Nevada Irrigation District

Staff Report

TO: Board of Directors

FROM: Chip Close, Water Operations Manager

DATE: February 23, 2022

SUBJECT: **2021 Yuba/Bear River Watershed Sanitary Survey Update**

WATER OPERATIONS

RECOMMENDATION:
Receive a presentation from Bonny Starr of Starr Consulting Services detailing the 2021 Yuba/Bear River Watershed Sanitary Survey Update, and receive and file.

BACKGROUND:
The Interim Enhanced Surface Water Treatment Rule requires NID to conduct a Watershed Sanitary Survey (WSS) on an ongoing and regular basis (every 5 years). As stated in the EPA State Joint Guidance on Sanitary Surveys, the primary purpose of a sanitary survey is: "to evaluate and document the capabilities of the water system's sources, treatment, storage, distribution network, operation and maintenance, and overall management to continually provide safe drinking water and to identify any deficiencies that may adversely impact a public water system's ability to provide a safe, reliable water supply." Sanitary surveys also aid in the process of evaluating a public water system's compliance with federal and state regulations to analyze system capabilities and provide sufficient treatment based upon source water supplies.

Placer County Water Agency (PCWA) and NID share a source of supply from the Yuba, and Bear River Watersheds. As such, the two agencies have shared in the development and cost of the WSS updates in 1996, 2002, 2012, 2017 and 2021. This coordination provides a substantial reduction in cost, and helps to build collaboration and coordination between the two agencies.

The 2021 WSS update set out 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

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 evaluate selected constituents of interest to identify potential water quality or treatment issues at each water treatment plant. Assess the ability of the water treatment plant to meet standards based on current and future regulatory framework. Develop recommendations for treatment plant actions to address water quality or treatment issues and/or address planning needs to meet expected future regulations

- Review and evaluate selected potential contaminating activities to identify impacts on source water quality. Determine whether it may be useful to conduct additional monitoring to further assess contaminant levels in the source water or contaminants from a particular watershed source

- Identify appropriate watershed management actions to protect and possibly improve source water quality. Develop recommendations for watershed management actions that are economically feasible and within the authority of the participating water agencies to implement. Of importance is to target contaminant activities that are most likely to affect source water quality, such as activities located near water treatment plants or activities that are predominant in the watershed

The 2021 update details significant changes at the treatment plants since the 2017 update. A summary of the changes include:

- Conversion to 25 percent liquid sodium hydroxide (bleach) at Elizabeth George, Loma Rica, Lake of the Pines, Lake Wildwood, and North Auburn water treatment plants

- Additional encasement of the supply to the Lake of the Pines Magnolia III Canal from Robles to Baldwin Ranch

- Encasement of 1/3 mile of the Newtown Canal which supplies water to the Lake Wildwood Water Treatment Plant

- Addition of tank mixers and vents for treated water storage at the North Auburn and Smartsville water treatment plants

- Partial encasement of the Meade Canal supplying the Smartsville Water Treatment Plant

The 2021 WSS concludes with a list of recommendations for the next 5 years of operation. The condensed list includes:

- Continue to optimize treatment during periods of reduced source water quality

- Continue to optimize disinfection treatment during high temperature periods both at treatment plant and in the distribution system

- Investigate possible microbial contamination sources in the Lake of the Pines source water

- Encourage canal protections (encasements) upstream of water treatment plants to protect source water quality

- Enhance coordination and communication with PG&E regarding maintenance needs throughout conveyance systems to protect source water quality

- Continue to utilize CABY and Yuba Rivers Integrated Regional Water Management Plan as a vehicle for grant funding of projects related to water quality

- Consider contacting Regional Board to confirm that Deer Creek and its tributaries are formally designated with the Municipal Beneficial Use designation

- Establish contact with California Department of Fish and Wildlife staff at the Oil Spill Prevention and Response program to raise awareness of NID water treatment facilities in Yuba/Bear River system

- Consider contacting Stage Board/Regional Board/DFW regarding the conduct of cannabis cultivation inspections in the Yuba/Bear River system

CONCLUSION:
The source water originating from the Yuba/Bear River systems continues to be of high quality with very little evidence of contamination. NID's treatment facilities are adequately designed and operated to provide treatment that continues to meet or exceed Federal and State standards. While of high quality, the 2021 WSS update provides several localized efforts that will help to further enhance and protect source water supplies for the future.

BUDGETARY IMPACT:
The estimated cost to complete the 2021 WSS update was $100,000. A Memorandum of Understanding between PCWA and NID signed in February of 2021 and established a cost sharing agreement along with a cast cap of $50,000 for each agency. To date, the work completed by Starr Consulting remains under budget.

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Attachments: (2)
- Yuba / Bear River Watershed Sanitary Survey 2021 Update PowerPoint
- Yuba / Bear River Watershed Sanitary Survey 2021 Update

YUBA/BEAR RIVER WATERSHED SANITARY SURVEY - 2021 UPDATE

NEVADA IRRIGATION DISTRICT

BOARD MEETING

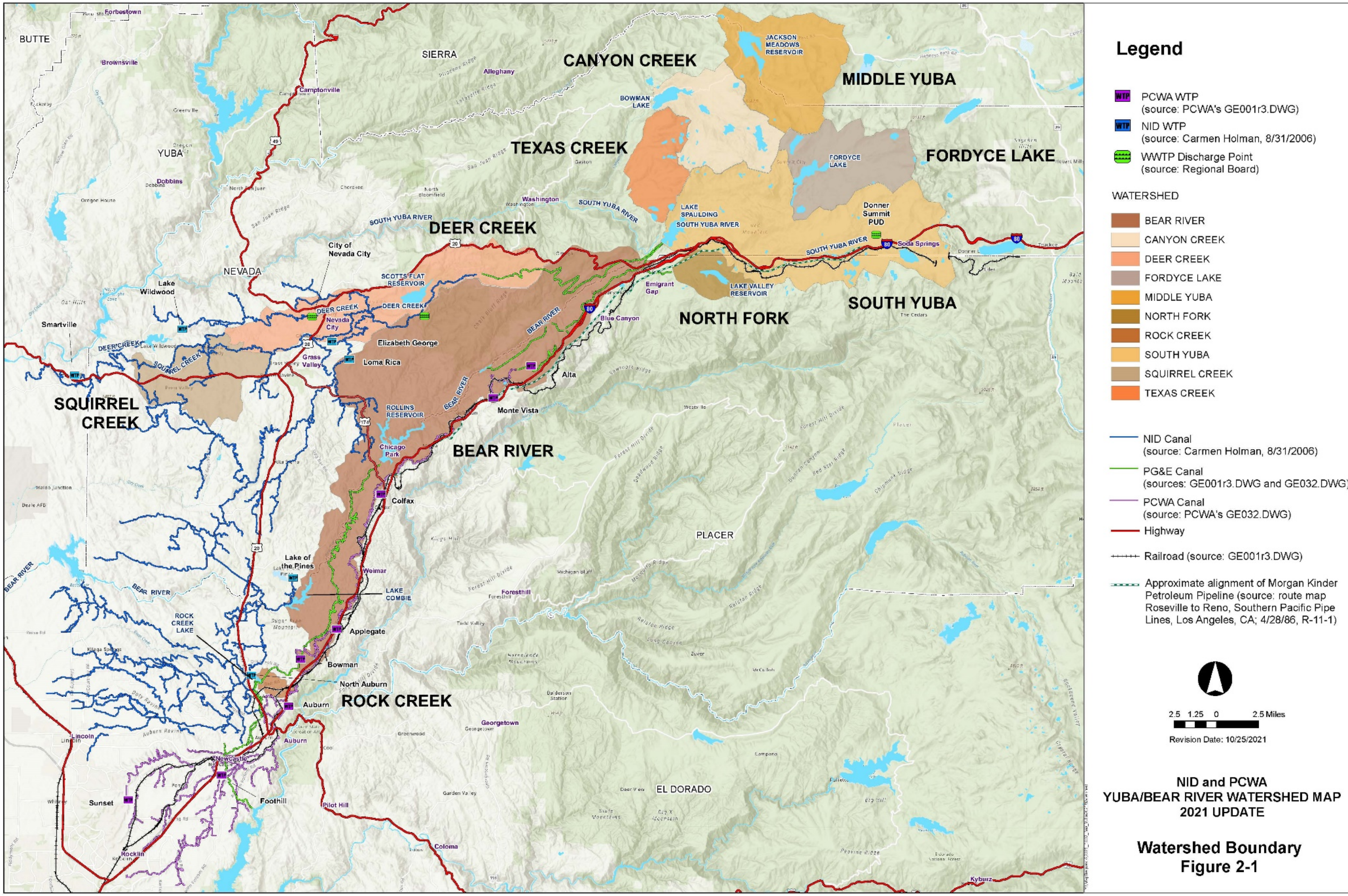
FEBRUARY 23, 2022

YUBA/BEAR RIVER WATERSHED

- Report prepared by Starr Consulting and Palencia Consulting Engineers
- Conducted jointly with Placer County Water Agency
- Study period was January 2016 through December 2020
- Surface Water Treatment Rules require public water systems to conduct update to watershed sanitary survey of all surface water supplies every five years, this is a regulatory compliance document
    - Last update was completed in January 2017

YUBA/BEAR RIVER WATERSHED

- Objectives of 2021 Update:
  - Fulfill SWTR and IESWTR (required every five years); identify significant changes in past five years and comment on appropriate level of treatment for pathogens at the water treatment plants
  - Review and evaluate selected water quality constituents of interest in raw and treated water to assess ability to meet current and future standards at each water treatment plant (WTP)
  - Review and evaluate selected potential contaminating activities to identify potential impacts on source water quality
  - Develop practical and feasible recommendations to protect and possibly improve source water quality and treatment



CANYON CREEK
MIDDLE YUBA
TEXAS CREEK
FORDYCE LAKE
DEER CREEK
NORTH FORK
SOUTH YUBA
SQUIRREL CREEK
BEAR RIVER
ROCK CREEK
PLACER
EL DORADO
NEVADA
SIERRA
YUBA
BUTTE
Legend
PCWA WTP (source: PCWA's GE001r3.DWG)
NID WTP (source: Carmen Holman, 8/31/2006)
WWTP Discharge Point (source: Regional Board)
WATERSHED
BEAR RIVER
CANYON CREEK
DEER CREEK
FORDYCE LAKE
MIDDLE YUBA
NORTH FORK
ROCK CREEK
SOUTH YUBA
SQUIRREL CREEK
TEXAS CREEK
NID Canal (source: Carmen Holman, 8/31/2006)
PG&E Canal (sources: GE001r3.DWG and GE032.DWG)
PCWA Canal (source: PCWA's GE032.DWG)
Highway
Railroad (source: GE001r3.DWG)
Approximate alignment of Morgan Kinder Petroleum Pipeline (source: route map Roseville to Reno, Southern Pacific Pipe Lines, Los Angeles, CA; 4/28/86, R-11-1)
2.5 1.25 0 2.5 Miles
Revision Date: 10/25/2021
NID and PCWA
YUBA/BEAR RIVER WATERSHED MAP
2021 UPDATE
Watershed Boundary
Figure 2-1

SIGNIFICANT CHANGES IN PAST FIVE YEARS

- Many of the NID water treatment plants underwent upgrades and minor modifications, some key changes included:
  - Conversion to 25 percent liquid sodium hydroxide for corrosion control at the Elizabeth George, Loma Rica, Lake of the Pines, Lake Wildwood, and North Auburn WTPs.
  - Additional completion of Magnolia III canal encasement, from Robles to Baldwin Ranch, at the Lake of the Pines WTP.
  - Encasement of 1/3 of a mile of the Newtown Canal at the Lake Wildwood WTP.
  - Partial encasement of the Meade Canal at the Smartville WTP.
  - Addition of tank mixers and vents for treated water storage at the North Auburn and Smartville WTPs.

SIGNIFICANT CHANGES IN PAST FIVE YEARS

- An ambient monitoring program along Squirrel Creek continues to show elevated levels of *Escherichia coli* (*E. coli*) and indicates that there are sources of fecal contamination in and upstream of Penn Valley that may be contributing, especially along Clear Creek and along Squirrel Creek between Valley Drive and Martinsburg Lane.
- There are periods of higher turbidity outside of storm events that could be attributable to reservoir and canal operations and maintenance or algal blooms. NID has an operating procedure to avoid diverting water during peak storm turbidities.
- Only the Smartville WTP has consistently elevated source water levels of *E. coli,* which appear to be very localized between Deer Creek and the WTP that warrant further consideration. Peak levels at Lake of the Pines WTP were historically associated with increases along the Magnolia III Canal, but have now been isolated to the onsite raw water reservoir since much of the canal is encased and this warrants further consideration.

SIGNIFICANT CHANGES IN PAST FIVE YEARS

- All the WTPs were placed in Bin 1 under Round 2 of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). Lake Wildwood WTP has been approved to move from previous Bin 2 to Bin 1 by California Division of Drinking Water (DDW).
- Total organic carbon (TOC) levels appear to be stable in the raw and treated water. The Smartville WTP had the highest average value and has a long local canal system as part of its supply that may be contributing to the increased values.
- An evaluation of source water temperatures and disinfection by-product (DBP) levels indicates that higher temperatures can be contributing to increased total trihalomethane (TTHM) levels at some WTPs, but do not correlate to haloacetic acid (HAA5) levels. Other factors, such as pH, TOC, and water age appear to be more significant to the increase in DBP levels.

SIGNIFICANT CHANGES IN PAST FIVE YEARS

- Livestock population continues its 15-year decreasing trend, with fewer head of cattle and acreage of grazing in the watershed. Cattle are a significant potential source of C*ryptosporidium* so this is favorable to source water quality.
- There has been a big shift in the process for timber harvest operations to be approved on private land in the watershed. Much is conducted under Exemption and Emergency Notices, rather than under Timber Harvest Plans, which have less rigorous requirements for planning and inspection and have the potential to impact source water quality.
- There was a significant increase in the number of spill events report to the California Office of Emergency Services (Cal OES) that had the potential to impact the Yuba/Bear River. Most of these are associated with vehicular accidents and were not reported to the participating water agencies via the formal Cal OES and DDW process.

SIGNIFICANT CHANGES IN PAST FIVE YEARS

- Cascade Shores Wastewater Treatment Plant (WWTP) has not yet completed its conversion to land discharge, and it is uncertain if it still plans to eliminate its National Pollutant Discharge Elimination System (NPDES) discharge. The Penn Valley Mobile Home Park did connect to the public sewer and will no longer discharge to the ponds adjacent to Squirrel Creek in Penn Valley, thereby reducing the risk of contaminating the creek above the Smartville WTP.
- There is one new and one pending gold mine operating in the Bear River watershed, upstream of Rollins Reservoir. The new facility was required to obtain an industrial stormwater permit through the State Water Resources Control Board (State Board), but this has not been issued yet due to inoperation.

SIGNIFICANT CHANGES IN PAST FIVE YEARS

- Outdoor cannabis cultivation has grown exponentially in the watershed, specifically Nevada County, during the study period. Each county has independent ordinances and regulations to limit and manage the potential impacts from outdoor cultivation. Statewide regulations related to medical and recreational marijuana use have been developed and implemented, but these only apply to legal grow operations. There continue to be substantial illegal grow operations throughout the watershed.

KEY FINDINGS AND CONCLUSIONS
RAW WATER QUALITY FOR THE YUBA/BEAR RIVER

TURBIDITY DATA REVIEW

- Median Raw Water Turbidity Varies by Plant, ranging from 2.5 NTU at Loma Rica WTP to 9.5 NTU at North Auburn WTP; highest values during winter months.
- Generally, the raw water turbidity for the Loma Rica and Elizabeth George WTPs stays below 10 NTU. The remainder of the WTPs occasionally rise above 10 NTU.
- North Auburn and Smartville WTPs had the most months with average > 10 NTU, 27 out of 60 months, likely caused by local conditions such as Rock Creek Reservoir and canals, respectively.
- Rollins Reservoir can fill with turbid waters during the wet season. This results in higher turbidities at WTPs located downstream of Rollins Reservoir, when turbid waters are released from Rollins Reservoir during the winter and spring.

MICROBIOLOGICAL CONSTITUENT DATA REVIEW

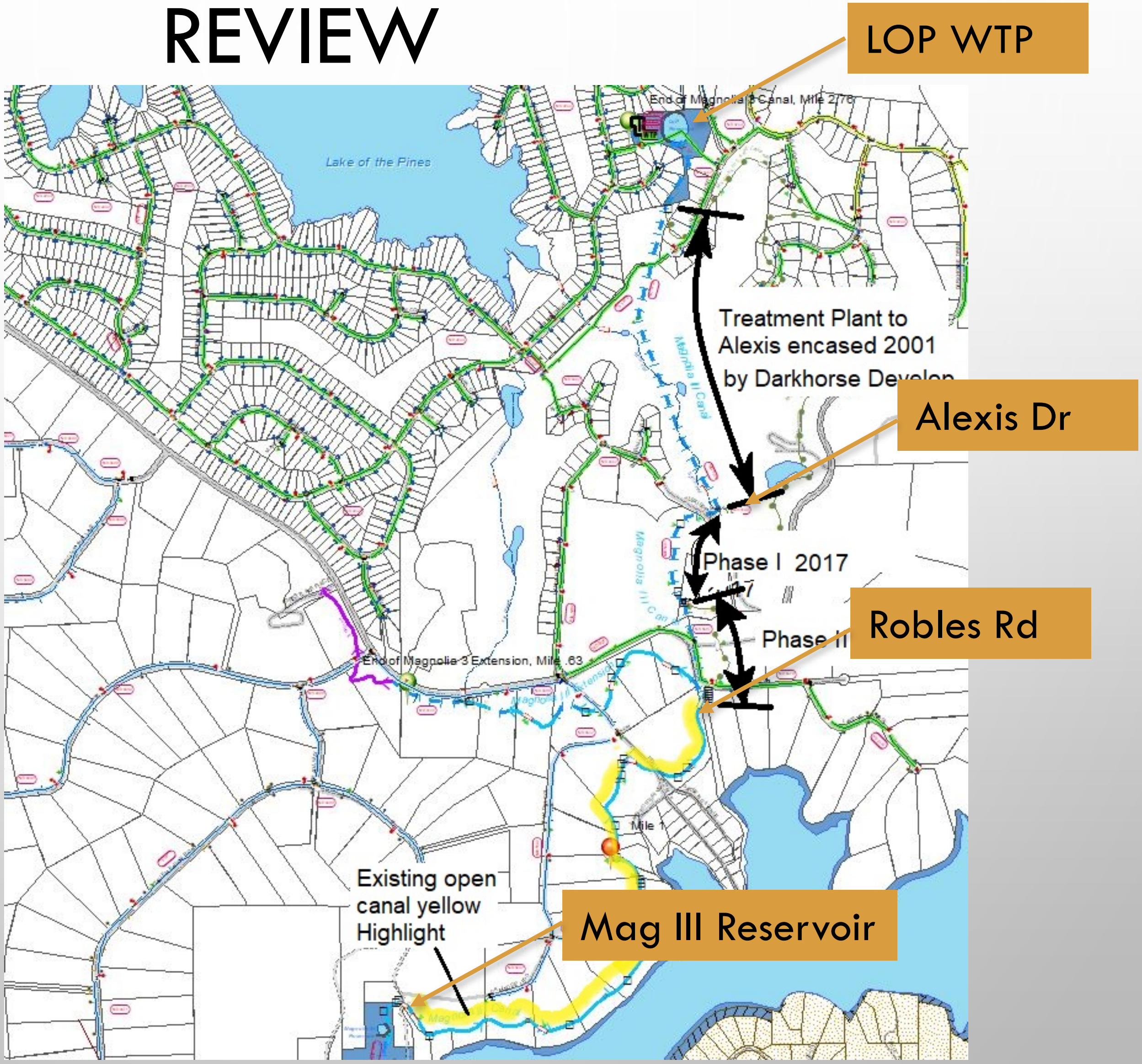
- Overall raw water median *E. coli* ranges from 3.1 MPN/100 mL at Elizabeth George WTP to 58.3 MPN/100 mL at Smartville WTP
  - Peaks can occur throughout the year
  - Many sources can contribute to levels
  - *E. coli* levels increase downstream on Deer Creek, an order of magnitude from top to bottom
- Higher *E. coli* levels at the Lake of the Pines WTP can be related to precipitation events, but also drainage from ranch land along the Magnolia III canal where cattle have been observed.

MICROBIOLOGICAL CONSTITUENT DATA REVIEW

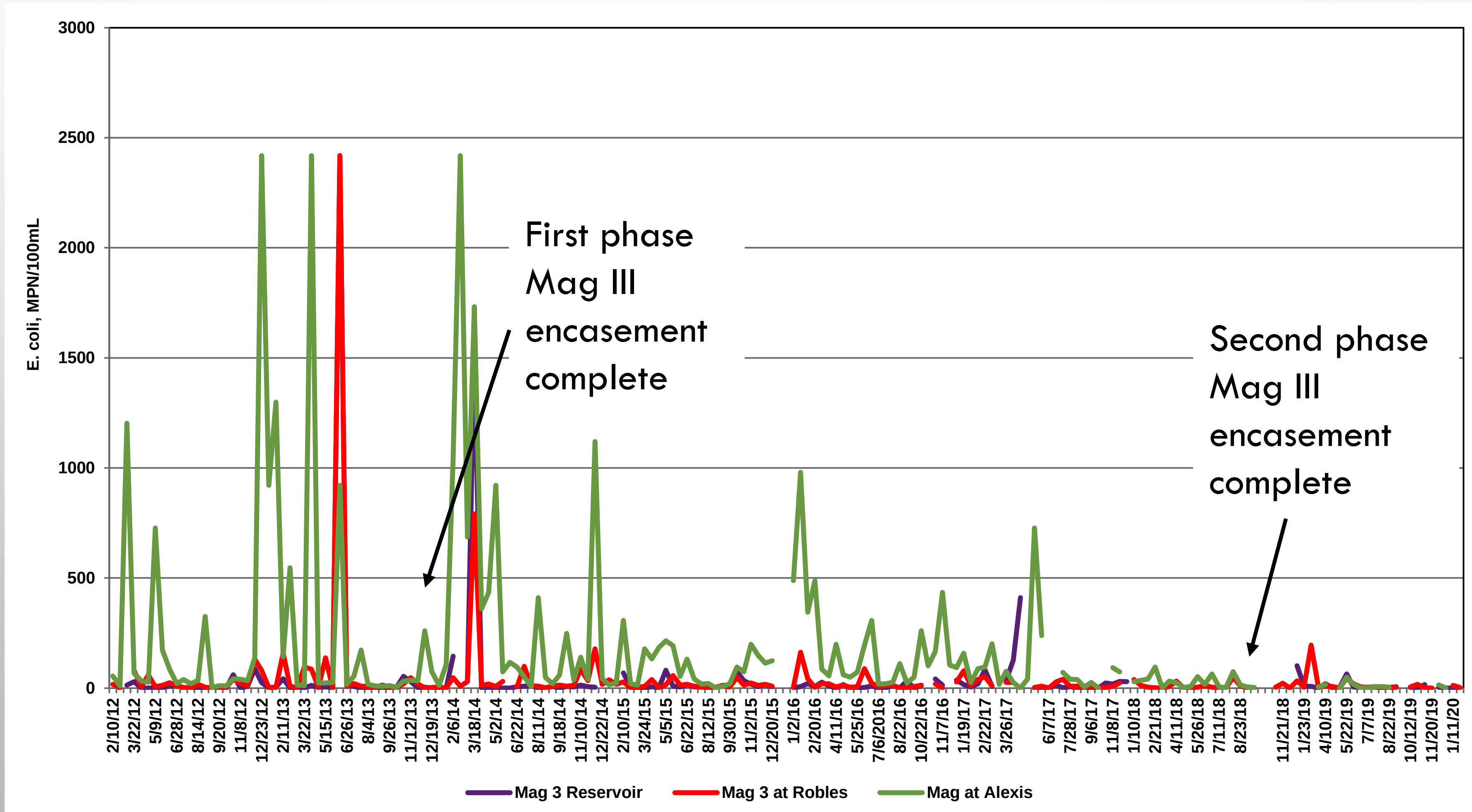
- All WTPs (except Smartville and Lake of the Pines) have majority (>90 percent) of monthly median *E. coli* less than 200 MPN/100 ml
  - 200 MPN/100 mL is trigger for considering increased level of pathogen treatment (beyond 3/4-log reduction)
  - At this time, 3/4-log reduction of *Giardia* and viruses continue to be appropriate for all other WTPs
- Smartville WTP had nine monthly median *E. coli* greater than 200 MPN/100 ml, triggering 4/5-log reduction of *Giardia* and viruses, already providing additional level of treatment
- LOP WTP had eight monthly median *E. coli* greater than 200 MPN/100 mL, needed to investigate data as only providing 3/4-log reduction of pathogens

MICROBIOLOGICAL CONSTITUENT DATA REVIEW

- Lake of the Pines WTP influent had eight monthly median *E. coli* greater than 200 MPN/100 ml during study period, triggering an assessment of pathogen data
  - Water supply from Combie Reservoir via the Magnolia III Canal to a terminal reservoir onsite LOP WTP
  - NID encased Mag III Canal between Robles Rd and Alexis Drive between 2013 and 2019
  - Only 2 monthly medians >200 MPN/100mL occurred after 2019

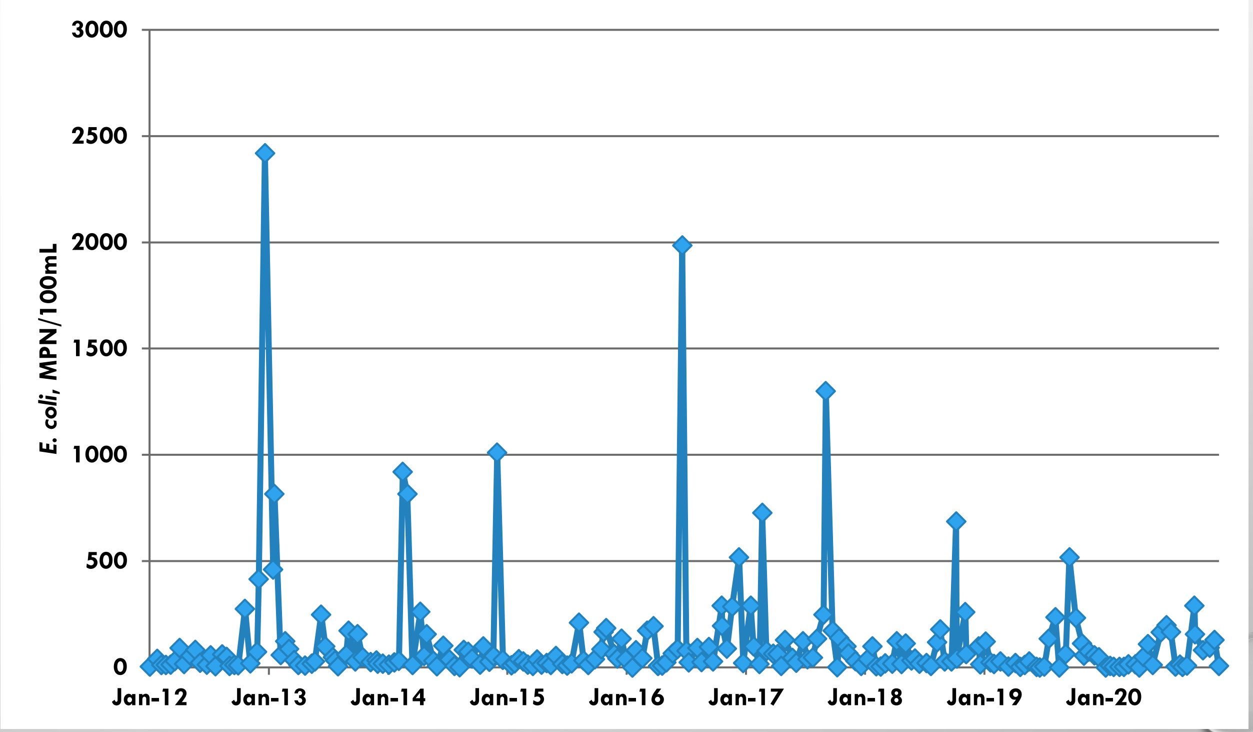


MICROBIOLOGICAL CONSTITUENT DATA REVIEW



MICROBIOLOGICAL CONSTITUENT DATA REVIEW

- LOP WTP recent monthly medians show significant improvement since canal encasement and are consistent with 3/4-log reduction pathogen requirement
- LOP WTP Influent still seeing some peak levels of *E. coli*, despite reductions seen along Magnolia III Canal
  - Timing of peaks changed from winter to early fall
  - Not related to precipitation
  - May be related to onsite reservoir activities (geese overnighting)



MICROBIOLOGICAL CONSTITUENT DATA REVIEW

- Long Term 2 ESWTR Second Round Monitoring Results
  - Elizabeth George and Loma Rica WTPs for *Cryptosporidium* (October 2016 – September 2018) resulted in Bin 1 Classification and no additional action was required (standard 2-log reduction)
  - Lake Wildwood, Lake of the Pines, North Auburn, and Smartville WTPs for *Cryptosporidium* (October 2017 – September 2019) resulted in Bin 1 classification and no additional action was required (standard 2-log reduction)
    - DDW approved Lake Wildwood WTP moving from previous Bin 2 to Bin 1 Classification

DISINFECTION BY-PRODUCT PRECURSOR DATA REVIEW

- Median raw water TOC levels range from 1.3 mg/L at Elizabeth George and Lake Wildwood WTPs to 2.0 mg/L at Smartville WTP; peak values occur during the wet months (late fall to early spring)
- All WTPs, except Smartville WTP, have running annual average levels less than 2.0 mg/L
- TOC levels are generally stable at all WTPs
- Water temperature plays a role in DBP formation; however it is evident that other factors are also impacting formation (water age, pH, and TOC) and may be more significant.
- TTHM formation is related to temperature in NID systems.
- Overall, haloacetic acid (HAA5) formation is less correlated to temperature than TTHM formation.

KEY FINDINGS AND CONCLUSIONS INDIVIDUAL INTAKE EVALUATIONS

TREATED WATER TURBIDITY DATA REVIEW

- All treated water turbidity standards met, both combined filter effluent and individual filter effluent
- Average treated water turbidity ranges from 0.03 to 0.04 NTU at the WTPs, meets all standards of the SWTR, IESWTR, Long Term 1 ESWTR (0.3 NTU/1 NTU)
- Overall solids reduction ranges from 98.7 to 99.7 percent, well above the 80 percent required

TREATED WATER MICROBIOLOGICAL DATA REVIEW

- No total coliform detects in the distribution systems
- No fecal coliform detects in distribution systems

DISINFECTION BY-PRODUCT DATA REVIEW

- All of the water treatment plants met the alternative compliance criterion for enhanced coagulation by having raw or treated water TOC levels less than 2 mg/L.
- Stage 2 D/DBP Rule –
  - Locational Running Annual Averages (RAAs) for all sites in all systems had TTHM and HAA5 below 80 and 60 ug/L, respectively, and met the MCLs
- Seasonality in DBPs, but it is variable at each water treatment plant depending on source water quality, treatment, and distribution system operations.
- NID continues DBP management strategies such as optimizing disinfection practices at the water treatment plants, installing tank mixers, and optimizing distribution system operations.

TITLE 22 DATA REVIEW

- Minor detections of lead and copper in the distribution system for several of the systems, none of the 90^{th} percentile values exceeded the respective Action Levels.
- Minor detections of aluminum and iron in the treated water for several of the systems, none above the Secondary MCLs.
- Smartville WTP had one ultra low-level detect of xylene (0.75 ug/L, well below the Primary MCL of 1,750 ug/L)

UNREGULATED DATA REVIEW

- Minor detections of hexavalent chromium in treated water, there is no current drinking water standard
- NID sampled two of its WTPs (Elizabeth George and Loma Rica) for unregulated constituents under the Unregulated Contaminant Monitoring Rule 4.
  - Most constituents were non-detectable.
  - Low level detects, well below Secondary MCL, for manganese.
  - Low level detects of brominated HAAs, nearly insignificant.

KEY FINDINGS AND CONCLUSIONS POTENTIAL CONTAMINANT SOURCES

KEY FINDINGS - WATERSHED

- Aquatic Pesticide Application
  - NID implements algae control and has a permit and procedures in place to protect drinking water intakes, no detects of pesticides used at WTPs
  - PG&E does not implement any algae control with pesticides
  - PG&E does not analyze the type or density of algae present in Rock Creek Reservoir and does not implement any management practices in the reservoir
- Rangeland Livestock
  - Limited grazing in USFS and NID, as well as other private areas along Bear River and in Penn Valley
  - Population decreased 14 percent over past five years, 19 percent over past 15 years
  - State Board and Regional Board are preparing a Statewide Grazing Guidance as part of the Non Point Source Program management
  - Water quality at LOP, Smartville, and Lake Wildwood WTPs may be influenced, but there are very low levels of protozoa in all source waters

KEY FINDINGS - WATERSHED

Forest Activities

- Timber Harvesting
  - Timber harvesting in watershed significant, more harvesting being conducted under Exemption and Emergency Notices instead of via Timber Harvest Plans
  - Harvesting varies by year, depending on operations, most is on private land and located in Bear River subwatershed
  - California's new Vegetation Treatment Program is expected to increase fuel reduction
- Wildfires
  - Three fires >20 acres in watershed during study period
  - Two fires along Deer Creek impacted NID canal systems
- CABY Participation
  - NID participates in CABY
  - NID received funding for partial encasement of the Meade Canal to the Smartville WTP
  - Several projects have indirect positive impacts on fuel management and forest health

KEY FINDINGS - WATERSHED

- Recreation
  - Widespread activity through watersheds, use appears stable
  - Some increases in facilities projected by PG&E and NID as result of FERC
  - Improved management by USFS, PG&E and NID
  - Regional Board monitoring along Squirrel Creek showed recreationalists may impact source water quality
- Source Water Spills
  - Increase in number of events reported to OES, most are smaller sanitary sewer overflows or petroleum spills
  - Formal OES spill notification program via DDW is ineffective, few notifications received by NID
  - NID has alternate spill notification programs that are effective

KEY FINDINGS - WATERSHED

- Wastewater
  - Cascade Shores WWTP – plans to convert to land disposal are uncertain at this time
  - City of Nevada City WWTP – had significant compliance issues during study period, currently implementing projects to improve treatment and discharge effluent quality
  - Penn Valley MHP – discontinued discharge to ponds along Squirrel Creek and connected to sanitary sewer in 2021, facility will be formally closed
- Urban Runoff
  - Three Phase II permittees in watershed, following BMPs
  - Caltrans Phase I permit covers watershed
  - 14 industrial permittees in watershed
  - 16 construction permittees currently in watershed
  - Limited monitoring data in receiving waters

KEY FINDINGS - WATERSHED

- Mining
  - Intensity of activity has decreased remarkably over time
  - Four active surface mines in watershed (quarries/gold)
  - Lava Cap Mine Superfund Site – management continues, mine capped and discharge will be treated by 2023
  - No detection of related constituents at levels of human health concern in source water

KEY FINDINGS - WATERSHED

- Cannabis Cultivation
    - Outdoor cultivation occurs both legally and illegally, cannot document illegal cultivation
    - Growing season is April through October
    - Legal cultivation regulated by Department and Cannabis Control, State Board, and three watershed counties
        - Nevada County also allows commercial cultivation
    - Outdoor cultivation has potential to impact source water quality (fertilizers, pesticides, erosion, trash)

RECOMMENDATIONS

RECOMMENDATIONS FOR NID

Recommendation
Continue to optimize treatment during times of potentially reduced source water quality – i.e., adjust coagulant dose, optimize polymers, reduce flow if possible to increase hydraulic detention times and reduce filtration loading rates, ensure optimized disinfection practices and contact time (CT).
Continue to optimize disinfection treatment during higher temperature periods to minimize DBP formation. Consider effects of water age on DBP formation. Consider assessing distribution system management practices which may affect detention time and optimize to prevent formation of DBPs. This could include; installation of tank mixers, increased flushing at dead ends, correlating water production more closely during transitional demand periods (i.e., fall), and optimize storage volume in the tanks seasonally.
Consider investigating possible microbial contamination sources at the Lake of the Pines and Lake Wildwood WTPs onsite reservoirs (i.e., overnighting geese, local drainage, algal blooms).

RECOMMENDATIONS FOR NID

Recommendation
Continue to encourage canal protections (encasements) upstream of water treatment plants to protect source water quality.
Consider enhancing coordination and communication with PG&E to discuss on-going maintenance needs throughout conveyance system to protect source water quality (i.e., reservoir dredging, chemical or mechanical treatment of vegetation).
Continue to use the Cosumnes, American, Bear, and Yuba Rivers Integrated Regional Water Management Plan as a vehicle for grant funding of projects related to water quality. Consider submitting application for grant funding of source water protection projects such as canal encasement, public education along the canals, pet waste management stations along the canals, and canal fencing through vulnerable areas.

RECOMMENDATIONS FOR NID

Recommendation
Consider contacting the Regional Board to confirm that Deer Creek and its tributaries, specifically Squirrel Creek, are formally designated with the Municipal (MUN) Beneficial Use as part of the Sacramento River Basin Plan.
Consider formal outreach to City of Nevada City, City of Grass Valley, and Nevada County Sanitation District regarding education on water supply system and request for notification of significant sanitary sewer overflows to Deer Creek or Squirrel Creek.
Consider establishing contact with the California Department of Fish and Wildlife (DFW) staff at the Oil Spill Prevention and Response (OSPR) program to ensure that upcoming Geographic Response Plans (GRPs) for the Yuba and Bear River include all water treatment plants accurately.
Consider contacting State Board/Regional Board/DFW regarding the conduct of cannabis cultivation inspections in the Yuba/Bear River system.

QUESTIONS

YUBA/BEAR RIVER WATERSHED SANITARY SURVEY 2021 UPDATE

Prepared For

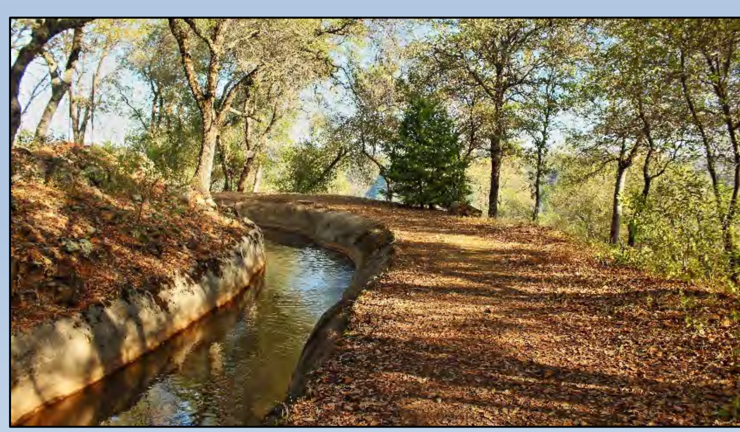
PCWA
water • energy • stewardship

NID

Prepared By

STARR CONSULTING

Palencia Consulting Engineers



Photos courtesy of alltrails.com, visitplacer.com, pcwa.net

YUBA/BEAR RIVER WATERSHED SANITARY SURVEY
2021 UPDATE

December 2021

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LIST OF ABBREVIATIONS

1996 Survey – Yuba/Bear River Watershed Sanitary Survey, 1996
2002 Update – Yuba/Bear River Watershed Sanitary Survey, 2002 Update
2012 Update – Yuba/Bear River Watershed Sanitary Survey, 2012 Update
2017 Update – Yuba/Bear River Watershed Sanitary Survey, 2017 Update
2021 Update – Yuba/Bear River Watershed Sanitary Survey, 2021 Update

ACL – Administration Civil Liability
APAP – Aquatic Pesticide Application Plan

BMP – Best Management Practice
BOD – Biochemical Oxygen Demand

CABY – Cosumnes, American, Bear and Yuba Rivers
CALFIRE – California Department of Forestry and Fire Protection
CalOES – California Office of Emergency Services
Caltrans – California Department of Transportation
CalVTP – California Vegetation Treatment Program
CAO – Cleanup and Abatement Order
CAP – *Cryptosporidium* Action Plan
CCR – Consumer Confidence Report
CDEC – California Data Exchange Center
CERCLA - Comprehensive Environmental Response, Compensation and Liability Act
CEQA – California Environmental Quality Act
CFE – combined filter effluent
cfs – cubic feet per second
CIWQS – California Integrated Water Quality System
CRRIC – California Rangeland Research and Information Center
CRWL – California Rangeland Watershed Laboratory
CT – Disinfection Contact Time
CUPA – Certified Unified Program Agency
CWA – Clean Water Act
cysts/L – cysts per liter

D/DBPR – Disinfectants/Disinfection By-Products Rule
DBP – disinfection by-product
DCC – Department of Cannabis Control
DDW – California Division of Drinking Water
DFW – California Department of Fish and Wildlife
DOC – California Department of Conservation
DWR – California Department of Water Resources

E. coli – Escherichia coli
EOC – Emergency Operations Center

ERA – exceedance response actions

FERC – Federal Energy Regulatory Commission
FIFRA – Federal Insecticide, Fungicide, and Rodenticide Act
FSA – Farm Service Agency

gal - gallon
gpm – gallons per minute
gpm/sf – gallons per minute per square foot
GRP – Geographic Response Plan

HAA – haloacetic acids
HAA5- sum of five HAAs
HAA6Br – sum of six brominated HAAs
HAA9 – sum of nine HAAs
hr – hour
HSC – Health and Safety Code

IESWTR – Interim Enhanced Surface Water Treatment Rule
IFE – individual filter effluent
IOC – inorganic constituent
IRWMP – Integrated Regional Water Master Plan
ITP – Inspector Training Program

lbs – pounds
LEPC – local emergency planning committee
LRAA – locational running annual average
LT1ESWTR – Long Term 1 Enhanced Surface Water Treatment Rule
LT2ESWTR – Long Term 2 Enhanced Surface Water Treatment Rule

MBBR – moving bed bioreactors
MCL – maximum contaminant level
MEP – maximum extent practicable
mg – million gallon
mgd – million gallons per day
mg/L – milligrams per liter
MHP – Mobile Home Park
min - minute
MMRSA - Medical Marijuana Regulation and Safety Act
MPN/100 mL – most probable number per 100 milliliters
MRP – Monitoring and Reporting Program Plan
MS4 – municipal separate storm sewer system

NAL – numeric action limit
ND – non-detect
NEL – numeric effluent limit
NEPA – National Environmental Protection Act
NID – Nevada Irrigation District
NIMS – National Incident Management System
NOA – Notice of Applicability
NOI – Notice of Intent
NPDES – National Pollution Discharge Elimination System
NPS – non-point source
NRCS – Natural Resources Conservation Service
NTU – nephelometric turbidity unit
NWQI – National Water Quality Initiative

OEL – operational evaluation limit
OHV – Off-Highway Vehicle
oocyst/L – oocysts per liter
OSPR – Oil Spill Prevention and Response
OSV – over-snow vehicle
OU – operable unit

PACL – polyaluminum chlorohydrate
PCWA – Placer County Water Agency
PHG – Public Health Goal
PG&E – Pacific Gas and Electric

RAA – running annual average
RCCP – Regional Conservation Partnership Program
Regional Board – Central Valley Regional Water Quality Control Board
RIMS – Response Information Management System
RMAC – Rangeland Management Advisory Committee
ROD – Record of Decision
RPA – reasonable potential analysis
RPF – Registered Professional Forester
RWQMP – Rangeland Water Quality Management Program

Second Update – Yuba/Bear River Watershed Sanitary Survey, Second Update
SEMS – Standardized Emergency Management System
SMARA – Surface Mining and Reclamation Act of 1975
SMARTS - Storm Water Multiple Application and Report Tracking System
SOC – synthetic organic compound
SSMP – sewer system management plans
SSO – sanitary sewer overflow

State Board – State Water Resources Control Board
SWMP – storm water management plan
SWPPP – storm water pollution prevention plan
SWTR – Surface Water Treatment Rule

TC – Technical Committee
THC - tetrahydrocannabinol
THP – Timber Harvest Plan
TMDL – total maximum daily load
TOC – total organic carbon
TSO – time schedule order
TSS – total suspended solids
TTHM – total trihalomethanes

UCCE – University of California Cooperative Extension
UCMR 4 – Unregulated Contaminant Monitoring Rule 4
UFRV – Unit Filter Run Volume
µg/L – micrograms per liter
UPRR – Union Pacific Rail Road
USBLM – United States Bureau of Land Management
USDA – United States Department of Agriculture
USEPA – US Environmental Protection Agency
USFS – United States Forest Service
UV – ultraviolet light

VOC – volatile organic compound

WDRs – Waste Discharge Requirements
WQMH – Water Quality Management Handbook
WQMP – Water Quality Management Plan
WTP – water treatment plant
WWTP – wastewater treatment plant

This report presents the findings of the 2021 Update to the Yuba/Bear River Watershed Sanitary Survey (2021 Update). This study covers the period January 2016 through December 2020. The initial watershed sanitary survey was completed in 1996 (1996 Survey), the first update was completed in 2002 (2002 Update), the second update was completed in 2007 (Second Update), the third update was completed in 2012 (2012 Update), and the fourth update was completed in 2017 (2017 Update) in accordance with the California Surface Water Treatment Rule (SWTR).

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

PARTICIPATING WATER AGENCIES

Placer County Water Agency (PCWA) and Nevada Irrigation District (NID) jointly conducted the 1996 Survey, the 2002 Update, the Second Update, the 2012 Update, and the 2017 Update. This 2021 Update has been conducted by these agencies as well. Together these two are herein referred to as the participating water agencies.

2021 UPDATE OBJECTIVES

The overall objective of this 2021 Update is to assess the source water quality of the Yuba/Bear River to ensure the ability of the existing water treatment plants for the participating water agencies to continue to provide their customers with drinking water that meets all drinking water standards.

This 2021 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. 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 evaluate selected constituents of interest to identify potential water quality or treatment issues at each water treatment plant. Assess the ability of the water treatment plants to meet standards based on current and future regulatory framework. Develop recommendations for treatment plant actions to address water quality or treatment issues and/or address planning needs to meet expected future regulations.

- Review and evaluate selected potential contaminating activities to identify impacts on source water quality. Determine whether it may be useful to conduct additional monitoring to further assess contaminant levels in the source water or contaminants from a particular watershed source.

- Identify appropriate watershed management actions to protect and possibly improve source water quality. Develop recommendations for watershed management actions that are economically feasible and within the authority of the participating water agencies to implement. Of importance is to target contaminant activities that are most likely to affect source water quality, such as activities located near the water treatment plants or activities that are predominant in the watershed.

SIGNIFICANT CHANGES SINCE THE 2017 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. This new information, which is summarized below, was obtained and evaluated for this 2021 Update.

- Many of the water treatment plants underwent upgrades and minor modifications, some key changes included:
    - New intake pumps and strainer, along with emergency generator, at the Alta Water Treatment Plant (WTP).
    - Conversion to a hydrated lime feed system at the Applegate WTP.
    - Rebuilt filters, with conversion to tri-media and installation of a new trough, at the Bowman WTP.
    - New raw water pipeline from Ophir Road as a secondary supply at the Foothill 1/2 WTPs.
    - Replacement of Caperton Reservoir with 460 feet of 36-inch pipe and encasement of 2900 feet of Caperton Canal at the Sunset WTP.
    - Conversion to 25 percent liquid sodium hydroxide at the Elizabeth George, Loma Rica, Lake of the Pines, Lake Wildwood, and North Auburn WTPs.
    - Additional completion of Magnolia III canal encasement, from Robles to Baldwin Ranch, at the Lake of the Pines WTP.
    - Encasement of 1/3 of a mile of the Newtown Canal at the Lake Wildwood WTP.
    - Addition of tank mixers and vents for treated water storage at the North Auburn and Smartville WTPs.
    - Addition of tank mixers and vents for treated water storage in the Applegate and Auburn Bowman distribution systems.
    - Partial encasement of the Meade Canal at the Smartville WTP.

- There was one ambient monitoring program collecting data in the watershed during the study period. Additional monitoring data along Squirrel Creek continues to show elevated levels of *Escherichia coli* (*E. coli*) and indicates that there are sources of fecal contamination in and upstream of Penn Valley that may be contributing, especially along Clear Creek and along Squirrel Creek between Valley Drive and Martinsburg Lane.

- Generally during the study period, 2016 through 2020, the source water turbidity levels remained similar or slightly lower than in the last study period. The same peaking trend during storm events was evident. There are other periods of higher turbidity outside of storm events that could be attributable to reservoir and canal operations and maintenance or algal blooms. NID has an operating procedure to avoid diverting water during peak storm turbidities.

- *E. coli* monthly medians remained at similar levels seen previously, with only the Smartville WTP having consistently elevated source water levels. *E. coli* impacts appear to be very localized. Peak levels at the Sunset WTP were investigated by PCWA and could be associated with drainage from grazing areas along the Caperton Canal. Encasement of the Caperton Canal and Caperton Reservoir are expected to reduce these impacts. Peak levels at Lake of the Pines WTP were historically associated with increases along the Magnolia III Canal, but have now been isolated to the onsite raw water reservoir since much of the canal is encased and this warrants further consideration. The raw water data for the Smartville WTP continue to indicate that there are sources of fecal contamination between Deer Creek and the water treatment plant, which warrants further consideration.

- All the WTPs were placed in Bin 1 under Round 2 of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). Lake Wildwood WTP has been approved to move from Bin 2 to Bin 1 by California Division of Drinking Water (DDW), and Bowman WTP should be moved to Bin 1 as well.

- Total organic carbon (TOC) levels appear to be stable in the raw and treated water. The Sunset and Smartville WTPs had the highest average values and have long local canal systems as part of their supply that may be contributing to the increased values.

- An evaluation of source water temperatures and disinfection by-product (DBP) levels indicates that higher temperatures can be contributing to increased total trihalomethane (TTHM) levels at some WTPs, but do not correlate to haloacetic acid (HAA5) levels. Other factors, such as pH, TOC, and water age appear to be more significant to the increase in DBP levels.

- Livestock population continues its 15-year decreasing trend, with fewer head of cattle and acreage of grazing in the watershed. Cattle are a significant potential source of *Cryptosporidium* so this is favorable to source water quality.

- There has been a big shift in the process for timber harvest operations to be approved on private land in the watershed. Much is conducted under Exemption and Emergency Notices, rather than under Timber Harvest Plans, which have less rigorous requirements for planning and inspection and have the potential to impact source water quality.

- There was a significant increase in the number of spill events report to the California Office of Emergency Services (Cal OES) that had the potential to impact the Yuba/Bear River. Most of these are associated with vehicular accidents and were not reported to the participating water agencies via the formal Cal OES and DDW process.

- Cascade Shores Wastewater Treatment Plant (WWTP) has not yet completed its conversion to land discharge, and it is uncertain if it still plans to eliminate its National Pollutant Discharge Elimination System (NPDES) discharge. The Penn Valley Mobile Home Park did connect to the public sewer and will no longer discharge to the ponds adjacent to Squirrel Creek in Penn Valley, thereby reducing the risk of contaminating the creek.

- There is one new and one pending gold mine operating in the Bear River watershed, upstream of Rollins Reservoir. The new facility was required to obtain an industrial stormwater permit through the State Water Resources Control Board (State Board), but this does not appear to have been issued.

- Outdoor cannabis cultivation has grown exponentially in the watershed, specifically Nevada County, during the study period. Each county has independent ordinances and regulations to limit and manage the potential impacts from outdoor cultivation. Statewide regulations related to medical and recreational marijuana use have been developed and implemented, but these only apply to legal grow operations. There continue to be substantial illegal grow operations throughout the watershed.

KEY FINDINGS AND CONCLUSIONS

The key findings and conclusions for this report are organized as they pertain to source water quality, treatment and regulatory compliance, and watershed contaminant sources. Highlights of these findings and conclusions are presented below.

Raw Water Quality for the Yuba/Bear River

Overall, the Yuba/Bear River provides excellent quality water. The raw water can be treated to meet all drinking water standards using conventional treatment processes. No persistently present constituents that require additional treatment processes have been identified in the raw water. Key findings for the constituents of interest are presented below.

Turbidity

- The median raw water turbidity ranges from 1.6 nephelometric turbidity units (NTU) at the Sunset WTP to 9.5 NTU at the North Auburn WTP. Generally, the raw water turbidity for the Alta, Monte Vista, Loma Rica, Elizabeth George, and Sunset WTPs stays below 10 NTU. During the reporting period, the remainder of the WTPs occasionally rose above 10 NTU, with the Bear River Canal WTPs and Deer Creek WTPs (particularly Smartville WTP) most frequently over 10 NTU.

- Smartville and North Auburn WTP had the most months where raw water monthly averages were above 10 NTU, for 27 months out of 60 months. Higher turbidities at North Auburn WTPs could be due to algal blooms or lack of maintenance in Rock Creek reservoir, maintenance of Bear River Canal, turbid water released from Rollins

Reservoir, and the inability to stop diversion off the canal during storm events. Higher turbidities at Smartville WTP are likely caused by the long canals leading to the water treatment plant, which are more susceptible to local storm runoff.

- Rollins Reservoir can fill with turbid waters during the wet season. This results in higher turbidities at water treatment plants located downstream of Rollins Reservoir, when turbid waters are released from Rollins Reservoir during the winter and spring.

Microbiological Constituents

- The median *E. coli* values ranges from 3.1 most probable number per 100 milliliters (MPN/100mL) at Elizabeth George WTP to 58.3 MPN/100mL at the Smartville WTP.

- *E. coli* levels increase downstream for the Boardman Canal WTPs and the Deer Creek WTPs. There is no clear trend in the data for the WTPs downstream of Rollins Reservoir. These trends are similar to the Second, 2012, and 2017 Updates.

- All of the WTPs, except for Smartville WTP, can continue with their current level of treatment of 3/4-log reduction for *Giardia* and viruses under the Surface Water Treatment Rule (SWTR). The Smartville WTP is currently operated to achieve 4/5-log reduction for *Giardia* and viruses, and should continue.

- Since the Sunset WTP had more than six *E. coli* monthly medians greater than 200 MPN/100mL, a closer examination of its monthly medians was conducted. Of the nine *E. coli* monthly medians greater than 200 MPN/100mL, seven of those monthly medians occurred during months with precipitation. Additionally, it should be noted that the Sunset WTP was not operating during these specific seven months. During operational months, only 11 percent of monthly medians were greater than the threshold. Peak levels can be associated with precipitation, but there are periods when they are not so there are likely other sources contributing *E. coli*.

- PCWA conducted a special study along the Caperton Canal to the Sunset WTP, which showed that *E. coli* increased the most from Caperton Canal to Clark Tunnel Road. *E. coli* levels increased again, although slightly less, from Clark Tunnel Road to Woodsdale Court. Cattle were observed to be located primarily from Clark Tunnel Road to Woodsdale Court.

- The Caperton Reservoir Improvement Project and the encasement of approximately 2,900 linear feet of the existing Caperton Canal (from approximately Clark Tunnel Road to Woodsdale Court) is expected to improve source water quality and reliability for the Sunset WTP.

- Higher *E. coli* levels at the Lake of the Pines WTP are often related to precipitation events and also ranch land along Magnolia III Canal where cattle have been observed. Encasement of the Magnolia III canal through the Baldwin Ranch area has resulted in a reduction in the frequency and magnitude of peak *E. coli* levels at Alexis Drive, however *E. coli* peaks still occur at the Lake of the Pines WTP influent. NID staff suspect that the *E. coli* levels may be due to geese overnighting on the reservoir surface leading to the WTP.

- All PCWA and NID WTPs are classified under Bin 1 for Round 2 of LT2ESWTR monitoring.

Disinfection By-Product Precursors

- Average TOC levels for all WTPs range from 1.4 milligrams per liter (mg/L) at Lake Wildwood and Foothill 1 WTPs to 2.6 mg/L at Smartville WTP.

- TOC levels did not increase consistently downstream for similar groupings of WTPs.

- Smartville WTP has the highest TOC levels, likely due to exposure to a natural watercourse (Squirrel Creek) and local canals.

- TOC levels are seasonally variable, with the peak levels typically occurring during the wet season (late fall to early spring).

- Temperature plays a role in DBP formation; however, it is evident that other factors are also impacting formation (water age, pH, and TOC) and appear to be more significant.

- Overall, HAA5 formation is less correlated to temperature than TTHM formation.

- PCWA and NID have both implemented best management practices to reduce DBP formation such as installation of tank mixers and vents at selected storage facilities.

Individual Intake Evaluations

All of the water treatment plants are currently in compliance with all existing drinking water regulations. PCWA and NID implement various types of treatment processes, depending on facility size and source water quality, and meet all current drinking water standards, including maximum contaminant levels (MCLs) and treatment technology requirements. Below is a summary of the selected treatment and regulatory compliance issues.

Turbidity

All treated water turbidity standards were met at all of the water treatment plants. The average raw water turbidity at the water treatment plants varies from 1.7 NTU at Sunset WTP to 15.8 NTU at North Auburn WTP; while the average treated water turbidity varies from 0.02 NTU at Sunset WTP to 0.05 NTU at Alta WTP. Overall, each of the water treatment plants achieves large amounts of solids removal with overall reductions varying from 97.9 to 99.7 percent removal.

Microbiological Constituents

All treated water coliform standards were met in each of the distribution systems. There were a few occasions of total coliform positive results, but none resulted in fecal coliform detects or violations of the Total Coliform Rule.

Disinfection By-Products

All of the water treatment plants met the alternative compliance criterion for enhanced coagulation by having raw or treated water TOC running annual average (RAA) levels less than 2 mg/L.

The treated water Stage 2 D/DBPR standards were also met in each of the distribution systems. All of the water treatment plants have DBP locational running annual average (LRAA) levels below the primary MCLs, 80 and 60 ug/L, for TTHMs and HAA5 respectively.

PCWA was required to conduct Operational Evaluations under the Stage 2 D/DBPR for the Applegate and Auburn Bowman distribution systems based on triggers in 2018 and 2016, respectively. Both systems have had mixers and vents installed in treated water storage facilities to reduce DBPs.

Other Detectable Title 22 Constituents of Interest

There were minor detections of lead and copper in the distribution system for several of the systems, but none of the 90th percentile values exceeded the respective Action Levels. Alta WTP had low level detects of arsenic, well below the primary MCL. Elizabeth George, Loma Rica, and Lake of the Pines WTPs had detectable levels of aluminum, well below the primary and secondary MCLs. Elizabeth George also had detectable levels of iron, well below the secondary MCL.

Other Detectable Unregulated Constituents

PCWA sampled four of its WTPs (Bowman, Auburn, Foothill 1/Foothill 2, and Sunset) and NID sampled two of its WTPs (Elizabeth George and Loma Rica) for unregulated constituents under the Unregulated Contaminant Monitoring Rule 4. Most constituents were non-detectable, including all cyanobacteria. There were low level detects of manganese, well below the secondary MCL. In addition, monitoring for brominated haloacetic acids in the distribution systems resulted in very low levels of these species and no significant increase in the concentration of total haloacetic acids.

NID also conducted monitoring for its WTPs in 2016 for hexavalent chromium, and it was detectable at very low concentrations in all source waters. There is currently no drinking water standard to compare with.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the total and fecal coliform data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus appears to continue to be appropriate reduction requirements for all of the water treatment plants, except the Smartville WTP. Smartville WTP has historically provided 4/5-log reduction and should continue to do so based on source water quality and the potential influence of upstream contaminating activities.

Based on the bin classification process for Round 2 of the LT2ESWTR all the water treatment plants were classified as Bin 1, requiring 2-log reduction of *Cryptosporidium*. DDW has approved Lake Wildwood WTP moving to Bin 1 based on the Round 2 monitoring results, and Bowman WTP should also be moved to Bin 1.

The water treatment plants implement either conventional or direct filtration to receive reduction credit for *Giardia*, viruses, and *Cryptosporidium* for physical removal. Disinfection with free chlorine provides the remaining credit for *Giardia* and viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR, either the Interim Enhanced SWTR (IESWTR) or the Long Term 1 ESWTR, and the LT2ESWTR.

Watershed Contaminant Sources

There are numerous types of potential contaminating activities in the watershed. Nine activities were selected for evaluation in this report based on constituents of interest and predominance in the watershed. Selected findings for each of these activities are provided below.

Canal Aquatic Herbicide Use

Although there is limited pesticide application in the Yuba/Bear River watershed, it has the potential to be significant in terms of source water quality due to the drinking water regulations for the pesticides used and its proximity of use to the water treatment plants. This evaluation focused on the seasonal algae control programs implemented by PCWA and NID.

Many of the conveyance canals, as well as Alta Forebay, Halsey Forebay and Afterbay, and Rock Creek Reservoir, are owned and operated by Pacific Gas and Electric (PG&E). PG&E does not conduct any chemical treatment of algae or aquatic plants; they use manual methods such as drawdown and pressure washing. There is limited investment in regular maintenance of these facilities with regard to protecting source water quality.

PCWA and NID apply herbicides as needed, typically sometime between April and October, which are based on chemical control using herbicides. During the study period PCWA used Cutrine-Plus and Cutrine-Granular (copper ethanolamine herbicide) and Algimycin-PWF (copper chelated based algaecide/cyanobacteriocide). During the study period NID used Cutrine–Ultra and Cutrine Plus (copper ethanolamine herbicide), Rodeo (glyphosate herbicide), Round Up Custom (glyphosate herbicide), Nautique (copper carbonate herbicide), Green Clean Pro (sodium carbonate peroxyhydrate algaecide), and Captain (copper ethylenediamine complex chelated copper herbicide). Both agencies have coverage under a General NPDES Permit from the State Board and are in strict accordance with the permit terms. Each has submitted an Aquatic Pesticide Application Plan (APAP). The agencies are careful not to apply the copper-based chemicals near the water treatment plant intakes and water treated with glyphosate is not diverted to the intakes.

A review of water quality from the PCWA and NID water treatment plants shows that there have been no detects of organics in the source water. Also, copper levels in the treated water are either non-detectable or well below the action level of 1.3 mg/L.

Rangeland Livestock

Livestock in the Yuba/Bear River watershed primarily includes cattle and sheep and is a relatively small livestock population in the watershed, especially rangeland grazing cattle. Cattle are the livestock of more concern because they are a known host for *Cryptosporidium parvum*. Also, there are several areas in close proximity to the water treatment plants where the cattle grazing could be more significant, such as near the Auburn, Lake of the Pines, Lake Wildwood, Sunset, and Smartville WTPs.

The total livestock population documented by the United States Department of Agriculture for Nevada County, including both rangeland and dairy cows, was just over 4,100 in 2017. This is an approximate 14 percent decrease over the five-year period from 2012 to 2017, and a 19 percent decrease over the past fifteen years. There are three active United States Forest Service (USFS) grazing allotment in the upper watershed; Canyon Creek, Pass Creek, and English Mountain Allotments. In addition, NID manages a grazing lease along the Bear River below Rollins Reservoir, the Luster Lease. Four areas of particular interest are private ownership in the watershed include; Squirrel Creek watershed, along Magnolia III canal, along the Ragsdale Random in Meadow Vista, and along the Caperton Canal.

Rangeland research published during the study strongly supports the effectiveness of best management practices related to vegetated buffers and grazing intensity to reduce the impact on source water quality. The State Board is preparing a new Statewide Grazing Guidance, rather than implement a regulatory approach for management.

A review of available *Cryptosporidium* data for the water treatment plants indicates that there are relatively low levels throughout the watershed, with a significant reduction in concentrations between Round 1 and Round 2 of the LT2ESWTR, and no consistent relationship on seasonal or geospatial trends. The impacts are expected to be highly localized.

Forest Activities

This study identified timber harvesting and wildfires as activities of significant interest. 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. Timber harvesting on federal lands is regulated by the USFS and by the California Department of Forestry and Fire Protection (CALFIRE) on state and private lands. There continues to be more timber harvest harvesting on state and private lands, compared with federal lands. CALFIRE is permitting more timber harvesting through the Exemption and Emergency Notice program than through tradition timber harvest plans on private land, in order to address hazardous fuels reduction and comply with the new California Vegetation Treatment Program.

A review of the Nevada County Agricultural Commissioner's annual crop report shows that harvesting operations were quite variable during the study period. This could be explained by the fact that most of the timber harvesting in the Yuba/Bear River watershed is by commercial growers, such as Sierra Pacific Industries, who have plans for rotational harvesting cycles and also implement salvage harvesting after wildfires.

Wildfires cause the loss of ground cover, the chemical transformation of soil, and the reduction in soil infiltration rates which all increase the likelihood of erosion and hydrophobic soils, contributing to increased solids in the receiving water and an increase in the turbidity of the raw water at the water treatment plants. There were only three fires in the watershed (either fully or partially), one in the Bear River sub basin and two in the Squirrel Creek sub basin.

A specific review of the turbidity and TOC data show that there are distinct seasonal peaks in both constituents during the wet winter months. It is possible that erosion from burned areas is contributing to those peaks.

NID implements forest best management practices to address sediment transport and fuel reduction on their lands in the watershed. Both NID and PCWA participate in the Cosumnes, American, Bear, Yuba Regional Integrated Water Master Planning effort. This includes applying for grant funding of a variety of projects, including source water protection efforts to reduce fuels and improve forest health. NID received funding to encase a portion of the Meade Canal to the Smartville WTP. PCWA received funding to install mixers and vents on storage tanks in the Applegate and Auburn Bowman distribution systems to reduce DBP formation.

Recreation

There is a large amount of recreation that occurs in the Yuba/Bear River watershed. Recreation occurs in each of the sub basins, at varying levels. Recreation includes body and non-body contact activities. Body contact recreation includes swimming, wading, and rafting and is allowed on all major reservoirs and river reaches in all sub basins. Non-body contact recreation includes camping, boating, off-highway vehicle (OHV) and over-snow vehicle (OSV) use, fishing, hiking, biking and winter activities such as snow play, skiing and snowmobiling.

Camping occurs in both formal campgrounds, nearly 50, and dispersed in the Tahoe National Forest. A review of user statistics for NID shows that the annual use of their recreational facilities is also quite large and is likely to have associated impacts.

Some of the key day-use activities that occur in the watershed include hiking, OHV use, boating, fishing, cross-country skiing, and snowmobiling. The USFS completed the Travel Management Program to designate OHV roads and trails. Motorized Vehicle Use Maps have been developed for the forest. The USFS has now completed a similar process to designate roads and trails for OSV in the Forest.

PG&E allows access to most of its facilities for day-use including parts of the water supply system such as Deer Creek Forebay, Drum Forebay and Afterbay, Alta Forebay, Halsey Forebay and Afterbay, Rock Creek Reservoir, and Wise Forebay. Most of these are limited to on-shore fishing with limited parking available.

Day-use for the lower Bear River and Squirrel Creek does have significant use during the warm weather months of July, August, and September. Access to the Bear River is used at the Highway 174 and Dog Bar Road crossings and in the area of the Bear River Campground, as well as the adjacent landowners. There are sanitation facilities near the Bear River Campground, but not at any other of these areas. Squirrel Creek recreation is centered on the Western Gateway Regional Park in Penn Valley. There are sanitation facilities provided.

Recreation analysis by USFS, NID, and PG&E all indicate that activities will be expanded in the future and each agency is planning to upgrade or expand current recreational facilities.

Studies conducted by the Central Valley Regional Water Quality Control Board (Regional Board) support that there are distinct impacts on Squirrel Creek that may be attributed to by recreationalists.

Source Water Spills

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.

A review of the California Office of Emergency Services (Cal OES) Hazardous Materials Spill Reports revealed 84 incidents in the watershed. Most were petroleum spills associated with vehicular accidents or small volume sewage spills. There were seven Category I Sanitary

Sewer Overflows. The participating water agencies did not receive notification via Cal OES/DDW for most of these events.

Due to the failure of the Cal OES/DDW formal notification process, both PCWA and NID have developed informal spill notification programs to attempt to obtain timely notification in the event that a spill threatens the source water quality for a water treatment plant. Both agencies have requested direct notification from their respective County OES in the event that a canal or receiving water is impacted. Both agencies also coordinate closely with PG&E regarding source water quality. PCWA has enhanced coordination with the California Highway Patrol and the California Department of Transportation due to frequent spill events along Interstate 80 that have the potential impact source water quality.

Wastewater

There are three permitted NPDES wastewater treatment plants discharging to the Yuba/Bear River system; Donner Summit Public Utilities District (PUD), Cascade Shores, and City of Nevada City. These are shown on the Watershed Map, **Figure 2-1**. There are five additional entities with collection systems located in the watershed.

The Donner Summit PUD facility is located in the upper watershed and provides full nitrification and denitrification. The Cascade Shores Wastewater Treatment Plant (WWTP) discharges to Gas Canyon Creek, which is a tributary to Greenhorn Creek and eventually discharges to Rollins Reservoir. The City of Nevada City WWTP discharges to Deer Creek, just west of Nevada City. Donner Summit PUD and Cascade Shores WWTP had minor violations during the study period, but generally discharge in compliance with their NPDES permits. The City of Nevada City WWTP had more significant compliance issues during the study period and has been implementing several compliance projects to improve treatment and discharge effluent quality.

In addition, although there are numerous land discharge systems and individual on-site septic systems located in the watershed there is only one land discharge facility of interest due to its proximity to Squirrel Creek. This is the Penn Valley Mobile Home Park (MHP). The Penn Valley MHP uses evaporative percolation ponds located on the north side of Squirrel Creek for wastewater treatment. The Regional Board encouraged this permittee to connect to the sanitary sewer and this was completed in 2021. The Penn Valley MHP no longer discharges to the ponds and will initiate a formal closure of the facility and the WDRs.

Urban Runoff

There is limited urbanization of the watershed upstream of the WTPs. Small cities and urban areas are regulated under the Phase II Stormwater Program. Under the Phase II Stormwater Program, Stormwater Management Plans (SWMP) were implemented with specific best management practices (BMPs) to minimize pollution, including implementation of treatment BMPs in new development. Monitoring was not required for any Phase II permittees in the Yuba/Bear River watershed.

There is one NPDES Stormwater Phase I permit; the Statewide California Department of Transportation (Caltrans). There are three Phase II permits; the cities of Grass Valley and Auburn and Placer County/North Auburn. An inventory of the Construction Stormwater Program resulted in identification of 16 sites during the study period in the watershed. An inventory was conducted to identify the Industrial Stormwater Permittees in the watershed, resulting in 14 permits in the watershed. There was limited ambient monitoring data conducted by these programs.

Mining

Mining has occurred in the Yuba/Bear River watershed for over 150 years. The intensity of use has decreased remarkably over that time, so that mining is now a relatively minimal activity. There have been no detections at levels of concern for constituents specific to mining at the WTPs. Mining occurs on both public and private lands for both metallic and non-metallic ores. Currently, there are four active surface mines, three of which quarry for sand, rock and stone and one is a new gold mine. Two of the mines have industrial stormwater permits, the other two appear to be remiss (Blue Lead Gold Mine and Sierra Boulder).

The Lava Cap Mine is an active Superfund Site where management continues. The mine has been capped and discharge will be treated by 2023.

Outdoor Cannabis Cultivation

Outdoor cannabis cultivation has grown exponentially in the watershed, especially in Nevada County, during the study period. Both adult personal and medical use cultivation is legal on private property, however there are county-specific requirements for legal cultivation. Outdoor cultivation has the potential to impact source water quality since the grow sites typically result in erosion, use of fertilizers and pesticides, and collection of trash. The outdoor cultivation period is typically April through October.

Cannabis cultivation is regulated at the State level by the Department of Cannabis Control (DCC) and locally by the three watershed counties. Nevada County is the only county to allow commercial cultivation activities. There is little information to quantify the presence of illegal outdoor cultivation activities.

RECOMMENDATIONS

Table ES-1 presents the recommendations developed for this 2021 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 is critical. Recommendations will be implemented by the participating water agencies as they have resources available.

Table ES-1
2021 Update Recommendations

Water Quality and Treatment

Recommendation	**Agency Impacted**
Continue to optimize treatment during times of potentially reduced source water quality – i.e., adjust coagulant dose, optimize polymers, reduce flow if possible to increase hydraulic detention times and reduce filtration loading rates, ensure optimized disinfection practices and contact time (CT).	PCWA and NID
Continue to optimize disinfection treatment during higher temperature periods to minimize DBP formation. Consider effects of water age on DBP formation. Consider assessing distribution system management practices which may affect detention time and optimize to prevent formation of DBPs. This could include; installation of tank mixers, increased flushing at dead ends, correlating water production more closely during transitional demand periods (i.e., fall), and optimize storage volume in the tanks seasonally.	PCWA and NID
Consider investigating possible microbial contamination sources at the Lake of the Pines and Lake Wildwood WTPs onsite reservoirs (i.e., overnighting geese, local drainage, algal blooms).	NID
Request DDW reassign Bowman WTP from Bin 2 to Bin 1 classification under LT2ESWTR based on the findings of this 2021 Update Report. Until then, continue to meet enhanced treated water turbidity limits to achieve 1-log action credit.	PCWA
Continue to encourage canal protections (encasements) upstream of water treatment plants to protect source water quality.	PCWA and NID
Consider replacing Canyon Creek with engineered conveyance between Drum Forebay and Alta Forebay to minimize risk of spills along Interstate 80.	PCWA

Table ES-1 Cont'd
2021 Update Recommendations

Watershed Contaminant Sources

Recommendation	Agency Impacted
Consider enhancing coordination and communication with PG&E to discuss on-going maintenance needs throughout conveyance system to protect source water quality (i.e., reservoir dredging, chemical or mechanical treatment of vegetation).	PCWA and NID
Continue to use the Cosumnes, American, Bear, and Yuba Rivers Integrated Regional Water Management Plan as a vehicle for grant funding of projects related to water quality. Consider submitting application for grant funding of source water protection projects such as canal encasement, public education along the canals, pet waste management stations along the canals, and canal fencing through vulnerable areas.	PCWA and NID
Consider contacting the Regional Board to confirm that Deer Creek and its tributaries, specifically Squirrel Creek, are formally designated with the Municipal (MUN) Beneficial Use as part of the Sacramento River Basin Plan.	NID
Consider formal outreach to City of Nevada City, City of Grass Valley, and Nevada County Sanitation District regarding education on water supply system and request for notification of significant sanitary sewer overflows to Deer Creek or Squirrel Creek.	NID
Consider establishing contact with the California Department of Fish and Wildlife (DFW) staff at the Oil Spill Prevention and Response (OSPR) program to ensure that upcoming Geographic Response Plans (GRPs) for the Yuba and Bear River include all water treatment plants accurately.	PCWA and NID
Consider contacting State Board/Regional Board/DFW regarding the conduct of cannabis cultivation inspections in the Yuba/Bear River system.	PCWA and NID

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This report presents the findings of the 2021 Update to the Yuba/Bear River Watershed Sanitary Survey (2021 Update). This study covers the period January 2016 through December 2020. The initial watershed sanitary survey was completed in 1996 (1996 Survey), the first update was completed in 2002 (2002 Update), the second update was completed in 2007 (Second Update), the third update was completed in 2012 (2012 Update), and the fourth update was completed in 2017 (2017 Update) in accordance with the California Surface Water Treatment Rule (SWTR).

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

PARTICIPATING WATER AGENCIES

Placer County Water Agency (PCWA) and Nevada Irrigation District (NID) jointly conducted the 1996 Survey, the 2002 Update, the Second Update, the 2012 Update, and the 2017 Update. This 2021 Update has been conducted by these agencies as well. Together these two are herein referred to as the participating water agencies.

2021 UPDATE OBJECTIVES

The overall objective of this 2021 Update is to assess the source water quality of the Yuba/Bear River to ensure the ability of the existing water treatment plants for the participating water agencies to continue to provide their customers with drinking water that meets all drinking water standards.

A watershed sanitary survey focuses on the first barrier to contamination of the drinking water supply; 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 fully assess the ability of the participating water agencies to treat the Yuba/Bear River source water, some evaluation of treatment plant capabilities and treated water quality is also necessary. Therefore, certain aspects of the second barrier (water treatment) are also evaluated in relationship to water quality.

This 2021 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. 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 evaluate selected constituents of interest to identify potential water quality or treatment issues at each water treatment plant. Assess the ability of the water treatment plants to meet standards based on current and future regulatory framework.

Develop recommendations for treatment plant actions to address water quality or treatment issues and/or address planning needs to meet expected future regulations.

- Review and evaluate selected potential contaminating activities to identify impacts on source water quality. Determine whether it may be useful to conduct additional monitoring to further assess contaminant levels in the source water or contaminants from a particular watershed source.

- Identify appropriate watershed management actions to protect and possibly improve source water quality. Develop recommendations for watershed management actions that are economically feasible and within the authority of the participating water agencies to implement. Of importance is to target contaminant activities that are most likely to affect source water quality, such as activities located near the water treatment plants or activities that are predominant in the watershed.

CONSTITUENTS AND TOPICS COVERED IN THE 2021 UPDATE

Several water quality constituents were selected for evaluation as part of the 2021 Update. **Table 1-1** presents a summary of the water quality constituents selected and the reason for selection.

Nine potential contaminating activities were selected for review as part of the 2021 Update:

- Canal aquatic herbicide use,
- Rangeland livestock,
- Forest activities, including timber harvesting and wildfires,
- Recreation,
- Source water spills,
- Wastewater,
- Urban runoff,
- Mining, and
- Cannabis cultivation.

Each of these activities can contribute at least one of the constituents identified in **Table 1-1** to the source water.

Table 1-1
Water Quality Constituents Selected for Evaluation as Part of the 2021 Update

Constituent	Reason for Inclusion in 2021 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*)	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. Source water levels of *Cryptosporidium* are used to determine treatment requirements under 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 under the Stage 1 Disinfectant/Disinfection By-Product Rule (D/DBPR).
Other Detectable Constituents	Other constituents of interest regulated under Title 22 and unregulated constituents for which monitoring is required were considered for potential impacts to treatability or treated water quality.
Temperature	Temperature is a water characteristic that affects the source water quality, treatability, and treated water quality of drinking water. The study period included a significant drought that impacted source water temperature so evaluation was conducted to see if impacts were related on DBP formation.
Total Trihalomethanes	Total trihalomethanes (TTHMs) are disinfection by-products formed in treated water. Treated water levels are regulated under the Stage 1 D/DBPR and the Stage 2 D/DBPR.
Haloacetic Acids	Haloacetic acids (HAA5) are disinfection by-products formed in treated water. Treated water levels are regulated under the Stage 1 D/DBPR and the Stage 2 D/DBPR.

Description of How the 2021 Update was Conducted

The project team consisted of a Technical Committee (TC) comprised of representatives from both participating water agencies and the consultant team of Starr Consulting and Palencia Consulting Engineers. The TC reviewed data evaluation and identification and development of key findings and recommendations.

The consultant team obtained information from all water treatment plants through an agency survey that addressed each treatment plant's processes, including a discussion of treatment challenges and changes since the 2017 Update. The participating water agencies provided raw and treated water data as well as information on their actions relevant to recommendations from the 2017 Update.

The consultant team collected information on contaminant sources in the watershed through literature reviews, Internet searches, and discussions with various agencies' staff. A list of references is provided in **Appendix A**.

REPORT ORGANIZATION

Section 1 - Introduction

This section identifies the participating water agencies that funded the study, describes the objectives of the 2021 Update, lists the main topics and constituents covered in the 2021 Update, describes how the 2021 Update was conducted, and includes a description of the basic report organization.

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, and (2) a description of each of the existing water supply systems. There have been very few significant changes in the watershed and water supply systems; therefore, the reader is referred to the 1996 Survey and the 2002 Update for more detailed descriptive information on watershed characteristics. This 2021 Update includes an update to the boundary delineations for the Bear River Above Combie Reservoir and Rock Creek Reservoir sub basins, which included small expansions to incorporated areas that contribute to the local canal system.

Section 3 – Yuba/Bear River Water Quality Review

This section contains two parts. The first part provides an overall review of the available source, or raw, water quality data in the watershed, including third party ambient monitoring programs. The second 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. **Appendix B** contains summaries of the water treatment plants' data used for this review. **Appendix C** provides the regulatory framework used for the compliance evaluations.

Section 4 - Watershed Contaminant Sources Review

This section describes pertinent characteristics of each of the nine potential contaminating activities that were reviewed as part of this study. **Appendix D** provides summaries of data collected as part of the contaminant source review.

Section 5 - Individual Intake Evaluations

This section contains an evaluation of all of the water treatment plant's treated water quality, as well as an evaluation of each water treatment plant's ability to meet the SWTRs and other existing regulations. **Appendix B** contains summaries of the water treatment plants' data used for this review. **Appendix C** provides the regulatory framework used for the compliance evaluations.

Section 6 - Findings and Recommendations

This section consists of key findings and a list of recommendations. Significant changes since the 2017 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 1996 Survey. For a more detailed account of this information, the reader is referred to the 1996 Survey and the 2002 Update. This 2021 Update includes minor modifications to the Bear River Above Combie Reservoir and Rock Creek Reservoir sub basin boundary delineations. The boundary delineations were expanded to include local runoff with the potential to enter the canal system as described below.

This section provides a description of the overall watershed including the ten sub basins, the canal water supply systems, and water treatment facilities, including a summary of significant changes since the 2017 Update. This work 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

Placer County Water Agency (PCWA) and Nevada Irrigation District (NID) both utilize water from the Yuba and Bear Rivers. The watersheds are located on the western slope of the Sierra Nevada in Sierra, Nevada and Placer counties. The watershed map is provided as **Figure 2-1**. There were some minor changes since the 2017 Update, these are described in the sub basin discussions below. Water is collected and transported in a variety of creeks, rivers, reservoirs, canals, and pipes. The water is eventually distributed to the fourteen water treatment plants for the participating water agencies.

The watershed includes several large lakes (Jackson Meadows, Bowman, Meadow, Fordyce, Spaulding, Lake Valley, Scotts Flat, Rollins, Combie), numerous small lakes (Milton, French, Jackson, Faucherie, Sawmill, Rucker, Feeley, Carr, Culbertson), and several key creeks and rivers (Fordyce, Middle and South Yuba, Deer, Bear, Squirrel). In addition to drinking water supply, these are used for other purposes including agricultural supply, power generation, and recreation. It should be noted that the canals that transport water below the watershed sub basins are mostly open ditches which have the potential to capture a small amount of local runoff and these contributions are minimally included in this evaluation.

Provided below is a brief description of each of the ten sub basins in the watershed.

Middle Yuba River above Milton Reservoir

The Middle Yuba River above Milton Reservoir has a watershed that is 39.3 square miles, or just over 25,000 acres, with elevations ranging from 5,700 to 8,200 feet and is largely covered by mixed coniferous forest. It is located in Sierra and Nevada counties. The sub basin ownership is approximately 50 percent Tahoe National Forest and 50 percent private. The principal uses in the sub basin are timber harvesting and year-round recreation. The principal water bodies are Jackson Meadows Reservoir (fed by Middle Yuba River and Pass Creek) and Milton Reservoir.

NID and PCWA
YUBA/BEAR RIVER WATERSHED MAP
2021 UPDATE

Watershed Boundary
Figure 2-1

Canyon Creek and Jackson Creek above Bowman Reservoir

The watershed above Bowman Reservoir is 30.4 square miles, or nearly 20,000 acres, with elevations ranging from 5,564 to 8,400 feet. It is largely covered by mixed coniferous forest. It is located in Nevada County. The sub basin ownership is approximately 60 percent Tahoe National Forest and 40 percent private. The principal uses in the sub basin are timber harvesting, seasonal recreation (spring to fall), and grazing. Bowman Reservoir is fed by Jackson Lake, via Jackson Creek, and French, Faucherie, and Sawmill lakes, via Canyon Creek.

Texas/Fall Creek System

Texas and Fall creeks have a watershed that is 17.2 square miles, or almost 11,000 acres, with elevations ranging from 5,400 to 7,700 feet and is largely covered by mixed coniferous forest. It is located in Nevada County. The sub basin ownership is approximately 50 percent Tahoe National Forest and 50 percent private. The principal uses in the sub basin are timber harvesting and year-round recreation. Water is stored in numerous small lakes, including; Upper Rock, Lower Rock, Culbertson, Upper Lindsey, Middle Lindsey, Lower Lindsey, Upper Feely, Lower Feely, Blue, Rucker, and Fuller. Water is then released to Rucker, Fall, Clear and Texas creeks where it is re-regulated into the Bowman-Spaulding Canal.

Fordyce Creek above Spaulding Reservoir

The Fordyce Creek watershed is 30.5 square miles, or nearly 20,000 acres, with elevations ranging from 6,400 to 9,000 feet and is largely covered by mixed coniferous forest. It is located in Nevada County. The sub basin ownership is approximately 50 percent Tahoe National Forest and 50 percent private. The principal uses in the sub basin are timber harvesting and year-round recreation. The principal reservoirs in the sub basin are Meadow and Fordyce, which release flows to Fordyce Creek and thence to Spaulding Reservoir.

South Yuba River above Spaulding Reservoir

The South Yuba River watershed is 86 square miles, just over 55,000 acres, with elevations ranging from 5,000 to 9,000 feet and is largely covered by mixed coniferous forest. It is located in Nevada and Placer counties. The sub basin ownership is approximately 35 percent Tahoe National Forest and 65 percent private. The principal uses in the sub basin are timber harvesting and year-round recreation, as well as some grazing. Interstate 80, the Union Pacific Rail Road, and the Kinder Morgan Petroleum Pipeline parallel the South Yuba River. The principal water bodies include Lake Van Norden and Kidd Lake, as well as the South Yuba River which flows to Spaulding Reservoir.

North Fork of the North Fork of the American River above Lake Valley Reservoir

The Lake Valley Reservoir watershed is 9.1 square miles, or nearly 6,000 acres, with elevations ranging from 5,475 to 6,824 feet and is largely covered by mixed coniferous forest. It is located in Placer and Nevada counties. The sub basin ownership is approximately 70 percent Tahoe National Forest and 30 percent private. The principal uses in the sub basin are timber harvesting and year-round recreation. Lake Valley Reservoir and Lake Valley Canal are the principal water bodies in the sub basin.

Bear River above Combie Reservoir

The watershed for the Bear River above Combie Reservoir is 134.9 square miles, over 86,000 acres, with elevations ranging from 1,600 to 5,200 feet and is largely covered with evergreen and mixed forest. It is located in Nevada and Placer counties. The sub basin ownership is approximately 20 percent Tahoe National Forest and 80 percent private. This sub basin contains nearly 20 rural community areas, such as; Alta, Dutch Flat, Peardale, Chicago Park, Colfax, Weimar, and Meadow Vista. The other principal uses in the watershed include timber harvesting, seasonal recreation (primarily Memorial to Labor days), and agriculture. Interstate 80, the Union Pacific Rail Road, and the Kinder Morgan Petroleum Pipeline travel along the southern boundary of the watershed. The principal water bodies are Rollins Reservoir, which is fed by imported water, the Bear River, and Greenhorn and Steephollow creeks, and Combie Reservoir, fed by the Bear River.

Deer Creek above the Tunnel Canal Diversion

The watershed for Deer Creek above the Tunnel Canal Diversion is 44.7 square miles, or almost 29,000 acres, with elevations ranging from 1,900 to 5,000 feet and is largely covered with evergreen and mixed forest. It is located in Nevada County. The sub basin ownership is approximately 25 percent Tahoe National Forest and 75 percent private. This sub basin contains portions of both Nevada City and Grass Valley, as well as several other rural community areas. Other uses in the watershed include timber harvesting and recreation. Highway 20 travels along the northern boundary of the watershed. The principal water body is Scotts Flat Reservoir, which Deer Creek flows through.

Squirrel Creek above China Union Canal Diversion

Water from Deer Creek is diverted through the Tunnel Canal into Squirrel Creek near Rough and Ready. The water is conveyed via Squirrel Creek to the China Union Canal below Lake Wildwood. The watershed for Squirrel Creek above China Union Canal is 26 square miles, or almost 17,000 acres, with elevations ranging from 1,070 to 2,570 feet. The sub basin is located in Nevada County and is largely privately owned. The sub basin contains portions of Grass Valley, Rough and Ready, and Penn Valley. The landscape is still primarily oak-studded grasslands. Other uses in the watershed include recreation, grazing, and farming. The principal contributing water bodies are Tunnel Canal and Squirrel, Grub, and Clear creeks.

Rock Creek Reservoir

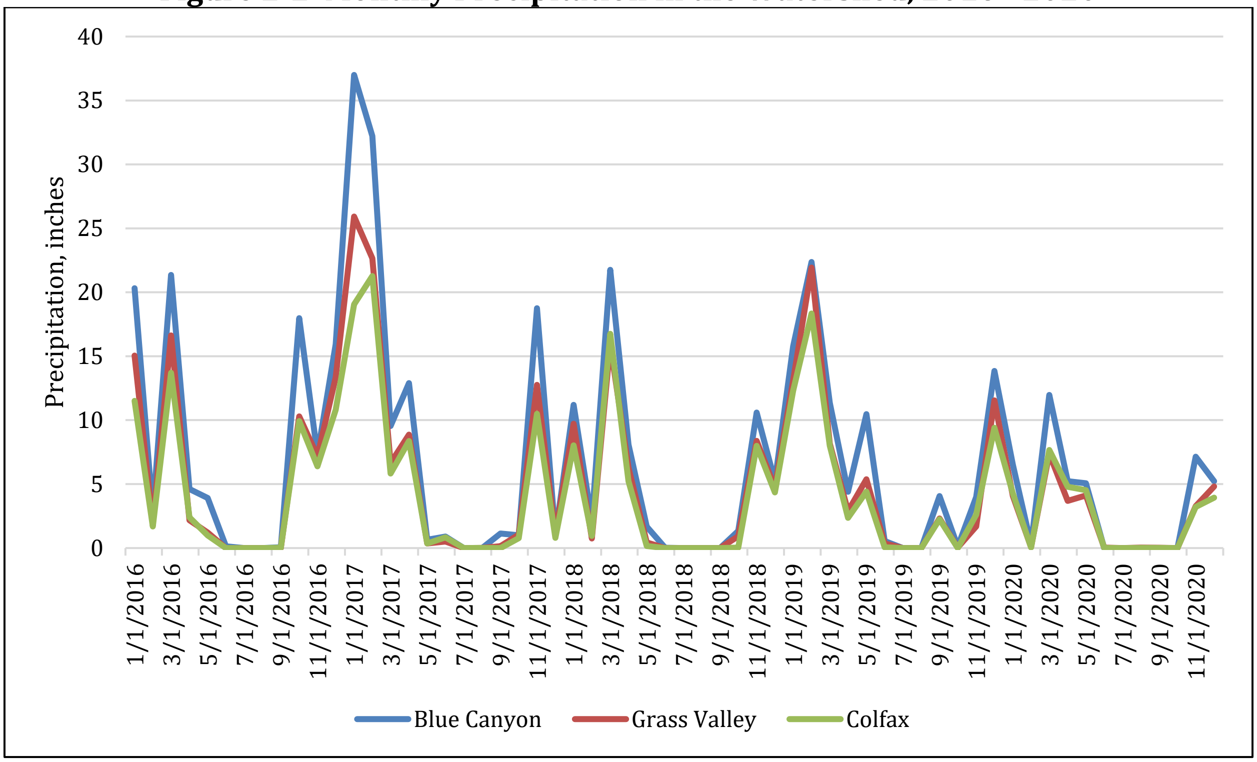
The local watershed for Rock Creek Reservoir is 2.3 square miles, nearly 1,500 acres, with elevations ranging from 1,440 to 1,692 feet. The sub basin ownership is totally private and wholly located within Placer County. The sub basin contains a portion of North Auburn. The watershed includes native oak-studded grasslands, but has significant urban development and associated landscaping. The principal contributing water bodies are imported water, Upper Dry Creek, Wise Canal, Rock Creek, and local drainage.

Watershed Hydrology During Study Period

During this study period there was wide variability in the hydrology, including precipitation, reservoir storage, and canal diversions, that had the potential to impact source water quality.

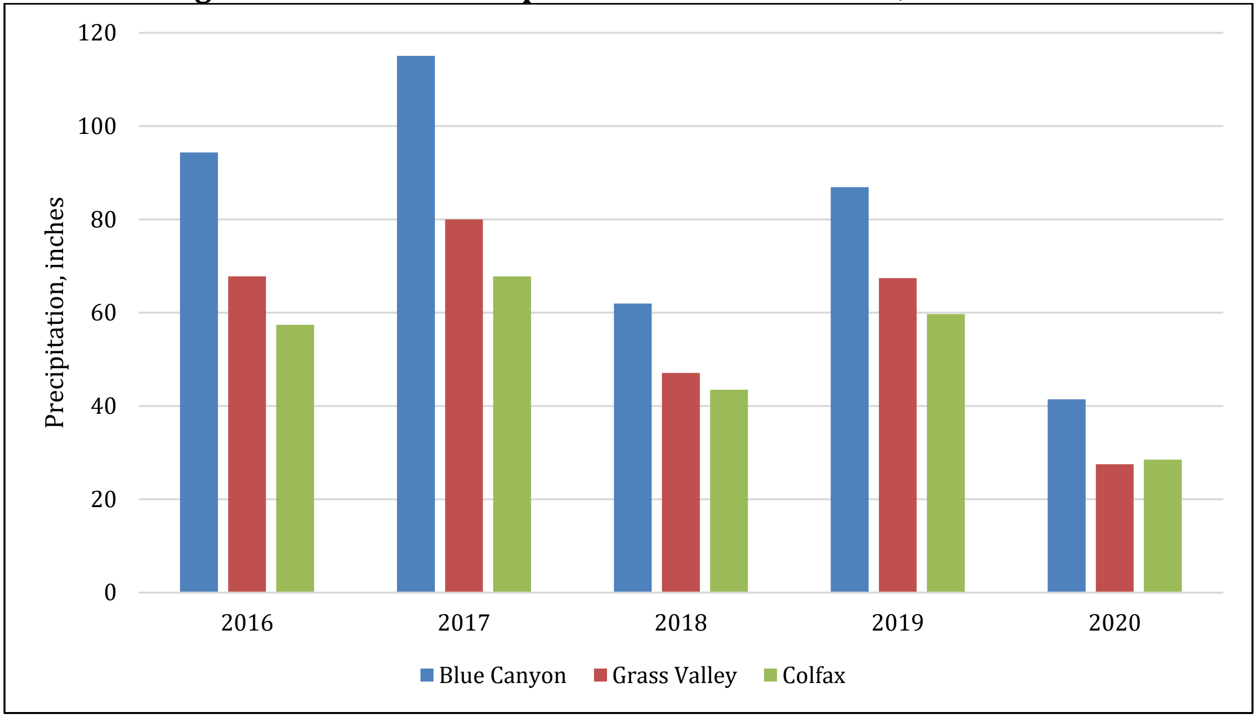
The study period, 2016 through 2020, included periods of above average rainfall and periods of extended drought. **Figure 2-2** provides a timeseries plot of the monthly precipitation at Blue Canyon (Yuba River upper watershed), Colfax (Bear River lower watershed), and Grass Valley (Deer Creek lower watershed). The winter month wet season is evident in the chart.

Figure 2-2. Monthly Precipitation in the Watershed, 2016 - 2020



When reviewing annual precipitation totals, **Figure 2-3** shows that Blue Canyon gets the highest annual rainfall while Colfax has the lowest. It can also be seen that the years can vary significantly, with 2016 and 2019 being close to normal water years, 2017 being an above normal water year, and 2018 and 2020 being below normal water years.

Figure 2-3. Annual Precipitation in the Watershed, 2016 - 2020



The amount of precipitation occurring each year determines the amount of storage available in key reservoirs in the watershed. Storage volumes were available for Rollins Reservoir and Scotts Flat Reservoir, but not for Lake Spaulding. The seasonal fill and release cycles are evident each year in **Figure 2-4**.

The amount of water flowing through the canals to the water treatment plants from the upper watershed to the lower watershed can be better understood when evaluating the canal diversions. The monthly canal diversions, as shown in **Figure 2-5**, exemplify the seasonal trends in the South Yuba Canal (to NID water treatment plants) and the Drum Canal (to PCWA water treatment plants). The Drum Canal has much higher flows, likely due to the amount of water transported by Pacific Gas and Electric (PG&E) for power generation, and has significantly larger swings in diversion rates, likely attributable to seasonal power demand. The annual canal diversions, as shown in **Figure 2-6**, allow comparison of water in the canals by water year. The Drum Canal annual diversion volume is significantly larger than the South Yuba Canal. The South Yuba Canal has a very consistent volume of water transported each year from the upper watershed to the lower watershed. The Drum Canal volume of water transported annually is a wide range from just under 260,000 acre-feet per year to just over 430,000 acre-feet per year.

Figure 2-4. Reservoir Storage Volume in the Watershed, 2016 - 2020

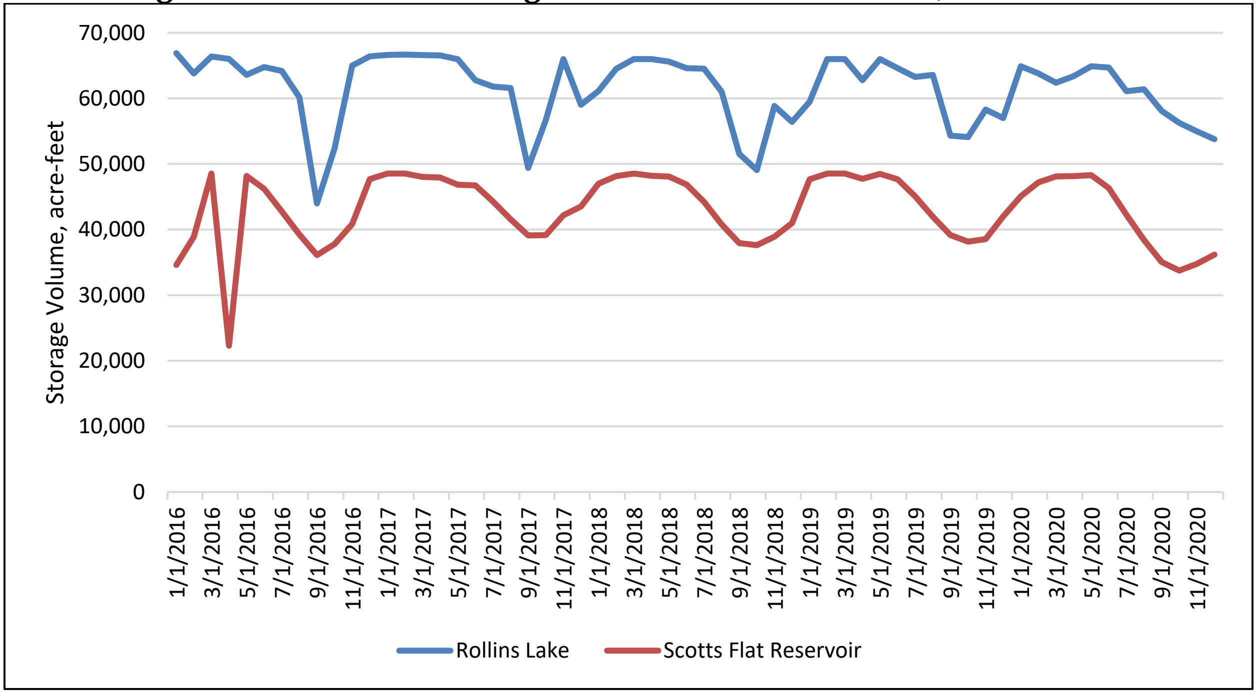


Figure 2-5. Monthly Canal Diversions in the Watershed, 2016 - 2020

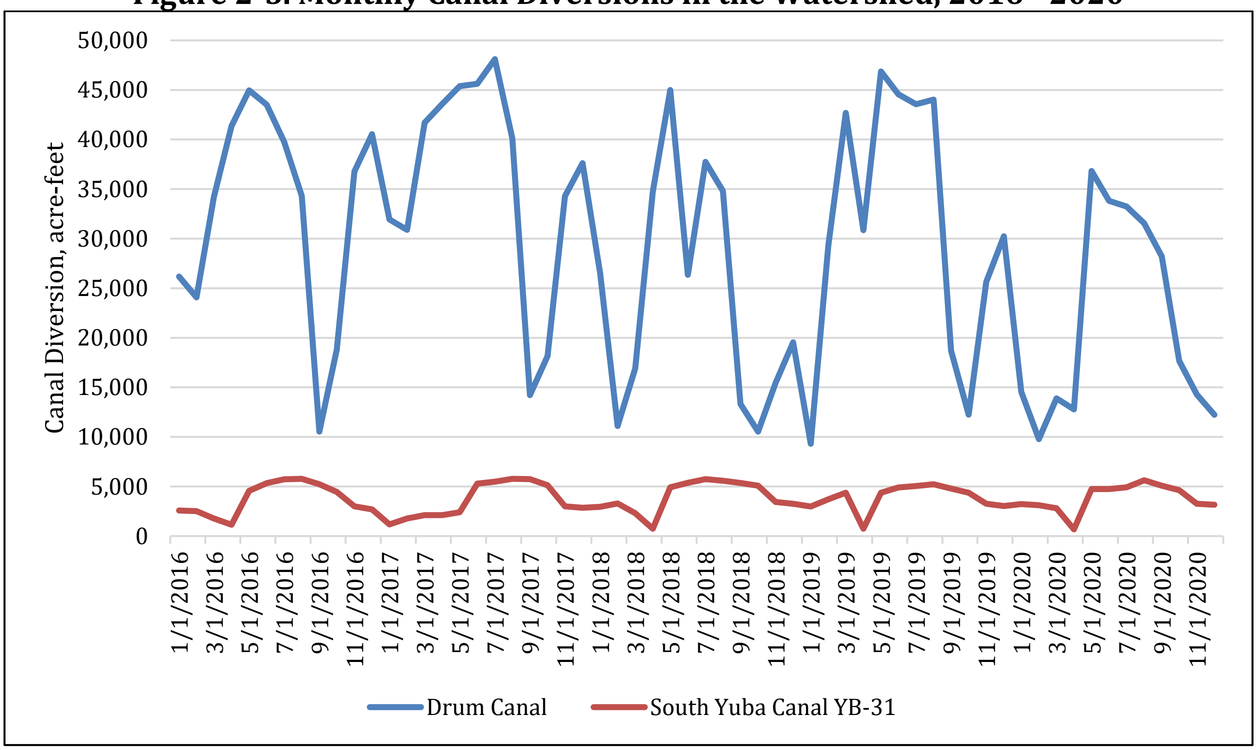
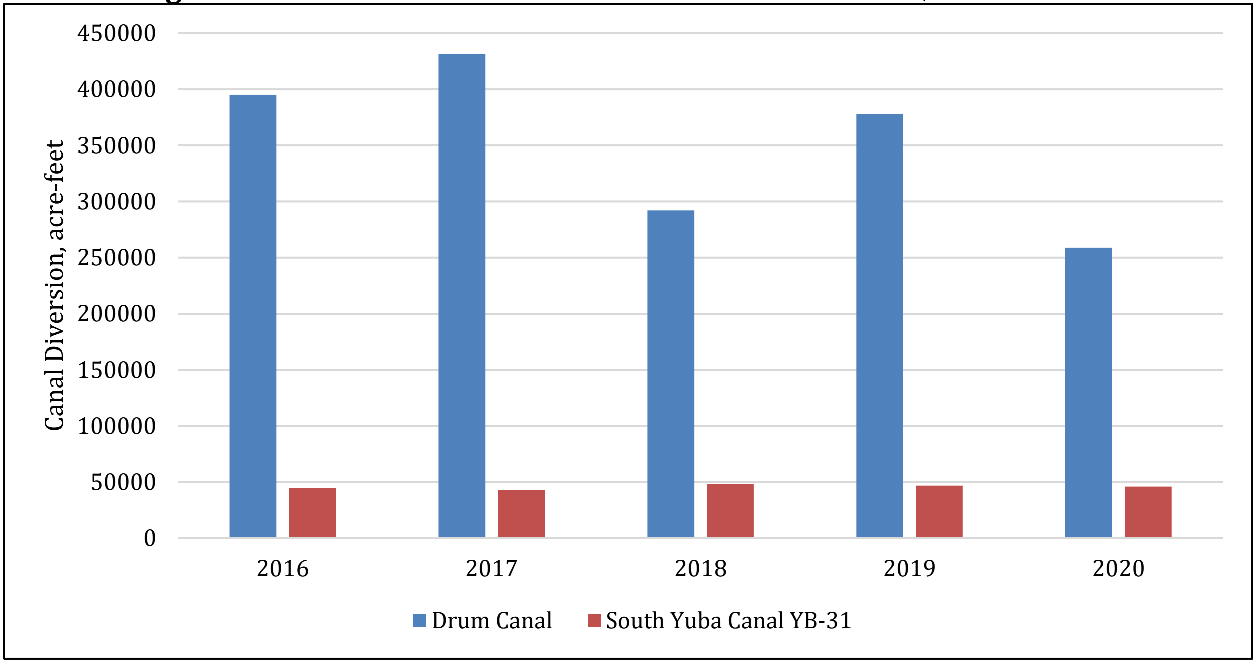


Figure 2-6. Annual Canal Diversions in the Watershed, 2016 – 2020



The Water Supply Systems

In the upper watershed above Spaulding Reservoir, water is collected from the Middle Fork of the Yuba River at Milton Reservoir and then conveyed down to Bowman Reservoir in the Milton-Bowman Tunnel. Bowman Reservoir also receives water from Canyon and Jackson creeks, water is then diverted and conveyed to Spaulding Reservoir in the Bowman-Spaulding Conduit. Along the way, water from Texas and Fall creeks is also collected. Spaulding Reservoir also receives water from Fordyce Creek and the South Yuba River. Below Spaulding Reservoir water is also received from Lake Valley Reservoir via the Lake Valley Canal.

The water from Spaulding Reservoir and Lake Valley Reservoir is channeled into the South Yuba Canal for NID's water treatment plants and into the Drum Canal for PCWA and NID's water treatment plants. Provided below is a description of the typical water supply systems for the participating water agencies below Spaulding Reservoir. These have been organized into five groups of similar water supply. It should be noted that these are typical operations and that most water treatment plants have alternative supplies that can be used during emergencies or outages.

It should be noted that all the natural waterbodies in California are designated by the Central Valley Regional Water Quality Control Board (Regional Board) with specific beneficial uses in the Basin Plan. When evaluating a potential discharge permit, only water quality objectives associated with designated beneficial uses are protected. A review of Table 2-1 in the Basin Plan for the Sacramento River Basin indicates that the Municipal and Domestic Supply (MUN) beneficial use is designated as existing for the Yuba River headwaters to Englebright Dam and the entirety of the Bear River. The Yuba River below Englebright Dam is not specifically designated as existing MUN use, which is where Deer Creek, and thus Squirrel Creek, discharge into. When smaller waterbodies are not specifically listed in the designation table, it can be unclear how to apply beneficial uses. Sometimes MUN is automatically applied and sometimes it is only applied if it is tributary to a MUN designated source. Since Deer Creek, and thus Squirrel Creek, enter the Yuba River just below Englebright Dam it is unclear from Table 2-1 how these smaller watercourses would consistently be designated.

Banner Cascade Pipeline System

The South Yuba Canal feeds Deer Creek 300 feet above the Cascade Canal diversion, which then provides water supply to the Elizabeth George Water Treatment Plant (WTP) and Loma Rica WTP. It should be noted that the Cascade Shores WTP ceased operating during the study period and has been removed from this 2021 Update. Both of these WTPs are owned and operated by NID. The Banner Cascade Pipeline was completed during the previous watershed sanitary survey period and replaced the Cascade Canal as the main conveyance from the Deer Creek diversion to the Loma Rica Reservoir to protect source water quality. Both of the downstream WTPs have the ability to take water directly from this pipeline now.

Deer Creek System

Deer Creek then passes through Scotts Flat Reservoir and Nevada City. Water is diverted from Deer Creek into the Newtown Canal (upstream of the Nevada City Wastewater Treatment Plant) to feed the Lake Wildwood WTP. Further downstream, water is diverted from Deer Creek into the Tunnel Canal down to Squirrel Creek, then to China Union Canal. This then feeds the Meade Canal to the Smartville WTP. Water can be sent to the Union Reservoir for later use via the Union Canal. Both of these WTPs are owned and operated by NID.

Upper Boardman Canal System

The Drum Canal feeds the Drum Forebay which then spills into the upper portion of Canyon Creek and into the Towle Canal, which then feeds the Alta Forebay. The Alta WTP uses the Alta Forebay for water supply. The Alta Forebay also feeds Lake Alta and Cedar Creek Canal, which is the water supply for the Monte Vista WTP. Lake Alta can also be filled seasonally during winter months from Canyon Creek via Pulp Mill Canal. The Cedar Creek Canal later feeds the Boardman Canal. The Boardman Canal is the water supply for the Colfax and Applegate WTPs. All of these WTPs are owned and operated by PCWA.

Bear River Canal and Lower Boardman Canal Systems

Water is diverted from Rollins Lake on the Bear River into the Bear River Canal. Water from the Bear River Canal is used three ways; diverted into the Lower Boardman Canal via the Ragsdale Random in Applegate, diverted upstream of the Halsey Forebay to the Bowman Canal to feed the Bowman WTP, and sent to the Halsey Afterbay, via the Halsey Forebay.

The Boardman Canal enters Lake Theodore and becomes the Lower Boardman Canal and is used to feed the Auburn WTP. This can also be used as an alternate feed for the Foothill WTP, including flows from the Boardman-Fiddler Green Diversion.

At the Halsey Afterbay water is collected from Halsey Forebay, Upper Dry Creek, Lake Arthur, and possibly seasonal overflows from the Lower Boardman Canal system (including the Ragsdale Random and Lake Theodore). Water passes from the Halsey Afterbay into Wise Canal, which transports water to Rock Creek Reservoir. The North Auburn WTP is fed directly from Rock Creek Reservoir. The Wise Canal leaves the Rock Creek Reservoir, passes through the Wise Forebay, and into the South Canal. The South Canal is the water supply for the Foothill WTP (which can also get water from the Lower Boardman Canal and the American River Pump Station). The South Canal also feeds the Dutch Ravine Canal, which feeds the Caperton Canal (portions of this canal are currently being encased through Bickford Ranch), which feeds Caperton Reservoir (which was encased in pipe by PCWA this year) and Whitney Reservoir, the water supply for Sunset WTP. The North Auburn WTP is owned and operated by NID, while the other WTPs are owned and operated by PCWA.

Bear River System

Water released from Rollins Lake into the Bear River then enters Combie Lake. Water is diverted from Combie Lake into the Magnolia III Canal, via the Combie Phase I Canal and Magnolia Reservoir, to supply the Lake of the Pines WTP. Lake of the Pines WTP is owned and operated by NID. Much of the Magnolia III Canal has been enclosed in a pipeline to protect source water quality.

THE WATER TREATMENT FACILITIES

Placer County Water Agency

PCWA owns and operates eight WTPs that utilize Yuba/Bear River water supply. These are presented below. Two of the WTPs, Bowman and Foothill, have two parallel treatment trains with different processes. The Alta, Monte Vista, Colfax, and Applegate WTPs provide water to individual distribution systems, which are separate public water systems. The Bowman and Auburn WTPs both feed water into the Auburn/Bowman distribution system, which is one combined public water system. The Foothill and Sunset WTP both feed water into the Foothill distribution system, which is one combined public water system.

Alta Water Treatment Plant

The Alta WTP is located along Interstate 80 in Placer County about 30 miles northeast of Auburn, off the Alta Forebay. Alta has been classified as a direct filtration plant by the California Division of Drinking Water (DDW), and consists of pre-chlorination, adsorption clarification, pressure filtration, and post chlorination. The plant design flow is 356 gallons per minute (gpm), with average flows at 217 gpm. During the study period an upgrade project was completed that established new intake pumps at the PG&E raw water structure, installed a new intake strainer at the plant, and installed a new emergency generator.

Monte Vista Water Treatment Plant

The Monte Vista WTP is located off the Cedar Creek Canal approximately 2.4 miles downstream from Lake Alta. Monte Vista has been classified as a direct filtration plant by DDW, and consists of pre-chlorination, adsorption clarification, pressure filtration, and post chlorination. The plant design flow is 85 gpm, with average flows at 35 to 40 gpm. During the study period no facility improvements were made.

Colfax Water Treatment Plant

The Colfax WTP is located in Colfax off the Boardman Canal approximately 14.2 miles downstream from Lake Alta. Colfax is a conventional water treatment plant, and consists of pre-chlorination, coagulation/flocculation, sedimentation, pressure filtration, and post-chlorination. The plant design flow is 1.244 million gallons per day (mgd), with average flows at 0.57 mgd. During the study period no facility improvements were made.

Applegate Water Treatment Plant

The Applegate WTP is located in Applegate off the Boardman Canal downstream of Pine Crest Road. Applegate is a microfiltration membrane plant, with no pretreatment and only post-chlorination. The plant design flow is 50 gpm, with average flows at 7 gpm. During the study period the plant was converted to a hydrated lime feed system, with a mixer added to the tank, after a corrosion study was completed.

Bowman Water Treatment Plant

The Bowman WTP is located along Interstate 80 on the east side of Auburn, off the Bowman Canal. Water is diverted from the Bear River Canal into an inverted siphon to Bowman Canal and passes through a PG&E staging area, above Halsey Forebay. The Bowman WTP has two separate treatment trains. The Bowman WTP is a conventional water treatment plant, consisting of pre-chlorination, coagulation/flocculation, sedimentation, gravity filtration, and post-chlorination. The plant design flow is 5.0 mgd, with average flows at 3.6 mgd. The Bowman Package WTP has been designated as a conventional filtration plant by DDW, and consists of a CPC Microfloc package unit (adsorption clarification and gravity filtration) followed by post-chlorination. The plant design flow is 2.0 mgd and the average flow is 2.0 mgd. The Bowman Package WTP typically operates from April through October. During the study period the filters were rebuilt and filled with tri-media instead of dual media. In addition, a new trough system was installed allowing air scour to occur simultaneously with backwash resulting in faster and more thorough backwashing.

Auburn Water Treatment Plant

The Auburn WTP is located along Interstate 80 in Auburn, off the Lower Boardman Canal whose source of supply is a combination of Upper Boardman Canal, Bear River Canal/Rollins Lake, and local runoff from Ragsdale Random and Lake Theodore. The Auburn WTP consists of pre-screening, pre-chlorination, Actiflo pretreatment, gravity filtration, post-chlorination, and a centrifuge for sludge thickening. The plant design flow is 8.0 mgd, with average flows at 2.16 mgd. The plant typically operates from April through October. During the study period no facility improvements were made.

Foothill 1 Water Treatment Plant

The raw water intake location for the Foothill 1 WTP is located off PG&E's South Canal. The plant can also be fed from the Lower Boardman Canal at station 903+00, or off the American River during South Canal maintenance. Foothill 1 WTP is a ballasted clarification water treatment plant. The plant design flow is 42 mgd, with average flows at about 25.9 mgd. The plant includes trash rack, grit removal, fine screening, Actiflo pretreatment, high rate filtration, post-chlorination, and a solids management system. During the study period no facility improvements were made. A new raw water pipeline from Ophir Road is currently being installed and is scheduled to be complete in October 2021. The raw water will be either the Yuba/Bear River or American River, and will provide PCWA with a secondary supply channel from the Ophir Road Pump Station.

Foothill 2 Water Treatment Plant

The Foothill 2 WTP is located in Newcastle off PG&E's South Canal. The plant can also be fed from the Lower Boardman Canal at station 903+00, or off the American River during South Canal maintenance. Foothill 2 is a conventional water treatment plant, consisting of pre-chlorination, coagulation/flocculation, sedimentation, gravity filtration, and post-chlorination. It is also permitted to run in direct filtration mode. The plant design flow is 15.0 mgd as a conventional filtration plant and 18.26 mgd as a direct filtration plant, with average flows at 15.1 mgd. During the study period no facility improvements were made. A new raw water pipeline from Ophir Road is currently being installed and is scheduled to be complete in October 2021. The raw water will be either the Yuba/Bear River or American River, and will provide PCWA with a secondary supply channel from the Ophir Road Pump Station.

Sunset Water Treatment Plant

The Sunset WTP is located in Rocklin and takes water from the Whitney Reservoir. The source of supply is the Caperton Canal. Sunset is a conventional water treatment plant, consisting of pre-chlorination, coagulation/flocculation, sedimentation, gravity filtration, and post-chlorination. The plant design flow is 8.0 mgd, with average flows at 4.32 mgd. During the study period no facility improvements were made, however the Whitney Reservoir was fully encased. In addition, portions of the Caperton Canal through Bickford Ranch are planned to be encased in 2021.

Nevada Irrigation District

NID owns and operates six WTPs that utilize Yuba/Bear River water supply. These are presented below. Each provides water to a distinct distribution system and is a separate public water system.

Cascade Shores Water Treatment Plant

The Cascade Shores WTP was located adjacent to Scotts Flat Reservoir and used water diverted off of Deer Creek via the Banner Cascade Pipeline. Cascade Shores WTP was closed in 2017 with supply now provided via the Elizabeth George WTP. This plant was not included in this 2021 Update for evaluation.

Elizabeth George Water Treatment Plant

The Elizabeth George WTP is located in Nevada City, 2,000 feet east of Banner Reservoir. The source of supply includes the Banner Cascade Pipeline or the Loma Rica Reservoir. The Elizabeth George WTP is a conventional filtration plant and has a capacity of 18 mgd, with an average flow of 4 mgd. The facility includes pre-chlorination, sedimentation basins, dual media gravity filters, a filter backwash wastewater handling system, post-chlorination, and upgraded solids handling. The primary disinfectant is sodium hypochlorite. During the study period (January 2018) the plant corrosion control was modified to feed 25 percent liquid sodium hydroxide (caustic) instead of calcium hydroxide (lime).

Loma Rica Water Treatment Plant

The Loma Rica WTP is located in Grass Valley and diverts water from Loma Rica Reservoir, which is the terminus of the Cascade Pipeline and Canal, at mile marker 19.01. Loma Rica WTP is a conventional water treatment plant, consisting of pre-chlorination, coagulation/flocculation, sedimentation, pressure filtration, and post-chlorination. The plant design flow is 8.3 mgd, with average flows at 3 mgd. During the study period (June 2017) the plant corrosion control was modified to feed 25 percent liquid sodium hydroxide (caustic) instead of calcium hydroxide (lime). In addition, an intertie project with the Lake of the Pines system, via Brewer Road water line, was completed to allow full flow to that system during fall and winter flows.

Lake of the Pines Water Treatment Plant

The Lake of the Pines WTP is located south of Grass Valley on the Magnolia III Canal. The source of supply is pumped from Lake Combie. Lake of the Pines WTP is a conventional water treatment plant, consisting of pre-chlorination, upflow clarification, gravity filtration, and post-chlorination. The plant design flow is 5 mgd, with average flows at 1.3 mgd. During the study period (January 2020) the plant corrosion control was modified to feed 25 percent liquid sodium hydroxide (caustic) instead of calcium hydroxide (lime). In addition, sections of the Magnolia III Canal were encased.

Lake Wildwood Water Treatment Plant

The Lake Wildwood WTP is located in Penn Valley on the Newtown Canal, whose source of supply is Deer Creek. Lake Wildwood WTP is a conventional water treatment plant, consisting of pre-chlorination, coagulation, upflow clarification, gravity filtration, and post-chlorination. The primary disinfectant is sodium hypochlorite. The plant design flow is 4 mgd, with average flows at 1.5 mgd. During the study period (January 2017) the plant corrosion control was modified to feed 25 percent liquid sodium hydroxide (caustic) instead of calcium hydroxide (lime). In addition, a portion of the Newtown Canal was encased.

North Auburn Water Treatment Plant

The North Auburn WTP is located in North Auburn on the Combie Ophir Canal, or Rock Creek Reservoir. North Auburn WTP is a conventional water treatment plant, consisting of pre-chlorination, coagulation, upflow clarification, gravity filtration, and post-chlorination. The plant design flow is 6 mgd, with average flows at 2.5 mgd. During the study period (July 2016) the plant corrosion control was modified to feed 25 percent liquid sodium hydroxide (caustic) instead of calcium hydroxide (lime). Tank mixers and vents were also added to storage reservoirs to reduce disinfection by-product formation.

Smartville Water Treatment Plant

The Smartville WTP is located in Smartville, and receives water from the Meade Canal. The Smartville WTP is a conventional water treatment plant, consisting of coagulation, flocculation, sedimentation, pressure filtration, and post-chlorination. The primary disinfectant is sodium hypochlorite. The plant design flow is 0.085 mgd, with average flows at 0.037 mgd. During the study period portions of the Meade Canal were encased. Tank mixers and vents were also added to storage reservoirs to reduce disinfection by-product formation.

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This section provides an overall review of the water quality data available within the focus area of this study. Primarily, this includes all of the source (raw) water data collected by the participating water agencies. In addition to those data sets, there was one outside ambient water quality monitoring program in the study area with relevant water quality data during the study period. This monitoring program was the Central Valley Regional Water Quality Control Board's (Regional Board) Microbial Tracking Study, which will be discussed separately from the data collected by Placer County Water Agency (PCWA) and Nevada Irrigation District (NID). **Appendix B** contains summaries of the water treatment plants' intake data used for this review. **Appendix C** provides the regulatory framework used for the compliance evaluations.

This section then provides a review of the constituents of interest, including an explanation for their selection and a summary of the data obtained for the study period, which is January 2016 through December 2020.

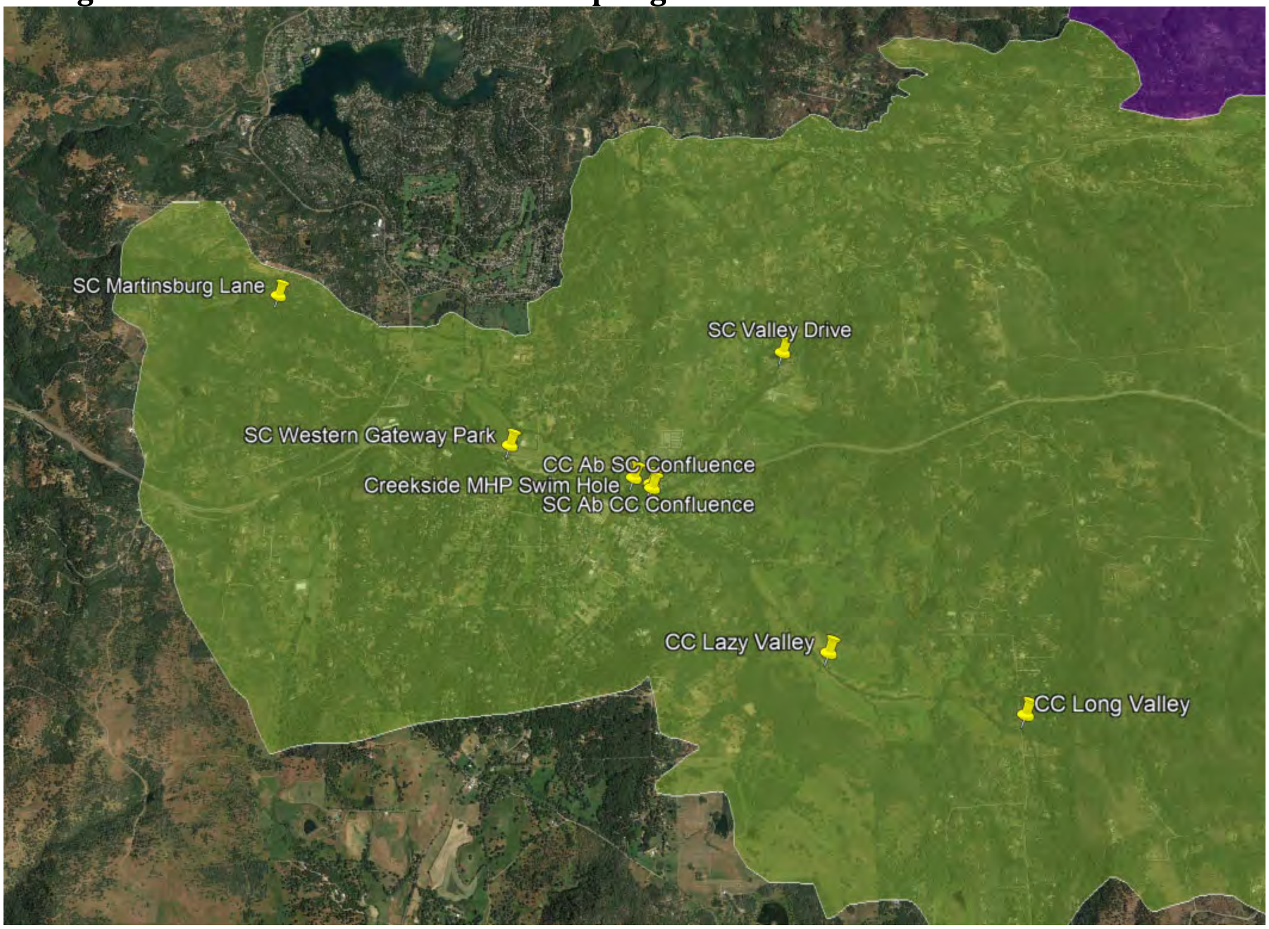
For assistance with abbreviations and acronyms, the reader is referred to the List of Abbreviations at the front of the Report.

AMBIENT WATER QUALITY MONITORING

Central Valley Regional Water Quality Control Board – Safe to Swim Studies

In 2007, the Regional Board identified a number of swimming holes in the Sacramento River and San Joaquin River basins for water quality sampling. The purpose of sampling the swimming holes was to determine if the standards for recreational beneficial use was being attained at these recreation sites. The initial sampling conducted in 2007 and 2008 was conducted prior to, during, and after Labor Day. Samples were collected for pH, electrical conductivity, total coliform and *Escherichia coli* (*E. coli).* In 2009, follow-up sampling was conducted for *E. coli O157:H7*, *Giardia*, and *Cryptosporidium* for sites with historic elevated *E. coli* levels. Samples in the Deer Creek watershed were collected primarily along Squirrel Creek near Western Gateway Park. As presented in the 2017 Update, data from 2011 to 2013 were collected further upstream on Squirrel Creek, Clear Creek, and Deer Creek, as shown in **Figure 3-1.** From March to June 2016, additional *E. coli* samples were collected along Squirrel Creek and Clear Creek at the same locations, and one additional site. Squirrel Creek at Martinsburg Lane was added, which is located furthest downstream below Western Gateway Park. **Table 3-1** shows range, mean and number of *E. coli* samples collected from 2008 to 2014, and also for the 2016 data.

Figure 3-1. Safe to Swim Studies Sampling Locations for Deer Creek Watershed



Averages along Squirrel Creek are fairly similar between the previous 2008 to 2014 and current 2016 dataset. The highest increase from upstream to downstream occurred along Squirrel Creek from Western Gateway to Martinsburg Lane.

Sites 2 (Clear Creek above confluence with Squirrel Creek), 5 (Squirrel Creek at Creekside Village Mobile Home Park), 6 (Clear Creek at Lazy Valley Road), and Squirrel Creek at Martinsburg Lane are of interest as the mean 2016 *E. coli* value at each site is greater than 200 most probable number per 100 milliliters (MPN/100mL), which is the trigger level at which additional log reduction is needed for *Giardia* and viruses, under the Surface Water Treatment Rule. Sites 2 and 6 are along Clear Creek, where cattle presence is documented. The highest 2016 average was at Martinsburg Lane which is near a 100 acre cattle pasture, a dog park and also downstream of the Western Gateway Park. All sites are upstream of the Smartville Water Treatment Plant (WTP), which currently operates with an additional log of *Giardia* and virus reduction. Clear Creek appears to be a source of *E. coli*, specifically below Long Valley Road. Squirrel Creek begins to see its *E.coli* increase below Valley Drive, especially at the confluence with Squirrel Creek and downstream to Martinsburg Lane.

Table 3-1
***E. coli* Monitoring Results for Safe to Swim Studies, Deer Creek Watershed, 2008 to 2014, and 2016**

Site	Range (2008-2014)	Mean (2008-2014)	Number of Samples (2008-2014)	Range (2016)	Mean (2016)	Number of Samples (2016)
1 – Squirrel Creek in Western Gate way Park	54.6 – 579.4	189.4	39	58 – 345	182	18
2 – Clear Creek above confluence with Squirrel Creek	30.5 – 547.5	**257.8**	29	48 – 1414	**333**	18
3 – Squirrel Creek above confluence with Clear Creek	45.2 – 1046.2	**207.9**	29	31 – 649	192	18
4 – Squirrel Creek downstream of swimming hole	148.3 – 167	157.7	2	No sample		18
5 – Squirrel Creek at Creekside Village Mobile Home Park	88 – 461.1	182.3	17	58 – 816	**233**	18
6 – Clear Creek at Lazy Valley Road	63.1 – 1046.2	**344.5**	16	45 – 613	**206**	18
7 – Squirrel Creek at Valley Drive	16 – 866.4	167.6	17	17 – 727	118	18
8 – Clear Creek at Long Valley Road	23.1 – 1413.6	**275.1**	17	2 – 435	86	18
9 – Squirrel Creek at Rough and Ready	36.4 – 365.4	147.9	8	No sample		18
10 – Deer Creek near Willow Valley Christmas Tree Farm	2 – 66.3	19.4	8	No sample		18
11 – Deer Creek below S Pine St.	37.3 – 2419.6	**595.4**	8	No sample		18
12 – Squirrel Creek below Clear Creek	248.1	248.1	1	No sample		18
Squirrel Creek at Martinsburg Lane	No sample			62 – 1300	**391**	18

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. This includes all constituents with primary and secondary Maximum Contaminant Levels (MCLs) and unregulated constituents that have Notification Levels. In general, it is assumed that if the raw water is below these limits, then the treated water (also called finished water) will be also. MCLs and Notification Levels are typically based on treated water sample results, but some do apply to raw water. **Appendix C** contains a summary of each of the contaminants currently regulated in drinking water by both the U.S. Environmental Protection Agency (USEPA) and the California Division of Drinking Water (DDW).

Overall, the Yuba and Bear Rivers provide excellent quality source water. The raw water can be treated to meet all drinking water standards using conventional filtration processes. There are no constituents present in the raw water that will require additional treatment processes based on data collected during this reporting period. The individual intake evaluations for treated water and regulatory compliance are presented in **Section 5**.

Selected data from the 14 existing water treatment plant intakes has been summarized and is included in the summary tables below. **Tables 3-2** through **3-4** show the statistics for each selected constituent.

Table 3-2
Raw Water Turbidity Summary Statistics for all PCWA and NID WTPs, NTU

WTP	Minimum	Maximum	Average	Median	95th %
Alta	0.61	6.9	2.2	1.9	4.9
Monte Vista	2.4	9.5	5.0	4.8	7.5
Colfax	1.6	17.7	8.2	8.1	13.7
Applegate	2.5	18.8	8.1	8.1	14.1
Bowman	1.2	114	9.9	3.1	30.5
Auburn	2.0	23.3	8.5	7.2	16.9
Foothill 1	1.4	57.3	8.4	4.2	26.5
Foothill 2	1.4	39.5	6.5	3.5	22.0
Sunset	0.63	3.8	1.7	1.6	2.5
Loma Rica	1.1	8.3	2.7	2.5	5.9
Elizabeth George	0.7	10.5	2.8	2.6	4.8
Lake of the Pines	2.0	40.2	7.1	4.3	24.7
Lake Wildwood	2.2	15.1	5.4	4.6	12.4
North Auburn	3.0	88.7	15.8	9.5	48.7
Smartville	3.9	31.4	10.5	9.3	20.5

Table 3-3
Raw Water *E. coli* Summary Statistics for all PCWA and NID WTPs, MPN/100mL

WTP	Minimum	Maximum	Average	Median	95th %
Alta	<2	81.9	12.0	5.9	49.4
Monte Vista	<2	240	18.5	6.1	81.6
Colfax	<2	184	23.6	10.6	80.4
Applegate	3.6	680	59.5	28.7	201
Bowman	<2	168.2	18.8	12.2	52.3
Auburn	6.5	305	54.3	40.8	139.1
Foothill	1	260	34	15.5	124.4
Sunset	1.5	1600	121.9	25.9	546
Loma Rica	<2	160	8.9	3.6	20.2
Elizabeth George	<2	108.1	5.5	3.1	15.8
Lake of the Pines	<2	1986.3	115.8	45.7	313.5
Lake Wildwood	<2	1046	56.1	18.7	241.6
North Auburn	<2	727	56	21.6	213.5
Smartville (Meade Canal)	<2	6,488	220.1	58.3	599.9

Table 3-4
Raw Water Total Organic Carbon Summary Statistics for all PCWA and NID WTPs, mg/L

WTP	Minimum	Maximum	Average	Median	95th %
Alta	0.9	2.8	1.6	1.5	2.1
Monte Vista	0.7	2.7	1.5	1.4	2.5
Colfax	0.99	2.4	1.5	1.5	2.0
Applegate	1.0	3.4	1.6	1.6	22.5
Bowman	0.9	3.1	1.6	1.4	2.8
Auburn	1.1	2.8	1.6	1.4	2.8
Foothill 1	1.0	2.4	1.5	1.4	2.1
Foothill 2	1.0	2.1	1.5	1.4	1.9
Sunset	1.2	2.4	1.8	1.8	2.3
Loma Rica	0.5	2.2	1.4	1.5	2.0
Elizabeth George	0.66	2.4	1.4	1.3	2.2
Lake of the Pines	1.1	2.1	1.5	1.6	2.0
Lake Wildwood	0.88	3.8	1.6	1.3	3.1
North Auburn	1.1	2.6	1.5	1.4	2.5
Smartville	1.1	7.7	2.6	2.0	5.9

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, microbials including *E. coli, Giardia,* and *Cryptosporidium*, and disinfection by-product precursors including total organic carbon (TOC), and temperature. 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**. Inorganic chemicals, volatile organic chemicals, and synthetic organic chemicals will be discussed in **Section 5**, as they are monitored in treated water only.

In order to provide a spatial analysis, the data has been grouped into five categories: 1) Lake Spaulding via Boardman Canal, 2) Lake Spaulding via Banner Cascade Pipeline, 3) Deer Creek downstream Scotts Flat Reservoir, 4) Downstream Rollins Reservoir via Bear River Canal, and 5) Downstream Rollins Reservoir via Bear River. Within each category, the water treatment plants (WTPs) have been arranged from upstream to downstream.

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 3-5** shows the relationship between potential contaminating activities and water quality constituents. Other detectable constituents, regulated and unregulated, were monitored in treated water and are discussed in **Section 5**.

Table 3-5
Relationship Between Potential Contaminating Activities and Water Quality

	Turbidity	Microbials	DBP Precursors	Other Detectable
Canal Aquatic Herbicide Use	√		√	√
Livestock Grazing	√	√	√	√
Forest Activities	√		√	√
Recreation	√	√	√	
Source Water Spills	√	√	√	√
Wastewater	√	√	√	√
Urban Runoff	√	√	√	√
Mining	√		√	√
Cannabis Cultivation	√		√	√

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, including PCWA and NID, optimize pretreatment processes to maximum 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 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. 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 particulates. The principal source of turbidity is general watershed runoff, and can also be contributed by other all of the potential contaminating activities. 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. Averages, medians, minimums, maximums, and 95th percentiles have been summarized for each plant in **Table 3-2**. Timeseries plots have been developed for raw water turbidity over the reporting period for each of the water treatment plants (**Figures 3-2** through **3-6**).

Figure 3-2 indicates that for the Boardman Canal WTPs, the raw water turbidity increases downstream**.** Raw water turbidities for the Alta and Monte Vista WTPs stay generally below 10 NTU, while the Colfax and Applegate WTP raw water turbidities can occasionally rise above 10 NTU.

Figure 3-2. Raw Water Turbidity, Lake Spaulding via Boardman Canal WTPs, 2016-2020

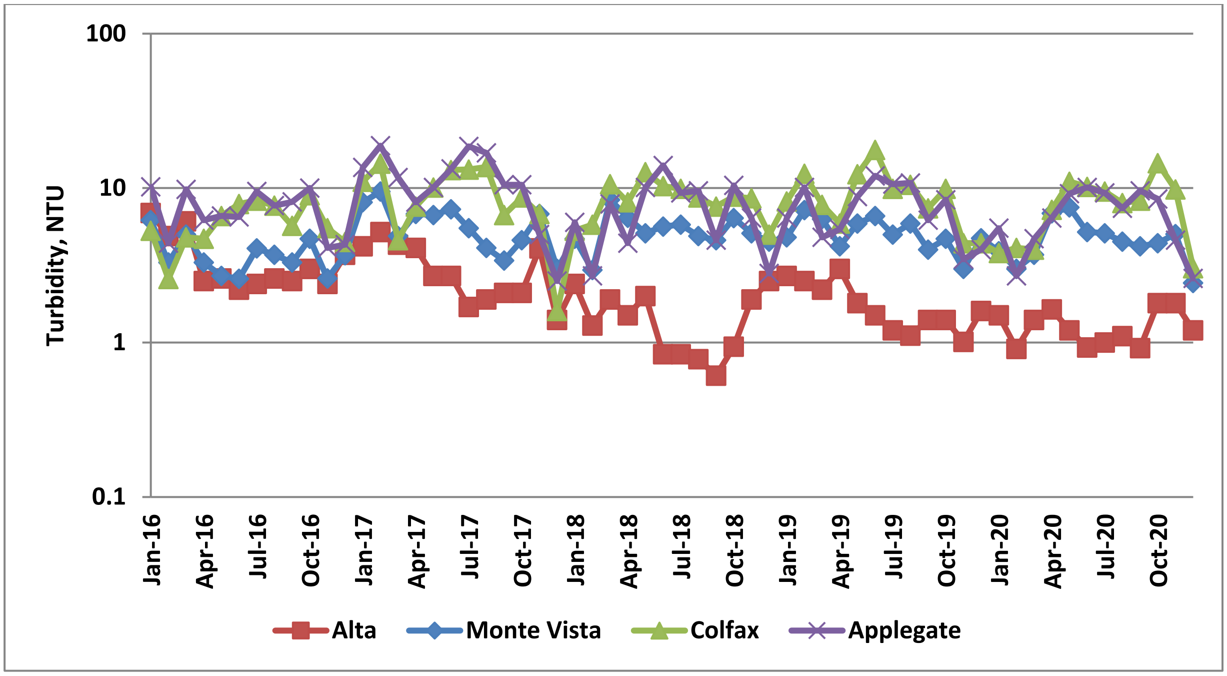


Figure 3-3 indicates that for the Banner Cascade Pipeline WTPs, turbidity is similar between the Elizabeth George and the Loma Rica WTPs, as both WTPs generally receive water directly from the Banner Cascade Pipeline via the Loma Rica Reservoir. During the 2016 to 2020 time period, both WTPs stayed generally below 10 NTU.

Figure 3-3. Raw Water Turbidity, Lake Spaulding via Banner Cascade Pipeline WTPs, 2016-2020

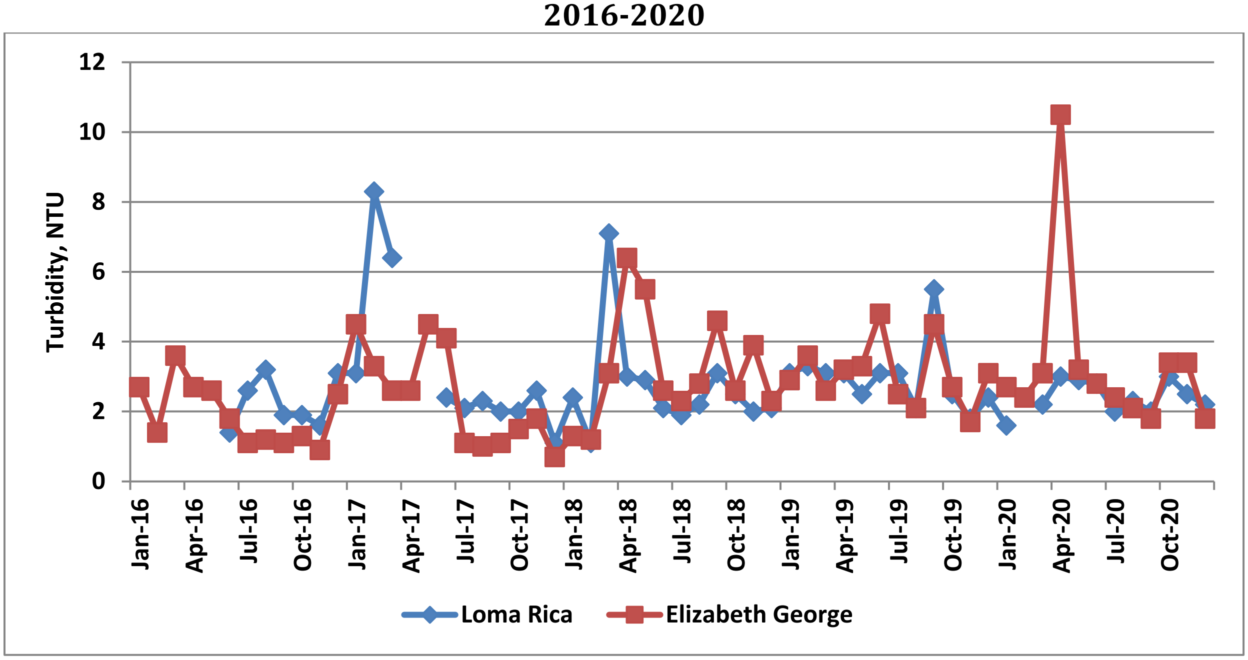
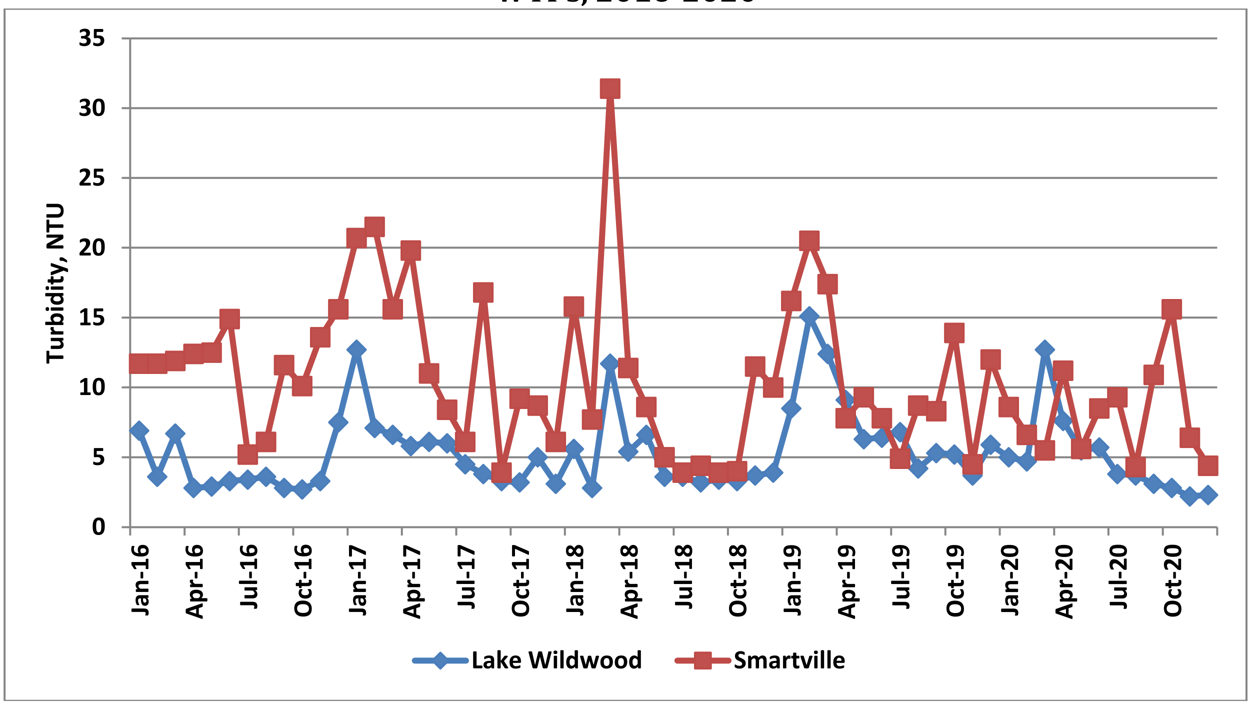


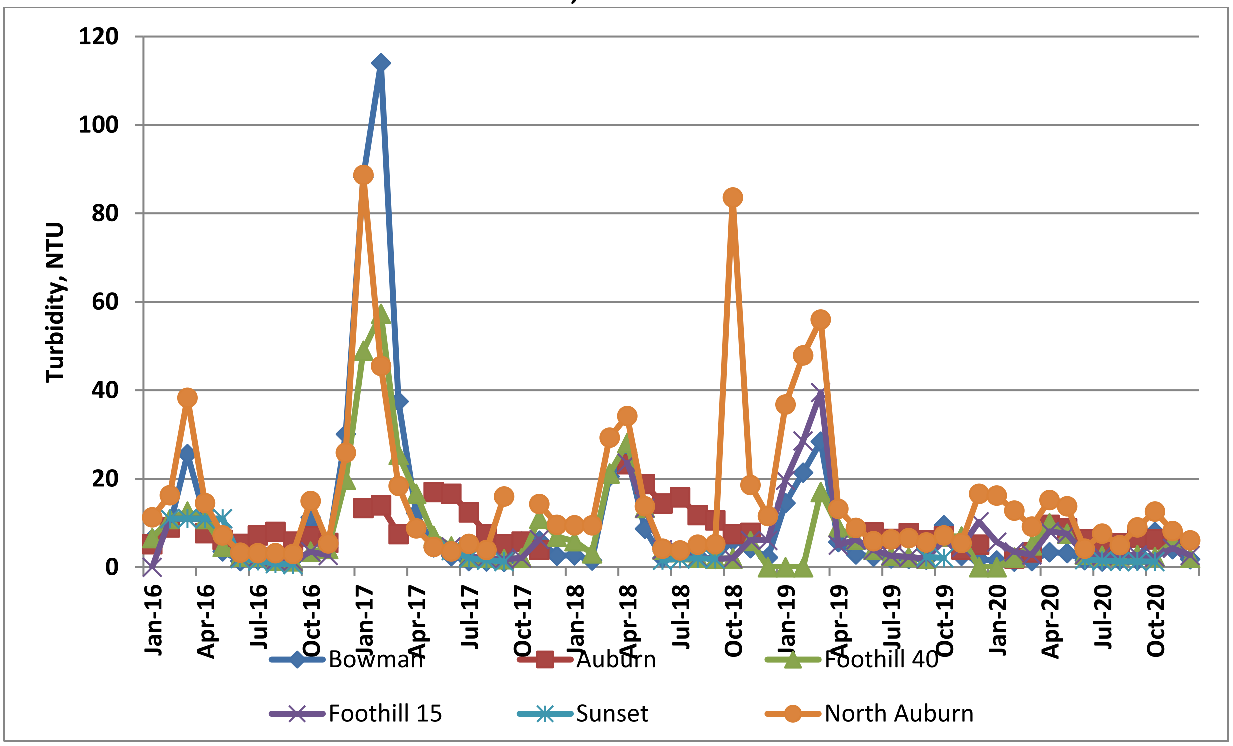
Figure 3-4 indicates that for the Deer Creek downstream of Scotts Flat Reservoir WTPs, turbidity is generally below 10 NTU for Lake Wildwood WTP, with the exception of a few peaks in the January to March time period. However, turbidities at Smartville WTP are frequently over 10 NTU. NID has been able to reduce source water peaks due to an operating procedure; NID stops diverting off the canals during a storm and does not begin diverting again until the storm has passed. This can be effective in reducing source water turbidities at the water treatment plants. NID notes that the operating procedure is less effective at Smartville WTP due to the very long canal system leading to the plant.

Figure 3-4. Raw Water Turbidity, Deer Creek Downstream Scotts Flat Reservoir WTPs, 2016-2020



As shown in **Figure 3-5**, the downstream Rollins Reservoir WTPs show seasonal variation, with peaks during the winter and spring and lower turbidities in the summer. This is due to turbid water filling up Rollins Reservoir after rain events, with subsequent release to the downstream WTPs throughout the winter and spring, particularly in 2017 and 2019. The North Auburn WTP had the most months where the raw water turbidity monthly average was over 10 NTU. This occurred 27 out of 60 months. North Auburn WTP is fed from Rock Creek Reservoir, which is a small water body at low elevation that is fed by the Wise Canal and also receives local drainage. PG&E operates this reservoir and does not implement any algae control measures so there are times of algae blooms which could be contributing to the increased turbidity levels. In addition, PG&E does not perform significant maintenance on the reservoir so there is probably a need for dredging or cleaning of the reservoir. Turbidities may also increase at the North Auburn WTP during the annual fall maintenance of the Bear River Canal. Additionally, NID is unable to isolate the North Auburn WTP and stop diversion during storm events like at the Lake Wildwood WTP. The October 2018 peak at the North Auburn WTP was caused by the lowering of Lake Combie to accommodate the installation of a new gate/rack at Combie Dam. The high turbidity was caused by sediment sloughing off the channel created, due to the extremely low lake level.

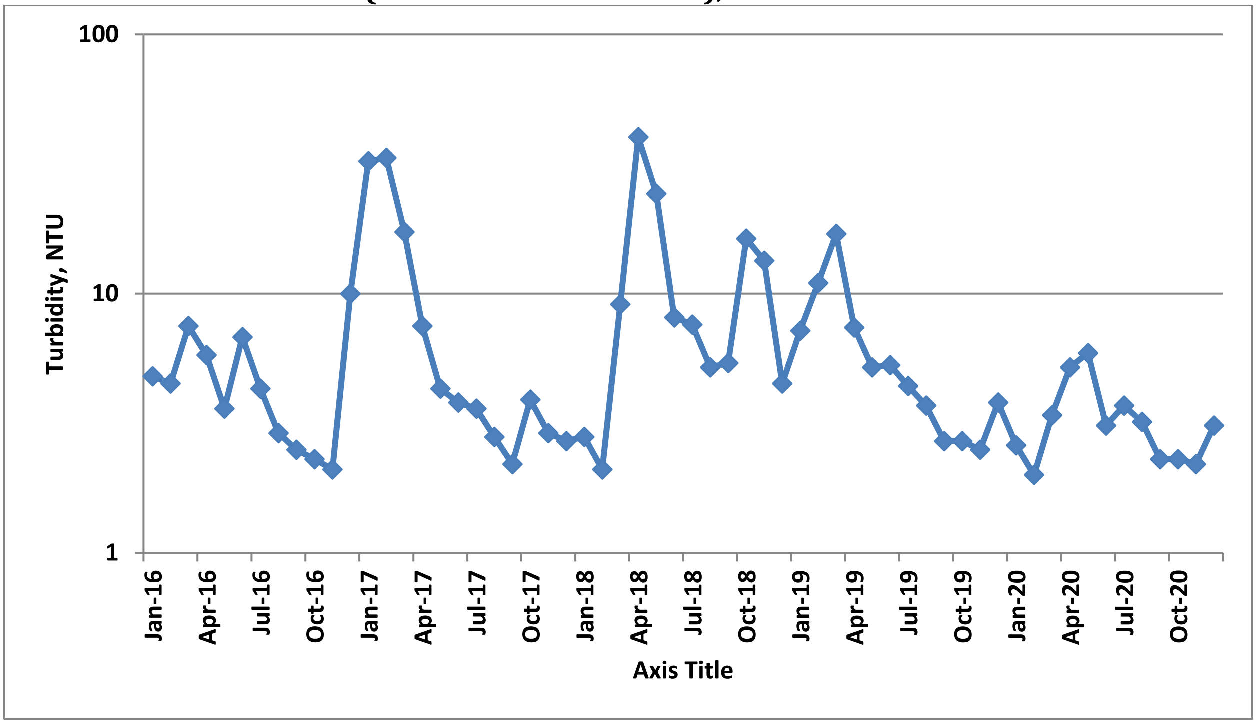
Figure 3-5. Raw Turbidity Data, Downstream Rollins Reservoir via Bear River Canal WTPs, 2016-2020



Lake of the Pines WTP is the only water treatment plant classified as downstream of Rollins Reservoir via the Bear River. **Figure 3-6** indicates that the source water turbidities for the Lake of the Pines WTP are generally below 10 NTU. Raw water turbidities for Lake of the Pines WTP show seasonal variation, with higher turbidities during the wet season, particularly in January and February 2017 when there was a peak storm period. Turbidity was high during the month of April 2018, with daily turbidity ranging from 18 to 91 NTU. During this time, Lake of the Pines WTP was experiencing an algae bloom, as recent rains had washed nutrients into Lake Combie. To avoid the bloom in the lake, NID utilized a bypass to bring water directly from the Magnolia Canal. However, turbidities were high in the canal due to recent rains, causing high turbidity at the Lake of the Pines WTP influent.

NID staff indicates that the Lake of the Pines WTP can have degraded water quality that may be impacted by local activities along the Magnolia III canal, including grazing and runoff, between the Combie Lake diversion and the water treatment plant. NID has been encasing much of the Magnolia III canal to reduce these impacts.

Figure 3-6. Raw Turbidity Data, Downstream Rollins Reservoir via Bear River (Lake of the Pines WTP), 2016-2020



Summary of Results for Turbidity

- The median raw water turbidity ranges from 1.9 NTU at the Alta WTP to 9.5 NTU at the North Auburn WTP. Generally, the raw water turbidity for the Alta, Monte Vista, Loma Rica, Elizabeth George, and Sunset WTPs stays below 10 NTU. During the reporting period, the remainder of the WTPs occasionally measured above 10 NTU, with the Bear River Canal WTPs and Deer Creek WTPs (particularly Smartville WTP) most frequently over 10 NTU.
- Smartville and North Auburn WTP had the most months where raw water monthly averages were above 10 NTU, for 27 months out of 60 months. Higher turbidities at North Auburn WTPs could be due to algal blooms or lack of maintenance in Rock Creek reservoir, maintenance of Bear River Canal, turbid water released from Rollins Reservoir, and the inability to stop diversion off the canal during storm events. Higher turbidities at Smartville WTP are likely caused by the long canals leading to the water treatment plant, which are more susceptible to storm runoff.
- Rollins Reservoir can fill with turbid waters during the wet season. This results in higher turbidities at water treatment plants located downstream of Rollins Reservoir, when turbid waters are released from Rollins Reservoir during the winter and spring.

Microbiological Constituents

General Characteristics and Background

The major microbiological constituents of concern include total coliforms, *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 the constituents in the raw water governs the overall treatment requirements for the water treatment plants.

Fecal coliform and *E. coli* have been used to indicate the potential presence of pathogenic microorganisms in source waters. Although coliform levels have not been shown to 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 include general watershed runoff, grazing, recreation, wastewater, urban runoff, spills, and animal populations. 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.

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 animal defecation.

Giardia lamblia is currently regulated by the Surface Water Treatment Rule (SWTR), the Interim Enhanced Surface Water Treatment Rule (IESWTR), and the Long Term 1 ESWTR (LT1ESWTR). Surface water supplies must provide for at least 3-log reduction of *Giardia* through physical removal and chemical inactivation. Additional reduction may be required for impaired water supplies. The USEPA provided guidance with the SWTR that indicated additional reduction would be appropriate if measured *Giardia* levels in the source water were greater than 0.01 cysts per liter. However, in the 1980's there was no practical means to measure *Giardia*, therefore the DDW prepared guidance under the SWTR that indicated that 3-log reduction would likely be appropriate when monthly median levels of total coliform in the raw water were less than 1,000 most probable number per 100 milliliters (MPN/100 mL). In recent years DDW has allowed for the substitution of fecal coliform or *E. coli* levels in raw water since they are more specific indicators. The DDW have set the guidance level for increased treatment at raw water monthly fecal or *E. coli* median levels greater than 200 MPN/100 mL, based on the historic ratio of five total coliform to one fecal coliform. *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 truer 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.

Cryptosporidium is currently regulated through the IESWTR and the 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 either *E. coli* or *Cryptosporidium*, depending on system size. Under the IESWTR and LT1ESWTR well-operated conventional and direct treatment plants are granted a 2-log removal credit for *Cryptosporidium* if they meet all treated water turbidity standards. The LT2ESWTR further regulates *Cryptosporidium* and requires additional action (treatment or protection) if the source water quality is determined to be impaired based on direct *E. coli* or *Cryptosporidium* monitoring of the source. This classification was based on source water monitoring, conducted in two rounds. Round 1 was completed between 2010 and 2015 for initial classification and Round 2 was completed between 2015 and 2020 for confirmation or revision of the initial classification. Small systems with a population less than 10,000 were to first monitor for *E. coli* bi-weekly for one year. If the average annual value was greater than 10 MPN/100 mL for a lake source, or 100 MPN/100mL (as modified by USEPA) for a flowing stream source, then *Cryptosporidium* must be monitored monthly for two years. If not, then the source was classified as Bin 1 and no additional action or treatment is required. If any *Cryptosporidium* running annual average level was greater than 0.075 oocysts per liter (oocyst/L) then additional action must be achieved based on bin classification of the source.

The DDW also developed the *Cryptosporidium* Action Plan (CAP) in the mid-1990's 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

PCWA monitors raw water for total coliform and *E. coli* on a monthly basis for each individual plant. NID was monitoring raw water for total coliform and *E. coli* on a monthly basis for each plant, but increased their monitoring frequency to twice a month beginning in January 2007.

For the Boardman Canal WTPs, **Figure 3-7** demonstrates similar monthly median *E. coli* levels for the Alta and Monte Vista WTP, and higher *E. coli* levels downstream at Colfax WTP. Applegate WTP has the highest *E. coli* levels, indicating a source of fecal contamination between the Colfax and Applegate WTPs. This downstream-increasing trend was also observed in the Second, 2012 Update, and 2017 Updates.

Figure 3-7. Combined Monthly Medians for *E. coli*, Lake Spaulding via Boardman Canal WTPs, 2016-2020

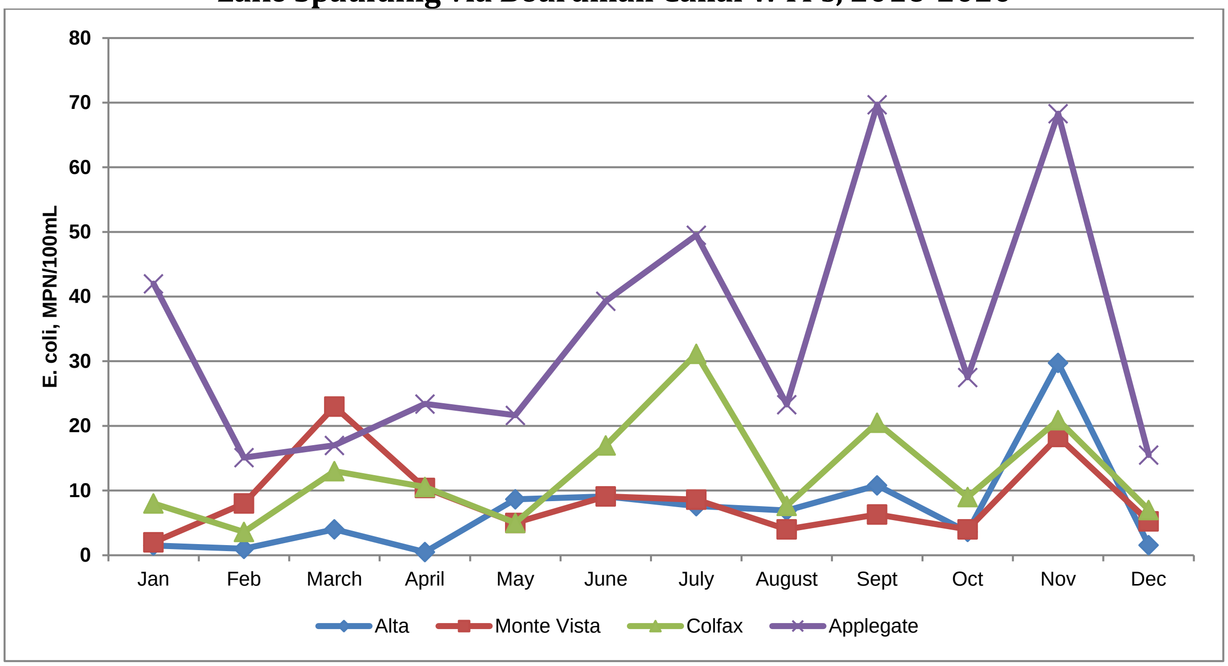
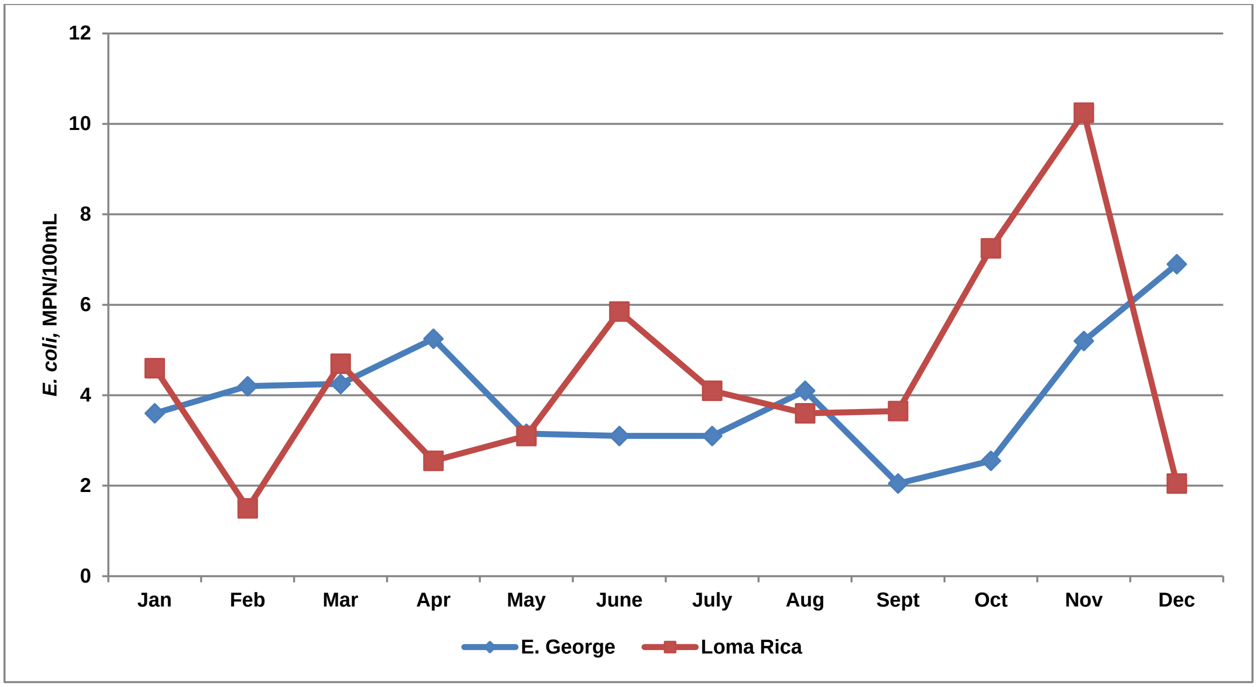


Figure 3-8 indicates that *E. coli* levels at the Elizabeth George and the Loma Rica WTPs are similar, as both WTPs receive water from the Banner Cascade Pipeline via the Loma Rica Reservoir. **Figure 3-8** also demonstrates that the monthly median *E. coli* levels for the Banner Cascade Pipeline WTPs are always well below 200 MPN/100mL.

Figure 3-8. Raw Water *E. coli*, Lake Spaulding via Banner Cascade Pipeline WTPs, 2016-2020



For the Deer Creek WTPs downstream of Scotts Flat Reservoir, **Figure 3-9** shows that the monthly median *E. coli* levels increase from Lake Wildwood WTP to Smartville WTP. This trend continues from the Second, 2012, and 2017 Updates. There are a number of potential sources of *E. coli* in the Squirrel Creek and Deer Creek watersheds, which include runoff from ranches, cattle walking in and along the creeks and canals, treated wastewater effluent, wastewater ponds, and recreation in Western Gateway Park. Some of these sources have been recently addressed/eliminated (i.e., Penn Valley Mobile Home Park connection to sewer in 2021 and encasement of Meade and Newtown Canals during the study period), as discussed in **Sections 2 and 4**. One-third of a mile of the Newtown Canal leading to Lake Wildwood WTP was encased in May 2017. Although this was not a long section of the canal, it was along a section close to homes with septic systems. Also, *E. coli* at the Smartville WTP may increase due to increased flows at the start of the irrigation season on April 1st of each year.

Figure 3-10 shows the *E. coli* monthly medians at the Smartville WTP, and although elevated *E. coli* can occur in April and May, likely due to the start of the irrigation season, peaks also occur at other times of the year (November to January), suggesting multiple sources of *E. coli.*

Figure 3-9. Combined Monthly Medians for *E. coli*, Deer Creek Downstream Scotts Flat Reservoir WTPs, 2016-2020

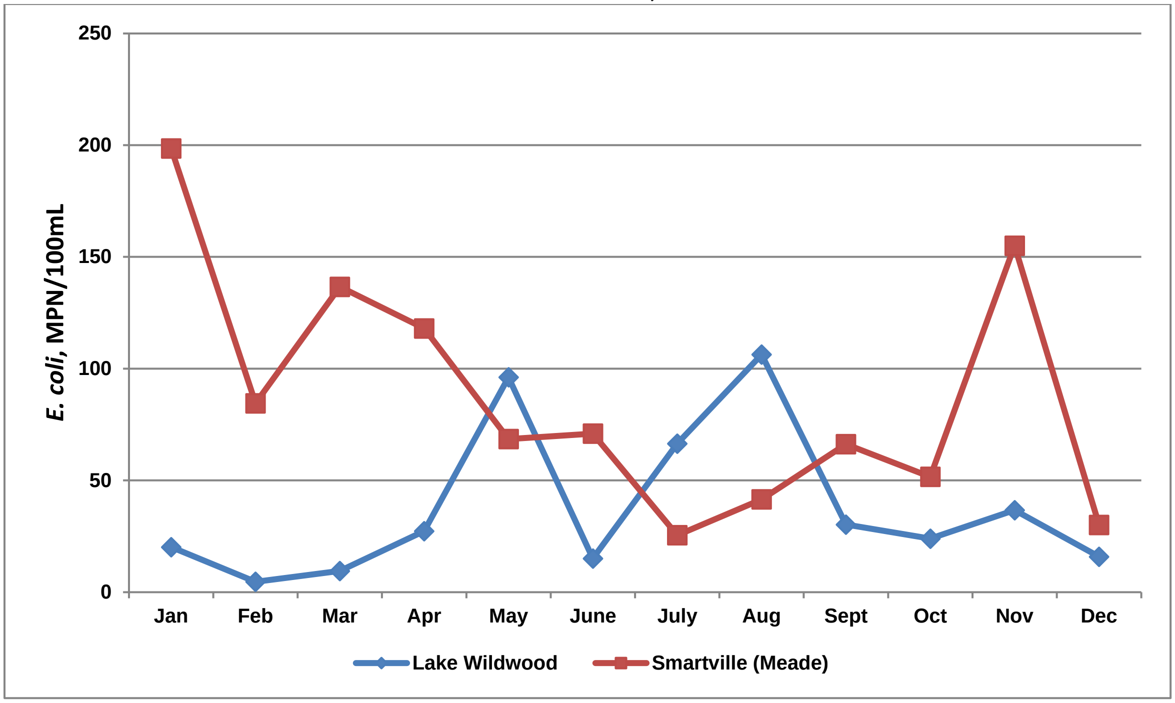
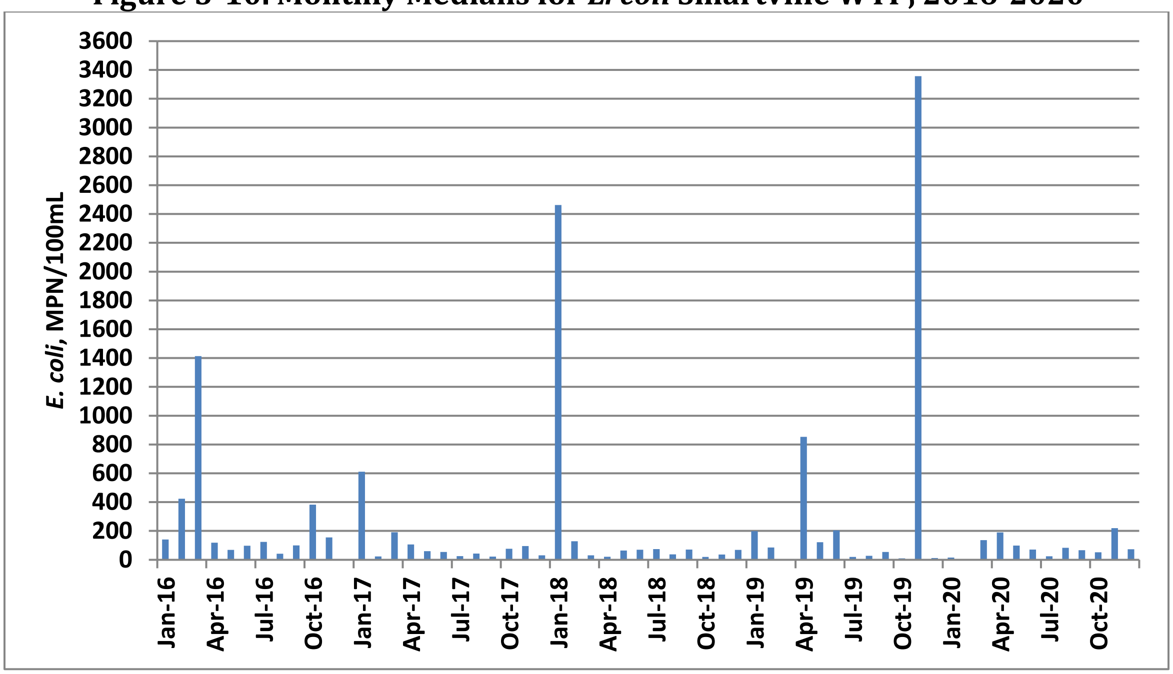


Figure 3-10. Monthly Medians for *E. coli* Smartville WTP, 2016-2020

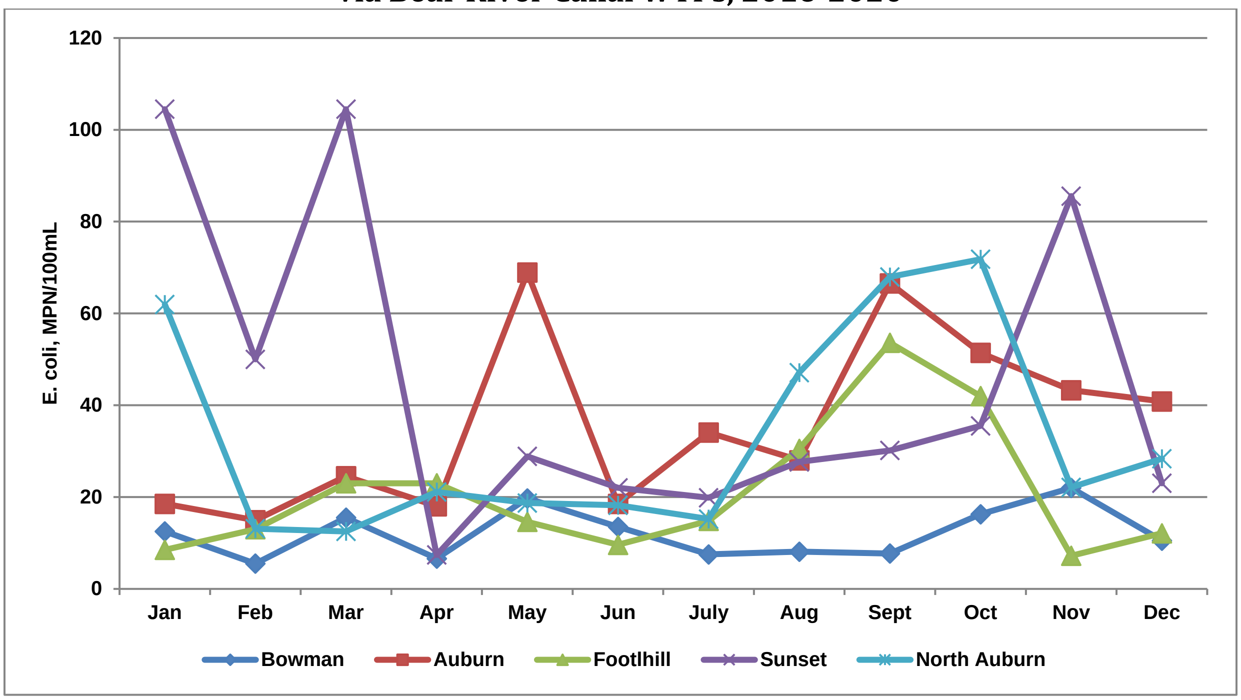


For the Downstream Rollins Reservoir via Bear River Canal WTPs, **Figure 3-11** indicates no clear trend moving downstream. This trend continues from the Second, 2012, and 2017 Updates. The North Auburn, Sunset, and Bowman WTPs show an increase in *E. coli* from September to October, which is when PG&E conducts their annual maintenance on the Bear

River Canal. During Bear River Canal Outages, the North Auburn WTP reverts to a backup water supply from the Combie Ophir 1 Canal. This is an NID earthen canal that is supplied water from the base of the dam at Lake Combie. The Sunset and Bowman WTPs revert to the Lower Boardman Canal. These changes in source water supply are likely the cause of the increased monthly medians.

A second trend shown in **Figure 3-11** is an increase in *E. coli* from July through September for the North Auburn, Foothill, and Sunset WTPs. This could be associated with in-reservoir degradation from lack of maintenance or algal blooms.

Figure 3-11. Combined Monthly Medians for *E. coli*, Downstream Rollins Reservoir via Bear River Canal WTPs, 2016-2020



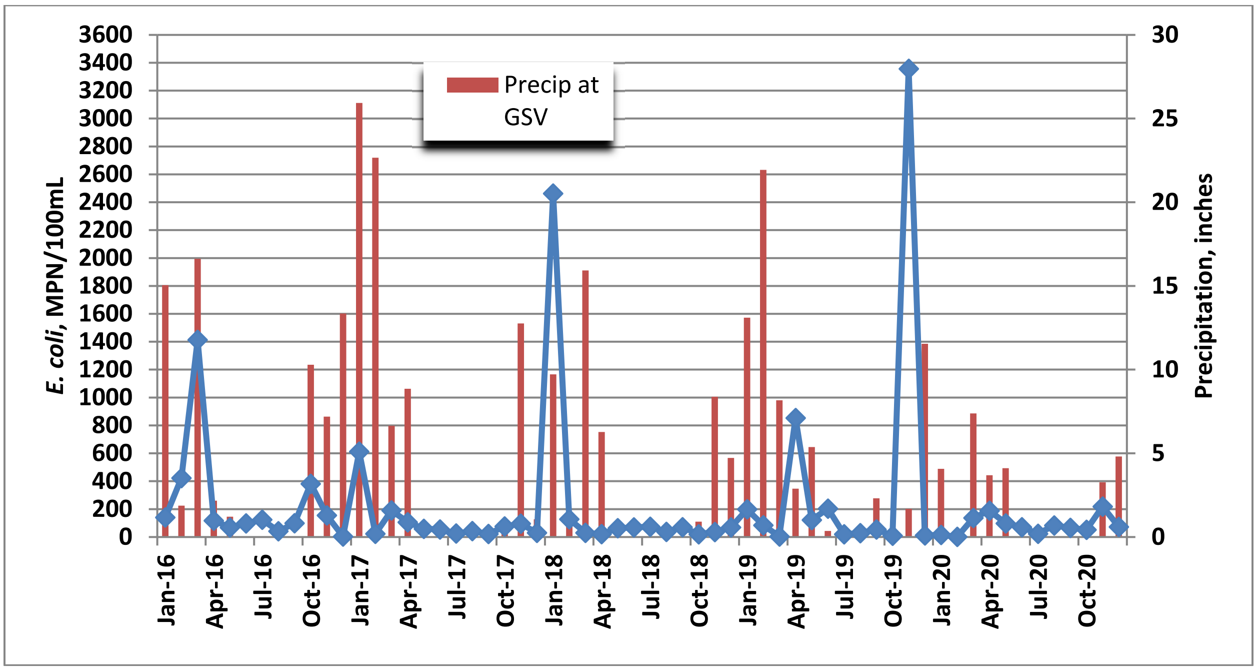
Monthly medians for *E. coli* were examined, as DDW requires an additional log reduction for *Giardia* and viruses if the monthly median for *E. coli* is greater than 200 MPN/100mL.

Out of the 60 month study period; the Alta, Colfax, Bowman, Loma Rica, and Elizabeth George WTPs had no monthly medians for *E. coli* greater than 200 MPN/100mL. The Monte Vista and Foothill WTPs each had two monthly median *E. coli* values above 200 MPN/100mL. The North Auburn, Lake Wildwood, and Auburn WTPs each had three monthly medians and Applegate WTP had four monthly median *E. coli* values above 200 MPN/100mL. Meanwhile, the Lake of the Pines WTP had eight monthly medians and the Smartville and Sunset WTP had nine monthly medians greater than 200 MPN/100mL for *E. coli.*

All of the WTPs with 10 percent or less of monthly medians (six or fewer during the study period) exceeding the 200 MPN/100 mL threshold were determined to need no further evaluation and should be operated to achieve 3/4-log reduction for *Giardia* and viruses. That includes all of the water treatment plants except Lake of the Pines, Smartville and Sunset WTPs.

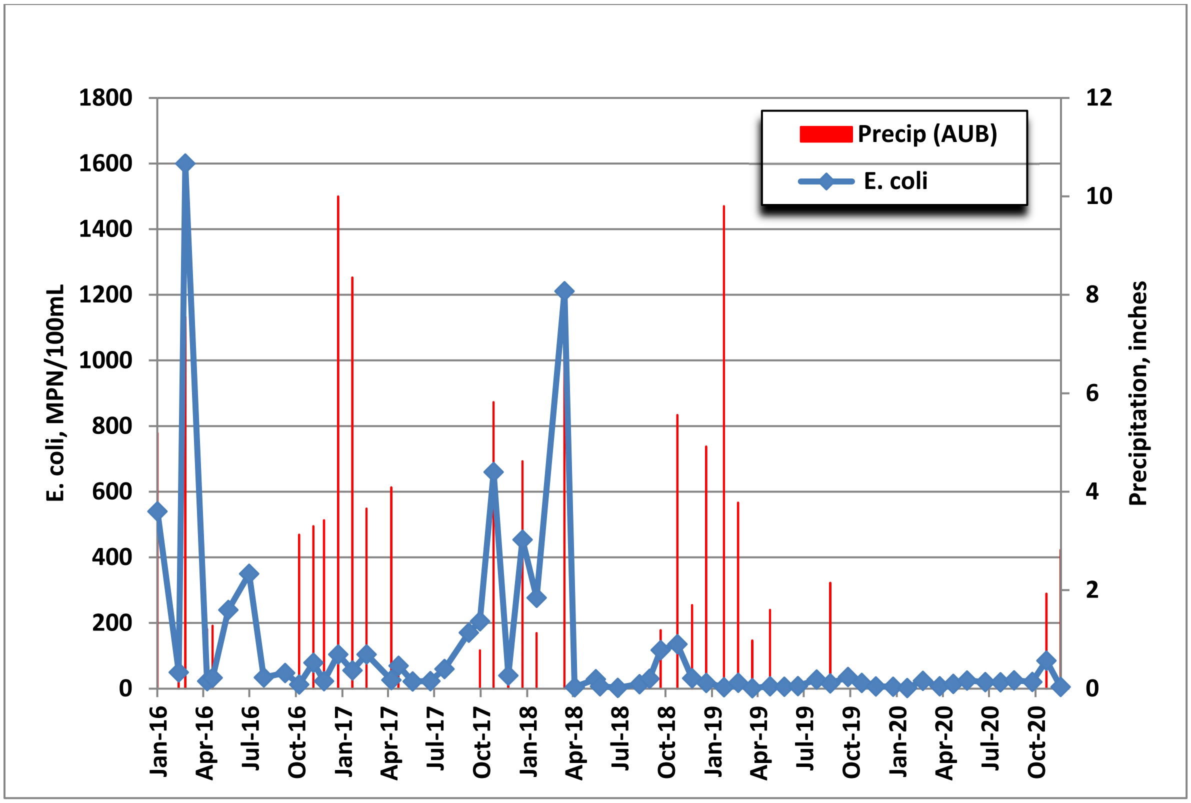
Although the Smartville WTP had nine monthly medians greater than 200 MPN/100mL, it is shown in **Figure 3-12** that all nine monthly medians occurred during months with precipitation. Sections of the Meade Canal leading to the Smartville WTP were encased in 2018/2019, but it is difficult to tell if the *E. coli* levels in 2020 were improved by the canal encasement as 2020 was the driest year of the study period. It should also be noted that the Smartville WTP is already classified as needing and operated to achieve 4/5-log reduction for *Giardia* and viruses. Therefore, the Smartville WTP should continue to be operated to achieve 4/5-log reduction for *Giardia* and viruses.

Figure 3-12. Monthly Median *E. coli* and Total Monthly Precipitation, Smartville WTP, 2016-2020



Since the Sunset WTP had nine *E. coli* monthly medians greater than 200 MPN/100mL, a closer examination of its monthly medians was completed. **Figure 3-13** shows precipitation plotted with *E. coli* values. (Note: CDEC did not have the 2020 water year precipitation data at the Auburn rain gauge). Of the nine *E. coli* monthly medians greater than 200 MPN/100mL, seven of those monthly medians occurred during months with precipitation. Additionally, it should be noted that the Sunset WTP was not operating during these specific seven months. Of the nine months when the *E. coli* monthly median of 200 MPN/100mL was exceeded, the Sunset WTP was in operation for only two months, June and July 2016. Sunset WTP was operational for 19 months during the study period, so the two median values exceeding the 200 MPN/100 mL threshold accounted for 11 percent. Therefore, the DDW guidelines are met for the Sunset WTP, and the current 3/4-log reduction requirement for *Giardia* and viruses continues to be appropriate.

Figure 3-13. Monthly Median *E. coli* and Total Monthly Precipitation, Sunset WTP, 2016-2020

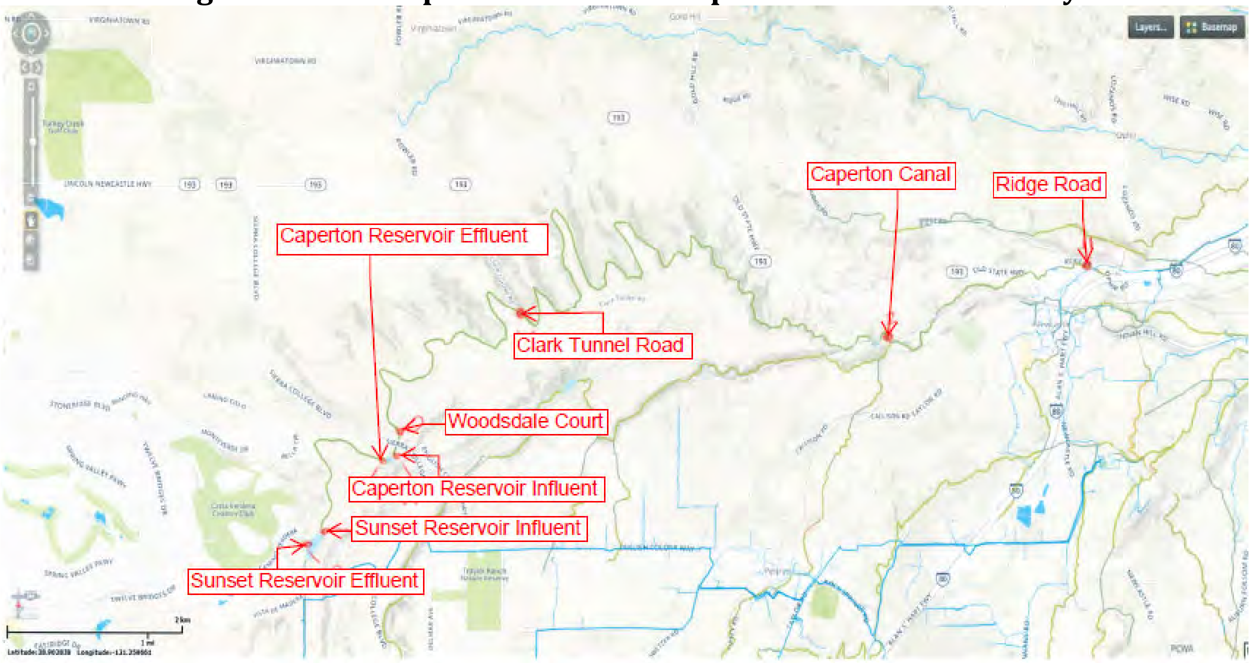


Note: Precipitation data from CDEC, Auburn (AUB) station

In an effort to better understand potential microbial sources, PCWA conducted a special study along the Caperton Canal to the Sunset WTP during the study period, collecting *E. coli* samples at various locations as shown in **Figure 3-14**.

The Caperton Canal special study was not able to shed additional light on the nine *E. coli* monthly medians which exceeded 200 MPN/100mL. Namely, due to the limited number of samples collected at the Whitney Reservoir Influent during the special study. Out of the nine *E. coli* monthly medians which exceeded 200 MPN/100mL, there was only corresponding special study data for two months, November 2017 and March 2018. Additionally, *E. coli* data was not high during these months in samples collected for the special study.

Figure 3-14. Sample Locations for Caperton Canal *E. coli* Study



The study did reveal the segments where *E. coli* increased the most. Based on comparing averages, as shown in **Table 3-6**, *E. coli* increased the most from Caperton Canal to Clark Tunnel Road. *E. coli* levels increased again, although slightly less, from Clark Tunnel Road to Woodsdale Court.

Table 3-6
Average and Median *E. coli* Levels for Caperton Canal *E. coli* Study, 2016 to 2018

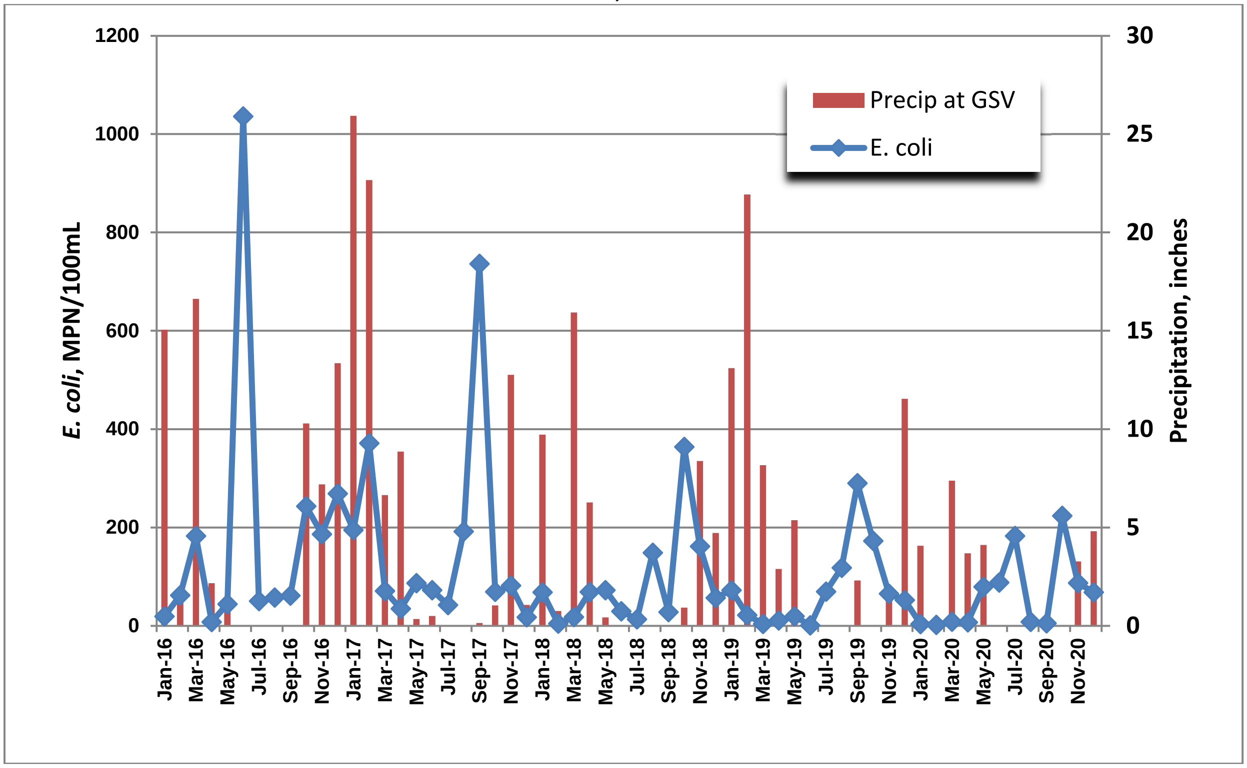
	Ridge Road	Caperton Canal	Clark Tunnel Road	Woodsdale Court	Caperton Reservoir Influent	Caperton Reservoir Effluent	Sunset Reservoir Influent
Average	83.1	39.8	142.4	197.6	161.0	158.4	103.6
Median	18.3	15.8	24.2	30.8	38.7	83.8	79

PCWA staff noted cattle grazing along the Caperton Canal during the special study period, with more cattle located from Clark Tunnel Road to Woodsdale Court.

There are two projects recently and currently being completed which are expected to improve source water quality and reliability for the Sunset WTP. The Caperton Reservoir Improvement Project was completed in September 2020, and the project involved replacing the Caperton Reservoir with 460 feet of 36-inch diameter pipe. This project was completed by PCWA's Field Services Department. Additionally, Phase 1 construction of the Bickford Ranch Community Facility District is currently underway from summer to fall 2021. Phase 1 work will consist of encasing approximately 2,900 linear feet of the existing Caperton Canal (from approximately Clark Tunnel Road to Woodsdale Court) into a 42-inch raw water pipeline. This work is expected to be completed in fall 2021 and could have a significant positive impact on source water quality.

Since the Lake of the Pines WTP had eight *E. coli* monthly medians greater than 200 MPN/100mL, a closer examination of its monthly medians was completed. **Figure 3-15** shows precipitation plotted with *E. coli* values. Of the eight *E. coli* monthly medians greater than 200 MPN/100mL, five of those monthly medians occurred during months with precipitation. Months with no precipitation, but the *E. coli* monthly median was greater than 200 MPN/100mL were June 2016, September 2017, and October 2020.

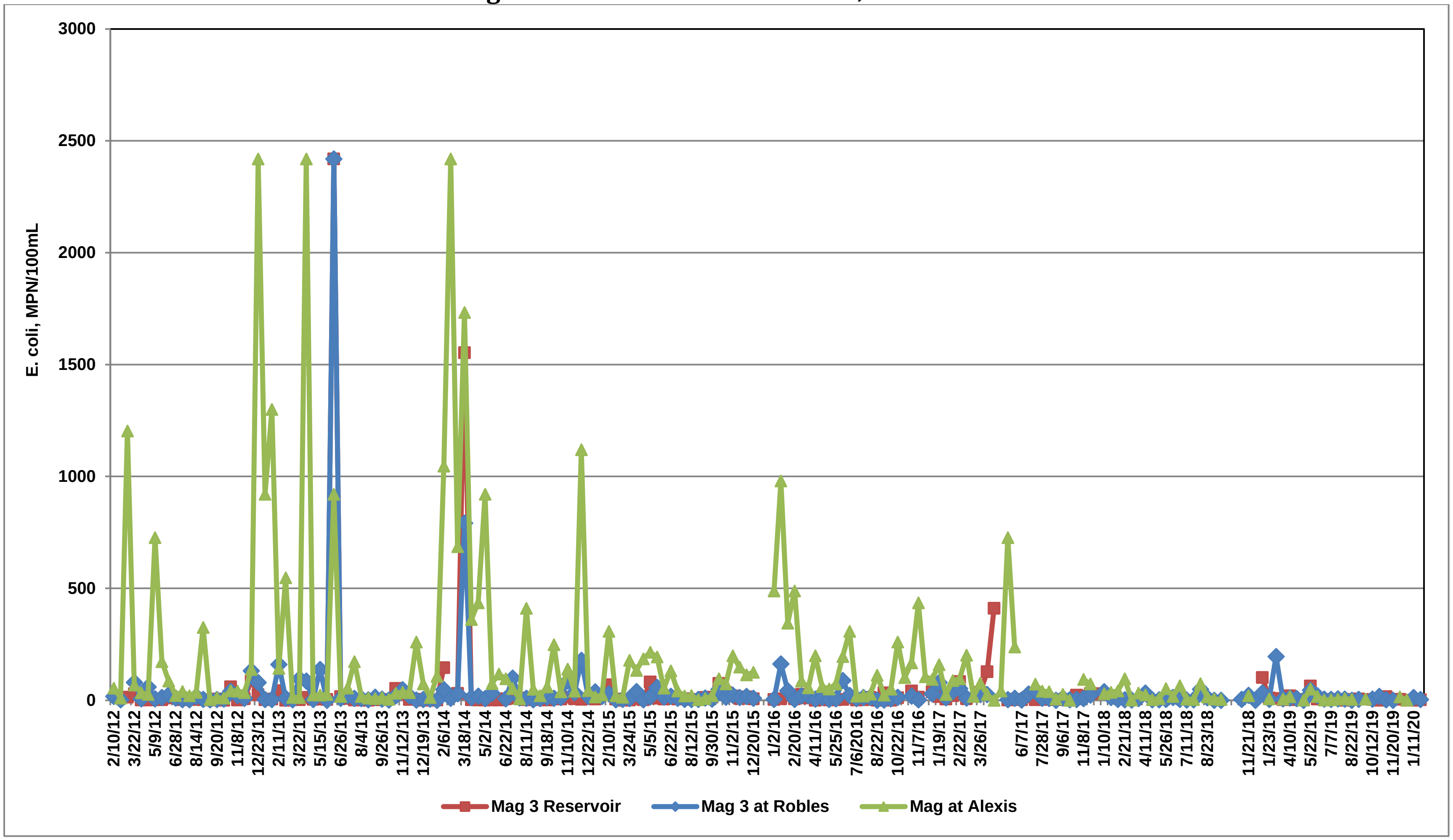
Figure 3-15. Monthly Median *E. coli* and Total Monthly Precipitation, Lake of the Pines WTP, 2016-2020



Note: Precipitation data from CDEC, Grass Valley (GSV) station

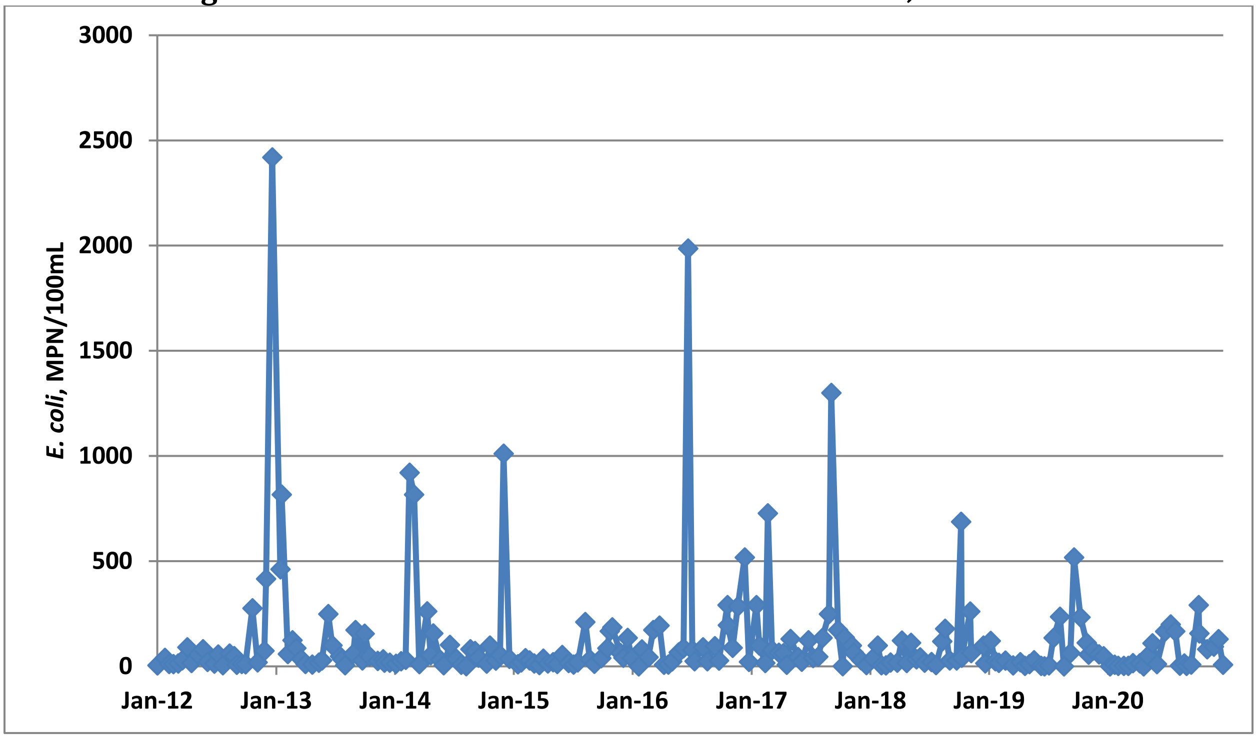
In order to investigate potential sources of *E. coli* at the Lake of the Pines WTP influent, NID has continued to sample for *E. coli* along the Magnolia III canal, which is the canal that transports water from the base of Lake Combie to the Lake of the Pines WTP. Magnolia III canal samples were collected from upstream to downstream at: 1) Magnolia III Reservoir, 2) Magnolia III Canal at Robles Drive, and 3) Magnolia III Canal at Alexis Drive. As **Figure 3-16** shows, *E. coli* levels rarely exceed the 200 MPN/100mL trigger at Magnolia III Reservoir and at Magnolia III Canal at Robles Drive. However, *E. coli* levels at Magnolia III Canal at Alexis Drive are higher, as shown in **Figure 3-16**. The suspected contamination source is ranch land that the open canal previously ran through. The frequency and magnitude of peak *E. coli* at Alexis Drive was reduced since the partial encasement of the canal from Baldwin Ranch to Alexis Drive was completed in November 2013, and further reduced after encasement from Robles Drive to Baldwin Ranch was completed in 2017/2018.

Figure 3-16. *E. coli* at Magnolia III Reservoir, Magnolia III Canal at Robles Drive, and Magnolia Canal III at Alexis Drive, 2012-2020



Although the encasement reduced *E. coli* levels at Alexis Drive, Lake of the Pines WTP influent *E. coli* levels as shown in **Figure 3-17** still can be above 200 MPN/mL, notably in September 2017, October 2018, September 2019 and October 2020. The Magnolia III canal ends at a raw water reservoir at the Lake of the Pines WTP site, where the intake for the water treatment plant is located. There are no others sources into the raw water reservoir and NID manages the maintenance on the reservoir. NID staff has monitored the reservoir for potential causes of microbial contaminants and is concerned that the *E. coli* levels may be due to geese overnighting on the reservoir surface.

Figure 3-17. *E. coli* Lake of the Pines WTP Influent, 2012-2020



Summary of Results for E. coli

- The median *E. coli* values ranges from 3.1 MPN/100mL at Elizabeth George WTP to 58.3 MPN/100mL at the Smartville WTP.

- *E. coli* levels increase downstream for the Boardman Canal WTPs and the Deer Creek WTPs. There is no clear trend in the data for the WTPs downstream of Rollins Reservoir. These trends are similar to the Second, 2012, and 2017 Updates.

- All of the WTPs, except for Smartville, can continue with their current level of treatment of 3/4-log reduction for *Giardia* and viruses under the SWTR. The Smartville WTP is currently operated to achieve 4/5-log reduction for *Giardia* and viruses, and should continue.

- Since the Sunset WTP had more than six *E. coli* monthly medians greater than 200 MPN/100mL, a closer examination of its monthly medians was conducted. Of the nine *E. coli* monthly medians greater than 200 MPN/100mL, seven of those monthly medians occurred during months with precipitation. Additionally, it should be noted that the Sunset WTP was not operating during these specific seven months. During operational months, only 11 percent of monthly medians were greater than the threshold. Peak levels can be associated with precipitation, but there are periods when they are not so there are likely other sources contributing *E. coli*.

- PCWA conducted a special study along the Caperton Canal to the Sunset WTP, which showed that *E. coli* increased the most from Caperton Canal to Clark Tunnel Road. *E. coli* levels increased again, although slightly less, from Clark Tunnel Road to Woodsdale Court. Cattle were observed to be located primarily from Clark Tunnel Road to Woodsdale Court.

- The Caperton Reservoir Improvement Project and the encasement of approximately 2,900 linear feet of the existing Caperton Canal (from approximately Clark Tunnel Road to Woodsdale Court) is expected to improve source water quality and reliability for the Sunset WTP.

- Higher *E. coli* levels at the Lake of the Pines WTP are often related to precipitation events and also ranch land along Magnolia III canal where cattle have been observed. Encasement of the Magnolia III canal through the Baldwin Ranch area has resulted in a reduction in the frequency and magnitude of peak *E. coli* levels at Alexis Drive, however *E. coli* peaks still occur at the Lake of the Pines WTP influent. NID staff suspect that the *E. coli* levels may be due to geese overnighting on the reservoir surface leading to the WTP.

Evaluation for Giardia and Cryptosporidium

The second round of monitoring for LT2ESWTR was conducted from October 2015 to September 2017 for PCWA's Auburn, Bowman, Foothill, and Sunset WTPs. Alta, Monte Vista, Colfax, and Applegate WTPs are Schedule 4 systems and conducted biweekly *E. coli* monitoring for 12 months from October 2017 to September 2018.

The second round of monitoring for LT2ESWTR was conducted from October 2016 to September 2018 for NID's Elizabeth George and Loma Rica WTPs, and from October 2017 to September 2019 for NID's Lake of the Pines, Lake Wildwood, North Auburn, and Smartville WTPs.

Table 3-7 shows the highest 12-month mean for *Cryptosporidium* and *Giardia* for PCWA and NID WTPs. The majority of water treatment plants, seven out of 10, saw significantly reduced levels of *Cryptosporidium* in the source water as part of the Round 2 monitoring. The highest 12-month mean for each water treatment plant averaged 0.047 oocysts/L in Round 1 and 0.018 oocysts/L in Round 2, resulting in a 62 percent reduction in the average value of the highest 12-month mean for each water treatment plant. As the highest *Cryptosporidium* 12-month mean for all WTPs in **Table 3-7** was less than the Bin 1 threshold of 0.075 oocysts per liter, all WTPs listed fall under Bin 1 for the second round of LT2ESWTR monitoring. Sunset WTP had the most detections of *Cryptosporidium,* with five detections in a 24 month period. However, the Sunset WTP was never operating in the five months that *Cryptosporidium* was detected.

Table 3-7
Summary of LT2ESWTR Round 2 Source Water Monitoring for *Cryptosporidium* and *Giardia*

WTP	*Cryptosporidium* Highest 12-month mean (oocysts/L)	*Giardia* Highest 12-month mean (cysts/L)
Bowman	0.017	0.05
Auburn	0.033	0.051
Foothill	0	0.008
Sunset	0.058	0.008
Elizabeth George	0.008	0.023
Loma Rica	0	0.0155
Lake of the Pines	0.0078	0.0388
Lake Wildwood	0	0.0233
North Auburn	0.0233	0.0388
Smartville	0.031	0.0388

Only two water treatment plants were placed into a different bin classification during Round 2, as compared to Round 1. NID's Lake Wildwood WTP was originally placed in Bin 2 during Round 1 and was moved down into Bin 1 during Round 2. Round 2 monitoring resulted in no detects of *Cryptosporidium*, for a 100 percent reduction. The cause of this is uncertain, but could be associated with the Newtown Canal partial encasement and probably related to the general variability associated with sample collection. PCWA's Bowman WTP was also originally placed in Bin 2 and moved down to Bin 1 during Round 2. Although there was detectable presumed *Cryptosporidium* at the Bowman WTP, the maximum annual average was significantly lower in Round 2 (0.017 oocysts/L compared with 0.083 oocysts/L), for an 80 percent reduction. The cause of this is also uncertain, but could be associated with improved performance of the Cascade Shores Wastewater Treatment Plant (WWTP) and probably related to the general variability associated with sample collection.

As mentioned above, PCWA's Schedule 4 WTPs as shown in **Table 3-8** conducted biweekly *E. coli* monitoring for one year. If the *E. coli* annual mean of those samples is greater than 10 MPN/100 mL for a lake source or 100 MPN/100mL for a flowing stream source, then the system is considered to be potentially at risk for microbial contamination and must conduct source water monitoring for *Cryptosporidium*. Annual means below these triggers results in Bin 1 classification and no additional action or treatment required. As the annual means were less than 100 MPN/100mL, these WTPS continue to be placed in Bin 1 and no additional action or treatment is required.

Table 3-8
Summary of LT2ESWTR Round 2 Source Water Monitoring for *E. coli*

WTP	*E. coli* Annual Mean
Alta	12
Monte Vista	22.9
Colfax	33.1
Applegate	41.5

Summary of Results for Giardia and Cryptosporidium

- All PCWA and NID WTPs are classified under Bin 1 for the second round of LT2ESWTR monitoring.

Disinfection By-Product Precursors

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. Since the Yuba and Bear Rivers do not have detectable levels of bromide, total organic carbon (TOC) is the key precursor for DBPs. In addition, temperature significantly affects the rate of disinfection kinetics and can result in increased levels of DBPs. The most common DBPs are total trihalomethanes (TTHMs), which are suspected carcinogens. Other DBPs, including haloacetic acids (HAA5), are suspected mutagens and teratogens. Potential sources of these organic precursors are plant matter, animal matter, and soil, which can be contributed by general watershed runoff, urban runoff, agricultural runoff, recreation, grazing, and wastewater sources.

The Stage 1 Disinfectants/Disinfection Byproduct Rule (D/DBPR) requires varying levels of TOC removal if the source water TOC concentrations exceed 2 mg/L and a utility uses 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 for TOC

Raw water TOC data was provided by PCWA and NID. Average TOC levels for all WTPs range from 1.4 to 2.6 mg/L.

Figure 3-18 shows that for the Lake Spaulding via Boardman Canal WTPs, TOC levels are similar for all of the WTPs; there is no clear trend of TOC increasing as water moves downstream from Alta to Applegate. Peak TOC occurred in August 2017 for all of the Boardman Canal WTPs.

Figure 3-18. Raw Water TOC, Lake Spaulding via Boardman Canal WTPs, 2016-2020

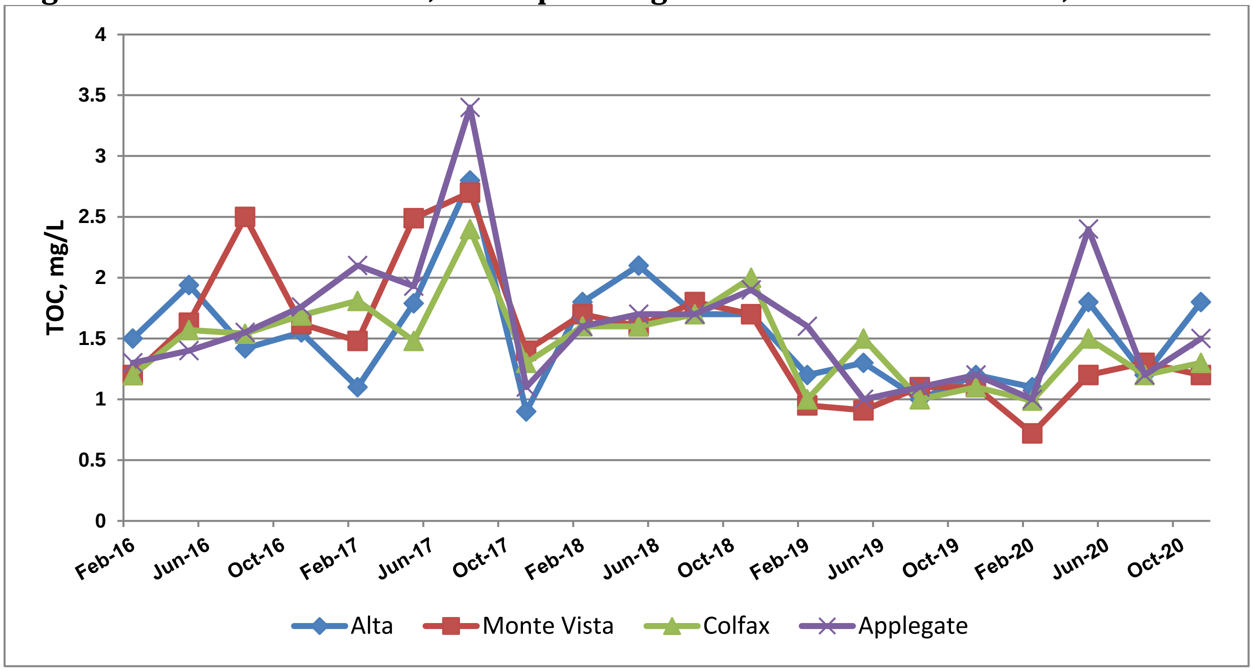


Figure 3-19 shows that TOC levels are similar for the Banner Cascade Pipeline WTPs.

Figure 3-19. Raw Water TOC, Lake Spaulding via Banner Cascade Pipeline WTPs, 2016-2020

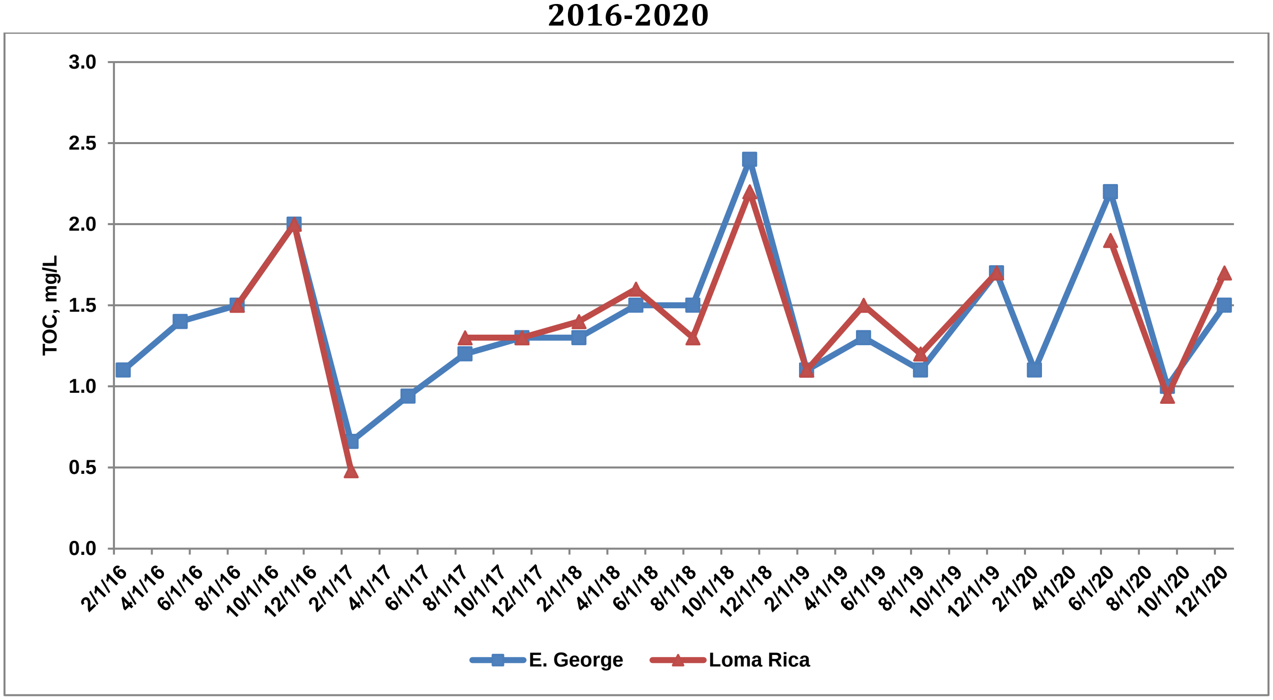
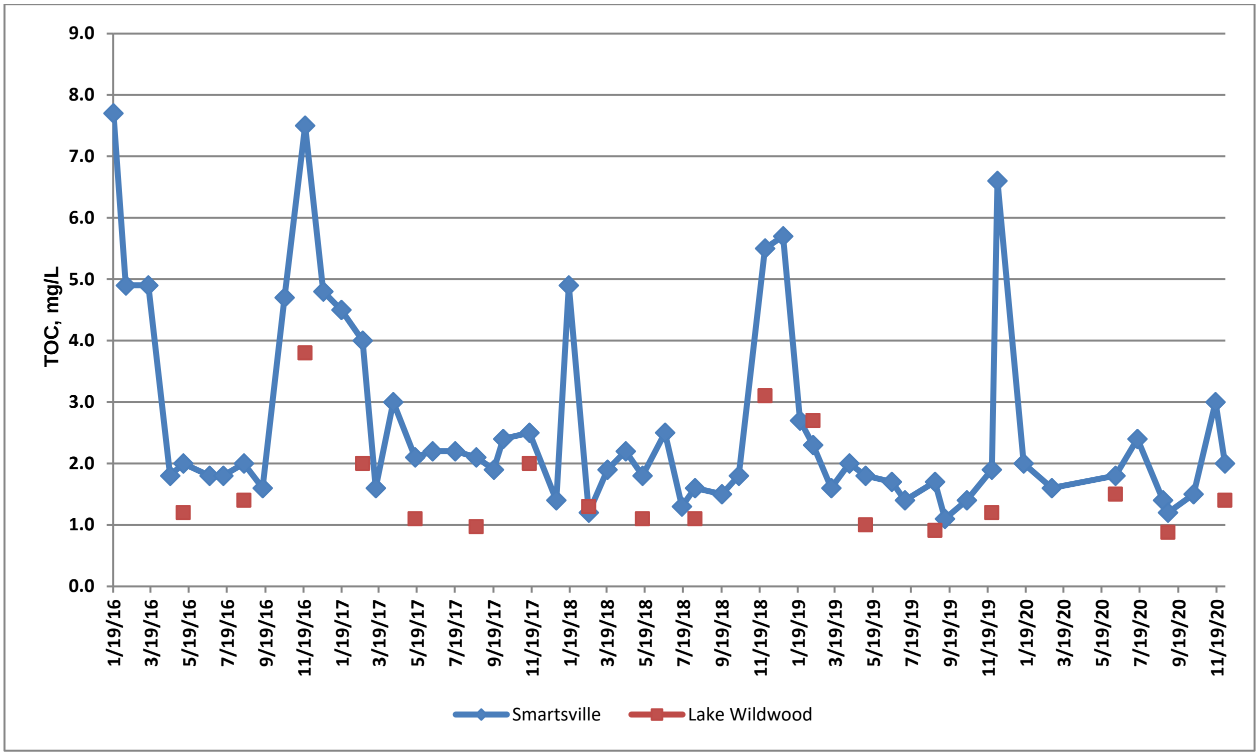


Figure 3-20 shows that TOC increases downstream for the WTPs using Deer Creek downstream of Scotts Flat Reservoir. It has been suggested that this is due to the water entering a natural watercourse, Squirrel Creek, and local canals before entering the Smartville WTP, as well as other localized potential contaminant sources, such as grazing. Higher TOC levels at Smartville typically occur in the November to January time period.

Figure 3-20. Raw Water TOC, Deer Creek Downstream Scotts Flat Reservoir WTPs, 2016-2020



Figures 3-21 and **3-22** show that downstream Rollins Reservoir via Bear River Canal, TOC levels follow no clear pattern from upstream to downstream. **Figure 3-21** show that raw water turbidities exceeded 2.0 mg/L from November 2016 to August 2017, which reflects watershed runoff into Rollins Reservoir from heavy winter rains. **Figure 3-22** shows that raw water TOC exceeded 2.0 mg/L once at Lake of the Pines WTP in June 2020.

Figure 3-21. Raw Water TOC, Downstream Rollins Reservoir via Bear River Canal WTPs, 2016-2020

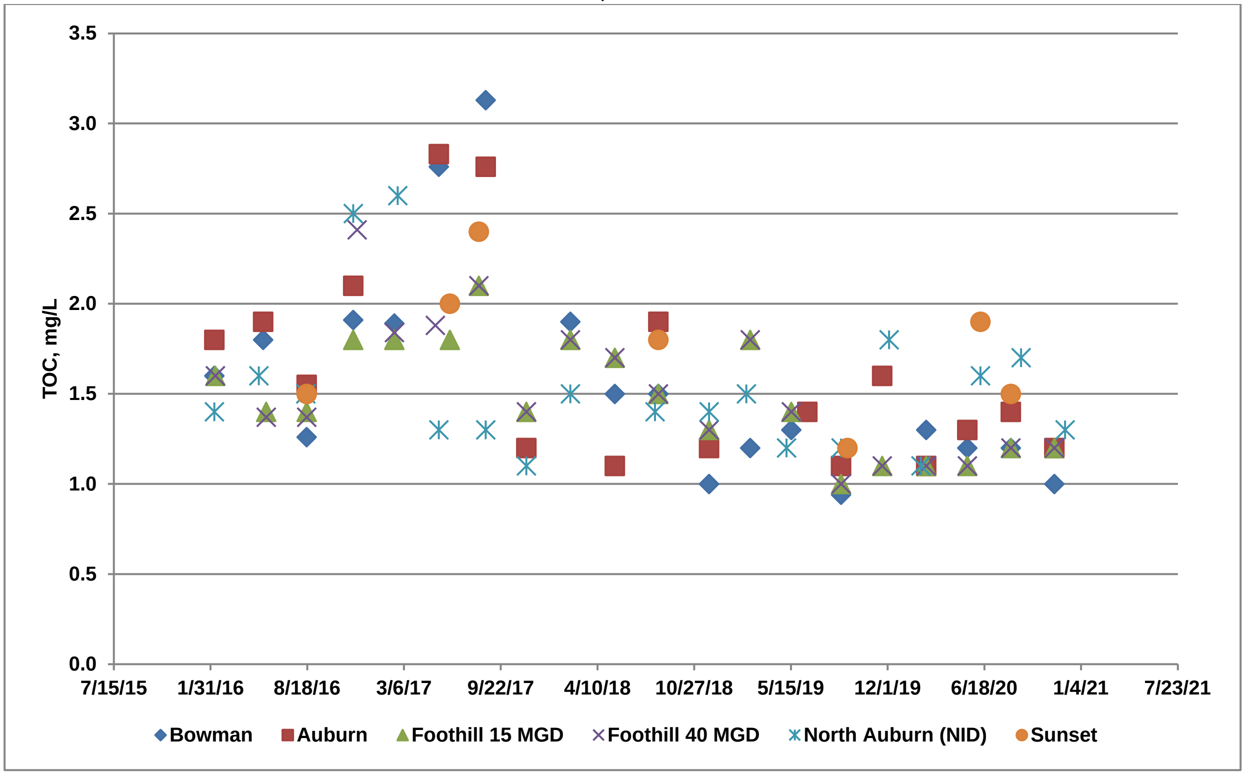
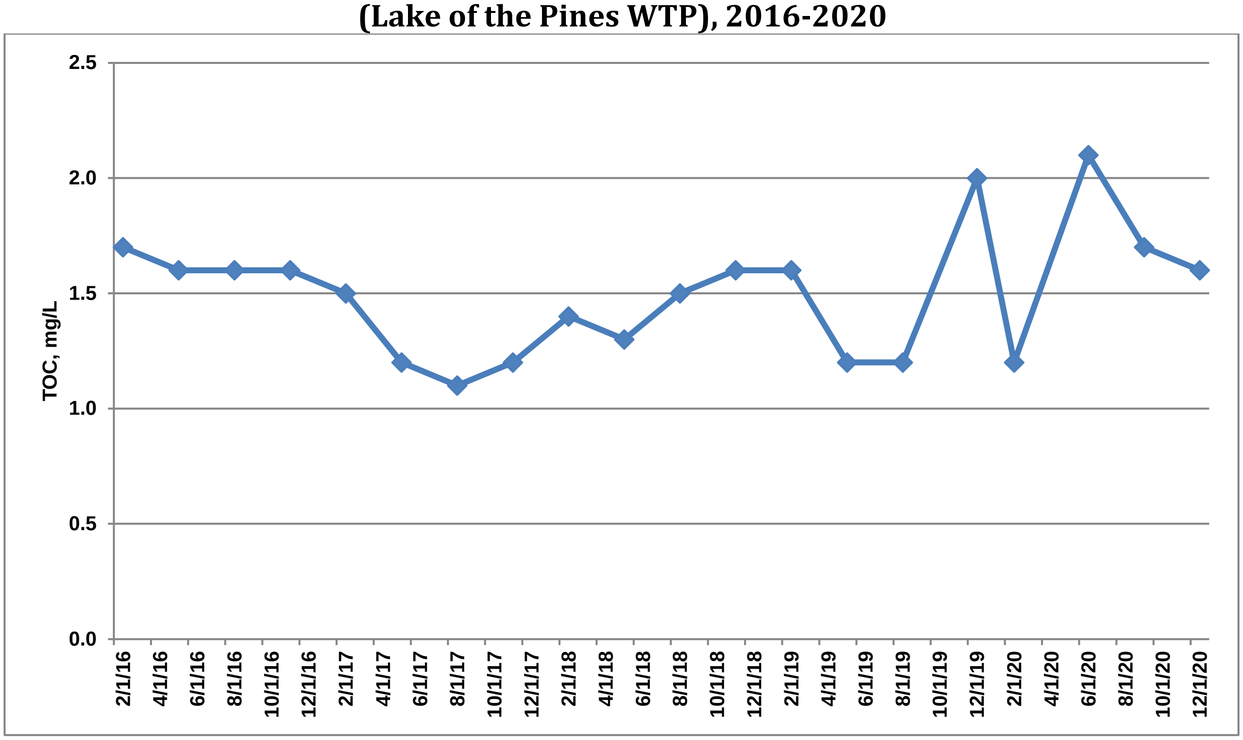


Figure 3-22. Raw Water TOC, Downstream Rollins Reservoir via Bear River (Lake of the Pines WTP), 2016-2020



Summary of Results for TOC

- Average TOC levels for all WTPs range from 1.4 mg/L at Lake Wildwood and Foothill 1 WTPs to 2.6 mg/L at Smartville WTP.
- TOC levels did not increase consistently downstream for similar groupings of WTPs.
- Smartville WTP has the highest TOC levels, likely due to exposure to a natural watercourse (Squirrel Creek) and local canals.
- TOC levels are seasonally variable, with the peak levels typically occurring during the wet season (late fall to early spring).

Source Water Temperature and DBP Formation Evaluation

Source water temperatures were compared to TTHMs and HAA5 at selected WTPs to determine if any correlations could be identified. Selected WTPs had individual TTHM or HAA5 concentrations above the respective MCLs of 80 and 60 µg/L, respectively, over the reporting period. As part of the temperature and DBP evaluation, Applegate and Bowman WTPs were selected for PCWA and Lake Wildwood WTP was selected for NID.

Figure 3-23 presents source water temperature and TTHMs for the Bowman WTP. TTHM formation correlated best at the Bowman WTP, particularly from 2016 to 2018. As the temperature rises and falls, the TTHMs generally follow the same pattern, except in February 2016, when TTHM was high, but temperature was low. Also, in August 2017, when temperature was high, but TTHMs were low. The highest TTHM of 100 µg/L occurred when raw water temperatures were not high. In February 2016, the raw water temperature was 52°F, raw water TOC was 1.6 mg/L, and pH was 7.6.

Figure 3-24 shows that HAA5 does not correlate with temperature at the Bowman WTP. As shown in the figure, HAA5s can be low (less than 20 µg/L) when temperatures are high in August, as in August 2017 and August 2020. The highest HAA5 of 66 µg/L occurred in May 2019 when raw water TOC was 1.3 mg/L. Unfortunately, there was no raw water temperature for this month.

Figure 3-23. Individual TTHMs and Temperature at Bowman WTP, 2016-2020

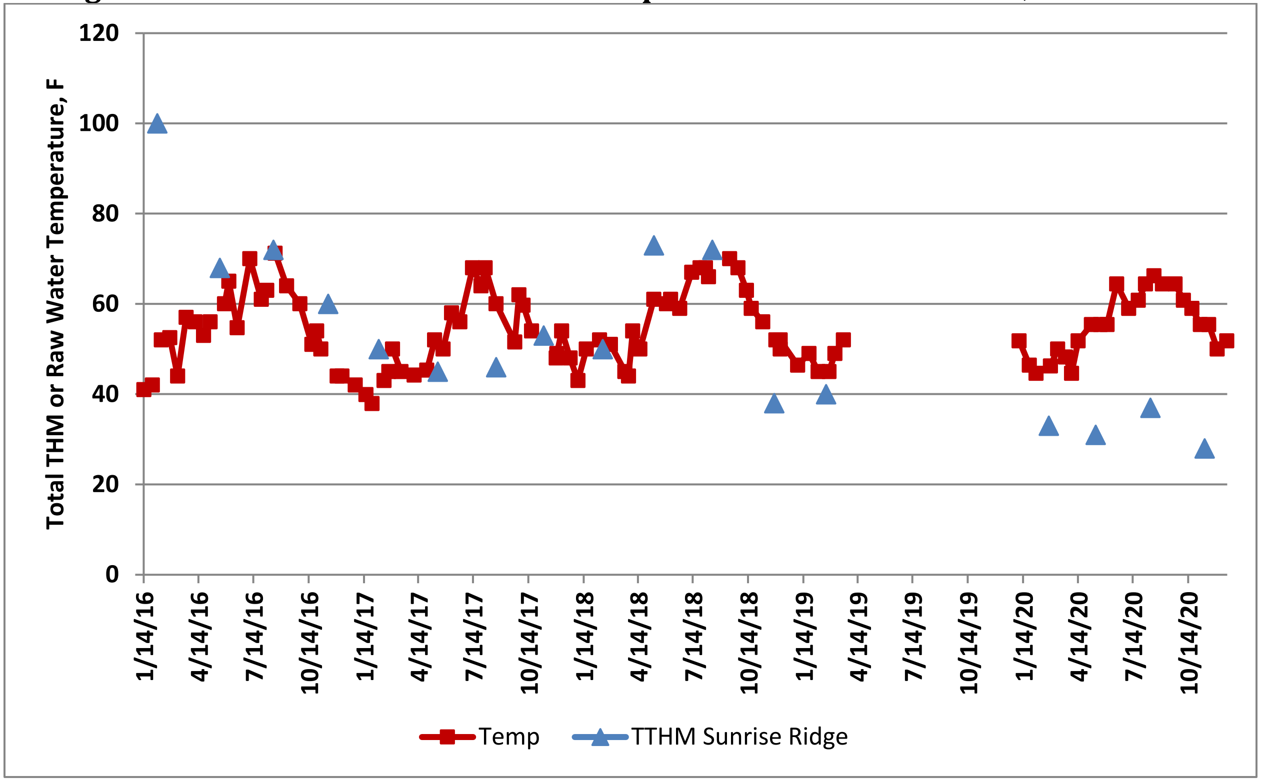
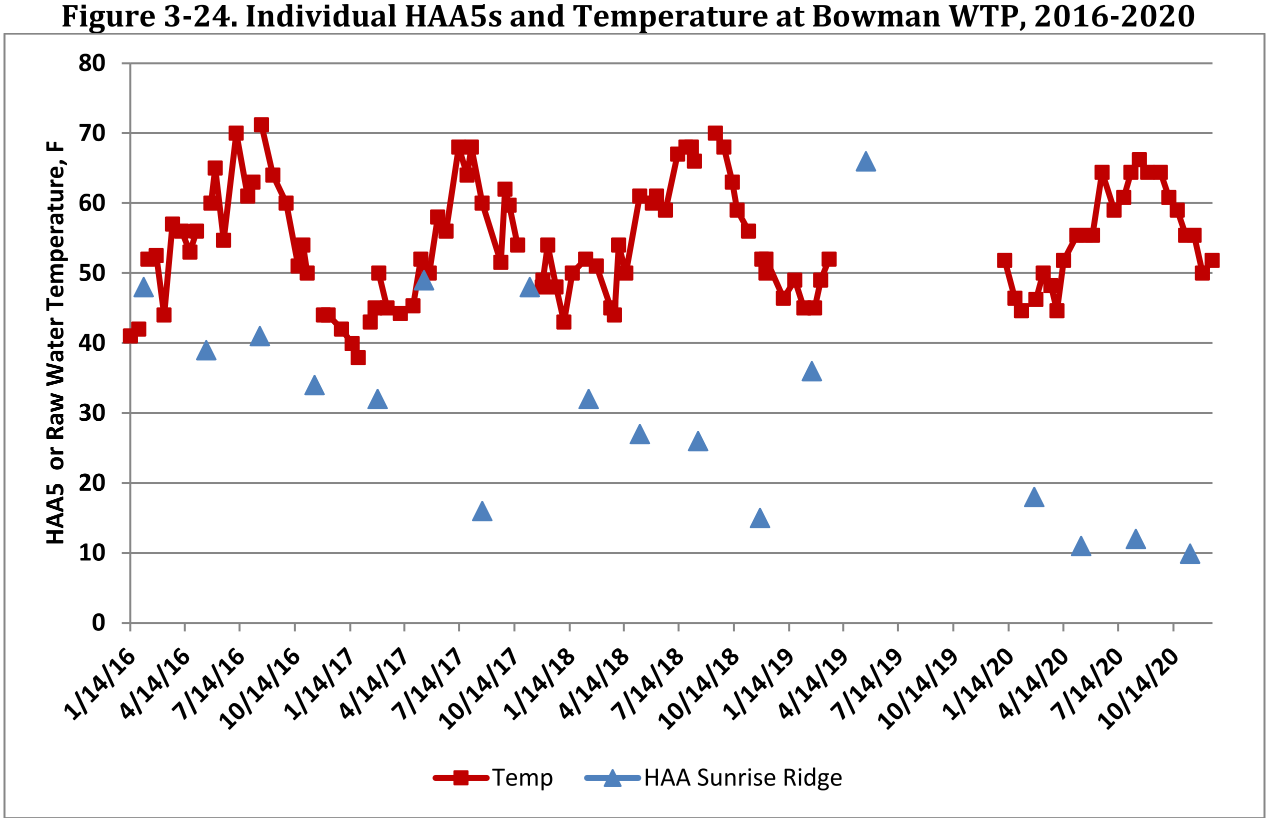


Figure 3-24. Individual HAA5s and Temperature at Bowman WTP, 2016-2020



Similar to the Bowman WTP, the Applegate WTP shows temperature correlates closer to THM formation compared to HAA5 (**Figure 3-25 and 3-26).** Also similar to Bowman WTP, the highest TTHM occurred when raw water temperatures were not high; the raw water temperature was 50 °F, raw water TOC was 1.9 mg/L, and pH was 6.8 in November 2018.

As concluded in the 2017 Update, temperature plays a role in DBP formation but there are also other factors such as water age, pH, and TOC. For Applegate WTP, water age is a significant factor due to a large tank for the system demand, which is more challenging to manage due to conservation efforts increased due to drought conditions. Over the reporting period, PCWA installed tank mixers and vents for the Applegate WTP and the Auburn/Bowman system which have reduced DBP formation.

Figure 3-25. Individual TTHMs and Temperature at Applegate WTP, 2016-2020

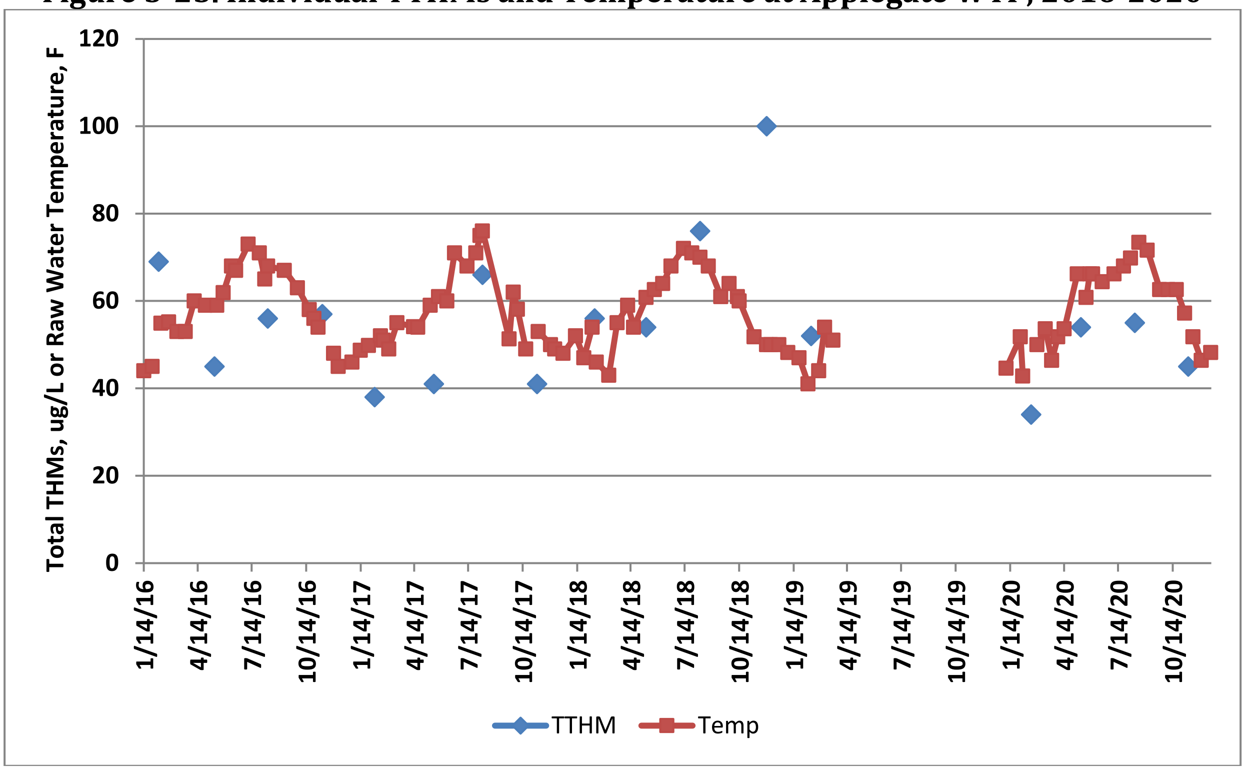
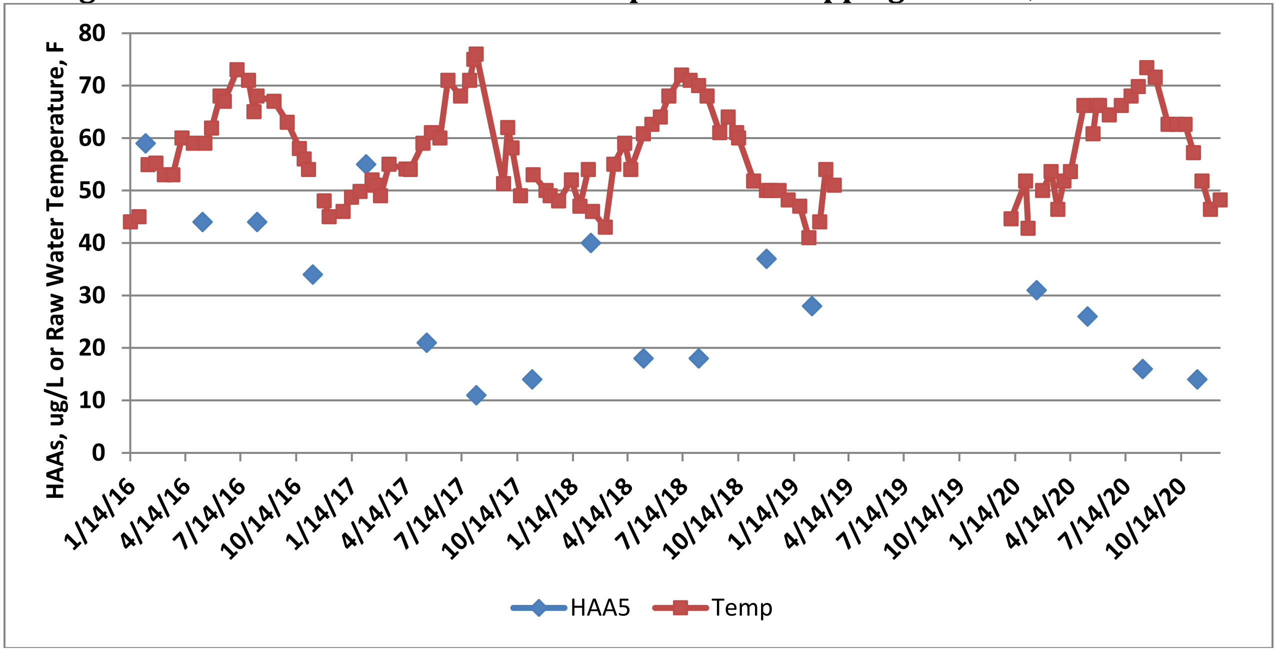


Figure 3-26. Individual HAA5s and Temperature at Applegate WTP, 2016-2020



As shown in **Figures 3-27 and 3-28**, compared to the Bowman WTP, temperature and DBP formation are less correlated at the Lake Wildwood WTP for both TTHM and HAA5s. The three lowest TTHM concentrations occurred when water temperature was low, in the time period from end of November to February. However, the three highest TTM concentrations also occurred from end of November to February. The highest TTHM concentration of 100 µg/L occurred in November 2016 when raw water temperature was 46.4 °F, and raw water TOC was 3.8 mg/L.

Similar to the PCWA WTPs, HAA5 are less correlated with temperature compared to TTHM. **Figure 3-28** shows that HAA5 do not fluctuate with changes in temperature.

Summary of Results for Source Water Temperature and DBP Formation

- Temperature plays a role in DBP formation; however, it is evident that other factors are also impacting formation (water age, pH, and TOC) and appear to be more significant.

- Overall, HAA5 formation is less correlated to temperature than TTHM formation.

- As discussed in **Section 5**, PCWA and NID have both implemented best management practices to reduce DBP formation such as installation of tank mixers and vents at selected storage facilities.

Figure 3-27. Individual TTHMs and Temperature at Lake Wildwood WTP, 2016-2020

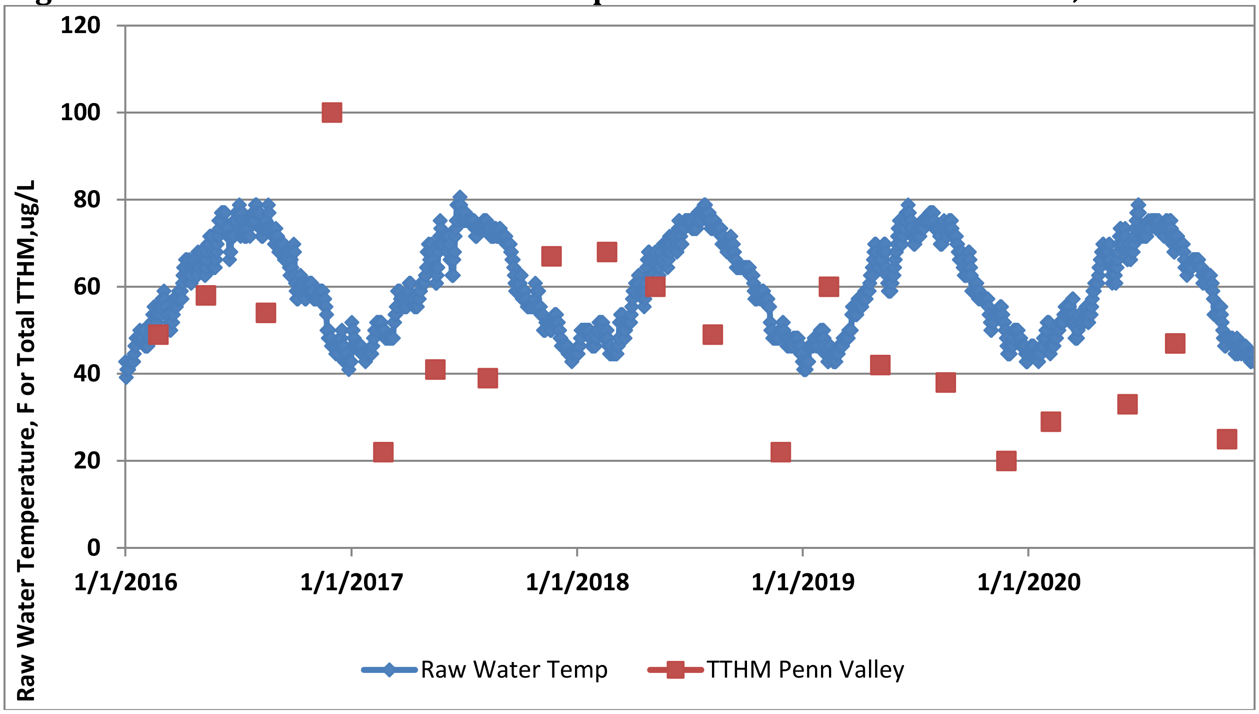
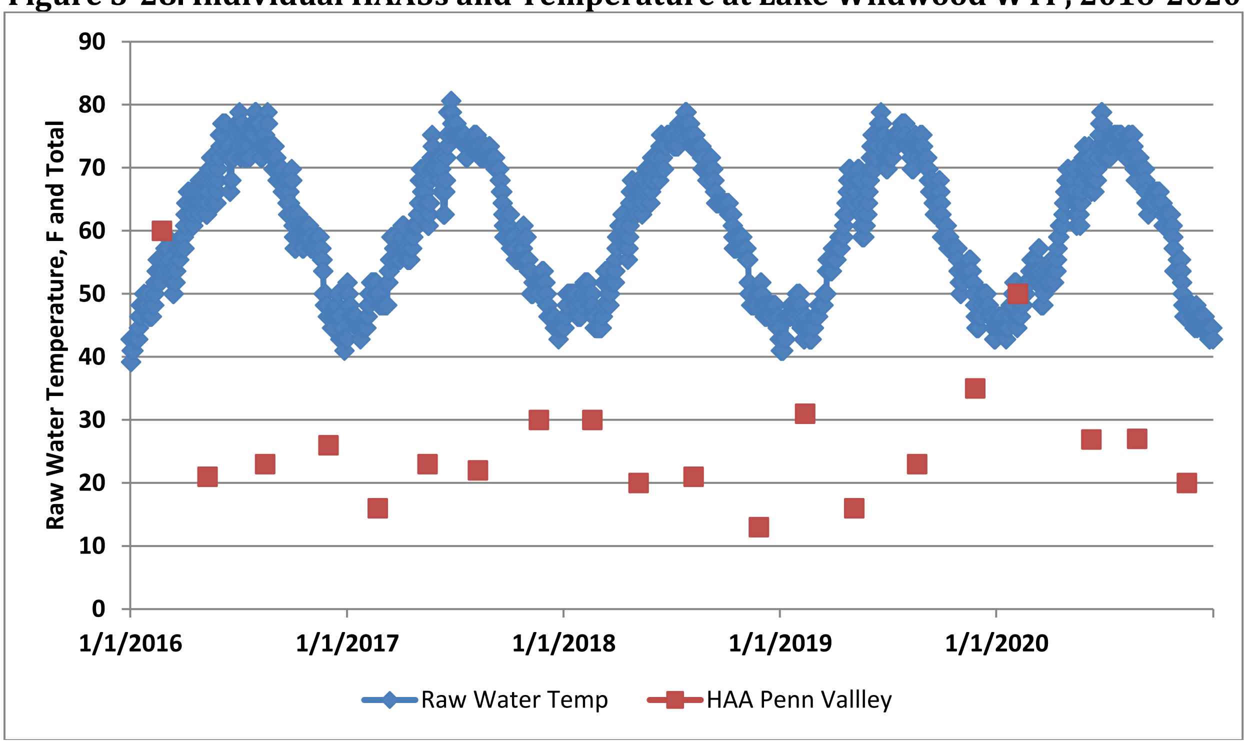


Figure 3-28. Individual HAA5s and Temperature at Lake Wildwood WTP, 2016-2020



This section contains an evaluation of the nine watershed potential contaminant sources selected for review for the 2021 Update. The nine potential contaminating activities that were selected for review as part of the 2021 Update include:

- Canal aquatic herbicide use,
- Rangeland livestock,
- Forest activities, including timber harvesting and wildfires,
- Recreation,
- Source water spills,
- Wastewater,
- Urban runoff,
- Mining, and
- Cannabis cultivation.

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.

CANAL AQUATIC HERBICIDE USE

Although there is limited pesticide application in the Yuba/Bear River watershed, it has the potential to be significant in terms of source water quality due to the regulation of many pesticides in drinking water and its proximity of use to the water treatment plants. For that reason, canal operations and maintenance was selected for investigation.

Background

The canals used to collect and transport water from the upper watershed to the lower watershed and to the water treatment plants are owned either by Placer County Water Agency (PCWA), Nevada Irrigation District (NID), or Pacific Gas & Electric (PG&E). These canals can be lined or earthen, and are typically shallow and only slightly sloped. For this reason, there can be times of slow-moving water during the summer and fall months that results in the growth and proliferation of aquatic weeds and algae.

Both PCWA and NID implement seasonal algae control programs as needed, typically sometime between April and October, that are based on chemical control using herbicides.

PG&E operates their canals and reservoirs, such as Alta Forebay, Halsey Forebay, Halsey Afterbay, and Rock Creek Reservoir, for the purpose of power generation and does not implement any type of chemical algae control program. They do not add any pesticides or herbicides to the canal or reservoir water. They utilize mechanical methods, such as drawdown to dry out the canals and pressure washing, to address aquatic weeds and algae.

The canals that are subject to treatment with aquatic pesticides range from Alta and Elizabeth George Water Treatment Plants (WTPs) down to the communities of Rocklin and Smartville.

Seasonal Patterns

During the treatment season, historically April through October, any portion of the canals in the PCWA and NID systems may be treated with aquatic pesticides to effectively control aquatic pests. Not all of these locations are used throughout the year, nor are all locations treated regularly.

Related Constituents

PCWA regularly utilizes aquatic pesticides on an as-needed basis to control the growth of aquatic vegetation that impedes the efficient and reliable flow of water. The aquatic pesticides used for aquatic vegetation control during the study period include:

- Algimycin-PWF (copper chelated based algaecide/cyanobacteriocide)
- Cutrine-Plus (copper ethanolamine herbicide)
- Cutrine Granular (copper ethanolamine herbicide)

NID also utilizes aquatic pesticides on an as-needed basis to control aquatic vegetation. The aquatic pesticides used during the study period include:

- Captain (copper ethylenediamine complex chelated copper herbicide)
- Cutrine–Plus (copper ethanolamine herbicide)
- Cutrine-Ultra (copper ethanolamine herbicide)
- Green Clean Pro (sodium carbonate peroxyhydrate algaecide)
- Nautique (copper carbonate herbicide)
- Rodeo (glyphosate herbicide)
- Round Up Custom (glyphosate herbicide)

Algimycin-PWF is a copper-based algaecide that is a liquid formulation designed to effectively control a broad range of algae and cyanobacteria growth. Control of certain forms of algae and cyanobacteria can aid in the reduction of taste and odor problems. Dosage rates and frequency of treatment depends on the sensitivity of species present, the extent/biomass of the bloom, and the depth of the growth present in the water column. The active ingredient is copper, which has a secondary drinking water standard of 1 milligram per liter (mg/L).

Captain is a chelated copper aquatic herbicide used against algae and elodea. Captain is administered into canals through a drip method. The active ingredient in Captain is copper ethylenediamine complex. Copper has a secondary drinking water standard of 1 mg/L.

Cutrine-Plus is a liquid that is applied to flowing water using a continuous drip system to achieve desired aquatic pest control with the least amount of chemical use. The active ingredient is copper, which has a secondary drinking water standard of 1 mg/L.

Cutrine-Ultra has the same active ingredient as Cutrine-Plus, but with an added emulsified surfactant/penetrant.

Cutrine granular has the same active ingredient as Cutrine-Plus, but is presented in a solid form that is added to sink to the bottom of a waterbody and dissolve to attack weeds and algae in deeper water more efficiently.

Green Clean Pro is an organic granular algaecide containing sodium carbonate peroxyhydrate. Green Clean Pro degradation byproducts include sodium carbonate, carbon dioxide, bicarbonate carbonate, and hydrogen dioxide.

Nautique is an aquatic herbicide that is a double chelated copper formulation that provides effective control of floating, submersed, and immersed aquatic plants. The copper carbonate is 15.9 percent, which is equivalent to metallic copper of 9.1 percent. Nautique can be applied directly as a surface spray, subsurface through trailing weighted hoses, or in combination with other aquatic herbicides and algaecides, surfactants, sinking agents, polymers, or penetrants. This product can be applied diluted or directly. The active ingredient is copper, which has a secondary drinking water standard of 1 mg/L.

Rodeo is applied as a liquid within rights of ways and in canals for emerged aquatic plants and other weeds growing at the water line and to floating-leaved aquatic weeds. This is a non-selective aquatic and terrestrial herbicide. It is mixed with a non-ionic surfactant. The active ingredient is glyphosate (53.8 percent), which has a primary drinking water standard of 0.7 mg/L.

Round Up Custom is applied as a liquid on the inside of canal banks for emerged aquatic plants and other weeds growing at the water line and to floating-leaved aquatic weeds. This is a non-selective aquatic and terrestrial herbicide. It is mixed with a non-ionic surfactant. The active ingredient is glyphosate (53.8 percent), which has a primary drinking water standard of 0.7 mg/L.

Presence in the Watershed

Glyphosate products can be applied on the inside banks and adjacent areas of canals and drains located in predominately rural settings away from inhabited dwellings utilizing a back-pack sprayer. Some products are also approved for direct application to the water.

PCWA does not apply copper based herbicides 300 yards upstream of the intake to any water treatment plant. NID does not apply copper based herbicides ½ mile upstream of the intake to any water treatment plant. Generally, the water treatment plants by-pass the canal water during the application of copper-based aquatic pesticides.

For both agencies, an application schedule is created each year by the Weed and Brush Supervisor (for PCWA) or the Assistant Maintenance Superintendent Vegetation Control (for NID) detailing the canals to be treated and the dates that they will be treated. This calendar is provided to each of the affected water treatment plants, other water treatment plants and customer services department (which is posted on their website). Affected customers are notified of treatments per customer request or general notification through the Agency newsletter. Affected water treatment plants are again notified the day before the application of copper-based aquatic pesticides. A scheduled application of aquatic pesticide may be cancelled if it is determined by the Weed and Brush Supervisor/Assistant Maintenance Superintendent Vegetation Control that the application will have minimal or no effect on the targeted aquatic pests.

The typical application area for copper-based products is in canals located in predominately rural settings away from inhabited dwellings utilizing a continuous drip system to maintain a desired dose rate over the treatment period. There are twenty-one application sites in the PCWA canal system; these are shown in **Table 4-1**. The goal is to treat aquatic vegetation frequently when vegetation is small, in order to minimize buildup of vegetation and potential dissolved oxygen depletion due to decaying vegetation. The sodium carbonate peroxyhydrate products are manually applied in slow moving waters and along the edge of some reservoirs.

The dose rate is dependent on the number of algae found during a pre-application inspection of the canal to be treated and usually ranges from 0.4 mg/L to 1.0 mg/L, with most canals receiving a dosage that results in a copper concentration of 0.8 mg/L at the point of application. **Table 4-2** provides a summary of the amount of the herbicides applied from 2016 through 2020 by PCWA. **Table 4-3** provides a summary of the amount of all herbicides applied from 2016 through 2020 by NID.

Table 4-1
Permanent Herbicide Application Points in PCWA Canal System

Boardman at Clipper Gap (YB 179) [1]
Boardman at Colfax Header Box (YB 49)
Boardman at Foothill WTP (YB 78)
Boardman at Heather Glenn and 49 Spill[1]
Boardman at Luther and Channel Hill Road
Boardman at McCrary Reservoir (YB 92)
Boardman below Mammoth Reservoir (YB 81)
Bowman Canal (YB 87)
Caperton at Clark Tunnel Road
Caperton below Caperton Reservoir[1]
Cedar Creek (YB 96) [1]
Dutch Ravine at Ridge and Taylor Road
Freeman and Shockley at Luther Road
Lower Antelope and Antelope Stub (YB 181A)
Lower Greeley (YB 91)
Middle Fiddler Green at Raccoon Hollow
Newcastle at Head of South Loop Canal
Perry at Mammoth Drive and Hooter Spill
Red Ravine at Gilardi Road
Shirland at Pacific Ave. (YB 147)
Upper Fiddler Green at RR Spill

[1] Application sites that may affect PCWA water treatment plants

Table 4-2
PCWA 2016 through 2020 Herbicide Application[1,2]

Herbicide	2016	2017	2018	2019	2020
Algimycin PWF (gal)	254	414.5	347	400.8	530.65
Cutrine-Plus (gal)	726.25	699	670	657.6	789.85
Cutrine Granular (lbs)	37.5	20.5	63.5	96.7	0

[1] There is 0.512 lbs of available copper per gallon of Algimycin PWF
[2] There is 0.909 lbs of available copper per gallon of Cutrine products

Table 4-3
NID 2016 through 2020 Herbicide Application[1,2]

Herbicide	2016	2017	2018	2019	2020
Captain (gal)	75.75	153.25	127.50	34.25	106.00
Cutrine Plus (gal)	145.5	1	2.75	98	45.25
Cutrine Ultra (gal)	13.75	19.75	0	2	0
Green Clean Pro (lbs)	0	0	0	0	40
Nautique (gal)	16	20	39	31.5	9
Rodeo (gal)	10.5	13.5	0	0	30.25
Round Up Custom (gal)	35.9	54	45.38	53.3	0

[1] There is 0.909 lbs of available copper per gallon of Cutrine products
[2] There is 0.96 lbs of available copper per gallon of Nautique

A post assessment of the treated canals is performed within two weeks of the aquatic pesticide application to assess the effectiveness of the treatment.

Table 4-4 provides a summary of the herbicide applications that may impact the various water treatment plants for PCWA and NID.

Table 4-4
Application of Products Directly to Canals for Water Treatment Plants

Cedar Creek and Boardman Canals	Colfax, Applegate and Monte Vista WTPs	Active Ingredients
Cutrine or Algimycin-PWF		0.909 or 0.512 Pounds Copper per Gallon
- Applications of Cutrine/Algimycin-PWF occur between April and October. Applications are made at least 0.8 miles above the Colfax WTP, 0.5 miles above Applegate WTP and 0.8 miles above Monte Vista WTP.		
Bowman Canal	**Bowman WTP**	**Active Ingredients**
Cutrine or Algimycin-PWF		0.909 or 0.512 Pounds Copper per Gallon
-Applications of Cutrine/Algimycin-PWF occur between April and October. Applications are made at least 1.4 miles above of the Bowman WTP.		

Table 4-4 Cont'd
Application of Products Directly to Canals for Water Treatment Plants

Boardman Canal	**Auburn WTP**	**Active Ingredients**
Cutrine or Algimycin-PWF		0.909 or 0.512 Pounds Copper per Gallon
-Applications of Cutrine/Algimycin-PWF occur between April and October. Applications are made at least 3.0 miles above of the Auburn WTP.		
Caperton Canal	**Sunset WTP**	**Active Ingredients**
Cutrine		0.909 Pounds Copper per Gallon
-Applications of Cutrine Plus occur between April and October. Applications are made at least 2.0 miles above of the Sunset WTP.		
Newtown Canal	**Lake Wildwood WTP**	**Active Ingredients**
Captain, Cutrine Rodeo, Round Up Custom		0.909 Pounds Copper per Gallon Glyphosate 53.8%
-Applications of Captain or Cutrine occur between April and October. Applications are made at least 0.5 mile above of the Lake Wildwood WTP. The application is 0.5 ppm. - Rodeo or Round Up Custom is applied only as needed, at a 1.0 percent solution, and only to foliage. Lake Wildwood WTP is off-line for 24 hours after a treatment.		
Meade & Town Canals	**Smartville WTP**	**Active Ingredients**
Captain, Cutrine Rodeo, Round Up Custom		0.909 Pounds Copper per Gallon Glyphosate 53.8%
-Applications of Captain or Cutrine occur only on Meade Canal between April and October. Applications are made at least 1.0 mile above of the Smartville WTP. The application is 1 ppm. - Rodeo or Round Up Custom is applied only as needed, at a 1.0 percent solution, and only to foliage. Canals are dosed separately to allow Smartville WTP to run on untreated water.		
Magnolia III Canal	**Lake of the Pines WTP**	**Active Ingredients**
Captain, Cutrine Rodeo, Round Up Custom		0.909 Pounds Copper per Gallon Glyphosate 53.8%
-Applications of Captain or Cutrine occur between April and October. Applications are made at least 1.25 mile above of the Lake of the Pines WTP. The application is 1 ppm. - Rodeo or Round Up Custom is applied only as needed, at a 1.0 percent solution, and only to foliage. LOP WTP is off-line for 24 hours after a treatment.		
Combie Ophir III Canal	**North Auburn WTP**	**Active Ingredients**
Rodeo, Round Up Custom		Glyphosate 53.8%
- Rodeo or Round Up Custom is applied only as needed, at a 1.0 percent solution, and only to foliage. North Auburn WTP is off-line for 24 hours after a treatment.		

Table 4-4 Cont'd
Application of Products Directly to Canals for Water Treatment Plants

Cascade Canal	Loma Rica WTP	Active Ingredients
Rodeo, Round Up Custom		Glyphosate 53.8%
- Rodeo or Round Up Custom is applied only as needed, at a 1.0 percent solution, and only to foliage. Loma Rica WTP is off-line for 24 hours after a treatment.		

[1] Round Up Custom is applied at a 1.75 percent solution and is only applied to vegetation along the edge of the canal, not into the water (rarely used).

Regulation and Management

Both PCWA and NID are regulated under General National Pollutant Discharge Elimination System (NPDES) Order (2013-0002-DWQ) from the State Water Resources Control Board (State Board) for their pesticide application programs. The current permits included a Notice of Intent (NOI), Aquatic Pesticide Application Plan (APAP), and Notice of Applicability (NOA). The General NPDES Order (2013-0002-DWQ) includes implementation of a monitoring program and Best Management Practices (BMPs). NID's APAP is dated October 2013 and PCWA's APAP is dated August 2016. There have been no revisions, updates or violations to these permits.

PCWA aquatic pesticide applications are administered by an outside consultant for Pest Control Advisor Services, who maintains a California Pest Control Advisor License and a California Qualified Applicator Certificate. All applications are made in conformance with current regulations and according to Federal Insecticide Fungicide and Rodenticide Act (FIFRA) label instructions, Department of Pesticide Regulation and Department of Public Health on the use of each chemical. Round Up Custom is used to keep right-of-ways clear along canals.

NID aquatic pesticide applications are administered by the Assistant Maintenance Superintendent Vegetation Control who maintains a California Pest Control Advisor License and a California Qualified Applicator Certificate. All applications are made in conformance with current regulations and according to FIFRA label instructions, Department of Pesticide Regulation, and Department of Public Health on the use of each chemical. Round Up Custom is used to keep right-of-ways clear along canals.

All PCWA and NID representatives involved with the transportation and/or application of pesticides are either Qualified Applicators or work with a Qualified Applicator. Annually all applicators attend a training session on the mixing, loading and application of pesticides. All new staff are required to attend the same training before being permitted to transport or apply any pesticides. The training is conducted by a licensed and/or certified Pest Control Advisor / Qualified Applicator.

In adherence with the NPDES permits issued to PCWA and NID, water quality tests are performed in the receiving waters. NID is required to sample Squirrel Creek, Deadman's Ravine, and Sailor's Ravine for copper and glyphosate. Field tests are performed before the application (background monitoring), during the application (event monitoring), and within seven days after the application of aquatic pesticides (post-event monitoring) to demonstrate the full restoration of water quality and protection of beneficial uses of the receiving waters following aquatic pesticide application. Water samples are also collected at the same time and area to be analyzed at an independent lab for the active ingredient in the aquatic pesticide being used.

The NPDES permits also require implementation of best management practices. This includes; herbicide spill prevention, selection of appropriate herbicides and application rates, education of staff, and coordination with water users.

Monthly reports on the amounts of pesticide used is prepared by PCWA and NID and sent to their respective County Agricultural Commissioners by the Weed and Brush Supervisor/Assistant Maintenance Superintendent of Vegetation Control. An annual report is sent to the State Board and Central Valley Regional Water Quality Control Board (Regional Board) in compliance with the NPDES permit. The annual report to the State includes the amounts of aquatic pesticide used, testing sites, the results of water quality testing, and compliance with the permit. There are also 24-hour and five day non-compliance reports due to the State Board and Regional Board.

The NPDES permit requires that PCWA and NID implement BMPs to protect water quality. This includes spill prevention, appropriate application rates, staff education, and coordination with users of the treated water.

Water Quality Issues and Data Review

A review of water quality from the PCWA and NID water treatment plants shows that there have been no detects of glyphosate in the source water. Also, copper levels in the treated water are either non-detectable or well below the secondary Maximum Contaminant Level (MCL) of 1 mg/L and the Action Level of 1.3 mg/L.

Source Water Protection Activities

PCWA and NID both implement direct coordination between the aquatic herbicide application staff and the water treatment plant operations. This prevents the treated water from entering the plants and minimizes the vulnerability to the activity.

RANGELAND LIVESTOCK

Background

In the Yuba/Bear River watershed, grazing can occur on either pastureland, which is irrigated, or rangeland. Livestock in the Yuba/Bear River watershed primarily includes cattle and sheep. There is a relatively small 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. 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. Livestock grazing can impact water quality by contributing sediment, total organic carbon (TOC), nutrients, and pesticides used for weed control in pastures.

Irrigated pastureland is included as part of the Irrigated Lands Regulatory Program. Good management of pastureland is no longer voluntary through elective participation in the Rangeland Water Quality Management Program. Non-irrigated rangeland grazing mostly occurs higher in the watershed on United States Forest Service (USFS) lands and is managed under lease conditions set by those agencies or on other private lands.

Information for this section was obtained from several agencies' websites and from discussions with personnel from the State Board, the Regional Board, the USFS, as well as staff at UC Davis.

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. Storms can 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[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 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[2]. 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].

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

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.

High levels of coliform in the Yuba/Bear River system can be associated with precipitation, as discussed in **Section 3**. Even though coliform is not considered a good indicator for *Cryptosporidium* and *Giardia*, the bacteria data available for the water treatment plants 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.

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.

The highest use pesticides, glyphosate and triclopyr, have not been detected in the source or treated water at the water treatment plants, as discussed in **Sections 3 and 5**.

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*[3]. 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 though calf play. Therefore, dairies are expected to have greater opportunity for spreading infection than rangeland cattle.

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[3] 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.

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 glyphosate and triclopyr. Glyphosate is a regulated constituent with a primary drinking water standard of 0.7 mg/L. Triclopyr has been used on pastureland through the study period. There is no drinking water standard for triclopyr.

Presence in Watershed

There are several impediments to collecting comparable, accurate data for livestock in the watershed, including the possible changes in cattle population through the year as well as the difference between County and watershed boundaries, which results in an overestimate in the cattle population in the Yuba/Bear River watershed. Nevertheless, the numbers provide a general picture of livestock populations and overall changes in the watershed. The total livestock population documented by the US Department of Agriculture for Nevada County, including both rangeland and dairy cows, was nearly 4,108 in 2017, as shown in **Table 4-5**. This is 14 percent decrease over the five-year period from 2012 to 2017, a 27 percent decrease over the ten-year period from 2007 to 2017, and a 19 percent decrease over the fifteen-year period from 2002 to 2017.

Table 4-5
Inventory of Livestock[1], 2002, 2007, 2012, and 2017

County	Cattle and Calves						
	2002	2007	2012	2017	5 Year Change	10 Year Change	15 Year Change
Nevada	5,042	5,615	4,778	4,108	-14%	-27%	-19%

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 Nevada County Agricultural Commissioner also keeps statistics on cattle/calf and steer/heifer populations in the county. These statistics are updated annually. The annual populations for cattle varied, decreased through the study period, and did not match the USDA statistics; 2016 was 7,000 head, 2017 was 7,000 head, 2018 was 6,300 head, 2019 was 6,200 head, and 2020 was 6,200 head. The sheep population ranged between 1,110 and 1,500 head each year during this period. It can be seen that the overall populations in the entire county are quite low, with the majority of livestock being cattle.

The US Department of Agriculture also tracks the amount of irrigated pastureland in Nevada County as well, shown in **Table 4-6**. This shows that there has been a decrease in the amount of land utilized for pastureland over the study period, similar to the inventory of livestock.

Table 4-6
Irrigated Pastureland[1], 2002, 2007, 2012, and 2017

County	Pastureland, acres						
	2002	2007	2012	2017	5 Year Change	10 Year Change	15 Year Change
Nevada	4,044	4,856	4,088	3,516	-14%	-28%	-13%

Based on information from the USDA website: www.nass.usda.gov.

The Nevada County Agricultural Commissioner also keeps statistics on pastureland and rangeland in the county. Consistently, they have reported 10,000 acres of pastureland and 95,000 acres of rangeland.

There are four USFS grazing allotments in the upper watershed. Three are active, Canyon Creek, Pass Creek, and English Mountain allotments, and one is still vacant, Devil's Peak. The active permits require the permittee to prepare a Management Plan to detail the season of use, number and kind of livestock, and imposes fees for use. Permittees are required to submit an Annual Operation Plan to the USFS. Devil's Peak allotment, including 11,191 acres of USFS land, is along the South Yuba River in the South Yuba sub basin and would require a full National Environmental Policy Act (NEPA) analysis before it could be activated. The English Mountain allotment, between Bowman Lake and Jackson Meadows Reservoir in the Middle Yuba and Canyon Creek sub basins, includes 10,583 acres of USFS land and has been returned to service during the study period. The Canyon Creek allotment, between Bowman Lake and Fordyce Lake in the Canyon Creek, Texas/Fall Creek and South Yuba sub basins, includes 16,913 acres of USFS land. The cattle prefer to graze near Loney Meadows in the western portion of Texas/Fall Creek subbasin. The permit currently covers 100 head of cattle grazing during the summer, between July 16 and September 20. This is a term permit covering 10 years and is granted to a rancher with adjacent lands. The Pass Creek allotment, between Jackson Meadows and Webber Lake in the Middle Yuba sub basin, includes 5,150 acres of USFS land.

Livestock grazing also occurs on private lands in the upper watershed and the lower watersheds. These are typically small operations with limited number of head. Three areas of particular interest are private ownership along Highway 20 in the Squirrel Creek sub basin between Penn Valley and Smartville, northwest of Lake Combie, and along the Ragsdale Random in Meadow Vista due to their proximity to NID and PCWA canals and water treatment plants. NID operates one limited grazing allotment in the watershed, the Luster Lease, located north of the Bear River below Rollins Reservoir. This is about 50 acres of limited grazing. A portion of the grazing allotment is contributory to the Bear River, but the terrain is steep and the rancher fences the allotment to prevent cattle from grazing close to the river.

Pastureland and rangeland in the watershed have been treated with pesticides to control the growth of invasive weeds. **Table 4-7** provides a summary of the pesticide applications between 2014 and 2018 for pastureland and rangeland in Nevada County. It can be seen that the overall level of chemical applied, as well as the prevalence on pastureland versus rangeland, varies from year to year but is generally low. The predominant pesticides are glyphosate and triclopyr.

Table 4-7
Chemical Application on Pastureland and Rangeland, pounds[1]

Pesticide	2014		2015		2016		2017		2018	
	Pasture	Range	Pasture	Range	Pasture	Range	Pasture	Range	Pasture	Range
2,4-D	0	0	0	0	0	0.1	0	0.2	2.7	0
Aminopyralid	3.4	2.6	4.1	0.1	3.2	0.6	4.3	0.2	2.6	0.9
Clopyralid	0	0	0	0.1	1	0	0	0	0.1	0
Glyphosate	11.1	10.8	6.5	19	37.1	91.4	6.7	9	19.1	8.5
Triclopyr	5	2.1	4.4	18.5	51.5	15.7	10.8	9.3	14.3	36.7
Total Annual Pounds	**35**		**52.7**		**200.6**		**40.5**		**84.9**	

[1]Source is California Department of Pesticide Regulation

Regulation and Management

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 Waste Discharge Requirements (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 Clean Water Act (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. There are no USBLM grazing allotments in the watershed. In addition, the USFS updated its Range Analysis and Planning Guide in 2017 to update protocols for range allotment management plans.

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 was not finalized or adopted. As part of this 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.

The Central Valley Regional Board and the Lahontan Regional Board were 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 were working together to maximize consistency and facilitate implementation across approximately 20 million combined acres of federally managed lands. In summer 2021 the Lahontan Regional Board announced that they did not have the resources to continue participating in the joint project and that the Central Valley Regional Board would continue to prepare independently. Ultimately each Regional 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.

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 sought 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 late 2021.

Rangeland Water Quality Management Program

The Rangeland Water Quality Management Program (RWQMP), developed in 1995 by the University of California Cooperative Extension (UCCE), the Cattlemen's Association, and the USDA's Natural Resources Conservation Service (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 now administered on the University of California (UC) Rangelands website as the Ranch Water Quality Planning module, as of August 2020.

University of California Cooperative Extension

The UCCE Sierra Foothill Research and Extension Center is located east of Marysville in Browns Valley 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. 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 Farm Service Agency (FSA) and the other is the 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 Yuba/Bear 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 the Yuba River as a local priority area, but this has not been confirmed.

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

Giardia and Cryptosporidium

There has been no monitoring of runoff from pastureland or rangeland for fecal indicator bacteria or protozoa during the study period. **Section 3** presents a discussion of the available *Cryptosporidium* analyses for the PCWA and NID source waters. The data presented are the presumptive sample results (total immunofluorescence assay). Under the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) Round 2 monitoring, all of the water treatment plants in the upper watershed had relatively low levels of *Giardia*, *Cryptosporidium* (averages less than 0.075 oocysts per liter), or *Escherichia coli* (*E. coli*) and were placed in Bin 1. Smartville WTP, Lake of the Pines, and Sunset WTP can have seasonally higher *E. coli* levels at their influent. There is potential for grazing upstream of each of these intake locations.

Pesticides

There has been no monitoring of runoff from pastureland or rangeland for pesticides in the watershed either. A review of the raw and treated water monitoring for the water treatment plants shows that there were no detects of glyphosate in the Yuba/Bear River water supply. Triclopyr is not regulated in drinking water; therefore, there is no monitoring data available at the water treatment plants.

Source Water Protection Activities

NID manages one grazing allotment in the watershed and as part of the management plan for the allotment there are BMPs specified to protect source water quality, including fencing to keep cattle away from the river.

FOREST ACTIVITIES

Since most of the watershed is covered by evergreen forest and a large portion of the upper watershed is part of the Tahoe National Forest, the activities occurring on these lands are critical to the long-term quality of the water supply. This study identified timber harvesting and wildfires as activities of significant interest and these are discussed below.

Timber Harvest

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 chemicals for silviculture or revegetation. Indirect impacts include the increased access for other forest users, increased soil erosion, and increased nutrient loading to the 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.

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 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[4]. It 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

As described in **Section 2**, much of the Yuba/Bear River watershed is covered with evergreen forest. Harvesting activities occur in most of the sub basins, but more commonly in those locations greater than 3,000 feet of elevation. Timber harvesting on federal lands is regulated by the USFS and by 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, large wildfires in the watershed, discussed in the Wildfires subsection below, drought, and beetle infestation have warranted significant salvage timber harvesting operations.

CALFIRE tracks timber harvest plans (THPs) by county, with little detail on the specific location. Where possible, THPs that provided information to clarify location outside of the watershed were removed. The remaining numbers represent the watershed counties (Nevada, Placer, and Sierra), and may be beyond the Yuba/Bear River watershed. During the study period, 2016 through 2020, there were 2,608 active THPs covering over 67,000 acres. Sierra Pacific Industries accounted for nearly 2,100 of those THPs for a total of 50,000 acres (75 percent of THP acreage). In addition, CALFIRE has modified its Forest Practice Rules to expand the use of Emergency and Exemption Notices for timber harvesting under specific scenarios. Emergency Notices are reserved for hazardous fuel removal only and a form must be completed and approved by CALFIRE to proceed with the harvest. During the study period, 2016 through 2020, there were 21 Emergency Notices approved in the watershed counties for a total of 1,335 acres. Fifteen were to address post-fire salvage operations, three

[4] 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.

were for hazardous fuel, two were for beetle infestation, and one was related to a sinkhole. Exemption Notices are more expansive, including 300-foot structure clearance, dead/dying/diseased tree removal, drought mortality, forest fire prevention, and small timberland owner. A form must be completed and approved by CALFIRE to proceed with harvest. During the study period, 2016 through 2020, there were 1,418 Exemption Notices approved in the watershed counites for a total of 814,678.3 acres. This is more than 10 times the acreage approved under THPs. The median size of an Exemption Notice is 2 acres. Sierra Pacific Industries accounted for 29 Exemption Notices for a total of 690,893 acres (85 percent of Exemption Notice acreage), which seems like they are utilizing this process much more heavily than the THP process. It should be noted that Emergency and Exemption Notices are not nearly as well vetted for protection to receiving waters and the Central Valley Regional Board is not involved in any pre- or post-harvest inspections on these permits.

The Central Valley Regional Board also tracks THPs and according to California Integrated Water Quality System (CIWQS), there were 104 THPs permitted to harvest in watershed counties during the study period, in two Regional Board jurisdictions under four different WDRs General Orders. A summary of the number of approved THPs under each County is provided in **Table 4-8** and a summary of the number of approved THPs in each WDR is provided in **Table 4-9**. The majority of the THPs approved were from the Central Valley Regional Board and those WDRs General Orders are discussed below.

Table 4-8
Number of THPs Approved by Watershed Counties, 2016 - 2020[1]

Order Number	Number of THPs Approved
Nevada	43
Placer	44
Sierra	17

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

Table 4-9
Number of THPs Approved by Order, 2016 - 2020[1]

Order Number	Number of THPs Approved
R5-2014-0144	80
R5-2017-0061	21
R6T-2009-0029	1
R6T-2014-0030	2

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

The Nevada County Agricultural Commissioner tracks the production of timber, in terms of board feet. This is not an accurate account of the acreage or amount of timber harvesting occurring in the watershed, but can provide an idea on the relative scale of timber harvesting operations over time in the county. **Table 4-10** provides a summary of the annual timber harvest between 2016 and 2020. This table shows that the harvesting operations vary quite widely between the years. This could be explained by the fact that most of the timber harvesting in the Yuba/Bear River watershed is by commercial growers, such as Sierra

Pacific Industries, who plan their harvesting in rotation cycles. Also, salvage operations from a wildfire burn area can account for large amounts of harvest.

Table 4-10
Timber Harvested in Nevada County, board feet

	2016	2017	2018	2019	2020
Timber	9,437,000	23,158,000	19,772,000	12,018,000	13,545,000

There are numerous chemicals applied to forested land in the process of silviculture but only four were used at more than 100 pounds per year in Nevada County. Borax, clopyralid, aminopyralid, oxyfluorfen, penoxsulam, hexazinone, and strychnine were all sporadically used at low levels. **Table 4-11** provides a summary of the pesticides used on timberland forest.

Table 4-11
Chemical Application on Forest Lands in Nevada County, pounds[1]

Chemical	2014	2015	2016	2017	2018
2,4-D	-	148.3	-	-	-
Glyphosate	5,513.1	7,206.5	1,461.2	1,077.8	1,890.2
Imazapyr	225.4	-	239.1	61.8	162.3
Triclopyr	-	200.7	52.5	22.5	10.7

[1]Source is California Department of Pesticide Regulation

Regulation and Management

As mentioned previously, there are two separate, parallel regulatory programs for timber harvesting, including fuel management and salvage operations as well. 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 applications for a THP must obtain coverage under the General permit from the Regional Board (as discussed below).

It should be noted that if the State Board adopts a Water Quality Management Plan for National Forest System Lands, as discussed under Livestock Grazing above, then this would include timber harvesting activities as well and the management strategy could change.

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 Yuba/Bear River is a very important source of surface drinking water that is vulnerable in the upper watershed to insects and wildfires.

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 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, the Tahoe National Forest implements 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 an 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 was not finalized or adopted. As part of this 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.

The Central Valley Regional Board and the Lahontan Regional Board were 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 were working together to maximize consistency and facilitate implementation across approximately 20 million combined acres of federally managed lands. In summer 2021 the Lahontan Regional Board announced that they did not have the resources to continue participating in the joint project and that the Central Valley Regional Board would continue to prepare independently. Ultimately each Regional 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.

In May 2018, then-Governor Jerry Brown signed Executive Order B-52-18 that mandates various state agencies to implement a minimum of 500,000 acres per year of statewide forest treatments within five years to reduce wildfire risk. In order to address the increased pace and scale of vegetation treatment allowed under this Order, the State Board adopted a Vegetation Treatment General Order (Order No. 2021-0026) in July 2021. This will ensure that vegetation treatments are conducted in a manner that is protective of water quality. This Order requires project proponents to follow the California Vegetation Treatment Program (CalVTP) developed by the California Board of Forestry and Fire Protection. The order prohibits degradation of water quality, impacts to waters of the State, construction of new roads, aerial spraying of pesticides, and commercial timber harvesting. This General Order and the CalVTP are designed to streamline the permitting process to enable the pace required by the Executive Order.

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 Boardman Canal and the Bear River Canal water treatment plants show a distinct seasonal trend with most peaks occurring during the wet weather season. It is possible that timber harvesting contributes to the increased solids loading due to storm runoff from dirt access roads and water crossings. It should be noted that both systems have upstream reservoirs that serve to buffer many water quality impacts downstream, including turbidity.

As noted previously, there were no detects of pesticides in the treated water for any water treatment plants. Also, there are no significant nutrient water quality concerns in the source water either.

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 early fall in the Yuba/Bear 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 Yuba/Bear 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[5]. 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

Most wildfires, whether prescribed, accidental, or arson, occur during the summer and fall months in the watershed. Wildfires can be either under the jurisdiction of CALFIRE or the USFS.

There were only three fires in the Yuba/Bear River watershed during this study period, 2016 through 2020. The Greenhorn Fire burned 15 acres in July 2017, at the Greenhorn

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

Campground on Rollins Lake. The Lobo Fire burned 821 acres in October 2017, along Lone Lobo Trail in Rough and Ready. A portion of the burn area was tributary to Squirrel Creek, and it did burn along the Newtown Canal upstream of the Lake Wildwood Water Treatment Plant (WTP). NID noted that the aerial retardant applications did impact the Newtown Canal and they ceased diversion to allow the water to bypass the Lake Wildwood WTP. The Jones Fire burned 705 acres in August 2020, near Jones Bar Road in Nevada City. A portion of the burn area was tributary to Deer Creek.

During the last watershed sanitary survey period, the Lowell Fire burned 2,304 acres in July and August 2015, in Steep Hollow west of Alta in the Bear River sub basin. The impacts of this fire could be evident in the early part of this study period, 2016 through 2020.

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.

<u>California Forest Improvement Program</u>

CALFIRE has continued implementation of a fuel 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. Some of the Yuba/Bear 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.

<u>Guidelines for Aerial Delivery of Retardants and Foam Near Waterways</u>

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." This policy was recently upheld in a December 2011 Record of Decision, Nationwide Aerial Application of Fire Retardant on National Forest System Land, USFS.

The USFS recently updated their GIS database to incorporate aerial retardant avoidance areas, specifically the 300-foot distance from hydrographic features.

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 Deer Creek, Bear River, and the Bear River Canal water treatment plants show a distinct seasonal trend with most peaks occur during the wet weather season. Erosion for recent burn areas could be contributing to these peaks.

Source Water Protection Activities

NID coordinates with CALFIRE and USFS related to their own efforts in the watershed, as well regarding land conversion and timber sales. NID is implementing a California Forest Improvement Plan on its land in the watershed for fuel treatment around Scotts Flat Reservoir, Rollins Lake, and English Meadow (in the Middle Yuba River east of Jackson Meadows Reservoir. The English Meadow Floodplain Restoration project is on 380 acres of USFS and NID lands, with intent to reduce sediment transport. NID is evaluating a Master Stewardship Agreement with Tahoe National Forest to continue forestland improvement on both NID and USFS lands.

Cosumnes, American, Bear, and Yuba Integrated Regional Water Master Plan

The Integrated Regional Water Master Plan (IRWMP) is a planning document that identifies a vision, guiding principles, broadly-supported goals, objectives, strategies, actions and projects for the purposes of enhancing the beneficial uses of water for the Cosumnes, American, Bear and Yuba (CABY) region. This effort was initiated by water suppliers, power utilities, and watershed conservation groups to; provide long-term water supplies, protect and improve water quality, and enhance environmental and habitat resources. The IRWMP was completed in 2007 and has been subsequently updated, most recently in July 2021.

There are five programmatic areas of the updated IRWMP; water supply, water quality, environment and habitat, climate change, and human-landscape interaction. These areas each have issues associated with them and there are 54 objectives identified in the IRWMP. Under water supply area are objectives related to upgrading aging infrastructure (WS-2), reservoir maintenance (WS-5), and healthy forests (WS-6). Within the water quality area are numerous objectives related to a variety of water quality concerns (WQ-1 through WQ-9). There are fuel load management/health forest objectives in other programmatic areas (Environment and Habitat EH-5 and Climate Change CC-3 and CC-4). Finally, in the overall area there is an interesting objective to protect water infrastructure against wildfire damage (OV-5).

CABY applies for California Department of Water Resources (DWR) Proposition 84 grant funding for a wide variety of projects. This includes projects related to forest activities, such as scotch broom removal, fuel management, and overall forest health. In 2015, CABY facilitated funding for both NID and PCWA through this program. NID received funds to encase 3,000 feet of the Meade Canal in 2017, which serves the Smartville WTP. PCWA received funds to install mixers in seven storage tanks to prevent disinfection by-product formation in 2017, for the Applegate and Auburn/Bowman distribution systems. CABY is waiting for additional funding opportunities and expects those may be related to drought impacts, which would match well with source water protection efforts.

RECREATION

Background

There is a large amount of recreation that occurs in the Yuba/Bear River watershed. Recreation occurs in each of the sub basins, at varying levels. Recreation includes body and non-body contact activities. Body contact recreation includes swimming, wading, and rafting and is allowed on all major reservoirs and river reaches in all sub basins. The number of body contact recreationalists cannot be estimated, but is expected to be far less than the total number of recreationalists. Non-body contact recreation includes camping, boating, off-highway vehicle (OHV) use, fishing, hiking, biking and winter activities such as snow play, skiing, and snowmobiling.

Seasonal Patterns

Body contact recreation occurs primarily between Memorial and Labor days. Most non-body contact recreation can occur throughout the year. Most camping, and associated activities, occurs in the upper watershed and is limited to May through October, with peak use over the summer holiday periods. During the winter months, December through March, winter activities such as skiing and snowmobiling primarily occur in the upper watershed only. Recreation in the lower watershed consists of more day-use activities such as boating, OHV use, fishing, hiking, and biking and can occur throughout the year, but is most significant during the spring, summer, and fall.

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. Also, boaters may dump sewage waste into a waterbody rather than use a pumpout.

Non-body contact recreation can also contribute to pathogen levels in the watershed but the more significant concern is associated with erosion caused by land-based activities which may in turn cause an increase in the solids loading to the receiving water and a subsequent increase in constituents such as turbidity, total dissolved solids, TOC, iron, and manganese at the water treatment plants.

Presence in the Watershed

Multiple agencies own and manage recreational facilities in the Yuba/Bear River watershed, including the USFS, PG&E, and NID. Recreational facilities are located from the headwaters down to the lower reaches of the watershed. This discussion has been separated into camping and day-use to assist with presentation.

Camping

Overnight camping occurs throughout the watershed and in all sub basins. Camping occurs in both formal campgrounds and dispersed in the Tahoe National Forest. **Table 4-12** provides a summary of all of the formal campgrounds, by sub basin, and the number of developed campsites.

The facilities at each campground vary, from full flush toilets to pit toilets and from running water to bring your own. The formal campgrounds are actively operated by various entities that are responsible for waste management and disposal and on-going maintenance. No formal statistics are kept by the Tahoe National Forest for recreational uses, therefore no assessment of overall impact or change during the past five years could be made. PG&E no longer tracks user statistics for its recreation facilities. Annual user statistics were provided for the NID recreation facilities at Scotts Flat and Rollins reservoirs, see **Table 4-13**.

Another facility of interest is the Bear River Campground, since it is located adjacent to the Bear River below Rollins Reservoir. This campground is owned and operated by Placer County. The campground is open from April 1 through October 31; however, no open flame is allowed June 1 through October 31. Primary use is between May and September when the campground is generally full on a daily basis. There are 23 sites, which are allowed eight persons, but are generally used by four. There are also two group sites that can hold up to 50 persons each. This accounts for nearly 200 campers per day during the summer months. The campground has vault toilets. There is no site manager, but the site is monitored and maintained daily during the season of use. The vault toilets are pumped regularly, typically between three and four times per year.

Table 4-12
Formal Campgrounds in Yuba/Bear River Watershed

Sub Basin	Campground	Operator	Number of Sites
Middle Yuba River	Jackson Meadows - Pass Creek	NID	30
	Jackson Meadows - Pass Creek Annex (Overflow)	NID	6
	Jackson Meadows - East Meadow	NID	46
	Jackson Meadows - Woodcamp	NID	20
	Jackson Meadows - Findley	NID	14
	Jackson Meadows - Fir Top	NID	12
	Jackson Meadows - Jackson Point	NID	10
	Jackson Meadows - Aspen Group	NID	3 Units (100 max)
	Jackson Meadows - Silvertip Group	NID	1 Unit (25 max)
	Jackson Meadows - Little Laiser Meadow Horse Camp	USFS	11
Canyon Creek	Bowman Lake	NID	7
	Jackson Creek	NID	14
	Faucherie Group	NID	2 Units (50 max)
	Canyon Creek	NID	16
	Sawmill Lake - Dispersed	NID	5
	Milton - Dispersed	NID	4
Texas/Fall Creek	Carr-Feeley Lakes - Dispersed	PG&E	11
	Upper Rock Lake – Dispersed	PG&E	1
	Lower Rock Lake – Dispersed	PG&E	3
	Culbertson Lake – Dispersed	PG&E	1
	Fuller Lake – Dispersed	PG&E	9
	Middle Lindsey Lake – Dispersed	PG&E	3
	Lower Lindsey Lake – Dispersed	PG&E	11
	Blue Lake – Dispersed	PG&E	9
	Rucker Lake – Dispersed	PG&E	7
	Grouse Ridge - Dispersed	PG&E	9
Fordyce Lake	Meadow Lake Individual and Groups	PG&E	25 + 2 Units (50 max)
	White Rock Lake - Dispersed	PG&E	1
	Sterling Lake - Dispersed	PG&E	8

Table 4-12 Cont'd
Formal Campgrounds in Yuba/Bear River Watershed

Sub Basin	Campground	Operator	Number of Sites
South Yuba River	Big Bend Group	USFS	2 Units (max 50)
	Hampshire Rocks	USFS	30
	Indian Springs	USFS	34
	Woodchuck	USFS	8
	Cisco Grove Campground and RV Park	Private	235
	Thousand Trails Snowflower RV Park	Private	208
	Kidd Lake Group	PG&E	10 Sites (69 max)
	Lake Spaulding	PG&E	26
NF of the NF of the American River	Lodgepole	PG&E	35
Deer Creek	Scotts Flat Reservoir – Individual and Groups	NID	171 + 4 Units (190 max)
	White Cloud	USFS	45
	Skillman Horse Group	USFS	11 Units (96 max)
Bear River	Rollins Reservoir - Peninsula	NID	70
	Rollins Reservoir - Orchard Springs	NID	100
	Rollins Reservoir - Greenhorn	NID	84
	Rollins Reservoir - Long Ravine	NID	73
	Bear River Campground – Individual and Group	Placer Co.	23 units + 2 units (100 max)
	Bear Valley Group	PG&E	1 Unit (50 max)

Table 4-13
NID User Statistics for Recreation Facilities*

Facility	2017	2018	2019	2020
Scotts Flat Campground	85,885	94,802	110,324	70,334
Long Ravine Campground – Rollins Reservoir	49,752	45,307	51,647	38,513
Orchard Springs Campground – Rollins Reservoir	38,794	38,047	34,225	19,520
Peninsula Campground – Rollins Reservoir	18,981	14,317	18,052	3,821

*Including both camping and day use combined

Day-Use Activities

Some of the key day-use activities that occur in the watershed include body-contact recreation, hiking, OHV use, boating, fishing, cross-country skiing, and snowmobiling. Hiking, OHV use, cross-country skiing, and snowmobiling largely occurs on public lands. Boating and fishing can occur on public and private lands.

Highly used hiking trails in the region include; Loch Leven Lakes Trail (near Big Bend Visitor Center), Grouse Lakes Area, Pioneer Trail east of Nevada City off Highway 20, Palisade Creek Trail (near Kidd Lake), and Pacific Crest Trail (along the summit).

OHV use can occur throughout the watershed, but is more prevalent in the upper watershed in the Tahoe National Forest. Some popular areas for OHV use include White Cloud, Meadow Lake, and along Fordyce Creek/I80 corridor.

Boating and fishing occurs on most waterbodies in the watershed. Public boat ramps are available for the large reservoirs including; Jackson Meadows, Bowman Reservoir, Lake Spaulding, Lake Valley Reservoir, Scotts Flat Reservoir, and Rollins Reservoir. There are also private docks and access on Lake Combie. PG&E allows access to most of its facilities for day-use, including boating and fishing. This includes access to parts of the water supply system such as Deer Creek Forebay, Drum Forebay and Afterbay, Alta Forebay, Halsey Forebay and Afterbay, Rock Creek Reservoir, and Wise Forebay. Most of these are limited to on-shore fishing with limited parking available.

Day-use for the lower Bear River and Squirrel Creek has significant use during the warm weather months of June through October. Access to the Bear River is used at the Highway 174 and Dog Bar Road crossings, as well as the adjacent landowners. There are no sanitation facilities at any of these areas. Squirrel Creek recreation is centered around Western Gateway Regional Park in Penn Valley. The park offers baseball fields, playgrounds, off-leash runs for dogs, and creek access for body contact recreating. There are sanitation facilities provided.

Another day-use activity is winter use for snow play, cross-country skiing and snowmobiling. These uses are significantly lower than the other summer season activities. There are several areas where snow play occurs. Most are located along Interstate 80, including: Loch Leven, Rainbow, Cisco Grove, Sno-Park at Yuba Gap, Nyack, and Blue Canyon. A few are located on the eastern end of Highway 20, including: Bear Valley and Omega Rest Area. Also, the Soda Springs/Boreal ski resorts are located in the uppermost part of the watershed and continue to expand and have significant operations.

There are five areas designated for cross-country skiing and two of those also have trails for snowmobiling, or over-snow vehicles (OSV). They include Castle Peak, Rattlesnake (near Yuba Gap), Big Bend, Donner Sno-Park, and Steephollow. There is also a multi-use snow trail loop from Jackson Meadows Reservoir to Meadow Lake. The key areas for OSV use are Pass Creek, Meadow Lake, Road 18, Rattlesnake, Sterling Lake, and Lola Montez.

Regulation and Management

There is regulation over recreation in the Yuba/Bear River watershed. As described previously, the owners and operators of the formal recreational facilities are required to conduct on-going maintenance and operations and appear to be vigilant in their activities. One management activity of note is the USFS Travel Management Plan. The Travel Management Plan consists of three Subparts; A – Forest-Wide Road Analysis, B-OHV road and trail designation, and C-OSV road and trail designation. Subpart A was completed in 2005, and should be updated every five years thereafter. The most recent Travel Analysis Report was published in 2015. The Report assesses the Tahoe National Forest's road system to determine the minimum roads and trails needed to serve its goals, it is not an assessment of the road conditions. The Report looks at trends in road uses and makes general recommendations for the future. Roads are recommended as either "keep", "convert", "decommission", or "store". The USFS uses this Report to inform future planning and maintenance activities in the forest.

The Pacific Southwest Region of the USFS completed Subpart B to designate routes for wheeled motorized vehicle use in the Tahoe National Forest. Routes were designated between 2005 and 2010, following a five-step Route Designation Strategy. Not all existing routes were designated for future use. After an intensive public input process, the Tahoe National Forest completed the designation process and approved the Motorized Travel Management Program Environmental Impact Statement in September 2010. This included a Motorized Vehicle Use Map, which shows the roads and trails approved for use.

Subpart C of the Travel Management Plan, OSV road and trail designation, has been developed for the Tahoe National Forest. The USFS completed and approved the Over-Snow Vehicle Use Designation Environmental Impact Statement in February 2019. This included 247 miles of groomed OSV trails and 135 miles of additional non-groomed OSV trails in the Tahoe National Forest. An OSV Use Map has been created, indicating that most of the USFS land in the Yuba/Bear River watershed will be open to OSV use.

As part of their Federal Energy Regulatory Commission (FERC) relicensing process, NID and PG&E continue to evaluate recreational use of their facilities in the Yuba/Bear River watershed. Both agencies indicate in their current Recreation Plans that they will be expanding, or improving, recreational access. This includes improved access for fishing at forebays, improved boat access at reservoirs, and improved campground facilities.

Water Quality Issues and Data Review

Microbiological Data

There has been very limited monitoring of runoff from recreational areas for microbial constituents. **Section 3** presents selected results from the Regional Board Safe to Swim Study along Squirrel Creek and it indicates that there may be a seasonal influence from recreational activities at some locations in the study area. **Section 3** also presents *E. coli* data for the water treatment plants. The various water supply systems have variable water quality. The

Bear River Canal water treatment plants show an increasing trend in *E. coli* during the summer use season, June through September. Additionally, Applegate WTP sees a peak monthly median in September.

Section 3 also presents a discussion of the available *Giardia* and *Cryptosporidium* analyses for the water treatment plants. The data presented are the presumptive sample results (total immunofluorescence assay). The low levels of protozoa in the water and sporadic nature of detection likely indicate that body contact recreation is not significantly contributing.

Solids Data

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 occur during the wet weather season, but some peaks occurring during summer months. The summer months are when algal blooms can occur in the slower moving canals, which would contribute to both TOC and turbidity, so it is thought that these are potentially responsible for those peaks. Since there are numerous activities in addition to general watershed erosion that could contribute, it is uncertain how much is attributable to recreational activities.

Source Water Protection Activities

There is limited opportunity for stakeholder activity in the recreation source. NID manages its recreation facilities using BMPs to protect source water quality.

SOURCE WATER 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 expected to be provided by Division of Drinking Water (DDW), if DDW is apprised of a hazardous material spill with risk to drinking water through the California Office of Emergency Services (Cal OES) State Warning Center. PCWA and NID have established voluntary notification communications 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.

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 exceedances, facility failures, or power outages affecting wastewater treatment plant operations, but they can also occur during other seasons.

Related Constituents

The most common spills are related to oil and petroleum products or sewage spills. Therefore, typical constituents of concern include volatile organic compounds (VOCs) and hydrocarbons to microbial constituents (i.e., viruses, bacteria, *Giardia*, *Cryptosporidium*). However, hazardous materials emergencies can involve a virtually infinite number of chemicals or chemical combinations.

Presence in the Watershed

There are a tremendous number of roadways in the watershed, many of which cross either the rivers, creeks, or canals associated with the Yuba/Bear River water supply. The main truck transportation routes through the watershed are Interstate 80, Highway 20, Highway 174, and portions of Highways 49 and 193, as shown on **Figure 2-1**. There are no restrictions on transport of hazardous materials in the watershed. A significant threat is near bridge crossings because of the immediate potential for spilled material to enter the river system. Of note during this study period was the frequency of vehicular accidents resulting in potential discharge to receiving waters along Interstate 80 between Auburn and Donner Summit.

A review of the USEPA Toxics Release Inventory Program revealed that there are still no facilities located in the watershed, and no discharges occurred.

Union Pacific Rail Road (UPRR) owns and operates the railroad tracks that parallel Interstate 80. Both railroad lines are used by UPRR and BNSF Railway Company 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, however no significant spills occurred during the study period.

Kinder Morgan owns a petroleum product pipeline that closely parallels Interstate 80 and the UPRR rail road tracks through the watershed. The pipeline ranges from six to eight inches in diameter, and transports a variety of petroleum products. No significant spills were reported during the study period.

A review of the Cal OES Hazardous Materials Spill Reports revealed 84 spill events occurring that resulted in a discharge that reached a receiving water upstream of the water treatment plants. A complete list of all the Cal OES-reported spill events in the watershed during the study period is provided in **Appendix D**. The majority of spills were small petroleum discharges associated with vehicular accidents (60 events), or small to medium sized wastewater discharges (14 events). There are frequent vehicular accidents along Interstate 80 that result in discharges of petroleum products to the Boardman Canal tributary area and have the potential to impact source water supply. There were 30 incidents identified during the study period with the potential to reach surface water, as shown in **Appendix D**. PCWA and NID are not consistently notified via the formal regulatory OES/DDW spill notification procedure. This means that the participating water agencies must rely on informal voluntary notifications procedures, which leaves these water supplies potentially vulnerable. The City of Nevada City caused the majority of the sewage discharges that were reported, impacting the Deer Creek water treatment plants.

A detailed review of the sanitary sewer overflows from wastewater collection systems is provided in the Wastewater subsection later.

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 Interstate 80.

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 operations 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 requires an annual inspection of all pipelines beginning January 2017. Assembly Bill (AB) 864 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. 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 3 CUPAs governing discharges that enter the watershed. 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 4-1**.

Figure 4-1. Cal OES Oil By Rail Routes and Hazardous Materials Teams

There is one transporter in the Yuba/Bear River watershed: UPRR. 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 4-2 illustrates the decision-making process for determining emergency response notification requirements if an incident occurs. **Figure 4-3** 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 4-2. Cal OES State Warning Center Notification Determination

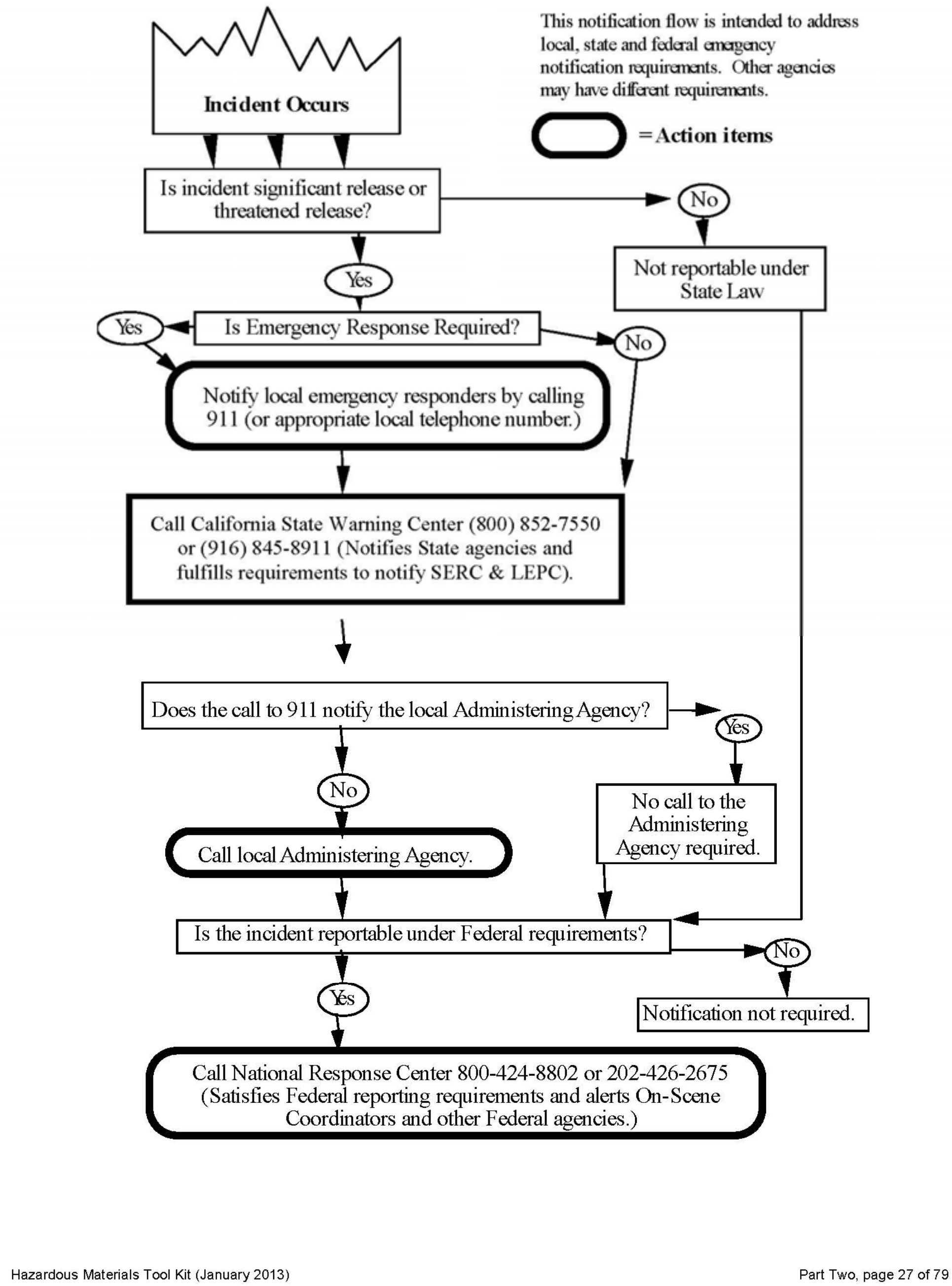
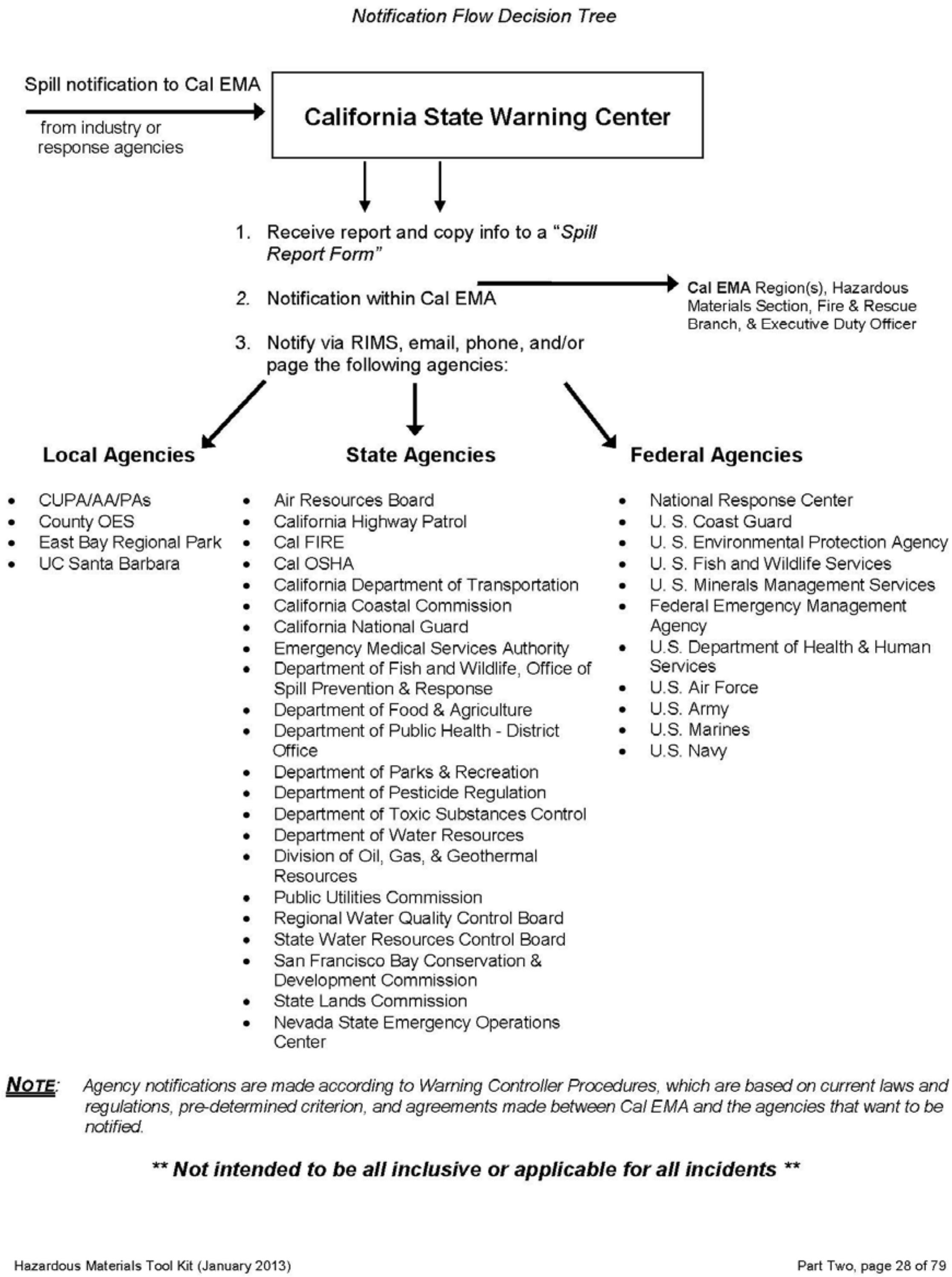


Figure 4-3. Cal OES State Warning Center Notification Flow Decision Tree



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. There is no specific protocol for how OES spill notifications are triaged and forwarded to DDW. Once they are determined to be sent, 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), with PCWA included as a participating water agency. OSPR has a list of the top ten watersheds to be completed, including the Yuba/Bear River system. They plan 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 **Section 5** showed that none of the water treatment plants had detects of organic constituents.

The most significant wastewater constituents of interest to source water are microbial constituents, specifically *E. coli, Giardia,* and *Cryptosporidium*. During the study period, *E. coli* data was most readily available at the water treatment plant intakes. The *E. coli* levels were relatively low, but the most frequent and more significant *E. coli* peaks occurred during the winter months, as discussed in **Section 3**. Plots of coliform levels and local precipitation at the water treatment plant intakes show that high coliform levels are frequently associated with high precipitation, which are associated with high river flow events. There is a potential for wastewater discharges, from either the treatment plants or the collection systems, to impact source water coliform levels.

Source Water Protection Activities

Because the potential for spills exists, PCWA and NID have established their own voluntary informal spill notification program consisting of direct notification and inter-notification agreements, internal procedures for routing of spill information, and internal response procedures. Both agencies are provided direct notification from their respective County OES in the event that a canal or receiving water is impacted. Both agencies also coordinate with PG&E regarding source water quality. There are no formal agreements with these agencies, or any of the specific dischargers in the watershed.

NID tracks the notifications they receive via DDW and other sources, such as Nevada County Environmental Health. Seventeen were received during the study period. This included 11 that were identified in **Appendix D**, while the other six were either out of the watershed or didn't reach surface water. For selected events with the greatest potential to impact NID's water treatment plants a summary report is prepared by collecting site-specific information related to the spill event and water treatment plants and other infrastructure potentially impacted. This allows NID to assess the potential impacts and document actions taken, such as monitoring, operational modifications, and communications.

WASTEWATER

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[6], 85 to 99 percent of heterotrophic bacteria[7], and 92[8] percent of *Giardia* cysts. Wastewater discharges occur primarily in the lower portion of the watershed.

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. During high flow events, typically during the wet 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.

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 synthetic organic compounds (SOCs). Many types of industrial effluent discharges to the collection system are regulated by the wastewater treatment plants and must meet effluent limits set, including pretreatment if necessary.

[6] National Research Council, 1998. Issues in Potable Reuse: The Viability of Augmenting Drinking Water Supplies with Reclaimed Water. National Academy Press.
[7] Chauret, C. et al., 1999. Fate of *Cryptosporidium oocysts*, *Giardia cysts*, and microbial indicators during wastewater treatment and anaerobic sludge digestion. Canadian Journal of Microbiology, 45: 257-262.
[8] www.Rangelandwatersheds.ucdavis.edu/MWQIC/MWQIC/Indicators_Giardia_window.html.

Presence in the Watershed

There are three permitted NPDES wastewater treatment plants (WWTPs) in the Yuba/Bear Watershed, see **Table 4-14**. These are shown on the Watershed Map, **Figure 2-1**. Each of these facilities has a collection system associated with them that are also located within the watershed.

Table 4-14
Wastewater Treatment Plants in the Yuba/Bear River Watershed

County	Name of Facility	City	2017 Capacity (mgd)	2021 Capacity (mgd)
Nevada	Donner Summit PUD WWTP	Donner	0.52	0.52
Nevada	Cascade Shores WWTP	Nevada City	0.026	0.026
Nevada	Nevada City WWTP	Nevada City	0.69	0.69

There are eight WDR-permitted wastewater collection systems located either entirely or partially within the Yuba/Bear River watershed. This includes: City of Colfax, Donner Summit Public Utilities District, City of Grass Valley, City of Nevada City, Nevada County Sanitation District (Mountain Lake Estates, Cascade Shores, Penn Valley), and Placer County Sewer Maintenance District No. 1.

In addition to the three permitted NPDES facilities there are other facilities with WDRs for land disposal located in the watershed, as well as individual on-site septic systems. The facilities located in close proximity to the lower watershed canals may have the potential to impact source water quality if there was a failure in the system. Failures from community systems would be reported through the spill notification systems, however spills from individual residences would only be reported by the owner. The counties do not inspect facilities regularly. It is likely that either NID or PCWA staff would notice such a discharge during routine canal maintenance and inspection. One of the community permitted facilities, Creekside Village Mobile Home Park located in Penn Valley, will be discussed in further detail below.

Donner Summit Public Utilities District Wastewater Treatment Plant

This wastewater treatment plant is located near Soda Springs, northwest of Lake Van Norden. The plant discharges to the South Fork of the Yuba River from October through July. Some winter flows are diverted for snow-making. The treated effluent is used for irrigation during the summer months (August and September) and discharge to the South Yuba River is prohibited during this period. NPDES Permit Order No. R5-2015-0068 was amended during the study period by Order No. R5-2017-0114. This Order rescinded the Cease and Desist Order (R5-2014-0044) and modified the permit to remove effluent limits for aluminum and copper based on updated monitoring data from 2015 through 2017. An updated NPDES permit was adopted in 2021 (R5-2021-0023) and will be applicable during the next study period. This order reinstated effluent limits for copper and added them for nickel, silver, and zinc. A Time Schedule Order was also adopted (R5-2021-0034) that provides interim effluent limits for these four constituents, as well as lead, through 2023 to allow the discharger time to plan for compliance and avoid mandatory minimum penalties.

The treatment system at the Facility consists of influent flow equalization, preliminary treatment, conventional activated sludge process, lime addition equipment to control pH and reduce salinity, biological treatment with membrane bioreactors plus filtration, and ultraviolet light (UV) disinfection. Biosolids treatment consists of two aerobic digesters and sludge drying beds. Sludge disposal is to a landfill. The permitted capacity is 0.52 million gallons per day (mgd). The facility includes a 1.56 million gallon storage tank for effluent emergency storage if necessary.

The Regional Board issued three Administrative Civil Liabilities (ACL) Orders to cover violations during the study period (R5-2016-0561, R5-2018-0509, and R5-2018-0532). There were only six violations associated with these; two for manganese, three for lead, and one for ammonia.

Cascade Shores Wastewater Treatment Plant

This wastewater treatment plant is owned and operated by Nevada County Sanitation District No. 1. It is located in Cascade Shores, on the south side of Scotts Flat Reservoir, and discharges to Gas Canyon Creek, which is a tributary to Greenhorn Creek and eventually discharges to Rollins Reservoir. NPDES Permit Order No. R5-2015-0031 was rescinded and replaced by General Order R5-2017-0085-015. The new General Order does include less stringent effluent limits for several constituents, specifically copper and zinc. Both of these were evaluated in the Reasonable Potential Analysis (RPA) and determined not to exceed applicable water quality objectives, and therefore could be removed from effluent limits. The RPA did not include the Secondary MCLs for copper and zinc, but the maximum effluent concentrations from the Cascade Shores WWTP for both copper and zinc were well below the respective MCLs. The Regional Board adopted Time Schedule Order (TSO) R5-2010-0909 to establish interim limits for copper and zinc and allowed for compliance by December 10, 2015, which was extended by TSO R5-2015-0032 to December 31, 2018 (when conversion to land application was expected to be complete). TSO R5-2019-1001 was adopted to allow the discharger an extension to complete conversion to land application by March 2021, since there had been a landslide on the property and other geotechnical concerns identified. In May 2021, the Regional Board adopted Order No. R5-2021-0032, which rescinded Order R5-2015-0031 and TSO R5-2019-1001. It is unclear whether Nevada County Sanitation District No. 1 still intends to convert to land disposal or will now continue surface water discharge under the new relaxed NPDES permit.

The treatment system at the facility was upgraded in 2010 and consists of combined grit screens at the headworks, an odor control unit, and an equalization tank. Secondary treatment consists of two parallel trains of anoxic moving bed bioreactors (MBBRs), aerobic MBBR, and dissolved air flotation units. Tertiary treatment consists of 12 ultrafiltration membrane filters, two inline ultraviolet light (UV) units, an outdoor re-aeration tank and an effluent meter. Excess sludge is transported to the Discharger’s Lake Wildwood Wastewater

Treatment Plant to be dewatered, then it is taken offsite for disposal at a landfill. The permitted capacity remained the same at 0.026 mgd.

The Regional Board issued one ACL Order to cover violations during the study period (R5-2018-0506). There were 14 violations during the study period associated with total coliform and nitrate.

City of Nevada City Wastewater Treatment Plant

This wastewater treatment plant is owned and operated by the City of Nevada City. It discharges to Deer Creek, just west of Nevada City. The facility consisted of sequencing batch reactors followed by tertiary filters and chlorination and dechlorination. NPDES Permit Order No. R5-2012-0033 was replaced by Order No. R5-2017-0060 during the study period.

The WWTP consists of screening, grit removal, lime addition, influent flow equalization and emergency storage, nitrification/denitrification, activated sludge, filtration, chlorination, and dechlorination. The waste activated sludge is stored in an aerated day tank, dewatered by a belt filter press, and hauled to Ostrom Road Landfill in Wheatland, CA. The permitted capacity of the facility is 0.69 mgd.

The Regional Board issued three ACL Orders to cover violations during the study period (R5-2017-0546, R5-2018-0507, and R5-2020-0501). There were 82 violations associated with these, for a wide range of constituents (total coliform, total suspended solids (TSS), biochemical oxygen demand (BOD), and dichlorobromomethane). In lieu of paying penalties for these ACLs, the City agreed in December 2019 to initiate one compliance project to renovate the tertiary treatment, including; weir washers, process repairs, process optimization, and installation of a new sludge day tank. The compliance project was to be completed by May 2021. Progress reports submitted by the City through 2020 showed significant improvement in effluent quality. A second compliance project was agreed to in April 2021 that would result in covering the chlorine contact tank and additional improvements to the process facilities. This was to be completed by June 2021.

Penn Valley Mobile Home Park

Squirrel Creek passes through Penn Valley where there are a significant number of septic systems and one community wastewater system, the Penn Valley Mobile Home Park (MHP), formerly the Creekside Village MHP. The Nevada County Sanitation District operates the Penn Valley WWTP, which does not discharge in the Yuba/Bear River watershed used in this study. The Penn Valley MHP has not historically been connected to the public sewer, but Regional Board staff pressured the discharger and as of April 2021 they now send all sewage to the Penn Valley WWTP.

The wastewater facility for the Penn Valley MHP had an original permit from the Regional Board for disposal to land, from 1976. The WDRs were most recently renewed in 1998 (Order No. 98-010) and no modifications were made during the study period. The MHP is located along the south side of Squirrel Creek and the evaporative/percolation ponds (three) are located adjacent to the north side of Squirrel Creek. The WDRs indicate a system discharge of 40,000 gallons per day to the ponds. Discharge of wastes to surface water is specifically prohibited, including untreated, partially treated, and treated water. In lagoon limits are set for dissolved oxygen, pH, BOD, and total settleable solids. The order has a companion Monitoring and Reporting Program (MRP) which indicates that dissolved oxygen and pH are monitored in the discharge weekly, while other constituents are monitored in the discharge monthly (BOD, nitrogen, total dissolved solids, and conductivity). There is no requirement to conduct any monitoring in the adjacent Squirrel Creek.

The Regional Board is keeping the WDR open, with the discharger paying annual fees, until a complete closure plan is developed and implemented to address the ponds. There is no timeline for specific activities or permit rescission, but it is expected to include sludge removal, monitoring, and professional judgement and occur over the next two years.

Collection Systems

A review of the CIWQS database for SSOs from collection systems located in the Yuba/Bear River watershed identified seven Category I discharges, as shown in **Table 4-15**. Most of these events are small in nature, but several were larger events. The two discharges in Applegate were into PCWA operated waterbodies, Lake Theodore and Lake Arthur, so they were able to be contained and prevented from impacting the source water supply.

Table 4-15
Sanitary Sewer Overflows, 2016 – 2020*

Collection System	Spill Location	Date	Total Spill Volume, gal	Spill Volume Reach Surface Water, gal	Surface Water Impacted	WTP Impacted
Mountain Lakes Estates CS	1242332 Discovery Way, Nevada City	2/10/17	90	20	Deer Creek	Smartville
Nevada City CS	222 Sacramento St, Nevada City	9/14/17	1,780	880	Deer Creek	LWW, Smartville
Nevada City CS	112 Orchard St, Nevada City	11/16/17	420	420	Oregon Ravine/Deer Creek	LWW, Smartville
Nevada City CS	222 Sacramento St, Nevada City	12/31/17	640	560	Deer Creek	LWW, Smartville
Nevada City CS	575 East Broad St, Nevada City	1/4/18	90	90	Oregon Ravine/Deer Creek	LWW, Smartville
Placer County SMD No. 1 CS	Applegate Road, Applegate	1/24/18	4,810	4,439	Lake Theodore	Auburn
Placer County SMD No. 1 CS	Applegate Road, Applegate	7/14/20	8,040	6,579	Unnamed Tributary to Lake Arthur	Auburn

*As reported in CIWQS

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 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.

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 storm drain 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

A review of the available water quality data, as presented in **Section 5** showed that none of the water treatment plants had detects of inorganic or organic constituents.

A review of water quality data for Alta and Elizabeth George WTPs do not reflect any impact from the Donner Summit Public Utilities District WWTP. A review of the water quality data for the water treatment plants downstream of Rollins Reservoir, thus the Cascade Shores WWTP, show general trends of elevated levels of turbidity, TOC, and coliform during the wet weather season. This could be associated with many activities. Rollins Reservoir likely provides some buffering capacity on the magnitude of impact from the wastewater plant to downstream water treatment plants.

Only the Smartville WTP is located downstream of the Nevada City WWTP and the Penn Valley MHP pond system. The Smartville WTP has higher levels of *E. coli* than the other water treatment plants and peaks occur in the winter/spring months, as presented in **Section 3**. The Smartville WTP also shows significant increases in turbidity and TOC during the winter months, which could be associated with many activities in the watershed.

A review of available monitoring data at the water treatment plant intakes during specific SSO events during the study period did not reveal a correlation to increased microbiological levels. There were very high levels of *E. coli* at the Smartville WTP on January 10, 2018, which was a week after a small SSO from the City of Nevada City. January 2018 was a normal wet month. It seems unlikely that the SSO was responsible and precipitation was not above normal, so it is unclear what was the cause of the elevated microbial level.

Source Water Protection Activities

Currently, there is little opportunity for source water protection activities related to wastewater. The treatment facilities are managed under NPDES discharge permits by the Regional Board.

URBAN RUNOFF

Background

There is limited urban runoff to the Yuba/Bear River system, focused in the urban areas of Nevada City, Grass Valley, Penn Valley, and Auburn.

Seasonal Pattern

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 are 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 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 urban runoff have shown 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

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 Yuba/Bear River watershed there is one NPDES Municipal Stormwater Phase I permits; the Statewide California Department of Transportation (Caltrans).

Under the new Municipal Phase II Permit, there are three city, county, or census designated places designated in the watershed. This includes; the City of Auburn, the City of Grass Valley, and Placer County/North Auburn. The City of Auburn had three violations and enforcement orders over the past five years. The City of Grass Valley had one violation and enforcement order over the past five years. Placer County did not have any violations.

Caltrans also has two individual NPDES permits under the State's Construction General NPDES Permit program in the watershed, one related to construction along Interstate 80 and one related to construction along Highway 174. Under the Construction General Permit program there are 14 other sites that have filed a Notice of Intent (NOI) to comply with the Construction General Permit Order. Due to the temporary nature of construction, this list varies over time. A list is provided in **Table 4-16**. There was a total of five violations from all permittees during the study period.

Table 4-16
Construction Stormwater Permittees In Watershed*

Discharger	Facility Name	WDID
New Airport Road LLC	Briar Meadows Estate	5S31C380637
California 123	California Construction	5S31C374728
Cashins Field LP	Cashins Field	5S29C393721
Nevada Irrigation District	Combie Reservoir Sediment Removal Project	5S31C384896
Federal Highway Administration CFLHD	Donner Pass Road Improvements	5S29C390268
Pacific Gas and Electric Company	Drum Rio Oso 115kV Reliability	5S29C393349
Pacific West Communities Inc	Ford Oaks Apartments	5S29C391883
Pacific Gas and Electric Company	Fordyce Dam Seepage Mitigation	5S29C393961
Pacific West Communities Inc	Lone Oak Apartments	5S29C389475
Placer County Department of Public Works	Memorial Overland Emigrant Trail	5S31C387740
Clear Creek Land	Ridge Village Estates	5S29C392851
Nevada County	Soda Springs Road Over South Yuba River Bridge Replacement	5S29C394000
The Event Helper Inc	The Event Helper	5S29C388080
Golden Sun Electric	Weimar Institute	5S31W005055

* Data obtained from CIWQS

There are 14 NPDES permits under the Industrial General Permit Order located throughout the watershed, including four new facilities. A list is provided in **Table 4-17**. There was a total of five violations from all permittees during the study period.

Table 4-17
Industrial Stormwater Permittees In Watershed*

Discharger	Facility Name	WDID
Armstrong Technology Inc.	Armstrong Technology Inc.	5S31I026104
Auburn City	Auburn City Airport	5S31I002840
Bear River Aggregates	Bear River Aggregates	5S31I023694
Nevada County	County of Nevada Department of Public Works	5S29I001610
English Mountain Ranch	English Mountain Ranch	5S29NEC006215
Hansen Brothers Ent	Hansen Bros Ent Greenhorn Creek	5S29I002778
Knee Deep Brewing Company LLC	Knee Deep Brewing Company LLC	5S31NEC003385
Placer County Department of Facility Services	Meadow Vista Transfer Station	5S31I005173
Mid Placer Public Schools Transportation	Mid Placer Public Schools Transportation	5S31I017901
Morgan Advanced Ceramics Inc	Morgan Advanced Ceramics Inc	5S31I002506
Placer Hills Union School District	Placer Hills Union School District	5S31I017900
Preserva Products Ltd	Preserva Products	5S31NEC006943
Robinson Enterprises Inc.	Robinson Enterprises Inc	5S29I010822
Union Pacific Railroad	Norden Yard	5S29NEC000271

* Data obtained from CIWQS

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 Total Maximum Daily Load (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.

Caltrans

The entire watershed encompasses numerous state highways and roads that are regulated for stormwater discharge by the State Board. Caltrans District 3 is 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 measurable 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's Storm Water Multiple Application and Report Tracking System (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 was one enforcement action and violation for one of the Caltrans construction projects under the State's Construction General Permit Order.

Phase II MS4s

There are three current Phase II MS4 systems in the watershed, including the cities of Auburn and Grass Valley and Placer County/North Auburn. It should be noted that large portions of these urban areas do not drain in to the Yuba/Bear River water supply system for PCWA and NID.

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 Yuba/Bear 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 Yuba/Bear River watershed.

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.

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 storm water 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.

In 2012 the State Board proposed amendments to the Construction General Permit. The State Board began the reissuance process again in 2020, with public workshops throughout the year, and resulted in a preliminary staff draft NPDES permit published in November 2020 and a draft NPDES permit in May 2021. The draft Construction Stormwater General Permit incorporates:

- New requirements to implement existing Total Maximum Daily Loads adopted by Regional Water Boards into applicable Basin Plans;
- New regulation of passive treatment technology uses and discharges from dewatering activities;
- New criteria for Notices of Non-Applicability;
- Efficiency to the existing Notice of Termination process;
- Requirements to implement the California Ocean Plan and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries, including the statewide Trash Provisions;
- Updated requirements for demolition activities;

- Updated water quality sampling requirements per the federal Sufficiently Sensitive Test Methods Rule; and
- Updated monitoring and reporting requirements.

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 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 new 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.
- Exceedance 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.

Water Quality Issues and Data Review

A review of the available water quality data, as presented in **Section 5** showed that none of the water treatment plants had detects of organic constituents.

A review of the ambient water quality for the water treatment plants in **Section 3** for turbidity and TOC shows that most of the water treatment plants show a distinct seasonal trend with most peaks occurring during the wet weather season. This could be associated with storm runoff periods from the urban areas for those water treatment plants downstream of urban areas..

Microbial constituents, specifically *E. coli, Giardia,* and *Cryptosporidium,* are also a potential concern from urban runoff. During the study period, *E. coli* data was most readily available at the water treatment plant intakes. The *E. coli* levels were relatively low, but the most frequent and more significant *E. coli* peaks occurred during the winter months, as discussed in **Section 3**. High coliform levels are frequently associated with high precipitation, which are associated with high river flow events. There is a potential for urban runoff discharges to impact source water coliform levels. Also, the Regional Board Safe to Swim Studies for the Squirrel Creek Watershed showed high peaks throughout Penn Valley that could be contributed to by urban runoff.

Source Water Protection Activities

Currently, there is little opportunity for source water protection activities related to urban runoff. The urban areas are required to implement Stormwater Management Plans to protect source water quality. PCWA and NID coordinate with the County OESs regarding potential discharges from the drainage systems.

MINING

Overall, the relative risk for the Yuba/Bear River drinking water supply from mining, both active and historic, is low due to regulation and management. There were extensive amounts of historic mining activity in the watershed, both the upper and lower watershed, while the current mining activities are very limited. The focus of this update is on active mining in the watershed and key mines in active remediation from historic operations.

Background

Mining can include both metallic and non-metallic resources, can be either surface or underground, and can be either active or historic. Mines are potential contaminant sources for the drinking water supply since they discharge waste flows to receiving waters. This can include adit or tunnel drainage and stormwater runoff from the facility.

The Lava Cap Mine, which is a Superfund Site, is 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 mines varies depending on the type, operation, and regulatory status of the mine. Most mines have at least some amount of consistent flow throughout the year.

Related Constituents

The constituents discharged are dependent on the type of mining conducted, but water quality impacts associated with mining generally includes; sediment, acidity, low dissolved oxygen, high heavy metals, and mercury (generally not at levels of human health concern).

Presence in the Watershed

Mining can occur on both private and public lands in the watershed. USFS manages mining on federal lands, such as Tahoe National Forest, and the California Department of Conservation (DOC) manages mining on state and private lands. USEPA and Regional Board regulate discharge from closed and abandoned mines, such as the Lava Cap Mine. Surface mines are regulated under the Surface Mining and Reclamation Act of 1975 (SMARA) and have mine identifications, which are managed by Counties.

Both metallic and non-metallic mining occurs, and has occurred in the watershed since the 1840s. Metallic mining is primarily gold, which can be mined through lode, placer, or hydraulic methods. Non-metallic primarily includes sand, gravel, and decorative rocks, which are typically surface-mined.

Mines can be classified as either; active, idle, closed, or abandoned by the respective regulatory and management agencies. Historic mines that are either closed or abandoned are remediated by DOC and USFS if they are a danger to people or the environment.

Gold Mining

The Yuba/Bear River watershed was an important part of the California Gold Rush. Historically, there have been thousands of gold mining claims in the watershed. Currently, there is one active gold mining operation and one proposed gold mining operation in the watershed. The Blue Lead Gold Mine is an open pit placer gold mine in Nevada County which obtained a WDR permit during the study period, but has not begun operations as per the Regional Board. It is located at Red Dog Road at Guy Blue Road, near Greenhorn Creek and tributary to Rollins Lake. A second placer gold mine is proposed in Nevada County, the Golden Girl Placer Mine. This is located in the same vicinity as the Blue Lead Gold Mine.

Casual mining using metal detectors and hands/pans is allowed throughout the watershed. Suction dredging in waterbodies is not allowed in California.

SMARA Mining

The DOC regulates and manages surface mines in California. A review of their interactive mapping tool resulted in the identification of ten surface mines in the watershed. **Table 4-18** presents the mines, as well as their current status and product. Only four mines are active, and three provide sand and gravel products and one is gold. Two of the four also have industrial stormwater permits for runoff (HBE Greenhorn Gravel Plant and Bear River Aggregate). Blue Lead Gold Mine was issued an individual WDR permit by the Central Valley Regional Board (R5-2018-0044) governing mining operations at the site, however the Regional Board does not believe that they have initiated any mining activities. This WDR requires construction and operation of onsite ponds for holding process waste water and that the Blue Lead Gold Mine must obtain coverage under the general industrial stormwater permit (Order 2014-0057-DWQ), which has not been done since it is not yet operational. Sierra Boulder does not have any industrial stormwater permits.

Table 4-18
SMARA Regulated Surface Mines in the Yuba/Bear River Watershed

Mine ID	Mine Name	Mine Status	Product
91-29-0006	HBE - GREENHORN GRAVEL PLANT	Active	Sand and Gravel
91-29-0007	HBE - BEAR RIVER PLANT - NEVADA COUNTY	Closed	Sand and Gravel
91-29-0012	LAKE COMBIE FACILITY	Closed	Sand and Gravel
91-29-0015	SECRET TOWN	Reclaimed	Sand and Gravel
91-29-0016	MEADOW LAKE GOLD MINE	Reclaimed	Gold
91-29-0019	LIBERTY HILL MINE	Abandoned	Gold
91-29-0022	SIERRA BOULDER	Active	Decorative Rock
91-29-0024	GOLDEN GIRL PLACER MINE	Proposed	Gold
91-29-0025	BLUE LEAD GOLD MINE	Active	Gold
91-31-0004	BEAR RIVER AGG. - MEADOW VISTA QUARRY	Active	Sand and Gravel
91-31-0011	BEAR RIVER GRAVEL PLANT - PLACER COUNTY	Closed	Sand and Gravel
91-31-0015	ROLLINS LAKE	Reclaimed	Shale

US Bureau of Land Management (USBLM)

The USBLM operates the LR2000 Database that records all mineral patents and mining claims in the watershed. A query of this database was conducted to identify case recordations related to mineral patents for placer and lode mining in the watershed counties; Nevada, Placer, and Sierra. No new mineral patents were pending or authorized for operation in the watershed. A query was also conducted on the unpatented mining claims in the watershed. Thousands of cases have been opened in the watershed counties, but almost all of those cases have been closed or withdrawn. No active or pending mining claims were identified in the watershed, but one mining claim was approved to be sent to patent in 1992. It is located in Nevada County (T16NR9E Section 8 Subdivision NE - Willow Valley Road, NC – Along Deer Creek (CAMC 45223)).

Lava Cap Mine

The Lava Cap Mine site occupies approximately 33-acres in western Nevada County. The site includes the mining area where ore was processed to recover gold, and areas where tailings which originated at the mine have been washed downstream and deposited over time. Gold and silver mining occurred from 1861 through 1918. The site was inactive until 1934. At that time, a flotation plant was installed to process ore and then a cyanide plant was installed to process concentrates. The facility was closed in 1943 due to World War II.

The site was issued a Cleanup and Abatement Order (CAO) from the Regional Board in 1979 to clean up mine tailings and prevent mine drainage to Little Clipper Creek, which is a tributary to Lost Lake which is operated by NID. The primary contaminant of concern is arsenic, in addition to other metals found in local groundwater. Water can be released into

Greenhorn Creek and subsequently to Rollins Reservoir and the Bear River. A dam and several detention basins were put in place. In 1997, a major storm caused the dam to collapse and mine tailings were deposited in Little Clipper Creek.

Regulation and Management

Mining activities are regulated by several agencies in the watershed, depending on type and location. Current active surface mines covering large areas are required to obtain coverage for stormwater discharges under the Industrial Stormwater Permit General Order (discussed previously in the Urban Runoff subsection). All surface mines must obtain a surface mining use permit from their county under SMARA. Any mining in the Tahoe National Forest must meet federal management requirements. Casual mining in waterbodies is prohibited to use suction dredging, as per the California Department of Fish and Wildlife. The Lava Cap Mine must meet all USEPA Superfund requirements.

SMARA Regulation

SMARA provides a comprehensive surface mining and reclamation policy with the regulation of surface mining operations to assure that adverse environmental impacts are minimized and mined lands are reclaimed to a usable condition. California Public Resources Code Section 2207 provides annual reporting requirements for all mines in the state, under which the State Mining and Geology Board is also granted authority and obligations. SMARA is administered and enforced locally, usually by county engineering or planning departments.

In 1991, following significant revisions to SMARA, the DOC Office of Mine Reclamation was created to provide a measure of oversight for local governments as they administer SMARA. To accomplish this goal, the Office of Mine Reclamation may provide comments to lead agencies on a mining operation's reclamation plan and financial assurance and may initiate compliance actions that encourage SMARA compliance. Since the primary focus is on existing mining operations and the return of those mined lands to a usable and safe condition, issues relating to abandoned legacy mines are addressed through the DOC Abandoned Mine Lands program.

For mines to meet the SMARA regulations, their operations must meet all of the following conditions:

- The operation has an approved reclamation plan,
- The operation has an approved financial assurance,
- The operation has filed its annual report,
- The operation has paid its reporting fee, and
- The operation has had its annual inspection by the lead agency which reflects the operation is in full compliance with the law.

On April 18, 2016, Governor Brown signed Senate Bill 209 and Assembly Bill 1142 into law and thereby enacted significant changes to SMARA. These reforms affected how the State Mining and Geology Board, the DOC, local lead agencies, and surface mine operators oversee, implement and comply with SMARA. In response to this rulemaking, DOC prepared and incorporated a training document entitled, "Guidance Document for Surface Mine Inspectors". The Division of Mine Reclamation established an Inspector Training Program (ITP) for all surface mine inspectors by December 31, 2017. The Guidance Document was designed to provide the basic instructions and recommendations for surface mine inspections. The ITP consists of inspection workshops designed to provide practical application of the Guidance Document. Mine inspections must be conducted by an inspector who has, on file with the Department of Conservation and the Lead Agency, an inspection workshop Certificate of Completion by July 31, 2020.

Federal Management

The USFS and the USBLM work together to manage mineral resources on the National Forests. The USBLM has primary responsibility for development and enforcement of mineral rights regulations and requirements. The USFS uses the USBLM to record all mining claims and patents on National Forests.

The USFS Handbook includes a section on Minerals and Geology, with a Chapter on Mining Claims. The USFS requires anyone proposing to conduct a mining operation to submit a Notice of Intent (NOI) for a proposed mining operation to the local USFS District Ranger. The NOI must provide sufficient information, related to location, nature of operations, access, and transport, to determine if the level of proposed disturbance will require a Plan of Operations and a detailed environmental analysis. The District Ranger will, within 15 days of receipt of the NOI, evaluate the NOI and notify the operator whether or not a Plan of Operations is required.

If a Plan of Operations is required, form FS-2800 must be completed. This includes identification of potential impacts to water quality:

"State how applicable state and federal water quality standards will be met. Describe measures or management practices to be used to minimize water quality impacts and meet applicable standards.

1. State whether water is to be used in the operation, and describe the quantity, source, methods and design of diversions, storage, use, disposal, and treatment facilities. Include assumptions for sizing water conveyance or storage facilities.
2. Describe methods to control erosion and surface water runoff from all disturbed areas, including waste and tailings dumps.
3. Describe proposed surface water and groundwater quality monitoring, if required, to demonstrate compliance with federal or state water quality standards.
4. Describe the measures to be used to minimize potential water quality impacts during seasonal closures, or for a temporary cessation of operations.

5. If land application is proposed for waste water disposal, the location and operation of the land application system must be described. Also describe how vegetation, soil, and surface and groundwater quality will be protected if land application is used."

The USFS has an abandoned mine unit to address remediation of dangerous sites. They often work with the DOC and counties in implementing remediation.

California Department of Fish and Wildlife

California has prohibited the use of any motorized vacuum or suction dredge equipment as part of a mining operation in any river, stream, or lake in California. This moratorium was in place through June 30, 2016. Under existing state law, the California Department of Fish and Wildlife (DFW) is also currently prohibited from issuing any permits for suction dredging in California under the Fish and Game Code.

The ongoing statutory moratorium established by Fish and Game Code section 5653.1 prohibits some, but not all forms of mining in and near California rivers, streams, and lakes. Individuals engaged or interested in otherwise lawful instream mining should be aware that other environmental laws may apply to these various other mining practices. Fish and Game Code section 5650, for example, prohibits the placement of materials deleterious to fish, including sand and gravel from outside of the current water level, into the river or stream. Further, Fish and Game Code section 1602 requires that any person notify DFW before substantially diverting or obstructing the natural flow of, or substantially changing or using any material from the bed, channel or bank of any river, stream or lake.

Under new state law effective January 1, 2016, Senate Bill 637 amends Fish and Game Code section 5653 and adds section 13172.5 to the Water Code.

SB 637 amends Fish and Game Code section 5653 as follows:

- Prohibits DFW from issuing any suction dredging permits absent a complete application which must include, among other things, a copy of any water quality permit or other authorization required by the State Board or Regional Board, or the U.S. Army Corps of Engineers, or a written determination by such agency that no water quality permit or other such authorization is necessary;
- Conditions DFW issuance of permits on regulations implementing the section that must ensure the use of vacuum or suction dredge equipment will not cause any significant effects to fish and wildlife, as opposed to prior law which conditioned the issuance of permits on regulations ensuring suction dredging would not be deleterious to fish;
- Provides DFW with authority to adjust permit fees to an amount sufficient to cover all reasonable costs incurred by DFW to regulate suction dredging as provided by the Fish and Game Code;
- Directs DFW to work with the State Board and the Regional Boards regarding potential violations of requirements, conditions, or prohibitions governing the use of vacuum or suction dredge equipment; and

- Defines for the first time by statute what it means to use vacuum or suction dredge equipment, otherwise known as suction dredging, as the use of a mechanized or motorized system for removing or assisting in the removal of, or the processing of, material from the bed, bank, or channel of a river, stream, or lake in order to recover minerals; but also clarifying the definition does not apply to, prohibit, or otherwise restrict non-motorized recreational mining activities, including panning for gold.

In general, Water Code section 13172.5, added by SB 637:

- Defines the use of vacuum or suction dredge equipment, otherwise known as suction dredging, in the same terms as described above and now provided in Fish and Game Code section 5653;
- Provides the State Board or the appropriate Regional Board may take one or more of three specified actions related to suction dredging to protect water quality, including (1) the adoption of waste discharge requirements or a waiver of such requirements; (2) specifying certain conditions or areas where the discharge of waste or other adverse impacts on beneficial uses of the waters of the state from the use of vacuum or suction dredge equipment is prohibited; or (3) prohibit any particular use of, or methods of using, vacuum or suction dredge equipment, or any portion thereof, to extract minerals based on a determination generally that doing so will cause or contribute to an exceedance of applicable water quality objectives or unreasonably impact beneficial uses; and
- Directs the State Board or the appropriate Regional Board to solicit public input as detailed and to hold at least one noticed public hearing before taking any action as provided.

Superfund Regulation

In 1999 the Lava Cap Mine site was listed as a Superfund Site, and funding was made available for remediation. The key contaminant in the surface discharge is arsenic. There are four Operable Units (OU) at the site; OU1 - Mine Area, OU2 – Groundwater, OU3 - Lost Lake Area, OU4 - Mine Area Residences.

The first Five-Year Review of the site was published in September 2011 and a second Five-Year Review in 2016. A third Five-Year Review is expected later in 2021. The purpose of the Review is to determine whether the remedial actions implemented at the site are protective of human health and the environment. In addition, the Review summarizes remaining issues and identifies follow-up actions to address them. Records of Decision (RODs) have been signed for OU1 (including the tailings and adit water in the mine area and the mine residences) and OU2 (groundwater).

The ROD for OU1 is being implemented as two distinct remedies; 1) excavation of tailings and tailings consolidation, vegetative covers, a tailings and pile cap, a rock buttress, and drainage channels and 2) treatment of adit water emanating from the mine area (still in design – expected by 2023). This also includes institutional controls to minimize potential future exposure to remaining contaminated materials. The remedy for OU4 is also included in this ROD and consisted of demolition of mine residences followed by removal of contaminated debris and soils.

The remedy for OU2 is in the remedial design phase and the remedy for OU3 is currently in the remedial investigation/feasibility phase (a feasibility study is expected in 2024 and an ROD will follow). The Review addressed the remedies that have been implemented at the site, which are the soil remedies for OU1 and OU4.

The Review found that the remedies for OU1 and OU4 were implemented in accordance with the requirements of the ROD. The remedies are functioning as designed. The remedies are protective of human health and the environment in the short term, but are not protective in the long term, because land use covenants, specified by the OU1 ROD, have not yet been implemented. The land use covenants have been prepared and are ready to be recorded, but the property owner has not yet agreed to record them. In addition, the planned institutional controls do not address two areas where wastes were left in place. It may be necessary to expand the area where institutional controls are implemented to include these two areas to prevent disturbance of and/or exposure to the wastes left in place.

Follow-up actions include implementing OU2 ROD, finalizing OU3 ROD, and developing strategies for addressing these issues related to filing land use covenants for OU1 and OU4 RODs.

Water Quality Issues and Data Review

A review of the available water quality data, as presented in **Section 5** showed that none of the water treatment plants had detects of inorganic or organic constituents.

A review of the ambient water quality for the water treatment plants in **Section 3** for turbidity and TOC shows that most of the water treatment plants show a distinct seasonal trend with most peaks occurring during the wet weather season. This could be associated with storm runoff periods from the mines.

Source Water Protection Activities

There is minimal opportunity for stakeholder involvement in mining activities. NID operates Lost Lake and could control the flow into Greenhorn Creek if necessary.

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 report.

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, and all three watershed counties passed ordinances for 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 years 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 Department of Cannabis Control program as discussed below.

It should be noted that substantial illegal cannabis cultivation has been occurring in the watershed for many years, wherever there is significant open space and access to water. Illegal cannabis cultivation is not included in any management program, and is usually addressed by law enforcement as complaints arise. 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 the Yuba/Bear River watershed.

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 the California Department of Pesticide Regulation for use on a specific crop like cannabis. None are currently approved since there is a federal ban on marijuana use. MMRSA charged the California Department of Pesticide Regulation with identifying pesticides for use on cannabis and the associated safe levels on harvested marijuana leaf, but the Department cannot do this since it conflicts with federal statutes. Pesticides registered for use on “unspecified green plants” can be used on cannabis. Home or illegal 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).

Pesticides most frequently found associated with illegal cannabis cultivation are Round Up (glyphosate) and carbofuran.

Presence in the Watershed

Cannabis cultivation can only legally occur on private lands, it is illegal and prohibited to cultivate on public lands, such as the Tahoe National Forest. 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 Nevada County allows commercial cultivation.

Nevada County Agricultural Commissioner indicated that they have started tracking commercial cannabis production and intends to include this in their Annual Crop Report in the next few years. This will help to quantify some of the production occurring in the Yuba/Bear River watershed.

Regulation and Management

California

CalCannabis Cultivation Licensing is a division of the California Department of Food and Agriculture, which has been licensing commercial cannabis cultivation facilities in California. In July 2021, Assembly Bill 141 was passed and established the Department of Cannabis Control (DCC) to consolidate all the various state agency authorities over cannabis. DCC will now issue licenses for cultivators for both adult and medicinal permits. It only issues permits in counties where it is legal to commercially cultivate cannabis (Nevada). 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. Nurseries are a specific type of cultivation license that only grows immature plants and designated mature seed plants. DCC 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 was one permittee under this Order in the Yuba/Bear River watershed, in Nevada County. 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 322 permittees under this Order in the Yuba/Bear River watershed, including 320 in Nevada County and two in Sierra County. A list is provided in **Appendix D**. There was a total of seven violations and four enforcement actions associated with these permittees.

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 and Deer Creek within the Yuba/Bear 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 11 permittees in this program in the Yuba/Bear River watershed, eight in Nevada County and three in Sierra County. A list is provided in **Appendix D**. The Order was rescinded in June 2019 (R5-2019-0062) and one permittee was 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 Tahoe National Forest, the primary type of outdoor cannabis cultivator is a drug-trafficking organization. These grow operations occur in the Yuba/Bear River 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.

Local Agencies

Nevada County

Nevada County permits personal and 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.

Personal cultivation is allowed both indoors and outdoors, but is limited by residence zone. In addition, there is a six-plant maximum per parcel (with a residence) and a 100-foot setback requirement from the property line.

Outdoor commercial cultivation can only occur on parcels greater than two acres and has limitations on the number of plants cultivated. The limit is based on the square feet of canopy. A Commercial Cannabis Cultivation License from DCC is required. Cultivators must obtain a land use permit and a cannabis permit from the County, and they are limited to three per person.

The ordinances specifically prohibit discharge from the site, sets odor, noise and light limits, and has fencing and setback requirements.

Nevada County manages cannabis cultivation through the Community Development Agency, Cannabis Compliance Division. The County can issue a "Notice to Abate Unlawful Cannabis Cultivation" to anyone they receive a complaint regarding, with five days provided to fix or fees are assessed.

Placer County

In November 2016 the Board of Supervisors approved preparation of an ordinance related to cannabis cultivation. This ordinance was passed and took effect January 2017. This is two-phased effort by the county to enact comprehensive cannabis regulation, focusing immediately on allowing limited personal cannabis cultivation and banning commercial cannabis activities.

The ordinance is consistent with the Proposition 215, MMRSA, and Proposition 64. It allows cultivation of up to six non-medical plants on 50 square feet or cultivation of 50 square feet of medical cannabis for personal use, but bans all commercial activity related to cannabis including cultivation, processing, manufacturing, delivery, and distribution. Cultivation, both indoors and outdoors, will only be allowed on parcels where the private residence of the authorized grower is located.

County staff prepared a zoning text amendment to outline additional detailed requirements for outdoor cultivation. The amendments limit outdoor cultivation to an area of no more than 50 square feet; establish a 100-foot setback from property lines and require planting closer to the grower's residence than to a neighbor's; require grows to be fenced; prohibit outdoor cultivation within 600 feet of a school, church, park, library, fairgrounds or youth-oriented facility; and institute an odor limit.

Sierra County

In July 2014 Sierra County passed Ordinance 1055 related to cannabis cultivation, including several key provisions: medical marijuana only, personal use only, no commercial grows, limit of 18 plants per person (maximum of 72 plants per property limit), must be property owner or have notarized letter from property owner, not within 100 feet of a school, no lights outdoors, six foot opaque fence around outdoor operations, and misdemeanor penalty if violate ordinance. In April 2016, Ordinance 1071 was passed which was more restrictive, but it was repealed by Ordinance 1073. In November 2016, voters approved Measure B which bans commercial cultivation of marijuana, regulates outdoor cultivation and indoor cultivation of medical marijuana for qualified patients and primary caregivers only, limiting cultivation per parcel to 10 plants for one qualified caregiver or patient and 20 plants for two or more qualified caregivers or patients, and regulates the location and conditions under which marijuana may be grown within Sierra County. The County may need to expand or modify this Ordinance to account for Proposition 64.

City of Grass Valley

The City of Grass Valley has modified its Municipal Code to prohibit the cultivation of cannabis outdoors. The City will allow for up to two cannabis nurseries, as per the DCC licensing requirements. This could allow for outdoor nursery facilities.

City of Nevada City

The City of Nevada City has modified its Municipal Code to prohibit outdoor cultivation of cannabis. Similar to the City of Grass Valley, the City will allow for cannabis nurseries to submit business license applications, without limit. They would also need to meet the DCC licensing requirements and could include outdoor nursery facilities.

Water Quality Issues and Data Review

A review of the available water quality data, as presented in **Section 5** showed that none of the water treatment plants had detects of inorganic or organic constituents.

A review of the ambient water quality for the water treatment plants in **Section 3** for turbidity and TOC shows that most of the water treatment plants show a distinct seasonal trend with most peaks occurring during the wet weather season, however some peaks can occur during the summer and fall months. Increases in the presence of algae in the source waters may be contributed to by increased nutrients applied on cannabis in the watershed.

Source Water Protection Activities

Cannabis cultivation is a relatively new, and rapidly changing, activity in the watershed. PCWA and NID have included this topic in this 2021 Update to better understand potential vulnerabilities associated with the activity and potential impacts on water quality.

Neither PCWA or NID has been contacted by any of the management agencies in the watershed regarding the presence of outdoor cultivation, or the status of any ongoing inspections or activities.

The purpose of this section is to evaluate the existing water treatment plants using Yuba and Bear River water for compliance with existing drinking water regulations, and identify potential treatment concerns related to future drinking water regulations (if applicable). For assistance with abbreviations and acronyms, the reader is referred to the List of Abbreviations at the front of the report.

There are fourteen existing intakes and associated water treatment plants (WTP) within the study area. The Placer County Water Agency (PCWA) plants include: Alta, Monte Vista, Colfax, Applegate, Bowman, Auburn, Foothill, and Sunset. Nevada Irrigation District (NID) plants include: Elizabeth George, Loma Rica, Lake of the Pines, North Auburn, Lake Wildwood, and Smartville. NID's Cascade Shores WTP ceased operation during the study period so was not included in this evaluation. Each of these is discussed herein within the context of current and future regulatory compliance and potential treatment issues beginning with the most upstream diversion point and then moving downstream for each agency.

Tables 5-1 and **5-2** provide a summary of design parameters for each of PCWA's and NID's water treatment plants, respectively.

Highlights of Selected Existing Drinking Water Regulations

National Interim Primary Drinking Water Regulations 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 and 4- log reduction requirements for *Giardia* and viruses, respectively. Sets turbidity requirements, which have since been tightened.

Interim or Long Term 1 Enhanced Surface Water Treatment Rule (ESWTR) and Filter Backwash Rule. Interim ESWTR applies to systems serving at least 10,000 population and Long Term 1 ESWTR 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 units (NTU) in 95 percent of samples, and not to exceed 1 NTU longer than 1 hour. Set IFE reporting and evaluation requirements. Requires recycling of all return flows to the headworks.

Stage 1 Disinfectants/Disinfection By-Products Rule (D/DBPR). Sets a treatment technology for DBP precursor removal (enhanced coagulation) based on source water total organic carbon (TOC) levels. Varying levels of removal are required if the source water concentrations are > 2 mg/L. Sets MCLs for total trihalomethanes (TTHMs) and haloacetic acids (HAA5) at 80/60 micrograms per liter (μg/L), respectively, in distribution system as system-wide running annual average (RAA), but these were superseded by the Stage 2 D/DBP Rule.

Long Term 2 ESWTR. 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 average *Cryptosporidium* value is greater than 0.075 oocysts per liter, 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 monitoring for *Cryptosporidium*.

Stage 2 D/DBPR. Requires compliance with distribution system MCLs for TTHM and HAA5 to be based on locational running annual average (LRAA). In Stage 2, compliance is based on LRAA of 80/60 μg/L. Initial Distribution System Evaluations were completed to identify long term monitoring locations. Operational evaluations are required if projected DBP levels exceed the MCLs.

Table 5-1
Placer County Water Agency Water Treatment Plants - Design Information

WTP	Design Flow (gpm)	Average Flow (gpm)	Type of Plant	Flash-Mix Type	Pre-oxidant Used	Coagulant and Coagulant Aid Used	Flocculator Type	Floc. DT (min.)	Sed. DT (min.)	Filter Type	Filtration Rate gpm/sf	Primary Disinfectant
Alta	356	217	Direct Filtration	Static Mixer	Sodium Hypochlorite	Poly Aluminum Chlorohydrate (PACL) with soda ash	Adsorption clarifier	N/A	N/A	3 Vertical dual media pressure filters	5	Sodium Hypochlorite
Monte Vista	85	35-40	Direct Filtration	Static Mixer	Sodium Hypochlorite	Poly Aluminum Chlorohydrate (PACL) with soda ash	Adsorption clarifier	N/A	N/A	1 Vertical dual media pressure filter	3	Sodium Hypochlorite
Colfax	1.244 mgd	0.57 mgd	Conventional	Mechanical	Sodium Hypochlorite	Liquid aluminum sulfate	5 stage tapered hydraulic energy flocculation basin	23.2	360	2 Horizontal dual media pressure filters	3	Sodium Hypochlorite
Applegate	50	7	Microfiltration	N/A	None	None	N/A	N/A	N/A	N/A	N/A	Sodium Hypochlorite
Bowman	5 mgd	3.6 mgd	Conventional	Mechanical	Sodium Hypochlorite	Liquid aluminum sulfate and Non-Ionic	Three paddle wheel zones	20.4	20	2 tri-media gravity filters	5	Sodium Hypochlorite
Bowman Package	2 mgd	2 mgd	Microfloc package units	Static Mixer	Sodium Hypochlorite	Poly Aluminum Chlorohydrate (PACL)	Adsorption clarifier	N/A	N/A	4 Tri-media filters	5	Sodium Hypochlorite

Table 5-1 Cont'd
Placer County Water Agency Water Treatment Plants - Design Information

WTP	Design Flow (gpm)	Average Flow (gpm)	Type of Plant	Flash-Mix Type	Pre-oxidant Used	Coagulant and Coagulant Aid Used	Flocculator Type	Floc. DT (min.)	Sed. DT (min.)	Filter Type	Filtration Rate gpm/sf	Primary Disinfectant
Auburn	8 mgd	2.16 mgd	Actifloc/Conventional	Static Mixer	Sodium Hypochlorite	Poly Aluminum Chlorohydrate (PACL) and Non-Ionic	Ballasted Sedimentation			4 dual media gravity filters	5	Sodium Hypochlorite
Foothill 1	42 mgd	25.9 mgd	Actiflo/ Conventional	Induction in line +vertical turbine propeller	Sodium Hypochlorite	Liquid alum or PACL, NIP polymer or PACL	Actiflo	2 min	8 min	9 dual media gravity filters	10	Sodium Hypochlorite
Foothill 2	18 mgd	15.1 mgd	Conventional or Direct (depending on flow rate)	Mechanical Mixer	Sodium Hypochlorite	Liquid alum or PACL, NIP polymer or PACL	3 stage tapered variable speed vertical flocculator	30	120	4 dual media gravity filters	5.9	Sodium Hypochlorite
Sunset	8 mgd	4.32 mgd	Conventional	Mechanical Mixer and Static Mixer	Sodium Hypochlorite	Liquid aluminum sulfate and NIP polymer	Single paddle energy zone	25	160	2 dual media gravity filters	2.9	Sodium Hypochlorite

gpm - gallons per minute DT = Detention Time gpm/ft^2 = gallons per minute per square foot

Table 5-2
Nevada Irrigation District Water Treatment Plants - Design Information

WTP	Design Flow (mgd)	Average Flow (mgd)	Type of Plant	Flash-Mix Type	Pre-oxidant Used	Coagulant and Coagulant Aid Used	Flocculator Type	Floc. DT (min.)	Sed. DT (min.)	Filter Type	Filtration Rate (gpm/sf)	Primary Disinfectant
Elizabeth George	18	4	Conventional	Adjustable Mechanical Flash Mixer	Sodium Hypochlorite	Alum with Caustic	Horizontal Paddle	20 @ max flow	52 min	2 cluster-type (4 cells each) dual media gravity filter	6	Sodium Hypochlorite
Loma Rica	8.3	3	Conventional	Adjustable Mechanical Flash Mixer	Sodium Hypochlorite	Alum with Caustic	Horizontal Paddle	30min	4.5 hours	4 dual media pressure filters	6	Sodium Hypochlorite
Lake of the Pines	5	1.3	Conventional	Adjustable Mechanical Flash Mixer	Sodium Hypochlorite	Alum with Caustic	Pulsator-Upflow Clarifier	Floc and Sed in same basin	46 min	2 tri media gravity filters	6	Sodium Hypochlorite
Lake Wildwood	4	1.5	Conventional	Partial Mechanical Mixer	Sodium Hypochlorite	Alum with Caustic	– Circular steel upflow Clarifier.	Floc and Sed in same basin	2.3 hours	4 dual media gravity filters	6	Sodium Hypochlorite
North Auburn	6	2.5	Conventional	Adjustable Mechanical Flash Mixer	Sodium Hypochlorite	Alum with Caustic	Upflow Clarifier	Floc and Sed in same basin	91	2 dual media gravity filters	6	Sodium Hypochlorite
Smartville	0.085	0.037	Conventional	Inline static mixer	None	100% Clarion Soda Ash	Contact Tank	13.5 min	78	2 dual media pressure filters	1.5	Sodium Hypochlorite

PLACER COUNTY WATER AGENCY WATER TREATMENT PLANTS

Alta Water Treatment Plant

System Description

The raw water intake location for the Alta WTP is located in the Alta Forebay, a small impoundment at the end of Pacific Gas and Electric's (PG&E) Towle Canal. The Alta WTP is located on the ridge between the Bear River and the North Fork of the American River along Interstate 80 in Placer County about 30 miles northeast of Auburn. Alta has been classified as a direct filtration plant by the State Water Resources Control Board, Division of Drinking Water (DDW). The plant design flow is 356 gallons per minute (gpm), with average flows at 217 gpm.

The influent water is pre-oxidized with sodium hypochlorite, and then polyaluminum chlorohydrate and soda ash are added as coagulant and coagulant aid, respectively. Soda ash is added for alkalinity adjustment. Chemicals are mixed by a static mixer, and the coagulated water enters an adsorption clarifier (contact flocculator). The clarified water, which has a maximum turbidity of 0.45 nephelometric turbidity units (NTU), is then filtered through three vertical dual media pressure filters. The filter loading rate is 5.0 gallons per minute/square foot (gpm/sf).

The filters are backwashed based on uniform filter run volumes (UFRV). Backwash water is recycled after settling in a 24,000-gallon tank, and recycle rates are kept below 10 percent of total plant flow. The plant has filter-to-waste capability after backwash and plant start-up. The filtered water is disinfected with sodium hypochlorite, and stored in one of two 100,000-gallon tank to meet contact time (CT) requirements. The average residual leaving the plant is 0.64 to 1.0 milligrams per liter (mg/L).

Highlight of Changes Since 2017 Update

During the study period new intake pumps were installed in the P&E raw water structure, a new emergency generator and new intake strainer were also installed to achieve higher capacity and electrical reliability at the site.

Significant Potential Contaminating Activities

The Alta WTP is located furthest upstream in the watershed. It diverts water from the Alta Forebay. In the upper watershed above Lake Spaulding, recreational use is heavy as well as timber harvesting, limited grazing, and seasonal discharge from the Donner Summit Public Utilities District Wastewater Treatment Plant (WWTP). More significant is the local drainage received into the Towle Canal and Alta Forebay from Canyon Creek. It is possible for runoff from Interstate 80 to enter the receiving water, making spills a potential significant concern as it includes constituents that are not easily amenable to conventional filtration and could occur at any hour of the day with limited, if any, spill notification. Additionally, PCWA staff have noted that the Alta Forebay has accumulated vegetation and debris over time due to a lack of on-going maintenance by PG&E.

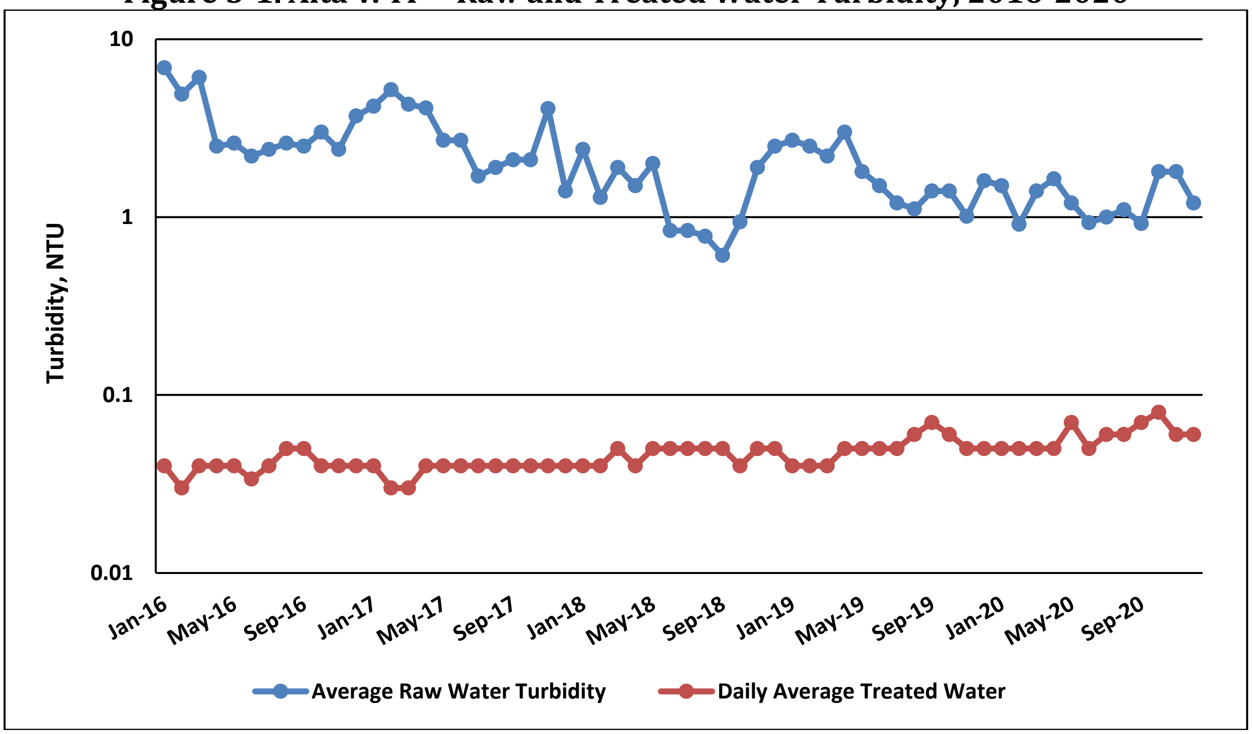
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at Alta WTP for the period of study was 2.2 NTU, and on average the treatment process decreased this to 0.05 NTU, which equates to an average removal of solids of 97.9 percent. **Figure 5-1** shows a timeseries plot of raw and treated turbidities. Alta WTP meets all current turbidity standards. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of daily samples, where the daily average is an average of all 4-hour (hr) samples taken in a 24 hour period.

Figure 5-1. Alta WTP – Raw and Treated Water Turbidity, 2016-2020



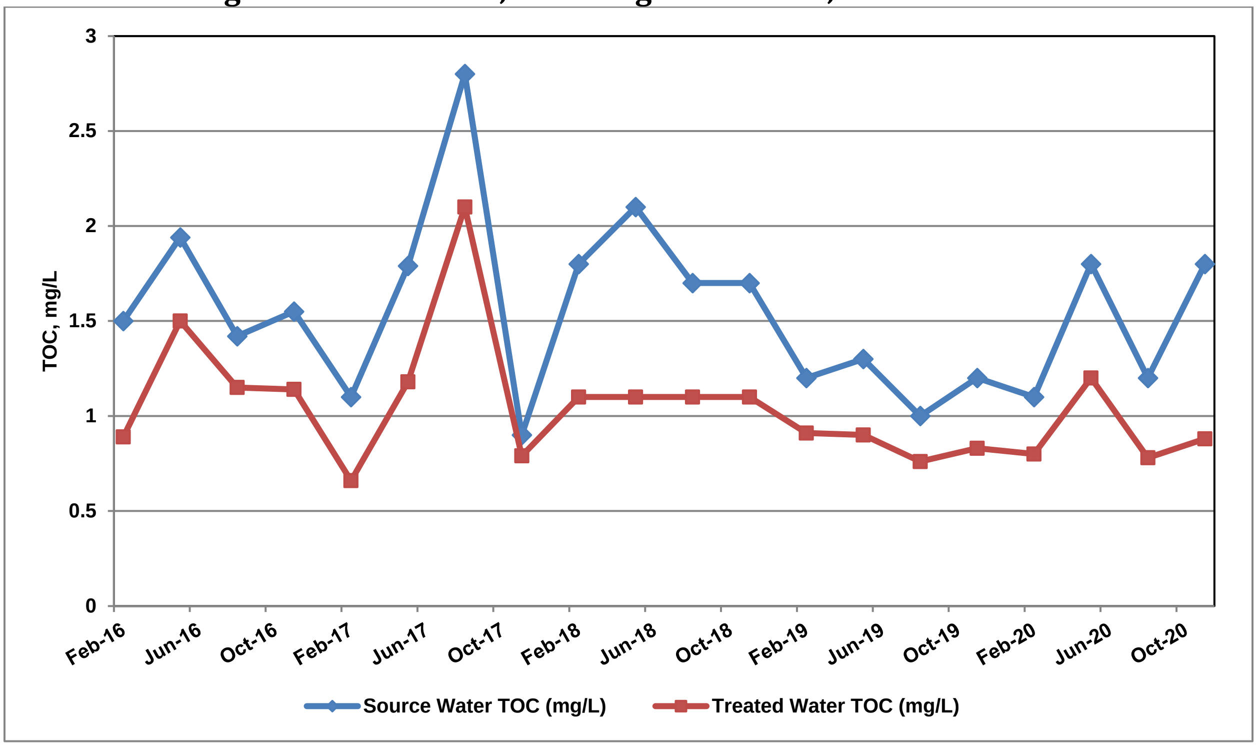
Microbiological Constituent

There were no positive coliform samples in the distribution system during the period of study.

Disinfection By-Products

PCWA monitors alkalinity and total organic carbon (TOC) levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Alta WTP were 1.6 mg/L and 1.0 mg/L, respectively, equating to 32.4 percent average removal. Since all of the TOC running annual averages (RAA) for both source and treated waters were less than 2.0 mg/L, no TOC removal calculation is required for the Alta WTP. **Figure 5-2** shows a timeseries plot of raw and treated water TOC at Alta WTP. There are no specific temporal trends.

Figure 5-2. Alta WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

PCWA began Stage 2 D/DBP monitoring in December 2013. PCWA is continuing to use the Stage 1 monitoring location for compliance monitoring under Stage 2 D/DBPR. Although two locations are required to be monitored, Section 141.605 of the Stage 2 D/DBPR allows that Subpart H systems less than 3,300 population and on quarterly monitoring, may use one site with a dual sample (both total trihalomethanes (TTHM) and haloacetic acids (HAA5)) if the peak concentration of DBPs are expected to occur at the same time. TTHM LRAAs ranged from 42 to 59.3 micrograms per liter (μg/L) and HAA5 LRAAs ranged from 19.3 to 27.8 μg/L. Based on available data over the reporting period, TTHM and HAA5 LRAAs were below the respective Maximum Contaminant Levels (MCLs) of 80 and 60 μg/L per the Stage 2 Disinfectants/Disinfection By-Products Rule (D/DBPR).

Other Detectable Title 22 Constituents of Interest

As reported in the 2019 Consumer Confidence Report (CCR), arsenic was detected at 2.2 μg/L, which is lower than the MCL of 10 μg/L, but higher than the PHG of 0.004 μg/L.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* data presented in **Section 3,** 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Alta WTP under the SWTR.

As a Schedule 4 WTP, PCWA conducted the second round of Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) monitoring at the Alta WTP by collecting biweekly *E. coli* samples from October 2017 to September 2018. As the annual *E. coli* mean was 12 MPN/100mL, and less than the trigger level of 100 MPN/100mL for flowing streams, no *Cryptosporidium* monitoring was required and the source is classified as Bin 1.

The Alta WTP is classified as a direct filtration plant, and currently receives reduction credit for 2.0-log *Giardia,* 1.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with sodium hypochlorite provides 1.0-log credit for *Giardia* and 3.0-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR, the Long Term 1 ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Alta WTP for all required Title 22 compliance constituents. **Table 5-3** lists the existing drinking water regulations and a compliance evaluation for these standards at the Alta WTP. The Alta WTP is currently in compliance with existing regulations.

Monte Vista Water Treatment Plant

System Description

The raw water intake location for the Monte Vista WTP is located off the Cedar Creek Canal at station 128+60, approximately 2.4 miles downstream from Lake Alta. Monte Vista has been classified as a direct filtration plant by DDW. The plant design flow is 85 gpm, with average flows at 35 to 40 gpm.

The influent water is pre-oxidized with sodium hypochlorite, and polyaluminum chlorohydrate and soda ash are added as coagulant and coagulant aid, respectively. Soda ash is added for alkalinity adjustment. Chemicals are mixed by a static mixer, and the coagulated water enters an adsorption clarifier (contact flocculator). The clarified water is then filtered through one vertical dual media pressure filter. The filter loading rate is three gpm/sf.

The filters are backwashed based on UFRV. Backwash water is recycled after settling in a 5,700-gallon tank. The plant has filter to waste capability after backwash or plant start-up.

The filtered water is disinfected with sodium hypochlorite, and stored in a 60,000-gallon tank to meet CT requirements. The average residual leaving the plant is 0.6 to 1.1 mg/L.

Table 5-3
Regulatory Compliance Evaluation
Placer County Water Agency – Alta WTP

	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.
Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in raw and treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of monitoring for *E. coli*, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 μg/L, respectively).

Highlight of Changes Since 2017 Update

No changes were made to the water treatment processes during the reporting period.

Significant Potential Contaminating Activities

The Monte Vista WTP is located downstream from the Alta Forebay and Lake Alta. Similar to the Alta WTP, recreational use, timber harvesting, limited grazing, and wastewater discharge occur in the upper watershed above Lake Spaulding and the possibility for spills entering the receiving water for Canyon Creek, Lake Alta, and Alta Forebay are of significant concern.

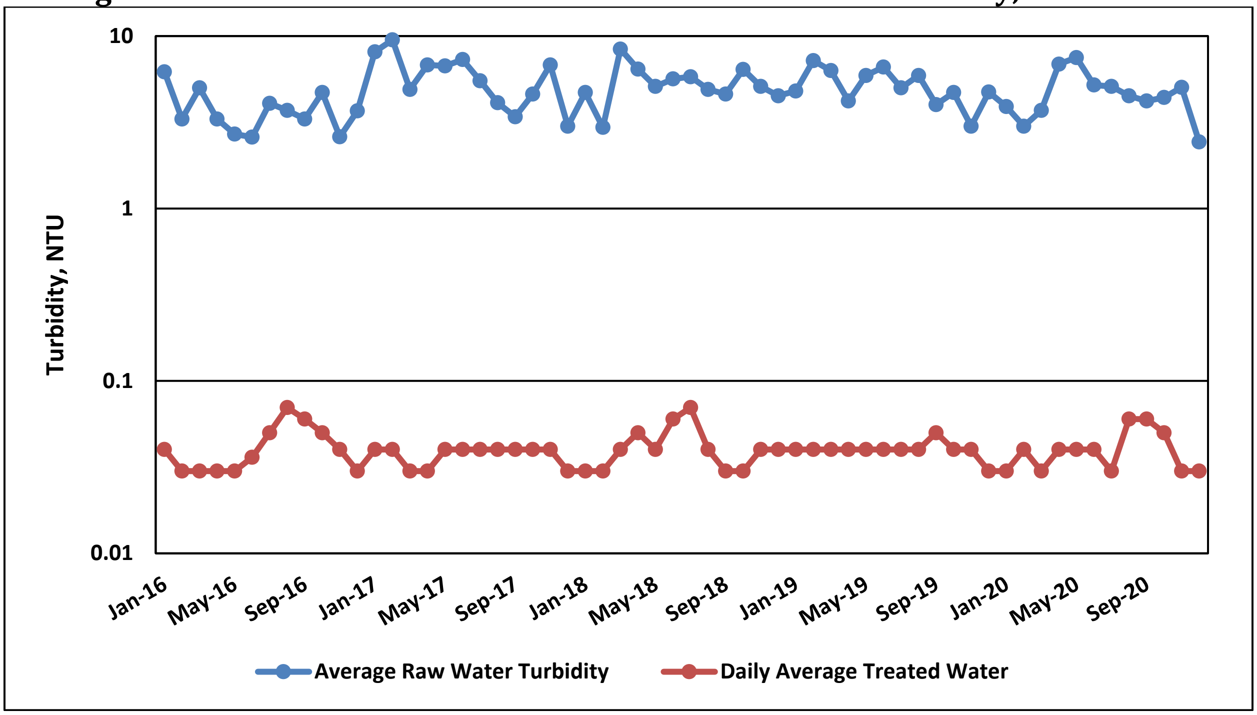
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at Monte Vista WTP for the period of study was 4.9 NTU, and on average the treatment process decreased this to 0.04 NTU, which equates to an average removal of solids of 99.2 percent. **Figure 5-3** shows a timeseries plot of raw and treated water turbidities. Monte Vista WTP meets all current turbidity standards. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-3. Monte Vista WTP – Raw and Treated Water Turbidity, 2016-2020



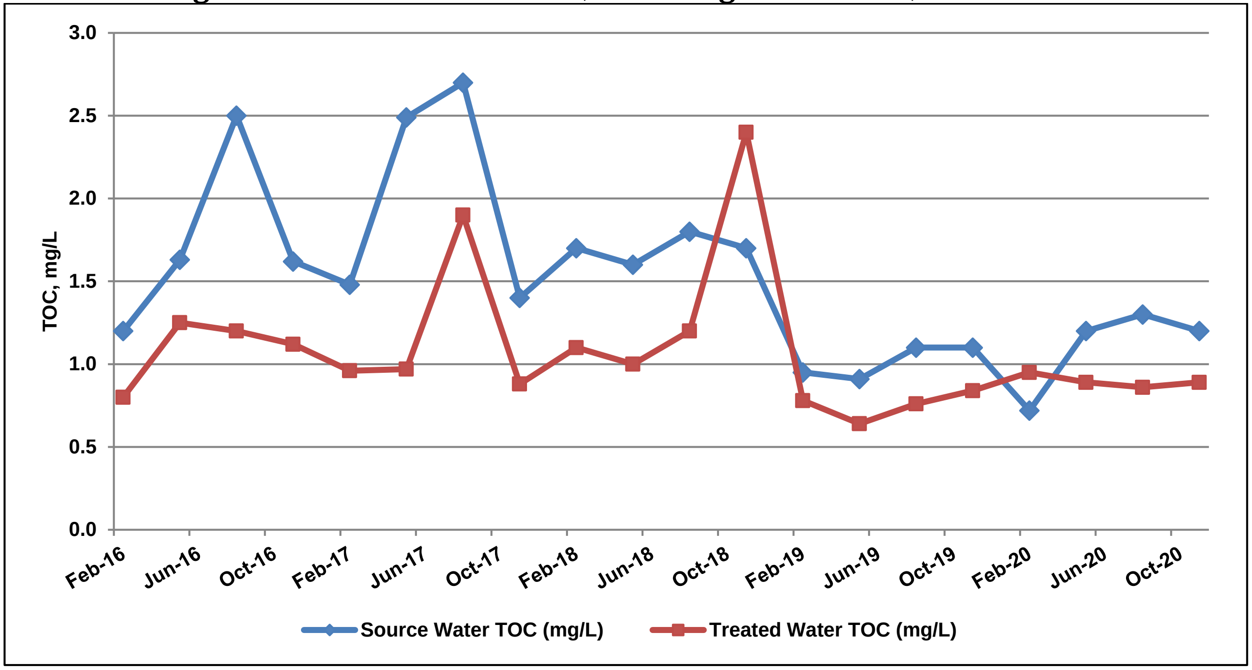
Microbiological Constituent

There were no positive coliform samples in the distribution system during the period of study.

Disinfection By-Products

PCWA monitors alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Monte Vista WTP were 1.5 mg/L and 1.1 mg/L, respectively, equating to 29.4 percent average removal. Since all of the treated water TOC RAAs were less than 2.0 mg/L, no TOC removal calculation is required for the Monte Vista WTP. **Figure 5-4** shows a timeseries plot of raw and treated water TOC at Monte Vista WTP. There are no specific temporal trends.

Figure 5-4. Monte Vista WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

PCWA submitted an official Stage 2 D/DBP monitoring plan in September 2013. PCWA monitors annually for THM and HAA5 at one site in the distribution system. TTHM LRAAs ranged from 38 to 66 μg/L and HAA5 LRAAs ranged from 14 to 27 μg/L. Based on data over the reporting period, TTHM and HAA5 LRAAs were below the respective MCLs per the Stage 2 D/DBPR.

<u>Other Detectable Title 22 Constituents of Interest</u>

Based on a review of the 2016 to 2020 CCRs, there are no other detectable Title 22 constituents of interest.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Monte Vista WTP under the SWTR.

As a Schedule 4 WTP, PCWA conducted the second round of LT2ESWTR monitoring at the Monte Vista WTP by collecting biweekly *E. coli* samples from October 2017 to September 2018. As the annual *E. coli* mean was 22.9 MPN/100mL, and less than the trigger level of 100 MPN/100mL for flowing streams, no *Cryptosporidium* monitoring was required and the source is classified as Bin 1.

The Monte Vista WTP is classified as a direct filtration plant, and currently receives reduction credit for 2.0-log *Giardia,* 1.0-log viruses, and 2-log *Cryptosporidium* for physical removal.

Disinfection with sodium hypochlorite provides 1.0-log credit for *Giardia* and 3.0-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR, the Long Term 1 ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Monte Vista WTP for all required Title 22 compliance constituents. **Table 5-4** lists the existing drinking water regulations and a compliance evaluation for these standards at the Monte Vista WTP. The Monte Vista WTP is currently in compliance with existing regulations.

Table 5-4
Regulatory Compliance Evaluation
Placer County Water Agency – Monte Vista WTP

	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.
Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of *E. coli* monitoring, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

Colfax Water Treatment Plant

System Description

The raw water intake location for the Colfax WTP is located off the Boardman Canal at station 704+62, approximately 14.2 miles downstream from Lake Alta. Colfax is a conventional water treatment plant. The plant design flow is 1.244 million gallons per day (mgd), with average flows at 0.57 mgd.

The influent water is pre-oxidized with sodium hypochlorite and alum is the primary coagulant. Powdered activated carbon is fed only when conditions warrant its use. Chemicals are mixed by a hydraulic jump and a mechanical flash mixer. The coagulated water enters a five stage tapered hydraulic energy flocculation basin, with a detention time of 23.3 minutes and then into a serpentine sedimentation basin with a detention time of six hours. The clarified water is then filtered through two horizontal dual media pressure filters. The filter loading rate is 3.0 gpm/sf. Polyaluminum chloride is used as a filter aid in the winter, and a non-ionic polymer is used in the summer.

The filters are backwashed on an as needed basis. Backwash water is recycled to rapid mix after settling in a backwash pond. The plant has filter to waste capability after backwash or plant start-up. The filtered water is disinfected with sodium hypochlorite, and stored in two tanks, one at 0.3 million gallons (mg) and one at 1.0 mg, to meet CT requirements. The average residual leaving the plant is 1.0 mg/L.

Highlight of Changes Since 2017 Update

No changes were made to the water treatment processes during the reporting period.

Significant Potential Contaminating Activities

The Colfax WTP diverts off the Boardman Canal upstream of Colfax. This includes all the vulnerabilities from the Monte Vista WTP diversion, as well as limited development, runoff, and access to the Canal downstream of the Monte Vista WTP. There is one residence in proximity of the intake.

Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

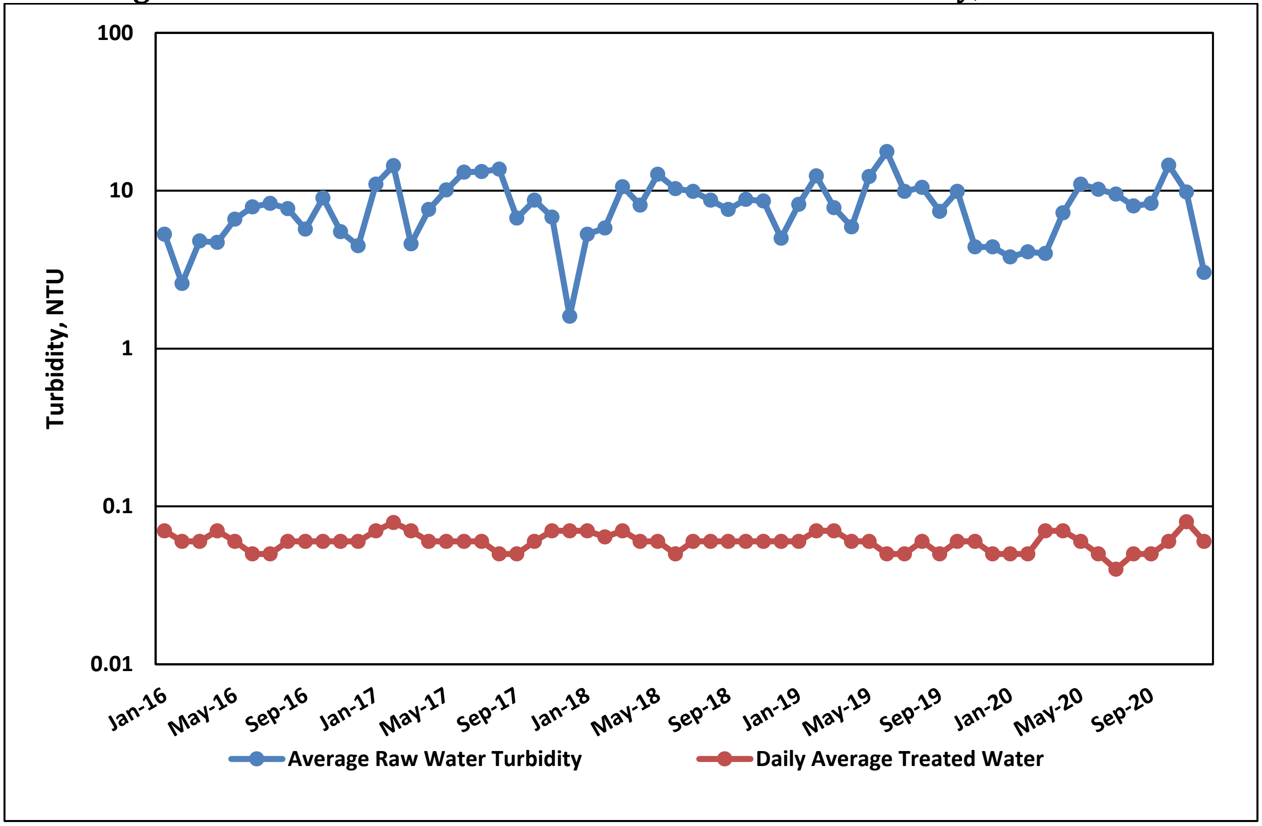
Turbidity

The average raw water turbidity at Colfax WTP for the period of study was 8.2 NTU, and on average the treatment process decreased this to 0.06 NTU, which equates to an average removal of solids of 99.3 percent. **Figure 5-5** shows a timeseries plot of raw and treated water turbidities. Colfax WTP meets all current turbidity standards. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Microbiological Constituent

There were no positive coliform samples in the distribution system during the period of study.

Figure 5-5. Colfax WTP – Raw and Treated Water Turbidity, 2016-2020



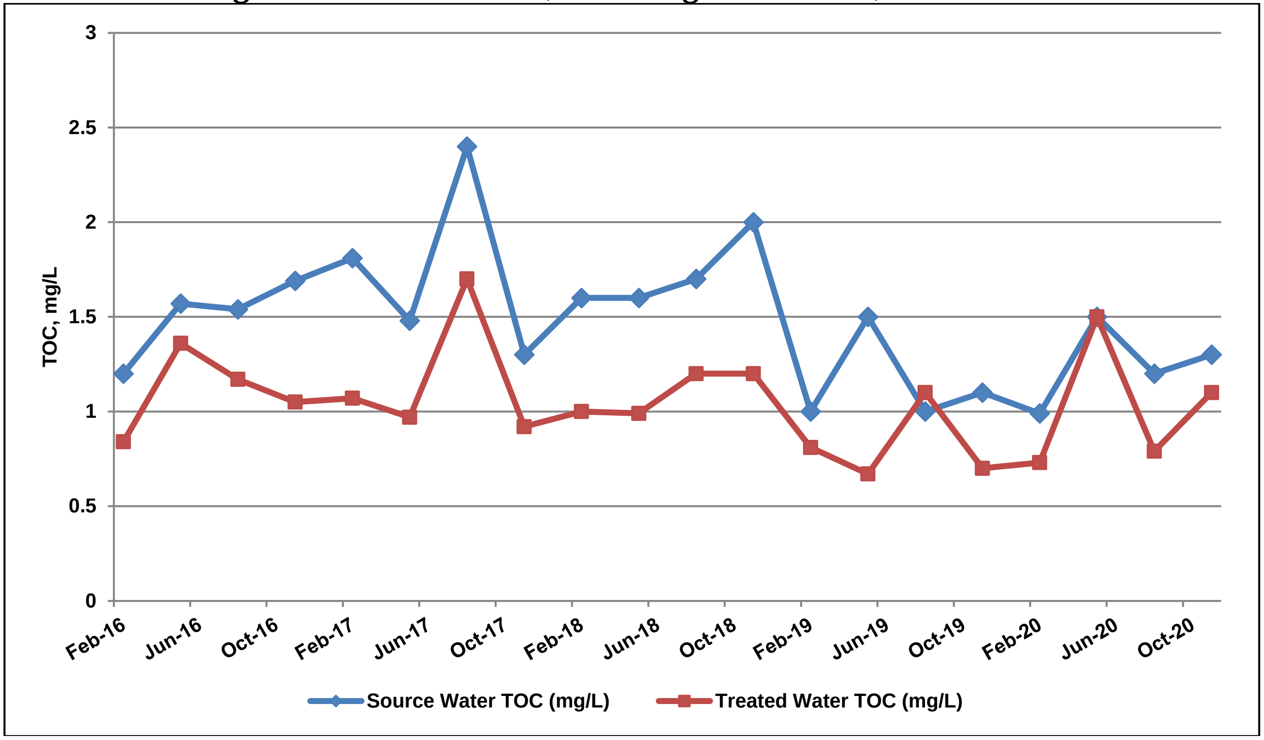
Disinfection By-Products

PCWA monitors alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Colfax WTP were 1.5 mg/L and 1.0 mg/L, respectively, equating to 29.2 percent average removal. Since all of the TOC RAAs for both source and treated waters were less than 2.0 mg/L, no TOC removal calculation is required for the Colfax WTP. **Figure 5-6** shows a timeseries plot of raw and treated water TOC at Colfax WTP. TOC levels in the raw water were generally below 2.0 mg/L, with one sample measured at 2.4 mg/L. There are no specific temporal trends.

Stage 2 D/DBP Rule Compliance Period

PCWA began Stage 2 D/DBP monitoring in February 2013. PCWA is continuing to use the Stage 1 monitoring location for compliance monitoring under Stage 2 D/DBPR. TTHM LRAAs ranged from 38 to 52.5 µg/L and HAA5 LRAAs ranged from 28.3 to 51 µg/L. Based on available data over the reporting period, TTHM and HAA5 LRAAs are below the respective MCLs per the Stage 2 D/DBPR.

Figure 5-6. Colfax WTP, Total Organic Carbon, 2016-2020



<u>Other Detectable Title 22 Constituents of Interest</u>

As reported in the 2018 CCR, lead was detected in the distribution system in 2017. Out of ten samples collected, one sample exceeded the lead Action Level of 15 µg/L.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Colfax WTP under the SWTR.

As a Schedule 4 WTP, PCWA conducted the second round of LT2ESWTR monitoring at the Colfax WTP by collecting biweekly *E. coli* samples from October 2017 to September 2018. As the annual *E. coli* mean was 33.1 MPN/100mL, and less than the trigger level of 100 MPN/100mL for flowing streams, no *Cryptosporidium* monitoring was required and the source is classified as Bin 1.

The Colfax WTP is classified as a conventional filtration plant, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with sodium hypochlorite 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, the Long Term 1 Enhanced SWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Colfax WTP for all required Title 22 compliance constituents. **Table 5-5** lists the existing drinking water regulations and a compliance evaluation for these standards at the Colfax WTP. The Colfax WTP is currently in compliance with existing regulations.

Table 5-5
Regulatory Compliance Evaluation
Placer County Water Agency – Colfax WTP

	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.
Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in raw and treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of monitoring for *E. coli*, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

Applegate Water Treatment Plant

System Description

The raw water intake location for the Applegate WTP is located off the Boardman Canal downstream of Pinecrest Road. Applegate is a microfiltration membrane plant. The plant design flow is 50 gpm, with average flows at 7 gpm.

No pre-oxidation or coagulants are needed. The influent water enters two Memcor microfiltration units, with six membrane modules each. The loading rate is approximately 0.05 gpm/sf. The membranes are backwashed with compressed air to remove particulate matter off the membrane every 20 minutes. The backwash water goes to a 200-gallon backwash waste tank and is not recycled. After about 1,000 hours of run time, a maintenance wash using caustic soda and citric acid is performed.

The filtered water is disinfected with sodium hypochlorite as the primary and residual disinfectant. The water is then stored in a 60,000-gallon tank to meet CT requirements. The average chlorine residual leaving the plant is 0.5 to 0.75 mg/L.

Highlight of Changes Since 2017 Update

During the study period, the plant was converted to hydrated lime feed to address system corrosion potential. Subsequently, a tank mixer was added to prevent caking of the lime.

Significant Potential Contaminating Activities

The Applegate WTP diverts off the Boardman Canal at Applegate. This includes all the vulnerabilities from the Colfax WTP, as well as low density rural development between Colfax and Applegate.

Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

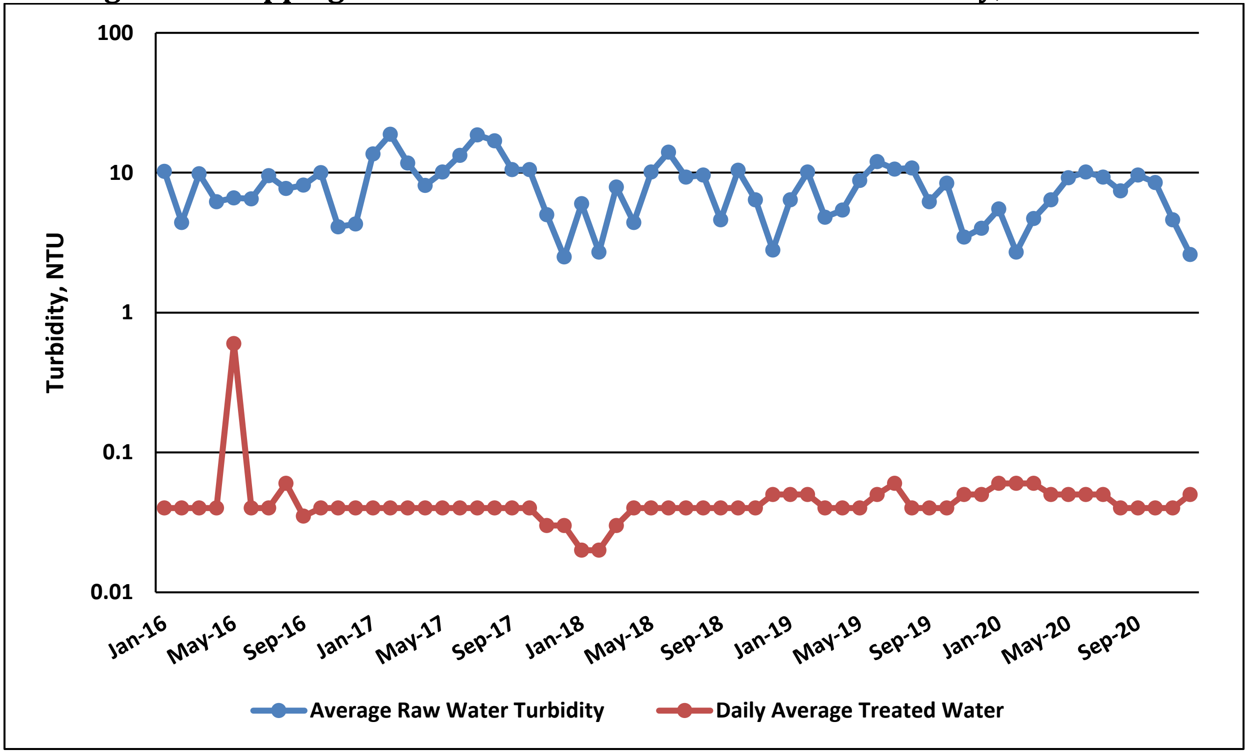
Turbidity

The average raw water turbidity at Applegate WTP for the period of study was 8.1 NTU, and on average the treatment process decreased this to 0.05 NTU, which equates to an average removal of solids of 99.4 percent. **Figure 5-7** shows a timeseries plot of raw and treated water turbidities. Applegate WTP meets all current turbidity standards. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Microbiological Constituent

There were no positive coliform samples in the distribution system during the period of study.

Figure 5-7. Applegate WTP – Raw and Treated Water Turbidity, 2016-2020



Disinfection By-Products

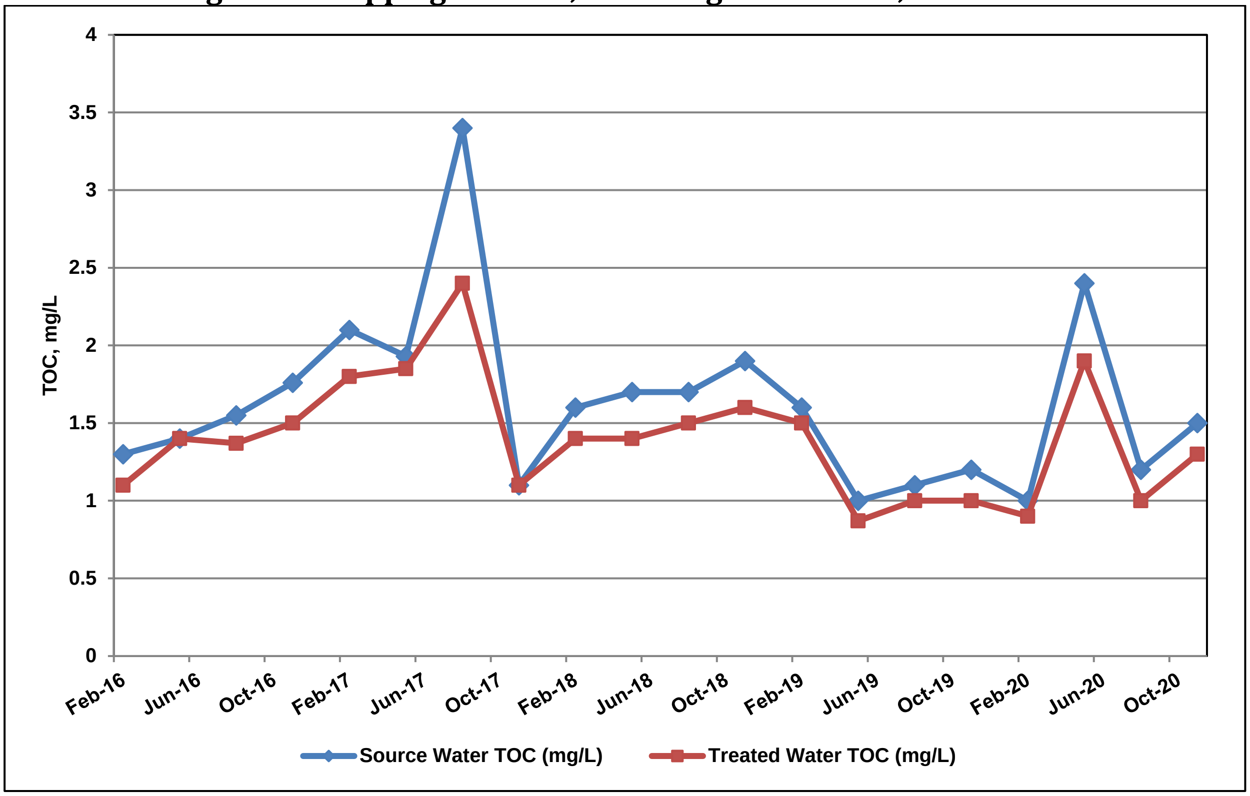
PCWA monitors alkalinity and TOC levels in its raw water and TOC levels in its treated waters quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Applegate WTP were 1.6 mg/L and 1.4 mg/L, respectively, equating to 14 percent average removal. Membrane filtration plants are not required to comply with the enhanced coagulation requirements. **Figure 5-8** shows a timeseries plot of raw and treated water TOC at Applegate WTP. TOC levels in the raw water were generally at or below 2.0 mg/L, with one sample measured at 3.4 mg/L. There are no specific temporal trends.

Stage 2 D/DBP Rule Compliance Period

PCWA began Stage 2 D/DBP monitoring in December 2013. PCWA was also directed by DDW to continue to collect TTHMs and HAA5 as currently required for Stage 1 D/DBPR as part of the Stage 2 D/DBPR monitoring. TTHM LRAAs ranged from 41.5 to 71.5 µg/L and HAA5 LRAAs ranged from 19.3 to 59 µg/L. TTHM and HAA5 LRAAs are below the respective MCLs per the Stage 2 D/DBPR. However, the individual TTHM sample collected in the fourth quarter of 2018 was 100 µg/L.

Applegate exceeded the TTHM Operational Evaluation Limit (OEL) from the Stage 2 D/DBP Rule in the fourth quarter of 2018. A limited scope OEL report was submitted, and stated a possible solution to reduce DBPs would be to vary the storage tank level in order to provide more turnover. PCWA installed mixers and vents at the Applegate tank which have reduced DBP formation.

Figure 5-8. Applegate WTP, Total Organic Carbon, 2016-2020



Other Detectable Title 22 Constituents of Interest

As reported in the 2017 CCR, lead was detected in the distribution system in 2016. Out of five samples collected, one sample exceeded the lead Action Level of 15 µg/L. As reported in the 2020 CCR, lead was detected in the distribution system in 2019. Out of twenty samples collected, one sample exceeded the lead Action Level of 15 µg/L.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Applegate WTP under the SWTR.

As a Schedule 4 WTP, PCWA conducted the second round of LT2ESWTR monitoring at the Applegate WTP by collecting biweekly *E. coli* samples from October 2017 to September 2018. As the annual *E. coli* mean was 41.5 MPN/100mL, and less than the trigger level of 100 MPN/100mL for flowing streams, no *Cryptosporidium* monitoring was required and the source is classified as Bin 1.

The Applegate WTP is classified as an alternative treatment technology, and currently receives reduction credit as a conventional plant for 4.0-log *Giardia,* 4.0-log *Cryptosporidium*, and 0.5-log viruses at 110 liter per hour per square meter, for physical removal. Applegate WTP is not currently receiving inactivation credit for the UV system, which is currently operated to reduce DBPs. Disinfection with sodium hypochlorite provides 0.5-log credit for *Giardia* and 3.5-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR, the Long Term 1 ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Applegate WTP for all required Title 22 compliance constituents. **Table 5-6** lists the existing drinking water regulations and a compliance evaluation for these standards at the Applegate WTP. The Applegate WTP is currently in compliance with existing regulations.

Table 5-6
Regulatory Compliance Evaluation
Placer County Water Agency – Applegate WTP

	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.
Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of monitoring for *E. coli*, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 μg/L, respectively). One TTHM OEL exceedance occurred in 4th quarter of 2018.

Bowman Water Treatment Plant

System Description

The raw water intake location for the Bowman WTP is located off the Bowman Canal. Water is diverted from the Bear River Canal into an inverted siphon to Bowman Canal and passes through a PG&E staging area, above Halsey Forebay. The Bowman WTP consists of two separate treatment trains; Bowman WTP and Bowman Package WTP. They have common source and treated water quality results.

The Bowman WTP is a conventional water treatment plant. The plant design flow is 5.0 mgd, with average flows at 3.6 mgd. The influent water is pre-chlorinated and alum and nonionic polymer are added as the primary coagulant and coagulant aid, respectively. Chemicals are mixed by a vertical turbine propeller. The coagulated water enters a three staged paddle wheel flocculation basin, with a detention time of 20.4 minutes and then into a sedimentation basin with a detention time of 20 minutes. The clarified water is then filtered through two tri media gravity filters. The filter loading rate is 5 gpm/sf. Non-ionic polymer is used as a filter aid as needed.

The filters are backwashed on an as needed basis, but production is usually limited to 24 hours. Backwash water and filter to waste flows to two reclaim settling ponds in series. Decant water from the second pond is returned to the plant, ahead of coagulation. The plant has filter to waste capability after backwash or plant start-up. The filtered water is disinfected with chlorine and stored in two clearwells, one at 1 mg and one at 10 mg, to meet CT requirements. The average residual leaving the plant is 1.0 mg/L.

The Bowman Package WTP consists of four-0.5 mgd CPC Microfloc package units. The plant design flow is 2.0 mgd, with an average flow of 2.0 mgd. The plant typically operates from April through October. The influent water is pre-oxidated with sodium hypochlorite and polyaluminum chloride is the primary coagulant. The coagulated water enters an adsorption clarifier which serves as both flocculation and sedimentation. The clarified water is then filtered through four dual media filters. The filter loading rate is 5.0 gpm/sf at 350 gpm per filter, and non-ionic polymer is used as a filter aid.

The filters are backwashed on an as needed basis, but production is usually limited to 24 hours. Backwash water and filter to waste flows to two reclaim settling ponds in series. Decant water from the second pond is returned to the plant, ahead of coagulation. The plant has filter to waste capability after backwash or plant start-up. The filtered water is disinfected with sodium hypochlorite and stored in two clearwells, one at 1 mg and one at 10 mg, to meet CT requirements. The average residual leaving the plant is approximately 0.9 mg/L.

Highlight of Changes Since 2017 Update

During the reporting period the filters were rebuilt and filled with tri-media instead of dual media. In addition, a new trough system was installed allowing air scour to occur simultaneously with backwash resulting in faster and more thorough backwashing.

Significant Potential Contaminating Activities

The Bowman WTP receives water from the Bear River Canal upstream of Halsey Forebay. The water in the Bear River Canal comes from Rollins Lake, which is subject to significant recreation, timber harvesting, mining, as well as a wastewater discharge from the Cascade

Shores WWTP. The Canal also crosses under Highway 174 and other local roads that could be a source for spills.

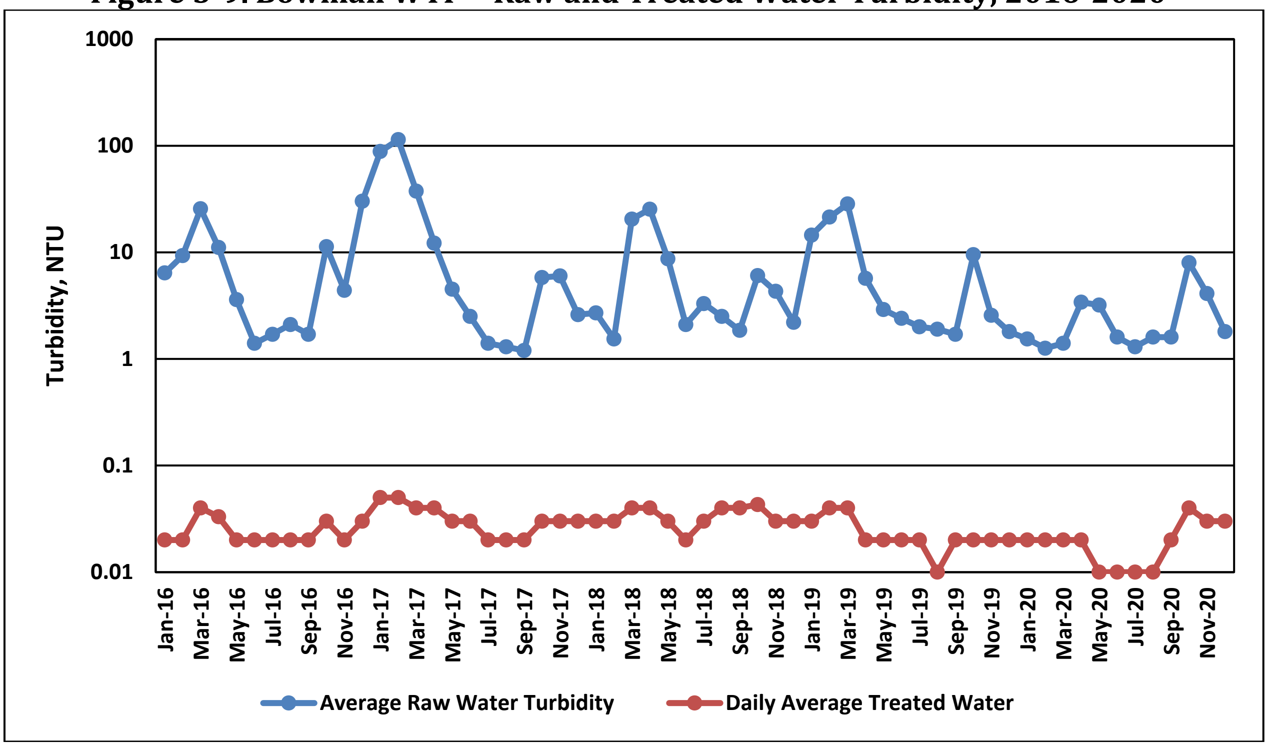
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at Bowman WTP for the period of study was 9.8 NTU, and on average the treatment process decreased this to 0.03 NTU, which equates to an average removal of solids of 99.7 percent. **Figure 5-9** shows a timeseries plot of raw and treated water turbidities. Bowman WTP meets all current turbidity standards. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-9. Bowman WTP – Raw and Treated Water Turbidity, 2016-2020



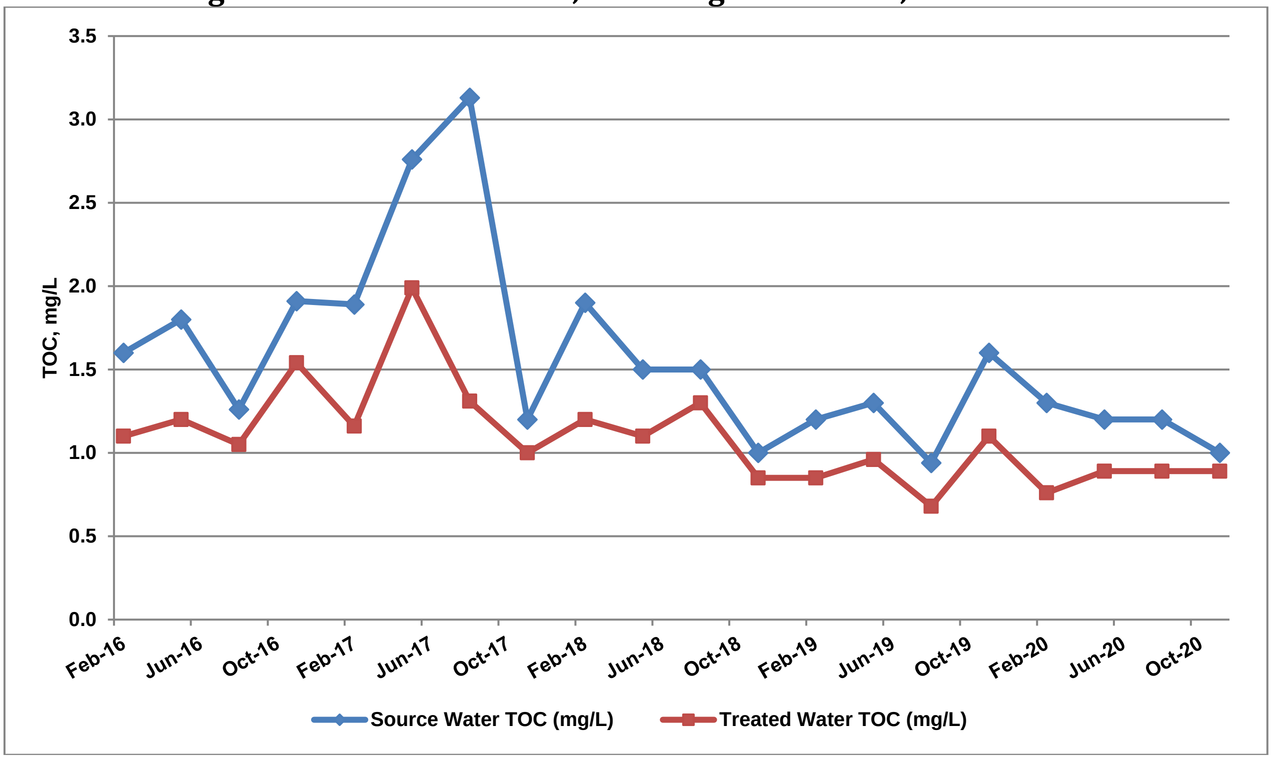
Microbiological Constituent

There were no positive coliform samples in the distribution system during the period of study.

Disinfection By-Products

PCWA monitors alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Bowman WTP were 1.6 mg/L and 1.1 mg/L, respectively, equating to 30 percent average removal. Since all of the treated water TOC RAAs for were less than 2.0 mg/L, no TOC removal calculation is required for the Bowman WTP. **Figure 5-10** shows a timeseries plot of raw and treated water TOC at Bowman WTP. There is no specific temporal trend.

Figure 5-10. Bowman WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

PCWA began monitoring the four Stage 2 D/DBP monitoring sites in November 2013. TTHM LRAAs ranged from 30.3 to 76.3 µg/L and HAA5 LRAAs ranged from 12.7 to 47.5 µg/L. The Landis Circle site was replaced with the Huntley site in January 2018. The LRAAs are shown for TTHMs in **Figure 5-11** and HAA5 in **Figure 5-12**.

The TTHM OEL from the Stage 2 D/DBP Rule was exceeded in the first quarter of 2016 as the Sunrise Ridge site was 100 µg/L. A limited scope OEL report was submitted, and stated that the Sunrise Ridge site is located at the end of the distribution system, so increased water age is the issue, particularly with mandatory conservation due to drought conditions. PCWA installed mixers and vents at several tanks in the Auburn/Bowman system which has reduced DBP formation.

Figure 5-11. LRAA TTHMs at Auburn Bowman Distribution System, Stage 2 D/DBP Data, 2016 – 2020

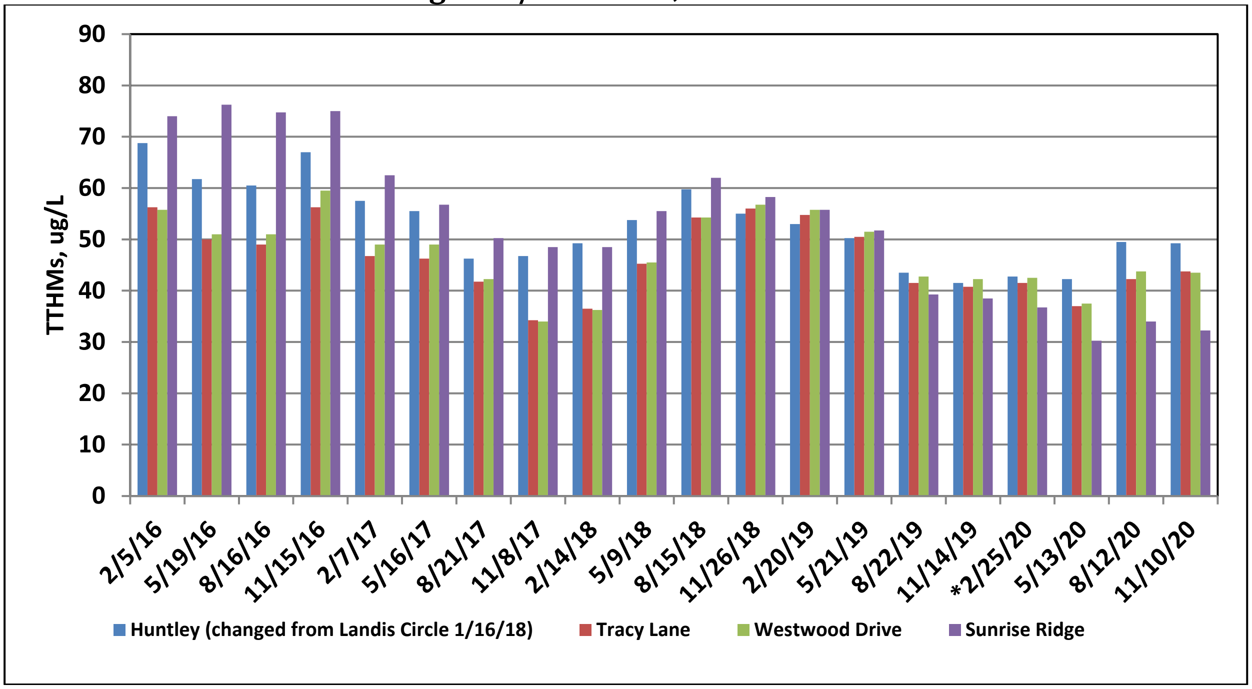
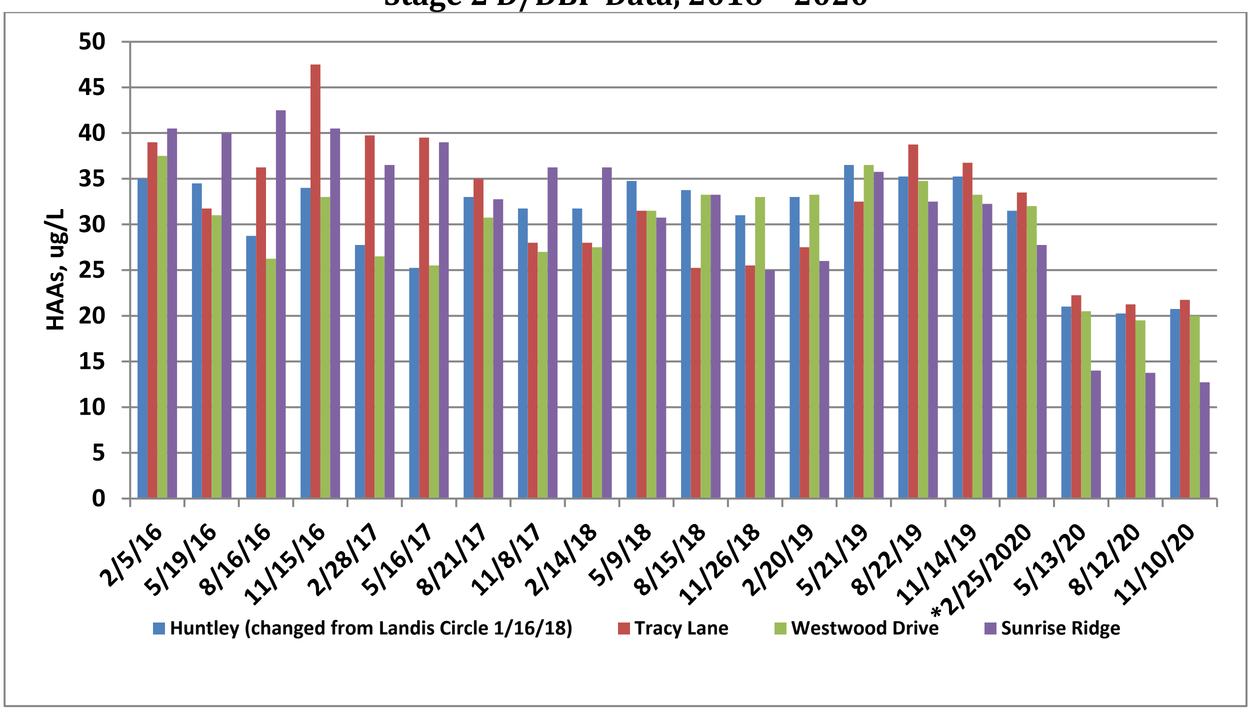


Figure 5-12. LRAA HAAs at Auburn Bowman Distribution System, Stage 2 D/DBP Data, 2016 – 2020



Other Detectable Title 22 Constituents of Interest

As reported in the 2017 CCR, lead was detected in the distribution system in 2016. Out of thirty samples collected, one sample exceeded the lead Action Level of 15 µg/L.

Unregulated Contaminant Monitoring Rule (UCMR) 4

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from April to July 2019 at the entry point to the distribution system. All sample results were non-detect.

The other 17 required constituents were also monitored quarterly at the entry point to the distribution system from January to October 2020 All sample results were non-detect except manganese which ranged from non-detect (ND) to 0.7 µg/L.

Three brominated haloacetic acid groups (HAA5, sum of nine HAAs [HAA9], and sum of six brominated HAAs [HAA6Br]) were monitored in the distribution system from January to October 2020 as shown in **Table 5-7.**

Table 5-7
Results from UCMR4 Monitoring for Auburn Bowman Distribution System, 2020

Site Name	HAA5 Average, µg/L	HAA6Br Average, µg/L	HAA9 Average, µg/L
Huntley	20.8	0.5	21
Tracy	23.5	0.5	24
Westwood	22	0.4	22.2
Sunrise Ridge	16.2	0.5	16.5

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* and *Giardia* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Bowman WTP under the SWTR.

PCWA conducted the second round of LT2ESWTR monitoring from October 2015 to September 2017. The highest 12-month mean for *Cryptosporidium* was 0.017 oocysts/L, indicating the source is Bin 1. The highest 12-month mean for *Giardia* was 0.05 cysts/L. Under Round 1 of source water monitoring as part of the LT2ESWTR, Bowman WTP was designated as Bin 2 and required an additional 1-log action. The Round 2 of monitoring resulted in a Bin 1classification of the source water for Bowman WTP. There was a significant reduction (62 percent) in the highest 12-month mean value of *Cryptosporidium* from Round 1 to Round 2. As discussed in **Sections 3 and 4**, this could be attributable to improved performance of the Cascade Shores WWTP or a result of sampling variability. PCWA has been denied a change from Bin 2 to Bin 1 by DDW, and continues to meet the additional log action required by using combined filter effluent and individual filter effluent options from the Microbial Toolbox in the LT2ESWTR.

The Bowman WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with chlorine provides 0.5-log credit for *Giardia* and 2.0-log credit for viruses.

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Bowman WTP for all required Title 22 compliance constituents. **Table 5-8** lists the existing drinking water regulations and a compliance evaluation for these standards at the Bowman WTP. The Bowman Package WTP is currently in compliance with existing regulations.

Table 5-8
Regulatory Compliance Evaluation
Placer County Water Agency – Bowman WTP

	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 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Second round of source water monitoring for *Cryptosporidium* complete. Results confirmed a Bin 1 classification, but DDW has not yet revised the historic Bin 2 classification. Due to Bin 2 classification, PCWA has been implementing more stringent turbidity requirements on CFE and individual filter effluents to receive 1.0-log action credit.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively). One TTHM OEL exceedance occurred in 1st quarter of 2016 at Sunrise Ridge site.

Auburn Water Treatment Plant

System Description

The raw water intake location for the Auburn WTP is located off the Lower Boardman Canal, whose source of supply is a combination of Upper Boardman Canal, Bear River Canal/Rollins Lake, and local drainage from the Ragsdale Random and Lake Theodore. Auburn is a conventional water treatment plant. The plant design flow is 8.0 mgd, with average flows at 2.16 mgd. The plant typically operates from April through October.

Raw water is delivered to the wet well of the raw water pump station at the Auburn WTP. After flowing through the wet well and a self-cleaning bar screen, the water is pumped to four Actifloc pre-treatment and filtration treatment process units. The modular Actifloc treatment train units consist of static mixing, coagulation-sedimentation, and filtration. Chemicals used in the clarification and disinfection process are injected ahead of the flash mixing chamber. During routine treatment the water is injected with a primary coagulant, generally polyaluminum chlorohydrate and non-ionic polymer as a coagulant aid, prior to entering the rapid mix chamber. Powdered activated carbon can be added if needed. Sodium hypochlorite is also added for pre-chlorination at this point, post-coagulant.

Following the flash mixing chamber, the water overflows to the coagulation and maturation chamber. Polymer and microsand are added to this chamber and are mixed with a turbine mixer. From here, the water overflows into the settling chamber. Tube settlers, installed at a 30 degree angle, allow the "ballasted" floc to settle to the bottom of the chamber and from there it is pumped to hydrocyclones. The hydrocyclones are designed to separate the microsand from sludge, allowing the microsand to be recycled back to the injection tank and the sludge to be discharged.

Each of the four triple media gravity filters has a surface area of 275 square feet. The filter media consists of 18 inches of anthracite coal, 9 inches of silica sand, and 3 inches of garnet sand. The multimedia sits above a dual parallel lateral type underdrain system. The filters are designed for a nominal filtration rate of 5 gpm/sf. Post-chlorination is applied prior to the water flowing into the 500,000 gallon~~s~~ clear well.

Highlight of Changes Since 2017 Update

No changes were made to the water treatment processes during the reporting period.

Significant Potential Contaminating Activities

The Auburn WTP receives water from the Lower Boardman Canal near the Interstate 80 Foresthill exit. The water in the Lower Boardman Canal comes from two main sources; the Bear River Canal and the Upper Boardman Canal. The Bear River Canal comes from Rollins Lake and is subject to the same vulnerabilities as the Bowman WTP. It then flows to the Lower Boardman Canal via the Ragsdale Random, which is subject to local drainage including low density residential and grazing. The Upper Boardman Canal is subject to the same vulnerabilities as the Applegate WTP, plus there is additional local runoff between Applegate and Auburn WTPs that include Lake Theodore and Interstate 80. Just upstream of the diversion location for the Auburn WTP there is residential development as well as the California Department of Forestry and Fire Protection station, including a heliport.

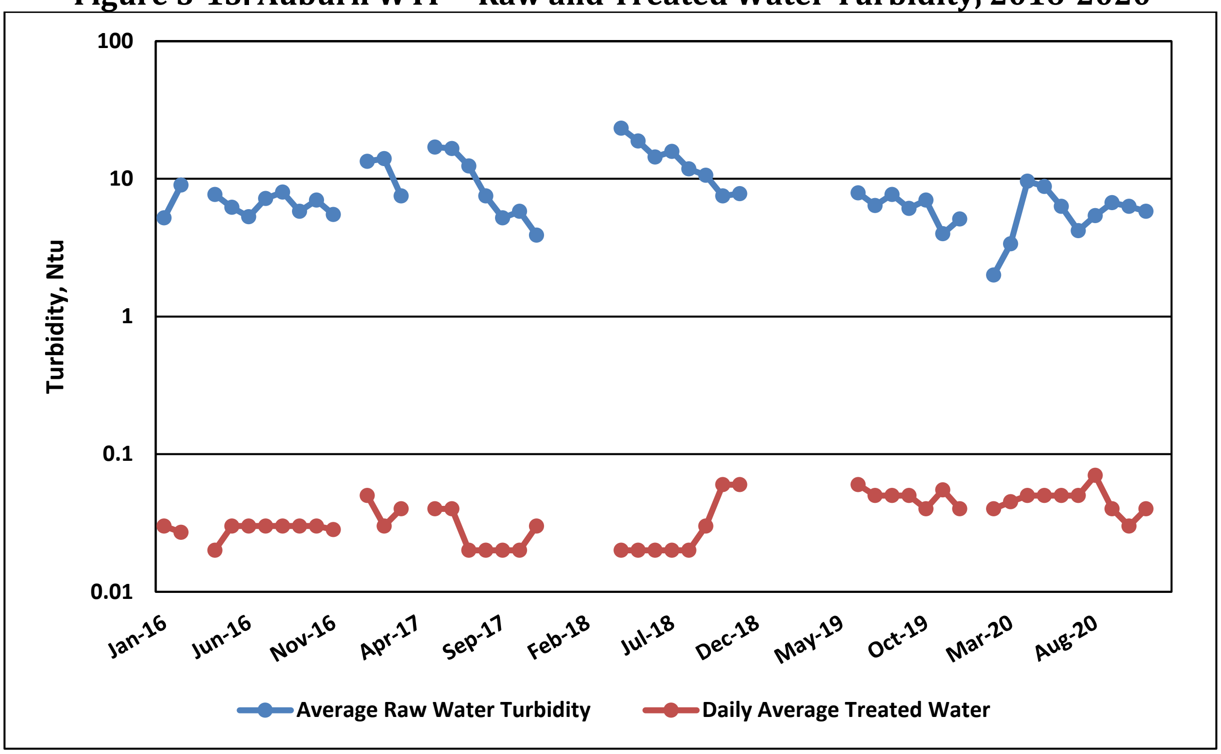
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at Auburn WTP for the period of study was 8.5 NTU, and on average the treatment process decreased this to 0.04 NTU, which equates to an average removal of solids of 99.6 percent. **Figure 5-13** shows a timeseries plot of raw and treated water turbidities. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-13. Auburn WTP – Raw and Treated Water Turbidity, 2016-2020



Microbiological Constituent

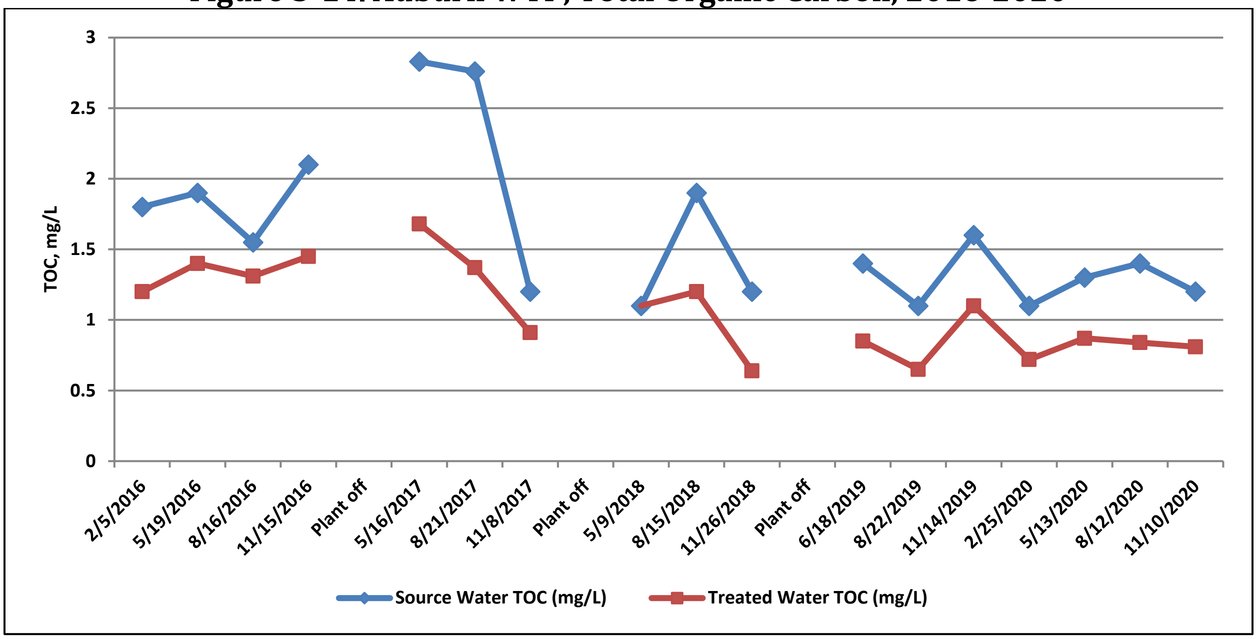
There were no positive coliform samples in the distribution system during the period of study.

Disinfection By-Products

PCWA 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 Auburn WTP were 1.6 mg/L and 1.0 mg/L, respectively, equating to 34 percent average removal. Since all of the treated water TOC RAAs were less than 2.0 mg/L, no TOC removal calculation is required for the Auburn WTP. **Figure 5-14** shows a timeseries plot of raw and treated water TOC at Auburn WTP. There is no specific temporal trend.

Since the Bowman WTP and Auburn WTP share the same distribution system, TTHM and HAA5 data is discussed in the section above for Bowman WTP.

Figure 5-14. Auburn WTP, Total Organic Carbon, 2016-2020



Other Detectable Title 22 Constituents of Interest

As reported in the 2017 CCR, lead was detected in the distribution system in 2016. Out of thirty samples collected, one sample exceeded the lead Action Level of 15 µg/L.

UCMR 4

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from April to July 2019 at the entry point to the distribution system. All sample results were non-detect.

The other 17 required constituents were also monitored quarterly at the entry point to the distribution system from January to October 2020 All sample results were non-detect except manganese which ranged from 7.3 to 28 µg/L.

Three brominated haloacetic acid groups (HAA5, HAA9 and HAA6Br) were monitored in the distribution system from January to October 2020 as shown previously in **Table 5-7.**

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli and Giardia* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Auburn WTP under the SWTR.

PCWA conducted the second round of LT2ESWTR monitoring from October 2015 to September 2017. The highest 12-month mean for *Cryptosporidium* was 0.033 oocysts/L, indicating the source is Bin 1. The highest 12-month mean for *Giardia* was 0.051 cysts/L.

The Auburn WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with 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, the Interim ESWTR, and the LT2ESWTR

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Auburn WTP for all required Title 22 compliance constituents. **Table 5-9** lists the existing drinking water regulations and a compliance evaluation for these standards at the Auburn WTP. The Auburn WTP is currently in compliance with existing regulations.

Foothill 1 Water Treatment Plant

System Description

The raw water intake location for the Foothill 1 WTP is located off PG&E's South Canal near Powerhouse Road. The plant can also be fed from the Boardman Canal at station 903+00 or from the American River during PG&E canal maintenance. Foothill 1 WTP is a ballasted clarification water treatment plant. The plant design flow is 42 mgd, with average flows at about 25.9 mgd.

The influent water is pre-chlorinated and either alum or polyaluminum chloride are used as the primary coagulant. Nonionic polymer is also used as coagulant aid. Powdered activated carbon is used seasonally as needed for tastes and odors. Chemicals are mixed by a mechanical in pipe induction mixer, and a mixing time of about two seconds. The coagulated water then enters a four chamber Actiflo microsand-ballasted separation process consisting of a coagulation, injection, maturation and separation chamber, with a detention time of 15 minutes, and then into contact basins. The clarified water is then filtered through nine dual media gravity filters. The filter loading rate is 100 gpm/sf. Filter aid is used as needed.

Table 5-9
Regulatory Compliance Evaluation
Placer County Water Agency – Auburn WTP

	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 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of source water monitoring for *Cryptosporidium*, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively). One TTHM OEL exceedance occurred in 1st quarter of 2016 at Sunrise Ridge site.

The filters are backwashed at least every three days, sometimes daily. The plant has filter to waste capability after backwash or plant start-up. Washwater and filter to waste flow to separate reclaim settling basins, where the decant is handled by a separate reclaimed pumping system and is returned ahead of coagulation. The filtered water is disinfected with chlorine and stored in a storage system, consisting of one-1 mg and one-10 mg storage basins, to meet CT requirements. The average residual leaving the plant is 0.5 to 0.75 mg/L.

Highlight of Changes Since 2017 Update

A new raw water pipeline from Ophir Road is currently being installed and is scheduled to be complete in October 2021. The raw water will be either the Yuba/Bear River or American River, and provides PCWA with a secondary supply channel from the Ophir Road Pump Station.

Significant Potential Contaminating Activities

The Foothill 1 WTP receives water from PG&E's South Canal, which is fed by the Wise Canal from Rock Creek Reservoir, which is fed with water from the Bear River Canal, Upper

Boardman Canal, and local drainage from Lake Theodore, Lake Arthur, and Halsey Afterbay. Therefore, the source water has all the same vulnerabilities as the Auburn WTP plus additional risk from Interstate 80 and local drainage from the Rock Creek area that includes high-density rural development, commercial, light industrial areas, and a portion of the Auburn Airport.

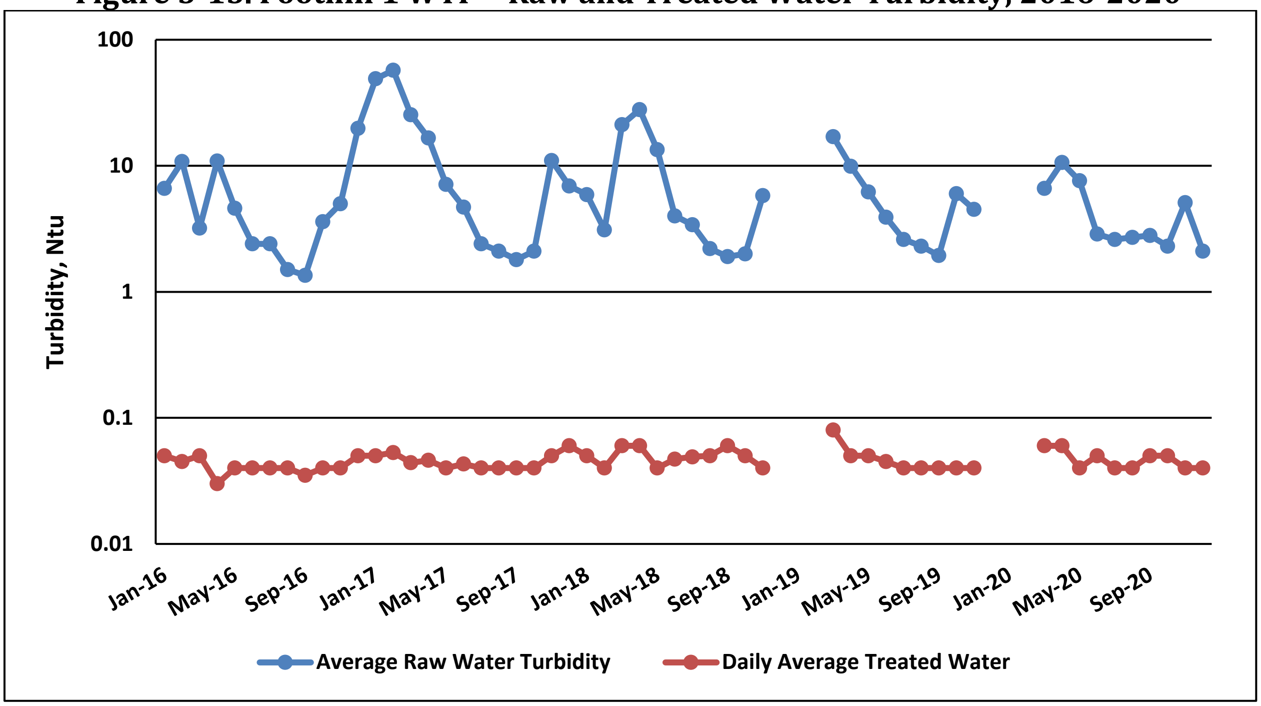
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at the Foothill 1 WTP for the period of study was 6.5 NTU, and on average the treatment process decreased this to 0.03 NTU, which equates to an average removal of solids of 99.6 percent. **Figure 5-15** shows a timeseries plot of raw and treated turbidities. Foothill 1 WTP meets all current turbidity standards. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-15. Foothill 1 WTP – Raw and Treated Water Turbidity, 2016-2020



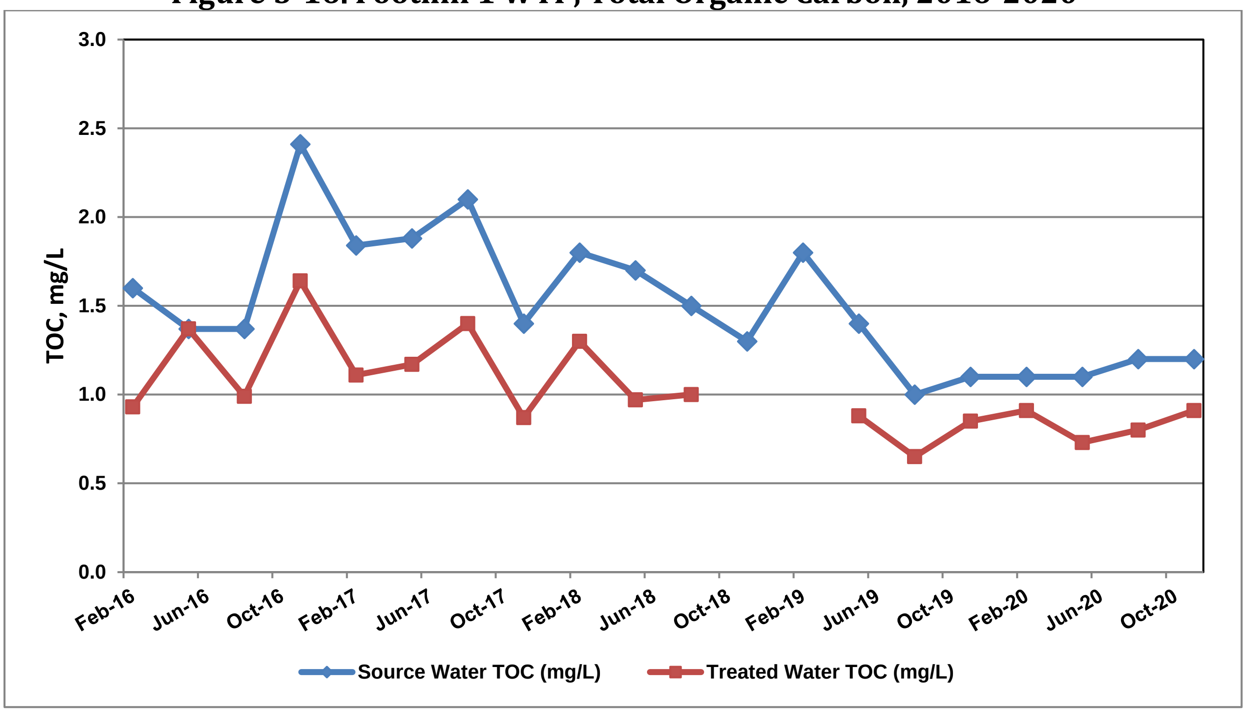
Microbiological Constituent

There was one positive total coliform sample in the distribution system in August 2017. However, this is not in violation of the Total Coliform Rule since it was less than five percent of the total number of samples collected. As stated in the 2018 CCR, there is strong evidence that the positive result was due to cross contamination as a split sample collected at the same time was sent to a second laboratory and was absent of total coliforms. All follow-up samples were also absent of total coliforms.

<u>Disinfection By-Products</u>

PCWA monitors alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Foothill 40 mgd WTP were 1.5 mg/L and 1.0 mg/L, respectively, equating to 31.9 percent average removal. Since the treated water TOC RAAs were less than 2.0 mg/L, no TOC removal calculation is required for the Foothill 40 mgd WTP. **Figure 5-16** shows a timeseries plot of raw and treated water TOC at Foothill 40 mgd WTP. There is no specific temporal trend.

Figure 5-16. Foothill 1 WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

PCWA began monitoring the eight Stage 2 D/DBP monitoring sites in February 2012. The 5903 Sunset site was changed to Woodside Park in October 2019. As the reporting period is from January 2016 to December 2020, the majority of the data is for the 5903 Sunset site. Excluding the Woodside Park data, TTHM LRAAs ranged from 28.8 to 64.8 µg/L and HAA5 LRAAs ranged from 18.8 to 45 µg/L as shown in **Figures 5-17** and **5-18**, respectively. Based on available data over the reporting period, TTHM and HAA5 LRAAs are below the respective MCLs per the Stage 2 D/DBPR.

Figure 5-17. LRAA TTHMs at Foothill Sunset System, Stage 2 D/DBP Data, 2016 – 2020

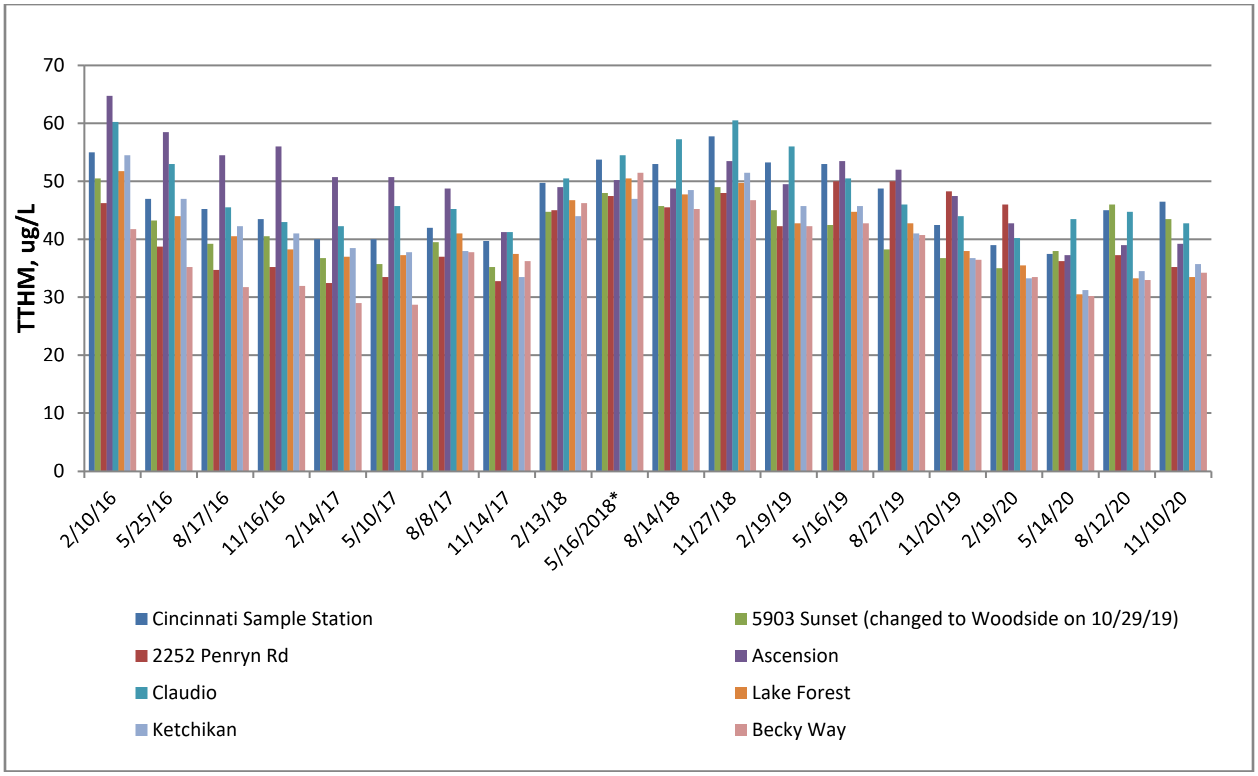
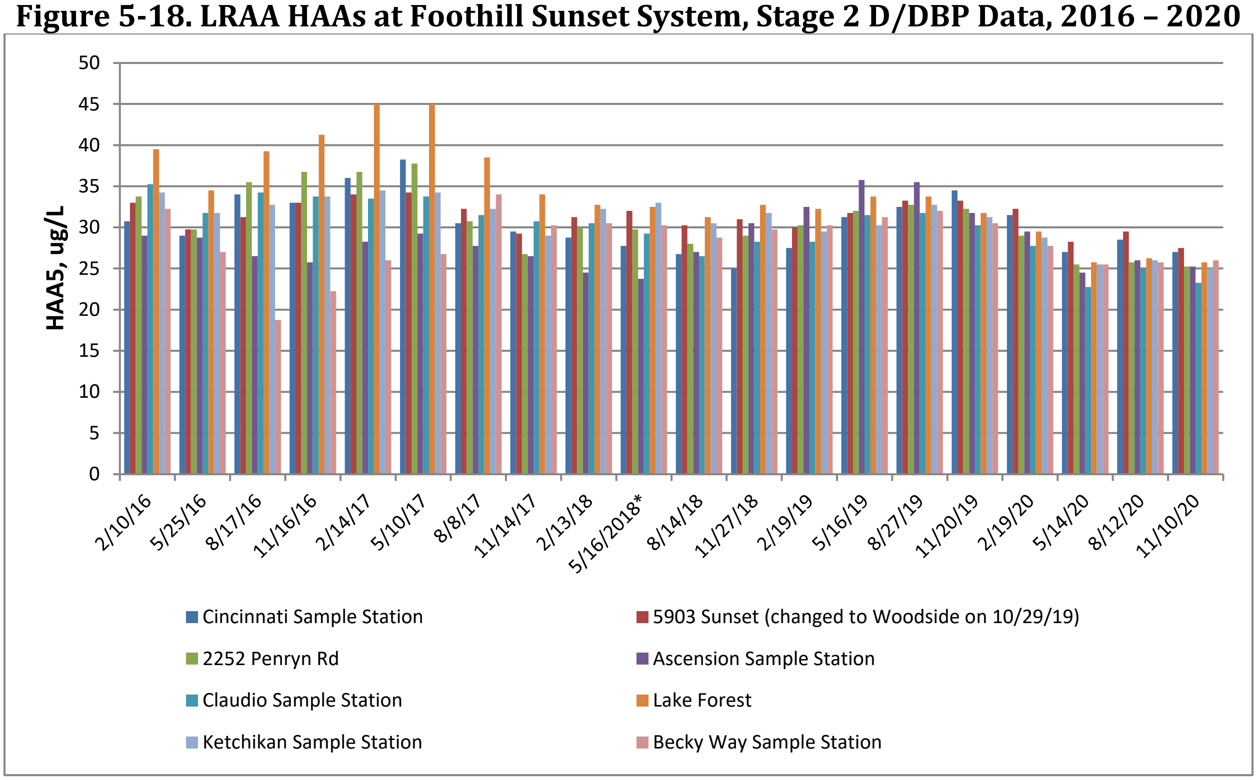


Figure 5-18. LRAA HAAs at Foothill Sunset System, Stage 2 D/DBP Data, 2016 – 2020



Other Detectable Title 22 Constituents of Interest

Based on a review of the 2016 to 2020 CCRs, there are no other detectable Title 22 constituents of interest.

UCMR 4

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from June to September 2020 at the entry point to the distribution system. All sample results were non-detect.

The other 17 required constituents were also monitored quarterly at the entry point to the distribution system from July 2018 to April 2019 All sample results were non-detect except manganese which ranged from ND to 1.2 μg/L.

Three brominated haloacetic acid groups (HAA5, HAA9 and HAA6Br) were monitored in the distribution system from July 2018 to April 2019 as shown in **Table 5-10.**

Table 5-10
Results from UCMR4 Monitoring for Foothill Sunset Distribution System

Site Name	HAA5 Average, μg/L	HAA6Br Average, μg/L	HAA9 Average, μg/L
Sunset	26.3	1.1	27.5
Ketchikan	28.5	1.3	29.8
Cincinnati	26.5	1.1	27.5
Ascension	24.3	1.1	25.3
Becky	26.5	1.2	27.3
Penryn	27.8	1.2	28.5
Claudio	27	1.4	28.3
Lake Forest	28	1.3	29.5

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* and *Giardia* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for Foothill 1WTP under the SWTR.

PCWA conducted the second round of LT2ESWTR monitoring from October 2015 to September 2017. The highest 12-month mean for *Cryptosporidium* was 0 oocysts/L, as no *Cryptosporidium* was detected in all samples, and the source is classified as Bin 1. The highest 12-month mean for *Giardia* was 0.008 cysts/L.

The Foothill 1 WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with 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, the Interim ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Foothill 1 WTP for all required Title 22 compliance constituents. **Table 5-11** lists the existing drinking water regulations and a compliance evaluation for these standards at the Foothill 1 WTP. The Foothill 1 WTP is currently in compliance with existing regulations.

Table 5-11
Regulatory Compliance Evaluation
Placer County Water Agency – Foothill 1 WTP

	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 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Second round of source water monitoring for *Cryptosporidium* completed, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

Foothill 2 Water Treatment Plant

System Description

The raw water intake location for the Foothill 2 WTP is the same as Foothill 1 WTP, located off PG&E's South Canal. The plant can also be fed from the Boardman Canal at station 903+00 or off the American River during South Canal maintenance. Foothill 2 WTP is a conventional water treatment plant. The plant design flow is 18.0 mgd under conventional treatment but is classified as direct filtration, with average flows at 15.1 mgd.

The influent water is pre-chlorinated and either alum or polyaluminum chloride are used as the primary coagulant. Nonionic polymer and powdered activated carbon are also used as coagulant aids. Chemicals are mixed by a mechanical mixer that has two speed settings, and a mixing time of about 15 seconds. The coagulated water then enters a three stage tapered variable speed vertical flocculator, with a detention time of 30 minutes, and then into sedimentation basins with a detention time of 120 minutes. The clarified water is then filtered through four dual media gravity filters. The filter loading rate is 5.9 gpm/sf. Filter aid is used as needed.

The filters are backwashed at least every three days, sometimes daily. The plant has filter to waste capability after backwash or plant start-up. Washwater and filter to waste flow to separate reclaim settling basins, where the decant is handled by a separate reclaimed pumping system and is returned ahead of coagulation. The filtered water is disinfected with chlorine, and stored in 1.0 mg and 10 mg storage basins to meet CT requirements. The average residual leaving the plant is 0.5 to 0.75 mg/L.

Highlight of Changes Since 2017 Update

A new raw water pipeline from Ophir Road is currently being installed and is scheduled to be complete in October 2021. The raw water will be either the Yuba/Bear River or American River, and provides PCWA with a secondary supply channel from the Ophir Road Pump Station.

Significant Potential Contaminating Activities

Please see previous discussion for Foothill 1 WTP.

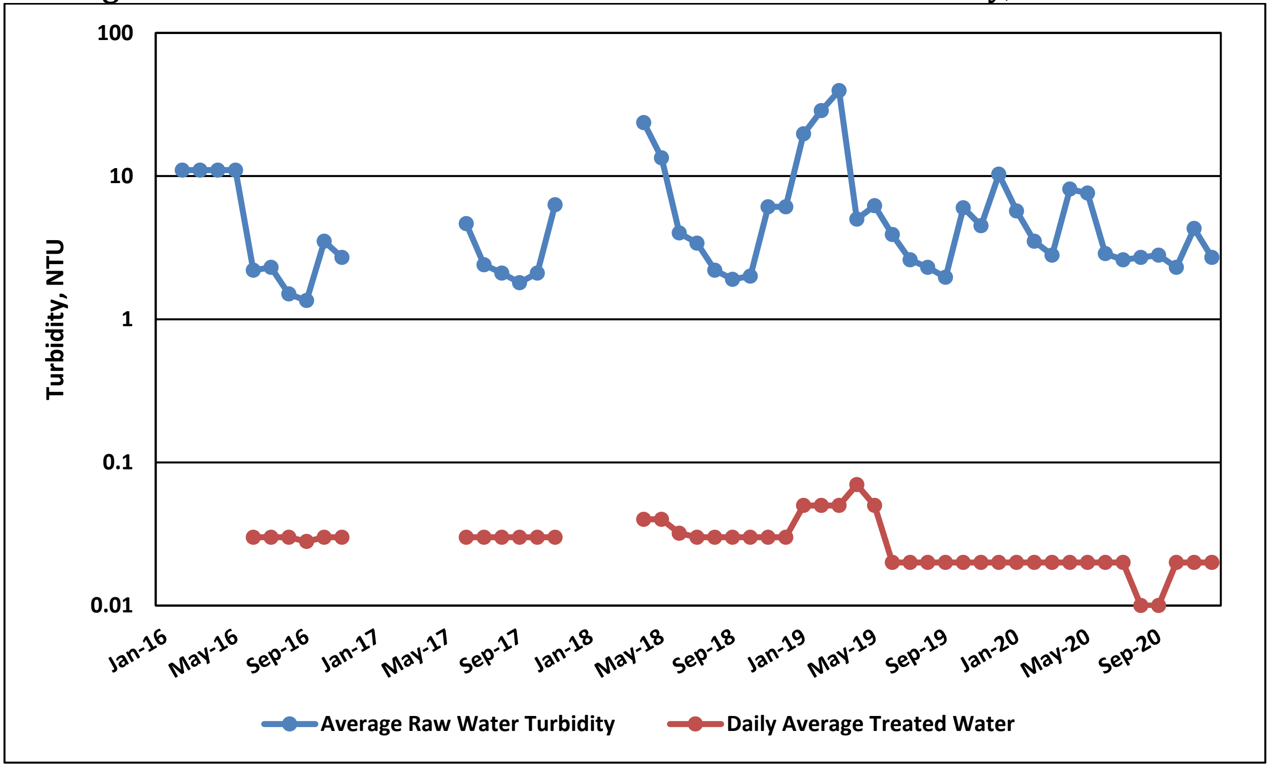
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at the Foothill 2 WTP for the period of study was 8.4 NTU, and on average the treatment process decreased this to 0.05 NTU, which equates to an average removal of solids of 99.4 percent. **Figure 5-19** shows a timeseries plot of raw and treated turbidities. The Foothill 2 WTP meets all current turbidity standards. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-19. Foothill 2 WTP – Raw and Treated Water Turbidity, 2016-2020



Microbiological Constituent

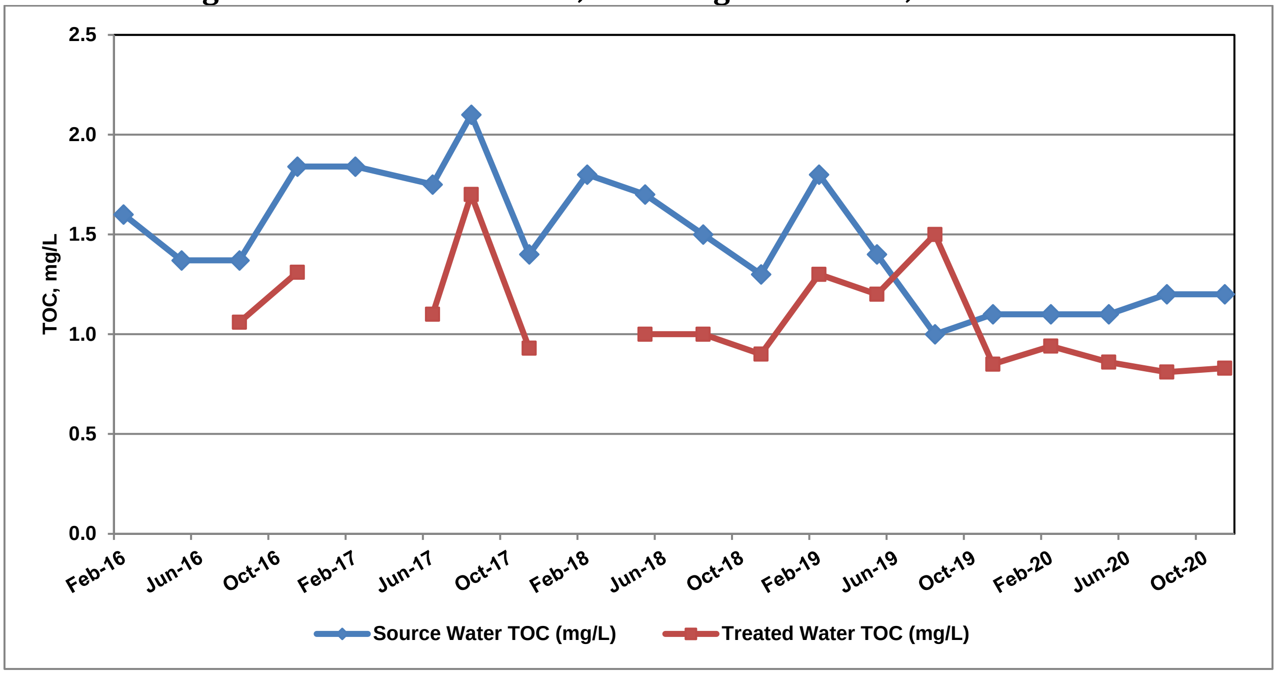
Please see previous discussion for Foothill 1 WTP.

Disinfection By-Products

PCWA monitors alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at the Foothill 2 WTP were 1.47 mg/L and 1.0 mg/L, respectively, equating to 26.6 percent average removal. Since all of the TOC RAAs for both source and treated waters were less than 2.0 mg/L, no TOC removal calculation is required for the Foothill 2 WTP. **Figure 5-20** shows a timeseries plot of raw and treated water TOC at the Foothill 2 WTP. TOC levels in the raw water were always below 2.0 mg/L, except in August 2017. There is no specific temporal trend.

Since the Foothill 2 WTP and the Foothill 1 WTP share the same distribution system, TTHM and HAA5 data is discussed in the discussion above for Foothill 1 WTP.

Figure 5-20. Foothill 2 WTP, Total Organic Carbon, 2016-2020



<u>Other Detectable Title 22 Constituents of Interest</u>

Please see previous discussion above for Foothill 1 WTP.

<u>UCMR 4</u>

Please see previous discussion above for Foothill 1 WTP.

***Giardia/Virus/Cryptosporidium* Reduction Requirements**

Based on the *E. coli* and *Giardia* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Foothill 2 WTP under the SWTR.

PCWA conducted the second round of LT2ESWTR monitoring from October 2015 to September 2017. The highest 12-month mean for *Cryptosporidium* was 0 oocysts/L, as no *Cryptosporidium* was detected in all samples, and the source is classified as Bin 1. The highest 12-month mean for *Giardia* was 0.008 cysts/L.

The Foothill 2 WTP is classified as a conventional filtration WTP for flows up to 15 mgd, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. For flows over 15 mgd, and up to 18.26 mgd, the Foothill 2 WTP is classified as a direct filtration WTP and receives reduction credit for 2.0-log *Giardia,* 1.0-log viruses, and 2-log *Cryptosporidium*. Disinfection with chlorine in conventional mode provides 0.5-log credit for *Giardia* and 2.0-log credit for viruses, and in direct mode provides 1.0-log credit for *Giardia* and 3.0-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR, the Interim ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Foothill 2 WTP for all required Title 22 compliance constituents. **Table 5-12** lists the existing drinking water regulations and a compliance evaluation for these standards at the Foothill 2 WTP. The Foothill 2 WTP is currently in compliance with existing regulations.

Table 5-12
Regulatory Compliance Evaluation
Placer County Water Agency – Foothill 2 WTP

	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 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in raw and treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of source water monitoring for *Cryptosporidium*, which classified ashbin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

Sunset Water Treatment Plant

System Description

The raw water intake location for the Sunset WTP is located within Whitney Reservoir. The source of supply is the Caperton Canal, which is fed by PG&Es South Canal. Sunset WTP is a conventional water treatment plant. The plant design flow is 8.0 mgd, with average flows at 4.32 mgd.

The influent water is pre-oxidized with sodium hypochlorite, and alum and nonionic polymer are the primary coagulant and coagulant aid, respectively. Chemicals are mixed by a static mixer and a "blender" type-mixing blade. The coagulated water enters two single staged paddle wheel flocculation basins, with a detention time of 25 minutes and then into two sedimentation basins with a detention time of 160 minutes at five mgd. The clarified water is then filtered through two dual media gravity filters. The filter loading rate is 2.9 gpm/sf. Non-ionic polymer is used as a filter aid as needed.

The filters are backwashed based on an as needed basis, but production is usually limited to 24 hours. The plant has filter to waste capability after backwash or plant start-up. Washwater and filter to waste flow to a reclaim settling basin, where the decant is returned ahead of coagulation. The filtered water is disinfected with sodium hypochlorite and stored in a 2.5 mg tank to meet CT requirements. The average residual leaving the plant is 1.0 to 3.0 mg/L.

Highlight of Changes Since 2017 Update

No changes were made to the water treatment processes during the reporting period. As discussed in **Section 3**, the Caperton Reservoir Improvement Project was completed in September 2020, and the project involved replacing the Caperton Reservoir with 460 feet of 36-inch diameter pipe. This project was completed by PCWA's Field Services Department.

Additionally, Phase 1 construction of the Bickford Ranch Community Facility District is currently underway. Phase 1 work will consist of encasing approximately 2,900 linear feet of the existing Caperton Canal (from approximately Clark Tunnel Road to Woodsdale Court) into a 42-inch raw water pipeline. This work is expected to be completed in fall 2021.

Significant Potential Contaminating Activities

The Sunset WTP receives water from the Caperton Canal, which is fed by PG&E's South Canal, which is fed by the Wise Canal from Rock Creek Reservoir, which is fed with water from the Bear River Canal, Upper Boardman Canal, and local drainage from Lake Theodore, Lake Arthur, and Halsey Afterbay. The supply is vulnerable to all the same activities as the Foothill WTP, plus residential and grazing activities along the Caperton Canal.

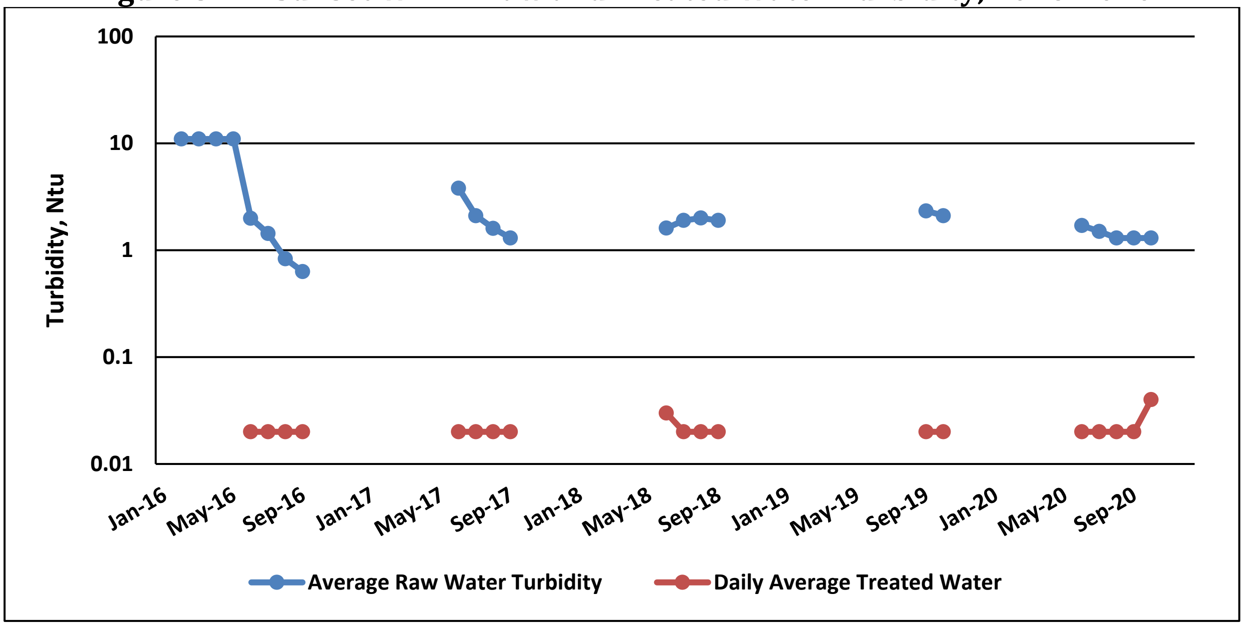
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

<u>Turbidity</u>

The average raw water turbidity at Sunset WTP for the period of study was 3.3 NTU, and on average the treatment process decreased this to 0.02 NTU, which equates to an average removal of solids of 99.4 percent. **Figure 5-21** shows a timeseries plot of raw and treated turbidities. Sunset WTP meets all current turbidity standards. It should be noted that the raw water turbidities plotted are a monthly average of daily grab samples. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-21. Sunset WTP – Raw and Treated Water Turbidity, 2016-2020



Microbiological Constituent

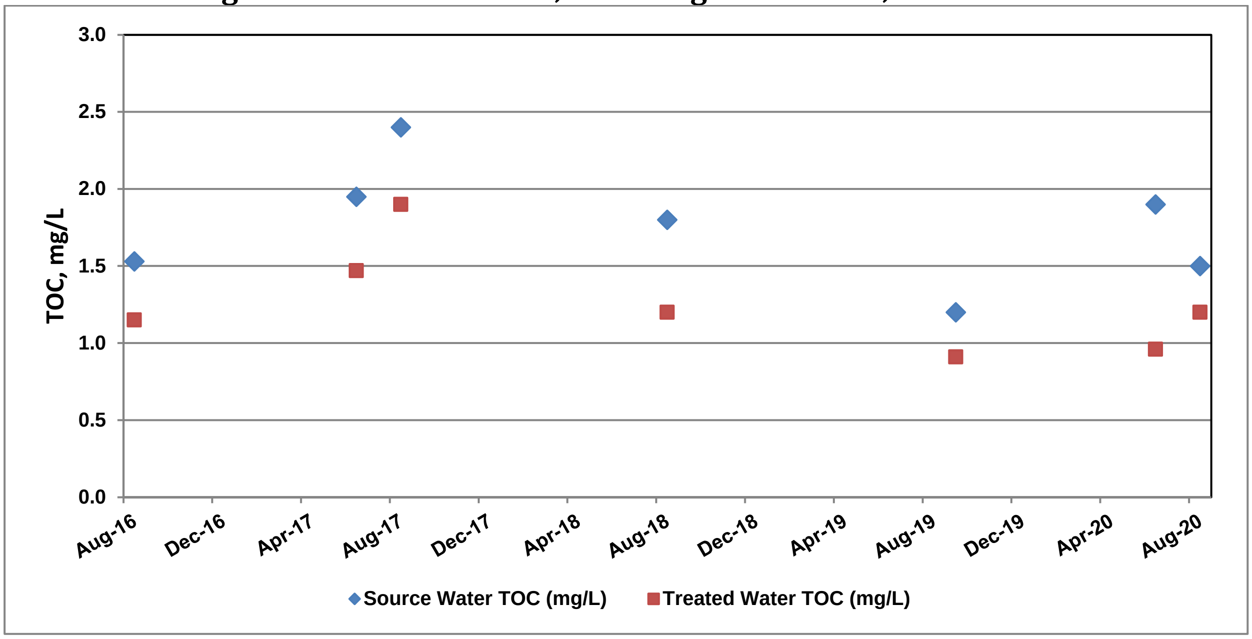
Please see previous discussion for Foothill 1 WTP.

Disinfection By-Products

PCWA monitors alkalinity and TOC levels in its raw water quarterly and TOC levels in its treated water quarterly (when operational) in order to determine TOC removal compliance. The average raw and treated water TOC levels at Sunset WTP were 1.8 mg/L and 1.3 mg/L, respectively, equating to 28.4 percent average removal. Since all of the treated water TOC RAAs were less than 2.0 mg/L, no TOC removal calculation is required for the Sunset WTP. **Figure 5-22** shows a timeseries plot of raw and treated water TOC at Sunset WTP. There is no specific temporal trend.

Since the Foothill WTP and Sunset WTP share the same distribution system, TTHM and HAA5 data is discussed above for Foothill WTP.

Figure 5-22. Sunset WTP, Total Organic Carbon, 2016-2020



<u>Other Detectable Title 22 Constituents of Interest</u>

Based on a review of the 2016 to 2020 CCRs, there are no other detectable Title 22 constituents of interest.

<u>UCMR 4</u>

Please see previous discussion above for Foothill 1 WTP. It is important to note that the Sunset WTP was only operating during one quarter in July 2018 when samples were collected from July 2018 to April 2019. Manganese was 2.3 µg/L during this quarter.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* and *Giardia* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for Sunset WTP under the SWTR.

PCWA conducted the second round of LT2ESWTR monitoring from October 2015 to September 2017. The highest 12-month mean for *Cryptosporidium* was 0.058 oocysts/L, indicating the source is classified as Bin 1. The highest 12-month mean for *Giardia* was 0.008 cysts/L.

The Sunset WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with sodium hypochlorite 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, the Interim ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

PCWA has been monitoring the raw and treated water for the Sunset WTP for all required Title 22 compliance constituents. **Table 5-13** lists the existing drinking water regulations and a compliance evaluation for these standards at the Sunset WTP. The Sunset WTP is currently in compliance with existing regulations.

Table 5-13
Regulatory Compliance Evaluation
Placer County Water Agency – Sunset WTP

	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 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of source water monitoring for *Cryptosporidium*, which is classified as Bin1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

NEVADA IRRIGATION DISTRICT WATER TREATMENT PLANTS

Elizabeth George Water Treatment Plant

System Description

The raw water intake location for the Elizabeth George WTP is diverted off of Deer Creek, via the Banner Cascade Pipeline. Elizabeth George is a conventional water treatment plant, and the plant design flow is 18 mgd, with average flows at 4 mgd.

The influent water is pre-oxidized with sodium hypochlorite, alum is used as the primary coagulant, and caustic is used for pH adjustment. Chemicals are mixed with an adjustable mechanical flash mixer. The coagulated water goes to a horizontal paddle flocculation basin with a detention time of 20 minutes, and then to a sedimentation basin with a detention time of 52 minutes. The clarified water is then filtered through two cluster-type (4 cells each) dual media gravity filter. The filter loading rate is 6.0 gpm/sf.

The filters are backwashed based on time, pressure differential, or turbidity. Backwash water is sent to new backwash water settling and reclamation basins with sludge removal systems and after settling, the decant is now returned to the plant headworks. The plant has filter to waste capability for normally 10 minutes after backwash. The filtered water is disinfected with sodium hypochlorite and stored to meet CT requirements. The average residual leaving the plant is 0.5 mg/L.

Highlight of Changes Since 2017 Update

In September 2018, the WTP switched from feeding calcium hydroxide (lime) to feeding 25 percent liquid sodium hydroxide (caustic).

Significant Potential Contaminating Activities

Since completion of the Banner Cascade Pipeline, which begins at the Deer Creek diversion, there have been reductions in the risks of potential contaminating activities to the water treatment plant. Similar to PCWA's Alta WTP, in the upper watershed above Lake Spaulding recreational use is heavy as well as timber harvesting, limited grazing, and seasonal discharge from the Donner Summit Public Utilities District Wastewater Treatment Plant (WWTP). Just upstream of the Deer Creek diversion is a PG&E powerhouse.

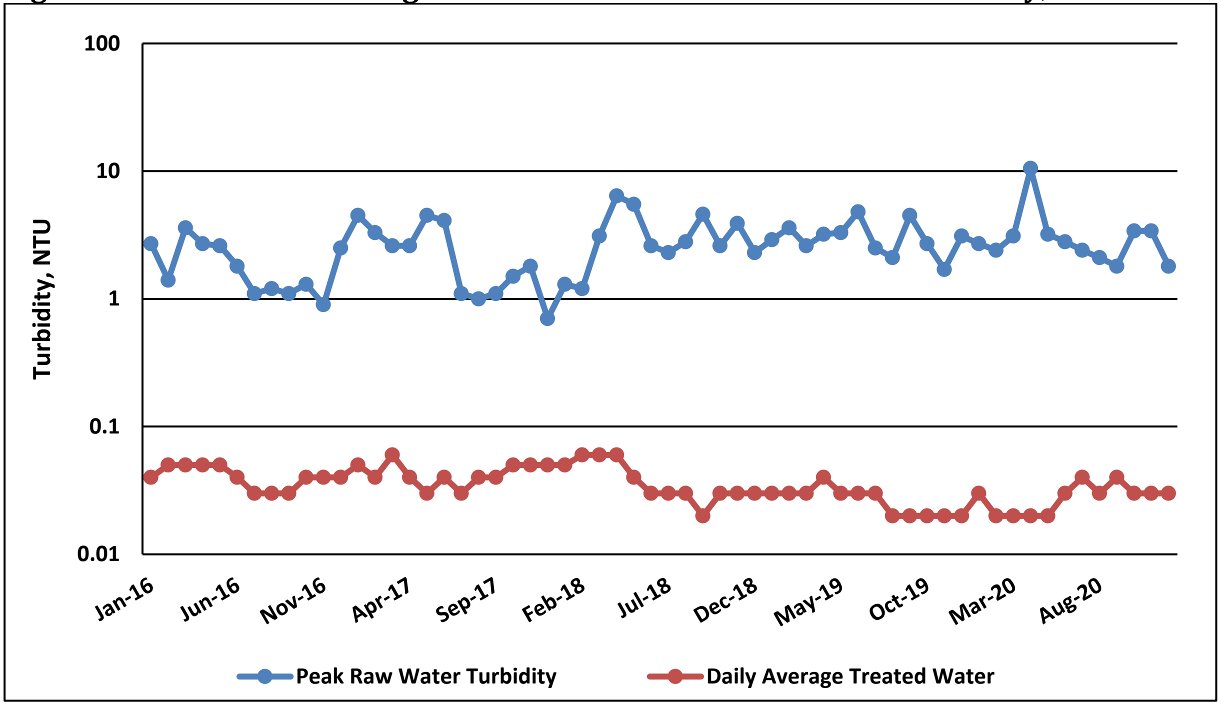
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

<u>Turbidity</u>

The average raw water turbidity at Elizabeth George WTP for the period of study was 2.8 NTU, and on average the treatment process decreased this to 0.04 NTU, which equates to an average removal of solids of 98.7 percent. **Figure 5-23** shows a timeseries plot of raw and treated water turbidities. Elizabeth George WTP meets all current turbidity standards. It should be noted that the raw water turbidity is the maximum peak daily, provided as a monthly average. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-23. Elizabeth George WTP – Raw and Treated Water Turbidity, 2016-2020



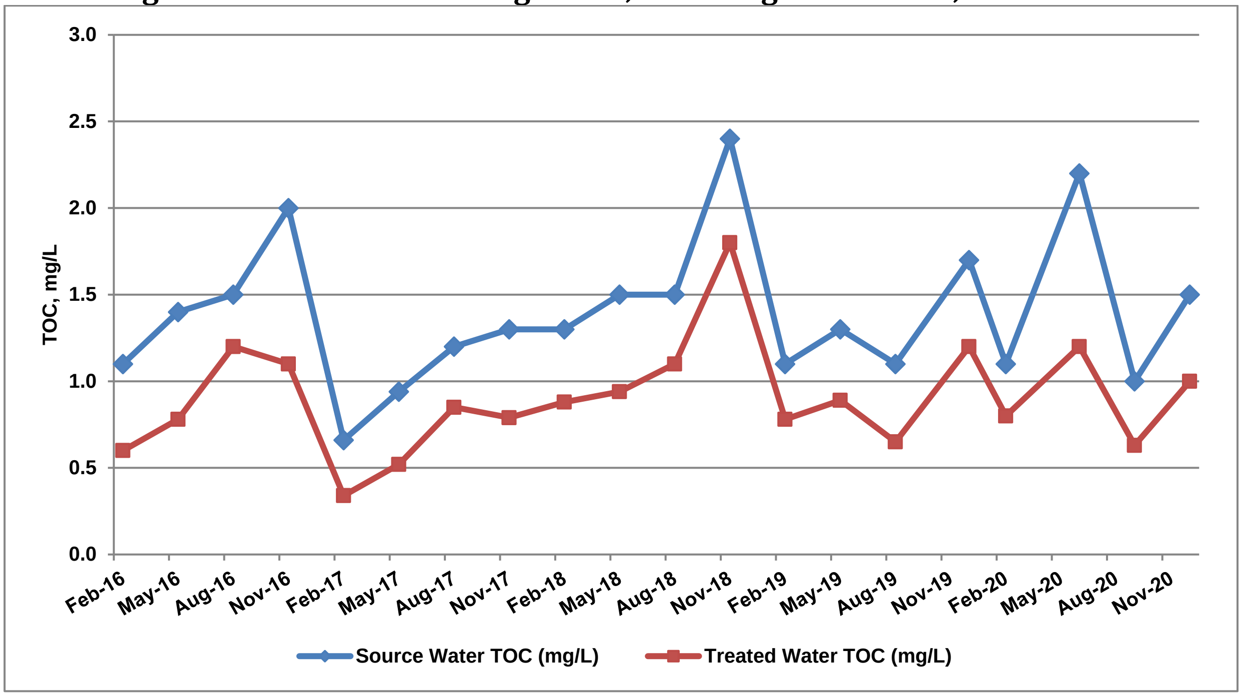
Microbiological Constituent

There were no positive coliform samples in the distribution system during the period of study.

Disinfection By-Products

NID monitors for alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Elizabeth George WTP were 1.4 mg/L and 0.9 mg/L, respectively, equating to 35 percent average removal. Since all of the TOC RAAs for both source and treated waters were less than 2.0 mg/L, no TOC removal calculation is required for the Elizabeth George WTP. **Figure 5-24** shows a timeseries plot of raw and treated water TOC at Elizabeth George WTP. TOC levels in the raw water were always at or below 2.0 mg/L, except in November 2018 and June 2020. The highest peaks generally occurred during wet weather months.

Figure 5-24. Elizabeth George WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

NID converted to four Stage 2 D/DBP Rule monitoring sites for the Elizabeth George distribution system in January 2011. TTHM LRAAs ranged from 22 to 59.3 µg/L and HAA5 LRAAs ranged from 11.4 to 47 µg/L. Based on data over the reporting period, TTHM and HAA5 LRAAs were below the respective MCLs per the Stage 2 D/DBPR.

<u>Other Detectable Title 22 Constituents of Interest</u>

Hexavalent chromium was detected at 0.065 µg/L in 2016 and 0.09 µg/L in 2017, above the PHG of 0.02 µg/L. Currently, there is no drinking water standard for hexavalent chromium. Iron was detected at 0.14 mg/L in 2018, below the secondary MCL of 0.3 mg/L, and aluminum was detected at 79 µg/L, below the secondary MCL of 200 µg/L.

<u>UCMR 4</u>

Biweekly monitoring for anatoxin-a, cylindrospermopsin, and total microcystin was conducted from June to September 2019 at the entry point to the distribution system. All sample results were non-detect.

The other 17 required constituents were also monitored quarterly at the entry point to the distribution system from February to October 2019 All sample results were non-detect except manganese which ranged from 0.75 to 4.6 µg/L.

Three brominated haloacetic acid groups (HAA5, HAA9, and HAA6Br) were monitored in the distribution system from February to October 2019 as shown in **Table 5-14.**

Table 5-14
Results from UCMR4 Monitoring for Elizabeth George Distribution System

Site Name	HAA5 Average, µg/L	HAA6Br Average, µg/L	HAA9 Average, µg/L
Hidden Valley PRV	14.7	0.2	15.1
100 Willow Valley	16.0	0.2	16.2
Country Lane and Indian Flat Rd.	13.3	0.1	13.3
217 Upper Slate Creek Rd.	16.7	0.2	16.9

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Elizabeth George WTP under the SWTR.

NID conducted the second round of LT2ESWTR monitoring from October 2016 to September 2018. The highest 12-month mean for *Cryptosporidium* was 0.008 oocysts/L, indicating the source is classified as Bin 1. The highest 12-month mean for *Giardia* was 0.023 cysts/L.

The Elizabeth George WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with 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, the Interim ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

NID has been monitoring the raw and treated water for the Elizabeth George WTP for all required Title 22 compliance constituents. **Table 5-15** lists the existing drinking water regulations and a compliance evaluation for these standards at the Elizabeth George WTP. The Elizabeth George WTP is currently in compliance with existing regulations.

Table 5-15
Regulatory Compliance Evaluation
Nevada Irrigation District – Elizabeth George WTP

	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 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in raw and treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of *Cryptosporidium* monitoring, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

Loma Rica Water Treatment Plant

System Description

The raw water for the Loma Rica WTP is diverted off of Deer Creek, via the Banner Cascade Pipeline. Loma Rica WTP is a conventional water treatment plant, and the plant design flow is 8.3 mgd, with average flows at 3 mgd.

The influent water is pre-oxidized with sodium hypochlorite, alum is used as the primary coagulant, and caustic is used for pH adjustment. Chemicals are mixed with an inline mechanical flash mixer. The coagulated water then goes to a serpentine basin where both flocculation and sedimentation occur. The flocculation type is horizontal paddle, with a detention time of 30 minutes. Sedimentation detention time is 4.5 hours at 6.4 mgd. The clarified water is then filtered through four dual media pressure filters. The filter loading rate is six gpm/sf.

The filters are backwashed based on time, pressure differential, or turbidity. Backwash water is sent to sedimentation ponds for two hours and is then recycled back to the headworks, no greater than 10 percent of the plant influent flow. The plant has filter to waste capability after backwash. The filtered water is disinfected with sodium hypochlorite and stored in a clearwell to meet CT requirements. The average residual leaving the plant is 0.5 mg/L.

Highlight of Changes Since 2017 Update

In June 2017, the WTP switched from feeding calcium hydroxide (lime) to feeding 25 percent liquid sodium hydroxide (caustic).

Significant Potential Contaminating Activities

Since completion of the Banner Cascade Pipeline, which begins at the Deer Creek diversion, there have been reductions in the risks of potential contaminating activities to the plant. Similar to PCWA's Alta WTP, in the upper watershed above Lake Spaulding recreational use is heavy as well as timber harvesting, limited grazing, and seasonal discharge from the Donner Summit Public Utilities District Wastewater Treatment Plant (WWTP). Just upstream of the Deer Creek diversion is a PG&E powerhouse.

Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

<u>Turbidity</u>

The average raw water turbidity at Loma Rica WTP for the period of study was 2.7 NTU, and on average the treatment process decreased this to 0.04 NTU, which equates to an average removal of solids of 98.7 percent. **Figure 5-25** shows a timeseries plot of raw and treated turbidities. Loma Rica WTP meets all current turbidity standards. It should be noted that the raw water turbidity is the maximum peak daily, provided as a monthly average. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

<u>Microbiological Constituent</u>

There were no positive coliform samples in the distribution system during the study period.

<u>Disinfection By-Products</u>

NID monitors for alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Loma Rica WTP were 1.4 mg/L and 1.0 mg/L, respectively, equating to 26 percent average removal. Since all of the TOC RAAs for both source and treated waters were less than 2.0 mg/L, no TOC removal calculation is required for the Loma Rica WTP. **Figure 5-26** shows a timeseries plot of raw and treated water TOC at Loma Rica WTP. TOC levels in the raw water were at or below 2.0 mg/L except for one sample in November 2018.

Similar to Elizabeth George WTP, peak concentrations generally occur during wet weather months.

Figure 5-25. Loma Rica WTP – Raw and Treated Water Turbidity, 2016-2020

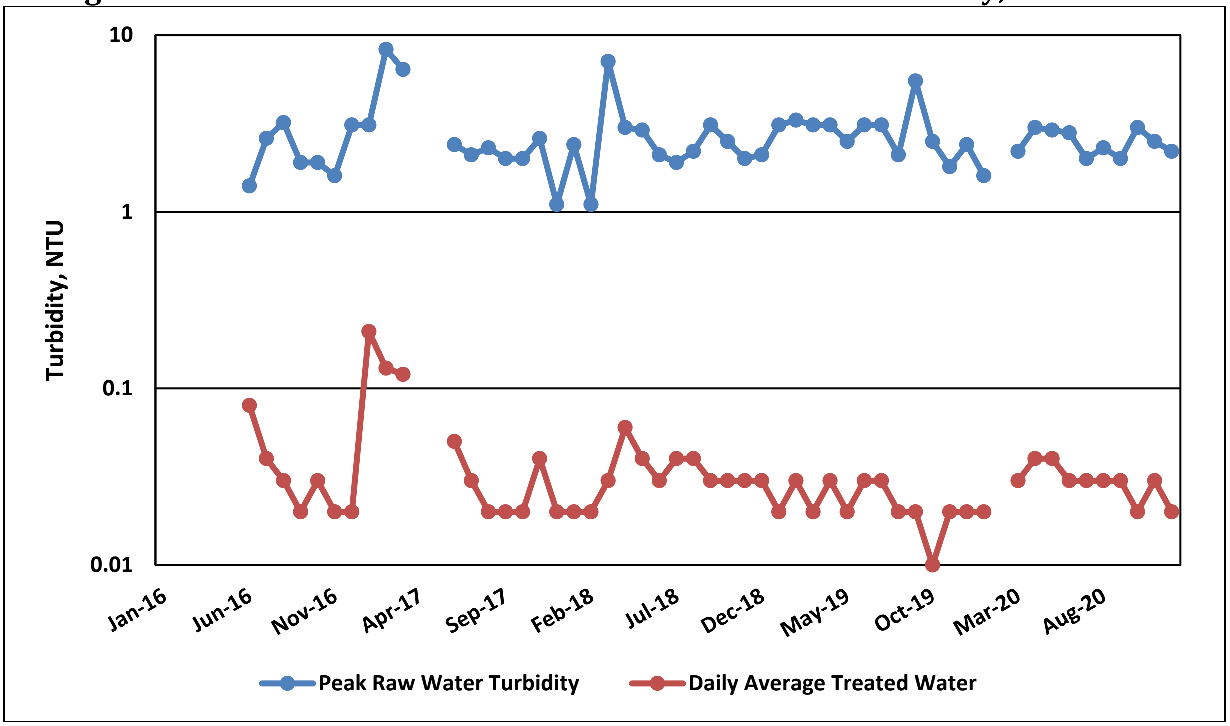
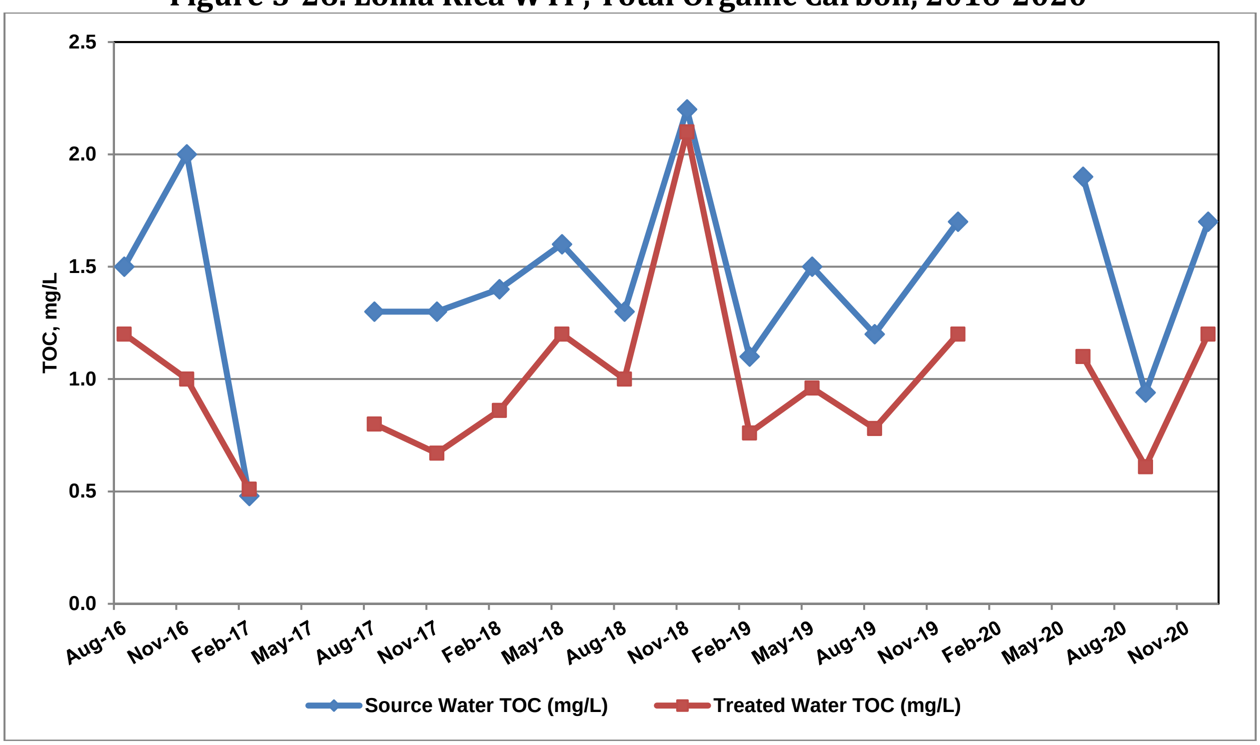


Figure 5-26. Loma Rica WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

NID converted to four Stage 2 D/DBP Rule monitoring sites for the Loma Rica distribution system in March 2011. TTHM LRAAs ranged from 27 to 59.5 μg/L and HAA5 LRAAs ranged from 19 to 39 μg/L. Based on data over the reporting period, TTHM and HAA5 LRAAs were below the respective MCLs per the Stage 2 D/DBPR.

Other Detectable Title 22 Constituents of Interest

Hexavalent chromium was detected at 0.054 μg/L in 2016, above the PHG of 0.02 μg/L. Currently, there is no drinking water standard for hexavalent chromium. Aluminum was detected at 67 μg/L in 2020, below the secondary MCL of 200 μg/L.

Copper was detected in the distribution system in 2017. However, the copper 90th percentile of 0.11 mg/L was well below the Action Level of 1.3 mg/L. Thirty samples were collected in 2017.

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 other 17 required constituents were also monitored quarterly at the entry point to the distribution system from January to October 2018 All sample results were ND, except manganese which ranged from 1.2 to 18 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 5-16.**

Table 5-16
Results from UCMR4 Monitoring for Loma Rica Distribution System

Site Name	HAA5 Average, μg/L	HAA6Br Average, μg/L	HAA9 Average, μg/L
Annie Dr.	20.8	0.3	21.2
Alta Sierra Reservoir	26.3	0.4	26.2
17473 Colfax Hwy.	23	0.3	23.2
10495 Oak Dr.	23.5	0.3	23.7

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Loma Rica WTP under the SWTR.

NID conducted the second round of LT2ESWTR monitoring from October 2016 to September 2018. The highest 12-month mean for *Cryptosporidium* was 0 oocysts/L, indicating the source is classified as Bin 1. The highest 12-month mean for *Giardia* was 0.0155 cysts/L.

The Loma Rica WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with 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, the Interim ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

NID has been monitoring the raw and treated water for the Loma Rica WTP for all required Title 22 compliance constituents. **Table 5-17** lists the existing drinking water regulations and a compliance evaluation for these standards at the Loma Rica WTP. The Loma Rica WTP is currently in compliance with existing regulations.

Table 5-17
Regulatory Compliance Evaluation
Nevada Irrigation District – Loma Rica WTP

	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 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in raw and treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of *Cryptosporidium* monitoring, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

Lake of the Pines Water Treatment Plant

System Description

The raw water intake location for the Lake of the Pines WTP is located within the terminal reservoir onsite. The source of supply is pumped from Lake Combie via the Magnolia III Canal. Lake of the Pines WTP is a conventional water treatment plant, and the plant design flow is 5 mgd, with average flows at 1.3 mgd.

The influent water is pre-oxidized with sodium hypochlorite, alum is used as the primary coagulant, and caustic is used for pH adjustment. Chemicals are mixed with an adjustable mechanical flash mixer. The coagulated water then goes to a Pulsator Upflow Clarifier where both flocculation and sedimentation occur. The sedimentation detention time is 46 minutes. The clarified water is then filtered through two tri-media gravity filters. The filter loading rate is six gpm/sf.

The filters are backwashed based on time, pressure differential, or turbidity. Backwash water is sent to a settling tank. After settling, the decant water is reclaimed back to the plant's raw water reservoir. The plant has filter to waste capability after backwash, normally for five to seven minutes. Filter to waste water is sent to a separate holding tank where it is then pumped back to the headworks. The filtered water is disinfected with sodium hypochlorite and stored in a clearwell to meet CT requirements. The average residual leaving the plant is 0.5 mg/L.

Highlight of Changes Since 2017 Update

In January 2020, the WTP switched from feeding calcium hydroxide (lime) to feeding 25 percent liquid sodium hydroxide (caustic). Also, the Magnolia III Canal from Robles to Baldwin Ranch was encased in pipe.

Significant Potential Contaminating Activities

The Lake of the Pines WTP uses water diverted from Lake Combie, which is located on the Bear River downstream of Rollins Reservoir. Rollins Reservoir is subject to recreation, timber harvesting, mining, as well as a wastewater discharge from the Cascade Shores WWTP. The Bear River between Rollins and Combie is also a summer season recreational area. The Bear River passes under Highway 174 as well as Dog Bar Road, which could have the potential for spills. Lake Combie has low-density residential development around the lake which includes some private docks. The Magnolia III Canal between Lake Combie and the water treatment plant previously passed through some areas with cattle grazing but is now completely encased. Encasement was completed in two phases; Phase 1 from Baldwin Ranch to Alexis Drive was completed in November 2013 and Phase 2 –from Robles Drive to Baldwin Ranch was completed in 2017/2018 (two outages).

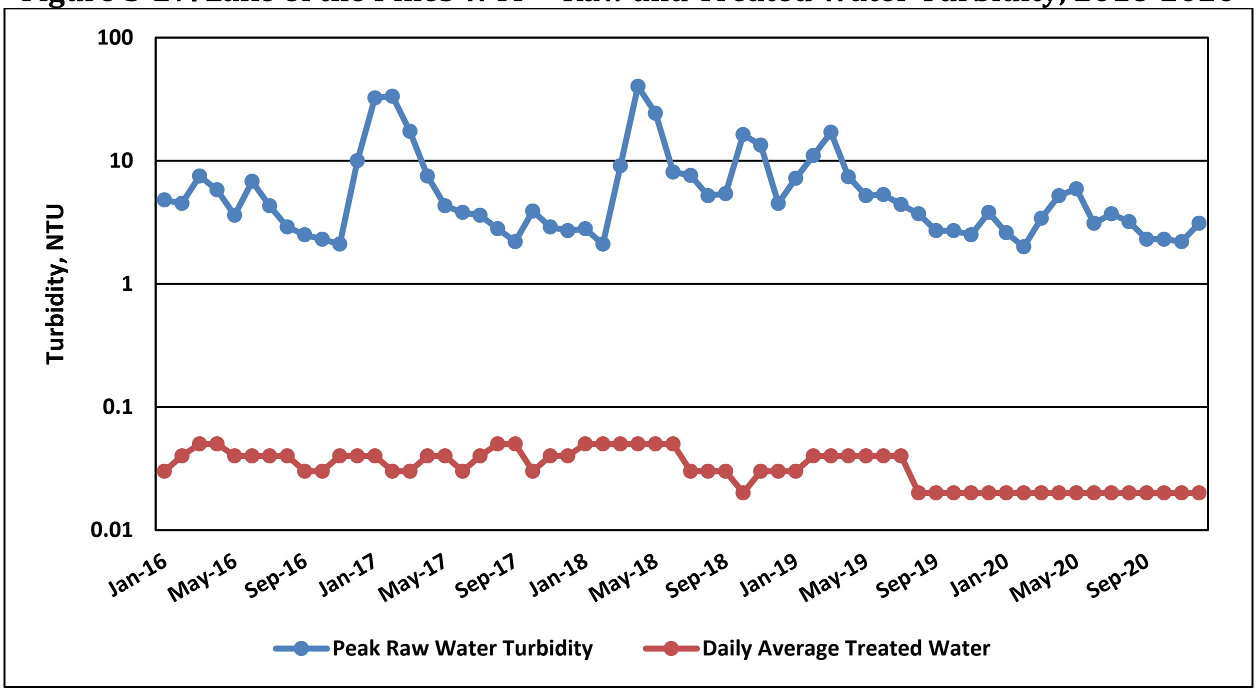
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at Lake of the Pines WTP for the period of study was 7.1 NTU, and on average the treatment process decreased this to 0.03 NTU, which equates to an average removal of solids of 99.5 percent. **Figure 5-27** shows a timeseries plot of raw and treated turbidities. Lake of the Pines WTP meets all current turbidity standards. It should be noted that the raw water turbidity is the maximum peak daily, provided as a monthly average. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-27. Lake of the Pines WTP – Raw and Treated Water Turbidity, 2016-2020



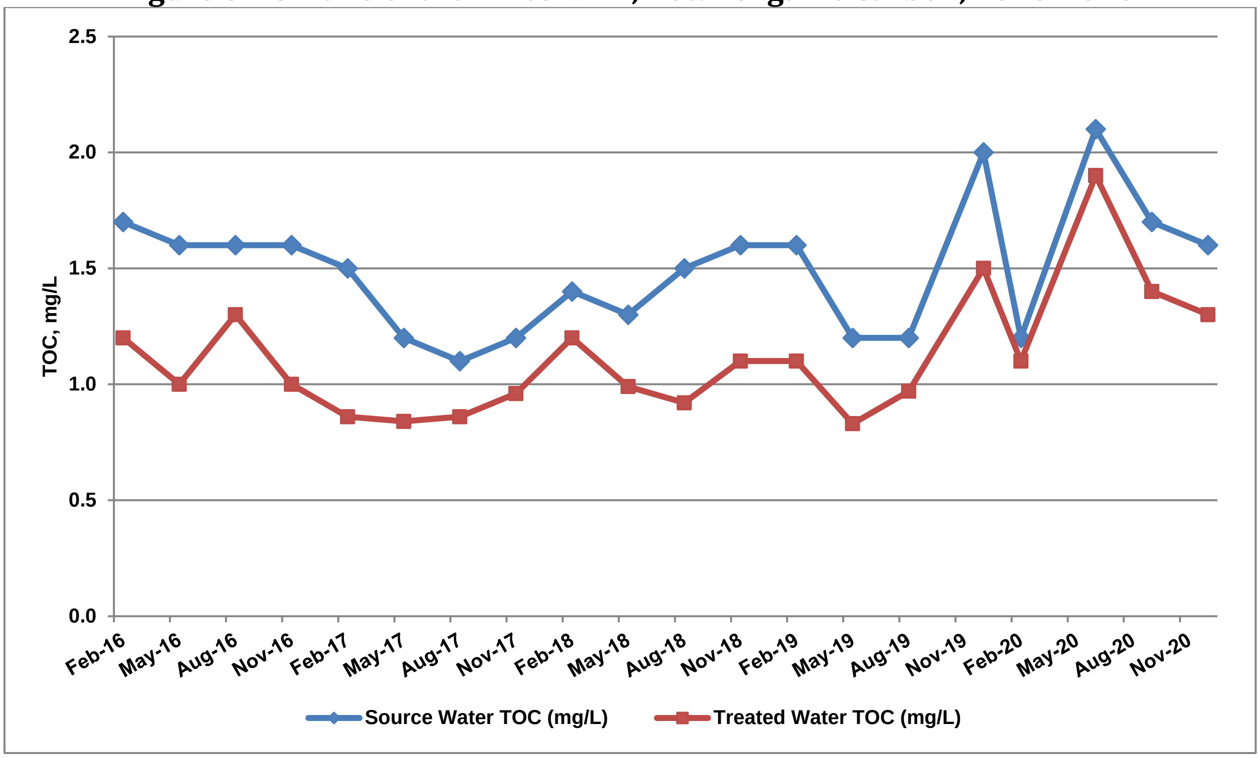
Microbiological Constituent

There were no positive coliform samples in the distribution system during the study period.

Disinfection By-Products

NID monitors for alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Lake of the Pines WTP were 1.5 mg/L and 1.1 mg/L, respectively, equating to 25.3 percent average removal. Since all of the TOC RAAs for both source and treated waters were less than 2.0 mg/L, no TOC removal calculation is required for the Lake of the Pines WTP. **Figure 5-28** shows a timeseries plot of raw and treated water TOC at Lake of the Pines WTP. TOC levels in the raw water are generally at or below 2.0 mg/L, except for one sample in June 2020. Generally, TOC levels peak during the wet weather months.

Figure 5-28. Lake of the Pines WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

NID converted to two Stage 2 D/DBP Rule monitoring sites in February 2013. TTHM LRAAs ranged from 37.3 to 58.5 µg/L and HAA5 LRAAs ranged from 20.5 to 31.5 µg/L. Based on data over the reporting period, TTHM and HAA5 LRAAs were below the respective MCLs per the Stage 2 D/DBPR.

<u>Other Detectable Title 22 Constituents of Interest</u>

Hexavalent chromium was detected at 0.050 µg/L in 2016, and 0.12 µg/L in 2017, above the PHG of 0.02 µg/L. Currently, there is no drinking water standard for hexavalent chromium. Aluminum was detected at 130 µg/L in 2019 and at 75 µg/L in 2020, below the secondary MCL of 200 µg/L.

Copper was detected in the distribution system in 2018. However, the copper 90th percentile of 0.071 mg/L was well below the Action Level of 1.3 mg/L. Twenty samples were collected in 2018.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Lake of the Pines WTP under the SWTR.

NID conducted the second round of LT2ESWTR monitoring from October 2017 to September 2019. The highest 12-month mean for *Cryptosporidium* was 0.0078 oocysts/L, indicating the source is classified as Bin 1. The highest 12-month mean for *Giardia* was 0.0388 cysts/L.

The Lake of the Pines WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with 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, the Long Term 1 ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

NID has been monitoring the raw and treated water for the Lake of the Pines WTP for all required Title 22 compliance constituents. **Table 5-18** lists the existing drinking water regulations and a compliance evaluation for these standards at the Lake of the Pines WTP. The Lake of the Pines WTP is currently in compliance with existing regulations.

Lake Wildwood Water Treatment Plant

System Description

The raw water intake location for Lake Wildwood WTP is located on the Newtown Canal, whose source of supply is Deer Creek. Lake Wildwood WTP is a conventional water treatment plant, and the plant design flow is 4 mgd, with average flows at 1.5 mgd.

The influent water is pre-chlorinated with sodium hypochlorite, alum is used as the primary coagulant, and lime is used for pH adjustment. Chemicals are mixed with a mechanical mixer on clarifier A while clarifier B utilizes a static inline mixer. The coagulated water then goes to two circular upflow (steel) clarifiers where both flocculation and sedimentation occur. The sedimentation detention time is 2.3 hours. The clarified water is then filtered through four dual media gravity filters. The filter loading rate is six gpm/sf.

The filters are backwashed based on time, and then pressure differential or turbidity. Each filter is backwashed at least every five days. Backwash water is sent to a reclaim pond, and after settling, the decant water is reclaimed back to the plant's raw water reservoir. The plant has filter to waste capability after backwash, normally for three to five minutes. The filtered water is disinfected with sodium hypochlorite and stored in a clearwell and storage tanks to meet CT requirements. The average residual leaving the plant is 0.6 mg/L.

Table 5-18
Regulatory Compliance Evaluation
Nevada Irrigation District – Lake of the Pines WTP

	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.
Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in raw and treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of *Cryptosporidium* monitoring, which classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

Highlight of Changes Since 2017 Update

In January 2017, the WTP switched from feeding calcium hydroxide (lime) to feeding 25 percent liquid sodium hydroxide (caustic). Also, 1/3 of a mile of the Newtown Canal, a section near homes and septic systems, was encased in pipe.

Significant Potential Contaminating Activities

The Lake Wildwood WTP diverts off of Deer Creek into the Newtown Canal. Deer Creek is filled with water from the South Yuba Canal/Lake Spaulding, so it is vulnerable to all the same activities as the Elizabeth George WTP, plus it passes through Scotts Flat Reservoir where there is summer recreational use. Deer Creek then flows through parts of Nevada City where there is urban runoff and the potential for wastewater collection system spills. Highways 20 and 49 cross the creek, as well as many other local roads, which could be a source of spills. The Newtown Canal passes through low-density residential areas as well as cattle and horse grazing.

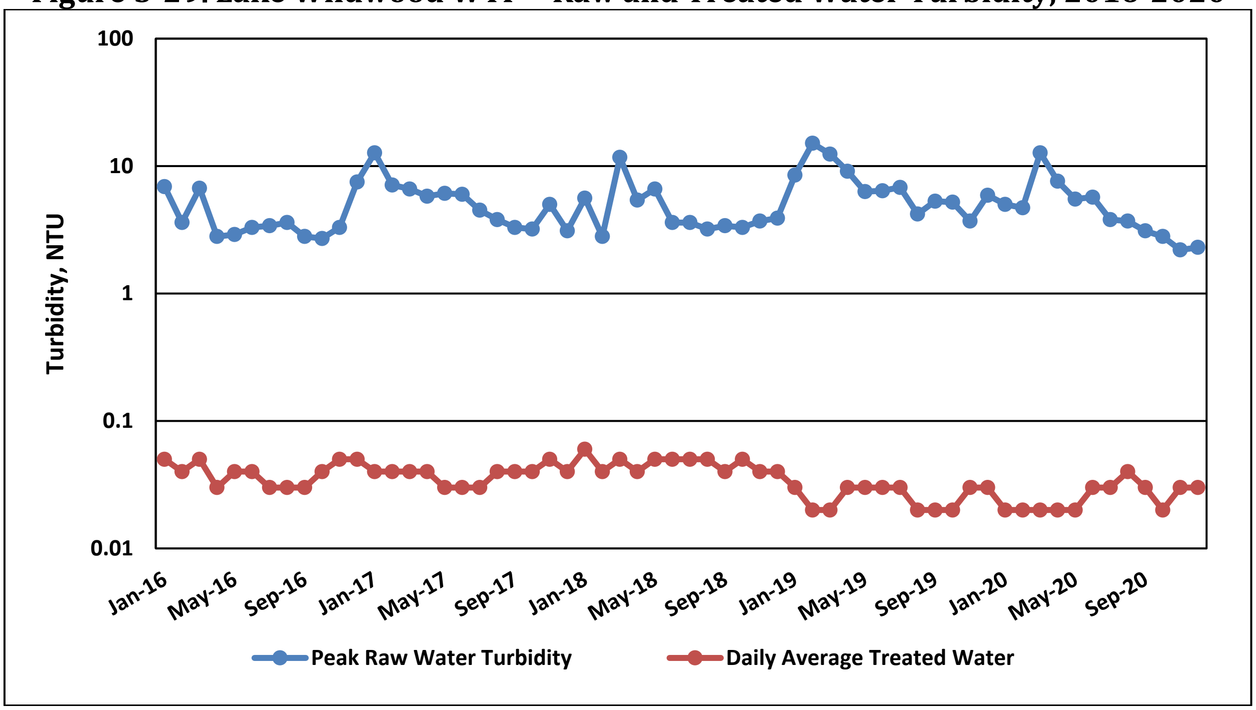
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at Lake Wildwood WTP for the period of study was 5.4 NTU, and on average the treatment process decreased this to 0.04 NTU, which equates to an average removal of solids of 99.3 percent. **Figure 5-29** shows a timeseries plot of raw and treated turbidities. Lake Wildwood WTP meets all current turbidity standards. It should be noted that the raw water turbidity is the maximum peak daily, provided as a monthly average. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24-hour period.

Figure 5-29. Lake Wildwood WTP – Raw and Treated Water Turbidity, 2016-2020



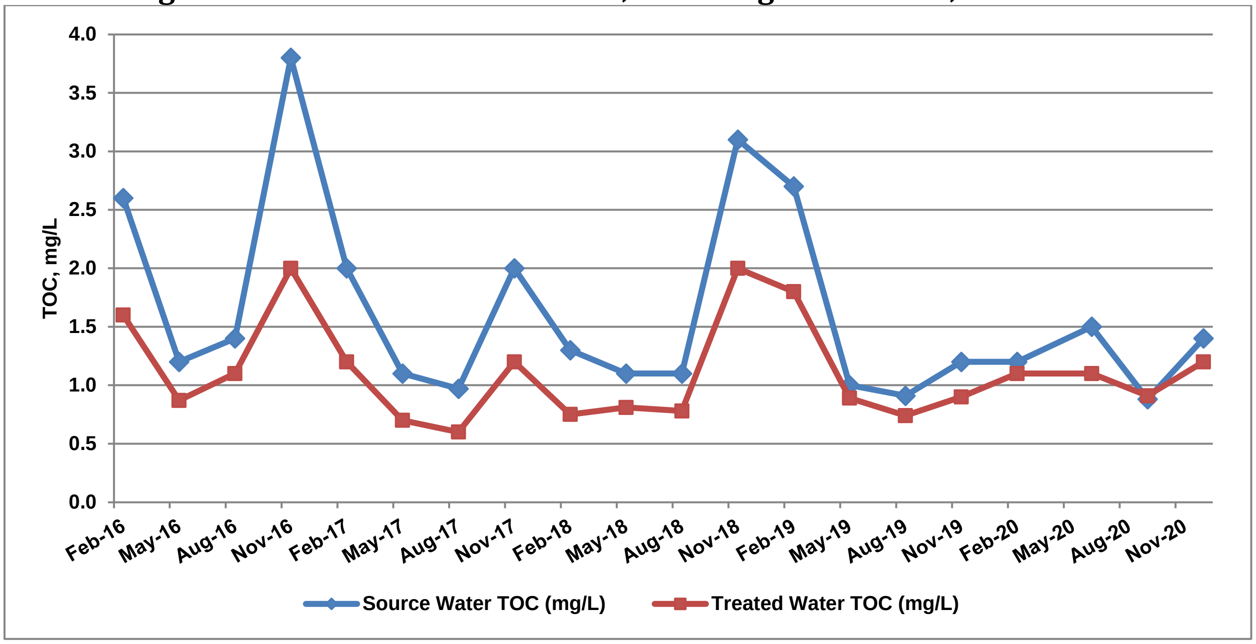
Microbiological Constituent

There were no positive coliform samples in the distribution system during the study period.

Disinfection By-Products

NID monitors for alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at Lake Wildwood WTP were 1.6 mg/L and 1.1 mg/L, respectively, equating to 31.4 percent average removal. Since the treated water TOC RAAs were less than 2.0 mg/L, no TOC removal calculation is required for the Lake Wildwood WTP. **Figure 5-30** shows a timeseries plot of raw and treated water TOC at Lake Wildwood WTP. Peak concentrations historically occur in November each year.

Figure 5-30. Lake Wildwood WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

NID converted to two new Stage 2 D/DBP Rule monitoring sites in February 2013. TTHM LRAAs ranged from 23.8 to 65.3 µg/L and HAA5 LRAAs ranged from 18.3 to 41 µg/L.

One individual TTHM sample at Penn Valley was measured at 100 µg/L, over the TTHM MCL of 80 µg/L, which occurred in the 4th quarter of 2016. Individual HAA5 samples at Penn Valley and Fair Oaks were measured at 60 µg/L, over the HAA5 MCL of 60 µg/L, which occurred in the 1st quarter of 2016. However, TTHM LRAAs and HAA5 LRAAs were below their respective MCLs per the Stage 2 D/DBPR.

Overall, NID has been trying to limit DBP formation by keeping chlorine residuals as low as possible, while still providing a residual at the furthest locations in the distribution system. NID staff believes that the Lake Wildwood, Lake of the Pines, and Smartville WTPs are vulnerable to spikes in DBPs due to the higher TOC and temperatures caused by long, meandering canals that supply these WTPs.

<u>Other Detectable Title 22 Constituents of Interest</u>

Hexavalent chromium was detected at 0.061 µg/L in 2016, and 0.061 µg/L in 2017, above the PHG of 0.02 µg/L. Currently, there is no drinking water standard for hexavalent chromium.

***Giardia/Virus/Cryptosporidium* Reduction Requirements**

Based on the *E. coli* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Lake Wildwood WTP under the SWTR.

Under the initial round of source water monitoring as part of the LT2ESWTR, Lake Wildwood WTP was designated as Bin 2 and required an additional 1-log action. NID conducted the second round of LT2ESWTR monitoring from October 2017 to September 2019. The highest 12-month mean for *Cryptosporidium* was 0 oocysts/L, indicating the source is Bin 1. The highest 12-month mean for *Giardia* was 0.0233 cysts/L. In a letter dated November 12, 2019, NID requested that the LT2ESWTR classification be changed from Bin 2 to Bin 1. This request was granted in a letter from DDW to NID dated October 30, 2020.

The Lake Wildwood WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with 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, the Long Term 1 ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

NID has been monitoring the raw and treated water for the Lake Wildwood WTP for all required Title 22 compliance constituents. **Table 5-19** lists the existing drinking water regulations and a compliance evaluation for these standards at the Lake Wildwood WTP. The Lake Wildwood WTP is currently in compliance with existing regulations.

North Auburn Water Treatment Plant

System Description

The raw water intake location for North Auburn WTP is located on the Combie Ophir Canal, or Rock Creek Reservoir. North Auburn WTP is a conventional water treatment plant, and the plant design flow is 6 mgd, with average flows at 2.5 mgd.

The influent water is pre-oxidized with sodium hypochlorite, alum is used as the primary coagulant, and caustic was used for pH adjustment. Chemicals are mixed with an adjustable inline flash mixer. The coagulated water then goes to an upflow clarifier where both flocculation and sedimentation occur. The sedimentation detention time is 91 minutes. The clarified water is then filtered through two dual media gravity filters. The filter loading rate is six gpm/sf.

The filters are typically backwashed based on turbidity. In the summer, each filter is backwashed at least every five days. In the winter, each filter is backwashed at least every three days. Backwash water is sent to a reclaimed pond, and after settling, the decant water is reclaimed back to North Auburn WTP's raw water reservoir. The plant has filter to waste capability after backwash, normally for three to five minutes. The filtered water is disinfected with sodium hypochlorite and stored in a clearwell to meet CT requirements. The average residual leaving the plant is 0.5 mg/L.

Table 5-19
Regulatory Compliance Evaluation
Nevada Irrigation District – Lake Wildwood WTP

	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.
Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of *Cryptosporidium* monitoring, which altered classification to Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 µg/L, respectively).

Highlight of Changes Since 2017 Update

In July 2016, the WTP switched from feeding calcium hydroxide (lime) to feeding 25 percent liquid sodium hydroxide (caustic). Tank mixers and vents were added to reduce DBP formation.

Significant Potential Contaminating Activities

The North Auburn WTP receives water from Rock Creek Reservoir, which is fed with water from the Bear River Canal, Upper Boardman Canal, and local drainage from Lake Theodore, Lake Arthur, and Halsey Afterbay. Therefore, the source water has all the same vulnerabilities as the Auburn WTP plus additional risk from Interstate 80 and local drainage from the Rock Creek area that includes high-density rural development, commercial, light industrial areas, and a portion of the Auburn Airport.

PG&E does not implement any water quality management programs at the Rock Creek Reservoir and conducts limited maintenance on the reservoir.

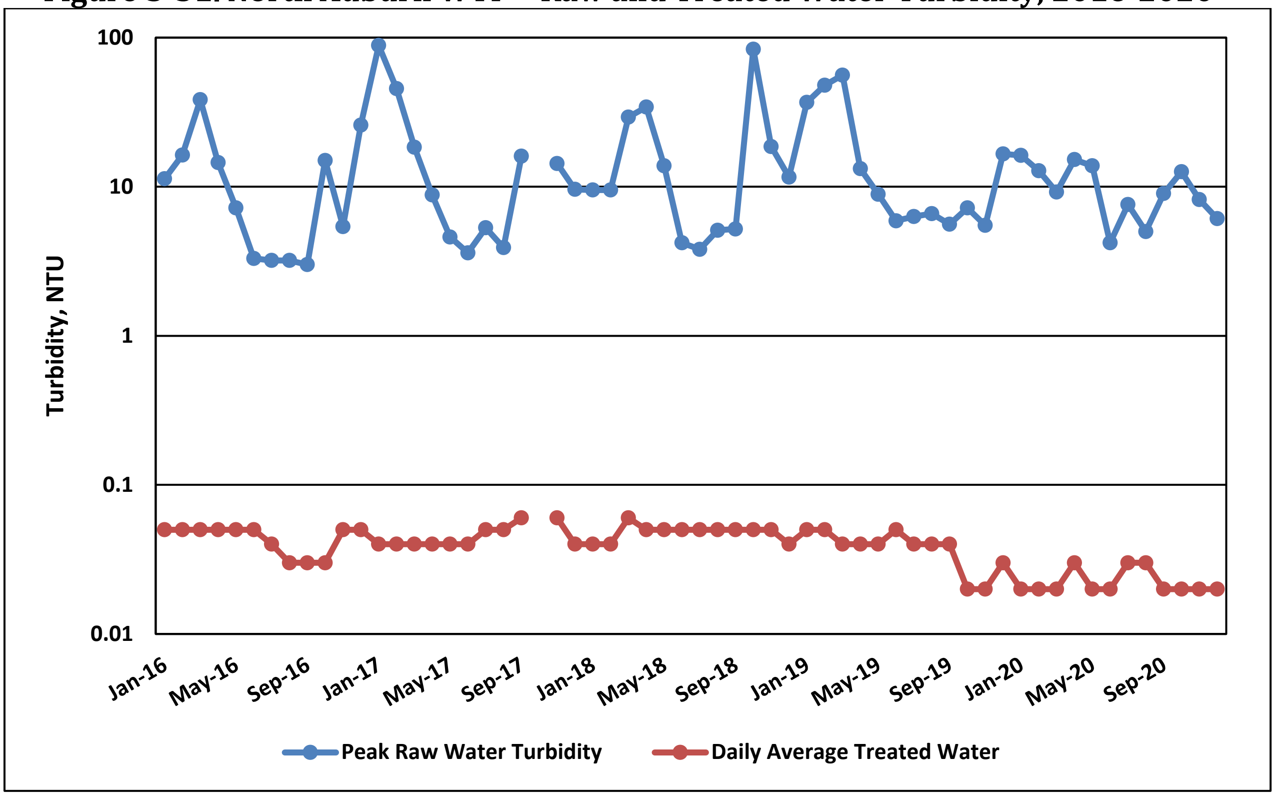
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at North Auburn WTP for the period of study was 15.8 NTU, and on average the treatment process decreased this to 0.04 NTU, which equates to an average removal of solids of 99.7 percent. **Figure 5-31** shows a timeseries plot of raw and treated turbidities. North Auburn WTP meets all current turbidity standards. It should be noted that the raw water turbidity is the maximum peak daily, provided as a monthly average. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-31. North Auburn WTP – Raw and Treated Water Turbidity, 2016-2020



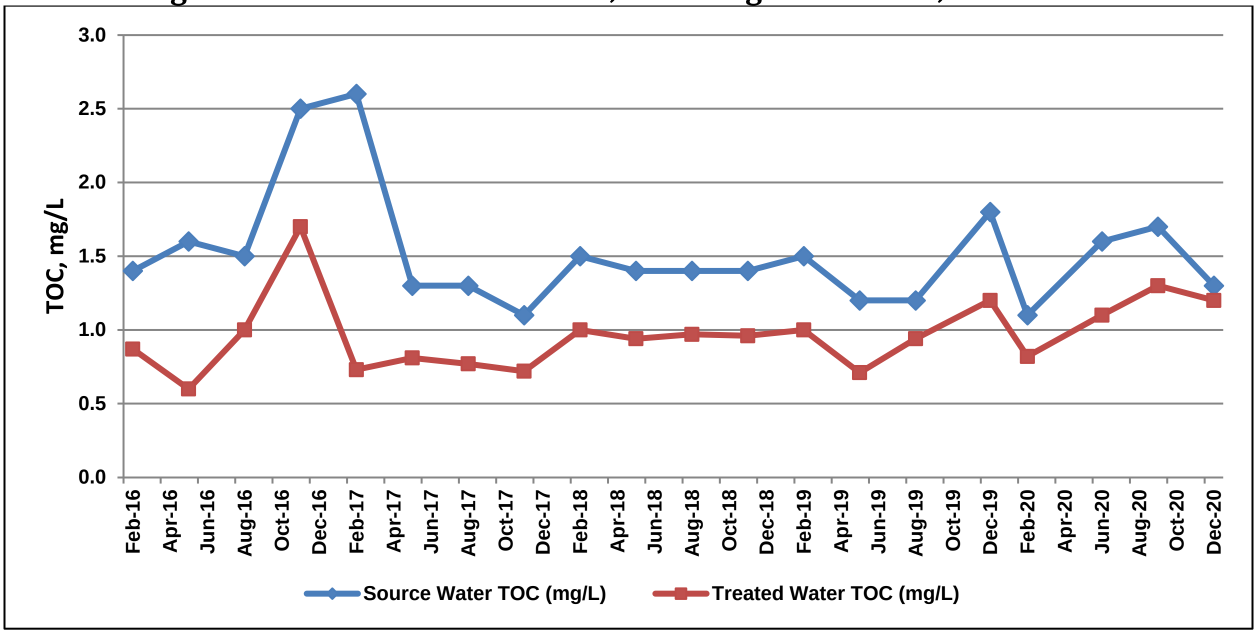
Microbiological Constituent

There were no positive coliform samples in the distribution system during the study period.

Disinfection By-Products

NID monitors for alkalinity and TOC levels in its raw water and TOC levels in its treated water quarterly in order to determine TOC removal compliance. The average raw and treated water TOC levels at North Auburn WTP were 1.5 mg/L and 0.97 mg/L, respectively, equating to 36.8 percent average removal. Since all of the treated water TOC RAAs were less than 2.0 mg/L, no TOC removal calculation is required for the North Auburn WTP. **Figure 5-32** shows a timeseries plot of raw and treated water TOC at North Auburn WTP. TOC levels in the raw water were below 2.0 mg/L throughout the reporting period, except for samples collected in November 2016 and February 2017. There is no specific temporal trend.

Figure 5-32. North Auburn WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

NID converted to two new Stage 2 D/DBP Rule monitoring sites in March 2013. TTHM LRAAs ranged from 29 to 50.3 µg/L and HAA5 LRAAs ranged from 12.5 to 34 µg/L. Based on data over the reporting period, TTHM and HAA5 LRAAs were below the respective MCLs per the Stage 2 D/DBPR.

<u>Other Detectable Title 22 Constituents of Interest</u>

Hexavalent chromium was detected at 0.058 µg/L in 2017, above the PHG of 0.02 µg/L. Currently, there is no drinking water standard for hexavalent chromium. Aluminum was detected at 50 µg/L in 2019, below the secondary MCL of 200 µg/L.

Copper was detected in the distribution system in 2017. However, the copper 90th percentile of 0.077 mg/L was well below the Action Level of 1.3 mg/L. Twenty samples were collected in 2017.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* and *Giardia* data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus/*Cryptosporidium* continues to be appropriate reduction requirements for the North Auburn WTP under the SWTR.

NID conducted the second round of LT2ESWTR monitoring from October 2017 to September 2019. The highest 12-month mean for *Cryptosporidium* was 0.0233 oocysts/L, indicating the source is classified as Bin 1. The highest 12-month mean for *Giardia* was 0.0388 cysts/L.

The North Auburn WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with 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, the Long Term 1 ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

NID has been monitoring the raw and treated water for the North Auburn WTP for all required Title 22 compliance constituents. **Table 5-20** lists the existing drinking water regulations and a compliance evaluation for these standards at the North Auburn WTP. The North Auburn WTP is currently in compliance with existing regulations.

Smartville Water Treatment Plant

System Description

The raw water intake location for Smartville WTP is located on the Meade Canal. At the end of 2010, the primary raw water location for Smartville WTP was changed to the Meade Canal in order to provide higher source water quality. Smartville WTP is a conventional water treatment plant, and the plant design flow is 0.085 mgd, with average flows at 0.037 mgd.

Clarion and soda ash are used as the primary coagulants and pH buffer, and the influent water is mixed with an inline static mixer. The coagulated water goes to an enclosed flocculation basin with a detention time of 13.5 minutes, and then to a sedimentation basin with a detention time of 78 minutes. The clarified water is then filtered through two dual media pressure filters. The filter loading rate is 1.5 gpm/sf.

The filters are typically backwashed based on time or turbidity. Backwash water is sent to a decant pond and then to an irrigation canal downstream of the plant. The plant has filter to waste capability after backwash, normally for 10 to 15 minutes. The filtered water is disinfected with sodium hypochlorite. The average residual leaving the plant is 0.5 to 1.0 mg/L.

Table 5-20
Regulatory Compliance Evaluation
Nevada Irrigation District – North Auburn WTP

	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.
Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC < 2.0 mg/L in treated water. Therefore, not required to implement enhanced coagulation for TOC removal.
Long Term 2 ESWTR	Microbial	Completed second round of *Cryptosporidium* monitoring, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 μg/L, respectively).

Highlight of Changes Since 2017 Update

During 2018/2019, sections of the Meade Canal were encased in pipe. Tank mixers and vents were added to storage reservoirs to reduce DBP formation.

Significant Potential Contaminating Activities

The Smartville WTP is fed by the Meade Canal. This is fed by the China Union Canal, which diverts off of Squirrel Creek. Water from Deer Creek is fed into Squirrel Creek via the Tunnel Canal. Deer Creek is filled with water from the South Yuba Canal/Lake Spaulding, so it is vulnerable to all the same activities as the Elizabeth George WTP, plus it passes through Scotts Flat Reservoir where there is summer recreational use. Deer Creek then flows through parts of Nevada City where there is urban runoff and the potential for wastewater collection system spills and discharges from the City of Nevada City WWTP. Highways 20 and 49 cross the creek, as well as many other local roads, which could be a source of spills. Squirrel Creek also passes through Penn Valley where there is extensive small ranch grazing, perched septic systems, and a mobile home park with wastewater ponds. As described in **Section 3**, there is also a popular swimming hole in Western Gateway Park. The canals pass through low-density residential areas as well as some cattle grazing.

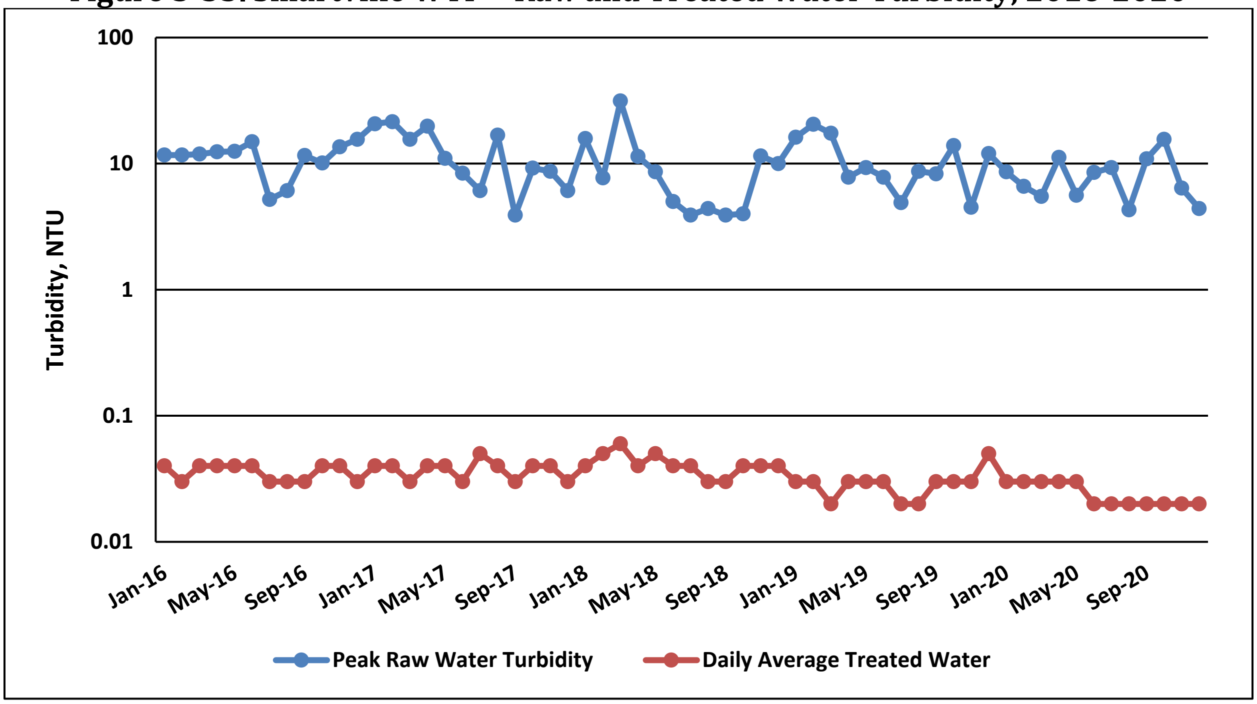
Water Quality Summary

Below is a discussion of each of the constituents of interest and any notable compliance issues for each constituent during the period of study.

Turbidity

The average raw water turbidity at Smartville WTP for the period of study was 10.5 NTU, and on average the treatment process decreased this to 0.03 NTU, which equates to an average removal of solids of 99.7 percent. **Figure 5-33** shows a timeseries plot of raw and treated turbidities. Smartville WTP meets all current turbidity standards. It should be noted that the raw water turbidity is the maximum peak daily, provided as a monthly average. The treated water turbidities are a monthly average of a daily average, which is based on samples taken every four hours in a 24 hour period.

Figure 5-33. Smartville WTP – Raw and Treated Water Turbidity, 2016-2020



Microbiological Constituent

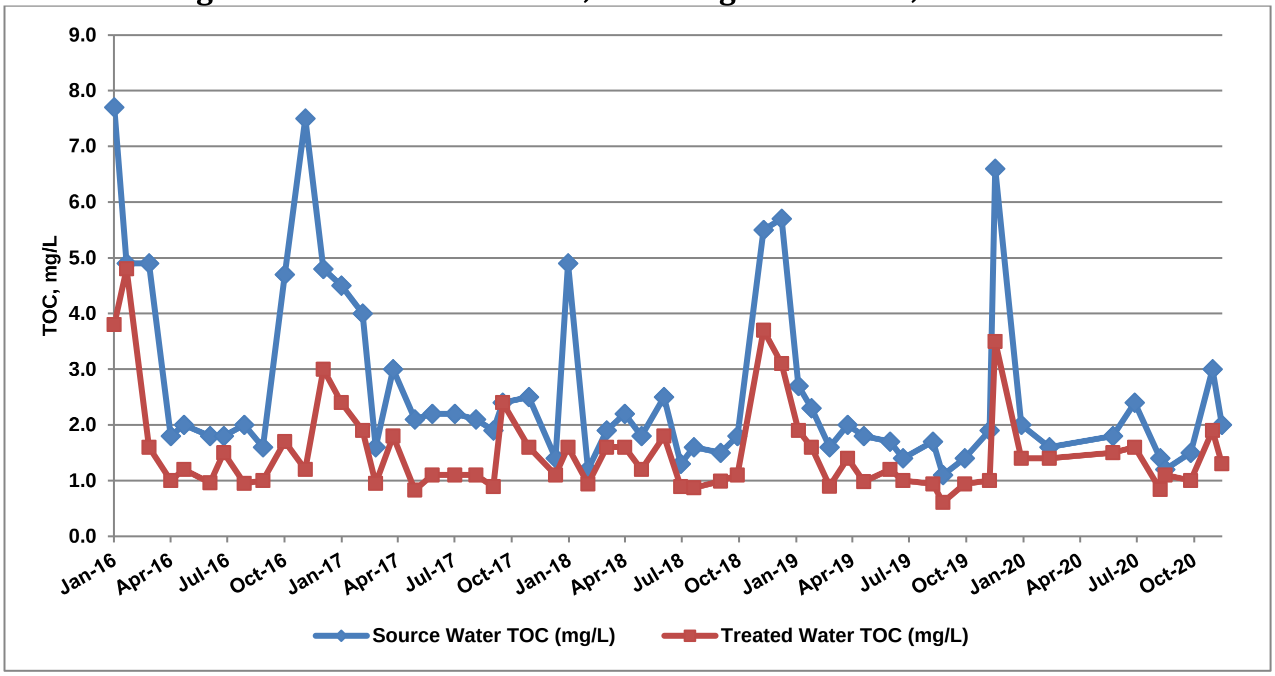
There were no positive coliform samples in the distribution system during the period of study.

Disinfection By-Products

NID monitors for 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 Smartville WTP were 2.6 mg/L and 1.5 mg/L, respectively, equating to 41.9

percent average removal. Since all of the treated water TOC RAAs were less than 2.0 mg/L, no TOC removal calculation is required for the Smartville WTP. However, NID usually calculates TOC removal as the WTP normally achieves a higher percent removal than required, based on source water TOC and alkalinity levels. **Figure 5-34** shows a timeseries plot of raw and treated water TOC at Smartville WTP. Based on the monthly alkalinity and TOC levels in the raw water, Smartville WTP needs to achieve 25 to 45 percent TOC removal, depending on source water alkalinity. There is a distinct seasonal trend for TOC, with peaks occurring during the wet weather months.

Figure 5-34. Smartville WTP, Total Organic Carbon, 2016-2020



Stage 2 D/DBP Rule Compliance Period

NID converted to one Stage 2 D/DBP Rule monitoring sites for the Smartville distribution system in January 2011. TTHM LRAAs ranged from 23.8 to 68.0 µg/L and HAA5 LRAAs ranged from 32.5 to 54 µg/L. Based on data over the reporting period, TTHM and HAA5 LRAAs were below the respective MCLs per the Stage 2 D/DBPR

<u>Other Detectable Title 22 Constituents of Interest</u>

Hexavalent chromium was detected at 0.088 µg/L in September 2017, above the PHG of 0.02 µg/L. Currently, there is no drinking water standard for hexavalent chromium. Total xylenes were detected at 0.75 µg/L in 2019, below the MCL of 1,750 µg/L.

Lead was detected in the distribution system in 2019. However, the lead 90th percentile was below the Action Level of 15 µg/L in the five samples collected.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the *E. coli* data presented in **Section 3**, 4/5-log reduction of *Giardia*/virus continues to be appropriate reduction requirements for the Smartville WTP under the SWTR.

NID conducted the second round of LT2ESWTR monitoring from October 2017 to September 2019. The highest 12-month mean for *Cryptosporidium* was 0.031 oocysts/L, indicating the source is classified as Bin 1. The highest 12-month mean for *Giardia* was 0.0388 cysts/L.

The Smartville WTP is classified as a conventional filtration WTP, and currently receives reduction credit for 2.5-log *Giardia,* 2.0-log viruses, and 2-log *Cryptosporidium* for physical removal. Disinfection with chlorine provides 1.5-log credit for *Giardia* and 3.0-log credit for viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR, the Long Term 1 ESWTR, and the LT2ESWTR.

Regulatory Compliance Evaluation

NID has been monitoring the raw and treated water for the Smartville WTP for all required Title 22 compliance constituents. **Table 5-21** lists the existing drinking water regulations and a compliance evaluation for these standards at the Smartville WTP. The Smartville WTP is currently in compliance with existing regulations.

Table 5-21
Regulatory Compliance Evaluation
Nevada Irrigation District – Smartville WTP

	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 4/5—log reduction requirement for *Giardia*/viruses. All operations, monitoring and reporting requirements are met and all treated water turbidity standards are met.
Long Term 1 ESWTR and Filter Backwash Rule	Microbial and Turbidity	All turbidity standards met. 2-log reduction credit for *Cryptosporidium* applicable.
Stage 1 D/DBPR	Disinfectants and Disinfection By-Products	RAA TOC > 2.0 mg/L in treated water. Meeting TOC removal requirement.
Long Term 2 ESWTR	Microbial	Completed second round of *Cryptosporidium* monitoring, which is classified as Bin 1.
Stage 2 D/DBPR	Disinfectants and Disinfection By-Products	TTHM/HAA5 LRAAs for Stage 2 are below drinking water standards (<80/60 μg/L, respectively).

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This section consists of a discussion of the key findings for this 2021 Update and a list of recommendations. Significant changes over the past five years are summarized at the beginning of this section.

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

SIGNIFICANT CHANGES SINCE THE 2017 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. This new information, which is summarized below, was obtained and evaluated for this 2021 Update.

- Many of the water treatment plants underwent upgrades and minor modifications, some key changes included:
    - New intake pumps and strainer, along with emergency generator, at the Alta Water Treatment Plant (WTP).
    - Conversion to a hydrated lime feed system at the Applegate WTP.
    - Rebuilt filters, with conversion to tri-media and installation of a new trough, at the Bowman WTP.
    - New raw water pipeline from Ophir Road as a secondary supply at the Foothill 1/2 WTPs.
    - Replacement of Caperton Reservoir with 460 feet of 36-inch pipe and encasement of 2900 feet of Caperton Canal at the Sunset WTP.
    - Conversion to 25 percent liquid sodium hydroxide at the Elizabeth George, Loma Rica, Lake of the Pines, Lake Wildwood, and North Auburn WTPs.
    - Additional completion of Magnolia III canal encasement, from Robles to Baldwin Ranch, at the Lake of the Pines WTP.
    - Encasement of 1/3 of a mile of the Newtown Canal at the Lake Wildwood WTP.
    - Addition of tank mixers and vents for treated water storage at the North Auburn and Smartville WTPs.
    - Addition of tank mixers and vents for treated water storage in the Applegate and Auburn Bowman distribution systems.
    - Partial encasement of the Meade Canal at the Smartville WTP.

- There was one ambient monitoring program collecting data in the watershed during the study period. Additional monitoring data along Squirrel Creek continues to show elevated levels of *Escherichia coli* (*E. coli*) and indicates that there are sources of fecal contamination in and upstream of Penn Valley that may be contributing, especially along Clear Creek and along Squirrel Creek between Valley Drive and Martinsburg Lane.

- Generally during the study period, 2016 through 2020, the source water turbidity levels remained similar or slightly lower than in the last study period. The same peaking trend during storm events was evident. There are other periods of higher turbidity outside of storm events that could be attributable to reservoir and canal operations and maintenance or algal blooms. Nevada Irrigation District (NID) has an operating procedure to avoid diverting water during peak storm turbidities.

- *E. coli* monthly medians remained at similar levels seen previously, with only the Smartville WTP having consistently elevated source water levels. *E. coli* impacts appear to be very localized. Peak levels at the Sunset WTP were investigated by Placer County Water Agency (PCWA) and could be associated with drainage from grazing areas along the Caperton Canal. Encasement of the Caperton Canal and Caperton Reservoir are expected to reduce these impacts. Peak levels at Lake of the Pines WTP were historically associated with increases along the Magnolia III Canal, but have now been isolated to the onsite raw water reservoir since much of the canal is encased and this warrants further consideration. The raw water data for the Smartville WTP continue to indicate that there are sources of fecal contamination between Deer Creek and the water treatment plant, which warrants further consideration.

- All the WTPs were placed in Bin 1 under Round 2 of the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). Lake Wildwood WTP has been approved to move from Bin 2 to Bin 1 by California Division of Drinking Water (DDW), and Bowman WTP should be moved to Bin 1 as well.

- Total organic carbon (TOC) levels appear to be stable in the raw and treated water. The Sunset and Smartville WTPs had the highest average values and have long local canal systems as part of their supply that may be contributing to the increased values.

- An evaluation of source water temperatures and disinfection by-product (DBP) levels indicates that higher temperatures can be contributing to increased total trihalomethane (TTHM) levels at some WTPs, but do not correlate to haloacetic acid (HAA5) levels. Other factors, such as pH, TOC, and water age appear to be more significant to the increase in DBP levels.

- Livestock population continues its 15-year decreasing trend, with fewer head of cattle and acreage of grazing in the watershed. Cattle are a significant potential source of *Cryptosporidium* so this is favorable to source water quality.

- There has been a big shift in the process for timber harvest operations to be approved on private land in the watershed. Much is conducted under Exemption and Emergency Notices, rather than under Timber Harvest Plans, which have less rigorous requirements for planning and inspection and have the potential to impact source water quality.

- There was a significant increase in the number of spill events report to the California Office of Emergency Services (Cal OES) that had the potential to impact the Yuba/Bear River. Most of these are associated with vehicular accidents and were not reported to the participating water agencies via the formal Cal OES and DDW process.

- Cascade Shores Wastewater Treatment Plant (WWTP) has not yet completed its conversion to land discharge, and it is uncertain if it still plans to eliminate its National Pollutant Discharge Elimination System (NPDES) discharge. The Penn Valley Mobile Home Park did connect to the public sewer and will no longer discharge to the ponds adjacent to Squirrel Creek in Penn Valley, thereby reducing the risk of contaminating the creek.

- There is one new and one pending gold mine operating in the Bear River watershed, upstream of Rollins Reservoir. The new facility was required to obtain an industrial stormwater permit through the State Water Resources Control Board (State Board), but this does not appear to have been issued.

- Outdoor cannabis cultivation has grown exponentially in the watershed, specifically Nevada County, during the study period. Each county has independent ordinances and regulations to limit and manage the potential impacts from outdoor cultivation. Statewide regulations related to medical and recreational marijuana use have been developed and implemented, but these only apply to legal grow operations. There continue to be substantial illegal grow operations throughout the watershed.

KEY FINDINGS AND CONCLUSIONS

The key findings and conclusions for this report are organized as they pertain to source water quality, treatment and regulatory compliance, and watershed contaminant sources. Highlights of these findings and conclusions are presented below.

Raw Water Quality for the Yuba/Bear River

Overall, the Yuba/Bear River provides excellent quality water. The raw water can be treated to meet all drinking water standards using conventional treatment processes. No persistently present constituents that require additional treatment processes have been identified in the raw water. Key findings for the constituents of interest are presented below.

Turbidity

- The median raw water turbidity ranges from 1.6 nephelometric turbidity units (NTU) at the Sunset WTP to 9.5 NTU at the North Auburn WTP. Generally, the raw water turbidity for the Alta, Monte Vista, Loma Rica, Elizabeth George, and Sunset WTPs stays below 10 NTU. During the reporting period, the remainder of the WTPs occasionally rose above 10 NTU, with the Bear River Canal WTPs and Deer Creek WTPs (particularly Smartville WTP) most frequently over 10 NTU.

- Smartville and North Auburn WTP had the most months where raw water monthly averages were above 10 NTU, for 27 months out of 60 months. Higher turbidities at North Auburn WTPs could be due to algal blooms or lack of maintenance in Rock Creek reservoir, maintenance of Bear River Canal, turbid water released from Rollins Reservoir, and the inability to stop diversion off the canal during storm events. Higher turbidities at Smartville WTP are likely caused by the long canals leading to the water treatment plant, which are more susceptible to local storm runoff.

- Rollins Reservoir can fill with turbid waters during the wet season. This results in higher turbidities at water treatment plants located downstream of Rollins Reservoir, when turbid waters are released from Rollins Reservoir during the winter and spring.

Microbiological Constituents

- The median *E. coli* values ranges from 3.1 most probable number per 100 milliliters (MPN/100mL) at Elizabeth George WTP to 58.3 MPN/100mL at the Smartville WTP.

- *E. coli* levels increase downstream for the Boardman Canal WTPs and the Deer Creek WTPs. There is no clear trend in the data for the WTPs downstream of Rollins Reservoir. These trends are similar to the Second, 2012, and 2017 Updates.

- All of the WTPs, except for Smartville WTP, can continue with their current level of treatment of 3/4-log reduction for *Giardia* and viruses under the Surface Water Treatment Rule (SWTR). The Smartville WTP is currently operated to achieve 4/5-log reduction for *Giardia* and viruses, and should continue.

- Since the Sunset WTP had more than six *E. coli* monthly medians greater than 200 MPN/100mL, a closer examination of its monthly medians was conducted. Of the nine *E. coli* monthly medians greater than 200 MPN/100mL, seven of those monthly medians occurred during months with precipitation. Additionally, it should be noted that the Sunset WTP was not operating during these specific seven months. During operational months, only 11 percent of monthly medians were greater than the threshold. Peak levels can be associated with precipitation, but there are periods when they are not so there are likely other sources contributing *E. coli*.

- PCWA conducted a special study along the Caperton Canal to the Sunset WTP, which showed that *E. coli* increased the most from Caperton Canal to Clark Tunnel Road. *E. coli* levels increased again, although slightly less, from Clark Tunnel Road to Woodsdale Court. Cattle were observed to be located primarily from Clark Tunnel Road to Woodsdale Court.

- The Caperton Reservoir Improvement Project and the encasement of approximately 2,900 linear feet of the existing Caperton Canal (from approximately Clark Tunnel Road to Woodsdale Court) is expected to improve source water quality and reliability for the Sunset WTP.

- Higher *E. coli* levels at the Lake of the Pines WTP are often related to precipitation events and also ranch land along Magnolia III Canal where cattle have been observed. Encasement of the Magnolia III canal through the Baldwin Ranch area has resulted in a reduction in the frequency and magnitude of peak *E. coli* levels at Alexis Drive, however *E. coli* peaks still occur at the Lake of the Pines WTP influent. NID staff suspect that the *E. coli* levels may be due to geese overnighting on the reservoir surface leading to the WTP.

- All PCWA and NID WTPs are classified under Bin 1 for Round 2 of LT2ESWTR monitoring.

Disinfection By-Product Precursors

- Average TOC levels for all WTPs range from 1.4 milligrams per liter (mg/L) at Lake Wildwood and Foothill 1 WTPs to 2.6 mg/L at Smartville WTP.
- TOC levels did not increase consistently downstream for similar groupings of WTPs.
- Smartville WTP has the highest TOC levels, likely due to exposure to a natural watercourse (Squirrel Creek) and local canals.
- TOC levels are seasonally variable, with the peak levels typically occurring during the wet season (late fall to early spring).
- Temperature plays a role in DBP formation; however, it is evident that other factors are also impacting formation (water age, pH, and TOC) and appear to be more significant.
- Overall, HAA5 formation is less correlated to temperature than TTHM formation.
- PCWA and NID have both implemented best management practices to reduce DBP formation such as installation of tank mixers and vents at selected storage facilities.

Individual Intake Evaluations

All of the water treatment plants are currently in compliance with all existing drinking water regulations. PCWA and NID implement various types of treatment processes, depending on facility size and source water quality, and meet all current drinking water standards, including maximum contaminant levels (MCLs) and treatment technology requirements. Below is a summary of the selected treatment and regulatory compliance issues.

Turbidity

All treated water turbidity standards were met at all of the water treatment plants. The average raw water turbidity at the water treatment plants varies from 1.7 NTU at Sunset WTP to 15.8 NTU at North Auburn WTP; while the average treated water turbidity varies from 0.02 NTU at Sunset WTP to 0.05 NTU at Alta WTP. Overall, each of the water treatment plants achieves large amounts of solids removal with overall reductions varying from 97.9 to 99.7 percent removal.

Microbiological Constituents

All treated water coliform standards were met in each of the distribution systems. There were a few occasions of total coliform positive results, but none resulted in fecal coliform detects or violations of the Total Coliform Rule.

Disinfection By-Products

All of the water treatment plants met the alternative compliance criterion for enhanced coagulation by having raw or treated water TOC running annual average (RAA) levels less than 2 mg/L.

The treated water Stage 2 D/DBPR standards were also met in each of the distribution systems. All of the water treatment plants have DBP locational running annual average (LRAA) levels below the primary MCLs, 80 and 60 ug/L, for TTHMs and HAA5 respectively.

PCWA was required to conduct Operational Evaluations under the Stage 2 D/DBPR for the Applegate and Auburn Bowman distribution systems based on triggers in 2018 and 2016, respectively. Both systems have had mixers and vents installed in treated water storage facilities to reduce DBPs.

Other Detectable Title 22 Constituents of Interest

There were minor detections of lead and copper in the distribution system for several of the systems, but none of the 90th percentile values exceeded the respective Action Levels. Alta WTP had low level detects of arsenic, well below the primary MCL. Elizabeth George, Loma Rica, and Lake of the Pines WTPs had detectable levels of aluminum, well below the primary and secondary MCLs. Elizabeth George WTP also had detectable levels of iron, well below the secondary MCL.

Other Detectable Unregulated Constituents

PCWA sampled four of its WTPs (Bowman, Auburn, Foothill 1/Foothill 2, and Sunset) and NID sampled two of its WTPs (Elizabeth George and Loma Rica) for unregulated constituents under the Unregulated Contaminant Monitoring Rule 4. Most constituents were non-detectable, including all cyanobacteria. There were low level detects of manganese, well below the secondary MCL. In addition, monitoring for brominated haloacetic acids in the distribution systems resulted in very low levels of these species and no significant increase in the concentration of total haloacetic acids.

NID also conducted monitoring for its WTPs in 2016 for hexavalent chromium, and it was detectable at very low concentrations in all source waters. There is currently no drinking water standard to compare with.

Giardia/Virus/Cryptosporidium Reduction Requirements

Based on the total and fecal coliform data presented in **Section 3**, 3/4-log reduction of *Giardia*/virus appears to continue to be appropriate reduction requirements for all of the water treatment plants, except the Smartville WTP. Smartville WTP has historically provided 4/5-log reduction and should continue to do so based on source water quality and the potential influence of upstream contaminating activities.

Based on the bin classification process for Round 2 of the LT2ESWTR all the water treatment plants were classified as Bin 1, requiring 2-log reduction of *Cryptosporidium*. DDW has approved Lake Wildwood WTP moving to Bin 1 based on the Round 2 monitoring results, and Bowman WTP should also be moved to Bin 1.

The water treatment plants implement either conventional or direct filtration to receive reduction credit for *Giardia*, viruses, and *Cryptosporidium* for physical removal. Disinfection with free chlorine provides the remaining credit for *Giardia* and viruses. This meets all of the current microbial removal/inactivation requirements of the SWTR, either the Interim Enhanced SWTR (IESWTR) or the Long Term 1 ESWTR, and the LT2ESWTR.

Watershed Contaminant Sources

There are numerous types of potential contaminating activities in the watershed. Nine activities were selected for evaluation in this report based on constituents of interest and predominance in the watershed. Selected findings for each of these activities are provided below.

Canal Aquatic Herbicide Use

Although there is limited pesticide application in the Yuba/Bear River watershed, it has the potential to be significant in terms of source water quality due to the drinking water regulations for the pesticides used and its proximity of use to the water treatment plants. This evaluation focused on the seasonal algae control programs implemented by PCWA and NID.

Many of the conveyance canals, as well as Alta Forebay, Halsey Forebay and Afterbay, and Rock Creek Reservoir, are owned and operated by Pacific Gas and Electric (PG&E). PG&E does not conduct any chemical treatment of algae or aquatic plants; they use manual methods such as drawdown and pressure washing. There is limited investment in regular maintenance of these facilities with regard to protecting source water quality.

PCWA and NID apply herbicides as needed, typically sometime between April and October, which are based on chemical control using herbicides. During the study period PCWA used Cutrine-Plus and Cutrine-Granular (copper ethanolamine herbicide) and Algimycin-PWF (copper chelated based algaecide/cyanobacteriocide). During the study period NID used Cutrine–Ultra and Cutrine Plus (copper ethanolamine herbicide), Rodeo (glyphosate herbicide), Round Up Custom (glyphosate herbicide), Nautique (copper carbonate herbicide), Green Clean Pro (sodium carbonate peroxyhydrate algaecide), and Captain (copper ethylenediamine complex chelated copper herbicide). Both agencies have coverage under a General NPDES Permit from the State Board and are in strict accordance with the permit terms. Each has submitted an Aquatic Pesticide Application Plan (APAP). The agencies are careful not to apply the copper-based chemicals near the water treatment plant intakes and water treated with glyphosate is not diverted to the intakes.

A review of water quality from the PCWA and NID water treatment plants shows that there have been no detects of organics in the source water. Also, copper levels in the treated water are either non-detectable or well below the action level of 1.3 mg/L.

Rangeland Livestock

Livestock in the Yuba/Bear River watershed primarily includes cattle and sheep and is a relatively small livestock population in the watershed, especially rangeland grazing cattle. Cattle are the livestock of more concern because they are a known host for *Cryptosporidium parvum*. Also, there are several areas in close proximity to the water treatment plants where the cattle grazing could be more significant, such as near the Auburn, Lake of the Pines, Lake Wildwood, Sunset, and Smartville WTPs.

The total livestock population documented by the United States Department of Agriculture for Nevada County, including both rangeland and dairy cows, was just over 4,100 in 2017. This is an approximate 14 percent decrease over the five-year period from 2012 to 2017, and a 19 percent decrease over the past fifteen years. There are three active United States Forest Service (USFS) grazing allotment in the upper watershed; Canyon Creek, Pass Creek, and English Mountain Allotments. In addition, NID manages a grazing lease along the Bear River below Rollins Reservoir, the Luster Lease. Four areas of particular interest are private ownership in the watershed include; Squirrel Creek watershed, along Magnolia III canal, along the Ragsdale Random in Meadow Vista, and along the Caperton Canal.

Rangeland research published during the study strongly supports the effectiveness of best management practices related to vegetated buffers and grazing intensity to reduce the impact on source water quality. The State Board is preparing a new Statewide Grazing Guidance, rather than implement a regulatory approach for management.

A review of available *Cryptosporidium* data for the water treatment plants indicates that there are relatively low levels throughout the watershed, with a significant reduction in concentrations between Round 1 and Round 2 of the LT2ESWTR, and no consistent relationship on seasonal or geospatial trends. The impacts are expected to be highly localized.

Forest Activities

This study identified timber harvesting and wildfires as activities of significant interest. 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. Timber harvesting on federal lands is regulated by the USFS and by the California Department of Forestry and Fire Protection (CALFIRE) on state and private lands. There continues to be more timber harvest harvesting on state and private lands, compared with federal lands. CALFIRE is permitting more timber harvesting through the Exemption and Emergency Notice program than through tradition timber harvest plans on private land, in order to address hazardous fuels reduction and comply with the new California Vegetation Treatment Program.

A review of the Nevada County Agricultural Commissioner's annual crop report shows that harvesting operations were quite variable during the study period. This could be explained by the fact that most of the timber harvesting in the Yuba/Bear River watershed is by commercial growers, such as Sierra Pacific Industries, who have plans for rotational harvesting cycles and also implement salvage harvesting after wildfires.

Wildfires cause the loss of ground cover, the chemical transformation of soil, and the reduction in soil infiltration rates which all increase the likelihood of erosion and hydrophobic soils, contributing to increased solids in the receiving water and an increase in the turbidity of the raw water at the water treatment plants. There were only three fires in the watershed (either fully or partially), one in the Bear River sub basin and two in the Squirrel Creek sub basin.

A specific review of the turbidity and TOC data show that there are distinct seasonal peaks in both constituents during the wet winter months. It is possible that erosion from burned areas is contributing to those peaks.

NID implements forest best management practices to address sediment transport and fuel reduction on their lands in the watershed. Both NID and PCWA participate in the Cosumnes, American, Bear, Yuba Regional Integrated Water Master Planning effort. This includes applying for grant funding of a variety of projects, including source water protection efforts to reduce fuels and improve forest health. NID received funding to encase a portion of the Meade Canal to the Smartville WTP. PCWA received funding to install mixers and vents on storage tanks in the Applegate and Auburn Bowman distribution systems to reduce DBP formation.

Recreation

There is a large amount of recreation that occurs in the Yuba/Bear River watershed. Recreation occurs in each of the sub basins, at varying levels. Recreation includes body and non-body contact activities. Body contact recreation includes swimming, wading, and rafting and is allowed on all major reservoirs and river reaches in all sub basins. Non-body contact recreation includes camping, boating, off-highway vehicle (OHV) and over-snow vehicle (OSV) use, fishing, hiking, biking and winter activities such as snow play, skiing and snowmobiling.

Camping occurs in both formal campgrounds, nearly 50, and dispersed in the Tahoe National Forest. A review of user statistics for NID shows that the annual use of their recreational facilities is also quite large and is likely to have associated impacts.

Some of the key day-use activities that occur in the watershed include hiking, OHV use, boating, fishing, cross-country skiing, and snowmobiling. The USFS completed the Travel Management Program to designate OHV roads and trails. Motorized Vehicle Use Maps have been developed for the forest. The USFS has now completed a similar process to designate roads and trails for OSV in the Forest.

PG&E allows access to most of its facilities for day-use including parts of the water supply system such as Deer Creek Forebay, Drum Forebay and Afterbay, Alta Forebay, Halsey Forebay and Afterbay, Rock Creek Reservoir, and Wise Forebay. Most of these are limited to on-shore fishing with limited parking available.

Day-use for the lower Bear River and Squirrel Creek does have significant use during the warm weather months of July, August, and September. Access to the Bear River is used at the Highway 174 and Dog Bar Road crossings and in the area of the Bear River Campground, as well as the adjacent landowners. There are sanitation facilities near the Bear River Campground, but not at any other of these areas. Squirrel Creek recreation is centered on the Western Gateway Regional Park in Penn Valley. There are sanitation facilities provided.

Recreation analysis by USFS, NID, and PG&E all indicate that activities will be expanded in the future and each agency is planning to upgrade or expand current recreational facilities.

Studies conducted by the Central Valley Regional Water Quality Control Board (Regional Board) support that there are distinct impacts on Squirrel Creek that may be attributed to by recreationalists.

Source Water Spills

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.

A review of the California Office of Emergency Services (Cal OES) Hazardous Materials Spill Reports revealed 84 incidents in the watershed. Most were petroleum spills associated with vehicular accidents or small volume sewage spills. There were seven Category I Sanitary Sewer Overflows. The participating water agencies did not receive notification via Cal OES/DDW for most of these events.

Due to the failure of the Cal OES/DDW formal notification process, both PCWA and NID have developed informal spill notification programs to attempt to obtain timely notification in the event that a spill threatens the source water quality for a water treatment plant. Both agencies have requested direct notification from their respective County OES in the event that a canal or receiving water is impacted. Both agencies also coordinate closely with PG&E regarding source water quality. PCWA has enhanced coordination with the California Highway Patrol and the California Department of Transportation due to frequent spill events along Interstate 80 that have the potential impact source water quality.

Wastewater

There are three permitted NPDES wastewater treatment plants discharging to the Yuba/Bear River system; Donner Summit Public Utilities District (PUD), Cascade Shores, and City of Nevada City. These are shown on the Watershed Map, **Figure 2-1**. There are five additional entities with collection systems located in the watershed.

The Donner Summit PUD facility is located in the upper watershed and provides full nitrification and denitrification. The Cascade Shores Wastewater Treatment Plant (WWTP) discharges to Gas Canyon Creek, which is a tributary to Greenhorn Creek and eventually discharges to Rollins Reservoir. The City of Nevada City WWTP discharges to Deer Creek, just west of Nevada City. Donner Summit PUD and Cascade Shores WWTP had minor violations during the study period, but generally discharge in compliance with their NPDES permits. The City of Nevada City WWTP had more significant compliance issues during the study period and has been implementing several compliance projects to improve treatment and discharge effluent quality.

In addition, although there are numerous land discharge systems and individual on-site septic systems located in the watershed there is only one land discharge facility of interest due to its proximity to Squirrel Creek. This is the Penn Valley Mobile Home Park (MHP). The Penn Valley MHP uses evaporative percolation ponds located on the north side of Squirrel Creek for wastewater treatment. The Regional Board encouraged this permittee to connect to the sanitary sewer and this was completed in 2021. The Penn Valley MHP no longer discharges to the ponds and will initiate a formal closure of the facility and the WDRs.

Urban Runoff

There is limited urbanization of the watershed upstream of the WTPs. Small cities and urban areas are regulated under the Phase II Stormwater Program. Under the Phase II Stormwater Program, Stormwater Management Plans (SWMP) were implemented with specific best management practices (BMPs) to minimize pollution, including implementation of treatment BMPs in new development. Monitoring was not required for any Phase II permittees in the Yuba/Bear River watershed.

There is one NPDES Stormwater Phase I permit; the Statewide California Department of Transportation (Caltrans). There are three Phase II permits; the cities of Grass Valley and Auburn and Placer County/North Auburn. An inventory of the Construction Stormwater Program resulted in identification of 16 sites during the study period in the watershed. An inventory was conducted to identify the Industrial Stormwater Permittees in the watershed, resulting in 14 permits in the watershed. There was limited ambient monitoring data conducted by these programs.

Mining

Mining has occurred in the Yuba/Bear River watershed for over 150 years. The intensity of use has decreased remarkably over that time, so that mining is now a relatively minimal activity. There have been no detections at levels of concern for constituents specific to mining at the WTPs. Mining occurs on both public and private lands for both metallic and non-metallic ores. Currently, there are four active surface mines, three of which quarry for sand, rock and stone and one is a new gold mine. Two of the mines have industrial stormwater permits, the other two appear to be remiss (Blue Lead Gold Mine and Sierra Boulder).

The Lava Cap Mine is an active Superfund Site where management continues. The mine has been capped and discharge will be treated by 2023.

Outdoor Cannabis Cultivation

Outdoor cannabis cultivation has grown exponentially in the watershed, especially in Nevada County, during the study period. Both adult personal and medical use cultivation is legal on private property, however there are county-specific requirements for legal cultivation. Outdoor cultivation has the potential to impact source water quality since the grow sites typically result in erosion, use of fertilizers and pesticides, and collection of trash. The outdoor cultivation period is typically April through October.

Cannabis cultivation is regulated at the State level by the Department of Cannabis Control (DCC) and locally by the three watershed counties. Nevada County is the only county to allow commercial cultivation activities. There is little information to quantify the presence of illegal outdoor cultivation activities.

RECOMMENDATIONS

Table 6-1 presents the recommendations developed for this 2021 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 is critical. Recommendations will be implemented by the participating water agencies as they have resources available.

TABLE 6-1
2021 Update Recommendations

Water Quality and Treatment

Recommendation	Agency Impacted	Basis for Recommendation
Continue to optimize treatment during times of potentially reduced source water quality – i.e., adjust coagulant dose, optimize polymers, reduce flow if possible to increase hydraulic detention times and reduce filtration loading rates, ensure optimized disinfection practices and contact time (CT).	PCWA and NID	Based on historical treatment challenges posed by source water quality, optimization is most likely to be important during storm events or during other high turbidity periods.
Continue to optimize disinfection treatment during higher temperature periods to minimize DBP formation. Consider effects of water age on DBP formation. Consider assessing distribution system management practices which may affect detention time and optimize to prevent formation of DBPs. This could include; installation of tank mixers, increased flushing at dead ends, correlating water production more closely during transitional demand periods (i.e., fall), and optimize storage volume in the tanks seasonally.	PCWA and NID	DBP levels in the distribution system have the potential to increase to levels of regulatory concern so preventing further development is critical. Disinfection optimization during times of high temperature source water is important. Minimizing water age at all times is another important strategy to keep DBP levels low.
Consider investigating possible microbial contamination sources at the Lake of the Pines and Lake Wildwood WTPs onsite reservoirs (i.e., overnighting geese, local drainage, algal blooms).	NID	Data shows that encasement of the canals has significantly reduced *E. coli* concentrations at the end of the canal. Both WTP influents still have some high concentration events, likely from some in-reservoir generated source.

TABLE 6-1 Cont'd
2021 Update Recommendations

Recommendation	Agency Impacted	Basis for Recommendation
Request DDW reassign Bowman WTP from Bin 2 to Bin 1 classification under LT2ESWTR based on the findings of this 2021 Update Report. Until then, continue to meet enhanced treated water turbidity limits to achieve 1-log action credit.	PCWA	The Round 2 monitoring for LT2ESWTR provided confirmation findings to place the Bowman WTP in Bin 1. Reduced levels are consistent with watershed-wide monitoring. Lower levels may be attributable to increased source management in the watershed (i.e., reduced cattle and wastewater).
Continue to encourage canal protections (encasements) upstream of water treatment plants to protect source water quality.	PCWA and NID	The voluntary encasement of canals in the watershed shows improvement in source water quality at the downstream water treatment plants. Canal protections are likely to result in source water quality improvement.
Consider replacing Canyon Creek with engineered conveyance between Drum Forebay and Alta Forebay to minimize risk of spills along Interstate 80.	PCWA	The use of Canyon Creek for conveyance exposes the water supply to significant risk from vehicular accidents along Interstate 80. Installation of an alternate engineered system, such as canal or pipe, would significantly reduce risk and improve source water quality and reliability.

Watershed Contaminant Sources

Recommendation	Agency Impacted	Basis for Recommendation
Consider enhancing coordination and communication with PG&E to discuss on-going maintenance needs throughout conveyance system to protect source water quality (i.e., reservoir dredging, chemical or mechanical treatment of vegetation).	PCWA and NID	PG&E does not implement a comprehensive source water quality maintenance program of its facilities. Consider working with PG&E to minimize risks to public health.

TABLE 6-1 Cont'd
2021 Update Recommendations

Recommendation	Agency Impacted	Basis for Recommendation
Continue to use the Cosumnes, American, Bear, and Yuba Rivers Integrated Regional Water Management Plan as a vehicle for grant funding of projects related to water quality. Consider submitting application for grant funding of source water protection projects such as canal encasement, public education along the canals, pet waste management stations along the canals, and canal fencing through vulnerable areas.	PCWA and NID	The impact of local activities is apparent in the source water quality. Implementing source water protection projects along the canals in close proximity to the water treatment plants will be more likely to impact source water quality.
Consider contacting the Regional Board to confirm that Deer Creek and its tributaries, specifically Squirrel Creek, are formally designated with the Municipal (MUN) Beneficial Use as part of the Sacramento River Basin Plan.	NID	Beneficial use designations listed in the Basin Plan are the basis for water body protections by the Regional Board. Ensuring the MUN beneficial use applies means that all associated water quality objectives will be considered in discharge permits.
Consider formal outreach to City of Nevada City, City of Grass Valley, and Nevada County Sanitation District regarding education on water supply system and request for notification of significant sanitary sewer overflows to Deer Creek or Squirrel Creek.	NID	Early notification in the event of a sewage or other hazardous material spill will ensure protection of public health. Some agencies may not be aware of which water conveyances are used for drinking water supply.

TABLE 6-1 Cont'd
2021 Update Recommendations

Recommendation	Agency Impacted	Basis for Recommendation
Consider establishing contact with the California Department of Fish and Wildlife (DFW) staff at the Oil Spill Prevention and Response (OSPR) program to ensure that upcoming Geographic Response Plans (GRPs) for the Yuba and Bear River include all water treatment plants accurately.	PCWA and NID	DFW's OSPR program prepares GRPs to address petroleum spills to inland surface waters. As part of these plans, they identify resources to be protected in the response. Providing them location and access information for the water treatment plants will allow DFW to include them in the response plan and be protected.
Consider contacting State Board/Regional Board/DFW regarding the conduct of cannabis cultivation inspections in the Yuba/Bear River system.	PCWA and NID	The Yuba/Bear River system was listed as a priority watershed, due to the high quality of the source water and high concentration of cultivation permits. This should result in increased inspections of cultivation sites. Establishing contact with the regulatory agencies may allow for a better understanding of the current status of enforcement and vulnerability.

APPENDIX A
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BIBLIOGRAPHY AND LIST OF CONTACTS

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APPENDIX B
SUMMARIES OF PCWA AND NID DATA

Alta

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16	6.9	0.04
Feb-16	4.9	0.03
Mar-16	6.1	0.04
Apr-16	2.5	0.04
May-16	2.6	0.04
Jun-16	2.2	0.0337
Jul-16	2.4	0.04
Aug-16	2.6	0.05
Sep-16	2.5	0.05
Oct-16	3	0.04
Nov-16	2.4	0.04
Dec-16	3.7	0.04
Jan-17	4.2	0.04
Feb-17	5.2	0.03
Mar-17	4.3	0.03
Apr-17	4.1	0.04
May-17	2.7	0.04
Jun-17	2.7	0.04
Jul-17	1.7	0.04
Aug-17	1.9	0.04
Sep-17	2.1	0.04
Oct-17	2.1	0.04
Nov-17	4.07	0.04
Dec-17	1.4	0.04
Jan-18	2.4	0.04
Feb-18	1.29	0.04
Mar-18	1.9	0.05
Apr-18	1.5	0.04
May-18	2	0.05
Jun-18	0.84	0.05
Jul-18	0.84	0.05
Aug-18	0.78	0.05
Sep-18	0.61	0.05
Oct-18	0.94	0.04
Nov-18	1.9	0.05
Dec-18	2.5	0.05
Jan-19	2.7	0.04
Feb-19	2.5	0.04
Mar-19	2.2	0.04
Apr-19	3	0.05
May-19	1.8	0.05
Jun-19	1.5	0.05
Jul-19	1.2	0.05
Aug-19	1.11	0.06
Sep-19	1.4	0.07
Oct-19	1.4	0.06
Nov-19	1.01	0.05
Dec-19	1.6	0.05
Jan-20	1.5	0.05
Feb-20	0.91	0.05
Mar-20	1.4	0.05
Apr-20	1.64	0.05
May-20	1.2	0.07
Jun-20	0.93	0.05
Jul-20	1	0.06
Aug-20	1.1	0.06
Sep-20	0.92	0.07
Oct-20	1.8	0.08
Nov-20	1.8	0.06
Dec-20	1.2	0.06

min	0.61	0.03	
max	6.9	0.08	
average	2.2	0.05	97.87%
median	1.9	0.05	
95th	4.915	0.07	

Monte Vista

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16	6.2	0.04
Feb-16	3.3	0.03
Mar-16	5	0.03
Apr-16	3.3	0.03
May-16	2.7	0.03
Jun-16	2.59	0.036
Jul-16	4.07	0.05
Aug-16	3.7	0.07
Sep-16	3.3	0.06
Oct-16	4.7	0.05
Nov-16	2.6	0.04
Dec-16	3.68	0.03
Jan-17	8.1	0.04
Feb-17	9.5	0.04
Mar-17	4.9	0.03
Apr-17	6.8	0.03
May-17	6.7	0.04
Jun-17	7.3	0.04
Jul-17	5.5	0.04
Aug-17	4.1	0.04
Sep-17	3.4	0.04
Oct-17	4.6	0.04
Nov-17	6.8	0.04
Dec-17	3	0.03
Jan-18	4.7	0.03
Feb-18	2.95	0.03
Mar-18	8.4	0.04
Apr-18	6.43	0.05
May-18	5.1	0.04
Jun-18	5.64	0.06
Jul-18	5.8	0.07
Aug-18	4.9	0.04
Sep-18	4.6	0.03
Oct-18	6.4	0.03
Nov-18	5.1	0.04
Dec-18	4.5	0.04
Jan-19	4.8	0.04
Feb-19	7.2	0.04
Mar-19	6.3	0.04
Apr-19	4.2	0.04
May-19	5.9	0.04
Jun-19	6.6	0.04
Jul-19	5	0.04
Aug-19	5.9	0.04
Sep-19	4	0.05
Oct-19	4.7	0.04
Nov-19	3	0.04
Dec-19	4.73	0.03
Jan-20	3.9	0.03
Feb-20	3	0.04
Mar-20	3.7	0.03
Apr-20	6.87	0.04
May-20	7.5	0.04
Jun-20	5.2	0.04
Jul-20	5.1	0.03
Aug-20	4.5	0.06
Sep-20	4.2	0.06
Oct-20	4.4	0.05
Nov-20	5.04	0.03
Dec-20	2.43	0.03

min	2.43	0.03	
max	9.5	0.07	
average	4.98	0.04	99.19%
median	4.765	0.04	
95th	7.53	0.06	

Colfax

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16	5.3	0.07
Feb-16	2.58	0.06
Mar-16	4.8	0.06
Apr-16	4.7	0.07
May-16	6.6	0.06
Jun-16	7.9	0.05
Jul-16	8.3	0.05
Aug-16	7.7	0.06
Sep-16	5.7	0.06
Oct-16	9	0.06
Nov-16	5.5	0.06
Dec-16	4.48	0.06
Jan-17	11	0.07
Feb-17	14.4	0.079
Mar-17	4.6	0.07
Apr-17	7.6	0.06
May-17	10.1	0.06
Jun-17	13.1	0.06
Jul-17	13.2	0.06
Aug-17	13.7	0.05
Sep-17	6.7	0.05
Oct-17	8.7	0.06
Nov-17	6.8	0.07
Dec-17	1.6	0.07
Jan-18	5.3	0.07
Feb-18	5.8	0.064
Mar-18	10.6	0.07
Apr-18	8.1	0.06
May-18	12.7	0.06
Jun-18	10.3	0.05
Jul-18	9.9	0.06
Aug-18	8.7	0.06
Sep-18	7.6	0.06
Oct-18	8.8	0.06
Nov-18	8.6	0.06
Dec-18	5	0.06
Jan-19	8.2	0.06
Feb-19	12.4	0.07
Mar-19	7.8	0.07
Apr-19	5.9	0.06
May-19	12.3	0.06
Jun-19	17.7	0.05
Jul-19	9.9	0.05
Aug-19	10.5	0.06
Sep-19	7.4	0.05
Oct-19	9.9	0.06
Nov-19	4.4	0.06
Dec-19	4.4	0.05
Jan-20	3.8	0.05
Feb-20	4.1	0.05
Mar-20	4	0.07
Apr-20	7.24	0.07
May-20	11	0.06
Jun-20	10.2	0.05
Jul-20	9.5	0.04
Aug-20	8	0.05
Sep-20	8.3	0.05
Oct-20	14.5	0.06
Nov-20	9.8	0.08
Dec-20	3.03	0.06

min	1.6	0.04	
max	17.7	0.08	
average	8.16	0.06	99.26%
median	8.05	0.06	
95th	13.735	0.07	

Applegate

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16	10.2	0.04
Feb-16	4.4	0.04
Mar-16	9.81	0.04
Apr-16	6.2	0.04
May-16	6.6	0.6
Jun-16	6.5	0.04
Jul-16	9.5	0.04
Aug-16	7.7	0.06
Sep-16	8.14	0.035
Oct-16	10	0.04
Nov-16	4.1	0.04
Dec-16	4.3	0.04
Jan-17	13.6	0.04
Feb-17	18.8	0.04
Mar-17	11.7	0.04
Apr-17	8.1	0.04
May-17	10.1	0.04
Jun-17	13.3	0.04
Jul-17	18.6	0.04
Aug-17	16.9	0.04
Sep-17	10.5	0.04
Oct-17	10.5	0.04
Nov-17	5	0.03
Dec-17	2.5	0.03
Jan-18	6	0.02
Feb-18	2.7	0.02
Mar-18	7.9	0.03
Apr-18	4.4	0.04
May-18	10.1	0.04
Jun-18	14	0.04
Jul-18	9.3	0.04
Aug-18	9.6	0.04
Sep-18	4.6	0.04
Oct-18	10.4	0.04
Nov-18	6.4	0.04
Dec-18	2.8	0.05
Jan-19	6.4	0.05
Feb-19	10.1	0.05
Mar-19	4.8	0.04
Apr-19	5.4	0.04
May-19	8.8	0.04
Jun-19	12	0.05
Jul-19	10.6	0.06
Aug-19	10.8	0.04
Sep-19	6.2	0.04
Oct-19	8.4	0.04
Nov-19	3.46	0.05
Dec-19	4	0.05
Jan-20	5.5	0.06
Feb-20	2.7	0.06
Mar-20	4.7	0.06
Apr-20	6.4	0.05
May-20	9.2	0.05
Jun-20	10.1	0.05
Jul-20	9.3	0.05
Aug-20	7.4	0.04
Sep-20	9.6	0.04
Oct-20	8.5	0.04
Nov-20	4.6	0.04
Dec-20	2.6	0.05

min	2.5	0.02	
max	18.8	0.6	
average	8.11	0.05	99.36%
median	8.12	0.04	
95th	14.145	0.06	

Bowman

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16	6.4	0.02
Feb-16	9.3	0.02
Mar-16	25.6	0.04
Apr-16	11.1	0.033
May-16	3.6	0.02
Jun-16	1.4	0.02
Jul-16	1.7	0.02
Aug-16	2.1	0.02
Sep-16	1.7	0.02
Oct-16	11.3	0.03
Nov-16	4.4	0.02
Dec-16	30.1	0.03
Jan-17	88.2	0.05
Feb-17	114	0.05
Mar-17	37.5	0.04
Apr-17	12.2	0.04
May-17	4.5	0.03
Jun-17	2.5	0.03
Jul-17	1.4	0.02
Aug-17	1.3	0.02
Sep-17	1.2	0.02
Oct-17	5.8	0.03
Nov-17	6	0.03
Dec-17	2.6	0.03
Jan-18	2.7	0.03
Feb-18	1.54	0.03
Mar-18	20.5	0.04
Apr-18	25.4	0.04
May-18	8.69	0.03
Jun-18	2.1	0.02
Jul-18	3.3	0.03
Aug-18	2.5	0.04
Sep-18	1.85	0.04
Oct-18	6.05	0.043
Nov-18	4.3	0.03
Dec-18	2.2	0.03
Jan-19	14.5	0.03
Feb-19	21.4	0.04
Mar-19	28.4	0.04
Apr-19	5.7	0.02
May-19	2.9	0.02
Jun-19	2.4	0.02
Jul-19	2	0.02
Aug-19	1.9	0.01
Sep-19	1.7	0.02
Oct-19	9.5	0.02
Nov-19	2.56	0.02
Dec-19	1.8	0.02
Jan-20	1.54	0.02
Feb-20	1.26	0.02
Mar-20	1.4	0.02
Apr-20	3.4	0.02
May-20	3.2	0.01
Jun-20	1.6	0.01
Jul-20	1.3	0.01
Aug-20	1.6	0.01
Sep-20	1.6	0.02
Oct-20	8	0.04
Nov-20	4.1	0.03
Dec-20	1.8	0.03

min	1.2	0.01	
max	114	0.05	
average	9.88	0.03	0.997
median	3.05	0.025	
95th	30.47	0.04015	

Auburn

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16	5.2	0.03
Feb-16	9	0.027
Mar-16		
Apr-16	7.7	0.02
May-16	6.2	0.03
Jun-16	5.3	0.03
Jul-16	7.2	0.03
Aug-16	8	0.03
Sep-16	5.8	0.03
Oct-16	7	0.03
Nov-16	5.5	0.0283
Dec-16		
Jan-17	13.4	0.05
Feb-17	14	0.03
Mar-17	7.5	0.04
Apr-17		
May-17	17	0.04
Jun-17	16.6	0.04
Jul-17	12.4	0.02
Aug-17	7.5	0.02
Sep-17	5.2	0.02
Oct-17	5.8	0.02
Nov-17	3.9	0.03
Dec-17		
Jan-18		
Feb-18		
Mar-18		
Apr-18	23.3	0.02
May-18	18.8	0.02
Jun-18	14.4	0.02
Jul-18	15.8	0.02
Aug-18	11.8	0.02
Sep-18	10.6	0.03
Oct-18	7.5	0.06
Nov-18	7.8	0.06
Dec-18		
Jan-19		
Feb-19		
Mar-19		
Apr-19		
May-19		
Jun-19	7.9	0.06
Jul-19	6.4	0.05
Aug-19	7.7	0.05
Sep-19	6.1	0.05
Oct-19	7	0.04
Nov-19	3.99	0.055
Dec-19	5.1	0.04
Jan-20		
Feb-20	2	0.04
Mar-20	3.37	0.045
Apr-20	9.6	0.05
May-20	8.8	0.05
Jun-20	6.3	0.05
Jul-20	4.2	0.05
Aug-20	5.4	0.07
Sep-20	6.7	0.04
Oct-20	6.3	0.03
Nov-20	5.8	0.04
Dec-20		

	min	2	0.02
	max	23.3	0.07
	average	8.51	0.04
	median	7.2	0.03
	95th	16.92	0.06

Foothill 1-4

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16		
Feb-16	11	
Mar-16	22	0.04
Apr-16	10.9	0.04
May-16	4.6	0.04
Jun-16	2.4	0.05
Jul-16	2.3	0.04
Aug-16	1.5	0.04
Sep-16	1.35	0.34
Oct-16	3.5	0.04
Nov-16	3.3	0.03
Dec-16	19.8	0.07
Jan-17	48.9	
Feb-17	57.3	
Mar-17	25.4	0.043
Apr-17	16.6	0.046
May-17	7.1	0.04
Jun-17	4.7	0.042
Jul-17	2.4	0.04
Aug-17	2.1	0.04
Sep-17	1.8	0.04
Oct-17	2.1	0.047
Nov-17		
Dec-17	6.9	
Jan-18	5.9	
Feb-18	3.2	0.04
Mar-18	21.2	0.07
Apr-18	28.3	0.06
May-18	13.4	0.04
Jun-18	4	0.044
Jul-18	3.4	0.047
Aug-18	2.2	0.05
Sep-18	1.9	0.05
Oct-18	2	0.05
Nov-18	6.1	0.04
Dec-18		
Jan-19		
Feb-19		
Mar-19		
Apr-19	8.2	0.06
May-19	6.2	0.05
Jun-19	3.9	0.04
Jul-19	2.6	0.04
Aug-19	2.3	0.04
Sep-19	1.99	0.04
Oct-19	7.99	0.04
Nov-19	9.4	0.04
Dec-19		
Jan-20		
Feb-20	2.2	0.05
Mar-20	3.3	0.05
Apr-20	9.3	0.05
May-20	7.6	0.04
Jun-20	2.87	0.04
Jul-20	2.6	0.04
Aug-20	2.7	0.04
Sep-20	2.8	0.04
Oct-20	2.3	0.05
Nov-20	6.5	0.04
Dec-20		

	min	1.35	0.03
	max	57.3	0.34
0.996	average	8.515686	0.051065
	median	3.9	0.04
	95th	26.85	0.0675

Foothill 5-9

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16	6.6	0.05
Feb-16	10.8	0.045
Mar-16	3.2	0.05
Apr-16	10.9	0.03
May-16	4.6	0.04
Jun-16	2.4	0.04
Jul-16	2.4	0.04
Aug-16	1.5	0.04
Sep-16	1.35	0.035
Oct-16	3.6	0.04
Nov-16	4.99	0.04
Dec-16	19.8	0.05
Jan-17	48.98	0.05
Feb-17	57.3	0.053
Mar-17	25.4	0.044
Apr-17	16.6	0.046
May-17	7.1	0.04
Jun-17	4.7	0.043
Jul-17	2.4	0.04
Aug-17	2.1	0.04
Sep-17	1.8	0.04
Oct-17	2.1	0.04
Nov-17	11	0.05
Dec-17	6.9	0.06
Jan-18	5.9	0.05
Feb-18	3.1	0.04
Mar-18	21.2	0.06
Apr-18	27.9	0.06
May-18	13.4	0.04
Jun-18	4	0.047
Jul-18	3.4	0.049
Aug-18	2.2	0.05
Sep-18	1.9	0.06
Oct-18	2	0.05
Nov-18	5.8	0.04
Dec-18		
Jan-19		
Feb-19		
Mar-19	17	0.08
Apr-19	9.9	0.05
May-19	6.2	0.05
Jun-19	3.9	0.045
Jul-19	2.6	0.04
Aug-19	2.3	0.04
Sep-19	1.94	0.04
Oct-19	6	0.04
Nov-19	4.5	0.04
Dec-19		
Jan-20		
Feb-20		
Mar-20	6.6	0.06
Apr-20	10.6	0.06
May-20	7.6	0.04
Jun-20	2.87	0.05
Jul-20	2.6	0.04
Aug-20	2.7	0.04
Sep-20	2.8	0.05
Oct-20	2.3	0.05
Nov-20	5.1	0.04
Dec-20	2.1	0.04

	min	1.35	0.03
	max	57.3	0.08
0.994	average	8.313519	0.046056
	median	4.55	0.0435
	95th	26.275	0.06

Foothill 15

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16	OFF	
Feb-16	11	
Mar-16	11	
Apr-16	11	
May-16	11	
Jun-16	2.2	0.03
Jul-16	2.3	0.03
Aug-16	1.5	0.03
Sep-16	1.35	0.028
Oct-16	3.5	0.03
Nov-16	2.7	0.03
Dec-16		
Jan-17		
Feb-17		
Mar-17		
Apr-17		
May-17		
Jun-17	4.648	0.03
Jul-17	2.4	0.03
Aug-17	2.1	0.03
Sep-17	1.8	0.03
Oct-17	2.1	0.03
Nov-17	6.3	0.03
Dec-17		
Jan-18		
Feb-18		
Mar-18		
Apr-18	23.6	0.04
May-18	13.4	0.04
Jun-18	4	0.032
Jul-18	3.4	0.03
Aug-18	2.2	0.03
Sep-18	1.9	0.03
Oct-18	2	0.03
Nov-18	6.1	0.03
Dec-18	6.1	0.03
Jan-19	19.7	0.05
Feb-19	28.6	0.05
Mar-19	39.5	0.05
Apr-19	5	0.07
May-19	6.2	0.05
Jun-19	3.9	0.02
Jul-19	2.6	0.02
Aug-19	2.3	0.02
Sep-19	1.96	0.02
Oct-19	6	0.02
Nov-19	4.5	0.02
Dec-19	10.3	0.02
Jan-20	5.7	0.02
Feb-20	3.5	0.02
Mar-20	2.8	0.02
Apr-20	8.1	0.02
May-20	7.6	0.02
Jun-20	2.87	0.02
Jul-20	2.6	0.02
Aug-20	2.7	0.01
Sep-20	2.8	0.01
Oct-20	2.3	0.02
Nov-20	4.3	0.02
Dec-20	2.7	0.02

	min	1.35	0.01
	max	39.5	0.07
0.994	average	6.49	0.03
	median	3.5	0.03
	95th	22.04	0.05

Sunset

Date	Average Raw Water Turbidity	Daily Average Treated Water
Jan-16		
Feb-16	11	
Mar-16	11	
Apr-16	11	
May-16	11	
Jun-16	1.99	0.02
Jul-16	1.43	0.02
Aug-16	0.83	0.02
Sep-16	0.63	0.02
Oct-16		
Nov-16		
Dec-16		
Jan-17		
Feb-17		
Mar-17		
Apr-17		
May-17		
Jun-17	3.8	0.02
Jul-17	2.1	0.02
Aug-17	1.6	0.02
Sep-17	1.3	0.02
Oct-17		
Nov-17		
Dec-17		
Jan-18		
Feb-18		
Mar-18		
Apr-18		
May-18		
Jun-18	1.61	0.03
Jul-18	1.9	0.02
Aug-18	2	0.02
Sep-18	1.9	0.02
Oct-18		
Nov-18		
Dec-18		
Jan-19		
Feb-19		
Mar-19		
Apr-19		
May-19		
Jun-19		
Jul-19		
Aug-19		
Sep-19	2.33	0.02
Oct-19	2.1	0.02
Nov-19		
Dec-19		
Jan-20		
Feb-20		
Mar-20		
Apr-20		
May-20		
Jun-20	1.7	0.02
Jul-20	1.5	0.02
Aug-20	1.3	0.02
Sep-20	1.3	0.02
Oct-20	1.3	0.04
Nov-20		
Dec-20		

	min	0.63	0.02
	max	11	0.04
0.996	average	3.331304	0.021579
	median	1.9	0.02
	95th	11	0.031

Alta

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
2/8/2016	22	1.5	0.89	
5/11/2016	20	1.94	1.5	
8/9/2016	36	1.42	1.15	
11/10/2016	16	1.55	1.14	1.6025
2/6/2017	14	1.1	0.7	1.5025
5/9/2017	16	1.8	1.2	1.465
8/7/2017	16	2.8	2.1	1.81
11/7/2017	24	0.9	0.8	1.6475
2/12/2018	19.1	1.8	1.1	1.8225
5/10/2018	15	2.1	1.1	1.9
8/6/2018	14.3	1.7	1.1	1.625
11/28/2018	16.4	1.7	1.1	1.825
2/12/2019	12.3	1.2	0.91	1.675
5/8/2019	11	1.3	0.9	1.475
8/13/2019	9.56	1	0.76	1.3
11/12/2019	14.8	1.2	0.83	1.175
2/18/2020	15.5	1.1	0.8	1.15
5/12/2020	13.7	1.8	1.2	1.275
8/11/2020	16.9	1.2	0.78	1.325
11/5/2020	13.7	1.8	0.88	1.475
				% removal
ave		1.55	1.0435	0.324595
median		1.53		
min		0.9		
max		2.8		
95th		2.135		

Monte Vista

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
2/8/2016	33	1.2	0.8	
5/11/2016	34	1.6	1.3	
8/9/2016	20	2.5	1.2	
11/10/2016	26	1.6	1.1	1.7375
2/6/2017	20	1.5	1.0	1.8075
5/9/2017	22	2.5	1.0	2.0225
8/7/2017	18	2.7	1.9	2.0725
11/7/2017	13	1.4	0.9	2.0175
2/12/2018	17.7	1.7	1.1	2.0725
5/10/2018	15.9	1.6	1	1.85
8/6/2018	12.2	1.8	1.2	1.625
11/28/2018	18	1.7	2.4	1.7
2/12/2019	17.9	0.95	0.78	1.5125
5/8/2019	18.6	0.91	0.64	1.34
8/13/2019	10.9	1.1	0.76	1.165
11/12/2019	11.9	1.1	0.84	1.015
2/18/2020	23	0.72	0.95	0.9575
5/12/2020	16.2	1.2	0.89	1.03
8/11/2020	14.2	1.3	0.86	1.08
11/5/2020	14.7	1.2	0.89	1.105
				% removal
ave		1.52	1.1	0.294059
median		1.44		
min		0.7		
max		2.7		
95th		2.51		

Colfax

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
2/8/2016	36	1.2	0.84	
5/11/2016	28	1.57	1.36	
8/9/2016	16	1.54	1.17	
11/10/2016	22	1.69	1.05	1.5
2/6/2017	22	1.8	1.1	1.6525
5/12/2017	28	1.5	1.0	1.63
8/7/2017	20	2.4	1.7	1.845
11/7/2017	14	1.3	0.9	1.7475
2/12/2018	20.9	1.6	1	1.695
5/10/2018	19.7	1.6	0.99	1.725
8/6/2018	11.9	1.7	1.2	1.55
11/28/2018	17	2	1.2	1.725
2/12/2019	16.3	1	0.81	1.575
5/8/2019	20.1	1.5	0.67	1.55
8/13/2019	9.94	1	1.1	1.375
11/12/2019	13.4	1.1	0.7	1.15
2/18/2020	21.9	0.99	0.73	1.1475
5/12/2020	17.2	1.5	1.5	1.1475
8/11/2020	15.2	1.2	0.79	1.1975
11/9/2020	14.2	1.3	1.1	1.2475
				% removal
ave		1.47	1.0435	0.292062
median		1.50		
min		0.99		
max		2.4		
95th		2.02		

Applegate

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
2/8/2016	37	1.3	1.1	
5/12/2016	34	1.4	1.4	
8/10/2016	32	1.55	1.37	
11/10/2016	18	1.76	1.5	1.5025
2/6/2017	24	2.1	1.8	1.7025
5/17/2017	32	1.9	1.9	1.835
8/7/2017	14	3.4	2.4	2.2975
11/7/2017	11	1.1	1.1	2.1325
2/12/2018	22	1.6	1.4	2.0075
5/10/2018	22	1.7	1.4	1.95
8/8/2018	12	1.7	1.5	1.525
11/28/2018	17	1.9	1.6	1.725
2/12/2019	24.1	1.6	1.5	1.725
5/9/2019	22.4	1	0.87	1.55
8/13/2019	11.1	1.1	1	1.4
11/26/2019	16.7	1.2	1	1.225
2/18/2020	28.6	1	0.9	1.075
5/12/2020	18.2	2.4	1.9	1.425
8/11/2020	14.2	1.2	1	1.45
11/9/2020	16.3	1.5	1.3	1.525
				% removal
ave		1.62	1.3945	0.14025894
median		1.58		
min		1		
max		3.4		
95th		2.45		

Bowman

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
2/5/2016	31	1.6	1.1	
5/19/2016	20	1.8	1.2	
8/16/2016	18	1.3	1.1	
11/15/2016	28	1.9	1.5	1.6425
2/16/2017	24	1.9	1.2	1.715
5/16/2017	30	2.8	2.0	1.955
8/21/2017	16	3.1	1.3	2.4225
11/8/2017	15	1.2	1.0	2.245
2/14/2018	18.8	1.9	1.2	2.2475
5/9/2018	20.6	1.5	1.1	1.9325
8/15/2018	14.8	1.5	1.3	1.525
11/26/2018	16.2	1	0.85	1.475
2/20/2019	15.9	1.2	0.85	1.3
5/21/2019	13.6	1.3	0.96	1.25
8/22/2019	10.6	0.94	0.68	1.11
11/14/2019	14.2	1.6	1.1	1.26
2/25/2020	19.2	1.3	0.76	1.285
5/13/2020	18.9	1.2	0.89	1.26
8/12/2020	14.2	1.2	0.89	1.325
11/10/2020	18.4	1	0.89	1.175
				% removal
ave		1.56	1.1	0.300417
median		1.40		
min		0.9		
max		3.1		
95th		2.7785		

Auburn

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
2/5/2016	25	1.8	1.2	
5/19/2016	24	1.9	1.4	
8/16/2016	20	1.55	1.31	
11/15/2016	30	2.1	1.45	1.8375
Plant off	Plant off			1.85
5/16/2017	56	2.8	1.7	2.16
8/21/2017	34	2.8	1.4	2.563333
11/8/2017	15	1.2	0.9	2.263333
Plant off	Plant off			2.263333
5/9/2018	22.7	1.1	1.1	1.686667
8/15/2018	16.5	1.9	1.2	1.4
11/26/2018	16.8	1.2	0.64	1.4
Plant off	Plant off			1.4
6/18/2019	22.7	1.4	0.85	1.5
8/22/2019	13.6	1.1	0.65	1.233333
11/14/2019	14.9	1.6	1.1	1.366667
2/25/2020	23.2	1.1	0.72	1.3
5/13/2020	22.8	1.3	0.87	1.275
8/12/2020	17.2	1.4	0.84	1.35
11/10/2020	17.2	1.2	0.81	1.25
				% removal
ave		1.61	1.064706	0.340379
median		1.40		
min		1.1		
max		2.83		
95th		2.774		

Foothill 15 MGD

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA	
2/10/2016	36	1.6			Plant Off
5/25/2016	34	1.4			Plant Off
8/17/2016	70	1.4	1.1		
11/16/2016	34	1.8	1.3	1.545	
2/14/2017	36	1.8		1.605	Plant Off
6/9/2017	22	1.8	1.1	1.7	
8/8/2017	44	2.1	1.7	1.8825	
11/14/2017	16	1.4	0.9	1.7725	
2/13/2018	19.1	1.8		1.7625	Plant Off
5/16/2018	17.7	1.7	1	1.75	
8/14/2018	14.6	1.5	1	1.6	
11/27/2018	20.8	1.3	0.9	1.575	
2/20/2019	36	1.8	1.3	1.575	
5/16/2019	16.7	1.4	1.2	1.5	
8/27/2019	10.5	1	1.5	1.375	
11/20/2019	14.7	1.1	0.85	1.325	
2/19/2020	20.1	1.1	0.94	1.15	
5/14/2020	18.7	1.1	0.86	1.075	
8/12/2020	13.7	1.2	0.81	1.125	
11/10/2020	18.5	1.2	0.83	1.15	
				% removal	
ave		1.47	1.080625	0.266627	
median		1.40			
min		1.0			
max		2.1			
95th		1.853			

Foothill 40 MGD

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA	
2/10/2016	36	1.6	0.9		
5/25/2016	34	1.4	1.4		
8/17/2016	70	1.4	1.0		
11/29/2016	24	2.4	1.6	1.6875	
2/14/2017	36	1.8	1.1	1.7475	
5/10/2017	30	1.9	1.2	1.875	
8/8/2017	44	2.1	1.4	2.0575	
11/14/2017	16	1.4	0.9	1.805	
2/13/2018	19.1	1.8	1.3	1.795	
5/16/2018	17.7	1.7	0.97	1.75	
8/14/2018	14.6	1.5	1	1.6	
11/27/2018	20.8	1.3		1.575	
2/20/2019	36	1.8		1.575	
5/16/2019	16.7	1.4	0.88	1.5	
8/27/2019	10.5	1	0.65	1.375	
11/20/2019	14.7	1.1	0.85	1.325	
2/19/2020	20.1	1.1	0.91	1.15	
5/14/2020	18.7	1.1	0.73	1.075	
8/12/2020	13.7	1.2	0.8	1.125	
11/10/2020	18.5	1.2	0.91	1.15	
					% removal
ave		1.51	1.0		0.319412
median		1.40			
min		1.0			
max		2.4			
95th		2.1155			

Sunset

	Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	
		Plant off	Plant off	Plant off	
		Plant off	Plant off	Plant off	
	8/17/2016	24	1.5	1.2	
	6/9/2017	22	2.0	1.5	
	8/8/2017	34	2.4	1.9	
	8/14/2018	15.1	1.8	1.2	
Plant Off					
Plant Off					
	9/9/2019	12.1	1.2	0.91	
	6/8/2020	19	1.9	0.96	
	8/12/2020	14.1	1.5	1.2	
					% removal
	ave		1.75	1.3	0.284201954
	median		1.80		
	min		1.2		
	max		2.4		
	95th		2.265		

Alta

Sample Date	Number of Samples Taken	Average Total Coliform Levels	Average E. Coli Coliform Levels	
Jan-16	1	17	0	
Feb-16	1	0	0	
Mar-16	1	170	4	
Apr-16	1	13	0	
May-16	1	79	13	
Jun-16	1	8	5	
Jul-16	1	240	9	
Aug-16	1	220	23	
Sep-16	1	33	0	
Oct-16	1	540	79	
Nov-16	1	350	7	
Dec-16	1	540	13	
Jan-17	1	14	2	
Feb-17	1	220	23	
Mar-17	1	17	0	
Apr-17	1	22	2	
May-17	1	130	49	
Jun-17	1	49	4	
Jul-17	1	13	8	
Aug-17	1	49	4	
Sep-17	1	2419.2	10.8	
Oct-17	2	1140.2	3.1	
Nov-17	2	595.95	57.75	
Dec-17	2	67	1.55	
Jan-18	2	388.7	11.8	
Feb-18	2	79.45	1	
Mar-18	2	170.7	33.1	
Apr-18	2	107.9	0	
May-18	2	905.75	1.55	
Jun-18	2	811.7	9.1	
Jul-18	2	1689.9	7.5	
Aug-18	2	1372	6.5	12-month average
Sep-18	2	753.6	11.15	12.00833
Oct-18	2	344.8	3.6	
Nov-18	2	1050.15	81.95	
Dec-18	2	95.65	1	
Jan-19	2	38.55	1.5	
Feb-19	2	18.2	1	
Mar-19	2	135.45	28.1	
Apr-19	2	291.6	0.5	
May-19	2	68	6	
Jun-19	2	454.55	19	
Jul-19	2	1378	7.25	
Aug-19	2	1223.55	6.9	
Sep-19	2	814.15	3.55	
Oct-19	2	129.55	3.1	
Nov-19	2	79.85	0	
Dec-19	2	28	0	
Jan-20	2	40.6	0	
Feb-20	2	33.15	0.5	
Mar-20	2	249.4	0	
Apr-20	2	119.1	5.8	
May-20	2	665.7	8.65	
Jun-20	2	1700.2	26.05	
Jul-20	2	1770	7.6	
Aug-20	2	2203	8.65	
Sep-20	2	2420	23.65	
Oct-20	2	1468.6	43.75	
Nov-20	2	724.7	29.75	
Dec-20	2	214.15	3.1	

min	0
max	81.95
average	12.01417
median	5.9
95th	49.4375

Monte Vista

Sample Date	Number of Samples Taken	Average Total Coliform Levels	Average E. Coli Coliform Levels	
Jan-16	1	9	2	
Feb-16	1	11	0	
Mar-16	1	79	23	
Apr-16	1	240	79	
May-16	1	23	5	
Jun-16	1	94	17	
Jul-16	1	130	33	
Aug-16	1	17	0	
Sep-16	1	240	9	
Oct-16	1	130	4	
Nov-16	1	170	17	
Dec-16	1	33	11	
Jan-17	1	23	13	
Feb-17	1	350	8	
Mar-17	1	9	0	
Apr-17	1	350	240	
May-17	1	8	2	
Jun-17	1	130	130	
Jul-17	1	49	4	
Aug-17	1	49	4	
Sep-17	1	488.4	0	
Oct-17	2	390.3	5.3	
Nov-17	2	295.95	20.5	
Dec-17	2	37.15	1.5	
Jan-18	2	147.85	6.85	
Feb-18	2	140.85	8.65	
Mar-18	2	605.45	210.75	
Apr-18	2	331.4	4.2	
May-18	2	217.4	3.15	
Jun-18	2	1453.8	3.05	
Jul-18	2	1426.4	3.15	
Aug-18	2	965.95	1	
Sep-18	2	1573.1	6.9	22.91667
Oct-18	2	446.2	26.9	
Nov-18	2	489.15	18.3	
Dec-18	2	73.15	1	
Jan-19	2	44.85	1	
Feb-19	2	54.85	8.9	
Mar-19	2	74.3	24.6	
Apr-19	2	283.95	10.4	
May-19	2	88.75	9.95	
Jun-19	2	2420	9.1	
Jul-19	2	903.35	8.6	
Aug-19	2	1156.2	7.4	
Sep-19	2	1226.15	6.3	
Oct-19	2	382.65	2	
Nov-19	2	448.45	5.85	
Dec-19	2	322.1	14.6	
Jan-20	2	198.6	0.5	
Feb-20	2	500.2	0	
Mar-20	2	371	4.25	
Apr-20	2	374.25	5.75	
May-20	2	860.8	12.05	
Jun-20	2	2203	1	
Jul-20	2	2203	11.5	
Aug-20	2	2203	5.85	
Sep-20	2	2420	1.5	
Oct-20	2	580.3	3.05	
Nov-20	2	527.6	27.75	
Dec-20	2	108.95	5.25	

min	0
max	240
average	18.48917
median	6.075
95th	81.55

Colfax

Sample Date	Number of Samples Taken	Average Total Coliform Levels	Average E. Coli Coliform Levels	
Jan-16	1	34	8	
Feb-16	1	130	49	
Mar-16	1	200	170	
Apr-16	1	70	49	
May-16	1	13	5	
Jun-16	1	130	17	
Jul-16	1	50	13	
Aug-16	1	5	0	
Sep-16	1	23	0	
Oct-16	1	17	2	
Nov-16	1	11	0	
Dec-16	1	33	7	
Jan-17	1	13	8	
Feb-17	1	500	2	
Mar-17	1	49	13	
Apr-17	1	94	31	
May-17	1	22	4	
Jun-17	1	49	49	
Jul-17	1	240	79	
Aug-17	1	49	7	
Sep-17	1	1119.9	25.9	
Oct-17	2	563.45	4.1	
Nov-17	2	247.25	79.3	
Dec-17	2	41.35	11.15	
Jan-18	2	247.75	22.55	
Feb-18	2	54.7	3.6	
Mar-18	2	731.6	102.15	
Apr-18	2	231.55	10.55	
May-18	2	483.1	2.55	
Jun-18	2	1310.3	32.25	
Jul-18	3	1528.43	72.33	
Aug-18	2	995.75	7.65	
Sep-18	2	1414.9	49.05	33.1025
Oct-18	2	437.85	15.85	
Nov-18	2	1290.4	184.25	
Dec-18	2	37.1	1.55	
Jan-19	2	58.45	28.05	
Feb-19	2	37.15	10.55	
Mar-19	2	43.75	4.65	
Apr-19	2	120.35	4.9	
May-19	2	150.65	12.1	
Jun-19	2	1140.2	16.45	
Jul-19	2	532.35	31.15	
Aug-19	2	931.2	26	
Sep-19	2	1573.5	20.5	
Oct-19	2	294.15	9.65	
Nov-19	2	83.6	3.75	
Dec-19	2	209.3	16.15	
Jan-20	2	34.95	2.6	
Feb-20	2	122.6	0	
Mar-20	2	157.3	3.1	
Apr-20	2	167.5	3.05	
May-20	2	363.05	6.4	
Jun-20	2	847.4	3.6	
Jul-20	2	1336.5	13.3	
Aug-20	2	1917	21.45	
Sep-20	2	1516.5	9.85	
Oct-20	2	588.6	9	
Nov-20	2	294.55	20.9	
Dec-20	2	38.2	2.55	

min	0
max	184.25
average	23.62467
median	10.55
95th	80.4425

Applegate

Sample Date	Number of Samples Taken	Average Total Coliform Levels	Average E. Coli Coliform Levels	
Jan-16	2	285	181.5	
Feb-16	2	185	81.5	
Mar-16	2	191.5	17	
Apr-16	2	285	144.5	
May-16	2	26.5	13	
Jun-16	2	293	25	
Jul-16	2	130	49.5	
Aug-16	2	260	31.5	
Sep-16	2	390	230	
Oct-16	2	136.5	27.5	
Nov-16	2	163	71.5	
Dec-16	2	34.5	15.5	
Jan-17	2	88.5	42	
Feb-17	2	325	43.5	
Mar-17	2	110	14.5	
Apr-17	2	210	136.5	
May-17	2	294.5	29.5	
Jun-17	2	730	199.5	
Jul-17	2	390	74.5	
Aug-17	2	79.5	41	
Sep-17	2	1326.85	69.7	
Oct-17	2	180.75	27.95	
Nov-17	2	799.2	68.3	
Dec-17	2	59.7	3.65	
Jan-18	2	1382	88.65	
Feb-18	2	201.75	15.1	
Mar-18	2	354.5	40.75	
Apr-18	2	336.85	15.65	
May-18	2	307.05	21.65	
Jun-18	2	804.15	63.2	
Jul-18	2	2419.2	70.6	
Aug-18	2	1016.5	23.3	
Sep-18	2	1859.45	58.7	41.45833
Oct-18	2	1119.9	21.1	
Nov-18	2	1468.2	233.15	
Dec-18	2	80.5	6.85	
Jan-19	2	77.08	6.8	
Feb-19	2	71.25	8.5	
Mar-19	2	201	40.55	
Apr-19	2	460.35	23.4	
May-19	2	173.65	16.8	
Jun-19	2	1414	39.3	
Jul-19	2	973.65	39.65	
Aug-19	2	1917	20.35	
Sep-19	3	2275.33	679.87	
Oct-19	2	557.15	42.1	
Nov-19	2	228.8	24.65	
Dec-19	2	251.75	31.35	
Jan-20	2	42.65	4.85	
Feb-20	2	144	3.65	
Mar-20	2	56.8	10.35	
Apr-20	2	151.35	3.6	
May-20	3	687.97	141.77	
Jun-20	2	643.65	12.85	
Jul-20	2	2203	32	
Aug-20	2	2420	21.4	
Sep-20	2	1643	22.7	
Oct-20	2	898.4	9.15	
Nov-20	2	777.05	16.6	
Dec-20	2	435.85	20.1	

min	3.6
max	679.87
average	59.494
median	28.725
95th	201.025

Bowman

Sample Date	Number of Samples Taken	Average Total Coliform Levels	Average E. Coli Coliform Levels
Jan-16	2	820.5	12.5
Feb-16	2	85	2
Mar-16	2	390	37
Apr-16	2	78.5	45
May-16	2	100	28
Jun-16	2	46	0
Jul-16	2	20	7.5
Aug-16	3	36.7	22.3
Sep-16	2	45	5.5
Oct-16	2	89.5	49.5
Nov-16	2	835	22
Dec-16	2	35.5	10.5
Jan-17	2	823.5	14
Feb-17	2	1600	5.5
Mar-17	2	41	15.5
Apr-17	2	515	71.5
May-17	2	20	6.5
Jun-17	2	28	14
Jul-17	2	20	9
Aug-17	2	185	64
Sep-17	2	1552.95	9.8
Oct-17	2	487.15	16.25
Nov-17	2	753.65	48.85
Dec-17	2	91.3	10.35
Jan-18	2	85.85	18.5
Feb-18	2	65.55	12.55
Mar-18	2	1916.4	51.7
Apr-18	2	146.3	4.15
May-18	2	1289.95	31.2
Jun-18	2	132.35	5.25
Jul-18	2	550.75	21.8
Aug-18	2	764.15	3.65
Sep-18	2	614.1	7.7
Oct-18	2	557.15	15.3
Nov-18	2	1552.95	168.2
Dec-18	2	150.8	5.3
Jan-19	2	190.45	10.8
Feb-19	2	75.5	13.6
Mar-19	2	140.1	8.05
Apr-19	2	198.6	1.55
May-19	2	105.1	19.7
Jun-19	2	316.7	34.8
Jul-19	2	269.5	4.65
Aug-19	2	263	4.25
Sep-19	2	475.85	5.2
Oct-19	2	366.05	4.7
Nov-19	2	433.3	12.8
Dec-19	2	351.1	11.95
Jan-20	2	45.4	9.9
Feb-20	2	104.95	0.5
Mar-20	2	86.4	2.55
Apr-20	2	239.45	6.6
May-20	2	269.9	11.15
Jun-20	2	250.05	13.5
Jul-20	2	316.55	3.6
Aug-20	2	368.65	8.1
Sep-20	2	350.75	14.85
Oct-20	2	607.7	17.75
Nov-20	2	385.55	21.7
Dec-20	2	250.7	16.15

min	0
max	168.2
average	18.84583
median	12.225
95th	52.315

Auburn

Sample Date	Number of Samples Taken	Average Total Coliform Levels	Average E. Coli Coliform Levels
Jan-16	2	1070	305
Feb-16	2	214.5	104.5
Mar-16	2	260	56
Apr-16	2	340	56
May-16	2	130	80
Jun-16	2	185	133.5
Jul-16	2	130	39.5
Aug-16	3	376.7	199.7
Sep-16	2	240	49
Oct-16	2	240	133.5
Nov-16	2	840	44
Dec-16	2	580	26.5
Jan-17	2	885	199.5
Feb-17	2	730	14
Mar-17	2	240	31.5
Apr-17	2	63.5	14.5
May-17	2	136.5	71.5
Jun-17	2	170	79.5
Jul-17	2	100	81.5
Aug-17	2	199.5	24.5
Sep-17	2	2076.05	71.25
Oct-17	2	1191.55	72.95
Nov-17	2	335.45	53.85
Dec-17	2	1427.2	71.25
Jan-18	2	564.75	24.55
Feb-18	2	202.1	10.5
Mar-18	2	1358.65	46.2
Apr-18	2	956.4	65.65
May-18	2	1346.25	66.35
Jun-18	2	344.85	6.9
Jul-18	2	1916.4	18.55
Aug-18	2	1715.15	47.6
Sep-18	2	1167.2	62.95
Oct-18	2	1221.9	17.45
Nov-18	2	500.9	119.3
Dec-18	2	222.95	17.7
Jan-19	2	173.95	12.5
Feb-19	2	274.1	28.95
Mar-19	2	185.5	6.45
Apr-19	2	310.15	9.2
May-19	2	96.2	11
Jun-19	2	2203	10.4
Jul-19	2	1173	12.6
Aug-19	2	1670.4	15.15
Sep-19	2	2420	70.15
Oct-19	2	2419.8	43.25
Nov-19	2	658.8	32.7
Dec-19	2	378.5	41.25
Jan-20	2	193.85	10.6
Feb-20	2	565.15	15.9
Mar-20	2	474.75	17.55
Apr-20	2	1499.7	21.5
May-20	3	1588.67	135.97
Jun-20	2	1618.2	26.65
Jul-20	2	1917	49.55
Aug-20	2	2203	31.5
Sep-20	2	2420	31.05
Oct-20	2	1643	59.55
Nov-20	2	643.1	9.9
Dec-20	2	1449.3	40.4

min	6.45
max	305
average	54.34033
median	40.825
95th	139.1465

Foothill

Sample Date	Number of Samples Taken	Average Total Coliform Levels	Average E. Coli Coliform Levels
Jan-16	1	79	49
Feb-16	1	38	13
Mar-16	1	49	23
Apr-16	1	49	23
May-16	1	1600	79
Jun-16	1	50	5
Jul-16	1	140	140
Aug-16	1	79	49
Sep-16	1	79	17
Oct-16	1	240	79
Nov-16	1	1600	110
Dec-16	1	79	5
Jan-17	1	110	2
Feb-17	1	1600	27
Mar-17	1	10	2
Apr-17	2	1260	260
May-17	1	22	14
Jun-17	1	23	13
Jul-17	1	46	46
Aug-17	1	130	17
Sep-17	1	2419.2	24.6
Oct-17	1	1299.7	19.7
Nov-17	1	435.2	6.3
Dec-17	1	155.3	13.4
Jan-18	1	290.9	8.5
Feb-18	1	224.7	18.1
Mar-18	1	365.4	25.9
Apr-18	1	128.1	22.8
May-18	1	328.2	88.8
Jun-18	1	1986.3	7.4
Jul-18	1	579.4	13.4
Aug-18	1	913.9	30.5
Sep-18	1	2419.2	53.6
Oct-18	1	2419.2	214.3
Nov-18	1	648.8	5.2
Dec-18	1	307.6	12.1
Jan-19	1	200.5	9.9
Feb-19	1	152.9	10.7
Mar-19	1	298.7	37.3
Apr-19	1	69.7	3.1
May-19	1	112.6	7.5
Jun-19	1	571.7	9.6
Jul-19	1	1986	14.8
Aug-19	1	686.7	10.9
Sep-19	1	1733	65
Oct-19	1	365.4	7.4
Nov-19	1	1120	10.8
Dec-19	1	517.2	16.1
Jan-20	1	137.6	7.5
Feb-20	1	101.2	9.8
Mar-20	1	201.4	8.6
Apr-20	1	387.3	24.3
May-20	1	517.2	14.6
Jun-20	1	1120	26.9
Jul-20	1	1733	3.1
Aug-20	1	1733	31.1
Sep-20	1	2420	123.6
Oct-20	1	1414	42
Nov-20	1	1203	7.2
Dec-20	1	224.7	1

min	1
max	260
average	34.00667
median	15.45
95th	124.42

Sunset

Sample Date	Number of Samples Taken	Average Total Coliform Levels	*E. coli*
Jan-16	1	1600	540
Feb-16	1	540	50
Mar-16	1	1600	1600
Apr-16	1	79	23
May-16	1	33	33
Jun-16	1	350	240
Jul-16	1	350	350
Aug-16	1	240	34
Sep-16	1	920	48
Oct-16	1	80	13
Nov-16	1	130	79
Dec-16	1	540	23
Jan-17	2	940	104.5
Feb-17	2	445	55.5
Mar-17	2	104.5	104.5
Apr-17	2	161	26.5
May-17	2	885	70
Jun-17	2	155	22
Jul-17	2	56	23
Aug-17	3	243	60
Sep-17	2	2419.2	170.65
Oct-17	2	1209.6	205.3
Nov-17	4	1922.78	660.33
Dec-17	2	1210.75	40.3
Jan-18	2	1440.15	454.15
Feb-18	2	705.8	276.9
Mar-18	2	1414.9	1211.15
Apr-18	2	1356.65	4.7
May-18	2	1644.8	28.85
Jun-18	2	1317.55	7.55
Jul-18	2	2419.2	2.55
Aug-18	2	1666.55	13.8
Sep-18	2	833.55	30.15
Oct-18	2	1553.1	117.65
Nov-18	2	2076.05	135.5
Dec-18	2	1472.35	31.8
Jan-19	2	203.45	17.8
Feb-19	2	261.85	4.7
Mar-19	2	232.25	17.9
Apr-19	2	110.6	1.5
May-19	2	643.25	7.45
Jun-19	2	2420	5.8
Jul-19	2	2420	8.05
Aug-19	2	2420	27.65
Sep-19	2	2076.5	16.05
Oct-19	2	1769.5	35.5
Nov-19	2	670.05	17.75
Dec-19	2	354.95	6.9
Jan-20	2	168.15	6
Feb-20	2	328.9	2.05
Mar-20	2	474.75	23.75
Apr-20	2	319.8	7.4
May-20	2	829.55	14.7
Jun-20	2	2420	25.1
Jul-20	2	2420	19.85
Aug-20	2	1917	19.45
Sep-20	2	2420	25.35
Oct-20	2	1860	20.65
Nov-20	2	1986.5	85.55
Dec-20	2	923.5	5.35

min	1.5
max	1600
average	121.8763
median	25.925
95th	546.0165

Cryptosporidium Results

Filtered System

PWS Name: Placer County Water Agency - Auburn/Bowman
PWS ID: CA3110005
Facility Name: Auburn WTP Raw
Facility ID: CA3110005-001

Month	1	2	3	4	5	6	7	8	9	10	11	12
Date	10/6/15	11/3/15	12/2/15	1/5/16	2/2/16	3/1/16	4/5/16	5/3/16	6/8/16	7/26/16	8/2/16	9/13/16
Result 1*	0.000	0.100	0.200	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.100	0.200	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000
12 Month Mean												0.033

Month	13	14	15	16	17	18	19	20	21	22	23	24
Date	10/4/16	11/1/16	12/6/17	1/4/17	2/1/17	3/8/17	4/5/17	5/3/17	6/7/17	7/18/17	8/2/17	9/13/17
Result 1*	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 Month Mean	0.033	0.025	0.008	0.017	0.017	0.017	0.017	0.008	0.008	0.008	0.008	0.008

LT2 Bin Concentration: Highest 12-month Mean	0.033

Bin Classification - from (§141.710(c)	1

*** All results in oocyst/L - valid field samples only (no matrix spike, OPR or method blank samples)**

Brad Wilkins, Water Quality Supervisor

12/6/2017
Date

PWS Name: Placer County Water Agency - Auburn/Bowman
PWS ID: CA3110005
Facility Name: Auburn WTP Raw
Facility ID: CA3110005-001

Giardia Results
Filtered System

Month	1	2	3	4	5	6	7	8	9	10	11	12
Date	10/6/15	11/3/15	12/2/15	1/5/16	2/2/16	3/1/16	4/5/16	5/3/16	6/8/16	7/26/16	8/2/16	9/13/16
Result 1*	0.100	0.000	0.100	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.100	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.100	0.000	0.100	0.000	0.210	0.000	0.000	0.000	0.000	0.000	0.100	0.000
12 Month Mean												0.043

Month	13	14	15	16	17	18	19	20	21	22	23	24
Date	10/4/16	11/1/16	12/6/17	1/4/17	2/1/17	3/8/17	4/5/17	5/3/17	6/7/17	7/18/17	8/2/17	9/13/17
Result 1*	0.000	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100
12 Month Mean	0.034	0.051	0.043	0.043	0.025	0.025	0.025	0.025	0.025	0.025	0.017	0.025

LT2 Bin Concentration: Highest 12-month Mean	**0.051**

*** All results in oocyst/L - valid field samples only (no matrix spike, OPR or method blank samples)**

Brad Wilkins, Water Quality Supervisor

12/6/2017
Date

Cryptosporidium Results
Filtered System

PWS Name: Placer County Water Agency - Auburn/Bowman
PWS ID: CA3110005
Facility Name: Bowman WTP Raw
Facility ID: CA3110005-003

Month	1	2	3	4	5	6	7	8	9	10	11	12
Date	**10/6/15**	**11/3/15**	**12/2/15**	**1/5/16**	**2/2/16**	**3/1/16**	**4/12/16**	**5/3/16**	**6/8/16**	**7/26/16**	**8/2/16**	**9/13/16**
Result 1*	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000
12 Month Mean												0.017

Month	13	14	15	16	17	18	19	20	21	22	23	24
Date	**10/4/16**	**11/1/16**	**12/6/16**	**1/4/17**	**2/1/17**	**3/8/17**	**4/5/17**	**5/3/17**	**6/7/17**	**7/18/17**	**8/2/17**	**9/13/17**
Result 1*	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000
12 Month Mean	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.008	0.017	0.017	0.017	0.017

LT2 Bin Concentration: Highest 12-month Mean	**0.017**

Bin Classification - from (§141.710(c)	**1**

*** All results in oocyst/L - valid field samples only (no matrix spike, OPR or method blank samples)**

Brad Wilkins, Water Quality Supervisor

12/6/2017
Date

PWS Name: Placer County Water Agency - Auburn/Bowman
PWS ID: CA3110005
Facility Name: Bowman WTP Raw
Facility ID: CA3110005-003

Giardia Results
Filtered System

Month	1	2	3	4	5	6	7	8	9	10	11	12
Date	10/6/15	11/3/15	12/2/15	1/5/16	2/2/16	3/1/16	4/12/16	5/3/16	6/8/16	7/26/16	8/2/16	9/13/16
Result 1*	0.000	0.158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.158	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 Month Mean												0.013

Month	13	14	15	16	17	18	19	20	21	22	23	24
Date	10/4/16	11/1/16	12/6/16	1/4/17	2/1/17	3/8/17	4/5/17	5/3/17	6/7/17	7/18/17	8/2/17	9/13/17
Result 1*	0.000	0.000	0.000	0.400	0.000	0.000	0.200	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.400	0.000	0.000	0.200	0.000	0.000	0.000	0.000	0.000
12 Month Mean	0.013	0.000	0.000	0.033	0.033	0.033	0.050	0.050	0.050	0.050	0.050	0.050

LT2 Bin Concentration: Highest 12-month Mean	0.050

*** All results in oocyst/L - valid field samples only (no matrix spike, OPR or method blank samples)**

Brad Wilkins, Water Quality Supervisor

12/6/2017
Date

PWS Name: Placer County Water Agency - Foothill/Sunset
PWS ID: CA3110025
Facility Name: Foothill WTP Raw
Facility ID: CA3110025-001

Cryptosporidium Results
Filtered System

Month	1	2	3	4	5	6	7	8	9	10	11	12
Date	10/6/15	11/3/15	12/8/15	1/5/16	2/2/16	3/1/16	4/5/16	5/3/16	6/8/16	7/26/16	8/2/16	9/13/16
Result 1*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 Month Mean												0.000

Month	13	14	15	16	17	18	19	20	21	22	23	24
Date	10/4/16	11/1/16	12/6/16	1/4/17	2/8/17	3/8/17	4/5/17	5/3/17	6/7/17	7/11/17	8/2/17	9/13/17
Result 1*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 Month Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

LT2 Bin Concentration: Highest 12-month Mean	0.000

Bin Classification - from (§141.710(c)	1

*** All results in oocyst/L - valid field samples only (no matrix spike, OPR or method blank samples)**

Brad Wilkins, Water Quality Supervisor

12/6/2017
Date

Giardia Results
Filtered System

PWS Name: Placer County Water Agency - Foothill/Sunset
PWS ID: CA3110025
Facility Name: Foothill WTP Raw
Facility ID: CA3110025-001

Month	1	2	3	4	5	6	7	8	9	10	11	12
Date	10/6/15	11/3/15	12/8/15	1/5/16	2/2/16	3/1/16	4/5/16	5/3/16	6/8/16	7/26/16	8/2/16	9/13/16
Result 1*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.000
12 Month Mean												0.008

Month	13	14	15	16	17	18	19	20	21	22	23	24
Date	10/4/16	11/1/16	12/6/16	1/4/17	2/8/17	3/8/17	4/5/17	5/3/17	6/7/17	7/11/17	8/2/17	9/13/17
Result 1*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 Month Mean	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.000	0.000	0.000

LT2 Bin Concentration: Highest 12-month Mean	**0.008**

*** All results in oocyst/L - valid field samples only (no matrix spike, OPR or method blank samples)**

Brad Wilkins, Water Quality Supervisor

12/6/2017
Date

Cryptosporidium Results
Filtered System

PWS Name: Placer County Water Agency - Foothill/Sunset
PWS ID: CA3110025
Facility Name: Sunset WTP Raw
Facility ID: CA3110025-006

Month	1	2	3	4	5	6	7	8	9	10	11	12
Date	10/13/15	11/3/15	12/2/15	1/5/16	2/2/16	3/1/16	4/5/16	5/3/16	6/8/16	7/26/16	8/2/16	9/13/16
Result 1*	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.000
12 Month Mean												0.008

Month	13	14	15	16	17	18	19	20	21	22	23	24
Date	10/4/16	11/1/16	12/6/16	1/4/17	2/8/17	3/8/17	4/5/17	5/3/17	6/7/17	7/11/17	8/2/17	9/13/17
Result 1*	0.000	0.200	0.100	0.100	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.200	0.100	0.100	0.200	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 Month Mean	0.008	0.025	0.033	0.042	0.058	0.058	0.050	0.050	0.050	0.050	0.050	0.050

LT2 Bin Concentration: Highest 12-month Mean	0.058

Bin Classification - from (§141.710(c)	1

*** All results in oocyst/L - valid field samples only (no matrix spike, OPR or method blank samples)**

Brad Wilkins, Water Quality Supervisor

12/6/2017
Date

Giardia Results
Filtered System

PWS Name: Placer County Water Agency - Foothill/Sunset
PWS ID: CA3110025
Facility Name: Sunset WTP Raw
Facility ID: CA3110025-006

Month	1	2	3	4	5	6	7	8	9	10	11	12
Date	10/13/15	11/3/15	12/2/15	1/5/16	2/2/16	3/1/16	4/5/16	5/3/16	6/8/16	7/26/16	8/2/16	9/13/16
Result 1*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 Month Mean												0.000

Month	13	14	15	16	17	18	19	20	21	22	23	24
Date	10/4/16	11/1/16	12/6/16	1/4/17	2/8/17	3/8/17	4/5/17	5/3/17	6/7/17	7/11/17	8/2/17	9/13/17
Result 1*	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Result 2*												
Result 3*												
Result 4*												
Monthly Mean	0.000	0.000	0.000	0.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
12 Month Mean	0.000	0.000	0.000	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008	0.008

LT2 Bin Concentration: Highest 12-month Mean	**0.008**

*** All results in oocyst/L - valid field samples only (no matrix spike, OPR or method blank samples)**

Brad Wilkins, Water Quality Supervisor

12/6/2017
Date

TTHM/HAA5 Report for Disinfection Byproducts Compliance
(For Systems Monitoring Annually or Every Three Years)

System Name: Placer CWA - Monte Vista System No.: 3110124

Calendar Year: 2016

Sample Location	Sample Date	Total Trihalomethanes Level (TTHM) (µg/L or ppb)	Five Haloacetic Acids Level (HAA5) (µg/L or ppb)
Ridge Road Sample Station, Dutch Flat (Corner of I-80 and Ridge Road)	8/9/16	41.0	23.0
If monitoring annually, report the average TTHM and HAA5 of all samples taken over the last 12 months:			
Meets standard? (The standard is 80 ppb for TTHM and 60 ppb for HAA5.)		☑ Yes ☐ No	☑ Yes ☐ No
If monitoring annually, report the number of samples taken during the last 12 months:		1	1

Comments: HAA Collected on 8/24/16. Original sample was lost due to shipping error.

Signature: Brad Wilkins Date: 10/6/2016

TTHM/HAA5 Report for Disinfection Byproducts Compliance
(For Systems Monitoring Annually or Every Three Years)

System Name: Placer CWA - Monte Vista System No.: 3110124

Calendar Year: 2017

Sample Location	Sample Date	Total Trihalomethanes Level (TTHM) (µg/L or ppb)	Five Haloacetic Acids Level (HAA5) (µg/L or ppb)
Ridge Road Sample Station, Dutch Flat (Corner of I-80 and Ridge Road)	8/7/17	40.0	14.0
If monitoring annually, report the average TTHM and HAA5 of all samples taken over the last 12 months:			
Meets standard? (The standard is 80 ppb for TTHM and 60 ppb for HAA5.)		☑ Yes ☐ No	☑ Yes ☐ No
If monitoring annually, report the number of samples taken during the last 12 months:		1	1

Comments:

Signature: Brad Wilkins Date: 10/10/2017

TTHM/HAA5 Report for Disinfection Byproducts Compliance
(For Systems Monitoring Annually or Every Three Years)

System Name: Placer CWA - Monte Vista System No.: 3110124

Calendar Year: 2018

Sample Location	Sample Date	Total Trihalomethanes Level (TTHM) (µg/L or ppb)	Five Haloacetic Acids Level (HAA5) (µg/L or ppb)
Ridge Road Sample Station, Dutch Flat (Corner of I-80 and Ridge Road)	8/6/18	66.0	22.0
If monitoring annually, report the average TTHM and HAA5 of all samples taken over the last 12 months:			
Meets standard? (The standard is 80 ppb for TTHM and 60 ppb for HAA5.)		☑ Yes ☐ No	☑ Yes ☐ No
If monitoring annually, report the number of samples taken during the last 12 months:		1	1

Comments:

Signature: ______________________ Date: 10/9/2018

Brad Wilkins

TTHM/HAA5 Report for Disinfection Byproducts Compliance
(For Systems Monitoring Annually or Every Three Years)

System Name: Placer CWA - Monte Vista System No.: 3110124

Calendar Year: 2019

Sample Location	Sample Date	Total Trihalomethanes Level (TTHM) (µg/L or ppb)	Five Haloacetic Acids Level (HAA5) (µg/L or ppb)
Ridge Road Sample Station, Dutch Flat (Corner of I-80 and Ridge Road)	8/13/19	38.0	27.0
If monitoring annually, report the average TTHM and HAA5 of all samples taken over the last 12 months:			
Meets standard? (The standard is 80 ppb for TTHM and 60 ppb for HAA5.)		☑ Yes ☐ No	☑ Yes ☐ No
If monitoring annually, report the number of samples taken during the last 12 months:		1	1

Comments:

Signature: ______________________ Date: 10/8/2019

TTHM/HAA5 Report for Disinfection Byproducts Compliance
(For Systems Monitoring Annually or Every Three Years)

System Name: Placer CWA - Monte Vista System No.: 3110124

Calendar Year: 2020

Sample Location	Sample Date	Total Trihalomethanes Level (TTHM) (µg/L or ppb)	Five Haloacetic Acids Level (HAA5) (µg/L or ppb)
Ridge Road Sample Station, Dutch Flat (Corner of I-80 and Ridge Road)	8/11/20	42.0	19.0
If monitoring annually, report the average TTHM and HAA5 of all samples taken over the last 12 months:			
Meets standard? (The standard is 80 ppb for TTHM and 60 ppb for HAA5.)		☑ Yes ☐ No	☑ Yes ☐ No
If monitoring annually, report the number of samples taken during the last 12 months:		1	1

Comments:

Signature: Brad Wilkins Date: 10/7/2020

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Alta** System #: **3E+06**

Sample Site		2016 Qtr 1	2016 Qtr 2	2016 Qtr 3	2016 Qtr 4	2017 Qtr 1	2017 Qtr 2	2017 Qtr 3	2017 Qtr 4	2018 Qtr 1	2018 Qtr 2	2018 Qtr 3	2018 Qtr 4
	Date	2/8/16	5/11/16	8/9/16	11/10/16	2/6/17	5/9/17	8/7/17	11/7/17	2/12/18	5/10/18	8/6/18	11/28/18
Mattel Drive	Result	42.00	53.00	57.00	72.00	28.00	49.00	48.00	48.00	73.00	55.00	61.00	47.00
	LRAA	42	47.5	50.667	56	52.5	51.5	49.25	43.25	54.5	56	59.25	59
	OEL	21	37	52.25	63.5	46.25	49.5	43.25	48.25	60.5	57.75	62.5	52.5
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
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	LRAA												
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	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	42	47.5	50.667	56	52.5	51.5	49.25	43.25	54.5	56	59.25	59

Brad Wilkins — 1/9/2019

Signature — Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Alta** System #: **3E+06**

Sample Site		2016 Qtr 1	2016 Qtr 2	2016 Qtr 3	2016 Qtr 4	2017 Qtr 1	2017 Qtr 2	2017 Qtr 3	2017 Qtr 4	2018 Qtr 1	2018 Qtr 2	2018 Qtr 3	2018 Qtr 4
	Date	2/8/16	5/11/16	8/24/16	11/10/16	2/28/17	5/9/17	8/7/17	11/7/17	2/12/18	5/10/18	8/6/18	11/28/18
Mattel Drive	Result	22.00	30.00	19.00	31.00	18.00	38.00	24.00	5.20	26.00	40.00	17.00	25.00
	LRAA	22	26	23.667	25.5	24.5	26.5	27.75	21.3	23.3	23.8	22.05	27
	OEL	11	20.5	22.5	27.75	21.5	31.25	26	18.1	20.3	27.8	25	26.75
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
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	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	22	26	23.667	25.5	24.5	26.5	27.75	21.3	23.3	23.8	22.05	27

Brad Wilkins — 1/9/2019

Signature — Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Alta** System #: **3E+06**

		2018				2019				2020			
Sample Site		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/12/18	5/10/18	8/6/18	11/28/18	2/12/19	5/8/19	8/13/19	11/12/19	2/18/20	5/12/20	8/11/20	11/5/20
Mattel Drive	Result	73.00	55.00	61.00	47.00	38.00	51.00	51.00	44.00	35.00	53.00	46.00	36.00
	LRAA	73	64	63	59	50.25	49.25	46.75	46	45.25	45.75	44.5	42.5
	OEL	36.5	45.75	62.5	52.5	46	46.75	47.75	47.5	41.25	46.25	45	42.75
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
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	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	73	64	63	59	50.25	49.25	46.75	46	45.25	45.75	44.5	42.5

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Alta** System #: **3E+06**

		2018				2019				2020			
Sample Site		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/12/18	5/10/18	8/6/18	11/28/18	2/12/19	5/8/19	8/13/19	11/12/19	2/18/20	5/12/20	8/11/20	11/5/20
Mattel Drive	Result	26.00	40.00	17.00	25.00	26.00	22.00	25.00	12.00	24.00	27.00	14.00	17.00
	LRAA	26	33	27.667	27	27	22.5	24.5	21.25	20.75	22	19.25	20.5
	OEL	13	26.5	25	26.75	23.5	23.75	24.5	17.75	21.25	22.5	19.75	18.75
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
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	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	26	33	27.667	27	27	22.5	24.5	21.25	20.75	22	19.25	20.5

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Applegate** System #: **3E+06**

Sample Site		2016 Qtr 1	2016 Qtr 2	2016 Qtr 3	2016 Qtr 4	2017 Qtr 1	2017 Qtr 2	2017 Qtr 3	2017 Qtr 4	2018 Qtr 1	2018 Qtr 2	2018 Qtr 3	2018 Qtr 4
	Date	2/8/16	5/12/16	8/10/16	11/10/16	2/6/17	5/17/17	8/7/17	11/7/17	2/12/18	5/10/18	8/8/18	11/28/18
Julie Way	Result	69.00	45.00	56.00	57.00	38.00	41.00	66.00	41.00	56.00	54.00	76.00	100.00
	LRAA	69	57	56.667	56.75	49	48	50.5	46.5	51	54.25	56.75	71.5
	OEL	34.5	39.75	56.5	53.75	47.25	44.25	52.75	47.25	54.75	51.25	65.5	82.5
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
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	LRAA												
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	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	69	57	56.667	56.75	49	48	50.5	46.5	51	54.25	56.75	71.5

***Notification of TTHM result was on 12/6/18. OEL Report will be completed by 3/6/19 in accordance with Title 22, Section 64537(d)**

Brad Wilkins 1/9/2019

Signature Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Applegate** System #: **3E+06**

Sample Site		2016 Qtr 1	2016 Qtr 2	2016 Qtr 3	2016 Qtr 4	2017 Qtr 1	2017 Qtr 2	2017 Qtr 3	2017 Qtr 4	2018 Qtr 1	2018 Qtr 2	2018 Qtr 3	2018 Qtr 4
	Date	2/8/16	5/12/16	8/24/16	11/10/16	2/28/17	5/17/17	8/7/17	11/7/17	2/12/18	5/10/18	8/8/18	11/28/18
Julie Way	Result	59.00	44.00	44.00	34.00	55.00	21.00	11.00	14.00	40.00	18.00	18.00	37.00
	LRAA	59	51.5	49	45.25	44.25	38.5	30.25	25.25	21.5	20.75	22.5	28.25
	OEL	29.5	36.75	47.75	39	47	32.75	24.5	15	26.25	22.5	23.5	27.5
	Result												
	LRAA												
	OEL												
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	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	59	51.5	49	45.25	44.25	38.5	30.25	25.25	21.5	20.75	22.5	28.25

Brad Wilkins 1/9/2019

Signature Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Applegate** System #: **3E+06**

		2018				2019				2020			
Sample Site		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/12/18	5/10/18	8/8/18	11/28/18	2/12/19	5/9/19	8/13/19	11/26/19	2/18/20	5/12/20	8/11/20	11/9/20
Julie Way	Result	56.00	54.00	76.00	100.00	52.00	50.00	55.00	27.00	34.00	54.00	55.00	45.00
	LRAA	56	55	62	71.5	70.5	69.5	64.25	46	41.5	42.5	42.5	47
	OEL	28	41	65.5	82.5	70	63	53	39.75	37.5	42.25	49.5	49.75
	Result												
	LRAA												
	OEL												
	Result												
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	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	56	55	62	71.5	70.5	69.5	64.25	46	41.5	42.5	42.5	47

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Applegate** System #: **3E+06**

		2018				2019				2020			
Sample Site		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/12/18	5/10/18	8/8/18	11/28/18	2/12/19	5/9/19	8/13/19	11/26/19	2/18/20	5/12/20	8/11/20	11/9/20
Julie Way	Result	40.00	18.00	18.00	37.00	28.00	17.00	15.00	17.00	31.00	26.00	16.00	14.00
	LRAA	40	29	25.333	28.25	25.25	25	24.25	19.25	20	22.25	22.5	21.75
	OEL	20	19	23.5	27.5	27.75	24.75	18.75	16.5	23.5	25	22.25	17.5
	Result												
	LRAA												
	OEL												
	Result												
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	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	40	29	25.333	28.25	25.25	25	24.25	19.25	20	22.25	22.5	21.75

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Colfax** System #: **3E+06**

Sample Site		2016				2017				2018			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/8/16	5/11/16	8/9/16	11/10/16	2/6/17	5/12/17	8/7/17	11/7/17	2/12/18	5/10/18	8/6/18	11/28/18
Hillcrest Drive	Result	48.00	28.00	61.00	49.00	41.00	41.00	56.00	37.00	54.00	39.00	72.00	45.00
	LRAA	48	38	45.667	46.5	44.75	48	46.75	43.75	47	46.5	50.5	52.5
	OEL	24	26	49.5	46.75	48	43	48.5	42.75	50.25	42.25	59.25	50.25
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
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	Result												
	LRAA												
	OEL												
Overall	RAA	48	38	45.667	46.5	44.75	48	46.75	43.75	47	46.5	50.5	52.5

Brad Wilkins 1/9/2019

Signature Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Colfax** System #: **3E+06**

Sample Site		2016				2017				2018			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/8/16	5/11/16	8/24/16	11/10/16	2/28/17	5/12/17	8/7/17	11/7/17	2/12/18	5/10/18	8/6/18	11/28/18
Hillcrest Drive	Result	51.00	29.00	25.00	42.00	45.00	33.00	25.00	30.00	29.00	29.00	38.00	32.00
	LRAA	51	40	35	36.75	35.25	36.25	36.25	33.25	29.25	28.25	31.5	32
	OEL	25.5	27.25	32.5	34.5	39.25	38.25	32	29.5	28.25	29.25	33.5	32.75
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
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	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	51	40	35	36.75	35.25	36.25	36.25	33.25	29.25	28.25	31.5	32

Brad Wilkins 1/9/2019

Signature Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Colfax** System #: **3E+06**

Sample Site		2018				2019				2020			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/12/18	5/10/18	8/6/18	11/28/18	2/12/19	5/8/19	8/13/19	11/12/19	2/18/20	5/12/20	8/11/20	11/9/20
Hillcrest Drive	Result	54.00	39.00	72.00	45.00	51.00	33.00	61.00	33.00	28.00	39.00	64.00	35.00
	LRAA	54	46.5	55	52.5	51.75	50.25	47.5	44.5	38.75	40.25	41	41.5
	OEL	27	33	59.25	50.25	54.75	40.5	51.5	40	37.5	34.75	48.75	43.25
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
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	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	54	46.5	55	52.5	51.75	50.25	47.5	44.5	38.75	40.25	41	41.5

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Colfax** System #: **3E+06**

Sample Site		2018				2019				2020			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/12/18	5/10/18	8/6/18	11/28/18	2/12/19	5/8/19	8/13/19	11/12/19	2/18/20	5/12/20	8/11/20	11/9/20
Hillcrest Drive	Result	29.00	29.00	38.00	32.00	37.00	27.00	25.00	25.00	42.00	25.00	27.00	20.00
	LRAA	29	29	32	32	34	33.5	30.25	28.5	29.75	29.25	29.75	28.5
	OEL	14.5	21.75	33.5	32.75	36	30.75	28.5	25.5	33.5	29.25	30.25	23
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
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	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	29	29	32	32	34	33.5	30.25	28.5	29.75	29.25	29.75	28.5

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Auburn/Bowman** System #: **3E+06**

Sample Site		2016				2017				2018			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/5/16	5/19/16	8/16/16	11/15/16	2/7/17	5/16/17	8/21/17	11/8/17	2/14/18	5/9/18	8/15/18	11/26/18
Huntley (changed from Landis Circle 1/16/18)	Result	73.00	53.00	73.00	69.00	35.00	45.00	36.00	71.00	45.00	63.00	60.00	52.00
	LRAA	73	63	66.333	67	57.5	55.5	46.25	46.75	49.25	53.75	59.75	55
	OEL	36.5	44.75	68	66	53	48.5	38	55.75	49.25	60.5	57	56.75
Tracy Lane	Result	68.00	36.00	54.00	67.00	30.00	34.00	36.00	37.00	39.00	69.00	72.00	44.00
	LRAA	68	52	52.667	56.25	46.75	46.25	41.75	34.25	36.5	45.25	54.25	56
	OEL	34	35	53	56	45.25	41.25	34	36	37.75	53.5	63	57.25
Westwood Drive	Result	73.00	36.00	59.00	70.00	31.00	36.00	32.00	37.00	40.00	73.00	67.00	47.00
	LRAA	73	54.5	56	59.5	49	49	42.25	34	36.25	45.5	54.25	56.75
	OEL	36.5	36.25	56.75	58.75	47.75	43.25	32.75	35.5	37.25	55.75	61.75	58.5
Sunrise Ridge	Result	100.00	68.00	72.00	60.00	50.00	45.00	46.00	53.00	50.00	73.00	72.00	38.00
	LRAA	100	84	80	75	62.5	56.75	50.25	48.5	48.5	55.5	62	58.25
	OEL	50	59	78	65	58	50	46.75	49.25	49.75	62.25	66.75	55.25
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	78.5	63.375	63.75	64.438	53.938	51.875	45.125	40.875	42.625	50	57.563	56.5

Brad Wilkins 1/9/2019

Signature Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Auburn/Bowman** System #: **3E+06**

Sample Site		2016				2017				2018			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/5/16	5/19/16	8/16/16	11/15/16	2/28/17	5/16/17	8/21/17	11/8/17	2/14/18	5/9/18	8/15/18	11/26/18
Huntley (changed from Landis Circle 1/16/18)	Result	55.00	44.00	0.00	37.00	30.00	34.00	31.00	32.00	30.00	46.00	27.00	21.00
	LRAA	55	49.5	33	34	27.75	25.25	33	31.75	31.75	34.75	33.75	31
	OEL	27.5	35.75	24.75	29.5	24.25	33.75	31.5	32.25	30.75	38.5	32.5	28.75
Tracy Lane	Result	59.00	31.00	43.00	57.00	28.00	30.00	25.00	29.00	28.00	44.00	0.00	30.00
	LRAA	59	45	44.333	47.5	39.75	39.5	35	28	28	31.5	25.25	25.5
	OEL	29.5	30.25	44	47	39	36.25	27	28.25	27.5	36.25	18	26
Westwood Drive	Result	52.00	36.00	0.00	44.00	26.00	32.00	21.00	29.00	28.00	48.00	28.00	28.00
	LRAA	52	44	29.333	33	26.5	25.5	30.75	27	27.5	31.5	33.25	33
	OEL	26	31	22	31	24	33.5	25	27.75	26.5	38.25	33	33
Sunrise Ridge	Result	48.00	39.00	41.00	34.00	32.00	49.00	16.00	48.00	32.00	27.00	26.00	15.00
	LRAA	48	43.5	42.667	40.5	36.5	39	32.75	36.25	36.25	30.75	33.25	25
	OEL	24	31.5	42.25	37	34.75	41	28.25	40.25	32	33.5	27.75	20.75
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	53.5	45.5	37.333	38.75	32.625	32.313	32.875	30.75	30.875	32.125	31.375	28.625

Brad Wilkins 1/9/2019

Signature Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Auburn/Bowman** System #: **3E+06**

Sample Site		2018 Qtr 1	2018 Qtr 2	2018 Qtr 3	2018 Qtr 4	2019 Qtr 1	2019 Qtr 2	2019 Qtr 3	2019 Qtr 4	2020 Qtr 1	2020 Qtr 2	2020 Qtr 3	2020 Qtr 4
	Date	2/14/18	5/9/18	8/15/18	11/26/18	2/20/19	5/21/19	8/22/19	11/14/19	*2/25/20	5/13/20	8/12/20	11/10/20
Huntley	Result	45.00	63.00	60.00	52.00	37.00	52.00	33.00	44.00	42.00	50.00	62.00	43.00
	LRAA	45	54	56	55	53	50.25	43.5	41.5	42.75	42.25	49.5	49.25
	OEL	22.5	42.75	57	56.75	46.5	48.25	38.75	43.25	40.25	46.5	54	49.5
Tracy Lane	Result	39.00	69.00	72.00	44.00	34.00	52.00	36.00	41.00	37.00	34.00	57.00	47.00
	LRAA	39	54	60	56	54.75	50.5	41.5	40.75	41.5	37	42.25	43.75
	OEL	19.5	44.25	63	57.25	46	45.5	39.5	42.5	37.75	36.5	46.25	46.25
Westwood Drive	Result	40.00	73.00	67.00	47.00	36.00	56.00	32.00	45.00	37.00	36.00	57.00	44.00
	LRAA	40	56.5	60	56.75	55.75	51.5	42.75	42.25	42.5	37.5	43.75	43.5
	OEL	20	46.5	61.75	58.5	46.5	48.75	39	44.5	37.75	38.5	46.75	45.25
Sunrise Ridge	Result	50.00	73.00	72.00	38.00	40.00	57.00	22.00	35.00	33.00	31.00	37.00	28.00
	LRAA	50	61.5	65	58.25	55.75	51.75	39.25	38.5	36.75	30.25	34	32.25
	OEL	25	49	66.75	55.25	47.5	48	35.25	37.25	30.75	32.5	34.5	31
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	43.5	56.5	60.25	56.5	54.813	51	41.75	40.75	40.875	36.75	42.375	42.188

*Tracy Lane 1st Quarter TTHM sampled on 2/26/20 due to lab preservation issue on 2/25/20 sample.

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Auburn/Bowman** System #: **3E+06**

Sample Site		2018 Qtr 1	2018 Qtr 2	2018 Qtr 3	2018 Qtr 4	2019 Qtr 1	2019 Qtr 2	2019 Qtr 3	2019 Qtr 4	2020 Qtr 1	2020 Qtr 2	2020 Qtr 3	2020 Qtr 4
	Date	2/14/18	5/9/18	8/15/18	11/26/18	2/20/19	5/21/19	8/22/19	11/14/19	2/25/20	5/13/20	8/12/20	11/10/20
Huntley	Result	30.00	46.00	27.00	21.00	38.00	60.00	22.00	21.00	23.00	18.00	19.00	23.00
	LRAA	30	38	34.333	31	33	36.5	35.25	35.25	31.5	21	20.25	20.75
	OEL	15	30.5	32.5	28.75	31	44.75	35.5	31	22.25	20	19.75	20.75
Tracy Lane	Result	28.00	44.00	0.00	30.00	36.00	64.00	25.00	22.00	23.00	19.00	21.00	24.00
	LRAA	28	36	24	25.5	27.5	32.5	38.75	36.75	33.5	22.25	21.25	21.75
	OEL	14	29	18	26	25.5	48.5	37.5	33.25	23.25	20.75	21	22
Westwood Drive	Result	28.00	48.00	28.00	28.00	29.00	61.00	21.00	22.00	24.00	15.00	17.00	24.00
	LRAA	28	38	34.667	33	33.25	36.5	34.75	33.25	32	20.5	19.5	20
	OEL	14	31	33	33	28.5	44.75	33	31.5	22.75	19	18.25	20
Sunrise Ridge	Result	32.00	27.00	26.00	15.00	36.00	66.00	13.00	14.00	18.00	11.00	12.00	9.90
	LRAA	32	29.5	28.333	25	26	35.75	32.5	32.25	27.75	14	13.75	12.725
	OEL	16	21.5	27.75	20.75	28.25	45.75	32	26.75	15.75	13.5	13.25	10.7
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
	Result												
	LRAA												
	OEL												
Overall	RAA	29.5	35.375	30.333	28.625	29.938	35.313	35.313	34.375	31.1875	19.438	18.688	18.806

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Foothill/Sunset** System #: **3E+06**

Sample Site		2016 Qtr 1	2016 Qtr 2	2016 Qtr 3	2016 Qtr 4	2017 Qtr 1	2017 Qtr 2	2017 Qtr 3	2017 Qtr 4	2018 Qtr 1	2018 Qtr 2	2018 Qtr 3	2018 Qtr 4
	Date	2/10/16	5/25/16	8/17/16	11/16/16	2/14/17	5/10/17	8/8/17	11/14/17	2/13/18	5/16/18	8/14/18	11/27/18
Cincinnati Sample Station (changed from 3720 Cincinnati 9/27/17)	Result	48.00	31.00	54.00	41.00	34.00	31.00	62.00	32.00	74.00	47.00	59.00	51.00
	LRAA	48	39.5	44.333	43.5	40	40	42	39.75	49.75	53.75	53	57.75
	OEL	24	27.5	46.75	41.75	40.75	34.25	47.25	39.25	60.5	50	59.75	52
5903 Sunset	Result	43.00	34.00	38.00	47.00	28.00	30.00	53.00	30.00	66.00	43.00	44.00	43.00
	LRAA	43	38.5	38.333	40.5	36.75	35.75	39.5	35.25	44.75	48	45.75	49
	OEL	21.5	27.75	38.25	41.5	35.25	33.75	41	35.75	53.75	45.5	49.25	43.25
2252 Penryn Rd	Result	33.00	26.00	34.00	48.00	22.00	30.00	48.00	31.00	71.00	40.00	40.00	41.00
	LRAA	33	29.5	31	35.25	32.5	33.5	37	32.75	45	47.5	45.5	48
	OEL	16.5	21.25	31.75	39	31.5	32.5	37	35	55.25	45.5	47.75	40.5
Ascension Sample Station	Result	65.00	40.00	61.00	58.00	44.00	40.00	53.00	28.00	75.00	45.00	47.00	47.00
	LRAA	65	52.5	55.333	56	50.75	50.75	48.75	41.25	49	50.25	48.75	53.5
	OEL	32.5	36.25	56.75	54.25	51.75	45.5	47.5	37.25	57.75	48.25	53.5	46.5
Claudio Sample Station	Result	38.00	32.00	53.00	49.00	35.00	46.00	51.00	33.00	72.00	62.00	62.00	46.00
	LRAA	38	35	41	43	42.25	45.75	45.25	41.25	50.5	54.5	57.25	60.5
	OEL	19	25.5	44	45.75	43	44	45.75	40.75	57	57.25	64.5	54
Lake Forest	Result	44.00	26.00	35.00	48.00	39.00	27.00	50.00	34.00	76.00	42.00	39.00	42.00
	LRAA	44	35	35	38.25	37	37.25	41	37.5	46.75	50.5	47.75	49.75
	OEL	22	24	35	39.25	40.25	35.25	41.5	36.25	59	48.5	49	41.25
Ketchikan Sample Station	Result	39.00	31.00	47.00	47.00	29.00	28.00	48.00	29.00	71.00	40.00	54.00	41.00
	LRAA	39	35	39	41	38.5	37.75	38	33.5	44	47	48.5	51.5
	OEL	19.5	25.25	41	43	38	33	38.25	33.5	54.75	45	54.75	44
Becky Way Sample Station	Result	38.00	23.00	30.00	37.00	26.00	22.00	66.00	31.00	66.00	43.00	41.00	37.00
	LRAA	38	30.5	30.333	32	29	28.75	37.75	36.25	46.25	51.5	45.25	46.75
	OEL	19	21	30.25	31.75	29.75	26.75	45	37.5	57.25	45.75	47.75	39.5
	Result												
	LRAA												
	OEL												
Overall	RAA	43.5	36.938	39.292	41.188	38.344	38.688	41.156	37.188	47	50.375	48.969	52.094

Brad Wilkins — Signature

1/9/2019 — Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Foothill/Sunset** System #: **3E+06**

Sample Site		2016 Qtr 1	2016 Qtr 2	2016 Qtr 3	2016 Qtr 4	2017 Qtr 1	2017 Qtr 2	2017 Qtr 3	2017 Qtr 4	2018 Qtr 1	2018 Qtr 2	2018 Qtr 3	2018 Qtr 4
	Date	2/10/16	5/25/16	8/17/16	11/16/16	2/14/17	5/10/17	8/8/17	11/14/17	2/13/18	5/16/2018*	8/14/18	11/27/18
Cincinnati Sample Station (changed from 3720 Cincinnati 9/27/17)	Result	26.00	22.00	55.00	29.00	38.00	31.00	24.00	25.00	35.00	27.00	20.00	18.00
	LRAA	26	24	34.333	33	36	38.25	30.5	29.5	28.75	27.75	26.75	25
	OEL	13	17.5	39.5	33.75	40	32.25	29.25	26.25	29.75	28.5	25.5	20.75
5903 Sunset	Result	29.00	28.00	36.00	39.00	33.00	29.00	28.00	27.00	41.00	32.00	21.00	30.00
	LRAA	29	28.5	31	33	34	34.25	32.25	29.25	31.25	32	30.25	31
	OEL	14.5	21.25	32.25	35.5	35.25	32.5	29.5	27.75	34.25	33	28.75	28.25
2252 Penryn Rd	Result	23.00	26.00	57.00	41.00	23.00	30.00	29.00	25.00	36.00	29.00	22.00	29.00
	LRAA	23	24.5	35.333	36.75	36.75	37.75	30.75	26.75	30	29.75	28	29
	OEL	11.5	18.75	40.75	41.25	36	31	27.75	27.25	31.5	29.75	27.25	27.25
Ascension Sample Station	Result	28.00	29.00	16.00	30.00	38.00	33.00	10.00	25.00	30.00	30.00	23.00	39.00
	LRAA	28	28.5	24.333	25.75	28.25	29.25	27.75	26.5	24.5	23.75	27	30.5
	OEL	14	21.5	22.25	26.25	30.5	33.5	22.75	23.25	23.75	28.75	26.5	32.75
Claudio Sample Station	Result	41.00	29.00	35.00	30.00	40.00	30.00	26.00	27.00	39.00	25.00	15.00	34.00
	LRAA	41	35	35	33.75	33.5	33.75	31.5	30.75	30.5	29.25	26.5	28.25
	OEL	20.5	24.75	35	31	36.25	32.5	30.5	27.5	32.75	29	23.5	27
Lake Forest	Result	32.00	32.00	55.00	46.00	47.00	32.00	29.00	28.00	42.00	31.00	24.00	34.00
	LRAA	32	32	39.667	41.25	45	45	38.5	34	32.75	32.5	31.25	32.75
	OEL	16	24	43.5	44.75	48.75	39.25	34.25	29.25	35.25	33	30.25	30.75
Ketchikan Sample Station	Result	30.00	31.00	34.00	40.00	33.00	30.00	26.00	27.00	46.00	33.00	16.00	32.00
	LRAA	30	30.5	31.667	33.75	34.5	34.25	32.25	29	32.25	33	30.5	31.75
	OEL	15	23	32.25	36.25	35	33.25	28.75	27.5	36.25	34.75	27.75	28.25
Becky Way Sample Station	Result	22.00	26.00	0.00	41.00	37.00	29.00	29.00	26.00	38.00	28.00	23.00	30.00
	LRAA	22	24	16	22.25	26	26.75	34	30.25	30.5	30.25	28.75	29.75
	OEL	11	18.5	12	27	28.75	34	31	27.5	32.75	30	28	27.75
	Result												
	LRAA												
	OEL												
Overall	RAA	28.875	28.375	30.917	32.438	34.25	34.906	32.188	29.5	30.0625	29.781	28.625	29.75

* 2nd Quarter HAA5 lab missed hold time for Cincinnati, Penryn, Ascension, Lake Forest, and Becky. Re-sampled on 6/27/18.

Brad Wilkins — Signature

1/9/2019 — Date

Distribution System Monitoring For TTHMs

System Name: **Placer County Water Agency - Foothill/Sunset** System #: **3E+06**

Sample Site		2018				2019				2020			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/13/18	5/16/18	8/14/18	11/27/18	2/19/19	5/16/19	8/27/19	11/20/19	2/19/20	5/14/20	8/12/20	11/10/20
Cincinnati Sample Station	Result	74.00	47.00	59.00	51.00	56.00	46.00	42.00	26.00	42.00	40.00	72.00	32.00
	LRAA	74	60.5	60	57.75	53.25	53	48.75	42.5	39	37.5	45	46.5
	OEL	37	42	59.75	52	55.5	49.75	46.5	35	38	37	56.5	44
Woodside Park Sample Station	Result	66.00	43.00	44.00	43.00	50.00	33.00	27.00	37.00	43.00	45.00	59.00	27.00
	LRAA	66	54.5	51	49	45	42.5	38.25	36.75	35	38	46	43.5
	OEL	33	38	49.25	43.25	46.75	39.75	34.25	33.5	37.5	42.5	51.5	39.5
Penryn Sample Station	Result	71.00	40.00	40.00	41.00	48.00	71.00	40.00	34.00	39.00	32.00	44.00	26.00
	LRAA	71	55.5	50.333	48	42.25	50	50	48.25	46	36.25	37.25	35.25
	OEL	35.5	37.75	47.75	40.5	44.25	57.75	49.75	44.75	38	34.25	39.75	32
Ascension Sample Station	Result	75.00	45.00	47.00	47.00	59.00	61.00	41.00	29.00	40.00	39.00	48.00	30.00
	LRAA	75	60	55.667	53.5	49.5	53.5	52	47.5	42.75	37.25	39	39.25
	OEL	37.5	41.25	53.5	46.5	53	57	50.5	40	37.5	36.75	43.75	36.75
Claudio Sample Station	Result	72.00	62.00	62.00	46.00	54.00	40.00	44.00	38.00	39.00	53.00	49.00	30.00
	LRAA	72	67	65.333	60.5	56	50.5	46	44	40.25	43.5	44.75	42.75
	OEL	36	49	64.5	54	54	45	45.5	40	40	45.75	47.5	40.5
Lake Forest Sample Station	Result	76.00	42.00	39.00	42.00	48.00	50.00	31.00	23.00	38.00	30.00	42.00	24.00
	LRAA	76	59	52.333	49.75	42.75	44.75	42.75	38	35.5	30.5	33.25	33.5
	OEL	38	40	49	41.25	44.25	47.5	40	31.75	32.5	30.25	38	30
Ketchikan Sample Station	Result	71.00	40.00	54.00	41.00	48.00	40.00	35.00	24.00	34.00	32.00	48.00	29.00
	LRAA	71	55.5	55	51.5	45.75	45.75	41	36.75	33.25	31.25	34.5	35.75
	OEL	35.5	37.75	54.75	44	47.75	42.25	39.5	30.75	31.75	30.5	40.5	34.5
Becky Way Sample Station	Result	66.00	43.00	41.00	37.00	48.00	45.00	33.00	20.00	36.00	32.00	44.00	25.00
	LRAA	66	54.5	50	46.75	42.25	42.75	40.75	36.5	33.5	30.25	33	34.25
	OEL	33	38	47.75	39.5	43.5	43.75	39.75	29.5	31.25	30	39	31.5
	Result												
	LRAA												
	OEL												
Overall	RAA	71.375	58.313	54.958	52.094	47.094	47.844	44.938	41.281	38.15625	35.563	39.094	38.844

Brad Wilkins 1/6/2021

Signature Date

Distribution System Monitoring For HAA5s

System Name: **Placer County Water Agency - Foothill/Sunset** System #: **3E+06**

Sample Site		2018				2019				2020			
		Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Qtr 1	Qtr 2	Qtr 3	Qtr 4
	Date	2/13/18	5/16/2018*	8/14/18	11/27/18	2/19/19	5/16/19	8/27/19	11/20/19	2/19/20	5/14/20	8/12/20	11/10/20
Cincinnati Sample Station	Result	35.00	27.00	20.00	18.00	45.00	42.00	25.00	26.00	33.00	24.00	31.00	20.00
	LRAA	35	31	27.333	25	27.5	31.25	32.5	34.5	31.5	27	28.5	27
	OEL	17.5	22.25	25.5	20.75	32	36.75	34.25	29.75	29.25	26.75	29.75	23.75
Woodside Park Sample Station	Result	41.00	32.00	21.00	30.00	37.00	39.00	27.00	30.00	33.00	23.00	32.00	22.00
	LRAA	41	36.5	31.333	31	30	31.75	33.25	33.25	32.25	28.25	29.5	27.5
	OEL	20.5	26.25	28.75	28.25	31.25	36.25	32.5	31.5	30.75	27.25	30	24.75
Penryn Sample Station	Result	36.00	29.00	22.00	29.00	41.00	36.00	25.00	27.00	28.00	22.00	26.00	25.00
	LRAA	36	32.5	29	29	30.25	32	32.75	32.25	29	25.5	25.75	25.25
	OEL	18	23.5	27.25	27.25	33.25	35.5	31.75	28.75	27	24.75	25.5	24.5
Ascension Sample Station	Result	30.00	30.00	23.00	39.00	38.00	43.00	22.00	24.00	29.00	23.00	28.00	21.00
	LRAA	30	30	27.667	30.5	32.5	35.75	35.5	31.75	29.5	24.5	26	25.25
	OEL	15	22.5	26.5	32.75	34.5	40.75	31.25	28.25	26	24.75	27	23.25
Claudio Sample Station	Result	39.00	25.00	15.00	34.00	39.00	38.00	16.00	28.00	29.00	18.00	25.00	21.00
	LRAA	39	32	26.333	28.25	28.25	31.5	31.75	30.25	27.75	22.75	25	23.25
	OEL	19.5	22.25	23.5	27	31.75	37.25	27.25	27.5	25.5	23.25	24.25	21.25
Lake Forest Sample Station	Result	42.00	31.00	24.00	34.00	40.00	37.00	24.00	26.00	31.00	22.00	26.00	24.00
	LRAA	42	36.5	32.333	32.75	32.25	33.75	33.75	31.75	29.5	25.75	26.25	25.75
	OEL	21	26	30.25	30.75	34.5	37	31.25	28.25	28	25.25	26.25	24
Ketchikan Sample Station	Result	46.00	33.00	16.00	32.00	37.00	36.00	26.00	26.00	27.00	23.00	28.00	22.00
	LRAA	46	39.5	31.667	31.75	29.5	30.25	32.75	31.25	28.75	25.5	26	25
	OEL	23	28	27.75	28.25	30.5	35.25	31.25	28.5	26.5	24.75	26.5	23.75
Becky Way Sample Station	Result	38.00	28.00	23.00	30.00	40.00	32.00	26.00	24.00	29.00	23.00	27.00	25.00
	LRAA	38	33	29.667	29.75	30.25	31.25	32	30.5	27.75	25.5	25.75	26
	OEL	19	23.5	28	27.75	33.25	33.5	31	26.5	27	24.75	26.5	25
	Result												
	LRAA												
	OEL												
Overall	RAA	38.375	33.875	29.417	29.75	30.063	32.188	33.031	31.938	29.5	25.594	26.594	25.625

* 2nd Quarter HAA5 lab missed hold time for Cincinnati, Penryn, Ascension, Lake Forest, and Becky. Re-sampled on 6/27/18.

Brad Wilkins 1/6/2021

Signature Date

	Date	Loma Rica Peak Raw Water Turbidity	Loma Rica Daily Average Treated Water	Date	Elizabeth George Peak Raw Water Turbidity	Elizabeth George Daily Average Treated Water	Date	Lake of the Pines Peak Raw Water Turbidity	Lake of the Pines Daily Average Treated Water	Date	Lake Wildwood Peak Raw Water Turbidity	Lake Wildwood Daily Average Treated Water	Date	North Auburn Peak Raw Water Turbidity	North Auburn Daily Average Treated Water	Date	Smartville Peak Raw Water Turbidity	Smartville Daily Average Treated Water	
	Jan-16			Jan-16	2.7	0.04	Jan-16	4.8	0.03	Jan-16	6.9	0.05	Jan-16	11.3	0.05	Jan-16	11.7	0.04	
	Feb-16			Feb-16	1.4	0.05	Feb-16	4.5	0.04	Feb-16	3.6	0.04	Feb-16	16.3	0.05	Feb-16	11.7	0.03	
	Mar-16			Mar-16	3.6	0.05	Mar-16	7.5	0.05	Mar-16	6.7	0.05	Mar-16	38.3	0.05	Mar-16	11.9	0.04	
	Apr-16			Apr-16	2.7	0.05	Apr-16	5.8	0.05	Apr-16	2.8	0.03	Apr-16	14.5	0.05	Apr-16	12.4	0.04	
	May-16			May-16	2.6	0.05	May-16	3.6	0.04	May-16	2.9	0.04	May-16	7.2	0.05	May-16	12.5	0.04	
	Jun-16	1.4	0.08	Jun-16	1.8	0.04	Jun-16	6.8	0.04	Jun-16	3.3	0.04	Jun-16	3.3	0.05	Jun-16	14.9	0.04	
	Jul-16	2.6	0.04	Jul-16	1.1	0.03	Jul-16	4.3	0.04	Jul-16	3.4	0.03	Jul-16	3.2	0.04	Jul-16	5.2	0.03	
	Aug-16	3.2	0.03	Aug-16	1.2	0.03	Aug-16	2.9	0.04	Aug-16	3.6	0.03	Aug-16	3.2	0.03	Aug-16	6.1	0.03	
	Sep-16	1.9	0.02	Sep-16	1.1	0.03	Sep-16	2.5	0.03	Sep-16	2.8	0.03	Sep-16	3	0.03	Sep-16	11.6	0.03	
	Oct-16	1.9	0.03	Oct-16	1.3	0.04	Oct-16	2.3	0.03	Oct-16	2.7	0.04	Oct-16	15	0.03	Oct-16	10.1	0.04	
	Nov-16	1.6	0.02	Nov-16	0.9	0.04	Nov-16	2.1	0.04	Nov-16	3.3	0.05	Nov-16	5.4	0.05	Nov-16	13.6	0.04	
	Dec-16	3.1	0.02	Dec-16	2.5	0.04	Dec-16	10	0.04	Dec-16	7.5	0.05	Dec-16	25.9	0.05	Dec-16	15.6	0.03	
	Jan-17	3.1	0.21	Jan-17	4.5	0.05	Jan-17	32.4	0.04	Jan-17	12.7	0.04	Jan-17	88.7	0.04	Jan-17	20.7	0.04	
	Feb-17	8.3	0.13	Feb-17	3.3	0.04	Feb-17	33.4	0.03	Feb-17	7.1	0.04	Feb-17	45.5	0.04	Feb-17	21.5	0.04	
	Mar-17	6.4	0.12	Mar-17	2.6	0.06	Mar-17	17.3	0.03	Mar-17	6.6	0.04	Mar-17	18.4	0.04	Mar-17	15.6	0.03	
	Apr-17			Apr-17	2.6	0.04	Apr-17	7.5	0.04	Apr-17	5.8	0.04	Apr-17	8.8	0.04	Apr-17	19.8	0.04	
	May-17			May-17	4.5	0.03	May-17	4.3	0.04	May-17	6.1	0.03	May-17	4.6	0.04	May-17	11	0.04	
	Jun-17	2.4	0.05	Jun-17	4.1	0.04	Jun-17	3.8	0.03	Jun-17	6	0.03	Jun-17	3.6	0.04	Jun-17	8.4	0.03	
	Jul-17	2.1	0.03	Jul-17	1.1	0.03	Jul-17	3.6	0.04	Jul-17	4.5	0.03	Jul-17	5.3	0.05	Jul-17	6.1	0.05	
	Aug-17	2.3	0.02	Aug-17	1	0.04	Aug-17	2.8	0.05	Aug-17	3.8	0.04	Aug-17	3.9	0.05	Aug-17	16.8	0.04	
	Sep-17	2	0.02	Sep-17	1.1	0.04	Sep-17	2.2	0.05	Sep-17	3.3	0.04	Sep-17	16	0.06	Sep-17	3.9	0.03	
	Oct-17	2	0.02	Oct-17	1.5	0.05	Oct-17	3.9	0.03	Oct-17	3.2	0.04	Oct-17			Oct-17	9.2	0.04	
	Nov-17	2.6	0.04	Nov-17	1.8	0.05	Nov-17	2.9	0.04	Nov-17	5	0.05	Nov-17	14.3	0.06	Nov-17	8.7	0.04	
	Dec-17	1.1	0.02	Dec-17	0.7	0.05	Dec-17	2.7	0.04	Dec-17	3.1	0.04	Dec-17	9.6	0.04	Dec-17	6.1	0.03	
	Jan-18	2.4	0.02	Jan-18	1.3	0.05	Jan-18	2.8	0.05	Jan-18	5.6	0.06	Jan-18	9.5	0.04	Jan-18	15.8	0.04	
	Feb-18	1.1	0.02	Feb-18	1.2	0.06	Feb-18	2.1	0.05	Feb-18	2.8	0.04	Feb-18	9.5	0.04	Feb-18	7.7	0.05	
	Mar-18	7.1	0.03	Mar-18	3.1	0.06	Mar-18	9.1	0.05	Mar-18	11.7	0.05	Mar-18	29.3	0.06	Mar-18	31.4	0.06	
	Apr-18	3	0.06	Apr-18	6.4	0.06	Apr-18	40.2	0.05	Apr-18	5.4	0.04	Apr-18	34.2	0.05	Apr-18	11.4	0.04	
	May-18	2.9	0.04	May-18	5.5	0.04	May-18	24.3	0.05	May-18	6.6	0.05	May-18	13.8	0.05	May-18	8.6	0.05	
	Jun-18	2.1	0.03	Jun-18	2.6	0.03	Jun-18	8.1	0.05	Jun-18	3.6	0.05	Jun-18	4.2	0.05	Jun-18	5	0.04	
	Jul-18	1.9	0.04	Jul-18	2.3	0.03	Jul-18	7.6	0.03	Jul-18	3.6	0.05	Jul-18	3.8	0.05	Jul-18	3.9	0.04	
	Aug-18	2.2	0.04	Aug-18	2.8	0.03	Aug-18	5.2	0.03	Aug-18	3.2	0.05	Aug-18	5.1	0.05	Aug-18	4.4	0.03	
	Sep-18	3.1	0.03	Sep-18	4.6	0.02	Sep-18	5.4	0.03	Sep-18	3.4	0.04	Sep-18	5.2	0.05	Sep-18	3.9	0.03	
	Oct-18	2.5	0.03	Oct-18	2.6	0.03	Oct-18	16.3	0.02	Oct-18	3.3	0.05	Oct-18	83.6	0.05	Oct-18	4	0.04	
	Nov-18	2	0.03	Nov-18	3.9	0.03	Nov-18	13.4	0.03	Nov-18	3.7	0.04	Nov-18	18.6	0.05	Nov-18	11.5	0.04	
	Dec-18	2.1	0.03	Dec-18	2.3	0.03	Dec-18	4.5	0.03	Dec-18	3.9	0.04	Dec-18	11.6	0.04	Dec-18	10	0.04	
	Jan-19	3.1	0.02	Jan-19	2.9	0.03	Jan-19	7.2	0.03	Jan-19	8.5	0.03	Jan-19	36.8	0.05	Jan-19	16.2	0.03	
	Feb-19	3.3	0.03	Feb-19	3.6	0.03	Feb-19	11	0.04	Feb-19	15.1	0.02	Feb-19	47.9	0.05	Feb-19	20.5	0.03	
	Mar-19	3.1	0.02	Mar-19	2.6	0.03	Mar-19	17	0.04	Mar-19	12.4	0.02	Mar-19	56	0.04	Mar-19	17.4	0.02	
	Apr-19	3.1	0.03	Apr-19	3.2	0.04	Apr-19	7.4	0.04	Apr-19	9.1	0.03	Apr-19	13.2	0.04	Apr-19	7.8	0.03	
	May-19	2.5	0.02	May-19	3.3	0.03	May-19	5.2	0.04	May-19	6.3	0.03	May-19	8.9	0.04	May-19	9.3	0.03	
	Jun-19	3.1	0.03	Jun-19	4.8	0.03	Jun-19	5.3	0.04	Jun-19	6.4	0.03	Jun-19	5.9	0.05	Jun-19	7.8	0.03	
	Jul-19	3.1	0.03	Jul-19	2.5	0.03	Jul-19	4.4	0.04	Jul-19	6.8	0.03	Jul-19	6.3	0.04	Jul-19	4.9	0.02	
	Aug-19	2.1	0.02	Aug-19	2.1	0.02	Aug-19	3.7	0.02	Aug-19	4.2	0.02	Aug-19	6.6	0.04	Aug-19	8.7	0.02	
	Sep-19	5.5	0.02	Sep-19	4.5	0.02	Sep-19	2.7	0.02	Sep-19	5.3	0.02	Sep-19	5.6	0.04	Sep-19	8.3	0.03	
	Oct-19	2.5	0.01	Oct-19	2.7	0.02	Oct-19	2.7	0.02	Oct-19	5.2	0.02	Oct-19	7.2	0.02	Oct-19	13.9	0.03	
	Nov-19	1.8	0.02	Nov-19	1.7	0.02	Nov-19	2.5	0.02	Nov-19	3.7	0.03	Nov-19	5.5	0.02	Nov-19	4.5	0.03	
	Dec-19	2.4	0.02	Dec-19	3.1	0.02	Dec-19	3.8	0.02	Dec-19	5.9	0.03	Dec-19	16.6	0.03	Dec-19	12	0.05	
	Jan-20	1.6	0.02	Jan-20	2.7	0.03	Jan-20	2.6	0.02	Jan-20	5	0.02	Jan-20	16.2	0.02	Jan-20	8.6	0.03	
	Feb-20			Feb-20	2.4	0.02	Feb-20	2	0.02	Feb-20	4.7	0.02	Feb-20	12.8	0.02	Feb-20	6.6	0.03	
	Mar-20	2.2	0.03	Mar-20	3.1	0.02	Mar-20	3.4	0.02	Mar-20	12.7	0.02	Mar-20	9.2	0.02	Mar-20	5.5	0.03	
	Apr-20	3	0.04	Apr-20	10.5	0.02	Apr-20	5.2	0.02	Apr-20	7.6	0.02	Apr-20	15.2	0.03	Apr-20	11.2	0.03	
	May-20	2.9	0.04	May-20	3.2	0.02	May-20	5.9	0.02	May-20	5.5	0.02	May-20	13.8	0.02	May-20	5.6	0.03	
	Jun-20	2.8	0.03	Jun-20	2.8	0.03	Jun-20	3.1	0.02	Jun-20	5.7	0.03	Jun-20	4.2	0.02	Jun-20	8.5	0.02	
	Jul-20	2	0.03	Jul-20	2.4	0.04	Jul-20	3.7	0.02	Jul-20	3.8	0.03	Jul-20	7.6	0.03	Jul-20	9.3	0.02	
	Aug-20	2.3	0.03	Aug-20	2.1	0.03	Aug-20	3.2	0.02	Aug-20	3.7	0.04	Aug-20	5	0.03	Aug-20	4.3	0.02	
	Sep-20	2	0.03	Sep-20	1.8	0.04	Sep-20	2.3	0.02	Sep-20	3.1	0.03	Sep-20	9	0.02	Sep-20	10.9	0.02	
	Oct-20	3	0.02	Oct-20	3.4	0.03	Oct-20	2.3	0.02	Oct-20	2.8	0.02	Oct-20	12.6	0.02	Oct-20	15.6	0.02	
	Nov-20	2.5	0.03	Nov-20	3.4	0.03	Nov-20	2.2	0.02	Nov-20	2.2	0.03	Nov-20	8.2	0.02	Nov-20	6.4	0.02	
	Dec-20	2.2	0.02	Dec-20	1.8	0.03	Dec-20	3.1	0.02	Dec-20	2.3	0.03	Dec-20	6.1	0.02	Dec-20	4.4	0.02	
				% rem			% rem			% rem			% rem			% rem			% rem
min		1.1	0.01		0.7	0.02		2	0.02		2.2	0.02		3	0.02		3.9	0.02	
max		8.3	0.21		10.5	0.06		40.2	0.05		15.1	0.06		88.7	0.06		31.4	0.06	
average		2.7	0.04	98.7%	2.8	0.04	98.7%	7.1	0.03	99.5%	5.4	0.04	99.3%	15.8	0.04	99.7%	10.5	0.03	99.7%
median		2.45	0.03		2.6	0.03		4.3	0.03		4.6	0.035		9.5	0.04		9.3	0.03	
95th		5.9	0.1		4.8	0.1		24.7	0.1		12.4	0.1		48.7	0.1		20.5	0.1	

E. George

Sample Date[2]	Source Water Alkalinity (mg/L) [1]	Source Water TOC (mg/L) [2]	Treated Water TOC (mg/L) [3]	RAA
2/8/16	12	1.10	0.60	
5/10/16	12	1.40	0.78	
8/15/16	14	1.50	1.20	
11/21/16	11	2.00	1.10	1.50
2/21/17	11	0.66	0.34	1.39
5/17/17	12	0.94	0.52	1.28
8/22/17	11	1.20	0.85	1.20
11/15/17	12	1.30	0.79	1.03
2/18/18	12	1.30	0.88	1.19
5/15/18	10	1.50	0.94	1.33
8/7/18	12	1.50	1.10	1.40
11/27/18	16	2.40	1.80	1.68
2/12/19	14	1.10	0.78	1.63
5/6/19	11	1.30	0.89	1.58
8/26/19	11	1.10	0.65	1.48
12/4/19	12	1.70	1.20	1.30
2/8/20	14	1.10	0.80	1.30
6/10/20	13	2.20	1.20	1.53
9/1/20	15	1.00	0.63	1.50
12/21/20	14	1.50	1.00	1.45
				% removal
	average	1.39	0.90	0.350719
	median	1.30		
	min	0.66		
	max	2.40		
	95th	2.21		

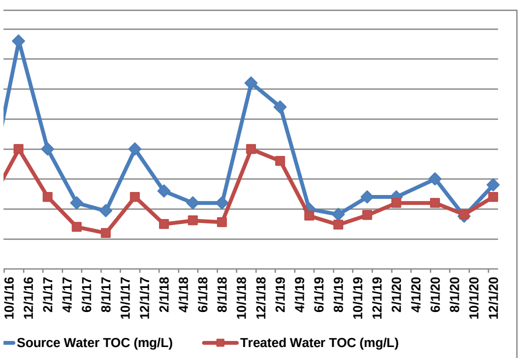
Loma Rica

Sample Date[2]	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
2/8/16	Plant off			
5/10/16	Plant off			
8/15/16	15	1.5	1.20	
11/21/16	12	2.0	1.00	1.75
2/21/17	10	0.5	0.51	1.33
5/17/17	Plant off			1.33
8/22/17	10	1.3	0.80	1.26
11/15/17	13	1.3	0.67	1.03
2/18/18	12	1.4	0.86	1.33
5/15/18	10	1.6	1.20	1.40
8/8/18	11	1.3	1.00	1.40
11/27/18	16	2.2	2.10	1.63
2/12/19	14	1.1	0.76	1.55
5/6/19	11	1.5	0.96	1.53
8/26/19	10	1.2	0.78	1.50
12/4/19	14	1.7	1.20	1.38
2/8/20	Plant off			1.47
6/10/20	10	1.9	1.10	1.60
9/1/20	14	0.9	0.61	1.51
12/2/20	11	1.7	1.20	1.51
				% removal
average		1.4	1.00	0.310121
median		1.5		
min		0.5		
max		2.2		
95th		2.05		

Lake Wildwood

Sample Date[2]	Source Water Alkalinity (mg/L) [1]	Source Water TOC (mg/L) [2]	Treated Water TOC (mg/L) [3]	RAA
2/8/16	26	2.60	1.60	
5/10/16	25	1.20	0.87	
8/15/16	14	1.40	1.10	
11/30/16	27	3.80	2.00	2.25
2/21/17	24	2.00	1.20	2.10
5/17/17	25	1.10	0.70	2.08
8/22/17	17	0.97	0.60	1.97
11/15/17	27	2.00	1.20	1.52
2/18/18	26	1.30	0.75	1.34
5/15/18	17	1.10	0.81	1.34
8/7/18	15	1.10	0.78	1.38
11/27/18	25	3.10	2.00	1.65
2/12/19	23	2.70	1.80	2.00
5/6/19	21	1.00	0.89	1.98
8/26/19	18	0.91	0.74	1.93
11/25/19	33	1.20	0.90	1.45
2/8/20	33	1.20	1.10	1.08
6/10/20	21	1.50	1.10	1.20
9/2/20	15	0.88	0.91	1.20
12/2/20	28	1.40	1.20	1.25

			% removal
ave	1.62	1.11	0.314541
median	1.25		
min	0.88		
max	3.80		
95th	3.135		



Smartsville

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
1/19/2016	58	7.7	3.8	
2/8/2016	70	4.9	4.8	
3/15/2016	82	4.9	1.6	
4/19/2016	62	1.8	1.0	
5/10/2016	63	2.0	1.2	
6/21/2016	52	1.8	1.0	
7/13/2016	42	1.8	1.5	
8/15/2016	29	2.0	1.0	
9/14/2016	34	1.6	1.0	
10/19/2016	57	4.7	1.7	
11/21/2016	45	7.5	1.2	
12/20/2016	90	4.8	3.0	3.8
1/18/2017	83	4.5	2.4	3.5
2/21/2017	67	4.0	1.9	3.5
3/14/2017	73	1.6	1.0	3.2
4/11/2017	77	3.0	1.8	3.3
5/16/2017	76	2.1	0.8	3.3
6/13/2017	74	2.2	1.1	3.3
7/19/2017	60	2.2	1.1	3.4
8/22/2017	49	2.1	1.1	3.4
9/19/2017	46	1.9	0.9	3.4
10/4/2017	50	2.4	2.4	3.2
11/15/2017	64	2.5	1.6	2.8
12/28/2017	80	1.4	1.1	2.5
1/17/2018	93	4.9	1.6	2.5
2/18/2018	81	1.2	0.9	2.3
3/20/2018	42	1.9	1.6	2.3
4/18/2018	67	2.2	1.6	2.3
5/15/2018	69	1.8	1.2	2.2
6/20/2018	86	2.5	1.8	2.3
7/17/2018	53	1.3	0.9	2.2
8/7/2018	39	1.6	0.9	2.1
9/19/2018	46	1.5	1.0	2.1
10/16/2018	53	1.8	1.1	2.1
11/27/2018	65	5.5	3.7	2.3
12/26/2018	44	5.7	3.1	2.7
1/22/2019	29	2.7	1.9	2.5
2/12/2019	37	2.3	1.6	2.6
3/13/2019	46	1.6	0.9	2.5
4/11/2019	64	2.0	1.4	2.5
5/7/2019	71	1.8	1.0	2.5
6/18/2019	61	1.7	1.2	2.5
7/9/2019	59	1.4	1.0	2.5
8/26/2019	47	1.7	0.9	2.5
9/11/2019	42	1.1	0.6	2.4
10/16/2019	56	1.4	0.9	2.4
11/25/2019	86	1.9	1.0	2.1
12/4/2019	57	6.6	3.5	2.2
1/15/2020	71	2.0	1.4	2.1
2/29/2020	92	1.6	1.4	2.1
				2.1
				2.1
				2.2
6/10/2020	60	1.8	1.5	2.2
7/15/2020	49	2.4	1.6	2.3
8/25/2020	38	1.4	0.8	2.2
9/2/2020	39	1.2	1.1	2.3
10/13/2020	42	1.5	1.0	2.3
11/17/2020	61	3.0	1.9	2.4
12/2/2020	75	2.0	1.3	1.9

			% removal
ave	2.6	1.5	0.419681
median	2.0		
min	1.1		
max	7.7		
95th	5.88		

LOP

Sample Date	Source Water Alkalinity (mg/L)	Source Water TOC (mg/L)	Treated Water TOC (mg/L)	RAA
2/8/16	20	1.70	1.20	
5/10/16	14	1.60	1.00	
8/15/16	14	1.60	1.30	
11/21/16	14	1.60	1.00	1.63
2/21/17	21	1.50	0.86	1.58
5/17/17	17	1.20	0.84	1.48
8/22/17	12	1.10	0.86	1.35
11/15/17	13	1.20	0.96	1.25
2/18/18	18	1.40	1.20	1.23
5/15/18	15	1.30	0.99	1.25
8/7/18	13	1.50	0.92	1.35
11/27/18	18	1.60	1.10	1.45
2/12/19	22	1.60	1.10	1.50
5/6/19	16	1.20	0.83	1.48
8/26/19	12	1.20	0.97	1.40
12/10/19	15	2.00	1.50	1.50
2/8/20	23	1.20	1.10	1.40
6/10/20	16	2.10	1.90	1.63
9/2/20	14	1.70	1.40	1.75
12/2/20	16	1.60	1.30	1.65
				%removal
ave		1.50	1.12	0.253177258
median		1.55		
min		1.10		
max		2.10		
95th		2.005		

E. George

		TC		E. coli
1/2/16		79.8		12.2
1/23/16		71.2		12.0
2/2/16		29.5		11.0
2/20/16		39.9		2.0
3/9/16		63.1		13.1
3/19/16		158.5		8.6
4/16/16		201.4		108.1
4/26/16		275.5		17.5
5/4/16		272.3		4.0
5/25/16		260.2		16.0
6/9/16		290.9		1.0
6/23/16		184.2		5.2
7/6/16		125.9		0
7/13/16		727.0		0.0
8/8/16		325.5		2.0
8/22/16		727.0		7.4
9/13/16		290.9		1.0
9/26/16		686.7		7.3
10/18/16		1553.1		15.8
10/22/16		272.3		5.2
10/30/16		214.3		3.1
11/7/16		99.3		3.1
11/21/16		410.6		8.5
12/14/16		298.7		13.2
1/19/17		137.4		28.5
2/15/17		157.0		1.0
2/22/17		93.2		7.4
3/8/17		851.6		0.0
3/14/17		65.7		2.0
4/12/17		90.7		2.0
4/22/17		17.9		2.0
5/27/17		127.4		6.3
6/7/17		151.0		2.0
6/28/17		189.2		11.0
7/12/17		172.2		3.1
7/28/17		248.1		2.0
8/10/17		158.5		0.0
8/30/17		579.4		1.0
9/6/17		435.2		0.0
9/27/17		218.7		2.0
10/11/17		248.1		0.0
10/17/17		172.5		2.0
11/8/17		71.4		6.3
11/14/17		201.4		3.1
12/7/2017		88.4		2.0
1/10/18	########	172.3		5.2
1/27/18		3.1		2.0
2/7/18		5.2	<	1.0
2/21/18		13.5		1.0
3/7/18		178.5		1.0
3/28/18		73.8		7.5
4/11/18		33.6		4.1
4/26/18		113.7		5.2
5/9/18		387.3		3.1
5/26/18		111.9		2.0
6/6/18		210.4		3.0
6/20/18		140.1		2.0
7/11/18		165.3		9.7
7/25/18		579.4		5.2
8/13/18		816.4		4.1
8/22/18		461.1		4.1
9/5/18		260.3		1.0
9/26/18		344.8		3.1
10/10/18		17.3		2.0
10/23/18		1046.2		3.1
11/7/18		275.5		5.2
11/21/18		95.9		5.2
12/18/18		250.0		17.3
12/23/18		142.1	<	1.0
1/9/19		72.3		1.0
1/23/19		30.1		1.0
2/3/19		14.5		3.0
2/23/19		6.3		0.0
3/19/19		63.1		1.0
4/10/19		28.8		2.0
4/24/19		145.0		9.7
5/8/19		186.0		1.0
5/22/19		111.2		4.1
6/18/19		2.48.1		5.2
6/22/19		37.3		3.1
7/7/19		235.9		3.1
7/21/19		378.4		7.5
8/10/19		344.8		1.0
8/22/19		261.3		0.0
9/11/19		224.7		1.0
9/22/19		261.3		0.0
10/12/19		547.5		1.0
10/31/19		83.6		2.0
11/6/19		73.3		3.1
11/20/19		14.8		3.1
12/8/19		150.0		5.2
12/24/19		68.9		8.6
1/11/20		38.4		2.0
1/25/20		43.5		2.0
2/5/20		193.5		9.7
2/22/20		10.7		1.0
3/7/20		95.9		5.2
3/21/20		96.1		11.0
4/11/20		68.3		2.0
4/23/20		53.7		8.5
5/6/20		157.6		8.2
5/26/20		285.1		3.1
6/3/20		110.6		4.1
6/28/20		980.4		2.0
7/15/20		435.2		1.0
7/29/20		261.3		2.0
8/12/20		186.0		9.8
8/26/20		410.6		9.7
9/2/20		45.7		9.8
9/16/20		110.0		3.1
10/7/20		151.5		9.6
10/21/20		191.8		9.4
11/4/20		224.7		18.5
11/25/20		33.2		4.1
12/9/20		29.5		2.0
12/23/20		44.1		0.0

12/28/16		12.0		1.0
1/18/17		195.6		2.0
5/15/17		95.9		0.0
7/18/17		461.1		4.1
8/15/17		435.2		0.0

min	0.0
max	108.1
average	5.5
median	3.1
95th	15.8

Loma Rica

		TC		E. coli
1/2/16		167.4		7.3
1/23/16		410.6		133.3
2/2/16		44.8		2.0
2/20/16		307.6		35.0
3/8/16		30.5		16.8
3/19/16		166.9		7.4
4/16/16		290.9		9.7
4/26/16		325.5		16.0
5/4/16		344.8		5.2
5/25/16		365.4		8.6
6/9/16		980.4		86.0
6/23/16		158.5		2.0
7/6/2016		70		3.1
7/13/16		549.2		5.1
8/8/2016		547.5		2
8/22/16		816.4		5.2
9/13/16		461.1		2.0
9/26/16		613.1		6.3
10/18/16		920.8		14.6
10/22/16		547.5		6.3
10/30/16		344.8		10.9
11/7/16		166.4		4.1
11/21/16		687.7		16.8
12/14/16		133.9		28.8
1/19/17		110.6		4.1
1/28/17		25.6		0.0
2/15/17		11.0		0.0
2/22/17		131.3		9.7
3/8/17		158.5		6.3
3/29/17		117.2		3.1
4/12/17		542.5		20.9
4/22/17		63.1		5.2
5/4/17		74.9		1.0
5/27/17		547.5		5.1
6/7/17		151.5		1.0
6/28/17		248.1		10.7
7/12/17		204.6		5.2
7/28/17		82.0		0.0
8/10/17		360.9		1.0
8/30/17		816.4		1.0
9/6/17		579.4		3.0
9/27/17		344.8		1.0
10/11/17		344.8		1.0
10/17/17		218.7		4.1
11/8/17		101.4		0.0
11/14/17		1986.3		1.0
12/6/17		42.6		1.0
12/19/17		118.7		1.0
1/10/18		214.3		7.2
1/27/18		4.1		2.0
2/7/18		3.1		1.0
2/21/18		24.1		0.0
3/7/18		350.0		10.0
3/28/18		2098.0		160.0
4/11/18		20.9		1.0
4/26/18		63.1		3.1
5/9/18		248.1		6.3
5/26/18		204.6		5.2
6/6/18		179.3		6.1
6/20/18		461.1		2.0
7/11/18		980.4		10.9
7/25/18		547.5		2.0
8/13/18		727.0		4.1
9/5/18		325.5		1.0
9/26/18		261.3		6.3
10/10/18		248.9		2.0
11/7/18		866.4		9.7
11/21/18		104.6		10.8
12/23/18		54.6		1.0
1/9/19		67.7		6.3
1/23/19		33.1		1.0
2/3/19		42.2		1.0
2/23/19		27.9		1.0
3/19/19		63.1		1.0
4/10/19		86.0		3.1
4/24/19		461.1		2.0
5/8/19		1553.1		3.1
5/22/19		60.2		3.1
6/13/19		275.5		10.9
6/23/19		113.0		3.1
7/7/19		313.0		6.3
7/21/19		613.1		15.8
8/10/2019		410.6		3.1
8/22/2019		727.0		0.0
9/11/2019		488.4		1.0
9/22/2019		387.3		0.0
10/12/19		290.9		0.0
10/31/19		214.3		14.5
11/6/19		214.3		3.1
11/20/19		52.8		6.3
12/8/19		290.9		11.0
12/22/19		47.3		19.9
1/11/20		47.1		3.1
1/25/20		142.1		7.4
2/5/20		38.9		1.0
2/22/20		28.5		2.0
3/7/20		42.0		3.1
3/21/20		20.1		0.0
4/11/20		24.1		0.0
4/23/20		54.6		3.1
5/6/20		74.3		3.0
6/3/20		139.6		3.1
6/28/20		436.0		5.2
7/15/20		78.6		1.0
7/29/20		517.2		6.3
8/12/20		1046.2		18.1
8/26/20		517.2		18.7
9/2/20		75.4		11.0
9/16/20		488.4		4.1
10/7/20		1553.1		9.7
10/21/20		201.4		16.9
11/4/20		214.3		18.9
11/25/20		29.8		4.1
12/9/20		27.9		3.1
12/23/20		33.6		1.0

8/10/18		410.6		3.1

min	0.0
max	160.0
average	8.9
median	3.6
95th	20.15

Lake of the Pines

		TC		E. coli
1/2/16		110.6		38.8
1/23/16		6.3		0.0
2/2/16		648.8		80.8
2/22/16		686.7		43.5
3/8/16		592.2		172.2
3/27/16	>	2419.2		193.5
4/10/16	>	2419.2		7.4
4/23/16		98.8		8.6
5/5/16		488.4		23.1
5/25/16	>	2419.2		65.7
6/9/16		2419.2		86.0
6/23/16	>	2419.2		1986.3
7/6/2016		207.5		77.1
7/13/16		472.1		24.0
8/8/16		2419.2		90.7
8/21/16	>	2419.2		24.6
9/13/16		1203.3		96.0
9/26/16		648.8		27.2
10/22/16		2419.2		290.9
10/23/16		2419.2		195.6
11/7/16	>	2419.2		87.8
11/23/16		2419.2		285.1
12/14/16	>	2419.2		517.2
12/27/16		549.2		20.9
1/19/17		>2419.2		290.9
1/28/17		1413.6		98.7
2/15/17		727.0		16.1
2/23/17		1553.1		727
3/8/17		2419.2		77.6
3/29/17		1119.9		64.5
4/12/17		1119.9		62.0
4/22/17		365.4		7.4
5/4/17		461.1		129.6
5/27/17		275.5		44.1
6/7/17		313.0		21.8
6/28/17		1986.3		123.6
7/12/17		1046.2		39.1
7/28/17		307.6		45.7
8/10/17		770.1		135.4
8/30/17		2419.2		248.1
9/6/17		2419.2		1299.7
9/27/17		>2419.2		172.5
10/11/17		298.7		1.0
10/17/17		387.3		137.6
11/8/17		209.8		98.8
11/14/17		1732.9		65.0
12/6/17		201.4		29.2
12/23/17		104.6		6.3
1/12/18		579.4		38.2
1/27/18		1732.9		98.5
2/7/18		16.8		5.2
2/21/2018		344.1		4.1
3/7/18		248.1		18.5
3/28/2018		1046.2		17.1
4/11/18		501.2		122.3
4/26/18		344.8		15.8
5/9/18		727.0		111.9
5/26/18	>	2419.6		33.2
6/6/18		770.1		42.2
6/20/18		1046.2		17.3
7/11/18		1732.9		20.3
7/25/18		770.1		6.3
8/13/18		920.8		118.7
8/22/18		1203.3		178.9
9/5/18		1732.9		28.1
9/26/18		579.4		28.1
10/10/18	>	2419.6		686.7
10/12/18		657.0		41.0
11/7/18		1203.3		260.3
11/10/18		512.0		63.0
12/18/18		547.5		99.0
12/23/18		579.4		14.6
1/9/19		1299.7		121.1
1/23/19		488.4		24.1
2/3/19		261.3		16.3
2/23/19		222.4		27.5
3/19/19		193.5		4.1
4/10/19		162.4		19.9
4/24/19		224.7		2.0
5/8/19		261.3		10.7
5/22/19		79.8		28.5
6/13/19		344.8		2.0
6/23/19		456.9		0.0
7/7/19		517.2		4.1
7/21/19		1732.9		135.4
8/10/19		1299.7		235.9
8/22/19		14.8		0.0
9/11/19		1046.2		62.7
9/22/19		1732.9		517.2
10/12/19		1553.1		233.3
10/31/19		261.3		111.9
11/6/19		325.5		55.7
11/20/19		248.9		74.9
12/8/19		344.8		57.1
12/22/19		148.3		48.0
1/11/20		142.1		0.0
1/25/20		142.1		7.4
2/5/20		137.6		2.0
2/22/20		96.0		2.0
3/7/20		195.6		2.0
3/21/20		517.2		14.8
4/11/20		410.6		14.4
4/23/20		48.7		0.0
5/6/20		313.0		49.5
5/20/20		1413.6		109.0
6/3/20		866.4		10.8
6/28/20		1011.2		165.8
7/15/20		665.3		198.9
7/29/20		1553.1		166.4
8/12/20		0.0		3.1
8/26/20		920.8		13.5
9/2/20		816.4		2.0
9/16/20		1553.1		8.5
10/9/20		1553.1		290.9
10/11/20		770.1		156.5
11/4/20		435.2		80.9
11/25/20		155.2		93.3
12/9/20		201.4		129.1
12/23/20		101.4		7.5

min	0.0
max	1986.3
average	115.8
median	45.7
95th	313.53

Lake Wildwood

		TC		E. coli
1/2/16		167.4		7.3
1/24/16		410.6		133.3
2/3/16		44.8		2.0
2/20/16		307.6		35.0
3/8/16		1986.3		145.0
3/19/16		410.6		14.6
4/16/16		248.1		17.3
4/26/16		172.3		37.3
5/4/16		547.5		64.4
5/25/16		920.8		148.3
6/9/16		547.5		4.1
6/23/16		1299.7		105.0
7/6/2016		222.4		5.2
7/13/16		1.0		0.0
8/8/16	>	2419.2		307.6
8/30/16		579.4		90.9
9/13/16		816.4		106.7
9/26/16		613.1		28.5
10/22/16	>	2419.2		8.6
10/30/16	>	2419.2		28.2
11/7/16		648.8		6.3
11/21/16		1413.6		41.9
12/14/16		105.9		17.1
12/28/16		980.4		14.6
1/19/17		135.4		14.5
1/28/17		195.6		20.1
2/15/17		387.3		35.0
2/22/17		153.9		20.1
3/8/17		344.8		16.9
3/29/17		2419.2		3.1
4/12/17		866.4		41.0
5/4/17		727.0		8.5
5/27/17		1732.9		90.9
6/7/17		1119.9		83.9
6/28/17		1732.9		18.1
7/12/17		1553.1		16.0
7/28/17		1119.9		116.9
8/3/17		1299.7		325.5
8/31/17		980.4		206.3
9/6/17		2419.2		1046.2
9/27/17		410.6		24.3
10/11/17		816.4		35.9
10/17/17		307.6		12.0
11/8/17		1119.9		98.5
11/14/17		381.1		34.1
12/6/17		261.3		7.4
12/19/17		156.5		16.0
1/10/18		1046.2		261.3
1/27/18		35.4		9.8
2/7/18		8.4		1.0
2/21/18		24.5		1.0
3/7/18		238.2		6.3
3/28/18		108.6		4.1
4/12/18		185.0		8.5
4/26/18		238.2		14.8
5/9/18		1413.6		248.1
5/26/18		2419.6		14.5
6/6/18		372.5		8.5
6/19/18		>2419.6		21.6
7/12/18		344.1		37.9
7/17/18		1553.1		435.2
8/13/18		1413.6		81.3
8/22/18		727.0		131.4
9/5/18		178.5		6.3
9/26/18		435.2		48.7
10/10/18		1732.9		42.6
10/16/18		547.5		18.9
11/13/18		435.2		16.0
11/21/18		88.0		6.3
12/18/18		488.4		31.3
12/23/18		248.9		9.7
1/9/19		325.5		18.7
1/23/19		201.4		21.6
2/3/19		83.6		4.1
2/23/19		365.4		5.2
3/19/19		42.0		2.0
4/10/19		686.7		73.8
4/25/19		365.4		7.4
5/8/19		248.1		25.9
5/23/19		1299.7		166.4
6/13/19		547.5		13.5
6/22/19		148.3		5.2
7/7/19		285.1		9.8
7/21/19	>	2419.6		31.3
8/10/19		579.4		35.0
8/22/19		1553.1		66.3
9/11/19		1553.1		45.9
9/22/19		1413.6		14.6
10/12/19		387.3		12.2
10/31/19		248.9		21.3
11/6/19		150.0		15.8
11/20/19		248.1		79.8
12/8/19		151.5		3.1
12/22/19		235.9		24.3
1/11/20		158.5		5.2
1/25/20		228.2		12.1
2/5/20		55.4		2.0
2/22/20		19.7	<	1.0
3/7/20		65.0		3.0
3/21/20		579.4		16.0
4/11/20		248.9		7.5
4/23/20		151.5		8.5
5/6/20		387.3		27.5
6/3/20		866.4		2.0
6/28/20		980.4		17.1
7/15/20		579.4		6.3
7/29/20		325.5		42.0
8/12/20		686.7		63.8
8/26/20		517.2		34.5
9/2/20		435.2		18.7
9/16/20		387.3		6.3
10/7/20		689.3		240
10/21/20		613.1		63.8
11/4/20		127.4		16.1
11/25/20		86.7		57.3
12/9/20		98.4		47.3
12/23/20		222.4		38.9

min	0.0
max	1046.2
average	56.1
median	18.7
95th	241.62

North Auburn

		TC		E. coli
1/2/16		228.2		33.2
1/23/16		613.1		90.7
2/2/16		307.6		19.9
2/20/16		172.0		6.3
3/20/16		248.1		11.0
3/27/16		1203.3		8.5
4/11/16		387.3		9.5
4/23/16		1046.2		32.7
5/4/16		1203.3		13.4
5/25/16		1732.9		34.5
6/9/16		1986.3		27.8
6/23/16		549.2		8.6
7/6/16		509.9		15.6
7/13/16	>	2419.2		14.8
8/8/16		1413.6		30.5
8/21/16		2419.2		8.6
9/13/16		344.8		21.6
9/26/16		648.8		6.3
10/22/16		686.7		42.2
10/30/16	>	2419.2		101.4
11/7/16		648.8		2.0
11/21/16		1553.1		39.5
12/14/16	>	2419.2		39.9
12/27/16		210.5		16.8
1/20/17		1986.3		111.2
2/15/17		488.4		12.1
2/22/17	>	2419.2		727.0
3/8/17		435.2		6.3
3/29/17		512.2		18.7
4/12/17		547.5		20.9
4/22/17		63.1		5.2
5/4/17		248.1		18.7
6/7/17		1299.7		21.3
6/28/17		1119.9		26.2
7/12/17		1119.9		35.4
7/28/17		1299.7		21.6
8/10/17		258.9		29.2
8/30/17		1986.3		65.0
9/6/17		2419.2		307.6
9/27/17		1413.6		21.8
10/11/17		435.2		7.2
10/17/17		980.4		172.6
11/8/17		84.2		29.4
11/14/17		275.5		14.8
12/6/17		2613.0		20.0
1/10/18		686.7		209.8
1/27/18		74.2		7.0
2/2/18		23.7		9.7
2/21/18		248.9		1.0
3/7/18		365.4		224.7
3/29/18		64.0		12.1
4/11/18		692.4		18.7
4/26/18		1299.7		33.1
5/9/18		198.9		18.5
5/26/18		770.1		10.8
6/6/18		325.5		5.2
6/20/18		1732.9		13.5
7/11/18	>	2419.6		16.0
7/17/18		2419.6		7.4
8/13/18		2419.6		52.9
8/22/18		1553.1		50.4
9/5/18		727.0		42.6
9/26/18		1986.3		93.3
10/10/18		2419.6		33.1
10/16/18		261.3		153.9
11/7/18		214.3		5.2
11/21/18	>	2419.6		44.1
12/18/18	>	2419.6		33.1
12/23/18		248.9		26.2
1/9/19		1413.6		45.7
1/23/19		579.4		27.9
2/3/19	>	2419.6		238.2
2/23/19		410.6		43.7
3/19/19		325.5		7.5
4/10/19		218.7		10.7
4/24/19		248.1		79.4
5/8/19		201.4		7.5
5/22/19		259.5		70.8
6/13/19		770.1		11.0
6/22/19		866.4		15.6
7/7/19	>	2419.6		13.4
7/21/19	>	2419.6		10.0
8/10/19		2419.6		17.1
8/22/19		1553.1		38.8
9/11/19		1413.6		47.3
9/22/19		1413.6		88.4
10./12./19		2419.6		114.5
10/31/19		261.3		5.2
11/6/19		1299.7		0.0
11/20/19		146.7		4.1
12/8/19	>	2419.6		461.1
12/22/19		648.8		137.6
1/11/20		235.9		44.1
1/25/20		435.2		44.3
2/5/20		235.9		8.6
2/22/20		410.6		17.5
3/7/20		387.3		50.4
3/21/20		325.5		42.8
4/11/20		488.4		23.5
4/23/20		307.6		14.6
5/6/20		42.8	<	1.0
6/3/20		1986.3		13.4
6/28/20		399.8		38.8
7/15/20		199.5		12.1
7/29/20	>	2419.6		27.2
8/12/20		1986.3		14.5
8/26/20		1986.3		137.6
9/2/20	>	2419.6		613.1
9/16/20		2419.2		150.0
10/7/20		2419.6		114.5
10/21/20	>	2419.6		18.7
11/4/20		410.6		113.0
11/25/20		91.0		7.2
12/9/20		501.2		3.1
12/12/20		920.8		13.5

9/8/17		290.9		23.1

min	0.0
max	727.0
average	56.0
median	21.6
95th	213.525

Smartville

		TC		E. coli
1/2/16		906.0		183.0
1/25/16		1607.0		97.0
2/2/16		8664.0		97.0
2/20/16		3076.0		749.0
3/8/16	>	2419.2		1413.6
OFF				
4/16/16		3873.0		216.0
4/26/16		1106.0		20.0
5/4/16		1313.0		63.0
5/25/16		1046.0		74.0
6/11/16	>	2419.2		74.9
6/23/16		3076.0		120.0
7/6/16		2595.0		185.0
7/13/16		3873.0		63.0
8/8/16		161.0		31.0
8/22/16		3873.0		52.0
9/13/16	>	2419.2		74.3
9/26/16		1553.1		123.6
10/22/16		12033.0		536.0
10/30/16		24192.0		228.0
11/7/16		2143.0		135.0
11/21/16	>	2419.2		175.0
12/15/16		65.2		3.1
12/29/16		44.3		4.1
1/19/17	>	2419.2		1203.3
1/21/17		1076.0		20.0
2/15/17		980.4		12.0
2/22/17		250.0		34.5
3/8/17		114.0		132.0
3/29/17		1982.0		249.0
4/12/17		6131.0		212.0
4/22/17		1793.0		0.0
5/4/17		1658.0		109.0
5/27/17		132.0		10.0
6/7/17		1553.0		109.0
6/28/17		1565.0		0.0
7/12/17		8664.0		31.0
7/28/17		588.0		20.0
8/10/17		8664.0		85.0
8/30/17		84.0		0.0
9/6/17		2419.2		3.0
9/26/17		6488.0		41.0
10/11/17		323.0		20.0
10/17/2017		172.3		133.3
11/8/2017		14136.0		106.0
11/14/2017		3448.0		85.0
12/7/2017		214.2		29.2
12/19/2017		4611.0		31.0
1/10/18		9804.0		4884.0
1/27/18		96.0		41.0
2/7/18		12997.0		246.0
2/21/18		496.0		10.0
3/7/18		588.0		41.0
3/28/18		1793.0		20.0
4/11/18		1246.0		0.0
4/26/18		1374.0		41.0
5/9/18		1529.0		96.0
5/26/18		6867.0		31.0
6/6/18		2909.0		63.0
6/20/18		3654.0		75.0
7/17/18		3873.0		74.0
8/13/18		5475.0		74.0
8/22/18		908.0		0.0
9/5/18		3282.0		10.0
9/17/18		6488.0		131.0
10/10/18		2187.0		20.0
10/16/18		727.0		20.0
11/19/18		379.0		20.0
11/22/18		450.0		52.0
12/19/18	>	2419.6		137.6
12/23/18		598.0		0.0
1/9/19		836.0		52.0
1/23/19		2909.0		345.0
2/3/19		134.0		0.0
2/23/19		5794.0		169.0
3/19/19		193.5		4.1
4/10/19		10462.0		1585.0
4/24/19		2909.0		122.0
5/8/19		5475.0		86.0
5/22/19		1850.0		158.0
6/13/19		2224.0		388.0
6/22/2019		3654.0		20.0
7/7/19		2603.0		20.0
7/21/19		4106.0		20.0
8/10/19		3448.0		35.0
8/22/19		7270.0		20.0
9/22/19		824.0		10.0
9/23/19		3654.0		98.0
10/12/19		1782.0		10.0
Mead Off				
11/20/19		24196.0		6488.0
11/22/19		4907.0		226.0
12/8/19		39.7		3.0
12/22/19		431.0		20.0
1/11/20		420.0		31.0
1/25/20		383.0		0.0
2/5/20		327.0		0.0
2/22/20		30.5		4.1
3/7/20		579.4		238.2
3/21/20		488.4		35.0
4/11/20	>	2419.6		33.6
4/23/20	>	2419.6		344.8
5/6/20		5475.0		98.0
6/3/20	>	2419.6		58.3
6/28/20		1986.3		83.6
7/15/20		2419.6		25.6
7/29/20	>	2419.6		21.8
8/12/20	>	2419.6		133.3
8/26/20		1732.9		31.7
9/2/20	>	2419.6		46.4
9/16/20		1553.1		86.0
10/7/20		770.1		14.8
10/21/20		1413.6		88.4
11/4/20		1986.3		209.8
11/25/20		1299.7		228.2
12/9/20		387.3		143.0
12/23/20		104.6		2.0

min	0.0
max	6488.0
average	220.1
median	58.3
95th	599.9

LT2 Cryptosporidium & Giardia Monitoring
N.I.D. E. George System
PWS # 2910004

	Number of Oocysts per liter		Sample Q.C. OPR %			Matrix Spike				Raw Water Quality	
						# Spiked		% Recovery			
Sample Date	Crypto	Giardia	Crypto	Giardia	Blank	Crypto	Giardia	Crypto	Giardia	NTU	E.Coli
10/18/2016	0.00	0.09	71	77	0	100	100	62	70	1.9	15.8
11/15/2016	0.00	0.00	74	81	0					1.0	0.0
12/13/2016	0.093	0.19	81	83	0					2.9	12.0
1/18/2017	0.00	0.00	74	18	0					6.6	2.0
2/14/2017	0.00	0.00	83	15	0					4.0	1.0
3/14/2017	0.00	0.00	79	67	0					0.9	2.0
4/18/2017	0.00	0.00	75	81	0					2.3	0.0
5/15/2017	0.00	0.00	79	22	0					5.0	0.0
6/14/2017	0.00	0.00	84	75	0					2.0	5.2
7/19/2017	0.00	0.00	79	69	0					1.6	4.1
8/15/2017	0.00	0.00	69	81	0					1.0	0.0
9/19/2017	0.00	0.00	45	38	0					0.7	0.0
10/17/2017	0.00	0.00	61	74	0					0.5	2.0
11/14/2017	0.00	0.00	73	30	0					3.1	2.3
12/19/2017	0.00	0.00	87	87	0					2.4	1.0
1/17/2018	0.00	0.00	70	72	0					1.3	0.0
2/13/2018	0.00	0.00	72	82	0					0.7	0.0
3/13/2018	0.00	0.00	64	40	0					1.0	1.0
4/17/2018	0.00	0.00	62	56	0					2.7	14.6
5/15/2018	0.00	0.00	79	42	0					2.1	3.1
6/19/2018	0.00	0.09	82	78	0	100	100	58	2	2.0	1.2
7/17/2018	0.00	0.00	84	61	0					1.6	6.3
8/13/2018	0.00	0.00	70	71	0					1.8	4.1
9/17/2018	0.00	0.00	74	73	0					3.9	4.1
Average:	0.004	0.015	73.79	61.38	0.00	100.00	100.00	60.00	36.00	2.2	3.4

LT2 Cryptosporidium & Giardia Monitoring
N.I.D. Loma Rica System
PWS # 2910006

	Number of Oocysts per liter		Sample Q.C.			Matrix Spike				Raw Water Quality	
			OPR %			# Spiked		% Recovery			
Sample Date	Crypto	Giardia	Crypto	Giardia	Blank	Crypto	Giardia	Crypto	Giardia	NTU	E.Coli
10/18/2016	0	0	71	77	0	100	100	29	79	4.0	14.6
11/15/2016	0	0	74	81	0					1.4	1.0
12/13/2016	0	0	81	83	0					3.2	4.1
1/18/2017	0	0	74	18	0					0.7	0.0
2/14/2017	0	0	83	15	0					0.7	0.0
3/14/2017	0	0.186	79	67	0					0.4	5.2
4/18/2017	0	0	75	81	0					0.6	7.4
5/15/2017	0	0	79	22	0					0.3	1.0
6/14/2017	0	0	84	75	0					1.8	0.0
7/19/2017	0	0	79	69	0					2.1	4.1
8/15/2017	0	0	69	81	0					1.2	5.2
9/19/2017	0	0	45	38	0					0.6	3.1
10/17/2017	0	0	61	74	0					2.1	4.1
11/14/2017	0	0	73	30	0					1.8	1.0
12/19/2017	0	0	87	87	0					1.8	0.0
1/17/2018	0	0	70	72	0					0.7	0.0
2/13/2018	0	0	72	82	0					1.1	0.0
3/13/2018	0	0	64	40	0					9.0	52.1
4/17/2018	0	0	62	56	0					1.4	5.2
5/16/2018	0	0	79	42	0					2.2	1.0
6/20/2018	0	0	82	78	0	100	100	41	72	1.3	2.0
7/17/2018	0	0	84	61	0					2.1	5.2
8/13/2018	0	0	70	71	0					0.8	4.1
9/17/2018	0	0	74	73	0					1.9	3.1
Average:	0.000	0.008	73.79	61.38	0.00	100.00	100.00	35.00	75.50	1.8	5.1

LT2 Cryptosporidium & Giardia Monitoring

N.I.D. Lake of the Pines

PWS # 2910014

	Number of Oocysts per Liter		Sample Q.C. OPR %			Matrix Spike # Spiked		Matrix Spike % Recovery		Raw Water Quality	
Sample Date	Crypto	Giardia	Crypto	Giardia	Blank	Crypto	Giardia	Crypto	Giardia	E.Coli	NTU
10/17/2017	0	0	74	70	0	99	100	0	3	137.6	7.4
11/14/2017	0	0	73	30	0					65.0	3.1
12/19/2017	0	0	87	87	0					3.0	1.9
1/17/2018	0	0	70	72	0					8.6	3.9
2/13/2018	0	0	72	82	0					12.2	1.9
3/14/2018	0.093	0	63	15	0					261.3	13.8
4/17/2018	0	0	62	56	0					9.7	21.2
5/15/2018	0	0	79	42	0					70.3	12.0
6/19/2018	0	0	82	78	0					17.3	4.0
7/17/2018	0	0	84	61	0					11.0	5.8
8/13/2018	0	0	70	71	0					118.7	2.2
9/19/2018	0	0	87	72	0					63.7	1.9
10/31/2018	0	0	61	62	0					131.4	1.5
11/13/2018	0	0.372	94	73	0					40.4	7.8
12/18/2018	0	0	92	89	0					99.0	2.4
1/15/2019	0	0	77	61	0					35.9	6.1
2/19/2019	0	0	83	46	0					35.9	14.2
3/19/2019	0	0	75	79	0					4.1	20.6
4/16/2019	0	0	83	79	0					3.1	5.9
5/14/2019	0	0	70	58	0					7.5	3.4
6/18/2019	0	0	92	68	0	100	100	31	76	3.1	3.6
7/16/2019	0	0	69	71	0					17.3	3.9
8/14/2019	0	0	72	69	0					104.6	3.6
9/17/2019	0	0.093	65	26	0					488.4	2.4
Average:	0.0039	0.0194	76.5	63.208	0	99.5	100	15.5	39.5	72.88	6.44

LT2 Cryptosporidium & Giardia Monitoring

N.I.D. Lake Wildwood

PWS # 2910023

	Number of Oocysts per Liter		Sample Q.C. OPR %			Matrix Spike # Spiked		Matrix Spike # Recovery		Raw Water Quality	
Sample Date	Crypto	Giardia	Crypto	Giardia	Blank	Crypto	Giardia	Crypto	Giardia	E.Coli	NTU
10/17/2017	0	0	74	70	0	99	100	40	90	12.0	3.0
11/14/2017	0	0	73	30	0					34.1	4.1
12/19/2017	0	0	87	87	0					16.0	2.4
1/17/2018	0	0	70	72	0					9.8	4.6
3/6/2018	0	0	72	32	0	Resampled. Original February sample was frozen on arrival to lab				14.8	10.4
3/13/2018	0	0.186	63	15	0					52.1	9.0
4/17/2018	0	0	62	56	0					10.8	4.6
5/15/2018	0	0	79	42	0					43.9	7.4
6/19/2018	0	0	82	78	0					21.6	2.7
7/17/2018	0	0	84	61	0					435.2	2.8
8/13/2018	0	0	85	78	0					81.3	7.0
9/17/2018	0	0	74	73	0					48.0	2.7
10/16/2018	0	0	78	72	0					18.9	2.5
11/13/2018	0	0	94	73	0					16.0	2.3
12/18/2018	0	0	92	89	0					31.3	2.8
1/15/2019	0	0	77	61	0					42.6	7.2
2/19/2019	0	0	83	46	0					14.8	16.2
3/19/2019	0	0	75	79	0					2.0	5.8
4/16/2019	0	0.279	83	79	0					7.3	9.2
5/14/2019	0	0	70	58	0					9.7	5.5
6/18/2019	0	0	92	68	0	100	100	14	51	11.0	6.6
7/16/2019	0	0	69	71	0					9.6	6.7
8/14/2019	0	0	72	69	0					27.5	2.7
9/17/2019	0	0	65	26	0					101.7	6.8
Average:	0.000	0.019	77.29	61.875	0	99.5	100	27	70.5	44.7	5.62

LT2 Cryptosporidium & Giardia Monitoring

N.I.D. North Auburn

PWS # 3110026

	Number of Oocysts per Liter		Sample Q.C. OPR %			Matrix Spike # Spiked		Matrix Spike % Recovery		Raw Water Quality	
Sample Date	Crypto	Giardia	Crypto	Giardia	Blank	Crypto	Giardia	Crypto	Giardia	E.Coli	NTU
10/17/2017	0	0	74	70	0	99	100	0	15	172.6	28.6
11/14/2017	0	0	73	30	0					14.8	3.3
12/19/2017	0	0	87	87	0					23.5	3.4
1/17/2018	0	0	70	72	0					6.3	4.2
3/6/2018	0	0	72	32	0	Resampled. Original February Sample was frozen on arrival to Lab				2.0	2.2
3/14/2018	0.279	0.186	63	15	0					275.5	21.0
4/17/2018	0	0	62	56	0					32.8	25.2
5/15/2018	0	0	79	42	0					12.2	12.7
6/20/2018	0	0	82	78	0					13.5	4.2
7/17/2018	0	0	84	61	0					7.4	2.7
8/13/2018	0	0	70	71	0					52.9	2.3
9/17/2018	0	0	74	73	0					50.4	1.4
10/16/2018	0	0	78	72	0					153.9	7.8
11/13/2018	0	0.186	94	73	0					39.3	9.1
12/18/2018	0	0	92	89	0					33.1	7.3
1/15/2019	0	0.093	81	73	0					37.4	27.4
2/19/2019	0	0	83	46	0					79.4	48.0
3/19/2019	0	0	74	63	0					7.5	15.5
4/16/2019	0	0	83	79	0					18.5	12.8
5/14/2019	0	0	70	58	0					8.6	3.8
6/18/2019	0	0	92	68	0	100	100	21	21	8.6	6.1
7/16/2019	0	0	73	62	0					4.1	5.1
8/13/2019	0	0	72	69	0					9.6	5.1
9/17/2019	0	0	65	26	0					224.7	5.6
Average:	0.0116	0.0194	76.96	61.042	0	99.5	100	10.5	18	53.7	11

LT2 Cryptosporidium & Giardia Monitoring

N.I.D. Smartsville

PWS # 5810005

	Number of Oocysts per Liter		Sample Q.C. OPR %			Matrix Spike # Spiked		Matrix Spike % Recovery		Raw Water Quality	
Sample Date	Crypto	Giardia	Crypto	Giardia	Blank	Crypto	Giardia	Crypto	Giardia	E.Coli	NTU
10/17/2017	0	0	74	70	0	99	100	33	71	133.3	4.5
11/14/2017	0	0	73	30	0					85.0	1.2
12/19/2017	0	0	87	87	0					31.0	2.1
1/17/2018	0.186	0	70	72	0					30.0	2.5
2/20/2018	0	0	88	38	0					10.0	1.7
3/13/2018	0.093	0	64	40	0					9.5	22.0
4/17/2018	0	0	62	56	0					1203.3	5.0
5/15/2018	0	0	79	42	0					133.4	5.0
6/19/2018	0	0.093	82	78	0					63.0	3.5
7/17/2018	0.093	0	84	61	0					74.0	4.1
8/13/2018	0	0	70	71	0					74.0	2.2
9/17/2018	0	0.093	74	73	0					131.0	2.3
10/16/2018	0	0	78	72	0					20.0	2.9
11/13/2018	0	0.093	94	73	0					52.0	1.5
12/20/2018	0	0.186	92	89	0					137.6	22.2
1/15/2019	0.093	0	77	61	0					10.0	6.6
2/19/2019	0	0	83	46	0					41.0	7.6
3/19/2019	0	0	75	79	0					10.0	2.6
4/16/2019	0	0	83	79	0					97.0	4.2
5/14/2019	0	0	70	58	0					110.0	4.4
6/18/2019	0	0	92	68	0	100	100	8	0	134.0	6.3
7/16/2019	0	0	69	71	0					0.0	3.4
8/14/2019	0	0	72	69	0					0.0	1.5
9/17/2019	0.093	0.093	65	26	0					146.0	6.5
Average:	0.0233	0.0233	77.38	62.875	0	99.5	100	20.5	35.5	114.0	5.2

State of California
Drinking Water Program

Department of Public Health

Stage 2 DDBPR Quarterly TTHM Report for Disinfection Byproducts Compliance (in µg/L or ppb)

System Name: **Nevada I.D. E. George** System No.: **2910004** Year: **2020** Quarter: 4th TTHM MCL = 0.080 mg/L or 80 ug/L

Year:		2016				2017				2018				2019				2020			
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/day):		1/20	4/19	7/12	10/19	1/18	4/11	7/19	10/16	1/17	4/11	7/17	10/16	2/19	5/6	8/20	10/30	2/10	6/9	8/25	10/21
#	Monitoring Location	TTHM Results (ug/L)																			
1	Hidden Valley PRV	38.0	27.0	59.0	51.0	33.0	21.0	37.0	43.0	52.0	56.0	70.0	59.0	33.0	60.0	59.0	54.0	42.0	64.0	57.0	55.0
2	16844 Pasquale Rd	49.0	46.0	60.0	71.0	17.0	21.0	52.0	35.0	43.0	44.0	68.0	55.0	37.0	31.0	44.0	30.0	27.0	43.0	45.0	40.0
3	Country Ln & Indian Flt	40.0	27.0	67.0	48.0	24.0	21.0	30.0	62.0	58.0	54.0	57.0	66.0	41.0	53.0	71.0	40.0	32.0	51.0	57.0	43.0
4	217 Upper Slate Creek	23.0	21.0	45.0	28.0	17.0	13.0	37.0	33.0	38.0	43.0	54.0	49.0	26.0	46.0	49.0	45.0	33.0	49.0	43.0	47.0
Number of Samples Taken		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
#	Monitoring Location	TTHM OEL (ug/L)																			
1	Hidden Valley PRV			45.8	47.0	44.0	31.5	32.0	36.0	46.0	51.8	62.0	61.0	48.8	53.0	52.8	56.8	49.3	56.0	55.0	57.8
2	16844 Pasquale Rd			53.8	62.0	41.3	32.5	35.5	35.8	43.3	41.5	55.8	55.5	49.3	38.5	39.0	33.8	32.0	35.8	40.0	42.0
3	Country Ln & Indian Flt			50.3	47.5	40.8	28.5	26.3	43.8	52.0	57.0	56.5	60.8	51.3	53.3	59.0	51.0	43.8	43.5	49.3	48.5
4	217 Upper Slate Creek			33.5	30.5	26.8	17.8	26.0	29.0	36.5	39.3	47.3	48.8	38.8	41.8	42.5	46.3	40.0	44.0	42.0	46.5
Is OEL ≤ MCL for all monitoring locations?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (a)																					
#	Monitoring Location	TTHM LRAA (ug/L)																			
1	Hidden Valley PRV	38.0	32.5	41.3	43.8	42.5	41.0	35.5	33.5	38.3	47.0	55.3	59.3	54.5	55.5	52.8	51.5	53.8	54.8	54.3	54.5
2	16844 Pasquale Rd	49.0	47.5	51.7	56.5	48.5	42.3	40.3	31.3	37.8	43.5	47.5	52.5	51.0	47.8	41.8	35.5	33.0	36.0	36.3	38.8
3	Country Ln & Indian Flt	40.0	33.5	44.7	45.5	41.5	40.0	30.8	34.3	42.8	51.0	57.8	58.8	54.5	54.3	57.8	51.3	49.0	48.5	45.0	45.8
4	217 Upper Slate Creek	23.0	22.0	29.7	29.3	27.8	25.8	23.8	25.0	30.3	37.8	42.0	46.0	43.0	43.8	42.5	41.5	43.3	44.0	42.5	43.0
Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?		Yes	Yes	Yes	Yes	Yes	Yes	yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (b)																					
Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If yes, list monitoring location # where MCL not met (b)																					

(a) If the OEL exceeds theTTHM MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the TTHM MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the TTHM MCL, the system is out of compliance at the end of that quarter.

Signature

Date

Stage 2 DDBPR Quarterly HAA5 Report for Disinfection Byproducts Compliance (in µg/L or ppb)

System Name: **Nevada I.D. E. George** System No.: **2910004** Year: **2020** Quarter: 4th HAA5 MCL = 0.060 mg/L or 60 ug/L

	Year:	2016				2017				2018				2019				2020			
	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/day):	1/20	4/19	7/12	10/19	1/18	4/11	7/19	10/16	1/17	4/11	7/17	10/16	2/19	5/6	8/20	10/30	2/10	6/9	8/25	10/21
#	Monitoring Location	HAA5 Results (ug/L)																			
1	Hidden Valley PRV	24.0	19.0	19.0	8.7	22.0	13.0	5.7	11.0	16.0	13.0	17.0	19.0	16.0	9.1	14.0	19.0	17.0	24.0	21.0	16.0
2	16844 Pasquale Rd	47.0	31.0	50.0	55.0	16.0	21.0	34.0	18.0	35.0	19.0	19.0	22.0	26.0	19.0	20.0	22.0	30.0	27.0	30.0	21.0
3	Country Ln & Indian Flt	16.0	16.0	18.0	26.0	14.0	17.0	26.0	16.0	16.0	10.0	16.0	18.0	16.0	16.0	15.0	19.0	19.0	22.0	23.0	17.0
4	217 Upper Slate Creek	28.0	23.0	27.0	27.0	17.0	12.0	29.0	19.0	20.0	15.0	20.0	21.0	16.0	34.0	17.0	22.0	21.0	27.0	18.0	18.0
	Number of Samples Taken	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
#	Monitoring Location	HAA5 OEL (ug/L)																			
1	Hidden Valley PRV			20.3	13.9	17.9	14.2	11.6	10.2	12.2	13.3	15.8	17.0	17.0	13.3	13.3	15.3	16.8	21.0	20.8	19.3
2	16844 Pasquale Rd			44.5	47.8	34.3	28.3	26.3	22.8	30.5	22.8	23.0	20.5	23.3	21.5	21.3	20.8	25.5	26.5	29.3	24.8
3	Country Ln & Indian Flt			17.0	21.5	18.0	18.5	20.8	18.8	18.5	13.0	14.5	15.5	16.5	16.5	15.5	17.3	18.0	20.5	21.8	19.8
4	217 Upper Slate Creek			26.3	26.0	22.0	17.0	21.8	19.8	22.0	17.3	18.8	19.3	18.3	26.3	21.0	23.8	20.3	24.3	21.0	20.3
	Is OEL ≤ MCL for all monitoring locations?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
	If no, list monitoring location # where MCL not met (a)																				
#	Monitoring Location	HAA5 LRAA (ug/L)																			
1	Hidden Valley PRV	24.0	21.5	20.7	17.7	17.2	15.7	12.4	12.9	11.4	11.4	14.3	16.3	16.3	15.3	14.5	14.5	14.8	18.5	20.3	19.5
2	16844 Pasquale Rd	47.0	39.0	42.7	45.8	38.0	35.5	31.5	22.3	27.0	26.5	22.8	23.8	21.5	21.5	21.8	21.8	22.8	24.8	27.3	27.0
3	Country Ln & Indian Flt	16.0	16.0	16.7	19.0	18.5	18.8	20.8	18.3	18.8	17.0	14.5	15.0	15.0	16.5	16.3	16.5	17.3	18.8	20.8	20.3
4	217 Upper Slate Creek	28.0	25.5	26.0	26.3	23.5	20.8	21.3	19.3	20.0	20.8	18.5	19.0	18.0	22.8	22.0	22.3	23.5	21.8	22.0	21.0
	Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
	If no, list monitoring location # where MCL not met (b)																				
	Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No			
	If yes, list monitoring location # where MCL not met (b)																				

(a) If the OEL exceeds the HAA5 MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the HAA5 MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the HAA5 MCL, the system is out of compliance at the end of that quarter.

Signature

Date

Stage 2 DDBPR Quarterly TTHM Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: Nevada I.D. Lake Wildwood System No.: 2910023 Year: 2020 Quarter: 4th TTHM MCL = 0.080 mg/L or 80 ug/L

Year:		2016				2017				2018				2019				2020			
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/day):		2/23	5/10	8/15	11/30	2/21	5/16	8/9	11/20	2/18	5/7	8/8	11/26	2/12	5/6	8/20	11/26	2/6	6/9	8/25	11/17
#	Monitoring Location	TTHM Results (ug/L)																			
1	18367 Fair Oaks	52.0	34.0	32.0	73.0	32.0	27.0	26.0	59.0	39.0	31.0	26.0	18.0	68.0	38.0	38.0	20.0	12.0	35.0	28.0	41.0
2	17593 Penn Valley Dr.	49.0	58.0	54.0	100.0	22.0	41.0	39.0	67.0	68.0	60.0	49.0	22.0	60.0	42.0	38.0	20.0	29.0	33.0	47.0	25.0
3																					
4																					
Number of Samples Taken		2	2	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
#	Monitoring Location	TTHM OEL (ug/L)																			
1	18367 Fair Oaks			37.5	53.0	42.3	39.8	27.8	42.8	40.8	40.0	30.5	23.3	45.0	40.5	45.5	29.0	20.5	25.5	25.8	36.3
2	17593 Penn Valley Dr.			53.8	78.0	49.5	51.0	35.3	53.5	60.5	63.8	56.5	38.3	47.8	41.5	44.5	30.0	29.0	28.8	39.0	32.5
3																					
4																					
Is OEL ≤ MCL for all monitoring locations?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (a)																					
#	Monitoring Location	TTHM LRAA (ug/L)																			
1	18367 Fair Oaks	52.0	43.0	39.3	47.8	42.8	41.0	39.5	36.0	37.8	38.8	38.8	28.5	35.8	37.5	40.5	41.0	27.0	26.3	23.8	29.0
2	17593 Penn Valley Dr.	49.0	53.5	53.7	65.3	58.5	54.3	50.5	42.3	53.8	58.5	61.0	49.8	47.8	43.3	40.5	40.0	32.3	30.0	32.3	33.5
3																					
4																					
Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (b)																					
Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If yes, list monitoring location # where MCL not met (b)																					

(a) If the OEL exceeds theTTHM MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the TTHM MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the TTHM MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

Stage 2 DDBPR Quarterly HAA5 Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: Nevada I.D. Lake Wildwood System No.: 2910023 Year: 2020 Quarter: 4th HAA5 MCL = 0.060 mg/L or 60 ug/L

Year:		2016				2017				2018				2019				2020			
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/day):		2/23	5/10	8/15	11/30	2/21	5/16	8/9	11/20	2/18	5/7	8/8	11/26	2/12	5/6	8/20	11/26	2/6	6/9	8/25	11/17
#	Monitoring Location	HAA5 Results (ug/L)																			
1	18367 Fair Oaks	60.0	19.0	13.0	42.0	17.0	22.0	12.0	36.0	21.0	20.0	18.0	16.0	26.0	13.0	20.0	32.0	47.0	27.0	18.0	41.0
2	17593 Penn Valley Dr.	60.0	21.0	23.0	26.0	16.0	23.0	22.0	30.0	30.0	20.0	21.0	13.0	31.0	16.0	23.0	35.0	50.0	26.9	27.0	20.0
3																					
4																					
Number of Samples Taken		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
#	Monitoring Location	HAA5 OEL (ug/L)																			
1	18367 Fair Oaks			26.3	29.0	22.3	25.8	15.8	26.5	22.5	24.3	19.3	17.5	21.5	17.0	19.8	24.3	36.5	33.3	27.5	31.8
2	17593 Penn Valley Dr.			31.8	24.0	20.3	22.0	20.8	26.3	28.0	25.0	23.0	16.8	24.0	19.0	23.3	27.3	39.5	34.7	32.7	23.5
3																					
4																					
Is OEL ≤ MCL for all monitoring locations?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (a)																					
#	Monitoring Location	HAA5 LRAA (ug/L)																			
1	18367 Fair Oaks	60.0	39.5	30.7	33.5	22.8	23.5	23.3	21.8	22.8	22.3	23.8	18.8	20.0	18.3	18.8	22.8	28.0	31.5	31.0	33.3
2	17593 Penn Valley Dr.	60.0	40.5	34.7	32.5	21.5	22.0	21.8	22.8	26.3	25.5	25.3	21.0	21.3	20.3	20.8	26.3	31.0	33.7	34.7	31.0
3																					
4																					
Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (b)																					
Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If yes, list monitoring location # where MCL not met (b)																					

(a) If the OEL exceeds the HAA5 MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the HAA5 MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the HAA5 MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

State of California
Drinking Water Program

Department of Public Health

Stage 2 DDBPR Quarterly TTHM Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: Nevada I.D. Loma Rica   System No.: 2910006   Year: 2020   Quarter: 4th   TTHM MCL = 0.080 mg/L or 80 ug/L

	Year:	2016				2017				2018				2019				2020			
	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/day):	3/16	6/21	9/13	12/20	3/14	6/14	9/19	12/28	1/16	4/10	7/11	10/3	1/22	4/11	7/9	10/16	1/15	6/13	7/14	10/6
#	Monitoring Location	TTHM Results (ug/L)																			
1	16607 Annie Dr.	41.0	47.0	61.0	52.0	18.0	33.0	51.0	50.0	58.0	53.0	62.0	65.0	42.0	37.0	61.0	59.0	59.0	58.0	56.0	59.0
2	Alta Sierra Res. Eff.	42.0	39.0	59.0	46.0	14.0	31.0	42.0	50.0	48.0	46.0	45.0	52.0	39.0	21.0	54.0	48.0	53.0	56.0	53.0	54.0
3	17473 Colfax Hwy	44.0	40.0	57.0	54.0	16.0	26.0	41.0	25.0	24.0	29.0	43.0	38.0	18.0	16.0	39.0	36.0	34.0	40.0	60.0	42.0
4	10495 Oak Dr	45.0	37.0	62.0	52.0	20.0	30.0	64.0	43.0	50.0	39.0	59.0	59.0	32.0	28.0	61.0	52.0	35.0	64.0	63.0	59.0
	Number of Samples Taken	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
#	Monitoring Location	TTHM OEL (ug/L)																			
1	16607 Annie Dr.			52.5	53.0	37.3	34.0	38.3	46.0	54.3	53.5	58.8	61.3	52.8	45.3	50.3	54.0	59.5	58.5	57.3	58.0
2	Alta Sierra Res. Eff.			49.8	47.5	33.3	30.5	32.3	43.3	47.0	47.5	46.0	48.8	43.8	33.3	42.0	42.8	52.0	53.3	53.8	54.3
3	17473 Colfax Hwy			49.5	51.3	35.8	30.5	31.0	29.3	28.5	26.8	34.8	37.0	29.3	22.0	28.0	31.8	35.8	37.5	48.5	46.0
4	10495 Oak Dr			51.5	50.8	38.5	33.0	44.5	45.0	51.8	42.8	51.8	54.0	45.5	36.8	45.5	48.3	45.8	53.8	56.3	61.3
	Is OEL ≤ MCL for all monitoring locations?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	If no, list monitoring location # where MCL not met (a)																				
#	Monitoring Location	TTHM LRAA (ug/L)																			
1	16607 Annie Dr.	41.0	44.0	49.7	50.3	44.5	41.0	38.5	38.0	48.0	53.0	55.8	59.5	55.5	51.5	51.3	49.8	54.0	59.3	58.0	58.0
2	Alta Sierra Res. Eff.	42.0	40.5	46.7	46.5	39.5	37.5	33.3	34.3	42.8	46.5	47.3	47.8	45.5	39.3	41.5	40.5	44.0	52.8	52.5	54.0
3	17473 Colfax Hwy	44.0	42.0	47.0	48.8	41.8	38.3	34.3	27.0	29.0	29.8	30.3	33.5	32.0	28.8	27.8	27.3	31.3	37.3	42.5	44.0
4	10495 Oak Dr	45.0	41.0	48.0	49.0	42.8	41.0	41.5	39.3	46.8	49.0	47.8	51.8	47.3	44.5	45.0	43.3	44.0	53.0	53.5	55.3
	Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	If no, list monitoring location # where MCL not met (b)																				
	Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	If yes, list monitoring location # where MCL not met (b)																				

(a) If the OEL exceeds theTTHM MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the TTHM MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the TTHM MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

State of California
Drinking Water Program

Department of Public Health

Stage 2 DDBPR Quarterly HAA5 Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: Nevada I.D. Loma Rica   System No.: 2910006   Year: 2020   Quarter: 4th   HAA5 MCL = 0.060 mg/L or 60 ug/L

Year:		2016				2017				2018				2019				2020			
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/day):		3/23	6/21	9/13	12/20	3/14	6/14	9/19	12/28	1/16	4/10	7/11	10/3	1/22	4/11	7/9	10/16	1/15	6/13	7/14	10/6
#	Monitoring Location	HAA5 Results (ug/L)																			
1	16607 Annie Dr.	27.0	34.0	22.0	29.0	11.0	24.0	21.0	25.0	18.0	17.0	25.0	23.0	21.0	13.0	24.0	18.0	28.0	33.0	29.3	23.0
2	Alta Sierra Res. Eff.	39.0	39.0	22.0	29.0	10.0	27.0	20.0	33.0	32.0	22.0	26.0	25.0	23.0	12.0	24.0	19.0	28.0	37.0	29.6	22.0
3	17473 Colfax Hwy	30.0	36.0	19.0	29.0	11.0	27.0	19.0	22.0	18.0	21.0	25.0	28.0	22.0	14.0	24.0	18.0	27.0	35.0	29.5	21.0
4	10495 Oak Dr	23.0	27.0	22.0	30.0	14.0	16.0	22.0	24.0	24.0	20.0	25.0	24.0	20.0	14.0	24.0	18.0	24.0	36.0	29.8	23.0
Number of Samples Taken		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
#	Monitoring Location	HAA5 OEL (ug/L)																			
1	16607 Annie Dr.			26.3	28.5	18.3	22.0	19.3	23.8	20.5	19.3	21.3	22.0	22.5	17.5	20.5	18.3	24.5	28.0	29.9	27.1
2	Alta Sierra Res. Eff.			30.5	29.8	17.8	23.3	19.3	28.3	29.3	27.3	26.5	24.5	24.3	18.0	20.8	18.5	24.8	30.3	31.1	27.7
3	17473 Colfax Hwy			26.0	28.3	17.5	23.5	19.0	22.5	19.3	20.5	22.3	25.5	24.3	19.5	21.0	18.5	24.0	28.8	30.3	26.6
4	10495 Oak Dr			23.5	27.3	20.0	19.0	18.5	21.5	23.5	22.0	23.5	23.3	22.3	18.0	20.5	18.5	22.5	28.5	29.9	28.0
Is OEL ≤ MCL for all monitoring locations?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (a)																					
#	Monitoring Location	HAA5 LRAA (ug/L)																			
1	16607 Annie Dr.	27.0	30.5	27.7	28.0	24.0	21.5	21.3	20.3	22.0	20.3	21.3	20.8	21.5	20.5	20.3	19.0	20.8	25.8	27.1	28.3
2	Alta Sierra Res. Eff.	39.0	39.0	33.3	32.3	25.0	22.0	21.5	22.5	28.0	26.8	28.3	26.3	24.0	21.5	21.0	19.5	20.8	27.0	28.4	29.2
3	17473 Colfax Hwy	30.0	33.0	28.3	28.5	23.8	21.5	21.5	19.8	21.5	20.0	21.5	23.0	24.0	22.3	22.0	19.5	20.8	26.0	27.4	28.1
4	10495 Oak Dr	23.0	25.0	24.0	25.5	23.3	20.5	20.5	19.0	21.5	22.5	23.3	23.3	22.3	20.8	20.5	19.0	20.0	25.5	27.0	28.2
Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (b)																					
Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If yes, list monitoring location # where MCL not met (b)																					

(a) If the OEL exceeds the HAA5 MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the HAA5 MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the HAA5 MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

Stage 2 DDBPR Quarterly TTHM Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: **Nevada I.D. Lake of the Pines** System No.: 2910014 Year: 2020 Quarter: 4th TTHM MCL = 0.080 mg/L or 80 ug/L

	Year:	2016				2017				2018				2019				2020			
	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/day):	2/18	5/10	8/15	11/22	2/21	5/16	8/8	11/20	2/19	5/7	8/8	11/27	2/12	5/6	8/20	11/26	2/10	6/12	8/25	11/17
#	Monitoring Location	TTHM Results (ug/L)																			
1	10961 Combie Road	57.0	53.0	60.0	64.0	43.0	35.0	43.0	33.0	51.0	51.0	47.0	27.0	44.0	53.0	64.0	24.0	44.0	20.0	61.0	42.0
2	Dark Horse Pump Stat.	57.0	53.0	63.0	59.0	48.0	31.0	42.0	43.0	45.0	64.0	54.0	34.0	57.0	58.0	67.0	50.0	40.0	51.0	58.0	48.0
3																					
4																					
	Number of Samples Taken	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
#	Monitoring Location	TTHM OEL (ug/L)																			
1	10961 Combie Road			57.5	60.3	52.5	44.3	41.0	36.0	44.5	46.5	49.0	38.0	40.5	44.3	56.3	41.3	44.0	27.0	46.5	41.3
2	Dark Horse Pump Stat.			59.0	58.5	54.5	42.3	40.8	39.8	43.8	54.0	54.3	46.5	50.5	51.8	62.3	56.3	49.3	48.0	51.8	51.3
3																					
4																					
	Is OEL ≤ MCL for all monitoring locations?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	If no, list monitoring location # where MCL not met (a)																				
#	Monitoring Location	TTHM LRAA (ug/L)																			
1	10961 Combie Road	57.0	55.0	56.7	58.5	55.0	50.5	46.3	38.5	40.5	44.5	45.5	44.0	42.3	42.8	47.0	46.3	46.3	38.0	37.3	41.8
2	Dark Horse Pump Stat.	57.0	55.0	57.7	58.0	55.8	50.3	45.0	41.0	40.3	48.5	51.5	49.3	52.3	50.8	54.0	58.0	53.8	52.0	49.8	49.3
3																					
4																					
	Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	If no, list monitoring location # where MCL not met (b)																				
	Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	If yes, list monitoring location # where MCL not met (b)																				

(a) If the OEL exceeds theTTHM MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the TTHM MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the TTHM MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

State of California
Drinking Water Program

Department of Public Health

Stage 2 DDBPR Quarterly HAA5 Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: **Nevada I.D. Lake of the Pines** System No.: 2910014 Year: 2020 Quarter: 4th HAA5 MCL = 0.060 mg/L or 60 ug/L

Year:		2016				2017				2018				2019				2020			
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/day):		2/18	5/10	8/15	11/21	2/21	5/16	8/8	11/20	2/19	5/7	8/8	11/27	2/19	5/6	8/20	11/26	2/10	6/12	8/25	11/17
#	Monitoring Location	HAA5 Results (ug/L)																			
1	10961 Combie Road	30.0	30.0	23.0	25.0	26.0	19.0	22.0	20.0	28.0	38.0	19.0	20.0	25.0	22.0	24.0	29.0	21.0	28.0	27.0	20.0
2	Dark Horse Pump Stat.	30.0	33.0	29.0	19.0	16.0	24.0	23.0	20.0	21.0	39.0	23.0	24.0	24.0	19.0	23.0	27.0	26.0	30.0	25.0	23.0
3																					
4																					
Number of Samples Taken		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
#	Monitoring Location	HAA5 OEL (ug/L)																			
1	10961 Combie Road			26.5	25.8	25.0	22.3	22.3	20.3	24.5	31.0	26.0	24.3	22.3	22.3	23.8	26.0	23.8	26.5	25.8	23.8
2	Dark Horse Pump Stat.			30.3	25.0	20.0	20.8	21.5	21.8	21.3	29.8	26.5	27.5	23.8	21.5	22.3	24.0	25.5	28.3	26.5	25.3
3																					
4																					
Is OEL ≤ MCL for all monitoring locations?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (a)																					
#	Monitoring Location	HAA5 LRAA (ug/L)																			
1	10961 Combie Road	30.0	30.0	27.7	27.0	26.0	23.3	23.0	21.8	22.3	27.0	26.3	26.3	25.5	21.5	22.8	25.0	24.0	25.5	26.3	24.0
2	Dark Horse Pump Stat.	30.0	31.5	30.7	27.8	24.3	22.0	20.5	20.8	22.0	25.8	25.8	26.8	27.5	22.5	22.5	23.3	23.8	26.5	27.0	26.0
3																					
4																					
Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (b)																					
Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If yes, list monitoring location # where MCL not met (b)																					

(a) If the OEL exceeds the HAA5 MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the HAA5 MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the HAA5 MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

State of California
Drinking Water Program

Department of Public Health

Stage 2 DDBPR Quarterly TTHM Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: Nevada I.D. North Auburn System No.: 3110026 Year: 2020 Quarter: 4th TTHM MCL = 0.080 mg/L or 80 ug/L

	Year:	2016				2017				2018				2019				2020			
	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/day):	2/18	5/10	8/16	11/21	2/21	5/16	8/8	11/20	2/20	5/7	8/14	11/27	2/12	5/6	8/20	11/26	2/10	6/12	8/25	11/17
#	Monitoring Location	TTHM Results (ug/L)																			
1	11325 Edgewood	42.0	36.0	32.0	68.0	38.0	34.0	29.0	36.0	40.0	38.0	52.0	36.0	46.0	49.0	61.0	44.0	39.0	57.0	54.0	48.0
2	Mt Vernon & Old Post	29.0	35.0	31.0	62.0	41.0	29.0	26.0	36.0	39.0	42.0	49.0	33.0	47.0	36.0	50.0	44.0	41.0	26.0	53.0	45.0
3																					
4																					
	Number of Samples Taken	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
#	Monitoring Location	TTHM OEL (ug/L)																			
1	11325 Edgewood			35.5	51.0	44.0	43.5	32.5	33.8	36.3	38.0	45.5	40.5	45.0	45.0	54.3	49.5	45.8	49.3	51.0	51.8
2	Mt Vernon & Old Post			31.5	47.5	43.8	40.3	30.5	31.8	35.0	39.8	44.8	39.3	44.0	38.0	45.8	43.5	44.0	34.3	43.3	42.3
3																					
4																					
	Is OEL ≤ MCL for all monitoring locations?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	If no, list monitoring location # where MCL not met (a)																				
#	Monitoring Location	TTHM LRAA (ug/L)																			
1	11325 Edgewood	42.0	39.0	36.7	44.5	43.5	43.0	42.3	34.3	34.8	35.8	41.5	41.5	43.0	45.8	48.0	50.0	48.3	50.3	48.5	49.5
2	Mt Vernon & Old Post	29.0	32.0	31.7	39.3	42.3	40.8	39.5	33.0	32.5	35.8	41.5	40.8	42.8	41.3	41.5	44.3	42.8	40.3	41.0	41.3
3																					
4																					
	Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	If no, list monitoring location # where MCL not met (b)																				
	Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	If yes, list monitoring location # where MCL not met (b)																				

(a) If the OEL exceeds theTTHM MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the TTHM MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the TTHM MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

Stage 2 DDBPR Quarterly HAA5 Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: Nevada I.D. North Auburn System No.: 3110026 Year: 2020 Quarter: 4th HAA5 MCL = 0.060 mg/L or 60 ug/L

#	Year:	2016				2017				2018				2019				2020			
	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/day):	2/19	5/10	8/16	11/21	2/21	5/16	8/8	11/20	2/20	5/7	8/14	11/27	2/12	5/6	8/20	11/26	2/10	6/12	8/25	11/17
#	Monitoring Location	HAA5 Results (ug/L)																			
1	11325 Edgewood	34.0	21.0	16.0	7.9	12.0	15.0	16.0	18.0	20.0	16.0	18.0	29.0	19.0	22.0	25.0	26.0	19.0	21.0	19.0	18.0
2	Mt Vernon & Old Post	29.0	21.0	16.0	10.0	10.0	15.0	15.0	16.0	19.0	17.0	19.0	27.0	17.0	25.0	25.0	30.0	20.0	20.0	20.0	18.0
3																					
4																					
	Number of Samples Taken	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
#	Monitoring Location	HAA5 OEL (ug/L)																			
1	11325 Edgewood			21.8	13.2	12.0	12.5	14.8	16.8	18.5	17.5	18.0	23.0	21.3	23.0	22.8	24.8	22.3	21.8	19.5	19.0
2	Mt Vernon & Old Post			20.5	14.3	11.5	12.5	13.8	15.5	17.3	17.3	18.5	22.5	20.0	23.5	23.0	27.5	23.8	22.5	20.0	19.0
3																					
4																					
	Is OEL ≤ MCL for all monitoring locations?			Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	If no, list monitoring location # where MCL not met (a)																				
#	Monitoring Location	HAA5 LRAA (ug/L)																			
1	11325 Edgewood	34.0	27.5	23.7	19.7	14.2	12.7	12.7	15.3	17.3	17.5	18.0	20.8	20.5	22.0	23.8	23.0	23.0	22.8	21.3	19.3
2	Mt Vernon & Old Post	29.0	25.0	22.0	19.0	14.3	12.8	12.5	14.0	16.3	16.8	17.8	20.5	20.0	22.0	23.5	24.3	25.0	23.8	22.5	19.5
3																					
4																					
	Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	If no, list monitoring location # where MCL not met (b)																				
	Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
	If yes, list monitoring location # where MCL not met (b)																				

(a) If the OEL exceeds the HAA5 MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the HAA5 MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the HAA5 MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021

Date

State of California
Drinking Water Program

Department of Public Health

Stage 2 DDBPR Quarterly TTHM Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: Nevada I.D. Smartsville System No.: 5810005 Year: 2020 Quarter: 4th TTHM MCL = 0.080 mg/L or 80 ug/L

Year:		2016				2017				2018				2019				2020			
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/day):		2/23	5/10	8/8	11/14	2/20	5/16	8/7	11/20	2/18	5/7	8/14	11/26	2/12	5/6	8/20	10/16	2/5	6/9	8/25	10/5
#	Monitoring Location	TTHM Results (ug/L)																			
1	8447 O'Brien Street	68.0	35.0	46.0	59.0	70.0	26.0	27.0	38.0	19.0	30.0	34.0	12.0	38.0	25.0	28.0	25.0	30.0	33.0	25.0	23.0
2																					
3																					
4																					
Number of Samples Taken		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
#	Monitoring Location	TTHM OEL (ug/L)																			
1	8447 O'Brien Street			48.8	49.8	61.3	45.3	37.5	32.3	25.8	29.3	29.3	22.0	30.5	25.0	29.8	25.8	28.3	30.3	28.3	26.0
2																					
3																					
4																					
Is OEL ≤ MCL for all monitoring locations?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (a)																					
#	Monitoring Location	TTHM LRAA (ug/L)																			
1	8447 O'Brien Street	68.0	51.5	49.7	52.0	52.5	50.3	45.5	40.3	27.5	28.5	30.3	23.8	28.5	27.3	25.8	29.0	27.0	29.0	28.3	27.8
2																					
3																					
4																					
Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (b)																					
Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If yes, list monitoring location # where MCL not met (b)																					

(a) If the OEL exceeds theTTHM MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the TTHM MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the TTHM MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

RDU - 6/6/2012

Stage 2 DDBPR Quarterly HAA5 Report for Disinfection Byproducts Compliance (in μg/L or ppb)

System Name: Nevada I.D.Smartsville System No.: 5810005 Year: 2020 Quarter: 4th HAA5 MCL = 0.060 mg/L or 60 ug/L

Year:		2016				2017				2018				2019				2020			
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/day):		2/23	5/10	8/8	11/14	2/20	5/16	8/7	11/20	2/18	5/7	8/14	11/26	2/12	5/6	8/20	10/16	2/5	6/9	8/25	10/5
#	Monitoring Location	HAA5 Results (ug/L)																			
1	8447 O'Brien Street	54.0	28.0	31.0	57.0	30.0	38.0	40.0	59.0	41.0	37.0	32.0	20.0	53.0	36.0	33.0	32.0	59.0	47.0	37.0	28.0
2																					
3																					
4																					
Number of Samples Taken		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
#	Monitoring Location	HAA5 OEL (ug/L)																			
1	8447 O'Brien Street			36.0	43.3	37.0	40.8	37.0	49.0	45.3	43.5	35.5	27.3	39.5	36.3	38.8	33.3	45.8	46.3	45.0	35.0
2																					
3																					
4																					
Is OEL ≤ MCL for all monitoring locations?				Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (a)																					
#	Monitoring Location	HAA5 LRAA (ug/L)																			
1	8447 O'Brien Street	54.0	41.0	37.7	42.5	36.5	39.0	41.3	41.8	44.5	44.3	42.3	32.5	35.5	35.3	35.5	38.5	40.0	42.8	43.8	42.8
2																					
3																					
4																					
Meets standard for all monitoring locations (i.e., LRAA ≤ MCL)?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
If no, list monitoring location # where MCL not met (b)																					
Will LRAA calc based on <4 qtrs of data be >MCL regardless of the monitoring results of subsequent qtrs, for all mon. locations? (c)		No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If yes, list monitoring location # where MCL not met (b)																					

(a) If the OEL exceeds the HAA5 MCL, system must conduct an operational evaluation and submit a report to CDPH no later than 90 days after being notified of the analytical result that caused the OEL exceedance.

(b) If LRAA exceeds the HAA5 MCL, system must conduct public notification. For the initial 3 qtrs of monitoring, system must meet the following: (1) Average of First Qtr Result is ≤4 MCL, (2) Average of 1st and 2nd Qtr Results is ≤ 2MCL, and (3) Average of 1st, 2nd, and 3rd Qtr Results is ≤1.33 MCL.

(c) If any individual quarter's result will cause the LRAA to exceed the HAA5 MCL, the system is out of compliance at the end of that quarter.

Comments:

Signature

1/8/2021
Date

APPENDIX C
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	2016/2021	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
USEPA Long Term Revisions to the Lead and Copper Rule	2019/2021	2	Lead and Copper
Contaminant Candidate List 5/Fifth Regulatory Determination	2021/2026	81	Chemical and Microbiological
Unregulated Contaminant Monitoring Rule 5	2021/2022	30	Chemical
CA Revised Total Coliform Rule	2021	3	Microbial

[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 exceedances.

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].

[1] USEPA Memorandum, "OGWDW Review of Small System Monitoring Requirements Under the Long Term 2 Enhanced Surface Water Treatment Rule", February 4, 2010.

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 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 ($\geq$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 Consumer Confidence Report (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.

On June 17, 2021, the Office of Administrative Law approved the perchlorate detection limit for purposes of reporting (DLR) regulations adopted by the State Board on October 6, 2020. The regulations will take effect on July 1, 2021. The DLR will change from 0.004 mg/l to 0.002 mg/l on 1 July 2021, and further decrease to 0.001 mg/l on 1 January 2024.

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 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 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 convened workgroups on these regulatory reviews in 2020 and 2021 to discuss possible topics related to rule revision. This has initiated 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 USEPA projects that they will determine by July 31, 2024 whether there will be possible rule revisions and the general scope of those revisions.

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 in January 2021. It includes determinations for eight constituents and updates on two 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 and 1,4-dioxane. A strontium regulatory determination continues to be delayed to allow for consideration of additional studies. No determination will be made for 1,4-dioxane (no meaningful opportunity for public health risk reduction). USEPA determined that PFOS and PFOA warrant regulation, and potentially other per- and poly-fluoroalkyl substances (PFAS) too.

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).

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.

USEPA Long Term Revisions to the Lead and Copper Rule

The final Long-Term Revisions to the Lead and Copper Rule were published on January 15, 2021. On January 20, 2021 the Biden Administration issued a Regulatory Freeze to allow Federal agencies an opportunity to review recent regulations. On March 12, 2021 EPA published two *Federal Register* notices that were intended to allow EPA time to continue its review of the LCRR and "conduct important consultations with affected parties." The first *Federal Register* notice delayed the effective date of the rule from March 16, 2021 to June 17, 2021. Following a 30-day public comment period, the second *Federal Register* notice was published final on June 16, 2021 and extended the effective date from June 17, 2021 until December 16, 2021 and delayed the rule compliance deadline from January 16, 2024 to October 16, 2024.

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. 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 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 an 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 exceedance 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.

Contaminant Candidate List 5 (CCL5)

In October 2018, the USEPA issued a request for CCL5 nominations and the draft list was published on July 19, 2021 with a final expected by July 2022.

The Draft CCL 5 includes 81 contaminants or groups (Exhibits 2a, 2b, and 2c). The list is comprised of 69 chemicals or chemical groups and 12 microbes. The 69 chemicals or chemical groups include 66 chemicals recommended for listing following an improved process to evaluate, one group of cyanotoxins, one group of 29 disinfection byproducts (DBPs), and one group of PFAS chemicals. The 12 microbes include eight bacteria, three viruses, and one protozoa recommended for listing based on the scores for waterborne disease outbreaks, occurrence, health effects, and recommendations from various experts. See list on **Attachment 3**.

Unregulated Monitoring Contaminant Rule 5

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 will be the Fifth Round of the UCMR.

The UCMR5 was proposed in March 2021 and includes 30 constituents, monitored between 2023 and 2025. The list includes 29 PFAS and one metal, lithium. Monitoring is conducted for all contaminants, by both large and medium PWSs (serving more than 3,300 people) and randomly selected small PWSs (serving 3,300 or fewer people).

California Revised Total Coliform Rule

In response to the Federal Revised Total Coliform Rule, California revised its version of the Total Coliform Rule in Title 22 in February 2021, effective July 1, 2021. Although these 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.

The Rule includes the new coliform treatment technique requirement replacing the total coliform MCL and a new *E.coli* MCL. The revisions establish a "find-and-fix" approach for investigating and correcting causes of microbial contamination within water distribution systems. California's rule also requires public water systems using continuously-disinfected groundwater sources to collect a coliform sample of the water prior to disinfection once each calendar quarter.

State Board/DDW prepared 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.

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 (PFAS), as described below. USEPA intends to prepare Health Advisories for two additional PFAS, GenX and PFBS, by spring 2022.

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, CCL4, and CCL5, for consideration of potential future regulation, and included in the UCMR3 and UCMR5. The Fourth Regulatory Determination has determined to regulate both constituents, as discussed previously. USEPA expects a proposed regulation by fall 2022 and a final by fall 2023.

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 and in 2021 to add more pesticides and update toxicity values.

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, 32 currently have NLs, as shown in **Table 9**, and 24 are chemicals with AALs, as shown in **Table 10**.

In 2021, DDW announced its intent to set a draft MCL for NDMA, which has both a PHG and NL. This is expected in late 2021 or early 2022.

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
Perfluorobutane sulfonic acid (PFBS)	0.0005	0.005
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	0.009	0.9
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	0.6	6
2,3,5,6-Tetrachloroterephthalate	3.5	35
Trithion	0.007	0.07

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. In March 2021, OEHHA published a final NL for perfluorobutane sulfonic acid (PFBS) at 0.0005 mg/L with an RL of 0.005 mg/L.

In addition, OEHHA prepared interim recommended NLs for four cyanotoxins in May 2021. This included anatoxin-a (0.004 mg/L), saxitoxin (0.0006 mg/L), microcystins (0.00003 mg/L), and cylindrospermopsin (0.0003 mg/L).

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 4**. 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 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. Final PHGs are expected in late 2021 or early 2022.

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 and it is expected in late 2021 or early 2022. 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.

In October 2019, OEHHA announced the initiation of PHG assessments for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). These were published in July 2021 with proposed PHGs of 0.007 parts per trillion (ppt) for PFOA and 1 ppt for PFOS, based on the one in a million cancer risk estimate. Non-cancer risks concentrations would be 3 ppt for PFOA and 2 ppt for PFOS. DDW expects that MCLs will be ready by 2024 for both PFOA and PFOS.

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.

DDW establishes its regulatory priorities for each year and in 2021 identified several new items of potential future regulatory note. DDW is investigating the reduction in DLRs for many metals to get closer to their PHGs. DDW is also considering development of a new MCL for n-nitrosodimethylamine (NDMA), which currently has a NL only. DDW is also considering revising the MCLs for styrene and cadmium. Finally, DDW intends to prepare NL and RL for harmful algal blooms.

It should be noted that there are other constituents of public interest on the drinking water horizon, such as cyanotoxins and pharmaceutical compounds. There is no specific regulatory path for them at this time so they are not directly addressed in this section, but may be discussed previously in 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 Perchlorate Regulation	Unknown	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 Lead and Copper Rule Revisions	2020/2021	2	Lead and Copper
CA Cross Connection Control Program	2021/2022	None	None
CA Revised Perchlorate DLR/MCL	2021/2023	1	Perchlorate
CA Reconsidered Hexavalent Chromium MCL	2021/2022	1	Hexavalent Chromium
CA Microplastics Regulation	2020/2022	1	Microplastics

[1] Draft/Final Rule Dates

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. However, this remains in legal limbo due to lawsuits pending.

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 Fourth Regulatory Determination in January 2021 that they intend to develop MCLs for PFOA and PFOS, and potentially other PFAS. USEPA expects a draft regulation by fall 2022 and a final by fall 2023.

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, 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 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. This is the second highest regulatory priority for 2021. DDW will adopt the federal regulation, and may apply additional or lower limits.

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 draft Cross Connection and Backflow Prevention Policy Handbook was released in February 2021. This is the third highest regulatory priority for DDW in 2021. They anticipate publication of the final Policy Handbook in late 2021.

The Policy Handbook includes sections on dual plumbed recycled water systems with design and operations criteria. In addition, it includes; 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 also includes 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. The MCL revision process will be delayed until after the DLR revision process is complete and additional information regarding low-level detects of perchlorate in drinking water sources is available in 2022 and later.

On June 17, 2021, the Office of Administrative Law approved the perchlorate DLR regulations adopted by the State Water Board on October 6, 2020. The regulations will take effect on July 1, 2021. The DLR will change from 0.004 mg/l to 0.002 mg/l on July 1, 2021, and further decrease to 0.001 mg/l on January 1, 2024.

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. DDW has identified this as their top regulatory priority for 2021 and expects a proposal later this year or early 2022. DDW is considering 17 possible MCLs, 1 through 15 µg/L, 20 µg/L, and 25 µg/L.

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.

DDW did not meet the July 1, 2021 deadline for analytical methods for microplastics, but continues to work on this as it is their fifth highest regulatory priority for 2021. DDW is investigating the possibility of managing microplastics through a policy handbook instead of a regulatory rule.

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	7439-96-5
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	varies by species
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
Contaminant Candidate List 5

EXHIBIT 2a—CHEMICAL CONTAMINANTS ON THE DRAFT CCL 5

1,2,3-Trichloropropane	
1,4-Dioxane	
17-alpha ethynyl estradiol	
2,4-Dinitrophenol DTXSID0020523	
2-Aminotoluene	
2-Hydroxyatrazine	
4-Nonylphenol (all isomers)	
6-Chloro-1,3,5-triazine-2,4-diamine	
Acephate	
Acrolein	
alpha-Hexachlorocyclohexane (alpha-HCH)	
Anthraquinone	
Bensulide	
Bisphenol A	
Boron	
Bromoxynil	
Carbaryl	
Carbendazim (MBC)	
Chlordecone (Kepone)	
Chlorpyrifos	
Cobalt	
Cyanotoxins	Toxins naturally produced and released by some species of cyanobacteria (previously known as ''blue-green algae''). The group of cyanotoxins includes, but is not limited to: Anatoxin-a, cylindrospermopsin, microcystins, and saxitoxin
Deethylatrazine	
Desisopropyl atrazine	
Desvenlafaxine	
Diazinon	
Dicrotophos	
Dieldrin	
Dimethoate	
Disinfection byproducts (DBPs)	See Exhibit 2b below
Diuron	
Ethalfluralin	
Ethoprop	
Fipronil	
Fluconazole	
Flufenacet	
Fluometuron	
Iprodione	
Lithium	
Malathion	
Manganese	
Methomyl	
Methyl tert-butyl ether (MTBE)	
Methylmercury	
Molybdenum	
Norflurazon	
Oxyfluorfen	
Per- and polyfluoroalkyl substances (PFAS) 5	This group is inclusive of any PFAS (except for PFOA and PFOS). For the purposes of this document, the structural definition of PFAS includes per- and polyfluorinated substances that structurally contain the unit R-(CF2)-C(F)(R ′)R″. Both the CF2 and CF moieties are saturated carbons and none of the R groups (R, R ′ or R″) can be hydrogen (USEPA, 2021f)
Permethrin	
Phorate	
Phosmet	
Phostebupirim	
Profenofos	
Propachlor	
Propanil	
Propargite	
Propazine	
Propoxur	
Quinoline	
Tebuconazole	
Terbufos	
Thiamethoxam	
Tri-allate	
Tribufos	
Tributyl phosphate	
Trimethylbenzene (1,2,4-)	
Tris(2-chloroethyl) phosphate (TCEP)	
Tungsten	
Vanadium	

EXHIBIT 2b—UNREGULATED DBPS IN THE DBP GROUP ON THE DRAFT CCL 5

Haloacetic Acids:
Bromochloroacetic acid (BCAA)
Bromodichloroacetic acid (BDCAA)
Dibromochloroacetic acid (DBCAA)
Tribromoacetic acid (TBAA)
Haloacetonitriles:
Dichloroacetonitrile (DCAN)
Dibromoacetonitrile (DBAN)
Halonitromethanes:
Bromodichloronitromethane (BDCNM)
Chloropicrin (trichloronitromethane, TCNM)
Dibromochloronitromethane (DBCNM)
Iodinated Trihalomethanes:
Bromochloroiodomethane (BCIM)
Bromodiiodomethane (BDIM)
Chlorodiiodomethane (CDIM)
Dibromoiodomethane (DBIM)
Dichloroiodomethane (DCIM)
Iodoform (triiodomethane, TIM)
Nitrosamines:

Nitrosodibutylamine (NDBA)
N-Nitrosodiethylamine (NDEA)
N-Nitrosodimethylamine (NDMA)
N-Nitrosodi-n-propylamine (NDPA)
N-Nitrosodiphenylamine (NDPhA)
Nitrosopyrrolidine (NPYR)
Others:
Chlorate
Formaldehyde

EXHIBIT 2c—MICROBIAL CONTAMINANTS ON THE DRAFT CCL 5

Adenovirus
Caliciviruses
Campylobacter jejuni
Escherichia coli (O157)
Enteroviruses
Helicobacter pylori
Legionella pneumophila
Mycobacterium abscessus
Mycobacterium avium
Naegleria fowleri
Pseudomonas aeruginosa
Shigella sonnei

ATTACHMENT 4
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	0.003
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	7×10^{-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
Ethylene dibromide (1,2-dibromoethane)	0.01
Fluoride	1,000
Glyphosate	900
Heptachlor	0.008
Heptachlor epoxide	0.006

OEHHA PHGs

Chemical	California PHG (ppb)
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
Vinyl Chloride	0.05
Xylene	1,800

APPENDIX D
WATERSHED CONTAMINANT SOURCE INFORMATION

Control#	Agency	Substance	Quantity	Unit	Type	Description	Contained	Water?	Water Way	Drinking Water Impacted	Known Impact	Location	City	County	Incident Date
'16-0051	PG&E	Unknown Oil	Sheen Length: 800 Feet Sheen Width: 800 Feet	Sheen	PETROLEUM	Caller Stated: An Unknown Sheen was obserbeed on the Alta Reservoir, Unknow what the source is and a previous discharge occurred (15-7652) which is 4.8 miles upstream from the reservoir and could potentially be the source (unconfirmed). RP deployed absorbant pads and containment booms to try and contain the release. Sheen Length: 800 Feet Sheen Width: 800 Feet. Sheen Color Rainbow and brown. Investigation underway to determine cause of release. Sheen Length: 800 Feet Sheen Width: 800 Feet	75%	Yes	Alta Reservoir	Yes	Drinking Water	Latitude: 39° 13' 09" N - Longitude: 120° 17' 09" W	Alta	Placer County	1/4/2016
'16-1399	Cal Fire Grass Valley	jet fuel A	20	Gal(s)	PETROLEUM	Caller states a leak out of an aircraft has caused the release of 20 gals of Jet Fuel onto the ground. The release is still ongoing. Unsure who will be performing clean up. Two fire chiefs and fire crews on scene. No waterways were impacted.	No	No		No	None	13626 New Airport Road / Auburn Airport	Auburn	Placer County	3/6/2016
'16-5994	Cranmer Engineering	Waste Water	320	Gal(s)	SEWAGE	Per the caller a large septic tank had a breech in the belly it went into a pipe that goes to a holding pond. About 320 gallons went into secondary containment which drains back into the pond.	Yes	No		No	None	20601 W. Pailo Lane	Colfax	Placer County	9/30/2016
'16-5410	California Highway Patrol (CHP) - Truckee	Sewage	20-40	Gal(s)	SEWAGE	A single commercial truck with a trailer in tow, jack-knifed into the center divider on the I-80 westbound near exit 139. The trailer was carrying sewage at the time of the incident and released its contents onto the road and a nearby storm drain. The destination of the storm drain is unknown. The CHP is on-scene. A cleanup is pending.	No	Yes	Storm Drain	No	Road Closure	I-80 westbound, west of exit 139	Colfax	Placer County	9/6/2016
'16-5234	Kinder Morgan	**Potential Release**Gasoline	Unknown	Gal(s)	PETROLEUM	**Potential Release** RP states that due to a sensor showing a vapor scenario, there is a potential release of gasoline. A remote camera is streaming live and there is no visible release at the time of this report. A crew is en-route to check the scene. **Potential Release**	Unknown	No		No	None	Remote Pump Station	Colfax	Placer County	8/28/2016
'16-5831	Truckee - CHP	Hydraulic Fluid	3	Gal(s)	PETROLEUM	Caller stated that they have a release of 3 Gal(s) of Hydraulic Fluid due to a vehicle accident which resulted in the release impacting the soil, no waterways were impacted, release is contained and is no longer releasing, it is unknown who is conducting cleanup at this time.	Yes	No		No	None	Bowman lake Road & Gruas Ride Road	Grass Valley	Nevada County	9/23/2016
'16-4015	NRC	Gasoline	25	Gal(s)	PETROLEUM	Per the NRC report: "CALLER REPORTED THAT A RECREATION VESSEL SANK AT THE BOTTOM OF THE MARINA DUE TO UNKNOWN CAUSES. CALLER REPORTED THAT THERE ALSO WAS A SMALL SHEEN ON THE WATER THAT HAS SINCE DISSIPATED. Hull Construction: FIBERGLASS HULL. Fuel on Board: 25 GALLON(S). SHEEN DISSIPATED NATURALLY. CONTRACTOR IS BEING CONTACTED."	Unknown	Yes	ROLLINS RESERVOIR	Unknown	None	ORCHARD SPRINGS MARINA	Grass Valley	Nevada County	7/1/2016
'16-6277	PG&E	Non-PCB Mineral Oil	14	Gal(s)	PETROLEUM	RP stats, A pole went down with a transformer on it due to possible weather conditions, which released less than 14 gallons of non-pcb mineral oil. The release has been contained and a crew is enroute to conduct cleanup of the release. No waterways or storm drains currently being impacted by the release. Only one residence is being impacted with a power outage due to this incident.	Yes	No		No	Other - Power Outage	3239 Manzanita Lane	Meadow Vista	Placer County	10/14/2016
'16-4821	Nevada County Environmental Health	Diesel Fuel	25-30	Gal(s)	PETROLEUM	RP States: Due to a semi-truck collision, 25-30 gallons of diesel fuel and 5-10 gallons of engine oil was released on to the soil at the dirt shoulder. The release was contained by CalTrans. The responsible party is choosing a contractor to conduct the clean-up. Possible delays when clean-up begins	Yes	No		No	Other - Possible delays when clean-up begins	Eastbound Hwy 20, Nevada County, .25 miles East of Dow Rd.	Nevada City	Nevada County	8/8/2016
'16-1632	Nevada County Dept of Environmental Health	Sewage	Unknown	Gal(s)	SEWAGE	Caller states: The release has been ongoing for approximately 5 days. The release is coming from a residential sewer lateral. The release is entering a tributary of Deer Creek. It is unknown how much has been released, the reporting party will back with an estimate. The release has been stopped and repairs are in progress.	Yes	Yes	Tributary of Deer Creek	Unknown	Other - Water Samples, area is inaccessible to humans (overgrown)	541 North Pine St.	Nevada City	Nevada County	3/15/2016

Control#	Agency	Substance	Quantity	Unit	Type	Description	Contained	Water?	Water Way	Drinking Water Impacted	Known Impact	Location	City	County	Incident Date
'16-5526	UPRR	Diesel or Hydraulic Fluid	100	Gal(s)	PETROLEUM	Caller states that a property owner who owns property next to UPRR property noticed that there are 2 snowplows on UPRR property that are leaking either diesel or hydraulic fluid onto dirt, less than 100 gallons. Investigation is ongoing, UPRR personnel is enroute to the location. Clean up will be coordinated and handled by a contractor. No waterways impacted.	No	No		No	None	58350 Old Donner Summit Rd	Norden	Nevada County	9/10/2016
'16-2917	DFW	Red Coolant	3	Gal(s)	CHEMICAL	RP states that a bigrig suffered a crack pipe in its engine resulting in the release of less than 3 gallons of red coolant onto the roadway, no soil impacted. The release is contained and cleanup is being coordinated. No waterways have been impacted.	Yes	No			None	WB I-80 - Soda Springs onramp	Norden	Nevada County	5/17/2016
'16-2760	Truckee CHP	Vehicle Fluid	5	Gal(s)	CHEMICAL	RP advises that due to a fatal traffic collision, vehicle fluid amounting to less than 5 gallons went into a storm drain in the center divide. Fire Department is on scene conducting clean up at this time however, some of the substance is unrecoverable. TC occured on Placer County side of County LIne.	Yes	Yes	Storm Drain	No		EB 80 JWO Blue Canyon	Norden	Nevada County	5/9/2016
'16-2722	Gold Run CHP	Oil	10	Gal(s)	PETROLEUM	RP advises that due to a traffic collision WB 80 JEO Cisco Grove, 10 gallons of oil from a big rig released into a creek in the center divider of freeway. RP advises clean up operations are being conducted and they are currently in the notification stage at this time. Per CHP Fish and Game Warden on scene advised of the amount of release. CHP Log 160507TK00037. CHP advises in Placer County	Unknown	Yes	creek	Unknown		WB 80 JEO Cisco Grove	Norden	Nevada County	5/7/2016
'16-0949	Concerned Citizen	Diesel Fuel	2-10	Gal(s)	PETROLEUM	RP states that a individual contacted them and reported a release from an elevated fuel tank onto the asphalt. Asphalt has a dirt drainage and no impact to waterways or drains. The tank capacity is approximately 100 gallon, however, RP states that the amount in the tank is unknown. Tank is located behind incident location address.	No	No			None	21455 Donner Pass Rd	Soda Springs	Nevada County	2/13/2016
'16-2443	Cal Trans - District 3	Diesel	100	Gal(s)	PETROLEUM	Cal Trans personnel observed the saddle tank of a moving tractor trailer leaking fuel onto the freeway. After the vehicle stopped, it is estimated a total of 100 gallons of fuel was released. An unknown amount of the release entered a storm drain that leads to a creek (possibly South Yuba River). A contractor or Cal Trans will be conducting a cleanup of the release. Nyack Towing will be draining the remainder of the fuel from the damaged saddle tank. The CHP and Cal Trans are on-scene.	Unknown	Yes	Storm drain	Unknown	Unknown	Eastbound I-80 at Eagle Lakes off-ramp.	Unincorporated county area Nevada	Nevada County	4/25/2016
'16-6554	Truckee CHP	Diesel	100	Gal(s)	PETROLEUM	RP states: Big rig non-injury accident resulted in 100 gallons of diesel released to the roadway due to saddle bags rupturing. Release is not contained and is still releasing. Unknown if any waterways affected. WB I80 #2 lane blocked at this time. CHP has requested CalTrans respond. CHP Incident #161028TK00022.	No	Unknown	unknown	Unknown	None	I80 WB JWO Blue Canyon	Unincorporated county area Placer	Placer County	10/28/2016
'16-4118	CHP - Truckee	Diesel	100	Gal(s)	PETROLEUM	A single vehicle tractor trailer roll-over occurred on the I-80 eastbound, east of Big Bend. The result was a release of diesel fuel from the saddle tank to asphalt. The Nevada County Environmental Health Department, Cal Trans, California Highway Patrol, and Cal Fire are on-scene. A cleanup is pending and no waterways were impacted.	Yes	No	None	No	Other - #2 lane closure	I-80 eastbound, east of Big Bend	Unincorporated county area Placer	Placer County	7/7/2016
'16-3128	CHP - Gold Run	Transmission Fluid	1	Gal(s)	PETROLEUM	Caller stated that they have a release of less then 1 Gal(s) of Transmission fluid do to unknown causes, caller stated a citizen called and notified them of the release from there vehicle, release is contained and is no longer releasing, no waterways were impacted, release impacted the asphalt and dirt, CalTrans is on scene.	Yes	No		No	None	EB Interstate 80, Just West of the Blue Canyon Off Ramp	Unincorporated county area Placer	Placer County	5/26/2016
'17-0014	NRC	VARIOUS CHEMICALS MIXED WITH WATER-RUN OFF	Unknown	Unknown	CHEMICAL	Per NRC Report: " RP IS REPORTING THE RELEASE OF CONTAMINATED WATER RUN-OFF (VARIOUS OILS/CHEMICALS). RP STATED THAT THE MATERIAL IS BEING COLLECTED FROM THE COUNTY LANDFILL AND THE PRODUCT IS DUMPED INTO DEER CREEK. RP STATED THAT THIS IS AN ONGOING ISSUE. RP STATED THAT THERE ARE ALSO RESIDUAL FLUIDS WASHED OFF VARIOUS CONSTRUCTION EQUIPMENT AND TRUCKS."	Unknown	Yes	Deer Creek	Unknown	Unknown	Robinson Timber	Grass Valley	Nevada County	12/31/2016

Control#	Agency	Substance	Quantity	Unit	Type	Description	Contained	Water?	Water Way	Drinking Water Impacted	Known Impact	Location	City	County	Incident Date
'17-0301	Nevada County Dept of Sanitation	Sewage	760	Gal(s)	SEWAGE	RP states that a broken pump line resulted in the release of approx 760 gal of sewage onto the ground and into a storm water run-off. The release is contained, and cleanup is en route.	Yes	Yes	storm water run-off	No	None	14326 Gas Canyon Rd	Nevada City	Nevada County	1/10/2017
'17-0461	Truckee - CHP	Diesel Fuel	30	Gal(s)	PETROLEUM	Caller stated that they have a release of 30 Gal(s) of diesel due to a traffic collision resulting in the release impacting the soil, no waterways impacted at this time, no cleanup actions have been implemented at this. Caller stated that the #1 lane has been closed until cleanup is complete. Caller stated that there is a nearby creek but release has not entered it at this time.	No	No		No	Road Closure	EB 80 1 Mile east of the Witmore CalTrans Yard.	Blue Canyon	Placer County	1/15/2017
'17-0737	PG&E	Mineral Oil, Non PCB	8	Gal(s)	PETROLEUM	Per the caller a tree went through the line causing the transformer to come crashing to the ground releaseing approximately 8 gallons on non PCB mineral oil.	Yes	No		No	None	33505 Main Street	Dutch Flat	Placer County	1/23/2017
'17-2847	Nevada County Environmental Health	Oil	1	Gal(s)	PETROLEUM	The release occurred due to a partially submerged vessel in Scotts Flat Lake. The initial event occurred between April 6, 2017 and April 10, 2017. The vessel is a 17' recreational boat. A slight sheen was noted to the water. The vessel is currently sitting on the edge of the lake. The gas tanks are resting over dry land. No release is occurring at this time. No remedial actions reported at this time. The material released is unrecoverable. Unknown who will perform clean up and removal of the vessel at this time.	Yes	Yes	Scott Flat Lake	Yes	None	Inlet of Scotts Flat Lake	Nevada City	Nevada County	4/10/2017
'17-2934	NRC	Oil	Unknown	Unknown	PETROLEUM	NRC report states" CALLER STATES THAT A SNOW PLOW BUSINESS HAS BEEN ALLOWING AN UNKNOWN AMOUNT OF UNKNOWN OIL (POSSIBLY DIESEL) TO RUN OFF THEIR PROPERTY AND INTO THE STREET NEAR THE SOUTH FORK OF THE YUBA RIVER. THE CALLER BELIEVES THAT THE OIL IS COMING FROM EQUIPMENT."	Unknown	No		No	None	21455 Donner Pass Rd	Soda Springs	Nevada County	4/20/2017
'17-4911	CalTrans	Diesel Fuel	30	Gal(s)	PETROLEUM	Caller states a solo big rig truck fire on the fwy caused the release, material flowed from the truck to the asphalt ground and into a storm drain, it is unknown where the drain leads to, the release is contained and no longer releasing, contractor handled cleanup.	Yes	Yes	storm drain	Unknown	None	WB I-80 at Clipper Gap	Auburn	Placer County	7/9/2017
'17-5725	CHP Truckee	Vehicle Fluids - Oil, Fuel	10	Gal(s)	PETROLEUM	Single vehicle accident caused the release, material is flowing directly into a waterway, FD is handling the containment, unknown who is performing clean up.	No	Yes	Alta Canal	Unknown	Unknown	Alta Resivior Rd at Bonnynook Rd	Alta	Placer County	8/10/2017
'17-5925	CDF Grass Valley ECC	Firefighting Water	Unknown	Gal(s)	OTHER	Per the caller there was a trash truck that caught fire which dumped its load in a parking lot. The fire department extinguished the fire and in the process there ws runoff into a storm drain.	No	Yes	Storm Drain	Unknown	None	12920 Earhart Ave	Auburn	Placer County	8/17/2017
'17-6103	CHP Truckee	Oil and fuel mix	5	Gal(s)	PETROLEUM	Caller states semi truck was reported off roadway unknown cause which released 5 gallons of oil and fuel mix. The material was released into soil and a storm drain. Fire Dept is on scene to contain material.	Yes	Yes	Storm Drain	Unknown	None	80 east bound x west of blue canyon	Alta	Placer County	8/24/2017
'17-6680	Kinder Morgan Pipelines	Fuel - Jet A Type	Unk	Gal(s)	PETROLEUM, VAPOR	**POTENTIAL RELEASE** Vapor alarm indicates possible release, RP personnel en route to investigate, pipeline takes material over the summit to Reno, investigation should conclude in approximately 30 minutes.	Unknown	Unknown	u	Unknown	Unknown	50 Carpenter Flat Rd, Colfax Booster Station	Colfax	Placer County	9/13/2017
'17-6738	City of Nevada City	Sewage	900	Gal(s)	SEWAGE	RP states, Due to a blockage of a mainline, approx 900 gallons of sewage was released. The majority of the release entered Deer Creek. It is unknown if drinking water will be impacted by this incident. The blockage has been cleared at 1300 hours and the release has been stopped. Signs have been posted, notifying of the sewage. The reporting party will be conducting cleanup of the release.	Yes	Yes	Deer Creek	Unknown	Signs Posted	222 Sacramento St.	Nevada City	Nevada County	9/16/2017
'17-7052	City of Nevada City	Sewage	Unknown	Unknown	SEWAGE	RP states: A restaurant's lateral line failed. This caused a release of an unknown amount of sewage to enter a storm drain. The storm drain leads to Deer Creek. The release is not contained. It is unknown who will conduct clean up at this time. The property owner will repair the line and the City of Nevada City will take samples of the creek and surface water.	No	Yes	Storm Drain	Unknown	None	300 Commercial Street	Nevada City	Nevada County	9/27/2017
'17-8307	Nevada City Public Work	Sewage	420	Gal(s)	SEWAGE	RP States: A clean out was overflowing due to roots impacting the drainage area. This caused a release of 420 gallons into the drainage which leads to deer creek. The release is contained and no longer releasing and clean up is complete.	Yes	Yes	Deer Creek	Unknown	None	112 Orchard Street	Nevada City	Nevada County	11/17/2017

Control#	Agency	Substance	Quantity	Unit	Type	Description	Contained	Water?	Water Way	Drinking Water Impacted	Known Impact	Location	City	County	Incident Date
'17-8538	Anonymous	Unknown material, black, odor	110	Gal(s)	UNSPECIFIED	Caller states there are two 55 gallon barrels in two different locations on residential rental property on city limits since 09/28/2017. The barrels are improperly stored that are causing a release of less than 110 gallons of unknown material. The release of material is approximately 5 feet from wells and about 15 feet from horse corrals. Multiple people living on rental property have had rashes. Multiple agencies have been contacted about mitigating the release of hazardous material but nothing has been fixed. The sewage line on property has backed up 6 times causing a release of unknown sewage into water table.	No	Yes	Wells	Yes	Other - Health issues and animal safety concerns	10290 Lazy Valley Dr	Penn Valley	Nevada County	9/28/2017
'17-7796	Kinder-Morgan	Diesel	Unknown	Unknown	PETROLEUM	***Threatened Release*** RP States: A vapor alarm went off on a remote diesel pipeline (OSFM 6" Reno Line). The alarm cleared 20 seconds after it sounded. Cameras in the area do not indicate a release, but the line has been shutdown and a technician is en route to check the line. ***Threatened Release***	Unknown	No	N/A	No	None	50 Carpenter Flat Road	Colfax	Placer County	10/26/2017
'17-7879	Nevada City Public Works	Sewage	50	Gal(s)	SEWAGE	Caller states flushable wipes caused a blockage and the release of material form a clean out. The material impacted the edge of the road. No storm drains or waterways impacted.	Yes	No	none	No	None	540 West Broad St.	Nevada City	Nevada County	10/29/2017
'17-8307	Nevada City Public Work	Sewage	420	Gal(s)	SEWAGE	RP States: A clean out was overflowing due to roots impacting the drainage area. This caused a release of 420 gallons into the drainage which leads to deer creek. The release is contained and no longer releasing and clean up is complete.	Yes	Yes	Deer Creek	Unknown	None	112 Orchard Street	Nevada City	Nevada County	11/17/2017
'17-8406	CHP Truckee	Diesel Fuel	100	Gal(s)	PETROLEUM	Caller states a solo semi-truck crash into a center divider wall caused the release, both gas tanks were ruptured and spilled 100 gallons of diesel fuel onto the asphalt roadway, less than 20 gallons entered a storm drain that leads to an unknown location, release is contained and no longer releasing, it is unknown at this time who will be handling cleanup, CHP is still making notifications. Road closures to the Number 1 Lane are in effect for an unknown amount of time.	Yes	No	storm drain	No	Road Closure	EB I-80 JWO Secret Town Off-Ramp	Colfax	Placer County	11/21/2017
'17-8821	Nevada City Public Works	Sewage	819	Gal(s)	SEWAGE	RP states that 819 gallons sewage was released onto the road and 294 gallons made into unnamed Creek, recovered 200 gallons and the rest was unrecoverable due to private lateral blockage. The release is contained and no longer releasing,County PW and County Sanitation conducted cleanup.	Yes	Yes	unnamed Creek	No	None	950 Naidu Ave.	Nevada City	Nevada County	12/12/2017
'17-9149	CHP	Diesel Fuel	100	Gal(s)	PETROLEUM	RP states, Due to a solo vehicle incident, a semi truck overturned damaging both its fuel tanks. The maximum amount that both fuel tanks can hold is 50 gallons each for a total of 100 gallons. It is currently unknown how much fuel has released from the tanks at the time of the report. One tank is completely empty and the other tank has stopped releasing. No waterways or storm drains will be impacted by this incident. It is unknown who will be conducting cleanup of the release.	Yes	No		No	None	HWY 80 EB west of Blue Canyon, MPM 52.25	Unincorporated county area Placer West of Donner Lake	Placer County	12/29/2017
'17-9186	ERTS	Engine Coolant	3	Gal(s)	CHEMICAL	Per the caller a mechanical failure, the line burst, caused the release.	No	No		No	Unknown	Donner Pass Eastbound Rest Area I-80	Donner	Nevada County	12/31/2017
'18-0472	ERTS	Diesel	50	Gal(s)	PETROLEUM	**Historical Report** Caller states a big rig was involved in a solo accident and the material released from its saddle tanks. The material impacted surrounding asphalt.	Yes	No	none	No	None	I 80 West at exit 155	Nevada City	Nevada County	12/29/2017
'18-0015	Nevada City	Sewage	640	Gal(s)	SEWAGE	RP advises that due to roots in a mainline caused the release to ground and nearby creek. RP advises his ageancy was able to recover 80 gallons of the substance, the rest is unrecoverable. RP has completed mitigation operations.	No	Yes	Deer Creek	No	None	220 Sacramento St	Nevada City	Nevada County	1/2/2018
'18-0061	Nevada City Public Works	Sewage	90	Gal(s)	SEWAGE	RP states, During routine maintenance for clearing roots, the crews accidentally punctured the pipe causing a release of 90 gallons of sewage. This is a continuous release, however a Vac Truck is containing the release. There is an impact to a seasonal water way, Oregon Ravine, crews have dammed the waterway and is using a pump to return the material to the sewer system. It is unknown if there will be an impact to drinking water. The release is expected to be stopped within 1 to 2 hours. A temporary road closure is in effect for East Broad St. until repairs are completed.	Yes	Yes	Oregon Ravine	Unknown	Road Closure	575 East Broad St.	Nevada City	Nevada County	1/4/2018

Control#	Agency	Substance	Quantity	Unit	Type	Description	Contained	Water?	Water Way	Drinking Water Impacted	Known Impact	Location	City	County	Incident Date
'18-0193	CHP Truckee	Diesel Fuel	25	Gal(s)	PETROLEUM	Caller states release was due to a big rig jack knifed releasing fuel down the right hand shoulder and hillside, no waterways were impacted, the release is contained, there are no road closures, Cal Trans will be conducting cleanup.	Yes	No		No	None	WB I-80 JWO Blue Canyon, at the 5,000 ft. mark	Unincorporated county area Placer West of Donner Lake	Placer County	1/9/2018
'18-0545	Placer County Environmental Health	Sewage Water	Unknown	Gal(s)	SEWAGE	Caller states release was due to a broken pipe on the side of the road, material is releasing 30 gallons per minute, release is on going, material flowed into a storm drain that is believed to lead into Lake Theodore, which is a small reservoir and possibly a drinking water source,, it is unknown if the material is unrecoverable, Placer Hills Fire is on scene and Placer County Water Agency and Placer County EH are enroute, responsible party is unknown, and it is unknown who will be stopping the release. RP will be making notification to PG&E next.	No	Yes	storm drain, Lake Theodore	Yes	Unknown	Applegate Road X Fair Ridge Drive	Clipper Gap	Placer County	1/25/2018
'18-0696	CHP Truckee	Fuel - Unknown Type	Unknown	Gal(s)	PETROLEUM	Vehicle accident and explosion involving a tanker truck caused the release, material is combusting and flowing onto asphalt and soil then going directly into a waterway, no details on injuries or tanker capacity, FD is handling the containment, unknown who is performing clean up.	No	Yes	Drum Canal / Bear River	Yes	Road Closure	SR 20 EO Lake Spalding Rd, 4 - 5 MWO Hwy 80	Unincorporated county area Placer West of Donner Lake	Placer County	1/31/2018
'18-1301	CHP	Diesel	Unknown	Gal(s)	PETROLEUM	RP States: Due to unknown causes, a big rig truck crashed, resulting in a currently unknown amount of diesel fuel to spill out. The substance spilt onto concrete before flowing to a nearby storm drain. The truck is upright and did not tip over. Substance has been cleaned up.	Yes	Yes	Storm Drain	No	None	Westbound 80, Rawlins lake road	Colfax	Placer County	2/27/2018
'18-1418	NRC	Oil, Fuel 1-D	Unknown	N/A	Petroleum	***POTENTIAL RELEASE*** According to NRC #1205782, Caller reported three alarms went off indicating a release of materials at their plant. An investigation is underway.	Unknown	No		No	Unknown	Colfax Plant	Colfax	Placer County	3/3/2018
'18-1425	Kinder Morgan	Diesel	Unknown	N/A	PETROLEUM	***Potential Release*** Caller states there is a potential for diesel release due to vapor detector at high level going off. Personnel are enroute to investigate at this time.	Unknown	No	N/A	No	None	Colfax Plant	Colfax	Placer County	3/4/2018
'18-2655	Kinder Morgan	Gasoline	Unknown	Unknown	PETROLEUM	RP States: Potential Release - A 20% vapor detector activated at Cisco Grove Pump Station. Personnel is advising there could be a potential release of an unknown amount of gasoline. The situation is currenty under investigation. No waterways have been impacted at this time.	Unknown	No			None	80 Cisco Grove	Soda Springs	Nevada County	4/24/2018
'18-3493	CHP Grass Valley	Diesel or Oil	1	Gal(s)	PETROLEUM	Per the caller a truck going down State Route 20 lost it's brakes and went through the intersection of Rough and Ready Highway and into Squirrel Creek	No	Yes	Squirrel Creek	Unknown	Unknown	Rough & Ready Highway & State Route 20	Unincorporated county area Nevada West of Donner Lake	Nevada County	5/30/2018
'18-3812	PGE	Insulating oil less 50 ppm PCB	2	Gal(s)	PETROLEUM	Per the caller a tree knocked off the secondary bushing causing 2 gallons to release on to a near by cedar tree	Stopped, Contained	No	None	No	None	14094 Tahoe View Drive	Grass Valley	Nevada County	6/11/2018
'18-3940	Nevada County Environmental Health	Diesel	75	Gal(s)	PETROLEUM	RP states, A semi truck and trailer was attempting to make a right turn after exiting HWY 20, and over turned onto its side. This damaged the trucks saddle tank, causing the release of 75 gallons of diesel fuel. The release has been stopped but has not been contained. No impact to any waterways or storm drains. A contractor will be conducting cleanup of the release. The driver of the truck was injured and transported to the hospital.	Stopped,Not contained	No		No	None	HWY 20 x Rough Ready Highway	Penn Valley	Nevada County	6/15/2018
'18-5308	CHP Chico Comm Center	Diesel	30	Gal(s)	PETROLEUM	Per the caller a big rig that went down an embankment caused the release.	Stopped, Contained	No		No	None	Westbound I-80 Just East Of of Cisco Grove	Cisco Grove	Placer County	8/6/2018
'18-5570	Placer County EH	Gasoline	10	Gal(s)	PETROLEUM	RP states: A boat sank in the Rollins lake (Nevada Irrigation District Waterway) at Long Ravine Marina causing the release of the material into the water. The release is not stopped however the boat is being removed from the water and booms are being put in place. The lake does lead to Rock Creek Reservoir Water Treatment Plant.	Not stopped, Contained	Yes	Lake Rollins	Yes	None	26909 Rollins Lake Road	Colfax	Placer County	8/17/2018
'18-6935	Axa XL	Diesel Fuel	50	Gal(s)	PETROLEUM	RP states that approximately 50 gallons of diesel fuel released, impacting the soil only, due to a collision. The release is contained and the contractor RAH Environmental is enroute to perform the clean-up. No waterways were impacted.	Contained	No		No	None	2355 N. Lakewood Dr.	Meadow Vista	Placer County	10/12/2018

Control#	Agency	Substance	Quantity	Unit	Type	Description	Contained	Water?	Water Way	Drinking Water Impacted	Known Impact	Location	City	County	Incident Date
'18-7381	CHP Gold Run	Diesel	200	Gal(s)	PETROLEUM	Caller states a semi truck was involved in a collision resulting in the release of less than 200 gallons of diesel onto dirt from the trucks saddle tank. Fuel is still flowing onto the dirt. No waterways impacted. A contractor will handle the clean up.	Not stopped	No		No	None	Westbound 80 at the Rollins Lake offramp	Colfax	Placer County	10/31/2018
'18-7526	Nevada County	Motor Oil	1	Gal(s)	PETROLEUM	Per the caller an emergecny generator had a loos fitting causing the release	Stopped, Contained	No		No	None	950 Maidu Ave	Nevada City	Nevada County	11/6/2018
'18-7739	Kinder Morgan	Unknown Vapor	Unknown	Lbs.	PETROLEUM, VAPOR	RP states a vapor was detected emanating from a pipeline, located at a pump station, due to unknown reasons. The pipeline is being shut-down as a precaution. Currently, the pipeline is being used to transport Jet Fuel. It is unknown if the release is contained or stopped at the time of this report. No vapor cloud is visible.	Not stopped,Not contained	No		No	None	50 Carpenter Flat Road	Colfax	Placer County	11/14/2018
'19-0418	Nevada Irrigation Dist.	Food Grade Mineral Oil	10	Gal(s)	UNSPECIFIED	Release was due to a broken oil line on a dam resulting in the release impacting Scottsflat Reservoir, release has been fully recovered no waterways were impacted.	Stopped, Contained	No		No	None	Scottsflat Reservoir, 23333 Scottflat Road	Nevada City	Nevada County	1/16/2019
'19-0846	Placer County Environmental Health Department	Chlorine, liquid	0.5	Gal(s)	CHEMICAL	A pickup truck slid off the roadway and came to a stop near a waterway (Simpson Spill). At the time of the incident, the vehicle was carrying several containers of pool chemicals. One of the containers was damaged and released its contents onto soil and the waterway. The local fire department is on-scene and performing a cleanup. The portion of liquid that entered the waterway was unrecoverable.	Stopped,Not contained	Yes	Simpson Spill (Tributary of Wooley Creek)	No	Road Closure	17440 Placer Hills Road	Meadow Vista	Placer County	2/5/2019
'19-1326	Kinder Morgan	Gasoline	Unknown	Gal(s)	PETROLEUM	Per the caller they have a high vapor alarm at the Colfax pumping station which means there is an LEL greater than 20%. The cameras show no product spilled, but they havve personnel en route to confirm.	Stopped, Contained	No		No	None	50 Carpenter Flat Rd	Colfax	Placer County	2/25/2019
'19-2472	CHP Chico	Fuel - Diesel Type	3	Gal(s)	PETROLEUM	Traffic accident caused the release, material flowed onto asphalt then went into a storm drain, Unknown who is handling the containment and clean up.	Not stopped,Not contained	Yes	Storm Drain	No	Road Closure	EB Hwy 80 at Sisco Grove Exit	Gold Run	Placer County	4/16/2019
'19-2958	Placer County Environmental Health	Aviation Fuel	1-2	Gal(s)	PETROLEUM	Per the caller a plane crash caused the release. The airport is closed at this time.	Stopped, Contained	No		No	None	13666 New Airport Rd	Auburn	Placer County	5/6/2019
'19-3024	Waste Management	Anti Freeze	3	Gal(s)	CHEMICAL	[Per the caller a pump failed on the truck causing the failure. Per the caller the release is stopped and contained. Per the caller no waterways are impacted.	Stopped, Contained	No		No	None	17387 Penn Valley Dr	Penn Valley	Nevada County	5/9/2019
'19-3165	CHP	Diesel	100	Gal(s)	PETROLEUM	Release was due to a single vehicle incident involving a big rigs saddle tank that was punctured, release has potentially entered a storm drain, release is still on going. Repairs are underway.	Not stopped,Not contained	Yes	Storm Drain	No	None	EB Interstate 80 at Hwy 20 Junction	Blue Canyon	Placer County	5/16/2019
'19-3382	CHP	Diesel	1-2	Gal(s)	PETROLEUM	RP states: A big rig crashed and caused the release of the material. The release is stopped and contained. A storm drain was impacted leading to an unknown location. Clean up is unknown at this time.	Stopped	Yes	Storm drain	Unknown	None	Westbound I-80 West of Blue Canyon Road	Alta	Placer County	5/26/2019
'19-3468	Nevada County Irrigation District	Hydraulic Mineral Oil	15	Gal(s)	PETROLEUM	Per the caller they were exercising a valve on the Combie Dam on the Bear River when they had a leak on the hydraulic line. Per the caller the release started at 1630 hours and was stopped and containment at 1700 hours and was cleaned by 1730 hours. Per the caller the release did enter the water of the dam.	Stopped, Contained	Yes	Bear River	Yes	Unknown	North side of Combie Dam	Unincorporated county area Nevada West of Donner Lake	Nevada County	5/29/2019
'19-4559	Chico CHP	Diesel	20	Gal(s)	PETROLEUM	RP states 20 gallons of diesel fuel released from the side-saddle tank of a semi-truck due to a traffic collision. The release is stopped and it is contained. The release is impacting only the road surface. No waterways were impacted. One West bound lane of Interstate 80 is closed pending remediation. It is believed CalTrans will be conducting the clean-up.	Stopped, Contained	No		No	None	Interstate 80, Approximately 20 Miles West of Truckee	Colfax	Placer County	7/17/2019
'19-6353	Nevada County Envi. Health	Petroleum fuel	Unknown	Unknown	PETROLEUM	RP states that a historical release of two underground storage tanks were discovered that are rusted and have holes (approximately 50 years old). Petroleum odor was observed. They are 2 1,000 gallon tanks that were discovered empty. Along old HWY 40. Sierra West Consultants Contracting company will conduct the cleanup. Ground water	Stopped, Contained	Yes	Ground water	No	None	21816 Donner Pass Rd.	Soda Springs	Nevada County	10/1/2019

Control#	Agency	Substance	Quantity	Unit	Type	Description	Contained	Water?	Water Way	Drinking Water Impacted	Known Impact	Location	City	County	Incident Date
'19-6595	California Highway Patrol (CHP) - Chico	Fuel, diesel	75	Gal(s)	PETROLEUM	Two freight tractor trailers were involved in a collision which resulted in a diesel fuel spill from one saddle tank. The fuel impacted asphalt and soil. The CHP and CalFire are on-scene and Caltrans is enroute. No fires or injuries were reported and no road closures imposed. An investigation is ongoing.	Stopped, Contained	No	None	No	Unknown	Eastbound Interstate 80, west of Blue Canyon Road	Colfax	Placer County	10/13/2019
'19-7028	CHP Chico	Diesel, Motor Oil, Transmission Fluid	5	Gal(s)	PETROLEUM	RP advised that there was a big rig accident, involving two big rigs, causing the release of Diesel, Motor Oil, and Transmission Fluid onto the dirt shoulder. No waterways were affected.	Stopped, Contained	No		No	None	EB I-80 West of Blue Canyon	Blue Canyon	Placer County	11/1/2019
'19-7707	CHP Chico	Diesel Fuel	5	Gal(s)	PETROLEUM	Per RP: A semi truck accident occurred causing a release of less than 5 gallons of an embankment. Fuel is slowly leaking, but no waterways have been impacted. Caltans and Fish and Wildlife are en route to mitigate the release.	Not stopped,Unknown if contained	No			None	WB 80 JWO Eagle Lakes offramp	Nevada City	Nevada County	12/3/2019
'19-7967	Cal Fire	Motor Oil	6	Qt.(s)	PETROLEUM	Caller states a 10 ft radius motor oil stain was discovered on the roadway due to unknown causes, estimated to be approximaltey 6 quarts worth of oil. An unknown amount has impacted a storm drain. Nevada County public works is responding for clean up.	Stopped,Contained	Yes	Storm Drain	No	None	Lake Vera Purdon x Airport Rd, north on Lake Vera Purdon	Nevada City	Nevada County	12/13/2019
'19-8195	Kinder Morgan	Diesel	Unknown	N/A	PETROLEUM	Caller states that a vapor sensor alarm has been tripped at the Colfax Booster Pump Station. There is no release quantity at this time, the caller is reporting a threatened release, or potential release. Alarm tripped at 0853 hours, station shut down at 0904 hours, isolated the station at 0906 hours.	Unknown if stopped	No		No	None	50 Carpenter Rd	Colfax	Placer County	12/23/2019
'20-0821	PG&E	Turbine Oil	0.09	Oz.	PETROLEUM	Caller states residual oil came dripped off a generator at a hydroelectric power house where a small sheen was discovered in the Bear River. Contained with absorbents. Some will naturally dissipate. The generator is not in service at this time.	Stopped, Contained	Yes	Bear River	Yes	None	4970 Drum Powerhouse Rd	Alta	Placer County	2/10/2020
'20-2473	CHP- Gold Run	Mix of Diesel and Motor Oil	50	Gal(s)	PETROLEUM	RP states that a semi truck caught on fire causing the release. The fire has been extinguished. No water impacted. No road closure. Caltrans and CalFire will conduct cleanup.	Stopped, Contained	No				East Bound I-80 just west of Eagle Lakes Rd	Unincorporated county area Nevada West of Donner Lake	Nevada County	5/7/2020
'20-2636	CHP Chico Comm Center	Diesel Fuel	1	Gal(s)	PETROLEUM	Per the caller a vehicle accident caused the release.	Stopped, Contained	No		No	None	WB I-80 Just East of Drum Forebay	Unincorporated county area Placer West of Donner Lake	Placer County	5/16/2020
'20-3381	CHP - Chico	Unknown Fluid	Unknown	Unknown	UNSPECIFIED	Release of an unknown slippery material from a vehicle. Caller stated they are still trying to locate the vehicle to determine what was released. Release is impacting the roadway causing traffic to be stopped on the EB Side SR 174 at Colfax, CalTrans is on scene, Fire responding.	Unknown if stopped	No		No	None	EB I80, Release goes from Colfax till Blue Banyon exit. // 39.282385 -120.706475	Colfax	Placer County	6/25/2020
'20-3701	Placer Utilities	Sewage	500	Gal(s)	SEWAGE	Release is due to a broken force main resulting in the release impacting Lake Theodore, the release i stopped and contained.	Stopped, Contained	Yes	Lake Theodore	Unknown	None	Dry Creek and Hwy 80 // Applegate Road	Auburn	Placer County	7/14/2020
'20-4152	Private citizen	***potential release*** vehicle fluids	Unknown	Unknown	PETROLEUM	***potential release*** Caller states he can see a vehicle in Steephollow Creek. Unknown if any fluids have released.	Unknown if stopped, Unknown if contained	Yes	Steephollow Creek	No	None	24577 Lowell Hill Rd	Grass Valley	Nevada County	8/4/2020
'20-4357	UPRR	Oil - Lube Type	40	Gal(s)	PETROLEUM, RAILROAD	A locomotive leaked for an unknown reason which caused the release, material flowed onto ballast, rail ties and asphalt over a six mile stretch (Applegate Rd to Placer Hills Rd), Freight Train #IOANP of the 13th, Eng #UP8678, DOT unknown, occurred on a main line, contractor assigned for clean up reported a one to two inch line of surface staining over the stretch and material unrecoverable, UP personnel were on scene investigating.	Stopped, Contained	No			None	MP 135.45, Roseville Sub	Colfax	Placer County	8/13/2020
'20-6639	CHP	Diesel	40	Gal(s)	PETROLEUM	RP states: A 40 ft box truck went off interstate 80 into the south Yuba River due to an unknown cause. The release is ongoing. Clean up is in progress through Caltrans.	Not stopped	Yes	South Yuba River	Unknown	None	25 South Yuba Drive	Unincorporated county area Placer West of Donner Lake	Placer County	11/30/2020

Agency	County	Regulatory Measure Type	Order No.	WDID	Effective Date	Termination Date	# Enforcement Actions within 5 years	# Violations within 5 years
Umphress, Wade	Nevada	Enrollee - WDR	2017-0023-DWQ	5S29CC409369	3/8/2019	4/15/2019	0	0
Adam Valensky	Nevada	Enrollee - WDR	R5-2015-0113	5A29MJ00007	8/17/2017	6/30/2019	0	0
Danielle Dao	Nevada	Enrollee - WDR	R5-2015-0113	5A29MJ00006	7/27/2017	7/1/2019	0	0
James Allen Welch	Nevada	Enrollee - WDR	R5-2015-0113	5A29MJ00001	9/27/2016	7/1/2019	0	0
John Orr	Nevada	Enrollee - WDR	R5-2015-0113	5A29MJ00011	9/19/2017	7/1/2019	0	0
Lyle McMahon	Nevada	Enrollee - WDR	R5-2015-0113	5A29MJ00008	8/28/2017	10/24/2017	0	0
Martchek, Benjamin	Nevada	Enrollee - WDR	R5-2015-0113	5A29MJ00005	7/21/2017	7/1/2019	0	0
Stephen Shimp	Nevada	Enrollee - WDR	R5-2015-0113	5A29MJ00013	10/18/2017	7/1/2019	0	0
Thomas Lusk	Nevada	Enrollee - WDR	R5-2015-0113	null	11/8/2017	3/22/2019	0	0
Aaron Wallace	Sierra	Enrollee - WDR	R5-2015-0113	5A46MJ00005	1/9/2018	7/1/2019	0	0
Harriett W Wallace	Sierra	Enrollee - WDR	R5-2015-0113	5A46MJ00004	7/7/2017	7/1/2019	0	0
Sierra Sun Farms	Sierra	Enrollee - WDR	R5-2015-0113	null	4/4/2016	3/18/2019	0	0

Facility Name	County	Regulatory Measure Type	Order No.	WDID	Effective Date	Expiration/Review Date	# Enforcement Actions within 5 years	# Violations within 5 years
Canna Lake Croft	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC409994	4/5/2019	4/15/2024	0	0
22947 Austin Ranch Road LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434983	5/11/2021	4/15/2024	0	0
AAV Ivey LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434473	4/6/2021	4/15/2024	0	0
AgSoul 13038 McCourtney	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434631	5/11/2021	4/15/2024	0	0
Holistic Grower	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431257	3/30/2021	4/15/2024	0	0
Ametrine LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430440	2/16/2021	4/15/2024	0	0
Sierra Sol Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400984	10/22/2018	4/15/2024	0	0
19649 Morningside Rd.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429382	12/9/2020	4/15/2024	0	0
tees	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429825	3/30/2021	4/15/2024	0	0
Sacred Tree Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC423462	2/6/2020	4/15/2024	0	0
Backwaters	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC420636	2/4/2020	4/15/2024	0	0
Balady Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405901	11/21/2018	4/15/2024	0	0
Foodoo Farms Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400248	2/2/2018	4/15/2024	0	0
Bear River Provision	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC416274	6/17/2019	12/17/2022	0	0
North San Juan Cabin	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC409862	6/5/2019	12/17/2022	0	0
GVnugs LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405833	11/21/2018	4/15/2024	0	0
Finesse Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC409536	3/22/2019	4/15/2024	0	0
Sustainable Medicinals LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC402484	8/1/2018	4/15/2024	0	0
12986 MURPHY ROAD	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC427279	6/1/2020	4/15/2024	0	0
Big Oak Industries, INC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430254	3/9/2021	4/15/2024	0	0
Big Pillow Enterprises LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429142	10/30/2020	4/15/2024	0	0
Rockytop	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406409	12/12/2018	4/15/2024	0	0
Blue Heron Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC428969	10/30/2020	4/15/2024	0	0
Blue Oak Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431190	3/12/2021	4/15/2024	0	0
Blue Oaks Organics LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426367	5/5/2020	4/15/2024	0	0
Banner Quaker Hill	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431614	3/30/2021	4/15/2024	0	0
Bonnie Built Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431284	3/10/2021	4/15/2024	0	0
Boulderhenge LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431449	3/9/2021	4/15/2024	0	0
Nevada Ridge	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426320	5/5/2020	4/15/2024	0	0
Duggans	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429887	2/16/2021	4/15/2024	0	0
Flying T	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC400703	3/23/2018	4/15/2024	0	0
Hatchet Creek Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC402229	11/16/2018	4/15/2024	0	0
Dawnridge	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406071	11/27/2018	4/15/2024	0	0
BriteLight	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434798	4/26/2021	4/15/2024	0	0
Bud Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC423352	3/9/2020	4/15/2024	0	0
Buy One Assets	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421568	10/17/2019	4/15/2024	0	0
CA Land Investments 0920, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429692	12/10/2020	4/15/2024	0	0
Penn Valley Terp Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC428546	12/9/2020	4/15/2024	0	0
Califarmia LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406783	12/12/2018	4/15/2024	0	0
CALIFORNIA RELIEF LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405972	11/15/2018	4/15/2024	0	0
Calsierra LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426353	6/23/2020	4/15/2024	0	0
Calsierra LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426634	6/26/2020	4/15/2024	0	0
CCC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427165	6/17/2020	4/15/2024	0	0
Chapman Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427036	4/29/2020	4/15/2024	0	0
Buckboard Road	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC404329	11/14/2018	4/15/2024	0	0
C&B INDUSTRIES LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406212	11/21/2018	4/15/2024	0	0
Clean Cannabis company llc	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434204	4/14/2021	4/15/2024	0	0
Clean Leaf Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405912	11/15/2018	4/15/2024	0	0
Cloud Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429789	2/12/2021	4/15/2024	0	0
Comfort Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431451	3/30/2021	4/15/2024	0	0
Cooper 530	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426670	5/12/2020	4/15/2024	0	0
Cooper Greenwood Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406423	11/28/2018	4/15/2024	0	0
Backbone Place Cultivation	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429546	1/15/2021	4/15/2024	0	0
MG Gardens	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC410192	7/11/2019	1/1/2022	0	0
Clean Cannabis company llc	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434203	4/14/2021	4/15/2024	0	0
Wabash Avenue	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434150	4/14/2021	4/15/2024	0	0
Ever Bloom Farms DBA	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC424196	6/11/2020	4/15/2024	0	0
medical use	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405666	11/6/2018	4/15/2024	0	0
Hill Craft Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400831	11/13/2018	4/15/2024	0	0
Buza	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC404444	4/15/2020	4/15/2024	0	0
Banana Belt Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406099	11/21/2018	4/15/2024	0	0
DayShock, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429525	12/9/2020	4/15/2024	0	0
Demeter	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430049	3/9/2021	4/15/2024	0	0
Cupcake Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406253	11/21/2018	4/15/2024	0	0
DENCOB, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406271	11/26/2018	4/15/2024	0	0
Homesteader Herb Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400834	5/8/2018	4/15/2024	0	0
Ivy XX	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC422469	12/13/2019	4/15/2024	0	0
Ducks Organic Farms Inc.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435631	6/9/2021	4/15/2024	0	0
Big Springs	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435240	6/9/2021	4/15/2024	0	0
E & M Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429144	12/9/2020	4/15/2024	0	0
Windwhistle Way	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430364	3/9/2021	4/15/2024	0	0
Dragonfly Hills Medicinals (DBA)	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405911	11/15/2018	4/15/2024	0	0
Elevated Concept Holdings, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405980	11/21/2018	4/15/2024	0	0
17119 Kentucky Court, Penn Valley	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC404421	11/6/2018	4/15/2024	0	0
Empire Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC432814	4/6/2021	4/15/2024	0	0
Enlightened Earth	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429903	2/16/2021	4/15/2024	0	0
Enso Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434528	4/26/2021	4/15/2024	0	0
Es Parte Del Show LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426034	4/3/2020	4/15/2024	0	0
19133 grizzly creek rd. Nevada city,	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC430041	3/30/2021	4/15/2024	0	0
EZRT	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429942	2/12/2021	4/15/2024	0	0
Feather River Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406086	11/21/2018	4/15/2024	0	0
Down Om Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405742	11/6/2018	4/15/2024	0	0
Larkspur	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421229	11/13/2019	4/15/2024	0	0
Five Oaks Organics LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427566	7/3/2020	4/15/2024	0	0
Five Season Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC407115	4/10/2019	4/15/2024	0	0
Fleur-de-Leaf Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421180	12/13/2019	4/15/2024	0	0

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Florio	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC410550	4/10/2019	4/15/2024	0	0
Yellow Dog Family Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC402687	10/16/2018	4/15/2024	0	0
Casa Del Sol	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427902	7/3/2020	4/15/2024	0	0
Fruitful Flower Collective	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421024	10/10/2019	4/15/2024	0	0
18193 Silverthorne Lane	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426463	5/12/2020	4/15/2024	0	0
20915 VIA MEDITERRANE	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC433944	4/5/2021	4/15/2024	0	0
Mandolin Gardens Inc	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400699	3/6/2018	4/15/2024	0	0
Slide Mine	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405689	5/9/2019	12/17/2022	0	0
Heller Garden	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406914	12/14/2018	4/15/2024	0	0
GLEANN SONA, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421328	10/17/2019	4/15/2024	0	0
Gold Country Botanicals, Inc.	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC422348	12/13/2019	4/15/2024	0	0
Gold Country Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406269	11/28/2018	4/15/2024	0	0
FERREL RAVINE	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426369	7/3/2020	4/15/2024	0	0
Gold State Opportunties LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC423825	3/9/2020	4/15/2024	0	0
Hatchet Creek Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427008	5/5/2020	4/15/2024	0	0
Golden State Logistics and Supplies	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429932	2/16/2021	4/15/2024	0	0
Good Times Farm, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429740	12/10/2020	4/15/2024	0	0
Goodnight Holdings, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC432954	4/5/2021	4/15/2024	0	0
Monte Vista Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406156	11/26/2018	4/15/2024	0	0
graces garden	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426143	4/6/2020	4/15/2024	0	0
Grandmas Garden LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434194	4/26/2021	4/15/2024	0	0
GraPanLLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430263	2/16/2021	4/15/2024	0	0
Greenhouse Project	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC409770	3/22/2019	4/15/2024	0	0
Green Fire Farms, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427221	5/26/2020	4/15/2024	0	0
CF Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406227	11/21/2018	4/15/2024	0	0
Greener Pasture Farms	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC403092	8/2/2018	4/15/2024	0	0
Perimeter 21, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435754	6/15/2021	4/15/2024	0	0
Wampum way	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405581	11/16/2018	4/15/2024	0	0
JJLS NVC 1	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC423661	4/3/2020	4/15/2024	0	0
GV Family Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431775	3/9/2021	4/15/2024	0	0
Haikhu Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426101	5/7/2020	4/15/2024	0	0
056-370-011-000	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC422382	11/22/2019	4/15/2024	0	0
Maidu Trails	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434265	4/14/2021	4/15/2024	0	0
Speck's Place	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC404442	9/16/2019	4/15/2024	0	0
000-600-001-000	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC426063	4/17/2020	4/15/2024	0	0
Hazy Farms, LLC, DBA Fresh Off The	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434429	5/24/2021	4/15/2024	0	0
Heleyon Organics	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405898	11/14/2018	4/15/2024	0	0
Rock Creek Ranch LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400122	2/6/2018	4/15/2024	0	0
High Hill Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435085	5/24/2021	4/15/2024	0	0
Jonathon Hogander Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421373	10/17/2019	4/15/2024	0	0
Honey Bearz Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406059	11/16/2018	4/15/2024	0	0
Blue Bird Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421082	11/4/2019	4/15/2024	0	0
Roots Underground	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC427951	7/9/2020	4/15/2024	0	0
Hundredweight	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434049	5/24/2021	4/15/2024	0	0
Hunter Pines LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC422783	4/15/2020	4/15/2024	0	0
Backbone Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406173	12/20/2018	4/15/2024	0	0
Red House	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406043	11/16/2018	4/15/2024	0	0
Ivy XX III	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429545	3/11/2021	4/15/2024	0	0
Ivy XX II	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC428628	1/14/2021	4/15/2024	0	0
Aloha Acres	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405669	1/2/2019	4/15/2024	0	0
BM cannabis	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC412967	4/22/2019	4/15/2024	0	0
Jahlibyrd	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405937	11/19/2018	4/15/2024	1	1
Fruits	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC419986	7/30/2019	4/15/2024	0	0
Sanctuary Farms #3	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406660	12/12/2018	4/15/2024	0	0
20266 Buckboard - Hife	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426368	4/6/2020	4/15/2024	0	0
South Yuba collective	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405706	12/12/2018	4/15/2024	0	0
John Loy	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC421727	11/21/2019	4/15/2024	0	0
Grown by Vets	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400706	4/17/2018	4/15/2024	0	0
Anti Hero	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421006	10/10/2019	4/15/2024	0	0
JR Holdings Group LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429909	2/12/2021	4/15/2024	0	0
JSC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434900	4/26/2021	4/15/2024	0	0
Juan Paniagua Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC415857	5/16/2019	12/17/2022	0	2
The Ridge	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC404367	10/8/2018	4/15/2024	0	0
Little Shady Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430413	3/12/2021	4/15/2024	0	0
Green Leaf Organics LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC404410	12/14/2018	4/15/2024	0	0
KB Management Solutions, LLC	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC406870	12/14/2018	4/15/2024	0	0
KBM_ML	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435176	5/24/2021	4/15/2024	0	0
KBBB	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC426830	8/13/2020	4/15/2024	0	0
Sunshine Valley	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429885	2/4/2021	4/15/2024	0	0
Marge's Garden	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC404433	12/12/2018	4/15/2024	0	0
chloé	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC410159	4/10/2019	4/15/2024	0	0
hooker oak parcel	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC408778	3/8/2019	4/15/2024	0	0
Westwood Evergreen Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC415601	5/22/2019	12/17/2022	0	0
The Growing Tree	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406371	11/30/2018	4/15/2024	0	0
Daisy Hill	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC425874	5/21/2020	4/15/2024	0	0
Green Gate Gardens Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400206	1/25/2018	4/15/2024	0	0
Busy Bee Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC402201	6/4/2018	4/15/2024	0	0
FV Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC412880	4/22/2019	4/15/2024	0	0
Krupnick's	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421234	10/17/2019	4/15/2024	0	0
Lady Bug Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406199	11/26/2018	4/15/2024	0	0
Landrace Ranch LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426147	4/3/2020	4/15/2024	0	0
Sunstone Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426521	4/17/2020	4/15/2024	0	0
Larson Consulting Group	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406188	11/27/2018	4/15/2024	0	1
Vince's Place	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406152	11/28/2018	4/15/2024	0	0
LoveLeeBudz	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430145	2/16/2021	4/15/2024	0	0
Leo Lion Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431078	3/30/2021	4/15/2024	0	0

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Rodde Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC422080	11/21/2019	4/15/2024	0	0
New World Chronic	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406374	11/30/2018	4/15/2024	0	0
Lion Eye Terroir	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC431836	5/24/2021	4/15/2024	0	0
LMY Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405874	11/14/2018	4/15/2024	0	0
LTG Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434440	4/5/2021	4/15/2024	0	0
Clear Creek Station	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC407101	12/14/2018	4/15/2024	0	0
Magnum Farm LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429958	2/12/2021	4/15/2024	0	0
Verdant Valley	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400533	3/28/2018	4/15/2024	0	0
Irie Acres	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC412882	5/13/2019	12/17/2022	0	0
Lighting Ridge	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406658	12/14/2018	4/15/2024	0	0
the oasis	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC421215	10/17/2019	4/15/2024	0	0
Maureen and Jonathan Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC408284	1/14/2019	4/15/2024	0	0
Pussywillow Farms60-190	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC404400	10/8/2018	4/15/2024	0	0
Pleasant Valley Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429535	2/3/2021	4/15/2024	0	0
Chaunceys	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400903	5/11/2018	4/15/2024	0	0
Nature's Nurturers	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421431	11/21/2019	4/15/2024	0	0
JBM Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC412740	4/22/2019	4/15/2024	0	0
Windwhistle Way	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC416428	7/11/2019	1/1/2022	0	0
Divine Pines	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400890	11/13/2018	4/15/2024	0	0
Mothership Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429524	6/16/2021	4/15/2024	0	0
Mountain House	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430455	3/30/2021	4/15/2024	0	0
Mountain Lion Earthworks Inc.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427808	7/3/2020	4/15/2024	0	0
MushMouth Farms, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429030	9/25/2020	4/15/2024	0	0
Mystic Farm LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427046	8/24/2020	4/15/2024	0	0
Mystic Farms LLC - Via Mediterrane	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427645	2/16/2021	4/15/2024	0	0
Nakis Enterprise LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427518	6/23/2020	4/15/2024	0	0
NBL Melody, LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429778	1/15/2021	4/15/2024	0	0
Nice Day Gardens	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429762	2/12/2021	4/15/2024	0	0
Sages Way	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406070	11/19/2018	4/15/2024	0	0
NorCal Cultivation	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC416357	6/17/2019	12/17/2022	0	0
Noria's Naturals	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430090	3/9/2021	4/15/2024	0	0
North Columbia 19	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429773	1/15/2021	4/15/2024	0	0
Pipersky Cultivation	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426737	6/1/2020	4/15/2024	0	0
Nurture Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429674	1/15/2021	4/15/2024	0	0
Oak Mesa Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426548	5/1/2020	4/15/2024	0	0
Oak Tree Sanctuary	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405978	11/16/2018	4/15/2024	0	0
trinity organics	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421257	10/10/2019	4/15/2024	0	0
Ophir Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC432830	4/26/2021	4/15/2024	0	0
Optimum Enlightening LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC428259	8/7/2020	4/15/2024	0	0
Organics 101 Consultants L.L.C.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405935	11/15/2018	4/15/2024	0	0
Edge Ranch	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426113	6/1/2020	4/15/2024	0	0
Birchville Farms L.L.C.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426265	5/12/2020	4/15/2024	0	0
16070 Ophir silver rd Nevada City N	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406434	12/12/2018	4/15/2024	0	0
Patterson Valley Cannabis LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC428263	8/26/2020	4/15/2024	0	0
Penn Valley Green Group- Bell Road	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430154	2/16/2021	4/15/2024	0	0
Piper Hill	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC416358	6/17/2019	12/17/2022	0	0
Humble Budling's Cosmic Light Sour	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC409734	4/5/2019	4/15/2024	0	0
Melanie Peters Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC408243	1/11/2019	4/15/2024	0	0
Circle Seven Ranch	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406179	11/26/2018	4/15/2024	0	0
11554 Shepard Rd	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426130	4/3/2020	4/15/2024	0	0
Koasati Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406268	11/26/2018	4/15/2024	0	0
Potterri Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405781	11/14/2018	4/15/2024	0	0
Pure Ascension LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC424910	4/3/2020	4/15/2024	0	0
Avion	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC409847	4/5/2019	4/15/2024	0	0
Songbird Select	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406180	2/15/2019	4/15/2024	0	0
Red Dragonfly Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400448	3/2/2018	4/15/2024	0	0
Cali Livan Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406260	11/21/2018	4/15/2024	0	0
Rachel's house	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC408963	5/10/2019	12/17/2022	0	0
S.G.R	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421248	12/13/2019	4/15/2024	0	0
RST	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430534	4/15/2021	4/15/2024	0	0
Paradise Hill	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429895	3/29/2021	4/15/2024	0	0
17595 Red Ball Circle	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC424323	4/3/2020	4/15/2024	0	0
Red Hawk Ridge	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406205	11/21/2018	4/15/2024	0	0
Reindeer Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC425075	4/3/2020	4/15/2024	0	0
Reppond Cultivation	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC424739	6/29/2020	4/15/2024	0	0
Tadpoles	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434966	5/14/2021	4/15/2024	0	0
Ridge Pros Inc.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC424139	4/3/2020	4/15/2024	0	0
Ridge Pros Inc.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC428484	8/26/2020	4/15/2024	0	0
Rise Above Farms LLC (15806)	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434684	6/15/2021	4/15/2024	0	0
Riversong	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426252	3/9/2021	4/15/2024	0	0
Sugar Hill	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC410273	4/10/2019	4/15/2024	0	0
21310 Rock Mountain rd. Grass Vall	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC423472	3/9/2020	4/15/2024	0	0
Rock Mountain LLC - North Exit Rd.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426880	5/12/2020	4/15/2024	0	0
Green Gift Gardens	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400659	3/2/2018	4/15/2024	0	0
Sacred Valley Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406344	11/30/2018	4/15/2024	0	0
Eagle Ridge	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426543	5/5/2020	4/15/2024	0	0
Clear Creek Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400525	2/9/2018	4/15/2024	0	0
Royal Crest Cannabis	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC402674	10/29/2018	4/15/2024	0	0
Mariposa 22	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426427	4/6/2020	4/15/2024	0	0
House Hanz	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC420154	8/7/2019	4/15/2024	0	0
S & V Services LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426579	9/22/2020	4/15/2024	0	0
S&M Clone Company	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC426387	6/26/2020	4/15/2024	0	0
SJC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC404377	10/8/2018	4/15/2024	0	0
Birchville Botanicals	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405756	11/6/2018	4/15/2024	0	0
Aloha Ranch	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406208	11/21/2018	4/15/2024	0	0
Ranch	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435370	6/15/2021	4/15/2024	0	0

Facility Name	County	Regulatory Measure Type	Order No.	WDID	Effective Date	Expiration/Review Date	# Enforcement Actions within 5 years	# Violations within 5 years
Lions Nest	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406272	11/26/2018	4/15/2024	0	0
Shakti Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406036	11/28/2018	4/15/2024	0	0
SK Farms Inc.	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406250	11/28/2018	4/15/2024	0	0
K and D Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405899	12/20/2018	4/15/2024	0	0
Sierra Foothill Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406189	11/29/2018	4/15/2024	0	0
Perimeter Road	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435149	5/24/2021	4/15/2024	0	0
Sierra Knits LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426845	5/12/2020	4/15/2024	0	0
Sierra Nevada Cannabis Company	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC404301	11/13/2018	4/15/2024	0	0
Fawnbrook Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406083	11/19/2018	4/15/2024	0	0
Sierra Ridge Energy - Pine Grove	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434076	4/6/2021	4/15/2024	0	0
Sierra Select Gardens	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406193	11/28/2018	4/15/2024	0	0
Trichome Premise	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406325	11/28/2018	4/15/2024	0	0
Owl Holler	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC406031	12/14/2018	4/15/2024	0	0
Sky Tiger Ranch	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429823	1/15/2021	4/15/2024	0	0
Oak Springs Farm	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434904	5/11/2021	4/15/2024	0	0
Sluice Box Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435009	6/9/2021	4/15/2024	0	0
Small Town Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC433766	4/5/2021	4/15/2024	0	0
Sun Ray Organics	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430475	3/9/2021	4/15/2024	0	0
spotts site	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421365	11/21/2019	4/15/2024	0	0
Star Seed Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434295	5/14/2021	4/15/2024	0	0
Good Seed	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC408551	2/25/2019	4/15/2024	0	0
Sun Shadow Wellness LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC423933	6/1/2020	4/15/2024	0	0
Sure Lock Homes Group LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435021	5/12/2021	4/15/2024	0	0
Honeygirl Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC418929	2/5/2020	4/15/2024	0	0
Tasty Exotic Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC423231	2/4/2020	4/15/2024	0	0
Tekeste Holding Group LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC432441	3/30/2021	4/15/2024	0	0
Vryideon	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405821	12/14/2018	4/15/2024	0	0
13847 Tyler Foote Crossing Rd	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421616	10/10/2019	4/15/2024	0	0
The Highlands LTD	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC415581	7/30/2019	1/1/2022	0	0
Abundant Gardens	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406499	11/30/2018	4/15/2024	0	0
garden	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC421299	11/21/2019	4/15/2024	0	0
Kentucky Court	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC406414	12/12/2018	4/15/2024	0	0
ThorKronic Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429059	9/25/2020	4/15/2024	0	0
Three Points Inc	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC401227	4/10/2018	4/15/2024	0	0
To Sages Way	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430185	2/16/2021	4/15/2024	0	0
Sierra Sublime	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406160	11/26/2018	4/15/2024	0	0
sugar bush farms llc	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC427595	4/26/2021	4/15/2024	0	0
Green Hummingbird	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400730	3/28/2018	4/15/2024	1	1
Man Cave	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434041	4/6/2021	4/15/2024	0	0
Jahlibyrd	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406042	11/16/2018	4/15/2024	0	0
C300A	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406146	11/26/2018	4/15/2024	0	0
W & W Enterprises LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC424020	4/3/2020	4/15/2024	0	0
W.A. Shure LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434238	4/6/2021	4/15/2024	0	0
W.A. Shure LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC434242	4/5/2021	4/15/2024	0	0
Larry Love Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406207	11/21/2018	4/15/2024	0	0
Westbound Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC405880	11/16/2018	4/15/2024	2	2
BMV Holdings	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC429852	2/16/2021	4/15/2024	0	0
Kelly McMichael Property	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC410531	3/22/2019	4/15/2024	0	0
Hutto Road Cultivation	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC426941	6/24/2020	4/15/2024	0	0
13113 Byron Rd	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC426190	5/26/2020	4/15/2024	0	0
Legacy Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400833	3/12/2018	4/15/2024	0	0
Grandmas Garden	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC400832	3/26/2018	4/15/2024	0	0
JW Farms	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435617	6/9/2021	4/15/2024	0	0
Winter Stone Partners LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC422613	3/9/2020	4/15/2024	0	0
Wolf Creek Farms LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC430959	3/9/2021	4/15/2024	0	0
Wolf Mountain LLC, a California Lim	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435102	5/24/2021	4/15/2024	0	0
Home	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406544	11/28/2018	4/15/2024	0	0
18273 Bald Hill Rd.	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC435702	6/15/2021	4/15/2024	0	0
Yuba basin Enterprises LLC	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC435451	6/9/2021	4/15/2024	0	0
Yuba Green Organics	Nevada	Enrollee - WDR	2019-0001-DWQ	5S29CC406100	11/16/2018	4/15/2024	0	0
Yuba Rush, LLC.	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC404312	10/5/2018	4/15/2024	0	0
Zephyr Farms	Nevada	Enrollee - Waiver	2019-0001-DWQ	5S29CC406161	11/28/2018	4/15/2024	0	0
Brandon Sanders Property	Sierra	Enrollee - WDR	2019-0001-DWQ	5S46CC408415	2/15/2019	4/15/2024	0	0
Sierra Sun Farms (Site #1)	Sierra	Enrollee - WDR	2019-0001-DWQ	5S46CC411990	3/26/2019	4/15/2024	0	0