gal(s)	No	Storm Drain	Sacramento River
45	5/10/2016	Damley Rd x Damley Lateral, Lat 39 13 33.28 N | Lon 122 15 36.94 W, Williams	Colusa	Colusa County Sheriff OES	CHEMICAL	5,000	Gal(s)	No	Central Canal	Sacramento River
46	5/10/2016	403 Stafford St, Folsom	Sacramento	City of Folsom	SEWAGE	55	Gal(s)	No	American River	American River
47	5/13/2016	Hazel and Folsom BLVD, located on Aerojet Site, Rancho Cordova	Sacramento	AMPAC Fine Chemicals	CHEMICAL	Unknown	-	Unknown	Ditch	American River
48	5/15/2016	Milepost 147.54 of the Valley subdivision, Yuba City	Sutter	UPRR	CHEMICAL	Unknown	-	Unknown	Storm Drain	Sacramento River
49	5/18/2016	MP: 104.8 Martinez Sub, Roseville Yard, 9391 Atkinsons Street, Roseville	Placer	UPRR	PETROLEUM	20	Gal(s)	No	Storm Drain	Sacramento River
50	5/18/2016	Sunken Boat 38 41.02N 121 38.04W, West Sacramento	Yolo	USCG Sector SF	PETROLEUM	Unknown	-	No	Sacramento River	Sacramento River
51	5/21/2016	6230 McNair Circle, Sacramento	Sacramento	Sacramento County Airport	CHEMICAL	150	Gal(s)	No	Storm Drain	Sacramento River
52	5/24/2016	5920 Landis Ave, Carmichael	Sacramento	SMUD	PETROLEUM	5	Gal(s)	No	Storm Drain	American River
53	5/26/2016	EB Interstate 80, Just West of the Blue Canyon Off Ramp	Placer	CHP Gold Run	PETROLEUM	1	Gal(s)	No	Storm Drain	American River
54	5/28/2016	3685 Frakes Wau, Yuba City	Sutter	Private Citizen	CHEMICAL	Unknown	-	Unknown	Private Drinking Water Well near Feather River	Sacramento River
55	5/29/2016	4708 Don Julio Blvd., Sacramento	Sacramento	Private Citizen	PETROLEUM	1	Gal(s)	No	Storm Drain	Sacramento River
June										
56	6/4/2016	Sugar Pine Reservoir off Foresthill Road // Possibly near Giant Gap Campground // Site Number 22, Foresthill	Placer	Tahoe National Forest - Grass Valley Interagency Command Center	PETROLEUM	60 - 80 feet	Sheen	No	Sugar Pine Reservoir	American River
57	6/5/2016	22830 FORESTHILL RD, SE QUARTER MT DIABLO BASELINE MERIDEN Latitude: 39° 08' 30" N / Longitude: 120° 47' 47" W, Section: 13 Township: 15N Range: 10E GIANT GAP CAMPGROUND, Foresthill	Placer	NRC	PETROLEUM	1	Cup(s)	No	Sugar Pine Reservoir	American River
58	6/6/2016	JR Davis Yard 9391 Atkinson St, Yard Track 201 Martinez Subdivision MP 104.8, Roseville	Placer	UPRR	PETROLEUM	10-15	Gal(s)	No	Storm Drain	Sacramento River
59	6/10/2016	144 Team Track Road, Auburn	Placer	CH2M - Environmental Consulting Service	SEWAGE	2,000	Gal(s)	No	Auburn Ravine	Sacramento River
60	6/12/2016	10734 International Drive., Rancho Cordova	Sacramento	Sacramento Area Sewer District	SEWAGE	1425	Gal(s)	No	Unnamed Channel	American River
61	6/22/2016	3200 Longview Dr., Sacramento	Sacramento	Private Citizen	CHEMICAL	Unknown	-	No	Arcade Creek	Sacramento River
62	6/24/2016	8051 Sunrise East Parkway, Citrus Heights	Sacramento	Sacramento Area Sewer District	SEWAGE	9,031	Gal(s)	No	Storm Drain	Sacramento River
63	6/27/2016	9391 Atkinson Street, Roseville	Placer	UPRR	PETROLEUM	1	Gal(s)	No	Storm Drain	Sacramento River
64	6/28/2016	MP: 113.12 Valley Sub, Athens Road, Roseville	Placer	UPRR	PETROLEUM	5	Gal(s)	No	Storm Drain	Sacramento River
65	6/29/2016	7955 Sunset Ave, Fair Oaks	Sacramento	SMUD	PETROLEUM	55	Gal(s)	Unknown	residence	American River

Attachment C: Spills in the OES Database
January - December 2016

#	Incident Date	Location	County	Agency Notifying	Type of Spill	Amount Spilled	Units	Contained Before Enter Waterway?	Waterway Entered	Tributary to
					July					
66	7/1/2016	9391 Atkinson St. Mile Marker 104.8 on the Martinez Subdivision, Roseville	Placer	UPRR	PETROLEUM	10-15	Gal(s)	No	Storm Drain	Sacramento River
67	7/3/2016	39.09871 N -121.92073 W, PGE Meter #1009917818	Colusa	PGE Fresno	PETROLEUM	1	Gal(s)	No	Irrigation Canal	Sacramento River
68	7/2/2016	Otter Creek SW of Kentucky Flat Rd, 38 58.733 N 120 44.705 W, Volcanoville	El Dorado	El Dorado County SO	PETROLEUM	1-3	Gal(s)	No	Otter Creek	American River
69	7/7/2016	1021 Howe Ave, Sacramento	Sacramento	SRCSD	SEWAGE	1722	Gal(s)	No	Storm Drain	Sacramento River
70	7/7/2016	I-80 eastbound, east of Big Bend	Placer	CHP Truckee	PETROLEUM	100	Gal(s)	No	Unnamed Channel	Sacramento River
71	7/8/2016	Aerojet/Rocketdyne 1200 Tank Farm Hazel Blvd x US 50, Rancho Cordova	Sacramento	AMPAC Fine Chemicals	CHEMICAL	15	Gal(s)	No	Storm Drain	American River
72	7/9/2016	3133 Becerra Way, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	314	Gal(s)	No	Chicken Ranch Slough	American River
73	7/11/2016	13104 Marina Dr, Smartville	Yuba	Private Citizen	PETROLEUM	Unknown	-	No	Englebright Lake	Sacramento River
74	7/17/2016	1057 Shoreline Dr, Placerville	El Dorado	El Dorado Co Env Mngt	PETROLEUM	Unknown	-	No	Arrowbee Lake	American River
75	7/26/2016	1629 G Street, Sacramento	Sacramento	Sacramento Co Fire Dispatch	SEWAGE	Unknown	-	No	Storm Drain	Sacramento River
76	7/26/2016	California State Prison Sacramento, Tower 31, Repressa	Sacramento	California State Prison Sacramento	SEWAGE	1000	Gal(s)	No	Storm Drain	American River
77	7/21/2016	3 mi North of Ramirez Rd, and Matews, 39.30382 N 121.547082 W, Marysville	Yuba	PG & E	PETROLEUM	1	Cup(s)	No	unknown	Sacramento River
78	7/27/2016	2390 Athens Ave, Lincoln	Placer	Placer Co. Env. Health	CHEMICAL	Unknown	-	No	Storm Drain	Sacramento River
79	7/30/2016	3142 Boyington Road, Penryn	Placer	ERTS	PETROLEUM	75	Gal(s)	No	Unknown drainage channel	Sacramento River
80	7/30/2016	103 4th St, West Sacramento	Yolo	Yolo Co Env Health	PETROLEUM	19	Gal(s)	No	Sacramento River	Sacramento River
81	7/30/2016	9616 Oats Drive, Repressa	Sacramento	Sacramento Area Sewer District	SEWAGE	2500	Gal(s)	No	Storm Drain	American River
					August					
82	8/1/2016	MM 4569 Hwy 50, 38 45.738 N 120 21.068 W, Kyburz	El Dorado	El Dorado Irrigation Dist	OTHER	Unknown	-	No	South Fork of the American River	American River
83	8/4/2016	3850 Roseville Road, milepost marker 96.36 of the Martinez subdivision, Sacramento	Sacramento	UPRR	UNKNOWN	4-55 drums	Gal(s)	Unknown	Storm Drain	Sacramento River
84	8/11/2016	9391 Atkinson Street, Roseville	Placer	UPRR	PETROLEUM	5	Gal(s)	No	Storm Drain	Sacramento River
85	8/11/2016	2625 Fulton Ave, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	5	Gal(s)	No	Strong Ranch Slough/American River	Sacramento River
86	8/11/2016	2710 Ramp Way Docks A-D, Sacramento	Sacramento	NRC	PETROLEUM	200'	Sheen	No	Sacramento Marina	Sacramento River
87	8/12/2016	7111 Church St, Roseville Railyard, MP 106.19 Martinez Sub, Roseville	Placer	UPRR	PETROLEUM	40	Gal(s)	Unknown	Storm Drain	Sacramento River
88	8/13/2016	MP: 88.9 of the Martinez Sub, Hwy 5 & L Street, Sacramento	Sacramento	UPRR	PETROLEUM	Unknown	-	Unknown	Storm Drain	Sacramento River
89	8/15/2016	Safeway #1866, 2220 Sunset Blvd, Rocklin	Placer	Safeway	PETROLEUM	10	Gal(s)	No	Storm Drain	Sacramento River
90	8/17/2016	East Park Reservoir at Stonyford Lake, Stonyford	Colusa	Colusa CO. Sheriff	UNSPECIFIED	Unknown	-	Unknown	East Park Reservoir at Stonyford Lake	Sacramento River
91	8/23/2016	1100 Howe Ave, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	2665	Gal(s)	No	Storm Drain	Sacramento River
92	8/27/2016	Sacramento River, from South of Miller Park to Garcia Bend, Sacramento	Sacramento	Private Citizen	PETROLEUM	200'x4000'	Sheen	No	Sacramento River	Sacramento River
93	8/27/2016	3505 S River Rd., Sherwood Harbor Marina, West Sacramento	Yolo	NRC	PETROLEUM	20	Gal(s)	No	Sacramento River	Sacramento River
94	8/27/2016	Sherwood Harbor, West Sacramento	Yolo	Private Citizen	PETROLEUM	Unknown	-	No	Sacramento River	Sacramento River
95	8/31/2016	MP: 106.19 of the Martinez Sub, Roseville Railyard, 711 Church Street, Roseville	Placer	UPRR	PETROLEUM	5	Gal(s)	No	Storm Drain	Sacramento River
					September					
96	9/1/2016	Latitude 39.110037, Longitude -121.340241 Beale Air Force Base	Yuba	Beale Air Force Base	OTHER	45,000 gallons of water, 1 pound of asbestos	Lbs.	No	Dry Creek	Sacramento River
97	9/1/2016	4145 Central Ave, Fair Oaks	Sacramento	Sacramento Area Sewer District	SEWAGE	21,600	Gal(s)	No	Unknown drainage channel	Sacramento River
98	9/6/2016	I-80 westbound, west of exit 139, Colfax	Placer	CHP Truckee	SEWAGE	20-40	Gal(s)	No	Storm Drain	Sacramento River
99	9/7/2016	1205 Champion Oaks Drive, Roseville	Placer	City of Roseville Fire Dept.	PETROLEUM	1-2	Qt.(s)	No	Storm Drain	Sacramento River
100	9/10/2016	2282 Woodcreek, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	60	Gal(s)	No	Storm Drain/Strong Ranch Slough	American River
101	9/15/2016	2301 Laredo Rd, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	101	Gal(s)	No	Chicken Ranch Slough	American River
102	9/18/2016	IN AN ALLEY WAY BETWEEN THE TWO STREETS: GREENHOLME DR. & HAYFORD WAY, Sacramento	Sacramento	NRC	CHEMICAL	3-55 drums	Gal(s)	No	Storm Drain	Sacramento River
103	9/17/2016	2727 Walnut Ave, Carmichael	Sacramento	Sacramento Area Sewer District	SEWAGE	1309	Gal(s)	No	Storm Drain	American River
104	9/18/2016	Across the street from 7201 Earhart Dr., Sacramento	Sacramento	Sacramento International Airport	PETROLEUM	5	Gal(s)	No	Storm Drain	Sacramento River
105	9/20/2016	1088 Foothills Blvd., Roseville	Placer	UPRR	CHEMICAL	0.5	Gal(s)	No	Storm Drain	Sacramento River
106	9/21/2016	MM 20.32, Hwy 20, Williams	Colusa	Colusa County EH	PETROLEUM	200 ft	Sheen	No	Salt Creek	Sacramento River
107	9/22/2016	Hinkle Creek/ American River at Negro Bar, Folsom	Sacramento	Private Citizen	CHEMICAL	L 1 mile, W 12', D 3'	Sheen	No	Hinckle Creek/ American River	American River
108	9/25/2016	Westside of Browning Road 1/4 mile North of Seymour Road, Robbins	Sutter	PG&E	PETROLEUM	5	Gal(s)	No	Unknown drainage channel	Sacramento River
109	9/30/2016	5750 S. Watt Ave, and 5800 S. Watt, Sacramento	Sacramento	Hunt and Sons	PETROLEUM	55-60	Gal(s)	No	Storm Drain	Sacramento River
					October					
110	10/4/2016	WB I-80 near MM #98, North Highlands	Sacramento	ERTS	CHEMICAL	10	Gal(s)	No	Storm Drain	Sacramento River
111	10/5/2016	Hazel Ave & Highway 50, Rancho Cordova	Sacramento	AMPAC Fine Chemicals	PETROLEUM	1	Qt.(s)	No	Storm Drain	Sacramento River
112	10/11/2016	9391 Atkinson St, Roseville	Placer	UPRR	CHEMICAL	10	Gal(s)	No	Storm Drain	Sacramento River
113	10/12/2016	Interstate 80, Just West of Nyack	Placer	CHP	PETROLEUM	3	Gal(s)	No	Storm Drain	American River
114	10/14/2016	4305 Auburn Blvd., Sacramento	Sacramento	Sacramento Municipal Utility District (SMUD)	PETROLEUM	70	Gal(s)	No	Storm Drain	Sacramento River
115	10/16/2016	9391 Atkinson St, Roseville	Placer	UPRR	PETROLEUM	50	Gal(s)	No	Storm Drain	Sacramento River
116	10/19/2016	10833 Folsom Blvd, Rancho Cordova	Sacramento	Sacramento Area Sewer District	SEWAGE	5522	Gal(s)	No	Storm Drain	American River
117	10/25/2016	MP 14.73 on Green Valley Rd, Placerville	El Dorado	El Dorado County Environmental Management	PETROLEUM	5	Qt.(s)	No	Mound Springs Creek	American River
118	10/26/2016	Sherwood Harbor, next to the Sacramento Yacht Club, West Sacramento	Yolo	Tightlines Guide Service	PETROLEUM	100' x100'	Sheen	No	Sacramento River	Sacramento River
119	10/26/2016	Lincoln Waste Water Plant - 1245 Fiddyment Road, Lincoln	Placer	Stantec	SEWAGE	5,000,000	Gal(s)	No	Auburn Ravine	Sacramento River
120	10/28/2016	I80 WB JWO, Blue Canyon	Placer	Truckee CHP	PETROLEUM	100	Gal(s)	No	Storm Drain	American River
121	10/28/2016	810 Crocker Road, Sacramento	Sacramento	SMUD	PETROLEUM	10-20	Gal(s)	Unknown		American River
122	10/29/2016	I5 S just North of Garden Hwy, Sacramento	Sacramento	Sacramento CHP	PETROLEUM	150	Gal(s)	Unknown	Storm Drain	Sacramento River
					November					
123	11/1/2016	9391 Atkinson St., Roseville	Placer	UPRR	CHEMICAL	50	Gal(s)	No	Storm Drain	Sacramento River
124	11/6/2016	Fleet Storage Building, 3101 Redding Ave, Sacramento	Sacramento	Sacramento City Fire Hazmat	PETROLEUM	5	Gal(s)	No	Storm Drain	Sacramento River
125	11/9/2016	4420 Oakhollow Dr, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	6156	Gal(s)	No	Storm Drain	Sacramento River
126	11/10/2016	Beaumont Street & Eleanore Avenue, Sacramento	Sacramento	Sacramento Fire Department	SEWAGE	20	Gal(s)	No	Storm Drain	Sacramento River
127	11/12/2016	Hwy 20 near Timbuctoo Rd, Smartville	Yuba	CALFIRE	OTHER	1	N/A	No	Yuba River	Sacramento River
128	11/12/2016	SACRAMENTO MARINA, 2710 RAMP WAY, Boat Ramp, Sacramento	Sacramento	NRC	UNSPECIFIED	Unknown	-	No	Sacramento River	Sacramento River
129	11/13/2016	Sunrise Blvd and Greenback Ln, Citrus Heights	Sacramento	CA-SAC	CHEMICAL	192	Oz.	No	Storm Drain	Sacramento River
130	11/15/2016	39.130122 / -121.420304, Beale Air Force Base	Yuba	Beale AFB	UNSPECIFIED	67	CY	No	Wetland / Stream	Sacramento River

#	Incident Date	Location	County	Agency Notifying	Type of Spill	Amount Spilled	Units	Contained Before Enter Waterway?	Waterway Entered	Tributary to
131	11/16/2016	5560 Illinois Ave, Fair Oaks	Sacramento	Private Citizen	CHEMICAL	200-300	Lbs.	No	Storm Culvert	Sacramento River
132	11/16/2016	279 Munroe Street, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	6,134	Gal(s)	No	Storm Drain	American River
133	11/18/2016	6900 Airport Blvd., Sacramento	Sacramento	Sacramento International Airport	CHEMICAL	3-5	Gal(s)	Unknown	Storm Drain	Sacramento River
134	11/28/2016	Juanita La, Santa Anita Park, Near Bell Rd side , Sacramento	Sacramento	Private Citizen	PETROLEUM	10' x 300'	Sheen	Unknown	Unknown Creek	Sacramento River
135	11/29/2016	1570 Rose Boquet Drive, Lincoln	Placer	City of Lincoln	SEWAGE	40	Gal(s)	No	Storm Drain	Sacramento River
December										
136	12/1/2016	6817 Flaming Arrow Dr, Citrus Heights	Sacramento	Sacramento Area Sewer District	SEWAGE	467	Gal(s)	No	Arcade Creek	Sacramento River
137	12/1/2016	1326 Oak Terrace Ct, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	300	Gal(s)	No	Strong Ranch Slough/American River	American River
138	12/3/2016	JR Davis Yard - 9391 Atkinson St - Martinez Subdivision, MP 104.8, Unknown Track Number, Roseville	Placer	UPRR	PETROLEUM	Unknown	-	No	Storm Drain	Sacramento River
139	12/8/2016	HWY 20, West of Spring Valley Rd., Browns Valley	Yuba	PG&E	PETROLEUM	5	Gal(s)	No	Storm Drain	Sacramento River
140	12/9/2016	Discovery Park, Sacramento	Sacramento	NRC	PETROLEUM	15 yds	Sheen	No	American River	American River
141	12/9/2016	4675 Aldona Lane, Sacramento	Sacramento	Sacramento County HazMat	CHEMICAL	55	Gal(s)	No	Arcade Creek	Sacramento River
142	12/10/2016	9321 Rolling Acres Ct, Orangevale	Sacramento	Sacramento Area Sewer District	SEWAGE	13	Gal(s)	No	Unknown Creek	Sacramento River
143	12/12/2016	11th St and B St, BAFB	Yuba	Beale Air Force Base	CHEMICAL	31	Gal(s)	No	Hutchinson Creek	Sacramento River
144	12/24/2016	4800 Old Kent Ln., Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	9880	Gal(s)	No	Storm Drain	Sacramento River
145	12/27/2016	9391 Atkinson Rd, Roseville	Placer	Placer County Environmental Health	PETROLEUM	Unknown	-	No	Dry Creek	Sacramento River
146	12/28/2016	2701 Corabel Ln, Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	800	Gal(s)	No	Chicken Ranch Slough	American River

#	Incident Date	Location	County	Agency Notifying	Type of Spill	Amount Spilled	Units	Waterway Entered	Tributary to
				January					
1	1/1/2017	1740 Chili Bar Lane	El Dorado County	California Fish and Wildlife	OTHER - asphalt	1	tons	South Fork American River	American River
2	1/3/2017	4100 Blk of El Dorado Road	El Dorado County	El Dorado Irrigation District	SEWAGE	1,000	gallons	Deer Creek	American River
3	1/3/2017	Eastbound 50 x East Bidwell	Sacramento County	CHP Sacramento	PETROLEUM	12	gallons	Storm Drain	American River
4	1/5/2017	1817 James Town Dr.	Sacramento County	Sacramento Area Sewer District	SEWAGE	92	gallons	Negro Creek	American River
5	1/5/2017	325 Elkhorn Blvd.	Sacramento County	Sacramento Area Sewer District	SEWAGE	765	gallons	East Main Drain Canal	Sacramento River
6	1/6/2017	Webber Creek at Lumenan Road	El Dorado County	California Fish and Wildlife	PETROLEUM	25	gallons	Webber Creek	American River
7	1/6/2017	8534 Everglade Dr.	Sacramento County	Sacramento Area Sewer District	SEWAGE	677	gallons	Storm Drain	American River
8	1/7/2017	Gold Rush and Gold Express	Sacramento County	Sacramento County Hazmat	PETROLEUM	3	gallons	Storm Drain	American River
9	1/7/2017	650 Douglas Blvd	Placer County	Roseville Fire Department	PETROLEUM	2	quarts	Dry Creek	Sacramento River
10	1/8/2017	6809 Anchor Circle	Sacramento County	Sacramento Area Sewer District	SEWAGE	460	gallons	Arcade Creek	Sacramento River
11	1/8/2017	5544 Watt Ave	Sacramento County	Sacramento Area Sewer District	SEWAGE	2,000	gallons	drainage channel	Sacramento River
12	1/8/2017	6205 Clara Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	6	gallons	Storm Drain	Sacramento River
13	1/8/2017	6468 Channing Drive	Sacramento County	Sacramento Area Sewer District	SEWAGE	2,600	gallons	Linda Creek	Sacramento River
14	1/8/2017	428 Wisconsin Ave	Sacramento County	Sacramento Area Sewer District	SEWAGE	430	gallons	Steelhead Creek	Sacramento River
15	1/8/2017	5708 Nonnie Avenue	Sacramento County	Sacramento Area Sewer District	SEWAGE	770	gallons	Arcade Creek	Sacramento River
16	1/8/2017	Robbins Water Treatment Plant	Sutter County	Sutter County Fire Department	SEWAGE	1,000	gallons	Canals, unknown name(s)	Sacramento River
17	1/8/2017	Grand Way and Dove Dr.	Yuba County	Beale Air Force Base	PETROLEUM	35	gallons	Dry Creek	Sacramento River
18	1/8/2017	5821 Mariposa Ave	Sacramento County	Sacramento Area Sewer District	SEWAGE	3,460	gallons	Storm Drain/Unknown Waterway	Sacramento River
19	1/8/2017	8420 Falcon View Drive	Sacramento County	Sacramento Area Sewer District	SEWAGE	33	gallons	Storm Drain	Sacramento River
20	1/9/2017	3216 Saturn Dr	Sacramento County	Sacramento Sewer District	SEWAGE	59	gallons	Storm Drain	American River
21	1/9/2017	3808 Botty St.	Sacramento County	Sacramento Area Sewer District	SEWAGE	1150	gallons	Ditch - Creek	American River
22	1/10/2017	680 Placerville Dr	El Dorado County	City of Placerville Public Works	SEWAGE	30	gpm	Hangtown Creek	American River
23	1/10/2017	Dredger Way and Main Ave	Sacramento County	Sacramento Sewer District	SEWAGE	1,140	gallons	Unnamed Drainage Channel	American River
24	1/10/2017	3812 Las Pasas Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	4,800	gallons	Storm Drain	American River
25	1/10/2017	Hwy 49 and Shell Ridge, down the side street Locksley Lane (Guard-rail on LH Side)	Placer County	Placer County Sewer	SEWAGE	600	gallons	Rock Creek	Sacramento River
26	1/10/2017	6355 Cavitt Stallman Dr.	Placer County	PG&E	PETROLEUM	0.5	gallons		Sacramento River
27	1/10/2017	6205 Clara Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	10,000	gallons	Storm Drain/Unidentified Creek	Sacramento River
28	1/10/2017	207 Tejon Ave	Sacramento County	Sacramento Area Sewer District	SEWAGE	8,200	gallons	Steelhead Creek	Sacramento River
29	1/10/2017	905 Herring Ave	Sacramento County	Sacramento Area Sewer District	SEWAGE	5,265	gallons	Steelhead Creek	Sacramento River
30	1/10/2017	5309 Pagel Court	Sacramento County	Sacramento Area Sewer District	SEWAGE	4	gallons	Storm Drain/Unknown Waterway	Sacramento River
31	1/10/2017	857 Maple Grove Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	3	gallons	Storm Drain	Sacramento River
32	1/11/2017	2004 Landon Lane	Sacramento County	Sacramento Area Sewer District	SEWAGE	148	gallons	Strong Ranch Slough	American River
33	1/11/2017	HWY 99 and Vine Street	Colusa County	Maxwell Public Utilities District	SEWAGE	63,000	gallons	Storm Drain, Unnamed Tributary	Sacramento River
34	1/11/2017	17441 Ophir Rd, Wastewater Treatment Plant	Placer County	City of Auburn	SEWAGE - partially treated	100,000	gallons	Auburn Ravine	Sacramento River
35	1/12/2017	6020 Coyle Ave	Sacramento County	Sacramento Area Sewer District	SEWAGE	13	gallons	Arcade Creek	Sacramento River
36	1/17/2017	2929 Routier Rd, Gold Ridge Apartments	Sacramento County	Sacramento Sewer District	SEWAGE	2115	gallons	Storm Drain	American River
37	1/18/2017	304 Dawnridge Rd.	Placer County	Roseville Fire Department	CHEMICAL	1	gallons	Storm Drain	Sacramento River
38	1/18/2017	Greenback Onramp to EB I80	Sacramento County	CHP Sacramento	PETROLEUM	50-60	gallons	Storm Drain	Sacramento River
39	1/19/2017	1700 Fulton Ave	Sacramento County	SC Fuels	PETROLEUM	30-50	gallons	Storm Drain	American River
40	1/20/2017	2043 Ione St.	Sacramento County	Sacramento Sewer District	SEWAGE	383	gallons	Strong Ranch Slough	American River
41	1/21/2017	Lumsden Pond in Lumsden Park	El Dorado County	City of Placerville	CHEMICAL	5	gallons	Lumsden Pond	American River
42	1/26/2017	7218 KayKay Court	El Dorado County	El Dorado Irrigation District	SEWAGE	1,000	gallons	Drainage Channel	American River
43	1/28/2017	400' west of Motherload Dr. and El Dorado Rd.	El Dorado County	El Dorado Irrigation District	SEWAGE	1,000	gallons	Unknown	American River
44	1/29/2017	4150 40 Rd	El Dorado County	El Dorado Irrigation Dist.	SEWAGE	5	gallons	unknown creek	American River
				February					
45	2/5/2017	4353 Chatee lane	El Dorado County	PG&E	PETROLEUM	2	gallons	N/A	American River
46	2/6/2017	In the area of 670 Placerville Dr.--in ravine behind the address.	El Dorado County	City of Placerville Public Works	SEWAGE	3,600	gallons	Hangtown Creek	American River
47	2/6/2017	3900 Natoma Ave.	Sacramento County	SMUD	PETROLEUM	40	gallons	American River	American River
48	2/6/2017	2260 Rockwood Dr.	Sacramento County	Sacramento Area Sewer District	SEWAGE	4	gallons	Strong Ranch Slough	American River
49	2/6/2017	3310 Zircon Dr	Placer County	City of Rocklin	PETROLEUM	8	quarts	Storm Drain	Sacramento River
50	2/6/2017	905 Haring Ave	Sacramento County	Sacramento Area Sewer District	SEWAGE	14,061	gallons	Unknown Creek	Sacramento River
51	2/7/2017	2300 Cool Water Creek Rd.	El Dorado County	City of Placerville/ Hangtown Creek Water Reclamation Facility	SEWAGE - partially treated	600	gpm	Hangtown Creek	American River
52	2/7/2017	577 Main Street	El Dorado County	City of Placerville Public Works	SEWAGE	15,750	gallons	Hangtown Creek	American River
53	2/7/2017	4240 Meadow Glenn Rd.	Placer County	Placer County Utilities	SEWAGE	500 - 2,500	gallons	Rock Creek	Sacramento River
54	2/7/2017	1588 Lisa Dr.	Placer County	Castle City Mobilehome Park	SEWAGE	600	gallons		Sacramento River
55	2/8/2017	8542 Merribrook Drive	Sacramento County	Sacramento Area Sewer District	SEWAGE	367	gallons	Storm Drain	American River
56	2/8/2017	Fullweiler Ave & Hwy 49	Placer County	City of Auburn	SEWAGE	10,000	gallons		Sacramento River
57	2/8/2017	SACRAMENTO RIVER, BETWEEN BUOY'S 1 & 2	Sacramento County	NRC	PETROLEUM - boat	N/A	N/A	Sacramento River	Sacramento River
58	2/8/2017	City of Marysville Wastewater Treatment Plant - 1 Bizz Johnson Drive.	Yuba County	City of Marysville Wastewater Treatment Plant	SEWAGE - partially treated	1,000 - 10,000	gallons	Feather River	Sacramento River
59	2/9/2017	5165 Dredger Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	1	gallons	Unnamed channel	American River
60	2/9/2017	2434 Greenwich Ct	Placer County	Private Citizen	PETROLEUM	5	gallons	Storm Drain	Sacramento River
61	2/9/2017	905 Herring Ave	Sacramento County	Sacramento Sewer District	SEWAGE	8,596	gallons	Steelhead Creek	Sacramento River
62	2/10/2017	3020 Newtown Rd, Mountain View Mobile Manor	El Dorado County	El Dorado County EH	SEWAGE	2000	gallons	diversion ditch	American River
63	2/10/2017	4718 Winding Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	10,000	gallons	Arcade Creek	Sacramento River
64	2/10/2017	5250 Power Line Rd	Sacramento County	SMUD	PETROLEUM	50	gallons	unnamed waterway	Sacramento River
65	2/10/2017	76 Broadway	Sacramento County	Phillips 66	OTHER - groundwater	Unknown	gallons		Sacramento River

66	2/13/2017	5849 Sutter Ave.	Sacramento County	Sacramento County Sewer District	SEWAGE	3,042	gallons	Chicken Ranch Slough	American River
67	2/14/2017	South Township Road .25 Miles SO Best	Sutter County	PG&E	PETROLEUM	20	gallons	Irrigation Ditch	Sacramento River
68	2/19/2017	3708 Don Julio Blvd	Sacramento County	Sacramento Area Sewer District	SEWAGE	15	gallons	Storm Drain/Drainage Channel	Sacramento River
69	2/20/2017	At the end of New York Creek Ct.	El Dorado County	El Dorado Irrigation District	SEWAGE	1,000	gallons	New York Creek	American River
70	2/20/2017	640 Placerville Dr, Southside in the Creek	El Dorado County	City of Placerville	SEWAGE	32,600	gallons	Hangtown Creek	American River
71	2/20/2017	5165 Dredger Way	Sacramento County	SASD	SEWAGE	634	gallons	Unnamed Drainage Channel	American River
72	2/20/2017	3812 Las Pasas Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	36,000	gallons	Strong Ranch Slough	American River
73	2/20/2017	Corner of Ducky Way & South Walnut	Placer County	South Placer Municipal Utility District.	SEWAGE	10,000	gallons	Storm Drain	Sacramento River
74	2/20/2017	905 Herring Avenue	Sacramento County	Sacramento Area Sewer District	SEWAGE	5,500	gallons	Steelhead Creek	Sacramento River
75	2/24/2017	23550 Grand View Way	Placer County	City of Colfax	SEWAGE - partially treated	371,500	gpd	Smuthers Ravine	American River
76	2/26/2017	3609 Murrtle Ave	Sacramento County	Sacramento Area Sewer District	SEWAGE	10,500	gallons	Magpie Creek	Sacramento River
77	2/27/2017	5727 Woodleigh Dr	Sacramento County	Sacramento Area Sewer District	SEWAGE	4,393	gallons	Arcade Creek	Sacramento River
March									
78	3/1/2017	Vicinity of 2020 Smith flat Rd	El Dorado County	City of Placerville	OTHER - dye	2-4	ounces	Smith Flat Creek	American River
79	3/5/2017	4400 Shandwick Dr	Sacramento County	Sacramento Area Sewer District	SEWAGE	4,500	gallons	Goat Creek	Sacramento River
80	3/7/2017	6156 Grass Valley Hwy, 2nd driveway on the right, North of Lone Star Rd	Placer County	Private Citizen of Auburn	SEWAGE - septic overflow	Unknown	Unknown	Bear River	Sacramento River
81	3/9/2017	1115 Folsom Blvd	Sacramento County	AMPAC Fine Chemicals	CHEMICAL	10	gallons		American River
82	3/9/2017	39.070106 / -121.605014	Yuba County	PG&E	PETROLEUM	30	gallons	Feather River	Sacramento River
83	3/23/2017	Sacramento River, Latitude: 38° 31' 10" N Longitude: 121° 31' 22" W	Sacramento County	NRC	PETROLEUM	10 Ft. x .5 Miles	sheen	Sacramento River	Sacramento River
84	3/24/2017	Eastbound Interstate 80 Just East of Laing	Placer County	CHP Truckee Comm Center	PETROLEUM	1-2	quarts	Storm Drain	American River
85	3/24/2017	3562 Lindenwood Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	7	gallons	Storm Drain	American River
86	3/26/2017	10257 Los Palos Dr.	Sacramento County	Sacramento Sewer District	SEWAGE	79	gallons	Storm Drain, unnamed Drainage Channel	American River
87	3/26/2017	SB I5 1 mile NO State Rt 20	Colusa County	CHP Chico	PETROLEUM	100	gallons	Laureline Creek	Sacramento River
88	3/28/2017	5086 Thalia Drive	El Dorado County	El Dorado Irrigation District	SEWAGE	72	gallons	Storm Drain	American River
89	3/28/2017	7441 Mariposa Avenue	Sacramento County	Sacramento Area Sewer District	SEWAGE	50	gallons	Mariposa Creek	Sacramento River
April									
90	4/3/2017	8000 Foothills Blvd	Placer County	Hewlett Packard Enterprise	OTHER - water with iron	18,000	gallons	Unknown dry creek bed	Sacramento River
91	4/4/2017	3181 Howe Ave	Sacramento County	Sacramento Area Sewer Dist.	SEWAGE	843	gallons	Storm Drain	Sacramento River
92	4/5/2017	Behind 1950 Quail Ridge Wy, Apartment Complex	Placer County	City of Roseville	PETROLEUM	10' x 10'	sheen	Pleasant Grove Creek	Sacramento River
93	4/10/2017	8434 Walerga Rd.	Sacramento County	Sacramento Area Sewer District	SEWAGE	14,880	gallons	Storm Drain - Unknown Creek	Sacramento River
94	4/10/2017	6445 Channing Drive	Sacramento County	County of Sacramento, HazMat	PETROLEUM	5	gallons	Storm Drain	Sacramento River
95	4/11/2017	6532 Demuth Cir	Sacramento County	Private Citizen	CHEMICAL	20-50	gallons	Storm Drain	Sacramento River
96	4/12/2017	5900 Auburn Blvd	Sacramento County	NRC	PETROLEUM	65	gallons	Arcade Creek	Sacramento River
97	4/13/2017	3200 Arden Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	1,270	gallons	Storm Drain	American River
98	4/16/2017	1617 J St.	Sacramento County	Sacramento County HAZMAT	PETROLEUM	20-30	gallons	Storm Drain	Sacramento River
99	4/18/2017	3020 Newtown Rd	El Dorado County	El Dorado County Environmental Management	SEWAGE - septic overflow	2,000	gallons	Ditch	American River
100	4/19/2017	6940 Fair Oaks Blvd	Sacramento County	Sacramento Area Sewer District	SEWAGE	840	gallons	Chicken Ranch Slough	American River
101	4/19/2017	Elverta Road, East of 99, rice fields	Sacramento County	CHP	PETROLEUM	2	gallons	Irrigation Canal	Sacramento River
102	4/21/2017	2955 Garden Hwy, Verona Marina	Sutter County	OSPR	CHEMICAL	1-2	gallons	Sacramento River	Sacramento River
103	4/21/2017	Algodon Rd and Feather River Blvd	Yuba County	Yuba Co Env Health	PETROLEUM	55	gallons	Drainage ditch	Sacramento River
May									
104	5/1/2017	Westbound HWY 80, west of HWY 174	Placer County	Cal Fire Grass Valley	PETROLEUM	15-20	gallons	unknown	American River
105	5/4/2017	149 Big Valley Rd	Sacramento County	City of Folsom	SEWAGE	10	gallons	Hinckle Creek	American River
106	5/9/2017	6243 Meadow Vista Drive	Sacramento County	Sacramento Area Sewer District	SEWAGE	144	gallons	Verde Cruz Creek	American River
107	5/9/2017	Acme Road at Progress Road	Sutter County	Sutter County Fire Department	PETROLEUM	200	gallons	agricultural canal	Sacramento River
108	5/9/2017	Progress Rd & Acme Rd	Sutter County	CHP - Chico	PETROLEUM	30-50	gallons	District 70 water canal	Sacramento River
109	5/10/2017	10685 Coloma Rd.	Sacramento County	Sacramento Area Sewer District	SEWAGE	1,500	gallons	Private Storm Drain System	American River
110	5/10/2017	12499 Incline St	Placer County	CH2M City of Auburn Wastewater Plant	SEWAGE	200	gallons	Auburn Ravine	Sacramento River
111	5/12/2017	5505 South Grove St	Placer County	California Fish and Wildlife	OTHER - pool water	20,000	gallons	Sucker Ravine Creek	Sacramento River
112	5/12/2017	1263 Franklin Avenue	Sutter County	Circle K Stores, Inc.	PETROLEUM	7	gallons	Storm Drain	Sacramento River
113	5/23/2017	Wise Road at West Side of Crater Hill Road	Placer County	Private Citizen of Placer County	UNKNOWN	Unknown	Unknown	Doty Creek, Auburn Ravine	Sacramento River
114	5/23/2017	West El Camino Ave at Truxel Rd, Project R-836	Sacramento County	PGE San Ramon	OTHER - groundwater	1,000	gallons	Storm Drain	Sacramento River
115	5/25/2017	4432 Winter St.	Sacramento County	NRC	PETROLEUM	1000	gallons	Storm Drain	Sacramento River
116	5/30/2017	Capitola Ave at Riverfront Lane, S77 Pump Station	Sacramento County	Sacramento Area Sewer District	SEWAGE	500	gallons	Unnamed tributary	American River
117	5/30/2017	7794 Folsom Dam Blvd	Sacramento County	NRC	PETROLEUM	0.25	cups	American River	American River
June									
118	6/2/2017	Rigby Ln x Applegate Rd	Placer County	Kinder Morgan	PETROLEUM	Unknown	Unknown	N/A	American River
119	6/5/2017	Wilbur Way X Bill Clark Way	Placer County	Placer Co EH	PETROLEUM	5	gallons	Creek	Sacramento River
120	6/8/2017	25th Street & B Street	Yuba County	United States Air Force	PETROLEUM	1-2	gallons	Storm Drain	Sacramento River
121	6/9/2017	WB 80, JEO of Baxter	Placer County	Truckee CHP	PETROLEUM	60	gallons	Canyon Creek	American River
122	6/14/2017	7720 Forest Road (100 yards west of this location)	El Dorado County	El Dorado Irrigation District	OTHER - drinking water	12,000	gallons	Unnamed Creek	American River
123	6/16/2017	700 Southgate Rd.	Sacramento County	Sacramento Fire Department	CHEMICAL	3-4	gallons		American River
124	6/20/2017	Corner of Shaleridge Road and HWY49	Placer County	Placer County Utilities	SEWAGE	500	gallons	storm drain, Unknown waterway	Sacramento River
125	6/22/2017	Hwy 20 x Poker Flat	Yuba County	CAL FIRE	PETROLEUM	Unknown	Unknown	Yuba River	Sacramento River
126	6/22/2017	4733 Auburn Blvd	Sacramento County	SMUD	PETROLEUM	40-60	gallons	Storm Drain	Sacramento River

127	6/27/2017	Big Meadow, National Forest El Dorado County	El Dorado County	USFS Lake Tahoe Basin Management Unit	PETROLEUM	50-60	gallons	Seasonal Marsh	American River
128	6/27/2017	325 Elkhorn Blvd.	Sacramento County	Sacramento Area Sewer District	SEWAGE	2,817	gallons	Storm Drain/ un-named waterway	Sacramento River
129	6/28/2017	Browns Ravine, Folsom Lake	El Dorado County	El Dorado County Environmental Management	PETROLEUM	1	gallons	Folsom Lake	American River
130	6/28/2017	5901 Ellerslee Dr	Sacramento County	Sacramento Area Sewer District	SEWAGE	500	gallons	Verde Cruz Creek	American River
131	6/28/2017	8401 Arnaldo Ave	Yuba County	US Air Force	PETROLEUM	200	gallons	Storm Drain	Sacramento River
132	6/30/2017	3900 Renick Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	5,733	gallons	Magpie Creek	Sacramento River
July									
133	7/4/2017	1025 University Ave. #1	Sacramento County	Sacramento Area Sewer District	SEWAGE	2,140	gallons	Storm Drain	American River
134	7/6/2017	North of 2474 County Rd 99 W	Yolo County	OSPR	PETROLEUM	15	gallons		Sacramento River
135	7/9/2017	WB I-80 at Clipper Gap	Placer County	CalTrans	PETROLEUM	30	gallons	Storm Drain	Sacramento River
136	7/9/2017	375 El Camino Avenue	Sacramento County	City of Sacramento Fire	PETROLEUM	15	gallons	Storm Drain	Sacramento River
137	7/14/2017	Salmon Falls Bridge	El Dorado County	California State Parks	PETROLEUM	Unknown	Unknown	South Fork of the American River	American River
138	7/17/2017	11359 La Porte Rd	Yuba County	Young Life of Woodleaf	CHEMICAL	5,000	gallons	Pond	Sacramento River
139	7/18/2017	9391 Atkinson Street	Placer County	UPRR	PETROLEUM	1	gallons		Sacramento River
140	7/18/2017	Beale Airforce Base 6601 B St	Yuba County	Beale Airforce Base	CHEMICAL	10-15	gallons		Sacramento River
141	7/24/2017	North Bank of Hutchinson's Creek, just West of "J" St.	Yuba County	Beale AFB	CHEMICAL - treated water	2,000	gallons	Hutchinson Creek	Sacramento River
142	7/26/2017	Hazel & Highway 50, Aerojet Property	Sacramento County	Ampac	CHEMICAL	10	gallons		American River
August									
143	8/5/2017	Corner of Antelope Hills Drive x Antelope Road	Sacramento County	Sacramento County EMD	CHEMICAL	1-4	gallons	Storm Drain	Sacramento River
144	8/7/2017	Behind the Blue Diamond, Almond Growers on C St	Sacramento County	Private Citizen	UNKNOWN	Unknown	Unknown		Sacramento River
145	8/10/2017	Alta Resivior Rd at Bonnynook Rd	Placer County	CHP Truckee	PETROLEUM	10	gallons	Alta Canal	American River
146	8/17/2017	Bull Creek Rd x HWY 50	El Dorado County	El Dorado Irigation District	UNKNOWN	1	cubic feet	Bull Creek/South Fork American River	American River
147	8/17/2017	12920 Earhart Ave	Placer County	CDF Grass Valley ECC	OTHER - fire fight	Unknown	gallons	Storm Drain	Sacramento River
148	8/17/2017	8201 Catalpa Drive	Sacramento County	Citizen	PETROLEUM	100	gallons	N/A	Sacramento River
149	8/23/2017	Steelhead Creek, Arcade Creek, American River Parkway	Sacramento County	Private Citizen	OTHER - homeless camps	Unknown	tons	Steelhead Creek, Arcade Creek, American River Parkway	American River
150	8/24/2017	80 east bound x west of blue canyon	Placer County	CHP Truckee	PETROLEUM	5	gallons	Storm Drain	American River
151	8/26/2017	Mosquito Ridge Road, MM15	Placer County	Placer County Environmental Health	PETROLEUM	10-15	gallons	unknown	American River
152	8/27/2017	6985 Garden Hwy	Sutter County	DFG	SEWAGE	500	gallons	Sacramento River	Sacramento River
153	8/31/2017	38 45'1.74"N, 121 33'37.20"W of W. Riego Road West of Highway 99	Sutter County	PG&E	OTHER - groundwater	90,000	gallons		Sacramento River
September									
154	9/1/2017	6851 Airport Blvd	Sacramento County	Sacramento International Airport	OTHER - fire fight	150	gallons	Storm Drain and Drainage area	Sacramento River
155	9/4/2017	9391 Atkinson	Placer County	UPRR	PETROLEUM	5	gallons		Sacramento River
156	9/7/2017	Hwy 20 at Plantz Rd	Yuba County	Marysville PD	PETROLEUM	1,500	gallons	Unknown	Sacramento River
157	9/8/2017	2710 Ramp Wy, Berth C50	Sacramento County	NRC	PETROLEUM	Unknown	sheen	Sacramento River	Sacramento River
158	9/10/2017	38 45' 23.34"N, 121 27' 0.23"W	Sutter County	PG&E	OTHER - groundwater	20,000	gallons		Sacramento River
159	9/11/2017	N Beal Rd at Brophy Rd, 39.1338 N 121.4781 W	Yuba County	PGE Marysville	PETROLEUM	10	gallons	Irrigation Area	Sacramento River
160	9/13/2017	50 Carpenter Flat Rd, Colfax Booster Station	Placer County	Kinder Morgan Pipelines	PETROLEUM - vapor	Unknown	gallons	unknown	American River
161	9/15/2017	7936 Papago Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	38,612	gallons	Goat Creek	Sacramento River
162	9/19/2017	2141 PERKINS WAY	Sacramento County	NRC	CHEMICAL	Unknown	Unknown	N/A	Sacramento River
163	9/20/2017	601 J St	Sacramento County	City of Sacramento	SEWAGE	89	gallons	Sacramento River	Sacramento River
164	9/21/2017	12305 Shale Ridge Road	Placer County	Placer County Environmental Health	OTHER - fire fight	Unknown	N/A	Combie Ophir Canal	Sacramento River
165	9/22/2017	82 Sanginaw Circle	Sacramento County	Sacramento Area Sewer District	SEWAGE	602	gallons	Storm Drain - Sacramento River	Sacramento River
166	9/22/2017	39.110153 / -121.339137	Yuba County	US Air Force	SEWAGE	50,000	gallons		Sacramento River
167	9/24/2017	Hazel Ave & Highway 50	Sacramento County	AMPAC	CHEMICAL	30-50	gallons	Pond	American River
168	9/24/2017	9391 Atkinson St. / Roseville Rail Yard	Placer County	UPRR	CHEMICAL	Unknown	N/A		Sacramento River
169	9/25/2017	Roseville Railyard, 9193 Atkinson St.	Placer County	UPRR	PETROLEUM	60	gallons	none	Sacramento River
170	9/25/2017	1210 Auburn Ravine Rd	Placer County	Placer County Environmental Health	PETROLEUM	1	quarts	Placer County Water Agency Canal	Sacramento River
171	9/25/2017	3 Loganberry Ct.	Sacramento County	Sacramento Sewer District	SEWAGE	1,514	gallons	Storm Drain	Sacramento River
172	9/27/2017	Chamberlain Avenue and Placer Street	Placer County	Placer County Environmental Health	UNKNOWN - milky substance	Unknown	Unknown	Auburn Ravine Creek	Sacramento River
173	9/27/2017	10249 Country Way	Sacramento County	NRC	PETROLEUM	5	gallons	Storm Drain	Sacramento River
174	9/28/2017	3205 Fifield Rd	Sutter County	Sutter County Sheriff's Office	PETROLEUM	Unknown	gallons	Pleasant Grove Creek	Sacramento River
175	9/28/2017	6738 Earhart Drive	Sacramento County	Communications Center Sacramento International Airport	PETROLEUM	Unknown	Unknown	Storm Drain	Sacramento River
October									
176	10/1/2017	1600 Garden Hwy, Launching Facility at Discovery Park	Sacramento County	Private Citizen of Sacramento County	UNKNOWN - boat house	Unknown	N/A	Sacramento River	Sacramento River
177	10/8/2017	9391 ATKINSON ST., MP 104, SUBDIVISION ROSEVILLE	Placer County	NRC	PETROLEUM	800	Gal(s)	Unknown	Sacramento River
178	10/9/2017	4411 Greenholme Dr	Sacramento County	Sacramento Area Sewer District	SEWAGE	727	Gal(s)	Magpie Creek	Sacramento River
179	10/12/2017	Intersection of Cirby Way x Sunrise Ave.	Placer County	Roseville Fire	CHEMICAL	15	Gal(s)	Linda Creek	Sacramento River
180	10/17/2017	9092 Wentworth Springs Rd	El Dorado County	Citizen	SEWAGE	Unknown	Unknown	Potable water/drinking water/fenced off pond	American River
181	10/23/2017	2600 Arden Wy, Mobile Fuel	Sacramento County	Tesoro Refining & Marketing	PETROLEUM	8	Gal(s)	Storm Drain	American River
182	10/25/2017	2594 Rio Linda	Sacramento County	AT&T	CHEMICAL	100	Gal(s)	Unknown	Sacramento River
183	10/28/2017	2201 Cottage Way	Sacramento County	Sacramento County Environmental Management Department	PETROLEUM	1,000 feet X 5 feet	Sheen	Unknown Creek in Howe Park	American River
November									

184	11/4/2017	U.S. Route 50, west of 59th Street	Sacramento County	CHP - South Sacramento	PETROLEUM	40	Gal(s)	Storm Drain	American River
185	11/4/2017	3365 South River Rd., Sacramento Yacht Club	Yolo County	NRC	PETROLEUM	Unknown	Gal(s)	Sacramento River	Sacramento River
186	11/9/2017	South of 1450 Expo Parkway	Sacramento County	California Fish and Wildlife	UNKNOWN - milky substance	50x50 ft	N/A	Canal	American River
187	11/11/2017	2710 Ramp Way, B10	Sacramento County	Sacramento Marina	PETROLEUM	Unknown	Unknown	Sacramento River	Sacramento River
188	11/21/2017	151 Blue Ravine Road	Sacramento County	VSPONE	CHEMICAL	40	Gal(s)	Storm Drain	American River
189	11/21/2017	EB I-80 JWO Secret Town Off-Ramp	Placer County	CHP Truckee	PETROLEUM	100	Gal(s)	Storm Drain	Sacramento River
December									
190	12/4/2017	30035 County Road 8/ Pilot gas station	Yolo County	ERTS	PETROLEUM	5	Gal(s)	Storm Drain	Sacramento River
191	12/13/2017	Cranmore Rd at Donahue Rd, 38 51.216 N 121 43.623 W	Sutter County	DWF OSPR	PETROLEUM	10-15	Gal(s)		Sacramento River
192	12/16/2017	6951 Garden Highway	Sacramento County	Sacramento County 3-1-1	SEWAGE - boat	Unknown	Gal(s)	Sacramento River	Sacramento River
193	12/29/2017	5521 Sagitarius Way	Sacramento County	Sacramento Area Sewer District	SEWAGE	4,196	Gal(s)	Brooktree Creek	Sacramento River

#	Incident Date	Location	City	County	Agency Notifying	Type of Spill	Substance	Amount Spilled	Units	Waterway Entered	Tributary to
January											
1	1/3/2018	50 Palma Harbor Place	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Raw Sewage	4413	Gal(s)	Storm Drain / Fisherman's Lake	Sacramento River
2	1/4/2018	Just down river from the Nimbus Fish Hatchery	Rancho Cordova	Sacramento	CDFW	PETROLEUM	Rainbow Sheen	1 mile	Sheen	American River	American River
3	1/7/2018	Highway 50 & Hazel Ave	Rancho Cordova	Sacramento	AMPAC Fine Chemicals	CHEMICAL	Toluene	200	Gal(s)	Pond	American River
4	1/8/2018	Robbs Forebay	Unincorporated Area	El Dorado	SMUD	PETROLEUM	Hydraulic Fluid	1	Pt.(s)	Robbs Forebay	American River
5	1/9/2018	151 Blue Ravine Rd	Folsom	Sacramento	Vision Service Plan	CHEMICAL	Ophthalmic Lens Generation Fluid - LH305, Non toxic	400	Gal(s)	Willow Creek	American River
6	1/9/2018	4033 Las Pasas Wy	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage - Raw Type	5, 982	Gal(s)	Unnamed Creek to Strong Ranch Slough	American River
7	1/10/2018	9524 Lake Natoma Dr, Lincoln Palisades Pump Station	Orangevale	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage - Raw Type	1,400	Gal(s)	Unnamed Creek	American River
8	1/13/2018	3121 Eastern Avenue, Eastern Villa Apartments	Unincorporated Area	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage, Raw	2,190	Gal(s)	storm drain, unknown creek, Chicken Ranch Slough	American River
9	1/15/2018	Between Lincoln Rd and Oswald Rd (5 miles)	Yuba City	Sutter	CDFW	UNSPECIFIED	Unknown Red Substance	Unknown	Gal(s)	Gilsizer Slough.	Sacramento River
10	1/16/2018	Corner of Clinton Ave and Darling Way	Roseville	Placer	City of Roseville	SEWAGE	Sewage	7	Gal(s)	Storm Drain/Dry Creek	Sacramento River
11	1/20/2018	7112 Greenback Lane	Citrus Heights	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	1,255	Gal(s)	Arcade Creek	Sacramento River
12	1/20/2018	6231 Sunrise Blvd	Citrus Heights	Sacramento	SMUD	PETROLEUM	Transformer Oil, Non PCB	25	Gal(s)		Sacramento River
13	1/20/2018	Myrtle and Harriaon	North Highlands	Sacramento	Citizen	UNSPECIFIED	Unknown	Unknown	Gal(s)	storm drain	Sacramento River
14	1/22/2018	N. Pacific St Between North St and Orange St.	Maxwell	Colusa	Maxwell Public Utility District	SEWAGE	Raw Sewage	318	Gal(s)	Storm Drain	Sacramento River
15	1/24/2018	N 7th at Richards Blvd	Sacramento	Sacramento	Sac FD	PETROLEUM	Fuel - Diesel, mixed w hydraulic oil	1	Gal(s)	StormStorrm drain	American River
16	1/24/2018	900 E St	West Sacramento	Yolo	Yolo County EHD	PETROLEUM	Oil	25	Gal(s)	N/A	Sacramento River
17	1/25/2018	Applegate Road X Fair Ridge Drive	Clipper Gap	Placer	Placer County EH	SEWAGE	Sewage Water	Unknown	Gal(s)	storm drain, Lake Theodore	Sacramento River
18	1/26/2018	Sierra College Blvd at Commons Dr.	Rocklin	Placer	County of Placer	UNSPECIFIED	Vegetable Oil	100	Gal(s)	Storm Drain	Sacramento River
19	1/27/2018	5113 Del Rosa Drive	Rocklin	Placer	South Placer Municipal Utility District	SEWAGE	Sewage, untreated	61	Gal(s)	storm drain/unknown creek	Sacramento River
20	1/29/2018	595 Menlo Dr	Rocklin	Placer	Placer County EH	SEWAGE	Sewage	1,000	Gal(s)	Kaseberg Creek	Sacramento River
21	1/31/2018	SR 20 EO Lake Spalding Rd, 4 - 5 MWO Hwy 80	Unincorporated Area	Placer	CHP Truckee	PETROLEUM	Fuel - Unknown Type	Unknown	Gal(s)	Drum Canal / Bear River	Sacramento River
22	1/31/2018	1970 Windemere Ln.	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	884	Gal(s)	Storm Drain/ Unknown	American River
February											
23	2/6/2018	El Dorado Road and Highway 50	Placerville	El Dorado	El Dorado Irrigation Dist	SEWAGE	Sewage	1,500	Gal(s)	Storm drain	American River
24	2/8/2018	6 miles north of Hwy 20 on Leesville Rd	Unincorporated Area	Colusa	Anonymous	OTHER	Cows	N/A	N/A	Stream	Sacramento River
25	2/15/2018	EB Interstate 80 at El Camino Exit.	Sacramento	Sacramento	XL Insurance	PETROLEUM	Diesel	50-75	Gal(s)	none	Sacramento River
26	2/20/2018	18 Main Street	Sutter	Sutter	City of Sutter Creek	SEWAGE	Sewage	2500	Gal(s)	Sutter Creek	Sacramento River
27	2/21/2018	2635 Edison Ave	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	1148	Gal(s)	Storm Drain, Tributary of Arcade Creek	Sacramento River
28	2/27/2018	Westbound 80, Rawlins lake road	Colfax	Placer	CHP	PETROLEUM	Diesel	Unknown	Gal(s)	Storm Drain	American River
29	2/27/2018	10730 International Drive	Rancho Cordova	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	2,250	Gal(s)	Storm drain	American River
March											
30	3/4/2018	6029 Greenback Lane	Citrus Heights	Sacramento	Sac Area Sewer Dist	SEWAGE	Raw Sewage	5,413	Gal(s)	Arcade Creek	Sacramento River
31	3/10/2018	1258 High Street	Auburn	Placer	City of Auburn - Sewer Dept	SEWAGE	Seweage	900	Gal(s)	Storm Drain, Seasonal creek and auburn ravine creek	Sacramento River
32	3/11/2018	3200 Truxel Rd	Natoma	Sacramento	Sac County EMD Hazmat	SEWAGE	Sewage	5,400	Gal(s)	Storm Drain	American River
33	3/12/2018	1260 LIVE OAK BLVD	Yuba City	Sutter	NRC	UNSPECIFIED	UNKNOWN MATERIAL	Unknown	Unknown	Unknown	Sacramento River
34	3/15/2018	3500 Auburn Blvd.	Sacramento	Sacramento	Sac County EMD Hazmat	PETROLEUM	Gasoline	5-6	Gal(s)	storm drain	Sacramento River
35	3/16/2018	Roseville Yard, 9391 Atkinson St.	Roseville	Placer	UPRR	PETROLEUM	Diesel / Renewable Hydrocarbon	1-2	Gal(s)		Sacramento River
36	3/16/2018	#3 ln, WB 80 at Penryn Rd.	Loomis	Placer	Caltrans	PETROLEUM	Diesel Fuel	25	Gal(s)	N/A	Sacramento River
37	3/17/2018	E bound I80 east of Nyack.	Emigrant Gap	Placer	CHP	PETROLEUM	Diesel	Unknown	Gal(s)	Strom drain	American River
38	3/20/2018	1751 East Roseville Parkway, Building 14, Parking Spot 550	Roseville	Placer	Civilian	PETROLEUM	Oil	8	Qt.(s)		Sacramento River
39	3/22/2018	Along Salmon Falls Road at Hidden Bridges	El Dorado Hills	El Dorado	El Dorado Irrigation Dist	OTHER	Water, potable	75,297	Gal(s)	Folsom Lake	American River
40	3/22/2018	South of Second street	Marysville	Yuba	Union Pacific Police	UNSPECIFIED	Railroad overpass	1	Unknown	Yuba River	Sacramento River
41	3/26/2018	Gibson Ranch, 3486 Elverta Rd.	Elverta	Sacramento	Trade Marc Associates Incorporated	OTHER	Water	17,952	Gal(s)	Dry Creek	Sacramento River
April											
42	4/1/2018	4236 Lingrove Wy	Carmichael	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage - Raw Type	700	Gal(s)	Unknown Creek	American River
43	4/3/2018	Cross St of Arnold St and Fairchild st.	Beale Air Force Base	Yuba	US Airforce / Beal	CHEMICAL	High Expansion Foam with water	6700	Gal(s)		Sacramento River
44	4/6/2018	39°10'08.4"N 122°09'20.2"W	Williams	Colusa	PG&E	PETROLEUM	Mineral Oil	50	Gal(s)	Salt Creek	Sacramento River
45	4/6/2018	5122 Madison Avenue	Sacramento	Sacramento	Sherwin Williams	CHEMICAL	Latex Paint	0.5	Gal(s)	Storm Drain	Sacramento River
46	4/9/2018	4875 Manzanita Ave, Creekside Oaks Apartments	Carmichael	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage - Raw Type	2,376	Gal(s)	Verde Cruz Creek	American River
47	4/9/2018	6900 Airport Blvd, Concourse B, Gate B6	Sacramento	Sacramento	Sac Intl AP	SEWAGE	Sewage - Raw Type, blue colored	10	Gal(s)	Storm drain	Sacramento River
48	4/15/2018	End of 10th St	Sheridan	Placer	Placer County	CHEMICAL	Chlorine	150	Gal(s)		Sacramento River
49	4/18/2018	6400 Green Valley Road	Placerville	El Dorado	El Dorado Irrigation Dist	OTHER	Water, chlorinated	165,000	Gal(s)	Mound Springs Creek	American River
50	4/19/2018	4646 Summer Stream Lane	Placerville	El Dorado	CDFW	PETROLEUM	Possibly Petroleum	Unknown	Unknown	Webber Creek	American River
51	4/20/2018	Gate B7, 6900 Airport Blvd West	Sacramento	Sacramento	Sac Intl AP	SEWAGE	Blue Juice / Sewage	4-5	Gal(s)	Storm Drain	Sacramento River
52	4/21/2018	Sacramento Airport	Sacramento	Sacramento	Horizon Airlines	CHEMICAL	Fluid, lavatory	2	Cup(s)	Storm drain	Sacramento River
53	4/28/2018	6470 Laughlin Rd.	Kelsey	El Dorado	Private Citizen	PETROLEUM	Transmission Fluid	Unknown	Unknown	Possible natural spring	American River
54	4/30/2018	WB 80, Drum Forebay Rd.	Alta	Placer	Grass Valley	UNSPECIFIED	Unknown	Unknown	Unknown	unknown	American River
55	4/30/2018	Marin Spike Way, Sump #140	Sacramento	Sacramento	Sac County EMD Hazmat	PETROLEUM	Fuel, diesel	50	Gal(s)	Sump	Sacramento River
May											

#	Incident Date	Location	City	County	Agency Notifying	Type of Spill	Substance	Amount Spilled	Units	Waterway Entered	Tributary to
56	5/2/2018	38.8969, -120.3781 30 miles North of Highway 50 on Ice House Rd	Pollock Pines	El Dorado	SMUD	PETROLEUM	Fuel or Oil	5	Gal(s)	Union Valley Reservior	American River
57	5/3/2018	2636 Fulton Avenue	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	1,500	Gal(s)	Chicken Ranch Slough	American River
58	5/8/2018	43 Lincoln Blvd (500 Feet from Service Station)	Lincoln	Placer	Lincoln Police Dept.	PETROLEUM	Gasoline	5-7	Gal(s)	Storm Drain	Sacramento River
59	5/8/2018	3333 Quality Dr	Rancho Cordova	Sacramento	Waste Management Sacramento	PETROLEUM	Unknown Oil	5-6	Gal(s)		American River
60	5/15/2018	MP 149.79 of the Valley Sub (Paseo Ave Crossing)	Live Oak	Sutter	UPRR	OTHER	Train vs Vehicle	N/A	N/A		Sacramento River
61	5/18/2018	4130 Edison Avenue	Sacramento	Sacramento	NRC	CHEMICAL	Glycol, Ethylene	Unknown	N/A	Storm drain	Sacramento River
62	5/21/2018	SB I5 at transition to SB US 50	Sacramento	Sacramento	Sacramento City FD	PETROLEUM	Fuel - Gasoline Type, mixed w water	10	Gal(s)	Sacramento River	Sacramento River
63	5/27/2018	2915 Lesvos Ct.	Lincoln	Placer	Grass Valley Control Center	UNSPECIFIED	Inorganic and Organic Materials	Unknown	Gal(s)		Sacramento River
64	5/27/2018	470 Jesse Avenue	Sacramento	Sacramento	Sacramento Fire Department	PETROLEUM	Gasoline	10	Gal(s)	Storm drain	Sacramento River
65	5/29/2018	23rd St between X St & W St	Sacramento	Sacramento	Waste Management	PETROLEUM	Hydraulic Fluid	1.5	Gal(s)		Sacramento River
66	5/29/2018	7428 Hickory Avenue	Orangevale	Sacramento	SMUD	PETROLEUM	Oil, mineral, unknown PCB's	30	Gal(s)	Storm drain	Sacramento River
67	5/29/2018	Gate B-14	Unincorporated Area	Sacramento	Sac Intl AP	PETROLEUM	Jet Fuel	35	Gal(s)		Sacramento River
					June						
68	6/1/2018	On the Bear River & HWY 70 @ Feather River Exit	Olivehurst	Yuba	Private Citizen	PETROLEUM	Oil Sheen	.5 miles x 30ft	Sheen	Bear River	Sacramento River
69	6/2/2018	1801 Garden Highway	Sacramento	Sacramento	NRC	PETROLEUM	Sheen	Unknown	Sheen	Sacramento River	Sacramento River
70	6/3/2018	US 50 Eastbound Just Prior to Watt Ave	Unincorporated Area	Sacramento	CHP Sacramento Comm Center	PETROLEUM	Gasoline	Unknown	Gal(s)		American River
71	6/4/2018	State Route 193 and Miners Spring Rd.	Placerville	El Dorado	CHP Sacramento	PETROLEUM	Jet A fuel	800	Gal(s)		American River
72	6/4/2018	5444 San Juan Ave.	Citrus Heights	Sacramento	Ca American Water	OTHER	Chlorinated Water (80 ppm)	500	Gal(s)		Sacramento River
73	6/14/2018	5823 Garden Highway	Unincorporated Area	Sacramento	CDFW	PETROLEUM	Gasoline	5	Gal(s)	Elkhorn Boat Ramp	Sacramento River
74	6/15/2018	Shirt Tail Bridge, Yankee Jim Road	Unincorporated Area	Placer	Placer County SO	PETROLEUM	Vehicle Fluids	20	Gal(s)	American River	American River
75	6/16/2018	SB I - 5 @ Vietnam Veteran's Bridge	Unincorporated Area	Yolo	CHP	PETROLEUM	Diesel	70	Gal(s)	Storm Drain - River	Sacramento River
76	6/19/2018	8980 Eden Oaks Ave	Orangevale	Sacramento	Private Citizen	UNSPECIFIED	Blocked water flow in a Creek	NA	N/A	Linda Creek	Sacramento River
77	6/24/2018	330 Amy's Ln	El Dorado Hills	El Dorado	El Dorado Irrigation Dist	SEWAGE	Sewage - Raw Type	1,940	Gal(s)	Unnamed drainage	American River
78	6/27/2018	9391 Atkinson St., MPM 105.95 on the Martinez Sub	Roseville	Placer	UPRR	PETROLEUM	Diesel	63	Gal(s)		Sacramento River
					July						
79	7/2/2018	Hinkle Creek	Folsom	Sacramento	Private citizen	CHEMICAL	Algicide	Unknown	N/A	Hinkle Creek	American River
80	7/3/2018	12535 Dennis Ct	Auburn	Placer	Placer County Utilities	SEWAGE	Sewage	310	Gal(s)	Wise Canal	Sacramento River
81	7/3/2018	Broadstone Parkway & Palladio Parkway	Folsom	Sacramento	Sacramento Fire - Dispatch	CHEMICAL	Paint	Unknown	N/A	Storm drain	American River
82	7/3/2018	Sherwood Harbor Marina	West Sacramento	Yolo	NRC	PETROLEUM	Oil/Fuel	Sheen	N/A	Sacramento River	Sacramento River
83	7/4/2018	Oswald Road, after the Eeast Bridge next to Sutter wildlife area	Yuba City	Sutter	Private Citizen	PETROLEUM	Cars	2	N/A	Sutter bypass	Sacramento River
84	7/8/2018	5871 GARDEN HWY / ANCHORAGE - APPROXIMATE 10 MINUTES NORTH	Sacramento	Sacramento	NRC	UNSPECIFIED	VESSEL SINKING	1	N/A	Sacramento River	Sacramento River
85	7/9/2018	MPM 105.1 on the Martinez Sub, 9391 Atkinson St.	Roseville	Placer	UPRR	PETROLEUM	Diesel	5-10	Gal(s)		Sacramento River
86	7/11/2018	Near Gate 6E, 6900 Airport Blvd.	Sacramento	Sacramento	Sac Intl AP	PETROLEUM	Hydraulic Fluid	5	Gal(s)		Sacramento River
87	7/11/2018	on Natomas Road 1/2 mile South of Riego	Unincorporated Area	Sutter	CDFW	PETROLEUM	Motor oil	7, 1 gallon 1, 5 gallons 1, 55 gallons	Gal(s)		Sacramento River
88	7/18/2018	Kemper Road west of Hwy 49	Auburn	Placer	Placer County Utilities	SEWAGE	Sewage	250	Gal(s)	Ditch	Sacramento River
89	7/20/2018	7451 Wachtel Way	Citrus Heights	Sacramento	Private Citizen	RADIOLOGICAL	Radioactive material	Unknown	N/A		Sacramento River
90	7/20/2018	7451 Wachtel Way	Citrus Heights	Sacramento	Citrus Heights Resident	RADIOLOGICAL	Radioactive Substance - Unknown Type	Unknown	Unknown		Sacramento River
91	7/25/2018	9391 Atkinson st	Roseville	Placer	UPRR	PETROLEUM	Diesel fuel	2	Pt.(s)		Sacramento River
92	7/28/2018	4407 Oak Hollow Drive	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	958	Gal(s)	Drainage ditch (name unknown)	Sacramento River
93	7/29/2018	MP 141.86 of the Valley Sub	Marysville	Yuba	UPRR	PETROLEUM	Gasoline	1	Gal(s)		Sacramento River
94	7/30/2018	4100 Throwita Way	Placerville	El Dorado	El Dorado Disposal	CHEMICAL	Calcium Hypochlorite	13.5	Lbs.	None	American River
					August						
95	8/2/2018	9391 Atkinson Street	Roseville	Placer	UPRR	PETROLEUM	Lube Oil	1	Gal(s)	None	Sacramento River
96	8/4/2018	American River and Folsom Lake	Folsom	Sacramento	Private Citizen	UNSPECIFIED	Human Cremains	N/A	N/A	American River and Folsom Lake	American River
97	8/12/2018	4000 Eastwood Village Lane	Carmichael	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	3120	Gal(s)	Storm Drain, Creek, Tributary to American River	American River
98	8/14/2018	9391 Atkinson St	Roseville	Placer	UPRR	PETROLEUM	Diesel	5-6	Gal(s)		Sacramento River
99	8/17/2018	26909 Rollins Lake Road	Colfax	Placer	Placer County EH	PETROLEUM	Gasoline	10	Gal(s)	Lake Rollins	Sacramento River
100	8/17/2018	1585 West El Camino Ave.	Sacramento	Sacramento	Sacramento Fire	PETROLEUM	Gasoline	5-6	Gal(s)	Storm Drain	Sacramento River
101	8/19/2018	Northbound State Route 51 at E street	Sacramento	Sacramento	CalTrans - District #3	PETROLEUM	Fuel, diesel	75	Gal(s)	Storm drain	Sacramento River
102	8/27/2018	6317 Main Avenue	Orangevale	Sacramento	Land and Habitat Restoration	PETROLEUM	Petroleum, unknown type	Unknown	N/A	Storm drain	American River
103	8/28/2018	2924 Becerra Wy	Unincorporated Area	Sacramento	CHP N Sac	SEWAGE	Sewage - Raw Type, mixed w water	20	Gal(s)	Arcade Creek	Sacramento River
					September						
104	9/2/2018	6500 Buckeye Lane	Granite Bay	Placer	South Placer Fire District	SEWAGE	Sewage	4000	Gal(s)	Linda Creek	Sacramento River
105	9/4/2018	Hampton Smartville & HWY 20	Smartville	Yuba	CalFire NEU	PETROLEUM	Diesel Fuel	Unknown	Unknown	Unknown	Sacramento River
106	9/5/2018	Pilot Travel Centers, 30035 County Road 8	Dunnigan	Yolo	Broadbent & Associates	PETROLEUM	Diesel	20	Gal(s)	Possibly went down a storm drain that leads to an on-site retention pond.	Sacramento River
107	9/6/2018	9706 Fair Oaks Blvd	Fair Oaks	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage - Raw Type	1,106	Gal(s)	American River	American River
108	9/7/2018	9640 YUBA NEVADA RANCH RD	Yuba City	Sutter	NRC	PETROLEUM	Motor Oil	Unknown	Unknown	None	Sacramento River
109	9/10/2018	WB Interstate 80 at Longview Drive	North Highlands	Sacramento	CHP Sacramento Comm Center	PETROLEUM	Diesel	75	Gal(s)		Sacramento River
110	9/19/2018	Hwy 51, E St offramp	Sacramento	Sacramento	ERTS	PETROLEUM	Diesel	50	Gal(s)	Storm drain	Sacramento River

#	Incident Date	Location	City	County	Agency Notifying	Type of Spill	Substance	Amount Spilled	Units	Waterway Entered	Tributary to
111	9/19/2018	Hwy 20 just west of Smartville	Smartville	Yuba	Private citizen	PETROLEUM	Diesel	Unknown	Unknown	None	Sacramento River
112	9/21/2018	9391 Atkinson Street	Roseville	Placer	UPRR	PETROLEUM	Diesel	Unknown	Unknown	None	Sacramento River
113	9/21/2018	Sacramento Amtrak Station, MP 89.23 Martinez Sub	Sacramento	Sacramento	UPRR	PETROLEUM	Fuel - Gasoline Type	50	Gal(s)		Sacramento River
114	9/24/2018	711 Church St	Roseville	Placer	UPRR	PETROLEUM	Diesel	50-70	Gal(s)		Sacramento River
115	9/26/2018	3701 16th Ave	Sacramento	Sacramento	Sacramento Fire Dispatch	PETROLEUM	Axle Grease	5	Gal(s)		Sacramento River
116	9/27/2018	Cotton Trail Road & Oak Hill Road (upstream of this location)	Placerville	El Dorado	Private citizen	UNSPECIFIED	Unknown material	Unknown	N/A	Squaw Hollow Creek	American River
117	9/29/2018	Cormorant Wy x Sacramento Inn Way	Sacramento	Sacramento	Sacramento City Fire	CHEMICAL	Muratic Acid	5	Gal(s)		American River
						October					
118	10/1/2018	300 Prison Road	Represa	Sacramento	Folsom State Prison	SEWAGE	Sewage	2,000	Gal(s)	Storm drain	American River
119	10/5/2018	9457 Orangevale	Orangevale	Sacramento	Private Citizen	CHEMICAL	Possible Pool Chemicals.	Unknown	Unknown	Private Pond / Natoma Lake	American River
120	10/11/2018	100 Prison Rd	Represa	Sacramento	CSP Sacramento	SEWAGE	Sewage	50-60	Gal(s)		American River
121	10/12/2018	10441 Ophir Rd	Auburn	Placer	Auburn Waste Water Treatment Plant	SEWAGE	Sewage - Raw Type	1,000	Gal(s)	Auburn Ravine Creek	Sacramento River
122	10/12/2018	Rear of 3360 El Camino Ave, Previous Sams Club	Sacramento	Sacramento	Sacramento Metro FD	PETROLEUM	Fuel - Gasoline Type	30	Gal(s)	Storm Drain	American River
123	10/16/2018	Robs Peak Forebay, 3 Miles Soutwest of Loon Lake on IceHouse Rd	Unincorporated Area	El Dorado	SMUD	PETROLEUM	Hydraulic Oil	1	Gal(s)	Robs Peak Forebay	American River
124	10/22/2018	3300 Christian Valley Road	Auburn	Placer	Placer County Utilities	SEWAGE	Sewage	1000	Unknown	Ore Creek	Sacramento River
125	10/27/2018	JSO TNF, 39 24.237 N 121 4.503 W, Next to Oregon Creek	Camptonville	Yuba	Tahoe National Forest	CHEMICAL	Dye - Dark blue colored liquid	2	Gal(s)	Oregon Creek	Sacramento River
126	10/31/2018	2180 Del Paso Blvd	Sacramento	Sacramento	UPS	CHEMICAL	Hard Surface Cleaner and Disinfecent 17% Isoporpanel and 80% Water	2.5	Gal(s)	Storm Drain	Sacramento River
						November					
127	11/2/2018	600 Block of Tahoe Ave	Roseville	Placer	Kinder Morgan/UPRR	PETROLEUM	Diesel Fuel	424	Gal(s)	Storm Drain	Sacramento River
128	11/4/2018	Feather River, Starbend Recreational Boat Launch	Marysville	Yuba	Anonymous	PETROLEUM	Fuel	10	Gal(s)	Feather River	Sacramento River
129	11/5/2018	Behind Loomis Basin Vetrinary Clinic, 3901 Sierra College Blvd.	Loomis	Placer	City of Loomis	OTHER	Dirt Mixed with Unknown Materials	Unknown	Lbs.	Sucker Ravine (Creek)	Sacramento River
130	11/9/2018	2601 CA HWY 49	Cool	El Dorado	NRC	CHEMICAL	ETHYLENE GLYCOL	15	Gal(s)	Storm Drain	American River
131	11/11/2018	9391 Atkinisons street, MP: 105.156 of the Marteniz Sub	Roseville	Placer	UPRR	PETROLEUM	Liquid Petroleum Gas	Unknown	Unknown	Storm Drain	Sacramento River
132	11/19/2018	9035 Woodcreek Oaks Blvd	Roseville	Placer	Solveone	PETROLEUM	Gasoline	3	Gal(s)	Storm Drain	Sacramento River
133	11/27/2018	At the Bend in the Road of Highway 113	Knights Landing	Yolo	Private Citizen	UNKNOWN	Unknown Substance	Foam	Unknown	Knights Landing Slough	Sacramento River
134	11/27/2018	2331 River Plaza Drive	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	3360	Gal(s)	Storm Drain	Sacramento River
135	11/29/2018	6926 Sylvan Road	Citrus Heights	Sacramento	SMUD	PETROLEUM	Non PCB Oil	10	Gal(s)	Storm Drain	Sacramento River
136	11/30/2018	8236 Orchid Tree Way	Antelope	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	1428	Gal(s)	Dry Creek	Sacramento River
						December					
137	12/7/2018	113 Kirksville Rd	Unincorporated Area	Sutter	CHP Chico	PETROLEUM	Gas or Oil	Unknown	Unknown	Unknown	Sacramento River
138	12/11/2018	Lake Arthur Road X Fisher Road	Applegate	Placer	CA Fish & Wildlife	CHEMICAL	Automotive Coolant	5	Gal(s)	Storm Drain	American River
139	12/12/2018	604 W. El Camino Ave	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	33,000	Gal(s)	Steelhead Creek	Sacramento River
140	12/16/2018	5914 Stanley Ave	Carmichael	Sacramento	Sac County EMD Hazmat	SEWAGE	Raw Sewage	5,000	Gal(s)	Storm Drain	American River
141	12/18/2018	39.100770, -121.397599, On Beale AFB, Closest Intersection - Gavin Mandery Rd & C Street.	Beale Air Force Base	Yuba	Beale AFB	SEWAGE	Sewage	10,000	Gal(s)	Hutchinson Stream	Sacramento River
142	12/19/2018	30035 County Road 8, Pilot Travel Center #168	Dunnigan	Yolo	Broadbent	PETROLEUM	Gasoline, Regular	30	Gal(s)	Storm Drain	Sacramento River
143	12/25/2018	1738 Bell Street	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage	4992	Gal(s)	Storm drain	Sacramento River
144	12/26/2018	8510 Moss Wood Circle	Folsom	Sacramento	City of Folsom	SEWAGE	Sewage	450	Gal(s)	Hinkle Creek	American River
145	12/26/2018	7672 Lakeshore Drive	Granite Bay	Placer	Placer County Utilities Divisior	SEWAGE	Sewage	3,500	Gal(s)	Folsom Lake	American River
146	12/27/2018	3700 Business Dr.	Sacramento	Sacramento	Sac County EMD Hazmat	PETROLEUM	Gasoline	10	Gal(s)	Storm Drain	American River

#	Incident Date	Location	City	County	Agency Notifying	Type of Spill	Substance	Amount Spilled	Units	Waterway Entered	Tributary to
					January						
1	1/2/2019	6900 Airport Blvd Way	Sacramento	Sacramento	Sacramento International Airport	CHEMICAL	De Icing Fluid	Unknown	Unknown	Storm Drain	Sacramento River
2	1/2/2019	Sacramento River near Tiscornia Park	Sacramento	Sacramento	Sacramento Regional Fire Department	PETROLEUM	Fuel, aircraft	Unknown	N/A	American River	American River
3	1/4/2019	1111 Sierra at Tahoe Road	Twin Bridges	El Dorado	NRC	SEWAGE	Sewage	Unknown	N/A		American River
4	1/6/2019	LAT / 39.1007 LON/ -121.3978	Unincorporated county area Yuba	Yuba	Beale Air Force Base	SEWAGE	Sewage	40,000	Gal(s)	Hutchinson Creek	Sacramento River
5	1/7/2019	1261 Fulton Avenue	Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	4,274	Gal(s)	Strong Ranch Slough	American River
6	1/7/2019	Kheener & Douglas	Roseville	Placer	Roseville FD HazMat	PETROLEUM	Diesel	Unknown	Gal(s)	Dry Creek	Sacramento River
7	1/8/2019	7799 Farmgate Way	Citrus Heights	Sacramento	Sacramento Sewer District	SEWAGE	Sewage	5,100	Gal(s)	Arcade Creek	Sacramento River
8	1/8/2019	961 BOULDER MINE RD	Pilot Hill	El Dorado	NRC	PETROLEUM	Motor Oil	Unknown	Unknown	SOUTH FORK OF THE AMERICAN RIVER	American River
9	1/13/2019	1876 Exposition Boulevard	Sacramento	Sacramento	Sacramento Municipal Utility District (SMUD)	PETROLEUM	Oil, mineral	100	Gal(s)	Storm drain	American River
10	1/14/2019	Eastbound 80 just after Dutch Flat exit	Dutch Flat	Placer	CHP	PETROLEUM	Aviation Fuel	Unknown	Gal(s)		American River
11	1/17/2019	160 Sherwood Court	Colfax	Placer	Grass Valley Command Center	PETROLEUM	Gasoline	20	Gal(s)	Storm Drain	American River
12	1/17/2019	19500 Fun Valley Road	Colfax	Placer	PG&E	OTHER	FR-3 Vegetable Oil None PCB	8	Gal(s)		American River
13	1/23/2019	2710 RAMP WAY / - B31	Sacramento	Sacramento	NRC	PETROLEUM	Gasoline	15	Gal(s)	Sacramento Marina	Sacramento River
14	1/23/2019	2060 Auburn Blvd	Unincorporated county area Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	30,830	Gal(s)	Storm Drain/Retention Basin/Arcade Creek	Sacramento River
15	1/28/2019	13425 Bowman road	Auburn	Placer	Placer County EH	CHEMICAL	Mercury	36,893	Cup(s)	storm drain	Sacramento River
16	1/29/2019	4141 North Freeway Blvd	Sacramento	Sacramento	Anonymous	OTHER	Mixture, Concrete, Silica, Fiberglass & Styrofoam	45,000-50,000	Gal(s)	Sewer Only	Sacramento River
					February						
17	2/1/2019	Eastbound U.S. 50 Highway, eastbound at Mather Field Road	Unincorporated county area Sacramento	Sacramento	Environmental Management Department's Incident Response	PETROLEUM	Fuel, diesel	50	Gal(s)	Storm drain	American River
18	2/2/2019	2111 Shelfield Dr	Carmichael	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	8,870	Gal(s)	Storm Drain/American River	American River
19	2/4/2019	392 Elm Ave	Auburn	Placer	Placer County Environmental Health	PETROLEUM	Motor Oil and Cooking Oil Mixture	5-15	Gal(s)	Storm Drain/Unknown Waterway	Sacramento River
20	2/4/2019	4339 Galbrath Drive	Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	7,800	Gal(s)	Storm drain	Sacramento River
21	2/5/2019	4140 Motherload drive	Shingle Springs	El Dorado	El Dorado Irrigation District	SEWAGE	Sewage	Unknown / 5 gallons per minute	N/A	Storm drain	American River
22	2/5/2019	17440 Placer Hills Road	Meadow Vista	Placer	Placer County Environmental Health Department	CHEMICAL	Chlorine, liquid	1	Gal(s)	Simpson Spill (Tributary of Wooley Creek)	Sacramento River
23	2/6/2019	6464 Villa Drive	Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	2,912	Gal(s)	Magpie Creek	Sacramento River
24	2/7/2019	American River Trail & Blue Tang Court	Cool	El Dorado	Georgetown Nevada Utility	SEWAGE	Sewage	31,000	Gal(s)	Knickerbocker Creek	American River
25	2/12/2019	9738 Lincoln Village Drive	Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	900	Gal(s)	Storm Drain	American River
26	2/14/2019	1102 Wayland Avenue	Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	1,000	Gal(s)	Storm drain	American River
27	2/15/2019	3089 Hazzard St	Placerville	El Dorado	CalFire Camino ECC	PETROLEUM	Diesel	100	Gal(s)	Hangtown Creek	American River
28	2/16/2019	Hazel & Highway 50	Rancho Cordova	Sacramento	AMPAC Fine Chemicals	CHEMICAL	Methlene Chloride	9	Lbs.	Pond on the Aerojet Site	American River
29	2/17/2019	WB 50 at 26 St.	Sacramento	Sacramento	CHP	PETROLEUM	Diesel	35-40	Gal(s)	Storm Drain	Sacramento River
30	2/17/2019	Prairie City Rd Exit off Highway 50	Folsom	Sacramento	ERTS	PETROLEUM	Diesel Fuel	75	Gal(s)		American River
31	2/19/2019	2272 Zinfandel Drive	Rancho Cordova	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	2,900	Gal(s)	Storm drain	American River
32	2/19/2019	5241 Andrea Boulevard	Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	1,012	Gal(s)	Tributary of Arcade Creek	Sacramento River
33	2/21/2019	Bluegrass Dr and Dry Creek Road	Auburn	Placer	Placer Co Utilities	SEWAGE	Sewage	100	Gal(s)	Creek	Sacramento River
34	2/26/2019	2305 Little Ben Rd	Lincoln	Placer	PG&E	CHEMICAL	mineral oil, no PBC's	1	Gal(s)		Sacramento River
35	2/26/2019	905 Herring Ave.	Rio Linda	Sacramento	Sacramento Sewer District	SEWAGE	Sewage	1,998	Gal(s)	Storm Drain, unnamed creek	Sacramento River
36	2/27/2019	6741 Kenora St	Rio Linda	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	1,914	Gal(s)	Steelhead Creek	Sacramento River
37	2/28/2019	8927 Renoir Court	Fair Oaks	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	2,700	Gal(s)	Tributary of American River	American River
38	2/28/2019	4003 Westporter Dr	Unincorporated county area Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	1,161	Gal(s)	Storm Drain/Sutter Slough	American River
					March						
39	3/3/2019	South of Intersection of Cranmore Rd. and Donahue Rd., on Cranmore (Near Second Beach)	Unincorporated county area Sutter	Sutter	California State Department of Fish and Wildlife	PETROLEUM	**Potential Release** Petroleum	Unknown Amount	Lbs.	Sacramento River	Sacramento
40	3/3/2019	8744 Shoshone Way	Orangevale	Sacramento	Sacramento Area Sewer Dist.	SEWAGE	Sewage	15,000	Gal(s)	Storm Drain	Sacramento
41	3/4/2019	17875 Lake Arthur Rd.	Applegate	Placer	Placer County EH	PETROLEUM	Unknown PCB Mineral Oil	10	Gal(s)	Storm Drain	American
42	3/4/2019	17885 Lake Arthur Rd	Applegate	Placer	Pacific Gas & Electric	PETROLEUM	Mineral Oil, non-PCB (less then 2 parts per million)	2	Gal(s)	Unknown	American
43	3/5/2019	2221 Fair Oaks Blvd	Sacramento	Sacramento	Sacramento Metro Fire	PETROLEUM	Gasoline	20	Gal(s)	Storm Drain	American
44	3/6/2019	4455 Pleasant Grove Rd	Pleasant Grove	Sutter	Air Products and Chemicals INC	CHEMICAL	Anti-Freeze	6	Gal(s)		Sacramento
45	3/6/2019	South End of 11th Street.	Sheridan	Placer	Placer County Road Department	PETROLEUM	Oil	1	Gal(s)	Drainage Ditch	Sacramento
46	3/6/2019	Behind 1630 Pheasant Run Rd	Olivehurst	Yuba	PG&E	PETROLEUM	Mineral Oil	4	Gal(s)	None	Sacramento
47	3/6/2019	East Bound US 50 West of Stockton Blvd	Sacramento	Sacramento	Sac Fire HAZMAT 30	PETROLEUM	Diesel	150	Gal(s)	Roadside Drain that leads to treatment plant	American
48	3/20/2019	2025 Trimble way	Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	3,100	Gal(s)	storm drain	American
49	3/23/2019	7682 Lily Mare Lane	Antelope	Sacramento	Sacramento Sewer Agency	SEWAGE	Sewage	1,800	Gal(s)	Storm drain / Goat Creek	Sacramento
50	3/25/2019	6056 Via Casitas	Carmichael	Sacramento	Sacramento Sewer District	SEWAGE	Sewage	1,620	Gal(s)	Storm Drain and Coyle Creek	Sacramento
51	3/26/2019	4503 Galbrath Street	Sacramento	Sacramento	Sacramento Sewer Dist	SEWAGE	Sewage	2,912	Gal(s)	Storm Drain / Rio Linda Creek	Sacramento
52	3/27/2019	6135 Almond Avenue	Orangevale	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	1,544	Gal(s)	Arcade Creek	Sacramento

#	Incident Date	Location	City	County	Agency Notifying	Type of Spill	Substance	Amount Spilled	Units	Waterway Entered	Tributary to
53	3/30/2019	2807 Elvyra Way	Sacramento	Sacramento	Sacramento County Sewer District	SEWAGE	Raw Sewage	4,072	Gal(s)	Chicken Ranch Slough	American
54	3/31/2019	7838 Mohican Way	Antelope	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage - Raw Type	5,000	Gal(s)	Storm Drain	Sacramento
						April					
55	4/2/2019	5624 Hillsdale Blvd, Condo Complex	Sacramento	Sacramento	Sac Area Sewer Dist	SEWAGE	Sewage - Raw Type	10355	Gal(s)	Magpie Creek	Sacramento
56	4/3/2019	2180 Woodlawn Drive	Rancho Cordova	Sacramento	Sacramento Area Sewer Dist.	SEWAGE	Sewage	6000	Gal(s)	Storm Drain / American River	American
57	4/6/2019	11280 Trade Center Drive, Suite 100	Rancho Cordova	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	17347	Gal(s)	Tributary to the American River	American
58	4/6/2019	JR Davis Roseville Yard 9391 Atkinson St	Roseville	Placer	Union Pacific Railroad	PETROLEUM	Diesel Fuel	unknown	Unknown		Sacramento
59	4/7/2019	229 Mont Rose Drive	Folsom	Sacramento	SMUD	PETROLEUM	Transformer Oil Unknown PCB	30	Gal(s)	storm drain	American
60	4/7/2019	6850 Airport Boulevard east ramp on terminal A at gate A12	Sacramento	Sacramento	Sacramento International Airport	PETROLEUM	Aviation Fuel	5	Gal(s)	storm drain	Sacramento
61	4/13/2019	7838 Mohican Way	Sacramento	Sacramento	Sacramento Area Sewer Dist	SEWAGE	Sewage	40,000 (ongoing)	Gal(s)	Unnamed tributary and Dry Creek	Sacramento
62	4/16/2019	EB Hwy 80 at Sisco Grove Exit	Gold Run	Placer	CHP Chico	PETROLEUM	Fuel - Diesel Type	3	Gal(s)	Storm Drain	Sacramento
63	4/17/2019	Westbound Hwy 50 at the bottom of the Mather Field offramp	Rancho Cordova	Sacramento	CHP Sacramento	PETROLEUM	Diesel	100	Gal(s)	Storm drain	American
64	4/22/2019	JR Davis Yard 9391 Atkinson St	Roseville	Placer	Union and Pacific Railroad	PETROLEUM	Diesel Fuel	Unknown	Unknown		Sacramento
65	4/22/2019	7th street and N street	Sacramento	Sacramento	City of Sacramento	PETROLEUM	Diesel	10-15	Gal(s)		Sacramento
						May					
66	5/6/2019	SOUTH OF 7907 GARDEN HWY	Sacramento	Sacramento	NRC	PETROLEUM	Unknown Oil	Unknown	Unknown	POTENTIAL TO IMPACT SACRAMENTO RIVER	Sacramento River
67	5/6/2019	13666 New Airport Rd	Auburn	Placer	Placer County Environmental Health	PETROLEUM	Aviation Fuel	1-2	Gal(s)		Sacramento River
68	5/16/2019	EB Interstate 80 at Hwy 20 Junction	Blue Canyon	Placer	CHP	PETROLEUM	Diesel	100	Gal(s)	Storm Drain	Sacramento River
69	5/17/2019	6001 Riverside Blvd, Next to Apartment Complex	Sacramento	Sacramento	City of Sacramento 311	UNSPECIFIED	Unknown Substance	55	Gal(s)	Sacramento River	Sacramento River
70	5/22/2019	39.089796 -121.424724	Beale Air Force Base	Yuba	Beale Air Force Base	CHEMICAL	Water with Low Level TCE	10,000	Gal(s)		Sacramento River
71	5/26/2019	Westbound I-80 West of Blue Canyon Road	Alta	Placer	CHP	PETROLEUM	Diesel	1-2	Gal(s)	Storm drain	Sacramento River
72	5/26/2019	I-80 westbound west of Blue Canyon Road	Alta	Placer	CHP	PETROLEUM	Diesel	Unknown	Gal(s)		Sacramento River
73	5/30/2019	2700 Alexandria Dr.	El Dorado Hills	El Dorado	El Dorado Irrigation District	SEWAGE	Sewage	250	Gal(s)	Storm Drain	American River
						June					
74	6/7/2019	8001 Washington Blvd	Roseville	Placer	Chevron	PETROLEUM	Gasoline	6	Gal(s)		Sacramento River
75	6/8/2019	9391 Atkinson St	Roseville	Placer	UPRR	CHEMICAL, RAILROAD	Green Liquid that goes into the locomotive radiator	unknown	Gal(s)		Sacramento River
76	6/9/2019	9391 Atkinson St	Roseville	Placer	UPRR	PETROLEUM	Diesel	2	Gal(s)		Sacramento River
77	6/11/2019	1142 Ricki Dr	Yuba City	Sutter	Recology	PETROLEUM	Hydraulic Oil	4	Gal(s)	Storm Drain	Sacramento River
78	6/24/2019	7800 Freeport Blvd	Sacramento	Sacramento	Sac Regional Fire	CHEMICAL	Battery Acid	2	Gal(s)	Sacramento River	Sacramento River
79	6/24/2019	7800 FREEPORT BLVD	Sacramento	Sacramento	NRC	PETROLEUM	Oil, Motor	1	Gal(s)	Sacramento River	Sacramento River
80	6/24/2019	5034 Manzanita Ave	Carmichael	Sacramento	Sacramento Area Sewer District,	SEWAGE	Sewage	2,500	Gal(s)	Verde Cruz Creek	Sacramento River
81	6/24/2019	659 Green Valley Road	El Dorado	El Dorado	NORCOM	PETROLEUM	Gasoline	5	Gal(s)	Folsom Lake	American River
82	6/24/2019	1501 North Ave	Sacramento	Sacramento	SMUD	PETROLEUM	Oil - Mineral Type, Non PCB	20	Gal(s)	Storm Drain	Sacramento River
83	6/27/2019	2746 Marconi Ave	Sacramento	Sacramento	Fish and Wild Life	PETROLEUM	Cooking Oil	10	Gal(s)	Storm Drain	Sacramento River
84	6/30/2019	6900 Airport Boulevard	Sacramento	Sacramento	Sacramento Airport	PETROLEUM	Jet A	Unknown	N/A	Storm drain	Sacramento River
						July					
85	7/1/2019	59th Street X Broadway	Sacramento	Sacramento	Sacramento Fire Department	PETROLEUM	Automotive Fluids (Oil and Possible Fuel Mixture)	10	Gal(s)	storm drain	Sacramento River
86	7/6/2019	6736 Earhart Dr.	Sacramento	Sacramento	Sacramento International Airport Communications Center	CHEMICAL	Coolant & Water Mix	5	Gal(s)	Storm Drain	Sacramento River
87	7/18/2019	6605 Sweet Gum Ct	Citrus Heights	Sacramento	Sac County Hazmat	CHEMICAL	Concrete Stain	unknown	Unknown	Storm Creek	Sacramento River
88	7/20/2019	Antelope Rd and Orange Dr	Citrus Heights	Sacramento	Sacramento County Healthnet	OTHER	Treated Surface Water	8,000	Gal(s)	Cripple Creek	Sacramento River
89	7/25/2019	601 Newcastle Rd	Newcastle	Placer	Placer County Environmental Health	PETROLEUM	Gasoline	20	Gal(s)	Storm Drain/Unknown	Sacramento River
90	7/26/2019	10441 OPHIR ROAD	Auburn	Placer	NRC	CHEMICAL	SODIUM HYPOCHLORITE (15% OR LESS)	950	Gal(s)	Body of Water: FLOOR DRAIN Tributary of: SANITARY SEWER	Sacramento River
91	7/29/2019	Canyon Way, 39.080765 -120.958283	Colfax	Placer	City of Colfax	SEWAGE	Sewage	1,000	Gal(s)	Bunch Creek	American River
						August					
92	8/5/2019	WB 1-80 at Canyon way, MM 133	Colfax	Placer	Cal Fire	PETROLEUM	Diesel fuel	several hundred	Gal(s)	Storm drain	American River
93	8/5/2019	7794 FOLSOM DAM ROAD	Folsom	Sacramento	NRC	PETROLEUM	HYDRAULIC OIL	10	Gal(s)	AMERICAN RIVER	American River
94	8/7/2019	3000 Northgate Blvd.	Sacramento	Sacramento	SMUD	PETROLEUM	FR3 Mineral Oil	80-90	Gal(s)	Storm Drain	Sacramento River
95	8/7/2019	5831 Fair Oaks Blvd, Twin Gardens Apartments	Carmichael	Sacramento	Sacramento Metro FD	PETROLEUM	Fuel - Gasoline Type, mixed w water	2-3	Gal(s)	Strorm Drain	American River
96	8/12/2019	6851 Lindbergh Drive	Sacramento	Sacramento	Sacramento International Airport	SEWAGE	Sewage	6	Gal(s)	Storm drain	Sacramento River
97	8/15/2019	5324 Garfield Ave.	Sacramento	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	2800	Gal(s)	Arcade creek	Sacramento River
98	8/17/2019	1616 Roverieto	Roseville	Placer	Roseville FD	PETROLEUM	Gasoline	12	Gal(s)	Storm Drain/Miners Ravine Creek	Sacramento River
99	8/18/2019	Main Line 2, MP 103 Sub Martinez	Roseville	Placer	UPRR	PETROLEUM,RAILROAD	Engine Oil	20	Gal(s)		Sacramento River
100	8/19/2019	Westbound I-80 west of the Gold Run Exit	Gold Run	Placer	CHP	PETROLEUM	Engine Oil	3-4	Gal(s)	Storm Drain	American River
101	8/19/2019	6900 Airport Boulevard Concourse B, Gate B8	Sacramento	Sacramento	Sac International Airport	PETROLEUM	Aviation Fuel	15-20	Gal(s)	Storm drain	Sacramento River
102	8/22/2019	Lat 39.088587 Long -121.424668	Beale Air Force Base	Yuba	Beal AFB	SEWAGE	Sludge	2000	Gal(s)	Hutchinson Creek	Sacramento River
103	8/24/2019	7799 Farmgate Way	Citrus Heights	Sacramento	Sacramento Co. HAZMAT	SEWAGE	Sewage	150	Gal(s)	Storm Drain	Sacramento River
104	8/25/2019	EB Interstate 80, 3/4 mile west of Maple St off ramp	Auburn	Placer	City of Auburn Fire Dept	PETROLEUM	Diesel	75	Gal(s)	Culvert	Sacramento River
105	8/28/2019	6851 Lindberg Dr, Concourse B	Sacramento	Sacramento	Sacramento International Airport	PETROLEUM	Hydraulic Fluid	1-2	Gal(s)	Storm Drain	Sacramento River
						September					
106	9/3/2019	9801 Beachwood Dr	Orangevale	Sacramento	Sacramento Area Sewer District	SEWAGE	*Historical Release* Sewage	1100	Gal(s)	Storm Drain	American
107	9/3/2019	9801 Beachwood Dr	Orangevale	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	1100	Gal(s)	Storm Drain	American
108	9/3/2019	698 Placerville Dr	Placerville	El Dorado	Cal Fire Camino	UNSPECIFIED	Trash	Unknown	Unknown	Hangtown Creek	American
109	9/16/2019	Westbound Highway 80 east of Laing Rd	Unincorporated county area Placer West of Donner Lake	Placer	CHP	PETROLEUM	Diesel	100	Gal(s)		American
110	9/20/2019	1600 Garden HWY	Sacramento	Sacramento	Sacramento County Env Management Dept	SEWAGE	Sewage	unknown	N/A	Boat Launch at the Y of Sacramento River and American River	Sacramento

#	Incident Date	Location	City	County	Agency Notifying	Type of Spill	Substance	Amount Spilled	Units	Waterway Entered	Tributary to
111	9/21/2019	Colgate Powerhouse on the Yuba River	Dobbins	Yuba	Yuba County OES	UNSPECIFIED	Unknown Murky Yellow Water	Unknown	Unknown	Yuba River	Sacramento
112	9/21/2019	7814 Pawnee Way	Antelope	Sacramento	SASD	SEWAGE	Sewage	1000	Gal(s)	Dry Creek	Sacramento
113	9/23/2019	10745 Cramer Road	Auburn	Placer	PG&E	PETROLEUM	Mineral Oil - Unknown PCB	2	Gal(s)		Sacramento
114	9/23/2019	MP 143.1, Union Pacific Canyon Subdivision	Sacramento	Sacramento	BNSF Railroad	OTHER	Fire Water	Unknown	Gal(s)	None	Sacramento
115	9/24/2019	300 Prison Rd	Represa	Sacramento	Folsom State Prison	SEWAGE	Sewage	400	Gal(s)	American River	American
116	9/25/2019	5441 Liberty St	North Highlands	Sacramento	Sacramento Area Sewer Dist	SEWAGE	Sewage - Raw Type	1000	Gal(s)	Magpie Creek	Sacramento
117	9/26/2019	7120 Paladin Way	Rio Linda	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	2600	Gal(s)	Creek.	Sacramento
October											
118	10/2/2019	9391 Atkinson St	Roseville	Placer	UPRR	PETROLEUM	Diesel Fuel	1	Gal(s)		Sacramento River
119	10/8/2019	6700 Whitsett Dr	North Highlands	Sacramento	Sacramento Area Sewer District	SEWAGE	Sewage	2,600	Gal(s)	Unnamed Tributary and Magpie Creek	Sacramento River
120	10/11/2019	Roseville, CA to Sparks, NV	Roseville	Placer	UPRR	PETROLEUM	Diesel	Unknown	Unknown	Unknown	Sacramento River
121	10/12/2019	7200 Garden Highway	Sacramento	Sacramento	CHP	PETROLEUM	Gasoline	20	Gal(s)	Small Aqueduct	Sacramento River
122	10/13/2019	7654 Pocket Rd	Sacramento	Sacramento	Private Citizen	PETROLEUM	Sheen	Unknown	Sheen	Sacramento River	Sacramento River
123	10/18/2019	Mount Vernon Road and Bald Hill Road	Auburn	Placer	CHP	SEWAGE	Sewage	30	Gal(s)	Pond	Sacramento River
124	10/18/2019	4317 RAMSEY DRIVE	NORTH HIGHLANDS	Sacramento	NRC	PETROLEUM	Motor Oil	8	Qt.(s)	STORM DRAIN	Sacramento River
125	10/21/2019	SB Hwy 5 JNO Richards Blvd	Sacramento	Sacramento	CHP Rancho	CHEMICAL	Fuel - Ethanol Type	500-600	Gal(s)	Drainage Ditch	Sacramento River
126	10/22/2019	Fairoaks Blvd at Monroe St	Sacramento	Sacramento	CHP	PETROLEUM	Hydraulic Fluid	unknown	Unknown	Stromdrain	American River
127	10/23/2019	Yankee Jim Road	Weimar	Placer	STATE OF CALIFORNIA (STATE PARK PEACE)	PETROLEUM	ETHYLENE GLYCOL, GASOLINE, OIL, TRANSMISSION FLUID	Unknown	N/A	NORTH FORK OF THE AMERICAN RIVER	American River
128	10/24/2019	6425 B Street	Beale Air Force Base	Yuba	Beale AFB	PETROLEUM	JP8 - Jet Fuel	100	Gal(s)		Sacramento River
129	10/27/2019	3066 Montgomery Way	Sacramento	Sacramento	Smud	PETROLEUM	Unknown PCB - Transformer Oil	20-30	Gal(s)		Sacramento River
130	10/30/2019	225 W Weimar cross road	Colfax	Placer	UPRR	PETROLEUM	Battery Acid	1	Gal(s)		American River
November											
131	11/1/2019	EB I-80 West of Blue Canyon	Blue Canyon	Placer	CHP Chico	PETROLEUM	Diesel, Motor Oil, Transmission Fluid	5	Gal(s)		Sacramento River
132	11/3/2019	1601 GARDEN HWY	Sacramento	Sacramento	NRC	PETROLEUM	Unknown Oil	Sheen Size Length: 300 FEET Sheen Size Width: 50 FEET	Sheen	Sacramento River	Sacramento River
133	11/9/2019	4502 Frankilin Rd	Yuba City	Sutter	PG&E	PETROLEUM	Transformer Oil (Unknown PCBs)	10	Gal(s)		Sacramento River
134	11/18/2019	Intersection of Riley St and East Bidwell	Folsom	Sacramento	City of Folsom FD	SEWAGE	Sewage	50- 100	Gal(s)	Storm drain	American River
135	11/19/2019	Martinez Subdivision MP 106.4	Roseville	Placer	UPRR	PETROLEUM	Diesel	10	Gal(s)		Sacramento
136	11/21/2019	Blackberry Circle Parkway Home Owners Association	Folsom	Sacramento	NRC	CHEMICAL	Pro Grass Herbicide	Unknown	Unknown	Stormdrain, Ditches	American River
137	11/23/2019	Old Salmon Falls Rd, Near Skunk Hollow	Unincorporated county area El Dorado	El Dorado	State Parks, Norcom	PETROLEUM	Fuel , Oil - Vehicle Fluids	Unk	Gal(s)	North Fork American River	American River
138	11/28/2019	N Garden HWY crossing of North Gate	Sacramento	Sacramento	Sacramento Fire Dept	PETROLEUM	Gasoline	4-5	Gal(s)	storm drain	Sacramento River
139	11/28/2019	Garden Highway and Northgate Blvd	Sacramento	Sacramento	Sacramento Fire Dispatch	PETROLEUM	Oil	2	Gal(s)	stormdrain	Sacramento River
140	11/30/2019	NB Interstate 5, south of Sutterville Rd, MM 20.4	Sacramento	Sacramento	Caltrans	PETROLEUM	Diesel	100	Gal(s)	Storm drain	Sacramento River
December											
141	12/2/2019	Westbound HWY 80 at Maple Ave	Auburn	Placer	CHP - Sacramento	PETROLEUM	Diesel	5	Gal(s)	storm drain	Sacramento River
142	12/2/2019	303 Riley Street	Folsom	Sacramento	City of Folsom	SEWAGE	Sewage	2	Gal(s)	American River	American River
143	12/6/2019	307 Bridge Street	Folsom	Sacramento	City of Folsom	SEWAGE	Sewage	25	Gal(s)	American River	American River
144	12/9/2019	5440 Stationers Way	Foothill Farms	Sacramento	Sacramento Area Sewer Distric	SEWAGE	Sewage	100000	Gal(s)	Unknown Named Tributary	Sacramento River
145	12/12/2019	2710 Ramp Way, Slip H-13	Sacramento	Sacramento	NRC	PETROLEUM	Unknown Oil	Unk	Unknown	Sacramento River	Sacramento River
146	12/14/2019	1422 Brewerton Dr	Sacramento	Sacramento	Sacramento Area Sewer Distric	SEWAGE	Sewage	9000	Gal(s)	Storm Drain	Sacramento River
147	12/14/2019	270 Battlecreek Circle	Sacramento	Sacramento	Sacramento Area Sewer Distric	SEWAGE	Sewage	1450	Gal(s)	Storm Drain/Natomas Main	Sacramento River
148	12/16/2019	Roseville Railyard	Roseville	Placer	Union Pacific Railroad (UPRR)	CHEMICAL	Pesticide (unknown name)	Unknown	N/A	Puddle (standing water)	Sacramento River
149	12/22/2019	3520 El Dorado Rd	Placerville	El Dorado	PG&E	PETROLEUM	Transformer Oil	5	Gal(s)		American River
150	12/23/2019	Almaden Ave x Madison Ave	Unincorporated county area Sacramento	Sacramento	SMUD	PETROLEUM	Transformer Oil	15	Gal(s)		Sacramento River
151	12/27/2019	601 J street	Sacramento	Sacramento	City of Sacramento	SEWAGE	Waste Water (Sewage)	21000	Gal(s)	Sacramento River	Sacramento River
152	12/29/2019	7147 Greenback Lane	Citrus Heights	Sacramento	Sacramento Fire Department - Dispatch	SEWAGE	Sewage	2000	Gal(s)	Storm drain	Sacramento River

Facility	City	County
greenceutical inc	Colusa	Colusa
Golden Roots Nursery Greenhouse	Yuba City	Colusa
Five Season Farm	Big Oak Valley	Nevada
Clean Leaf Farms	Big Oak Valley	Nevada
K and D Farms	Grass Valley	Nevada
Gold Country Farms LLC	Grass Valley	Nevada
Gold Country Farm	Grass Valley	Nevada
Jahlibyrd	Grass Valley	Nevada
Zephyr Farms	Grass Valley	Nevada
AgSoul, LLC	Grass Valley	Nevada
Larson Consulting Group	Grass Valley	Nevada
Greenhouse Project	Grass Valley	Nevada
Circle Seven Ranch	Grass Valley	Nevada
Cali Livan Farms	Grass Valley	Nevada
Divine Pines	Grass Valley	Nevada
Windwhistle Way	Grass Valley	Nevada
Feather River Farm	Grass Valley	Nevada
Califarmia LLC	Grass Valley	Nevada
Grown by Vets	Grass Valley	Nevada
Sierra Select Gardens	Grass Valley	Nevada
GVnugs LLC	Grass Valley	Nevada
Green Hummingbird	Grass Valley	Nevada
CALIFORNIA RELIEF LLC	Grass Valley	Nevada
Red House	Grass Valley	Nevada
Westbound Farms	Grass Valley	Nevada
Koasati Farms	Grass Valley	Nevada
Elevated Concept Holdings, LLC	Grass Valley	Nevada
Busy Bee Farms	Grass Valley	Nevada
LMY Farm	Grass Valley	Nevada
Melanie Peters Property	Grass Valley	Nevada
Honey Bearz Farm	Grass Valley	Nevada
Jahlibyrd	Grass Valley	Nevada
Verdant Valley	Grass Valley	Nevada
Clear Creek Station	Grass Valley	Nevada
Vince's Place	Grass Valley	Nevada
Lions Nest	Grass Valley	Nevada
Sierra Nevada Cannabis Company	Grass Valley	Nevada
New World Chronic	Grass Valley	Nevada
Buckboard Road	Grass Valley	Nevada
Dawnridge	Grass Valley	Nevada
Banana Belt Farms	Grass Valley	Nevada
Sage Farms	Grass Valley	Nevada
KB Management Solutions, LLC	Grass Valley	Nevada
Owl Holler	Grass Valley	Nevada
C300A	Grass Valley	Nevada
Royal Crest Cannabis	Grass Valley	Nevada

2017-0023-DWQ Enrollees in the Sacramento River Watershed

Facility	City	County
Bear River Buds	Grass Valley	Nevada
Finesse Farms	Grass Valley	Nevada
Yuba Rush, LLC.	Nevada City	Nevada
Foodoo Farms Property	Nevada City	Nevada
Organics 101 Consultants L.L.C.	Nevada City	Nevada
SK Farms Inc.	Nevada City	Nevada
Lighting Ridge	Nevada City	Nevada
Clear Creek Farm	Nevada City	Nevada
Sierra Foothill Farms	Nevada City	Nevada
Larry Love Farms	Nevada city	Nevada
Vryideon	Nevada City	Nevada
Green Gate Gardens Property	Nevada City	Nevada
Songbird Select	Nevada City	Nevada
Marge's Garden	Nevada City	Nevada
Red Hawk Ridge	Nevada City	Nevada
Poplar Meadow Farm	Nevada City	Nevada
The Growing Tree	Nevada City	Nevada
Dragonfly Hills Medicinals (DBA)	Nevada City	Nevada
Greener Pasture Farms	Nevada City	Nevada
Sierra Sublime	Nevada City	Nevada
Mandolin Gardens Inc	Nevada City	Nevada
Tanimal Farm LLC,	Nevada City	Nevada
Pussywillow Farms60-190	Nevada City	Nevada
Monte Vista Farm	Nevada City	Nevada
Buza	Nevada City	Nevada
SJC	Nevada City	Nevada
Shakti Farm	Nevada City	Nevada
Aloha Acres	Nevada City	Nevada
Aloha Ranch	Nevada City	Nevada
16070 Ophir silver rd Nevada City Nevada County 9	Nevada City	Nevada
The Ridge	Nevada City	Nevada
Birchville Botanicals	Nevada City	Nevada
Grandmas Garden	Nevada City	Nevada
Shiva 8888	Nevada City	Nevada
The Highlands LTD	Nevada City	Nevada
hooker oak parcel	Nevada City	Nevada
Trichome Premise	Nevada City	Nevada
LADY BUG FARMS	Nevada City	Nevada
Home	Nevada City	Nevada
Speck's Place	Nevada City	Nevada
medical use	Nevada City	Nevada
chloé	Nevada City	Nevada
Sages Way	Nevada City	Nevada
Avion	Nevada City	Nevada
Barn Burner Farms	Nevada City	Nevada
Legacy Farms	Nevada City	Nevada

2017-0023-DWQ Enrollees in the Sacramento River Watershed

Facility	City	County
Oak Tree Sanctuary	Nevada City	Nevada
Humble Budling's Cosmic Light Source Magic	Nevada City	Nevada
Florio	Nevada City	Nevada
Rock Creek Ranch LLC	Nevada City	Nevada
Aaron Lusk Property	Nevada City	Nevada
Hill Craft Farms	Nevada City	Nevada
Califarmia LLC	Nevada City	Nevada
Backbone Farms	Nevada City	Nevada
Abundant Gardens	Nevada City	Nevada
Chaunceys	Nevada City	Nevada
Green Leaf Organics LLC	Nevada City	Nevada
CF Farms	Nevada City	Nevada
Sugar Hill	North San Juan	Nevada
Clear Creek Acres	North San Juan	Nevada
Lone Ridge	North San Juan	Nevada
Muse Gardens	North San Juan	Nevada
Fawnbrook Farm	North San Juan	Nevada
South Yuba collective	North San Juan	Nevada
Sierra Sol Farms	North San Juan	Nevada
Down Om Farms	North San Juan	Nevada
Wampum way	North san juan	Nevada
Bodies Homegrown	North San Juan	Nevada
MG Gardens	Penn Valley	Nevada
Flying T	Penn Valley	Nevada
Maureen and Jonathan Property	Penn Valley	Nevada
Potterri Farm	Penn Valley	Nevada
Canna Lake Croft	Penn Valley	Nevada
Green Gift Gardens	Penn Valley	Nevada
Good Seed	Penn Valley	Nevada
Chapman Property	Penn Valley	Nevada
HR Hamilton Medical Cannabis Cultivation Operatio	Penn Valley	Nevada
Kelly McMichael Property	Penn Valley	Nevada
Heller Garden	Penn Valley	Nevada
Three Points Inc	Penn Valley	Nevada
17119 Kentucky Court, Penn Valley CA 95946	Penn Valley	Nevada
Kentucky Court	Penn Valley	Nevada
Yuba Green Organics	Penn Valley	Nevada
Jahlibyrd	Penn Valley	Nevada
Sidetrack Ranch	Penn Valley	Nevada
Cupcake Farms	Penn Valley	Nevada
Sanctuary Farms #3	Penn Valley	Nevada
Sacred Valley Farm	Penn Valley	Nevada
C&B INDUSTRIES LLC	Penn Valley	Nevada
Rockytop	Rough and Ready	Nevada
Homesteader Herb Farm	San Juan	Nevada
DENCOB, LLC	Smartsville	Nevada

2017-0023-DWQ Enrollees in the Sacramento River Watershed

Facility	City	County
Heleyon Organics	Smartsville	Nevada
Hatchet Creek Farms	Smartsville	Nevada
Balady Farms	Smartsville	Nevada
Red Dragonfly Farm	Smartsville	Nevada
Sustainable Medicinals LLC	Smartsville	Nevada
Yellow Dog Family Farms	Smartsville	Nevada
Bombbay Farms	Sacramento	Sacramento
Fireworx Farms Joellis	Sacramento	Sacramento
Sacramento Craft Collective	sacramento	Sacramento
1025 Joellis Suite 1	Sacramento	Sacramento
Sac Valley Trees, Inc.	Sacramento	Sacramento
Enlightened Growth LLC	Sacramento	Sacramento
Northstar C Street Property	Sacramento	Sacramento
Sac Pharma Partners Inc	Sacramento	Sacramento
135 Main Avenue Operating Group Nursery	Sacramento	Sacramento
Mediform LTD	Sacramento	Sacramento
Fireworx Farms	Sacramento	Sacramento
Compassionate Resources	Sacramento	Sacramento
Sacramento Cannabis Company	Sacramento	Sacramento
Northstar Opportunity St Property	Sacramento	Sacramento
BrightSource Farms	Sacramento	Sacramento
SPENagri	Sacramento	Sacramento
1900 Railroad Facility	Sacramento	Sacramento
Tokoa Agro LLC	Sacramento	Sacramento
1955/1957 Railroad	Sacramento	Sacramento
Ohana Growers	Sacramento	Sacramento
Tubbs Holdings LLC	Sacramento	Sacramento
Mountain Lion Earthworks	Sacramento	Sacramento
2080 A Railroad Avenue Cannabis Cultivation	Sacramento	Sacramento
Laughing Buddha Farms	Sacramento	Sacramento
Seven Leaves	Sacramento	Sacramento
Emerging Industries	Sacramento	Sacramento
2400 Manning Street	Sacramento	Sacramento
2410 Manning Street Sacramento Cultivation Facilit	Sacramento	Sacramento
2435 & 2445 Harvard St	Sacramento	Sacramento
ACE Agriculture LLC	Sacramento	Sacramento
Land Avenue, INC	Sacramento	Sacramento
Alternative Outlet Inc	Sacramento	Sacramento
HellaFire, LLC	Sacramento	Sacramento
Cal Farming, Inc.	Sacramento	Sacramento
LIVEADE WELLNESS, INC.	Sacramento	Sacramento
Prominent Investments, Inc.	Sacramento	Sacramento
4260 24th Street Project	Sacramento	Sacramento
Raley Partners Inc	Sacramento	Sacramento
De La Mota Inc	Sacramento	Sacramento
Pigeon Racer Farm	Sacramento	Sacramento

2017-0023-DWQ Enrollees in the Sacramento River Watershed

Facility	City	County
530 Display Way LLC	Sacramento	Sacramento
88 ICO LLC - Cultivation	Sacramento	Sacramento
Delias, Inc.	Sacramento	Sacramento
Wicked Gardens LLC	Redding	Shasta
Cartibis	Redding	Shasta
Kagow, LLC	Redding	Shasta
Mountain Lakes Manufacturing	Redding	Shasta
KO Services Inc	Shasta Lake	Shasta
Shasta Botanicals LLC	Shasta Lake	Shasta
Shasta Growers	Shasta Lake	Shasta
Golden State Herb Shasta Lake Nursery	Shasta Lake	Shasta
Green Heaven LLC	Shasta Lake	Shasta
Brandon Sanders Property	North San Juan	Sierra
Sierra Sun Farms (Site #1)	North San Juan	Sierra
Telos Genetic Nursery	Mount Shasta	Siskiyou
Elevate Shasta	Mount Shasta	Siskiyou
407 Berry St Unit C	Mount Shasta	Siskiyou
Cory Peak Inc	Mount Shasta	Siskiyou
Yamil Salas Property	Dunnigan	Yolo
Melvin Garcia Property	Dunnigan	Yolo
Tony Albert Property	Dunnigan	Yolo
Fireball Farms LLC Yolo 2	Dunnigan	Yolo
Cody E Grimes Property	Dunnigan	Yolo
Omar Vidrio Property	Dunnigan	Yolo
Olga Fonseca Property	Dunnigan	Yolo
Gilberto Navarro Property	Dunnigan	Yolo
BKMK LLC Property Site #2	Dunnigan	Yolo
Road 89 LLC Property	Winters	Yolo
Paul Long Property	Zamora	Yolo
Mark Alexander Property	Zamora	Yolo
MCC Holistic Care	Marysville	Yuba

2019-0001-DWQ Enrollees in Sacramento River Watershed

Facility	**City**	**County**
greenceutical inc	Colusa	Colusa
Niagara Ave Building	Colusa	Colusa
Compassleaf LLC Colusa CA	COLUSA	Colusa
Golden Roots Nursery Greenhouse	Yuba City	Colusa
Cybele Holdings Inc	El Dorado	El Dorado
Green Valley Farm	Pilot Hill	El Dorado
Dude Man Co.	placerville	El Dorado
Somerset Ridge	Somerset	El Dorado
Landrace Ranch LLC	Penn Valley	Nevada
Oak Mesa Property	Auburn	Nevada
Five Season Farm	Big Oak Valley	Nevada
Clean Leaf Farms	Big Oak Valley	Nevada
K and D Farms	Grass Valley	Nevada
Rodde Property	Grass Valley	Nevada
garden	grass valley	Nevada
John Loy	Grass valley	Nevada
Nakis Enterprise LLC	Grass Valley	Nevada
Gold State Opportunties LLC	Grass Valley	Nevada
Gold Country Farms LLC	Grass Valley	Nevada
Hutto Road Cultivation	Grass Valley	Nevada
Blue Bird Farms	Grass Valley	Nevada
Gold Country Farm	Grass Valley	Nevada
Jonathon Hogander Property	Grass Valley	Nevada
Larkspur	Grass Valley	Nevada
Jahlibyrd	Grass Valley	Nevada
Erik Siljak	Grass valley	Nevada
Zephyr Farms	Grass Valley	Nevada
AgSoul, LLC	Grass Valley	Nevada
S & V Services LLC	Grass Valley	Nevada
Larson Consulting Group	grass Valley	Nevada
Greenhouse Project	Grass Valley	Nevada
Circle Seven Ranch	Grass Valley	Nevada
Cali Livan Farms	Grass Valley	Nevada
Divine Pines	Grass Valley	Nevada
Sacred Tree Farm	Grass Valley	Nevada
Windwhistle Way	Grass Valley	Nevada
Feather River Farm	Grass Valley	Nevada
Califarmia LLC	Grass Valley	Nevada
GLEANN SONA, LLC	GRASS VALLEY	Nevada
Grown by Vets	Grass Valley	Nevada
Sierra Select Gardens	grass valley	Nevada
GVnugs LLC	Grass Valley	Nevada
Backwaters	Grass Valley	Nevada
Green Hummingbird	Grass Valley	Nevada
CALIFORNIA RELIEF LLC	GRASS VALLEY	Nevada
Anti Hero	Grass Valley	Nevada

2019-0001-DWQ Enrollees in Sacramento River Watershed

Facility	City	County
Krupnick's	Grass Valley	Nevada
Tasty Exotic Farms LLC	Grass Valley	Nevada
Red House	Grass Valley	Nevada
Fleur-de-Leaf Farms LLC	Grass Valley	Nevada
Westbound Farms	Grass Valley	Nevada
Koasati Farms	grass valley	Nevada
Elevated Concept Holdings, LLC	Grass Valley	Nevada
Busy Bee Farms	Grass Valley	Nevada
LMY Farm	GRASS VALLEY	Nevada
Melanie Peters Property	Grass Valley	Nevada
Nature's Nurturers	grass valley	Nevada
Reindeer Farms LLC	Grass Valley	Nevada
17595 Red Ball Circle	Grass Valley	Nevada
Honey Bearz Farm	Grass Valley	Nevada
trinity organics	grass valley	Nevada
Jahlibyrd	Grass Valley	Nevada
Verdant Valley	Grass Valley	Nevada
Clear Creek Station	Grass Valley	Nevada
Vince's Place	Grass Valley	Nevada
Lions Nest	GRASS VALLEY	Nevada
FV Farms	Grass Valley	Nevada
Sierra Nevada Cannabis Company	Grass Valley	Nevada
BM cannabis	Grass Valley	Nevada
New World Chronic	Grass Valley	Nevada
NorCal Cultivation	Grass Valley	Nevada
Winter Stone Partners LLC	Grass Valley	Nevada
Calsierra LLC	Grass Valley	Nevada
Buckboard Road	Grass Valley	Nevada
Honeygirl Farms	Grass Valley	Nevada
Dawnridge	Grass Valley	Nevada
Banana Belt Farms	Grass Valley	Nevada
20266 Buckboard - Hife	Grass Valley	Nevada
Sage Farms	Grass Valley	Nevada
Bear River Provision	Grass Valley	Nevada
KB Management Solutions, LLC	Grass Valley	Nevada
Owl Holler	Grass Valley	Nevada
21310 Rock Mountain rd. Grass Valley	Grass valley	Nevada
JBM Farms	Grass Valley	Nevada
C300A	Grass Valley	Nevada
S.G.R	Grass Valley	Nevada
Fruitful Flower Collective	Grass Valley	Nevada
Buy One Assets	Grass Valley	Nevada
spotts site	grass valley	Nevada
056-370-011-000	Grass Valley	Nevada
the oasis	grass valley	Nevada
Royal Crest Cannabis	Grass Valley	Nevada

2019-0001-DWQ Enrollees in Sacramento River Watershed

Facility	City	County
Bear River Buds	GRASS VALLEY	Nevada
Finesse Farms	Grass Valley	Nevada
Patterson Valley Cannabis LLC	Grass Valley	Nevada
Calsierra LLC	Grass Valley	Nevada
Ridge Pros Inc.	Grass Valley	Nevada
Pure Ascension LLC	Grass Valley	Nevada
KBBB	Grass Valley	Nevada
Sierra Knits LLC	Grass Valley	Nevada
Shakti Farm	Nevada	Nevada
FERREL RAVINE	NEVADA	Nevada
Yuba Rush, LLC.	Nevada City	Nevada
Foodoo Farms Property	Nevada City	Nevada
Organics 101 Consultants L.L.C.	Nevada City	Nevada
SK Farms Inc.	Nevada City	Nevada
Sun Shadow Wellness LLC	Nevada City	Nevada
Lighting Ridge	Nevada City	Nevada
Birchville Farms L.L.C.	Nevada City	Nevada
Clear Creek Farm	Nevada City	Nevada
Sierra Foothill Farms	NEVADA CITY	Nevada
Larry Love Farms	Nevada city	Nevada
Vryideon	Nevada City	Nevada
Green Gate Gardens Property	Nevada City	Nevada
Songbird Select	NEVADA CITY	Nevada
12986 MURPHY ROAD	Nevada City	Nevada
Marge's Garden	Nevada City	Nevada
Red Hawk Ridge	Nevada City	Nevada
13113 Byron Rd	Nevada City	Nevada
Mariposa 22	Nevada City	Nevada
The Growing Tree	Nevada City	Nevada
Sunstone Farms	Nevada City	Nevada
Dragonfly Hills Medicinals (DBA)	Nevada City	Nevada
Greener Pasture Farms	Nevada City	Nevada
13847 Tyler Foote Crossing Rd	Nevada City	Nevada
Sierra Sublime	Nevada City	Nevada
Mandolin Gardens Inc	Nevada City	Nevada
Hunter Pines LLC	Nevada City	Nevada
Tanimal Farm LLC,	Nevada City	Nevada
Pipersky Cultivation	Nevada City	Nevada
Pussywillow Farms60-190	Nevada City	Nevada
Monte Vista Farm	Nevada City	Nevada
Buza	Nevada City	Nevada
SJC	Nevada City	Nevada
Aloha Acres	NEVADA CITY	Nevada
Aloha Ranch	NEVADA CITY	Nevada
16070 Ophir silver rd Nevada City Nev	Nevada City	Nevada
House Hanz	Nevada City	Nevada

2019-0001-DWQ Enrollees in Sacramento River Watershed

Facility	City	County
The Ridge	Nevada City	Nevada
Birchville Botanicals	Nevada City	Nevada
Haikhu Farms	Nevada City	Nevada
Grandmas Garden	Nevada City	Nevada
Shiva 8888	NEVADA CITY	Nevada
The Highlands LTD	Nevada City	Nevada
Casa Del Sol	Nevada City	Nevada
Daisy Hill	Nevada City	Nevada
graces garden	nevada city	Nevada
Rachel's house	Nevada City	Nevada
hooker oak parcel	Nevada City	Nevada
Trichome Premise	Nevada City	Nevada
LADY BUG FARMS	Nevada City	Nevada
Home	Nevada City	Nevada
Speck's Place	Nevada City	Nevada
medical use	nevada city	Nevada
000-600-001-000	Nevada City	Nevada
JJLS NVC 1	Nevada City	Nevada
Roots Underground	Nevada City	Nevada
chloé	Nevada City	Nevada
Edge Ranch	Nevada City	Nevada
Reppond Cultivation	Nevada City	Nevada
Eagle Ridge	Nevada City	Nevada
Sages Way	Nevada City	Nevada
Avion	Nevada City	Nevada
Barn Burner Farms	NEVADA CITY	Nevada
Irie Acres	Nevada City	Nevada
Legacy Farms	Nevada City	Nevada
Cooper 530	Nevada City	Nevada
Five Oaks Organics LLC	Nevada City	Nevada
Oak Tree Sanctuary	NEVADA CITY	Nevada
Humble Budling's Cosmic Light Source	Nevada City	Nevada
Florio	Nevada City	Nevada
Rock Creek Ranch LLC	Nevada City	Nevada
Aaron Lusk Property	Nevada City	Nevada
Hill Craft Farms	Nevada City	Nevada
Califarmia LLC	Nevada City	Nevada
Backbone Farms	NEVADA CITY	Nevada
Abundant Gardens	Nevada City	Nevada
Chaunceys	Nevada City	Nevada
Green Leaf Organics LLC	Nevada City	Nevada
Fruits	Nevada City	Nevada
CF Farms	Nevada City	Nevada
S&M Clone Company	Nevada City	Nevada
Mystic Farm LLC	Nevada City	Nevada
Bud Farm	Nevada City	Nevada

2019-0001-DWQ Enrollees in Sacramento River Watershed

Facility	City	County
18193 Silverthorne Lane	Nevada City	Nevada
Mountain Lion Earthworks Inc.	Nevada City	Nevada
Sugar Hill	North San Juan	Nevada
Clear Creek Acres	North San Juan	Nevada
Lone Ridge	North San Juan	Nevada
Muse Gardens	North San Juan	Nevada
Fawnbrook Farm	North San Juan	Nevada
South Yuba collective	North San Juan	Nevada
Nevada Ridge	North San Juan	Nevada
Slide Mine	North San Juan	Nevada
Sierra Sol Farms	North San Juan	Nevada
Down Om Farms	North San Juan	Nevada
Ivy XX	North San Juan	Nevada
Wampum way	North san juan	Nevada
Bodies Homegrown	North San Juan	Nevada
Ever Bloom Farms DBA	North San Juan	Nevada
North San Juan Cabin	North San Juan	Nevada
Gold Country Botanicals, Inc.	Penn Valley	Nevada
MG Gardens	Penn Valley	Nevada
Flying T	Penn Valley	Nevada
Maureen and Jonathan Property	Penn Valley	Nevada
Potterri Farm	Penn Valley	Nevada
Piper Hill	Penn Valley	Nevada
Canna Lake Croft	Penn Valley	Nevada
Green Fire Farms, LLC	Penn Valley	Nevada
Green Gift Gardens	Penn Valley	Nevada
Good Seed	Penn Valley	Nevada
Chapman Property	Penn Valley	Nevada
Chapman Property	Penn Valley	Nevada
CCC	PENN VALLEY	Nevada
HR Hamilton Medical Cannabis Cultiva	Penn Valley	Nevada
Kelly McMichael Property	Penn Valley	Nevada
Heller Garden	Penn Valley	Nevada
Three Points Inc	Penn Valley	Nevada
17119 Kentucky Court, Penn Valley CA	Penn Valley	Nevada
Kentucky Court	Penn Valley	Nevada
Yuba Green Organics	Penn Valley	Nevada
Jahlibyrd	Penn Valley	Nevada
W & W Enterprises LLC	Penn Valley	Nevada
ThorKronic Farms LLC	Penn Valley	Nevada
Sidetrack Ranch	Penn Valley	Nevada
Cupcake Farms	Penn Valley	Nevada
Sanctuary Farms #3	Penn Valley	Nevada
Sacred Valley Farm	Penn Valley	Nevada
MushMouth Farms, LLC	Penn Valley	Nevada
C&B INDUSTRIES LLC	Penn Valley	Nevada

2019-0001-DWQ Enrollees in Sacramento River Watershed

Facility	City	County
Ridge Pros Inc.	Penn Valley	Nevada
Rock Mountain LLC - North Exit Rd.	Penn Valley	Nevada
Blue Oaks Organics LLC	Penn Valley	Nevada
Rockytop	Rough and Ready	Nevada
Juan Paniagua Property	Rough and Ready	Nevada
Homesteader Herb Farm	San Juan	Nevada
Es Parte Del Show LLC	Smartsville	Nevada
DENCOB, LLC	Smartsville	Nevada
Westwood Evergreen Farm	SMARTSVILLE	Nevada
Heleyon Organics	Smartsville	Nevada
11554 Shepard Rd	Smartsville	Nevada
Hatchet Creek Farms	Smartsville	Nevada
Hatchet Creek Farms	Smartsville	Nevada
Balady Farms	Smartsville	Nevada
Red Dragonfly Farm	Smartsville	Nevada
Sustainable Medicinals LLC	Smartsville	Nevada
Yellow Dog Family Farms	Smartsville	Nevada
Optimum Enlightening LLC	Smartsville	Nevada
Bombbay Farms	Sacramento	Sacramento
Fireworx Farms Joellis	Sacramento	Sacramento
Sacramento Craft Collective	sacramento	Sacramento
1025 Joellis Suite 1	Sacramento	Sacramento
Sac Valley Trees, Inc.	Sacramento	Sacramento
Enlightened Growth LLC	Sacramento	Sacramento
Northstar C Street Property	Sacramento	Sacramento
Sac Pharma Partners Inc	Sacramento	Sacramento
135 Main Avenue Operating Group Nu	Sacramento	Sacramento
Mediform LTD	Sacramento	Sacramento
Fireworx Farms	Sacramento	Sacramento
Compassionate Resources	Sacramento	Sacramento
Sacramento Cannabis Company	Sacramento	Sacramento
Northstar Opportunity St Property	Sacramento	Sacramento
BrightSource Farms	Sacramento	Sacramento
SPENagri	Sacramento	Sacramento
1900 Railroad Facility	Sacramento	Sacramento
Tokoa Agro LLC	Sacramento	Sacramento
1955/1957 Railroad	Sacramento	Sacramento
Ohana Growers	Sacramento	Sacramento
Tubbs Holdings LLC	Sacramento	Sacramento
Mountain Lion Earthworks	Sacramento	Sacramento
2080 A Railroad Avenue Cannabis Cult	Sacramento	Sacramento
Laughing Buddha Farms	Sacramento	Sacramento
Seven Leaves	Sacramento	Sacramento
Emerging Industries	Sacramento	Sacramento
Evergreen Gardens Ventures	Sacramento	Sacramento
2400 Manning Street	Sacramento	Sacramento

2019-0001-DWQ Enrollees in Sacramento River Watershed

Facility	City	County
2410 Manning Street Sacramento Cult	Sacramento	Sacramento
2435 & 2445 Harvard St	Sacramento	Sacramento
The Green Plug	Sacramento	Sacramento
ACE Agriculture LLC	Sacramento	Sacramento
Land Avenue, INC	Sacramento	Sacramento
Alternative Outlet Inc	Sacramento	Sacramento
HellaFire, LLC	Sacramento	Sacramento
Cal Farming, Inc.	Sacramento	Sacramento
LIVEADE WELLNESS, INC.	SACRAMENTO	Sacramento
Prominent Investments, Inc.	Sacramento	Sacramento
4260 24th Street Project	Sacramento	Sacramento
Raley Partners Inc	Sacramento	Sacramento
De La Mota Inc	Sacramento	Sacramento
Pigeon Racer Farm	Sacramento	Sacramento
530 Display Way LLC	Sacramento	Sacramento
88 ICO LLC - Cultivation	Sacramento	Sacramento
Delias, Inc.	Sacramento	Sacramento
Wicked Gardens LLC	Redding	Shasta
Cartibis	Redding	Shasta
Kagow, LLC	Redding	Shasta
CaliLove Connection LLC	Redding	Shasta
Mountain Lakes Manufacturing	Redding	Shasta
SLO Electro, LLC Property	Redding	Shasta
Pinnacle Cultivators	Redding	Shasta
KO Services Inc	Shasta Lake	Shasta
Shasta Botanicals LLC	Shasta Lake	Shasta
Shasta Growers	Shasta Lake	Shasta
Golden State Herb Shasta Lake Nurser	Shasta Lake	Shasta
Green Heaven LLC	Shasta Lake	Shasta
Brandon Sanders Property	North San Juan	Sierra
Sierra Sun Farms (Site #1)	North San Juan	Sierra
Telos Genetic Nursery	Mount Shasta	Siskiyou
1119 Ream Ave., Mount Shasta, CA, 9(	Mount Shasta	Siskiyou
Elevate Shasta	Mount Shasta	Siskiyou
407 Berry St Unit C	Mount Shasta	Siskiyou
Cory Peak Inc	Mount Shasta	Siskiyou
Clifford Bullock Jr Property	Arbuckle	Yolo
Yamil Salas Property	Dunnigan	Yolo
Lawrence Allende Property	Dunnigan	Yolo
Melvin Garcia Property	Dunnigan	Yolo
Tony Albert Property	Dunnigan	Yolo
Fireball Farms LLC Yolo 2	Dunnigan	Yolo
Cody E Grimes Property	Dunnigan	Yolo
Omar Vidrio Property	Dunnigan	Yolo
Mike Nevis Property	Dunnigan	Yolo
Olga Fonseca Property	Dunnigan	Yolo

2019-0001-DWQ Enrollees in Sacramento River Watershed

Facility	City	County
Gilberto Navarro Property	Dunnigan	Yolo
BKMK LLC Property Site #2	Dunnigan	Yolo
Paul Long Property	Zamora	Yolo
Cheryl Washington Property	Zamora	Yolo
Mark Alexander Property	Zamora	Yolo
MCC Holistic Care	Marysville	Yuba
THCore	Marysville	Yuba

R5-2015-0113 Historic Enrollees in Sacramento River Watershed

Facility	City	County
LL Capital Inc Property		Lassen
Melanie Peters Property	Grass Valley	Nevada
Benjamin Martchek Property	Grass Valley	Nevada
Jonathon Hogander Property	Grass Valley	Nevada
Lyle McMahon	Grass Valley	Nevada
John Orr Property	Grass Valley	Nevada
FV Farms	Grass Valley	Nevada
James Allen Welch Property	Nevada City	Nevada
Aaron Lusk Property	Nevada City	Nevada
Muse Gardens	North San Juan	Nevada
Kelly McMichael Property	Penn Valley	Nevada
Danielle Dao Property	Penn Valley	Nevada
Adam Valensky Property	Penn Valley	Nevada
Maureen and Jonathan Property	Penn Valley	Nevada
Jason Tackitt and Stephen Shimp Property	Penn Valley	Nevada
Juan Paniagua Property	Rough and Ready	Nevada
Fred and Sharon Thon Property		Plumas
Shane Ratilainen Property	Twain	Plumas
Brandon Sanders Property	North San Juan	Sierra
Sierra Sun Farms (Site #1)	North San Juan	Sierra
Sierra Sun Farms (Site #2)	North San Juan	Sierra
Harriet W Wallace Property	North San Juan	Sierra
Aaron Wallace Property	North San Juan	Sierra
Clifford Bullock Jr Property	Arbuckle	Yolo
Olga Fonseca Property	Dunnigan	Yolo
Omayra Hernandez Property	Dunnigan	Yolo
Tony Albert Property	Dunnigan	Yolo
Patrick Spears Property	Dunnigan	Yolo
Yamil Salas Property	Dunnigan	Yolo
Lawrence Allende Property	Dunnigan	Yolo
Omar Vidrio Property	Dunnigan	Yolo
Cody E Grimes Property	Dunnigan	Yolo
BKMK LLC Property Site #2	Dunnigan	Yolo
Gilberto Navarro Property	Dunnigan	Yolo
Melvin Garcia Property	Dunnigan	Yolo
Mike Nevis Property	Dunnigan	Yolo
Lee Lowe Property	Dunnigan	Yolo
Claudia Mathis Property	Dunnigan	Yolo
Mark Alexander Property	Zamora	Yolo
Paul Long Property	Zamora	Yolo
Cheryl Washington Property	Zamora	Yolo
Paul Long Property	Zamora	Yolo

Update of Activities at Aerojet Rocketdyne Holdings, Inc. Superfund Site
August 2018 – August 2020

This document serves as an Update of Activities at the Aerojet Rocketdyne Holdings, Inc. (Aerojet Rocketdyne) Superfund Site (Aerojet) since the fifth Update of Activities in August 2018. A significant amount of background information was provided in the original memorandum in November 2008 and the subsequent updates, some of which has not changed so it may not repeated in this Update; please refer to the other documents.

The City of Sacramento (City) tracks and assesses the Aerojet Superfund site as part of its American River Source Water Protection Program because it has the potential to impact the source water quality. These City efforts do not include detailed tracking of the groundwater plume movement. The contaminants of concern in the groundwater cleanup are not effectively treated with conventional water treatment, so ensuring they are not detectable in the source water through the multi-barrier approach is critical. Added to this update is information on the site redevelopment, as it relates to stormwater drainage to the Lower American River.

During the period covered by this update there was a significant change to the operations and regulatory management of the Aerojet site, but no change in groundwater extraction and treatment facilities. Aerojet Rocketdyne ceased industrial operations at the Rancho Cordova site in December 2019. The National Pollutant Discharge Elimination System (NPDES) for sitewide stormwater discharge (Order No. R5-2013-0156) was rescinded by the Central Valley Regional Water Quality Control Board (Regional Board) on June 4, 2020 since there are no industrial operations. There is one violation and two notification events that are discussed.

Aerojet has a significant volume of treated groundwater discharging to the Lower American River and remains a key activity of interest related to source water quality for the City. In order to continue to provide source water protection of the Lower American River, it is recommended that the City continue to track the regulatory status of the site and provide stakeholder input, as well as maintain direct communication with Aerojet related to permit effluent limit violations and notification events. An updated Action Plan, with regulatory and coordination schedules, prepared for the City will assist the City in tracking and providing stakeholder input on activities at the site with potential impact to Lower American River source water quality.

Facility Description and Operation

The Aerojet site covers 5,900 acres near Rancho Cordova, 15 miles east of Sacramento, California. The northeastern edge of the site is about one half mile south of the American River. Aerojet developed, manufactured, and tested liquid and propulsion systems at this site from the early 1950s through 2019. In addition, the facility manufactured chemicals such as rocket propellants, agricultural chemicals, pesticides (including pendimethalin), aqueous fire-fighting foam, and pharmaceuticals. Aerojet relocated its rocket propulsion manufacturing group to Alabama in December 2019, ending industrial operations at the Rancho Cordova site. Located on the site currently is Aerojet Rocketdyne, only the staff associated with site remediation; AMPAC Fine Chemicals, which manufactures bulk pharmaceutical chemicals; Wesco Aircraft/Incora, which offers supply chain management services for aerospace and pharmaceutical industries; Folsom Lake Honda, which leases land to store vehicles; American Integrated Services, which offers environmental remediation and construction services; the State of California, which is the Department of Corrections fuel storage; Cafe Express, which offers food services; and SK Pharmteco, which is a contract manufacturing operation that is the parent company of AMPAC Fine Chemicals.

Environmental investigations at the site began in 1979. Groundwater contamination has been defined in a number of discrete plumes. There are two major receiving waters tributary to the American River that pass through the Aerojet site: Alder Creek and Buffalo Creek. Alder Creek currently receives storm runoff and cooling water discharges (which are discontinued in 2020), as well as artesian groundwater seeps in the northeast region of the Aerojet property. Buffalo Creek receives storm runoff, a small amount of industrial process water (which was significantly reduced in 2020), and treated groundwater discharge. Buffalo Creek has been modified, realigned, and impounded in three areas: from upstream to downstream. These are F-Area Lake (located on the east end of the Aerojet property), East and West retention ponds, and West Lake. As site redevelopment occurs, the impoundments are expected to be eliminated and alternate storm water management infrastructure will be developed for those portions of the site by the applicable governing entity (City of Folsom, City of Rancho Cordova, and Sacramento County).

The major contaminants found in soil and groundwater both onsite and offsite are solvents such as trichloroethylene (TCE) and chloroform, and rocket fuel by-products such as N-nitrosodimethylamine (NDMA) and perchlorate. **Table 1** provides a list of the principal contaminants and their associated sources, human health thresholds, and treatment options. More recently, monitoring has detected the presence of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in some wells on the site.

It should be noted that although the solvents are generally volatile and therefore less persistent in the environment, NDMA, perchlorate, PFOA, and PFOS are not volatile and are very water soluble and persistent in the environment.

Cleanup efforts at the site are jointly administered by the USEPA, the Regional Board, and the California Department of Toxic Substances Control (for soil contamination sites). The focus of the City tracking efforts has been on the groundwater remedy that results in discharges to the Lower American River and is permitted through the Regional Board. The City's also tracks Aerojet's NPDES permit for stormwater and other low-threat wastewaters collected and discharged from the site, which was rescinded on June 4, 2020. The City will now include site redevelopment efforts as they are related to stormwater management.

Aerojet prepares contaminant plume maps for TCE, NDMA, and perchlorate periodically, as well as a composite plume map showing the general geographic extent of the overall plume. **Figure 1** presents a site map from the USEPA, provided at an Aerojet Community Action Group (CAG) meeting in September 2019, and **Figure 2** presents the groundwater contaminant plume maps from the USEPA, provided at an Aerojet CAG meeting in May 2018.

USEPA Regulatory Status

The USEPA overall cleanup approach at the Aerojet Superfund site remains to be first controlling groundwater contamination moving off-site and then remediating soil and groundwater contamination at source areas on-site. Aerojet was listed on the National Priorities List (NPL) in 1983 and a Partial Consent Decree (PCD) was originally signed in 1989 and modified in 1998 and 2002, bringing it officially into the Superfund Program. The PCD is a legal agreement between the USEPA, the State of California, and Aerojet Rocketdyne that binds Aerojet Rocketdyne to the remediation and specifies how the site investigation and remediation process will be implemented. Aerojet is one of the largest Superfund sites in America and has a complex and long plan for remediation. It is expected to take 250 years to completely remediate the soil and groundwater. In order to prioritize areas of greatest risk, reduce impact to the region, and accelerate site reuse/redevelopment, Aerojet was divided into Operable Units (OUs) that each go through the regulatory process. There are nine OUs that go through a separate regulatory process with the USEPA, as described below.

- Preliminary Assessment/Site Inspection (PA/SI) – Investigate site conditions, sometimes early implementation actions are initiated to prevent the further release of hazardous substances.
- National Priorities List (NPL) Site Listing – Site may be added to NPL for most serious, long-term cleanup sites.
- Remedial Investigation/Feasibility Study (RI/FS) – Determines nature and extent of contamination, assesses the treatability of site contamination, and evaluates potential alternatives.
- Proposed Plan – Selection of remedy from RI/FS. This is the only document made available for public review and comment.
- Record of Decision (ROD) – Final cleanup alternative plan and direction to responsible party to implement remedy. This includes the Unilateral Administrative Order (UAO) legally enforcing the remedy.
- Remedial Design/Remedial Action (RD/RA) – Preparation and implementation of plans and specifications for applying remedies. Most cleanup is done during this phase.
- Construction Complete – Completion of all physical cleanup construction (does not indicate cleanup levels have been met yet).
- Post Construction Completion – Ensures that response actions are working and includes Long Term Response Actions, Operation and Maintenance, Institutional Controls, Five-Year Reviews, and Remedy Optimization.
- NPL Delete – Remove site from the NPL once all response actions are complete and cleanup goals have been met.
- Site Reuse/Redevelopment – Return sites to safe and productive use without adversely affecting the remedy.

Table 1
Principal Groundwater Contaminants at the Aerojet Rocketdyne Superfund Site

Contaminant	Source	MCL, µg/L	PHG, µg/L	Groundwater Treatment at Aerojet Rocketdyne	Conventional Water Treatment Effectiveness[1]
Perchlorate - Inorganic anion	Component of solid rocket propellant	6	1	Biological reduction and ion exchange reduce perchlorate to <4 µg/L	Not effective
N-nitrosomodimethylamine – Semi volatile organic compound	Combustion product of liquid rocket fuel	0.01 [2]	0.003	UV light/peroxide oxidation removes NDMA to < 0.002 µg/L	Not effective
1,4-dioxane	Stabilizer in solvents	1 [2]	None [3]	UV light/peroxide oxidation removes 1,4-dioxane to < 3 µg/L	Not effective
Trichloroethylene (TCE)	Solvent	5	1.7	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
Tetrachloroethylene (PCE)	Solvent	5	0.06	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
1,1-dichloroethene (1,1-DCE)	Solvent	6	10	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
cis-1,2 – dichloroethene (1,2-DCE)	Solvent	6	13	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
trans-1,2 – dichloroethene (1,2-DCE)	Solvent	10	50	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
1,1-dichloroethane (1,1-DCA)	Solvent	5	3	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
1,2-dichloroethane (1,2-DCA)	Solvent	0.5	0.4	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
1,1,2-trichloro-1,2,2-trifluoroethane (CFC-113)	Solvent	1,200	4,000	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
Carbon tetrachloride (CCl4)	Solvent, refrigerant, propellant	0.5	0.1	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
Chloroform	Solvent	80 [4]	0.4	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal
Vinyl chloride	VOC degradation product	0.5	0.05	Air stripping and/or GAC removes VOCs to < 0.5 µg/L	Minimally effective, <20 percent removal

Table 1 Cont'd
Principal Groundwater Contaminants at the Aerojet Rocketdyne Superfund Site

Contaminant	Source	MCL, µg/L	PHG, µg/L	Groundwater Treatment at Aerojet Rocketdyne	Conventional Water Treatment Effectiveness[1]
Perfluorooctanoic acid (PFOA)	Surfactant and fire-fighting foam	0.0051 [2,5]	None [6]	GAC, ion exchange, and/or membrane could be considered if necessary	Not effective
Perfluorooctane sulfonate (PFOS)	Surfactant and fire-fighting foam	0.0065 [2,5]	None [6]	GAC, ion exchange, and/or membrane could be considered if necessary	Not effective

MCL – Maximum Contaminant Level: Primary MCLs are set as close to the Public Health Goals (PHGs), or MCLGs, as is economically and technologically feasible.

PHG – Public Health Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health.

USEPA Health Advisory - The concentration of a chemical in drinking water that is not expected to cause any adverse noncarcinogenic effects for a lifetime of exposure

[1] Effectiveness of Volatile Organic Compounds (VOCs) based on AWWA Water Quality and Treatment 4th Edition

[2] DDW Notification Level

[3] DDW Response Level for 1,4-dioxane set at 35 µg/L, USEPA Lifetime Health Advisory set at 200 µg/L

[4] The MCL is 80 µg/L for the sum of total trihalomethanes (as disinfection by-products) chloroform, dibromochloromethane, bromodichloromethane, and bromoform.

[5] DDW Notification Levels for PFOA/PFOS were updated in August 2019

[6] DDW Response Level for PFOA set at 0.01 µg/L and PFOS set at 0.04 µg/L, USEPA Lifetime Health Advisories set at 0.070 µg/L (either individually or combined)

Figure 1. Aerojet Rocketdyne Site Plan

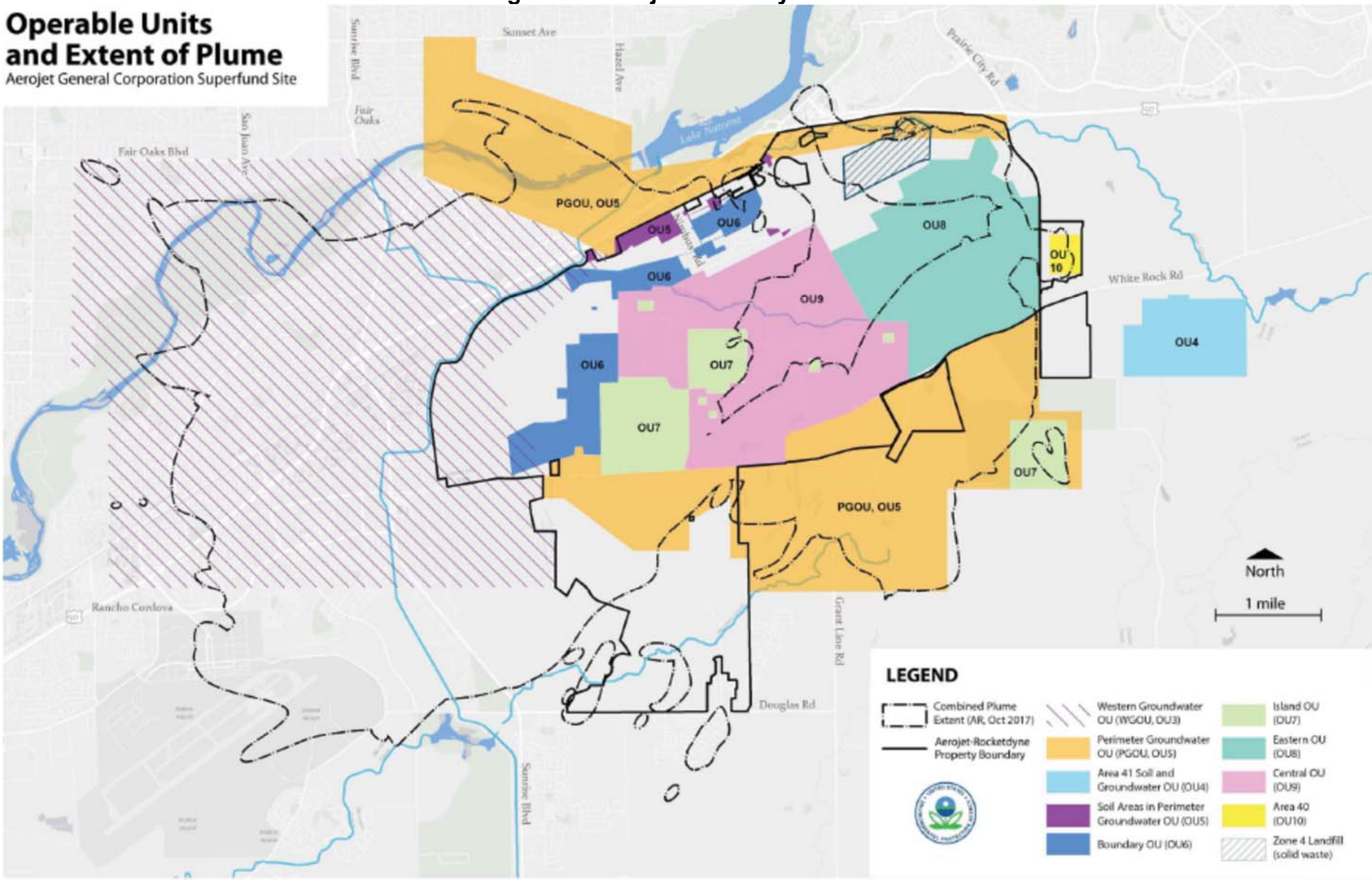
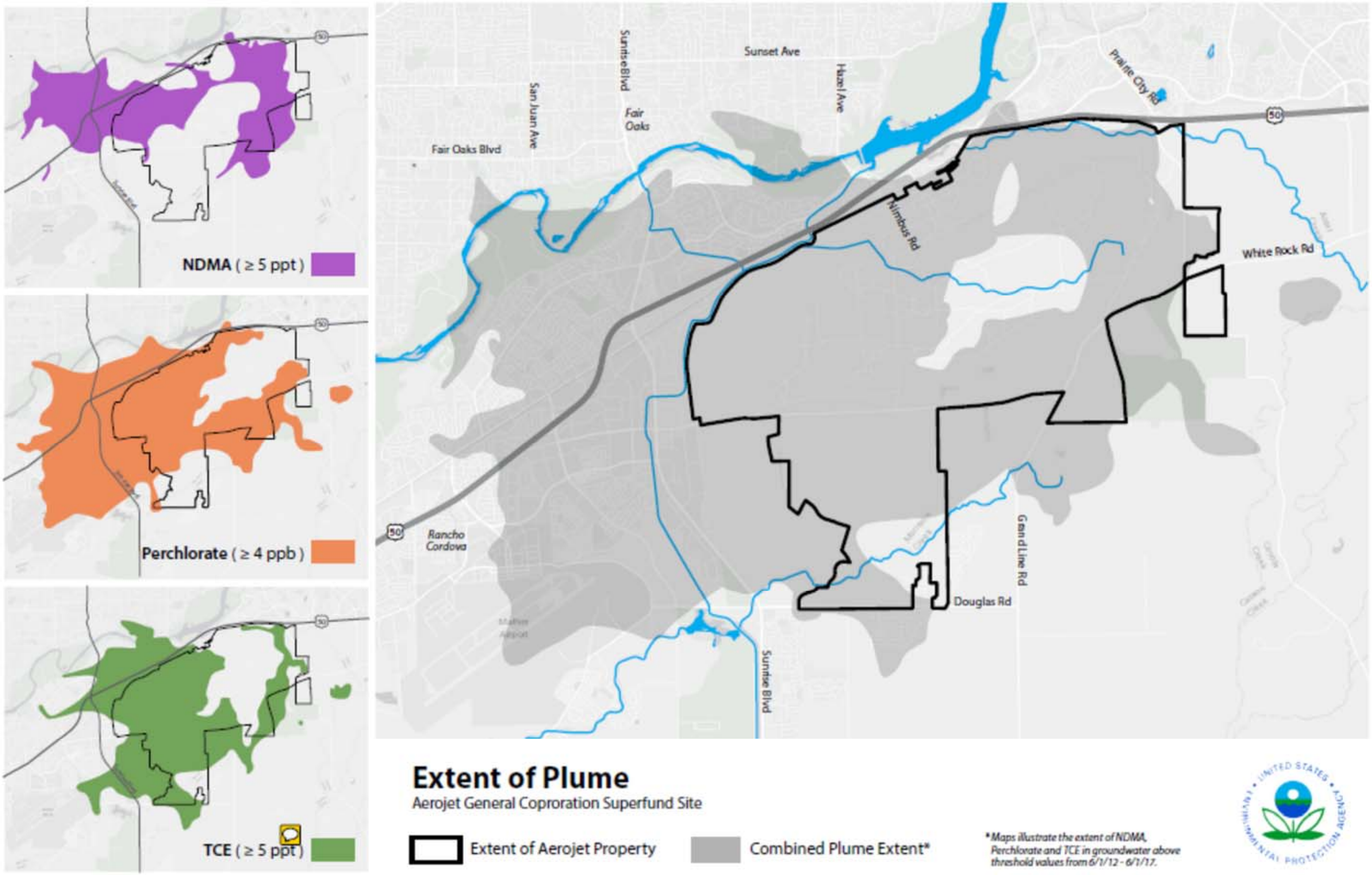


Figure 2. Aerojet Rocketdyne Plume Maps



The OUs/remedies have been prioritized to capture and treat contaminated groundwater in the early phases to try and minimize the migration of contamination off the site. It should be noted that the groundwater remedies are considered interim since they are dependent on the control of the source areas in other OUs that are in earlier stages of planning and remedy.

- OU1 is the Sitewide OU and it will be assessed once all the individual OU remedies have been installed. The first Five-Year Review was released by USEPA in September 2016, including OUs 3 and 5, and thereafter on five-year cycles. The next one is expected in September 2021 and will include OU3, OU5, and OU6 as they have final RODs. Once all the OU remedies are approved (most likely by 2031), then an entire sitewide analysis will be conducted. This will include an overall risk assessment and is expected to be available for public review.

- The first OU to be addressed is the Western Groundwater OU (also known as OU3). This OU includes all groundwater west of Aerojet's main facility. It extends just south of International Drive, west to Mather Field Road, north just beyond the American River, and east to include much of the Gold River development. Principal contaminants include TCE, perchlorate, and NDMA. The final RI/FS was published in October 2000, with a Proposed Plan published for comment in December 2000. The City submitted comments to USEPA on the Proposed Plan. The final ROD was recorded in July 2001. The Construction Completion was approved by USEPA in July 2011. The first Five-Year Review was finalized in September 2016, and is discussed later. OU5, Perimeter Groundwater, also has a completed ROD and Workplan so it was included in that review. USEPA now requires quarterly Compliance Monitoring Reports for monitoring data from the outer hydraulic barrier and the inner hydraulic barrier to allow for reassessment of the current remedy for this OU. The first reports were submitted in 2012, respectively, and are now submitted March, June, September, and December. These reports are from Aerojet to the USEPA and are designed to assess the current effectiveness of the remedy to determine if modifications should be made to optimize the remedy (i.e. selection of operating wells). These evaluations have resulted in modifications to the remedy and subsequently the GET facilities and discharges.

- The second OU to be addressed is the Perimeter Groundwater OU (also known as OU5). This includes all remaining groundwater leaving the Aerojet facility to the north or south not included in the Western Groundwater OU. It includes OU2 (American River). Principle contaminants include TCE and other VOCs, perchlorate, and NDMA. The final RI/FS was submitted in 2008 and accepted in August 2010, with a Proposed Plan published for comment in September 2009. The City conducted a detailed review of the Proposed Plan and submitted comments to the USEPA. The final ROD was recorded in February 2011. The UAOs were issued with the ROD and included a Statement of Work for the RD/RA. Aerojet is working on the Remedial Design, and construction has been completed. USEPA has requested that Perimeter Groundwater OU be included in the quarterly Compliance Monitoring Reports to integrate the remedies for OU3 and OU5, since the groundwater component is physically interconnected. This OU remedy was also assessed as part of the Five-Year Review in September 2016.

- Boundary OU (also known as OU6) includes areas adjacent to or within the 2002 Carve-Out Lands. OU6 includes nine management areas that are scattered and include the Magazine Area, Chemical Plant 2, portions of Chemical Plant 1, the Administration Area, and along Buffalo Creek. Investigation work to define source areas began in 2005. The RI/FS was finalized in September 2012. The City conducted a detailed review of the Proposed Plan and submitted comments to the USEPA. A final Proposed Plan and ROD were published in July 2015. The Design/Implementation Workplan was completed in 2020. A Remedial Action Completion Report is expected in 2021 with Certification to follow in 2023. This OU will be included in the next Five-Year Review in September 2021.

- Island OU (also known as OU7) is located in the central part of the Aerojet site and includes the most significant groundwater contamination source areas at the facility. It has eight management areas. Data for the Area 39 (a heavy contamination area with groundwater springs draining to Alder Creek) RI has been collected and evaluated and the revised draft RI was finalized in 2016. A final RI for Island OU will be prepared using supplementary data being collected now and is expected to be published in 2021 or 2022. The FS for Island OU will be prepared after the RI is completed, with a Proposed Plan following that and a final ROD later. The Design/Implementation Workplan is expected in 2023 or 2024.

- Area 40 (also known as OU10) is managed by DTSC and the Regional Board. The area is located east of Prairie City Road, and portions of the site drain to the American River. It is known for shallow groundwater contamination with VOCs, perchlorate, and heavy metals. The Site was separated out from Boundary OU in 2017 to allow DTSC to prepare a Remedial Action Plan (RAP) under California Environmental Quality Act requirements. The City provided a detailed review and submitted comments on the Draft RAP in July 2018, which continued to request consideration of the downstream surface water impacts to the Lower American River as well as continued re-evaluation of monitoring programs. The RAP was finalized in August 2018. Remedial work began immediately after and a Remedial Action Completion Report is expected by October 2020 with Certification to follow in December 2020. This will be included in the next Five-Year Review in September 2021.

- Eastern OU (also known as OU8) is a soil and groundwater OU which includes most of the liquid and solid rocket testing areas on the eastern side of the facility. Sampling for the data collection is complete and Aerojet is preparing the RI/FS. The Draft RI/FS is expected in 2021/2023, followed by a Proposed Plan in 2025, and a ROD in 2029. The Design/Implementation Workplan is also expected in 2029.

- Central OU (also known as OU9) contains most of Chemical Plant 1 and associated rocket manufacturing and is generally in the central portion of the facility. The Sampling Plan is complete and Aerojet is preparing the RI/FS. The Draft RI/FS is expected in 2021, followed by a Proposed Plan in 2023, and a ROD in 2024.

- Cavitt Ranch OU (also known as OU4 and described as Area 41 OU) is a 550 acre site situated 1.5 miles east of Aerojet's main facility and south of White Rock Road. This site was used for drying and burning old solid rocket fuel. Soil and groundwater are contaminated primarily with TCE and perchlorate but also contain other VOCs, dioxan/furans and some elevated metals. This was determined to be the lowest priority OU. The Sampling and Analysis Plan was submitted in 2014, which outlines the plan for data collection to support the RI/FS. It is expected that this will be revised prior to commencing work. The RI/FS is expected in 2021/2022, followed by a Proposed Plan in 2023, and a ROD in 2024.

Every year Aerojet prepares an Annual Report for each OU to evaluate its success in implementing the remedy. This includes a groundwater extraction and treatment facility effectiveness evaluation. Modifications are made to the remedy as needed to address any gaps in plume containment. Every five years a Five Year Review must be prepared as well to look holistically at all OUs that are implementing the remedy and the overall success of the site wide remediation effort.

The PCD includes sampling of the American River (Exhibit V (B) and (G)(7)) for VOCs. This requires sampling of the American River at five locations under certain flow conditions in the Lower American River: Landis Collector (6169), Deterding Collector (6170), Fairbairn Treatment Plant (6171), Sunrise Foot Bridge (6182), and Arcade (Sacramento Suburban Water District) Collectors (6183). See **Figure 3** for the location of these sites relative to the NPDES receiving water sample sites. These monitoring requirements are in addition to the NPDES permit requirements for receiving water sampling. If flows do not meet the flow/sampling relationship defined in the PCD, then no samples will be collected that month. A summary of the monthly monitoring determinations from September 2018 through July 2020 is presented in **Table 2**.

Of the five months when VOC sampling was conducted, only one month resulted in detections. In December 2018 the E.A. Fairbairn WTP was offline when Aerojet staff came to sample the raw water. The raw water tap was not flowing so Aerojet staff collected water from the treated water tap, which was running on recycled water. This was verified by City and Aerojet staff and determined that the results for site 6171 were not representative of American River source water.

As part of the remedy implementation, Aerojet is attempting to reuse or replace lost groundwater by discharging the treated water in ways that can be best utilized by impacted drinking water utilities or other downstream diverters. This may result in more water being discharged to the American River. One option that has been implemented is for Carmichael Water District to use their Ranney Collectors to divert treated groundwater discharge blended in the American River, treat it for drinking water, and then pipe it back to Golden State Water Company as replacement water. A pipeline was completed in 2016 that conveys 4.6 million gallons per day (mgd) to Golden State Water Company.

Figure 3. Aerojet Rocketdyne PCD Exhibit V and NPDES Permit Receiving Water Sample Sites

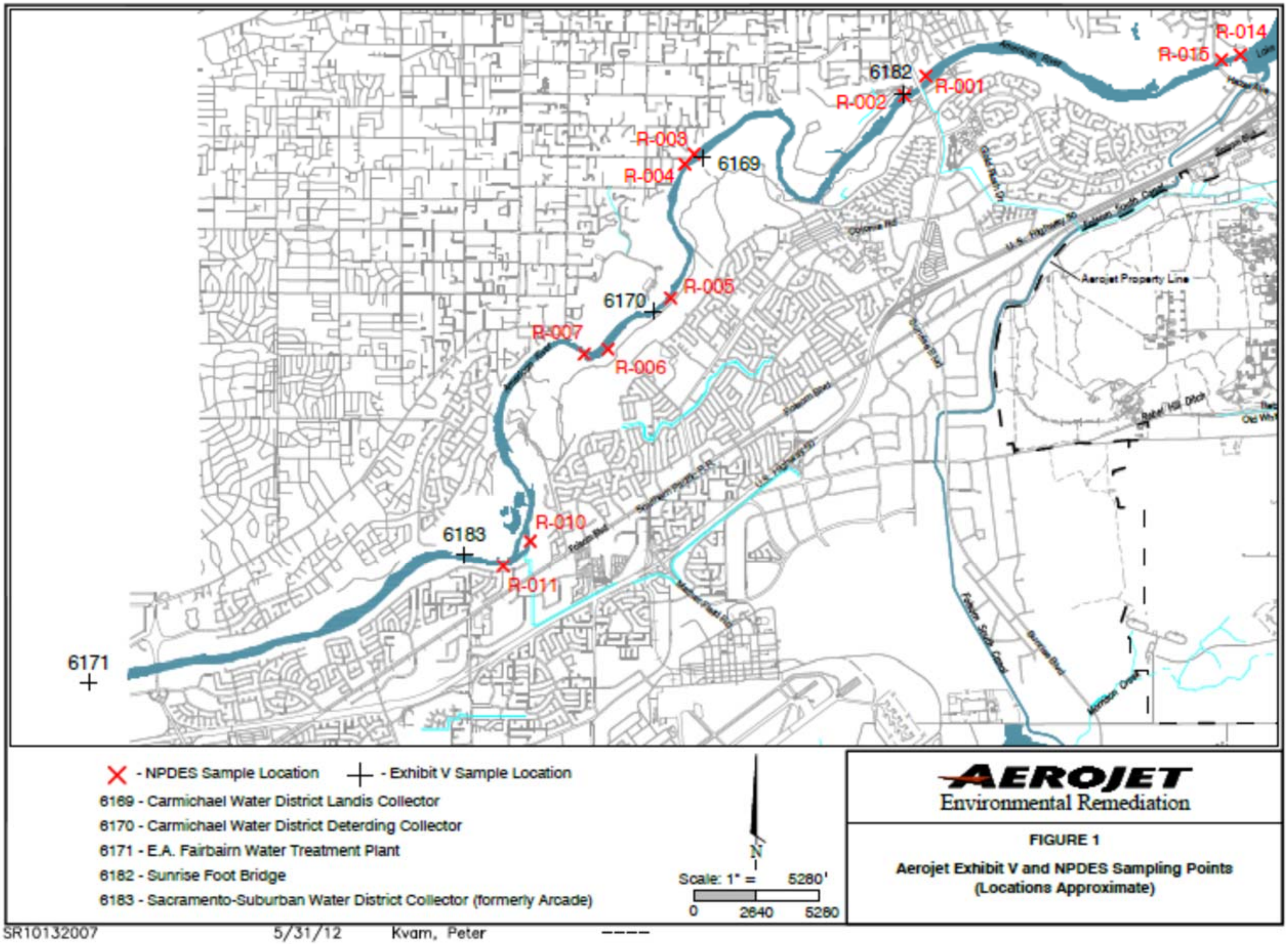


Table 2
Summary of PCD Exhibit V American River Monitoring

Date	Sampling Conducted?	Date and Results of VOC Sampling
September 2018	Yes	All ND
October 2018	No	
November 2018	No	
December 2018	Yes	6171 (EAFWTP) – bromodichloromethane 11 µg/L, bromoform 1.2 µg/L, chloroform 49 µg/L, dibromochloromethane 5.2 µg/L (EAFWTP offline, sample taken from treated water recycle line)
January 2019	No	
February 2019	No	
March 2019	No	
April 2019	No	
May 2019	No	
June 2019	No	
July 2019	No	
August 2019	No	
September 2019	No	
October 2019	No	
November 2019	No	
December 2019	Yes	All ND
January 2020	No	
February 2020	No	
March 2020	Yes	All ND
April 2020	No	
May 2020	No	
June 2020	Yes	All ND
July 2020	No	
August 2020	No	

Groundwater Plume Interaction with Lake Natoma

The 2018 Annual Report for Perimeter Groundwater OU, specifically Zone 4, determined that the monitoring wells in the northeast portion of the site indicated that there was possible gap in containment from the movement of the groundwater contamination plume north toward Lake Natoma, beyond the current extent of the extraction wells. Aerojet prepared an investigation of the region to determine if there was movement of the plume north toward Lake Natoma and potential migration from groundwater to surface water, published in September 2019 but not posted for public review until September 2020. The study included a groundwater-surface water interface evaluation to determine if Lake Natoma/American River is a gaining or losing stream in order to identify the potential for the groundwater contamination to migrate into surface water. The evaluation included perchlorate and NDMA, but not the PFCs that have been detected in that area as well.

Evaluations found that the current extraction wells were not providing hydraulic containment of perchlorate and NDMA north of Highway 50, near Lake Natoma. A groundwater-surface water interface investigation was conducted to determine if there was a hydraulic connection between the groundwater contaminant plumes, at various layers, and Lake Natoma. It was determined that the groundwater in Layers D and E may coalesce and intersect with the bottom of Lake Natoma. The findings were not entirely conclusive on the magnitude and timing of the potential intersection. The horizontal analysis of groundwater showed consistent movement of the plume north toward Lake Natoma. The vertical analysis of groundwater showed periods of downward movement (57 percent of the time) and periods of upward movement (43 percent of the time). This means that the groundwater is discharging to Lake Natoma nearly half the time and it averages about 4 percent of the Lake Natoma outflow.

Aerojet conducted a mass discharge evaluation assuming that groundwater is discharging to Lake Natoma. That was combined with a dilution attenuation factor, essentially mixing with clean surface water, to project the concentrations in Lake Natoma under low-flow scenarios. The evaluation found that the projected concentrations were orders of magnitude below the risk-based screening levels for perchlorate and NDMA and therefore determined that the groundwater is not a significant risk to surface water (Lake Natoma/Lower American River). The study states that the model is not considered perfect and includes inherent uncertainties and limitations, but that they believe it is valid since they utilized conservative assumptions.

A detailed evaluation of the validity of the mass discharge analysis methodology and the groundwater-surface water interaction study could not be conducted as it is out of the technical expertise of Starr Consulting. It should be noted that there was no water quality data collected to validate or calibrate any of the predicted concentrations, and there was no comparison of receiving water monitoring data from the NPDES permit monitoring either.

Five-Year Review

Superfund law requires that remedial actions that result in any contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be reviewed every five years to ensure protection of human health and the environment. The USEPA has completed its first Five-Year Review of the existing Records of Decision (RODs), or cleanup actions in place, at the Aerojet Superfund Site. It was prepared by the US Army Corps of Engineers. This review covered the Western Groundwater Operable Unit (OU3) and Perimeter Groundwater OU (OU5), which were the only two OUs with remedies in place at the time of initiation. The Five-Year Review Report was finalized on September 22, 2016. The next Five-Year Review is expected in September 2021 and will include OU3, OU5, Boundary OU (OU6), and Area 40/OU10.

The Five-Year Review is open for public review and comment, as presented in the Aerojet Rocketdyne Action Plan companion to this Update. The City provided an informal email regarding the Five-Year Review in August 2016, which was briefly noted in the final report. The City requested that the cumulative downstream impacts of the treated groundwater discharge, stormwater runoff, and groundwater seeps be evaluated. The USEPA noted that only the NPDES permit compliance evaluation of the GET facilities was included in the report and that a cumulative evaluation for all sources is outside the scope of the remedies selected (it will not be conducted until all OU remedies are in place under the Sitewide analysis).

Overall, USEPA determined that the remedy is not functioning as intended by the RODs and modifications were necessary. There are containment gaps, land use restrictions have not been completed, assumptions have changed (for example, the chloroform MCL has been lowered), and there is incomplete information to complete the vapor intrusion assessment. Therefore, USEPA permanently deferred making a protectiveness statement for OU3 and OU5 (as well as OU6) until more information is available.

The Five-Year Review Report provided a summary of information related to OU3 and OU5. Key highlights related to potential impacts to the Lower American River include:

- The concentration of constituents of concern in the groundwater are generally stable or decreasing, except for increasing levels of TCE in Layers C/D in the Inner Barrier, perchlorate in the area south of GET H, and NDMA in the area west of GET K.
- Lower pumping rates from the extraction wells in 2014 have prevented hydraulic containment in the Inner Barrier, so extraction and treatment rates need to be increased to GET facility treatment capacity.
- Increasing levels of perchlorate upgradient of extraction wells for GET K need to be tracked to determine if the facility needs to be upgraded for perchlorate treatment (Aerojet determined to install perchlorate treatment at GET K and this is being installed and will be operational October 2020).
- Increasing levels of NDMA upgradient of extraction wells for GET H need to be tracked to determine if the facility needs to be upgraded for NDMA treatment (levels at GET H are currently below cleanup levels).
- Regional Board NPDES sampling for perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) at GET E/F and GET AB resulted in detects in both the influents and effluents. Levels were highest at GET E/F (PFOS at 96 nanograms per liter [ng/L] in the effluent and PFOA at 24 ng/L in the effluent) and lower at GET AB (PFOS and PFOA at 3 ng/L in the effluent).

Each of the GET systems has its own Operations and Maintenance (O&M) manual; most of the updates to the O&M manuals were prepared in October 2014 and are updated annually in December. A new process control manual was developed in late 2016 for GET E/F to improve the biological perchlorate reduction. Each of the O&M manuals provide a detailed description of the GET system (extraction wells, pipeline, treatment components), control and monitoring system, operating procedures, maintenance management, contingency plans, recordkeeping and reporting, and safety plan. Additionally, each of the manuals includes a detailed schedule and checklist of semi-weekly, monthly, quarterly, semiannual, and annual inspections that must take place. The NPDES permits are also included in these manuals.

Appendix H provides a Risk Assessment Review and Toxicity Analysis. This includes a statement on the potential off-property impacts of untreated or incompletely treated groundwater as well as the seeping groundwater to Alder Creek, which was determined to be negligible and limited to recreational impacts (without presentation of supporting information).

There were six recommendations from the Five-Year Review Report, which Aerojet has been working on over the past few years, including:

- Update the groundwater risk assessment to include the new chloroform MCL for OU3 by 9/30/18.
- Assess groundwater containment issues in OU3 and OU5 and address gaps by 9/30/19.
- Evaluate migration of constituents of concern in groundwater and investigate the need to update treatment at GET K (perchlorate treatment is being installed now) by 9/30/20.
- Reassess the vapor intrusion activities in OU3, OU5, and OU6 by 9/30/17.
- Implement land use controls for various soil contamination areas by 9/30/17.
- Update the soil and soil vapor risk assessment for mercury, cadmium, and 1,1,1-trichloroethane by 9/30/18.

In addition to the recommendations above, there were several other findings related to the groundwater contamination and treatment that Aerojet has been working to address, including:

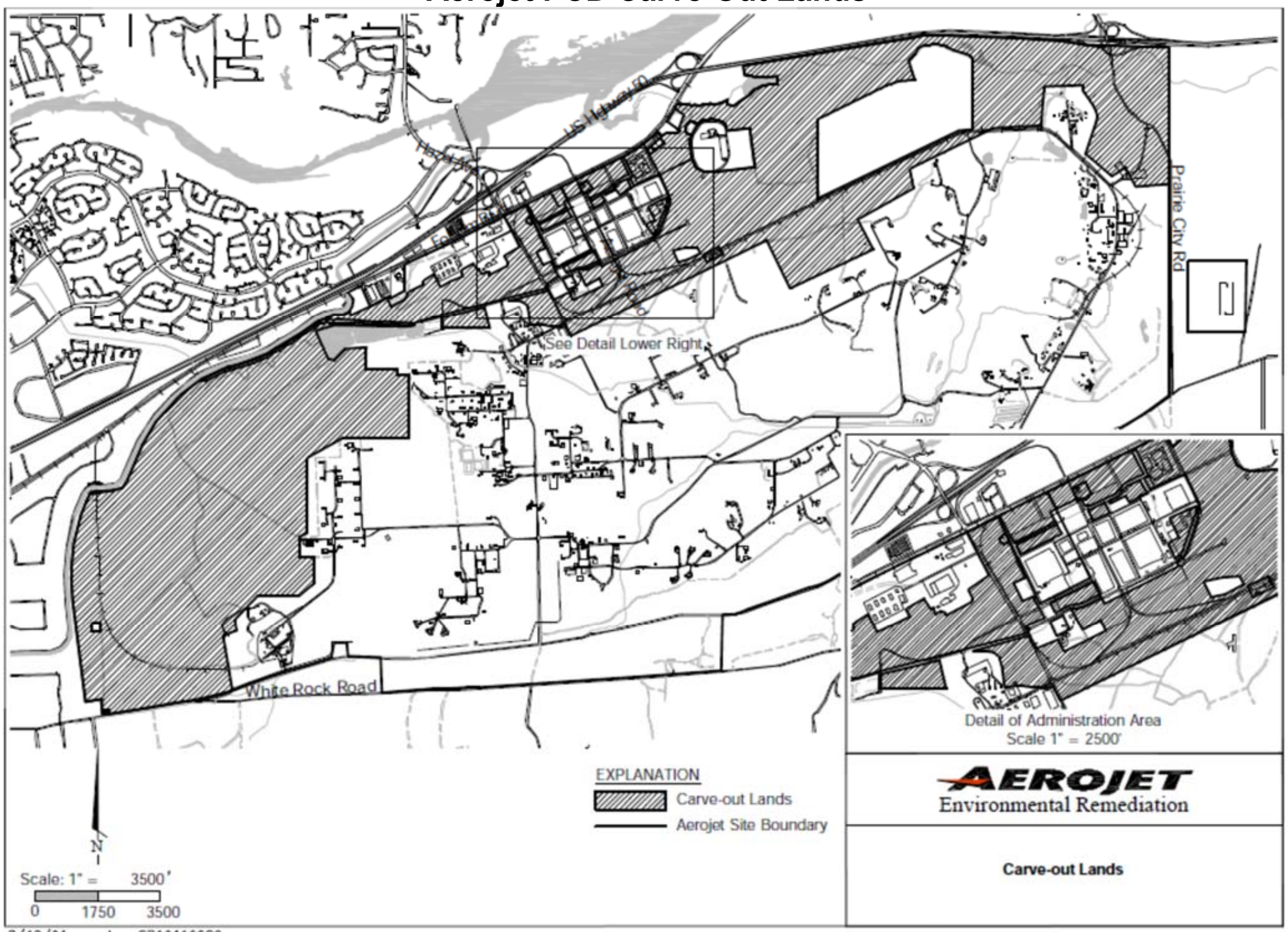
- More sampling is needed to find the source of PFOS/PFOA to GETs AB and E/F. This has been included as part of the NPDES program.
- Deficiencies in the monitoring programs exist and they need to be addressed.
- Activities and performance of wells AC-6 and AC-18 are not well documented and need to be improved in order to assess performance and this should be included in the OU3 Performance Evaluation Report. (Golden State Water Company has ceased using AC-6 so that water is sent to GET K for treatment now)

Site Redevelopment Plans

Given the large acreage of the site, proximity to urban areas, and Aerojet's need for financial resources to continue remediation at the site; Aerojet intends to sell land for redevelopment as it is certified by the Superfund regulatory agencies. The PCD was modified in 2002 to redefine the boundaries of land classified under the NPL Superfund and identify "Carve-Out Lands" for future redevelopment. These are shown in **Figure 4**. This modification included covenants and land restrictions for redevelopment; it also requires Aerojet lands to be redeveloped in accordance with all applicable planning and permitting processes. If the redevelopment of the Carve-Out Lands is successful, Aerojet may consider redevelopment of the interior lands of the site in the future.

As each OU is remediated and cleared by USEPA, DTSC, and Regional Board for transfer, Aerojet will work with land developers and municipal entities to sell and transfer land for redevelopment. There are few local land developers that are familiar with the redevelopment of Superfund sites, so this process has been slower than similar redevelopment in Southern California. This will eventually result in the conversion of the site to traditional urban development, including residential, commercial, and industrial uses as well as open space and parks. Redevelopment is led by Aerojet's land development division, Easton Development Corporation. The overall land reuse plan is now over 20 years old and may not reflect current development needs in the region. There is a movement to consider reviewing the plan to determine if it needs to be revised.

Figure 4
Aerojet PCD Carve-Out Lands

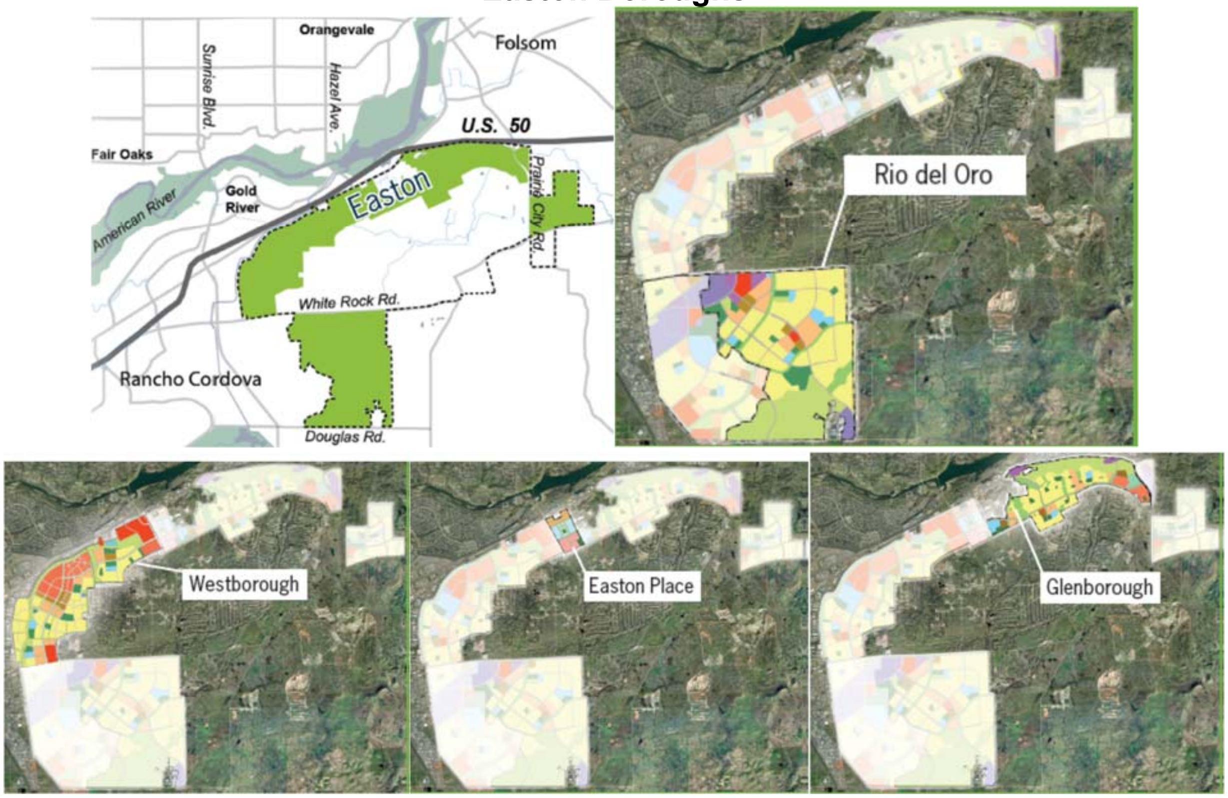


The primary concern for source water protection related to redevelopment is the planning for stormwater runoff from the land. Historic use and operations at the Aerojet site have allowed most runoff and some GET discharge to permeate locally, limiting the timing and amount of drainage and discharge to the Lower American River. Conversion to urban development will result in hydromodification, both in terms of increased quantity of runoff and potentially degraded quality of runoff, which has the potential to impact the Lower American River both during construction phases and in final development.

The Easton redevelopment plan breaks the “Carve-Out Lands” into five boroughs; Hillsborough, Glenborough, Easton Place, Westborough, and Rio del Oro. These are shown in the **Figure 5,** except Hillsborough which is the separate region on the eastern side of the site. Glenborough and Easton Place are under the jurisdiction of Sacramento County. Hillsborough is under the jurisdiction of the City of Folsom. Westborough and Rio del Oro are under the jurisdiction of the City of Rancho Cordova.

Sacramento County Zoning Code, Title V has a Special Planning Area for Aerojet lands that includes the requirement for a Land Use Master Plan (any conceptual land use plan, map, or specific plan). All redevelopment boroughs must meet these requirements.

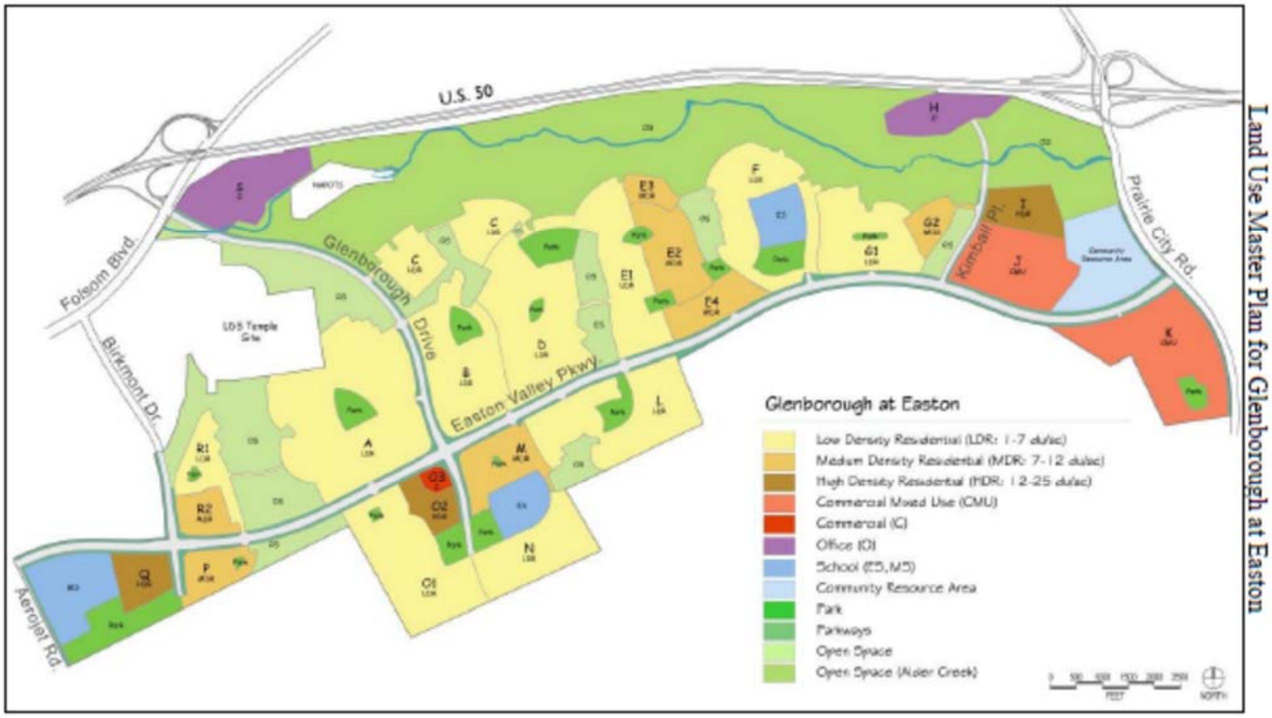
Figure 5
Easton Boroughs



Sacramento County

Glenborough will be a master planned community located within Sacramento County, just over 1,200 acres. The City of Folsom plans to expand their Sphere of Influence to annex this development into the City limits. Nearly 40 percent of the land will be parks/open space, including the Alder Creek Parkway along the north side of the borough along Highway 50. The Glenborough Land Use Master Plan, shown in **Figure 6**, designates eighteen single-family residential villages, three multi-family residential developments, two commercial mixed use sites, one commercial site, two office sites, three elementary school sites, and numerous park sites, in addition to a large open space area adjacent to or near Alder Creek.

Figure 6
Land Use Master Plan for Glenborough



A Land Use Master Plan has been prepared for Glenborough that includes goals for stormwater management; it was approved by Sacramento County in 2009 as a Special Planning Area. An EIR and small lot approval has been completed as well, indicating that Glenborough will likely be the first redevelopment to occur. It clarifies that a majority of the project area is tributary to Alder Creek, with a small amount draining to Buffalo Creek. Much of the area within the Alder Creek drainage shed has been greatly disturbed by previous dredge mining activities resulting in a topography of cobble and gravel tailing piles and depressed slickens areas. The existing stormwater runoff from this area is assumed to be minimal because of the high permeability of the cobble tailing piles and storage volume within the slickens ponds.

The Plan states that development of Glenborough at Easton will significantly change the runoff characteristics of this drainage shed, resulting in increased runoff volumes in Alder Creek. Alder Creek is located within a relatively deep ravine and has adequate capacity to convey the additional flows. However, the culvert crossing at Folsom Boulevard does not have adequate capacity to handle the additional flows generated by the project. The project will increase the capacity of this crossing through the addition of a 96-inch diameter culvert at Folsom Boulevard. Stormwater quality facilities will be provided in conformance with the *City and County of Sacramento Guidance Manual for On-site Stormwater Quality Control Measures* (Stormwater Guidance Manual). The Stormwater Guidance Manual divides the Alder Creek drainage shed into five sub-sheds. Runoff from each sub-shed will be directed to an extended detention water quality basin before discharging into Alder Creek. Required basin capacities have been determined based on sub-shed size and surface cover. Stormwater quality basins will be located within the Alder Creek corridor, as shown in the Stormwater Guidance Manual. A fluvial geomorphic and stormwater quality assessment will be prepared for the Alder Creek corridor to include areas within and immediately downstream of the project area. The study will evaluate the Alder Creek floodplain and the project's proposed water quality basins to determine the potential for erosion from Glenborough at Easton stormwater runoff. If the study determines that substantial erosion can be anticipated from additional stormwater runoff within Glenborough at Easton, then recommendations to minimize this erosion will be identified and implemented. Erosion control measures may include detention basins, application of standard and best management practices for construction, or diversion of runoff to other locations to protect sensitive habitat areas within the Alder Creek corridor and open space "fingers." A stormwater quality facility will be required to treat runoff into the Buffalo Creek drainage shed. It is anticipated that this basin will be located within an interim detention basin west of Easton Place.

Easton Place will be a transit oriented, pedestrian scaled, regional high density mixed use center complemented by community serving commercial uses located within Sacramento County. It is uncertain if this borough will be annexed into the City of Folsom or remain in unincorporated Sacramento County. This zone encompasses approximately 183 acres. The Easton Place Land Use Master Plan, shown in **Figure 7**, designates three separate Districts within the plan area, including the Transit District, the Central District, and the Market District. Streets within Easton Place are laid out in a grid pattern connecting to the Hazel Avenue light rail station on the Folsom Line of Regional Transit. Urban parks will be included within Easton Place.

A Land Use Master Plan has also been prepared for Easton Place that includes goals for stormwater management, also approved by Sacramento County in 2009 as a Special Planning Area. It clarifies that the project area is tributary to Buffalo Creek, and is conveyed through the existing Aerojet administration campus via ditches and culverts. The stormwater system in Easton Place must be designed to maintain existing flows and quality. Buffalo Creek downstream is an improved trapezoidal channel with a defined capacity. Little detail is provided, but the Plan states that interim detention will be necessary to keep downstream flows at or below the capacity of existing downstream facilities. Interim facilities will eventually be replaced by permanent facilities as development progresses along Buffalo Creek downstream of Easton Place. Stormwater quality facilities will be provided in conformance with the City and County of Sacramento's *Guidance Manual for On-site Stormwater Quality Control Measures* (January 2003). A stormwater quality facility will be required to treat runoff to the Buffalo Creek drainage shed. It is anticipated that this basin will be located within the interim detention basin west of Easton Place.

Figure 7
Land Use Master Plan for Easton Place

The Sacramento County Zoning Code includes details on hydrology and water quality that apply to the development of both Glenborough and Easton Place. Key items related to stormwater management include;

- Prior to each phase of development and issuance of grading permits, obtain coverage under the General Permit for Discharges of Stormwater Associated with Construction Activity from the Central Valley Regional Board. As part of the permit application, the applicant shall prepare a Stormwater Pollution Prevention Plan (SWPPP) to identify the sources of sediment and other pollutants on site and to ensure the reduction of such pollutants in stormwater discharged from the site. The SWPPP will include an Erosion and Sedimentation Control Plan and provide descriptions of Best Management Practices (BMPs) selected to control erosion, sediment discharge, and other pollutant sources during construction. The SWPPP will be approved by the Regional Board prior to any ground-disturbing activities, and appropriate BMPs will be implemented throughout the duration of construction activities. BMPs identified in the SWPPP and Erosion and Sedimentation Control Plan will be implemented during each phase of construction.

- Prepare a Fluvial Geomorphic and Stormwater Quality Assessment for the Alder Creek corridor within and immediately downstream of the project area, prepared either by Sacramento County or by the land developers. The study will evaluate the Alder Creek floodplain and the project's proposed water quality basins to determine the potential for increased erosion resulting from the project's increased runoff. Parameters for the study will be discussed and determined in consultation with the Sacramento County Water Resources Department. The study will be completed prior to any grading activities in the project area. If the study concludes that substantial erosion is anticipated from project runoff, recommendations to reduce or minimize erosion will be identified and will be implemented as part of each phase of construction or incorporated into project design, as appropriate and in consultation with the County. Erosion control measures may include construction of detention basins, use of standard construction and urban BMPs, or diversion of runoff to another location along Alder Creek to reduce the impact of increased runoff in more sensitive areas. Specific measures will be approved prior to issuance of grading permits (for facilities that may require grading) or prior to issuance of building permits (for facilities or measures incorporated into project design).

- Prior to each phase of development and the issuance of improvement plans approval, prepare a Post Construction Stormwater quality plan (PCSQP), in compliance with the County's Stormwater Quality Standards for Development Projects. The plan shall demonstrate the design of the proposed treatment and Low Impact Development (LID) measures to reduce pollutants in urban runoff, per the latest edition of the Stormwater Quality Design Manual. The PCSQP shall be prepared by a registered civil engineer or a registered professional hydrologist in coordination with and Sacramento County Department of Water Resources (DWR). The plan will be reviewed and approved by the County's DWR prior to any ground-disturbing activities. Treatment and LID measures described in the plan will be incorporated into project design and implemented as part of each phase of development. In addition, long term maintenance of the proposed treatment and applicable LID measures shall be ensured by executing maintenance covenants with the County's DWR before the approval of the plan. A variety of stormwater BMPs are available for managing urban runoff. Stormwater BMPs are most effective when implemented as part of a comprehensive stormwater management program that includes proper selection, design, construction, inspection, and maintenance measures. Stormwater BMPs can be grouped into two broad categories: structural and nonstructural. Structural BMPs are used to treat the stormwater at either the point of generation or the point of discharge to the stormwater sewer system or to receiving waters. Nonstructural BMPs include a range of pollution prevention, education, institutional, management, and development practices designed to limit the conversion of rainfall to runoff and to prevent pollutants from entering runoff at the source of runoff generation. LID is a stormwater management strategy designed to maintain or restore the natural hydrologic functions of an area. This strategy incorporates natural and built features to control stormwater runoff by reducing the runoff rate, filtering pollutants, and facilitating groundwater infiltration. LID measures are designed to improve the quality of surface waters and stabilize flow rates. Typical measures may include preserving open space, minimizing land disturbance, protecting natural systems and processes, using traditional site infrastructure, incorporating natural site elements as design features, and micromanaging stormwater at its source. The project incorporates many of these measures, through preservation of the Alder Creek corridor, and the applicant shall incorporate additional, feasible measures into the project's design.

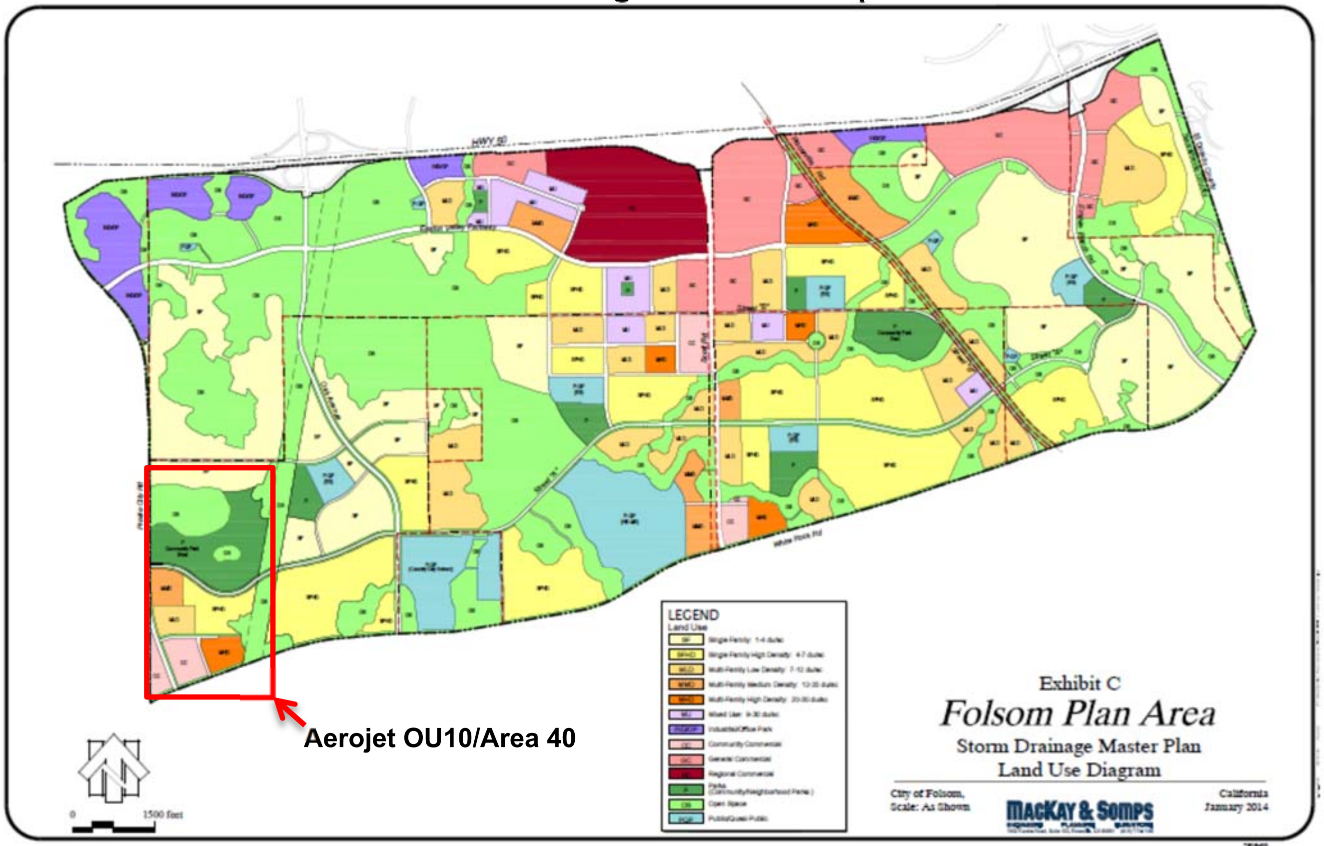
City of Folsom

The Sacramento Local Agency Formation Commission (LAFCo) adopted Resolution 1196 in June 2001 to increase the City of Folsom's Sphere of Influence. Two resolved are of interest to the Aerojet lands and redevelopment, items 8 and 10. Item 8 states that a drainage master plan shall be completed and that there be no net increase in floodwater elevations downstream. Item 10 states that any application to annex Aerojet General Corporation property, or a portion of such property, must include information sufficient to demonstrate the on-site surface contamination has been remediated to standards determined to be acceptable by Federal and state regulatory agencies and that either the groundwater contamination has been remediated or that measures to remediate the contamination are in place and working satisfactorily. In addition, the City of Folsom shall provide evidence of any covenants and restrictions limiting the surface or subsurface use of the property.

Hillsborough will be over 700 acres and includes approximately 70 acres from OU10/Area 40 (in the southwest corner of the borough), as shown in **Figure 8**; it will be annexed to the City of Folsom as part of the Folsom Plan Area. All stormwater infrastructure development must meet the City of Folsom standards and will be owned and operated by the City. The master planned community will consist of mostly single-family homes embedded in a semi-rural setting that is enhanced by the borough's mature oak woodlands. Hillsborough will offer a corporate office campus adjacent to Prairie City Road and a community-serving Town Center that is easily accessible from residential neighborhoods. There will be a 40 acre community park, extensive trails systems, and preserved oak woodlands and open space.

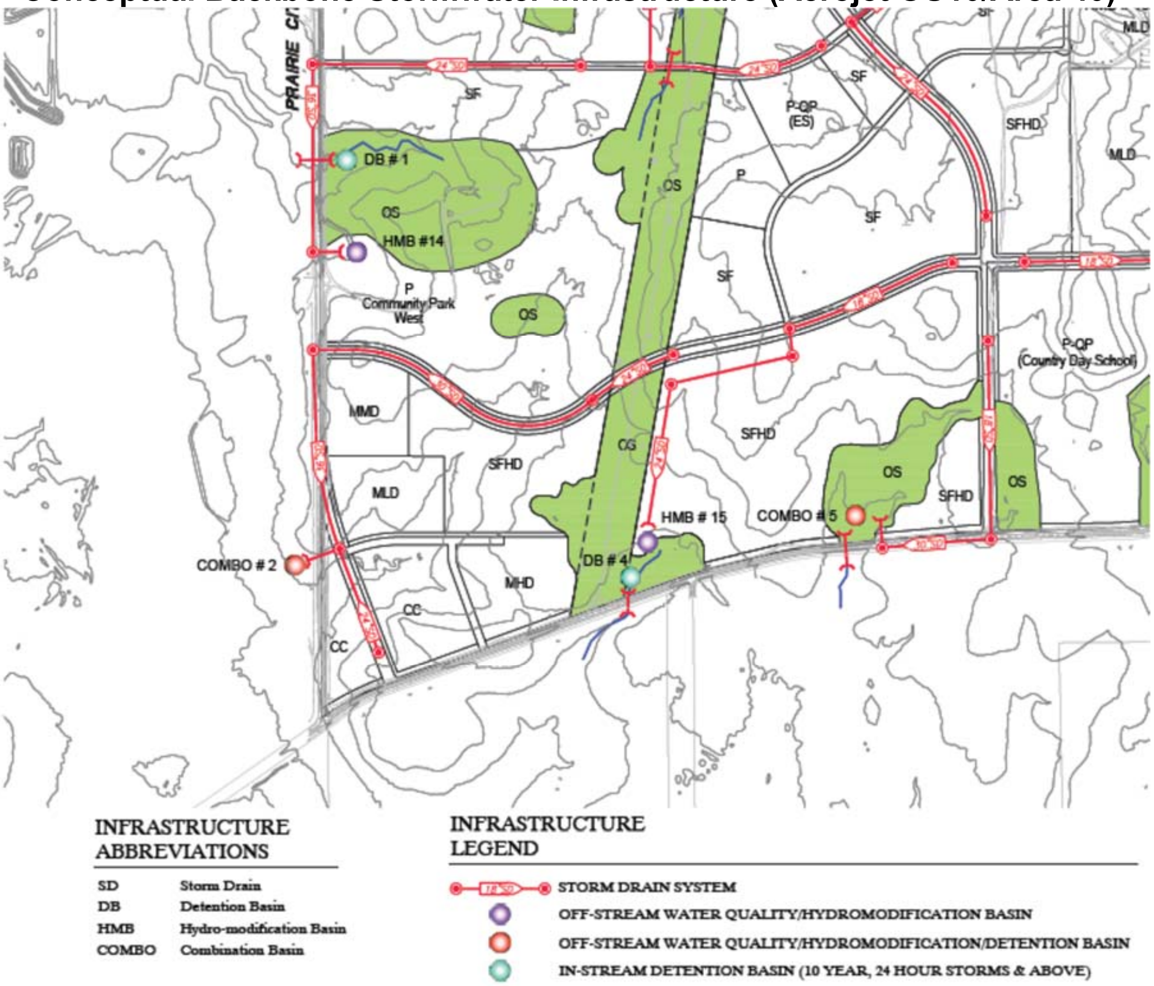
Aerojet expects it to be certified for redevelopment by December 2020. The OU10/Area 40 land will be part of the "Southwest District" of the borough, as shown in **Figure 8**, with some of the land planned for residential and commercial. The northern portion of the Aerojet land, where source contamination is currently being remediated, will be developed as a park and open space.

Figure 8
Hillsborough Land Use Map



A Storm Drainage Master Plan (SDMP) was prepared in 2014, as required by the LAFCo Resolution 1196, which includes specific plans for stormwater infrastructure. The City of Folsom's storm drainage design standards will apply and will require development to ensure that the quality and quantity of stormwater runoff not exceed existing flows and quality. Most of Hillsborough drains north to Alder Creek, while some portions drain south to Coyote Creek. Most of OU10/Area 40 drains north to Alder Creek, but a very small portion of the Aerojet lands drain south to Buffalo Creek. The northern portion of the Aerojet lands is where the source contamination areas are so the lands have only been cleared for development as open space/parks. No stormwater detention basins or hydromodification basins are allowed on those areas either. The SDMP includes design efforts to manage hydromodification to pre-development levels as required by the City, both in terms of quantity and quality. This includes in-stream and off-stream storage for both Alder and Buffalo Creeks in Area 40, as shown in **Figure 9**. In addition, an off-site detention basin is needed on Aerojet property west of Prairie City Road in the Eastern OU. This will be a combination basin (both detention and hydromodification) and will require review and approval by Sacramento County Planning/Drainage.

Figure 9
Folsom Plan Area, Storm Drainage Master Plan,
Conceptual Backbone Stormwater Infrastructure (Aerojet OU10/Area 40)



A Specific Plan was prepared in 2011 and was most recently updated in 2018, there is no mention of the underlying contamination issues on Aerojet lands. The Draft EIR/EIS completed for the Folsom Plan Area in 2014 did include a section on Hazards and Hazardous Materials that discussed the history and contamination of the Aerojet land. The history and risks associated with OU10/Area 40 are described, including references to Aerojet Superfund documents. It is explained that the site is undergoing remediation and surface contamination is expected to be eliminated. Source contamination areas in OU10/Area 40, as well as the additional land in Eastern OU, will be prohibited from development or use for stormwater detention. There may be potential for some VOC off-gassing near the Detention Basin 1 (DB#1), which will drain toward Alder Creek. As per Aerojet, this DB#1 will be required to install a liner to prevent migration of VOCs into stormwater runoff.

City of Rancho Cordova

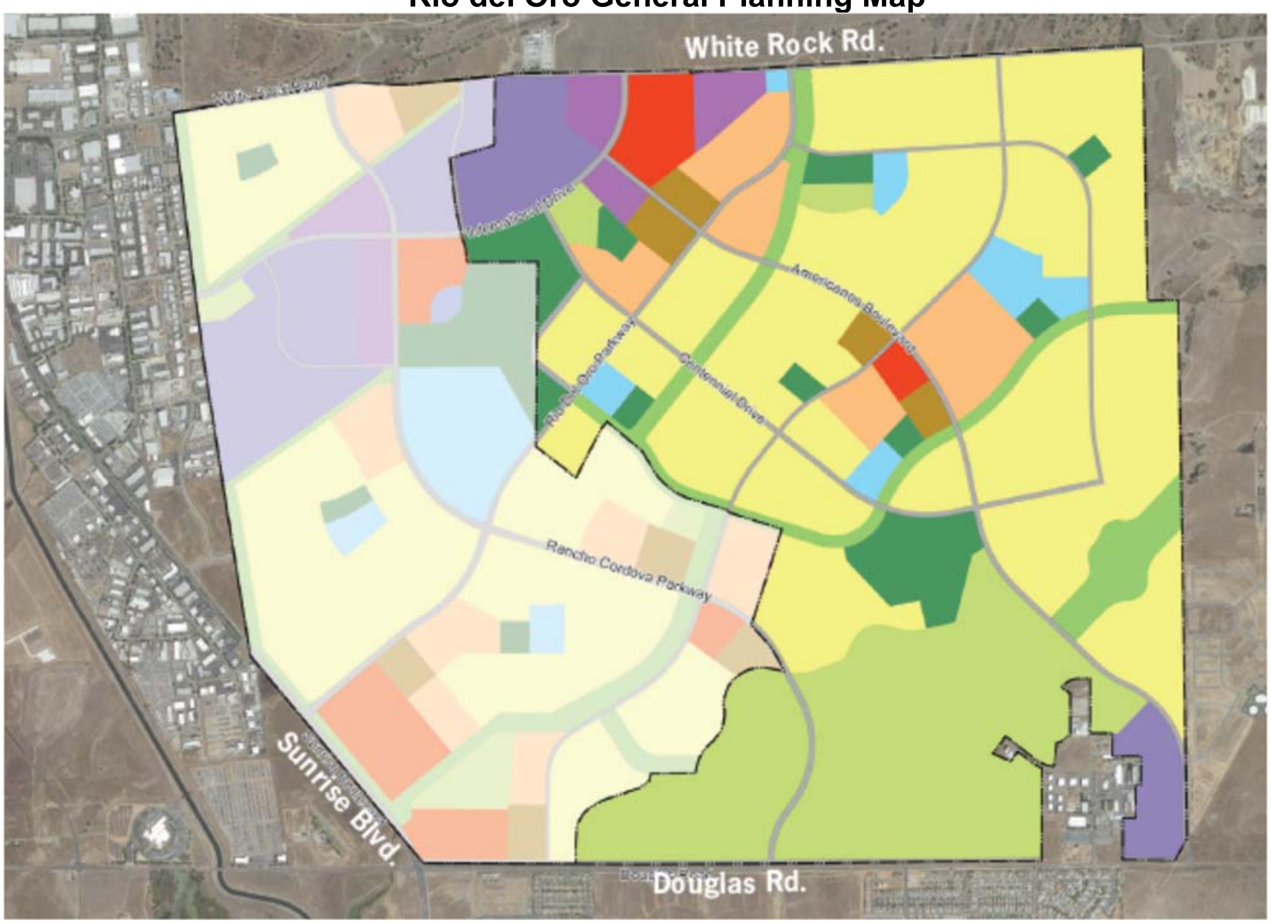
Westborough is located in the City of Rancho Cordova and will be 1,665 acres of mixed-use commercial, including a Town Square with transit and urban-living options. Its general planning is shown in **Figure 10**. This will include high, medium, and low density housing types and three proposed elementary schools. There will be 380 acres of parks and open space with miles of walking/bicycling trails. This will also include a new interchange access to Hwy 50.

Figure 10
Westborough General Planning Map

No specific plan has been adopted at this time, but the City of Rancho Cordova posted a Notice of Preparation for an EIR in 2007, which includes a Specific Plan, so work is ongoing. The NOP notes that development of the borough will significantly increase the amount of runoff leaving the site, via Buffalo Creek to the Lower American River, with the increase in the amount of impervious surface area. Drainage from the area would pass through a flume and culvert crossings that restrict the flow capacity of Buffalo Creek downstream of the project site. Onsite water detention is proposed to mitigate the increased runoff due to the increase in the amount of impervious surface area, thereby keeping future flows within the capacity of the downstream drainage system. Runoff from the upstream side of the Folsom South Canal would be detained at two locations. The first location would be a linear basin approximately 200 feet wide, located adjacent to the Folsom South Canal along the west side of the project site. The second detention location would be east of the project site and consist of expanding existing detention facilities. The linear detention basin would have a pumped discharge, since ground elevations along the west side of the site are nearly the same as the invert of the flume. The pump station would be located immediately west of the inlet to the flume. The detention basins east of the project site would detain flows from the Buffalo Creek watershed east of the project area. Runoff would be conveyed to the linear detention basin through drainage inlets and pipes. Other proposed storm-drainage improvements include deepening and widening Buffalo Creek between the expanded detention basins and flume. An open channel that runs north–south along the east side of the project would also be constructed to convey runoff from the east side of the project to Buffalo Creek.

Rio del Oro is located in the City of Rancho Cordova Sphere of Influence and will be 2,312 acres, with over 600 acres dedicated to parks and a wetland preserve. Its general planning is shown in **Figure 11**. It will include multi-family and single-family residential units as well as a local Town Center and three retail centers. There will be two business parks and light industrial space.

Figure 11
Rio del Oro General Planning Map



The City of Rancho Cordova prepared a Specific Plan for Rio del Oro in 2016, including stormwater infrastructure. This includes Aerojet lands as well as 1,600 acres west. The Master Drainage Study for Rio del Oro indicates that all lands drain south to Morrison Creek, and future development will continue this drainage pattern. These are not tributary to the Lower American River so this borough is not of concern to the Source Water Protection Program.

Regional Board Regulatory Status

Aerojet has been issued two NPDES permits by the Regional Board for discharge to surface water; one for discharge of treated groundwater from groundwater treatment and extraction (GET) facilities and one for stormwater discharges. Generally these permits have a term of five years and are renewed then; however, modifications can be made at any time during the permit based on Regional Board decision or at the request of the Discharger (Aerojet Rocketdyne).

No new GET facilities are planned for Western Groundwater or Perimeter Groundwater OUs at this time, but more flow will be supplied to existing facilities to increase to design limits and incorporate more waters associated with modifications to the proposed remedies. Existing GET facilities may require upgrades or modifications to ensure that they continue to meet effluent limits. Source Area OUs may result in additional flows directed to the GET facilities or creation of new GET facilities. Aerojet does not plan to fully implement the remedy for the Source Area OUs prior to issuance of a ROD/UAO from USEPA.

GET System NPDES Permit

There were no modifications to the NPDES GET permit during this update period. The current NPDES GET permit, Order No. R5-2017-0095, was issued on August 11, 2017 and replaced Order No. R5-2014-0126. The Order continues to permit treatment and discharge of over 50 million gallons per day (mgd) of groundwater to surface water. The permit includes nearly 48 mgd of treated groundwater discharging to the American River or its tributaries. Key terms of the permit include:

- Revision to the effluent limit for perchlorate at GET E/F from 4 and 6 µg/L (average monthly and maximum daily) to 6 and 10 µg/L, based on conversion from Technology Based Effluent Limit to Water Quality Based Effluent Limit,
- Removal of Well 4665 as a direct discharge point (now flows go to GET J),
- Increased discharge flow at White Rock GET (1.3 to 2.04 mgd),
- Identification of best available technologies and effluent goals for all the major contaminants (which Aerojet must operate facilities to try and meet), and
- Addition of perfluorinated compounds to the GET E/F and GET AB influent and effluent quarterly monitoring requirements.

The current permit includes effluent discharge from 10 GET facilities to the American River; American River Groundwater Extraction and Treatment (ARGET), GET E/F, GET J, GET K-A, GET L-A, GET L-B, AC-6 Well, AC-23 Well, GET AB, and White Rock GET.

The three Golden State Water Company (GSWC) wells are still not operated as originally intended as part of the remedy. All three wells have had complications from fine solids in the source water which interfere with the operation of the ion exchange systems to remove perchlorate. Currently, Wells 6, 18, and 23 are operated for GSWC water supply distribution needs and Aerojet plume management. Treatment with ion exchange resin is installed at all wellheads and required when source water levels exceed 6 µg/L. These also pump and discharge to the GSWC distribution system, and discharge to surface water only occurs during startup and shutdown. The City submitted comments that resulted in language being added to the permit in 2011 that require Aerojet to submit a plan for compliance in the event that perchlorate levels in these wells exceed 8 µg/L perchlorate for two consecutive months. Well 6 is no longer used by GSWC and the extract is now sent to GET K for treatment and Well 23 is being removed from the NPDES permit as part of the 2020 revisions.

Under the NPDES permit for discharge of treated groundwater, Aerojet is required to monitor the influent and effluent for each GET facility, for a total of 13 influent sample points and 14 effluent sample points (including the low-threat discharges). The influent sites are required to be monitored monthly for the applicable constituents of concern in the contaminated groundwater, which varies between facilities. Semi-VOCs and perfluorinated compounds (as applicable) are required to be monitored quarterly at several of the GET facilities. The effluent sites are required to be monitored monthly for a larger suite of constituents to ensure compliance with all effluent limitations. **Table 3** provides a summary of the Operating Units and the GET facilities. **Table 4** provides a list of the general effluent limitations of interest for drinking water purposes.

In addition, the Regional Board has identified 13 receiving water sites on the American River, or Alder Creek, that are also monitored monthly. The two sites on Alder Creek are only monitored if there is a discharge from Outfall 009, which would only happen through the low-threat discharges, and none occurred during this study period. These sites are monitored for VOCs, NDMA, perchlorate, temperature, dissolved oxygen, turbidity, electrical conductivity, pH, and total dissolved solids.

The treated groundwater discharges generally meet the NPDES permit effluent limits, which the Regional Board typically sets at or below the drinking water MCLs or Notification Levels set by the Division of Drinking Water (DDW). A data query of the California Integrated Water Quality System (CIWQS) was conducted for the Aerojet GET Facilities NPDES permit from July 2018 through June 2020. This included all the GET facilities discharging to the American River. A review of the database indicates only one discharge effluent violation during the update period, July 2018 through July 2020, entered the American River. The City received a notification from Aerojet for this event. The violation is described in **Table 5**.

Table 3
Summary of Operating Units and GET Facilities at the Aerojet Rocketdyne Superfund Site

Operating Unit	Name of Facility	Target Contaminants	Treatment Processes[1]	Permit Flow	Discharge Location
Western Groundwater – OU3	GET E/F[2]	Perchlorate, NDMA, VOCs	Bioreactor/sand filtration (biological reduction), H_2O_2/UV, Ion Exchange, Air Stripping	11.52 mgd	Buffalo Creek/ American River
	GET H-A	Perchlorate, VOCs	Bag Filters, Ion Exchange, GAC	3.9 mgd	Morrison Creek or Boyd Station Channel/ American River
	GET J[3]	Perchlorate, NDMA, VOCs	Bag Filters, Ion Exchange, O_3/UV, GAC	6.75 mgd	Buffalo Creek/ American River
	GET K-A	NDMA, VOCs, Perchlorate	Basket Strainers, H_2O_2/UV, Ion Exchange	5.11 mgd	American River
	GET LB (Bajamont)	NDMA, VOCs	Bag Filter, UV	1.44 mgd	American River
	GET LA (Ancil Hoffman)	NDMA	Bag Filter, H_2O_2/UV	2.88 mgd	American River/ Irrigation
Perimeter Groundwater – OU5	Sailor Bar Park	VOCs	GAC	0.58 mgd	Sailor Bar Park Pond
	GET AB	Perchlorate, NDMA, VOCs	Bag Filters, Ion Exchange, H_2O_2/UV, Air Stripping	5.76 mgd	Buffalo Creek/ American River or Aerojet Industrial Supply[4]
	White Rock	Perchlorate, VOCs	Bag Filters, Ion Exchange, Air Stripping, UV/H2O2 (added 2020)	2.88 mgd	Buffalo Creek/ American River or Morrison Creek
	ARGET[5]	VOCs, 1,4-Dioxane, Perchlorate	HiPOx (H2O2/Ozone), Ion Exchange, Air Stripping	5.04 mgd	Buffalo Creek/ American River
Golden State Water Company -	AC-6	Perchlorate	Ion Exchange	1.08 mgd	American River
	AC-18	Perchlorate	Ion Exchange	2.59 mgd	Morrison Creek
	AC-23 (removed 2020)	Perchlorate	Ion Exchange	3.17 mgd	Boyd Station Channel/ American River
Industrial Cooling Tower -	Building 20-019	None	None	0.0008 mgd	Buffalo Creek
All Areas -	Low Threat Discharges	Varies	Treatment if Practical	No Limit	Any

[1] All media filtration beds have pre-filters.
[2] Now includes flows from GET E/F Sprayfield and Propellant Burn Area (PBA) and Inactive Rancho Cordova Test Site (IRCTS), treatment expanded for perchlorate removal by ion exchange.
[3] Now includes flows from Well 4665.
[4] Up to 1,200 gpm can be supplied to the Aerojet Industrial System (expected to be decreased to 500 gpm for fire system needs now that industrial operations are ceased).
[5] Now includes flows from GET D, treatment expanded for perchlorate removal by ion exchange.

Table 4
General GET Effluent Discharge Limitations

Constituent	Units	Average Monthly	Maximum Daily
VOCs [1]	µg/L	0.5	0.7 [2]
1,2-Dichloroethane (1,2-DCA)[3]	µg/L	0.38	0.5
Chloroform [4]	µg/L	3.0	5.0
Tetrachloroethene (PCE) [5]	µg/L	5.0	5.0
Trichloroethene (TCE) [6]	µg/L	1.5, 3.0	1.5, 3.0
cis-1,2-dichloroethylene [7]	µg/L	1.5	1.5
1,4-Dioxane [8]	µg/L	3	6, 10
NDMA	µg/L	0.002/0.003/0.007 [9]	0.010 [10]
Perchlorate [11]	µg/L	4, 6	6, 10, 12 [12]
Acetaldehyde [7]	µg/L	5	5
Formaldehyde [7]	µg/L	50	50
Acrylamide [7]	µg/L	0.05	0.05
Chlorine Residual [13]	mg/L	0.01	0.02
pH [14]	Units	6.5	8.5

[1] Selected VOCs are specific to each GET facility, based on presence in influent waters unless noted below. Low threat discharges shall comply with all constituents on EPA Method 8260B short list. Each shall meet limit.
[2] Low Threat Discharges only have maximum daily limit of 5 µg/L.
[3] Applies only to GETs E/F and AB.
[4] Applies only to GETs J, and AC-6.
[5] Applies only to AC-6.
[6] GET E/F has a TCE maximum daily limit of 1.5 µg/L, with an upper limit of 3 µg/L (for periods of operational changes to correct exceedences, as approved by the Executive Officer).
[7] Applies only to GET E/F.
[8] Applies only to ARGET, GET E/F, and Low Threat Discharges (this only has a maximum daily limit of 10 µg/L).
[9] NDMA limit is 0.003 µg/L for GETs AB and White Rock, 0.007 µg/L for GETs J, K-A, L-A, and L-B, and does not apply to Sailor Bar Park, GET HA, AC-6, AC-18, and AC-23. All others 0.002 µg/L.
[10] Low Threat Discharges only have a maximum daily value at 0.020 µg/L.
[11] GET E/F has a perchlorate average monthly limit of 6 µg/L and a maximum daily limit of 10 µg/L.
[12] Low Threat Discharges only have a maximum daily value at 12 µg/L.
[13] Applies only to GET AB.
[14] Listed values represent instantaneous minimum and maximum.

Table 5
Summary of Selected Exceedences for the GET Systems (July 2018 – July 2020)

Date	Type	Location	Description	Corrective Action
1/23/20 [1]	CAT2	M-016 (GET AB Effluent)	N-Nitrosodimethylamine Monthly Average limit is 3 ng/L and reported value was 8.3 ng/L at M-016.	After completing a UV treatment pilot study at GET AB, it was found that one of the valves was not properly seated, resulting in partial bypass of UV treatment and NDMA being detected in the effluent. The valve in question was subsequently exercised and properly seated.

Source: CIWQS Facility At-A-Glance Report, www.ciwqs.waterboards.ca.gov
[1] City received notification about exceedence from Aerojet

During the update period, the Regional Board issued one Administrative Civil Liability to Aerojet to address effluent violations from the GET facilities between December 1, 2017 and December 31, 2019 (discussed previously). This was ACL R5-2020-0533. Aerojet was assessed a total of $9,000 for violations at two facilities.

In August 2020 the Regional Board drafted an update to the NPDES Permit to address increasing flows at GET HA (discharge to Morrison Creek so not of concern) and GET KA (4.03 to 5.11 mgd), eliminating well AC-23, adding a cooling tower discharge (space cooling of administrative building, only effluent limit for copper) of 0.0008 mgd (transferred from the rescinded Stormwater NPDES Permit), and several changes at White Rock GET. White Rock GET changes include an increase in flow (2.04 to 2.88 mgd), addition of UV treatment for NDMA destruction (for future use), and ability to discharge to Morrison Creek instead of Buffalo Creek (for future consideration as Teichert may use in 2022).

Review of eSMR Discharge Monitoring Report Data

Other detections of interest from the CIWQS database include;

- ARGET effluent monitoring shows regular detection of dioxane, NDMA, and perchlorate. These are all below permit effluent limits, but perchlorate has come close to the daily maximum. There is no treatment in place for NDMA.
- GET E/F effluent monitoring shows periodic detection of acetaldehyde, formaldehyde, NDMA, dioxane, and perchlorate. These are all below permit effluent limits, but NDMA has had individual results above the monthly average. There is not treatment in place for 1,4-dioxane.
- GET J effluent monitoring shows regular detection of chloroform and NDMA. These are all below permit effluent limits.
- GET KA effluent monitoring shows regular detection of chloroform, PCE, NDMA, and perchlorate. These are all below permit effluent limits, but perchlorate has had individual results above the monthly average.
- GET LA effluent monitoring shows periodic detection of NDMA. These are all below permit effluent limits.
- GET LB effluent monitoring shows periodic detection of NDMA. These are all below permit effluent limits.
- Low-threat discharge effluent monitoring shows periodic detection of chloroform, perchlorate, TCE, and PCE. These are all below permit effluent limits.
- AC-23 effluent monitoring shows periodic detection of perchlorate. These are all below permit effluent limits.
- GET AB effluent monitoring shows periodic detection of NDMA. There have been results greater than the maximum daily and average monthly permit effluent limits, but on average they are below both limits.
- White Rock GET effluent monitoring shows periodic detection of NDMA. These are all below permit effluent limits. There is no treatment in place for NDMA removal, however it will be installed under the 2020 NPDES Permit modification for future use if source levels continue to increase. In addition, there was one detection of cis-1,2-dichloroethene and TCE above effluent limits.

- NDMA was periodically detected at several American River monitoring sites, at low levels generally less than 3 ng/L. This is less than the DDW Notification Level of 10 ng/L and the PHG of 3 ng/L. In November 2018 Site R-007 was detectable. In January 2019 Sites R-006 and R-007 were detectable. In February 2019 Site R-003 was detectable. In February 2020 Sites R-001, R-002, R-006, R-010 were detectable. In March 2020 Sites R-002, R-005, R-006, R-007 were detectable. In May 2020 Sites R-006 and R-007 were detectable.
- Perchlorate was detected once in the American River, at Site R-005, downstream of Buffalo Creek and GET LA, at 4.3 µg/L.

Perfluorinated Compounds

In June 2016, Regional Board staff conducted testing for perfluorinated compounds at Aerojet Rocketdyne's GET AB and GET E/F facilities. GET AB was found to have PFOS and PFOA concentrations at 3 ng/L, in both the influent and effluent. GET E/F had PFOS detects of 74 ng/L in the influent and 96 ng/L in the effluent. GET E/F had PFOA detects of 33 ng/L in the influent and 24 ng/L in the effluent. Currently, both constituents have a USEPA Lifetime Health Advisory of 70 ng/L and DDW Notification Levels (PFOA – 5.1 ng/L and PFOS – 6.5 ng/L). The Regional Board directed Aerojet Rocketdyne to conduct quarterly monitoring of perfluorinated compounds in January 2018 to confirm the initial data results at the GET facilities. The data results for PFOA and PFOS from January 2018 through April 2020 at GET E/F and GET AB are presented in **Table 6**.

The data results show that PFOA levels at the influent and effluent of GET E/F are generally at or below the detection limit for reporting (DLR) of 2 ng/L. GET AB has slightly higher influent levels of PFOA, with an average of 7.8 ng/L, but the effluent levels are generally below the DLR with the exception of the April 2019 result at 2.2 ng/L. This is below the DDW Notification Level of 5.1 ng/L.

The data results show that PFOS levels at the influent of GET E/F are detectable, with an average influent concentration of 4.7 ng/L, below the DDW Notification Level of 6.5 ng/L. GET E/F effluent levels are generally at or below the DLR of 2 ng/L. It also shows that the influent levels at GET AB are very high averaging 162 ng/L, well above the DDW Notification Level of 6.5 ng/L. However, the effluent levels are generally non-detectable with the exception of the April 2019 result at 2.8 ng/L – still below the DDW Notification Level. It is likely that the ion exchange units at both GET facilities are reducing the concentrations of PFOA and PFOS.

The only PFC that is detectable in the effluents of GET E/F and GET AB is perfluorohexanoic acid (PFHxA). This is generally detectable in both effluents, usually below 10 ng/L. The influent concentrations are generally not very high, but the ion exchange and GAC treatment processes don't appear to have good efficiency (<50 percent) for removal of this PFC. There is currently no advisory level for this PFC, but it may be included in future regulations of PFCs.

Aerojet began testing extraction wells in 2017 to see where the perfluorinated compounds are originating. The chemical is found in aqueous firefighting foam, which Aerojet used onsite as part of its rocket testing operations. Monitoring results showed that GET A wellfield, located on the northeast portion of the site along Highway 50, is the greatest source of perfluorinated compounds.

Table 6
Aerojet PFOA and PFOS Monitoring Summary

Date	PFOA (ng/L)				PFOS (ng/L)			
	GET E/F		GET AB		GET E/F		GET AB	
	Influent	Effluent	Influent[1]	Effluent	Influent	Effluent	Influent[1]	Effluent
January 2018	1.4*	<0.86	7.1	<0.86	4.7	1.5*	130	<0.55
April 2018	<0.85	<0.9	6.7	<0.85	1.4*	<0.57	140	<0.54
July 2018	1.7	<0.76	9.8	<0.76	4.6	<0.49	190	<0.48
October 2018	1.5*	<0.82	7	<0.81	4	<0.52	140	<0.51
January 2019	1.7	<0.75	7.4	<0.72	5.6	<0.47	160	<0.46
April 2019[2]	1.8*	<0.81	13	2.2	5.4	<0.51	300	2.8
July 2019	1.3*	<0.72	7.9	<0.72	4	<0.45	180	<0.46
October 2019	1.6*	<0.82	6.7	<0.81	4.6	<0.52	130	<0.51
January 2020	1.5*	<0.77	5.8	<0.78	4.1	<0.49	120	<0.5
April 2020	1.8	<0.71	6.5	<0.72	5.1	1.7	130	<0.46

* J-flagged estimates below the DLR (2 ng/L)
[1] GET AB Influent includes several wells, data point represents highest value reported
[2] April 2019 – GET AB Influent and Effluent detected much higher than normal number and concentration of PFCs

At the request of the Regional Board, Aerojet prepared a summary in September 2020 of all PFC sampling results to date to better evaluate the sitewide status of PFC plumes, including their sources, movement, ability to treat at the GET facilities before discharge to surface water, and to make recommendations on a monitoring plan. This summary shows that Aerojet has conducted a significant amount of data collection between 2016 and 2020 for the GET facilities, extraction wells, and monitoring wells. This is beyond what the Regional Board required as part of the NPDES permit. Generally speaking, PFOS is the most frequently detected PFC, as well as detected at the highest concentrations.

All the GET facilities were monitored for their influent (including sub-influent streams) and effluents for a wide variety of PFCs. The findings include;

- GET AB detects PFOA/PFOS above the NL in the influents, but is below the reporting level in the effluent. PFHxA is detectable in the effluent.
- WRND detects PFOA above the NL in the influent, but below the NL in the effluent.
- ARGET detects PFOS in the GET D sub-influent above the NL and PFOA in the GET D sub-influent at the NL. Both are below the reporting levels in the effluent.
- GET E/F detects PFOA/PFOS below the NL in the influents and below the reporting levels in the effluent.
- Sailor Bar Park Well detects PFOA/PFOS below the NL in the influent and below the reporting levels in the effluent.
- GET J detects PFOA/PFOS below the NL in the influent and below the reporting levels in the effluent. PFHxA is detectable in the effluent.
- GET LA detects PFOS in the effluent, but not in the influent so it is believed to be present in Teflon tape used in the treatment facility.
- None of the other GETs have detectable PFCs in the influent or effluent.

After determining which GET facilities had PFCs in their influents, 54 extraction wells were monitored for the same suite of PFCs. These are the feeder wells, or the sources of PFCs, to the GET facilities. There were four areas that appear to have the highest presence and concentration of PFCs; GET E/F north wellfield, GET D sub-influent wellfield, Fish Hatchery wellfield, and GET J wellfield. Monitoring wells in the areas downgradient of these areas were then identified to be sampled for PFCs as well to determine if the extraction wells were adequately containing PFCs, or if off-site flux was occurring. An additional 86 monitoring wells were monitored for the same suite of PFCs. These wells cover four depths (Layers B through E) and a spatial range. It was found that the extraction wells are mostly containing the PFCs on-site, except for two areas; Layer B north/northwest of the property and Layers D/E north of Highway 50 near Alder Creek.

Aerojet presented recommendations for continued monitoring of the PFCs at the GETs and monitoring wells. GET AB and WRND will be monitored monthly, both influent and effluent, for at least one year or a complete ion exchange resin cycle. This will allow them to determine if the perchlorate cycle adequately covers PFCs as well. ARGET, Sailor Bar Park, GET EF, and GET J will be monitored quarterly for influent and effluent. Aerojet will also investigate the removal of PFHxA through ion exchange at GET AB to see why it is breaking through earlier. Monitoring wells will be monitored quarterly to ensure containment, including; two in Layer B, 12 in Layer C, seven in Layer D, and four in Layer E. There has been no monitoring of Alder Creek and none is planned, even though the highest concentrations are in the groundwater along Alder Creek and groundwater seeps are known to occur in the area. The data will be reported as part of the Annual Reports for OU-3 and OU-5.

Other Permit Considerations

The Aerojet NPDES permit for discharge of treated groundwater includes several provisions of interest, including some that were advocated by the City during permit reviews:

- Prepare a safeguard to an electric power failure to assure that all requirements of the permit can be met in the event of the loss of power. This can include alternate sources of power, standby generators, retention capacity, operating procedures, or other means.

  Full backup power, such as standby generators, is not implemented by Aerojet. Most facilities shut down during power failures and startup when it returns without incident. GET E/F has a biological process that can be disturbed during power failures so Aerojet has a small power supply to allow recirculation to continue in the biological filters to minimize die-off of the bacteria and has added numerous safety checks to their operating procedures to test the process prior to bringing back online. In addition, Aerojet keeps two weeks of spare parts in stock to assist with repairs.

- Requirement for an operations and maintenance manual within 60 days for any new GET. These manuals must now include processes to meet the new effluent goals in the NPDES permit.

- Inclusion of a review of all VOCs detected in the influent and effluent of all the GET facilities, regardless of an effluent discharge limit, to see if the constituent should be evaluated and included in the effluent limitations.

- Notification to downstream water utilities, including the City of Sacramento, Carmichael Water District, Sacramento County Water Agency, and East Bay Municipal Utility District (and Golden State Water Company if discharge to Alder Creek) within 24-hours after Aerojet has received information that its discharge exceeds effluent limitations, or if operational monitoring of the treatment facilities indicates that there is a potential for effluent limitations to be exceeded.

Discussion of Notifications and Follow Up Actions

The City received two notifications from Aerojet, as follows.

Notification 1: April 24, 2019

The City received notification from Aerojet on April 24, 2019 for two discharge events; one at the White Rock GET facility on April 2, 2019 and one at GET H facility on April 2, 2019. GET H was discharging to Morrison Creek, which is not tributary to the American River, so it is not discussed further. The April 2 results for White Rock GET effluent showed TCE was detected at 8.7 µg/L, above their permit effluent limits (both maximum daily [0.7 µg/L] and average monthly [0.5 µg/L]), and cis-1,2-DCE was detected at 3 µg/L (same effluent limits). TCE has a primary MCL of 5 µg/L, and a PHG of 1.7 µg/L, so this result was above those thresholds. Cis-1,2-DCE has a primary MCL of 6 µg/L, and a PHG of 13 µg/L, so this result was below those thresholds. Aerojet believed that the cause of the exceedence was related to a failure in the air stripper.

Notification 2: January 29, 2020

The City received notification from Aerojet on January 29, 2020 for discharge events at the GET AB facility on January 2 and 21, 2020. The January 2 and 21 results were for the GET AB regulatory sampling point, which is the plant effluent. NDMA was detected twice; at 5.4 ng/L (January 2) and 7.5 ng/L (January 21). These are below their permit effluent limit for maximum daily (10 ng/L), but above the average monthly limit (3 ng/L). NDMA has a Notification Level of 10 ng/L, and a PHG of 3 ng/L, so these results were below the Notification Level but above the PHG.

Communication with Aerojet

The City communicates directly with Aerojet staff for follow-up information when there is a notification of an effluent limit violation or operational upset. In addition, the City and Starr Consulting participate in approximately biennial site visits with Aerojet staff, the most recent one in August 2018 and another planned for Fall 2020 pending COVID restrictions. In the interim, a conference call was conducted between the City, Starr Consulting, and Chris Fenessey and Peter Kvam with Aerojet in September 2020. The City has requested that Aerojet staff provide the earliest possible notification of any treatment upset or issue that may impact source water quality. Aerojet staff has provided information on discharge events, response measures, and on-going site investigations.

ARGET's 1,4-dioxane treatment process has been deactivated as influent concentrations are now below the effluent limit. In addition, although NDMA is detectable in the effluent Aerojet does not implement the HiPox treatment system and does not intend to unless source concentrations increase significantly.

Aerojet continued improvements at GET E/F by installing a fifth air stripper, and putting the air strippers in a two-stage operation. The facility operations continue to be contracted to Envirogen, the fluidized bed reactor (FBR) manufacturer. Water from the Inactive Rancho Cordova Test Site (IRCTS) is now piped to GET E/F, approximately 1,200 gpm to capture a perchlorate plume, for treatment and discharge to the American River. A new process control manual for GET E/F's biological filters was put in place in late 2016/early 2017 to improve operation and reliability. Although 1,4-dioxane is detectable in the effluent of GET E/F the source wells do not indicate a reasonable potential for higher levels at this time and no treatment is planned.

GET AB includes the source waters for the historic GETs A and B. The source waters are contaminated with NDMA, VOCs, and perchlorate so they get various degrees of ion exchange, UV, and air stripping treatment. The effluent has several options: feed the Aerojet industrial water supply (which is expected to be minimized since industrial operations have ceased), overflow to Buffalo Creek at the GET site, land discharge to Rebel Hill Ditch, or overfeed to the Aerojet industrial supply system for downstream discharge (five miles) to Buffalo Creek at the ARGET effluent location. The last option was considered a covered discharge as per the site's Stormwater System NPDES permit, however this permit no longer exists so it is not anticipated to occur any longer. The GET AB NDMA treatment process, UV, has a limit on the concentration of NDMA that can be treated and it is currently limiting the capacity of the facility. Aerojet conducted a two-year study to investigate the potential to improve the UV treatment process to allow for full capacity of GET AB. This may result in replacement with a new UV system. For now, Aerojet carefully manages the source wells to ensure an appropriate influence concentration of NDMA. The plume appears to be moving south so Aerojet is actively modeling its movement to predict timing and concentration of the NDMA plume.

GET LA, located on the north side of the American River, has influent concentrations low enough to cease operations. Currently, the extraction well is not operating and no discharge is occurring from GET LA. However, Carmichael Water District and Sacramento County may want to use the water in the future for irrigation purposes at Ancil Hoffman golf course so it will continue to be included in the NPDES permit for the time being.

White Rock GET includes the source waters from the White Rock North Dump area near Teichert. After treatment with ion exchange and air stripping, the flow is either sent to Teichert for their industrial supply needs or the GET AB effluent for discharge. Water can go in both directions between the facilities, depending on demands. This will be expanded to include NDMA treatment under the amended NPDES Permit in 2020, as future treatment in the event of source water concentrations increasing. In addition, a new discharge point to Morrison Creek has been added under the amended NPDES Permit.

Aerojet installed a comprehensive *Supervisory Control and Data Acquisition (*SCADA) system for the GET facilities in 2014. This includes operational alarms and set points. The operations staff visit all GET facilities daily during the work week. During off-hours, alarms from the GET facilities are sent to the Aerojet security office and then forwarded to the operations group as required. Aerojet is moving toward 24-hour operations of the GET facilities. When power is out to a GET, the system is controlled to turn off but maintain industrial water supply to the FBRs to prevent microbiological die-off. When the facility is brought back on-line there is a startup mode which requires recirculation to ensure operations are working correctly.

Stormwater NPDES Permit

NPDES permit Order No. R5-2013-0156, adopted on December 6, 2013 covers stormwater discharges from the site, a small amount of operational and process water, and industrial supply excess flows. This permit expired in 2018 but was administratively extended to allow Aerojet to close its industrial operations. In December 2019 Aerojet ceased industrial operations at the Rancho Cordova site thereby eliminating the need for an individual NPDES permit for stormwater discharges. In May 2020 the Regional Board confirmed that the industrial discharge points had been terminated and determined to rescind the NPDES permit on June 4, 2020 (R5-2020-0036). During the past two years the Stormwater NPDES permit was active so a discussion is provided below as historical context.

The majority of these flows go directly into infiltration zones not directly connected to surface waters. These flows discharge to Alder and Buffalo creeks as well as local drainages to the

American River. Flows from GET AB effluent discharge to Buffalo Creek upstream of West Lake, while effluent discharge from GET E/F, ARGET, and GET J all enter Buffalo Creek below West Lake and have higher likelihood of discharge to the Lower American River throughout the year. Four of the six discharge points have effluent limitations associated with them. Stormwater was historically collected on-site and stored in one of five impoundments on the Aerojet site. Water was kept in the impoundments for evaporation and percolation, such as West Lake, but it could be discharged to one of the receiving waters on the property if inflows exceed the storage capacity. Between 2008 and 2011 there was only one discharge event from the stormwater impoundments to Buffalo Creek. During the last update period (September 2016 through August 2018) there were four discharges (January 2017, January 2017, February 2017, and March 2017). Since August 2018 there has only been one discharge event (February 2019). These retention basins collect and hold the runoff and act to reduce suspended materials and sediments. Although these discharges are infrequent, they can last for several days and have discharged up to 14 million gallons of stormwater. Since October 2008 there have been no violations of the permit.

Order No. R5-2013-0156 revised the projected flows in Buffalo Creek (due to the GET discharges) to be more consistent and likely not held in the impoundments as significantly as previous. This was due to the increased flows in Buffalo Creek from the GET AB discharge, upstream of West Lake. There were two new discharge locations in the revised permit, 004A and 004B, for excess industrial supply water (which included treated groundwater from GET AB effluent). They both discharge directly into Buffalo Creek, but are both located upstream of the two receiving water sites (RSW001 and RSW002) and therefore there was no monitoring site upstream of them. Both of these discharge points are characterized as excess water not needed by the Discharger's industrial processes. The permit did not limit the volume of the discharge flow at these sites, but implied a nominal flow. Limited flows at these discharge points was contrary to the possible GET NPDES permit scheme (designed to reduce groundwater recharge of treated effluent) of GET AB waters being purposefully sent through the industrial supply system and discharged at these two downstream locations to avoid infiltration in the upper reaches of Buffalo Creek. Neither one of these discharge points (004A and 004B) had effluent limits associated with it in the stormwater NPDES permit; they were assumed to be in compliance under the GET AB effluent.

Under the stormwater NPDES permit, Aerojet was required to monitor four discharge locations around the property for a variety of constituents, including perchlorate, during discharge events. Aerojet was also required to monitor five receiving water locations on Buffalo and Alder creeks during those discharge events. Perchlorate has been detected in Buffalo Creek upstream of the impoundments, as well as in Alder Creek. The source of perchlorate is uncertain, but could include GET facility discharge, surface scouring to both creeks, and possible upwelling of shallow groundwater contamination to Alder Creek via seeps. The permit included an effluent limitation for a maximum daily value of 6 µg/L of perchlorate, set at the current primary MCL for perchlorate. By limiting the discharge effluent to the MCL, it reduced the likelihood of detectable perchlorate in the American River from this source from their regular operations due to dilution. However, this did not preclude detection from occurring, such as under high discharge concentrations or low flow scenarios in the Lower American River. The permit required Aerojet Rocketdyne to notify the City of Sacramento before beginning discharge from the storm water detention basins. Notifications were made and received by a similar process as described for the GET facilities, and the City received notification from Aerojet for one discharge during the update period.

Order No. R5-2013-0156 required Self-Monitoring Reports to be submitted to CIWQS, so Discharge Monitoring Reports were submitted electronically to the Regional Board so the discharge reports could be reviewed on the CIWQS database.

Although industrial operations have ceased, there is still sitewide runoff on the property. During significant rainfall events, stormwater flows are collected and discharged via Alder and Buffalo Creeks to the American River. Aerojet operated two large retention ponds to hold flows from Buffalo Creek, but these will be removed as part of sitewide redevelopment. The Regional Board staff have indicated that the stormwater monitoring during the wet season for perchlorate will be incorporated into the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or Superfund, monitoring program. At the request of the Regional Board, replacement monitoring for the Alder Creek perchlorate monitoring has been prepared as a supplemental monitoring program within the general Superfund monitoring program. Aerojet will continue to monitor and this will be included in the Annual Reports. This monitoring will include general constituents as well to assist with identifying the overall quality of the water and the possible source (i.e. runoff versus groundwater seeps). It does not include NDMA or PFCs at this time. The monitoring program includes response actions if perchlorate is detected above the MCL.

Discussion of Notifications

As per the NPDES permit, Aerojet notified the City once during this update permit about an impending release from the stormwater system. On February 18, 2019 Aerojet notified the City that they would be releasing from West Lake by opening the valve at Cell 2, EFF-004. The valve would stay open for several days and Aerojet would notify the Fairbairn WTP when the discharge was stopped.

Review of eSMR Discharge Monitoring Report Data

A review of the CIWQS monthly eSMR report was conducted to evaluate the water quality monitoring data for the receiving water sites associated with the Aerojet stormwater permit. Four sites were monitored monthly for a handful of constituents, including perchlorate. The four sites include; RSW001 – Buffalo Creek upstream of the Detention Basins, RSW002 – Administrative Ditch Prior to Buffalo Creek, RSW004u – Alder Creek Upstream at Prairie City Road, and RSW004d – Alder Creek Downstream near Folsom Boulevard.

For the Buffalo Creek monitoring sites, perchlorate was non-detectable at the RSW001 and RSW002 sites. For the Alder Creek monitoring sites, there were no detects of perchlorate at RSW004u. Perchlorate was detectable at the RSW004d site in 13 of 24 samples, ranging from 2.2 – 14 μg/L, with an overall average of 4 μg/L. This is similar to the data review for the third City update conducted in August 2018.

This data continues to confirm that there is definitely a source of perchlorate tributary to Alder Creek downstream of Prairie City Road, which could be upwelling groundwater and/or Aerojet stormwater runoff. Detects of perchlorate occurred during all seasons, with the highest concentrations occurring during the summer months when stormwater runoff is at its lowest. Regional Board staff has conducted several additional sampling events along Alder Creek to try and identify a potential source, but there has been no success.

Overall Significance and Recommendations

The Aerojet site has significant potential to impact source water quality, considering volume discharged and plans for increase, proximity to drinking water intakes, nature and levels of contaminants present, emergency regulatory impact, lack of full backup power at GET E/F, a history of effluent discharge violations, and planned expansive redevelopment of the site. The remediation efforts at the site are evolutionary in nature and continually in development or redevelopment. There are ten recommendations for the City to consider, as resources allow.

- Continue to track the discharger, via contact with USEPA staff, Regional Board staff, DTSC staff, and Aerojet staff as applicable. The biennial site visit to the Aerojet site should be continued. The Updated Action Plan associated with this summary provides regulatory and coordination schedules for the various planning and regulatory actions related to the Aerojet site. The City should continue to track the CAG meetings, NPDES permit updates, and USEPA planning documents, and provide stakeholder input and public comment where most helpful to American River source water protection, according to the recommendations in this update and the City's Action Plan.

- Plan to review the next Five-Year Review in September 2021. Look for evaluations of perchlorate, NDMA, and PFCs in the groundwater plumes near Alder Creek and Lake Natoma to ensure that the sources are identified, remediation goals are identified, appropriate treatment techniques are in place, and effluent discharge levels are below applicable human health thresholds. Also consider if sufficient evaluation has been conducted to determine risk from groundwater-surface water interactions along Alder Creek and Lake Natoma.

- Consider coordinating with USEPA and Regional Board regarding the groundwater plume movement toward Lake Natoma and potential groundwater-surface water interactions. The modeling that was conducted is known to include uncertainties and limitations, so should they consider confirmation monitoring for perchlorate, NDMA, and PFCs in both Alder Creek and Lake Natoma to ensure that if present they are detectable in the surface water that they are well below levels of concern.

- Consider following up with USEPA and Regional Board regarding NPDES stormwater monitoring results for perchlorate in Alder Creek, to recommend that they consider potential off-property impacts and the need to address in remedy. This investigation should be considered for expansion to include NDMA and PFCs since they are known to be in the groundwater contamination adjacent to Alder Creek and evidence and modeling shows that the groundwater movement can be upward in this region.

- Consider coordinating with USEPA and Regional Board on proposed assessments to determine if source water levels of NDMA in the source waters of ARGET warrants treatment process in place. Finally, GET E/F has detected low levels of 1,4-dioxane in the effluent, but there is no treatment process in place.

- Continue to track land redevelopment and better understand the potential impacts of stormwater hydromodification on runoff quantity, timing, and quality from the “Carve-Out Lands”. Consider contact with Sacramento County, City of Folsom, and City of Rancho Cordova to better understand timing of land redevelopment, coordination between jurisdictions, and additional plans/studies conducted related to stormwater management for Alder and Buffalo Creeks (such as Fluvial Geomorphic and Stormwater Quality Assessments).

- Continue discussions with the Regional Board staff to track results for the replacement monitoring program under the Superfund monitoring for perchlorate in stormwater runoff on Buffalo and Alder Creeks.

- Continue to coordinate with Aerojet staff and Regional Board staff as appropriate to encourage that all notifications continue to be made. Based on a review of the water quality data, violations listed by the Regional Board, and notifications received by the City of Sacramento, the City appears to be receiving all notifications required under the GET System and Stormwater System NPDES permits.

- Continue to periodically review the Aerojet GET reporting data on the CIWQS website to identify any discharge violations or data of interest. If data is identified, consider communicating with Regional Board staff to discuss if NPDES permits are adequate to address potential concerns.

- Continue to include assessment of the Aerojet Rocketdyne site in the American River Watershed Sanitary Survey updates. The City should continue to share information of interest on Aerojet Rocketdyne with other local water utilities, especially those with similar concerns that are also downstream of the confluence of Buffalo Creek and the Lower American River. An update to this Summary should be considered on an approximately biennial basis or as needed, as well as continuing to review and update on specific topics on an as needed basis.

- Continue working relationship with Aerojet staff, including potentially offering tour of Fairbairn Water Treatment Plant. Consider if any of the above recommendations would be beneficial for discussion with Aerojet staff.

References:

Chris Fennessy, Aerojet Rocketdyne, Personal Communication, various. Christopher.fennessy@rocket.com.

Alex MacDonald, Central Valley Regional Water Quality Control Board, Personal Communication, various. amacdonald@waterboards.ca.gov

Elissa Callman, Miscellaneous Emails Related to Aerojet Notifications.

Karen Newton, Miscellaneous Emails Related to Aerojet Notifications.

DTSC Envirostor Website:
https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=34370002

State Water Resources Control Board Geotracker Website:
http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL185992958

USEPA Aerojet General Superfund Site Website:
https://www.epa.gov/enforcement/case-summary-epa-issues-order-aerojet-general-corporation-superfund-site
https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0901718

Sacramento Local Agency Formation Commission;
https://saclafco.saccounty.net/SphereofInfluenceInformation/Pages/default.aspx

Sacramento County Zoning Ordinance;
https://planning.saccounty.net/LandUseRegulationDocuments/Documents/SPA%20NPA%20Title%20IV/SPAs%20NPAs%20and%20Specific%20Plans/TitleV%20508-300%20Aerojet.pdf

City of Folsom Planning Documents;
https://www.folsom.ca.us/community/planning/folsom_plan_area/default.asp

City of Rancho Cordova Planning Documents;
https://www.cityofranchocordova.org/government/planning/zoning-specific-plans-and-special-planning-areas

Order No. R5-2017-0095; NPDES No. CA 0083861 Revised WDRs for Aerojet Rocketdyne Groundwater Extraction and Treatment Systems.

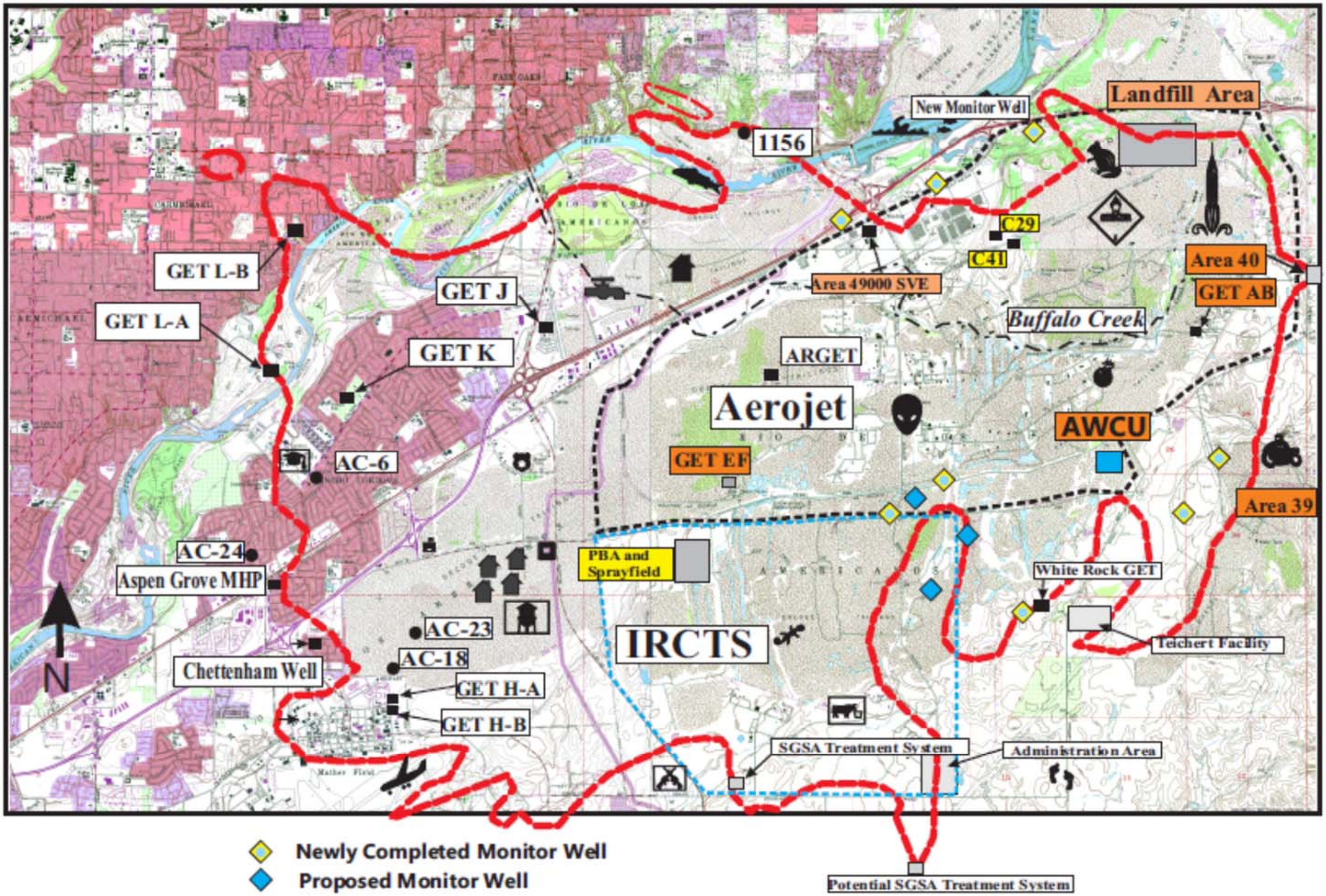
Order No. R5-2018-0508; Administrative Civil Liability for Aerojet Rocketdyne Groundwater Extraction and Treatment Systems.

Order No. R5-2020-0533; Administrative Civil Liability for Aerojet Rocketdyne Groundwater Extraction and Treatment Systems.

Order No. R5-2013-0156; NPDES No. CA0004111 Revised WDRs for Aerojet Rocketdyne Sacramento Facility.

Aerojet Community Advisory Group Meeting Minutes and Handouts; September 2018 – July 2020.

California Integrated Water Quality System; Aerojet NPDES Data Query, July 2018 – July 2020
eSMR At A Glance:
https://www.waterboards.ca.gov/ciwqs/publicreports.html



*Source: Central Valley Regional Water Quality Control Board, Aerojet CAG Meeting Minutes, May 2020