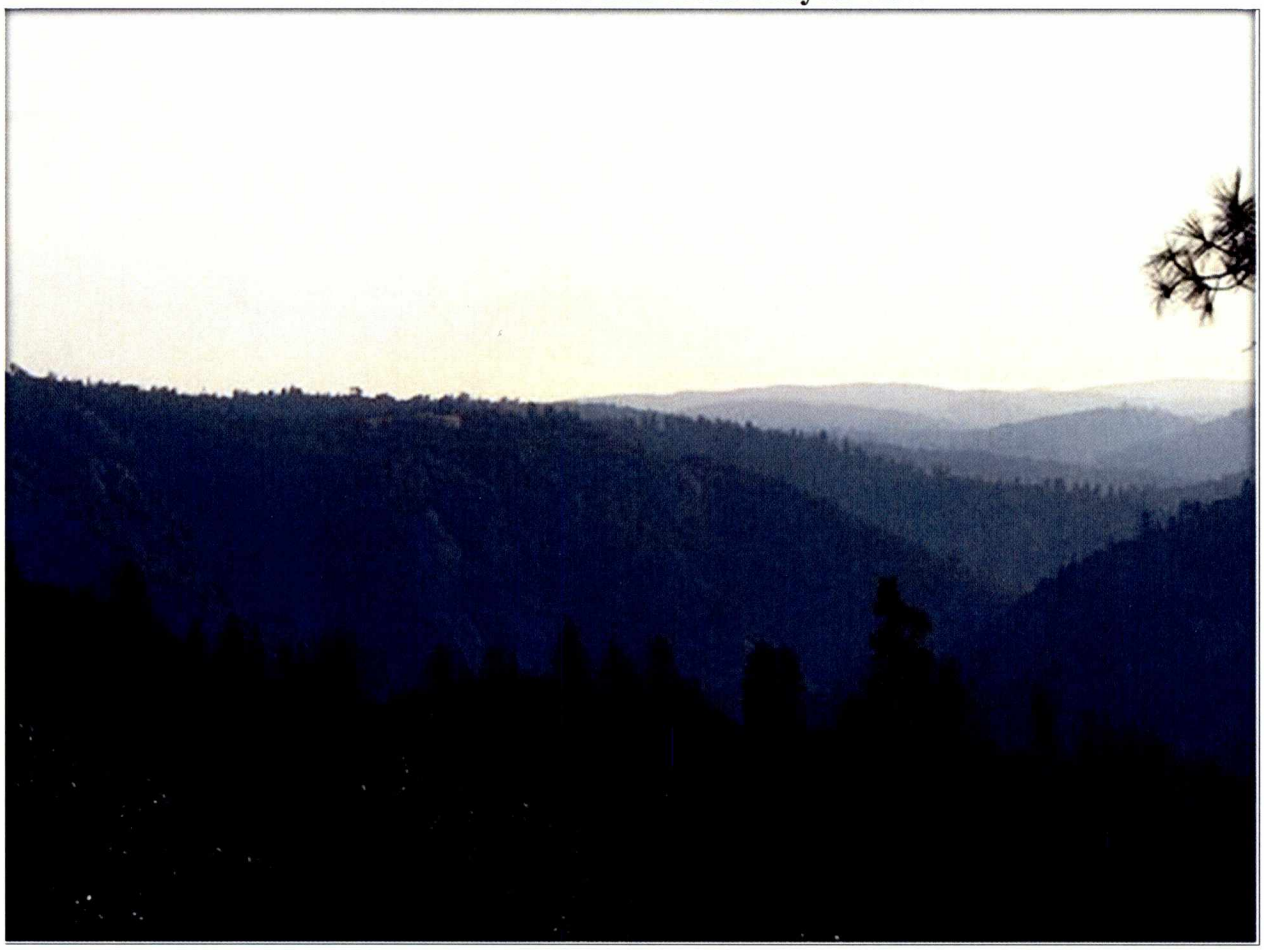
Mokelumne River
Watershed Sanitary Survey
Update 2015

"Mokelumne River Main Stem/Canyon View"



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East Bay Municipal Utility District
January 2016

Mokelumne River Watershed Sanitary Survey 2015 Update

East Bay Municipal Utility District
January 2016

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Best Management Practices, Water Treatment Plant, Pardee Recreation Area

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Scoping Map

Data Table

MRWSS 2015 Update Acronyms

Acronym	Definition
AADT	Average Annual Daily Traffic
AAL	Archived Advisory Levels
ABAG	Association of Bay Area Governments
AC	Alameda County
ACCG	Amador-Calaveras Consensus Group
ACCWP	Alameda Countywide Clean Water Program
AF	Acre Feet
AFY	Acre Feet per Year
AGP	Annual Grazing Plans
AIP	Agreement in Principle
AMP	Allotment Management Plans
APHA	American Public Health Association
ARWSS	American River Watershed Sanitary Survey
AUM	Animal Unit Months (one animal grazing for one month)
AWA	Amador Water Agency
AWWA	American Water Works Association
BART	Bay Area Rapid Transit
BAT	Best Available Technology
BLM	Bureau of Land Management
BMP	Best Management Practices
BRAQ	Briones Aqueduct Tap
BRBC	Bearinda Cove
BRTW	Briones Tower
CAL FIRE	California Department of Forestry and Fire Protection
Caltrans	California Department of Transportation
CANS	Camanche North Shore
CARWSP	Camanche Area Regional Water Supply Project
CASQA	California Stormwater Quality Association
CASRN	Chemical Abstract Series Registry Number
CASS	Camanche South Shore
CASSIN	Camanche South Shore Water Treatment Plant Influent
CAWP	Central Amador Water Project
CCB	Chlorine Contact Basin

CCC	Contra Costa County
CCCSD	Central Contra Costa Sanitary District
CCCWP	Contra Costa Clean Water Program
CCL	Contaminant Candidate List
CCR	Consumer Confidence Report
CCWD	Contra Costa Water District
CDC	California Department of Corrections
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CFLRP	Collaborative Forest Landscape Restoration Program
CFR	Code of Federal Regulations
CFU	Coliform Forming Units
CHHP	Camanche Hills Hunting Preserve
CHTW	Chabot Outlet Tower
CNDD	California Natural Diversity Database
CPUD	Calaveras Public Utility District
CSIP	Capital Security Improvement Projects
CT	Concentration Time
CVP	Central Valley Project
CYA	California Youth Authority
CVSD	Castro Valley Sanitary District
D/DBPR	Disinfectant and Disinfection By-Products Rule
DBP	Disinfection Byproducts
DDBP	Disinfectant and Disinfection By-Products
DDW	Division of Drinking Water
District	East Bay Municipal Water District
DLR	Detection Limit for Reporting
DOC	Dissolved Organic Carbons
DPR	Department of Pesticide Regulation
DSOD	California Division of Safety of Dams
DTSC	Department of Toxic Substances Control
DWP	District Work Plan
DWQ	Department of Water Quality
EA	Environmental Assessment

EAP	Emergency Action Plan
EBHCP	East Bay Habitat Conservation Plan
EBMUD	East Bay Municipal Utility District
EBRPD	East Bay Regional Park District
EBWMP	East Bay Watershed Master Plan
EBWSS	East Bay Watershed Sanitary Survey
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMS	Emergency Management System
EOC	Emergency Operations Center
EOD	Emergency Operations Director
EOP	Emergency Operations Plan
EOT	Emergency Operations Team
ESA	Endangered Species Act
ESP	Environmental Stewardship Plan
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FMP	Fire Management Plan
FMU	Fire Management Units
FPA	Flavor Profile Analysis
FRAP	CAL FIRE's Resource Assessment Program
FRPP	Fire Response Preparedness Plan
FRWA	Freeport Regional Water Authority
FRWP	Freeport Regional Water Project
FSC	Folsom South Canal
FSCC	Folsom South Canal Connection
FWS	Fish and Wildlife Service
GHAD	Geologic Hazard Abatement District
GIS	Geographic Information Systems
GWDR	Ground Water Disinfection Rule
GWR	Ground Water Rule
HAA	Haloacetic Acids
HCP	Habitat Conservation Plan
HM	Hydromodification Management
HOS	Hypolimnetic Oxygenation System

HPC	Heterotrophic Plate Count
HRMP	Habitat Restoration and Management Plan
ICS	Incident Command Systems
IDSE	Individual Distribution System Evaluation
IESWTR	Interim Enhanced Surface Water Treatment Rule
IPM	Integrative Pest Management
IRWMP	Integrated Regional Water Management Plan
JSA	Joint Settlement Agreement
JVID	Jackson Valley Irrigation District
LADWP	Los Angeles Department of Water and Power
LAMP	Local Agency Management Programs
LCP	Land Conservation Plan
LCR	Lead and Copper Rule
LID	Low Impact Development
LRAA	Locational Running Annual Average
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
LTRC	Long Term Renewal Contract
LUST	Leaking Underground Storage Tank
LVVWD	Las Vegas Valley Water District
MAC	
MBAS	Foaming Agents
MCCT	Mokelumne Coast to Crest Trail
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MDL	Method Detection Level
MFL	Million Fibers per Liter
MGD	Million Gallons per Day
MHSD	Mokelumne Hill Sanitation District
MLLT	Mother Lode Land Trust
MOU	Memorandum of Understanding
MPN	Most Probable Number
MRDL	Maximum Residual Disinfectant Level
MRDLG	Maximum Residual Disinfectant Level Goals
MRP or MRSWP	Municipal Regional Stormwater Permit
MRWSS	Mokelumne River Watershed Sanitary Survey

MSL	Mean Sea Level
MSR	Municipal Service Reviews
MTBE	Methyl tertiary-butyl ether
MTF	Multiple Tube Fermentation
MTRS	Meridian Township Range Section
MWMP	Mokelumne Watershed Management Plan
NAS	National Academy of Science
ND	Non-Detect
NEPA	National Environmental Policy Act
NF	National Forest
NIMS	National Incident Management Systems
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRD	Natural Resources Department
NRF	National Response Framework
NRP	National Response Plan
NSSF	National Shooting Sports Foundation
NTU	Nephelometric Turbidity Unit
NWIS	National Water Information System
OES	Office of Emergency Services
OG	OG Property Owner LLC
OHV	Off Highway Vehicle
OMD	Operations & Maintenance Department
OWTS	Onsite Wastewater Treatment System
PACIN	Pardee Center Water Treatment Plant Influent
PARIN	Pardee Recreation Area Water Treatment Plant Influent
PCBs	Polychlorinated Byphenyls
PUR	Pesticide Use Report
RAA	Running Annual Average
RDM	Residual Dry Matter
RLEEP	Ranger Led Environmental Education Program
RMP	Resource Management Plan
ROD	Record of Decision
RPF	Registered Professional Forester

RPU	Resource Patrol Unit
RRMP	Range Resource Management Plan
RV	Recreational Vehicle
RWQCB	Regional Water Quality Control Board
RWTP	Regional Water Treatment Plant
S1DBPR	Stage 1 – Disinfectant/Disinfection By-Product Rule
S2DBPR	Stage 2 – Disinfectant/Disinfection By-Product Rule
SCADA	Supervisory Control and Data Acquisition
SCS	Soil Conservation Service
SCWA	Sacramento County Water Agency
SDWA	Safe Drinking Water Act
SEMS	Standardized Emergency Management System
SFR	Single Family Residential
SHA	Safe Harbor Agreements
SIP	Seismic Improvement Program
SMARA	Surface Mining and Reclamation Act
SMCL	Secondary Maximum Contaminant Level
SMGB	State Mining and Geology Board
SNC	Sierra Nevada Conservancy
SNFP	Sierra National Forest Plan
SNFPA	Sierra National Forest Plan Amendment
SOCC	Security Operations Control Center
SOI	Sphere of Influence
SORT	System Operational Readiness Testing
SOTW	Sobrante Tower
SOWTP	Sobrante Water Treatment Plant
SPI	Sierra Pacific Industries
SPWTP	San Pablo Water Treatment Plant
SPRI	San Pablo Reservoir Inlet
SPTW	San Pablo Tower
SRWSS	Sacramento River Watershed Sanitary Survey
SSMP	Sewer System Management Plan
SSO	Sewer System Overflow
SWMP	Stormwater Management Plan
SWPPP	Stormwater Pollution Prevention Plan

SWRCB	State Water Resources Control Board
SWTR	Surface Water Treatment Rule
TCR	Total Coliform Rule
TDS	Total Dissolved Solids
THM	Trihalomethane
TMDL	Total Maximum Daily Load
TOC	Total Organic Carbon
TON	Threshold Odor Number
TT	Treatment Technique
TTHM	Total Trihalomethane
UC	University of California
UMRWA	Upper Mokelumne River Watershed Authority
UMRWAP	Upper Mokelumne River Watershed Authority Project
USACE	U.S. Army Corps of Engineers
USBR	U.S. Department of the Interior, Bureau of Reclamation
USDA	U.S. Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USGS	U.S. Geological Survey
USL	Upper San Leandro
USL WTP	USL Water Treatment Plant
UST	Underground Storage Tank
VA	Vulnerability Assessment
VOC	Volatile Organic Chemical
WARMF	Watershed Analysis and Risk Management Framework
WDR	Waste Discharge Requirements
WFMP	Working Forest Management Plan
WHRRMP	Wildfire Hazard Reduction and Resource Management Plan
WOD	Water Operations Department
WSMP	Water Supply Management Program
WSS	Watershed Sanitary Survey
WTP	Water Treatment Plant
WUI	Wildland Urban Interface

Executive Summary

Background

The California State Water Resources Control Board – Division of Drinking Water (SWRCB-DDW, previously the California Department of Public Health (CDPH)) requires that all surface water systems conduct a watershed sanitary survey and then update that study every five years thereafter. The purpose of this Mokelumne River Watershed Sanitary Survey 2015 Update (MRWSS 2015 Update) is to assess the source and treated water quality data and the watershed conditions during the update period 2010 – 2014 and confirm that each water system meets drinking water regulatory requirements. Potential contaminating activities and sources are evaluated, and watershed control and management practices are reviewed. Recommendations are made to strengthen source water protection.

The East Bay Municipal Utility District (District) submitted the first Mokelumne River Watershed Sanitary Survey (MRWSS) to CDPH in December 1995, followed by five-year updates in 2000, 2005 and 2010 (MRWSS Update 2000, etc.). The document herein is the District's fourth five-year update of the original MRWSS.

The MRWSS Update 2015 covers the lands that drain to the District's Pardee and Camanche Reservoirs. The Upper Mokelumne River Watershed is defined as portions of the Mokelumne River Watershed that drain to Pardee Reservoir from the North Fork, Middle Fork, South Fork, and Main Stem of the Mokelumne River. The Camanche Watershed consists of the lands between Pardee and Camanche Dams that drain to Camanche Reservoir. Together, these two watersheds cover 627 square miles located along the Upper Mokelumne River in the Sierra Nevada foothill counties of Alpine, Amador, Calaveras, and San Joaquin.

Water Supply, Conveyance, and Treatment

The District has water rights for up to 325 million gallons per day (MGD) from the 577 square-mile (approximately 370,000 acres) Upper Mokelumne River Watershed. In addition, there are five agencies upstream that have diversion structures and/or powerhouses along the Mokelumne River within the Upper Mokelumne River Watershed: Amador Water Agency (AWA), Jackson Valley Irrigation District (JVID), Calaveras Public Utility District (CPUD), Calaveras County Water District (CCWD), and Pacific Gas and Electric (PG&E).

Relatively unchanged during the MRWSS 2015 Update period, the vast majority of the Upper Mokelumne River Watershed consists of open-space and forest land with large tracts of designated wilderness and small concentrations of residential development. Including the District, six major institutional landowners and approximately 81 major private landowners have been identified in the Upper Mokelumne River Watershed. Approximate landowner holdings are as follows: District 3 percent, Sierra Pacific Industries (SPI) 24 percent, Bureau of Land Management (BLM) 3 percent, PG&E 1 percent, United States Forest Service (USFS) 54 percent, and others 15 percent.

The Camanche Watershed is approximately 42 square miles, draining lands to the north and south of the lower Mokelumne River and immediately to the west of Pardee Reservoir. It is bounded on the west by Camanche Dam.

The Mokelumne River is the District's major source of raw water supply. The Mokelumne Aqueducts transport Mokelumne River water from Pardee Reservoir to the East Bay for either direct use at the WTPs or for storage in the East Bay terminal reservoirs – Briones, San Pablo, and Upper San Leandro (USL). The District operates Pardee and Camanche Reservoirs as an integrated system to achieve multiple objectives: providing high quality water supply; releasing flows downstream of Camanche Reservoir for fisheries and other downstream water uses; managing operations for flood control mitigation and power generation; and maintaining sufficient carryover storage for droughts, facility maintenance or emergencies.

During the MRWSS 2015 Update period, California experienced reduced water demand, likely caused by a combination of economic and drought conditions. The five-year annual average Mokelumne Aqueduct draft from Pardee Reservoir dropped from 183 MGD (2005 – 2009) to 163 MGD (2010 – 2014). In 2014, the annual average Mokelumne Aqueduct draft dropped to only 146 MGD, and the District utilized its supplemental Sacramento River supply to deliver approximately 23,350 acre-feet (AF) of Sacramento River water to San Pablo and USL Reservoirs. The Sacramento River source is addressed in the Sacramento River Watershed Sanitary Survey and the American River Watershed Sanitary Survey and their updates.

Due to the pervasive drought in California, the average annual precipitation during the 2010 – 2014 period was 41.5 inches, based on the Mokelumne Basin 4-Station average, significantly lower than the historical average of 47.8 inches (1930-2014). Winter 2010 – 2011 precipitation was higher than average, while 2012 was average. In calendar years 2013 and 2014 the total precipitation was well below average, at only 18 inches and 38 inches, respectively.

For Pardee Reservoir, inflows during the five-year update period can be described as near-average in 2010, above average in 2011, and well below average in 2012, 2013 and 2014. Due to high inflows in June 2010 and spring 2011, Pardee Reservoir spilled. Despite the significantly lower inflows in 2012, 2013 and 2014, Pardee Reservoir elevation was filled above 560 feet in spring/summer 2012 and 2013, maximizing water available to the District's service area and the water available for cold water release to Camanche Reservoir in the autumn. Below average Pardee inflow in 2012, 2013 and 2014 resulted in lower releases into Camanche Reservoir. In November 2014, Camanche Reservoir was at 183.91 feet or approximately 30 percent of capacity. The District experienced no interruption in Mokelumne Aqueduct flow between 2010 and 2014.

The District operates six water treatment plants (WTPs) that treat surface water from Pardee or Camanche Reservoirs, three WTPs in the District's East Bay service area and three small upcountry WTPs. The three large East Bay WTPs are Walnut Creek, Orinda, and Lafayette WTPs. In 2011, the Walnut Creek WTP plant expansion was completed with the installation

of the last two new filters, increasing the permitted capacity from a maximum of 100 MGD to 115 MGD. A redundant coagulant feed system was installed at Orinda WTP (to improve reliability) and a control system upgrade is underway. Aqueduct chlorination facilities were installed at Walnut Creek WTP, relocating the sodium hypochlorite dose point downstream to minimize Disinfectant and Disinfection By-Products (DDBP) potential. The small systems, serving less than 10,000 people each, are the Pardee Recreation Area, Pardee Center, and the Camanche South Shore (CASS) WTPs. Camanche North Shore (CANS) WTP treats groundwater from three wells and so is not included in this MRWSS. The CASS WTP calcium hypochlorite chlorination system was replaced with sodium hypochlorite.

Construction began on a new Camanche Reservoir area regional water treatment plant (RWTP) and associated pipelines, part of the Camanche Area Regional Water Supply Project (CARWSP) Phase I. CARWSP is a partnership between three water agencies: AWA, CCWD, and EBMUD. The new RWTP will replace the existing CANS and CASS WTPs and is located at CASS. A new pipeline will connect the RWTP and EBMUD's Mokelumne Aqueducts No. 2 & 3, so that the Camanche Reservoir area drinking water source will now be Pardee Reservoir instead of Camanche Reservoir. New conveyance piping across Camanche Reservoir will deliver the treated water to the Camanche North Shore area. The three water purveyors will each then distribute the treated water within their respective service areas around Camanche Reservoir as CARWSP project funding and phases are completed:

- Phase I, 2015 – 2016: Construction of the RWTP (0.5 MGD current capacity, 2 MGD future capacity), the raw water pipeline from the Mokelumne Aqueducts to the RWTP, and the distribution pipeline across Camanche Reservoir to North Shore. (CANS WTP will remain in standby mode for emergency use.)
- Phase II, 2020 (tentative): AWA's service area improvements
- Phase III, 2025 (tentative): CCWD's service area improvements to serve the town of Wallace.

Water Quality Conditions

Pardee Reservoir raw water quality is generally excellent. Camanche Reservoir raw water quality is very good, although the raw water turbidity did rise with the drought and dropping reservoir level. The raw waters met primary drinking water Maximum Contaminant Levels (MCLs) with some exceptions, such as microbiological contaminants (total coliforms, *E. coli)* and turbidity. In Pardee Reservoir, aluminum was detected in the raw water at concentrations above the Detection Limit for Reporting (DLR), but well below the primary and secondary drinking water MCLs. Organic compounds, DDBPs and MTBE were not detected in either Pardee or Camanche Reservoirs between 2010 and 2014.

The District's WTPs are each effective and reliable in removing aluminum, particulates and microorganisms. The monthly reports, annual water quality reports, and annual inspection reports submitted to DDW indicate that treated waters from these WTPs met all drinking water quality regulations during this MRWSS Update period. Disinfection residual and microbiological data from the District's distribution systems showed no problems attaining the detectable disinfectant residual requirement. The Stage 2 Disinfectant/Disinfection By-

Product Rule (S2D/DBPR) MCLs were met by large system WTPs, while the small system WTPs will implement Stage 2 during the MRWSS 2020 Update period.

Based on the first round of Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) monitoring that began in 2006, all of the District's WTPs were assigned a Bin 1 classification, including Pardee Center, Pardee Recreation Area, CASS, Walnut Creek, Lafayette, and Orinda WTPs. With a Bin 1 classification, no additional treatment requirement is necessary. The second round of LT2ESWTR monitoring began in March 2015 and will be discussed in the MRWSS 2020 Update.

Potential Contaminant Sources

Relatively unchanged during the MRWSS 2015 Update period, contaminant sources in the watershed with the highest potential impact on water quality have been identified as the following: fire and fuels management, geologic hazards, grazing, District facilities, recreation, mines, and logging. Three contaminant sources (transportation corridors, illegal dumping, and agriculture) are considered to have insignificant to low potential impact on water quality. Table 5-22 in Section 5 contains a summary of the potential threats and water quality parameters impacted for all 14 contaminant source categories.

The District owns and manages lands around its reservoirs that make up approximately 3 percent of the Pardee watershed and 50 percent of the Camanche Watershed. District facilities and activities that have the potential to impact water quality include wastewater collection and treatment systems, recreation, and grazing. Recreation continues to be popular on District lands, at the Pardee and Camanche Reservoir Recreation Areas. Recreation is also popular upstream of Pardee Reservoir at reservoirs and along some sections of the Mokelumne River and tributaries, particularly camping, boating and off highway vehicle use (OHV).

In the non-District watershed lands above Pardee Reservoir, new development slowed in both incorporated and unincorporated parts of Amador and Calaveras counties. Logging and grazing continue to be major activities. Erosion from OHV use continues to be a concern on both public and private lands. Changes in USFS and BLM OHV policies have restricted OHV travel to identified roads, but enforcement of OHV restrictions remains challenging due to the large area involved. The FS has increased signage and added a campground host at the Moore Creek Campground below Salt Springs Reservoir to help with monitoring and enforcement.

Watershed Management and Control

The District completed the following work in response to strategies outlined in the District's 2008 Mokelumne Watershed Master Plan (MWMP):

Fire Management Plan, December 2011: Program to minimize the risk to life, property and water quality from wildfires in the EBMUD-owned portion of the Mokelumne watershed. Outlines fire risks and hazards, along with strategies for risk reduction and

fire response (suppression and restoration). Documents Best Management Practices (BMPs) for fire prevention, hazard reduction, and fire suppression.

Water Quality Monitoring Program (2006 – 2012): Included storm water sampling and grazing BMPs to minimize the risk of *Cryptosporidium* entering the reservoirs. Livestock were removed during the wet weather season ("dry grazing") and young cattle were excluded from direct contact with streams and creek.

Rangeland Management Plan, March 2013: Grazing and range management practices for healthy and productive watersheds. Standardized grazing lease and tenant selection procedures, and Annual Grazing Plan requirements. Outlines a Rangeland Health Assessment and Monitoring Program: current assessment, range health checklist, and spring and fall surveys.

In 2012, the Water Quality Control Policy for Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems (OWTS Policy) was approved by SWRCB, in response to AB885. County agencies may implement local agency management programs (LAMP) if approved by the Regional Water Quality Control Board (RWQCB). Amador and Calaveras County are both currently drafting LAMP documents for submittal in 2016. Although this regulation has the potential to reduce potential septic system contamination, existing septic systems are not expected to be significantly affected. The increased requirements for existing OWTS near impaired waters (Section 303(d), Clean Water Act) currently have little impact in the Upper Mokelumne River Watershed, because only one water body is listed as impacted for bacteria and nutrients: Rattlesnake Creek below Lower Bear River Reservoir for the pathogen *E. coli*. Future actions related to the LAMP documents may increase water quality monitoring for nutrients in specific water bodies, which in turn might affect existing OWTS systems near impaired water bodies.

The $17 million Cornerstone Project is a USFS Collaborative Forest Landscape Restoration Program (CFLRP) project that addresses landscape restoration over ten years, on 390,904 acres in the upper reaches of the Mokelumne River headwater area (land ownership 76 percent USFS, 22 percent private, <1 percent State and Country property). Begun in 2012, the Cornerstone project is being implemented by the Amador-Calaveras Consensus Group (ACCG), consisting of approximately 28 groups and a few unaffiliated individuals. Funding is expected to be 40 percent CFLR and 60 percent ACCG matching funds (includes other USFS funds). The CFLRP purpose is to encourage the collaborative, science-based ecosystem restoration of priority forest landscapes, with social and economic objectives including local job creation. Specific efforts completed to date include the Indian Valley Meadow Restoration in 2012.

The 2013 Road Rules, part of the Forest Practice Rules, tightened logging road requirements on private property and state owned lands to prevent individual and cumulative adverse impacts to beneficial uses of water. Issued by the California Department of Forestry and Fire Protection (CAL FIRE), the revised Road Rules include road building, repair, and monitoring requirements effective January 2015, with a statewide requirement for hydrological disconnection of roads from watercourses where feasible.

In December 2014, the Central Valley RWQCB renewed the Conditional Waiver of Waste Discharge Requirements for Discharges Related to Timber Harvesting. Waiver enrollment participants must meet eligibility requirements and comply with waiver conditions, including BMPs, monitoring and reporting.

Approximately 2,424 acres of PG&E property within the Upper Mokelumne River Watershed were protected by donation or conservation covenant, as part of a PG&E bankruptcy settlement, overseen by the Pacific Forest and Watershed Lands Stewardship Council. A separate grant program will fund future physical enhancements on these lands as selected by the new landowner or conservation easement holder. Donated parcels will not impact existing or future PG&E utility operations. The following Land Conservation and Conveyance Plans were finalized in 2014 and 2015:

North Fork Mokelumne River Planning Unit: 1,115 acres donated to CAL FIRE; Mother Lode Land Trust (MLLT) will hold the conservation covenant. The land is in Amador County along Tiger and Panther Creeks and surrounding the Tiger Creek Regulator Reservoir, near the North Fork and main stem of the Mokelumne River.

Lower Bear Area Planning Unit: Ownership of all 899 acres will be retained by PG&E. MLLT will hold a conservation easement. The land is in Amador County surrounding Upper and Lower Bear River Reservoirs.

Blue Lakes Planning Unit: 410 acres will be donated to the USFS. Sierra Nevada Conservancy (SNC) will hold the conservation covenant.

Several Power Fire-related lawsuits were settled in 2013, with PG&E and its tree-trimming contractor paying approximately $45 million to the federal government for firefighting costs and damages to the Eldorado National Forest (NF). The Eldorado NF Amador Ranger District is developing forest and watershed restoration projects in the 2004 Power Fire area with a portion of these funds. In 2014, the Eldorado NF Power Fire Reforestation Project Notice Of Intention was issued, with the Environmental Impact Report (EIR) expected in 2015. The proposed action identifies approximately 4,400 acres to be replanted within the 17,000-acre burned area, detailing several conifer planting densities and various levels of mechanical soil preparation and herbicide applications to reduce competing vegetation.

The 2013 Mokelumne/Amador/Calaveras Integrated Regional Water Management Plan (MAC Plan) Update was issued, with the Upper Mokelumne River Watershed Authority as the lead responsible agency. CARSWP regional WTP received approximately $1.4 million in grant funding through the MAC Plan process, almost half of the $3 million construction cost estimate. A 2015 MAC Plan Project Addendum updated project information forms for projects currently seeking funding, including several located in the Upper Mokelumne River Watershed, such as the Highway 88 Corridor Wastewater Transmission Pipeline and the Lower Bear River Reservoir Expansion Project.

A $10 million lien was placed on the Penn Mine property to recover the remediation costs paid by the District and the State of California, should a buyer be found for the property. Without this lien, Calaveras County might have sold the property for back taxes alone. The District has an interest in the property being owned, operated and maintained in a manner that protects water quality.

In 2015, Amador County approved a county-wide Storm Water Ordinance with revised BMPs and enforcement provisions. This ordinance was in response to the SWRCB's 2013 General Permit for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems (MS4s), which added Amador County to the Phase II traditional MS4 designation list. Amador Country was newly designated an MS4 because of limited storm water management in this area, and several water bodies or water body segments within or bounding Amador County that are 303(d) listed for particular contaminants, including Pardee and Camanche Reservoirs as well as the Lower Mokelumne River.

Conclusions and Recommendations

Raw water quality in Pardee Reservoir is generally excellent. Camanche Reservoir raw water quality is very good. All District WTPs are capable of reliably meeting all primary drinking water regulations, treating or removing particulates, pathogens, and other water quality contaminants. Although no new potential corrective actions were added in this MRWSS 2015 Update, watershed source protection is an integral part of water quality management as reflected in the recommended ongoing actions listed in Table ES-1.

Table ES-1: Summary of Recommendations

Recommendation	Responsible Agency	Description/Explanation
Continue water quality monitoring	The District	Continue water quality monitoring to protect source water and treated water quality. Implement regulatory monitoring as required by SWCRB and EPA, and operational monitoring as needed to optimize water treatment and distribution. Includes the second round of LT2ESWTR sampling, S2DDBP monitoring, and reservoir limnological profiling.
Consider implementing a nutrient and algae study in Pardee Reservoir	The District	A new nutrient and algae study would investigate the role and source of nutrients affecting algae taste and odor events.
Continue event-specific follow-up water quality monitoring	The District, Caltrans	Monitor known spills or accidents entering reservoir or tributary, or with the potential to enter, that may significantly impact influent water quality.
Continue to implement 'No Wake Zone' along the reservoir shoreline	The District	Enforce 5-mph speed limit along the shoreline to reduce shoreline erosion.
Maintain outlet tower exclusion zone	The District	Provide additional protection for outlet towers against accidents (e.g., structural damage) and direct water quality impact (e.g. fuel leak from a boat).
Continue invasive species monitoring and vessel inspection program	The District	Prevent importation of invasive species that can negatively impact water quality and system infrastructure.

Maintain no-body contact policy in Pardee Reservoir and tributaries on District property	The District,	Reduce potential for contamination.
Continue to provide floating restrooms on Pardee Reservoir	The District	Reduce potential for contamination.
Maintain horse and dog restrictions	The District	Dogs are not allowed in or on Pardee Reservoir. Dogs are not allowed on trails outside the developed recreation areas. Horses are not allowed to enter or drink from waters other than developed drinking stations (applies to Pardee and Camanche Reservoirs and their tributaries on District property).
Continue trail maintenance and ground cover plantings	The District	Reduce erosion
Continue inspecting reservoir shoreline for erosion	The District	This is especially important with water level is lower than normal
Continue Penn Mine and Mine Tailing Ponds work, Camanche Watershed	The District	Continue ongoing compliance monitoring of the Penn Mine groundwater. Inspect conditions to ensure adequate stormwater control measures are implemented. Continue working with BLM to finalize and implement remediation plans at the Mining Tailings Ponds.
Install and maintain in-stream sediment control as needed	The District	Control sediment loading from runoff
Continue coordination with CAL FIRE and USFS when wildfires occur	The District	Especially if wildfire may impact source water
Continue surveillance and emergency response program	The District	The District rangers patrol and work with County Sheriffs for routine law enforcement within the District owned watershed lands. The District has an EOP that is written and administered in accordance with the NRF, NIMS and California SEMS guidelines.
Continue participation in watershed educational programs	The District	Stewardship through Education Program, Mokelumne Volunteer Program (MVP) , Ranger Led Environmental Education Program (RLEEP) and Ranger-led tours
Continue participating in relevant agencies and stakeholder groups	The District	CAL FIRE, USFS, Calaveras and Amador Counties, BLM, UMRWA. Topics of interest include: water quality, stormwater runoff, future development, fire and fuel management, surveillance and emergency response, and public education/outreach

Section 1: Introduction

Sanitary Survey Requirements

As the primacy agency for the implementation of the Surface Water Treatment Rule (SWTR), the SWRCB-DDW specified that all surface water utilities shall prepare a Watershed Sanitary Survey (WSS) of their water supply watersheds by January 1, 1996, and update it every five years thereafter. Title 22 of the California Code of Regulations requires that the WSS include the following:

- a physical and hydrological description of the watershed
- an evaluation of raw and finished water quality data
- a description of activities and sources of potential contamination
- a description of watershed control and management practices
- an evaluation of the system's ability to meet requirements of Title 22 - Chapter 17: Surface Water Filtration and Disinfection Treatment
- recommendations for corrective actions

In December 1995, the District submitted the first MRWSS to SWRCB-DDW (formerly CDPH) to comply with these regulatory requirements. The 1995 MRWSS focused on lands that drain into Pardee Reservoir. In December 2000, the District submitted the first five-year update of the MRWSS to CDPH. The MRWSS Update 2000 expanded the scope of the original 1995 MRWSS by adding an assessment of the Camanche Watershed, defined as lands that lie between Pardee Dam and Camanche Dam that drain into Camanche Reservoir. Additional updates were submitted in January 2006 and January 2010.

MRWSS Update 2015 is the fourth five-year update of the 1995 MRWSS, and meets all requirements for preparation as described in Title 22. The major emphasis in MRWSS Update 2015 continues to be the identification of potential contaminant sources and their corresponding water quality concerns. While all regulated water quality parameters are addressed, microbiological parameters serve as the primary focus. Of particular interest are the potential sources of *Giardia* and *Cryptosporidium*, in part due to the treatment challenges associated with these pathogens.

Objectives

The main objectives of MRWSS Update 2015 parallel those from the first update in 2000:

- Satisfy all SWTR requirements for a WSS.
- Document changes that have taken place in the Pardee and Camanche watersheds during the MRWSS 2015 Update period.
- Produce a report that updates the 1995 MRWSS and its updates, while retaining pertinent information from these previous documents.
- Evaluate the water quality concerns pertaining to District's Pardee and Camanche Reservoirs.

- Develop a document that complements the District's Year 2015 Update of the East Bay Watershed Sanitary Survey (EBWSS Update 2015).

Additional objectives were established for MRWSS Update 2005 and carried forward to the MRWSS 2010 and 2015 updates. The first additional objective was to identify trends in water quality and contaminant sources. With the proliferation of Geographic Information Systems (GIS) in public and private agencies within the watersheds, an effort was made to collect as much GIS data as possible from outside agencies, with the objective of expanding the District's GIS database for evaluating contaminant sources. Finally, a few specific events that had potential to affect water quality were described in greater detail than in previous updates. This was done to more thoroughly document specific water quality impacts and agency (District and others) responses to these events, which can be studied to form the basis for future recommendations.

Survey Methods

MRWSS Update 2015 was conducted by District staff in the Water Operations Department (WOD). The MRWSS Update 2010 was reviewed and all text, tables, and figures that required updating were identified. Information was gathered from internal and external sources, and then compiled. As part of this effort, documents were reviewed, water quality data were analyzed, hydrologic data were updated, and the necessary field survey conducted.

Report Organization

The document is organized into seven sections.

Section 1: Introduction gives an overview of WSS requirements, objectives, and methods.

Section 2: Water Supply, Conveyance, and Treatment Systems is an overview of the District's facilities and operations. As the District is a minor landowner within the Camanche and Upper Mokelumne River Watersheds, agencies with water supply facilities or whose activities directly impact water quality and quantity are also highlighted in Section 2.

Section 3: Watershed Description contains a description of watershed characteristics (location, geology and soils, vegetation and wildlife, drainage basins, precipitation and evaporation, local runoff and diversions). Section 3 also documents the land uses, land ownership and jurisdictional authority within watershed lands.

Section 4: Water Quality includes a discussion of drinking water regulations, water quality monitoring that is conducted by the District, analysis of raw and finished water quality data, and evaluation of the District's water treatment facilities' ability to meet the requirements of the SWTR and LT2ESWTR.

Section 5: Potential Contaminant Sources in the Watersheds documents the locations and quantities of potential contaminant sources in the watersheds and identifies the key water quality parameters of concern associated with each contaminant source. In addition,

the relationships between the water quality parameters of concern and the significance of the potential corresponding contaminant sources identified are discussed.

Section 6: Watershed Control and Management provides an overview of the District's management practices pertaining to the watersheds and to the protection of source water. Also, the management practices of other agencies with jurisdiction over the watershed lands are discussed in this section.

Section 7: Recommendations lists recommended actions.

Section 2: Water Supply, Conveyance, and Treatment Systems

Overview

The District supplies water to approximately 1.3 million people within 20 incorporated cities and 15 unincorporated communities in Alameda and Contra Costa Counties, located in the East Bay of the San Francisco Bay Area. In the East Bay, the water system provides water to a 331-square-mile service area from Crockett to San Lorenzo, the San Ramon Valley, and from Walnut Creek to the San Francisco Bay. In addition, the District operates four small water systems adjacent to Pardee and Camanche Reservoirs.

Typically, approximately 90 percent of the District's water supply originates from Pardee Reservoir on the Mokelumne River as shown on Figure 2-1. During 2014, because of drought conditions, approximately two-thirds of the District's water supply originated from Pardee Reservoir. The remaining water originates from the local reservoirs and sometimes from the Sacramento River, as described in the EBWSS 2015 update.

From Pardee Reservoir, Mokelumne River water is diverted and transported to the District's service area in the East Bay via the Mokelumne Aqueducts. Pardee Reservoir is also the water source for the District's Pardee Center and PARA facilities. Camanche Reservoir, located just downstream of Pardee Reservoir, serves as the source of supply for the District's CASS Recreation Area (Figure 2-2). The District's CANS Recreation Area is located along the northern shoreline of Camanche Reservoir, but is supplied by groundwater.

All raw water, whether taken directly from the District's reservoirs or aqueducts, is treated at one of the District's WTPs. The District currently operates four small water systems that are proximate to the Pardee and Camanche Reservoirs – PARA, Pardee Center, CASS and CANS WTPs. CANS WTP is the only small water system that is supplied by groundwater. The Camanche Area Regional Water Supply Project (CARWSP) is the result of a partnership between three water agencies: AWA, CCWD, and EBMUD. In the future, CARWSP will address the water needs of the communities and recreation areas adjacent to Camanche Reservoir, and will replace both CANS and CASS. In addition to the small water systems, the District operates six large system WTPs in the East Bay; three of which, Orinda, Lafayette, and Walnut Creek, treat Mokelumne River water directly. Figure 2-3 depicts the flow and distribution of water for the District's water supply facilities.

Only the four small water systems and the Walnut Creek, Lafayette, and Orinda WTPs are discussed in this document. The District's other East Bay WTPs and facilities are discussed at length in the East Bay Watershed Sanitary Survey (EBWSS) and its updates.

The focus of this document is the Upper Mokelumne River watershed lands in association with the District's water supply facilities at Pardee and Camanche Reservoirs. The District has water rights (up to 325 MGD) to the 577 square mile Upper Mokelumne River watershed on the west slopes of the Sierra Nevada Mountains. The Mokelumne River

represents the District's major source of supply, and has supplied the District with a 2010 - 2014 average annual draft of 163 MGD.

During the MRWSS 2015 update period, California experienced reduced water demand, likely caused by a combination of economic and drought conditions. The 5-year annual average Mokelumne aqueduct draft from Pardee Reservoir dropped from 183 MGD (2005 – 2009) to 163 MGD (2010 – 2014). In 2014, the annual average Mokelumne aqueduct draft dropped to only 146 MGD, and the District utilized its supplemental Sacramento River supply to deliver approximately 23,350 AF of Sacramento River water to San Pablo and USL Reservoirs. The Sacramento River source is addressed in the Sacramento River Watershed Sanitary Survey and the American River Watershed Sanitary Survey and their updates.

Upper Mokelumne Watershed Area Facilities

The Upper Mokelumne Watershed is defined as the watershed lands that contribute flow to the North Fork, Middle Fork, South Fork, and Main Stem of the Mokelumne River, which then drain to Pardee Reservoir, as shown in Figure 2-4. Pardee Watershed Facilities are shown on Figure 2-1. Descriptions of the Pardee Reservoir and Outlet Tower are available on pages 2-6 to 2-7 of the MRWSS Update 2000.

The District has water rights and facilities to divert up to 325 MGD from the Mokelumne River, subject to the availability of Mokelumne River runoff and the prior water rights of other users. Figure 2-5 provides an overview of the Mokelumne River diversions and flows including the District's water rights. The District's position in the hierarchy of Mokelumne water users is determined by a variety of agreements between Mokelumne water right holders, the appropriative water rights permits and licenses which have been issued by the state, pre-1914 rights, and riparian rights, as shown in Figure 2-6. Factors that affect the District's ability to use its full entitlement include variability in rainfall and runoff, use by other senior water right holders, flood control requirements and in-stream flow requirements to protect fish.

In addition to the District's Pardee Reservoir facilities, there are five upstream agencies that have diversion structures and/or powerhouses along the Mokelumne River that can impact the availability of the District's Mokelumne River supplies - AWA, JVID, CPUD, CCWD, and PG&E. With the exception of PG&E, Table 2-1 summarizes the projected water demands for these agencies. Updates to these agencies' facilities or operations are described below.

North Fork of the Mokelumne River

PG&E and AWA operate facilities on the North Fork of the Mokelumne River. The storage reservoir capacities and associated engineering data for the facilities that are managed by these two agencies are listed in Table 2-2.

PG&E

The PG&E Mokelumne Hydroelectric Project (Project 137) is operated in accordance with judgments and decrees associated with the City of Lodi and the District. These decrees, commonly known as the "Lodi Decree" define the relative rights of Lodi, PG&E, the District, and areas around Jackson and Sutter Creek. The Lodi Decree addresses the timing and quantity of PG&E discharges of water into the Mokelumne River. The releases from PG&E's Mokelumne hydroelectric system can have impacts upon the District's exercise of its Pardee and Camanche water rights, in particular during the late summer and fall months. Detailed descriptions of these facilities are on pages 2-14 to 2-17 of the MRWSS Update 2000.

In October 11, 2001, the Federal Energy Regulatory Commission (FERC) issued an order approving a new operating license for Project 137. The new license included provisions to comply with the Federal Power Act Section (4e) requirements. Among the modifications to the operations were new minimum stream-flows, pulse flow requirements, short-term power generation constraints, new ramping rates, and summer releases for river recreation. Many of the in-stream flows and resource management measures had been in place since PG&E's 1996 Fish and Wildlife Agreement with California Department of Fish and Game (CDFG). Lodi Decree rules still govern PG&E releases downstream of Project 137 into the Mokelumne River, but the new license requirements may seasonally change the timing of flows.

Amador Water Agency (AWA)

Since 1985, the Central Amador Water Project (CAWP) has been owned and operated by AWA. The CAWP surface water diversion is limited to a firm yield of 1,150 acre-feet per year (AFY). AWA is working to obtain additional surface water rights for the CAWP system that would expand the surface water diversions to 2,200 AFY. Currently, the water source for the CAWP is rainfall and snowmelt stored in the Tiger Creek Afterbay. Water is pumped from the Tiger Creek Afterbay to the Highway 88 ridge then treated at the Buckhorn WTP to supply many small communities, including Pine Grove, Jackson Pines, and Pioneer. In 2015 AWA will complete construction of a gravity supply line (6.7 miles, 20-inch and 24-inch diameter) from Tiger Creek Regulator Reservoir to the Buckhorn WTP. AWA also has facilities on the Main Stem of the Mokelumne River, discussed below.

Middle and South Forks of the Mokelumne River

Two agencies that divert water along the Middle and South Forks of the Mokelumne River include CPUD and CCWD. Table 2-1 documents the projected water demands of these agencies and Table 2-2 summarizes the storage reservoir capacities and associated engineering data for these facilities.

Calaveras Public Utility District (CPUD)

CPUD services approximately 2,000 water connections in communities which include Mokelumne Hill and San Andreas. CPUD diverts water at the diversion dam, located downstream of the confluence of the Licking Fork and South Fork of the Mokelumne River, by pumping to Jeff-Davis Reservoir. Jeff-Davis Reservoir has a storage capacity of 2,000

acre-feet (AF). A rarely used back-up raw water supply is diverted from Schaad's Reservoir, a small impoundment on the Middle Fork located upstream from the take-out for the diversion canal.

In addition to its pre-1914 rights, CPUD currently has an appropriative right of 2,130 AF. CPUD pumps over 450 million gallons of water annually to its customers. The Mokelumne Hill Ditch, owned and operated by CPUD, on the South Fork of the Mokelumne River has been out of service since 1974 and is not anticipated to be used in the future due to excessive leakage. Additional information on CPUD's facilities can be found in CCWD/CPUD's Upper Mokelumne River Sanitary Survey (Tetra Tech, 2000 and MicroGeo, 2005).

Calaveras County Water District (CCWD)

CCWD diverts water primarily through a gravity diversion on Bear Creek, approximately six miles above the confluence with the Middle Fork. CCWD currently has an appropriative right of 1,830 AF and can divert year round from Bear Creek up to a maximum rate of 4 cfs. However, flows in Bear Creek cannot support CCWD's demand during seasonal dry periods. To supplement its raw water supply, CCWD maintains a contract with CPUD to purchase additional water from the Middle Fork. Water is treated at the 1-MGD West Point WTP, which serves CCWD's West Point and Wilseyville service area. Additional information on CCWD's facilities can be found in CCWD/CPUD's Upper Mokelumne River Sanitary Survey (Tetra Tech, 2000 and MicroGeo, 2005).

Main Stem of the Mokelumne River

The three agencies that divert water along the Main Stem of the Mokelumne River include JVID, AWA, and PG&E. Table 2-1 documents the projected water demands of these agencies and Table 2-2 summarizes the storage reservoir capacities and associated engineering data for these facilities.

Jackson Valley Irrigation District (JVID)

JVID provides wholesale water supply and distribution of raw water to irrigation, industrial, and domestic uses in the lower elevations of Amador County. Water for use by JVID is diverted to Lake Amador via a pipeline at the Jackson Creek Spillway Dam on the north arm of Pardee Reservoir. JVID has an entitlement to divert up to 3,850 AF annually from Pardee Reservoir under an assignment of the 1927 State Department of Finance filing; however, JVID does not hold the rights to store this water. JVID Mokelumne River water rights are also subject to reversion to upstream needs. AWA applied for reversion of 1,050 AF; reversions are determined by SWRCB approval. JVID also maintains water rights to divert up to 36,000 AFY from Jackson Creek.

Amador Water Agency (AWA)

The Amador Canal is owned and operated by AWA. Water is diverted from Lake Tabeaud through the canal to Tanner Reservoir to Tanner and Ione WTPs to supply the customers in Jackson, Ione, Amador City, Sutter Creek, and Drytown. Although the Amador Canal was purchased by AWA from PG&E in 1985, PG&E retained ownership of the water rights. AWA's contract with PG&E allows 15,000 AF to be diverted into the canal during normal and wet years. The diversion is subject to a 25 percent reduction in dry years. AWA's

entitlements are subject to 1977 and 1978 agreements among AWA, the District, Amador County, and Pioneer Community Services District.

In June 2007, the 30-inch Amador Transmission Pipeline became operational, connecting Lake Tabeaud to Tanner Reservoir. However, Amador Canal in still in service to serve raw water customers along the canal. AWA is currently exploring the possibility of installing a new small diameter pipeline in or along the canal to continue service to its existing raw water customers along the canal. After this pipe is installed, AWA plans to abandon use of the canal.

PG&E

PG&E owns and operates Lake Tabeaud, which serves as the forebay for the Electra Powerhouse, located about five miles upstream of Pardee Reservoir. Detailed descriptions of Electra Powerhouse and other facilities can be found on pages 2-14 to 2-17 of the MRWSS Update 2000

Camanche Watershed Area Facilities

Figure 2-2 depicts the Camanche Watershed, Camanche Reservoir, and its corresponding facilities. General descriptions of these facilities are on pages 2-19 and 2-20 of the MRWSS Update 2000.

Reservoir Operations

The District operates Pardee and Camanche Reservoirs as an integrated system to achieve multiple objectives: providing high quality water supply for the District's customers; releasing flows downstream of Camanche Reservoir for fisheries and other downstream water uses; and managing operations for flood control mitigation downstream of Camanche Reservoir, while maintaining sufficient carryover storage for emergencies such as droughts or facility outages. Pardee and Camanche Reservoirs operations are constrained by water rights, water quality, flood control, storage, water supply, and power generation criteria

Pardee Reservoir Operations 2010 - 2014

Figure 2-7 shows a summary of Pardee Reservoir operations for the 2015 update period compared to historical operations. The five years can be described as near-average in 2010, above average in 2011, and well below average in 2012, 2013 and 2014. More on hydrology can be found in Section 3 of this report. Due to high inflows in June 2010 and spring 2011, Pardee Reservoir spilled. Despite the significantly lower inflows in 2012, 2013 and 2014, Pardee Reservoir elevation is filled above 560 feet in the spring or summer 2012 and 2013, maximizing water available to the District's service area and the water available for cold water release to Camanche Reservoir in the autumn. Above average inflow in 2010 and 2011 resulted in above average releases to Camanche Reservoir each spring, as shown on the bottom graph of Figure 2-7. Similarly, below average inflow in 2012, 2013 and 2014 resulted in lower releases into Camanche Reservoir.

Camanche Reservoir Operations 2010 – 2014

Camanche Reservoir operations for the update period are shown in Figure 2-8. The reservoir water elevation did not overtop its spillway (elevation 235.5 feet) during this period, and has only done so twice in the past 25 years (February 1986 and January 1997). Due to the above average releases from Pardee Reservoir in 2011, shown as inflow to Camanche Reservoir, above average releases were made from Camanche Reservoir during the same time period. The lowest end-of-month elevation during this period occurred in November 2014, when the reservoir water elevation was at 183.91 feet or approximately 30 percent of capacity. Three consecutive years of below normal inflow resulted in relatively few releases for flood control after 2011. Releases met Joint Settlement Agreement (JSA)-required flows for all months during the update period.

Outlet Tower Locations and Protection Features

The locations of the District's outlet towers are shown in Figure 2-1 for Pardee Reservoir and Figure 2-2 for Camanche Reservoir. The District's outlet towers are protected by exclusion zones with warning signs posted on the reservoirs and shorelines.

The Pardee Outlet Tower has gates at elevations 550 feet, 520 feet, 490 feet, and 460 feet. They are operated to obtain the best quality water available at the outlet tower for diversion to the District's service area. Reservoir turbidity and plankton data are used to select the optimum outlet gates.

Mokelumne Aqueducts

Mokelumne River water is diverted from Pardee Reservoir at the District's Pardee Outlet Tower. The water is conveyed through the Pardee Tunnel to the Campo Seco facility where it trifurcates to the three Mokelumne Aqueducts. The water then flows by gravity 91.5 miles to the District's service area in the East Bay. In Walnut Creek, the Mokelumne Aqueducts connect with the east terminus of the two Lafayette Aqueducts where Mokelumne River water is either conveyed directly to Walnut Creek, Lafayette or Orinda WTPs, or stored in the District's Briones, San Pablo, and Upper San Leandro (USL) Reservoirs, as shown in Figure 2-3.

In February 2011 the Freeport Regional Water Project (FRWP) became operational, able to deliver supplemental supply from the Sacramento River to the Mokelumne Aqueducts for delivery to two of the District's terminal reservoirs located in the East Bay – San Pablo and USL Reservoirs. EBMUD has a Long Term Renewal Contract (LTRC) with the USBR, which provides for up to 133,000 AF in a single dry-year, not to exceed a total of 165,000 AF in three consecutive dry-years. Under the LTRC, the CVP supply is available to EBMUD only in dry-years when EBMUD's total stored water supply is forecast to be below 500 TAF on September 30 of each year. For additional details, see the EBWSS Update 2015.

Chemical Additions to Raw Water

The Pardee Chemical Building located at Pardee Center has historically been operated to maintain pH and disinfection levels in the water being conveyed through the Mokelumne

Aqueducts. Liquid lime is added at Pardee Center to maintain a target pH of 8 to 8.7. This chemical addition is required to protect the aqueduct lining from corrosion and to add alkalinity to facilitate coagulation in WTPs that treat water directly from the Mokelumne Aqueducts.
Prior to June 2012, the District added liquid chlorine in the form of 12.5 percent sodium hypochlorite solution to the Mokelumne Aqueducts to control biological growth and meet the disinfection (Concentration-Time or CT) requirement of the SWTR. In 2012, because of concerns over DBPs, the aqueduct sodium hypochlorite addition point was moved downstream adjacent to Walnut Creek WTP. Hypochlorite facilities at WCWTP add hypochlorite to both to the aqueducts just before the West Portal tunnel and to the Walnut Creek raw water feed.

WTP Facilities and Operations

The District currently operates a total of seven WTPs that treat water directly from either the Pardee or Camanche Reservoirs – three WTPs that are part of the East Bay large system and four WTPs that are part of the small upcountry systems. The four small systems, serving less than 10,000 people each, are the PARA, Pardee Center, CASS, and CANS WTPs. PARA and Pardee Center WTPs treat Pardee Reservoir water; CASS WTP treats Camanche Reservoir water; and CANS WTP treats groundwater from three wells.

In 2016, a new regional WTP (CARWSP) will replace CASS and CANS at Camanche Reservoir with treated water from Pardee Reservoir.

The three large system WTPs are Walnut Creek, Orinda, and Lafayette WTPs located in the District's East Bay service area. These WTPs treat Mokelumne River water transported from Pardee Reservoir through the Mokelumne Aqueducts, as shown in Figure 2-3, Water System Flow and Distribution Fiscal Year Ending June 30 2014. As shown in Figure 2-3, Mokelumne water is also diverted and stored in Briones Reservoir, which contains approximately 75 percent Mokelumne water and 25 percent local runoff. This reservoir can supply Walnut Creek, Lafayette, and Orinda WTPs during high demand periods and/or an emergency or outage of the Mokelumne River supply; however, only Orinda WTP is currently supplied by Briones Reservoir during high demand periods. Briones Reservoir is part of the District's East Bay facilities, which are discussed at length in the EBWSS and its updates.

PARA WTP

PARA WTP serves a transient, non-community small water system located on the north shore of Pardee Reservoir. The WTP intake is located south of the Recreation Area marina, as shown in Figure 2-1. The maximum capacity of the plant is 100 gallons per minute (gpm). Raw water is pumped through a six-inch pipeline from the reservoir by one of two 100-gpm pumps (one spare pump) mounted on a floating platform. The intake depth is suspended approximately 40 feet below the water surface. An exclusion zone restricts recreation in proximity to the intake both from the shore and from the reservoir. PARA WTP employs ultrafiltration and uses sodium hypochlorite for disinfection. The sodium hypochlorite is stored in 16-gallon containers within the spill containment area.

Pardee Center WTP

Pardee Center WTP is a non-transient, non-community small water system located on the west shore of Pardee Reservoir. The WTP intake is located adjacent to the Pardee Outlet Tower along the southwestern arm of Pardee Reservoir, as shown in Figure 2-1. The maximum capacity of the plant is 12 gpm. Raw water is pumped to a raw water tank by either from the reservoir by two 100-gpm pumps through a six-inch pipeline, or by two (one 270-gpm and another 195-gpm) shaft pumps from the outlet tunnel at the chemical building. An exclusion zone restricts recreation in proximity to the intake both from the shore and from the reservoir. Pardee Center WTP employs nanofiltration membranes and uses sodium hypochlorite for disinfection. The sodium hypochlorite is stored in eight-gallon containers within the spill containment. Soda ash is used for corrosion control.

CASS WTP

CASS WTP supplies CASS Recreation Area and adjacent residences. The maximum capacity of the plant is 480 gpm. The intake supplying the WTP is located approximately 1,200 feet from the shore along the north side of the recreation area, shown on Figure 2-2. A minimum 500-foot protection zone is established around the intake location. Raw water is continuously withdrawn from Camanche Reservoir by two 250-gpm pumps mounted on a floating platform, which draw water from a depth of 32 feet below the water surface. Treatment consists of the addition of coagulant and coagulant-aid (optional); in-line filtration through eight filters; and pre-filtration and post-filtration chlorination. Filtration consists of eight dual-media, anthracite/sand filters each with 20 square feet of filter surface rated at 3 gallons per minute per square foot (gpm/sf).

CANS WTP

CANS WTP is a small water system that supplies CANS Recreation Area with potable water (Figure 2-2). The source of supply for the CANS Recreation Area is groundwater drawn from three wells. Table 2-3 contains information on the CANS WTP well system. The groundwater is treated by four pyrolucite filters and sodium hypochlorite is used for disinfection and to aid in the removal of iron and manganese. Sodium hypochlorite is stored in a 400-gallon tank with built-in self-containment.

CARWSP

A new water treatment plant is being built to replace the existing treatment plants at Camanche Reservoir, CANS and CASS, with the new WTP in service by the end of 2016. The Camanche Area Regional Water Supply Project (CARWSP) is a partnership between three water agencies: AWA, CCWD, and EBMUD. The CARWSP will include a new regional WTP (RWTP), 0.5 - 2 MGD ultrafiltration, located at Camanche South Shore. New conveyance piping across Camanche Reservoir will deliver the treated water to the Camanche North Shore area. The three water purveyors will distribute the treated water within their respective service areas around Camanche Reservoir. In addition, the project will include a new pipeline connection between the RWTP and EBMUD's Mokelumne Aqueducts No. 2 & 3, so that the new RWTP source water is Pardee Reservoir instead of Camanche Reservoir. The new RWTP will replace both CANS and CASS WTPs.

As shown in Figure 2-9, the CARWSP project will be implemented in phases as environmental documentation is completed and funding is available:

- Phase I: In 2015 – 2016 the 0.5 MGD ultrafiltration RWTP will be constructed at Camanche Reservoir South Shore, along with the raw water pipeline from the Mokelumne Aqueducts and the distribution pipeline across Camanche Reservoir to the North Shore. By the end of 2016, the existing CASS and CANS WTPs will be shut down, although the CANS plant will be put into standby so that it can be used in an emergency.

- Phase II: Phase 2 of the project will serve Amador Water Agency's needs (specifically, the Lake Camanche Village portion of their service area). Amador Water Agency is currently preparing environmental documentation and applying for grant funding. Phase 2 will likely be constructed by 2020.

- Phase III: Phase 3 would serve Calaveras County Water District, specifically, the portion of their service area that serves the town of Wallace. This option is fairly costly and likely will not be constructed before 2025.

Walnut Creek WTP

Due to the high quality of the Mokelumne Aqueduct and Briones Reservoir water, the Walnut Creek WTP was designed and permitted to operate as an in-line filtration plant. Pre-treatment consists of the addition of polyaluminum chloride, cationic polymer, and optional sodium hypochlorite. The plant employs gravity filters with anthracite/sand media, which are permitted to operate at a maximum rate of 8 gpm/sf, when source water turbidity is lower than 1.0 Nephelometric Turbidity Units (NTU). Otherwise, the filters are permitted to operate at a maximum rate of 6 gpm/sf. Sodium hypochlorite, fluoride, and caustic are commonly added in the combined filter effluent pipe before the treated water is delivered to the chlorine contact chamber (CCC). Ammonia is added to the CCC effluent to form chloramines before water enters the clearwell.

The backwash water wastestream is discharged into two backwash wastestream equalization basins. Anionic polymer is added to the backwash wastestream prior to flocculation and sedimentation. The settled backwash wastestream and the filter-to-waste stream are pumped at a rate up to 10 percent of plant production rate to combine with the raw water for reuse as water supply although it can also be returned to the Mokelumne Aqueducts if necessary. Sludge from the settling basin is discharged to a 0.5 million gallon sludge detention basin prior to removal by trucks to the District's WTP in Oakland. Supernate from the sludge detention basin is periodically returned to the backwash wastestream equalization basins.

In May 2010, SWRCB DDW approved an application from the District for a water supply permit amendment for expanding the plant to meet the growth and demand of the system. In 2012 two new filters went into service increasing the permitted maximum capacity of the plant from 100 MGD to 115 MGD.

Lafayette WTP

Lafayette WTP was designed and permitted to operate as an in-line filtration plant. Its firm capacity is 25 MGD; its maximum capacity is 35 MGD. During the winter low demand periods, the plant typically is taken out of service. The Lafayette WTP process train consists of chemical pre-treatment, filtration, and chemical post-treatment. Pre-treatment consists of coagulant with polyaluminum chloride and cationic polymer, and sodium hypochlorite addition at the rapid mix. After chemical addition, the water flows to the filters. The plant has eight declining rate filters, six of which are dual media – sand/anthracite – filters and approved to operate at 6 gpm/sqft, and two of which are mono media – sand – filters and approved to operate at 3 gpm/sqft. After filtration, sodium hypochlorite, fluoride, caustic, and ammonia are added to the water as it flows by gravity through a 48-inch pipe into the clearwell.

Backwash water from the Lafayette WTP is discharged to the washwater solids handling facility, which includes an equalization basin, clarifier, and solids storage basin. Anionic polymer is added to the backwash water wastestream as it is pumped from the equalization basin to the clarifier. Clarified backwash water is pumped back to the Mokelumne Aqueduct.

Orinda WTP

Orinda WTP is an in-line filtration plant with coagulation, dual media filtration, and disinfection, treating water from the Mokelumne Aqueducts and Briones Reservoir. Orinda WTP has a permitted capacity of 175 MGD.

Polyaluminum chloride, cationic polymer, and sodium hypochlorite are applied to the raw water during the rapid mix process. Sodium hydroxide and fluoride, as well as sodium hypochlorite and ammonia for secondary disinfection are added after filtration. Twenty dual media – anthracite and sand – filters are used for filtration. Each filter has a maximum filtration rate of 6 gpm/sqft, which is equal to approximately 10 MGD. The plant permitted instantaneous capacity is 200 MGD, when all 20 filters are in service.

The backwash water wastestream is pumped into one of the two settling basins, which are operated independently of each other, with a detention time of three to six hours. Under the National Pollution Discharge Elimination System (NPDES) permit, the supernatant is then discharged to San Pablo Creek, which flows into San Pablo Reservoir. Sodium bisulfide is added to dechlorinate the backwash water wastestream supernatant prior to release to San Pablo Creek.

Process Changes at the WTPs

At CASS WTP, calcium hypochlorite was discontinued and sodium hypochlorite is now used, stored in a 400-gallon tank with built-in self-containment.

At CANS WTP, supply wells #2 and #3 were rehabilitated by replacing casings and damaged screens, followed by a flushing and sampling program. Also, a beneficial reuse process was also added to the WTP filter backwash system under a limited threat spray

irrigation permit with the State Board. The backwash water is stored in four 2,500 gallon tanks and used during dry weather (April 30 – October 1) to irrigate a turf area at the CANS Blue Oaks campground. Previously, the backwash water reclaim was discharged to a local creek in the Camanche Reservoir watershed.
During the 2010- 2015 update period, major plant expansion and improvements were completed at Walnut Creek WTP. The last two new filters were completed in 2011, which increased the permitted maximum production of the plant from 100 MGD to 115 MGD.
At Lafayette WTP, a new clearwell was constructed during the most recent WSS update period, replacing the old clearwell that did not meet seismic criteria. A new backwash supply pipe was also constructed so that distribution water can in the future serve as a backup for backwashing filters should the existing backwash tank seismically fail. This backwash backup option will be fully operational in 2016 when the Diablo Pumping Plant is upgraded.

At Orinda WTP, a redundant coagulant feed system was installed, filter flow controllers were upgraded and new aqueduct chlorination facilities were constructed, effectively moving the chlorination point downstream from Bixler to Walnut Creek to reduce DDBP formation potential. The control system is currently being replaced with a DCS Experion system. Plans are ongoing for a significant WTP outage in the next few years for additional upgrades.

Figure 2-1: Pardee Watershed Facilities

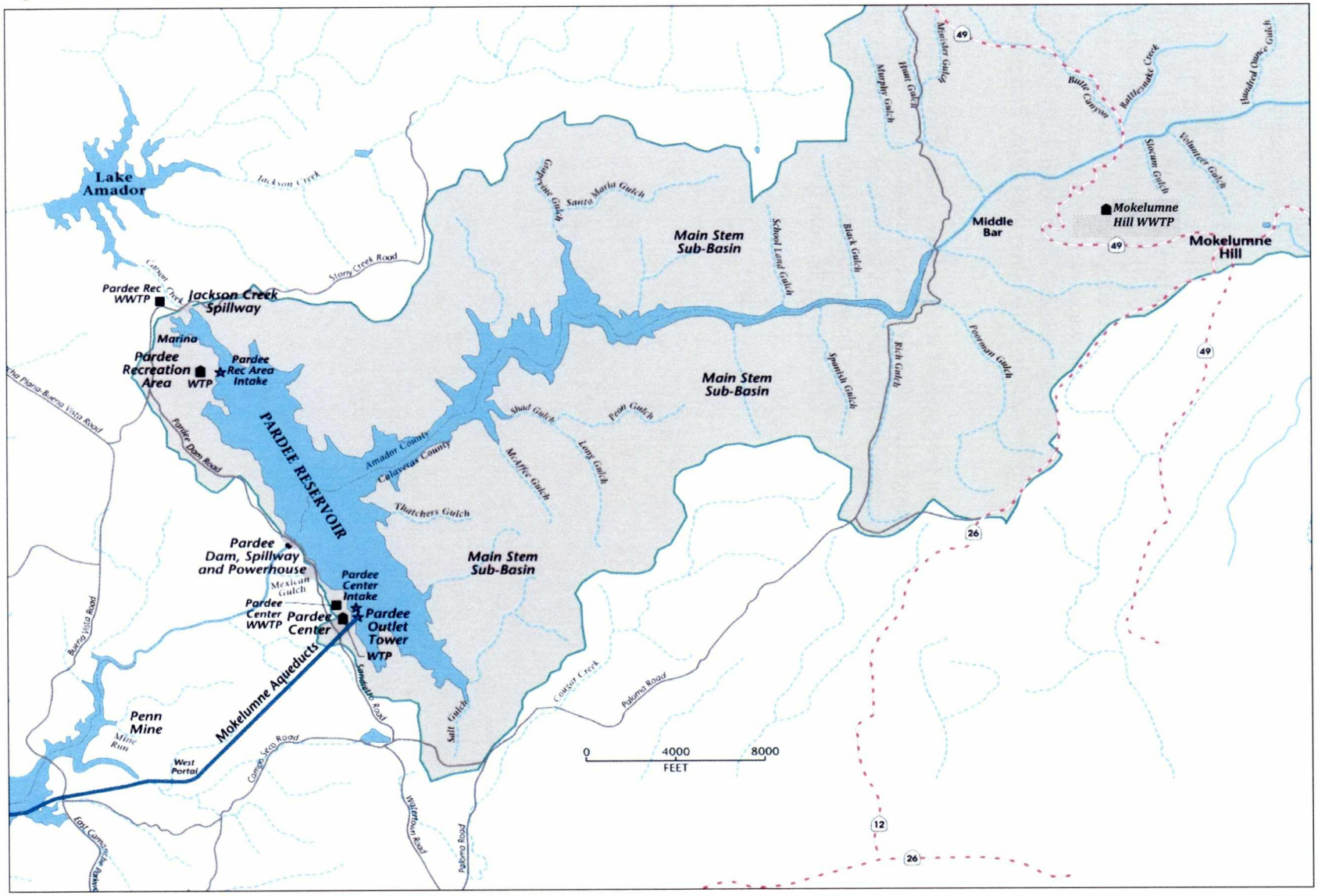


Figure 2-2: Camanche Watershed

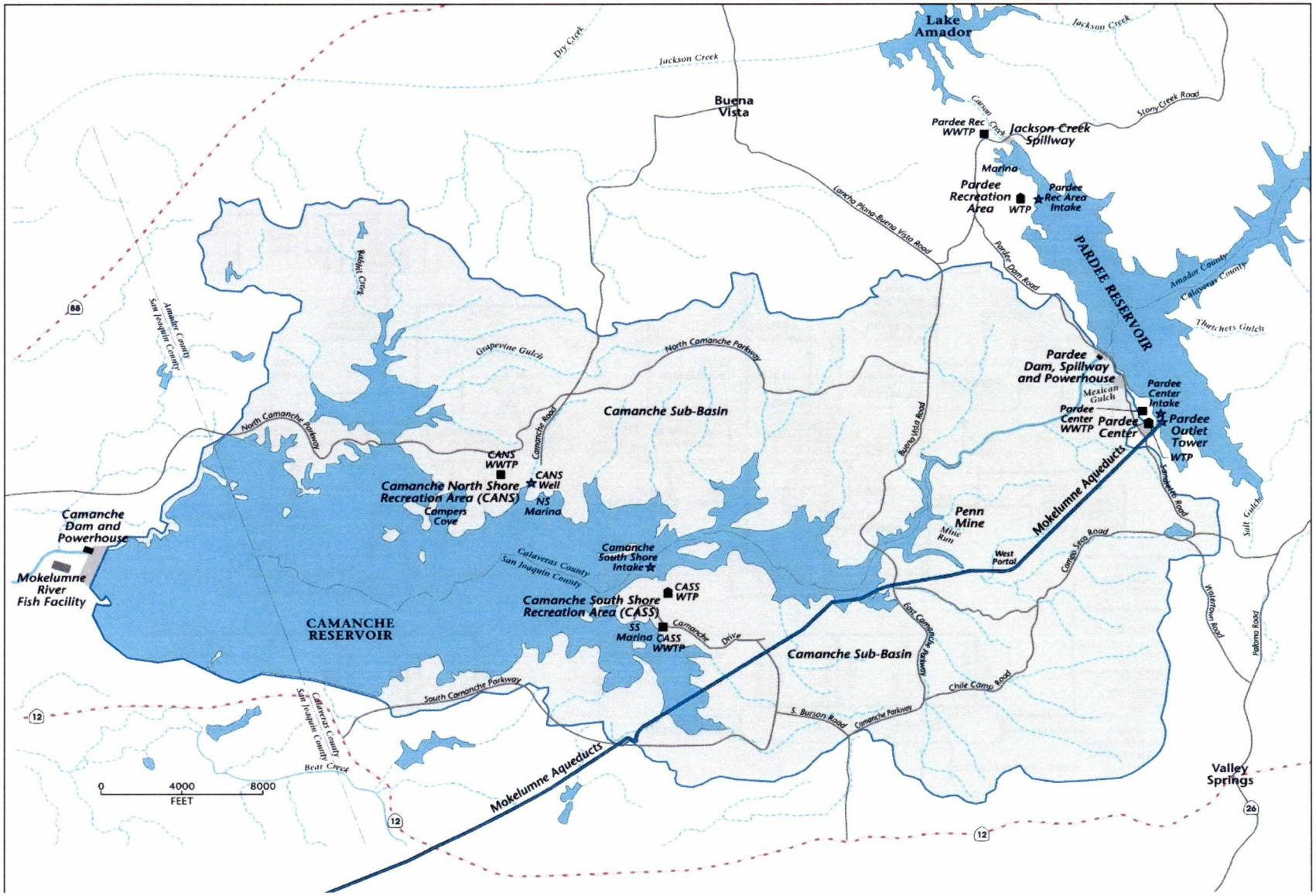
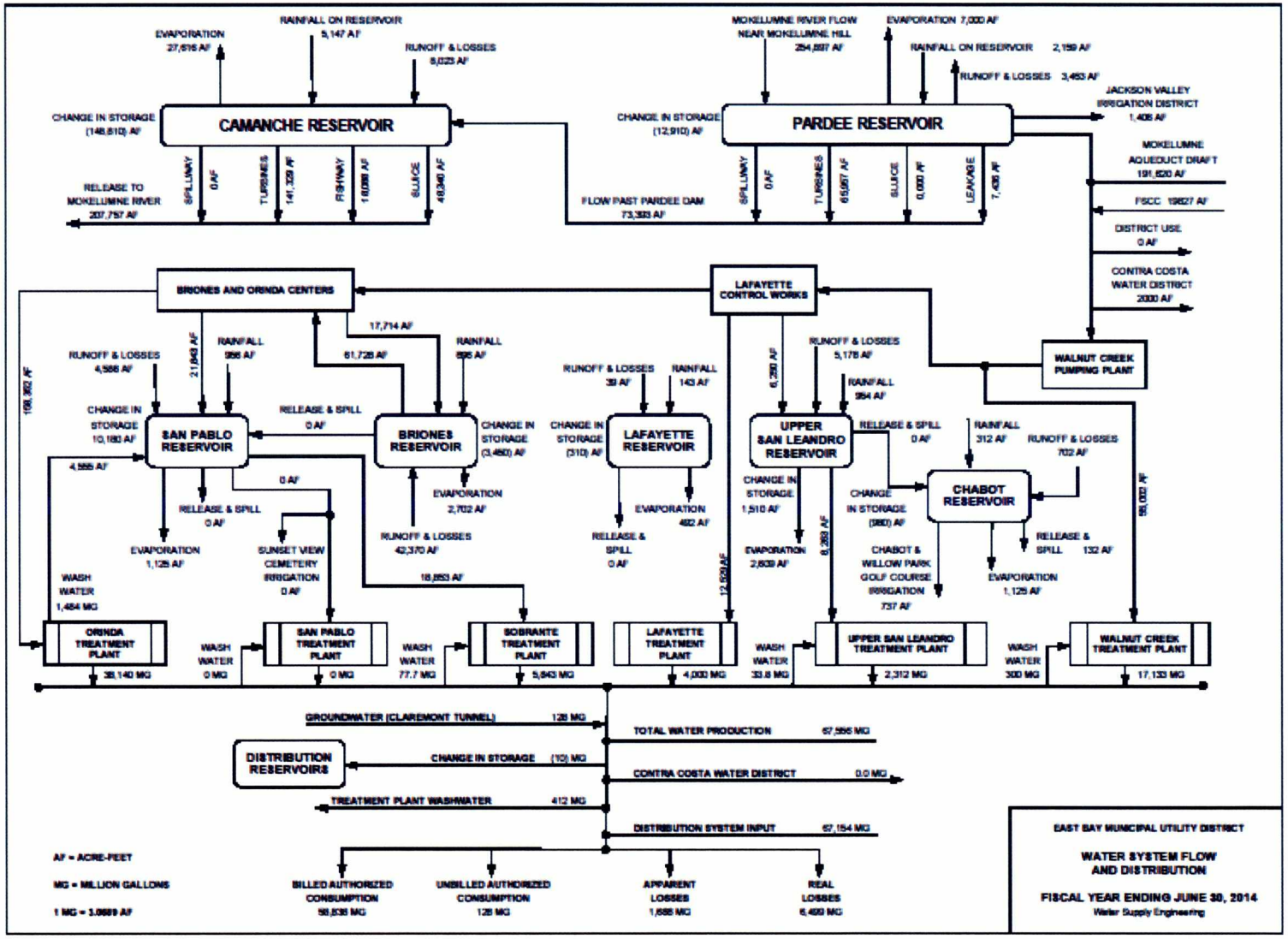


Figure 2-3: Flow and Distribution Diagram, Year Ending June 30, 2014



Source: Water Supply Statistical Engineering Report, Fiscal Year ending June 30, 2014

Figure 2-4: Upper Mokelumne River Watersheds Basemap with Hydrologic Features

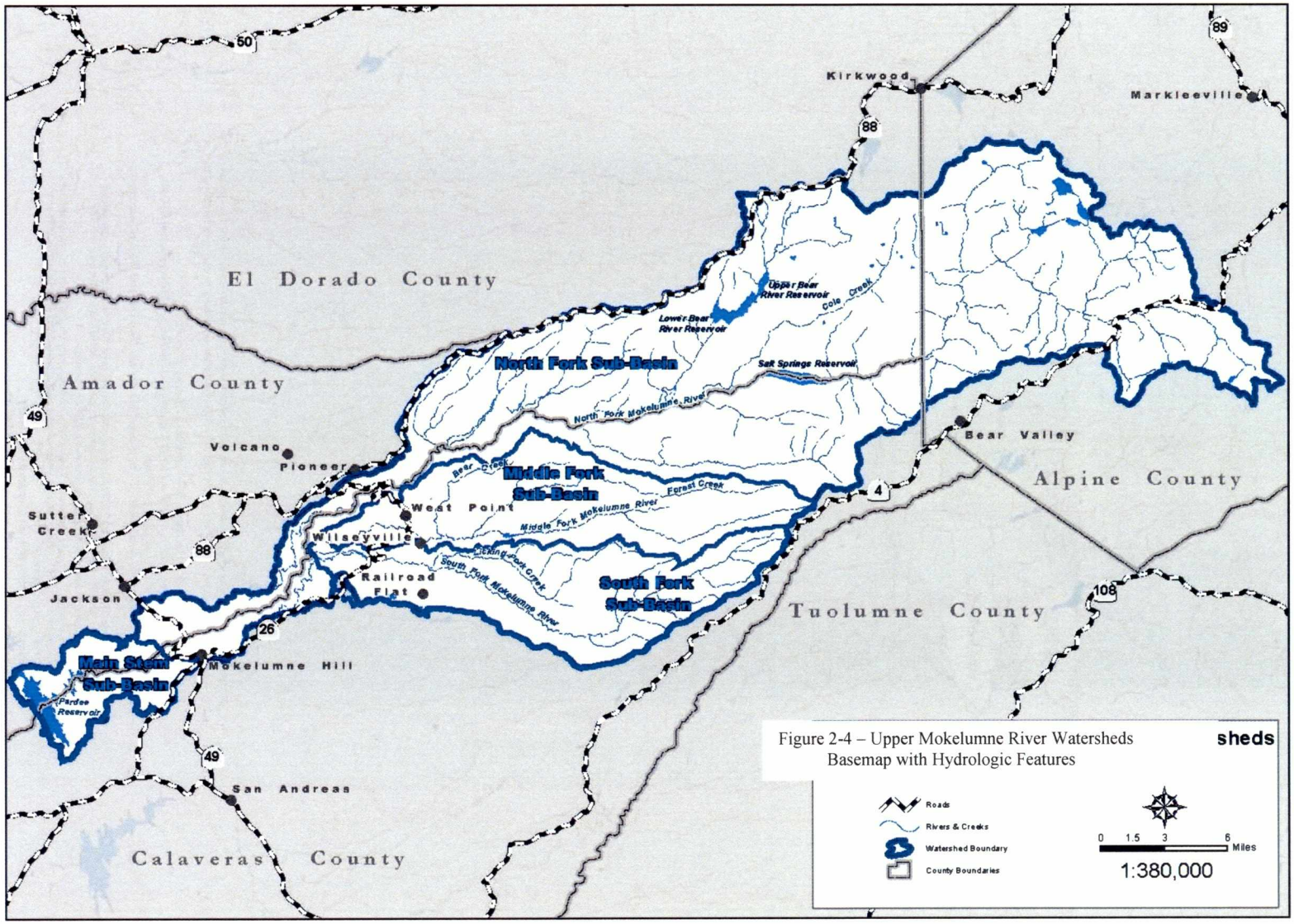
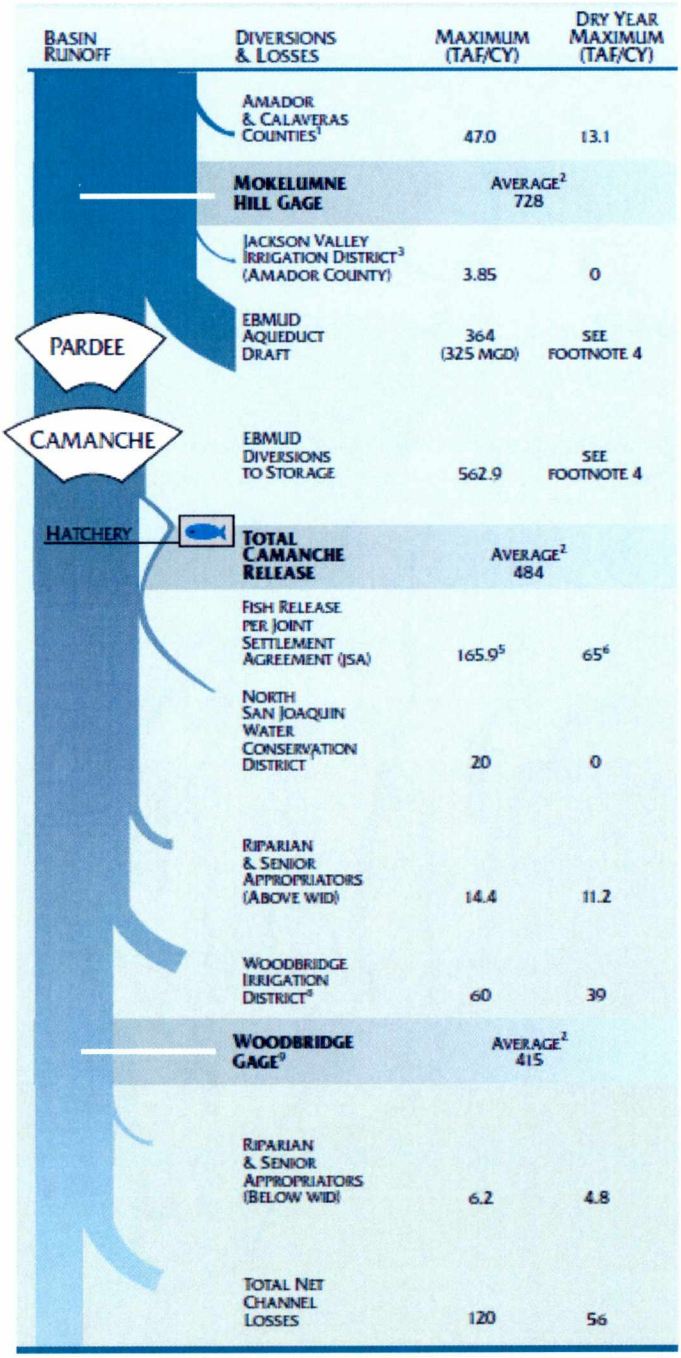


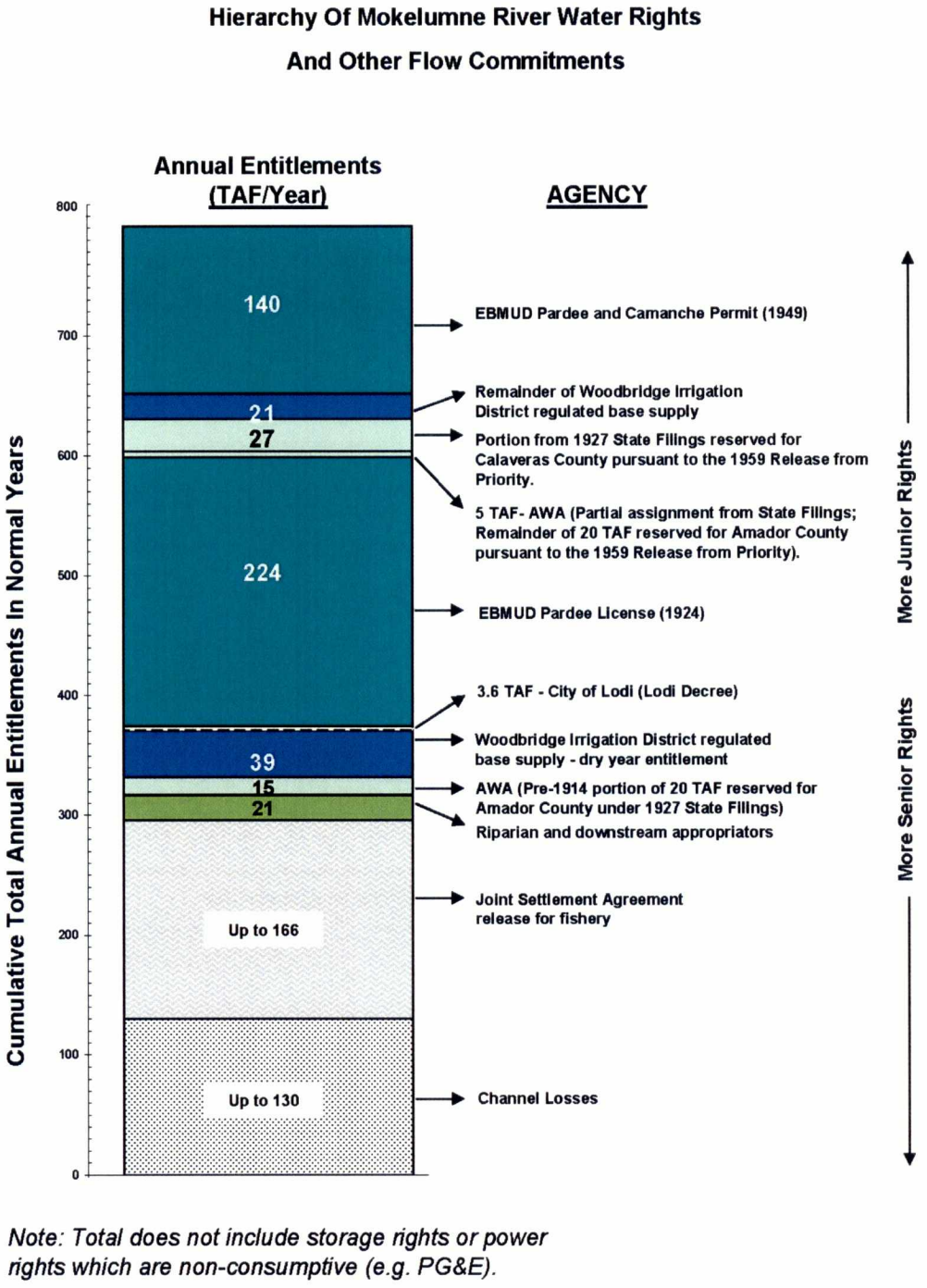
Figure 2-5: Upper Mokelumne River Diversions and Flow



1. Amador County has 15 TAF of pre-14 rights, which could be exercised in dry years if there is sufficient runoff.
2. Average data provided for the various periods of historical record.
3. May be "0" if no water is available under JVID priority or Pardee elevation is below 550 ft.
4. Varies with runoff and storage conditions.
5. Water releases committed by EBMUD to protect fishery per "Normal and Above" water year type under JSA criteria.
6. Water releases committed by EBMUD to protect fishery per "Dry" water year type under JSA criteria. In critically dry years, the minimum releases could be as low as 22.5 TAF.
7. May be "0" if no water is available surplus to EBMUD needs.
8. EBMUD's obligation to release water to the Woodbridge Irrigation District is governed by a series of water rights settlement agreements to a maximum of 60 TAF/yr when inflow to Pardee is greater than 375 TAF.
9. Includes local runoff between Camanche and WID.

Source: EBMUD's Urban Water Management Plan 2015

Figure 2-6: Hierarchy of Upper Mokelumne River Water Rights & Other Flow Commitments



Note: Total does not include storage rights or power rights which are non-consumptive (e.g. PG&E).

Source: EBMUD's Water System Revenue Bonds, Series 2015B (Green Bonds) and Series 2015C (June 2, 2015)

Figure 2-7: Pardee Operations Summary 2010-2014

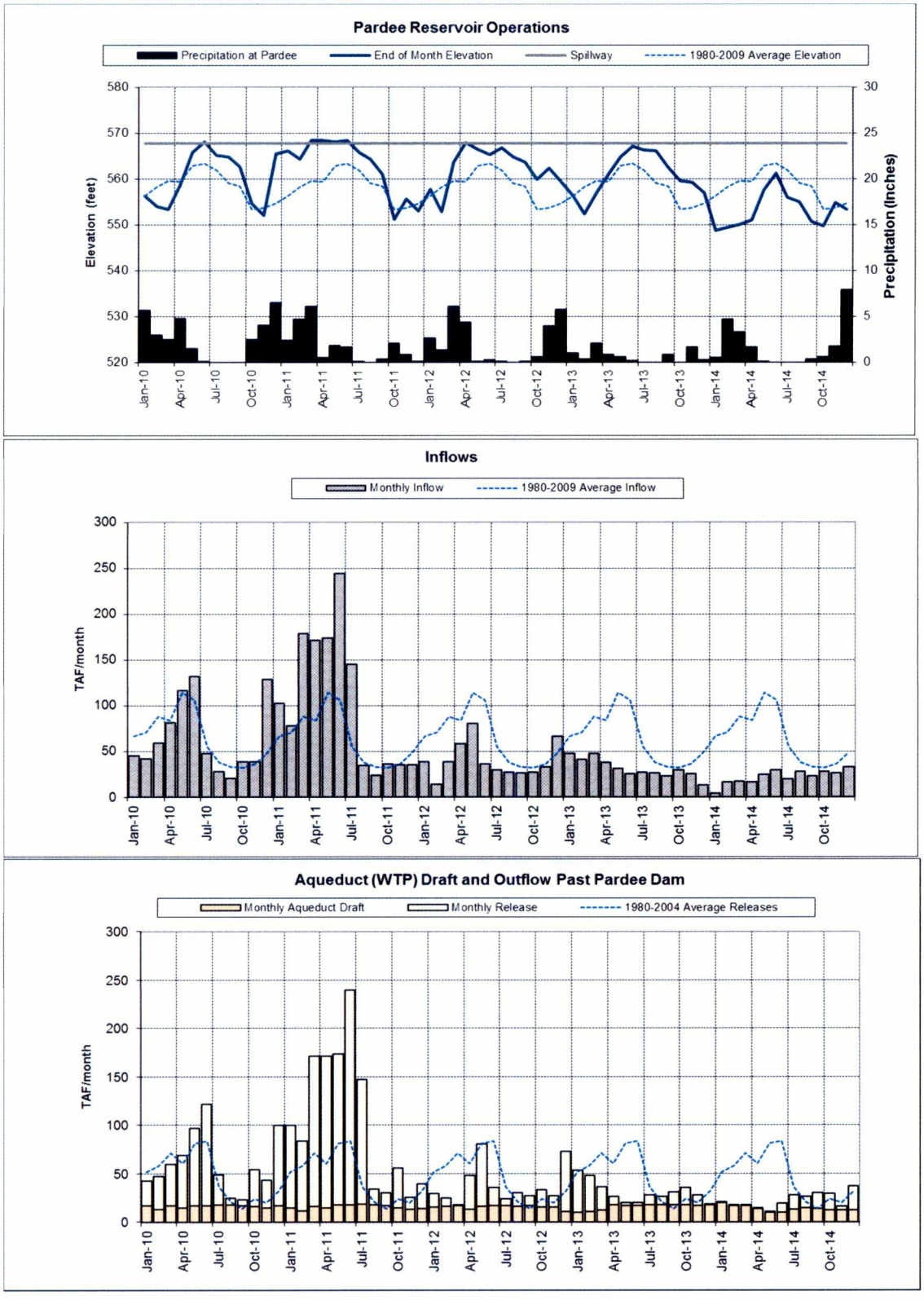


Figure 2-8: Camanche Reservoir Operations 2010-2014

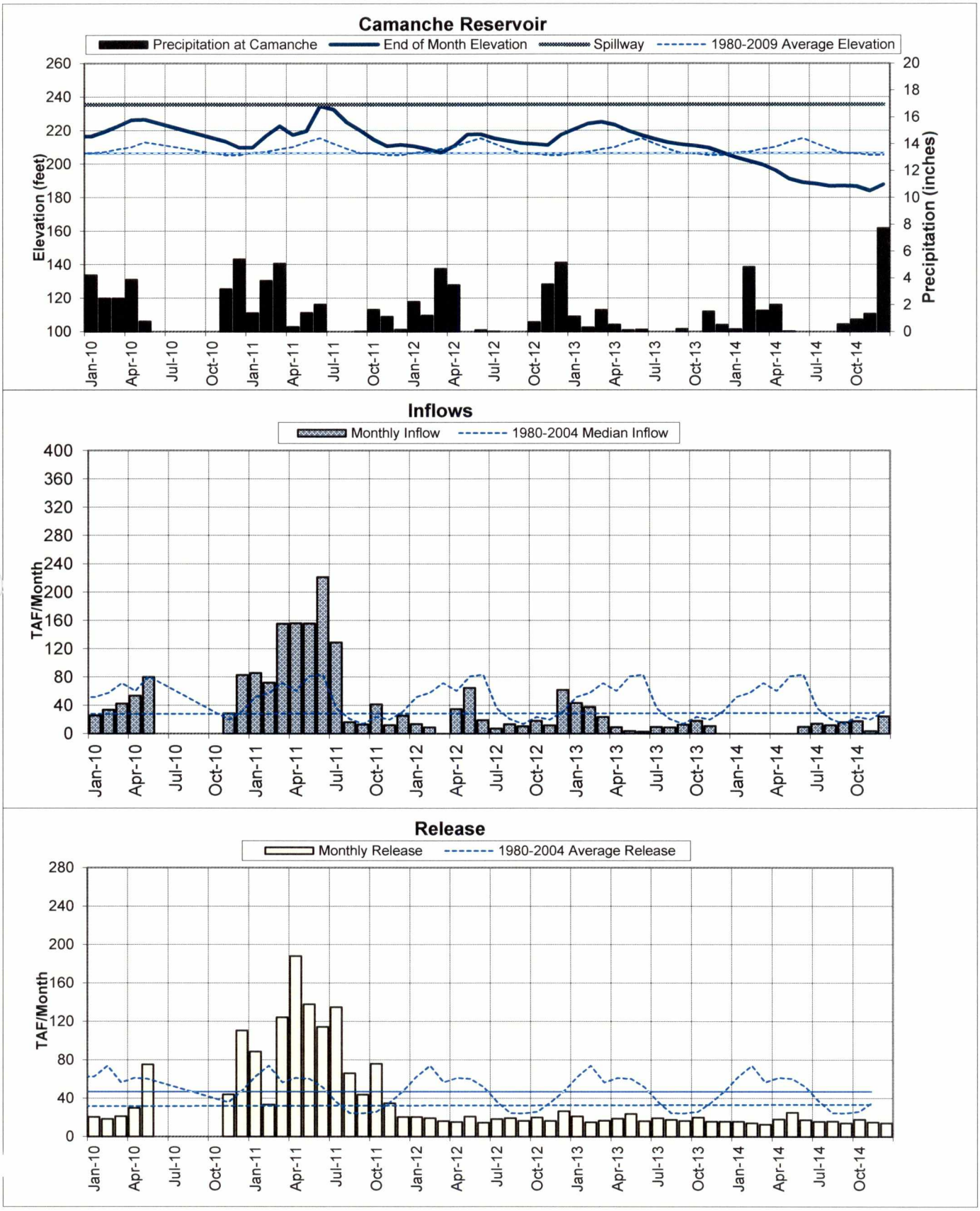


Figure 2-9: Camanche Area Regional Water Supply Project (CARWSP)

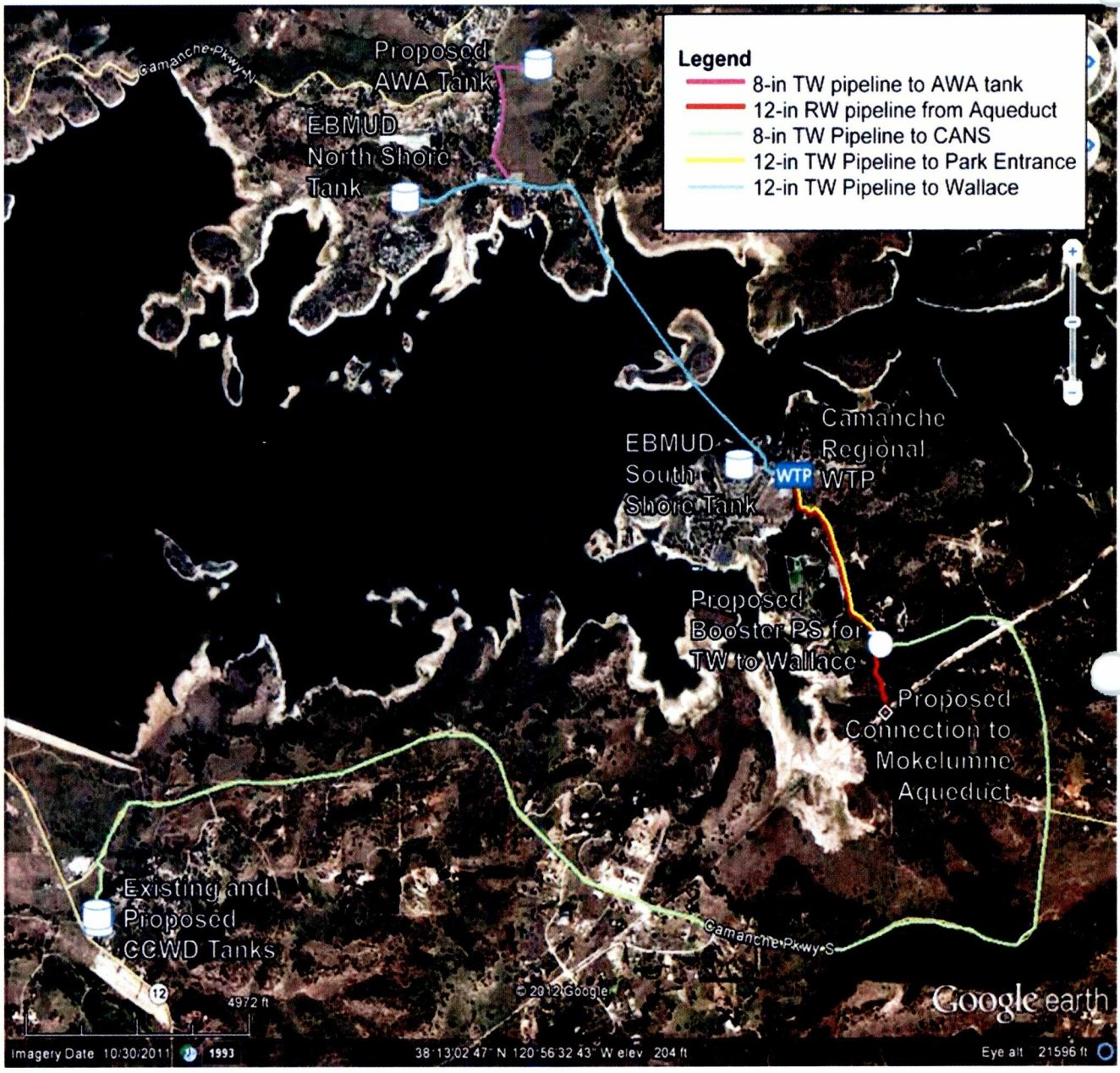


Table 2-1: Projected Demands of Agencies other than the District

Agency	2010	2040
Amador Water Agency	8,155	13,925
Jackson Valley Irrigation District	3,850	2,800
Calaveras County Water District	2,030	2,030
Calaveras Public Utility District	1,299	2,542

Source: Mokelumne Watershed Interregional Sustainability Evaluation (MokeWISE) Program, Final Report, June 2015 http://mokewise.org/docs/MokeWISE%20Final%20Report%20June%202015.pdf

Table 2-2: Upper Mokelumne River and Camanche Watershed Storage Reservoir Summary

Storage Reservoir	Operating Agency	Max Capacity (AF)	Dam Crest Length (ft.)	Type of Structure	Year Storage Began	Drainage Area (sq. mi.)
Upper Blue Lake	PG&E	7,300	837	Earth & Rock Fill	1881	2.7
Lower Blue Lake	PG&E	5,091	1,063	Earth & Rock Fill	1885	4.6
Twin Lake	PG&E	1,207	1,520	Earth & Rock Fill	1898	0.8
Meadow Lake	PG&E	5,656	775	Rock Fill/Gunite Face	1903	5.5
Upper Bear River	PG&E	7,306	1,212	Rock Fill/Gunite Face	1900	28
Lower Bear River	PG&E	52,025	979/865	Rock Fill/Concrete Face	1952	37
Salt Springs	PG&E	141,857	1,257	Rock Fill/Concrete Face	1931	169
Tiger Creek Forebay	PG&E	39	900	Earth Fill	1931	NA
Tiger Creek Regulator	PG&E	533	486	Concrete Slab & Buttress	1931	9
Tiger Creek Afterbay	PG&E	2,607	448	Concrete Arch	1931	357
Lake Tabeaud	PG&E	2,369	636	Earth Fill	1901	0.75
Electra Afterbay	PG&E	40	319	Concrete Gravity	1948	NA
Electra Diversion	PG&E	36	188	Concrete Gravity	1931	NA
Middle Fork (Schaad's)	CPUD	1,700	900	Earth Fill	1939	28.5
Pardee	EBMUD	197,950	1,377	Concrete Arch	1929	578
Camanche	EBMUD	417,120	2,640	Earth & Rock Fill	1963	621

Table 2-3: CANS WTP Well System

	Construction Date	Depth	Well Capacity (varies w/head)
Well #1	Not used		
Well #2	1977	320 ft.	90 gpm max.
Well #3	1979	228 ft.	90 gpm max
Well #4	1997	420 ft.	50 gpm max

Section 3: Watershed Description

Background

The Upper Mokelumne River and Camanche Watersheds lie on the western slope of the Sierra Nevada Mountains in Alpine, Amador, Calaveras, and San Joaquin Counties. The total area of the watersheds is 627 square miles, and extends from Highland Peak (elevation 10,934 feet), near the crest of the Sierras, to Camanche Reservoir (crest elevation 235 feet), located in the lower western foothills near Clements. Over half of the watershed is forested land within the Eldorado and Stanislaus National Forests.

Natural Resources, Upper Mokelumne River Watershed

The 2000 MRWSS contained detailed descriptions of the Upper Mokelumne Watershed geology, soils, vegetation, wildlife, hydrology, general land use, ownership and jurisdictions. This section contains a brief summary of these previous write-ups, and notes any changes. In the hydrology section, graphs have been added to show river flows during the update period compared to historic flows. Summaries of climate data for four upper-basin stations used by the District have also been added.

Location

The Upper Mokelumne River Watershed is composed of the lands above Pardee Dam which drain to Pardee Reservoir. The watershed encompasses 578 square miles in Alpine, Amador, and Calaveras counties. Figure 3-1 depicts the sub-watersheds and hydrologic features. Descriptions of the sub-basins are in discussed under *Drainage Basin* in this section.

Geology

The Upper Mokelumne River Watershed is located in the Sierra Nevada Geomorphic Province and is characterized by three major lithologic groups: Paleozoic metamorphic rocks, granitic rocks of the Sierra Nevada batholith, and Tertiary volcanic rocks. A general geologic map of the watershed can be found in the 2000 MRWSS, page 3-5.

A series of northwest trending faults form a 30- to 50-mile-wide band of rocks that parallels the Sierra Nevada Range. Collectively called the Foothills fault system, the faults can be subdivided into two fault zones - the Bear Mountains and Melones zones. The area has little recent history of fault movement and few seismic events 3.5 or greater with epicenters in the watershed area have occurred since 1910.

Soils

The North, Middle, and South Forks of the Upper Mokelumne River Watershed have shallow-to-deep, medium-textured-to-stony soils. Most have weathered from metasedimentary or granitic rock, and are located in a variety of topographic settings

ranging from ridge tops to steep canyon sides. Soils found in the Main Stem Mokelumne River sub-watershed consist of generally shallow to moderately deep, medium-textured and stony soils. Most are weathered from fractured metamorphic rocks and granite. Deep loamy soils have developed on gently rounded ridges underlain by granitic rocks, on occasional gently sloping table-top ridges underlain by volcanic flow deposits, and on sharp ridges underlain by schists and slates.

Vegetation

The Upper Mokelumne River Watershed features vegetative communities typical of the Sierra Nevada Mountains and foothills. A map of the major vegetative communities in the watershed is provided on page 3-11 of the 2000 MRWSS. A detailed assessment of vegetation communities can also be found Sierra Pacific Industries (SPI) Watershed Assessment (2000).

Ponderosa pine predominates on dry sites between 2,000 and 5,000 feet in elevation. Black oak is abundant in the lower canyons. Mixed conifers are most common in moist areas between 3,000 and 6,000 feet. White fir is the most common coniferous species of northern exposures at the higher elevations. Open annual grasslands, dense oak woodlands, and oak savannah communities are common at the lower elevations. Sub-dominant vegetation types include chaparral and riparian scrub communities. Canyon chaparral, which is limited by the steep, rocky terrain of the canyon walls, includes Mariposa manzanita, buckbrush, and poison oak.

The banks of the Mokelumne River and its perennial tributaries support the bulk of the Upper Mokelumne River Watershed riparian vegetation, although several of the ephemeral tributaries support minor riparian communities. The riparian zones are limited to narrow strips along waterway embankments. Hydrophilic, deciduous trees and shrubs, such as alders, dogwoods, and willows, are typical of the riparian communities.

Wildlife

The Eldorado and Stanislaus National Forests provide habitat for approximately 340 species of wildlife. This total includes 202 bird species, 79 mammal species, 20 fish species, 24 reptile species, and 15 amphibian species. Reptiles, amphibians, birds, fish and mammals of all size ranges are located in the aquatic and upland communities of the Upper Mokelumne River Watershed. Some of the larger mammals include the mountain lion, black-tailed deer, and black bear. Smaller mammals include the western grey squirrel, raccoon, muskrat and brush rabbit.

As documented in the watershed assessment conducted by SPI, 33 wildlife species (seven amphibian and reptile species, 13 bird species, one fish species, five mammal species, and seven invertebrate species) of special status and/or concern potentially occur in the Upper Mokelumne River Watershed. The principal sources consulted for the description of target species -- special status species -- included the California Natural Diversity Database (CNDD); California Wildlife Habitat Relationships; publications by California Native Plant Society; reports on Status of Sierra Nevada and other relevant references. Of the 33 special status wildlife species potentially occurring in Upper Mokelumne River Watershed, ten

species are listed as federal and/or state endangered or threatened species. These endangered or threatened species include the California red-legged frog, bald eagle, great gray owl, willow flycatcher Lahontan cutthroat trout, Sierra Nevada red fox, California wolverine, vernal pool fairy shrimp (two sub-species), and valley elderberry longhorn beetle.

Drainage Basins

The watershed encompasses an area of approximately 578 square miles above Pardee Dam. This area is divided into four sub-basins: the North Fork (370 sq. mi.), Middle Fork (80 sq. mi.), South Fork (79 sq. mi), and the Main Stem (approximately 50 sq. mi). The watershed is approximately 60 miles long, and ranges from 1.5 to 17 miles in width. The North Fork is the major tributary, flowing some 55 miles from its source at the crest of the Sierras to its confluence with the Middle Fork near West Point. Elevations within the North Fork sub-watershed range from 10,430 feet at Round Top Peak to 900 feet at the confluence with the Middle Fork. The Middle Fork of the Mokelumne River flows about 22 miles from its headwaters in Stanislaus National Forest at elevation 7,200 feet to join the North Fork at elevation 900 feet. The South Fork flows about 24 miles from its headwaters in Stanislaus National Forest near elevation 7,000 feet, to its confluence with the Middle Fork about one mile upstream of its confluence with the North Fork at about elevation 1,200 feet. The Main Stem of the Mokelumne River begins 17 miles upstream of Pardee Dam at the confluence of the North and Middle Forks. It flows in a narrow valley, past PG&E's Electra Powerhouse, under Highway 49 near the community of Mokelumne Hill, and into Pardee Reservoir about two miles downstream of the Highway 49 bridge. Elevations within the Main Stem sub-watershed range from 3,012 feet to 570 feet at Pardee Reservoir.

Appendix 3-1 contains two river maps showing approximately river miles above the top of Pardee Reservoir, estimated by EBMUD staff.

Precipitation and Evaporation

Figure 3-1 shows the locations of important climate stations for the Upper Mokelumne River Watershed, including those that make up the 4-Station Average, indicative of rainfall in the watershed: Caples Lake, Salt Springs Reservoir, Tiger Creek Powerhouse, and Calaveras Big Trees. Figure 3-2 shows the 4-Station average total monthly precipitation from 2010 to 2014, along with the historical 1930 through 2014 monthly precipitation average.

Due to the pervasive drought in California, the average annual precipitation during the 2010-2014 period was 41.5 inches, based on the Mokelumne Basin 4-Station average, significantly lower that the historical (1930-2014) average of 47.8 inches. Winter 2010 – 2011 precipitation was higher than average. The total precipitation in calendar years 2013 and 2014 was only 18 and 38 inches respectively.

Winter precipitation above 5,000 feet elevation usually occurs as snow, while at lower elevations precipitation occurs more commonly as rain or sleet. Most of the Middle Fork, South Fork, and Main Stem sub-basin area lies below 5,000 feet elevation. Cumulative seasonal snowfalls above 6,000 feet typically approach 400 inches, with compacted snow depths attaining 100 inches or more at densities varying from 35 to 50 percent water.

Local Runoff and Diversions

Stream flow in the Mokelumne River is modified by upstream diversions and regulated by reservoir storage operations for hydroelectric power generation and water supply as discussed in Section 2. PG&E operates a network of storage reservoirs and diversion facilities on the North Fork. AWA diverts Mokelumne River water from Lake Tabeaud through the Amador Canal and from the Tiger Creek Afterbay. As discussed in Section 2, AWA is planning to phase out the Amador Canal as a raw water conveyance facility and is currently using it only to serve raw water to customers living along the canal. Since 2007, AWA's Amador Transmission Pipeline has connected Lake Tabeaud to Tanner Reservoir. JVID receives water from Pardee Reservoir. CPUD owns and operates Schaads Reservoir on the Middle Fork and diverts water into Jeff Davis Reservoir (2,000 AF capacity of off-stream storage) for treatment and distribution to customers. Figure 3-3 depicts the diversions and storage of Mokelumne River water in the Upper Mokelumne River Watershed.

Section 3 in the MRWSS Update 2000 showed mean monthly flows and exceedance probabilities for the Main Stem, Middle Fork, and South Forks of the Mokelumne River. This information was expanded by plotting flows during the update period, along with historic true natural flows in the Main Stem. These plots are shown in Figure 3-4 along with flows in the Middle and South Forks. Locations of the US Geological Survey (USGS) flow recording stations are shown in Figure 3-1 (USGS 11316670 on the North Fork, 113170000 on the Middle Fork, 11318500 on the South Fork, and 11318500 on the Mokelumne River main stem).

Land Uses

The Upper Mokelumne River Watershed comprises approximately 370,000 acres (578 square miles). The vast majority of this upper watershed consists of open-space and forestland with large tracts of designated wilderness and small concentrations of residential development. There are only very small amounts of agriculture (mainly orchards and vineyards) and a few areas dedicated to recreational development. There are very few areas devoted to industrial or commercial use, mostly along Highway 26 near Mokelumne Hill and West Point. Table 3-1 summarizes the predominant land uses identified within Upper Mokelumne River Watershed. Figure 5-4 complements Table 3-1 by depicting the spatial distribution predominant land uses identified.

Most of the intensely developed areas within the Upper Mokelumne River Watershed are small residential communities. As shown in Figure 5-4, the majority of these areas are located in the lower elevations of the sub-watershed areas of the Middle Fork, South Fork, and Main Stem of the Mokelumne River. The population continues to grow in the counties of Upper Mokelumne River Watershed (Alpine, Amador, and Calaveras). Table 3-2 summarizes both historical and projected watershed populations by county for the decades from 2000 through 2050. Current growth projections vary and are around 1 percent per year over the next 5 years. The county-wide population growth rates may not be representative of growth within the Upper Mokelumne Watershed. Most of the faster-growing areas in Amador and Calaveras counties fall outside the watershed boundaries. Table 3-3 presents an estimate of the total population within the Upper Mokelumne River Watershed based on the

2000 Census GIS dataset overlaid on the watershed boundary. The total population in the watershed in 2000 was estimated at 5,923 persons living in 3,475 homes.

Land Ownership and Jurisdictional Authority

Including the District, six major institutional landowners and 81 major private landowners have been identified in the Upper Mokelumne River Watershed. The major landowners are listed in Table 3-4. Ownership is divided approximately as follows: the District - 3 percent, SPI - 24 percent, BLM - 3 percent, PG&E - 1 percent, US Forest Service (USFS) - 54 percent, and others - 15 percent.

Figure 3-6 shows land ownership in Calaveras County, detailing land owned by Sierra Pacific Industries (SPI), BLM and the US Forest Service. Note that SPI is one of the largest lumber produces in the United States, and that they own a very large band of mid-elevation land encompassing much of the Middle and South Fork watershed land. Figure 3-7 details the Upper Mokelumne Watershed by identifying which parcels are owned by the Eldorado and Stanislaus National Forests, by BLM, and by private corporations or individuals. Although BLM may own a relatively small percentage of the watershed, the parcels are important because they are located right along the Mokelumne River. USFS land is located in the upper elevations in the eastern watershed.

There are approximately 81 private landowners within the Upper Mokelumne River Watershed with more than 160-acre holdings. In addition to these landowners, there are three counties (Alpine, Amador, and Calaveras) and four utilities (AWA, CPUD, CCWD, and JVID) with major jurisdictional authority. Jurisdictional authority is important to the District in managing watershed lands, particularly with the lands which are not owned by the District. Land use controls for water quality protection are an important management technique and are discussed in Section 6.

Natural Resources of the Camanche Watershed

Camanche Watershed is composed of the lands above Camanche Dam and below Pardee Dam that drain toward Camanche Reservoir. The 2000 MRWSS contained detailed descriptions of the Camanche Watershed geology, soils, vegetation, wildlife, hydrology, general land use, ownership and jurisdictions. This section contains a brief summary of information in the 2000 survey, and identifies changes.

Location

The Camanche Watershed is approximately 42 square miles, draining lands to the north and south of the lower Mokelumne River and immediately to the west of Pardee Reservoir. It is bounded on the west by Camanche Dam.

Geology and Soils

The topography of the watershed varies from the gently sloping plain of the eastern San Joaquin Valley to the moderately rolling hills and ridges of the western-most Sierra Nevada foothills. Elevations range from 235 feet above Mean Sea Level (MSL) to about 700 feet

above MSL on the ridge-crests adjacent to Pardee Dam. The most noticeable outcroppings are comprised of Mehrten Formation lahar deposits. This formation generally overlies older sediments. Mehrten Formation generally consists of an upper, soft volcanoclastic layer with interbedded sediments; middle, resistant volcanoclastic unit and a lower unit of light-colored ashy tuff.

Major soil groups in the watershed include well-drained stony clays to stony silt loams; well-drained gravelly to cobbly loams; well-drained clays occupying moderate slopes; relatively young overlying soil deposits consisting of well-developed alluvia with resistant hardpans; and unconsolidated to slightly-consolidated alluvia. Small, valley-side deposits consist of alluvial fans, landslides, and very recent in-channel deposits. All exposed sedimentary rocks and soils are subject to erosion and transport into the reservoir, largely as a function of slope. The presence of vegetation is a major factor in the prevention of erosion. Local sediments are the primary source of inorganic turbidity.

Vegetation and Wildlife

The Camanche watershed vegetation can be classified primarily as blue oak woodland and annual grassland. Blue oak woodland is dominated by blue oaks, commonly forming open savanna-like stands on dry ridges and gentle slopes. Shrubs may be present but are rarely extensive, often occurring on rock outcrops. Associated shrub species include poison oak, California coffeeberry, buckbrush, redberry, California buckeye, and manzanita. Typical understory is composed of annual grassland vegetation such as bromegrass, wild oats, foxtail, filaree, fiddleneck and other non-native annuals. Blue oak woodland usually intergrades with annual grasslands or valley oak woodlands at lower elevations and blue oak-grey pine woodlands at higher elevations.

Annual grasslands are dominated by introduced annual grasses, including wild oats, ripgut grass, foxtail chess, wild barley, and foxtail fescue. Common forbs include broadleaf filaree, redstem filaree, turkey mullein, clover, bur clover, popcorn flower and California poppy.

Blue oak woodlands and annual grasslands in the western Sierra Nevada support numerous species of amphibians, reptiles, birds and mammals. The Camanche watershed provides habitat for about 303 species of wildlife, including 176 bird species, 67 mammal species, 26 fish species, 22 reptile species and 12 amphibian species. The area potentially supports 37 species classified as special status species – 3 invertebrates, 1 fish, 6 amphibians, 2 reptiles, 21 birds and 4 mammals. Those special status species listed as endangered and/or threatened include the vernal pool fairy shrimp, vernal pool tadpole shrimp, valley elderberry longhorn beetle, hardhead, California red-legged frog, California tiger salamander, bald eagle, Swainson's hawk, and bank swallow.

Drainage Basins

The hydrologic drainage pattern of Camanche Watershed was shown in Figure 2-2 in the previous section. All local streams, except Mokelumne, are ephemeral, and the only named streams in clockwise order from Camanche Dam are Rabbit Creek and Camanche Creek. Unnamed streams occupy China Gulch, a draw that passes through the community of Campo Seco, and Chile Camp Gulch.

Precipitation and Evaporation

The District collects monthly precipitation (rainfall) and evaporation data at the District's Camanche North Weather Station. Average monthly rainfall and temperatures are shown on Figure 3-6. Almost 90 percent of the precipitation occurs as rainfall during the months of November through April. Snowfall is extremely rare.

Local Runoff and Diversions

As previously mentioned, the local streams are ephemeral and; therefore, do not carry flows during most of the year. High flows occur only during periods of significant runoff produced by major frontal storms. Total annual runoff volumes are relatively small and are not individually quantified; only aggregate volumes are estimated for the watershed. Based on studies of similar intermittent foothill streams, which are proximate geographically, instantaneous peak flows are expected to be of relatively short duration and approximately two orders of magnitude larger than their mean flows.

No storage reservoirs or natural impoundments other than Camanche Reservoir are present in the watershed except in the northeast corner of the basin. Ten small but permanent ponds and impoundments and at least one ephemeral pond are present in this quadrant. Some of these are connected to the natural drainage courses and some are confined to natural or quarried depressions. Most of these depressions appear to be the products of historical mining and quarrying activities.

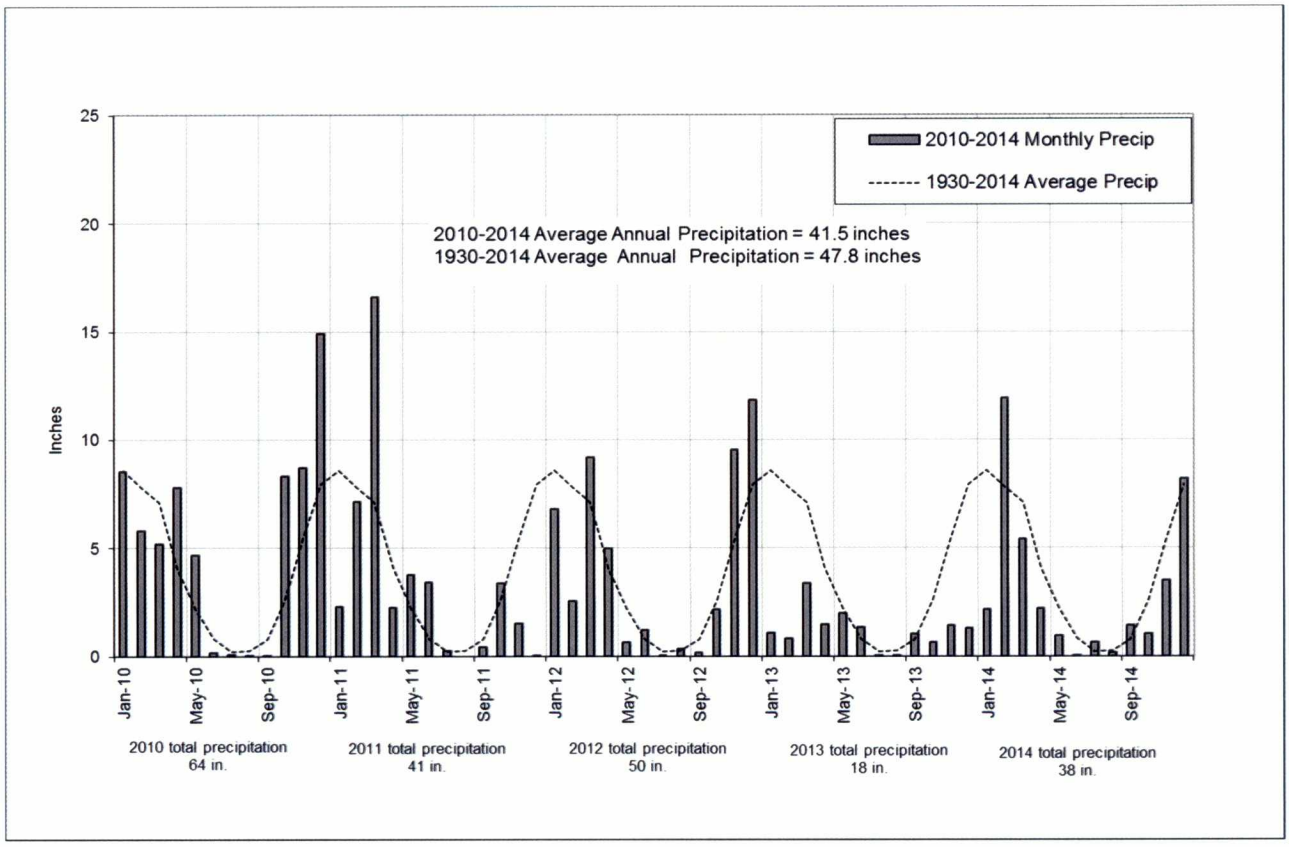
Land Uses

Camanche Reservoir comprises the majority land use within Camanche Watershed (Figure 2-6). The remaining area is comprised of open-space, agricultural areas and localized urban areas adjacent to the District's recreational facilities. The major transportation corridors include Highway 12 and the secondary roads leading to CANS and CASS Recreation Areas.

Land Ownership and Jurisdictional Authority

Including Camanche Reservoir and CANS and South Shore Recreation Areas, the District owns approximately 50 percent of the lands within the Camanche Watershed. The majority of the remaining land is privately owned. A small portion is owned by BLM. The watershed basin encompasses portions of three counties – Amador, Calaveras and San Joaquin.

Figure 3-2: Upper Mokelumne Watershed 4-Stations Average Precipitation



Source: District's Water Supply Engineering Database, which may contain provisional data, and Annual Statistical Reports.

Figure 3-3: Mokelumne River Releases, Diversions, and Losses

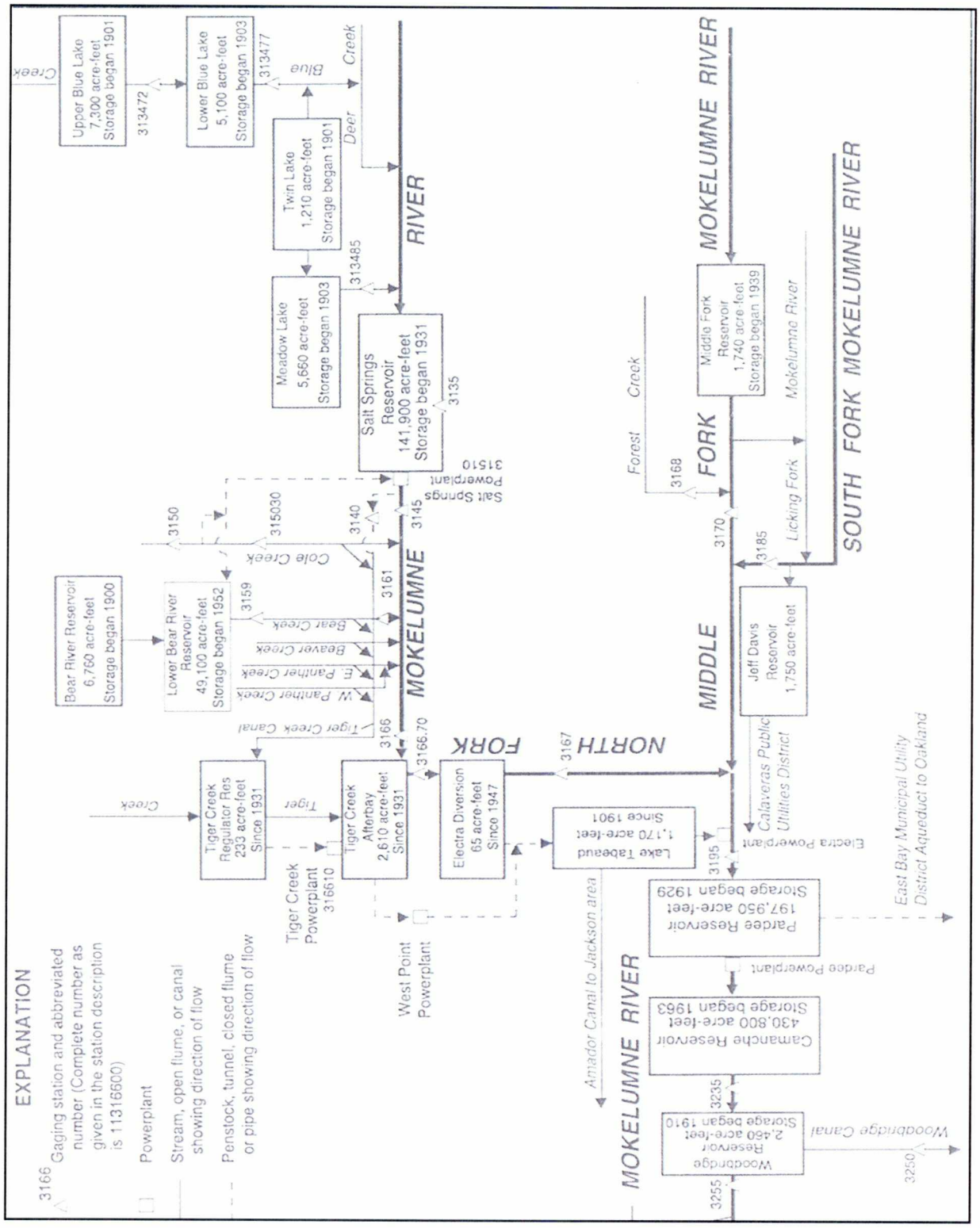
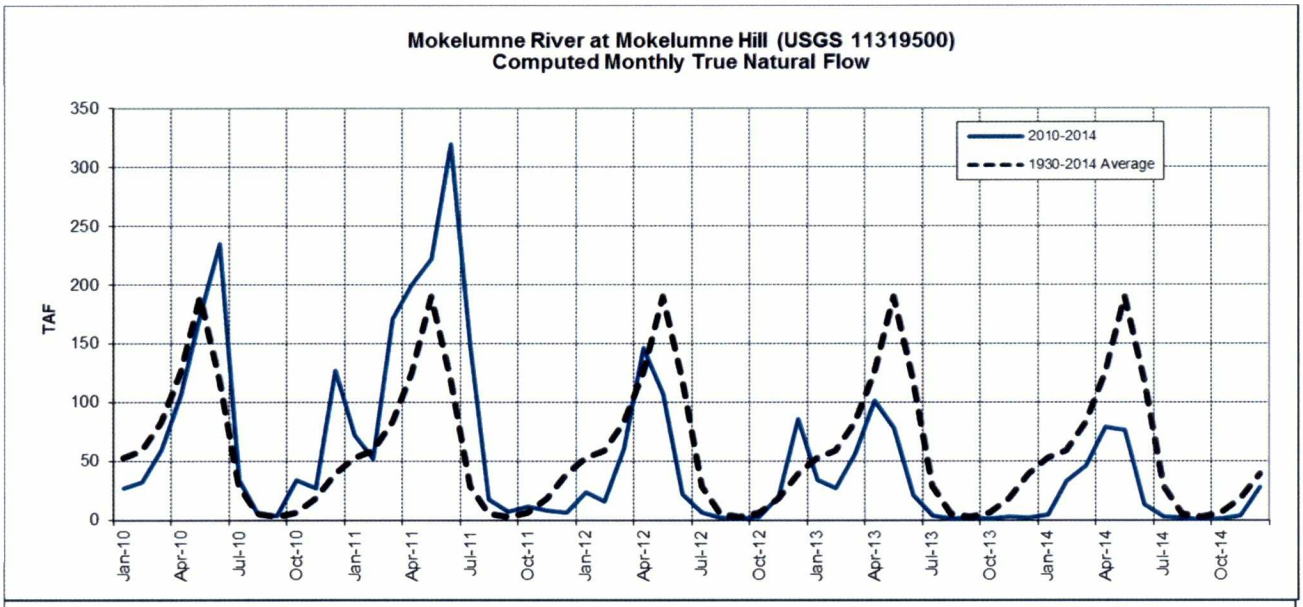
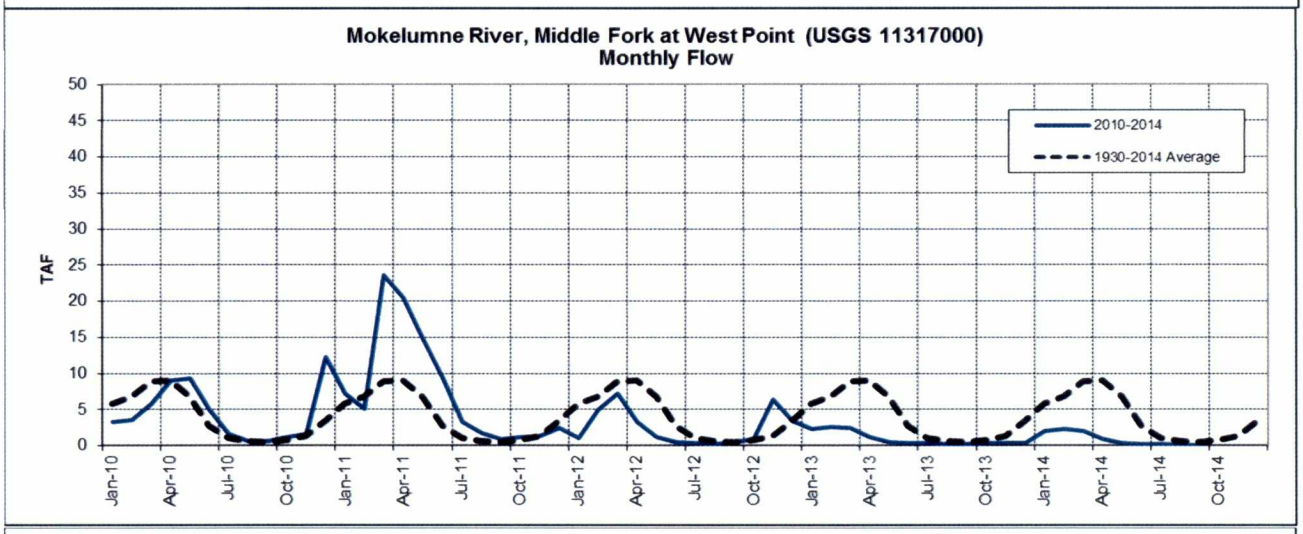
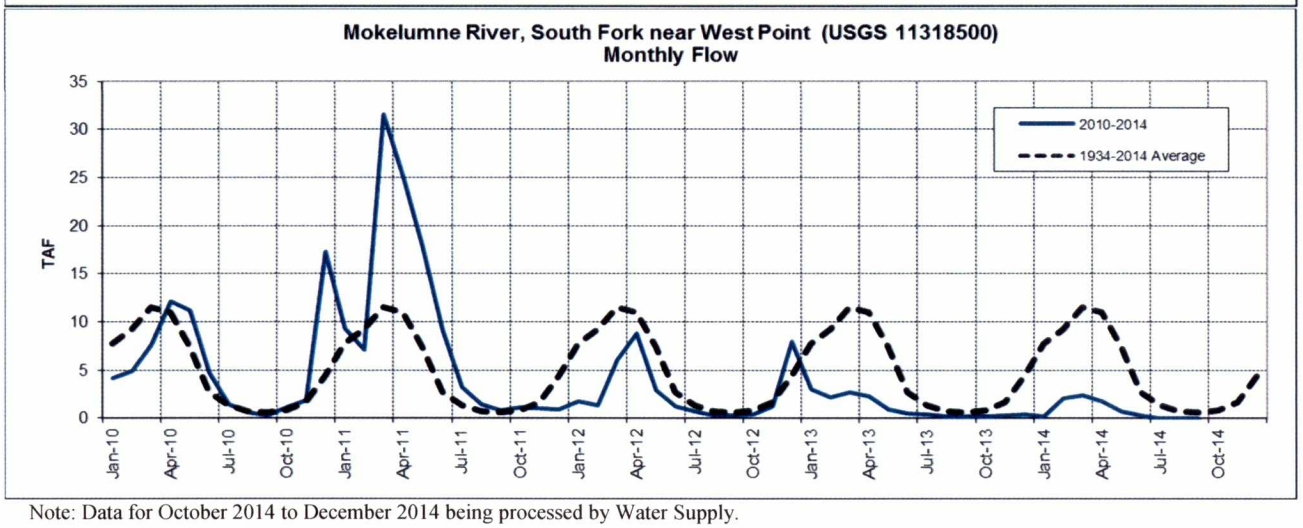


Figure 3-4: Mokelumne Flows 2010-2014







Note: Data for October 2014 to December 2014 being processed by Water Supply.

Figure 3-1: Upper Mokelumne River Watersheds – Climate and Gauging Stations

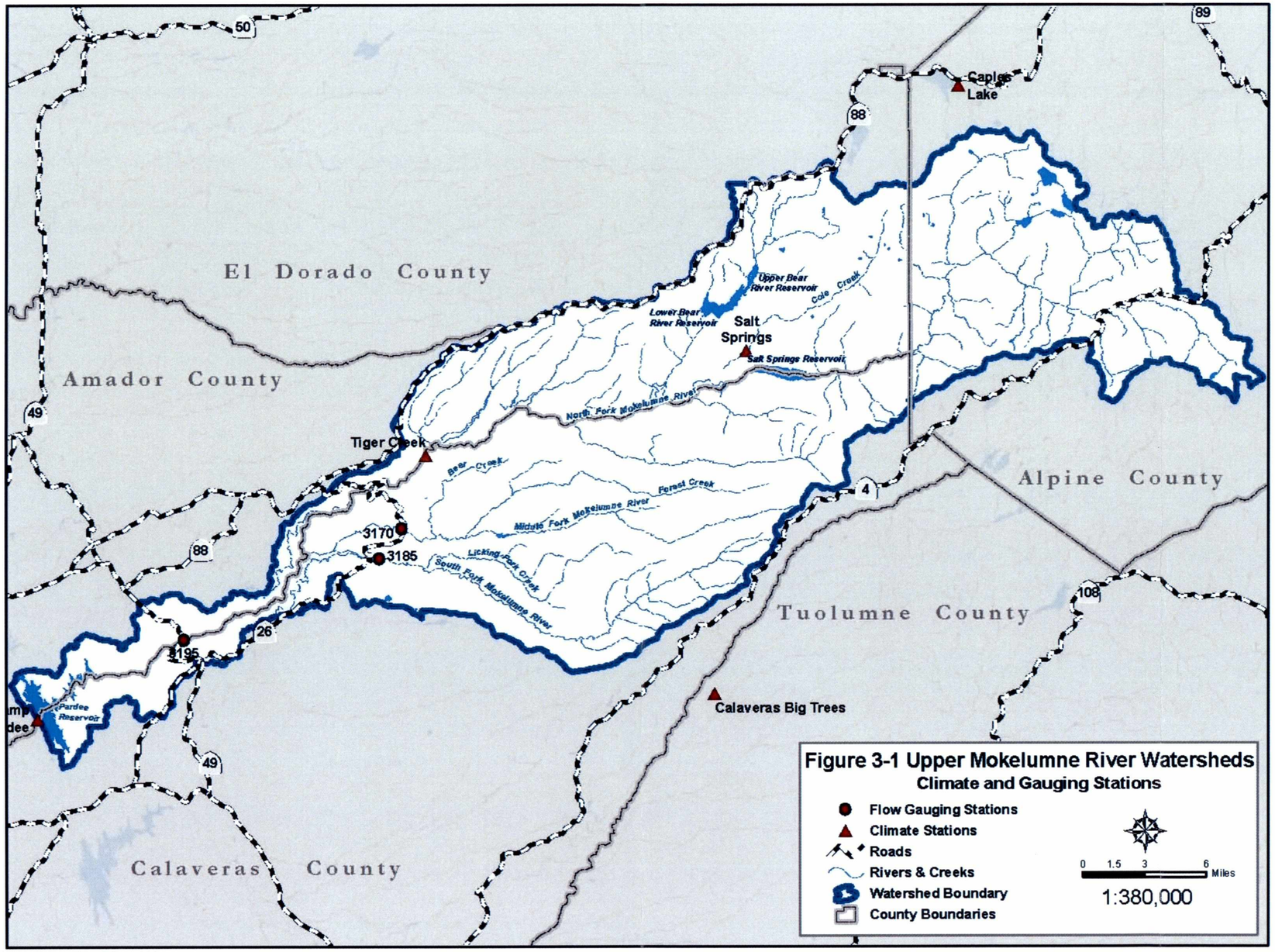


Figure 3-5: Camanche Climate

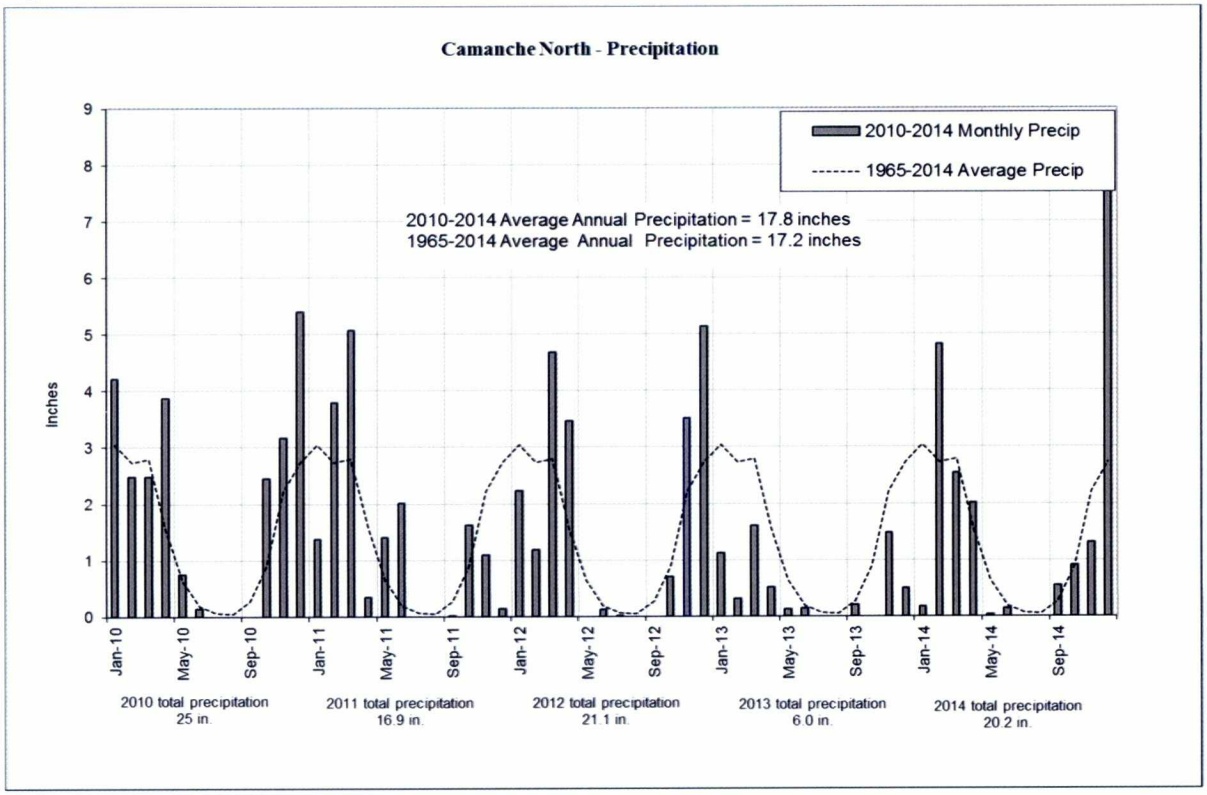


Figure 3-6: Upper Mokelumne River Watershed Land Ownership

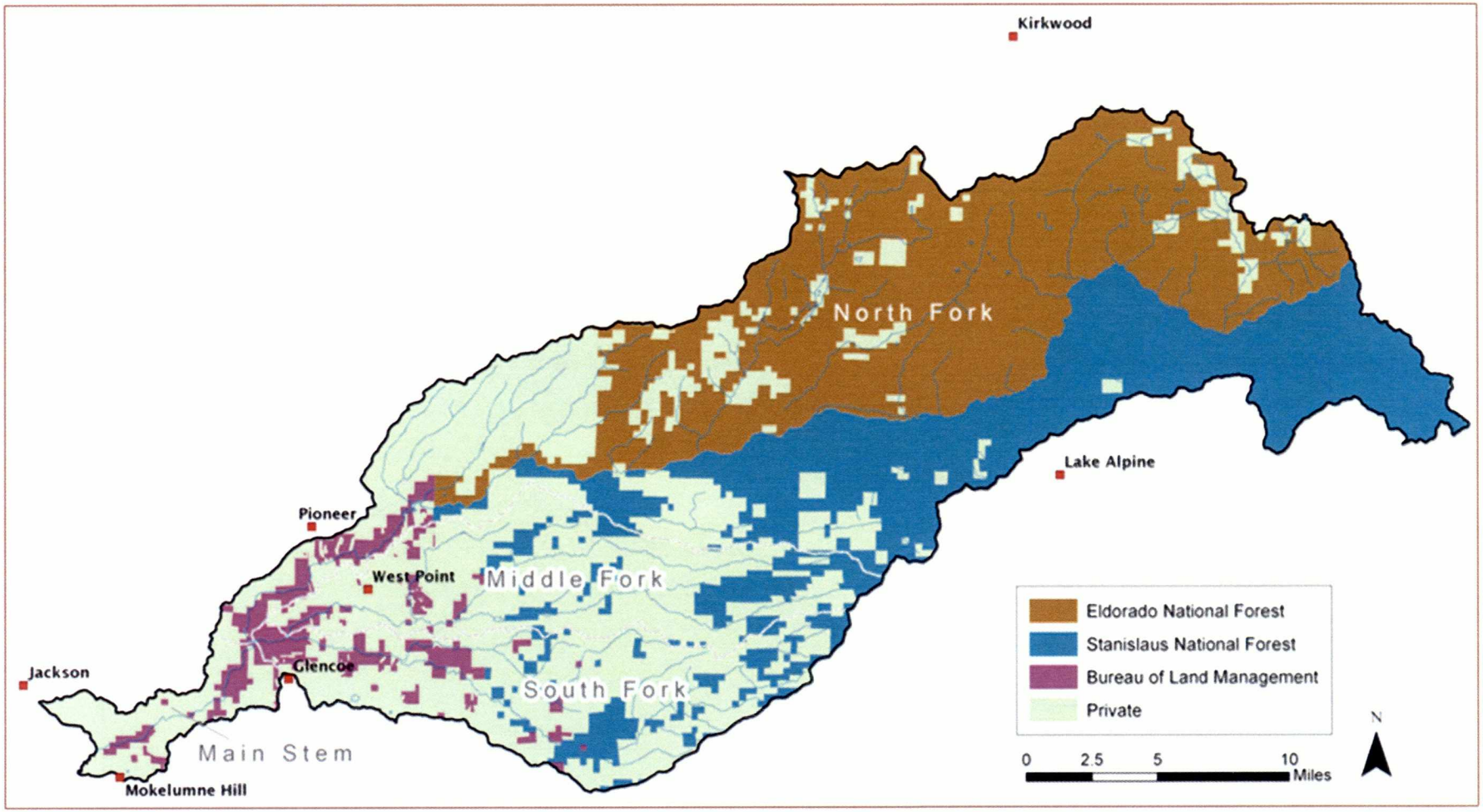


Figure 3-7 Land Ownership in Calaveras County

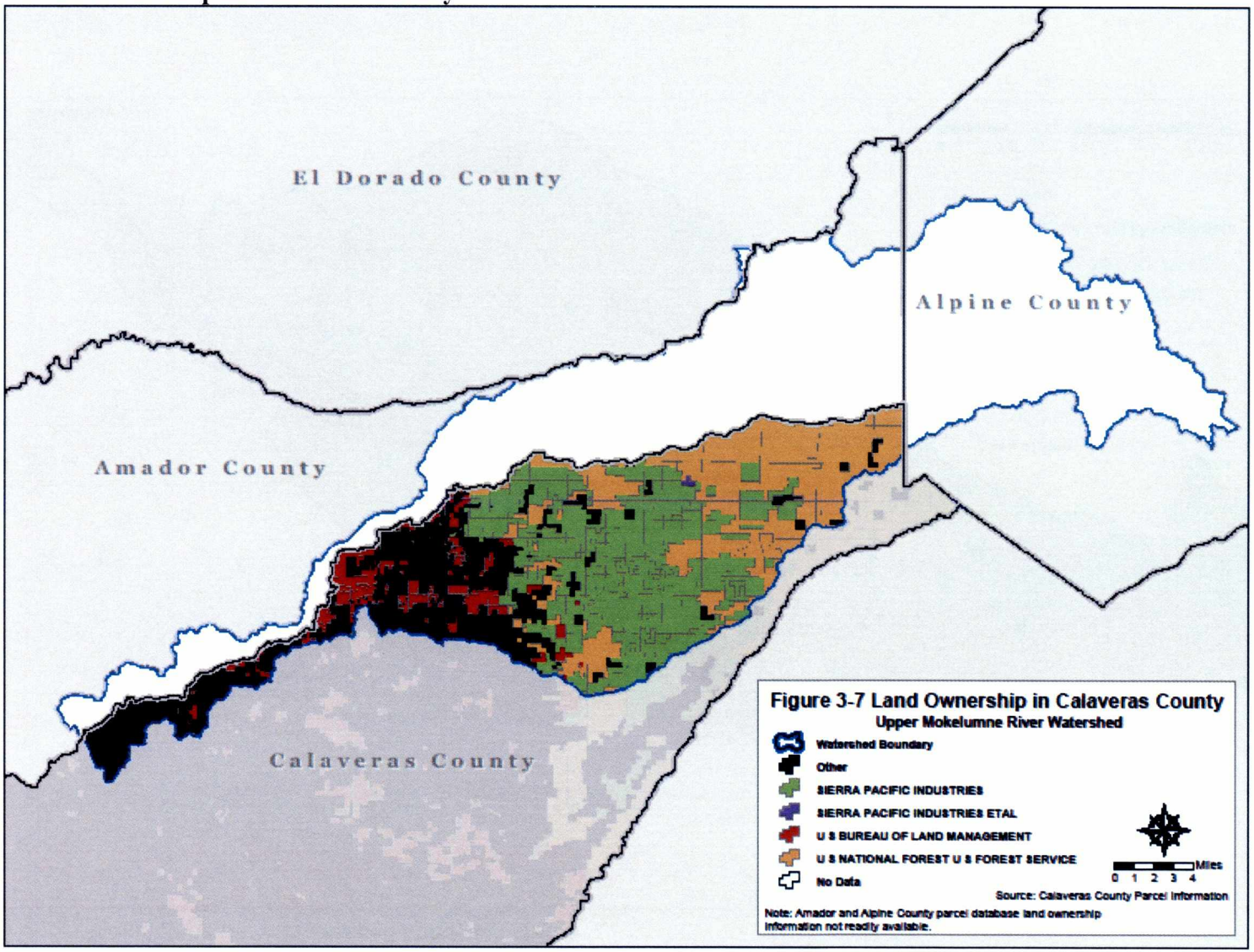


Table 3-1: Land Use in the Upper Mokelumne River Watershed

Land Use	Acres	Percent
Open Space[1]	241,350	65.58
Production Forests	121,000	32.88
Residential[2]	2,600	00.71
Large Lot Residential[3]	1,500	00.41
Agriculture[4]	800	00.22
Recreation	400	00.11
Industrial	220	00.03
Commercial	130	00.03
Total	368,000	100.00

NOTES:
[1] Open space: Wilderness areas managed upper watershed, grazing land.
[2] Residential: Building lots less than 5 acres.
[3] Large lot residential: Building lots 5 to 40 acres.
[4] Does not include grazing.

Table 3-2: Population Projections by Decade for Each Upper Mokelumne River Watershed County

Current Census data from California Department of Finance:

		Projections					
County	2010	2015	2020	2030	2040	2050	2060
Alpine	1,233	1,252	1,296	1,328	1,249	1,149	1,058
Amador	38,487	37,178	39,108	41,840	43,165	42,593	42,906
Calaveras	45,654	45,923	48,957	53,317	55,881	56,501	58,023

Projections Prepared by Demographic Research Unit, California Department of Finance, December 2014

Projections from 2000 MRWSS Update:

County	1980	1990	2000	2010	2020
Alpine	1,100	1,200	1,400	1,700	2,000
Amador	19,300	30,600	42,500	56,100	70,500
Calaveras	21,000	32,500	54,400	78,200	102,200

Table 3-3: Estimated Populations and Number of Homes within the Upper Mokelumne River Watershed

Sub-watershed	Population	Number of Homes
North Fork	1,825	1,320
Middle Fork	1,686	924
South Fork	855	499
Main Stem	1,557	732
Total	5,923	3,475

Source: 2000 Census data and GIS analysis

Table 3-4: Major Landowners in the Upper Mokelumne River Watershed

Sub-Basin	BLM	District	PG&E	SPI	USFS	Other	Total
Main Stem	216	11,344	0	0	55	5,763	16,432
North Fork	3,840	0	5,319	35,706	183,420	19,924	249,154
Middle Fork	1,853	0	0	26,481	8,735	13,109	50,177
South Fork	5,620	0	0	24,037	6,790	14,956	51,403
Total Acres	**11,528**	**11,344**	**5,319**	**86,224**	**198,999**	**53,751**	**367,166***
% of Total Upper Watershed	3.1%	3.1%	1.4%	23.5%	54.2%	14.6%	100.0%

* Compiled from Amador and Calaveras County Parcel data, 2005. Gaps in data yield a smaller acreage (less than 1 percent) than the actual watershed.
File: LandOwnerAcres.xls

Note: This 2005 division of land between the Main Stem and the North Fork is approximate. 2015 update combined District acres and listed as all on the Main Stem.

Section 4: Water Quality

Introduction

This section is a summary of raw water quality monitoring programs and sample results from 2010 through 2014 for the Camanche and Pardee Watershed areas. Raw water is monitored in the Upper Mokelumne River as well as in Pardee and Camanche Reservoirs. As part of the evaluation of the District's source water, raw water quality parameters are compared to the drinking water standards.

A general evaluation of the District's WTPs was conducted with regard to meeting drinking water regulations, including performance standards, monitoring requirements, and operating criteria. The District has six WTPs directly treating surface water from the Upper Mokelumne River. Three of these WTPs serve small systems (less than 10,000 people served) and three of the WTPs serve large systems (greater than 10,000 people served). The three small system WTPs include: Pardee Center, Pardee Recreation and Camanche South Shore WTPs. The three large system WTPs are the Walnut Creek, Lafayette, and Orinda WTPs in the East Bay. Sobrante and USL WTPs are discussed in the EBWSS 2015 Update. Camanche North Shore WTP uses only groundwater supplies and so is not evaluated in this MRWSS update.

Drinking Water Regulations

Table 4-1 is a summary of major Federal and State drinking water regulations.

Water Quality Monitoring Programs

The District conducts several water quality monitoring programs on the Mokelumne River and its tributaries, as well as at Pardee and Camanche Reservoirs. These monitoring programs are for regulatory compliance, water rights, environmental assessment, and water supply objectives. The District also monitors general water quality parameters throughout the reservoirs to assist staff in managing reservoir operations and water treatment issues.

Constituents regulated by Title 22 as well as other minerals and nutrients are addressed in this section by site (watersheds and reservoirs) and then by category – microbial constituents, inorganic chemicals, synthetic organic chemicals, volatile organic chemicals, and radionuclides.

The data summarized herein were collected between January 2010 and December 2014, and were analyzed by laboratories certified by SWRCB-DDW Environmental Laboratory Accreditation Program for those parameters. The data also includes results of field samples measured by certified water treatment or distribution operators using calibrated instruments, and data from on-line water quality analyzers archived in the District's SCADA system. Raw and treated water quality data are compared with corresponding treated water quality

Table 4-1. Summary of Major Federal and State Drinking Water Regulations

Regulation	Year of Promulgation	Number of Contaminants	Targeted Contaminants
National Interim Primary Drinking Water Regulations (NIPDWR)	1975-1981	7	Trihalomethanes, Arsenic, Radiologicals
Phase I Standards	1987	8	VOCs
Phase II Standards	1991	36	VOCs, SOCs, and IOCs
Phase V Standards	1992	23	VOCs, SOCs, and IOCs
Surface Water Treatment Rule	1989	5	Microbiological, Turbidity
Total Coliform Rule (TCR)	1989	2	Microbiological
Lead and Copper Rule (LCR)	1991/2003[1] 2000, 2007[2]	2	Lead and Copper
Drinking Water Source Assessment and Protection Program	1996	-	Source Water Protection
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	4	Radionuclides
Arsenic MCL	2001/2008[1]	1	Arsenic
Filter Backwash Recycling Rule	2001/2007[1]	-	Microbiological, Turbidity
Long Term 1 ESWTR	2002	2	Microbiological and Turbidity, Systems <10,000
Stage 2 D/DBP Rule	2006/2012[1]	9	DBPs
Long Term 2 ESWTR	2006/2013[1]	1	*Cryptosporidium*
Unregulated Contaminant Monitoring Rule 2	2006	25	Chemical, Microbiological
CA Public Notification Requirements	2006	None	None
CA Secondary Drinking Water Standards	2006	25	Aesthetics
CA Perchlorate MCL	2007	1	Perchlorate
Contaminant Candidate List 2	2008	11	Chemical
CA Waterworks standard	2008	None	None
Endocrine Disrupters Screening Program	2009/2010	73	Endocrine Disrupters
Contaminant Candidate List 3	2009	104	Chemical, Microbiological
CA Notification Levels	Ongoing	54	IOCs, VOCs, SOCs
Unregulated Contaminant Monitoring Rule 3	2012	30	Chemical and Biological
Revised Total Coliform Rule	2012	3	Microbiological
Hexavalent Chromium MCL	2014	3	Hexavalent Chromium

[1]California Adoption of Federal Rule
[2]LCR Minor Revisions and LCR Short-Term Revisions

regulatory standards. Often the actual method detection limit (MDL) of analysis was less than the regulated DLR, and the results are reported in this document as detected. For each parameter, if more than fifty percent of sample results were less than the MDL, the median is stated as non-detect (ND).

Title 22 Monitoring Program

California Code of Regulations Title 22 is a compilation of rules and regulations that addresses human health and safety issues. The Environmental Health section includes drinking water standards, reclamation criteria, and hazardous waste. Chapters 15 and 17, the Domestic Water Quality and Monitoring chapter (which deals with drinking water standards and monitoring requirements) and the Surface Water Filtration and Disinfection Treatment chapter, have the most relevance to WSS requirements.

The water quality constituents for Title 22 compliance are addressed by category: VOCs, SOCs, fluoride, asbestos, nitrates and nitrites, inorganic chemicals, general mineral and general physical; and radiological.

In accordance with Title 22 requirements, the District prepares an Annual Water Quality Report – also known as a Consumer Confidence Report (CCR) - that summarizes the water quality conditions being supplied to District consumers. Appendix 4-1 contains the District's CCRs for Pardee Center, PARA, CASS, Walnut Creek, Lafayette and Orinda WTPs.

Special Studies

In addition to Title 22, the District conducts several water quality monitoring programs on Pardee and Camanche Reservoirs and the Upper Mokelumne Watershed for water rights, environmental assessment, and water supply objectives. The District evaluates general water quality throughout the reservoirs to assist staff in managing reservoir operations and water treatment issues. Water quality monitoring of watershed tributaries provides insight to changes in water quality. Special stormwater monitoring studies also help the District evaluate best land management practices. Descriptions of the monitoring programs that pertain to the raw water quality of Pardee and Camanche Reservoirs are presented in the following sections.

Reservoir Limnological Profiling

The District periodically monitors reservoir water quality conditions at several locations in Pardee and Camanche Reservoirs using a YSI vertical profiler. The water quality parameters (temperature, pH, dissolved oxygen, specific conductance, and oxidation reduction potential) are analyzed by depth. Field conditions and turbidity measurements are recorded as well. This information is analyzed and reviewed on an as-needed basis to assist the District's water supply and treatment operations. The reservoir profile data is not included in this WSS.

Upper Mokelumne River Monitoring

The District also monitors water quality at several stations along the Upper Mokelumne River and its main tributaries upstream of Pardee Reservoir. The purpose of this monitoring

program is to develop a long-term record of water quality conditions to establish a baseline and to monitor long-term trends for turbidity, total coliform, *E. coli*, *Cryptosporidium*, *Giardia*, TOC and dissolved organic carbon (DOC), metals, nutrients, and other parameters.

Stormwater Monitoring

In 2006, the District began work with local ranchers to evaluate BMPs on Pardee Watershed to minimize the risk of *Cryptosporidium* entering the reservoirs. The BMPs included the removal of livestock during the wet-weather season (referred to as "dry grazing"), and/or exclusion of very young cattle (less than four months of age) from direct contact with streams and creeks. To evaluate the effectiveness of the BMPs, a stormwater runoff monitoring plan was developed and implemented in the fall of 2006 for the Briones and Pardee Watersheds.

During the winters of water years beginning in 2007, the District sampled stormwater runoff at a total of ten locations in the Pardee Watershed. While the study suggests that the BMPs for dry grazing improve water quality, compared to year-round grazing, it does not provide information to quantify the significance of the BMP in overall reservoir water quality protection or risk reduction. The watershed monitoring program was discontinued in 2012.

Penn Mine

Penn Mine is an abandoned copper and zinc mine in the Camanche Watershed, a potential contaminant source discussed at length in Section 5. The District has worked for many years to protect Camanche Reservoir and the Lower Mokelumne River, including construction of a landfill onsite for mine waste.

In accordance with Title 27 of the California Code of Regulations and the *Penn Mine Landfill Post-Closure Operations and Maintenance Plan* (TRC, 1999), the District conducts groundwater monitoring at four wells around the landfill. Based on the results of monitoring and site inspections performed from 2000-2014, there is no evidence of release of landfill leachate to groundwater. The District will continue to perform groundwater sampling and analysis and landfill inspections and submit bi-annual reports to the SWRCB. The 2014 bi-annual report is included in Appendix 4-2.

Since restoration was completed, the District has also monitored the water quality of surface water runoff from the site for metals, TDS, turbidity, and pH. Given that the site has been restored for over ten years, the District discontinued the surface water monitoring in 2010.

Raw Water Quality Monitoring Locations

The sampling locations in Pardee and Camanche Reservoirs are mapped in Figure 4-1 and listed in Table 4-2a. The District also monitors water quality at several sampling locations along the Upper Mokelumne River and its main tributaries upstream of Pardee Reservoir, as mapped in Figure 4-2 and listed in Table 4-2b.

Figure 4-1. Pardee and Camanche Reservoir Monitoring Stations

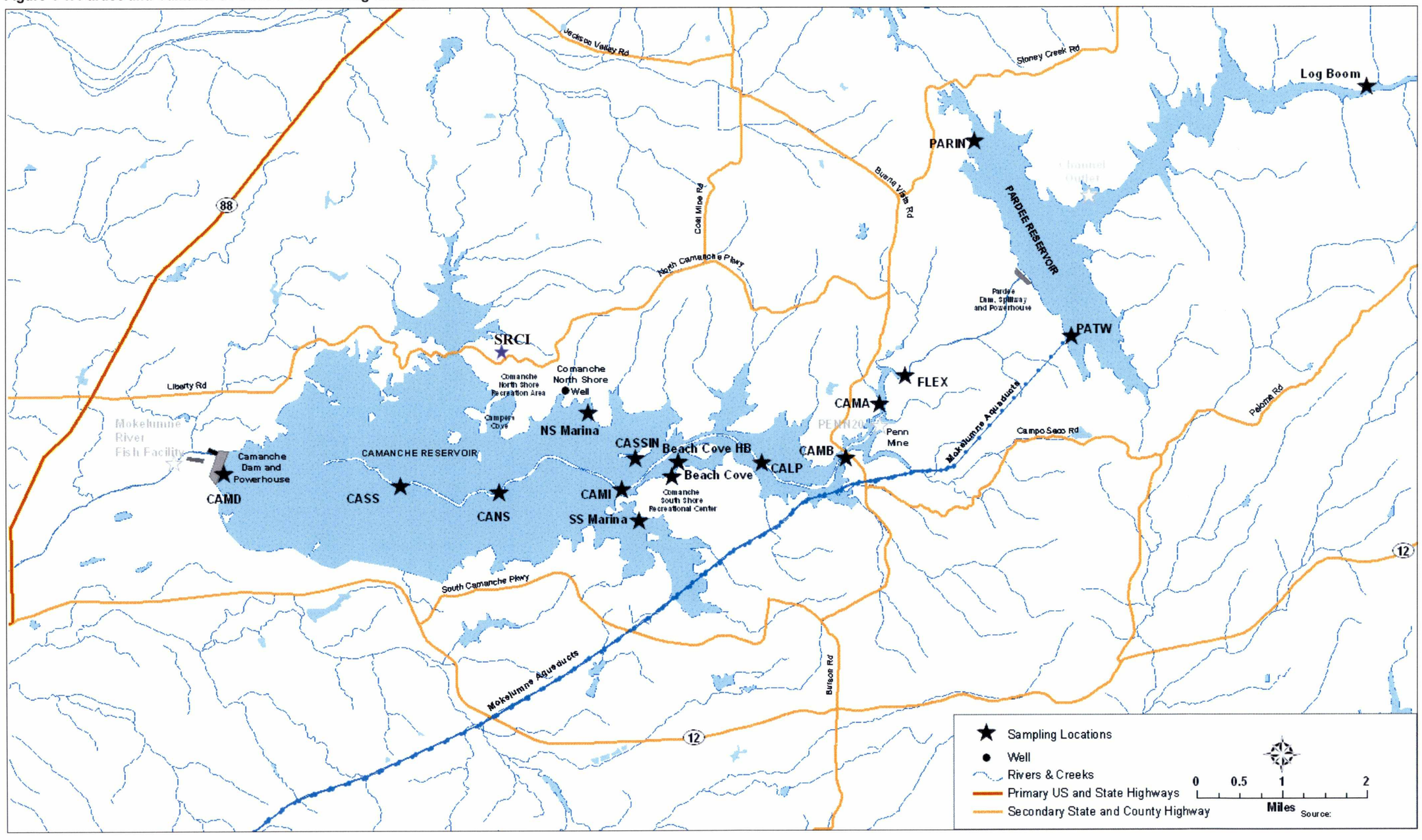


Figure 4-2. Upper Mokelumne River Watershed Monitoring Stations

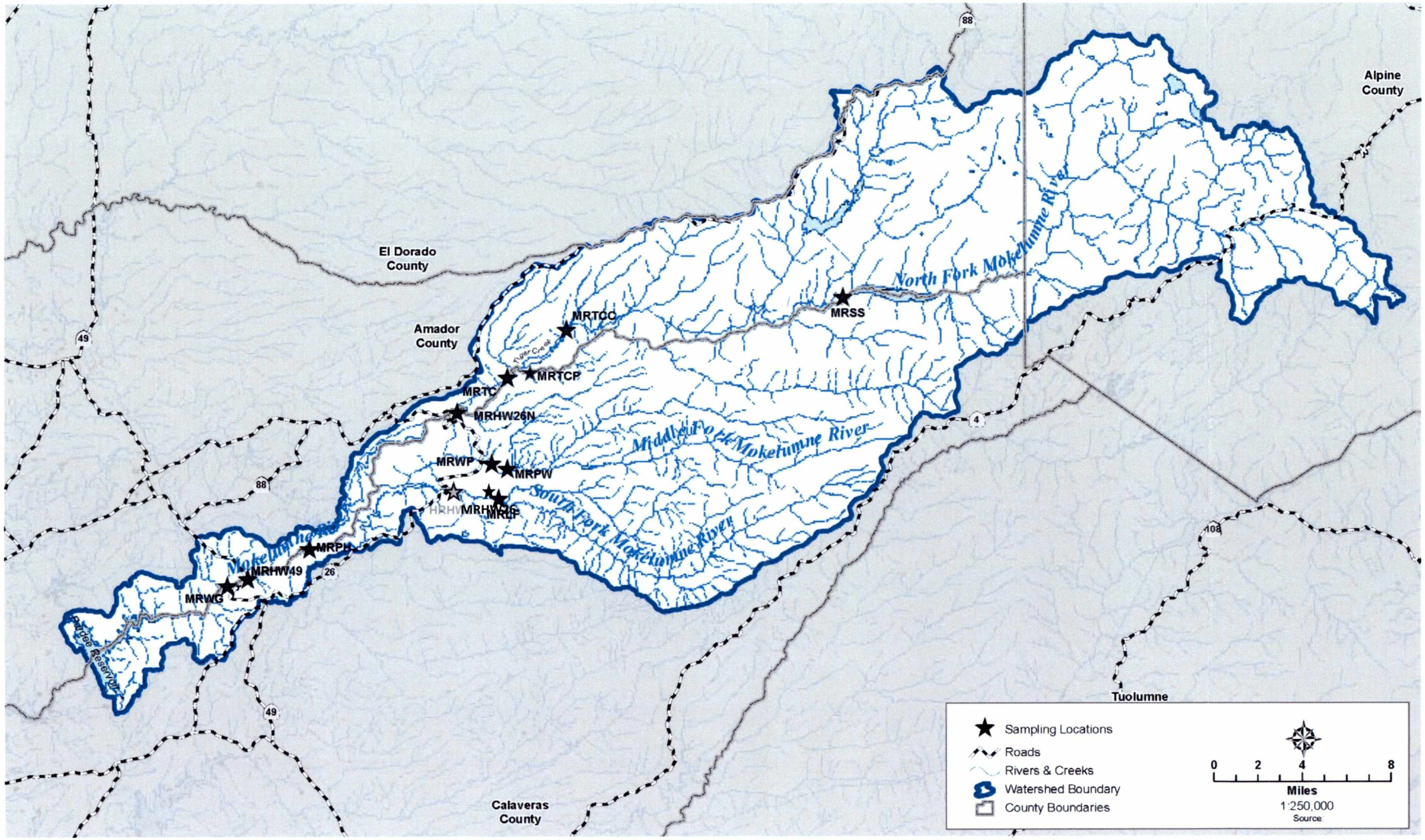


Table 4-2a. Pardee and Camanche Reservoir Monitoring Stations

Sampled 2010 - 2014

Station	Description
Pardee Reservoir	
PATW	Pardee Outlet Tower (all
Pardee Center WTP	
PACIN	Raw water influent to plant
Pardee Recreation Area WTP	
PARIN	Raw water influent to plant
Mokelumne Aqueduct	
Tunnel	Tunnel at shaft pump

Station	Description
Camanche Reservoir	
CAMA	Mokelumne Arm 1/4 mi above Penn Mine
Beach Cove	Cove near beach at Cam. South Shore Rec. Area
Beach Area HB	At handicap boat ramp at Cam. South Shore Rec. Area
SRCI	Rabbit Creek Arm inlet surface north of Camanche Parkway
Camanche South Shore WTP	
CASSIN	Raw water influent to plant

Sampled prior to 2010

Station	Description
Pardee Reservoir	
Log boom	Moke. Channel at logboom
PAMA	Pardee Marina
PAR Intake	Reservoir at Pardee Rec. Area WTP Intake
PADA	Pardee Reservoir at dam
PATW	Pardee Outlet Tower
Pardee Center WTP	
PACIN	Raw water influent to plant
Pardee Recreation Area WTP	
PARIN	Raw water influent to plant
Mokelumne Aqueduct	
Tunnel	Moke. Aqueduct at tunnel (before chemical addition)
Camanche South Shore WTP	
CASSIN	Raw water influent to plant

Station	Description
Camanche Reservoir	
Flex	At merge btw Moke R and Camanche Res
CAMA	Mokelumne Arm 1/4 mi above Penn Mine
CAMB	Mokelumne Arm 1/4 mi below Penn Mine
CALP	At Lancha Plana Bridge
CAMI	At Old Camanche Bridge
Beach Cove	Cove near beach at Cam. South Shore Rec. Area
Beach Area HB	At handicap boat ramp at Cam. South Shore Rec. Area
CASS Intake	Reservoir at Cam. South Shore WTP Intake
NS Marina	Near marina at Cam. North Shore Rec. Area
SS Marina	Near marina at Cam. South Shore Rec. Area
CANS	West-central portion of reservoir
CASS	East-central portion of reservoir
CAMD	Camanche Res at Dam

Table 4-2b. Mokelumne River and Tributary Monitoring Stations

	Description
North Fork Mokelumne River	
MRTC	North Fork Mokelumne River, downstream of the confluence with Tiger Creek.
MRHW26	
MRHW26N	North Fork Mokelumne River immediately upstream of Highway 26 bridge, at end of PG&E kayak take-out path. This station has been monitored in lieu of MRTC since October 2006.
Middle Fork Mokelumne River	
MRPW	Middle Fork Mokelumne River upstream of Wilseyville (CCWD) pump station, approximately 1 mile upstream of Highway 26 crossing.
MRWP	Middle Fork Mokelumne River at West Point at Highway 26 crossing.
South Fork Mokelumne River	
MRLF	South Fork Mokelumne River at Railroad Flat Road crossing, approximately 1/4 mile upstream of Licking Fork confluence.
Mokelumne River (main stem below confluence of forks)	
MRPH	Mokelumne River approximately 1/2 mile downstream of Electra Powerhouse at PG&E day use recreation area.
MRHW49	Mokelumne River at Highway 49 bridge crossing.
MRWG	Wilson Gulch approx. 100 yards upstream of where it drains to the Mokelumne River. Wilson Gulch drains from Mokelumne Hill Sanitary District spray fields into the main stem of the Mokelumne River about 1000 feet downstream of Highway 49.

Upper Mokelumne River and Tributaries

Some of the sampling locations mapped in Figure 4-2 and listed in Table 4-2b were monitored on a monthly basis in 2010 and then on a quarterly basis 2011 - 2014. Other sampling locations were monitored less frequently during the MRWSS 2015 Update.

All grab samples in the Upper Mokelumne Watershed were analyzed for turbidity, total coliform, and *E. coli*. At MRHW49, the samples collected included a much wider range of parameters, and the average daily flows were recorded by an automated flow monitoring device. At all the other sampling stations, the instantaneous flow was measured when samples were collected.

Raw Water Quality

Table 4-3 is a statistical summary of turbidity, total coliform, *E. coli*, and flow at the nine sampling locations. There were fewer samples during the MRWSS 2015 Update, with only approximately 30 percent of the total coliform and *E. coli* samples, and even fewer turbidity samples, as compared with the MRWSS 2010 Update.

The flows in the Middle Fork and South Fork of the Mokelumne River were significantly lower than in the North Fork and Main Stem. The watershed has experienced over three years of drought, which is reflected in 90th percentile flows that are close to half of the 90th percentile flow rates in the MRWSS 2010 Update. The North Fork watershed covers a much larger area and higher elevation range than the Middle and South Forks. As discussed in Section 3, precipitation above 5,000 feet typically occurs as snow, while at lower elevations precipitation occurs as rain or sleet. Most of the Middle Fork and South

Fork are below 5,000 feet, while elevation in the North Fork ranges from 900 to over 10,000 feet. As expected, the highest flows were in the Main Stem below the confluence of all three forks. Flows in Wilson Gulch, a small drainage from Mokelumne Hill, were several orders of magnitude less than the river or its main tributaries. The median turbidities at all sites were not significantly different from one another. The median total coliform and *E. coli* concentrations on the North Fork were substantially lower than the smaller tributaries, although the Highway 49 median value was higher than seen in the MRWSS 2010 Update. These results are generally consistent with past MRWSS Updates.

The highest total coliform samples came from the West Point sampling location on the Middle Fork and from the Licking Fork sampling location on the South Fork, with the maximum coliform counts one or even two orders of magnitude higher than the other sampling locations. The West Point area of the Middle Fork had the highest maximum *E coli* results during the MRWSS 2015 Update, an order of magnitude higher than most of the other sampling sites. The South Fork, Middle Fork and the Highway 26 sampling sites also saw a handful of elevated *E. coli* spikes.

Figures 4-3 through 4-7 depict the fluctuations in flow, turbidity, total coliform, and *E. coli* during the MRWSS 2015 Update period:

- Figure 4-3: North Fork Mokelumne River at MRTC andMRHW26N
- Figure 4-4: Middle Fork Mokelumne River at MRPW and MRWP
- Figure 4-5: South Fork Mokelumne River at MRLF
- Figure 4-6: Wilson Gulch at MRWG
- Figure 4-7: Mokelumne River Main Stem at MRPH and MRHW49

The fluctuations in flow in Figures 4-3 through 4-7 result from a number of watershed conditions and activities, including drought, snow melt and precipitation, as well as the diversions and releases associated with the extensive hydroelectric facilities along the Mokelumne River. USGS National Water Information System (NWIS) streamflow data (mean daily flow from continuous automated flow monitoring and recording stations) is included in Figures 4-3 through 4-6 to supplement flows measured by the District at the time of sampling. The District has its own continuous flow monitoring and recording station at MRHW49. Average daily flow measurements at all locations depict noticeable flow increases in the wet seasons, with the largest flows in winter 2010-11. As discussed in Section 3, drought conditions contributed to lower flows in 2012 – 2014.

Seasonal fluctuations in turbidity are seen on the North Fork, as shown in Figure 4-3, with elevated turbidities occurring during the wet winter 2010 – 2011. The other sampling sites lacked enough turbidity data for analysis. Total coliform and *E. coli* did not follow the same seasonal trends from one year to the next. Some years they were higher in the dry summer and early autumn months, and other years they were higher in the wet winter and spring months. Elevated dry period coliform might be attributed to body-contact recreation, and elevated wet weather coliform are likely related to watershed runoff.

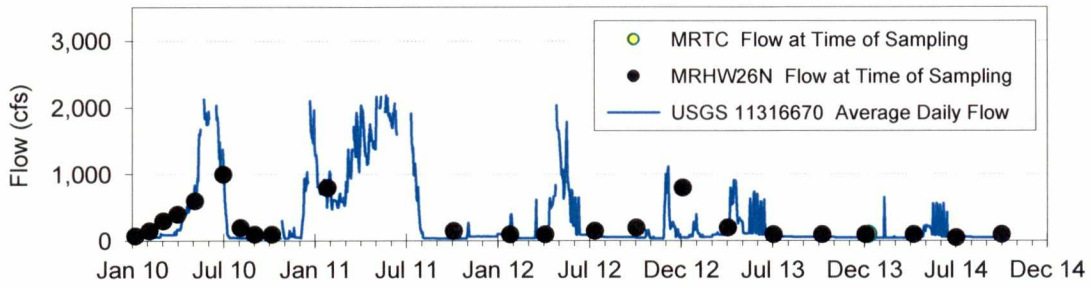
Table 4-3. Upper Mokelumne Watershed: Statistical Summary of Turbidity, Total Coliform, *E. coli,* and Flow Monitoring

Parameter	River/Tributary	Sampling Station	No. Samples	Median	90th Percentile	Max
Flow (cfs)	Main Stem	MRHW49	21	612	1460	2390
		MRPH	24	350	1510	4200
	North Fork	MRHW26N	24	150	800	4200
		MRTC	16	100	800	4200
	Middle Fork	MRPW	25	15	69	300
		MRWP	25	15	69	300
	South Fork	MRLF	25	20	65	500
		MRHW26	25	15	50	500
	Wilson Gulch	MRWG	9	0.04	0.27	0.45
Turbidity (NTU)	Main Stem	MRHW49	4	1.05	2.78	3.5
		MRPH	8	0.925	1.89	2.8
	North Fork	MRHW26N	9	1.1	1.76	2.4
		MRTC	0	N/A	N/A	N/A
	Middle Fork	MRPW	9	1.2	2.12	3.4
		MRWP	9	1.1	2.2	3.8
	South Fork	MRLF	9	0.73	1.56	3.8
		MRHW26	9	0.69	1.84	4.4
	Wilson Gulch	MRWG	4	1.35	19.41	27
Total Coliform (MPN/100 mL)	Main Stem	MRHW49	21	50	470	500
		MRPH	25	46	232	1300
	North Fork	MRHW26N	26	23.5	315	5400
		MRTC	17	32	242	490
	Middle Fork	MRPW	26	140	790	9200
		MRWP	26	170	1200	>16000
	South Fork	MRLF	26	120	895	16000
		MRHW26	26	115	645	9200
	Wilson Gulch	MRWG	9	170	720	800
E. coli (MPN/100 mL)	Main Stem	MRHW49	21	14	33	70
		MRPH	25	8	49.6	330
	North Fork	MRHW26N	26	4	50	3500
		MRTC	17	4.5	23	49
	Middle Fork	MRPW	26	30	250	3500
		MRWP	26	49	745	>16000
	South Fork	MRLF	26	19.5	150	3500
		MRHW26	26	19.5	90	1300
	Wilson Gulch	MRWG	9	33	236	500

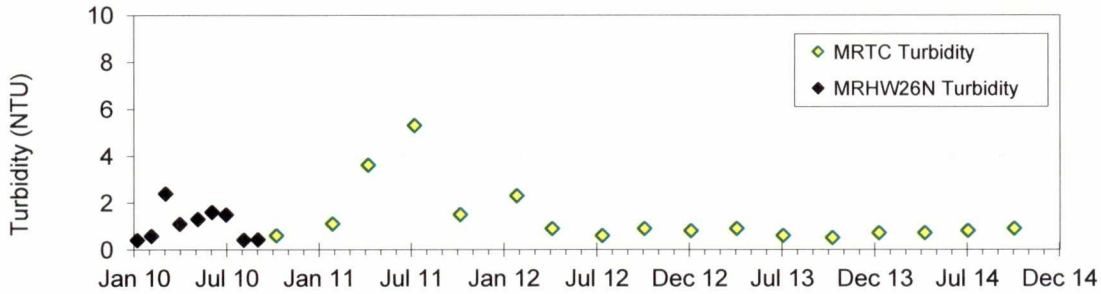
Note: All flow statistics are for observed flows at the time of sampling except for MRHW49 where the statistics are for average daily flows on the days that samples were collected.

Figure 4-3. Water Quality and Flow on North Fork Mokelumne River at MRTC and at MRHW26N

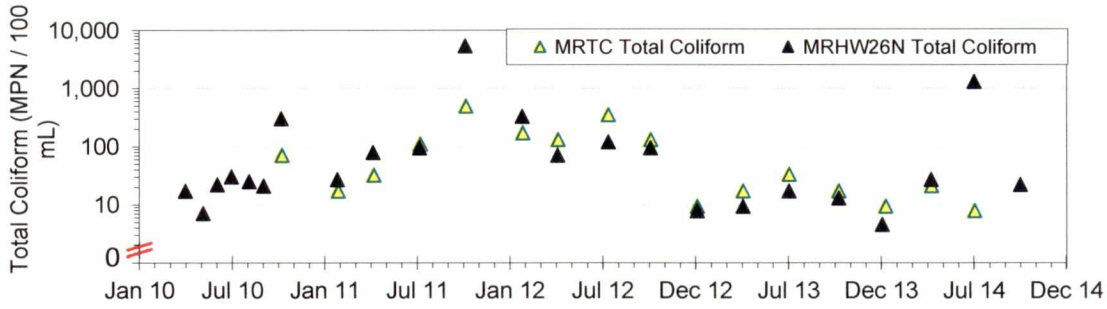
a) Flow. Instantaneous flow at time of sampling and average daily flow recorded by USGS 11316670 near MRTC.



b) Turbidity



c) Total coliform



d) *E. coli*

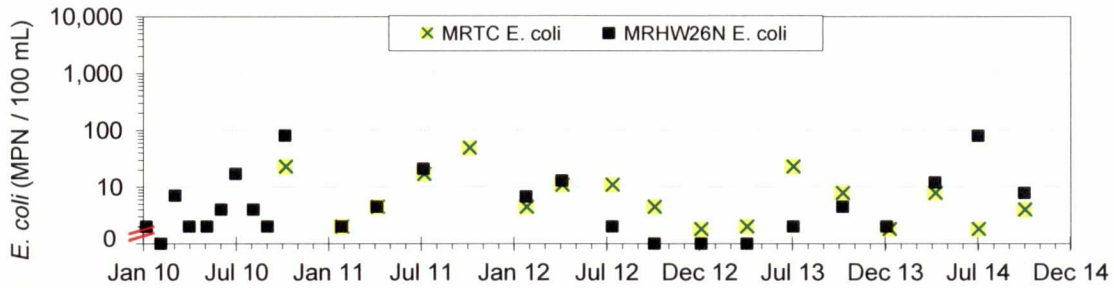


Figure 4-4. Water Quality and Flow on Middle Fork Mokelumne River at MRPW and MRWP

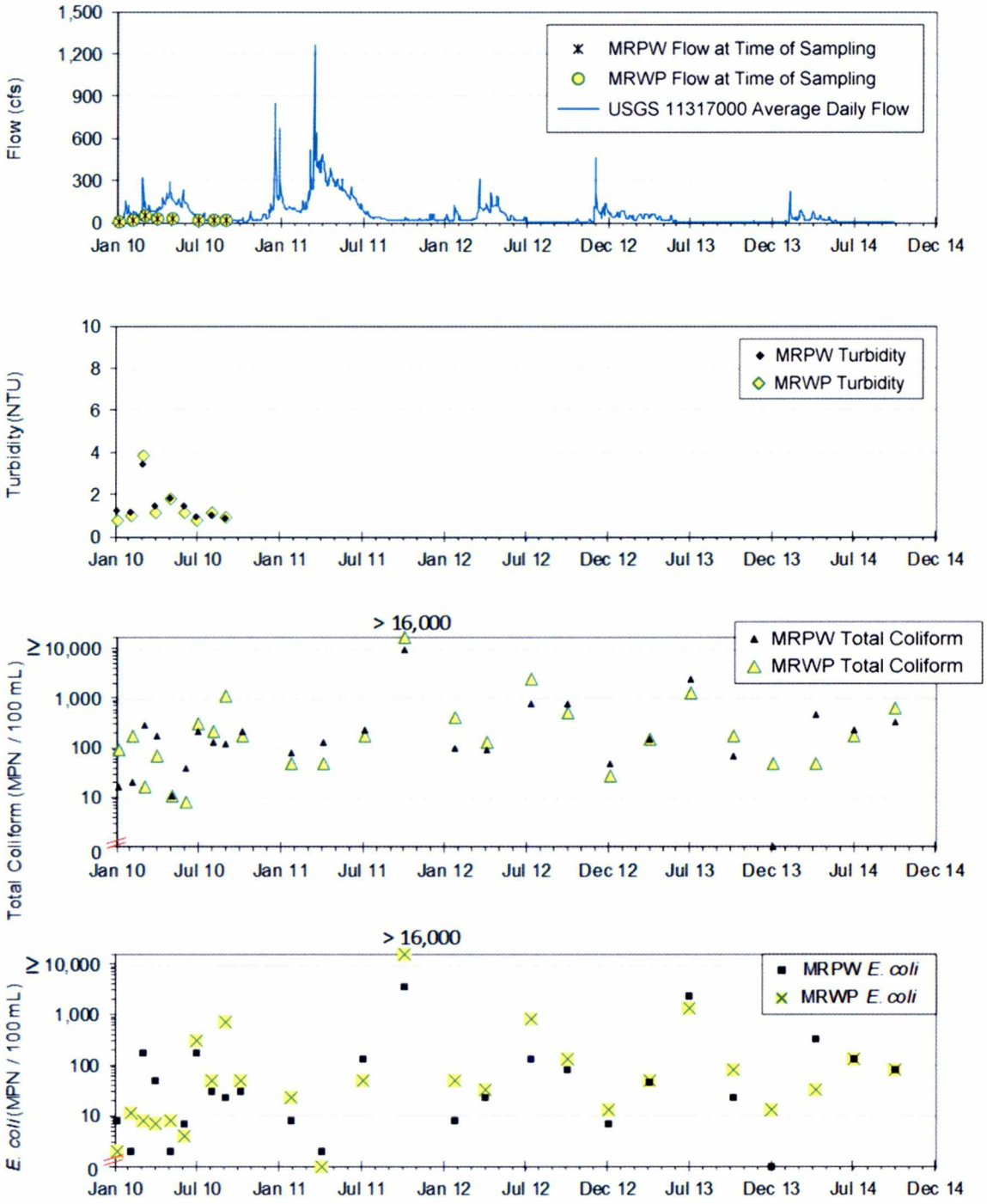
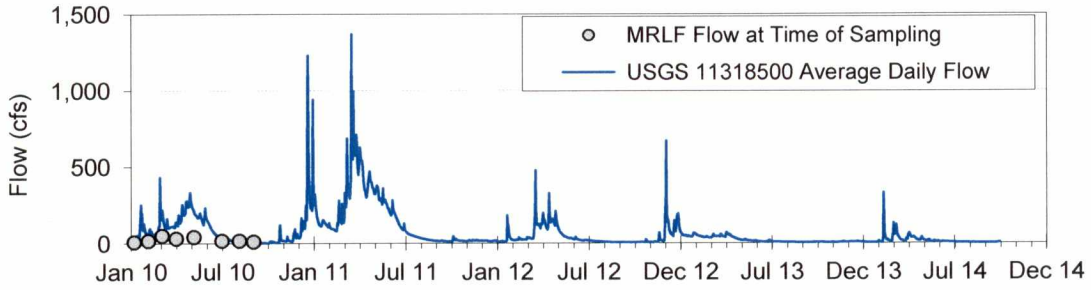
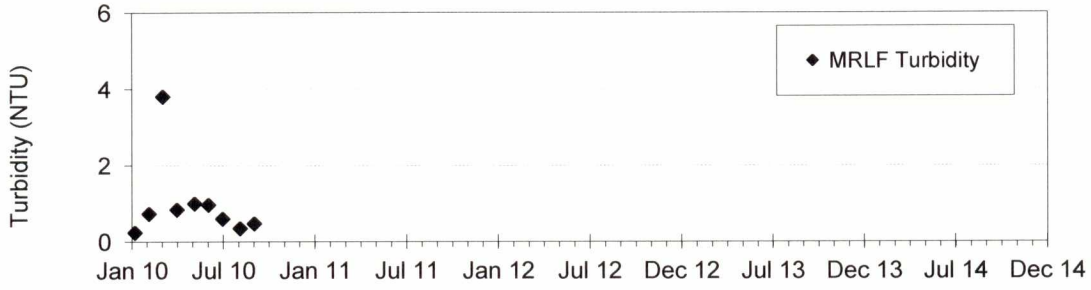


Figure 4-5. Water Quality and Flow on South Fork Mokelumne River at MRLF

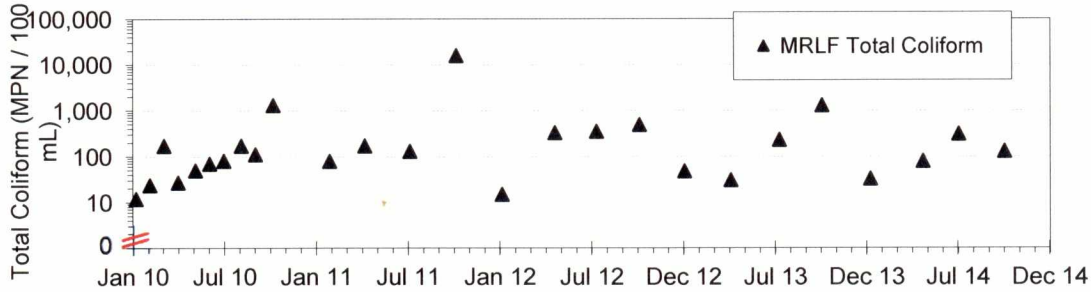
a) Flow. Instantaneous flow at time of sampling and average daily flow recorded by USGS 11318500 downstream of MRLF near Highway 26.



b) Turbidity



c) Total coliform



d) *E. coli*

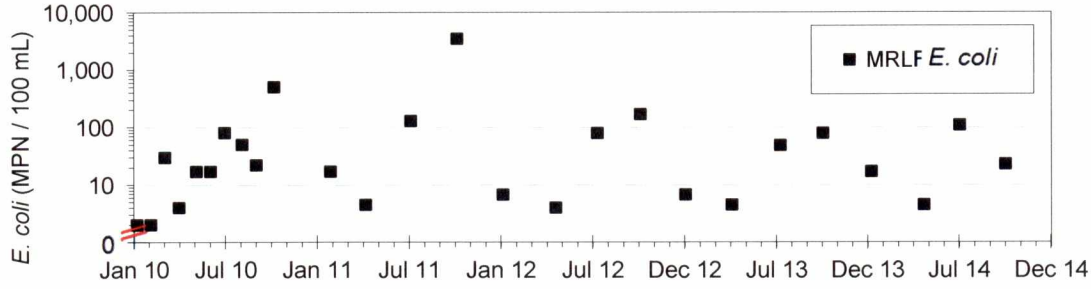
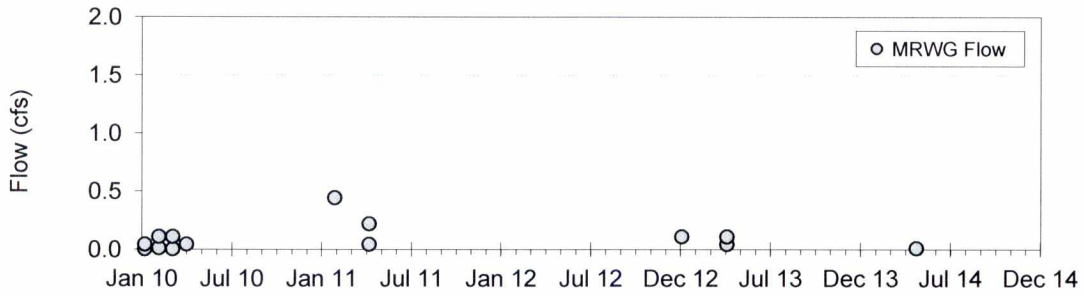
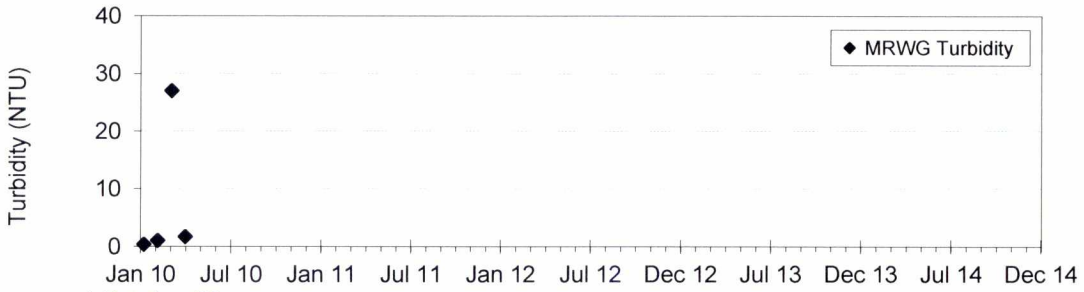


Figure 4-6. Water Quality and Flow of Wilson Gulch at MRWG

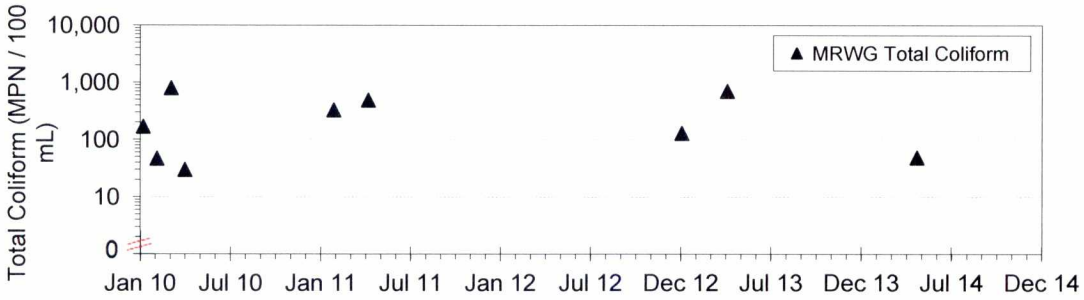
a) **Flow.** Instantaneous flow at time of sampling.



b) **Turbidity**



c) **Total coliform**



d) ***E. coli***

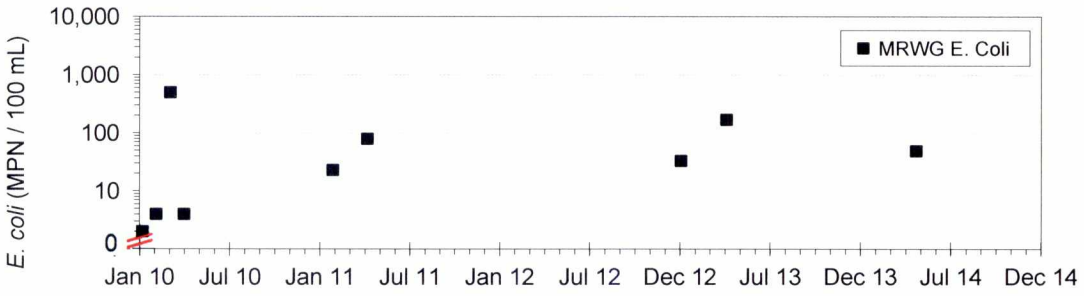
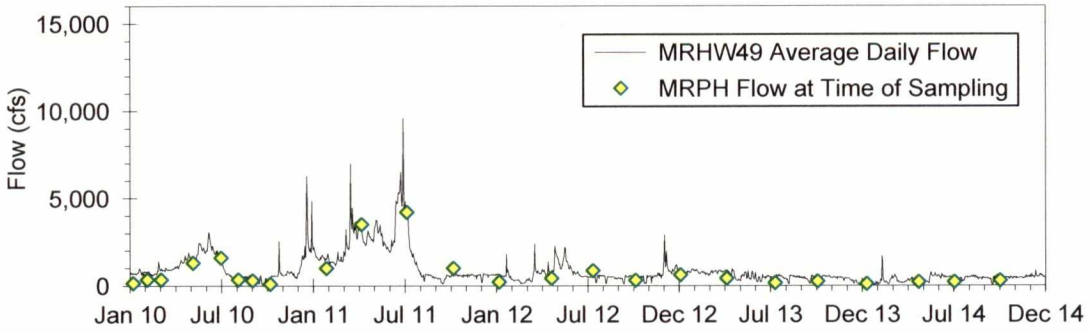
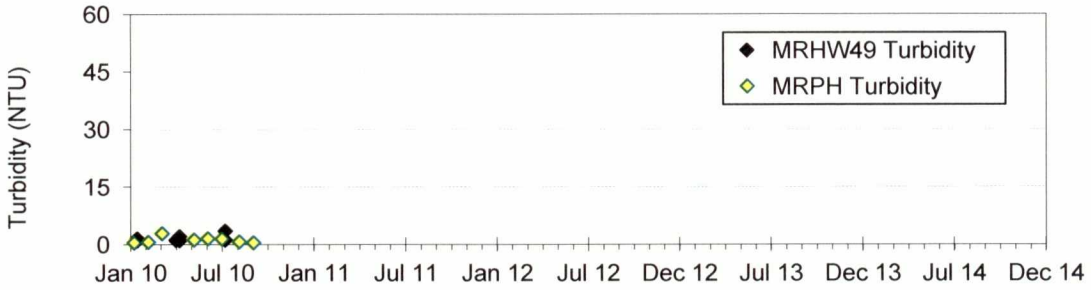


Figure 4-7. Water Quality and Flow on the Main Stem of the Mokelumne River, below Confluence of Forks, at MRPH and MRHW49

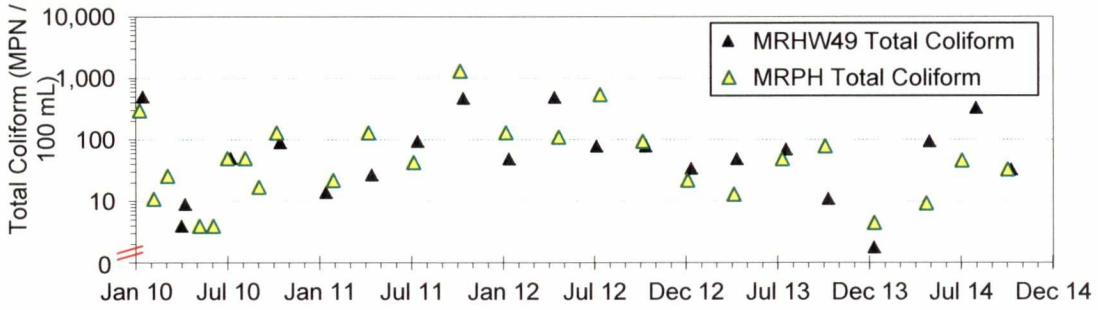
a) Flow. Instantaneous flow at time of sampling at MRPH andaverage daily flow recorded by the District at MRHW49.



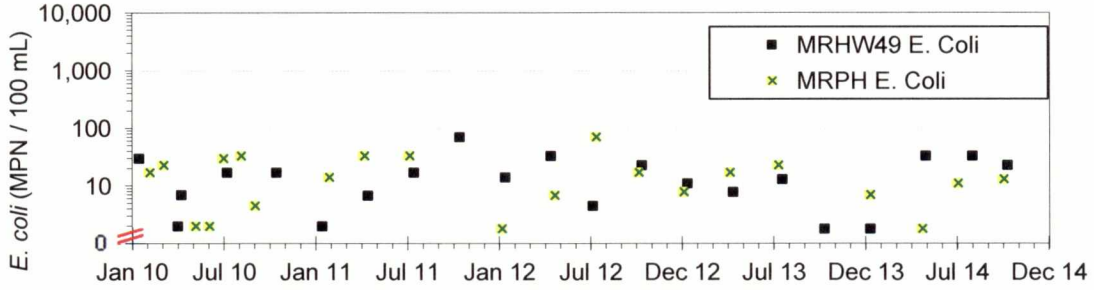
b) Turbidity



c) Total coliform



d) *E. coli*



In general, the range of turbidity, total coliform and *E. coli* concentrations were similar between the MRWSS 2015 Update and the MRWSS 2010 Update.

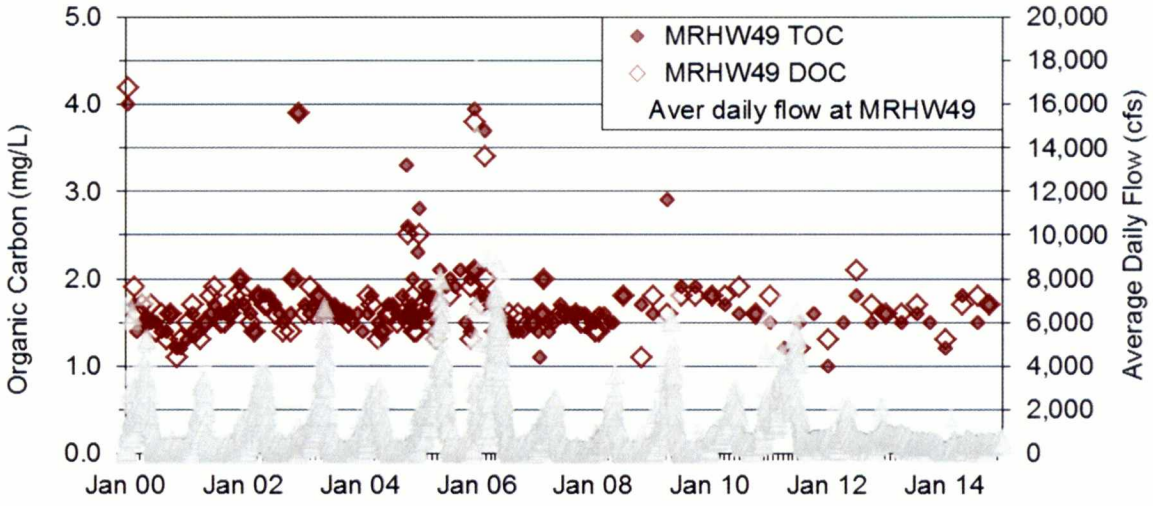
On July 14, 2015, CCWD issued a "boil water" notice in the Bummerville area near West Point, because total coliforms and fecal coliforms were detected in their distribution system intermittently over several days. At the time, the CCWD West Point WTP was treating water from the Middle Fork of the Mokelumne River, purchased from CPUD. Follow-up monitoring and analyses determined that the positive total and fecal coliform results were likely the result of laboratory errors. The "boil water" notice was lifted on July 18, 2015.

TOC and DOC are routinely monitored on the Main Stem at MRHW49 every three months. Figure 4-8 shows the organic carbon results from the MRWSS 2015 Update period, alongside the average daily flows on the river. TOC and DOC did not differ significantly. The median TOC for the ten-year period was 1.6 mg/L with a range of 1.1 to 4.0 mg/L. Ninety percent of the samples had TOCs below 2.0 mg/L. The TOCs exceeding 2.0 mg/L generally occurred in winter and spring, and roughly corresponded with periods of rising flows or high flows on the river.

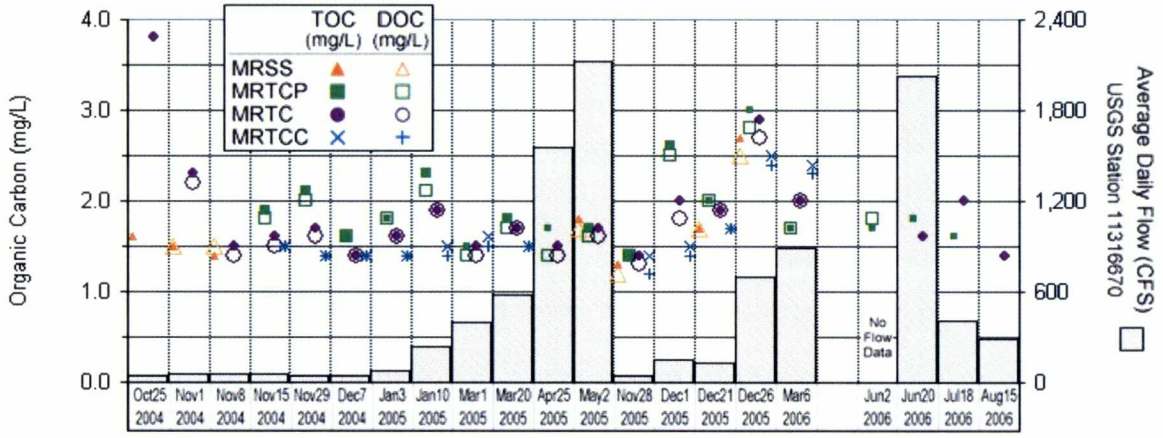
Immediately following the October 2004 Power Fire in the North Fork watershed, TOC spiked to a high of 3.3 mg/L. TOCs above 2.0 mg/L were found for the remainder of 2004. To evaluate the potential water quality effects of the Power Fire, organic carbon was also monitored, beginning in October 2004, on a near-monthly basis on the North Fork (three locations), on Tiger Creek Canal, and on the Middle Fork in the two years following the fire (Figure 4-8b and 4-8c). On the North Fork, TOC spiked at MRTC (downstream of the Power Fire) in October and early November following the Power Fire and then subsided at all downstream locations to a range of 1.2 to 3.0 mg/L for the next two years. A similar spike was not observed at Pardee Reservoir Outlet Tower. The Power Fire did not cause any measurable water quality effects at the tower.

Figure 4-8. TOC and DOC in the Upper Mokelumne River Watershed with Flow at Highway 49

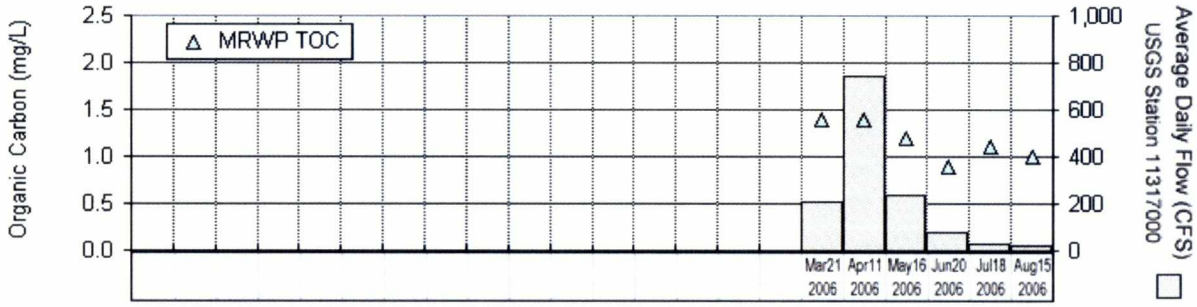
a) Routine monitoring -- Mokelumne River at Highway 49



b) Post Power Fire monitoring -- North Fork / Tiger Creek Canal (time not to scale)



c) Post Power Fire monitoring -- Middle Fork at West Point (time not to scale)



1. Flows in plot (a) are average daily flows from the District flow monitoring and recording station at MRHW49. Flows in plots (b) and (c) are average flows for the day of sampling from USGS NWIS at stations 11316670 and 11317000 near MRTC and MRWP, respectively.

Cryptosporidium and *Giardia* were sampled roughly once per quarter 2012 - 2014 at MRHW49. Out of fourteen samples, *Cryptosporidium* was detected once, at 0.2 oocysts/L, and *Giardia* was detected three times at a maximum of 0.2 cysts/L (Table 4-4).

Table 4-4. Non-regulatory *Cryptosporidium* and *Giardia* in the Upper Mokelumne River Sampling at MRHW49

Collection Date	*Cryptosporidium* Oocysts (# / L)	*Giardia* Cysts (#/L)	MDL [a] (# / L)
4/12/2012	0.2	ND	*0.1*
7/5/2012	*ND*	ND	*0.1*
10/11/2012	*ND*	ND	*0.1*
11/29/2012	*ND*	0.2	*0.1*
1/10/2013	*ND*	ND	*0.1*
2/20/2013	*ND*	ND	*0.1*
4/11/2013	*ND*	ND	*0.1*
7/18/2013	*ND*	ND	*0.1*
10/10/2013	*ND*	ND	*0.1*
1/9/2014	*ND*	ND	*0.1*
2/9/2014	*ND*	0.1	*0.1*
4/29/2014	*ND*	0.09	*0.1*
7/31/2014	*ND*	ND	*0.1*
10/9/2014	*ND*	ND	*0.1*

# *Cryptosporidium* Samples	14	# *Giardia* Samples	14
# *Cryptosporidium* Detections	1	# *Giardia* Detections	3
Max *Cryptosporidium* Oocysts (# / L)	*0.2*	Max *Giardia* Cysts (# / L)	*0.2*

a) For regulatory monitoring, the Detection Limit for Reporting for *Cryptosporidium* and *Giardia* is 0.1 #/L.

For the regulated chemicals that were monitored in the Upper Mokelumne River or its tributaries during 2010 – 2014, none exceeded the drinking water MCL, with the exception of aluminum, which is easily removed in water treatment. Aluminum was detected in 11 out of 20 samples above 50 ug/L, the DLR; one sample measured 285 ug/L, exceeding the secondary drinking water MCL of 200 ug/L. Iron was detected in nine out of nineteen samples, with a maximum of 256 ug/L, below the secondary MCL of 300 ug/L. Several herbicides and pesticides were monitored, even though they are not regulated by a drinking water MCL, and only trace levels of hexazinone (trade names Pronone, Velpar and DPX 3674) were detected. Several disinfection byproducts were seen elevated somewhat above their DLRs, including bromodichoromethane, chloroform, and total trihalomethanes. Nutrients and plankton were found only at low levels, as expected.

As watershed activities change and watershed management practices are modified, the sampling that the District conducts at the seven tributary locations will continue to be a valuable water quality information tool.

Pardee Reservoir

Pardee Reservoir water is a high-quality drinking water supply that provides raw water to the small system WTPs at Pardee Recreation Area and Pardee Center and to the large system WTPs in the East Bay via the Mokelumne Aqueducts.

Raw Water Quality

Table 4-5 is a statistical summary of the raw water quality data of parameters regulated by Title 22 and other pertinent parameters collected from Pardee Reservoir, Pardee Center (PACIN) and Pardee Recreation Area (PARIN) WTP influents, and the Mokelumne Aqueduct Tunnel at Pardee (before chemical addition) for the five-year period of the MRWSS 2015 Update. For each parameter, the number of samples, number of detections, and the median, minimum, and maximum concentrations are included along with the regulated MCLs and DLRs, when applicable. It is important to remember that MCLs apply to treated water quality. The raw water quality was evaluated using treated water MCLs as a benchmark and potential guide for treatment operations only.

Table 4-5. Pardee Reservoir Raw Water Monitoring - January 2010 through December 2014

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Microbiological Constituents									
Cryptosporidium	TT [b]	# / 10L	14	0	ND	ND	ND	1	1
E. coli	TCR [c]	MPN/100mL	247	84	ND	ND	11	1.8	- - -
Fecal Coliform	TCR [c]	MPN/100mL	1	0	ND	ND	ND	1.8	- - -
Giardia	TT [b]	# / 10L	14	0	ND	ND	ND	1	1
Legionella	TT [b]		NA	NA	NA	NA	NA	NA	- - -
Total Coliform	TCR [c]	MPN/100mL	247	185	4	ND	700	2	
Turbidity	TT [b]	NTU	6	6	0.57	0.4	0.77	- - -	- - -
Viruses	TT [b]		NA	NA	NA	NA	NA	NA	- - -
Primary Standards – Inorganic Chemicals									
Aluminum (Al)	1000	µg/L	5	3	35	ND	56.9	9.4 – 19.8	50
Antimony (Sb)	6	µg/L	5	0	ND	ND	ND	0.2 – 0.3	6
Arsenic (As)	10	µg/L	5	1	ND	ND	0.31	0.2 – 0.3	2
Asbestos [d]	7	MFL	4	0	ND	ND	ND	0.2	0.2
Barium (Ba)	1000	µg/L	5	5	9.9	8.1	10.8	0.416 – 1.04	100
Beryllium (Be)	4	µg/L	5	0	ND	ND	ND	0.03	1
Cadmium (Cd)	5	µg/L	5	0	ND	ND	ND	0.02 – 0.051	1
Chromium (Cr)	50	µg/L	7	3	ND	ND	0.93	0.067–0.61	10
Chromium-6 (Cr (VI))	- - -	µg/L	3	1	NA	NA	0.034	0.03	1
Cyanide (CN)	150	µg/L	NA	NA	NA	NA	NA	NA	100
Fluoride (F^-)	2	mg/L	104	104	0.0165	0.0096	0.036	0.0004 - 0.0022	0.1
Mercury (Hg)	2	µg/L	5	0	ND	ND	ND	0.02 – 0.04	1
Nickel (Ni)	100	µg/L	5	3	0.27	ND	1.1	0.2 – 0.3	10
Nitrate+Nitrite (as N)	10	mg/L	60	42	0.01	ND	0.054	0.00071	- - -
Nitrate (as N)	10	mg/L	101	68	0.0097	ND	0.054	0.0009 – 0.0058	0.4
Nitrite (as N)	1	mg/L	64	6	ND	ND	0.011	0.0005 – 0.004	0.4
Perchlorate (ClO_4^-)	6	µg/L	10	0	ND	ND	ND	0.3 – 0.5	4
Selenium (Se)	50	µg/L	5	0	ND	ND	ND	0.2 – 0.4	5
Thallium (Tl)	2	µg/L	5	0	ND	ND	ND	0.2 - 0.61	1

Table 4-5. Pardee Reservoir Raw Water Monitoring (*continued*)

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Primary Standards – Synthetic Organic Chemicals (SOCs)									
Acrylamide	TT [b]		NA	NA	NA	NA	NA	NA	- - -
Alachlor	2	µg/L	2	0	—	ND	ND	0.005	1
Atrazine (Aatrex)	1	µg/L	2	0	—	ND	ND	0.008	0.5
Bentazon	18	µg/L	2	0	—	ND	ND	0.22	2
Benzo(a)pyrene	0.2	µg/L	2	0	—	ND	ND	0.022	0.1
Carbofuran	18	µg/L	2	0	—	ND	ND	0.38	5
Chlordane	0.1	µg/L	2	0	—	ND	ND	0.095	0.1
Dalapon	200	µg/L	2	0	—	ND	ND	1.4	10
1,2-Dibromo-3-chloropropane (DBCP)	0.2	µg/L	2	0	—	ND	ND	0.01	0.01
2,4-Dichlorophenoxy-acetic acid (2,4-D)	70	µg/L	2	0	—	ND	ND	0.2	10
Di(2-ethylhexyl)adipate	400	µg/L	2	0	—	ND	ND	0.03	5
Di(2-ethylhexyl)phthalate	4	µg/L	2	0	—	ND	ND	0.19	3
Dinoseb (DNBP)	7	µg/L	2	0	—	ND	ND	0.21	2
Diquat	20	µg/L	2	0	—	ND	ND	0.6 - 2	4
Endothall	100	µg/L	2	0	—	ND	ND	1	45
Endrin	2	µg/L	2	0	—	ND	ND	0.027	0.1
Epichlorohydrin	TT [b]		NA	NA	NA	NA	NA	NA	- - -
Ethylene Dibromide (EDB)	0.05	µg/L	2	0	—	ND	ND	0.01	0.02
Glyphosate	700	µg/L	2	0	—	ND	ND	15	25
Heptachlor	0.01	µg/L	2	0	—	ND	ND	0.005	0.01
Heptachlor Epoxide	0.01	µg/L	2	0	—	ND	ND	0.009	0.01
Hexachlorobenzene	1	µg/L	2	0	—	ND	ND	0.026	0.5
Hexachlorocyclo-pentadiene	50	µg/L	2	0	—	ND	ND	0.023	1
Lindane (Gamma BHC)	0.2	µg/L	2	0	—	ND	ND	0.0091	0.2
Methoxychlor	30	µg/L	2	0	—	ND	ND	0.007	10
Molinate	20	µg/L	2	0	—	ND	ND	0.01	2
Oxamyl (Vydate)	50	µg/L	2	0	—	ND	ND	0.25	20
Pentachlorophenol (PCP)	1	µg/L	4	0	ND	ND	ND	0.09 – 0.1	0.2
Picloram	500	µg/L	2	0	—	ND	ND	0.12	1
Polychlorinated Biphenyls (PCB's)	0.5	µg/L	2	0	—	ND	ND	0.48	0.5
Simazine	4	µg/L	2	0	—	ND	ND	0.008	1
2,4,5-TP (Silvex)	50	µg/L	2	0	—	ND	ND	0.14	1
2,3,7,8-TCDD (Dioxin)	30	pg/L	2	0	—	ND	ND	0.26	5
Thiobencarb	70	µg/L	2	0	—	ND	ND	0.009	1
Toxaphene	3	µg/L	2	0	—	ND	ND	.048	1

Table 4-5. Pardee Reservoir Raw Water Monitoring (continued)

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Primary Standards – Radioactivity									
Gross Alpha	15	pCi/L	NA	NA	NA	NA	NA	NA	3
Gross Beta/ Photon	50	pCi/L	NA	NA	NA	NA	NA	NA	4
Radium 226+228	5	pCi/L	NA	NA	NA	NA	NA	NA	- - -
Radium-226	- - -	pCi/L	NA	NA	NA	NA	NA	NA	1
Radium-228	- - -	pCi/L	NA	NA	NA	NA	NA	NA	1
Strontium-90	8	pCi/L	NA	NA	NA	NA	NA	NA	2
Tritium	20,000	pCi/L	NA	NA	NA	NA	NA	NA	1,000
Uranium	20	pCi/L	NA	NA	NA	NA	NA	NA	1
Disinfectant/Disinfection Byproducts Rule									
Bromate	10	µg/L	NA	NA	NA	NA	NA	NA	5
Chloramines as Cl_2	4	mg/L	NA	NA	NA	NA	NA	NA	- - -
Chlorine as Cl_2	4	mg/L	NA	NA	NA	NA	NA	NA	- - -
Chlorine Dioxide	0.8	mg/L	NA	NA	NA	NA	NA	NA	- - -
Chlorite	1	mg/L	NA	NA	NA	NA	NA	NA	0.02
HAA5	60	µg/L	NA	NA	NA	NA	NA	NA	- - -
Total Trihalomethanes	80	µg/L	21	0	ND	ND	ND	0.3 – 1.3	- - -
Bromodichloro-methane	- - -	µg/L	6	0	ND	ND	ND	0.07–0.21	1
Bromoform	- - -	µg/L	6	0	ND	ND	ND	0.091–0.31	1
Chloroform	- - -	µg/L	6	0	ND	ND	ND	0.051–0.15	1
Dibromochloro-methane	- - -	µg/L	61	0	ND	ND	ND	0.11–0.26	1

Table 4-5. Pardee Reservoir Raw Water Monitoring (continued)

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Primary Standards – Volatile Organic Chemicals (VOCS)									
Benzene	1	µg/L	6	0	ND	ND	ND	0.05 – 0.14	0.5
Carbon Tetrachloride	0.5	µg/L	6	0	ND	ND	ND	0.05 – 0.25	0.5
1,2-Dichlorobenzene (o-DCB)	600	µg/L	6	0	ND	ND	ND	0.11 – 0.23	0.5
1,4-Dichlorobenzene (p-DCB)	5	µg/L	6	0	ND	ND	ND	0.088–0.18	0.5
1,1-Dichloroethane (1,1-DCA)	5	µg/L	6	0	ND	ND	ND	0.064–0.21	0.5
1,2-Dichloroethane (1,2-DCA)	0.5	µg/L	6	0	ND	ND	ND	0.11 – 0.14	0.5
1,1-Dichloroethylene (1,1-DCE)	6	µg/L	6	0	ND	ND	ND	0.07 – 0.25	0.5
cis-1,2-Dichlorethylene (c-1,2-DCE)	6	µg/L	6	0	ND	ND	ND	0.08 – 0.25	0.5
trans-1,2-Dichloro-ethylene (t-1,2-DCE)	10	µg/L	6	0	ND	ND	ND	0.093–0.19	0.5
Dichloromethane (Methylene Chloride)	5	µg/L	6	0	ND	ND	ND	0.051–0.18	0.5
1,2-Dichloropropane	5	µg/L	6	0	ND	ND	ND	0.12 – 0.15	0.5
1,3-Dichloropropene (TOTAL)	0.5	µg/L	6	0	ND	ND	ND	- - -	0.5
Cis-1,3-Dichloro-propene	- - -	µg/L	6	0	ND	ND	ND	0.057–0.23	0.5
Trans-1,3-Dichloro-propene	- - -	µg/L	6	0	ND	ND	ND	0.079–0.18	0.5
Ethylbenzene	300	µg/L	6	0	ND	ND	ND	0.042–0.18	0.5
Methyl-tert-butyl ether (MTBE)	13	µg/L	6	0	ND	ND	ND	0.1–0.39	3
Monochlorobenzene (Chlorobenzene)	70	µg/L	6	0	ND	ND	ND	0.12 – 0.21	0.5
Styrene	100	µg/L	6	0	ND	ND	ND	0.086–0.19	0.5
1,1,2,2-Tetra-chloroethane	1	µg/L	6	0	ND	ND	ND	0.12 – - 0.2	0.5
Tetrachloroethylene (PCE)	5	µg/L	6	0	ND	ND	ND	0.064 – 0.2	0.5
Toluene	150	µg/L	6	0	ND	ND	ND	0.061–0.16	0.5
1,2,4-Trichlorobenzene	5	µg/L	6	0	ND	ND	ND	0.095–0.19	0.5
1,1,1-Trichloroethane (1,1,1-TCA)	200	µg/L	6	0	ND	ND	ND	0.062–0.19	0.5
1,1,2-Trichloroethane (1,1,2-TCA)	5	µg/L	6	0	ND	ND	ND	0.087–0.21	0.5
Trichloroethylene (TCE)	5	µg/L	6	0	ND	ND	ND	0.08 – 0.17	0.5
Trichlorofluoromethane (Freon 11)	150	µg/L	6	0	ND	ND	ND	0.049–0.22	5
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	1200	µg/L	6	0	ND	ND	ND	0.081–0.25	10
Vinyl Chloride	0.5	µg/L	6	0	ND	ND	ND	0.11 – 0.22	0.5
Xylenes (Total)	1750	µg/L	6	0	ND	ND	ND	0.16 – 0.55	- - -
m+p-Xylene	- - -	µg/L	6	0	ND	ND	ND	0.093–0.37	0.5
o-Xylene	- - -	µg/L	6	0	ND	ND	ND	0.068–0.18	0.5

Table 4-5. Pardee Reservoir Raw Water Monitoring (continued)

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Secondary Standards									
Aluminum (Al)	200	µg/L	5	3	35	ND	56.9	19.8	50
Chloride (Cl)	250	mg/L	53	53	1.3	0.74	2.3	0.002-0.042	- - -
Color	15	color unit	NA	NA	NA	NA	NA	NA	- - -
Specific Conductance	900	µS/cm	6	6	40	30	42	- - -	- - -
Copper (Cu)	1000	µg/L	NA	NA	NA	NA	NA	NA	50
Foaming Agents (MBAS)	500	µg/L	NA	NA	NA	NA	NA	NA	- - -
Iron (Fe)	300	µg/L	NA	NA	NA	NA	NA	NA	100
Manganese (Mn)	50	µg/L	NA	NA	NA	NA	NA	NA	20
Methyl-tert-butyl ether (MTBE)	5	µg/L	6	0	ND	ND	ND	0.1 – 0.39	3
Odor-Threshold	3	TON	NA	NA	NA	NA	NA	NA	1
pH	6.5-8.5	pH units	16	16	7.4	6.7	8.4	- - -	- - -
Silver (Ag)	100	µg/L	NA	NA	NA	NA	NA	NA	10
Sulfate	250	mg/L	10	10	1.1	1	1.2	0.003	0.5
Thiobencarb	1	µg/L	2	0	ND	ND	ND	0.009	1
Total Dissolved Solids (TDS)	500	mg/L	10	10	35	18	89	5.5 - 11	- - -
Turbidity	5	NTU	6	6	0.57	0.4	0.77	- - -	- - -
Zinc (Zn)	5000	µg/L	NA	NA	NA	NA	NA	NA	50

Table 4-5. Pardee Reservoir Raw Water Monitoring (continued)

Water Quality Parameters	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Other Constituents								
Total Alkalinity (as $CaCO_3$)	mg/L	101	101	15	10	42	5 - 10	- - -
Ammonia as N	mg/L	12	12	0.01	ND	0.027	0.006-0.01	- - -
Bromide	mg/L	NA	NA	NA	NA	NA	NA	- - -
Calcium (Ca)	µg/L	10	10	3345	2650	3870	15.6	- - -
Total Hardness (as $CaCO_3$)	mg/L	91	91	14	8	20	2-3	- - -
Magnesium (Mg)	µg/L	10	10	848	642	976	9.36-14	- - -
Total Organic Carbon (TOC)	mg/L	81	81	1.5	0.89	3	0.024-0.29	0.3
Dissolved Organic Carbon	mg/L	NA	NA	NA	NA	NA	NA	- - -
Orthophosphate (as P)	mg/L	85	85	ND	ND	0.021	0.0019-0.005	- - -
Total Phosphate (as P)	mg/L	81	81	0.013	ND	0.022	0.013-0.008	- - -
Silica	µg/L	121	121	8780	7310	13,500	20 – 58	- - -
Sodium (Na)	µg/L	11	11	2200	1400	2340	11.4 - 16	- - -
Total Suspended Solids (TSS)	mg/L	NA	NA	NA	NA	NA	NA	- - -
Tert-Amyl methyl ether	µg/L	6	0	ND	ND	ND	0.085-0.17	3
Ethyl-tert-butyl-ether	µg/L	6	0	ND	ND	ND	0.076-0.19	3

a. Abbreviations: DLR = Detection Limit for Reporting, MDL = Method Detection Limit, NA = data not available, ND = not detected above the MDL (i.e. value is below method detection limit), — = statistic is impossible to compute due to low sample count, - - - = no value exists, TT = Treatment Technique (see footnote *b*), TCR = Total Coliform Rule (see footnote *c*).

b. Treatment Technique (TT)

- *Cryptosporidium*: 99% removal.
- *Giardia lamblia*: 99.9% removal/inactivation
- Viruses: 99.99% removal/inactivation
- *Legionella*: No limit, but USEPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
- Turbidity: Turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
- Acrylamide: 0.05% monomer in polyacrylamide dose of 1 ppm
- Epichlorohydrin: 0.01% residual of epichlorohydrin in dose of 20 mg/L.

c. Total Coliform Rule (TCR) – No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliform or *E. coli*. If two consecutive TC-positive samples, and one is also positive for *E. coli* or fecal coliform, the system has an acute MCL violation.

d. Sample locations include Pardee Reservoir plus PACIN, PARIN and Mokelumne Aqueduct Tunnel

Turbidity.

Pardee Reservoir has very low turbidity water most of the time with occasional spikes of moderate turbidity. Turbidity data collected in the Mokelumne Aqueduct at Campo Seco online turbidity monitoring station and averaged over each day are depicted in Figure 4-9 alongside Mokelumne River Flows at MRHW49. The median turbidity was 0.49 NTU, though during high runoff periods, as indicated by MRHW49 flows, the turbidity increased. The maximum average daily turbidity at Campo Seco was 3.38 NTU and occurred summer 2011.

Figure 4-9. Mokelumne Aqueduct Daily Average Turbidity from Campo Seco Online Monitoring Station and Daily Average Flow in the Mokelumne River at MRHW49

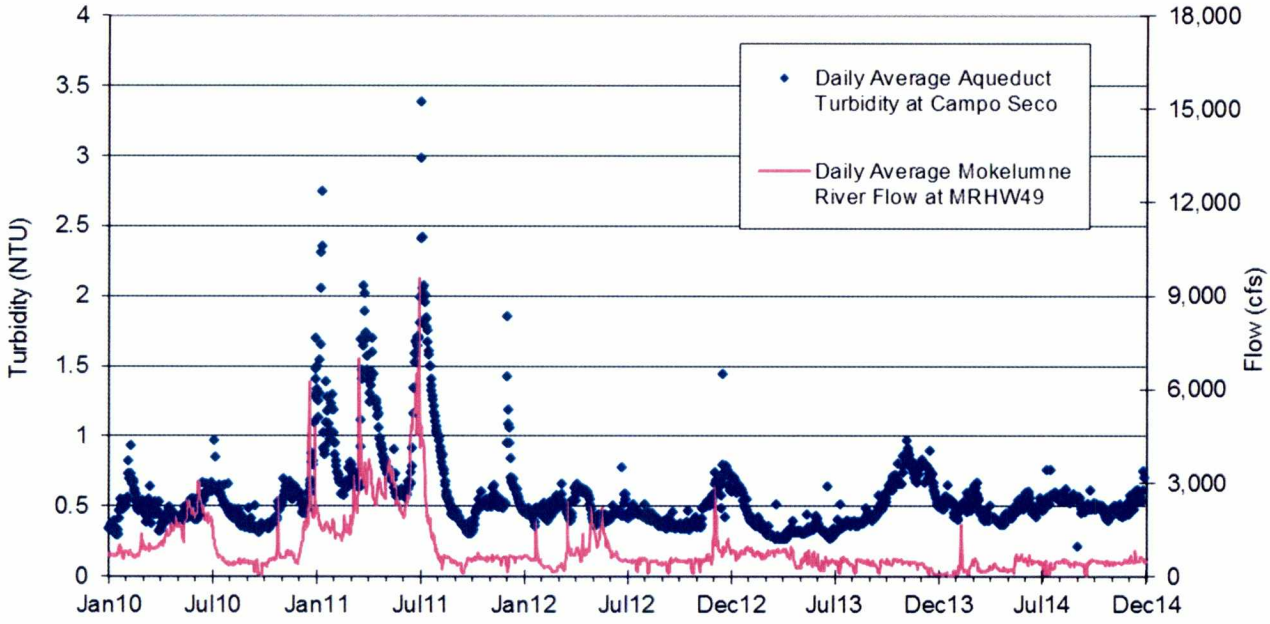


Table 4-6 compares the turbidity from Campo Seco, as well as coliform data (discussed below) during the periods of MRWSS Update 2015, 2010 and 2005. The median daily turbidities were about the same for the three update periods, and the maximum turbidities were similar.

Microbiological Water Quality.

For untreated water, coliform concentrations in Pardee Reservoir water were low. The District collected biweekly or monthly samples for total coliform and *E. coli* in PACIN and PARIN. Total coliform and *E. coli* were also sampled monthly throughout the period of the MRWSS 2015 Update from the reservoir surface at Pardee Tower.

LT2ESWTR sampling was not required and was not conducted during the MRWSS 2015 Update period. Round 2 LT2ESWTR sampling is scheduled for 2015. Pardee Reservoir supply source was assigned a Bin 1 classification under the Round 1 LT2ESWTR sampling results collected in 2006 – 2008.

Table 4-6 shows the statistical summary for each microbiological parameter with all raw water sampling locations combined for the five-year periods of MRWSS Update 2015, 2010, and 2005. The median coliform concentrations remained similar between the three update periods for each analyte.

Table 4-6. Summary of Turbidity and Coliform data in Pardee Reservoir from MRWSS Updates 2015, 2010 and 2005[a]

		MRWSS Update 2015			MRWSS Update 2010			MRWSS Update 2005			
		Jan. 2010 - Dec. 2014			*Jan. 2005 - Dec. 2009*			*Jun. 1999 - Dec. 2004*			
Parameter	Units	No. of Samples	Median	Max	No. of Samples	Median	Max	No. of Samples	Median	Max	MDL
Turbidity (Daily Average)	NTU	NA[b]	0.49	3.38	NA[b]	0.47	5.76	NA[b]	0.37	1.77	
E. coli	MPN/ 100 mL	494	ND	11	375	ND	13	224	ND	50	1 - 2
Fecal Coliform	MPN/ 100 mL	1	ND	ND	184	ND	50	236	ND	50	1.8
Total Coliform	MPN/ 100 mL	247	4	700	277	4	≥ 16,000	244	8	2,400	2

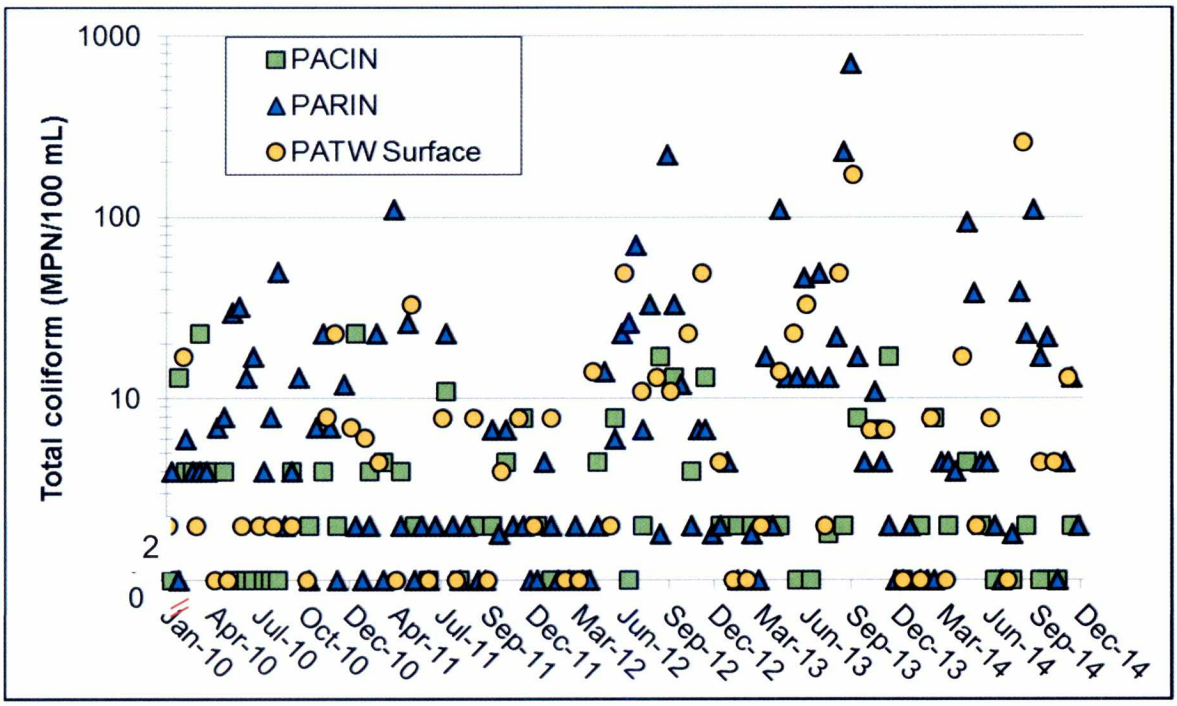
The minimum for all coliform was non-detect for both periods.

a) NA: not applicable. Turbidities were measured continuously by an online analyzer at CASSIN. The daily averages were analyzed for the median and maximum statistics.

Figures 4-10 and 4-11 show the MRWSS 2015 Update results for total coliform and *E. coli* sampling, respectively. Ninety-five percent of the time, total coliform were at or below 20 MPN/100 mL in PACIN, 100 MPN/100 ml in PARIN, and 50 MPN/100 mL on the reservoir surface at the tower. *E. coli* was at or below 10 MPN/100 mL 95 percent of the time at the reservoir surface and 5 MPN/100 or less 95 percent of the time at PACIN andPARIN.

Figure 4-10. Total Coliform in Pardee Reservoir 2010-2014

(a) Sample results (non-detect samples were treated as zero)



(b) Frequency and cumulative distribution of sample results

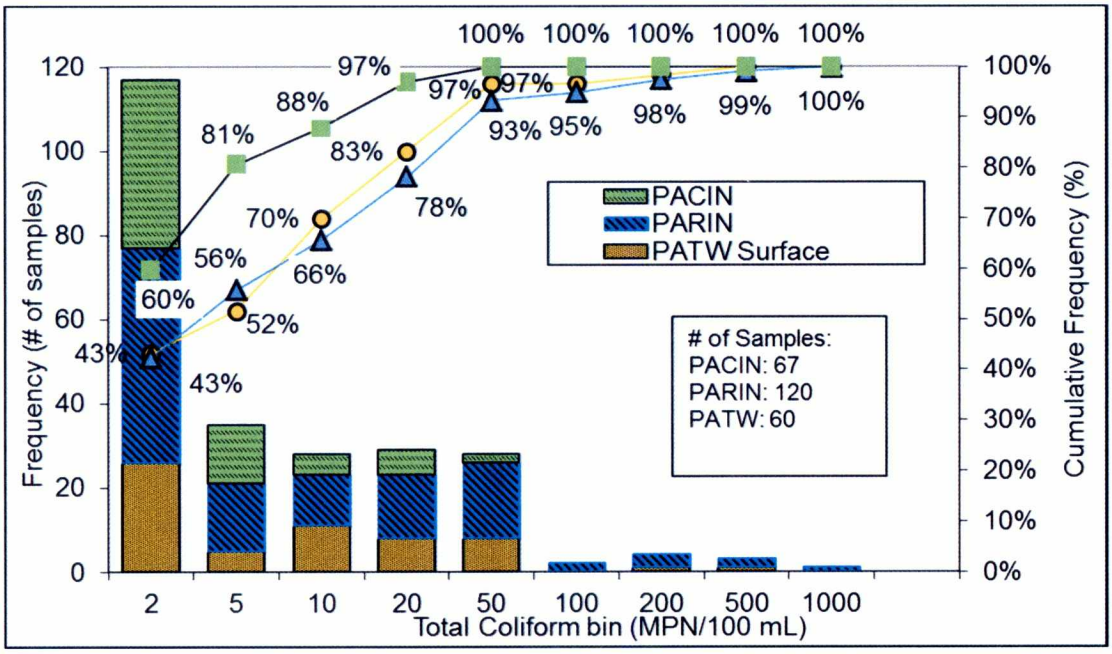
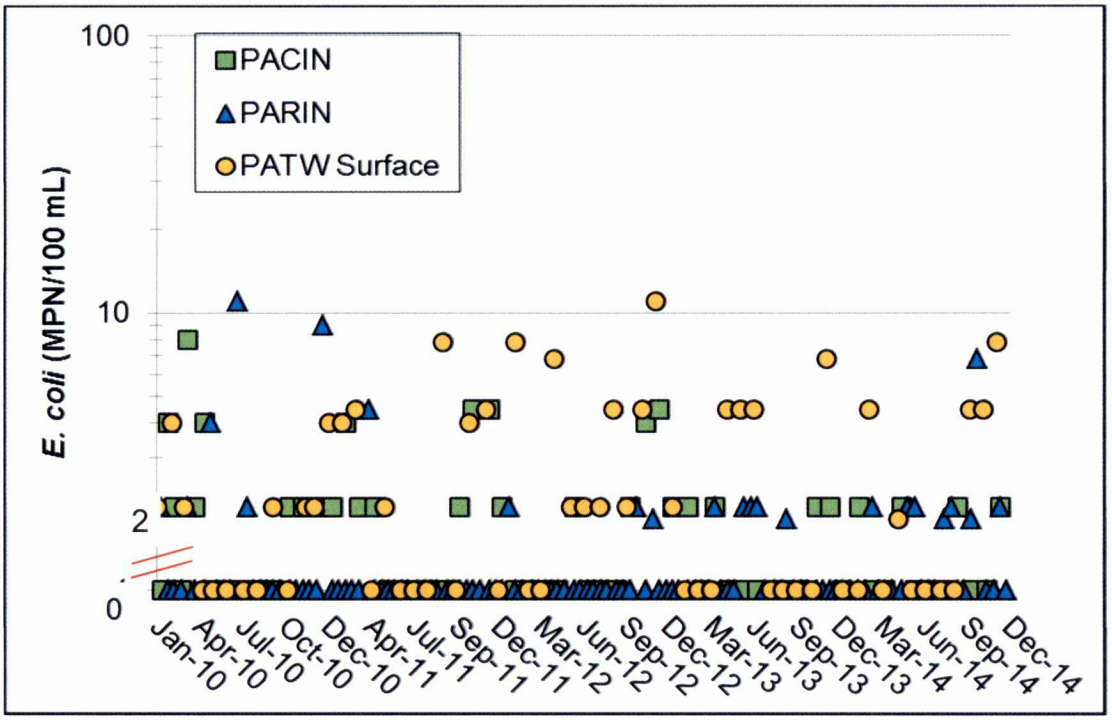
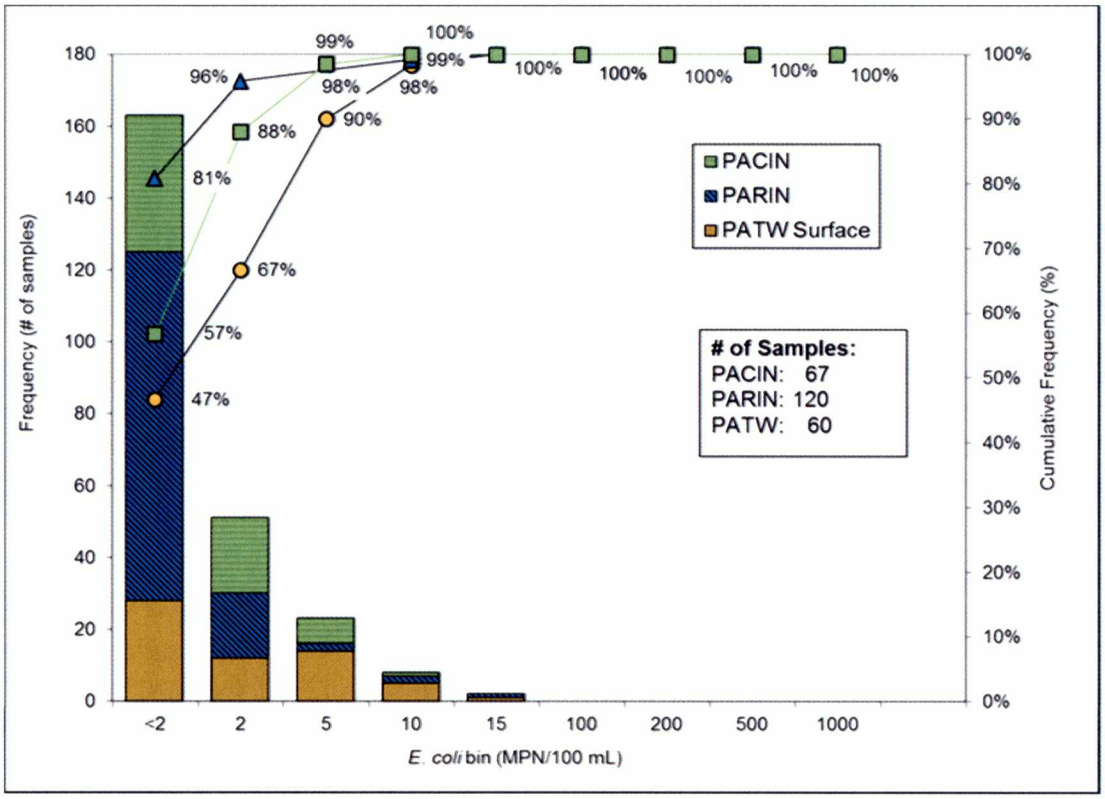


Figure 4-11. *E. coli* in Pardee Reservoir 2010-2014

(a) Sample results



(b) Frequency and cumulative distribution of sample results.



The District has monitored *Giardia* and *Cryptosporidium* in Pardee Tunnel at varying frequencies since 1991. Starting in October 2006, monthly samples were collected for two years as part of LT2ESWTR for the East Bay system, resulting in a Bin 1 classification. All of these samples were collected from Pardee Tunnel before chemical addition. Since 2012, the District has been conducting a baseline water quality monitoring study for *Cryptosporidium* and *Giardia*, as shown inTable 4-7. *Cryptosporidium* were not detected and *Giardia* was detected once in Pardee Tunnel during this sampling period.

Table 4-7. *Cryptosporidium* and *Giardia* in Pardee Tunnel 2012-2014

Collection Date	*Cryptosporidium* [a] Oocysts (# / L)	*Giardia* [a] Cysts (# / L)	DLR (# / L)
10/31/2012	*ND*	*ND*	*0.1*
12/11/2012	*ND*	*ND*	*0.1*
2/26/2013	*ND*	*ND*	*0.1*
4/9/2013	*ND*	*ND*	*0.1*
6/11/2013	*ND*	*ND*	*0.1*
8/6/2013	*ND*	*ND*	*0.1*
10/8/2013	*ND*	*ND*	*0.1*
12/10/2013	*ND*	*ND*	*0.1*
2/11/2014	*ND*	*0.1*	*0.1*
4/8/2014	*ND*	*ND*	*0.1*
6/10/2014	*ND*	*ND*	*0.1*
8/12/2014	*ND*	*ND*	*0.1*
10/14/2014	*ND*	*ND*	*0.1*
12/9/2014	*ND*	*ND*	*0.1*
# Samples	14	14	
# Detections	0	0	
Maximum	*ND*	*ND*	

a) ND: Non-detect

Regulated Inorganic Chemicals.

All regulated inorganics in Pardee Reservoir raw water were non-detect, below the DLR, with the exception of aluminum, which is easily removed in all five WTPs served by Pardee Reservoir. Aluminum samples were all well below the federal and state MCLs.

Title 22 requires the District to measure all regulated inorganic chemicals annually in PACIN, annually in the treated water effluents of the three East Bay in-line filter plants, and once every nine years in PARIN. All of the inorganics measured in the WTP effluents, as submitted to SWRCB-DDW in the monthly WTP and annual water quality reports, have been far below the MCLs.

Regulated Organic Compounds.

During the period of the MRWSS 2015 Update, none of the regulated SOCs or VOCs were detected above the MDL. DDW requires that the District monitor VOCs annually and SOCs twice a year every three years at PATW open gates. In addition, DDW requires that VOCs are also monitored once every six years at PACIN. MTBE has not been detected in Pardee Reservoir since 2003.

Radioactivity.

Based on Title 22, and sampling results, gross alpha will be monitored at PACIN once every nine years and all six regulated radiologicals will be monitored at PATW once every nine years. During the MRWSS 2015 Update, none of the regulated radioactive parameters were sampled in Pardee Reservoir. The regulated radioactive parameters were sampled in Pardee Reservoir during the MRWSS 2010 Update and all results were below their DLRs.

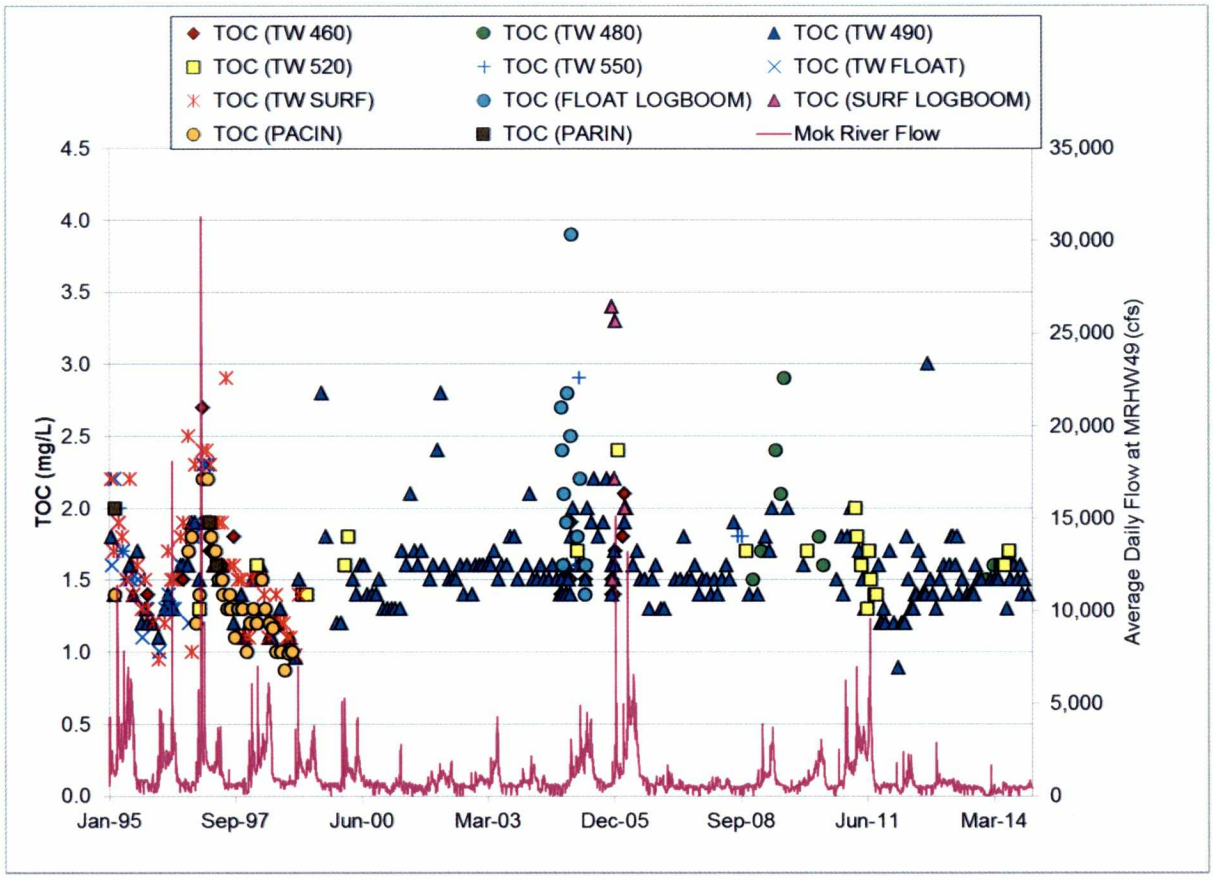
Disinfection By-Products.

The four trihalomethanes regulated in the distribution system under the D/DBP Rule are measured in Pardee Reservoir when other VOCs are analyzed. None were detected in the MRWSS Update 2015 period.

Total Organic Carbon.

During the MRWSS 2015 Update, TOC samples were only taken at the outlet tower, with results typically between 1.0 and 2.0 mg/L. The median TOC was 1.5 mg/L and the maximum was 3.0 mg/L, similar values to previous MRWSS updates (MRWSS Update 2005 and 2010 median TOCs were 1.2 and 1.6 mg/L, and maximum TOCs were 2.8 and 3.9 mg/L, respectively). TOC at PATW, PACIN, and PARIN typically spikes during higher runoff periods, but spikes are sometimes observed during low runoff periods.

Figure 4-12. TOC in Pardee Reservoir (1995 through 2014)



Taste & Odor.

During 2010 – 2014, TON was not monitored at Pardee Reservoir nor in the PARA or PACT influent or effluent. Many taste and odor problems can be associated with certain algal species commonly found in Pardee Reservoir according to literature. Planktonic algae are monitored throughout the year in Pardee Reservoir at the surface and at open gates of PATW. Samples are collected more frequently during warmer months when algal blooms may occur.

Results of planktonic algae sampling at Pardee Reservoir are summarized in Table 4-8, including the potential water treatment concerns associated with each species. This table is limited to classes of algae known to potentially pose concerns for taste and odor, and filtration treatment. This table only reports major species detected during the MRWSS 2015 Update with a maximum detected level greater than 10,000 # algae cells per 100 mL.

Table 4-8. Algal Genera Detected in Pardee Reservoir > 10,000 #/mL 2010 through 2014[a,b,c]

Algae Class / Genus	2010 - 2014 Max Detected Level (#/100 mL)	2005 - 2009 Max Detected Level (#/100 mL)	2000 - 2004 Max Detected Level (#/100 mL)	Water Treatment Concern[c]	
				Filter-Clogging	Potential Taste & Odor
Bacillariophyceae					
Aulacoseirae (formerly Melosira)	34,000	93,000	17,000	X	X
Cyclotella	24,000	49,000	7,800	X	X
Fragilaria	120,000	160,000	69,000	X	X
Nitzschia	14,000	16,000	19,000	X	
Chlorophyceae					
Spondylosium	23,000	11,000	16,000		
Ulothrix	34,000	7,400	1,500		X
Chrysophyceae					
Dinobryon	51,000	140,000	130,000	X	X
Cyanophyceae					
Aphanothece	1,300,000	23,000	ND	X	
Dolichospermum (formerly Anabaena)	140,000	160,000	37,000	X	X
Merismopedia	11,000	27,000	< 1000		

a) This list includes all algae detected greater than 10,000/100 mL at least once between Jan. 2010 and Dec. 2014.
b) At least one sample was collected during all 120 months of the period from January 2000 through December 2014.
c) AWWARF (now Water Research Foundation) and Lyonnaise des Eaux. *Identification and Treatment of Tastes and Odors in Drinking Water* (1987); and APHA, AWWA, and WEF, *Standard Methods for the Examination of Water and Wastewate*r, 21st Edition (2005).

During the MRWSS 2015 Update, the more problematic algae were present in similar amounts to those seen in the MRWSS 2010 update, an increase over the levels seen in the

MRWSS Update 2005. One species commonly associated with odor problems, *Cyanophyceae Anabaena*, was detected in three samples at approximately 100,000 cells per 100 mL, an order of magnitude higher than detected in the 2005 update. However, these levels are still below the estimated critical odor limit of 530,000 cells per 100 mL[1]. The *Cyanophyceae Aphanothece* species was detected in two samples exceeding 1,000,000 in fall 2013.

Algae that can potentially cause filter-clogging problems were identified in quantities of potential concern, such as *Fragilaria*, *Aulacoseira* (formerly classified as *Melosira*) and *Aphanothece*. The in-line filtration plants in the East Bay have experienced shorter filter run times during algae blooms in Pardee Reservoir. During stratified reservoir conditions, the gates of Pardee tower can often be operated to minimize the impact of these blooms.

Other Secondary Standards.

Aluminum was detected over the DLR in Pardee Reservoir raw water during the MRWSS 2015 Update period, but well below the MCL level. Pardee Center, PARA, Walnut Creek, Orinda, and Lafayette WTPs are all capable of reducing these metals, and the treated water effluent concentrations have been well below the secondary MCLs.

General Water Quality.

Minerals and nutrients were detected at low to moderate concentrations in Pardee Reservoir. As Table 4-5 indicates, Pardee is a relatively soft water, with hardness ranging from 8 to 20 mg/L as $CaCO_3$ during MRWSS 2015 Update period. The pH ranged from 6.7 to 8.7 and alkalinity was between 10 and 42 mg/L as $CaCO_3$.

Trends in Water Quality

Although elevated raw water turbidity events above 3 NTU occur periodically at PACIN and PARIN, as shown in Table 4-6, the PACT and PARA WTP membrane filtration plant effluent turbidities are near constant at 0.05 NTU, regardless of influent raw water turbidity. Table 4-9 presents effluent turbidity statistics for the District's East Bay Walnut Creek, Lafayette, and Orinda in-line WTPs that treat Mokelumne River water, also indicating consistent low effluent turbidities regardless of raw water fluctuations.

High raw water turbidity events more often result in operational difficulties and or shorter filter run times. Operational procedures have been developed to mitigate the impact of raw water turbidity spikes on treatment plant operations at the East Bay in-line WTPs. The effluent turbidities at all District WTPs meet all turbidity regulations. During the MRWSS 2015 Update period, all WTPs consistently met the regulatory standard for the average monthly turbidity percent reduction being greater than 80 percent.

[1] AWWARF (now Water Research Foundation) and Lyonnaise des Eaux. *Identification and Treatment of Tastes and Odors in Drinking Water* (1987).

Table 4-9. Combined Effluent Turbidity Statistics

Facility	East Bay Municipal Utility District Combined Plant Effluent Turbidity Statistics January 1, 2010 12:00 AM to December 31, 2014 11:59 PM						
	1-Minute Turbidity Data (NTU)						
	50%	90%	95%	97%	98%	99%	Total # of 1-Minute Readings
Lafayette WTP	0.022	0.029	0.032	0.034	0.035	0.038	1,834,569
Sobrante WTP	0.036	0.049	0.053	0.055	0.057	0.061	1,512,552
USL WTP	0.046	0.063	0.067	0.071	0.074	0.085	564,946
Walnut Creek WTP	0.029	0.036	0.039	0.04	0.042	0.044	2,624,356
Orinda WTP Comb Eff.	0.025	0.031	0.033	0.037	0.04	0.045	2,628,282
Pardee Center WTP	Maximum turbidity 2010 – 2014 = 0.05 NTU						
Pardee Recreation Area WTP	Maximum turbidity 2010 – 2014 = 0.05 NTU						

Comparison of Raw/Treated Water to Standards

The data collected in Pardee Reservoir and summarized in this report show that the raw water already meets most treated water quality standards. The only primary MCLs exceeded in the raw water are microbiological parameters and turbidity, all of which are effectively removed through the process trains at Pardee Center, PARA, Walnut Creek, Lafayette and Orinda WTPs. All five WTPs effectively treat Pardee Reservoir water and produce consistent, high-quality treated water, regardless of seasonal variations in raw water turbidity.

The District's annual CCRs report the treated drinking water quality data and are provided in Appendix 4-1 for the MRWSS 2015 Update period. The CCRs document water quality in compliance with the regulations, including distribution system water quality parameters.

Camanche Reservoir

Camanche Reservoir is predominantly used for flood control and to meet fish flow requirements defined in the District's water rights permit. One small system, CASS WTP, treats Camanche Reservoir water. The system serves about 250 permanent residents and a seasonal transient population, usually less than 3,000; therefore, the raw water quality monitoring requirements as defined under Title 22 for Camanche Reservoir are less extensive than those required for Pardee Reservoir. The results of this monitoring, along with other pertinent water quality parameters, are discussed below. CANS WTP treats groundwater and so is not included in this MRWSS.

Raw Water Quality

Table 4-10 is a statistical summary of the raw water quality data of parameters regulated by Title 22 and other pertinent parameters collected from Camanche Reservoir and CASS WTP influent (CASSIN) for the period of the MRWSS 2015 Update. For each parameter, the number of samples, number of detections, and the median, minimum, and maximum concentrations are included, along with the regulated MCLs and DLRs when applicable. It is important to remember that MCLs apply to treated water quality. The raw water quality is being evaluated using treated water MCLs as a benchmark and potential guide for treatment operations only.

Table 4-10. Camanche Reservoir Raw Water Monitoring – January 2010-December 2014[a]

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Microbiological Constituents									
Cryptosporidium	TT [b]	# / 10L	NA	NA	NA	NA	NA	NA	1
E. coli	TCR [c]	MPN/100mL	228	128	2	ND	1,100	1.8-2	- - -
Fecal Coliform	TCR [c]	MPN/100mL	108	87	4.5	ND	9,000	2	- - -
Giardia	TT [b]	# / 10L	NA	NA	NA	NA	NA	NA	1
Legionella	TT [b]		NA	NA	NA	NA	NA	NA	- - -
Total Coliform	TCR [c]	MPN/100mL	229	210	17	ND	>16,000	2	
Turbidity	TT [b]	NTU	NA	NA	NA	NA	NA	NA	- - -
Viruses	TT [b]		NA	NA	NA	NA	NA	NA	- - -
Primary Standards – Inorganic Chemicals									
Aluminum (Al)	1000	µg/L	5	5	83.8	51	140	9.36 - 17	50
Antimony (Sb)	6	µg/L	5	0	ND	ND	ND	0.2-0.3	6
Arsenic (As)	10	µg/L	5	5	0.4	0.27	0.54	0.2-0.4	2
Asbestos	7	MFL	1	0	ND	—	—	0.2	0.2
Barium (Ba)	1000	µg/L	5	5	19.4	15	24.2	0.1 – 1.04	100
Beryllium (Be)	4	µg/L	5	0	ND	ND	ND	0.03 - 0.051	1
Cadmium (Cd)	5	µg/L	5	0	ND	ND	ND	0.02 - 0.051	1
Chromium (Cr)	50	µg/L	7	0	ND	ND	ND	0.067 – 0.61	10
Chromium-6 (Cr (VI))	- - -	µg/L	3	2	0.02	ND	0.026	0.03 - 1	1
Cyanide (CN)	150	µg/L	NA	NA	NA	NA	NA	NA	100
Fluoride (F^-)	2	mg/L	5	5	0.025	0.016	0.039	0.0004 - 0.003	0.1
Mercury (Hg)	2	µg/L	5	0	ND	ND	ND	0.02 – 0.04	1
Nickel (Ni)	100	µg/L	5	5	0.32	0.27	0.44	0.1-0.3	10
Nitrate+Nitrite (as N)	10	mg/L	4	2	.0037	ND	0.019	---	- - -
Nitrate (as N)	10	mg/L	4	2	.0037	ND	0.019	0.0005 – 0.0031	0.4
Nitrite (as N)	1	mg/L	4	0	ND	ND	ND	0.0005 – 0.0015	0.4
Perchlorate (ClO_4^-)	6	µg/L	5	0	ND	ND	ND	0.3 – 0.5	4

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Selenium (Se)	50	µg/L	5	0	ND	ND	ND	0.2-0.4	5
Thallium (Tl)	2	µg/L	5	0	ND	ND	ND	0.2-0.3	1
Primary Standards – Synthetic Organic Chemicals (SOCs)									
Acrylamide	TT [b]		NA	NA	NA	NA	NA	NA	- - -
Alachlor	2	µg/L	1	0	ND	—	—	0.0052	1
Atrazine (Aatrex) [d]	1	µg/L	1	0	ND	—	—	0.0081	0.5
Bentazon	18	µg/L	NA	NA	NA	NA	NA	NA	2
Benzo(a)pyrene	- - -	µg/L	NA	NA	NA	NA	NA	NA	- - -
Carbofuran	18	µg/L	NA	NA	NA	NA	NA	NA	5
Chlordane	0.1	µg/L	NA	NA	NA	NA	NA	NA	0.1
Dalapon	200	µg/L	NA	NA	NA	NA	NA	NA	10
1,2-Dibromo-3-chloropropane (DBCP)	0.2	µg/L	1	0	ND	—	—	0.28	0.01
2,4-Dichlorophenoxy-acetic acid (2,4-D)	70	µg/L	NA	NA	NA	NA	NA	NA	10
Di(2-ethylhexyl)adipate	400	µg/L	NA	NA	NA	NA	NA	NA	5
Di(2-ethylhexyl)phthalate	4	µg/L	NA	NA	NA	NA	NA	NA	3
Dinoseb (DNBP)	7	µg/L	NA	NA	NA	NA	NA	NA	2
Diquat	20	µg/L	NA	NA	NA	NA	NA	NA	4
Endothall	100	µg/L	NA	NA	NA	NA	NA	NA	45
Endrin	2	µg/L	NA	NA	NA	NA	NA	NA	0.1
Epichlorohydrin	TT [b]		NA	NA	NA	NA	NA	NA	- - -
Ethylene Dibromide (EDB)	0.05	µg/L	1	0	ND	—	—	0.19	0.02
Glyphosate	700	µg/L	NA	NA	NA	NA	NA	NA	25
Heptachlor	0.01	µg/L	NA	NA	NA	NA	NA	NA	0.01
Heptachlor Epoxide	0.01	µg/L	NA	NA	NA	NA	NA	NA	0.01
Hexachlorobenzene	1	µg/L	NA	NA	NA	NA	NA	NA	0.5
Hexachlorocyclo-pentadiene	50	µg/L	NA	NA	NA	NA	NA	NA	1
Lindane	0.2	µg/L	NA	NA	NA	NA	NA	NA	0.2
Methoxychlor	- - -	µg/L	NA	NA	NA	NA	NA	NA	- - -
Molinate	20	µg/L	1	0	ND	—	—	0.011	2
Oxamyl (Vydate)	50	µg/L	NA	NA	NA	NA	NA	NA	20
Pentachlorophenol (PCP)	1	µg/L	NA	NA	NA	NA	NA	NA	0.2
Picloram	500	µg/L	NA	NA	NA	NA	NA	NA	1
Polychlorinated Biphenyls (PCB's)	0.5	µg/L	NA	NA	NA	NA	NA	NA	0.5
Simazine	4	µg/L	1	0	ND	—	—	0.0081	4
2,4,5-TP (Silvex)	50	µg/L	NA	NA	NA	NA	NA	NA	1
2,3,7,8-TCDD (Dioxin)	30	pg/L	NA	NA	NA	NA	NA	NA	5

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Thiobencarb	70	µg/L	1	0	ND	—	—	0.0092	1
Toxaphene	3	µg/L	NA	NA	NA	NA	NA	NA	1
Primary Standards – Radioactivity									
Gross Alpha	15	pCi/L	1	0	ND	—	—	1.59	3
Gross Beta/ Photon	50	pCi/L	1	0	ND	—	—	2.28	4
Radium 226+228	5	pCi/L	NA	NA	NA	NA	NA	NA	- - -
Radium-226	- - -	pCi/L	NA	NA	NA	NA	NA	NA	- - -
Radium-228	- - -	pCi/L	NA	NA	NA	NA	NA	NA	- - -
Strontium-90	8	pCi/L	NA	NA	NA	NA	NA	NA	2
Tritium	20,000	pCi/L	NA	NA	NA	NA	NA	NA	1,000
Uranium	20	pCi/L	NA	NA	NA	NA	NA	NA	1
Disinfectant/Disinfection Byproducts Rule									
Bromate	10	µg/L	NA	NA	NA	NA	NA	NA	5
Chloramines as Cl_2	4	mg/L	NA	NA	NA	NA	NA	NA	- - -
Chlorine as Cl_2	4	mg/L	NA	NA	NA	NA	NA	NA	- - -
Chlorine Dioxide	0.8	mg/L	NA	NA	NA	NA	NA	NA	- - -
Chlorite	1	mg/L	NA	NA	NA	NA	NA	NA	0.02
HAA5	60	µg/L	NA	NA	NA	NA	NA	NA	- - -
Total Trihalomethanes	80	µg/L	1	0	ND	—	—	---	- - -
Bromodichloro-methane	- - -	µg/L	1	0	ND	—	—	0.21	1
Bromoform	- - -	µg/L	1	0	ND	—	—	0.31	1
Chloroform	- - -	µg/L	1	0	ND	—	—	0.15	1
Dibromochloro-methane	- - -	µg/L	1	0	ND	—	—	0.26	1
Primary Standards – Volatile Organic Chemicals (VOCS)									
Benzene	1	µg/L	1	0	ND	—	—	0.14	0.5
Carbon Tetrachloride	0.5	µg/L	1	0	ND	—	—	0.25	0.5
1,2-Dichlorobenzene (o-DCB)	600	µg/L	1	0	ND	—	—	0.23	0.5
1,4-Dichlorobenzene (p-DCB)	5	µg/L	1	0	ND	—	—	0.18	0.5
1,1-Dichloroethane (1,1-DCA)	5	µg/L	1	0	ND	—	—	0.21	0.5
1,2-Dichloroethane (1,2-DCA)	0.5	µg/L	1	0	ND	—	—	0.14	0.5
1,1-Dichloroethylene (1,1-DCE)	6	µg/L	1	0	ND	—	—	0.2	0.5
cis-1,2-Dichlorethylene (c-1,2-DCE)	6	µg/L	1	0	ND	—	—	0.25	0.5
trans-1,2-Dichloro-ethylene (t-1,2-DCE)	10	µg/L	1	0	ND	—	—	0.19	0.5
Dichloromethane (Methylene Chloride)	5	µg/L	1	0	ND	—	—	0.18	0.5
1,2-Dichloropropane	5	µg/L	1	0	ND	—	—	0.15	0.5

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
1,3-Dichloropropene (TOTAL)	0.5	µg/L	1	0	ND	—	—	- - -	- - -
Cis-1,3-Dichloro-propene	- - -	µg/L	1	0	ND	—	—	0.23	0.5
Trans-1,3-Dichloro-propene	- - -	µg/L	1	0	ND	—	—	0.18	0.5
Ethylbenzene	300	µg/L	1	0	ND	—	—	0.18	0.5
Methyl-tert-butyl ether (MTBE)	13	µg/L	1	0	ND	—	—	0.39	3
Monochlorobenzene (Chlorobenzene)	70	µg/L	1	0	ND	—	—	0.21	0.5
Styrene	100	µg/L	1	0	ND	—	—	0.19	0.5
1,1,2,2-Tetra-chloroethane	1	µg/L	1	0	ND	—	—	0.2	0.5
Tetrachloroethylene (PCE)	5	µg/L	1	0	ND	—	—	0.2	0.5
Toluene	150	µg/L	1	0	ND	—	—	0.16	0.5
1,2,4-Trichlorobenzene	5	µg/L	1	0	ND	—	—	0.19	0.5
1,1,1-Trichloroethane (1,1,1-TCA)	200	µg/L	1	0	ND	—	—	0.19	0.5
1,1,2-Trichloroethane (1,1,2-TCA)	5	µg/L	1	0	ND	—	—	0.21	0.5
Trichloroethylene (TCE)	5	µg/L	1	0	ND	—	—	0.17	0.5
Trichlorofluoromethane (Freon 11)	150	µg/L	1	0	ND	—	—	0.22	5
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	1200	µg/L	1	0	ND	—	—	0.25	10
Vinyl Chloride	0.5	µg/L	1	0	ND	—	—	0.22	0.5
Xylenes (Total)	1750	µg/L	1	0	ND	—	—	0.18 – 0.37	- - -
m+p-Xylene	- - -	µg/L	1	0	ND	—	—	0.37	0.5
o-Xylene	- - -	µg/L	1	0	ND	—	—	0.18	0.5
Secondary Standards									
Aluminum (Al)	200	µg/L	5	5	83.8	51	140	9.36 - 17	50
Chloride (Cl)	250	mg/L	NA	NA	NA	NA	NA	NA	- - -
Color	15	color unit	NA	NA	NA	NA	NA	NA	- - -
Specific Conductance	900	µS/cm	NA	NA	NA	NA	NA	NA	- - -
Copper (Cu)	1000	µg/L	NA	NA	NA	NA	NA	NA	50
Foaming Agents (MBAS)	500	µg/L	NA	NA	NA	NA	NA	NA	- - -
Iron (Fe)	300	µg/L	NA	NA	NA	NA	NA	NA	100
Manganese (Mn)	50	µg/L	NA	NA	NA	NA	NA	NA	20
Methyl-tert-butyl ether (MTBE)	5	µg/L	1	0	ND	ND	ND	0.39	3
Odor-Threshold	3	TON	NA	NA	NA	NA	NA	NA	1
pH	6.5-8.5	pH units	1	1	7.6	NA	NA	0	- - -
Silver (Ag)	100	µg/L	NA	NA	NA	NA	NA	NA	10
Sulfate	250	mg/L	NA	NA	NA	NA	NA	NA	0.5

Water Quality Parameters	MCL	Units	No. of Samples	No. of Detections	Median	Minimum	Maximum	MDL	DLR
Thiobencarb	1	µg/L	1	0	ND	ND	ND	0.0092	1
Total Dissolved Solids (TDS)	500	mg/L	NA	NA	NA	NA	NA	NA	- - -
Turbidity	5	NTU	NA	NA	NA	NA	NA	NA	- - -
Zinc (Zn)	2000	µg/L	NA	NA	NA	NA	NA	NA	50

Other Constituents

Total Alkalinity (as $CaCO_3$)	mg/L	NA	NA	NA	NA	NA	NA	- - -
Ammonia	mg/L	NA	NA	NA	NA	NA	NA	- - -
Bromide	mg/L	NA	NA	NA	NA	NA	NA	- - -
Calcium (Ca)	µg/L	NA	NA	NA	NA	NA	NA	- - -
Total Hardness (as $CaCO_3$)	mg/L	NA	NA	NA	NA	NA	NA	- - -
Magnesium (Mg)	µg/L	NA	NA	NA	NA	NA	NA	- - -
TOC	mg/L	NA	NA	NA	NA	NA	NA	0.3
Dissolved Organic Carbon	mg/L	NA	NA	NA	NA	NA	NA	- - -
Orthophosphate (as P)	mg/L	NA	NA	NA	NA	NA	NA	- - -
Total Phosphate (as P)	mg/L	NA	NA	NA	NA	NA	NA	- - -
Silica	µg/L	NA	NA	NA	NA	NA	NA	- - -
Sodium (Na)	µg/L	NA	NA	NA	NA	NA	NA	- - -
Total Suspended Solids (TSS)	mg/L	NA	NA	NA	NA	NA	NA	- - -
Tert-Amyl methyl ether	µg/L	1	0	ND	---	---	0.17	3
Ethyl-tert-butyl-ether	µg/L	1	0	ND	---	---	0.19	3

a. Abbreviations: DLR = Detection Limit for Reporting, MDL = Method Detection Limit, NA = data not available, ND = not detected above the MDL (i.e. value is below the method detection limit), — = statistic is impossible to compute due to low sample count, - - - = no value exists, TT = Treatment Technique (see footnote *b*), TCR = Total Coliform Rule (see footnote *c*).

b. Treatment Technique (TT)

- *Cryptosporidium*: 99% removal.
- *Giardia lamblia*: 99.9% removal/inactivation
- Viruses: 99.99% removal/inactivation
- *Legionella*: No limit, but USEPA believes that if *Giardia* and viruses are removed/inactivated, *Legionella* will also be controlled.
- Turbidity: Turbidity may never exceed 1 NTU, and must not exceed 0.3 NTU in 95% of daily samples in any month.
- Acrylamide: 0.05% monomer in polyacrylamide dose of 1 ppm
- Epichlorohydrin: 0.01% residual of epichlorohydrin in dose of 20 mg/L.

c. Total Coliform Rule (TCR) – No more than 5.0% samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliform or *E. coli*. If two consecutive TC-positive samples, and one is also positive for *E. coli* or fecal coliform, the system has an acute MCL violation.

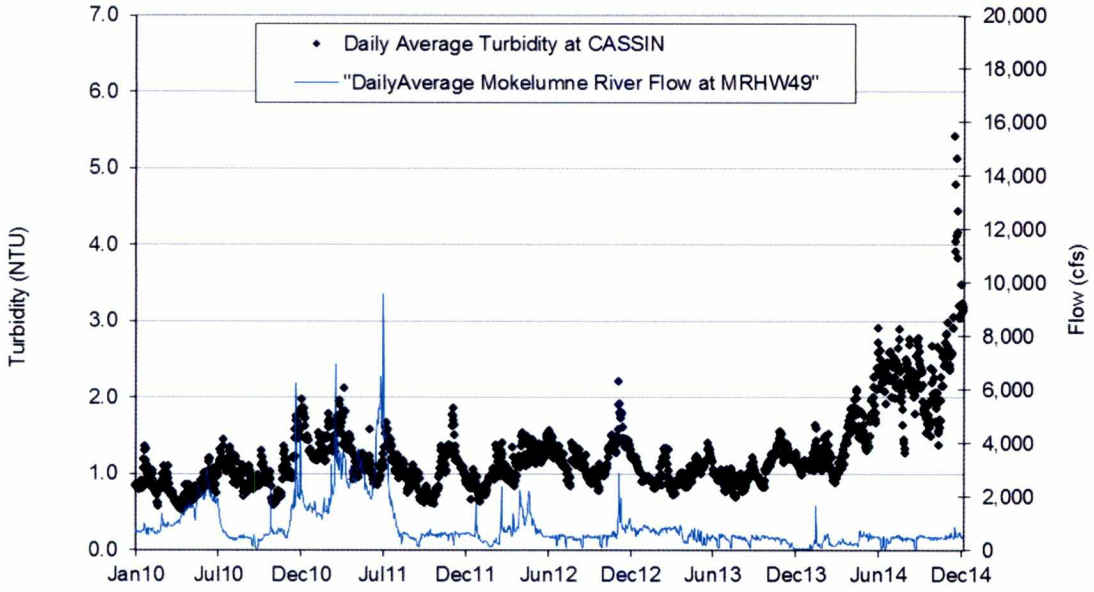
Turbidity.

Camanche Reservoir raw water has very low turbidity water most of the time, with occasional spikes of moderate turbidity. Figure 4-13 compares the CASS WTP effluent daily average turbidity (online turbidity monitoring station) with the Mokelumne River flow into Pardee Reservoir. Although elevated turbidity events typically occur in the winter and/or spring with higher runoff, during the MRWSS Update 2015 there have been fewer high flow events in the Mokelumne River. Due to the drought, in 2014 the level in Camanche Reservoir dropped from a typical elevation of approximately 220 feet down to 184 feet, resulting in higher than normal dry weater raw water turbidities.

As seen in Table 4-11, Camanche Reservoir raw water turbidity daily average was a median of 1.1 NTU, as measured at the CASS WTP influent online turbidimeter, with a maximum of 5.4 NTU. During the MRWSS Update 2015, the Camanche Reservoir median and maximum turbidity was similar to turbidities during the MRWSS Update 2010.

Figure 4-13. Daily Average Turbidity at CASSIN and Daily Average Flow in the Mokelumne River

Turbidity and flow were measured by online monitoring stations at CASSIN and MRHW49, respectively.



Microbiological Water Quality.

Camanche Reservoir is primarily used for flood control and fish flows. However, the District does monitor for coliform throughout the reservoir. The District collected samples once every two weeks for total coliform and *E. coli* at CASSIN. Both parameters were also sampled every two weeks during the summer in the vicinity of CASS Beach Area (Beach Cove and Beach Area HB locations).

Table 4-11 shows the statistical summary for each microbiological parameter with all raw water sampling locations combined for the MRWSS 2015 Update and MRWSS 2010

Update periods. The median and maximum coliform concentrations remained at the same order of magnitude between periods for each parameter.

Table 4-11. Summary of Turbidity and Coliform data in Camanche Reservoir a from MRWSS Update 2005 and MRWSS Update 2010

Parameter	Units	MRWSS Update 2015 2010 – 2014			MRWSS Update 2010 2005 - 2009			MDL
		No. of Samples	Median	Max	No. of Samples	Median	Max	
Turbidity (Daily Average)	NTU	NA [b]	1.1	5.4	NA [b]	0.96	3.94	
E. coli	MPN/100 mL	228	2	1,100	302	2	9,000	1-2
Fecal Coliform	MPN/100 mL	108	4.5	9,000	226	2	9,000	2
Total Coliform	MPN/100 mL	229	17	≥16,000	252	29	16,000	2

a) The minimum for all coliform was non-detect for both periods.
b) NA: not applicable. Turbidities were measured continuously by an online analyzer at CASSIN. The daily averages were analyzed for the median and maximum statistics.

Figures 4-14 and 4-15 show the results of total coliform and *E. coli* sampling, respectively. Total coliform exceeded 1,000 MPN/100 mL most summers on the reservoir surface during high recreational use. At CASSIN, the total coliform was typically less than 100 MPN/100 mL because the plant intake is in a protected location and below the reservoir surface. Similarly, the *E. coli* maxima also peaked during the summer, with peak results on the reservoir surface ranging from 100 MPN/100 mL to 1000 MPN/100 mL. At CASSIN the *E. coli* was typically less than 10 MPN/100 mL. As illustrated by the frequency and cumulative distribution of data in Figure 4-15, the *E. coli* distribution at CASSIN was concentrated at non-detect and low concentrations, whereas the distribution at the reservoir surface was more evenly distributed across the spectrum. The *E. coli* samples collected for Round 1 LT2ESWTR at CASSIN were well below 10 MPN/100 mL, so *Cryptosporidiium* monitoring was not required. CASS WTP has been assigned a Bin 1 classification and the District will not be required to meet additional removal requirements for *Cryptosporidium*.

Regulated Inorganic Chemicals

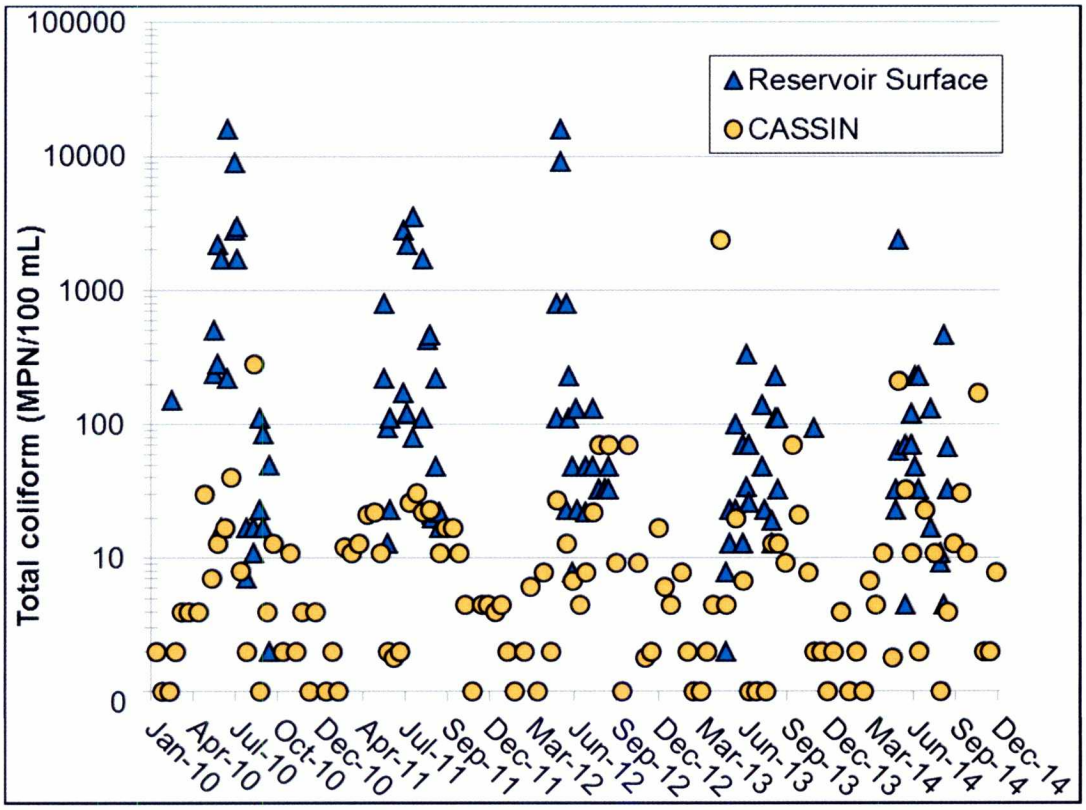
The maximum raw water concentrations of regulated inorganics in Camanche Reservoir raw water have been non-detect or well below the federal and state MCLs, based on annual Title 22 sampling at CASSIN.

Regulated Organic Compounds

SWRCB-DDW approved a reduced monitoring waiver for the regulated SOCs in 2005, with the result that only atrazine and simazine are sampled once every every nine years in Camanche Reservoir at CASSIN. Atrazine and simazine were last sampled in April 2012 and were not detected. Camanche Reservoir was monitored once for VOCs in the MRWSS 2015 Update period, in May 2014 at the CASSIN sampling location, and all results were below the MDL. MTBE has not been detected in Camanche Reservoir since 2003.

Figure 4-14. Total Coliform in Camanche Reservoir

(a) Sample results. Non-detect samples were treated as zero (MDL = 2 MPN/100 mL).



(b) Frequency and cumulative distribution of sample results.

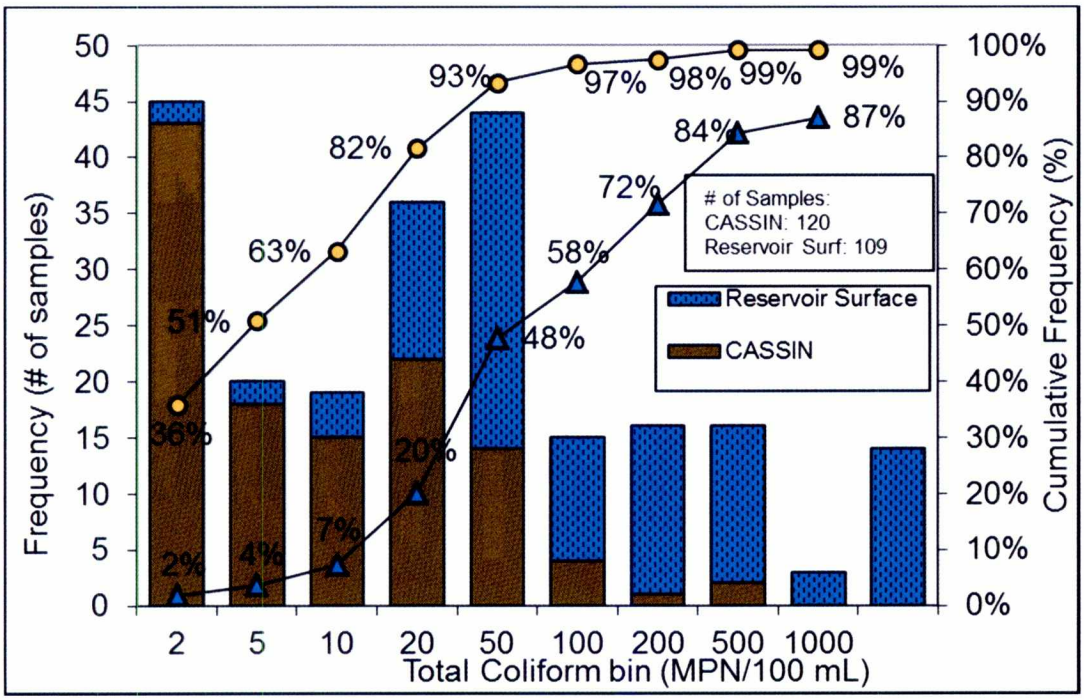
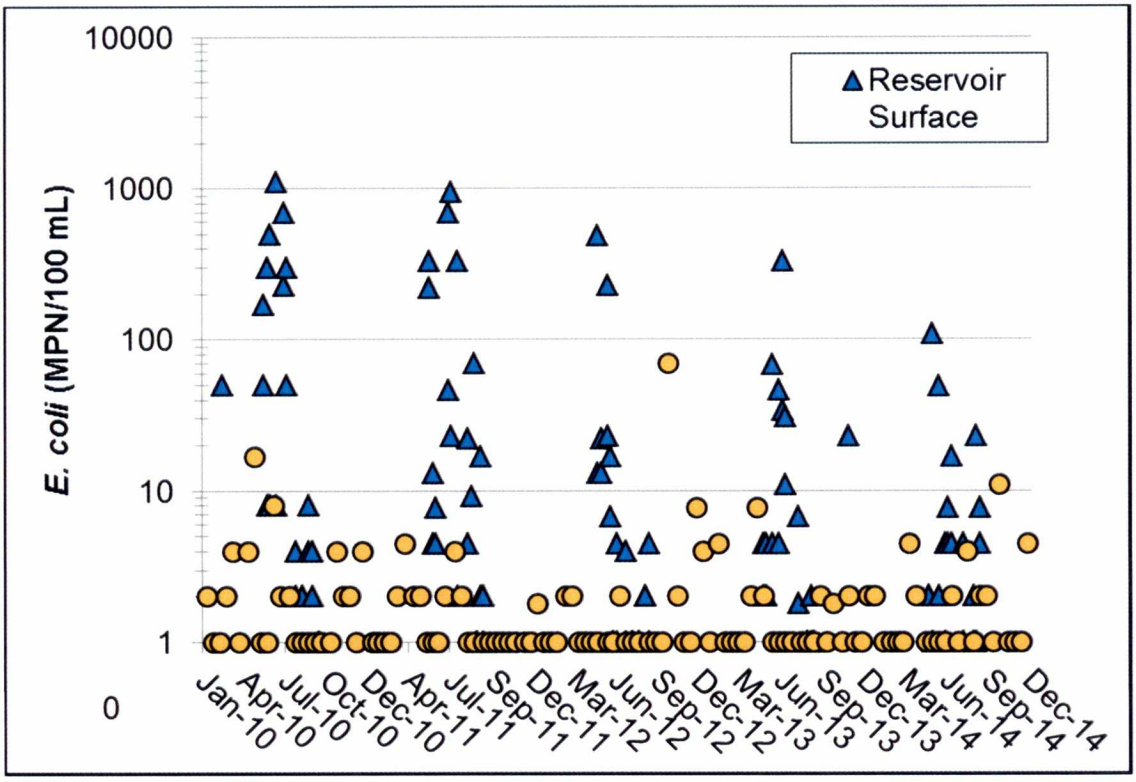
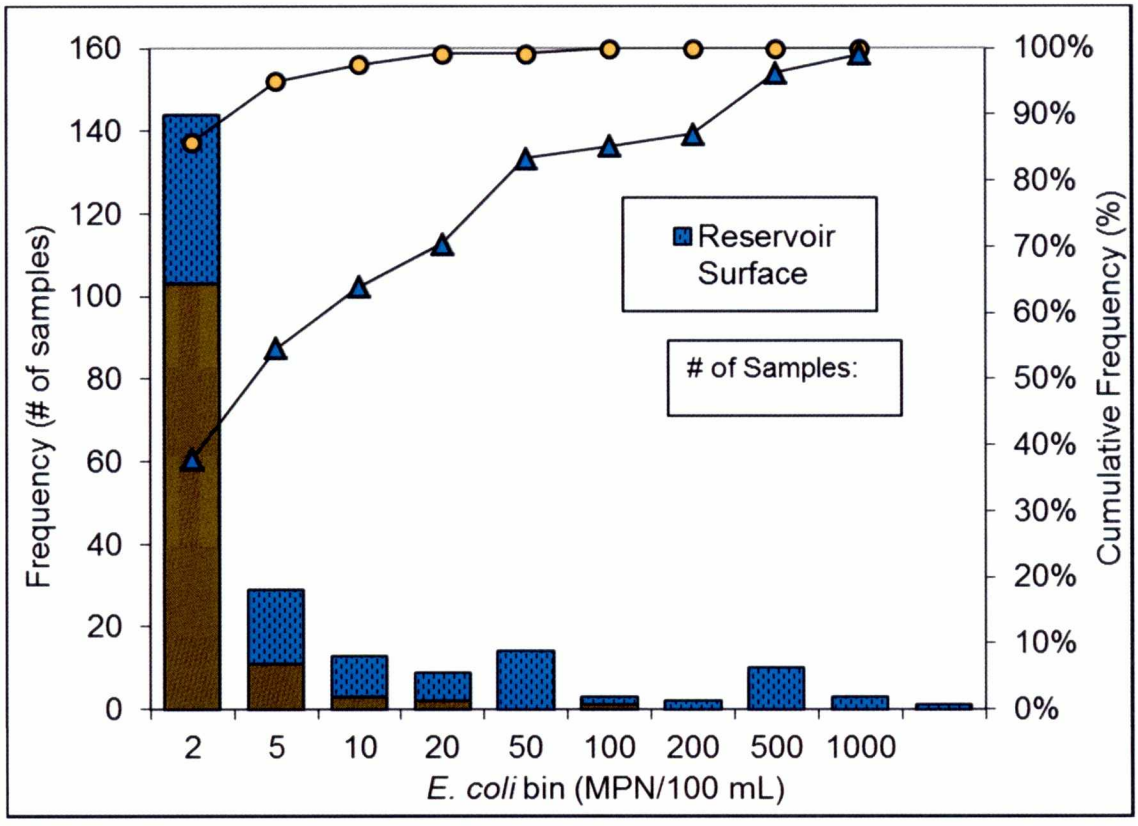


Figure 4-15. *E. coli* in Camanche Reservoir





Radioactivity

Under Title 22, the District is required to monitor gross alpha particle activity at CASSIN once every nine years; gross alpha was last sampled in 2010 and it was non-detect. SWRCB-DDW will not require uranium or radium monitoring unless gross alpha particle activity exceeds 5 pCi/L. Small systems like CASS WTP are not required to monitor for strontium, tritium, or gross beta particle activity.

Disinfection By-Products

The four trihalomethanes regulated in the distribution system under the D/DBP Rule are measured in Camanche Reservoir when other VOCs are analyzed. None were detected during the period of this MRWSS update.

Total Organic Carbon

TOC sample was not monitored from CASSIN during the period of this MRWSS update.

Taste & Odor

TON in CASSIN was not sampled during the period of the MRWSS 2015 Update. The TON collected from the plant effluent ranged from 1 to 35 TON, exceeding the secondary MCL.

Many taste and odor problems can be associated with certain algal species commonly found in Camanche Reservoir, however, since the reservoir is primarily used for flood control and fish flows, planktonic algae are not monitored as closely as in Pardee Reservoir. Algae have not been an issue for treatment performance and operation at CASS WTP. In the period of the MRWSS 2015 Update, plankton samples were taken on only one occasion in January 2014 at one location. Table 4-12 presents the results for algae that were detected during the one sample in January 2014 **and** that were present at levels greater than 10,000 algae cells/mL (though typically much higher levels are needed to cause treatment concerns). Furthermore, this table is limited to classes of algae known to pose concerns for water quality and treatment, listing the potential water quality and treatment concerns associated with each species.

Other Secondary Standards

SWRCB DDW no longer requires sampling for secondary parameters in the CASSIN. Those parameters that were sampled are shown in Table 4-10 and were either non-detect or well below the MCL.

General Water Quality

Minerals and nutrients were detected at low to moderate concentrations in Camanche Reservoir. As noted in Table 4-10, Camanche Reservoir water is fairly neutral in nature with a median pH of 7.6.

Trends in Water Quality

The treated water turbidities at CASS WTP indicate that consistently low turbidity is produced whether or not there is a raw water turbidity spike caused by a rainfall event.

Total coliform and *E. coli* data discussed previously suggest a direct correlation between maximum raw water microbiological counts and highest annual recreational use of Camanche Reservoir.

Table 4-12. Algal Genera Detected in Camanche Reservoir January 27, 2014>10,000 #/mL[a]

Algae Class / Genus	January 27, 2014 Max Detected Level (#/100 mL)	2000 - 2009 Max Detected Level (#/100 mL)	Water Treatment Concern[c]	
			Filter-Clogging	Potential Taste & Odor
Bacillariophyceae				
Cyclotella	16,000	2,000	X	X
Nitzschia	15,000	13,000	X	
Cyanophyceae				
Dolichospermum (formerly Anabaena)	78,000,000	ND	X	X

a) Sources: EBMUD, 2005; AWWA, Lyonnaise, Des Eaux, 1987; APHA, AWWA, and WEF, 1992.

Comparison of Raw/Treated Water to Standards

The data collected in Camanche Reservoir and summarized in this report show that the raw water already met most treated water quality standards. The only primary MCLs exceeded in the raw water were microbiological parameters and turbidity, which were effectively removed through the process train at CASS WTP. Table 4-1 highlights the consistently low turbidity of the treated water from the plant effluent. The CASS filters consistently surpassed the operating criteria of 80 percent turbidity removal of the monthly average raw water turbidity. CASS WTP produced consistent, high quality treated water, regardless of seasonal variation in raw water turbidity. Odor concentrations occasionally exceeded secondary MCLs in the treated effluent, but the MCL exceedance for TON did not coincide with any odor complaints by consumers.

The data indicates that CASS WTP effectively treated Camanche Reservoir water. The CCRs document distribution system-wide averages for the pertinent water quality parameters and are provided in Appendix 4-1. Monthly summaries of WTP operations were used to evaluate the corresponding treated and finished water qualities.

Table 4-13. Combined Effluent Turbidity Statistics

Turbidity		
Camanche South Shore WTP	0.1 NTU	Maximum turbidity 2010 – 2014 as reported in the Annual Water Quality Report (CCR)

Evaluation of the System's Ability to Meet the SWTR and DBPR

This section discusses the ability of the Upper Mokelumne River Watershed Area's water treatment and distribution systems to meet USEPA's SWTR, IESWTR, LT1ESWTR, LT2ESWTR, and S2DBPR. The evaluation includes the three small systems in the vicinity

of Pardee and Camanche Reservoirs and the three large system in-line WTPs in the East Bay, Walnut Creek, Orinda, and Lafayette WTPs. The three large system in-line WTPs treat Mokelumne River water transported from Pardee Reservoir through the Mokelumne Aqueducts to the East Bay. PARA and Pardee Center WTPs treat Pardee Reservoir water, while CASS WTP treats Camanche Reservoir water. CANS WTP treats groundwater and is not included in this evaluation, since its supply is not under direct influence of surface water.

Treatment Requirements for SWTR, IESWTR

Multi-barrier treatment systems must be provided for approved surface waters, reliably achieving the following performance requirements:

SWTR

- A total of 99.9 percent (three log) reduction of *Giardia* cysts through filtration and disinfection,
- A total of 99.99 percent (four log) reduction of viruses through filtration and disinfection,
- Residual disinfectant concentration cannot be <0.2 mg/L for more than four hours, and
- Residual disinfectant concentration cannot be undetectable in greater than 5 percent of samples in a month, for any two consecutive months.

IESWTR and LT1ESWTR

A total of 99 percent (two log) reduction of *Cryptosporidium* through filtration, provided TT performance parameters are met, as described below,

Performance Standards.

SWTR, IESWTR, and LT1ESWTR established turbidity performance standards. The turbidity level of the combined filter effluent:

- Shall be less than or equal to 0.3 NTU in at least 95 percent of the measurements taken each month; except Walnut Creek, Orinda, and Lafayette WTPs, which shall be less than or equal to 0.2 NTU in at least 95 percent of the measurements taken each month as a condition of the Water Supply Permit.
- Shall not exceed 1.0 NTU for more than one continuous hour;
- Shall not exceed 1.0 NTU at four-hour intervals; and
- Shall not exceed 1.0 NTU for more than eight consecutive hours; except Walnut Creek, Orinda, and Lafayette WTPs which shall not exceed 0.5 NTU for more than eight consecutive hours as a condition of the Water Supply Permit.

Monitoring Requirements

On-line instrumentation collects flow, pH, turbidity and chlorine residuals data on a continual basis. The District follows the sample monitoring program as specified in the annual SWTR Operations Plan for the East Bay in-line WTPs. Water quality monitoring for Pardee Center, PARA, and CASS Recreation Area WTPs is conducted in accordance with provisions of the individual Water Supply Permits.

Operating Criteria

For the East Bay in-line WTPs, the SWTR Operations Plan gives criteria for length of filter runs and describes backwash procedures for each plant. Filter backwash procedures stipulate the requirements the filters must meet when being placed back in service. Filtered water turbidity levels are measured continuously. The SWTR Operations Plan also lists treatment chemical supplies stored for use, and contacts for vendors whose products are used regularly. It outlines procedures for each plant in the event of disinfection failure, including shutdown of the plant if a chlorine residual of 0.2 mg/L cannot be met in the plant effluent.

Operational criteria for the Pardee Center, PARA, CANS Recreation Area, and CASS Recreation Area WTPs are followed in accordance with their respective Water Supply Permits. Filtered water turbidity levels are measured continuously. Plant procedures are followed for chemical supplies and disinfection.

Reporting

To meet regulatory requirements, the District submits a monthly water quality report to the SWRCB-DDW. This report typically contains the following and other information as deemed necessary:

- Distribution System Bacteriological Test Results Report, including percentage of distribution samples with detectable residuals to comply with the SWTR.
- Monthly SWTR Summary of Monitoring
- Exception Report
- Monthly Fluoridation Report
- Water Quality Complaints Summary

Based on the results presented in these reports, the treated water from all six plants (CASS, Pardee Center, PARA, Walnut Creek, Lafayette, and Orinda WTPs) met all turbidity requirements each month they were in operation. Also, in each WTP, the filters surpassed the operating criteria of 80 percent turbidity removal of the monthly average raw water turbidity. All operating criteria were met when filters were returned to service. The performance standard of maintaining a disinfection residual not less the 0.2 mg/L was achieved at each plant. Finally, distribution system monitoring complied with SWTR requirements - total coliform counts were zero in more than 95 percent of the monthly samples. Also, a detectable disinfection residual and/or HPC less than or equal to 500 cfu/ml was measured in more than 95 percent of the monthly samples.

CASS exceeded the secondary MCL for odor (TON) in three samples in 2012, but the MCL exceedances did not coincide with any odor complaints by consumers.

LT2ESWTR

The LT2ESWTR was promulgated in January 2006 to mitigate *Cryptosporidium* risks for large and small water systems. In adherence to LT2ESWTR, the District began two years of monthly monitoring in October 2006 for *Cryptosporidium*, *E. coli*, and turbidity in Pardee Reservoir for the large system East Bay in-line WTPs. *Cryptosporidium* was not detected, and Walnut Creek, Lafayette, and Orinda WTPs were assigned a Bin 1 classification; additional treatment is not required. Filtration studies were conducted to demonstrate the

District's in-line filtration process is equivalent to or exceeds direct filtration in particulate removal performance. Reports from these studies were submitted to and approved by SWRCB-DDW. The next round of LT2ESWTR monitoring will begin in April 2015 and will be discussed in the MRWSS 2020 Update.

During the MRWSS 2010 Update, *E. coli* samples were collected at least twice per month for 12 consecutive months from PACIN, PARIN, and CASSIN to represent each small system. Based on these results, Pardee Center, PARA, and CASS WTPs were assigned a Bin 1 classification under LT2ESWTR, and the District will not be required to meet additional removal requirements for *Cryptosporidium*.

PACIN, PARIN and CASSIN will be monitored for LT2ESWTR again in 2017 for small systems.

S2DBPR

S1DBPR required quarterly sampling for TTHMs and HAA5s at various locations in the distribution system and set MCLs at 80 µg/L and 60 µg/L, respectively. Under S1DBPR, MCL compliance is calculated using the running annual average (RAA) of all samples from all monitoring locations across the system. S2DBPR built on that rule by ensuring that samples are collected from areas of the distribution system most vulnerable to high DBPs. The rule included a provision that required an initial distribution system evaluation (IDSE) in order to identify these areas. Sixteen sites in the East Bay distribution system were chosen for S2DBPR, including areas served by Walnut Creek, Lafayette, and Orinda WTPs: four represent average residence times, six represent the highest TTHMs in the system, and six represent the highest HAAs in the system. Under S2DBPR, MCL compliance is calculated using the locational RAA (LRAA) for each monitoring location in the distribution system. The District samples quarterly at these locations to comply with S2DBPR. As documented in the monthly reports submitted to SWRCB-DDW, the distribution system samples were always in compliance with S2DBPR.

Under S2DBPR requirements, the Camanche and Pardee water systems were not required to conduct IDSE monitoring due to small system waivers. In 2013, under S2DBPR, THM and HAA5 monitoring in the small systems was increased from one annual sample to two sample sites, each sampled annually.

Conclusion

Pardee Reservoir raw water quality is generally excellent. Camanche Reservoir raw water quality is very good, although the raw water turbidity did rise with the drought and dropping reservoir level. The raw water turbidity and coliform levels were above the treated water MCLs, as is typical. The raw waters met all the primary treated water MCLs for radioactivity and organic chemicals. During the MRWSS 2015 Update period, raw water aluminum exceeded the DLR but remained far below the primary and secondary drinking water MCLs. Metals are efficiently removed in treatment at all District WTPs.

In the past, elevated MTBE concentrations in both reservoirs brought the attention of the District. However, due in part to District efforts, as well as a state ban on MTBE in gasoline, no MTBE has been detected in either reservoir since 2003.

Pardee Center, PARA, CASS, Walnut Creek, Lafayette and Orinda WTPs were effective and reliable at removing particulates and microorganisms. The monthly WTP reports and annual water quality reports submitted to SWRCB-DDW indicate that the treated or finished waters from these six WTPs met all treated water quality regulations. In addition, disinfection residual and HPC data from the distribution systems showed that the District had no problems meeting the detectable disinfectant residual criteria of the IESWTR. On the basis of LT1ESWTR and LT2ESWTR sampling, all systems were assigned a Bin 1 classification and additional treatment is not required. S1DBPR and S2DBPR TTHM and HAA5 results continue to be well below the MCLs.

Section 5: Potential Contaminant Sources

Introduction

This section summarizes the potential contaminant sources identified in the previous MRWSSs (1995, updated 2000, 2005 and 2010), and expands on those accounts using potential contaminant data made available in the update period between 2010 and 2014. Agencies with jurisdiction in the watershed were solicited for data to assess each potential contaminant source. Sources from these agencies and from within EBMUD were interviewed and reviewed to determine the status and development of contaminant sources.

This section first presents the potential contaminant sources found in each of the two watersheds, and then summarizes the significance of the potential contaminant sources:

- Upper Mokelumne River Watershed (upstream of Pardee Dam).
- Camanche Watershed
- Significance of the Potential Contaminant Sources

Upper Mokelumne River Watershed

Potential contaminant sources found in the Upper Mokelumne River Watershed are discussed in the following categories:

- EBMUD Facilities (all sources and categories combined)
- Water Resources Development
- Sanitation Facilities
- Hazardous Materials
- Urban Area Runoff
- Rural Area Runoff
- Utilities - Hydroelectric Power
- Transportation Corridors
- Agriculture
- Wildlife and Livestock
- Recreation/Public Access
- Mines
- Geologic Hazards
- Fires and Fuels management
- Logging
- Pesticides
- Unauthorized Activities

EBMUD Facilities

EBMUD facilities within the Upper Mokelumne River Watershed include the Pardee Reservoir, PARA, Pardee Center, and the Pardee Dam, Spillway and Powerhouse. Each of these facilities is discussed below with respect to potential contaminant sources.

Pardee Reservoir

Recreation at Pardee Reservoir is strictly controlled by EBMUD in accordance with the provisions of EBMUD's Water Supply Permits, Concession Contract Agreements, and the licensing requirements from FERC. Although boating is allowed at the reservoir, body contact with the water is not allowed. The reservoir is patrolled regularly to limit incidents of illegal body-contact and trespassing.

Adequate sanitation facilities for boaters utilizing Pardee Reservoir are a potential public health issue. EBMUD has addressed the problem by maintaining a combination of floating and shoreline toilets to meet visitor use demands. EBMUD staff (not concessionaire employees) regularly pump out the toilets following practices that minimize any chance for spillage, and then dispose of the effluent at the PARA WWTP. The facilities are maintained and inspected on a regular basis.

Potential contaminating incidents during the period 2010-2014:

- On July 7, 2014, there was a gasoline spill near the Pardee Dam and approximately eight ounces of gasoline entered Pardee Reservoir when a boat capsized during a medical emergency. Absorbent pads were deployed.

Pardee Recreation Area (PARA)

PARA is located in a rural area on the north shore of Pardee Reservoir in Amador County. The main roads into the area are Stoney Creek Road and Pardee Dam Road. There are no major businesses, care facilities, highways, hospitals, or schools in the immediate area. Predominantly undeveloped watershed and agricultural lands surround the facility.

PARA encompasses approximately 289 acres. PARA will close temporarily July 2015-February 2016 for remodeling and renovations. Table 5-1 summarizes the facilities at the PARA and Figure 5-1 shows the general area layout. The remaining acreage is undeveloped watershed. Beginning in 2009, the marina boat fueling facilities became on-shore only. The PARA water and wastewater treatment plants are maintained and operated by EBMUD. All other facilities are maintained and operated by the concessionaire, Pardee Lake Recreation.

Recreation. The recreation area is normally closed during the winter months (from the first Sunday of November until the Friday leading into President's Day weekend in February). Recreation is restricted to hiking, picnicking, camping, recreational vehicle (RV) parking, fishing and boating. No body contact activities are allowed.

Table 5-2 summarizes visitor use at PARA between 2010 and 2014. There was an average of 80,500 visitors per year at PARA, down from 96,700 visitors per year during the previous update period. Fishing is a major activity at Pardee Reservoir; since there is a national trend of reduced interest in fishing as a recreational activity, this may explain at least part of the decline in visitor numbers. During this update period there were no sewer overflows.

Water Supply. PARA is served by the PARA WTP which is described in Section 2.

Hazardous Material Storage. The WTP for Pardee Reservoir Recreation Area uses sodium hypochlorite for disinfection. The 12 percent hypochlorite is stored in a 20-gallon bulk storage tank with spill containment. Any spills are contained within the WTP building. An inventory of hazardous materials stored on site is performed annually and reported in the Pardee Recreation Environmental Emergency Response and Release Prevention Plan (ER Plan). A table of hazardous materials, as listed in the 2014 ER Plan, is reproduced here in Appendix 5-1.

Three underground storage tanks (UST) were removed from above the marina store at PARA in 1997, as detailed in the MRWSS 2010 update. After a period of groundwater monitoring for hydrocarbons, the site closure was approved in June 2005 by the RWQCB.

Sanitation Facilities. Operation of EBMUD's PARA WWTP is conducted under permit with the RWQCB. The wastewater is routed to a primary treatment pond followed by a polishing pond. Table 5-3 summarizes the WWTP's characteristics. Appendix 5-2 provides an overview of the monitoring program for the PARA wastewater ponds.

Pardee Center

Pardee Center is located on the west shore of Pardee Reservoir, primarily in Calaveras County (Figure 5-2). The main roads into the area are Pardee Dam Road and Sandretto Road. There are no major businesses, care facilities, highways, hospitals, or schools in the immediate area. Undeveloped watershed and agricultural land surround the facility. Pardee Center is an EBMUD facility consisting of administrative offices, a chemical feed facility, equipment storage areas, a fuel-dispensing station, maintenance shops, a swimming pool, two residences, a WTP, a WWTP, and two small parking areas.

Chemical Feed Facility. The main Pardee Center Chemical Plant feeds liquid calcium hydroxide (liquid lime) into the Mokelumne Aqueducts for pH adjustment. Prior to June 2012, sodium hypochlorite was fed into the aqueducts at this location for disinfection (now dosed near Walnut Creek WTP).

Water Supply. Pardee Center is served by the Pardee Center WTP which is described in Section 2. The WTP uses nano-filtration membranes in the treatment process. Pardee Center WTP uses sodium hypochlorite for disinfection.

Hazardous Materials. The chemical feed facility stores liquid sodium hypochlorite (12.5 percent concentration by weight) in three 10,000-gallon bulk storage tanks, two tanks in service and one empty in standby. The liquid calcium hydroxide is stored in two tanks, one in service and one empty in standby. The Pardee Center WTP transfers sodium hypochlorite from the chemical feed facility to the WTP in 3-5 gallon carboys. The sodium hypochlorite is then stored in a 15-gallon container, diluted down to an approximately one percent solution. Soda ash is used for WTP effluent pH adjustment and corrosion control and is mixed in a 12-gallon container. Any spills are contained locally in the treatment building. An inventory of hazardous materials stored on site is performed annually and reported in Pardee Center ER Plan.

For a summary of the Pardee Lime Facility NPDES Industrial Stormwater Permit from the RWQCB, see the 2010 MRWSS update.

Sanitation Facilities. The Pardee Center WWTP is operated under permit with the RWQCB. Table 5-3 summarizes the plant's characteristics. Effluent from the WWTP is conveyed into a holding/settling tank with a capacity of about 1,000 gallons for additional treatment. The effluent from the tank is routed to a 2,900 gallon sump before disposal to a percolation pond. Any drainage from overflows (none have occurred in the past) would flow to the Pardee Spillway, which drains to Camanche Reservoir. Appendix 5-2 contains discharge permit monitoring requirements for Pardee Center WWTP.

The entire WWTP was refurbished to original technical specifications in 2008 to ensure continued compliance with regulations. Cleaning and CCTV inspection of wastewater mains is used as a preventative maintenance effort to ensure regulatory compliance and prevent sewer overflows.

Pardee Dam, Spillway and Powerhouse

Hydropower Generation. Potential contaminants associated with hydroelectric operations in general are discussed in the *Hydroelectric Section*. In 2007, a water pump failed in the Pardee Powerhouse containment basement and approximately 500 gallons of water was pumped to the river afterbay instead of to the oil/water separator: oil and/or grease were not detected in any of the follow-up surface water samples. For additional details see the 2010 MRWSS update.

Recreation Use at Middle Bar. The section of the river between the Electra Powerhouse and the Middle Bar Bridge is known as the Electra Run. It is a very popular area for kayakers and white water rafters. The Middle Bar takeout facility includes a 20-space paved parking lot, a two-station, handicapped-accessible toilet and a short surfaced trail to the river's edge. No permits, fees, or access passes are required for the general public use of these facilities.

On EBMUD property, the Mokelumne Coast to Crest Trail (MCCT) passes by both Camanche and Pardee Reservoirs, ending about one mile east of the Middle Bar Bridge on the Calaveras side of the Mokelumne River. Trail use requires an EBMUD permit and is open to pedestrians and equestrians.

Water Resources Development

Existing hydropower and water supply projects on the Mokelumne River are described in Section 2.

Thousands of acres of PG&E land along the Mokelumne River have been transferred to new owners or managers as part of PG&E's 2003 bankruptcy settlement. See Section 6, PG&E Land Conservation Commitment Stewardship Council, for a detailed discussion of scope and timeline.

Sanitation Facilities

The sanitation facilities in the Upper Mokelumne River Watershed include wastewater collection and treatment systems, septic tank and leach field systems, and chemical toilets. Chemical toilets are largely associated with recreational activities and are discussed in the Recreation section.

Wastewater Collection and Treatment Systems

Table 5-3 summarizes information on the five small community wastewater systems in the Upper Mokelumne River Watershed and Figure 5-3 shows their locations. As noted on the table, no direct discharges occur to any surface waters of the watershed; effluent restrictions for each wastewater treatment facility also are listed in the table. Each of the wastewater disposal systems has a non-discharging system permit from the CVRWQCB. The RWQCB has primary responsibility for monitoring, inspection, and enforcement proceedings for each of the five systems.

There is a risk of sewage overflows from wastewater treatment and disposal facilities using land disposal sites. Wastewater collection systems constitute another potential source of contamination by microbiological constituents. The systems may be vulnerable to spills in the event of pipe failures, accidental breaches due to adjacent construction activities, or overflows induced by wet weather infiltration.

AWA operates several wastewater systems that serve the small communities north of Tiger Creek Reservoir, one of which is located in the Upper Mokelumne River Watershed. The Tiger Creek Estates system consists of multiple septic systems emptying into a common tank, which feeds a leach field or spray disposal field. Pardee Center and PARA wastewater systems are discussed in more detail under *EBMUD Facilities* earlier in this section and in Section 2.

The Mokelumne Hill Sanitation District (MHSD) and WWTP are located near the Mokelumne River just above Pardee Reservoir and Highway 49 as described in Section 2. Section 6 describes the 2011-2014 MHSD reviews by Calaveras LAFCo. In summary, MHSD was evaluated by Calaveras LAFCo and found lacking in several areas, and so agency dissolution was considered among other options. MHSD made a number of operational improvements in 2012-2014. In December 2014 LAFCo adopted documents with further recommendations for MHSD improvement but there was no further discussion about dissolving the agency.

A survey of incident reports from EBMUD's Regulatory Compliance Office and the State Office of Emergency Services (Cal OES) showed one treated sewage overflow (20 gpm) from the MHSD WWTP in 2006, spilling into the adjacent creek which discharges into the Mokelumne River. During the 2015 MRWSS update period, MHSD reported one treated wastewater spill in October 2013 as runoff from a disposal field. The 33 gallons ran 300 feet downhill on the MHSD property and pooled in a low point, where it percolated into the soil and was cleaned up. No waterways were directly affected.

Septic Systems

Outside of the handful of areas with WWTPs and sewer systems, the majority of developed lands within the Upper Mokelumne River Watershed use septic systems to manage residential sewage. Figure 5-5 shows the population densities in the watershed based on the 2010 census.

Large Septic Systems. Figure 5-3a and Table 5-3a summarize the six large capacity septic systems with leach fields located in the Upper Mokelumne River Watershed. Four of the large septic systems were identified by the Calaveras County 2004 Ground Water Protection Program (listed as Class V injection wells): two are privately run mobile home parks; one is an elementary school; and one is a Girl Scout camp. One of the large capacity septic and leach field systems is operated by AWA at the Tiger Creek Estates off Highway 88. Another is located at a camp and retreat center in the Middle Fork Watershed.

Residential Septic System Estimates. In 2007, the Upper Mokelumne River Watershed Assessment and Planning Project (UMRWAP) estimated that there were roughly 3,200 individual residential septic systems in the Upper Mokelumne River Watershed. The UMRWAP concluded that many septic systems in the watershed are old, were designed for seasonal use without permits, and are a likely source of pathogen contamination, especially in the Middle and South Fork rivers. Section 6 provides a more detailed discussion of the UMRWAP.

Figure 5-17 shows the locations of both known septic systems and potential septic systems, as developed under the 2007 UMRWAP. Estimates for potential individual residential septic systems were based on the following information:

- UMRWAP Estimate: 1,501 potential Calaveras County unpermitted septic systems, based on occupied land parcels outside of centralized sewage collection areas.
- Calaveras County, Environmental Health Department: 157 permitted septic systems
- Amador County, Environmental Health Department: 1,525 submitted septic permits
- Alpine County: 7 permitted septic systems

During the 2015 MRWSS update period, no significant septic survey projects were proposed or funded. The ongoing MAC IRWP water quality projects do not include any focusing on septic systems. See Section 6 for additional MAC IRWP project information.

Regulatory Compliance. The counties are responsible for septic system regulatory compliance, including design criteria and standards and permits. They issue permits for septic system repairs and new construction, inspect new construction sites for compliance and investigate reports of failed septic systems. The RWQCB is responsible for ensuring that the counties take appropriate steps to prevent non-point sources of pollution such as septage from entering surface water or groundwater bodies in quantities sufficient to impair water quality needed to protect beneficial uses, including domestic water supply.

The USFS is not required to comply with county septic tank requirements, because local jurisdictions have no authority over federal lands. Currently the Eldorado National Forest (NF) requires owners of existing cabins with special use permits to obtain a county permit

when a septic system is repaired or installed. If is not possible to install or repair an existing cabin septic system in compliance with current state or county codes, then a forest system vault system is allowed; however, an annual County permit is still required.

North Fork

Only small portions of the North Fork sub-watershed are suitable for septic tank systems due to the generally excessive steepness of the terrain and the unsuitability of much of the massive granitic batholith bedrock underlying most of the higher elevations. Comparison of the population densities shown in Figure 5-5 with the estimated location of septic systems in Figure 5-17 show that many of the septic tanks located in Amador County are along Highway 88, on the ridge separating the Mokelumne and Cosumnes River drainages. According to data collected as part of the UMRWAP, there were 1,438 septic systems in the North Fork sub-watershed as of 2006.

NF Special Use Permits. Approximately 48 recreational residences with individual septic systems are located on Eldorado NF lands in the Bear River Reservoir Tract (located on the south side of Lower Bear River Reservoir, above the Bear River Group Campground and the Camp Winton Boy Scout camp). The residences are privately owned and improvements are allowed by special use permits on USFS lands. The individual special use permits have 20-year terms and were last renewed in 2005. As part of the special use permit renewal process, the owners submitted condition checklists, including septic condition. County permits are required by USFS local offices for all needed septic repairs. The residential residences are almost exclusively summer cabins, on lots that average 100 feet by 150 feet in size.

The Bear River Lake Resort is located on the northwest side of Lower Bear River Reservoir on private land belonging to PG&E. Services include cabins, a campground and a marina. Sewage holding tanks are used, and the septage is regularly pumped out and hauled away for disposal.

Some residences served by septic tanks are also situated on Stanislaus NF lands off Highway 4 in the vicinity of Bear Valley, and between Bear Valley and Salt Springs Reservoir. However, most of the residences in the resort area of Mt. Reba-Bear Valley and a large part of the ski area development are located outside the watershed boundary.

Middle Fork

Most of the septic tank-served residential areas of the Middle Fork sub-watershed are situated around the outskirts of the sewered communities of West Point and Wilseyville. A 2000 WSS performed for CCWD and CPUD (Tetra Tech, 2000) noted elevated coliform in river flows and cited the Lynn Park Acres subdivision, with several homes adjacent to the river on septic systems, as a potential contaminant source. CCWD maintains some septic systems in this sub-basin, and in the last update estimated four to five overflows per year, all of which were contained on-site. No overflows were reported by CCWD during 2010-2014. The 1995 GIS analysis yielded an estimate of 1,522 persons in 856 households on septic systems. According to the 2006 UMRWAP estimate, there are 931 septic systems in the Middle Fork sub-watershed.

South Fork

Most of the unsewered development in the South Fork sub-watershed is concentrated in the lower half of the basin. A previous CCWD/CPUD WSS (Tetra Tech 2000) noted three residences adjacent to the CPUD pumps station on Licking Fork, and five other residences around Jeff Davis Reservoir, and classified the threat potential from septic systems as "low." According to the 2006 UMRWAP estimate, there are 502 septic systems in the South Fork sub-watershed.

Main Stem

Most of the septic systems are concentrated in several areas south of Highway 88, including the unincorporated community of Clinton. Other developed areas occur along Route 26, to the north of Mokelumne Hill, and to the southeast of Pardee Reservoir. According to the 2006 UMRWAP, there are 317 septic systems in the Main Stem sub-watershed.

Solid Waste Disposal Sites

The State Solid Waste Management Board has the overall responsibility for regulation and management of solid wastes within the watershed. The only solid waste handling site located within the Upper Mokelumne River Watershed is the Wilseyville Transfer Station, in the South Fork sub-watershed, about one-third mile south of Wilseyville. The transfer station location is shown in Figure 5-3. This small transfer station is staffed by two employees and operates four days a week: Friday, Saturday, Sunday, and Monday. There is a main facility and a Wilseyville Transfer Station Annex (Wood and Yard Waste Site). About ten tons of municipal solid waste is transferred each operating day. The transfer station is too small to warrant a wastewater treatment facility. There have never been any complaints of odor or other problems at this facility.

Hazardous Materials

Underground Storage Tanks (UST)

USTs present a low threat as a contaminant source for surface water due to their very low density, sufficient distance from streams, and stringent requirements for containment at storage facilities. A majority of USTs within the watershed area contain fuel and other petroleum products including gasoline, diesel fuel, and liquefied petroleum gas, such as propane.

USTs in the Upper Mokelumne River Watershed are reported in the California RWQCB Geotracker database along with one abandoned mine land disposal site. USTs primarily pose a potential threat to groundwater and/or soils. The following types of USTs (leaking, remediated and permitted) are summarized in Table 5-4 and located on Figure 5-3:

- **Leaking USTs (LUSTs):** Currently two sites are located within the Upper Mokelumne Watershed. Located in West Point and Mokelumne Hill, the status of these sites is site assessment and verification monitoring.

- **Remediated LUSTs:** Six remediated LUST cleanup sites are reported on Table 5-4. One site remediation was complete during the 2105 MRWSS update period, at Star Gas in West Point, and the rest were remediated 2000-2009.

Remediated LUST cleanup sites reported as complete in the MRWSS 2005 update and earlier are not repeated in this update.

- **Abandoned Mine Land Disposal Site:** One abandoned mine land disposal site is listed in the State Geotracker database. The Blazing Star Mine in West Point was in active operation recently enough to have had a RWQCB discharge permit; it remains in the Geotracker database now that operations have ceased and it has been abandoned by the owners. The CVRWQCB monitors abandoned mine-related water quality threats and works on remediating priority sites. Currently there are no priority mine sites undergoing remediation in the Upper Mokelumne River Watershed.
- **Permitted USTs:** Three permitted USTs are currently in use in the Upper Mokelumne River Watershed. One is located off Highway 4 at the Bear Valley Ski Area. Two are located off Highway 88, one at the Caltrans-Peddler Hill Maintenance Yard and another at the Bear River Lake Resort.

Other Hazardous Chemicals

As previously reported, PG&E has replaced the polychlorinated biphenyl (PCB) transformers in its powerhouses with mineral oil-filled distribution transformers, thus greatly reducing the risk of hazardous PCBs explosions and spills.

During this update period, there were three Cal OES spill reports for the Upper Mokelumne River Watershed. Two spills involved small quantities of petroleum products (5-10 gallons) spilling into either the Mokelumne River or Pardee Reservoir. The third spill was a citizen report of an unknown spill in a creek near West Point, possibly sediment or a treatment chemical like alum.

Hazardous materials stored on EBMUD facilities are discussed under *EBMUD Facilities* in this section.

Urban Area Runoff

This section describes potential contaminant sources from urban areas within the Upper Mokelumne River Watershed. Urban land uses include single-family residential, multi-family residential, and commercial and public facilities (excluding parks and recreational facilities such as golf courses). The significant urban areas present include the unincorporated communities of Mokelumne Hill, West Point, Wilseyville, parts of Glencoe and the northern part of Railroad Flat in Calaveras County, and Pine Grove, Pioneer, Buckhorn, and the southern portion of the City of Jackson in Amador County. The potential contaminants associated with urban areas include pesticides, fertilizers, paints, wood preservatives, surface runoff from streets and driveways, construction sediments and wastes, domestic animal wastes, and automobile-related sources.

New developments can have a variety of effects on the watershed with water quality implications including increased urban runoff, increased wastewater flows, loss of vegetation, and increased erosion (especially during construction activity and when attention to road and culvert maintenance is inadequate).

Although urban development continues in the watershed, the rate has been slow over the past five years, keeping pace with the economy, and just beginning to pick up again. Figure 5-5 shows the population densities in the watershed according to the 2010 census data. In the more populous areas, including Mokelumne Hill and West Point, there were approximately 200-300 people per census block. In the less populated areas along Highway 26, there were population densities of between 26-100 or 101-200 people per census block.

History of Spills and Accidents

The Cal OES Hazardous Material Spill Reports documented several spills on or near Highway 49 during 2010-2014, as listed in Table 5-5:

- In August 2014, a traffic accident occurred on Electra Road, one mile east of Highway 49, resulting in the release of 5-10 gallons of gasoline and oil into the Mokelumne River. It is unknown when this accident occurred. The driver was found deceased in the car.
- On September 26, 2011, an 8000-gallon tanker truck carrying liquid asphalt sealant overturned on the Highway 49, as described further under *Transportation*.

Calaveras County

Between 2000 and 2010, populations actually decreased slightly for the main communities affecting the upper Mokelumne River: Mokelumne Hill (646, down from774), Railroad Flat (475, down from 549), and West Point (674, down from746). Calaveras County growth is typically occurring in the southern part of the county that drains into the Stanislaus Watershed (Copperopolis and Angels Camp). Just east of Highway 49 and south of the Mokelumne River, a parcel has tentative map approval (approved 2004) to subdivide into 6 parcels; the County Planning Department has granted the project schedule extensions because of the recession, and so the project currently has until March 2016 to record a final map and proceed with development. Calaveras County's General Plan Housing Element projects a 1.3 percent growth rate between 2015 and 2020, and a need for 2,344 residential units to fill the need of the unincorporated county's population growth.

Amador County

Amador County's General Plan Housing Element April 2014 noted that, over all, the county population has grown by 6 percent between 2010 and 2013 to 37,123. A substantial portion of the county's future growth is expected to occur in cities, most of which are located outside of the Mokelumne River Watershed. Within the unincorporated areas, Amador County's General Plan calls for growth to be focused in existing communities. The Department of Finance estimates that the population of Amador County will be 39,352 in 2020, an increase of 6 percent over 2013.

In the southern portion of the City of Jackson, development accelerated in the period 2000-2004, and slowed down between 2005 and 2009, then essentially stopped 2010-2014 with the downturn in the economy. There were no new subdivision applications submitted to Amador County 2010- 2014. Within the Mokelumne Watershed, only one subdivision was permitted in the 2005-2014 period, Jackson View Estates, Jackson City. Jackson View Estates is a 127-unit single family residential (SFR) development permitted along Scottsville Drive, with approximately 25 units built as of 2014. There were plans for another nearby development, Jackson Hill, near French Bar Road and Highway 49 (540 homes and a golf course, about half draining to Mokelumne Watersheds), but the developers went bankrupt and the permitting process was terminated.

Construction-Related Stormwater Runoff

The RWQCB regulates runoff from construction sites, outlines BMPs for runoff management/monitoring, and can require a Stormwater Pollution Prevention Plan (SWPPP). City and county public works staff generally oversee construction sites and report violations.

Figure 5-4 shows land use and urban areas in the Upper Mokelumne River Watershed. Table 3-1, provided in *Section 3: Watershed Description,* lists the breakdown of land usage.

Stormwater Drainage Overflows. There are few areas from which significant quantities of urban runoff directly enter the Mokelumne River system. Communities and developing areas in the watershed utilize ditches and intermittent natural stream channels as conveyance courses for their minor quantities of stormwater drainage.

Rural Area Runoff

The potential contaminant sources and water quality concerns associated with rural area runoff are similar to those associated with urban area runoff, and the residential component of rural areas is considered to produce the most significant impacts from this land classification. For this update, changes in residential development are discussed under *Urban Area Runoff.* Septic systems, agriculture, and wildlife and livestock are potential contaminant sources associated with rural areas.

Utilities - Hydropower Generation

While there are a number of agencies with hydroelectric facilities in Upper Mokelumne River Watershed, including EBMUD, PG&E's facilities are the most extensive. Of particular importance is PG&E's Project 137. Project 137 encompasses PG&E's hydroelectric facilities and related reservoirs, tunnels, and power plants in the Upper Mokelumne River Watershed. These facilities are described in further detail in Section 2. The potential contaminant sources associated with the PG&E facilities can also be applied, to a lesser extent, to the smaller hydroelectric operations owned by other utilities in the Upper Mokelumne River Watershed.

The major PG&E power facilities include dams, powerhouses and power lines carried on towers and poles. Administrative facilities, switching centers, and service centers may be located at or away from the powerhouses. These centralized facilities generally include

office space, vehicle equipment storage, and repair and maintenance shops. Appurtenant facilities include small staging areas, valve houses, air valve housing for siphons, remote platforms for storing cloud-seeding equipment, and helicopter pads. In addition to the many roads - both paved and unpaved - and vehicular traffic associated with PG&E facilities, occasionally helicopters and boats are used.

Hydroelectric operation of PG&E's reservoirs may impact stream flow and water quality characteristics downstream of its facilities. Variations in stream flow due to power generation and/or reservoir release practices may impact stream bank erosion, sediment transport, and water quality. During the 2015 MRWSS update period, PG&E hydroelectric facilities did not report any Cal OES Hazardous Material Spills.

Canal Maintenance. PG&E removes attached algae from its extensive canal and flume system so that the attached algae does not impede flow through the canal system and clog the turbines and penstocks. This algae growth indicates biostimulation from the input of nutrients, and the growth-enhancing effects of elevated water temperatures attained in the canals and flumes. PG&E's maintenance process consists of draining the canals and running a truck-mounted water jet, with high velocity nozzles directed to blast the algae loose. Most of the nutrients are removed as part of the biomass when algae are blown out of the canal; however, some remain in the canal to be flushed upon refilling, and thus remain in the system.

Transportation Corridors

Figure 5-3 provides an overview of the major transportation corridors within the Upper Mokelumne River Watershed. The primary water quality concern is surface runoff from roads and parking areas. Contaminants associated with transportation corridors include automobile-related petroleum hydrocarbons and metals, turbidity from erosion caused by rapid runoff, inadequate or failed stormwater collection systems, construction and maintenance activities, pesticides applied along road shoulders, and chemicals from accidental spills and illegal dumping. The types of contaminants associated with these sources include lead, copper, nickel and zinc as typical metals.

History of Spills and Accidents

Cal OES Hazardous Material Spill Reports documented one spill on or near Highway 49 during 2010-2014, as listed in Table 5-5:

- In August 2014, a one-vehicle traffic accident occurred on Electra Road, one mile east of Highway 49, resulting in the release of 5-10 gallons of gasoline and oil into the Mokelumne River. It is unknown when this accident occurred. The driver was found deceased in the car.

Although not reported in a Cal OES Hazardous Material Spill Report, a potentially significant truck accident occurred right above Pardee Reservoir:

- On September 26, 2011, a 8000-gallon tanker truck carrying liquid asphalt sealant overturned on the Highway 49 roadway approximately 1,600 feet south of Highway 49 bridge, so approximately 400 to 500 feet south of Mokelumne River. Figure 5-18 is a photo of the overturned tanker truck and Appendix 5-3 includes EBMUD's detailed incident reports. The tanker ruptured but was leaking very slowly, with approximately 200 gallons spilled. Highway curbing booms and absorbent (sand) contained the spilled material. Product was transferred into another tanker before attempting to right the truck.

According to the Caltrans annual reports, there was very little activity in the watershed on paved road construction and reconstruction during the 2015 MRWSS update period, nor are there significant projects planned during the next few years. Paved road construction and reconstruction projects are usually constructed during the dry season, repaved before prolonged wet weather sets in, and must meet stringent BMP requirements. Erosion associated with paved roads is generally insignificant when compared to unpaved roads; however, surface runoff is of a greater concern with paved roads.

The 2015-2016 Caltrans District 10 Work Plan has identified a Section of Highway 26 along the Mokelumne River north of Highway 49 as "prone to erosion and sediment discharge". Appendix 6-5, Caltrans page 5-1 and Figure 5-1, lists and maps areas, including sections that affect the Main Stem and that required maintenance in 2014, "including rock cut slopes, landslides, and moderate soil erosion." There is no specific remediation plan yet identified.

Risks Due To Public Access. No railroads, and only two major highways, traverse the watershed, and they are used only rarely to transport hazardous substances, except for local use. Due to their lower summit elevations, wider rights-of-way, and less serpentine routes, Interstate 80 and Highway 50 to the north are the preferred trans-Sierra and interstate routes versus Highways 88 and 4. Interstate 5 and Highway 99 are the preferred north-south routes compared to Highway 49 for similar reasons. Other than transportation within the watershed, there is little hazardous waste transport activity.

The risk of highway accidents or public access in the sub-watersheds resulting in hazardous materials contamination of Pardee Reservoir is considered very low. Nonetheless, the potential consequences of a disastrous spill in the Mokelumne River, and ultimately Pardee Reservoir, warrant future vigilance by Caltrans and the CHP regarding hazardous materials transport policies in the watershed to make sure that the risk of contamination remains acceptably low.

Potential secondary risks of hazardous materials contamination originate from more routine releases such as leaking or overheated radiators and spillages at refueling stations; however, the chances of residues from such minor spills reaching the Pardee Reservoir in any detectable quantities are exceedingly low due to the generally adequate distances between the highways and the Mokelumne River and its tributary streams.

Agriculture

Agricultural activity has minimal impact on water quality in the Upper Mokelumne Watershed due to the small size and quantity of farms. In general, agricultural land is not of primary interest as a source of microbiological contamination, but could contribute particulates, pesticides, and nutrients and metals from fertilizers. Figure 5-4 shows land use classifications, including lands classified as Agricultural by the CAL FIRE's Resource Assessment Program (FRAP). Farms in the Calaveras County portion of the watershed are located primarily near the communities of Wilseyville and West Point. Crops grown are predominantly wine grapes and walnuts. In Amador County, there are small farms growing primarily wine grapes, but there are no significant agricultural areas in Amador County that fall within the watershed.

Wildlife and Livestock

While livestock is a significant contributor of animal waste in the Upper Mokelumne River Watershed, birds and other wildlife can also introduce microorganisms into Pardee and Camanche Reservoir and its tributaries through direct contact or animal waste. Deer, raccoons, beavers, otters, skunks, coyotes, California ground squirrels, gulls, and geese are common species occurring in the Upper Mokelumne River Watershed. Significant pathogens associated with animal waste include *Cryptosporidium parvum, Giardia lamblia, Salmonella, E. coli* and avian influenza.

Livestock grazing activities can affect public water supplies in a number of significant ways:

(1) Introduce and transmit disease-causing microorganisms into raw drinking water supplies
(2) Elevate nutrient loads
(3) Increase erosion
(4) Compact soils and thereby decrease ground water recharge
(5) Disturb riparian corridors and tributary stream banks as livestock access natural water sources

Grazing on Private Lands

Numerous private landowners manage ranches dedicated to horses, cattle, and sheep. A small percentage of the pastures are irrigated, where water supplies permit, and the rest are utilized as dry pasturage. No significant penning or product processing areas were identified on the watershed, and the calving/lambing and transport loading areas were judged to have no special overall significance due to their extremely small total area.

Between EBMUD lands near Pardee Reservoir and the NFs in the upper watershed is private land, where grazing and livestock ranching is known to occur. PG&E and SPI have agreements to lease land for activities including grazing. Since permits are not required to raise livestock on privately owned land, County or State agencies do not keep records. The county agricultural commissioner tracks how cattle are sold, which give some indication of the amount of grazing activity in the county, though not specific to the Upper Mokelumne River Watershed. In Calaveras County, two cattle ranches were identified in the past:

Garamendi/McSorley Ranch in Mokelumne Hill, and Hertlein Ranch in West Point. There are no major feedlots within the Upper Mokelumne River Watershed, nor is there any agency, besides the RWQCB, that has the authority to oversee livestock waste management.

Grazing on NF Lands

Both the Eldorado and Stanislaus NFs are used extensively as open rangeland subject to federal leasing agreements. As shown in Figure 5-6, there are 12 permitted grazing allotments within the Upper Mokelumne River Watershed that are managed by the Eldorado and Stanislaus NFs. The allotments located on the north side of the North Fork Mokelumne River are permitted by the Eldorado NF, while those on the south side are permitted by the Stanislaus NF. Some of the 12 grazing allotments are entirely within the Upper Mokelumne River Watershed, and some allotments are partially in and partially out of the watershed.

The Indian Valley grazing allotment is still listed in the Eldorado NF Land and Resource Management Plan and is still included in the count, even though it has not been an active grazing allotment since 1989. A National Environmental Policy Act (NEPA) analysis would need to be completed prior to grazing or closing this allotment, and the currently active allotments have priority for funding.

The maximum number of cattle allowed by the NF is determined when the grazing allotments are renewed, once every ten years. The allowable grazing season is also detailed in the permit, subject to adjustment by forest service staff during the spring survey. Annual fall surveys are conducted to monitor the effects of grazing and to measure the residual dry matter on the pastures. If adverse effects are observed, then the grazing allotment permit would be reviewed.

When private land is adjacent to or surrounded by NF land and the land is not fenced, it is common for the cattle to roam freely between NF and private land. Private landowners, including SPI and PG&E, negotiate separate private grazing contracts for grazing on their land and set the number of cattle allowed. The NF grazing permit lists (but does not review) the permitted numbers of cattle on adjacent private lands. The permitted grazing allotment also details the allowable grazing season, which can be adjusted.

Table 5-7 shows the total permitted numbers of livestock (cows and calves) allowed on each of the 12 NF permitted grazing allotments. Also listed are the permitted number allowed by the private agreements on the adjacent unfenced private lands. The permitted numbers have remained fairly steady during 2000-2014. Permitted numbers are listed as cow/calf pairs, and each pair is counted as 1.32 Animal Unit Months (AUMs), which equals one animal grazing for one month. The table lists the percentage of the allotment that is within the Upper Mokelumne River Watershed; presumably the livestock would be split proportionally.

Grazing on EBMUD Lands

At this time, EBMUD has nine grazing leases in the Main Stem sub-watershed, covering 12,983 acres. The leases allow for the utilization of 7,482 AUMs. Wells, springs, ponds and municipal water sources provide stock water. Table 5-8 lists the grazing leases currently in place in the Pardee Watershed. Section 6 summarizes EBMUD's Mokelumne Rangeland Management Plan, which was released in 2013. EBMUD develops annual grazing plans in conjunction with lessees, indicating BMPs to minimize adverse impacts from grazing

activities and stipulating the allowable AUMs for specific ranges. The stocking levels are dependent on rainfall and subsequent forage production each year. Tenants are required to distribute or rotate their livestock among the pastures to minimize overgrazed areas and reduce overall fire hazards. Annual fall surveys are conducted to monitor the effects of grazing and to measure the residual dry matter on the pastures.

Recreation

Numerous activities are included under the heading of recreation for the Upper Mokelumne Watershed: camping, backpacking, pack animal-assisted hiking, hunting, equestrian activities, boating, fishing, day-use activities, hiking, bicycling, picnicking, skiing, swimming, white water rafting, and OHV use. Figure 5-8 shows the locations of the more heavily used recreation sites. Recreation associated with EBMUD's facilities within the Upper Mokelumne Watershed is addressed under the section entitled *EBMUD Facilities*. The potential impacts on water quality from recreation include erosion, vandalism, sanitation facilities, and introduction of human and animal wastes.

Body-Contact Recreation

Most of the body-contact water recreation sites within the watershed are on the North Fork and Main Stem sub-watersheds. Some of the main body-contact water recreation sites are shown in Figure 5-8. Table 5-9 summarizes managed recreation sites and lists the activities. Along the North Fork popular areas include the Bear River Resort and group facilities, Blue Lakes, and Bear River South Shore. Moore Creek and White Azalea also receive significant amounts of public usage. White water recreation opportunities exist from the Bear River confluence down to the Tiger Creek Afterbay. The first run (Class III-V), which extends from Bear River to Devil's Nose, is suitable for intermediate to advanced kayakers and rafters. The second run (Class V), from Devil's Nose to Tiger Creek, is recommended only for expert boaters.

Since the 2000 MRWSS, relicensing negotiations for PG&E's Project 137 resulted in many additional recreation enhancements along the North Fork. The enhancements include a minimum number of white water releases during the white water boating season (May through September), and development of white water boating access facilities, including vault and portable toilets, parking areas, barrier rocks for resource protection, and signage for the Tiger Creek, Ponderosa Way, Devil's Nose, and Electra Runs. The license agreement also provided for funding of two river rangers during the white water boating season.

Along the Main Stem, the Elektra run is a Class II+ (Class III above 1,500 cfs) run that extends from Electra Powerhouse to below Highway 49 Bridge. The Electra Run is a stretch on the Mokelumne River heavily used by rafters, canoeists, inner tubers, and kayakers. As discussed in *EBMUD Facilities*, a boating take-out for this run was constructed near the Middle Bar Bridge in 2003. In 2012 another new public boating take-out was constructed at Big Bar just upstream of the Highway 49 Bridge. The Big Bar take-out facility includes a paved parking lot and toilet facilities. No permits, fees, or access passes are required for the general public use. No consistent records or detailed estimates are kept for the numbers of white water recreational boaters or rafters on any of the river reaches.

Non-Body Contact Recreation

Privately-owned boats that can introduce various contaminants from different recreational water bodies are a serious concern for EBMUD. Boating policies continue to be enforced at EBMUD's recreation facilities to prevent invasive species such as Quagga or Zebra Mussels from being introduced into Pardee and Camanche Reservoirs. EBMUD's boat inspection program includes two parts: a history survey, followed by a physical inspection. Boats that fail either the survey or the inspection cannot be legally launched in EBMUD's reservoirs.

Non-body contact recreational activities in the watershed consist of fishing, camping, hunting, boating, alpine skiing, cross-country skiing, hiking/backpacking, snowmobiling, off-highway vehicle (OHV) (e.g., motorcycles, all-terrain vehicles, four-wheel drives, SUVs) use, wildlife observation, nature photography and mountaineering. Most of the activities occur on public lands or at public recreation facilities above 2,000 feet in elevation, in the snowbelt, and where summertime temperatures are cooler.

BLM lands are not managed for recreation, and use consists primarily of hiking, hunting, fishing and wildlife viewing along and near unpaved roads throughout its 171,700 acres of lands.

Pollution controls within NF lands are primarily the responsibility of the USFS. The controls are implemented through the standards, policies and guidelines established in the Land and Resources Management Plans of each NF. The controls are enforced by the Forest Supervisors and the individual Ranger District offices in accordance with their individually established procedures.

Schaads Reservoir is the only significant recreational site located in the Middle Fork sub-watershed. The 1,800 AF reservoir is owned by CPUD and utilized by CCWD as a drinking water source. Fishing and camping are allowed at Schaads, but swimming is prohibited.

There are no significant recreational facilities located in the South Fork sub-watershed. With the exception of recreation areas below Electra Powerhouse, all recreational facilities located within the Main Stem sub-watershed occur on EBMUD lands and are addressed under the section entitled *EBMUD Facilities*.

The intensity of body-contact and non-body-contact recreation and use is indicated by the number of recreational sites reported by Eldorado and Stanislaus NFs, PG&E, and EBMUD.

MCCT. The eastern-most leg of the MCCT was completed in 2012 and extends from Middle Bar almost to Big Bar. This segment was completed and opened to the public in 2009.

OHV Use

OHV use continues to be a widespread and sometimes damaging recreation activity within the Upper Mokelumne River Watershed but the damage may continue to decrease over the next few years as the recent NF and BLM OHV policies continue to be implemented. The

NF Travel Management Rule and the updated BLM Sierra Resource Management Plan now ban previously-allowed unlimited off-road travel and only allow OHV use on designated roads and trails (defined by Motor Vehicle Maps). Section 6 provides a detailed discussion on the NF and BLM travel management changes.

The BLM and Eldorado NF Motor Vehicle Maps were released in 2007 and 2009 respectively, showing allowable OHV roads and trails. Public outreach is ongoing and signs have been posted, but the enforcement staff are still in an educational mode regarding enforcing prohibited off-road travel. Similarly, Stanislaus NF released their Motor Vehicle Maps in 2010 and made map copies available to the public in 2011. Stanislaus NF reports that monitoring and enforcement activities are currently effective for controlling OHV damage. NF staff have always been able to cite OHV users for excessive environmental damage, and so it may take a number of years to see the net effect of the regulation changes.

Erosion from unpaved roads and trails can be a major source of sediments and contaminants. Public and minimally patrolled lands are especially vulnerable to damage. Some OHV staging areas are shown on Figure 5-8.

The USFS reports that current areas of high OHV activity include the Cabbage Patch and Mattley Meadow area off Highway 4, and the area between Lower Bear River Reservoir and Salt Springs Reservoir. Control measures been fairly effective, including reconstruction, signing, and intensified enforcement of OHV regulations.

Within the Middle Fork, South Fork, and Main Stem sub-watersheds, access control has been somewhat effective at keeping OHVs off vulnerable earthen roads. Despite some local evidence of damage, the Upper Mokelumne River Watershed in general appears to be in generally good condition. Private landowners are increasingly turning to fencing and gating to prevent damaging intrusions of OHVs.

On SPI lands, unpaved roads have been closed to control erosion. Gates have been installed on nearly all access roads. SPI has noted an increasing amount of OHV traffic in the past decade. SPI is also working to control access by increasing patrolling, better signing, and increased enforcement by public law enforcement agencies.

Mines

Mines and quarries are potential contaminant sources for turbidity, radionuclides, general minerals, metals, oil, grease and hydrocarbons depending upon type of materials being processed and the size of operation. A number of closed and abandoned historic mines are located in the Upper Mokelumne River Watershed, as shown in Figure 5-9. There are no active mines in the Upper Mokelumne River Watershed, per the California Department of Conservation interactive map. Currently there are no apparent water quality concerns in the watershed associated with mine drainage waters. See Section 6 for a discussion on mine regulation and reclamation.

The 2000 MRWSS reported the last active mines in the watershed and detailed a 1997 incident affecting Gwin Mine when heavy rains caused a hydraulic discharge at the main

shaft. No further activity has been reported since that time. Gwin Mine is located several miles southwest of Mokelumne Hill, just upstream of Pardee Reservoir.

Geologic Hazards

Geologic hazards include erosion and landslides, which can increase turbidity and nutrient loads to a water supply. The greatest impacts from soil erosion occur near the reservoir where even small rainfall events can transport the sediments over a short distance. Section 6, subsection *EBMUD: Erosion Control* discusses various EBMUD erosion control projects. For example, erosion, changing water levels and wind-driven waves slowing threaten to undermine the perimeter access road around the edge of Pardee Reservoir.

In the past, landslides triggered by heavy rainfall events have resulted in elevated turbidity loads to Pardee Reservoir. A landslide above Salt Springs Reservoir in January 1997 created a turbidity plume that forced a shutdown of the aqueduct. Turbidity exceeded 100 NTU and would have overwhelmed EBMUD's inline WTPs in the East Bay, so the WTPs instead relied on local East Bay reservoir storage for several months. Earthquakes can also trigger landslides, but as noted in the Section 3, the area has little recent history of fault movement. Many of the past documented instances of erosion and landslides have occurred on the North Fork and Main Stem of the Mokelumne River. Locations of historic gully and erosion as of 1974 were documented in the MRWSS 2000 Update.

Fire and Fuels Management

Water quality can be impaired by increased runoff and erosion and hydrophobic soil conditions caused by fires. Fuel management measures such as pesticide application, mechanical vegetation removal, and grazing can also impact water quality, as discussed in the *Pesticides* and *Wildlife and Grazing* sections. Fires greater than 20 acres that occurred in the Upper Mokelumne Watershed during the update period as recorded by CAL FIRE and/or EBMUD staff are mapped on Figure 5-10. Statistics for these and other smaller fires are summarized in Table 5-10.

Fire danger is greatest on lands that are not managed to reduce fuel supplies, provide fire breaks, or afford ready access by fire fighters and their equipment. This is most extreme in remote canyons and on the steep, densely vegetated canyon walls. Clear cut and select cut timber harvesting serves to temporarily lower fire danger by reducing fuel supplies, increasing the spacing between fuels, and ensuring for the routine presence of short response-time work crews within the forested areas. Most fires are discovered and extinguished during their early, manageable stages by on-site logging personnel, backed up by on-call California Department of Forestry and Fire Protection, and USFS fire fighters.

Official fire management and control responsibility in the NFs belongs to the USFS. Responsibility on private lands is shared by the CAL FIRE, local fire districts, and private landowners. Prescribed burns are regularly conducted, especially on federal lands, to prevent or eliminate excessive accumulations of fuel and to open up firebreaks. This measure is being implemented to reduce the probability of catastrophic fires in the future. The latest California Fire Plan was revised in 2010 and is discussed in Section 6. An integral part of

pre-fire management focuses on taking action before fires occur. Projects are designed and implemented to reduce the frequency, severity, and size of wildfires and include the following:

- Fuel breaks to stop wildfires
- Wildfire protection zones to buffer communities
- Forest stewardship for healthy forests
- Prescribed fire to reduce fire fuels

Figure 5-11 shows the location of the annual fire mitigation measures in the Pardee and Camanche Watersheds. EBMUD has an active program of fire hazard mitigation that involves disking, mowing, brush removal, prescribed burning, livestock grazing and other measures. Table 5-11 lists the typical scope of work for these mitigations during 2015 MRWSS update period.

Power Fire (2004)

The Power Fire occurred in October 2004, near the Salt Springs Reservoir. The fire burned 16,823 acres, approximately five percent of the Upper Mokelumne Watershed. Recreation opportunities were affected, including nine campsites, many hiking trails, and over 200 miles of OHV routes. A summary of the fire event is presented in Table 5-12. The 2005 MRWSS update provides a more detailed discussion on the Power Fire.

EBMUD performed sampling and analysis of post-fire water quality in the Mokelumne River. Samples were taken through 2006 to assess the impact of the Power Fire. Grab samples, Hydrolab®, and field turbidity measurements were taken along the North Fork from upstream of the fire near Salt Springs Reservoir down to the Pardee Outlet Tower.

Parameters showing the greatest increase were conductivity, TDS, calcium, silicon, aluminum, and iron. The highest turbidity measurement made by EBMUD was 16 NTU measured just downstream of the fire area at PG&E's Tiger Creek afterbay. This sample was taken less than a week after the fire following a very light rain. Flow in the river was very low at the time so the suspended solids loading into Pardee Reservoir were insignificant. At the Highway 49 Bridge, a routine sampling point for EBMUD 27 miles downstream of the Power Fire boundary, concentrations of potential contaminants in post-fire samples were found to be within their baseline annual ranges. Much higher turbidities were found in tributaries adjacent to highly burned areas that were sampled by USFS staff, as discussed in the Final Environmental Impact Statement (EIS) summary.

EBMUD's post-fire water quality analysis concluded that "no significant measurable water quality effects were observed at the outlet tower of Pardee Reservoir." It was noted that weather conditions were favorable for water quality following the Power Fire. For example, a cold storm in early November 2004 covered burned areas above 4,500 feet in snow. Water quality samples taken in April and May 2005, when river flows were high from snowmelt, showed that loadings of contaminants to Pardee Reservoir remained low.

Eldorado NF staff observed and implemented the following mitigations on the burned area during the 2010 MRWSS update period:

- Retained snags in patches and along drainages in harvest units.
- Straw was distributed and PG&E seeded some of the fire areas near the flume/canal
- Culverts have been cleaned out and are monitored before and during storm events
- Fire lines have been rehabilitated (graded and planted)
- Trees planted, grubbed in under-stocked stands
- Approximately a 50 percent reduction in the quantity of closed canopied, large tree dominated wildlife habitat

Logging

Logging is one of the major land use activities in the Upper Mokelumne River Watershed (excluding the lower Main Stem river section). The main water quality concerns associated with logging are increased turbidity and nutrient loading from eroded soils. In addition, herbicides are commonly used when replanting new growth. The previous MRWSS and updates described causes of erosion and the cumulative watershed impacts associated with logging practices. A study was cited that had shown as much as 20 percent increased water yields in the Middle and South Fork Watersheds due to historic logging practices (MRWSS 2000, pages 5-107).

Timber harvesting activities are believed to be responsible for the release of several constituents of concern including sediments, nutrients and total coliform bacteria. While the impacts of individual timber harvest may not be significant, the cumulative impacts of numerous operations throughout the watershed are considered significant.

National Forest Land Timber Harvests

Logging on the Eldorado and Stanislaus NFs continues to decline when compared to previous decades. Some of the harvested stands were selected based on fuel loading and disease/insect problems.

The SNFPA spotted owl guidelines published in 2001 outlined very restrictive procedures for determining which stands could be harvested. The subsequent revised SNFPA (2004) was much less restrictive, but still decreased overall activity, especially around Riparian Conservation Areas (RCA) and Protected Activity Centers (PAC) that provide habitat for protected species. Since the 1990s, the focus has been on understory removal of trees less than 30 inches in diameter; however, recent budgetary constraints have left limited funds for planning timber harvesting projects. Hazard-removal of stands near urban interfaces and roads are the given highest priority, as directed by the SNFPA 2004. Table 5-13 shows timber harvests in the update period on NF Land, including thinning along the South Fork.

Private Land Timber Harvests

CAL FIRE is responsible for enforcing timber harvesting regulations on privately-owned lands in California. The California Forest Practice Act was enacted in 1973 to ensure that logging is conducted in a manner that will preserve and protect fish, wildlife, forests and streams. Additional rules enacted by the State Board of Forestry and Fire Protection are also enforced to protect these resources.

Timber Harvest Plans (THPs). The regulations require submittal and advance approval of THPs for all significant harvesting efforts. THPs are in effect for three-year time segments and can be extended several times, with the result that the timber may be harvested a number of years after the THP is approved. A THP identifies what timber is allowable to log, but the THP does not document the total areas actually cut and harvested.

THPs are the environmental review documents submitted by landowners to CAL FIRE outlining what timber is proposed for harvest, how it will be harvested, and the steps that will be taken to prevent damage to the environment. THPs are prepared by Registered Professional Foresters (RPFs) who are licensed to prepare these comprehensive, detailed plans. CAL FIRE follows up on approved THPs with site inspections and can shut down operations, cite or fine RPFs, Licensed Timber Operators, and landowners if illegal operations are found. THPs typically cost between $6,000 and $35,000 (2003 dollars) to prepare.

SPI is the largest current private landowner and timber harvester, operating on both its own lands, USFS lands, and other private lands in the Upper Mokelumne River Watershed. THPs filed with CAL FIRE are shown on Table 5-14a for the period 2005-2014, and Figure 5-15 shows the corresponding areas by year. The vast majority of these THPs were submitted by SPI, who owns more than 80,000 acres of the 368,000 acres in the watershed.

Logging by SPI decreased during the 2015 MRWSS update period and will remain diminished for the next several years, due to two very large wildfires in adjacent watersheds. SPI has only two years to complete salvage logging in areas damaged by the Rim Fire (2013) and the King Fire (2014), both outside the Mokelumne Watershed, and so Mokelumne Watershed logging has been and will be deferred. Table 5-14a indicates a 50 percent increase in THPs during the 2010-2014 period when compared with the 2005-2009 period.

PG&E, another significant private landowner in the watershed, maintains an active timber management program that is managed by a staff of RPFs. As part of the timber management program, there are ongoing timber harvest plans on several of the properties proposed for ownership transfer under Project 137, Stewardship Council LCCPs. As required by state regulation, PG&E has filed THPs with CAL FIRE for the specific timber areas.

Non-Industrial Timber Management Plans (NTMPs). NTMPs were added to the California Forest Practice Act in 1989. NTMPs promote long term management and planning on forest ownerships of 2,500 acres or less, with reduced regulatory time and expense. In exchange, landowners agree to manage forests through uneven-aged management (no clear cutting) and long-term sustained yield. Private forest owners are generally classified into industrial and non-industrial ownerships based on size and association with industrial uses; non-industrial ownerships typically do not own a mill. See Figure 5-16 and Table 5-14b for the location and size of the NTMPs approved within the Upper Mokelumne Watershed.

Pesticides

At the present time, there is no known usable data for what might be the largest volume of pesticide/herbicide used in the watershed, i.e. over-the-counter sales to individuals. In the Mokelumne Watershed, the denser population areas are also closer to Pardee Reservoir, so there is less opportunity for attenuation of the pollutants. However, as described in Section 4, analysis of water quality monitoring data for Pardee Reservoir does not indicate that these chemicals are present in detectable levels in the water supply. Pesticide usage data for the 2015 MRWSS update period was obtained from USFS, as well as Amador and Calaveras counties, in addition to EBMUD. County data includes all agricultural pesticide use reported with a township location inside the watershed.

National Forest Lands

In Stanislaus NF, pesticides are primarily being used for plantation maintenance only. Decreases in timber harvesting, and the shift towards removal of smaller trees with less clear-cutting have resulted in much less pesticide use for reforestation. During the 2015 MRWSS update period, pesticides were not used in the Stanislaus NF. This trend in pesticide usage in the Stanislaus NF is expected to continue.

In Eldorado NF, use of pesticides in recent years has been predominantly for control of invasive weeds. Table 5-15a presents the data on pesticides used at the Eldorado NF within the Upper Mokelumne River Watershed between 2010 and 2014. Only small amounts of pesticides were used at the forest during this reporting period.

BMPs for pesticide application at the NFs are outlined in the USDA *Water Quality Management for Forest System Lands in California* manual, dated September 2000.

Non-Federal Lands

County Agricultural Commissioners have jurisdiction over pesticides applied on non-federal lands. The Agricultural Commissioner's staff verifies compliance with pesticide laws by periodic inspections of pesticide applications, mixing and loading operations, employee headquarters inspections, and inspections of pesticide storage facilities. The Counties then send the pesticide use information to the State Department of Pesticide Regulation (DPR).

2010 through 2014 production agriculture pesticide use data was obtained from Amador and Calaveras County agriculture departments, including information on the application operator. The majority of the Upper Mokelumne River Watershed portion of Alpine County is NF and designated as wilderness; therefore, pesticide use data was not collected from Alpine County.

Specific data is available on the production agricultural pesticide use in the Upper Mokelumne River Watershed, because production agricultural applications users, including forest/timberland applications such as SPI, are required to report pesticide and herbicide use by location, including township-range-section, to the county. Pesticide data for urban users, such as structural pest control applications, is only available by County and is incomplete, since only limited urban users must report pesticide use.

SPI is the largest user of pesticides in the Upper Mokelumne River Watershed, applying herbicides for treatment of regrowth sites. Quantities of pesticides used by SPI in the watershed were obtained from the Amador and Calaveras County data, and are shown in Tables 5-15 b and 5-15c. The contractor hired by SPI typically applies pesticides on SPI properties from April through August. Tables 5-15b and 5-15c list the pesticides used by SPI in the watershed between 2010 and 2014 by product name and by quantity using several measurement units. SPI has spent most of its resources to harvest the dead wood from the King Fire, outside of the Mokelumne Watershed. For this reason, the amount of pesticide used during this reporting period is only approximately half of SPI's typically annual pesticide usage.

The total production agriculture pesticide use on Mokelumne River Watershed within Amador and Calaveras counties is summarized in Tables 5-15d and 5-15e, respectively. The pesticide usage data shown on these two tables are indexed by commodity and does not include pesticide used by SPI.

PG&E

Typically, a total of approximately 10-15 acres around PG&E facilities (equipment yards, flumes, dam faces) are treated annually with pre- and post-emergents. Total quantities applied by PG&E vary from year to year, because rights-of-way are treated every three to five years, and plantations are treated one to three times in the 60-year growing cycle. Plantation treatments may decrease once the Stewardship Council land transfers are complete, because lands being donated contain timber management units (see Section 6).

Caltrans

Caltrans District 10 typically applies pesticides along portions of State Highway (88, 26, 4, and 49) in the Upper Mokelumne River Watershed for weed abatement and fire control. The dirt shoulders of paved highways in both directions are sprayed in bands of four to eight feet. Caltrans has reduced pesticide use by limiting spraying of pre-emergents to signs and barriers, mowing at optimum times, and applying sub-lethal concentrations of post-emergents to allow for development of bio-barriers to weed growth.

EBMUD

The Mokelumne Watershed and Recreation Division (MW&RD) has an Integrated Pest Management (IPM) program to address pest issues in its area of responsibility. Currently there are programs to control pests such as yellow jackets, ground squirrels, and feral pigs; this control is achieved through mechanical means such as trapping, and in some cases, shooting by federal trappers. Voles are controlled with zinc phosphide, a rodenticide used to prevent destruction of bird habitat at the Camanche Hill Hunting Preserve (CHHP). Other pests are controlled by both mechanical and/or chemical means. Such pests include insects around facilities/structures, and noxious weeds such as Yellow Star Thistle. Herbicides currently approved for use in the Mokelumne Division by EBMUD's IPM Committee are Roundup Pro, Garlon 4 Ultra, Transline, and Milestone VM.

In addition, the Water Supply Division Pardee Section also has separate herbicide and pesticide programs to address pest issues in the Pardee area. Herbicides are applied twice a year around the Pardee area by EBMUD's Maintenance Specialists certified for pesticide application. Herbicides are also applied once a year to the Camanche Dam and dikes using a helicopter. In addition, other pesticides are being applied once a month at twenty-four locations within the Pardee area by a contractor.

The types and amounts of herbicides and pesticides used at EBMUD's properties within the Upper Mokelumne River Watershed area by MW&RD and the Water Supply Division during the 2015 MRWSS update period are summarized in Table 5-16.

Unauthorized Activities

Amador and Calaveras County staff indicate that illegal dumping continues to be a problem. The worst areas are typically roadsides outside official dumps sites, such as Defender Grade Road near Pioneer in Amador County. On these roads, illegal dumping consists mostly of construction waste, large appliances, and other inert materials. Calaveras County operates seven transfer stations where Calaveras and Alpine County property owners can discard their household trash and mixed recyclables at no cost. Additionally, Calaveras County operates a solid waste facility in Milton that is a landfill, transfer station, and toxics collection facility. Of these facilities, only the transfer station in Wilseyville lies within the watershed.

The Stanislaus NF is seeing a very significant increase in illegal marijuana farming, particularly at elevations between 2,500-4,500 feet in the Calaveras River Watershed. Two marijuana farms were found in the Eldorado NF portion of the Upper Mokelumne River Watershed over the past five years, but no significant environmental damage was reported.

During the 2015 MRWSS update period, Calaveras County has seen an increase in medical marijuana farms, legally growing marijuana, but illegally erecting greenhouses without the required building permits. Calaveras County has chosen to limit this growing potential contaminant source by citing and shutting down growers based on the building permit violations.

Calaveras County Sheriff's Department continues to find and eradicate marijuana grow sites in the Mokelumne Watershed. These illegal grow sites are typically subjected to a wide variety of pesticides and fertilizers use in their operations, not to mention the trash and other human wastes left behind in these makeshift camps. Alpine County reported a marijuana farm at approximately 7,500 feet elevation, suggesting that marijuana farms could become more of a problem in the Upper Mokelumne River Watershed in the future.

In the Upper Mokelumne River Watershed, lands in the 2,500-4,500 foot elevation range are owned primarily by SPI. SPI reports that illegal marijuana farming is not a big problem on their land, given that most of their roads are gated and fairly routinely traveled. When SPI finds illegal farms, they make a report to the proper authorities (county sheriff or NF law enforcement).

Rangers continue to patrol recreational activities at Pardee Reservoir and Middle Bar. Each year, rangers make several contacts with recreational users regarding their illegal water contact (e.g. swimming, waterskiing, wading without waders) at these locations that usually results in their immediate eviction from the facility in question.

Camanche Watershed

The Camanche Watershed is defined here as the 49-square-mile area that drains to Camanche Reservoir, downstream of Pardee Dam. As described in Section 2, Camanche Reservoir is immediately downstream of Pardee Reservoir, and therefore contaminant sources in the Upper Mokelumne River Watershed, discussed in the previous section, can affect Camanche Reservoir water quality. This section addresses additional land uses and activities in the Camanche Watershed only.

Many of the details pertaining to the relationships between the potential contaminant sources (land uses and activities) and the five water quality parameter groups have been thoroughly addressed in the Upper Mokelumne River Watershed section and in previous MRWSSs (1995, 2000, 2005, and 2010); therefore, they will not be discussed here to the same level of detail.

Potential contaminant sources are discussed in the following categories:

- EBMUD Facilities
- Water Resources Development
- Sanitation Facilities
- Hazardous Materials
- Urban Area Runoff
- Rural Area Runoff
- Utilities - Hydroelectric Power
- Transportation Corridors
- Agriculture
- Wildlife and Livestock
- Recreation/ Public Access
- Mines
- Geologic Hazards
- Fires and Fuels management
- Logging
- Unauthorized Activities

Most facilities and corresponding activities within the Camanche Watershed are associated with EBMUD facilities. Therefore, most of the potential contaminant sources identified for Camanche Watershed will be documented under the category of *EBMUD Facilities*. Sanitation facilities, urban area runoff, rural area runoff, hydroelectric power, and recreation, if associated with EBMUD facilities, are included under the category of *EBMUD Facilities*.

EBMUD Facilities

EBMUD facilities within the Camanche Watershed include the Camanche Dam and dike system, Camanche hydroelectric facilities, CASS Recreation Area, CANS Recreation Area, Pardee Reservoir afterbay and spillway, and EBMUD's Watershed Headquarters Administration Building and Maintenance Yard. EBMUD also owns and operates hydroelectric facilities, as discussed under "Utilities - Hydroelectric Power".

CASS Recreation Area

The CASS Recreation Area is located in a rural area on the south shore of Camanche Reservoir in Calaveras County. In 2015, improvements will be made to the CASS road system. Figure 5-12 shows the locations of the Camanche Reservoir Recreation Areas, and Figure 13a shows the CASS Recreation facilities. Detailed CASS campground maps are included in Appendix 5-5. The only road to the facility is Wade Lane, and there are no major businesses, care facilities, highways, hospitals, or schools in the immediate area. The facility is surrounded by the reservoir on three sides, and the area to the east is a residential area.

The CASS Recreation Area encompasses approximately 1,740 acres. Approximately 140 acres are developed, including a marina with fueling facilities paved boat launch, fish cleaning station, camper convenience store, general store, public restrooms, day-use picnic areas, RV sites, campgrounds, amphitheater, rental cottages, laundry facilities, mobile home park, WTP, WWTP, park office, Calaveras County Sheriff office, maintenance yard, dry storage yard, and several large parking areas. Beginning in 2009, the marina boat fueling facilities became on-shore only. Table 5-17 summarizes the recreation facilities located in this recreation area. The remaining acreage is undeveloped watershed. Except for the water and WWTPs, ranger station, and maintenance yard, which are maintained and operated by EBMUD, the facilities are maintained and operated by the concessionaire, Camanche Recreation Company.

Recreation. Recreational activities include swimming, boating, fishing, picnicking, camping, bicycling, horseback riding, and hiking. Table 5-18a presents the number of visitor use at CASS Recreation Area for the update period. In 2014, the CASS Recreation Area served 69 permanent residences and an average of 505 visitors per day, a decrease from the 515 visitors per day during the previous update period. Average annual visitor use for the update period was 184,196, which is a five percent decrease over the previous five-year period annual average.

During the 2015 MRWSS update period, as shown on Table 5-19, several boating-related spills occurred affecting Camanche Reservoir:

- In June 2010, a privately owned ski boat sank on Camanche Reservoir approximately 200 yards from CASS Eucalyptus Day Use Area, releasing approximately 18 gallons of gasoline and five quarts of oil into the water. A sheen on the water approximately a quarter mile long and two to eight feet wide was seen shortly after the incident as high wind conditions carried a small portion of the released material away before the containment boom was deployed. The discharge was contained by booms and

removed with absorbents. Gasoline that was not recovered was believed to have evaporated.

- In July 2010, a truck drove into the reservoir when attempting to launch a boat, releasing an estimated six quarts of oil.
- In September 2013, approximately a half-gallon of motor oil leaked into the Mokelumne River above Camanche Reservoir from Pardee Dam Road. A bucket with oil had a leak. The release was contained with berms and most of the oil was recovered.
- In October 2013, a boat leaked approximately one gallon of engine oil into Camanche Reservoir for unknown reasons.

Water Supply. As described in Section 2, drinking water for the residents and visitors is currently provided by EBMUD's CASS WTP that draws its supply from Camanche Reservoir. A new regional water treatment plant (RWTP) is being built as part of the CARWSP project to replace both existing Camanche Reservoir treatment plants (CANS and CASS). Located at the CASS Recreation Area, the RWTP is expected to be in service by the end of 2016. Related pipeline work is being constructed in 2015-2016, including a new pipeline connection between the RWTP and EBMUD's Mokelumne Aqueducts No. 2 and 3, and new conveyance piping across Camanche Reservoir to deliver treated water to the Camanche North Shore area.

Hazardous Materials Storage. The WTP for the CASS Recreation Area uses a coagulant and sodium hypochlorite to treat the water prior to distribution. The coagulant is stored in the delivered 55-gallon containers with spill containment for each container. Any spills are contained locally in the WTP building. In 2010, the calcium hypochlorite system was replaced with sodium hypochlorite. Waste oils, paints, automotive batteries, used tires, and universal wastes are stored on-site in spill containment pallets by concessionaire.

Sanitation Facilities. Wastewater disposal and treatment services for the CASS Recreation Area are provided by a sewer collection system and wastewater treatment facilities. The wastewater treatment facilities are composed of three ponds: two with mechanical aeration, and one for final disposal by evaporation and percolation. Chemical toilets are also used at CASS Recreation Area to augment the sanitation facilities during the peak visitor season. No sewer overflows occurred in the CASS sewer system during the past five years.

The CASS Solid Waste Facility is owned by EBMUD and was operated between 1967 and 1984. It accepted household waste from the CASS Recreation Area. In July 1987, the RWQCB issued a Waste Discharge Requirement for facility closure, groundwater monitoring, and reporting on closure activities. In 1997, the RWQCB indicated that no significant threat to water quality remained and rescinded the discharge requirement. This now abandoned solid disposal site is located adjacent to the wastewater treatment ponds.

CANS Recreation Area

The CANS Recreation Area is located in a rural area on the north shore of Camanche Reservoir in Amador County. In 2015, a new campground and restaurant will be added at CANS. Figure 5-12 shows Camanche Reservoir Recreation Areas, and Figure 13b shows the

CANS Recreation facilities. Detailed CANS campground maps are included in Appendix 5-5. The only roads into the area are Camanche North Parkway and Camanche Road. There are no major businesses, care facilities, highways, hospitals, or schools in the immediate area other than a few stores and restaurants at Lake Camanche Village three miles away. The area to the north is a residential area. The areas to the west and east are predominantly undeveloped watershed and agricultural land.

The CANS Recreation Area encompasses approximately 535 acres. Approximately 100 acres of the parcel is developed and includes a marina with fueling and boat cleaning facilities, paved boat launch, fish cleaning station, coffee shop, general store, public restrooms, day-use picnic areas, campgrounds, rental cottages, motel units, laundry facilities, two mobile home parks, WTP, WWTP, park office, Amador County Sheriff office, maintenance yard, three dry storage yards, and several large parking areas. Table 5-17 summarizes the recreation facilities that can be found in the CANS Recreation Area. The remaining acreage is undeveloped watershed. The WTP and WWTP, ranger and sheriff stations, and maintenance yard are maintained and operated by EBMUD. The remaining facilities are maintained and operated by the concessionaire, Camanche Recreation Company.

The marina on-water boat fueling facilities include a secondary containment system with sensor leak monitoring and alarms, installed in 1998. The concessionaire performs daily and weekly inspections of the fuel tank, double wall piping, and fuel dispenser (on the floating dock). Inspection documentation is submitted weekly to EBMUD.

Recreation. Recreational activities include swimming, boating, fishing, picnicking, camping, bicycling, horseback riding, and hiking. In 2014, the CANS Recreation Area served 126 permanent residences and an average of 533 visitors per day, a decrease from the average 603 visitors per day during the MRWSS 2010 update period. Table 5-18b presents the record of visitors at CANS Recreation Area for the 2015 MRWSS update period. The average annual visitors for the 2015 MRWSS update period was 194,425 visitors, which is a thirteen percent decrease over the previous five-year period.

In 2013, two gallons of herbicide was spilled at CANS Campground; the spill did not directly enter a waterway.

Water Supply. As described in Section 2, drinking water for the residents and visitors is currently provided by EBMUD's CANS WTP. Three wells provide potable and non-potable water to the CANS Recreation Area facilities. EBMUD's potable water treatment facilities provide drinking water to 211 service connections (155 general and residents, 56 seasonal). A new RWTP is being built as part of the CARWSP project to replace both existing treatment plants.

Hazardous Material Storage. Sodium hypochlorite (400 gallons) liquid is stored in a double-walled containment tank in a separate protected room. Hazardous material storage by the concessionaire is similar to that at CASS Recreation Area.

Urban/Rural Runoff. Four USTs were removed from the CANS Recreation Area Marina Store in April 1997. During the removal activities, hydrocarbon contamination was discovered in the old piping run to the North Shore Marina. Subsequent soil excavation took place, along with confirmation sampling, which indicated that some contaminated soil was left in place. In November 1999, two groundwater monitoring wells were installed at the site. Two site characterizations were performed: one in 2000, and the other in 2004. In 2004, free product was observed in one of the wells, and in October 2005, additional soil and groundwater sampling was performed. The data collected indicate that the contamination is highly localized, there is no threat to reservoir water quality, and natural attenuation is an acceptable remediation alternative. The case has been closed and site closure was received from the RWQCB in December 2009.

Sanitation Facilities. Wastewater treatment and disposal services are provided by a combination of a sewer collection system, a septic system, and spray fields. Chemical toilets are used at CANS Recreation Area to augment the sanitation facilities. The current WWTP consists of six ponds: two for aeration, one for extended aeration, two for winter storage and one for polishing/equalization. After treatment, spray irrigation is practiced over an eight and a half-acre area. The spray irrigation is controlled by a computer program which maximizes evaporation while minimizing runoff. The spray area is contained, with any runoff diverted back into the polishing pond.

There were no sewer overflows for the CANS system during the 2015 MRWSS update period.

Watershed Headquarters and Maintenance Yard. In addition to the Ranger Stations located at the CASS and CANS Recreation Areas, EBMUD operates an office building that serves as the headquarters for EBMUD's Mokelumne Watershed and Recreation Division. Wastewater treatment and disposal is provided on-site by two septic tanks and leach fields (one for the administration building and one for the crew's quarters). The facilities and septic systems/leach fields were upgraded and replaced in 2011. EBMUD also operates a maintenance yard that houses equipment and supplies for EBMUD's Pardee and Camanche facilities.

Water Resources Development

As described in Section 2, A new RWTP is being built as part of the CARWSP project to replace both existing treatment plants. Located at the CASS Recreation Area, the RWTP is expected to be in service by the end of 2016. Related pipeline work is being constructed in 2015-2016, including a new pipeline connection between the RWTP and EBMUD's Mokelumne Aqueducts No. 2 and 3, and new conveyance piping across Camanche Reservoir to deliver treated water to CANS.

Integrated watershed management between the Pardee and Camanche Watersheds will be critical to insure any negative impacts detected at Camanche Reservoir are minimized.

Sanitation Facilities

As mentioned in Section 3, EBMUD owns approximately half of Camanche Watershed, including the reservoir and sanitation facilities. Any sewer overflows within EBMUD property are associated with EBMUD's facilities and are discussed above. AWA (AWA) provides wastewater service to a small area north of EBMUD's CANS Recreation Area; AWA calls this service area Camanche Village Unit 6. Wastewater is collected and pumped through four pump stations, treated at a WWTP, and is disposed of through spray disposal fields. AWA facilities that serve Camanche Village Unit 6 are located within or at Camanche Watershed boundary. AWA treatment facilities consist of a primary pond, two polishing ponds, a chlorine contactor, a storage pond, and a 12-acre spray field. No runoff is allowed from the spray field; runoff is captured in tailwater ditches and returned to the pond. The storage pond overflowed in 2006 due to a 100-year rain event; no other ponds with less treatment were permitted to overflow. Residents and businesses outside EBMUD property and AWA Camanche Village Unit 6 rely on septic systems.

Hazardous Materials

Hazardous materials stored associated with EBMUD's facilities are discussed above. Incidents involving abandoned drug lab chemicals and solvents being recovered are sometimes reported in the watershed. The materials are typically dumped and along roadsides. Reports are made to the Amador or Calaveras Sheriff's office, which with the County Environmental Health Office respond and clean-up these sites. Typical chemicals found during these incidents were discussed in the Upper Mokelumne Watershed section.

Urban Area Runoff

Urban land uses include residential, commercial, and public facilities. The potential contaminants in the runoff from these facilities include metals, solvents, oil, grease, hydrocarbons, and pesticides from landscaping activities, coliform bacteria, and sediments from construction. Urban area runoff within Camanche Watershed is associated with EBMUD's facilities and Camanche Village served by AWA, as discussed above. In addition, the area north of CHHP is also residential and relies on septic systems; future development is expected in this area.

Rural Area Runoff

For the purposes of this study, rural area runoff is focused on potential contaminant sources associated with rural residences. Rural residences are generally dispersed over large areas, often on large parcels of land - one house per 100 acres. The potential water quality issues associated with rural residences are similar to those for urban residential areas. One difference for the rural residences is the use of septic systems instead of sewers for waste collection and treatment. Much of the non-EBMUD property in Camanche Watershed is rural and relies on septic systems. There were no subdivision applications submitted to Amador County during 2010-2014 for the Camanche Watershed area.

Utilities - Hydroelectric Power

Hydroelectric power generation occurs at Camanche Dam and is part of EBMUD's facilities as mentioned above. Some water from the turbine stock seal area and the turbine head cover pump is collected in the wastewater sump located within the powerhouse. Penstock water flowing through the wear seals, leaking turbine seals and the monthly wash down water used to generate between 0.05-0.10 MGD of wastewater. The amount has been reduced to approximately 0.014 MGD with EBMUD's various source control efforts.

The wastewater treatment process consists of a collection sump equipped with an oil belt skimmer located within the powerhouse. Oil that is recovered by the belt skimmer is recycled and reused at the powerhouse. The water within the sump is pumped to a 20,000-gallon retention pond (located outside of the powerhouse). The retention pond is equipped with a rope oil skimmer, and through a series of baffles, re-circulates the surface skimming to an aboveground storage tank. The oil is removed from the site as recycled waste oil every 90 days. The effluent from the pond is pumped to a 750,000 gal holding/infiltration pond located on the northwestern corner of the Camanche Warehouse lay down area. This pond is operated in accordance with a State of California's General Waste Discharge Requirements for Sanitary Sewer Systems (WDR) discharge to land permit. An 85,000-gallon standby earthen basin is located adjacent to the sump and is used when the retention pond undergoes scheduled maintenance or for overflow from the evaporation percolation pond.

Transportation Corridors

The primary concerns associated with transportation corridors are the automotive-related contaminants in surface runoff from roads and parking areas and herbicide application. While no major transportation corridors traverse Camanche Watershed, several secondary roads exist which primarily service EBMUD's CASS and CANS recreation facilities. These roads are highlighted under *EBMUD Facilities* section above.

During the 2015 MRWSS update period, as shown on Table 5-19, one transportation-related spills occurred affecting Camanche Reservoir:

- In September 2013, a tanker truck overturned on Highway 26 at Campo Seco and released 20- 25 gallons of a chemical to a drain that goes to the Mokelumne River. The released chemical was Pozzolith, a liquid admixture chemical that accelerates concrete setting time, with an MSDS HMIS Health Hazard Rating of 2.

Agriculture

No major agricultural activities are currently present within the Camanche Watershed.

Wildlife and Livestock

While livestock can be significant contributors of animal waste in the Camanche Watershed, birds and other wildlife can introduce microorganisms into Camanche Reservoir and its tributaries through direct contact or animal waste. Deer, raccoons, bobcats, opossums, beavers, otters, skunks, coyotes, California ground and grey squirrels, gulls, and waterfowl are common species occurring in the Camanche Watershed. Significant pathogens

associated with animal waste include *Cryptosporidium parvum, Giardia lamblia, Salmonella, E. coli* and avian influenza.

Cattle grazing occurs throughout the Camanche Watershed basin and is permitted on portions of EBMUD-owned lands surrounding Camanche Reservoir. EBMUD's grazing policies were described in the Upper Mokelumne River Watershed section. Grazing occurs on approximately 5,000 acres of land in the Camanche Watershed. Table 5-20 lists the active grazing leases and the total AUMs. Figure 5-14 shows the location of each allotment.

Recreation

Recreation activities occur within the Camanche Watershed and are associated with EBMUD's facilities at CASS and CANS Recreation Areas; these are discussed under *EBMUD Facilities.* As discussed previously, numerous activities are included under the heading of recreation. A variety of water quality concerns are associated with recreation and vary depending upon the specific activity.

Non-Body Contact Recreation

CHHP is located adjacent to CANS Recreation Area. It is located on EBMUD land, but operated by a concessionaire. It is a popular site that has grown significantly over the past few decades and now hosts regional as well as national events. Due to CHHP's proximity to Camanche Reservoir, non-lead shot is required for all upland game hunting. The use of lead shot is only allowed at their sporting clay stations (30 clay stations covering approximately 28 acres) within their lead reclamation zones. Lead ammunition was collected and reclaimed for the first time in 2010; this is anticipated to be an ongoing BMP to be conducted approximately once every five years.

CHHP uses several septic tanks, a sand filter and leach field for waste disposal. The wastewater from the picking room is not connected to the septic system; it enters a separate a 2000-gallon holding tank that is pumped out and hauled off to a landfill in Amador County.

Mines

Only one mine, Penn Mine, in the Camanche Watershed has been identified as a potential contaminant source. Penn Mine was a copper and zinc mine abandoned in 1953. EBMUD and the RWQCB completed the Penn Mine Environmental Restoration Project to implement site restoration work (1997-1999). Approximately 380,000 cubic yards of waste material was excavated and placed in a six-acre landfill (with a clay liner and leachate collection system). A soil cover was placed over areas disturbed by the waste excavation, which were then revegetated with native grasses and shrubs. BMPs were employed for erosion control and sediment management. Existing diversion channels were removed and surface water was allowed to flow into restored.

Three years of post-restoration monitoring of the Penn Mine facilities determined that the site was returned to 'pre-mining' condition, and the USEPA rescinded its 309 Order.

EBMUD continued quarterly monitoring of surface water runoff from the site for metals, turbidity, and pH until January 2010.

Since 2000, four groundwater wells around the landfill are routinely monitored and the landfill is regularly inspected for maintenance requirements and site stability. Bi-annual reports are submitted to the SWRCB. During the 2015 MRWSS update period, based on continued monitoring results and site inspections, there continues to be no evidence of release of landfill leachate to groundwater. EBMUD plans on continuing the groundwater sampling, landfill inspections, and bi-annual SWRCB reports.

Mine Tailings Ponds

A series of three tiered ponds - lower, middle and upper ponds - are located just north of Camanche Reservoir. These ponds are suspected to have been used in association with historical mining activities; based on local topography, surface flows from the ponds drain into Camanche Reservoir.

The three ponds are dry most of the time. The upper pond is approximately 5.2 acres in size. It is primarily on BLM property with the southern portion (approximately 0.6 acres) located on EBMUD property. It consists of mine waste, possibly transported from the Penn Mine Site. Samples collected from the northern portion of the upper pond by BLM showed concentrations of arsenic, lead, zinc and iron above regulatory limits, though elevated metals levels have not been observed in Camanche Reservoir that can be conclusively attributed to the ponds as the reservoir is already on the State's list of Impaired Water bodies for copper, mercury and zinc pollution. The dam at the upper pond has been breached, and surface drainage from the upper pond flows into the middle and lower ponds (both of which have filled with native sediment and are more like moist grasslands today) in a southwesterly ephemeral drainage. From the lower pond, surface water flows into Camanche Reservoir. The middle and lower ponds are 1 and 1.3 acres respectively, and lie entirely on EBMUD land.

Phase I and II site assessments were completed by EBMUD. The Poison Lake Pond Complex Site Engineering Evaluation/Cost Analysis was completed by BLM. Supplemental investigations and a Human Health and Ecological Risk Assessments were also completed.

EBMUD stabilized the lower bank of the lower pond in summer 2009 with a rock wall, backfill, and native vegetation. BLM has also temporarily stabilized the upper pond and drainage between the upper and middle ponds with check dams, bonded fiber matrix, and erosion control blankets.

In 2013, BLM and EBMUD held a series of meetings to keep local residents informed about proposed remediation alternatives and other activities at the site. The engineering report recommended that the 2 lower ponds on District property be left alone, since vegetation now covers the ponds and effectively prevents sediments from moving. The remediation strategy should be finalized with BLM by 2016. After obtaining approval from the RWQCB, remediation will take approximately 18 months.

Geologic Hazards

Soil erosion is the primary geologic hazard in Camanche Watershed. Suspended sediment in a water supply reservoir can cause turbidity problems. Phosphorus and nitrogen, which associate with sediments, promote algal blooms and increases in biological oxygen demand in the reservoir during the summer. In 1997, 50,000 cubic yards of material eroded out of Mexican Gulch into the Mokelumne River below Pardee Dam. A contractor removed the material with mining equipment. Since that time, there have not been any other erosion issues at Mexican Gulch. This is primarily due to the fact that the flows over the spillway have been much less than during that period (approximately 40,000 cfs). Also, the spillway has been restructured in attempts to avoid similar problems if flows reach those levels in the future.

While specific geologic hazards are not identified for Camanche Watershed, heavy rainfall can lead to erosion from surface runoff. The risk to the Camanche Reservoir is greatest when erosion occurs near the reservoir itself, since small rainfall events can transport sediment over a short distance. Large storms can transport sediment from throughout the watershed. Erosion is most likely to occur where the land has been disturbed, exposing bare soil. Road cuts on steep slopes are a major source of sediment erosion. Landslides, fires, or disturbances by animals are other modes by which the erosion risk increases.

See the 2010 MRWSS update for a description of two major erosion prevention projects completed by EBMUD to decrease erosion into Camanche Reservoir: the CASS Area shoreline boulder retaining wall and the China Gulch Restoration Project. The China Gulch Restoration Project also prohibits drainage from the mine tailings ponds from reaching Camanche Reservoir.

Fire and Fuels Management

In lower, less forested portions of the Sierra foothills, human-caused wildfires may pose a more significant threat than lightning strikes. Fire created by activities along the roadside or trails, such as discarded smoking materials, catalytic converters, or vehicle fires, could have significant negative impacts on the water quality of Camanche Reservoir resulting from increased erosion during rainfall events.

Table 5-21 lists fires that occurred during the 2015 MRWSS update period in the Camanche Reservoir area and Watershed. The largest fire reported in the watershed during this update period, was a 20-acre fire south of Coyote Flat Campground in 2011. There were no known water quality impacts as a result of this fire.

Unauthorized Activities

Unauthorized activities within the Camanche Watershed can contribute to a myriad of contaminants entering the Mokelumne River and ultimately Camanche Reservoir. Roadways leading into or through the watershed increase the potential for unauthorized activities, such as illegal dumping. Illegal dumping and trespassing may impact reservoir water quality by introducing contaminants from materials dropped into creeks or the Mokelumne River

leading directly into the reservoir. The illegal dumping of household wastes and appliances is an ongoing problem within watersheds. In addition, commercial dumping (e.g. concrete blocks, creosote logs, tires) has also occurred.

Significance of Potential Contaminant Sources

This section summarizes the various contaminant sources identified previously and their potential for water quality degradation. The potential for each contaminant source to impact water quality is ranked insignificant, low, medium, and high as shown in Table 5-22. These rankings take into account watershed characteristics (size, slopes, soils, and vegetation), type of contaminant, distance to water bodies, and magnitude of source. The water quality parameter of greatest concern for a specific contaminant source in Table 5-22 is identified in bold type.

Table 5-1: Pardee Reservoir Recreation Facilities

FACILITY	PARDEE RECREATION AREA Existing Size/Quantity
Tent Campsites	94
RV Campsites (short term)	12
RV Campsites (seasonal)	87
Picnic Tables	143
Roads (paved)	3 mi
Roads (unpaved)	1.5 mi
Hiking Trails	4.11mi
Total Day Use Parking Spaces	455
Vehicle w/ Boat/Trailer or RV Parking Stalls	137
Drinking Fountains	33
Hydrants	20
Swimming Pools	2
Fish Cleaning Facilities	1
Above Ground Fuel Tanks	2
RV Dump Stations	1
Restrooms (portable)	48
TOTAL BUILDINGS	12
Restroom/Shower Buildings	4
Toilets	11
Urinals	5
Sinks	15
Heads	10
Laundry (Locations)	1
Dryers	2
Washers	2
Marina	1
Slips	70
Park Headquarters	1
Entrance Kiosk	1
Pool Building	1
Coffee Shop	1
Pump House	1
Sanitary Can Cleaning Station	1
Maintenance Shop	1
EBMUD Boat House	1
RV/Boat Storage Area	101 spaces
Boat Launch Ramps	2 Locations
Main - Elevation (540-572)	10 lanes
Low Water – Elevation (495-535)	2 lanes
Public Telephones	1

Reviewed by Mark Bolton, EBMUD

Table 5-2: Visitor Use Pardee Recreation Area (2010-2014)

	Number of Visitors				
	2010	**2011**	**2012**	**2013**	**2014**
January	Closed	Closed	Closed	Closed	Closed
February	11228	7915	7337	7621	6369
March	10662	9532	6587	9088	6879
April	10084	14125	10718	9510	8878
May	12232	13566	11066	9182	9518
June	13087	12687	9892	7712	8578
July	10214	12471	9447	7881	9792
August	10584	8406	7584	7800	7553
September	8786	7888	7589	5860	4670
October	7088	5221	6612	5750	4297
November	Closed	690	779	1154	235
December	Closed	Closed	Closed	Closed	Closed
Total	**93965**	**92501**	**77611**	**71558**	**66769**

Source: Mark Bolton, EBMUD

Table 5-3. Non-Discharging Small Community Wastewater Systems, Upper Mokelumne River Watershed

Sub-Watershed	Facility Name	Operating Agency	Treatment Type	Type of Development	Effluent Disposal	Design Capacity (gpd)	Avg. Flow (gpd)
Middle Fork	West Point WWTP	Calaveras County Water District	Aerobic and anaerobic digestion and UV disinfection	120-acre community (164 connections as of 2007)	Sand filters, UV disinfection, holding ponds, sprayfield.	58,000	25,000
EFFLUENT RESTRICTIONS: Monthly Mean – 40 mg/L BOD5, 0.2 mL/L/hr settleable solids, 23 MPN/100 ml total coliform. Daily Max: 80 mg/L BOD5, 0.5 mL/L/hr settleable solids, 230 MPN/100 ml total coliform							
South Fork	Wilseyville Camp Sewer Treatment Plant	Calaveras County Water District	Aerated Lagoon	28 residential connections and one commercial connection	Storage pond, with 10-acre spray field (occasional	9,000	6,000
	Mokelumne Hill WWTP	Mokelumne Hill Sanitary District	Two aerated lagoons, chlorination tank	Community of Mokelumne Hill (about 280 connections)	Storage pond, and spray disposal field	150,000	60,000
EFFLUENT RESTRICTIONS: Monthly Mean – 40 mg/L BOD5, 0.5 mL/L/hr settleable solids. Daily Max: 80 mg/L BOD5, 1.0 mL/L/hr settleable solids							
Main Stem	Pardee Center WWTP	EBMUD	Extended aeration package plant	Residential, office, shop and recreational facilities for EBMUD employees	Percolation pond on Camanche Watershed	3,000	~1,000
EFFLUENT RESTRICTIONS: Monthly Mean – 40 mg/L BOD5, 40 mg/L suspended solids, 0.5 mL/L/hr settleable solids. Daily Max: 80 mg/L suspended solids, 80 mg/L BOD5, 1.0 mL/L/hr settleable solids							
	Pardee Recreation Area WWTP	EBMUD	Multiple-stage oxidation/evaporation ponds	80 recreational vehicle units and a recreational center including restaurant	Evaporation spray irrigation fields outside watershed[2]	38,100	5,000
2 Surface water at treatment site drains to the Lake Amador watershed via Carson Creek.							

Source: Central Valley Regional Water Quality Control Board

Table 5-3a. Non-Discharging Large Septic Systems, Upper Mokelumne River Watershed

Sub-Watershed	Facility Name	Operating Agency	Location	Treatment Type	Type of Development	Effluent Disposal
North Fork	Tiger Creek Estates	Amador Water Agency	Pioneer / Buckhorn	Septic System		Leach field
Middle Fork	Dunrovin Mobile Home Village	Private Mobile Home Park	West Point	Septic System (multiple tanks)	30 residential connections	Leach field
Middle Fork	Camp Lodestar	Private Camp	Wilseyville	Septic System (multiple tanks)	Seasonal camp 167 residents	Leach field
South Fork	Silver Mountain Park	Private Mobile Home Park	Wilseyville	Septic System		Leach field
South Fork	Railroad Flat Elementary	Private	Railroad Flat	Septic System		Leach field
South Fork	Camp Menzies (Girl Scouts)	Private	Off Highway 4	Septic System	Seasonal camp	Leach field

Source: Calaveras County Groundwater Protection Program 2004, Amador Water Agency Wastewater Systems in Amador County map, updated 2015

Table 5-4: Underground Storage Tanks, Upper Mokelumne River Watershed(1)

NAME	ADDRESS	CITY	COUNTY	SUBSTANCE	POTENTIAL THREAT	STATUS	LAST UPDATE
Leaking Underground Storage Tanks (LUST) Cleanup Sites							
SIERRA TRADING POST #8	8026 HWY 49	Mokelumne Hill	Calaveras	Heating/ Fuel Oil; Diesel	Aquifer used for drinking water supply	Open - Site Assessment	3/25/2008
WEST POINT EXXON	347 MAIN ST	West Point	Calaveras	Gasoline	Aquifer used for drinking water supply	Open - Verification Monitoring (3/16/2011 Site Assessment)	3/12/2012
Remediated LUST Cleanup Sites(2)							
STAR GAS	22645 HWY 26	WEST POINT	Calaveras	Gasoline	Soil	Completed - Case Closed (remediated 7/12/2012)	6/27/2013
Permitted Underground Storage Tanks							
SIERRA TRADING POST #8	8026 Hwy 26	Mokelumne Hill	Calaveras	n/a	n/a	n/a	n/a
BEAR RIVER LAKE RESORT(3)	40800 Hwy 88	Pioneer	Amador	n/a	n/a	n/a	n/a
Caltrans-Peddler Hill Maint. (3)	41951 Highway 88	Pioneer	Amador	n/a	n/a	n/a	n/a
Bear Valley Ski Area	Bear Valley Ski Area	Bear Valley	Alpine	n/a	n/a	n/a	n/a
Abandoned Mine Land Disposal Site							
BLAZING STAR MILL/MINE	0 JURS RD	West Point	Calaveras	n/a	n/a	Open	1/1/1965(4)

1. See Figure 5-3 for locations.
2. Sites included if leak discovered or site remediation completed 2010 - 2014.
3. Site LUST has been fully remediated and new tank is now permitted. Site is listed only under Permitted Tanks.
4. Default date in Geotracker database (indicates no action yet taken).

Source: California State Water Quality Control Board Geotracker Database, http://geotracker.swrcb.ca.gov, Reports by County

Table 5-5: OES Spills Tributary to the Upper Mokelumne River, Pardee Reservoir 2010 - 2014

OES Spill Report #	Date	County	Location	Agency Reporting	Type of Spill	Amount Spilled (gal)	Contained Before Entered Waterway?	Water Way Entered
Upper Mokelumne River and Pardee Reservoir								
14-4782	8/25/2014	Amador	Electra Rd, 1 mi east of Hwy 49	Calfire- Camino	Gasoline and Oil Mixture	5-10	No	Mokelumne River
'14-3825	7/7/2014	Amador	Pardee Reservoir, near dam	East Bay MUD	Gasoline	8	No	Pardee Reservoir
'10-6371	10/22/2010	Calaveras	Near West Point, 200 yards upstream from Hwy 26	Citizen	Unknown, sediment, possible treament chemical alum	UNK	No	Wet Creek

Source: California State Office Emergency Services

Table 5-6: not used

Table 5-7: Livestock Grazing Allotments in Stanislaus and El Dorado National Forests, Upper Mokelumne River Watershed

Permitted Allotment	National Forest	Acres [1] NF Land	Acres [1] Private Land	Permitted Number C/C[2] NF Land	Permitted Number C/C[2] Private Land	Allotment Percentage in Watershed[3]	Grazing Season	AUMs[4]
Bear River	El Dorado	23,053	7.373	168	42	100%	06/15 – 09/30	(788) [197]
Corral Flat	El Dorado	221	131	8	12	100%	07/11 – 09/30	(29) [42]
Pardee	El Dorado	35,416	1,665	224	44	83%	07/16 – 10/10	(846) [166]
Indian Valley	El Dorado	14,607		185	85	100%	07/21-9/20	(5)
Shotgun	Stanislaus	4,410		35	236	88%	5/1– 9/15	100
Lower Blue	Stanislaus	17,820		69	269	100%	5/1 – 9/15	411
Mattley	Stanislaus	15,156		132	39	77%	6/16 – 9/15	523
Bear Valley	Stanislaus	23,066		145	0	82%	7/1 -9/30	574
Stanislaus Meadow	Stanislaus	17,890		100	0	41%	7/1 – 9/30	396
Pacific Valley	Stanislaus	28,096		215	0	25%	7/1 – 9/30	911
Highland Lakes	Stanislaus	13,946		160	0	90%	7/1 - 9/30	851
Mokelumne	Stanislaus	8,747		73	28	100%	5/15 – 9/30	434

(1) Livestock move freely between NF and private land (adjacent and unfenced).
(2) C/C = Cow and Calf pairs. Each pair contributes 1.32 AUMs
(3) Allotment is partially in and partially out of the Upper Mokelumne River watershed.
(4) Animal Unit Months (AUMs) of forage = Animal units times number of months. (AUMs on National Forest land) [AUMs on private land]
(5) Vacant since 1992, Last grazed 1989
Source: El Dorado and Stanislaus National Forests

Table 5-8 EBMUD-Managed Grazing, Pardee Reservoir Area

Name	Approximate Acreage	Grazing Allowed	Estimated AUMs	Lease Expiration
Wildermuth House	2300	45 %All Year 55% Apr-Oct	1329	October 2015
Pardee Dam	466	55% All Year 26% Apr-Dec 23% Apr-Oct	158	October 2015
Watertown[a]	580	All Year	262	October 2015
Carson Creek[a]	245	All Year	75	October 2015
Chrome Mountain	1717	60% All Year 40% Apr-Dec	1099	October 2015
Rabbit Flat	401	All Year	401	October 2015
Goat Hill	950	Apr-Dec	960	October 2015
Gales Ridge	392	Apr-Dec	101	October 2015
North Middle Bar	762	59% All Year 31% Apr-Dec 10% Apr-Oct	495	October 2015

a. Pastures are outside the Pardee Reservoir Watershed

Source: Chris Swann, EBMUD

Table 5-9. Upper Mokelumne River Watershed – U.S. Forest Service Recreational Activities (1995 MRWSS)

Recreation Sites	Elev. (ft)	Months of Use	Family Camp Units	Group Camp Units	Picnic Units (day use only)	Store Within 5 miles	Toilets Flush/ Valve	Stream or Lake Water	Forest Service Camp-ground	Group Camp-ground	Picnic Areas	Picnic Area other than Forest Service	Hiking	Obser-vation Point	Fee	Boating	Boat Ramp	Fishing	Swim-ming	Drink-ing Water	Rec. Vehicle
El Dorado National Forest																					
Bear Creek	3,200	5/01-10/01			3	NO	V	YES			X										
Bear River Group	6,000	6/15-10/15		3		YES	V	NO		X			X		X	X	X	X	X	X	
Lumberyard	6,500	6/01-10/31	8			YES	V	NO	X											X	X
Mokelumne	3,200	5/01-11/15	8			NO	V	YES	X									X	X		
Peddler Hill	6,800	6/01-11/15				NO		NO						X							
Salt Springs	3,900	5/01-11/15			4	NO	V	NO			X					X		X			
Shot Rock	7,500	6/15-11/15			3	NO	V	NO			X			X							
South Shore	5,900	6/01-11/15	22			YES	V	NO	X				X	X	X	X	X	X	X	X	X
Tragedy Springs	7,900	6/15-10/15			3	YES	V	NO	X											X	
White Azalea	3,500	5/01-11/15	6			NO	V	YES	X									X	X		
Stanislaus National Forest																					
Bloomfield	8,000		10				V											X	X		X
Moore Creek	3,200	5/01-11/15	8			NO	V	YES	X									X	X		X
Hermit Valley	7,500		6				V											X	X		X

Table 5-10 Wildfires in the Pardee Reservoir Watershed (> 0.5 acre)

DATE	LOCATION	CAL FIRE Name	SIZE (ACRES)
9/28/2010	CAMPO SECO RD 1/4 MI WEST OF WATERTOWN RD, CALAVERAS CO		2
7/22/2011	GWIN MINE RD 1/2 MI WEST OF MIDDLE BAR BRIDGE - PARDEE WATERSHED	MIDDLE	97
8/10/2011	MIDDLE BAR RD AMADOR CO.		4.6
2011		EAST	44
2011		SALT	343
2011		BLUE	698
5/30/2012	PALOMA RD & HWY 26		40
9/5/2012	MULTIPLE SPOTS ALOMNG STONEY CREEK RD AMADOR COUNTY		0.5
6/15/2014	PARDEE WATERSHED OBSERVATION POINT		2.5
7/12/2014	PARDEE RECREATION AREA CAMPSITE 214		1.2

Source: CDF and EBMUD

Table 5-11 Fuel Management Activities, EBMUD 2010 -2014

TYPE OF TREATMENT	ANNUAL QUANTITY
Discing	18.7 Miles
Roads/Trails Mowed	110.6 Miles
Brush Removal (Hand Crews)	15 Acres
Prescribed Burning	40 Acres[2]

1. For locations see Figure 5-11 Source: Chris Swann
2. Single activity May 2015

Table 5-12 Power Fire Summary

Location	North Fork of the Mokelumne River, between Hwy 88 and Salt Springs Reservoir, 17 miles East of Pioneer. Center of fire is approximately 31(river) miles upstream of Pardee Reservoir.
Time Period	Originated October 6, 2004, 100% contained by October 21, 2004
Size	16,823 acres (5 percent of Upper Mokelumne Watershed area)
Land Type	13,738 acres National Forest, 3,085 private land. Mixed conifer and oak woodlands. Steep terrain ranging from 2,700 to 6,200 feet elevation.
Cause	Manmade (began near PG&E Salt Springs Reservoir Powerhouse)
Cost	$7,722,000

See the MRWSS 2005 update for a location map.

Table 5-13 Timber Harvests for National Forest Service Land

2010-2014 Timber Harvesting, Upper Mokelumne River Watershed within National Forest Lands			
National Forest	**Acres**	**Type**	**Sub-watershed**
Eldorado, Amador District	none		
Stanislaus, Calaveras District	635	Thinning	South Fork Mokelumne River
Total	**635**	**Acres**	

Source: El Dorado and Stanislaus Nation Forests, Resource

Table 5-14a: Timber Harvests Plans, 2010 – 2014 ,Upper Mokelumne River Watershed

YEAR	TIMBER HARVEST PLANS
	(total acres)
2010	5495
2011	2792
2012	3970
2013	2433
2014	230
Total	**14920**
2005	245
2006	1986
2007	2540
2008	2291
2009	2434
Total	**9,496**

1. Timber Harvest Plans (THPs) required when harvesting timber on private land

Source: California Department of Fire

Table 5-14b: Non-Industrial Timber Management Plans
Program Inception to Present (1989–2014)
Upper Mokelumne River Watershed

YEAR	NON-INDUSTRIAL TIMBER MANAGEMENT PLANS
	(total acres)
2002	243
2003	940
2005	648
2007	306
Total	1831

Source: California Department of Fire

Table 5-15a. Eldorado National Forest Pesticide Usage 2010-2014

	ANNUAL QUANTITY USED					
PRODUCT NAME	**2010**	**2011**	**2012**	**2013**	**2014**	**UNIT**
ROUNDUP CUSTOM	0	0	0	0	27	GALLON
TRANSLINE	0	4	12.5	11.5	0	OUNCE

Source: Eldorado National Forest, Culturist, Jeff Griffin, August 2015

Table 5-15b 2010-2014 Production Agriculture Pesticide Use on Mokelumne River Watershed Applied by SPI, Listed by Volume

	ANNUAL QUANTITY USAGE						
PRODUCT NAME	EPA REGISTRATION NUMBER	2010	2011	2012	2013	2014	UNITS
ACCORD XRT	62719-517-ZC	-	-	122	-	-	GALLON
ARSENAL HERBICIDE APPLICATORS CONCENTRATE	241-299-AA	3	-	-	-	-	GALLON
ARSENAL HERBICIDE APPLICATORS CONCENTRATE	241-299-AA	-	-	373	-	-	OUNCE
BUCCANEER GLYPHOSATE HERBICIDE	524-445-ZA-55467	18	-	-	-	-	GALLON
CHOPPER HERBICIDE	241-296-AA	24	29	-	-	-	GALLON
CONQUER	1050984-50002-AA	-	-	777	-	236	GALLON
DU PONT VELPAR L WEED KILLER	352-392-AA	88	-	9	-	-	GALLON
DU PONT VELPAR L WEED KILLER	352-392-AA	-	-	-	-	183	QUART
DYNE-AMIC	5905-50071-AA	75	44	35	94	45	GALLON
DYNE-AMIC	5905-50071-AA	2	-	-	-	-	PINT
DYNE-AMIC	5905-50071-AA	29	54	3	-	-	QUART
DYNE-AMIC	5905-50071-AA	96	-	20	-	-	OUNCE
DYNE-AMIC	5905-50071-AA	-	-	16	-	-	POUND
ELEMENT 3A	62719-37-ZE	-	-	27	94	-	GALLON
GLY STAR ORIGINAL	42750-60-AA	737	845	607	654	689	GALLON
GLYPHOSATE 4 PLUS	81927-9-AA	-	-	271	654	-	GALLON
MILESTONE	62719-519-AA	-	-	-	3,228	2,239	OUNCE
MSO CONCENTRATE METHYLATED SEED OIL	36208-50027-AA	133	-	-	654	-	GALLON
MSO CONCENTRATE WITH LECI-TECH	34704-50053-AA	-	16	-	654	-	GALLON
NUFARM POLARIS HERBICIDE	228-534-AA	3	-	-	7	7	GALLON
NUFARM POLARIS HERBICIDE	228-534-AA	-	-	-	25	-	QUART
NUFARM POLARIS AC HERBICIDE	228-480-AA	-	-	-	7	2	GALLON
NUFARM POLARIS AC HERBICIDE	228-480-AA	-	-	-	-	5	QUART
NUFARM POLARIS AC HERBICIDE	228-480-AA	-	-	92	-	10	OUNCE
NUFARM POLARIS SP HERBICIDE	228-536-AA	-	-	65	240	31	GALLON
NUFARM POLARIS SP HERBICIDE	228-536-AA	-	-	-	210	-	OUNCE
NUFARM WEEDONE L V 4 EC BROADLEAF HERBICIDE	228-139-AA-71368	-	-	29	240	-	GALLON
NUFARM WEEDONE L V 4 EC BROADLEAF HERBICIDE	228-139-AA-71368	-	-	3	-	-	QUART
RANGER PRO HERBICIDE	524-517-ZB	-	-	-	291	-	GALLON
REFUGE HERBICIDE	100-1362-AA	-	-	-	697	-	GALLON
RIVERDALE 2, 4-D L.V. 6 ESTER	228-95-AA	31	55	-	697	-	GALLON

RIVERDALE 2, 4-D L.V. 6 ESTER	228-95-AA	4	-	-	-	-	QUART
RIVERDALE RAZOR SPI	228-366-AA	145	-	-	697	-	GALLON
SUPER SPREAD MSO	2935-50176-AA	-	-	-	364	220	GALLON
SYL-TAC	2935-50167-AA	-	-	-	-	10	GALLON
TRI-FOL	2935-50152-AA	-	-	-	364	-	GALLON
TRI-FOL	2935-50152-AA	531	424	154	-	-	OUNCE
VELOSSA	5905-579-AA	317	160	192	364	16	GALLON
VELOSSA	5905-579-AA	-	-	-	1,006	272	QUART
WESTERN FARM SERVICE NO FOAM A	11656-50086-AA	2	-	-	364	-	GALLON
WESTERN FARM SERVICE NO FOAM A	11656-50086-AA	3	-	-	-	-	QUART
WILCO GOPHER GETTER RESTRICTED USE BAIT	36029-50005-AA	-	-	-	364	-	GALLON

Sources: Amador County, Agriculture and Standards Inspector, Barry Clark, September 2015.
Calaveras County, Deputy Agricultural Commissioner, Eric Mayberry, September 2015.

Table 5-15c 2010-2014 Production Agriculture Pesticide Use on Mokelumne River Watershed Applied by SPI, Listed by Weight

		ANNUAL PESTICIDE USAGE					
PRODUCT NAME	**EPA REGISTRATION NUMBER**	**2010**	**2011**	**2012**	**2013**	**2014**	**UNITS**
RCO OMEGA GOPHER GRAIN BAIT	5042-32-AA	-	-	-	-	161	POUND
RIVERDALE SPYDER HERBICIDE	228-408-AA	-	-	665	80	-	OUNCE
WILCO GOPHER GETTER AG BAIT	36029-7-AA	-	-	32	298	-	POUND
WILCO GOPHER GETTER RESTRICTED USE BAIT	36029-25-AA	40	87	80	-	-	POUND

Sources: Amador County, Agriculture and Standards Inspector, Barry Clark, September 2015.
Calaveras County, Deputy Agricultural Commissioner, Eric Mayberry, September 2015.

Table 5-15d 2010-2014 Total Production Agriculture Pesticide Use on Mokelumne River Watershed within Amador County[1]

	2010-2014 PESTICIDE USAGE				
COMMODITY / PRODUCT NAME	**Gallon**	**Liters**	**Quart**	**Pounds**	**Ounce**
FOREST, TMBRLND					
ACCORD XRT	12	-	-	-	-
VELOSSA	15	-	-	-	-
GRAPE, WINE					
ACTIVATOR 90	-	-	288	-	-
FIRST CHOICE NO FOAM A	-	-	4	-	-
JMS STYLET-OIL	-	-	196	-	-
KALIGREEN	-	-		6	-
MICRO-SULF	-	-	2	19	-
MICROTHIOL DISPERSS	-	-	-	38	-
ROTHIOL SPECIAL MICRONIZED TABLE S	-	-	-	7	-
MICROTHIOL SPECIAL MICRONIZED WETTABLE SULFUR	-	-	-	2	-
MILSTOP BROAD SPECTRUM FOLIAR FUNGICIDE	-	-	-	2	-
OMITE-30W	-	-	-	3	-
PASADA 1.6F	-	-	2	-	-
PRISTINE FUNGICIDE	-	-	24	-	-
QUINTEC	-	-	18	-	-
RALLY 40 WSP	-	-	6	-	-
RALLY 40W AGRICULTURAL FUNGICIDE IN WATER SOLUBLE POUCHES (WITHDRAWN)	-	-	2	2	-
RUBIGAN E.C.	-	-	3	-	-
SOVRAN FUNGICIDE	-	-	6	-	-
PASTURELAND					
NUFARM WEEDONE L V 4 EC BROADLEAF HERBIC	3	-	-	-	-
NUFARM WEEDONE L V 4 EC BROADLEAF HERBICIDE	7	-	-	-	-
WEEDONE LV6 EC	3	-	-	-	-
RANGELAND					
MILESTONE	-	-	16	-	-
TOMATO					
MICROTHIOL DISPERSS	-	-	-	2	-
M-PEDE	-	-	-	-	-
TOMATO ORG					
ENTRUST	-	-	11	-	-
KALIGREEN	-	-	-	33	-

MICROTHIOL DISPERSS	-	-	-	104	-
M-PEDE	-	15	-	-	-
MYCOTROL O	-	-	144	-	3
NEEMIX 4.5	0.1	-	8,534	-	-
PYGANIC CROP PROTECT	1	-	64	-	-
PYGANIC CROP PROTECTION EC 1.4	-	-	1,670	-	-
PYGANIC CROP PROTECTION EC 1.4 II	-	-	400	-	-
ROOTSHIELD WP BIOLOGICAL FUNGICIDE	-	-	-	6	-

[1] Does not include SPI pesticide use data.
Source: Amador County, Agriculture and Standards Inspector, Barry Clark, September 2015.

Table 5-15e 2010-2014 Total Production Agriculture Pesticide Use on Mokelumne River Watershed within Calaveras County[1]

	2010-2014 USAGE QUANTITY					
COMMODITY / PRODUCT NAME	Gallon	Quart	Pint	Grams	Pounds	Ounce
BEEHIVE						
HOPGUARD	-	-	-	378	-	-
FOREST, TMBRLND						
ACCORD XRT	85	-	-	-	-	-
GARLON 3A	9	-	-	-	-	-
GRAPE, WINE						
AGRI-MEK 0.15 EC MITICIDE/INSECTICIDE	-	-	-	-	5	-
AGRI-MEK SC MITICIDE/INSECTICIDE	-	-	-	-	20	-
COSAVET DF	-	-	-	-	-	9
DITHANE DF	-	-	-	-	-	5
DREXEL DIURON 4L HERBICIDE	-	6	-	-	-	2
DREXEL DIURON 4L HERBICIDE1.	-	-	-	-	-	2
GLY STAR PLUS	-	5	-	-	32	-
GLY STAR PRO	-	2	-	-	-	-
KALIGREEN	-	-	-	-	-	17
KUMULUS DF	-	-	-	-	-	46
MICROTHIOL DISPERSS	-	-	-	-	13	13
MILLER NU FILM P	-	-	-	-	6	-
PRISTINE	-	-	-	-	20	-
PRISTINE FUNGICIDE	-	-	-	-	169	-
PROCURE 480SC	-	-	-	-	45	-
PRONTO BIG 'N TUF 41% GLYPHOSATE WEED & GRASS KILLER	-	4	-	-	-	-
RALLY 40 WSP	-	-	-	-	25	-
RED-TOP DUSTING SULFUR	-	-	-	-	-	150
ROUNDUP POWERMAX HERBICIDE	-	6	-	-	-	-
ROUNDUP ULTRAMAX HERBICIDE	-	3	-	-	-	-
THIOLUX JET	-	-	-	-	-	8
VITICURE	-	-	-	-	37	-
WILBUR-ELLIS DUSTING SULFUR	-	-	-	-	-	50
OT-FLWRNG PLANT						
LIQUI-COP	-	3	-	-	-	-
MILLER'S MICROCOP	-	-	-	-	6	-
ROUNDUP WEED & GRASS KILLER CONCENTRATE PLUS	2	-	-	-	12	-
PASTURELAND						
GLY-4 PLUS HERBICIDE	-	4	-	-	-	-

PISTACHIO						
WILCO GOPHER GETTER RESTRICTED USE BAIT	-	-	-	-	-	2
RANGELAND						
AMINE 4 2,4-D WEED KILLER	-	-	-	-	108	-
DYNE-AMIC	1	-	-	-	60	-
GARLON 3A HERBICIDE	-	-	-	-	728	-
GARLON 4 ULTRA	-	-	-	-	36	-
GARLON 4ULTRA	-	3	-	-	-	-
INDUCE	6	-	-	-	-	-
MILESTONE	0.1	-	-	-	144	-
MILESTONE VM	-	-	-	-	36	-
MON-65005 HERBICIDE	-	-	-	-	91	-
NUFARM WEEDAR 64 BROADLEAF HERBICIDE	6	-	-	-	1,130	-
POINTBLANK	1	-	-	-	16	-
R-11 SPREADER-ACTIVATOR	-	1	2	-	44	-
REMEDY ULTRA	-	-	-	-	57	-
TRANSLINE	13	2	-	-	106	-
TRICLOPYR 3A	-	-	-	-	839	-
WILCO GOPHER GETTER RESTRICTED USE BAIT	-	-	-	-	-	19
UNCUL NON-AG						
GLY-4 PLUS	-	11	-	-	-	-
GLY-4 PLUS HERBICIDE	-	6	-	-	-	-
GLYFOS HERBICIDE	-	-	2	-	-	-
MON-65005 HERBICIDE	-	-	-	-	124	-
ROUNDUP PRO HERBICIDE	-	-	-	-	60	-
TRANSLINE	-	-	-	-	8	-
WALNUT						
Unknown	10	5	-	-	-	-
17545-50030	-	-	4	-	-	-
ALION HERBICIDE	1	-	-	-	-	-
CLEAN CROP MALATHION 8 AQUAMUL	3	-	24	-	244	-
DIURON 4L	6	-	-	-	-	-
DYNE-AMIC	8	-	-	-	102	-
FIRST CHOICE SPREADER STICKER	2	-	-	-	-	-
FIRST CHOICE SURPHTAC ADJUVANT	1	-	16	-	-	-
GF-120 NF NATURALYTE FRUIT FLY BAIT	6	-	-	-	-	-
GLY STAR PLUS	72	-	-	-	-	-
GLY-4 PLUS	-	240	-	-	-	-
GLY-4 PLUS HERBICIDE	-	516	22	-	-	-

GLYFOS HERBICIDE	-	36	-	-	-	-
GOVERN 4E INSECTICIDE	-	-	20	-	-	-
GROUNDED-CA	5	-	-	-	-	-
HONCHO PLUS HERBICIDE	15	-	-	-	-	-
LEAF ACT 80B BUFFER SPREADER	-	-	1	-	-	-
MALATHION 8 AQUAMUL	-	48	-	-	-	-
MALATHION 8EC	-	-	12	-	-	-
MONTEREY INSECT BAIT	-	-	32	-	-	-
NUFOS 4E	-	-	6	-	-	-
NU-LURE INSECT BAIT	-	-	-	-	65	-
PENETRATOR PLUS	-	-	-	-	-	-
PINDAR GT	3	-	-	-	-	-
PROWL H2O HERBICIDE	12	-	-	-	-	-
RNA ACTIVATOR 85	-	-	1	-	-	-
ROUNDUP ORIGINAL MAX HERBICIDE	5	-	-	-	-	-
ROUNDUP POWERMAX HERBICIDE	5	-	-	-	-	-
SABER CA HERBICIDE	-	-	12	-	-	-
TOUCHDOWN TOTAL	8	-	-	-	-	-
TREEVIX POWERED BY KIXOR HERBICIDE	-	-	-	150	275	1
TRI-FOL	-	-	1	-	-	-
VULCAN	-	-	36	-	-	-
WILCO GOPHER GETTER RESTRICTED USE BAIT	-	-	-	-	-	19

[1] Does not include SPI pesticide use data.
Source: Calaveras County, Deputy Agricultural Commissioner, Eric Mayberry, September 2015.

Table 5-16 2010-2014 EBMUD Annual Herbicide and Pesticide Usage on Upper Mokelumne River Watershed

	ANNUAL QUANTITY USED					
PRODUCT NAME	**2010**	**2011**	**2012**	**2013**	**2014**	**UNIT**
Herbicide Usage on Upper Mokelumne River Watershed Area other than Pardee Area						
GALON 4 ULTRA	208	0	112	1,854	760	OUNCE
HASTEN (vegetable oil)	0	0	0	3,504	1,249	OUNCE
MILESTONE VM	46.6	59	174	217	163	OUNCE
R-11 (surfactant)	181	110	263	208	228	OUNCE
ROUNDUP PRO	337	787	112	1,160	576	OUNCE
SURFLAN AS	0	256	0	2,016	0	OUNCE
TRANSLINE	7.2	0	0	0	0	OUNCE

Herbicide Usage on Pardee Area						
ACCORD	210	226	NA	NA	NA	QUART
DIMENSION	66	118	86	35	102	QUART
GALLERY	6	6	NA	NA	NA	POUND
GARLON	22	NA	NA	NA	NA	QUART
LANDMARK	120	24	NA	NA	4.5	OUNCE
MILESTONE	464	757	729	196	681	OUNCE
PAYLOAD	384	NA	NA	NA	NA	OUNCE
RODEO	NA	NA	160	60	151	QUART
TRANSLINE	NA	4	NA	NA	NA	QUART
Pesticide Usage on Pardee Area						
BIFEN L/P INS	105	3	192	NA	NA	POUNDS
BIFEN IT INSE	0.451	NA	0.4	0.488	0.484	GALLONS
CONTRAC RAT	NA	3.937	1.5	NA	NA	POUNDS
ESSENTRIA G	NA	NA	NA	NA	15	POUNDS
MARTINS PERME	1.155	0.832	1.142	0.465	0.76	GALLONS
MICROCARE 3%	NA	0.054	0.031	0.031	0.059	GALLONS
PHANTOM	6.75	3.00	NA	NA	NA	POUNDS
TEMPO ULTRA W	0.13	0.035	NA	0.205	NA	POUNDS
TERMIDOR SC	0.062	0.187	NA	NA	0.018	GALLONS
WISDOM LAWN	NA	198	NA	NA	NA	POUNDS

Sources:
Herbicide usage on Upper Mokelumne River Watershed Area provided by EBMUD Mokelumne Watershed and Recreation Division, Senior Ranger / Naturalist, Justin Mynk, August 2015;
Herbicide usage data on Pardee Area provided by EBMUD Water Supply Division Bruce Stewart, Construction & Maintenance Scheduler, December 2015;
Pesticide usage data on Pardee Area provided by Foothill-Sierra Pest Control, December 2015.

Table 5-17: Camanche North Shore And South Shore Recreation Area Facilities

FACILITY	SOUTH SHORE Existing Size/Qnty	NORTH SHORE Existing Size/Qnty
Tent Campsites	292	241
RV Campsites (short term)	120	0
RV Campsites (seasonal)	87	0
Picnic Sites	99	46
Roads (paved)	11 mi.	9 mi.
Total Day Use Parking Spaces	400	450
Paved Parking Spaces	156	202
Fishing Docks	3	0
Fishing Ponds	3	0
Amphitheater	1	0
Drinking Fountains	86	51
Trail Staging Areas	1 accessing 28 mi of trail	1 accessing 7.1 mi of trail
Volleyball Courts	1	0
Basketball Courts	1	2
Playgrounds	1	1
Fish Cleaning Facilities	1	1
RV Dump Stations	1	1
Restrooms (portable)	24	33
TOTAL BUILDINGS	95(70 private)	158 (130 private)
Restroom Buildings	11	5
Toilets	53	33
Urinals	18	8
Sinks	60	33
Showers (Locations)	7	2
Heads	30	22
Laundry (Locations)	2	1
Dryers	4	2
Washers	4	2
Park Offices	1	1
Ranger Station	1	0
Entrance Kiosks	1	1
Restaurant/Café	1	1
Recreation Hall	1	1
Utility Building (former stables)	0	1
Projection Buildings	1	0
General Store	1	1
Service Stations (land)	1	0
Marina	1	1
Service Stations (on water)	0	1
Open Berths	16	44
Covered Berths	24	40
Rental Boats	10	11
Courtesy Docks	3	2
Boat Launch Ramps	4 Locations	2 Locations
SS Main - Lake Eleveation (235-205)	8 lanes	
NS Main - Lake Elevation (235-200)		8 lanes
NS Main - Lake Elevation (200-197)		4 lanes
NS Main - Lake Elevation (197-194)		2 lanes
NS Low Water - Lake Elevation (194-175)		2 lanes
SS Low Water 1 Lake Elevation (225-185)	2 lanes	
SS Low Water 2 Lake Elevation (185-160)	2 lanes	
SS Low Water 3 Lake Elevation (160-125)	1 lane	
Mobile Home Parks	1	2
Mobile Home Lots Total	69	128
Private Mobile Homes	69	126
Monthly Rentals (230, Stables)		2
Rental Cottages Buildings	7	10
Triplexes (220, 223, 224, 225) 4 BLDG		4 BLDG
"A Unit" Motel Rooms (King Size Beds) 2 Person		4
"B Unit" 4 Person Housekeeping		4
"C Unit" 6 Person Housekeeping		4
Cottages/13 BLDG, MHP1, MHP3, CSS	7	5 BLDG
Motel Room (Twin Size Beds)/1 BLDG 2 Person		4
4 Person Housekeeping/12 BLDG 4 Duplexes plus ADA	7	9
TOTAL TRIPLEX AND COTTAGE UNITS	7	25
Maintenance Facilities		
Shop Buildings	1	1
Storage Buildings	1	3
Fenced Yards	2	1
Sewage Treatment Facilities		
Sewer Lift Stations	7	5
Sewer Treatment Ponds	3	6
Sewer Spray Fields	0	1
Water Treatment Facilities		
Water Tanks	2	2
Wells	1	4
Raw Water Pumping Platforms	1	0
Backwash Ponds	0	2
Telemetry Buildings	1	1
Treatment Plant Buildings	1	1
Dry Storage Yards	1	3
Spaces	25	154
Public Telephones	3	3

Source: Mark Bolton (EBMUD)

Table 5-18a: Visitor Use of Camanche South Shore Recreation Area (2010 - 2014)

Month	2010	2011	2012	2013	2014	average
Jan	10858	10340	10177	8204	10220	10858
Feb	11087	10985	10947	10744	9885	11087
Mar	14286	10033	10555	13694	11573	14286
Apr	13883	16596	14598	14919	14562	13883
May	18334	17440	18838	18731	18653	18334
Jun	22270	20495	22430	24736	19028	22270
Jul	32188	33212	27677	29666	23500	32188
Aug	21302	20881	21796	24941	21868	21302
Sep	16837	17573	15353	14084	10273	16837
Oct	11059	11169	9681	9708	9340	11059
Nov	11718	9964	10761	10747	10670	11718
Dec	9594	9974	8437	9186	8719	9594
Total	**193416**	**188662**	**181250**	**189360**	**168291**	**193416**

Source: Mark Bolton,EBMUD

Fig 5-18b Visitor Use of Camanche North Shore Recreation Area (2010 - 2014)

Month	2010	2011	2012	2013	2014
Jan	12247	12120	10925	8976	10867
Feb	12532	11826	11583	9827	10418
Mar	13915	11324	10516	11146	11421
Apr	14038	14326	14759	12373	13747
May	18917	16945	19734	18860	19556
Jun	27034	23327	25997	28152	21826
Jul	36630	37215	33885	33062	25512
Aug	24664	23483	24990	25028	20735
Sep	18312	18604	15902	16114	11075
Oct	11975	11267	9545	10047	8725
Nov	10914	10969	8644	9343	8132
Dec	10363	10914	8209	10122	8511
Total	211541	202320	194689	193050	170525

Source: Mark Bolton, EBMUD

Table 5-19 : OES Spills Tributary to the Camanche Reservoir Area and Watershed 2010 - 2014

OES Spill Report #	Date	County	Location	Agency Reporting	Type of Spill	Amount Spilled (gal)	Contained Before Entered Waterway?	Water Way Entered
Camanche Reservoir								
'10-3598	6/12/2010	Calaveras	4700 Wade Lane	East Bay MUD	Gasoline	18	No	Camanche Reservoir
'10-4183	7/11/2010	Calaveras	11700 Wade Lane	Lake Camanche	Oil	6	No	Lake Camanche
'13-6172	10/2/2013	Calaveras	11700 Wade Lane	East Bay MUD	Engine Oil	1	No	Camanche Reservoir
'13-5694	9/10/2013	Calaveras	Hwy 26 at Campo Seco	Caltrans San Joaquin Area	Pozzolith, Chemical	20-25	No	Mokelumne River.
'13-5620	9/7/2013	Calaveras	Pardee Damn Rd.	East Bay MUD	Motor Oil	1/2	No	Mokelumne River
Possibly Camanche Reservoir but maybe not								
'12-7682	12/17/2012	Calaveras	across from 3039 Butler Ln	Citizen	Sewage	Unknown	No	Indian Creek
'13-0442	1/22/2013	Calaveras	2933 Heney Lane	Private Citizen	Sewage	Unknown	No	Indian Creek
'14-4053	7/18/2014	Calaveras	near Hwy 12 and Creek View Ln	East Bay Municipal Utility Dist	Raw Water	7,000,000	No	Bear Creek

Source: California State Office Emergency Services

Table 5-20 Active Grazing Leases on EBMUD land around Camanche Reservoir

Name	Approximate Acreage	Estimated AUMs	Lease Expiration
West Portal	52	35	October 2015
Arkansas Bend	243	170	October 2015
China Gulch	1118	580	October 2015
Camanche Dam	438	492	October 2015
North Camanche Dikes	697	670	October 2015
South Camanche Dikes	420	490	October 2015
Camanche Creek	1243	575	October 2015
South Lancha Plana	797	201	October 2015
Causeway	80	60	Annual renewal

Source: Chris Swann, EBMUD

Table 5-21 Wildfires in the Camanche Reservoir Area

DATE	LOCATION	CAL FIRE Name	SIZE (ACRES)
6/19/2010	CAMANCHE POWERHOUSE, NORTH SIDE MOKE RIVER - SJ County		0.25
8/16/2010	STONE LANE & KEYSTONE WAY - CALAVERAS COUNTY		2
8/28/2010	12600 PATTISON RD BURSON		1
5/29/2011	CAMANCHE N. SHORE - RABBIT CREEK CAMPGROUND		0.5
6/15/2011	13750 CAMANCHE PKWY - CALAVERAS CO.		2
6/25/2011	CAMANCHE WATERSHED SOUTH OF COYOTE FLAT CAMPGROUND		20
7/25/2011	3200 CAMANCHE RD IONE		4
6/23/2012	CAMANCHE NORTH SHORE - EAGLE BEACH CAMPGROUND		6.8
8/31/2012	MOKELUMNE RIVER DAY USE AREA BETWEEN LOT 3 & HATCHERY		1.8
4/30/2013	CAMANCHE N. SHORE EAST SIDE MAINT YARD		1.8
5/28/2013	13441 FRAUSTO LN BURSON		2.08
6/20/2014	CAMANCHE N. SHORE ABOVE PRIMITIVE CAMPGROUND		9.6
7/19/2014	CAMPO SECO RD 1/4 MI WEST OF WATERTOWN POND		4.2
9/11/2014	CAMANCHE PKWY S SOUTH OF LANCHA PLANA BRIDGE CAL County		1.3

Source: CAL FIRE and EBMUD

Table 5-22: Summary of Contaminant Sources and Their Potential Impact on Water Quality

Contaminant Source	Key Contaminants	Potential to Impact to Drinking Water Quality
Fires and Fuels Management	**Turbidity** Algae/Taste and Odor TOC SOCs, VOCs, pesticides, herbicides	*Medium to High* -Increasing fuel stock in National Forests -Fires due to lightning strikes are a significant threat. -While fires make land vulnerable to erosion, heavy rainfall is necessary to induce major erosion and impact water quality. -BMPs (goat grazing, firebreaks, etc.) are being implemented.
Geologic Hazards	**Turbidity** Radionuclides General minerals and Metals TOC	*Medium to High* -High erosion risk lands within watersheds and in close proximity to water bodies. -Historically landslides have occurred in close proximity to water bodies.
Wildlife and Livestock	**Turbidity** Algae/Taste and Odor **Microorganisms** General minerals and Metals TOC **Nutrients**	*Medium to High* -Grazing on private land is not regulated or tracked -Cattle grazing can be significant source of microorganisms, especially Cryptosporidium -Erosion and TOC loadings from cattle grazing -BMPs have been developed and implemented on District and National Forest land.
EBMUD Facilities (Excluding recreation)	**Microorganisms** Turbidity General minerals Metals TOC **Oil and grease, other hydrocarbons**	*Medium to High* -Increasing visitor use at Camanche Reservoir -Facilities including septic systems proximate to the reservoirs and tributaries. -Sewage spills have occurred at Camanche facilities -Maintenance activities can contribute contaminants.
Recreation (EBMUD)	Turbidity Algae/Taste and Odor **Microorganisms** General minerals and Metals TOC **Oil, grease, other hydrocarbons, MTBE**	*Medium to High* -Significant recreation use at both Pardee and Camanche Reservoirs -Recreation is prohibited near the outlet towers. -Body contact is permitted only in Camanche Reservoir. -Cross contamination from privately owned boats can be a significant issue. -Fire hazards increase with visitor use.
Recreation (Sierra Pacific, Eldorado & Stanislaus National Forests, Bureau of Land Management, PG&E)	**Turbidity** Algae/Taste and Odor Microorganisms General minerals, Metals TOC Oil and grease, other hydrocarbons, MTBE	*Medium to High* -Recreational activities occur at reservoir and river locations throughout the watershed basin -Increased access and recreation sites along Mokelumne River -Erosion due to OHV use now declining due to increased road regulations

Table 5-22: Summary of Contaminant Sources and Their Impact on Water Quality (continued)

Contaminant Source	Key Contaminants	Potential to Impact to Drinking Water Quality
Mines	Turbidity Radionuclides **General minerals and Metals** Oil and grease, other hydrocarbons	*Medium to High* -Inactive mines exist throughout watersheds. -Water quality degradation due to mine discharges has been significant. -Mines are proximate to reservoirs and main tributaries.
Logging	**Turbidity** **Nutrients** **Algae/Taste and Odor** **General minerals** and Metals Microorganisms TOC SOCs, VOCs, pesticides, herbicides oil and grease, other hydrocarbons	*Medium to High* -Logging is extensive in Upper Mokelumne watershed, -Increasing criteria assessed in harvest plans on public and private lands -Logging roads cut areas and provide access for OHVs -Logging roads traverse watersheds and cross tributaries. -Pesticides used for vegetation management. -Housing, maintenance, and administrative facilities are located within watershed -Increased regulations for logging roads decrease risks
Utilities - Hydroelectric Power Generation	**Turbidity** **Algae**/Taste and Odor **Temperature** General minerals and Metals TOC SOCs, VOCs, pesticides, herbicides Oil and grease, other hydrocarbons	*Low to High* -Operations of facilities can dramatically affect water temperatures. -Extensive hydroelectric facilities occur throughout Pardee and Camanche watersheds -Hydroelectric facilities are integrated into the complex system of reservoirs, canals, and tunnels
Rural Area Runoff - Residential	Turbidity Algae/Taste and Odor **Microorganisms** General minerals and Metals TOC SOCs, VOCs, pesticides, herbicides Oil and grease, other hydrocarbons	*Low to High* -Rural areas are sparsely populated, but there are less control measures for erosion and sanitation facilities -Rural development is increasing
Sanitation Facilities	Algae, Taste and Odor **Microorganisms** TOC	*Low to High* -Impacts from leaks and spills are dependent on location of incident, amount and type of material, and response time -Failed septic systems have been documented -Aging septic systems more prone to fail

Table 5-22: Summary of Contaminant Sources and Their Impact on Water Quality (continued)

Contaminant Source	Key Contaminants	Potential to Impact to Drinking Water Quality
Transportation Corridors	**Turbidity** General minerals and Metals TOC SOCs, VOCs, pesticides, herbicides **Oil and grease, other hydrocarbons**	*Low to Medium* -Increasing development increases road utilization -Main thorough-fares proximate to reservoirs. -Storm water drains feed directly into the reservoirs. -Accidents occur along main thoroughfares. -Maintenance activities can contribute contaminants. -Logging activities create roads throughout watershed -Trends toward integrated pest management for road maintenance
Unauthorized Activities (Illegal Dumping or Marijuana Farm Sites)	Turbidity Algae Microorganisms General minerals and Metals TOC SOCs, VOCs, pesticides, herbicides Oil and grease, other hydrocarbons	*Low to Medium* Access roads to the reservoirs increase risks of impacting water quality. Illegal dumping increasing with additional populations and increasing dump fees. Abandoned sites of illegal marijuana farms, where large quantity of herbicides, pesticides, and fertilizers were used / left on-site.
Agriculture	Turbidity Algae/Taste and Odor General minerals TOC SOCs, VOCs, pesticides, herbicides	*Insignificant to Low* Agricultural properties are few and small. Pesticide and herbicide applications are well regulated.

Notes: Bold indicates contaminants of greatest concern.
Ranking of land uses and activities is based on contaminants of concern, proximity to water bodies, magnitude of sources, watershed characteristics, and any mitigating factors. Contaminants are prioritized as follows:

1. Microbiological contaminants with the potential for acute illness.
2. Algae and inorganic compounds which contribute to taste and odor problems.
3. Turbidity which also transports adsorbed contaminants.
4. Total organic carbon which when disinfected can form DBPs.
5. Other organic and inorganic compounds which are at or below detection limits in raw waters.

Figure 5-1. Pardee Recreation Area Map

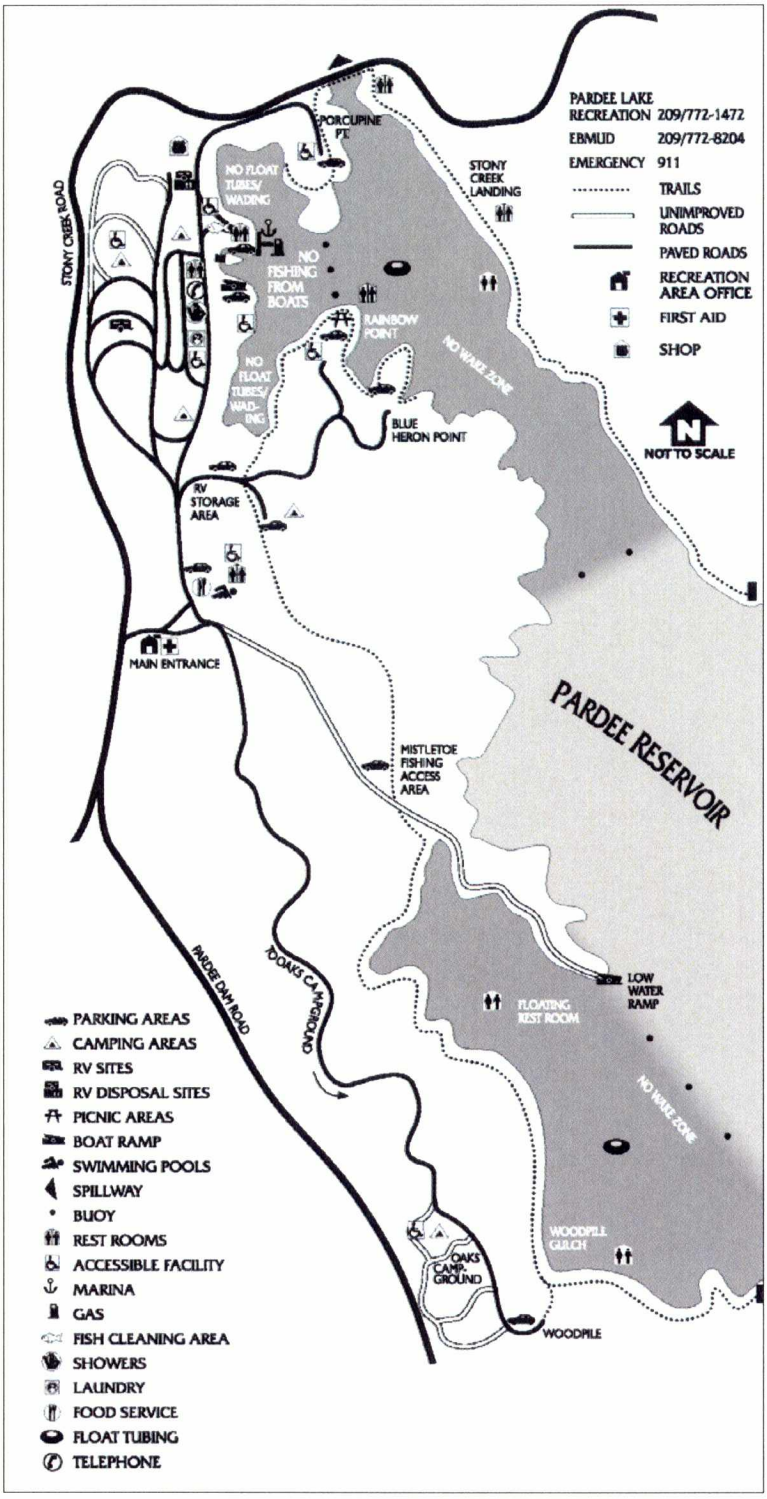
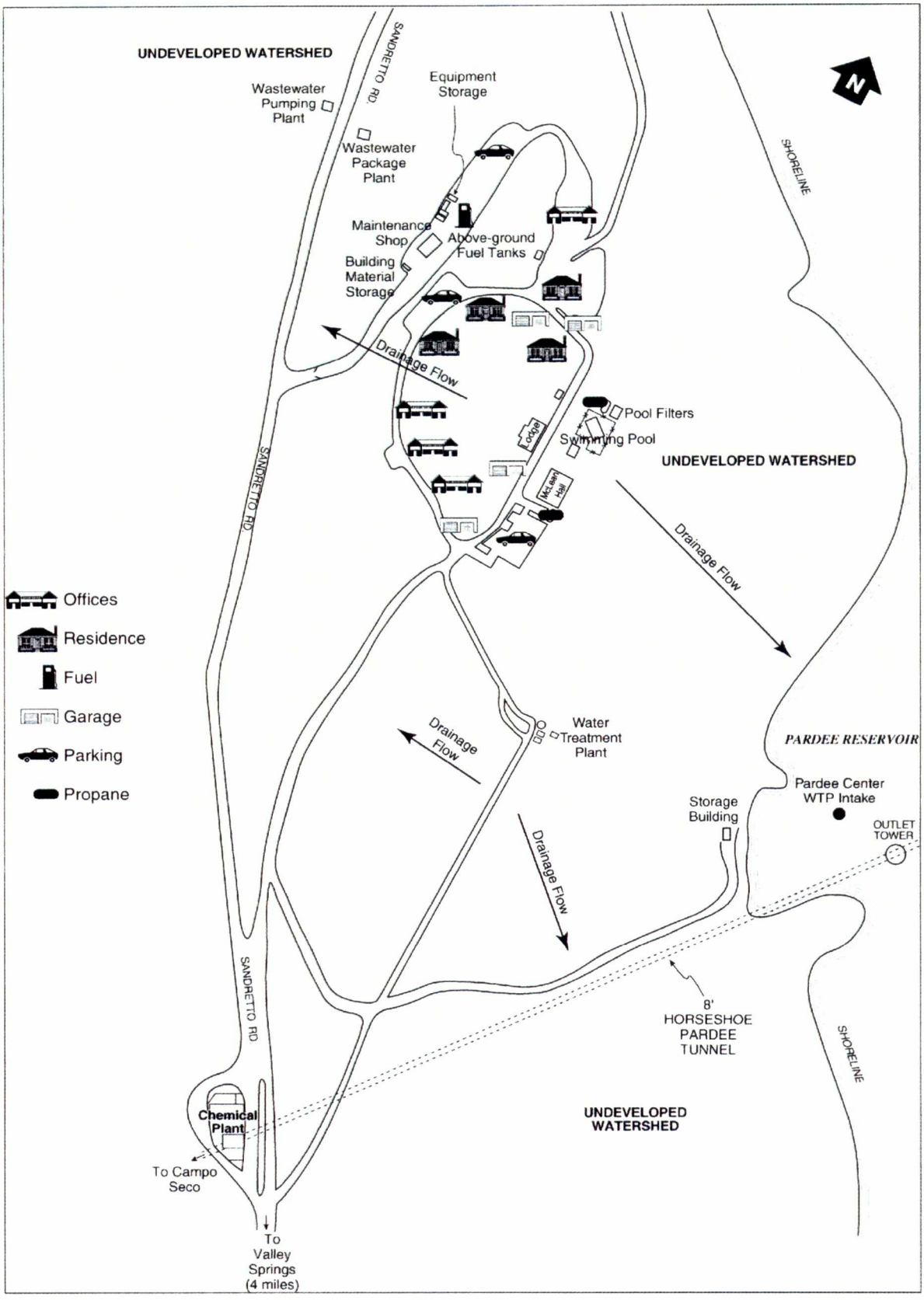


FIGURE 5-2 - Pardee Center Area Map



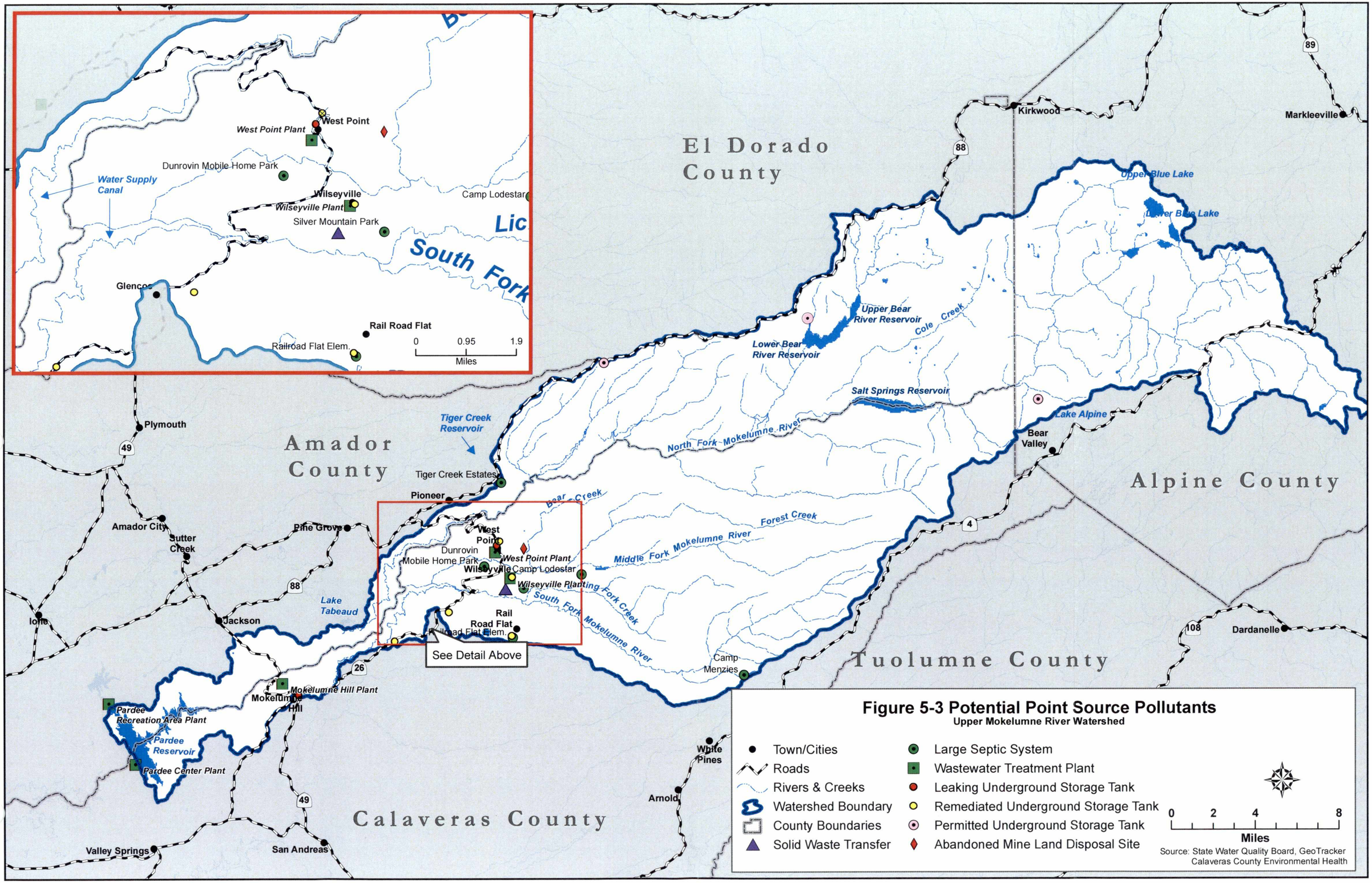


Figure 5-3 Potential Point Source Pollutants

Upper Mokelumne River Watershed

- Town/Cities
- Roads
- Rivers & Creeks
- Watershed Boundary
- County Boundaries
- Solid Waste Transfer
- Large Septic System
- Wastewater Treatment Plant
- Leaking Underground Storage Tank
- Remediated Underground Storage Tank
- Permitted Underground Storage Tank
- Abandoned Mine Land Disposal Site

0 2 4 8

Miles

Source: State Water Quality Board, GeoTracker
Calaveras County Environmental Health

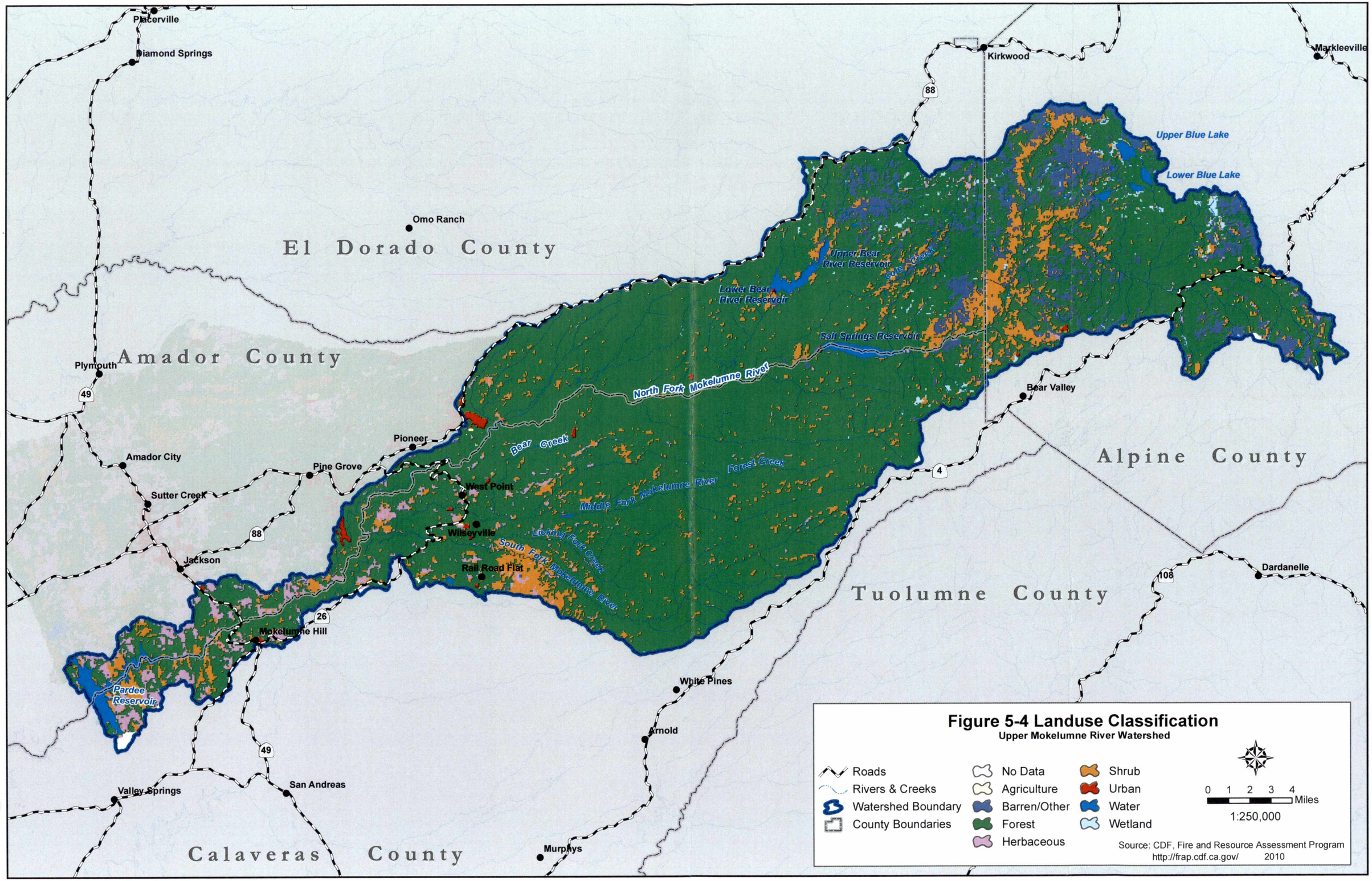


Figure 5-4 Landuse Classification

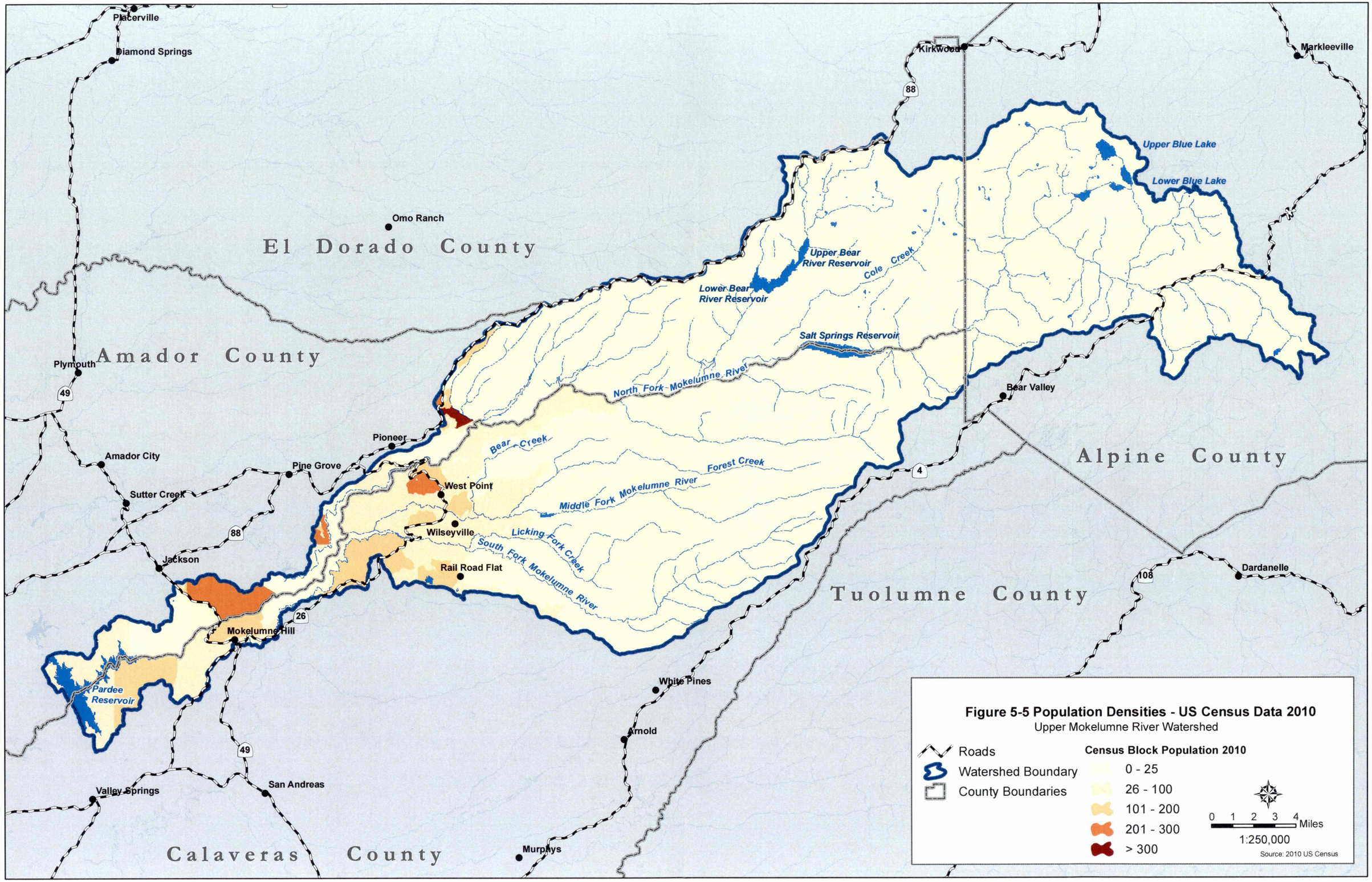
Upper Mokelumne River Watershed

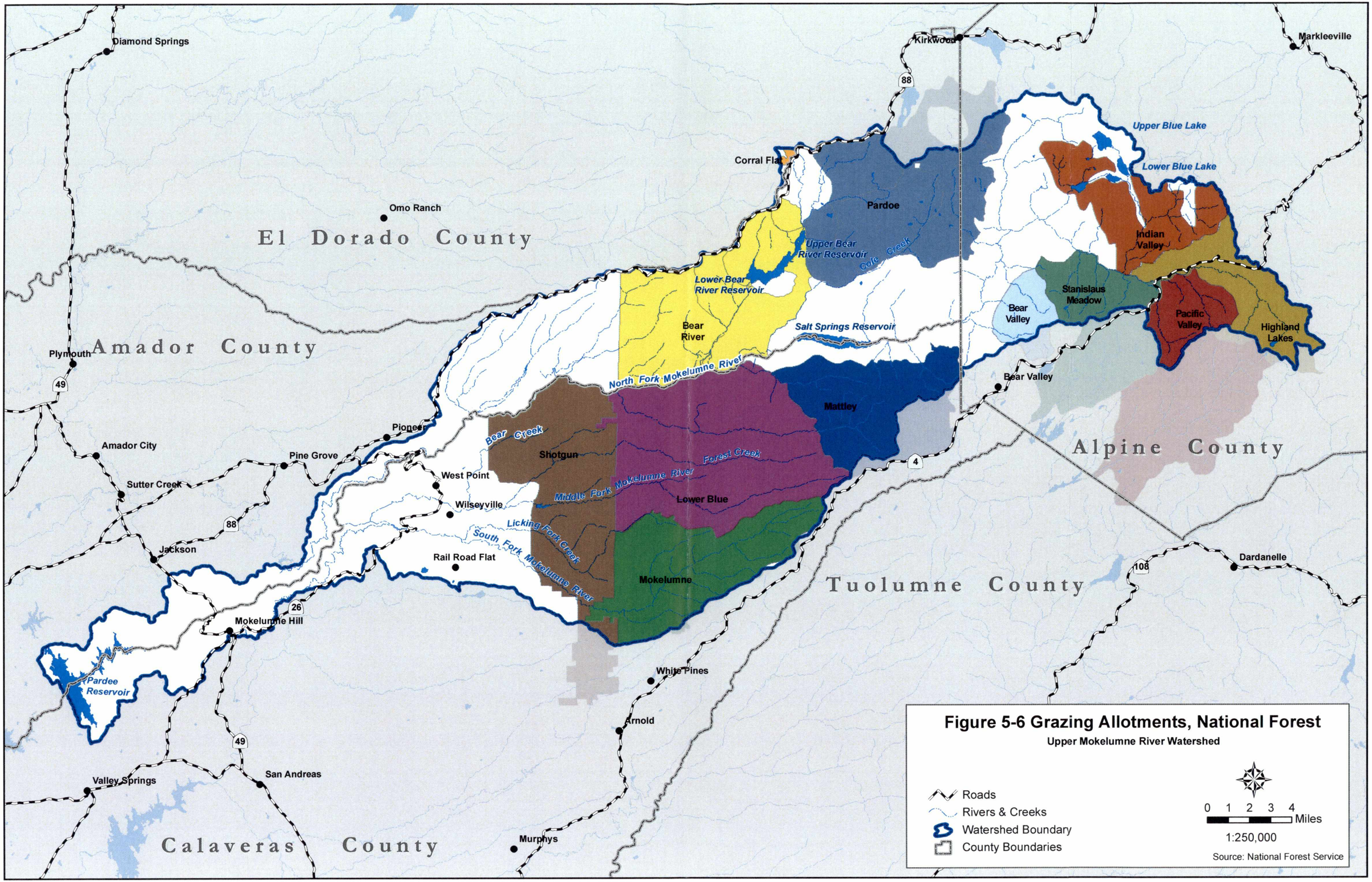
- Roads
- Rivers & Creeks
- Watershed Boundary
- County Boundaries
- No Data
- Agriculture
- Barren/Other
- Forest
- Herbaceous
- Shrub
- Urban
- Water
- Wetland

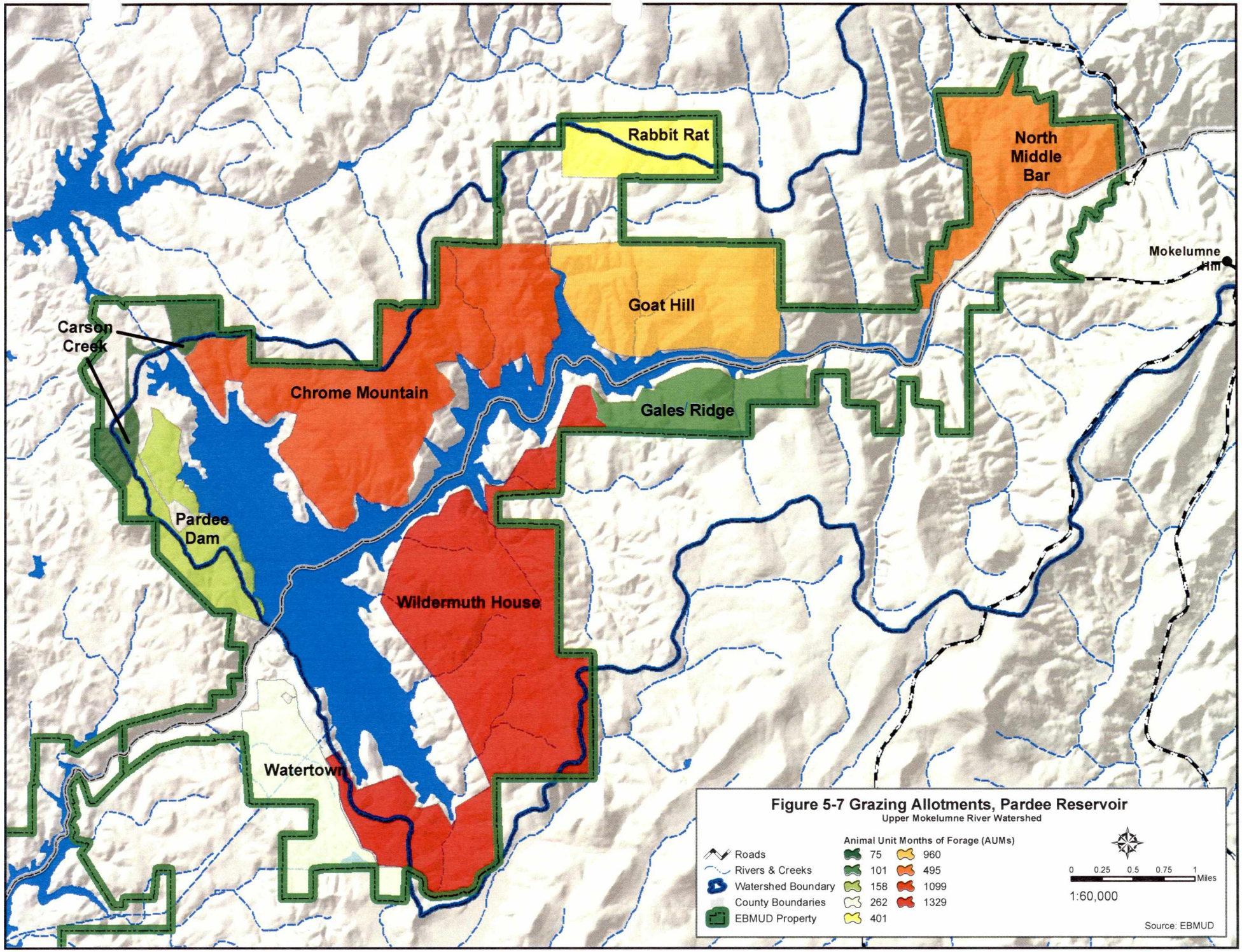
0 1 2 3 4 Miles

1:250,000

Source: CDF, Fire and Resource Assessment Program
http://frap.cdf.ca.gov/ 2010


Placerville
Diamond Springs
Kirkwood
Markleeville
88
Upper Blue Lake
Lower Blue Lake
Omo Ranch
El Dorado County
Upper Bear River Reservoir
Cole Creek
Lower Bear River Reservoir
Salt Springs Reservoir
Amador County
Plymouth
49
North Fork Mokelumne River
Bear Creek
Pioneer
Amador City
Pine Grove
Forest Creek
West Point
Middle Fork Mokelumne River
Sutter Creek
Wilseyville
Licking Fork Creek
South Fork Mokelumne River
Jackson
Rail Road Flat
Bear Valley
Alpine County
4
88
26
Mokelumne Hill
Dardanelle
108
Tuolumne County
Pardee Reservoir
White Pines
Arnold
49
Valley Springs
San Andreas
Calaveras County
Murphys
Figure 5-5 Population Densities - US Census Data 2010
Upper Mokelumne River Watershed
Roads
Watershed Boundary
County Boundaries
Census Block Population 2010
0 - 25
26 - 100
101 - 200
201 - 300
> 300
0 1 2 3 4 Miles
1:250,000
Source: 2010 US Census


Diamond Springs
Kirkwood
Markleeville
88
Upper Blue Lake
Lower Blue Lake
Corral Flat
Omo Ranch
Pardoe
El Dorado County
Upper Bear River Reservoir
Calf Creek
Indian Valley
Lower Bear River Reservoir
Stanislaus Meadow
Bear Valley
Pacific Valley
Highland Lakes
Bear River
Salt Springs Reservoir
Amador County
Plymouth
49
North Fork Mokelumne River
Bear Valley
Mattley
Pioneer
Bear Creek
Amador City
Shotgun
Forest Creek
Pine Grove
Alpine County
Sutter Creek
West Point
Middle Fork Mokelumne River
Lower Blue
Wilseyville
Licking Fork Creek
88
Jackson
South Fork Mokelumne River
Rail Road Flat
Dardanelle
108
Mokelumne
Tuolumne County
26
Mokelumne Hill
White Pines
Pardee Reservoir
Arnold
49
San Andreas
Valley Springs
Calaveras County
Murphys
Figure 5-6 Grazing Allotments, National Forest
Upper Mokelumne River Watershed
Roads
Rivers & Creeks
Watershed Boundary
County Boundaries
0 1 2 3 4
Miles
1:250,000
Source: National Forest Service


Rabbit Rat
North Middle Bar
Mokelumne Hill
Goat Hill
Carson Creek
Chrome Mountain
Gales Ridge
Pardee Dam
Wildermuth House
Watertown
Figure 5-7 Grazing Allotments, Pardee Reservoir
Upper Mokelumne River Watershed
Roads
Rivers & Creeks
Watershed Boundary
County Boundaries
EBMUD Property
Animal Unit Months of Forage (AUMs)
75
101
158
262
401
960
495
1099
1329
0 0.25 0.5 0.75 1 Miles
1:60,000
Source: EBMUD

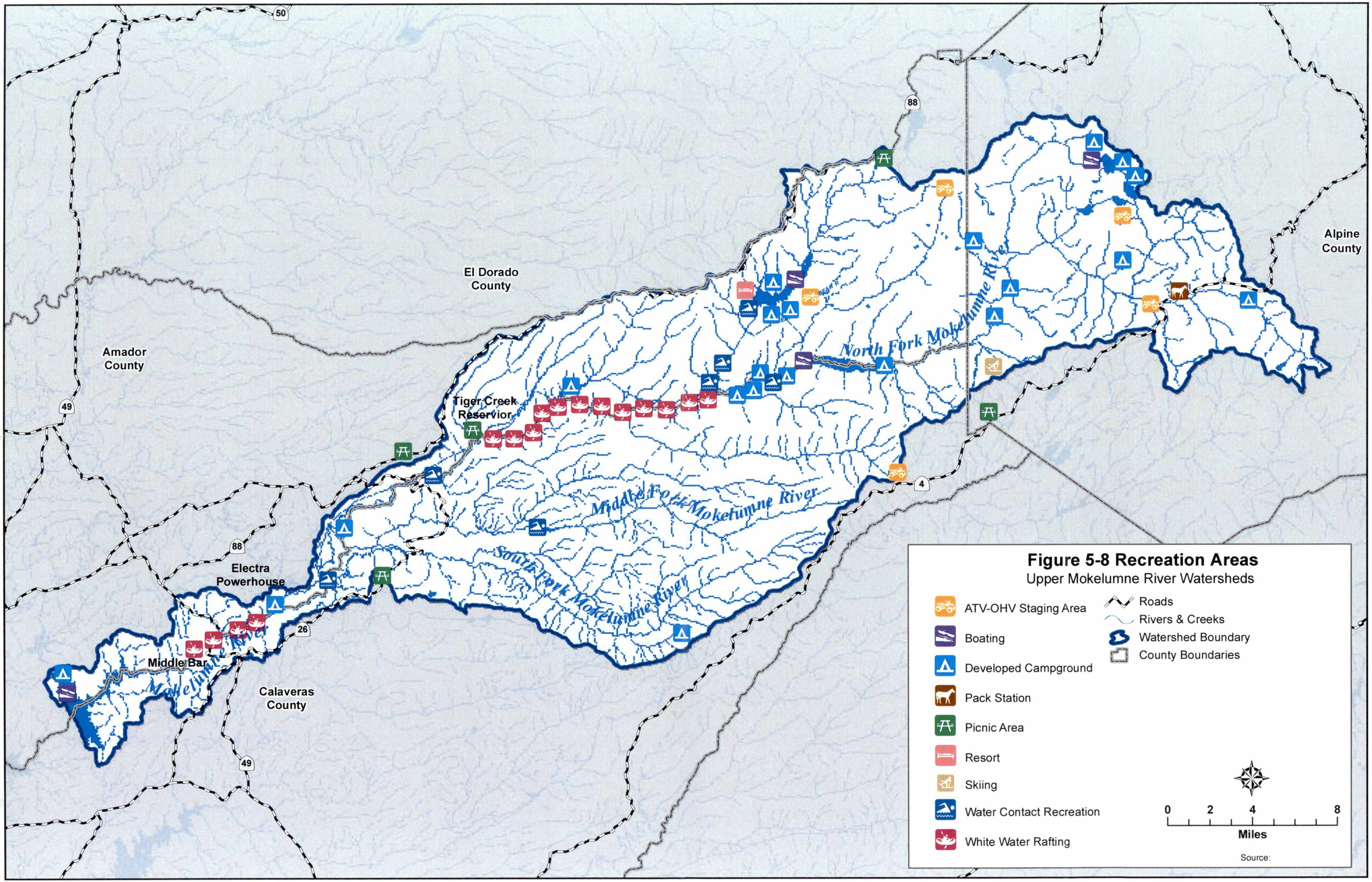


Figure 5-8 Recreation Areas
Upper Mokelumne River Watersheds

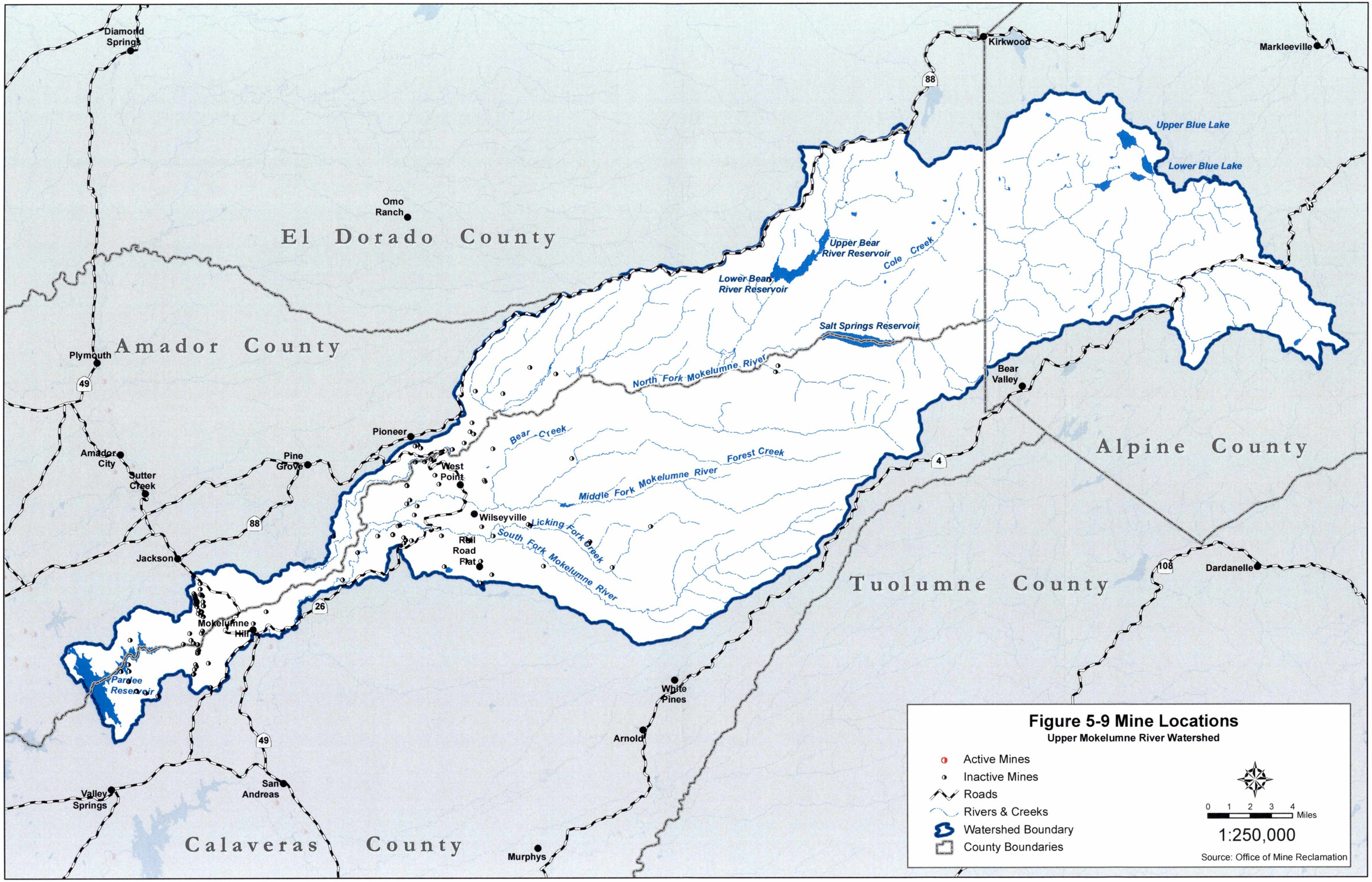


Figure 5-9 Mine Locations

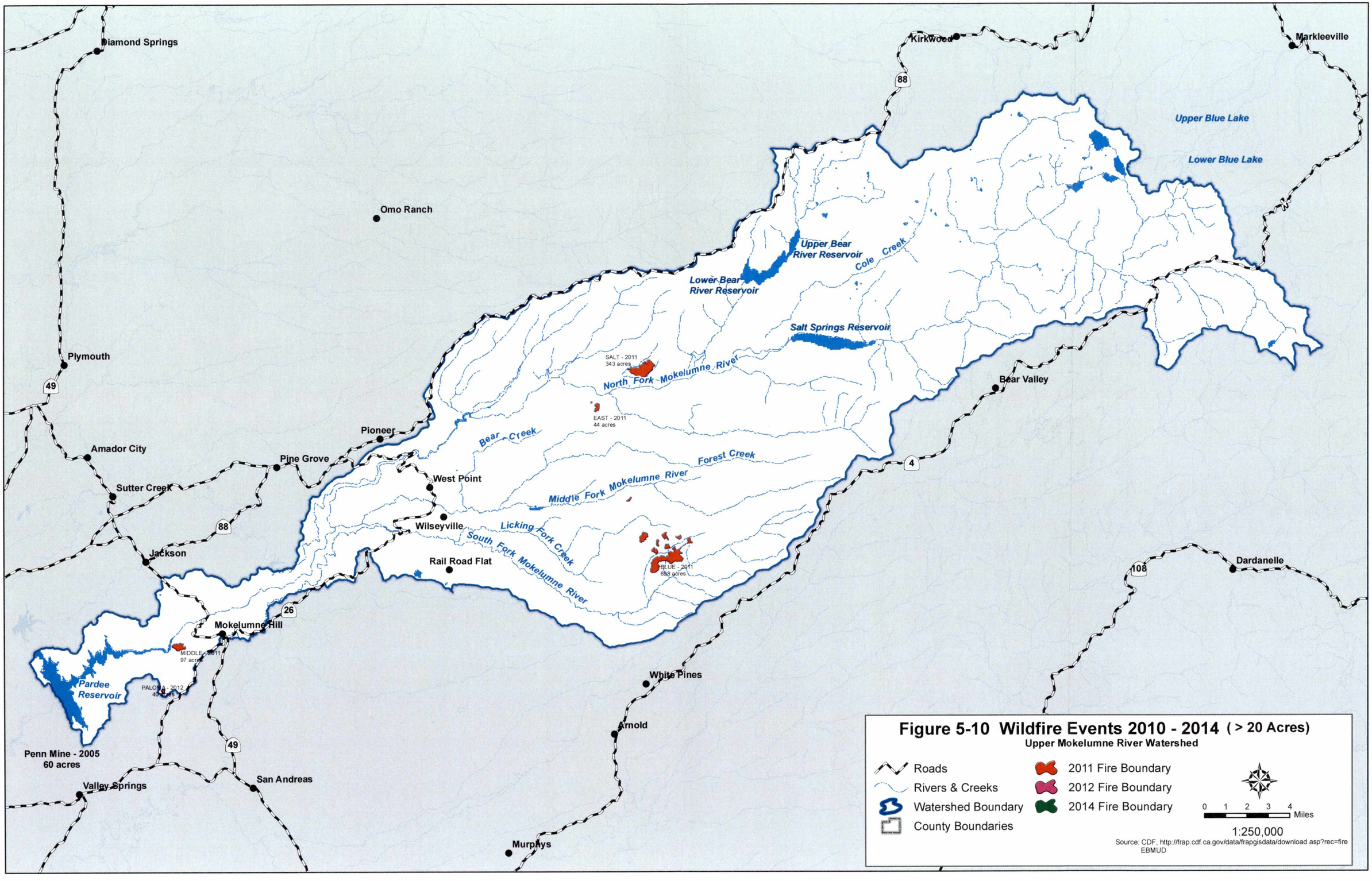
Upper Mokelumne River Watershed

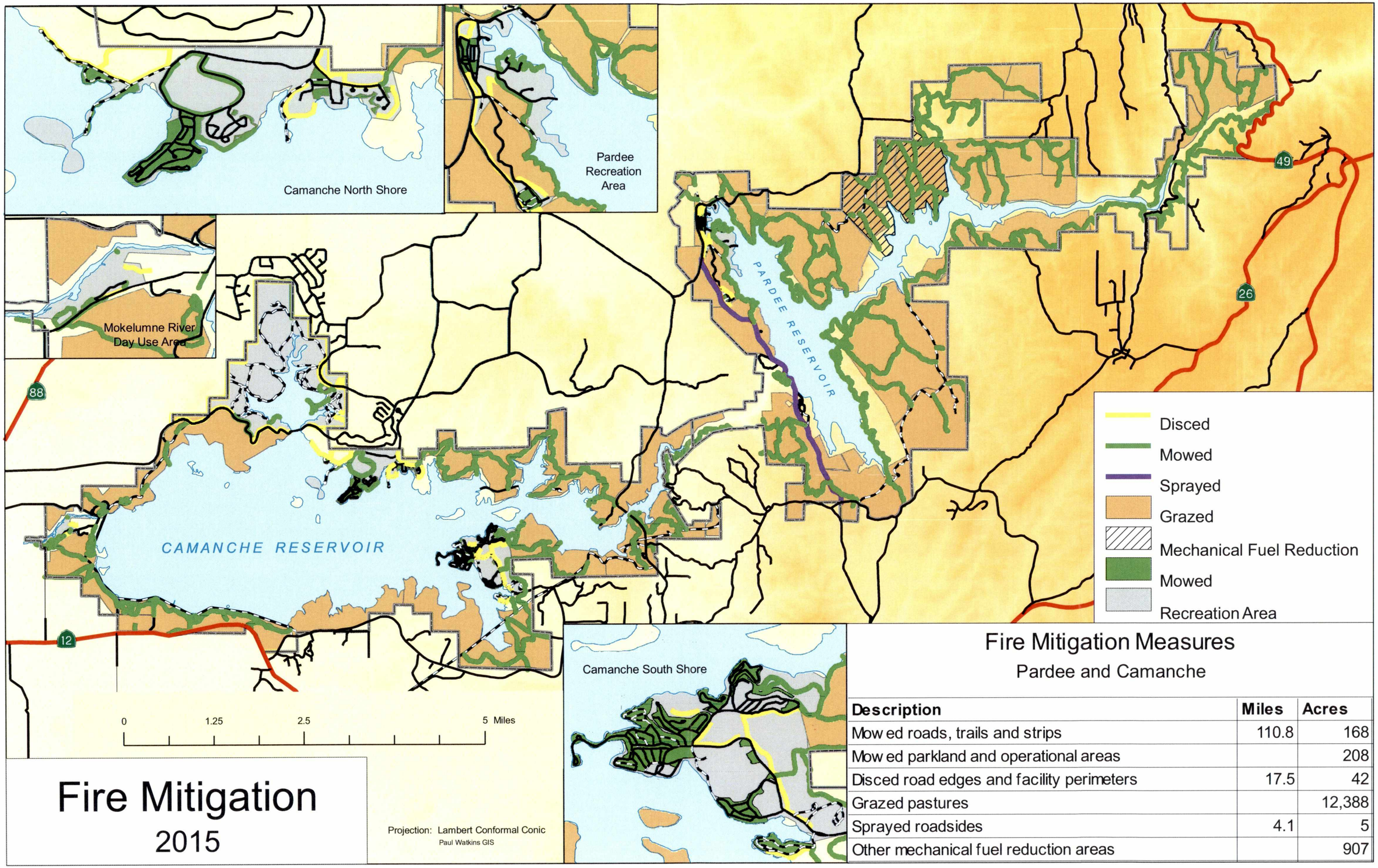
- Active Mines
- Inactive Mines
- Roads
- Rivers & Creeks
- Watershed Boundary
- County Boundaries

0 1 2 3 4 Miles

1:250,000

Source: Office of Mine Reclamation


Diamond Springs
Kirkwood
Markleeville
88
Upper Blue Lake
Lower Blue Lake
Omo Ranch
Upper Bear River Reservoir
Cole Creek
Lower Bear River Reservoir
Salt Springs Reservoir
SALT - 2011
343 acres
North Fork Mokelumne River
Bear Creek
EAST - 2011
44 acres
Forest Creek
Middle Fork Mokelumne River
Licking Fork Creek
South Fork Mokelumne River
BLUE - 2011
688 acres
Plymouth
49
Amador City
Pioneer
Pine Grove
Sutter Creek
West Point
Wilseyville
Jackson
Rail Road Flat
Mokelumne Hill
MIDDLE - 2011
97 acres
Pardee Reservoir
PALOMA - 2012
40 acres
Penn Mine - 2005
60 acres
Valley Springs
San Andreas
Bear Valley
4
108
Dardanelle
White Pines
Arnold
Murphys
Figure 5-10 Wildfire Events 2010 - 2014 (> 20 Acres)
Upper Mokelumne River Watershed
Roads
Rivers & Creeks
Watershed Boundary
County Boundaries
2011 Fire Boundary
2012 Fire Boundary
2014 Fire Boundary
0 1 2 3 4
Miles
1:250,000
Source: CDF, http://frap.cdf.ca.gov/data/frapgisdata/download.asp?rec=fire
EBMUD



Fire Mitigation Measures

Pardee and Camanche

Description	Miles	Acres
Mowed roads, trails and strips	110.8	168
Mowed parkland and operational areas		208
Disced road edges and facility perimeters	17.5	42
Grazed pastures		12,388
Sprayed roadsides	4.1	5
Other mechanical fuel reduction areas		907

Source: Kent Lambert

Figure 5-11 Fire Mitigation Measures – Pardee and Camanche

FIGURE 5-12: Camanche South Shore Recreation Area

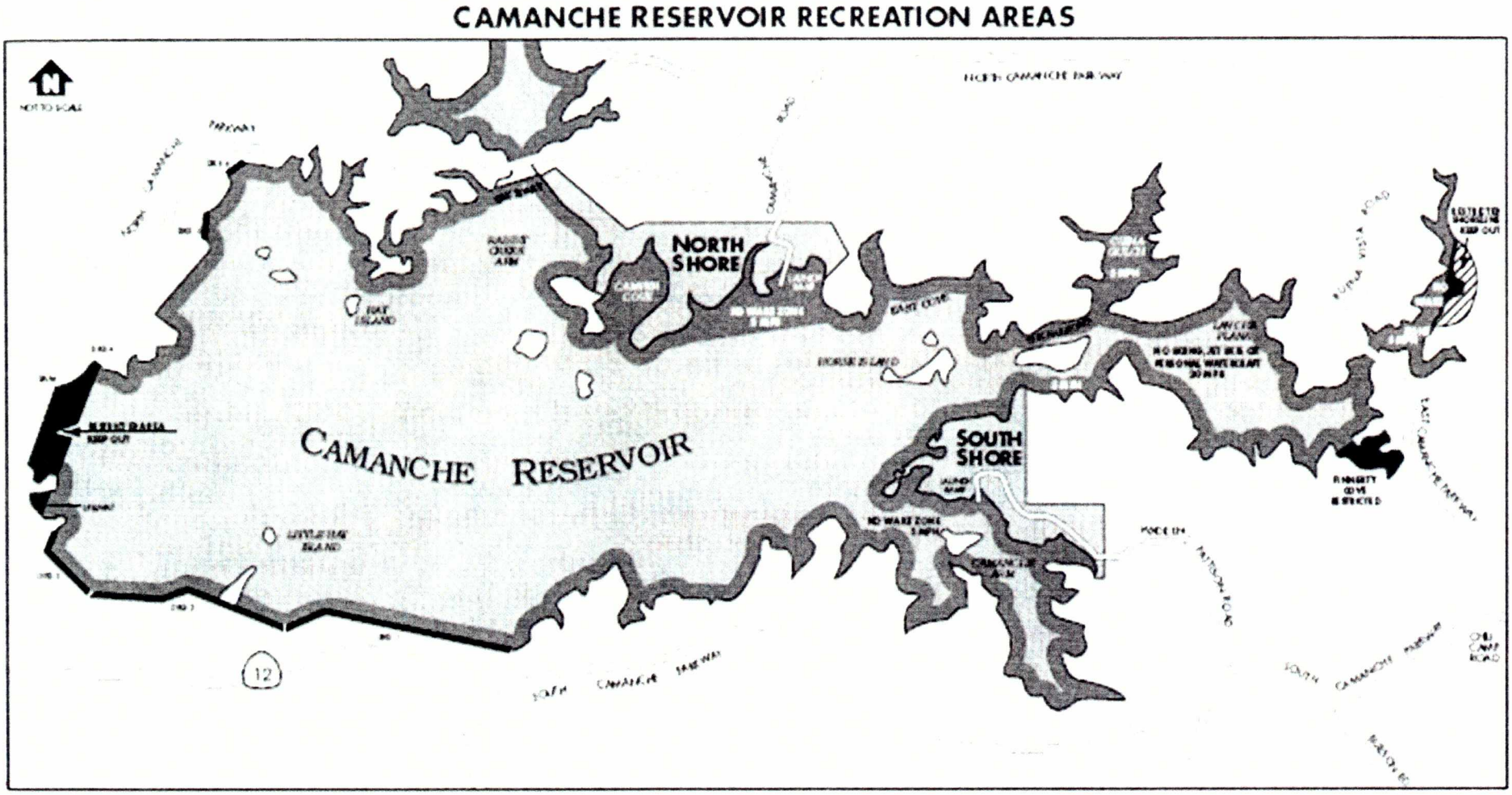


Figure 5-13a. Camanche South Shore Recreation Area

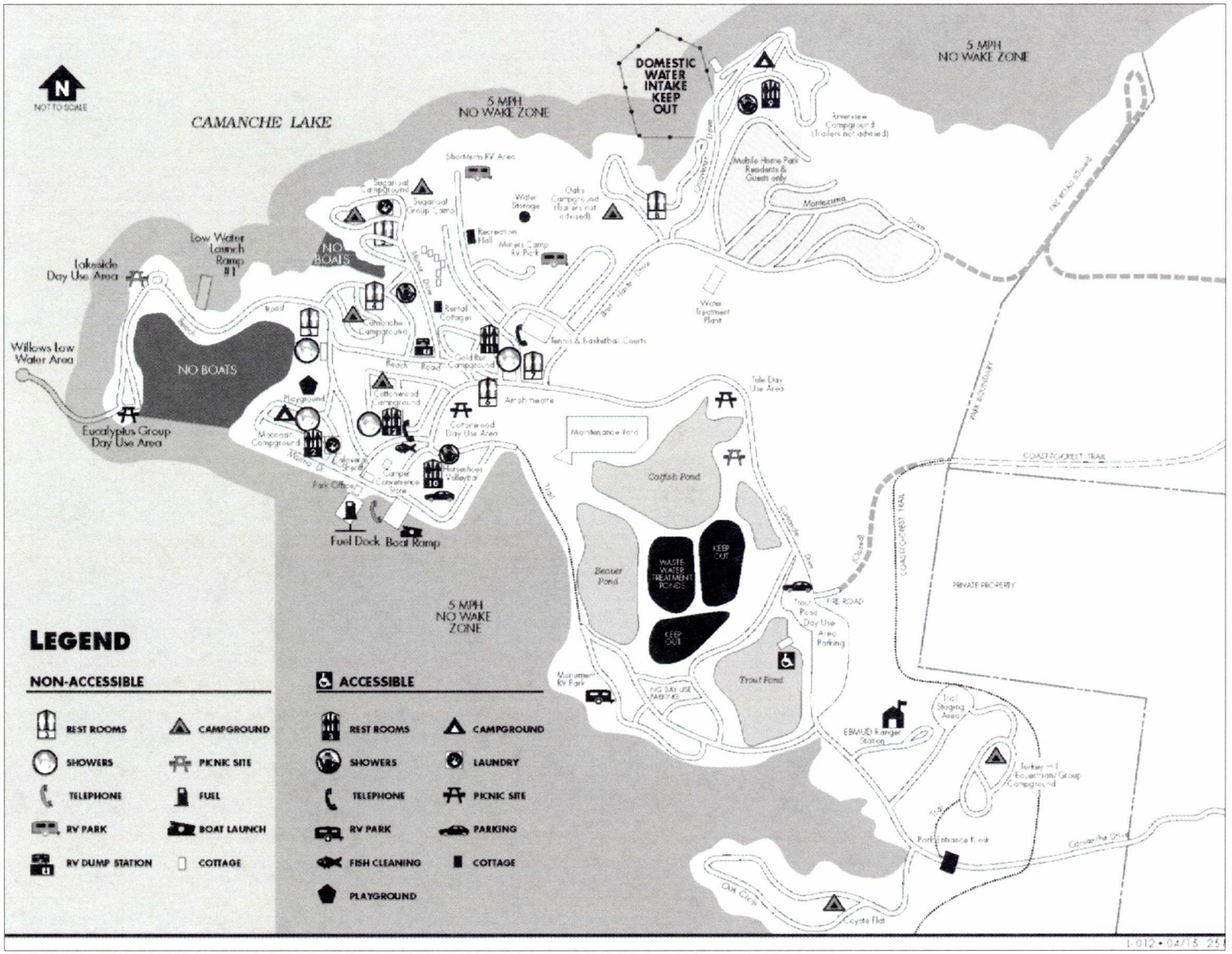
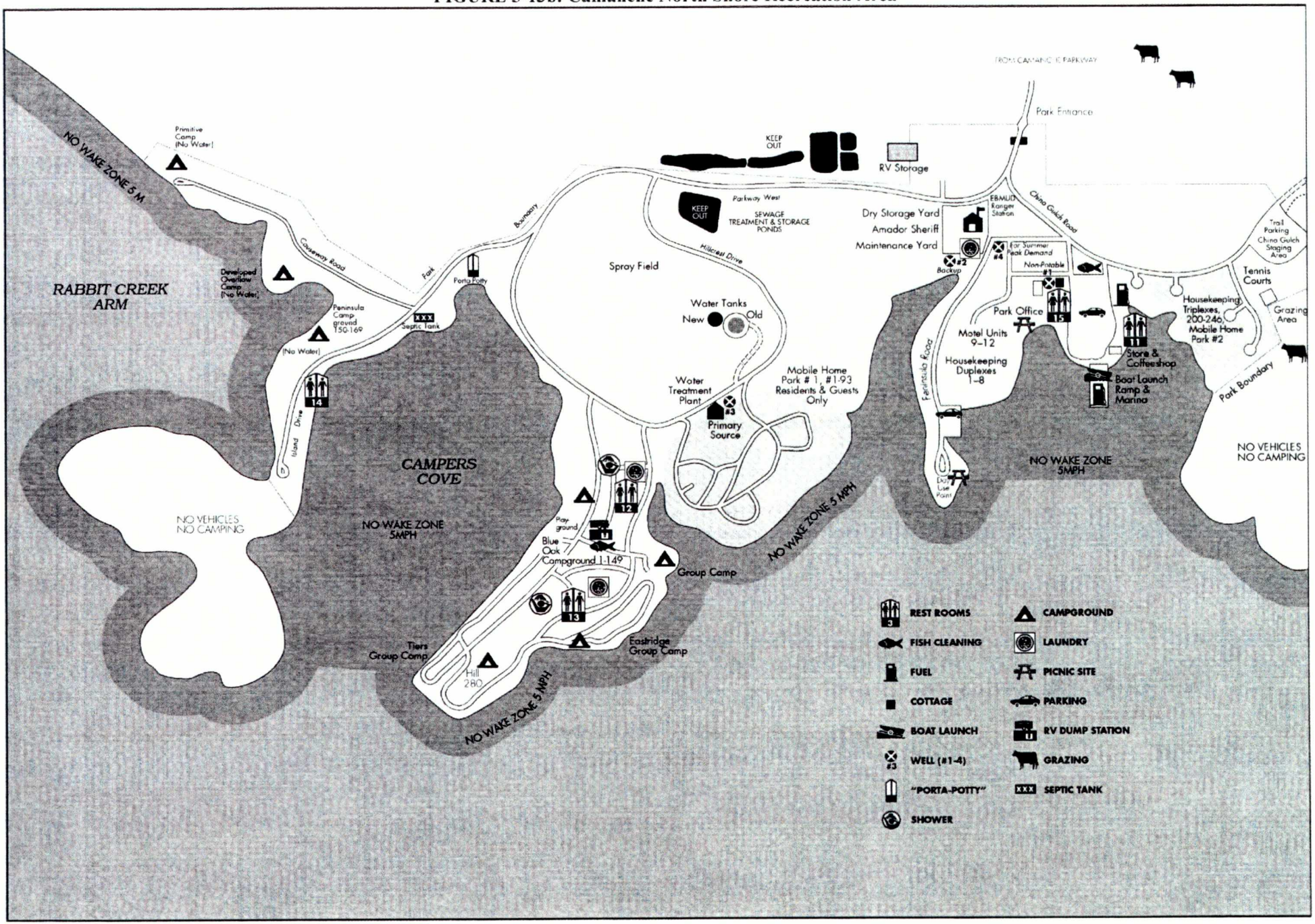
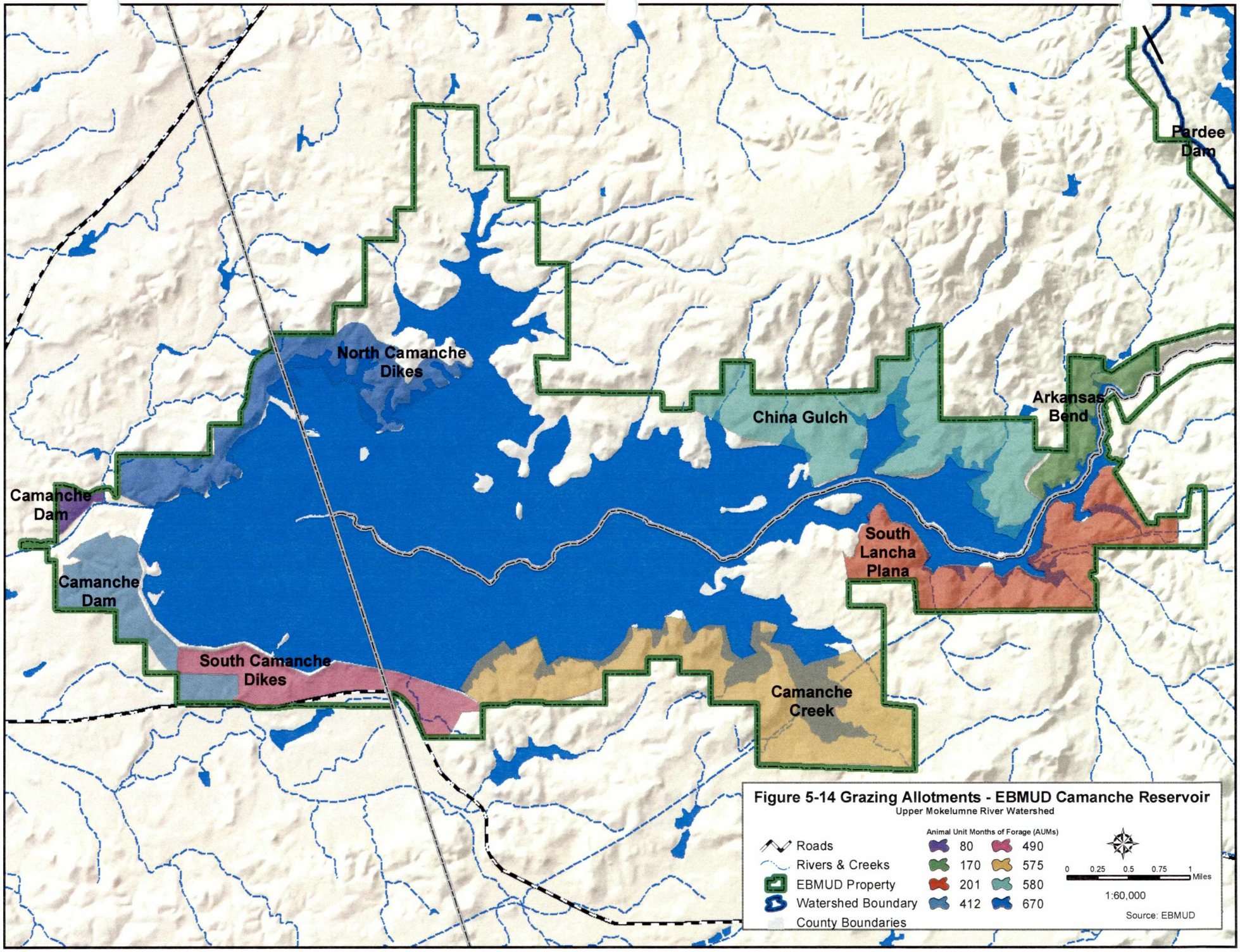


FIGURE 5-13b: Camanche North Shore Recreation Area




Pardee Dam
North Camanche Dikes
China Gulch
Arkansas Bend
Camanche Dam
South Lancha Plana
Camanche Dam
South Camanche Dikes
Camanche Creek
Figure 5-14 Grazing Allotments - EBMUD Camanche Reservoir
Upper Mokelumne River Watershed
Roads
Rivers & Creeks
EBMUD Property
Watershed Boundary
County Boundaries
Animal Unit Months of Forage (AUMs)
80
170
201
412
490
575
580
670
0 0.25 0.5 0.75 1 Miles
1:60,000
Source: EBMUD

Diamond Springs
Kirkwood
Markleeville
88
Upper Blue Lake
Lower Blue Lake
Omo Ranch
El Dorado County
Upper Bear River Reservoir
Cole Creek
Lower Bear River Reservoir
Salt Springs Reservoir
Amador County
Plymouth
49
North Fork Mokelumne River
Bear Creek
Forest Creek
Middle Fork Mokelumne River
Pioneer
Pine Grove
Amador City
Sutter Creek
West Point
Wilseyville
Licking Fork Creek
South Fork Mokelumne River
Rail Road Flat
Jackson
88
Bear Valley
Alpine County
4
108
Dardanelle
Tuolumne County
26
Mokelumne Hill
Pardee Reservoir
White Pines
Arnold
49
Valley Springs
San Andreas
Calaveras County
Murphys

Figure 5-15 Timber Harvest Plans 2000-2014

Upper Mokelumne River Watershed

Roads
Rivers & Creeks
Watershed Boundary
County Boundaries

2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014

0 1 2 3 4 Miles
1:250,000

Source: California Department of Forestry
ftp://ftp.fire.ca.gov/forest

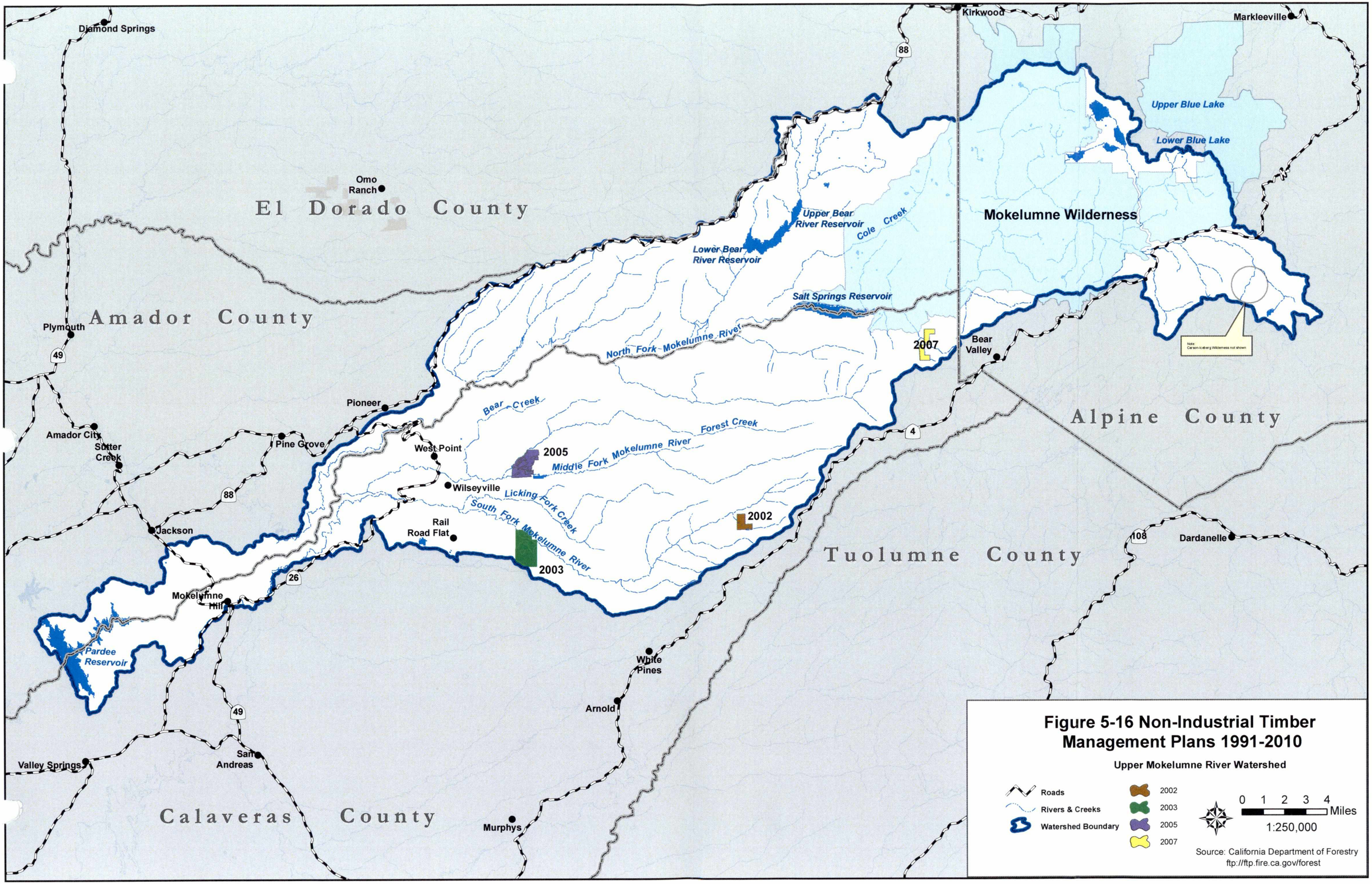
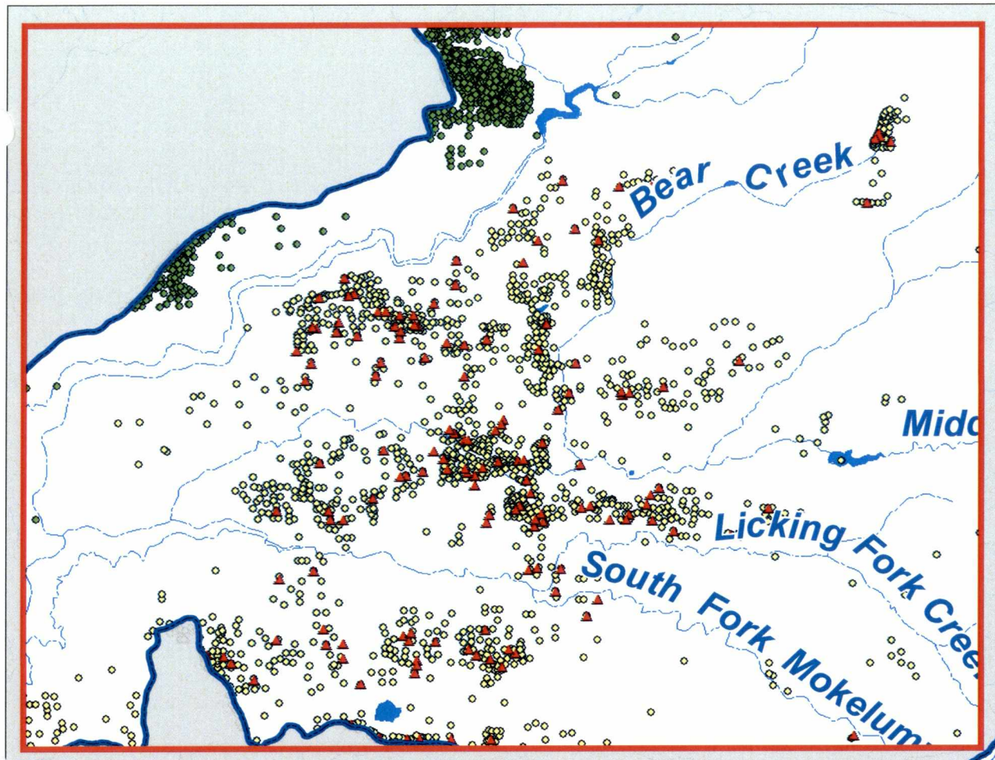


Figure 5-16 Non-Industrial Timber Management Plans 1991-2010

Upper Mokelumne River Watershed



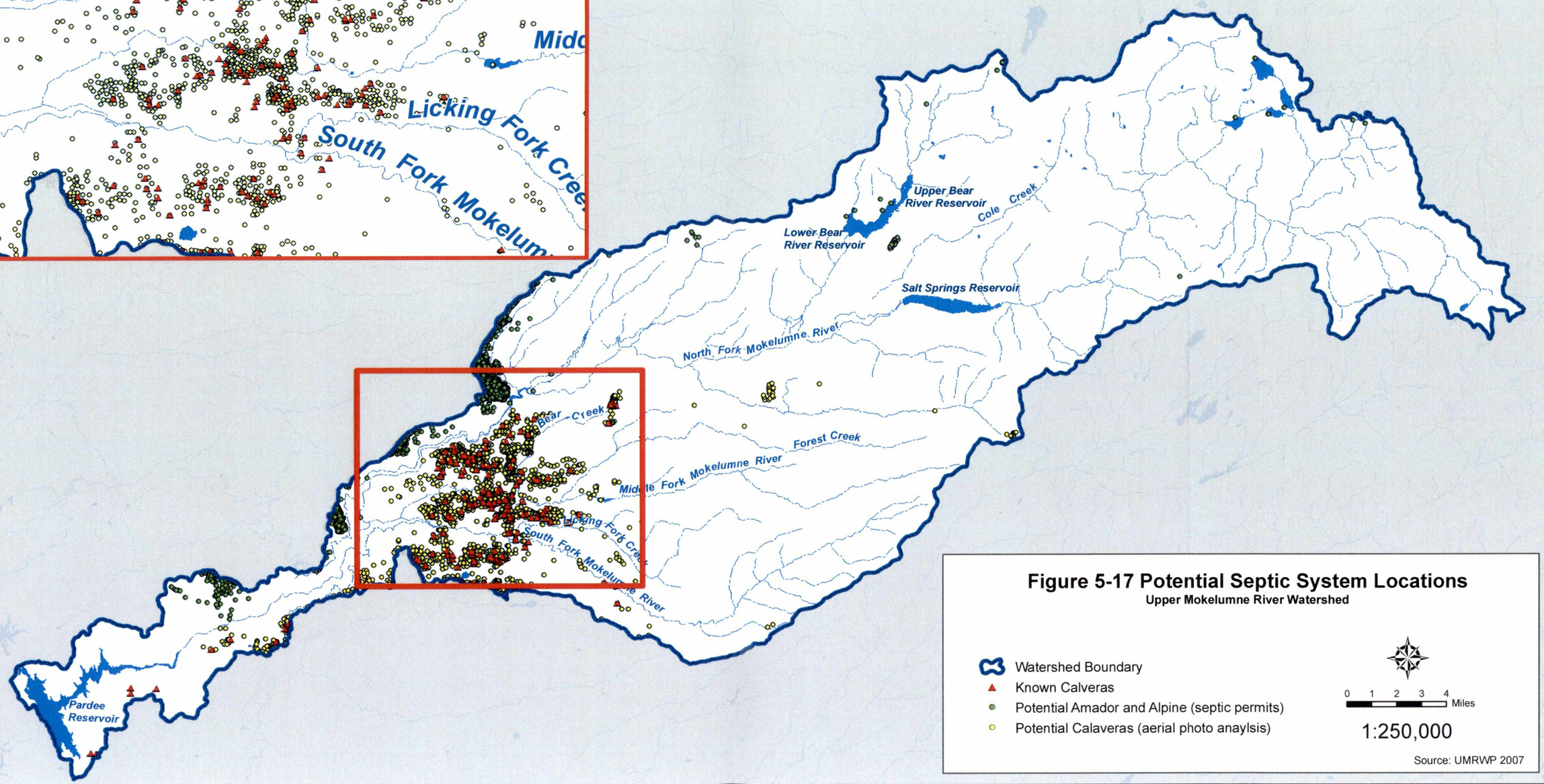


Figure 5-17 Potential Septic System Locations

Upper Mokelumne River Watershed

- Watershed Boundary
- Known Calveras
- Potential Amador and Alpine (septic permits)
- Potential Calaveras (aerial photo anaylsis)

0 1 2 3 4 Miles

1:250,000

Source: UMRWP 2007

Figure 5-18 2011 Tanker Truck Spill Above Pardee Reservoir



Tanker Truck Liquid Asphalt Spill, Highway 49, approximately 1,600 feet south of Highway 49 bridge

Section 6: Watershed Control and Management

Introduction

Section 6 documents watershed management practices of East Bay Municipal Utility District (EBMUD), and other public and private entities that may have a significant impact on water quality within the Upper Mokelumne River and Camanche Watersheds. For the 2015 MRWSS update, management practices and information from EBMUD and outside agencies were reviewed. Documenting the practices that are implemented within the watersheds and the division of authority among public agencies provides a basis for understanding where and how future modifications can be made.

This section first presents the jurisdictional authority for the various responsible agencies. Then the Watershed Management policies and practices are summarized, broken into three groups:

1. Watershed Management (general)
2. Watershed Management by EBMUD (by category)
3. Watershed Management by Others (by category)

Jurisdictional Authority in the Watershed

One component of a watershed sanitary survey is to define the "lines of communication" between responsible agencies. A summary of the agencies that have jurisdictional authority within the Upper Mokelumne River and Camanche Watersheds is presented to provide an overview of the agencies involved and a basis for understanding their responsibilities with regard to water quality.

Table 6-1 summarizes the local/regional, state, and federal agencies and utilities, and their concerns or jurisdictional authority that are relevant to the Camanche and Upper Mokelumne River Watershed lands. This information can assist EBMUD in the event that BMPs need to be modified and/or created, and to develop open lines of communication between interested agencies. Each of these agencies has a role in achieving adequate source water protection and their active participation is essential for successful protection.

Watershed Management Practices

This section provides an overview of the practices and policies that have potentially significant impacts on source water quality in the Camanche and Upper Mokelumne River Watersheds. Watershed management practices by EBMUD and other public entities were reviewed.

The documents listed in Table 6-2 were obtained and reviewed for the 2015 MRWSS update. First, these policies and documents are described generally if they pertain to multiple watershed management categories; next, EBMUD management practices are discussed by

category; and finally, the various other agency management practices are discussed in context of the following watershed management categories:

- Land Use Planning
- Access control
- Erosion Control
- Pest Management
- Logging Practices
- Grazing and Livestock Management
- Mineral Exploration and Mining
- Stormwater Management
- Waste Management
- Structures, Dredging, and Fill Management
- Inspection, Surveillance, and Enforcement Procedures
- Emergency Response
- Public Education
- Fire and Fuels Management

Section 3 details land ownership in the Upper Mokelumne River Watershed, including EBMUD, six major institutional landowners and major private landowners. Of these landowners, EBMUD property accounts for about 3 percent SPI owns approximately 24 percent of the land, BLM approximately 3 percent, PG&E approximately 1 percent, USFS approximately 54 percent, and others approximately 15 percent.

Figures 3-7 and 3-8 identify which parcels are owned by the major landowners. Although BLM may own a relatively small percentage of the watershed acreage, the BLM parcels are important because they are located right along the Mokelumne River. National Forest (NF) land is located in the upper elevations in the eastern watershed. Figure 3-7 details land ownership in Calaveras County, where SPI owns a large band of mid-elevation land encompassing much of the Middle and South Fork Watershed land.

USFS Watershed Management

USFS, a division of the U.S. Department of Agriculture (USDA), directs the management of the Eldorado and Stanislaus NFs, which together encompass all NF lands within the watershed. Specific NFs each adopt their own land and resources management plans for their respective areas of jurisdiction. The plans contain standards and guidelines, as well as specific plans and management area prescriptions.

In 2012, the USFS released the 2012 Planning Rule, a major overhaul of the 1982 document that guides the individual NF land management plans. The 2012 Planning Rule creates an adaptive framework that emphasizes collaboration and supports an all-lands context for resource management. The all-lands approach recognizes that many management issues such as fire, water and wildlife will require understanding of what is happening both on and off the NF System lands.

Sierra NF Plan Amendment (SNFPA)

The Sierra NF Plan Amendment (SNFPA) was promulgated in January 2004. The 2004 amendment established management direction, land allocations, desired future conditions, standards and guidelines for management actions, and a strategy for supporting adaptive management of forest lands. The plan refined management direction for (1) old forest ecosystems, (2) aquatic, riparian, and meadow ecosystems, and (3) fire, fuels, and forest health. Components of the 2004 SNFPA are discussed further in the *Grazing and Livestock Management* subsection. Because of lawsuits and a court order, a 2013 Final Supplemental EIS was issued to correct specific deficiencies in the original Supplemental EIS. The new Supplemental EIS properly models all alternatives and will consider the "new" objectives of reducing stand density and restoring ecosystems after catastrophic disturbance events (fire) in evaluation of alternatives.

The Stanislaus NF, Forest Plan Direction, April 2010, and Errata 2015, summarizes specific required Management Practices, including water quality management, and requires the use of the USDA BMPs (described below). A road ecosystem travel analysis completed in 2012 evaluated the Stanislaus NF road system, and recommended roads which should be eliminated or abandoned. Water quality was one of the factors that was considered in the analysis. The Eldorado NF complies with the SNFPA.

Cornerstone Project

Begun in 2012, the Cornerstone Project is a USFS Collaborative Forest Landscape Restoration Program (CFLRP) project that addresses landscape restoration over ten years on 390,904 acres in the upper reaches of the Mokelumne River headwater area (land ownership 76 percent USFS, 22 percent private, <1 percent State and Country property). The Cornerstone project is being implemented by the Amador-Calaveras Consensus Group (ACCG), consisting of approximately 28 groups and a few unaffiliated individuals. Approximately $17 million in project funds are earmarked over the ten years, with funding expected to be 40 percent CFLR and 60 percent ACCG matching funds (includes other USFS funds). The CFLRP purpose is to encourage the collaborative, science-based ecosystem restoration of priority forest landscapes, with social and economic objectives including local job creation. Specific efforts completed to date include the Indian Valley Meadow Restoration in 2012.

Travel Management Rule

USFS finalized the Travel Management Rule in 2005 requiring each NF or ranger district to designate those roads, trails and areas open to motor vehicle use. Years of unmanaged motorized use on NF land has resulted in unplanned roads and trails, erosion, and watershed and habitat degradation. The Travel Management Rule restricts motor vehicles (cars, trucks, ATVs, motorcycles, RVs, 4WDs, etc.) to designated roads and trails, and specifically prohibits cross country travel. Parking outside of developed trailheads and recreational sites is restricted to turnouts or within one vehicle length of the road or trail. Designated trails and dirt roads are also closed seasonally to prevent damage during wet conditions.

Although temporary restrictions were implemented earlier, the final travel management changes were implemented as follows:

- The Eldorado NF Final EIS, Record of Decision (ROD) 2008, and associated Motor Vehicle Map 2009. The Motor Vehicle Map identifies which roads and trails allow motor vehicle travel, both surfaced and dirt.
- The Stanislaus NF Forest-wide Forest Plan Amendment ROD 2009 and associated Motor Vehicle Map 2010.
- In 2012, a lawsuit against the Eldorado NF resulted in the temporary closure of 42 roads (120 miles of off-road trails) that cross meadows, including the Deer Valley Trail and Blue Lake Road in the Upper Mokelumne River Watershed. The lawsuit alleged that USFS had not satisfactorily shown how vehicular use on off-road trails affects the hydrology of meadow areas crossed by the trails. USFS has agreed that some of the roads are impacting the meadows, and the roads will remain closed until impacts can be corrected. The Deer Valley and Blue Lakes Road Environmental Assessment (EA) was issued in 2015. Some roads are still being evaluated for hydrological impacts.

Water Quality Management for Forest Lands in California: BMPs

In 2012, USFS issued a National BMPs (BMP) for Water Quality Management Handbook, revising and incorporating the BMPs from the 2000 document "Water Quality Management Plan for Forest Lands in California: Best Management Practices". The documents establish uniform BMPs for protection of USFS lands in California from non-point source contaminants, and are described in more detail in MRWSS 2010.

Mokelumne Wilderness

The Mokelumne Wilderness is a 105,165 acre protected area between Highways 4 and 88 that straddles the crest of the Sierra Nevada range, draining to the North Fork Mokelumne and Carson River watersheds. Approximately 20 percent of EBMUD's Upper Mokelumne River Watershed area is within the Mokelumne Wilderness, as shown in Figure 5-16. See Appendix 6-1 for an NF and wilderness location map. Designated in 1964, the Mokelumne Wilderness is managed by the NFs. Travel is restricted to horseback or foot only, with all mechanical transportation prohibited (wheelchairs excepted). Permits are mandatory for entry.

BLM Watershed Management

The BLM Folsom Field Office (now the Mother Lode Office) adopted the Sierra Resource Management Plan (RMP) in 2008, replacing the 1980 BLM Management Framework Plan. The Sierra RMP summarizes specific management actions, mitigations, and project design features for managing resources and uses of BLM lands, with breakdowns including water resources, livestock grazing, energy and minerals, recreation, and abandoned mines. The RMP requires that BMPs be developed as needed in accordance with BLM guidance and policy.

The RMP details a ban on OHV travel, except on approved roads (similar to the current NF approach). The RMP has Motorized Vehicle Route Designations maps to show paved and unpaved roads approved for motorized vehicles. RMP maps also show the Mokelumne River sections recommended for inclusion as a Wild and Scenic River. See Appendix 6-2 for

RMP maps 6e and 8b showing the Motor Vehicle Route Destinations and the Recommended Wild and Scenic River, Main and North Fork Mokelumne.

Natural Resources Conservation Service (NRCS)

NRCS was originally established by Congress in 1935 as the Soil Conservation Service (SCS). NRCS has expanded to become a conservation leader for all natural resources, ensuring private lands are conserved and restored. NRCS works with landowners through conservation planning and assistance designed to benefit the soil, water, air, plants, and animals that result in productive lands and healthy ecosystems. NRCS partners with local communities and conservation districts and provides funding for local watershed projects.

California Department of Fish and Wildlife (CDFW)

CDFW is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. In addition to other responsibilities, CDFW issues Lake or Streambed Alteration Agreements and suction dredging permits. There has been a moratorium on these suction dredging permits since 2009. For additional information, see the later subsection under Mining.

Any proposed activity that may substantially modify a river, stream, or lake requires a Lake or Streambed Alteration Agreement, which will include reasonable conditions necessary to protect fish and wildlife resources. Diversions, obstructions or changes in the natural flow or the streambed, channel or bank of a river are a few examples. In addition, using materials from a streambed or lake bottom, or disposing of debris or waste materials where they can pass into any river, stream, or lake, are also activities regulated by CDFW, and may require a permit prior to the start of such activities.

PG&E Land Conservation Commitment Stewardship Council

The Pacific Forest and Watershed Lands Stewardship Council (Stewardship Council) is a nonprofit organization founded in 2004 as part of a bankruptcy settlement, requiring PG&E to protect approximately 140,000 acres of PG&E watershed lands in 22 counties. The land will either be protected with perpetual conservation easements or shall be made available for donation to public entities and/or non-profit organizations, if not necessary for current or future hydro-project operations. The Stewardship Council was funded by PG&E with $70 million over ten years to oversee this process.

The Stewardship Council's main task was to develop the Land Conservation Plan (LCP) as a series of three volumes to manage the donated lands, to preserve and enhance recreation, sustainable forestry, open space, protection of habitat, agricultural uses, and protection of cultural resources:

- **LCP Volume I, Land Conservation Framework (2007):** Overall framework (legal requirements, planning process, methodologies, public involvement, and relevant regulatory processes.
- **LCP Volume II, Planning Unit Concepts (2007):** Documents existing conditions and presents management objectives, potential measures, and conceptual plans

- **LCP Volume III, Final Disposition Packages (2009-2016):** A series of real estate transaction packages that will detail the specific land conservation and/or disposition requirements for each parcel or parcel cluster.

As of April 2015, the Stewardship Council's Board has approved the final Land Conservation and Conveyance Plans (LCCPs) for the three planning units that lie within the Upper Mokelumne River Watershed (see Appendix 6-3 for detailed disposition package maps, 2,424 acres total).

- **North Fork Mokelumne River Planning Unit, November 2014:** 1,115 acres will be donated to CAL FIRE and Mother Lode Land Trust (MLLT) will hold the conservation covenant for all 1,115 acres. The land is in Amador County along Tiger and Panther Creeks and surrounding the Tiger Creek Regulator Reservoir, near the North Fork and Main Stem of the Mokelumne River. In the future, the new landowner or conservation easement holder may restrict OHV use from Tiger Creek, enhance existing day use facilities at Electra, add a permanent restroom at the Tiger Creek put-in, improve fishing access at Tiger Creek Reservoir and/or reduce timber harvest.
- **Lower Bear Area Planning Unit, September 2014:** Ownership of all 899 acres will be retained by PG&E. MLLT will hold a conservation easement for the 899 acres. The land is in Amador County surrounding Upper and Lower Bear River Reservoirs. In the future, the new conservation easement holder may close unauthorized OHV area
- **Blue Lakes Planning Unit, April 2015:** 410 acres will be donated to the USFS. Sierra Nevada Conservancy (SNC) will hold the conservation covenant for the 410 acres owned by the USFS. In the future, the new landowner or conservation easement holder may protect Twin Lake shoreline from vehicle access, restrict recreation use by Deer Creek, add a day use area at Upper Blue Lake and/or formalize or close OHV trails. The remaining 1,447 acres within the planning unit will be retained by PG&E (after the requesting agencies withdrew due to a requirement pertaining to the Federal Powers Act).

A grant program has been developed to fund physical enhancements on these lands in the future. The potential physical enhancements identified earlier in the process may be implemented in the future by the new landowner.

By the end of 2016, the Stewardship Council intends to establish a funding mechanism to allow the holder of the conservation easement to be reimbursed for costs, and all fee title transactions and conservation easement recordings should be complete.

Upper Mokelumne River Watershed Authority (UMRWA)

UMRWA is a joint powers agency established in 2000 for the purpose of preserving and enhancing Mokelumne River water supply, water quality, and environment. The member agencies are Alpine County, Alpine County Water Agency, Amador County, AWA, Calaveras County, CCWD, CPUD, JVID and EBMUD. UMRWA addresses four areas of interest: watershed management, water resource projects, integrated regional planning, and

water conservation. Funding for UMRWA programs comes from stakeholders, members and grants.

Ongoing since 2005, local teachers, the Central Sierra Resource Conservation and Development District (CSRC&D) Council, and the UMRWA began a watershed education program for local schools. The Stewardship through Education Program is a watershed educational program which is run by teachers and funded by local water agencies and EBMUD. Docents are trained and certified, and are then given permission to run tours on EBMUD watershed property.

UMRWA Project (UMRWAP)

UMRWAP was a three-year effort costing nearly $1.3 million, completed in 2007. UMRWAP advanced a broader understanding of watershed water quality issues and developed a method and tools for the long-term evaluation of Upper Mokelumne River water quality.

The UMRWAP report is detailed in the MRWSS 2010 update and briefly summarized below:

- **Land Use:** Created a land cover and land use GIS database and map
- **Monitoring:** Created and implemented a monitoring program. Created a master database with existing monitoring data.
- **Baseline Water Quality:** 51 parameters within the four major river segments. Benchmarks were established. Identified trends as well as benchmark exceedances.
- **Modeling: WARMF:** The Watershed Analysis and Risk Management Framework (WARMF) model was calibrated. Simulated water quality in unmonitored areas. EBMUD is the WARMF Steward and so maintains the WARMF model.
- **Fire Behavior**: Simulated potential wildland fires using the modeling tools FARSITE and FlamMap. WARMF then analyzed potential water quality impacts.
- **Water Quality Vulnerability Zones:** Identified vulnerability zones more susceptible to transport contaminants to surface waters.
- **Draft Septic System Management Program (UMRWP Appendix K):** A draft Septic System Management Plan (SSMP) was developed for implementation by the Alpine, Amador and Calaveras Counties. SSMP includes community outreach, recommended septic survey, and possible septic management practices, first targeting the areas where the suspected problematic septic systems are located.
- **Key Findings:** River water quality is very good and concentrations of only a few parameters exceed benchmarks. Elevated concentrations of fecal coliform, *E. coli*, and *Cryptosporidium* were observed in Middle and South Forks and Main Stem. Septic systems are believed to be the primary source of microbial contamination. Reducing frequent small, high intensity fires would likely improve water quality. Areas near waterbodies with very steep slopes are most susceptible to transporting contaminants.

Key Recommendations/Tools

Key watershed management recommendations and tools to address existing and potential water quality concerns included:

- **Land Use Management:** General Plan updates should encourage compact development.
- **Monitoring:** Implement water quality and temperature monitoring in river segments identified as having elevated parameters of interest, particularly pathogens.
- **Septic Management:** Develop and implement a septic management program. Expand sewer collection systems where feasible.
- **Fire Management:** Manage the fuels through measures such as prescribed burns, harvesting of biomass fuels, etc.
- **Stormwater Management:** Implement "green street" design principals to support increased infiltration of stormwater and decreased runoff and erosion. Standards needed for roadside pesticide use.
- **Trash Management**: Provide toilets and trash receptacles at informal recreation sites.
- **Public Outreach:** Highest priority is informing residents about septic system management practices.

Integrated Regional Water Management Plan (IRWMP)

IRWMPs are required for regional management of water resources in at least four main areas: water supply, groundwater management, ecosystem restoration, and water quality. The IRWMP is a non-binding planning document that offers multiple potential solutions to local and regional water management issues, coordinating water resources, planning and implementation activities. IRWMPs have been funded by Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act, 2002, Proposition 84 (2006), and Proposition 1E.

The Mokelumne/Amador/Calaveras (MAC) IRWM region was formed in 2006 and the MAC IRWMP (MAC Plan) was issued in November 2006. MOU signatories included AWA CCWD, EBMUD, Amador County, Amador Regional Sanitation Authority, and the cities of Jackson, Plymouth and Sutter Creek. Over 12 public stakeholder workshops were held between 2005 and 2007.

Substantial funds are designated to implement MAC Plan projects. In 2009 UMRWA assumed lead agency responsibilities for the 2013 MAC Plan update. The 2013 MAC Plan update consists of three volumes:

- Vol. 1: Plan update with MAC region description, issues, governance, objectives, project review process, coordination, and plan administration
- Vol. 2: Appendix with proposed project information forms (for the purposes of applying for IRWMP project funding)
- Vol. 3: Appendix with comments and responses

The CARSWP regional WTP received approximately $1.4 million in grant funding through the MAC Plan process, almost half of the $3 million construction cost estimate.

In 2015, a Project Addendum was released with an updated list of 48 proposed MAC Plan project evaluations. Highlighted below are several potential projects currently seeking funding, that are located in the Upper Mokelumne River Watershed:

- **Camanche Area Regional Water Supply Project Phase II.** Construction to connect AWA's distribution system on Camanche Reservoir's north shore to EBMUD's new Regional WTP distribution piping. ($7.0 million estimate)
- **Highway 88 Corridor Wastewater Transmission Pipeline.** Study to consider a sewer pipeline to collect septic tank effluent wastewater from seven community wastewater systems, including several in the Upper Mokelumne River watershed. Primary perceived benefit is reduced groundwater nitrates. ($50,000 estimate)
- **Lake Camanche Village Wastewater Reuse Project.** Planning project to upgrade an existing AWA wastewater plant to membrane bioreactor or equivalent treatment for reuse in JVID. Includes a new lift station and collection line for EBMUD's CANS Recreation Area. ($14.5 million estimate)
- **Lower Bear River Reservoir Expansion Project.** Feasibility study proposed by AWA to raise existing dam/embankment 32 feet, replace intake structure and spillway, and relocate existing roads and operational facilities. Added dry year supply could benefit EBMUD. ($5.2 million estimate)
- **Mokelumne Water Quality, Soil Erosion, and Sedimentation Restoration Project**. As proposed by AWA, develop a three-phase program in the Mokelumne River Watershed upstream of Pardee Reservoir to eliminate point sources of gully erosion. Phase 1 Inventory areas, Phase 2 develop action plan with priorities, and Phase 3 seek partners and funding. Coordinate with similar efforts, including USFS Amador District Ranger's 2004 Power Fire study and restoration project. ($150,000 estimate)
- **West Point Water Treatment Plant Drinking Water Compliance Project**. As proposed by CCWD, add a backup filter system for the existing treatment system, to address a current violation with SWRCB, so that West Point has a reliable potable water supply. ($825,000 estimate)
- **CPUD Water Distribution System Improvements**. As proposed by CPUD, study replacing all or portions of the transmission main from Jeff Davis WTP to various communities including Mokelumne Hill. ($1.0 million estimate)
- **Jeff Davis Treatment Plant Improvements**. As proposed by CPUD, upgrade various Jeff Davis WTP processes, including adding recycling facilities for backwash water. CPUD's sole source of raw water is a diversion on the Mokelumne River South Fork. Jeff Davis WTP is located just inside the Mokelumne River Watershed near Rail Road Flat. ($80,000 estimate)
- **Middle Fork Ditch Pipeline and Hydroelectric Power Project**. As proposed by CPUD, construct a new pipeline from the existing penstock at Schaads Reservoir Mokelumne River Middle Fork, to existing pipeline which delivers water to Jeff Davis WTP from the South Fork Mokelumne River Pump Station. (A historic ditch that once transported water from Schaads to the South Fork has fallen into disrepair.) ($11.1 million estimate)
- **Citizen Water Quality Monitoring.** As proposed by Foothill Conservancy, implement a three-year water quality monitoring program staffed by trained volunteers. Sampling would occur in Calaveras and Amador County areas where

other monitoring efforts have gaps or where an identified need for monitoring is determined. Data would be shared with the SWRCB's Citizen Monitoring program database, and with county health and sanitation districts. ($25,000 estimate)

National Wild and Scenic River Designation Recommendation

National Wild and Scenic River designation has been proposed for sections of the North Fork and Main Stem Mokelumne River. Wild and Scenic Rivers are typically managed by one of four federal agencies: BLM, National Park Service, U.S. Fish and Wildlife Service (FWS), and USFS. BLM and USFS have both recommended the National Wild and Scenic River designation for these Mokelumne River sections due to their outstanding water quality, scenic beauty, and cultural and historical resources; however, only Congress can designate wild and scenic rivers. The next steps typically take between one and ten years and involve congressional support followed by an act of Congress.

Sections of Mokelumne River recommended for National Wild and Scenic River designation, include sections with Wild, Scenic and Recreation classifications:

- Wild Rivers are those rivers or segments of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.
- Scenic rivers are those rivers or segments of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.
- Recreational rivers are those rivers or segments of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment of division in the past.

In June 2015, California Assembly Bill 142 passed in the Assembly and so moves to a vote in the California Senate. This bill provides interim protection of the Mokelumne River upstream of Pardee Reservoir, while also requiring a study of the river's suitability for permanent protection as a Wild and Scenic River designation. The bill requires that the suitability study be complete by 2021.

The BLM Sierra RMP (2008) recommends that 20.2 miles of the North Fork and Main Stem Mokelumne River be designated a National Wild and Scenic River. See Appendix 6-2 map 8B, Recommended Wild and Scenic River – Main Stem and North Mokelumne, indicating the recommended sections. The recommended sections are from just west of Tiger Creek Dam to 100 feet below the Highway 49 Bridge, with gaps around the West Point and Electra Powerhouses. This section begins just downstream of the 17-mile long, USFS-managed segment of the North Fork that is eligible for inclusion in the Wild and Scenic Rivers system. The land between the USFS and BLM sections is mostly owned by PG&E and associated with Tiger Creek Powerhouse.

BLM manages sixty percent of the land affected by the proposed reclassifications. The designation would have no legal effect on the private lands in the river corridor. Existing water and hydroelectric projects would continue to operate as they do today.

A Wild and Scenic River is protected from new dams and diversions that may harm the waterway's free-flowing character and natural condition. Wild and Scenic Rivers can still be developed, but the designation adds the requirement that any future development on federally-owned land protect the "outstandingly remarkable resources." The designation would establish a quarter-mile protected corridor on both sides of the river. Roads: Existing infrastructure can be maintained. Any proposed federally-assisted project requires a project review to ensure that the project will not have a direct and adverse effect on the river's character, water quality or "outstandingly remarkable resources."

Rivers classified as wild are withdrawn from the mining and mineral leasing laws, meaning that no new leases can be granted. On all Wild and Scenic Rivers, existing mining and mineral claims and leases would be allowed to continue, subject to regulations that protect water quality (minimize surface disturbance, water sedimentation, pollution and visual impairment).

Sierra Nevada Conservancy

The Sierra Nevada Conservancy (SNC) is a state agency created by bi-partisan legislation and signed into law by Governor Schwarzenegger in 2004. The SNC was created with the understanding that the environmental, economic, and social wellbeing of the Sierra Nevada and its communities are closely linked and that the Region would benefit from an organization providing a strategic direction. California's principal watershed lies within this region (covers 22 counties), supplying 65 percent of the developed water supply across the state. The SNC program has seven objectives, with two objectives being to protect and improve water and air quality and to reduce the risk of natural disasters, such as wildfire;

Funding for the implementation of the SNC's programs is primarily provided by bond funds (Proposition 1, 2014 and Proposition 84, 2006). The SNC was involved in grant distribution and is currently accepting Proposition 1 grant applications. SNC Prop 84 funds have supported various activities within the Mokelumne Watershed.

Local Agency Formation Commission (LAFCo)

Local Agency Formation Commission (LAFCo) is a public agency with county-wide jurisdiction established in 1963 and modified by the California Cortese-Knox-Hertzberg Local Government Reorganization Act of 2000. The objectives of each LAFCo are to encourage the orderly formation of local governmental agencies, to preserve agricultural land resources and to discourage urban sprawl. Among other duties are:

- Municipal Service Reviews (MSR) were added to LAFCo's mandate in 2005. MSRs are a comprehensive study to better inform LAFCo, local agencies, and the community about the provision of municipal services. The MSR evaluates operations, finances, management, board oversight and future planning. The MSR is a prerequisite to a sphere of influence determination (SOI) and may also lead a LAFCo to take other actions under its authority.
- Initiation of Special District Consolidations: As of July 1, 1994, LAFCos have the authority to initiate proposals that include the dissolution or consolidation of special

districts, or the merging of an existing subsidiary district. Prior to initiating such an action, LAFCo must determine that EBMUD's customers would benefit from the proposal through adoption of an SOI or other special study.

Upper Mokelumne River Watershed Council

The Upper Mokelumne River Watershed Council (Council) is located in Jackson and is coordinated by EBMUD. The Council supports landowners, local governments, and stakeholders with water quality monitoring, watershed planning, resource conservation, watershed assessment/restoration, and public outreach and education on the Upper Mokelumne River, Dry Creek, and Upper Calaveras River watersheds. The Council works to restore and maintain the Upper Mokelumne River Watershed in a manner that ensures sustainable environmental, economic, educational, cultural, recreational, and water quality benefits.

Central Sierra Resource Conservation & Development

The Central Sierra Resource Conservation & Development (CSRC&D) Council was originally formed by the USDA in 1997, and reorganized as a nonprofit in 2003. The CSRC&D Council helps people in rural areas plan and carry out activities that increase the conservation of natural resources, support economic development, enhance the environment and standard of living in local communities. CSRC&D area councils are locally organized, sponsored, and led. USDA provides technical and financial assistance, and sponsors obtain additional funding and services from a variety of other sources.

The following projects were highlighted in the CSRC&D Council 2012 Annual Report:

- Stewardship Through Education programs in Amador and Calaveras Counties, using a publication called Circles and Cycles, which describes Mokelumne Watershed
- Water quality monitoring program

Mokelumne Coast to Crest Trail (MCCT)

MCCT is a scenic non-motorized, multi-user trail corridor that will extend from the Pacific Ocean near San Francisco Bay to the crest of the Sierra Nevada Mountains, just south of Lake Tahoe. Development of the MCCT is being coordinated by the MCCT Council, a coalition of volunteers and public and private agencies, including EBMUD. In the Mokelumne watershed area, the trail will pass up the North Fork of the Mokelumne River. The 300-mile proposed trail will cross public lands under diverse jurisdictions, including various state and federal agencies, public utility and railroad corridors, local and regional parks, as well as some parcels of private property. Trail construction will utilize BMPs embraced by each agency, following industry standards. Bare slopes will be seeded and mulched.

The approximately 32 miles of MCCT route on EBMUD watershed property is now complete. The MCCT trail has been developed on EBMUD property by staff and the Mokelumne Trailbusters, a volunteer organization managed by EBMUD. The most recently completed trail section is a three-mile loop trail extending from Middle Bar up towards Highway 49.

The Trailbusters work two days per month and have installed many features including trail gates, retaining walls, fencing and benches. Stone stairs, landings, retaining walls and gabions are constructed where needed to compensate for steep terrain and to minimize erosion. Native trees are also planted for erosion control.

On Stanislaus NF lands, the MCCT Committee and USFS spent more than a year exploring and mapping potential routes for the MCCT on existing roads and trails. USFS has developed 19 miles of this MCCT trail segment most recently adding two miles of trail construction in Stanislaus NF in 2012.

Proposition 40 grant funding added $10,000 worth of trail signs and kiosks, installed in 2010. This section covers the 16 miles between Moore Creek and Coral Hollow. Signs will identify the trail route and summarize key trail regulations. NF maps summarize rules such as proper locations for stock animals and minimum distances or buffer zones for protection of water courses.

EBMUD Watershed Management

For the 2015 MRWSS update, EBMUD's management practices were documented for access control, fire and fuels management, erosion control, pest management, grazing, inspection, surveillance, control, and emergency response. EBMUD manages watershed lands it owns surrounding Pardee and Camanche Reservoirs. The Watershed and Recreation Rules and Regulations, last updated in 2014, outline the specific rules pertaining to access, boating, camping, commercial uses, dangerous activities, sanitation, trails, vehicles, bicycles, and hunting.

Mokelumne Watershed Master Plan

EBMUD's Mokelumne Watershed Master Plan (MWMP) was completed in 2008, providing long-term policy and guidance for future use and management of the lands and water owned by EBMUD within the hydrologic watersheds of Pardee and Camanche Reservoirs. The MWMP outlines the land use, land use goals, strategies to achieve those goals, and the objectives associated with those strategies in five areas: natural resources, community use, assets, communications, and financial management. Several of the MWMP strategies include the development of detailed management plans. All except the ecological integrity/natural resources management plan have been completed.

The following detailed management plans responding to MWMP strategies were completed previously and detailed in the 2010 MRWSS update period:

- **Recreation Management Plan, January 2010.** Identifies specific measures to provide a quality recreational experience while protecting water quality and the environment.
- **Infrastructure Management Plan, January 2010.** An infrastructure asset management system to "Prevent asset failure due to deferred or otherwise inadequate maintenance."

- **Financial Management Plan, January 2010.** An accounting framework to track revenues and expenditures based on watershed management programs.
- **Mobile Home Park Management Plan, January 2010.** Specific management practices to ensure that construction, repair, and maintenance activities by mobile homeowners meet legal and EBMUD standards and align with EBMUD goals.

The following three detailed management plans responding to MWMP strategies were completed during the 2015 MRWSS update period:

- Fire Management Plan (FMP), December 2011
- Water Quality Monitoring Program (2006-2012)
- Rangeland Management Plan, March 2013

FMP, December 2011

The purpose of the FMP is to establish an updated and formalized program for minimizing the risk to life, property and water quality from wildfires in the EBMUD-owned portion of the Mokelumne watershed. The FMP outlines fire risks and hazards, along with strategies for risk reduction and fire response (suppression and restoration). Objectives include:

- Establish fire management units (FMUs): firebreaks, road access, and predicted containment areas for wildfires on each FMU on watershed property and threat areas outside EBMUD property boundaries.
- Continue grazing to reduce fuels and fire risk per the Rangeland Management Plan.
- New or enhanced access routes for fire suppression (topography, risk of ignition)
- Document BMPs for fire prevention, hazard reduction, and fire suppression, referencing related plans and programs such as rangeland management and ecological integrity.
- Document the current fire rating system (weather/fuel moisture conditions, watershed use restriction criteria, etc.)
- Outline restoration activities to be implemented after a fire based on the characteristics of the burned area, such as size, intensity of burning, vegetation, slope, etc.
- Incorporate prescribed burns, firewood/fuel removal, and habitat creation
- Estimate potential impacts to water quality from fire and provide for post-fire monitoring as part of the water quality program.
- Public education program in coordination with other fire agencies for recreation visitors, and others conducting work or otherwise present in the watershed.
- Continue participation in local fire-safe councils (fire response, information exchange).
- Serve as a reference document for existing annual FRPs and the fire atlas.

Water Quality Monitoring Program (2006-2012)

In 2006, a stormwater runoff monitoring plan was developed and implemented for the Pardee watershed to evaluate the effectiveness of grazing BMPs intended to minimize the risk of *Cryptosporidium*. The BMPs included the removal of livestock during the wet-weather season ("dry grazing") and exclusion of cattle less than four months of age from

direct contact with streams and creeks. These BMPs were incorporated into the 2013 Rangeland Management Plan.

Rangeland Management Plan, March 2013

The Rangeland Management Plan addresses grazing and range management issues to identify and implement management practices that meet the rangeland management goals for healthy and productive watersheds:

- Employ sustainable rangeland management practices
- Reduce fire hazard and potential fire hazard severity by reducing grassland fuels,
- Maintain existing undeveloped open space by limiting development within the Mokelumne hydrologic watershed boundaries
- Consider cost effectiveness for ranchers
- Minimize noxious invasive species and promote native plant species

The Rangeland Management Plan objectives include:

- Permit grazing by domestic livestock for fuel reduction, protect against erosion
- BMPs for protection of water quality and ecological integrity.
- Infrastructure requirements by pasture (provide for construction and maintenance)
- Sustainable grazing practices (multiple pastures, rotation, seasonal/managed grazing)
- Maintain or improve the health of the rangeland resources with indicators/metrics
- Expand GIS system with key of grazed lands attributes for tracking over time.
- Recognize the relationship between grazing and maintenance of open space.
- Certified Rangeland Manager (licensed): create leases, plans for EBMUD lands.
- Form a grazing focus group

The Rangeland Management Plan grazing program components include:

- Standard grazing lease and tenant selection procedures
- Annual Grazing Plans (AGP) for each lease, outlining BMPs and monitoring requirements (water quality protection, residual dry matter goals, and invasive species control)
- Rangeland Health Assessment and Monitoring Program: Includes current conditions assessment, range health checklist, spring and fall surveys, and specifics for vulnerable and degraded areas, sensitive habitats and water quality concerns
- Periodic review cycle with adaptive management

Safe Harbor Agreements

Safe Harbor Agreements (SHA) are overseen by USFWS. Landowners can sign up to restore or enhance habitat on their property which contribute to the recovery of threatened and endangered species. See the 2010 MRWSS for additional details. In summary, in 2007, EBMUD signed the Lower Mokelumne Watershed SHA, California's first multi-landowner SHA, providing elderberry bushes (sole food of the federally-threatened Valley elderberry longhorn beetle). In 2009, EBMUD signed an historic 28,000-acre SHA to protect and enhance three listed species in the Mokelumne watershed around Pardee and Camanche Reservoirs. This 30-year SHA will cover three federally-protected species: Valley elderberry longhorn beetle, California red-legged frog, and the California tiger salamander.

During the 2015 MRWSS Update period, EBMUD documented the existing endangered species habitat within the watershed, planted approximately 160 acres with elderberry bushes, developed two acres of new shallow water spawning habitat, and restored approximately 1500 linear feet of shallow water riparian habitat.

Access Control - EBMUD

All Camanche and Upper Mokelumne River watershed lands owned by EBMUD are fenced and posted, with human access strictly controlled. The shorelines of Pardee Reservoir and the Mokelumne River where it passes through EBMUD land are also fenced to exclude cattle. Cattle are not excluded from the riparian areas of some subordinate tributaries but grazing is restricted at critical times of the year to minimize impact. Most public roads within EBMUD watershed lands are fenced along the entire passage through EBMUD lands except in the Recreation Areas.

Trail Permits

EBMUD requires users to acquire a permit before accessing EBMUD trails. EBMUD Trail Use Rules and Conditions outline that the users shall, when on EBMUD property, stay on designated trails and close gates after passing through. Furthermore, the Rules require that permit holders use designated restroom facilities (toilets shown on trail map). Users shall not use conveyances with wheels, tracks, or skids on unpaved roads or trails.

Signs

Signs along the trails and at trailheads notify hikers that EBMUD permits are required, request that users protect the watershed, and summarize key water quality rules (such as: stay on designated trails, no dogs or wheeled vehicles, no camping or fires). See Appendix 6-4 for examples of sign postings.

Equestrian Access and Camping

Horses are allowed on most EBMUD trails and fire roads and in the equestrian campground, but they are excluded from the rest of the recreation areas. Based on sign-ins at trail registers, about 80 to 85 percent of the Mokelumne area trail users are equestrians. EBMUD Trail Use Rules and Conditions outline that the users shall:

- Stay on designated trails, closing gates after passing through
- Remove and dispose of all animal waste products (from user's animals) from staging area
- Not allow any saddle or pack animal to stand unattended/untethered or swim/wade in any reservoir or stream

The Turkey Hill Equestrian/Group Campground is located on 16 acres near CASS, adjacent to the MCCT. The campground encourages equestrian camping in a location reasonably distanced from streams, rivers and reservoirs. Operated by concessionaire, the seven sites can accommodate 32 horses and 128 people. Sites include a paddock for each horse a horse wash station, and bins for horse waste. Permit rules require that horse waste be cleaned up and disposed of in waste bins.

EBMUD Security Improvements

During this update period, EBMUD's new Mokelumne Watershed Headquarters building construction was completed, building access control and CCTV cameras. As a result of the 2003 District Vulnerability Assessment (VA), EBMUD completed construction on phase one of its Capital Security Improvement Projects (CSIP) including a backbone security system and 24-hour Security Operations Control Center (SOCC). Much progress has been made toward hardening the targets of EBMUD's Critical Infrastructure/Key Resources facilities by replacing older chain-link fencing with improved, tighter-mesh fencing standards, lighting upgrades, gate access controls, building access controls, CCTV cameras and digital video recording, alarm systems, etc., across EBMUD facilities.

Fire and Fuels Management - EBMUD

CAL FIRE has the primary wildland fire suppression responsibility for all EBMUD lands within the Mokelumne Area. Local fire districts and volunteer fire departments (Local Agencies) have the primary structure fire suppression responsibility for all EBMUD properties within the Mokelumne Area. EBMUD MW&RD firefighters are responsible for assisting with the suppression of wildland fires within the Mokelumne Area on EBMUD property. In addition, EBMUD firefighters cooperate in the suppression of wildland fires on adjacent property and support the efforts of CAL FIRE and Local Agencies in structure protection, vehicle/vessel fires and dumpster fires on EBMUD property to the extent reasonable and appropriate.

MW&RD Fire Response Plan (FRP)

EBMUD's Mokelumne Watershed FRP is updated annually by the MW&RD Resource Patrol Unit; it documents current EBMUD fire prevention measures, suppression resources, and response procedures in order to safely facilitate timely and effective response to fires in its area of concern. It is intended both as a guide to Division staff and as a communication tool with other Divisions/Departments within EBMUD as well as with outside agencies.

Some FRP details include:

- The FRP sets guidelines for EBMUD, concessionaire, and contract personnel when operating equipment in dry fuels with a high probability of ignition. MW&RD staff follow the Mowing/Weed Abatement Procedure (Appendix K). Concessionaires follow their respective Fire Prevention Plans (Appendixes L, M, and N).
- **Fire Training Guidelines (Appendix A):** EBMUD firefighters must complete initial firefighting and wildland firefighting training, along with annual refresher training. Multiple vehicles are equipped with fire suppression equipment and necessary radios to conduct effective communication with all responding agencies.
- **Environmentally Sensitive Areas (Appendix Q):** The FRP contains a map of Environmentally Sensitive Areas which shows the 100-foot No Fire Retardant Buffer Zone around Pardee Reservoir. Fire suppression chemicals are typically only used at substantial distances (greater than 100 feet) from EBMUD's reservoirs and tributaries with standing water. CAL FIRE operating procedures restrict the use of chemicals within 300 feet of "anadromous" waterbodies with the exception of the protection of life and property.

- **Red Flag Protocol**. The Red Flag Protocol procedure outlines the notifications and operational steps that will take place in the event a Fire Weather Watch or Red Flag Warning is issued by the National Weather Service for EBMUD property in the Mokelumne Area. Prudent measures are taken to reduce fire hazards on EBMUD property and to maintain firefighting capability, equipment and patrols. Mokelumne area employees, concessionaire employees, and recreational visitors are notified Operational changes include extra ranger patrols, increased water storage at recreation areas, and prohibiting activities that create sparks (outdoor cutting, welding or mowing).
- **Disking**. Disking is accomplished annually in the late spring to provide fuel breaks, especially at the property boundary bordered by residential developments and other urban interfaces. Recreation Area road edges most susceptible to fire starts are also disked. During the 2015 MRWSS Update period, the trend to replace disking with mowing has continued, in order to minimize erosion where slopes are steep or the fire threat is low.
- **Mowing.** Interior fire access roads and public hiking/equestrian trails are mowed annually in order to reduce the threat of accidental fire starts while minimizing impacts from erosion that would be facilitated by grading the soil to bare ground.
- **Concessionaires**. Concessionaires for EBMUD operating within about 2,500 acres of developed Recreation Areas also have an active program of mowing and line trimming.

Woody Fuels Management Program

Permits are issued by EBMUD to remove down and dead wood from areas where it could constitute a fire hazard. Open to the public and EBMUD employees, there is a two-cord limit per person.

Brush Removal

EBMUD works effectively with CAL FIRE and the California Youth Authority (CYA) and the California Department of Corrections (CDC) to remove or reduce heavy stands of brush near adjacent residential properties and at locations strategic to the spread of catastrophic wildfires. This is accomplished by manual removal using hand tools wielded by state wards from the local conservation camps at Pine Grove and Vallecito under the direct supervision of CAL FIRE. Brush removal is conducted using techniques established to minimize soil erosion and is directed by EBMUD staff.

Prescribed Burning

MW&RD Rangers conduct vegetation management burns for multiple purposes on the watershed on an annual basis. These purposes include integrated pest management for noxious weed control, fire suppression training and vegetation conversion from brush to grasses and other herbaceous plants.

In addition to fuel reduction and control of noxious weeds, the benefits of these burns include improved range conditions, improved wildlife habitat, increased water production, and conditions favoring biodiversity. The amount of annual acreage burned is variable from year to year.

MW&RD 2007 Fire Atlas

The MW&RD 2007 Fire Atlas (Fire Atlas) was created to facilitate emergency response to incidents on or threatening EBMUD lands. The Fire Atlas has been distributed within EBMUD and to various agencies, including CAL FIRE. The Fire Atlas consolidates very detailed fire response information and will significantly improve emergency fire response by EBMUD and other agencies.

The Fire Atlas is made up of detailed aerial photos and maps, plus a series of specialty maps, as follows:

- Aerial Photos and Maps by Grid: For each grid location there is an aerial photo (showing property lines and roads) and a detailed map. Each detailed map is annotated to show roads (paved, gravel, unimproved), trails, water sources (listing supply rate gpm), bridges (with weight restrictions), evacuation areas, EBMUD property lines and defined Fire Response Zones (the zone immediately outside EBMUD property).
- Aerial Photos and Maps by Recreation Areas: For each EBMUD Recreation Area there is an aerial photo and a detailed map. Shows similar information those by grid, but are centered on the recreation areas and shown at a smaller scale.
- Specialty Maps: Include Fire Response Zone overview, environmentally sensitive areas, helicopter landing zones, Fire Districts, EBMUD water sources, fire weather zones and an index.

Grazing - EBMUD

Livestock grazing on 12,900 acres of EBMUD-owned watershed is utilized for fuels management and accounts for the removal of an estimated 26,000 to 50,000 tons of grasses and other one hour fuels in the grazing leases. The amount varies depending on the annual rainfall and corresponding forage production. The lease agreements stipulate that residual dry matter (RDM) is to be left on the ground in order to minimize erosion and enhance both the quality and quantity of forage produced. The RDM requirement varies by slope according to the Table 6-3. *Cryptosporidium* and nitrates are water quality parameters of interests that may be connected to grazing activities.

In 2013, the Mokelumne Watershed Rangeland Management Plan (Rangeland Management Plan) was released as part of the MWMP. A detailed description of the 2013 Rangeland Management Plan is provided with the MWMP discussion earlier in this section. The Rangeland Management Plan documents the grazing BMPs that were implemented in the current EBMUD grazing plans, including:

- **Seasonal Grazing Lease Periods:** Beginning in 2006, several annual grazing leases were modified to allow seasonal grazing only (grazing seven months or nine months per year, during dryer months), as shown in Table 5-8. The lease periods were selected based on site considerations, such as proximity to reservoir outlet towers, steep terrain, fence conditions or soil conditions.
- **Detailed Grazing Program Components** including:
  - Standard grazing lease and tenant selection procedures
  - AGP for each lease, outlining BMPs and monitoring requirements (water quality protection, RDM goals, and invasive species control).

- Rangeland Health Assessment and Monitoring Program: Includes current conditions assessment, range health checklist, spring and fall surveys, and specifics for vulnerable and degraded areas, sensitive habitats, and water quality concerns
- Periodic review cycle with adaptive management

Erosion Control - EBMUD

BMPs for erosion control are being developed/adopted for use on EBMUD-owned watersheds. Current BMPs on the watersheds include, but are not limited to, the use of the following measures to protect construction sites and areas of disturbed soil from erosion during the wet weather season:

- Placement of silt fences, wattles, and erosion control facines on project perimeters (facines are bundles of dormant branches that will root, grow and provide quick plant cover)
- Tarping of spoils piles
- Use of silt dams for work in the riparian/aquatic environment
- Use of erosion control tarps and blankets, jute netting, straw, seeding and hydromulching on disturbed soil
- Placement of straw bales, check dams and sediment traps in runoff channels
- Monitoring of construction sites and streams during storms for evidence of erosion
- Strategic placement of stockpiles of erosion control materials for emergency use

Several environmental restoration and erosion control improvement projects were implemented 2005-2009 and are detailed in the 2010 MRWSS, including the Camanche Reservoir China Gulch Erosion Control Project (2009), the Camanche Shoreline Stabilization Project (2006) adjacent to the South Shore Campground, and the Natural Asbestos Stabilization on an unpaved fire road/trail where the soil has naturally-occurring asbestos (road is also used as part of the MCCT near Pardee Reservoir).

Pardee Shoreline Stabilization Project

Erosion is threatening to undermine the perimeter access roads around the edge of Pardee Reservoir. The erosion is caused by water levels rising and falling (changes by approximately 18 feet seasonally), and by wind caused waves. Approximately $2 million may be needed in the future to fully stabilize the access roads, especially during late winter/early spring high water periods. Substantial earthwork will be needed.

Pest Management - EBMUD

As discussed in Section 5, the MW&RD has an IPM program to address pest issues in its area of responsibility. The Mokelumne Division has implemented a BMP with regard to herbicide application and use. Several points from this document are listed below:

- Herbicides shall not be used within 1,000 feet of reservoirs or tributary creeks, except for spot treatment of pest plant species only. Application within this 1,000--foot zone must be approved prior by the IPM Committee.
- When herbicide application has been approved by IPM Committee within the 1,000-foot zone, the following restrictions apply:

    - There shall be a minimum three-foot wide zone maintained from flowing watercourses, standing water, or aquatic habitat where spot spray application shall be prohibited. Direct target plant contact application may occur in accordance with herbicide label.
- Outside the three-foot zone, spot spray application is allowed, provided drift does not occur. Wind speeds shall essentially be near zero.
- Mixing herbicides shall not occur adjacent to a storm drain inlet, culvert, watercourse, or filter bed. Mix in an area where spillage, if it occurs, can be easily contained.
- All herbicide applicators shall have attended an annual pesticide safety course.
- The least toxic herbicide that will adequately achieve IPM goals shall be used.

Quagga/Zebra Mussel Prevention Program

In 2011, EBMUD released the Invasive Aquatic Species Response Plan (revised final draft). This plan provides a response framework should an infestation of non-native invasive aquatic species be discovered in EBMUD reservoirs or water system infrastructure. Although intended primarily to address a Quagga or Zebra Mussel infestation, it can apply to other potentially invasive organisms. Recent California legislation, AB 2065, has added requirements to the California Fish and Game Code requiring programs to prevent the introduction of nonnative dreissenid mussel species like quagga and zebra mussels.

EBMUD has a Quagga/Zebra Mussel Prevention Program to protect its reservoirs, including Pardee and Camanche Reservoirs. This prevention program includes a Vessel Inspection Program and a Vessel Inspection Seal Program. The Vessel Inspection Program requires every vessel to pass both a vessel history survey and a physical vessel inspection before it can be legally launched in EBMUD reservoirs. The Vessel Inspection Seal Program allows the boat operator to elect to have a vessel inspection seal placed on their vessel so that they can re-enter EBMUD reservoirs without having an additional physical inspection (a new vessel history survey is still required with each launch).

Vessel History Survey

Boat operators complete the EBMUD Recreation Area Private Boat Launch Inspection Form with information on the vessel operator and where the vessel was operated in the past 30 days. County of origin is determined by vessel registration documents. A vessel will fail the vessel history survey and will not be allowed to launch in EBMUD reservoirs if it is originally from a high risk area or if it has been launched on waters in a high risk area in the past 30 days. Currently, all Southern California counties and all locations outside of California are defined as high risk (there has been positive identification of one of the mussel species). Some reservoirs have a vessel cleaning and a 30-day quarantine program as an alternative to the vessel history requirements.

Physical Vessel Inspection

Performed by qualified EBMUD staff, vessels will fail the physical vessel inspection and not be allowed to launch if standing water is found on the vessel (including live bait containers), if water drains out of an engine when it is lowered into the vertical position, or

if mussels or other aquatic invasive species are found attached to some portion of the vessel. CDFW will be notified if Quagga or Zebra Mussels are suspected.

In addition, EBMUD is also asking all boaters to follow the CDFW guidelines for mussel prevention, checking their boat, trailer and vehicle every time a boat is taken out of the water. All exposed surfaces should be checked and all water should be drained, wait five days, and keep watercraft dry between launches into different fresh waters.

CASS Ground Squirrels

Ground squirrels around CASS trees have been trapped and exterminated with CO_2 gas. Poisons are not used around the reservoir.

Canadian Goose Management Program

The Canadian Goose Management Program has reduced the goose population at Camanche Reservoir using legal hunt methods, along with a permitted nest and egg reduction effort. This program addresses water quality concerns at Camanche Reservoir beaches. Water testing has shown high levels of *E. coli* bacteria in some of the swimming coves at Camanche, likely caused by an unnaturally high goose population. The grass around the campgrounds and beaches is mowed in order to reduce the threat of accidental fire starts, and the geese are drawn to these areas to eat the cut grass.

Between 2007 and early 2010, the goose management program reduced the goose overpopulation by 1016 geese using legal hunt methods at Camanche Reservoir and CHHP. The beach *E. coli* contamination levels were reduced, but at times still remained close to the maximum levels allowed for beaches in California.

In order to further improve recreational beach water quality, a CDFG permit was obtained in March 2010 to reduce the goose nest and egg production around Camanche Reservoir by a total of 67 nests/400 eggs. The required FWS registration was completed, and in April 2010, cooking grade oil was applied to 299 eggs from an estimated 43 nests at multiple locations on Camanche Reservoir.

The Camanche Reservoir "carrying capacity" is estimated at approximately 2000 geese total, without creating adverse water contaminant levels. EBMUD staff continue to monitor the goose population and water contaminant levels to adapt the goose management program as needed.

Stormwater Management - EBMUD

Between 2001 and 2008, Pardee Center had a NPDES Industrial Stormwater Permit from the RWQCB for discharges associated with the Pardee lime facility, the result of legal proceedings with Calaveras County. A Stormwater Pollution Prevention Plan (SWPPP) and a Monitoring and Reporting Program were implemented in compliance with the permit conditions, including monitoring samples twice per year. A cleanup of the abandoned Pardee Lime Tower in May 2005 removed the only significant source of potential stormwater contamination from the site. In 2008 the Calaveras County Superior Court dissolved the injunction.

See the 2010 MRWSS update for a detailed description of the six bio-retention filter basins constructed in two CASS campgrounds in 2005 to capture and treat road, campsite and parking lot runoff before discharging into Camanche Reservoir.

Waste Management - EBMUD

EBMUD's Regulatory Compliance Office maintains many BMPs related to water quality protection and waste management. The Employee Field Guide includes procedures such as Chemical Spill Response, Trench Spoils - Contaminated, and Sewage Spill Response Checklist. The EBMUD Environmental Compliance Manual contains plans for hazardous material management and hazardous waste management, integrated pest management, point source discharges, and sewer system overflows. The manual also includes BMPs on subjects such as sedimentation control, dechlorination, hazardous waste storage locker use and stormwater management.

A Sewer System Management Plan (SSMP) was certified by EBMUD's Board of Directors in August 2010 for CANS Recreation Area, CASS Recreation Area, and PARA to comply with the Statewide General Waste Discharge Requirement Order. The CVRWQCB has adopted the same State requirements, composed of eleven elements, to manage wastewater systems to protect drinking water supplies. The SSMP is a living document that describes EBMUD's activities to manage its wastewater collection systems effectively, minimize the number and impact of sanitary sewer overflows. The SSMP will be updated a minimum of once every five years.

WDR Order

RWQCB WDR individual orders are used to regulate each of the WWTP effluent discharges from Pardee Center, PARA, CANS and CASS. The WWTP effluents each discharge to ponds or spray fields, with adjacent groundwater monitoring wells. The WDRs specify the monitoring and discharge requirements, covering the influent, effluent, lagoon, land application area, lysimeter, and groundwater monitoring. The WDR details water quality constituents and sampling frequency, along with discharge specifications and prohibitions. See Appendix 5-2 for WDR monitoring details.

NPDES Permits for WTP Backwash Water Discharge

RWQCB NPDES general orders are used to regulate each of the WTP backwash water discharges from Pardee Center, PARA, CANS and CASS. Pardee Center NPDES permit is no longer required due to low flow. At CASS and PARA the NPDES permit threat level was raised from low to limited, resulting in new dechlorination and bioassay requirements. See Appendix 6-5 for NPDES permit examples.

Separate facility BMP documents are required for CASS and the PARA because of the limited threat rating. These CASS and PARA facility BMPs detail facility operations, potential pollutants, pollution control and effluent treatment methods, chlorine management and responsibility and training.

The WTP backwash water is discharged as follows:

- PARA: To a holding pond. Pond overflow is dechlorinated and then land applied
- CASS: To a raw water flow which discharges into an unnamed creek and then to one of three fishing ponds
- CANS: To two unlined holding ponds. Pond overflow is to an ephemeral creek, which flows to Camanche Reservoir only during wet weather conditions.

In 2011, the RWQCB granted CANS an individual permit to allow landscape irrigation for the backwash water. A grassy area near the Blue Oak campground is watered with the backwash water. Specialized turf is used which bioaccumulates and retains iron and manganese, since the groundwater source water is high in these constituents.

Hazardous Material Business Plans

Hazardous Material Business Plans (HMBP) are required by the State and are kept on file with the County Health Department and at the facility. One primary function of the HMBP is to let firefighters know what materials are onsite before they enter an emergency situation. All HBMPs are updated annually and an example can be found in Appendix 6-6. HMBPs contain basic information on the location, type, quantity, and health risks of the hazardous materials stored, used, or generated at a facility. District emergency contacts information and maps are also detailed. Each of EBMUD's upcountry facilities has an HMBP documenting all hazardous materials on site such as: hypochlorite, polymer, potassium permanganate, oxygen, acetylene, propane, gasoline and diesel fuels, and lubricating oil.

Boat Fueling Camanche Reservoir

The boat fueling stations at Camanche Reservoir have BMPs to avoid spilling gasoline when fueling up. Should any fuel spill onto the reservoir surface, the concessionaire has hydrophobic absorbents on site to clean up the fuel.

Floating Toilets

Floating toilets are installed at Pardee Reservoir. Floating toilets are serviced by EBMUD staff (not concessionaire employees) following practices that minimize any chance for spillage. A California Department of Boating and Waterways grant application is currently being prepared to add floating toilets at Camanche Reservoir. Convenient facilities encourage responsible behavior by recreational reservoir users.

Inspection, Surveillance, and Enforcement - EBMUD

The MW&RD has Resource Patrol Units (RPU) whose primary responsibility is to protect the public and EBMUD property in the Mokelumne area. This is achieved through patrolling all areas in the watershed. Patrol methods used to make public contacts include vehicle, boat, ATV, bicycle and foot. Examples of the public contacts made include checking entry permits, giving directions or information to recreation facilities, and enforcement and education of park rules. The patrol truck is the primary means of patrol for the RPU. Four permanent rangers are tasked to maintain coverage seven days a week, 365 days per year. Additionally, two more rangers are reassigned on a temporary basis during the peak visitor and fire season (May through September). Assisting rangers in patrol functions are local

sheriffs brought in under contract. Two full-time deputies from both Amador and Calaveras counties are assigned year-round to EBMUD lands.

Emergency Response - EBMUD

This section discusses EBMUD staff response to emergencies in the Upper Mokelumne River Watershed. See also the later subsection section titled *Emergency Response* for emergency response preparedness with other agencies. The discussion includes NIMS/SEMS and the dam FERC emergency requirements.

RPU

The RPU takes the lead for EBMUD's response to wildland fires on or near EBMUD property. Along with fire response, the RPU responds to a variety of emergencies within our recreation and watershed property. These emergencies include hazmat spills, vehicle accidents, boating accidents, physical altercations, and medical emergencies. Because of proximity of EBMUD offices to the recreation areas, the RPU is often first on the scene of a variety of medical emergencies. This quick response by EBMUD staff has justified the acquisition of Automatic External Defibrillators now carried on RPU patrol vehicles. Drowning, physical assaults, bee stings and boating and vehicle accidents are just some of the medical emergencies attended by RPU staff.

Security Shift Supervisors

Security Shift Supervisors at EBMUD are trained first responders for any security or emergency response incident and have access to the full range of resources available to EBMUD. If there is a report or threat of a terrorist or other security concern or any natural or man-caused emergency, while Mokelumne staff coordinates these matters with the local Sheriffs' offices, fire departments and other resources, EBMUD Security and Emergency Preparedness Office requests that the SOCC also be called, at 510-287-0999. The SOCC will notify the on-duty Shift Supervisor and the Manager of Security and Emergency Preparedness, who will coordinate with the involved superintendents and managers in the Mokelumne area, and scale the appropriate response and Emergency Operations Center (EOC) support in keeping with the Standardized Emergency Management System (SEMS), National Incident Management System (NIMS) and the National Response Plan (NRP).

Public Education - EBMUD

Rangers from the Mokelumne Division participate in a number of annual public education events. The Ranger Led Environmental Education Program (RLEEP) educates school groups on watersheds and environmental issues. The Stewardship through Education Program is a collaboration with several other groups to develop watershed educational materials. Rangers attend career days at local elementary schools and talk about their career field and their own career at EBMUD. Rangers attend Fire Prevention Week, and describe to the public our role in fire prevention efforts from our own offices to the campgrounds and watershed lands. EBMUD rangers also co-host an annual River Cleanup day in which members of the public meet and spend a day collecting refuse from the Mokelumne River. The Mokelumne Trailbusters, a dedicated group of volunteers managed by EBMUD, is involved with three diverse land stewardship projects in Amador and Calaveras Counties. These projects are: construction of a thirty-mile segment of the MCCT; planting native

vegetation, erosion control and riparian restoration at Pardee and Camanche Reservoir Recreation and Watershed Areas; and participating in the Mokelumne River cleanup in the Pardee/Camanche area. The Trailbuster Work Schedule (every other Saturday throughout the year) includes outings such as Bald Eagle tours; Wildflower hikes; Native American Cave Paintings tours; Gold Rush History tours; and the annual California and National Trail Days hike/work project. Participation varies from 3 to 65 individuals.

Land Use Planning

Effective land use planning is critical to the overall protection of source water quality. Depending upon the specific land use, any number of water quality parameters can be affected including turbidity, microbes, organics, and inorganics. Section 5, which addresses potential contaminant sources as they relate to land uses and activities, provides specific details regarding the water quality concerns corresponding to the land uses identified. Below is a brief summary of some of the land use planning programs in both Calaveras and Amador counties.

County governments have the authority to restrict activities on lands within the counties that are subject to their jurisdiction. This is done primarily through the establishment and enforcement of land zoning ordinances. Uses of a parcel of land must be consistent with the zoning for that parcel. A General Plan is a long-range policy guide designed to be used by public officials and citizens in the development of land. These General Plans designate specific land uses for each parcel within the counties. Zoning must be consistent with the land uses designated by the County Plan. Zones fall into four general categories: interim zones, resource production zones, residential zones, and commercial/economic zones.

The General Plan and zoning in Amador County is very similar to the General Plan and zoning for Calaveras County. Zones may be consistent with a variety of land uses. Most of the land owned by the largest private landowner in the Mokelumne River Watershed, SPI Corporation, is zoned for timber production with some parcels zoned unclassified (Calaveras County) or R1A (Amador County).

Amador County General Plan - Housing Element Update

The Amador County General Plan Housing Element 2014-2019 identifies and analyzes current and future housing demands in the county. Of the 35,000 residents in the 2010 census, the majority (59 percent) inhabit the unincorporated portions of the county. The projected overall population growth in the county is expected to be around 29 percent between 2010 and 2060.

In the past 10 years, both Amador County and Calaveras County have added detailed water elements or working papers to their General Plans, reflecting the importance of considering water as an integral part of the General Plan Update. These documents better link water-related planning and management with land-use planning. The Amador County Hydrology and Water Quality General Plan Update Working Paper 2007 describes the area hydrology and water quality characteristics, and identifies potential water issues that could arise under the updated general plan.

Calaveras County General Plan - Housing Element Update

Nine agencies provide water and/or sewage to the communities in Calaveras County. In general, there are adequate supplies of water to meet domestic water needs, but a lack of infrastructure to deliver it. Angels Camp (not in the watershed) is the only incorporated town in Calaveras County, and it provides its own public water and sewage system. Most of the population inhabits unincorporated county areas. About 75 percent of residents are served by on-site septic systems. The Mokelumne Hill Sanitation District (MHSD) has the capacity to serve the community for 40-50 years.

Access Control

Landowners can control uses and activities on their land to avoid water supply contamination. Examples of appropriate controls include posting against trespassing, conservation of natural protective features, and adherence to sound waste disposal practices. The major landowners in the upper Mokelumne River Watershed are the BLM, Eldorado NF, SPI, PG&E, and Stanislaus NF.

Fencing and Gating

BLM does not have any riparian areas fenced to control access. Livestock control fences are present but these are designed for livestock management, and not to limit access.

Most of the fencing in Eldorado NF is between range allotments and some fencing is present within the allotments to prevent livestock from entering sensitive areas; however, no single program exists which is designed to protect sensitive watershed areas and riparian lands. Each USFS District Ranger has the authority to restrict usage if a problem exists.

In Stanislaus NF, the USFS has access control measures in campgrounds that restrict vehicles from the riparian zone of Moore Creek, the North Fork of the Mokelumne near Moore Creek, and the North Fork of the Mokelumne near Ebbetts Pass (Bloomfield campground). In 2015 the Stanislaus NF staff removed illegal toilets constructed along the North Fork of the Mokelumne River downstream of Moore Creek Campground to protect river water quality and discourage use in unauthorized areas.

Gating of roadways prevents vehicular access but does not limit livestock access and only partially limits human access. A few gated roadways exist on BLM land in the Mokelumne River Watershed. They are generally placed to prevent driving into mining claims or for public safety.

Eldorado NF has an extensive system of gating of roadways. Access is restricted on roads for a variety of reasons. For example, some roads are closed except when needed for a particular project; some may be closed due to wildlife issues, and some are closed during winter.

Very few roads on lands owned and operated exclusively by the Stanislaus NF are gated; however, a large number of single purpose (timber harvesting) roads are present which are

blocked until they are needed again (in 10 to 20 years). The NF land gates that are present are rarely closed because most of them are in the snowbelt and the roads are closed in winter by snow.

SPI estimates that over 90 percent of the roads entering SPI lands have been gated during the 2000-2009 period and are normally kept closed. Because of this, SPI lands have less problems with unauthorized activities (such as OHV use or illegal marijuana growing) when compared with the adjacent NF lands. Any illegal use is reported to appropriate law enforcement staff (NF or county sheriff's department).

BLM has many rights-of-way in the Mokelumne River Watershed. However, access is not restricted on any of the rights-of-way present on BLM land. Eldorado NF has "cooperative" roads, some of which have restricted access where they cross private land. Stanislaus NF has easements on lands owned by SPI in two categories: limited and unlimited. Unlimited easements allow complete public access and limited easements allow access only for protection and management of USFS lands.

Wilderness Area Restrictions

Mokelumne wilderness is jointly administered by Eldorado and Stanislaus NFs. The wilderness is protected by means of restrictions on activities and strict conformance with the wilderness land use designation. Human uses are basically limited to hiking, nature study and photography, horseback riding, backpacking, limited pack train excursions, fishing, cross country skiing and mountaineering. No mechanized vehicles, including mountain bikes or snowmobiles, are permitted in the wilderness area.

Control is imposed by means of overnight permit requirements and issuance. A limited entry permit system is in place, with permits issued on a first-come, first-served basis. A maximum of 12 people per group are allowed for day use and a maximum of 8 people per group are allowed for overnight visits. Backpacking without a permit is a violation punishable by fine. Riparian lands, streams, and water quality are further protected by means of restrictions on campsites and human waste disposal sites. Camps and latrines must be located at least 100 feet away from trails, lakes and stream courses. Stock animals are subject to further, more stringent restrictions on where they may be tethered, as well as tree and vegetation protection measures.

Big Bar Mokelumne River Access

In 2011, new boat put-in/take-out facilities were completed on along the Mokelumne River, just west of the Big Bar Bridge on Highway 49. Figure 6-1 shows an aerial view of the new Big Bar Launch facilities. Previously river boaters and kayakers had to park illegally and trespass across undeveloped private lands to access the river at Big Bar. The new facilities include two access roads, a parking area, toilet, informational kiosk, four picnic sites, a boat put-in/take-out, and associated foot paths. The improvements are operated by BLM and located on two acres of private land, leased to PG&E for up to 25 years. The work is being funded by grants from PG&E and the California Department of Boating and Waterways.

OHV Use Restrictions

As of 2009, the USFS prohibits all off-road vehicles on the Eldorado and Stanislaus NF lands, unless it is an area specifically designated for off-road use as shown on the forest Motor Vehicle Map. Motor vehicles (cars, trucks, ATVs, motorcycles, RVs, 4WDs, etc.) are now restricted to designated roads and trails only. Similarly, the 2008 BLM Sierra RMP prohibits all off-road vehicles on BLM lands unless it is a designated motorized route shown on the RMP maps.

All designated wilderness areas are off limits by Congressional designation. Specific NF lands are closed due to the presence of unstable or devegetated soils, unstable roads and drainage systems, and sensitive biota, such as spotted owl nesting pairs or rare plants.

USFS is not funded to install gates to limit access; so notification is by means of forest orders, signs and maps. Violators are subject to citation by USFS rangers. Convictions can result in stiff penalties of up to a $5,000 fine and/or six months in jail.

As discussed earlier under the USFS section, a lawsuit against the Eldorado NF in 2012 resulted in the temporary closure of an additional 42 roads (120 miles of off-road trails) that cross meadows, including the Deer Valley Trail and Blue Lake Road in the Upper Mokelumne River Watershed. The lawsuit alleged that the Eldorado NF had not satisfactorily shown how vehicular use on off-road trails affects the hydrology of meadow areas crossed by the trails. The Eldorado NF has agreed that some of the roads are impacting the meadows, and the roads will remain closed until impacts can be corrected. The Deer Valley and Blue Lakes Road Environmental Assessment (EA) was issued in 2015. Some roads are still being evaluated for hydrological impacts.

Erosion Control

On NF lands, USFS is primarily responsible for the control of erosion and other potential sources of pollution. Both the Eldorado and Stanislaus NFs use the national standards and guidelines for these purposes, proposed BMPs developed by the State of California's Department of Forestry and Fire Protection, and their own Land and RMPs. Included among these regulations are limitations on operations in stream protection zones, on steep or unstable slopes, and during wet weather conditions. Very little quantitative data is available for the NF lands.

See the MRWSS 2010 Update for a summary of the 2004 SNFPA strategies for erosion control.

On private lands, CAL FIRE is responsible for enforcing the regulations of the California FPA to control erosion impacts. The regulations require submittal and advance approval of Timber Harvest Plans (THP) for all significant harvesting efforts for each three-year time segment. The Road Rules, 2013, discussed in an earlier section, significantly tightened logging road building, repair, and monitoring requirements and will minimize erosion on logging roads.

County Grading Ordinances. Amador County requires all projects that move more than 50 cubic yards of grading to obtain a Grading Permit. All plans must comply with standards set by NPDES Stormwater Prevention Requirements. Projects exceeding one acre must file a Notice of Intent (NOI) with the RWQCB and provide an SWPPP. Calaveras County added a grading and drainage ordinance in 2008 covering the unincorporated areas of the county. The ordinance requires implementation of erosion and sedimentation control measures to protect water quality and to reduce discharge of pollutants by using BMPs. A Design Manual for Grading, Drainage and Erosion Control was issued in 2007 by Calaveras County to aid complacence with the grading and drainage ordinance. The detailed requirements are very similar to the Amador County grading ordinance, detailed above, except that projects exceeding 1,000 cubic yards are defined as engineered grading.

Pest Management

Pest management typically includes management practices for nuisance vegetation control, mosquito control, rodent control, or pesticide spraying for agricultural needs. These practices rely quite heavily on the use of pesticides and herbicides. The water quality concerns associated with pesticide and herbicide uses were discussed in Section 5.

Pest management also includes preventative measures taken to prevent the spread of invasive species like quagga and zebra mussels. Recent California legislation, AB 2065, has added requirements to the California Fish and Game Code requiring programs to prevent the introduction of nonnative dreissenid mussel species like quagga and zebra mussels. EBMUDs invasive species prevention program was described previously. PG&E has implemented a Mussel Prevention Program at its reservoirs and waterways which includes:

- a vulnerability assessment of PG&E lakes and reservoirs to determine the potential for mussel infestation,
- a public education program to inform reservoir users of the infestation risk and measures to prevent an infestation,
- monitoring for early detection of these mussels, and
- management of recreational, boating, and fishing activities

The California Department of Pesticide Regulation (DPR) regulates pesticides, requires permits for applications of certain restricted materials by agriculture or commercial applicators, and reports the permitted pesticide applications in the Pesticide Use Report (PUR) database. A Guide to pesticide Regulation in California was published in 2011, explaining pesticide regulations, the product registration process, and permit enforcement activities.

- **Restricted materials** are those pesticides which are a potential hazard to public health, pesticide applicators, field workers, domestic animals, crops, or to wildlife and the environment in general, as determined by the Department of Pesticide Regulation.
- **Production agricultural permits** are required for applications of pesticides to growing crops, agricultural fields, and most applications to forest trees and ornamental turf. These permits include the application date and location to the section Meridian Township Range Section (MTRS).

- **Non-agricultural permits** include applications or pesticides to post-harvest commodity treatments, rights of ways, landscapes, structural use, and other non-agricultural uses by commercial applicators. These permits include an application month and application county. There is no application date or section (MTRS) for non-agricultural data.
- **Permits are not required** for residential and institutional uses and most applications to livestock, so this data is not included in the PUR database. According to a DPR fact sheet, in a typical year about three-quarters of the pesticides used in agriculture are NOT restricted materials and so no permit is required.

The County Agricultural Commissioner enforces pesticide laws and regulations at the local level and issues the Restricted Materials Permits. Prior to issuing a permit to possess or use a restricted material, each County Agricultural Commissioner shall determine if a significant adverse environmental impact may result from the use of the pesticide. The DPR restrictions on chemicals are associated to geography and timeline. The county requires the permit applicants to sign off on the terms and conditions before issuing a permit. Permit duration varies between 30 days and 3 years.

- The county agriculture departments host grower's meetings twice a year to issue permits and to present updates on new DPR laws and regulations.
- Permit applicants are required to have six hours of continuing education with the county once every three years; a minimum of two hours is on updates of new State DPR laws and regulations on restricted pesticide usage.

SPI has BMPs for ground application of pesticides that include maintaining an untreated 25 to 150-foot buffer from flowing domestic water supplies (depending on the presence of aquatic species and site-specific factors such as domestic water supplies and slope), no rinsing of equipment within 200 feet of any watercourse, no spraying when wind speeds exceed ten miles per hour, and the completion of written recommendation from a Licensed Pest Control Advisor for all herbicide applications.

NF procedures for proper pesticide application can be found in the document "USDA Water Quality Management for Forest Lands in California: Best Management Practices," dated 2000. Pesticides must be applied according to label directions. The BMPs outline the pesticide planning process and the responsible party for ensuring BMP compliance. Constraints identified on the label and other legal requirements of application must be incorporated into project plans and contracts, including streamside wet area protection during pesticide spraying. Water quality monitoring shall be considered during the planning process to ensure application accuracy and lack of impact on water quality. Pesticide spill contingency plans are required, and BMPs for cleaning and disposal of pesticide containers and equipment are included.

Logging Practices

Federal Land

NF timber, which includes trees, portions of trees, and other forest products on NF System lands, may be disposed of for administrative use by sale or without a charge, as may be most advantageous to the United States. Most of the wood products that may be disposed of for administrative use are in the form of personal wood fuels; permits are subject to a maximum quantity set for each NF.

USFS will insure that each permit for timber use is consistent with applicable land and RMPs and environmental quality standards. The key factors include:

- Fire protection and suppression
- Minimizing additional soil erosion
- Insuring favorable conditions of water flow and quality
- Protection of residual timber
- Regeneration of timber

The Code of Federal Regulations prescribes the manner in, and extent to which, timber sales and uses will be conducted, and specifies the conditions of the sale or use and/or the cancellation of same.

BLM requires one or more "Use" Authorization Permits for activities that may impact vegetation. Under the BLM forestry program, a contract is required for removal of timber and other vegetation resources for commercial or domestic use. Timber includes saw timber, fuel wood, poles, posts, and any standing trees, downed trees or logs capable of being measured in board feet. Other vegetative resources include Christmas trees, cones, boughs, manzanita, moss, and many other unspecified products which are salable.

Uses and projects, such as new road construction or use of existing roads for commercial hauling of private timber across BLM land, require issuance of right-of-way grants or temporary use permits from BLM. Such uses include access roads, utility lines, communication sites, or any other uses that involve the placement of either temporary or permanent improvements upon BLM lands. In addition, any activity that involves physical disturbance to the land or vegetation requires a permit (e.g., brush removal or test hole drilling). Other long-term occupancy or use of BLM land that could affect vegetation may also be authorized by a lease. Applications must be filed with the local BLM office.

Private and State-Owned Property

Timber owners or operators who propose to cut and remove solid-wood forest products of designated live commercial forest trees from non-federal timber lands must first submit a THP to CAL FIRE for approval. THPs detail the planned logging operations and steps to minimize environmental impacts, including a projection of which trees will be felled, how and where access roads will be cut and which waterways may be impacted. Timber owners include persons who own timber or timber rights on lands owned by another party.

In December 2014, CVRWQCB renewed the Conditional Waiver of Waste Discharge Requirements for Discharges Related to Timber Harvesting. Waiver enrollment participants must meet eligibility requirements and comply with waiver conditions, including BMPs, monitoring and reporting. CVRWQCB is are taking a more active role in proposing additional mitigation measures at the time of THP review and approval, and are usually attending pre-harvest inspections of THP areas. CAL FIRE approves THPs to assure that timber operators carry out their activities in keeping with the goal of maximum, sustained timber production while considering maintenance of recreational opportunities, watershed quality, wildlife, range, forage, and fisheries.

In 2013, a new type of timber harvesting permit was established to allow non-industrial landowners of 15,000 acres or less to harvest timber via a non-expiring permit. The California Board of Forestry is required to develop the process for the new Working Forest Management Plan (WFMP) and implement it by January 2016. The Central Valley Water Board will need to revise or replace the Conditional Waiver once the Board of Forestry has adopted the WFMP regulations.

The California State Board of Forestry and Fire Protection released the Forest Practice Rules and Act, Road Rules, 2013 which significantly tightened logging road building, repair, and monitoring requirements. Effective January 2015, these revised Road Rules include numerous references to "significant sediment discharge" and include a statewide requirement for hydrological disconnection of roads from watercourses where feasible. The revised rules are more performance-based rather than past prescriptive-based rules, allowing flexibility for timber management plans submitted to CAL FIRE. The improved Road Rules should minimize logging impacts on water quality and turbidity runoff.

SPI conducted watershed assessment and their report concluded that 13 of 26 planning watersheds owned by SPI had high susceptibility to erosion. As a result of this assessment, SPI developed integrated management recommendations pertaining to new timber harvests, forest practices, restoration strategies, landscape management, and monitoring and adaptive management. SPI is continuing to reduce erosion from forest roads, skid trails and landings. This is done by increasing the amount of crossing repairs and replacements—specifically culverts, rocked-low water crossings, and bridges, and increasing the amount of road rocking nearby streams and watercourses. Other techniques (such as the placement of filtering straw bales, straw wattles, and mulching techniques) are also used when working in proximity to streams.

Timber Operations in Areas Substantially Damaged Due to Wildland Fires

In 2012, the Board of Forestry and Fire Protection issued a guidance memorandum for commercial timberland damaged by fire. The memorandum includes details on tree removals performed as an Exempt Activity or under an Emergency Notice. Harvesting must still comply with regulations and BMPs.

Structure Protection Exemption

In 2015, the Board of Forestry and Fire Protection adopted emergency regulations allowing specified forest management activities, including the cutting or removal of trees between 150' and 300' of a habitable structure (previously only 150') for the purpose of reducing

flammable materials and maintaining a fuel break. A Registered Professional Forester (RPF) must prepare, sign, and submit the new form to CAL FIRE.

Grazing and Livestock Management

All grazing and livestock use on USFS Lands, and on other lands under USFS control, must be authorized by a Grazing or Livestock Uses Permit. The Code of Federal Regulations (CFR) sets the rules under which livestock operations will be conducted in order to meet the multiple-use, sustained yield, economic, and other needs and objectives for the lands involved. Allotment Management Plans (AMP) prescribe the manner in, and extent to which, these operations will be carried out on a site-specific basis, to minimize environmental and water quality impacts. The use of BLM lands for grazing or any livestock use requires the issuance of a grazing lease.

The 2004 Sierra Nevada Forest Plan (SNFP) Record of Decision (ROD) specifies grazing limitations to promote hardwood regeneration, and specifies management goals for pounds of RDM acre on grazed grasslands to ensure ecosystem health. For grazing allotments in occupied willow flycatcher sites, only late season (after August 15) grazing is allowed. If, upon evaluation, the habitat is deemed degraded, restoration projects shall be implemented which may include reducing or eliminating grazing areas. When re-issuing grazing permits near riparian zones, the compatibility of livestock with riparian conservation objectives is evaluated. Goals for season-long grazing included limiting livestock utilization to 30 or 40 percent for early and late seral status meadows respectively, and limiting disturbance to no more than 20 percent of stream banks and shorelines, or 10 percent in stream reached identified as “essential habitat.”

Mining

Title 36, Section 228 of the CFR sets the rules and procedures through which the surface of NF System Land may be used in conjunction with operations authorized by the United States Mining and Mineral leasing laws, and the sale of mineral materials. Hard rock mineral leasing on NF System administered lands is subject to CFR Title43 Part 3500. Mineral development on, or requiring access across, lands under the management of BLM will require one or more "use" authorization permits issued by the BLM. Categories of permits include locatable minerals, leasable minerals, salable minerals (which include oil and gas, and geothermal).

The Office of Mine Reclamation (OMR) and the State Mining and Geology Board (SMGB) jointly administer the California Surface Mining and Reclamation Act of 1975 (SMARA). City and county "lead agencies" adopt ordinances for land use permitting and reclamation procedures which provide the regulatory framework under which local mining and reclamation activities are conducted. SMGB reviews these lead agency ordinances. SMARA is applicable to federal lands regulated by BLM and the USFS.

The OMR maintains a database of statewide mine locations and is responsible for compliance related matters. For active mines, mine operators are required to submit annual

reports and annual reporting fees to the Department of Conservation OMR. Mined-land reclamation includes maintaining water and air quality, and minimizing flooding, erosion and damage to wildlife and aquatic habitats caused by surface mining, often including topsoil replacement and revegetation.

The CVRWQCB issues permits and takes enforcement action when surface water or groundwater regulation and policies are violated. The CVRWQCB monitors abandoned mine-related water quality threats and works on remediating priority sites. Currently there are no mine sites undergoing remediation in the Upper Mokelumne River Watershed.

Penn Mine

Penn Mine is an abandoned mine in the Camanche Watershed, and is the only mine that has been identified as a potential contaminant source for Pardee or Camanche Reservoirs. The remediation and surface water monitoring tasks are now complete.

Penn Mine is located on the south side of the Mokelumne River, upstream of Camanche Reservoir. Although not on EBMUD property, EBMUD participated in the Penn Mine Environmental Restoration Project, completed in November 1999. Surface water control measures reduce acid rock drainage discharge to Camanche Reservoir. Waste materials were collected in a six-acre landfill, constructed with a clay liner, low density polyethylene cap, and leachate collection system.

Leachate is still regularly pumped from the landfill and disposed of by a hazardous waste contractor (paid for by the initial lump-sum bid). The landfill cap is regularly mowed. BMPs were employed during and following construction for erosion control and sediment management. In addition, silt is periodically removed from behind the weir at the confluence of the two streams. The landfill cover was repaired and improved in 2009 to minimize rainwater infiltration. Because of evidence that some rainwater still leaked into the landfill, in 2014, additional repairs were made in the top plastic liner lapping to further reduce rainwater infiltration. Initial indications are that the 2014 repairs fixed the water leak.

In the past, EBMUD performed quarterly monitoring of surface water runoff from the site for metals, turbidity, and pH. Routine monitoring of the four groundwater wells around the landfill also occurred. Beginning with the second quarter of 2010, regular monitoring of surface water runoff is no longer performed, given that the site has been restored for over ten years; however, bi-annual groundwater monitoring around the landfill continues.

During the 2015 MRWSS update period, EBMUD and the State of California placed a $10 million lien on the Penn Mine property to recuperate the remediation costs paid by EBMUD and the State of California, should a buyer be found for the property. Without this lien, Calaveras County might have sold the property for back taxes. EBMUD has an interest in the property being owned, operated and maintained in a manner that protects water quality.

Mine Tailings Impoundment

There are three impoundment areas (ponds) just north of Camanche Watershed above China Gulch, suspected to have mine tailings from historical mining activities. Although the main

pond is mostly on BLM property, a small section is on EBMUD property. The lower two ponds are entirely on EBMUD property. All three impoundments have gradually filled with sediment over time and now only contain water on an intermittent basis.

Phase I and II environmental site assessment reports were completed in 2007 to assess the presence and distribution of elevated metals in three pond areas. Metals concentrations found in the upper pond were much higher than the middle and lower ponds, particularly arsenic and copper. Sediment and surface water sampling in Camanche Reservoir do not indicate detrimental impacts from the impoundment areas. However, elevated metals in surface water and/or soil at the upper pond area have the potential to migrate to the middle and lower pond area (and eventually to Camanche Reservoir) during intermittent discharge of surface water. A Human Health and Ecological Risk Assessment is planned in the near future.

In 2013, BLM and EBMUD held a series of meetings to keep local residents informed about proposed remediation alternatives and other activities at the site. The engineering report recommended that the two lower ponds on EBMUD property be left alone, since vegetation now covers the ponds and effectively prevents sediments from moving. The remediation strategy should be finalized with BLM by 2016. After obtaining approval from the RWQCB, remediation will take approximately 18 months.

Camanche Reservoir China Gulch Erosion Control Project

The Camanche Reservoir China Gulch Erosion Control Project was completed in 2009. This reservoir bank stabilization project now protects approximately 50 feet of Camanche Reservoir shoreline from wind and wave erosion. See the earlier section under EBMUD Watershed Management, Erosion Control for additional details. This shoreline is downstream of the lower mine tailings impoundment pond.

Suction Dredging Moratorium

In 2014 CDFW issued environmental review documents and revised regulations for its suction dredging permitting program, prohibiting the use of any motorized vacuum or suction dredge equipment as part of a mining operation in any river, stream, or lake in California. Related litigation is pending in the California Supreme Court as of January 2015.

Stormwater Management

The water quality concerns associated with stormwater are detailed in Section 5. In general, the concerns identified with urban stormwater include organics, inorganics, microbes, and occasionally turbidity. The first storms of the rainy season have the potential for transporting unusually high concentrations of numerous water quality parameters. These elevated concentrations in turn create both reservoir and treatment-related concerns. Given that there are a few urban areas within the watershed, Amador and Calaveras County stormwater management programs are important to source water protection.

General Construction Activity Stormwater Permit

The SWRCB has developed a General Construction Activity Stormwater Permit for stormwater runoff associated with any construction activity including clearing, grading, excavation, reconstruction, and dredge and fill activities that result in the disturbance of at least one acre of total area.

Discharges composed entirely of industrial stormwater runoff may be eligible for coverage under a General Industrial Stormwater Permit issued by SWRCB rather than an individual permit. Eligible activities include:

- Facilities subject to stormwater effluent guidelines (CFR Title 40, subchapter N).
- Manufacturing facilities.
- Mining facilities.
- Hazardous waste treatment, storage, or disposal facilities.
- Landfills, land application sites, and open dumps that receive industrial waste.
- Recycling facilities such as metal scrap yards, battery reclamation sites, salvage yards, and automobile yards.
- Transportation facilities.
- Sewage treatment plants.
- Certain stormwater discharge facilities.

Calaveras County Stormwater Management Plan (SWMP)

In 2007, Calaveras County developed a Stormwater Management Plan (SWMP), as required for all regulated jurisdictions by the SWRCB as a condition of coverage under California's statewide General Permit for Stormwater Discharges. The Calaveras County SWMP requires that all Calaveras County ordinances, permitting processes, design guidelines and operating procedures be modified to meet specific BMPs for stormwater control. Although the specific municipal separate storm sewer systems (MS4s) stormwater discharge permit areas defined by the SWRCB are outside EBMUD's watershed, Calaveras County intends to apply many of the stormwater quality control measures to all unincorporated County areas. This countywide approach for selected measures is being done to maximize program effectiveness, to promote consistent regulation of construction activities throughout the County, and to better control stormwater pollution. BMPs are targeted for implementation by 2010 and cover public education and involvement, illicit discharges, and construction site runoff. New ordinances have been in effect since 2008 covering stormwater quality and grading and drainage requirements.

Amador County Stormwater Management

In 2015 Amador County approved a county-wide Stormwater Ordinance with revised BMPs and enforcement provisions. This ordinance was in response to the SWRCB's 2013 General Permit for Stormwater Discharges from MS4s, which added Amador County to the Phase II traditional MS4 designation list. Amador Country was newly designated an MS4 because of limited stormwater management in this area and several waterbodies or waterbody segments within or bounding Amador County that are 303(d)-listed for particular contaminants, including Pardee and Camanche Reservoirs, as well as the Lower Mokelumne River.

Stormwater management is needed to reduce the pollutant loads prior to adoption of any TMDLs.

Caltrans Stormwater Management Program (SWMP)

Caltrans must comply with the regulations and policies established in its own Statewide SWMP and the stormwater NPDES Permit. The Mokelumne River watershed falls into Caltrans District 10. The SWMP references stormwater BMPs in the Construction Handbook published by the California Stormwater Quality Association (CASQA). See the 2010 MRWSS update for additional details on what is included in the SWMP, including descriptions of:

- Stormwater Advisory Teams
- Stormwater Treatment BMP Technology Report
- Stormwater Data Report

SWMP Annual Report 2014-2015

Describes specific measures Caltrans took during the year to implement water quality control measures and assess the effectiveness of each activity performed. Highlights from the statewide SWMP Annual Report 2014-2015 include:

- Total pesticide use increased because District 10's fiscal year 2014-2015 pre-emergent program suffered and rendered the program less effective than in normal precipitation years due to the lack of significant rainfall over the past few years. This trend caused an increase in post emergent herbicide application in order to control noxious weeds in fire strip areas and around safety devices and barriers. Another factor has been an increase in Landscape inventory over the past few years which now requires additional herbicide application in order to control weeds in aesthetic areas.

SWMP District 10 Work Plan 2015-2016

Each Caltrans district issues an annual DWP outlining the planned stormwater activities for the upcoming fiscal year, and information about Caltrans District's waterbodies, BMPs and monitoring programs. The following sections pertain directly to the Upper Mokelumne River Watershed:

- DWP Section 4 describes and identifies locations where spills from Caltrans District 10's facilities can discharge directly to a drinking water reservoir. The determination was based on proximity between the waterbody and the Caltrans facility, use characteristics of the facility, and the probably spill response time. Chapter 4 now lists Highways 49 and 26 in the Mokelumne watershed, as shown in Appendix 6-7.
- DWP Section 5 lists road segments prone to erosion and sediment discharge, located in sensitive watersheds or where there is an existing or potential threat to water quality. A portion of Highway 26 in the Mokelumne Watershed is listed and shown on Caltrans DWP Figure 5-1, also included in Appendix 6-7. The scheduled stabilization date is "TBD".
- DWP Section 6 lists specific District 10 projects in maintenance, design or construction phases, with summary tables including information on the road route number and waterbodies within or adjacent to the project limits. Design and

construction projects listed in the 2015-2016 DWP do not impact EBMUD's Mokelumne watershed.

Waste Management

Discharge Requirements

The owner or operator of any facility or activity which discharges or will discharge waste that may affect surface water or groundwater quality, or from which waste may be discharged in a diffused manner (e.g., erosion from soil disturbance), must first obtain WDRs from the RWQCB.

The RWQCB issues NPDES permits and adopts WDRs to protect the waters of the State for all designated beneficial uses in the watershed. The SWRCB and RWQCB seek to attain the highest possible water quality in the state. Examples of activities that may require an NPDES permit include:

- Feedlots for cattle, swine, sheep, goats, horses, turkeys, chickens, and ducks
- Sewage treatment plants
- Stormwater runoff discharges (municipal, industrial, and construction)
- Dredge spoils discharges
- Mining activities
- Groundwater discharge operations

Examples of the types of wastes that may require waste discharge requirements are:

- Drainage from agricultural operations
- Drainage from waste materials in landfills
- Flow or seepage containing debris or eroded earth from logging operations
- Drainage from inoperative and abandoned mines
- Waste from construction or dredging operations
- Food production and processing wastes
- Waste from manufacturing and refining operations
- Municipal and industrial wastes, if percolation or injection to groundwater are the disposal methods to be utilized

The discharge of waste into a municipal sewer system is not usually subject to waste discharge requirements. However, USEPA, SWRCB, the RWQCB, and the local wastewater management agency may require some industries to pretreat hazardous wastes prior to discharge to the municipal sewer system. The local wastewater management agency will notify the industry of the requirements. Waste disposal by injection well also may be subject to a Federal Underground Injection Control Program Permit issued by USEPA.

The RWQCB evaluates the "Report of Waste Discharge" to determine whether the proposed discharge is consistent with the RWQCB's adopted water quality standards, the Areawide Waste Treatment Management ("208") Plan, the Water Quality Control Plan (Basin Plan) for the area in which the proposed activity is located, and the "Chapter 15" regulations, if applicable.

Land Disposal Regulations

Many of the larger communities in Calaveras County utilize wastewater treatment systems, which collect sewage from septic tanks and transport the effluent to community treatment facilities. After treatment, wastewater is disposed of on land. Land disposal of treated wastewater in Calaveras County is regulated by the CVRWQCB. Discharge requirements are specific to individual sanitary districts. Discharge monitoring requirement for Pardee Center WWTP are shown in Appendix 5-2.

Marijuana Cultivation Fact Sheet

CVRWQCB issued a Marijuana Cultivation Fact Sheet in 2014 detailing their jurisdiction over waste discharges and educating growers about water quality impacts and required permits for medical marijuana (Proposition 215) growing operations. The fact sheet acknowledges that marijuana cultivation in the Central Valley Region "has grown exponentially in recent years" both in number and in size. See Appendix 6-8.

Pharmaceutical Disposal Programs

Neither Amador nor Calaveras County accept pharmaceutical products at their household hazardous waste drop-off facilities.

Underground Tanks (UST) and Chemical/Fuel Storage

The UST law established state regulations requiring permits to be issued by the RWQCB to UST owners. A developer-applicant will need this permit if they own, operate, or intend to construct a UST containing a hazardous substance.

All new USTs must provide primary and secondary containment for the hazardous substances stored. The primary container must be product-tight under all circumstances (i.e., impervious to the substance it contains). Secondary containment must be constructed to prevent structural weakening as a result of contact with any released hazardous substances, and also shall be capable of storing the hazardous substances. To protect water quality statewide, standards have been established for monitoring USTs that store hazardous substances.

Certain specific actions and evaluations must be completed by the UST owner when the UST is either temporarily or permanently taken out of service. Temporary closure allows a UST to be taken out of service for up to one year without implementing permanent closure. LUSTs must be repaired or permanently closed.

MHSD, LAFCo Review

Because Mokelumne Hill Sanitation District (MHSD) is a small wastewater treatment agency with spray irrigation fields adjacent to the Mokelumne River, just upstream of Pardee Reservoir (see Section 2 for additional details), treated wastewater overflows have the potential to impact Pardee Reservoir water quality. In June 2012, Calaveras LAFCo issued an MSR for MHSD, summarizing that: "MHSD provides minimally adequate services and faces challenges with accountability." The MSR recommended considering a Zero SOI option, which would signal the eventual dissolution of MHSD, with services possibly being provided by CCWD. Deficits included a lack of constituent outreach, public

Board meetings, emergency contact system, capital improvement plan, and rates adequate to cover services and depreciation. MHSD reported that the treatment hypochlorite system and 60 percent of the collection system needed replacement. Many regulatory submittals were submitted late. MHSD had a higher than average number of regulatory violations. Since these deficiencies were not identified in the 2005 MSR, the 2012 MSR observed that MHSD had not been made aware of management practices that are in need of improvement.

Between June 2012 and December 2014, MHSD made a number of improvements:

- Began holding regular public Board meeting in the Mokelumne Hill library
- Now has a 24-hour live-person answering service
- Completed a collection system replacement project
- Completed a rate study and implemented a rate increase schedule

In December 2014, Calaveras LAFCo adopted a revised SOI that recommended retaining the existing Coterminous SOI plus annexing MHSD infrastructure spray fields.

Septic Tank Regulations and Assembly Bill (AB) 885

Approximately one percent of the land use in the Mokelumne River Watershed is residential. But because of the close proximity of many residential areas to creeks and other waterways, poorly functioning or situated septic systems present a major potential source of contamination to the Mokelumne River system and Pardee Reservoir.

AB885 authorized regulation of OWTS through the SWRCB. The final Water Quality Control Policy for Siting, Design, Operation and Maintenance of Onsite Wastewater Treatment Systems (OWTS Policy) was signed in 2012, effective May 2013. This Policy establishes a statewide, risk-based, tiered approach for the regulation and management of OWTS installations and replacements. The OWTS Policy sets standards for OWTS that are constructed or replaced, that are subject to a major repair, that pool or discharge waste to the surface of the ground, and that have affected, or will affect, groundwater or surface water to a degree that makes it unfit for drinking water or other uses, or cause a health or other public nuisance condition.

The final 2012 OWTS Policy requires:

- New requirements that apply to OWTS with new construction, replacement or major repairs; that pool or discharge waste to the surface of the ground; or that have affected, or will affect, groundwater or surface water to a degree that makes it unfit for drinking water or other uses, or cause a health or other public nuisance condition
- Minimum operating requirements for OWTS that may include siting, construction, and performance requirements
- Requirements for OWTS near certain waters listed as impaired under Section 303(d) of the Clean Water Act by bacteria (pathogens) or nitrogen compounds (nutrients) requiring development of a TMDL
- Requirements authorizing local agency implementation of the requirements; corrective action requirements; minimum monitoring requirements
- Conditional waiver of waste discharge requirements

- Connection to local sewer if within 200 feet and total costs are less than 200 percent of repair costs

Implementation of the OWTS Policy will be overseen by the SWRCB and the RWQCB. Local county agencies may implement LAMP, if approved by the CVRWQCB. Calaveras County has already adopted new septic system requirements in 2013. Amador and Calaveras County are both are currently drafting LAMP documents for submittal in 2016.

Neither Amador nor Calaveras Counties expect immediate impacts to existing septic systems because of this new regulation. Only one impaired waterbody located in the Upper Mokelumne River or Camanche Watersheds is impacted by bacteria or nitrogen compounds and requiring a TMDL. Lower Rattlesnake Creek below Lower Bear River Reservoir is listed as impacted by *E. coli* based on samples collected in 2004 and 2005. Future actions by the RWQCBs related to the LAMP documents may increase water quality monitoring requirements for bacteria and nutrients in specific waterbodies, thus possibly listing additional waterbodies as impaired in the Upper Mokelumne Watershed.

As of the 2010 Integrated Report[1], impaired waters located in the Upper Mokelumne River and Camanche Watersheds under Section 303(d) of the Clean Water Act, categories 4 and 5, requiring development of a TMDL include the following:

- Pardee Reservoir: Mercury (category 5, TMDL estimated 2021; for example, seven of 44 samples collected at two locations exceeded the USEPA fish tissue criterion for human health)
- Bear River (Lower Bear River Reservoir to Mokelumne River, North Fork): Copper (category 5, TMDL estimated 2021)
- Bear River (from Allen to Upper Bear River Reservoir): pH (category 5, TMDL estimated 2021)
- Rattlesnake Creek (at confluence with Mokelumne River, North Fork): *E. coli* (category 5, TMDL estimated 2021)
- Camanche Reservoir: Copper (category 5, TMDL estimated 2020), Mercury (category 5, TMDL estimated 2021), Zinc (category 5, TMDL estimated 2021)

Lead Shot Use and Recovery Program

CHHP, operated by a concessionaire, is located on the North Shore of Camanche Reservoir, on 1500 acres of rolling hills and reservoir shoreline owned by EBMUD. EBMUD revised the Watershed Rules and Regulations so that lead shot is prohibited from use in the CHHP upland game bird hunting areas, beginning October 2009. Lead shot is now only allowed in the designated "Lead Reclamation Areas" where it will periodically be reclaimed and recycled.

In 2005, USEPA issued “BMPs for Lead at Outdoor Shooting Ranges”. USEPA and the National Shooting Sports Foundation (NSSF) created a Shooting Initiative Environmental Stewardship program under which shooting ranges and hunt facilities could apply for certification. CHHP prepared a Draft Environmental Stewardship Plan (ESP) and submitted

[1]1 http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml

it to USEPA for review in 2009, documenting the present environmental conditions and prioritizing management actions. Later in 2009, USEPA canceled the Environmental Stewardship program.

CHHP also issued CHHP Lead Management Practices, March 2009:

- Lead will be reclaimed from designated "Lead Reclamation Areas" such as the Sporting Clay courses and the Trap and Skeet Range (approximately 28 acres).
- CHHP will not construct any shooting stations that would cause the spent lead to fall into water, wetlands, creeks or other environmentally sensitive areas.
- The shooting courses were built in a semi-circle formation, so that spent lead shot falls inside the course, concentrated into a 75-foot-wide area (calculations based on maximum load, typical shotgun and shot size)
- Shooting stands in steep terrain will have a v-ditch or berms installed to decrease lead shot mobility during periods of heavy rain.
- Periodically, all vegetation will be cut from the 75-foot strip; then a lead reclamation contractor will remove the lead shot along with the topsoil. The lead will either be reused (reloaded ammunition) or shipped to a lead reclamation facility.
- The soil will be replaced.

The first lead recovery at CHHP occurred in 2010, and the next is planned for 2015. Since the draft report was issued, several shooting courses were reevaluated and found to have the potential for lead shot to land in the reservoir wet areas. These shooting courses were realigned in 2011 to ensure that lead shot remains within the shooting course semi-circular area.

Structures, Dredging and Fill Management

Any person or public agency proposing to locate a structure, excavate, or discharge dredged or fill material into waters of the United States must obtain a Section 404 Dredged Material Discharge or Fill Material Placement Permit from the U.S. Army Corps of Engineers (USACE). Typical activities requiring permits include the construction or installation of artificial canals, artificial islands, boat ramps, breakwaters, bulkheads, dams, dikes, weirs, groins and jetties, intake pipes, levees, mooring buoys, outfall pipes, overhead power crossings, pipes and cables, piers and wharves, riprap, road fills, signs, and tunnels; or activities that result in dredging or filling, or the discharge of sand, gravel, dirt, clay, and stone.

The Federal Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act grant the USACE jurisdiction over all navigable waters within the United States. Recent legislation and court decisions have expanded the legal definition of navigable waters to include marshes, swamps, and diked lands, even though they may not, in fact, be navigable.

The decision whether to grant or deny a permit is based on a public interest review of the probable impacts of the proposed activity and its intended use. Benefits and detriments are balanced by considering effects on such concerns as: conservation, economics, wetlands, fish and wildlife values, flood hazards, navigation, water quality and the needs and welfare

of the people. In addition, projects involving discharge or dredge or fill material must comply with the Section 404(b) (1) guidelines prepared by USEPA. The guidelines restrict discharges into aquatic areas when there are less environmentally damaging, practicable alternatives. Reasonable and practicable mitigation of unavoidable impacts also will be required. A permit will be granted unless the project is found to be contrary to the public interest or fails to comply with the guidelines.

The USACE is required by federal law to consult with state and federal wildlife agencies regarding any impacts of a project on aquatic habitats.

Inspection, Surveillance, and Enforcement Procedures

EBMUD's programs for inspection, surveillance, and enforcement are described in the *EBMUD* portion of this section.

Emergency Response

SEMS in California and NIMS used across the country require all-hazards planning to enable local government agencies like EBMUD to respond to, work through and recover from the impact of disasters and other planned or unplanned emergency events. Depending upon the type of emergency, any number of water quality contaminants may impact source water quality including turbidity, microbes, organics, and inorganics. Of particular concern are emergency scenarios that could result in contaminants being introduced within close proximity to a raw-water reservoir outlet tower or into a potable water storage tank.

EBMUD's Emergency Operations Plan (EOP) was completely rewritten in 2009 to fully adopt SEMS and NIMS, and to describe the overall EBMUD emergency management program through a phased approach: preparedness, alert and warning, activation of the emergency operations plan, District notification, response scaled to the incident, continuity of essential EBMUD business during the response, and recovery. The EOP outlines an all-hazards approach to a broad range of emergency scenarios. EOP Annexes describe EBMUD response planning for many situation specific scenarios, such as earthquake, aqueduct or levee failure, dam failure, hazardous materials spill or leak, major fires, severe storm or flood, civil disturbance, contamination of water supplies, sewage spill, widespread power outage, and a local or even national security emergency.

During a major disaster, EBMUD operates as part of the Statewide Emergency Management System. Local cities, special districts, counties, mutual aid regions, and state agencies participate in this response. In a disaster, natural or man-caused, EBMUD activates its Emergency Operations team (EOT), opens its Emergency Operations Center (EOC) in Oakland, and may activate its Alternate EOC and/or Mobile Emergency Command Center.

EBMUD uses the SEMS/NIMS Incident Command Systems (ICS) to standardize response. Between 2005 and the present, EBMUD has entered into a Mutual Assistance Agreement

with Los Angeles Department of Water and Power (LADWP) to assist one another in the event of a regional emergency that impacts one agency but not the other. EBMUD has developed strong working relationships with city and county police, sheriff's and fire/EMS agencies, trained its EOT to the intermediate and advanced levels of NIMS-required training, written and implemented business continuity plans across EBMUD, and dramatically improved its ability to communicate during an emergency. Through training, exercise and pre-planning coordination, EBMUD has greatly improved its ability to work in unified command with other first-responder agencies during emergencies.

EBMUD rangers are classified by the state as "wildland firefighters" and have the responsibility for initial response and mop-up of all fires on EBMUD-owned lands. In addition, they have the responsibility for fire road grading and maintenance, and fire prevention activities in accordance with the Annual Fire Plan. See earlier subsection EBMUD Emergency Response for additional details.

FERC Emergency Action Plan

At EBMUD's Pardee and Camanche Dams on the Mokelumne River in Amador and Calaveras Counties, EBMUD owns and operates the Dams and associated hydro-electric facilities, and small water treatment plants to serve local population and EBMUD facilities. These dams are regulated by FERC and EBMUD has a separate Emergency Action Plan (EAP) that is updated annually and exercised regularly.

The FERC EAP focuses on warning emergency agencies, upstream projects, and downstream inhabitants if there should be an impending or actual sudden release of water caused by an accident to, or failure of, EBMUD's Pardee and Camanche Dam facilities. FERC requires a Comprehensive EAP Exercise Program be held face-to-face once every five years with participants from the various response agencies to discuss emergency management and resource allocation; the program consists of a tabletop exercise and a functional exercise. During the tabletop exercise there is no time pressure and the participants discuss a particular dam break scenario and response. During the functional dam break exercise, the participants from the various agencies respond to messages under real-time conditions from "private" offices, followed by a debriefing. Although not required, EBMUD chooses to hold a face-to-face tabletop exercise annually. EBMUD's staff works with FERC, California Highway Patrol, Amador and Calaveras County Sheriff's Offices on both security and operational area response and planning issues related to EBMUD's facilities in this region.

The RWQCB, CDFW, Caltrans, and SWRCB Division of Drinking Water have responsibilities to mobilize personnel to oversee responses and cleanup following any spillages or releases of hazardous materials. If the situation should become a major crisis, the California Emergency Management Agency (Cal EMA) may step in to coordinate the overall emergency response, public notification and evaluation, and cleanup and abatement efforts.

Caltrans Emergency and Spill Response Requirements

Caltrans maintains a list titled *Drinking Water Reservoirs and Recharge Facilities* in the Caltrans District 10 Work Plan, as Table 4-1. This list is used to track sections of Caltrans roads adjacent to drinking water reservoirs where a hazardous material spill might contaminate drinking water. The Caltrans District 10 Work Plan, Pardee Reservoir and the Mokelumne River (Main, North, South, and Middle Forks) will be listed, for sections of Highways 49 and 26 near the bridge river crossings. This list is used by Caltrans for response to accidental spills. When Caltrans issues contracts for work on the listed road, those contracts include enhanced spill response requirements.

Public Education

The Environmental Health Department of Amador County advises businesses individually on managing their hazardous waste and controlling pollutants. Free of charge, the County regularly collects household hazardous waste at a transfer station (latex paints, used oil, depleted batteries, etc.). County public schools have presented students with information on appropriate recycling and recycling practices, groundwater contamination prevention, and composting.

The Alpine Watershed Group is a locally organized, voluntary group established to assess the condition of the watershed and to build a work plan for restoration and protection activities within the watershed. Their current programs include water quality monitoring, maintaining erosion control BMPs, stream bank restoration projects, and monthly informational meetings.

EBMUD has recognized since the early 1970s that water suppliers have an obligation, as managers of an essential natural resource, to educate the public to conserve and protect that resource. Environmental education is a key component of EBMUD's Public Information Division and for their NRD. In addition, EBMUD provides ranger-naturalists to lead field trips to EBMUD reservoirs and watershed lands.

Stewardship through Education Program. In 2005, local teachers, the CSRC&D Council, and the UMRWA began a watershed education program for local schools. The Stewardship through Education Program is run by teachers and funded by local water agencies and EBMUD.

The annual Mokelumne River Cleanup Day is sponsored by EBMUD, the MCCT Council and various local businesses. Volunteers typically include kayakers, anglers, and other river lovers; representatives of the Foothill Conservancy, Mokelumne Wilderness Volunteers, Mokelumne Trailbusters, USFS, SNC, EBMUD, and Trout Unlimited, plus teams from local businesses and elected officials.

Fire and Fuels Management

BLM Lands

BLM runs a Fuel Wood Program where suitable dead and down material can be removed. Permits are sold on a case-by-case basis. The BLM Folsom Field Office FMP 2008 outlines wildland fire management strategies, including fire suppression and prescribed burn policies. Specific fire management strategies are listed for FMUs, and the Upper Mokelumne Watershed is covered by the Mokelumne FMU - CA-180-07. Specific data is presented for the FMU also includes fire history and total land. (Although BLM owns over 19,000 acres in this FMU, it is still only 3 percent of the total.)

National Forest Lands

NF BMPs for fire suppression and fuels management can be found in the document "USDA Water Quality Management for Forest Lands in California: Best Management Practices" The BMPs outline fire suppression and fuels management activities and require that water quality be protected while achieving management objectives. The BMPs cover prescribed burns and wildfires, considering fragile soils and steep slopes whenever possible.

In the 2004 SNFPA, described earlier, the first emphasis on fire and fuels management was placed on reducing fuels in the wildland urban interface (WUI), with a goal that 50 percent of initial fuel treatments are to be located in the WUI until all treatments in the WUI have been completed. The strategy of the 2004 SNFPA is based on the premise that disconnected fuel treatment areas overlapping across the general direction of fire spread will change fire spread, and thus, only a fraction of the acreage needs to be treated to yield desirable modifications to wildfire behavior. In essence, the SNFPA allows for fewer fuel treatments and less disturbance of the land. The 2004 SNFPA notes that only 0.3 percent of the standing inventory will be removed each year, which amounts to only 1/5 of the annual net growth. Thus, there is a net accumulation of fuel. The ROD recognizes the need for a better public understanding of the need to thin the forests.

The SNFPA lists guidelines for fuel management projects, and prescribes standards that reduce the impacts on habitat as defined by Home Range Core Areas and Protected Activity Centers, RCAs, and Critical Aquatic Refuges. California spotted owl and northern goshawk habitat especially place restrictions on fuel management activities.

Stanislaus and Eldorado NF have issued Temporary Fire Restrictions effective July 2, 2015, through the end of the 2015 fire season (with certain exemptions), applying to the lower and mid-level elevations of the Mokelumne Watershed:

1. Prohibiting fires, campfires or stove fires except in Developed Recreation Sites
2. Prohibiting smoking except within an enclosed vehicle or building, within a Developed Recreation Site, or while stopped in an area at least three feet in diameter that is barren or cleared of all flammable material

Stanislaus NF Fire Management Plan (FMP)

The 2005 Stanislaus NF FMP is described in detail in the MRWSS 2010 update.

CAL FIRE New Drought Mortality Exemption

On June 17, 2015, the Board of Forestry and Fire Protection adopted emergency regulations allowing specified forest management activities, including the cutting or removal of trees that are dead or dying as a result of the drought conditions across California. Areas to be treated that are larger than 20 acres cumulatively across an ownership require a Registered Professional Forester (RPF) to prepare, sign, and submit a new exemption form to CAL FIRE. Areas less than 20 acres do not require an RPF.

Power Fire Restoration and Reforestation Projects

The Power Fire Restoration project EIS, 2005, proposed that all dead and dying trees in the Mokelumne Wilderness and areas that experienced low-intensity burn would be retained, and snags would be retained in variable numbers in riparian conservation areas. In other areas salvage logging was planned. Near streams such as Beaver and Panther Creek, 150-foot exclusion zones for equipment would be maintained and temporary roads and landings would be placed at least 300 feet from perennial streams. Woody debris (slash cover) would be left on the ground following salvage logging, resulting in effective ground cover of approximately 40 percent in high burn severity areas.

Past salvage timber efforts logged approximately 60 percent of the project before lawsuits halted operations in 2006. Some post-fire salvage logging on SPI's private land resulted in slope failures, affecting downslope NF lands. Logged units and pre-fire plantations on NF lands have mostly been replanted and had brush and grass removed by hand at least once. Approximately 20 percent of these plantations have failed because brush and grasses consume the limited water and nutrients and the seedlings die. Tree survival and growth in the remainder of the plantations are at continued risk due to competing vegetation. Management of competing vegetation is essential for conifer seedlings.

In 2013 a Power Fire lawsuit was settled in which PG&E and its tree-trimming contractor agreed to pay $45 million to the federal government for fire-fighting costs and damage to the Eldorado NF. The Eldorado NF Amador Ranger District is developing forest and watershed restoration projects in the 2004 Power Fire area with a portion of these funds.

In 2014, the Eldorado NF Power Fire Reforestation Project NOI was issued, that the NF will prepare an Environmental Impact Report (EIR) in 2015. The proposed action identifies approximately 4,400 acres to be replanted within the 17,000-acre burned area, with various planting densities and levels of mechanical soil preparation. See Appendix 6-9 for a map and details. BMPs include exclusion zones for herbicide applications. The goal is to reestablish a forested landscape in the burn area that is fire resilient, restoring wildlife habitats and provide for native plant and animal species, and control or eliminate invasive species. Several different planning arrangements encourage the development of different forest conditions: old growth dense stands, spotted owl nesting conditions, and more open forest conditions with shrub and oak habitats suitable for Salt Springs Deer Herd foraging.

Table 6-1: Agencies with Influence over Source Water Quality

Agency	Jurisdiction or Issues of Concern
Local / Regional Agencies	
EBMUD	Management of water supply, quality, treatment, and distribution.
	Collection, treatment, and disposal of wastewater
Counties of Alpine, Amador, Calaveras, and San Joaquin	Regulation and monitoring of agricultural pesticide usage. Control of animal and plant pests.
	Inspection of hazardous materials storage and underground storage tanks.
	Fire protection, storage of hazardous materials, emergency response.
	Stormwater collection and disposal.
	Management of natural resources.
	Emergency planning and response.
	General plan/zoning land use changes, use permits, environmental compliance.
	Construction and maintenance of county roads--vegetation management and erosion control.
	Transportation planning and traffic control.
	Development services /building permits.
	Hazardous materials business plan.
	Collection, treatment and disposal of wastewater, septic system permits.
Sierra-Pacific Industries	Management of forests - planting and logging.
	Management of associated facilities -- roads, timber processing plant, administrative and maintenance buildings.
PG&E	Management of hydroelectric facilities.
	Management of associated facilities -- water transmission, water quality, roads, administrative buildings, recreation sites.
AWA	Management of water supply, quality, treatment, and distribution.
CPUD	Management of water supply, quality, treatment, and distribution.
CCWD	Management of water supply, quality, treatment, and distribution.
JVID	Management of water supply, quality, treatment, and distribution.

Table 6-1: Agencies with Influence over Source Water Quality (Continued)

Agency	Jurisdiction or Issues of Concern
State Agencies	
Caltrans - CA Department of Transportation	Construction and maintenance of state and federal roads
	Stormwater collection along state and federal roads
	Hazardous materials spill response and maintenance of spill records along state and federal rights-of-way
CA Department of Fish and Wildlife	Protection of state listed species
	Monitoring of water quality for aquatic species
	Regulation of alterations to natural state of rivers, streams, or lakes. Invasive species control
CA Department of Forestry and Fire Prevention	Fire prevention and suppression on all state-responsible lands (includes all EBMUD-owned watershed lands, except Lafayette Watershed)
	Regulation of timber harvesting activity on private lands
CA Department of Public Health	
CA Department of Toxic Substances Control	Regulation of hazardous waste generation and storage
CA Regional Water Quality Control Board - Central Valley Region	Protection of drinking water supplies Regulation of public water supply, treatment, and distribution systems Regulation of waste discharge into surface waters Regulation of stormwater discharge
CA Sierra Nevada Conservancy	State agency created in 2004. Initiates and funds Sierra Nevada region environmental projects (Prop 84 bond funds)
CA State Water Resources Control Board	Protection of drinking water supplies Regulation of public water supply, treatment, and distribution systems Regulation of waste discharge into surface waters Regulation of stormwater discharge
Federal Agencies	
U.S. Army Corps of Engineers	Regulation of discharge of dredged or fill materials into waters of U.S.
U.S. Department of Agriculture Natural Resources Conservation Service	Resource conservation and soils
USFS	Management of NFs
U.S. Department of Interior Fish and Wildlife Service	Protection of federally listed species
U.S. Bureau of Land Management	Management and permitting of activities on federal lands.
U.S. Environmental Protection Agency	Set drinking water standards, delegate authority for enforcement to states
	Protection of drinking water supplies
	Regulation of public water supply, treatment, and distribution systems

Table 6-2: Documents Reviewed for MRWSS Update 2015

ID	Agency	Title	Date	Affected Management Practice
1	Amador County	General Plan, Housing Element Update	2015	Land Use
2	Amador County	Hydrology and Water Quality General Plan Update Working Paper	2007	Land Use, Stormwater Management
3	Amador County	Local Hazard Mitigation Plan Update draft	2013	Fire and Fuels Management
4	Amador County	Amador County Stormwater Ordinance	2015	Stormwater Management
5	Calaveras County	General Plan, Housing Element Update (draft)	2015	Land Use
6	Calaveras County	General Plan (draft) Water Element Baseline Report Supplement	2014	Land Use, Stormwater Management
7	Calaveras County	Calaveras Recycles, Wilseyville Transfer Station	2014	Waste Management
8	Calaveras County	Design Manual Grading, Drainage and Erosion Control	2012	Land Use, Stormwater Management
9	Calaveras County	General Plan, Utilities and Services Systems, Preliminary Draft EIR	2012	Wastewater Management
10	Calaveras LAFCO	Final Water and Wastewater Municipal Service Review	2012	Wastewater Management
11	Caltrans	Stormwater Program Annual Report, District 10	2014	Stormwater Management
12	Caltrans	Stormwater Program 2015-2016 Workplan, District 10	2014	Stormwater Management
13	California Department Fish and Game	Draft Environmental Impact Statement (EIR) and Proposed new Suction Dredging Regulations	2011	Mineral Exploration and Mining
14	California Department Forestry and Fire Protection (CAL FIRE)	Forest Practice Rules and Act Road Rules 2013	2015	Logging
15	California Department Forestry and Fire Protection (CAL FIRE)	Timber Operations in Areas Substantially Damaged Due to Wildland Fires Memorandum	2012	Logging
16	Central Sierra RC&D	Annual Report	2012	Water Quality Monitoring, Education
17	EBMUD	Various watershed management practices and BMPs	2013	Rangeland Management, Water Quality Monitoring Program, Invasive Aquatic Species Response Plan
18	USDA USFS	2012 Planning Rule Final Directives for NF System Land Management Planning	2012	Restoration, Fire and Fuels Management, Logging, Pest Management

Table 6-2: Documents Reviewed for MRWSS Update 2015 (continued)

ID	Agency	Title	Date	Affected Management Practice
19	USDA USFS Pacific Southwest Region	Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement	2013	Restoration, Fire and Fuels Management, Logging, Pest Management
20	USDA USFS Pacific Southwest Region	Draft Water Quality Management Handbook	2011	Logging, Grazing
21	USDA USFS	Water Quality Management For Forest System Lands in California BMPs	2000	Logging, Road Management, Mining, Recreation, Vegetation, Fire and Fuel Management, Grazing
22	USDA USFS Pacific Southwest Region	Ecological Restoration Implementation Strategy: Stanislaus NF	2011	Logging, Road Management, Mining, Recreation, Vegetation, Fire & Fuel Management, Grazing
23	Stanislaus NFS	Stanislaus NF, Forest Plan Direction 2010, with Errata 2015	2015	Land Use, Erosion Control, Logging, Grazing
24	Stanislaus NFS	Stanislaus NF, Temporary Fire Restrictions	2015	Fire and fuel management
25	Eldorado NFS	Power Fire Restoration Project – Proposed Action and Data Table	2014	Fire and fuel management
26	PG&E Pacific Forest and Watershed Lands Stewardship Council	Land Conservation Strategic Plan Goals and Objectives: 2014-2016	2014	Land Use
27	Stanislaus NFS	Stanislaus Fire Plan	2004	Fire and fuel management
28	Stanislaus NFS	Forest Plan Direction: Motor Vehicle Travel Management	2004	Erosion Control, Access Control
29	State Water Resources Control Board,	AB885, OTWS Regulations	2012	Waste Management
30	State Water Resources Control Board, Central Valley Region	Drinking Water Policy, Basin Plant amendments	2014	Water Quality
31	State Water Resources Control Board, Central Valley Region	Marijuana Cultivation Fact Sheet	2014	Water Quality, Permits
32	SPI Industries	Pesticide Use BMPs	2010	Pest Management
33	Upper Mokelumne River Watershed Authority MAC Plan Signatories	Mokelumne/Amador/Calaveras Integrated Regional Water Management Plant Update 2013 Project Addendum 2015	2013 2015	Access Control, Pest Management, Recreation, Public Education, Erosion Control, Grazing, Fire and Fuels Management

Table 6-3: Residual Dry Matter Requirements by Slope

RESIDUAL DRY MATTER STANDARD MINIMUM TABLE

Woody Cover (percent)	RDM standard for percent slope (lb/acre)			
	01-10 percent	10-20 percent	20-40 percent	>40 percent
0-25	500	600	700	800
25-50	400	500	600	700
50-75	200	300	400	500
75-100	100	200	250	300

Note: Table excerpted from University of California, Division of Agriculture and Natural Resources, Rangeland Monitoring Series Publication 8092

Figure 6-1. Big Bar River Takeout Above Pardee Reservoir at Highway 49



Section 7: Recommendations

The recommendations contained in this section can help strengthen source protection, the first barrier against water quality degradation. By elevating the importance and strengthening the performance of the first barrier, the potential impacts on water treatment, the second barrier, are reduced.

Table 7-1 Summary of Recommendations

Recommendation	Responsible Agency	Description/Explanation
Continue water quality monitoring	The District	Continue water quality monitoring to protect source water and treated water quality. Implement regulatory monitoring as required by SWCRB and EPA, and operational monitoring as needed to optimize water treatment and distribution. Includes the second round of LT2ESWTR sampling, S2DDBP monitoring, and reservoir limnological profiling.
Consider implementing a nutrient and algae study in Pardee Reservoir	The District	A new nutrient and algae study would investigate the role and source of nutrients affecting algae taste and odor events.
Continue event-specific follow-up water quality monitoring	The District, Caltrans	Monitor known spills or accidents entering reservoir or tributary, or with the potential to enter, that may significantly impact influent water quality.
Continue to implement 'No Wake Zone' along the reservoir shoreline	The District	Enforce 5-mph speed limit along the shoreline to reduce shoreline erosion.
Maintain outlet tower exclusion zone	The District	Provide additional protection for outlet towers against accidents (e.g., structural damage) and direct water quality impact (e.g. fuel leak from a boat).
Continue invasive species monitoring and vessel inspection program	The District	Prevent importation of invasive species that can negatively impact water quality and system infrastructure.
Maintain no-body contact policy in Pardee Reservoir and tributaries on District property	The District,	Reduce potential for contamination.
Continue to provide floating restrooms on Pardee Reservoir	The District	Reduce potential for contamination.
Maintain horse and dog restrictions	The District	Dogs are not allowed in or on Pardee Reservoir. Dogs are not allowed on trails outside the developed recreation areas. Horses are not allowed to enter or drink from waters other than developed drinking stations (applies to Pardee and Camanche Reservoirs and their tributaries on District property).
Continue trail maintenance and ground cover plantings	The District	Reduce erosion
Continue inspecting reservoir shoreline for erosion	The District	This is especially important with water level is lower than normal

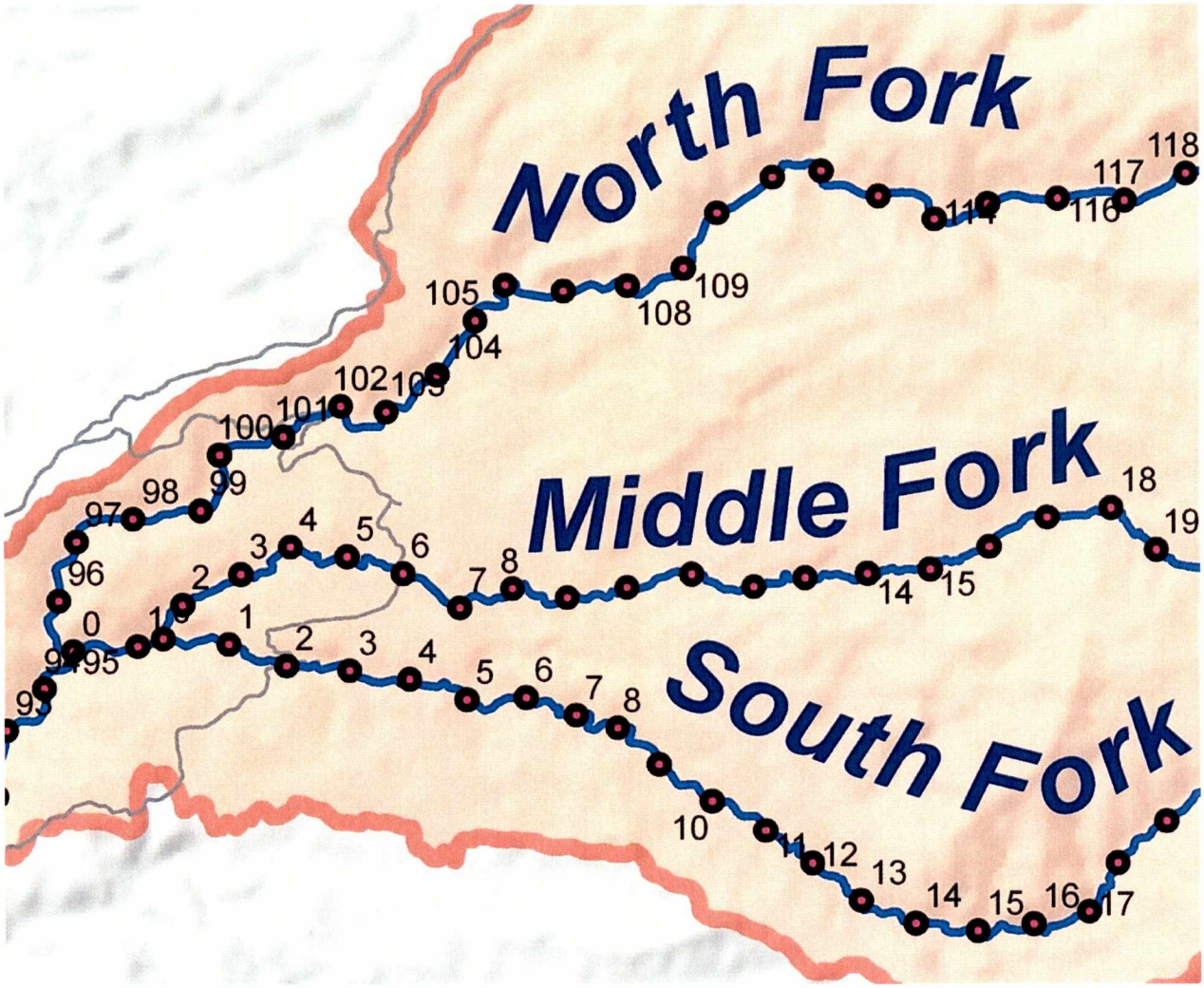
Continue Penn Mine and MineTailings Ponds work, Camanche Watershed	The District	Continue ongoing compliance monitoring of the Penn Mine groundwater. Inspect conditions to ensure adequate stormwater control measures are implemented. Continue working with BLM to finalize and implement remediation plans at the Mining Tailings Ponds.
Install and maintain in-stream sediment control as needed	The District	Control sediment loading from runoff
Continue coordination with CAL FIRE and USFS when wildfires occur	The District	Especially if wildfire may impact source water
Continue surveillance and emergency response program	The District	The District rangers patrol and work with County Sheriffs for routine law enforcement within the District owned watershed lands. The District has an EOP that is written and administered in accordance with the NRF, NIMS and California SEMS guidelines.
Continue participation in watershed educational programs	The District	Stewardship through Education Program, Mokelumne Volunteer Program (MVP) , Ranger Led Environmental Education Program (RLEEP) and Ranger-led tours
Continue participating in relevant agencies and stakeholder groups	The District	CAL FIRE, USFS, Calaveras and Amador Counties, BLM, UMRWA.Topics of interest include: water quality, stormwater runoff, future development, fire and fuel management, surveillance and emergency response, and public education/outreach

Appendix 3-1

Approximate River Miles, Mokelumne River, Section Above Pardee Reservoir

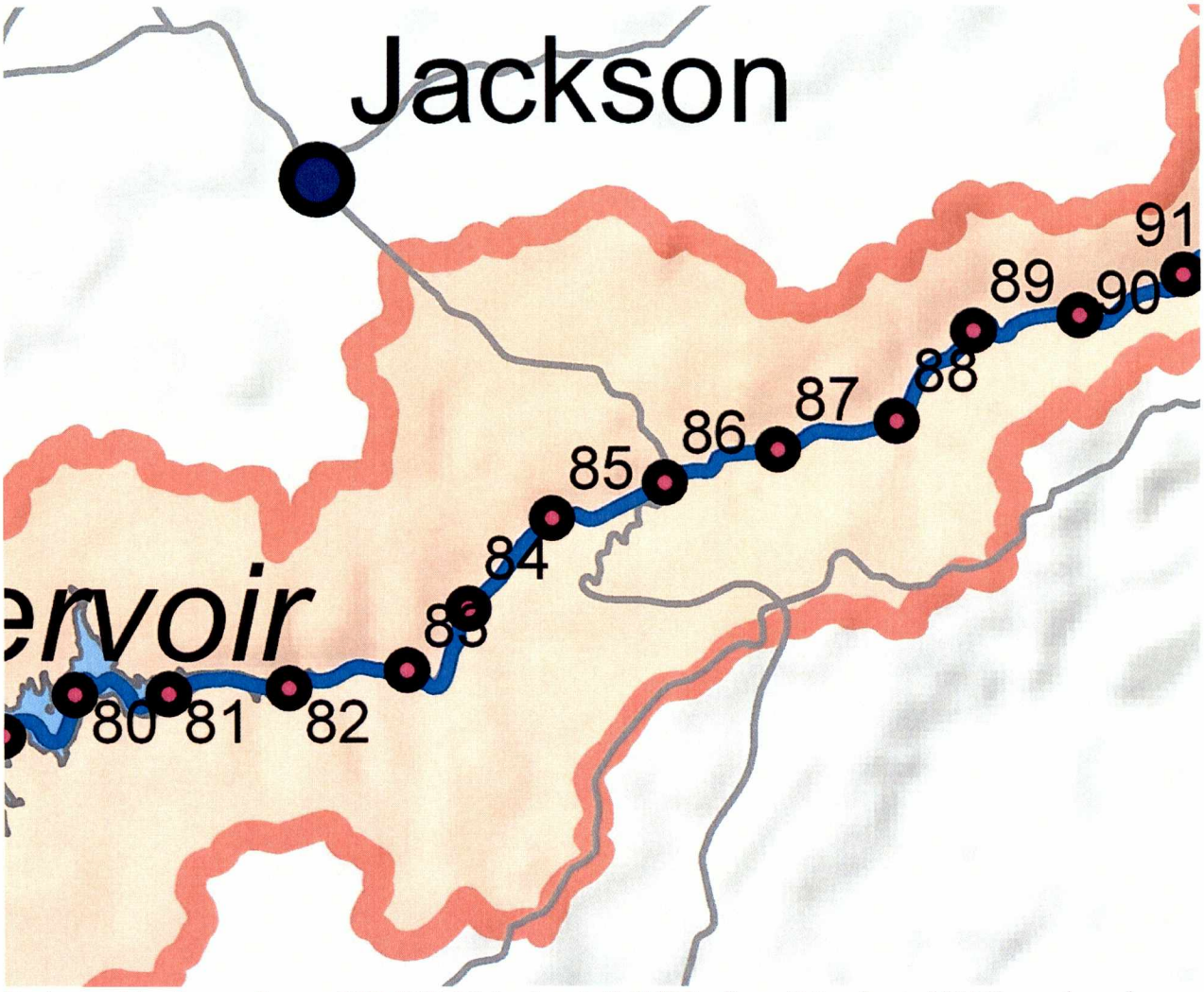
Estimated by James Jones, EBMUD Fisheries & Wildlife, from 7.5-min USGS quadrangle maps

Appendix 3-1: Approximate River Miles, Mokelumne River, Section Above Pardee Reservoir #1



Estimated by James Jones, EBMUD Fisheries & Wildlife, from 7.5-minute USGS quadrangle maps

Appendix 3-1: Approximate River Miles, Mokelumne River, Section Above Pardee Reservoir #2



Estimated by James Jones, EBMUD Fisheries & Wildlife, from 7.5-minute USGS quadrangle maps



EAST BAY MUNICIPAL UTILITY DISTRICT 2010

ANNUAL WATER QUALITY REPORT

In 2010, EBMUD water met or surpassed every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

ENSURING WATER QUALITY

EBMUD samples and tests your water extensively to make sure it is safe to drink. We look for more than 100 substances in the water including bacteria, pesticides, herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water treatment processes.

Before water reaches your tap, EBMUD takes many steps to ensure its quality. This includes managing watershed lands and reservoirs, treating the water, operating a complex distribution system of pipes, pumping plants and reservoirs, testing water samples in our laboratories and in the field, maintaining facilities and addressing customer concerns.

EXCELLENT WATER SOURCE

One of the most important factors in water quality is its source: the more pristine the source, the purer the water.

Ninety percent of EBMUD's water comes from the 577 square mile watershed of the Mokelumne River on the western slope of the Sierra Nevada. This area is mostly national forest, EBMUD-owned lands and other undeveloped lands little affected by human activity. The Mokelumne watershed collects snowmelt from Alpine, Amador and Calaveras counties that flows into Pardee Reservoir near the town of Valley Springs.

Three large aqueducts carry the water more than 90 miles to the East Bay. As it travels, the water is protected from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges.

When water demand is high, EBMUD supplements the Sierra supply with water from protected local watersheds. All raw water, regardless of source, is first treated and filtered at one of EBMUD's water treatment plants before entering the distribution system and reaching your tap.

EBMUD

WATER QUALITY REGULATIONS

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the California Department of Public Health (CDPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The CDPH regulations also establish limits for contaminants in bottled water.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling USEPA's Safe Drinking Water Hotline at 800-426-4791 or visiting www.epa.gov/safewater.

Contaminants in drinking water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Synthetic organic contaminants, such as pesticides and herbicides that may come from a variety of sources, including agriculture, urban storm water and residential uses.

Volatile organic chemical contaminants from industrial processes and petroleum production, and from gas stations, urban storm water runoff, agricultural application, and septic systems.

Radioactive contaminants that can be naturally occurring or be the result of oil and gas production and mining activities.

Cryptosporidium

Cryptosporidium is a microbial contaminant found in surface water throughout the United States. Although filtration is highly effective in removing Cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal.

Our monitoring indicates the presence of these organisms in one of our source waters. Current test methods cannot determine if the organisms are dead or are capable of causing disease. Ingestion of Cryptosporidium may cause abdominal infection with symptoms including nausea, diarrhea and abdominal cramps.

Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants and small children, and the elderly are at greater risk of developing life-threatening illness. We encourage these individuals to consult their physician regarding appropriate precautions to take to avoid infection.



Low resistance

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, and some elderly and infants can be particularly at risk from infections.

These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the USEPA Safe Drinking Water Hotline: 800-426-4791 or www.epa.gov/safewater.

Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high-quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

In the past five years, EBMUD has led successful efforts to strengthen state and federal environmental laws that protect consumers from lead exposure. In January 2011, President Obama signed the *Reduction of Lead in Drinking Water Act* requiring manufacturers to reduce lead in plumbing products used for drinking water to 0.25 percent by 2014. California's lead regulations require all such products currently sold in the state to meet those requirements.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or online at www.epa.gov/safewater/lead.

EBMUD 2010 ANNUAL WATER QUALITY REPORT

SURPASSING STATE REGULATIONS

In 2010, EBMUD water met or surpassed every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

The five tables show the measured levels of constituents detected in 2010 or in the most recent required year at EBMUD source waters, water treatment plants or in the distribution system.

Table 1 – Health-Related Standards
Constituents with primary maximum contaminant levels (MCLs) are regulated to protect your health.

Table 2 – Aesthetic Standards
Constituents with secondary maximum contaminant levels (MCLs) are regulated to maintain aesthetic standards for drinking water, such as odor, taste and appearance.

Table 3 – Unregulated constituents
Water agencies are required to report these substances if detected, but no maximum contaminant levels have been established.

Table 4 – Lead and copper
Lead and copper are regulated at the customer's tap and were most recently sampled as required, in 2008.

Table 5 – Other water quality parameters
These water measurements, such as pH, hardness and alkalinity, may be of interest to some consumers.

1 Constituents with primary MCLs		Unit	Year sampled	MCL or [MRDL]	PHG, (MCLG) or [MRDLG]	Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Microbiological	Cryptosporidium in source water	#/liter	2008	TT	(0)	NA	0	0	0	0.3	0	Naturally present in the environment
	Total Coliform	—	2010	5%	(0)	NA	0.6% (highest percentage found in any month)					Naturally present in the environment
	Turbidity	NTU	2010	1	NS	0.03	0.02 – 0.09	0.02 – 0.13	0.02 – 0.10	0.03 – 0.11	0.04 – 0.11	Soil runoff
		—		95% ≤0.3	NS	100%	100%	100%	100%	100%	100%	
Radioactive	Gross alpha in source water [a]	pCi/L	2006, 2007	15	(0)	<3	<3	<3	<3	<3 – 11	<3	Erosion of natural deposits
	Gross beta in source water	pCi/L	2006, 2007	50 [b]	(0)	<4	<4	<4	<4	<4 – 9.1	<4	Decay of natural and man-made deposits
	Uranium in source water [a]	pCi/L	2006, 2007	20	0.43	NA	<1	<1	<1	<1	<1	Erosion of natural deposits
Inorganic	Aluminum	ppb	2010	1000	600	<50	<50	<50	<50	<50	53 – 76	Erosion of natural deposits; residue from some surface water treatment processes
	Chloramine as Cl_2	ppm	2010	[4]	[4]	1.9 [c]	<0.05 – 3.3 [d]					Drinking water disinfectant added for treatment
	Fluoride in source water [e]	ppm	2010	2	1	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	Erosion of natural deposits; discharge from fertilizer and aluminum factories [e]
Organic	Acrylamide	—	2010	TT	(0)	NA	met req.	NA	NA	NA	NA	Added to water during water treatment
	Control of DBP precursors/TOC	—	2010	TT	NS	NA	NA	NA	NA	met req.	met req.	Various natural and man-made sources
	Haloacetic acids, 5 species	ppb	2010	60	NS	18 [c]	16 – 27	12 – 25	12 – 19	15 – 38	8 – 33	By-product of drinking water disinfection
	Trihalomethanes	ppb	2010	80	NS	36 [c]	36 – 46	34 – 39	30 – 40	32 – 48	15 – 43	By-product of drinking water disinfection

2 Constituents with secondary MCLs	Unit	Year sampled	MCL	PHG	Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Aluminum	ppb	2010	200	NS	<50	<50	<50	<50	<50	53 – 76	Erosion of natural deposits; residue from some surface water treatment processes
Chloride	ppm	2010	250	NS	9	4	5	5 – 6	17	17	Runoff/leaching from natural deposits; seawater influence
Color	color units	2010	15	NS	2	3	3	2	<1	2	Naturally-occuring organic materials
Odor	TON	2010	3	NS	2	3	1	1 – 3	1	2	Naturally-occuring organic materials
Specific conductance	µmhos/cm	2010	900	NS	162	61	62	76 – 122	270	383	Substances that form ions when in water; seawater influences
Sulfate	ppm	2010	250	NS	15	1.2	1.2	5.3 – 12	32	41	Runoff/leaching from natural deposits; industrial wastes
Total dissolved solids	ppm	2010	500	NS	102	45	45	54 – 76	160	230	Runoff/leaching from natural deposits
Turbidity	NTU	2010	5	NS	0.03	0.02 – 0.09	0.02 – 0.13	0.02 – 0.10	0.03 – 0.11	0.04 – 0.11	Soil runoff

3 Unregulated constituents	Unit	Year sampled	Notification level	PHG	Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Boron	ppb	2010	1000	NS	<100	<100	<100	<100	<100	118 – 122	Runoff/leaching from natural deposits
Chlorate	ppb	2010	800	NS	247	130	160	140 – 160	170 – 410	230 – 410	By-product of sodium hypochlorite decomposition
N-Nitrosodimethylamine [f] (NDMA)	ppt	2010	10	3	4	1.4 – 2.9	0.9 – 3.5	2.5 – 3.2	1.7 – 3.3	2.6 – 21	By-product of drinking water chlorination

4 Lead and copper	Unit	Year sampled	Regulatory action level	PHG	90th percentile	Sites above regulatory action level	Typical sources
Copper	ppb	2008	1300	300	65	0 out of 53	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Lead [g]	ppb	2008	15	0.2	4	2 out of 53	Internal corrosion of household plumbing systems; discharges from industrial manufacturers; erosion of natural deposits

KEY TERMS

DBP – disinfection by-products. These are formed when chlorine and/or ozone reacts with natural constituents in water. Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products.

MCL – maximum contaminant level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs are set to protect odor, taste and appearance of drinking water.

MCLG – maximum contaminant level goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

MRDL – maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG – maximum residual disinfectant level goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Notification level – A health-based advisory level established by the California Department of Public Health for chemicals in drinking water that lack MCLs.

PDWS – primary drinking water standard. These standards regulate contaminants that affect health by setting MCLs and MRDLs along with their monitoring, reporting and water treatment requirements.

PHG – public health goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Regulatory action level – The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

TOC – total organic carbon. A measure of organic compounds that could form by-products after disinfection.

Turbidity – A measure of the cloudiness of water. Turbidity is monitored because it is a good indication of the effectiveness of our filtration systems.

TT – treatment technique. A required process intended to reduce the level of a contaminant in drinking water.

90th percentile – A measure that indicates 90 percent of the samples had a lower result.

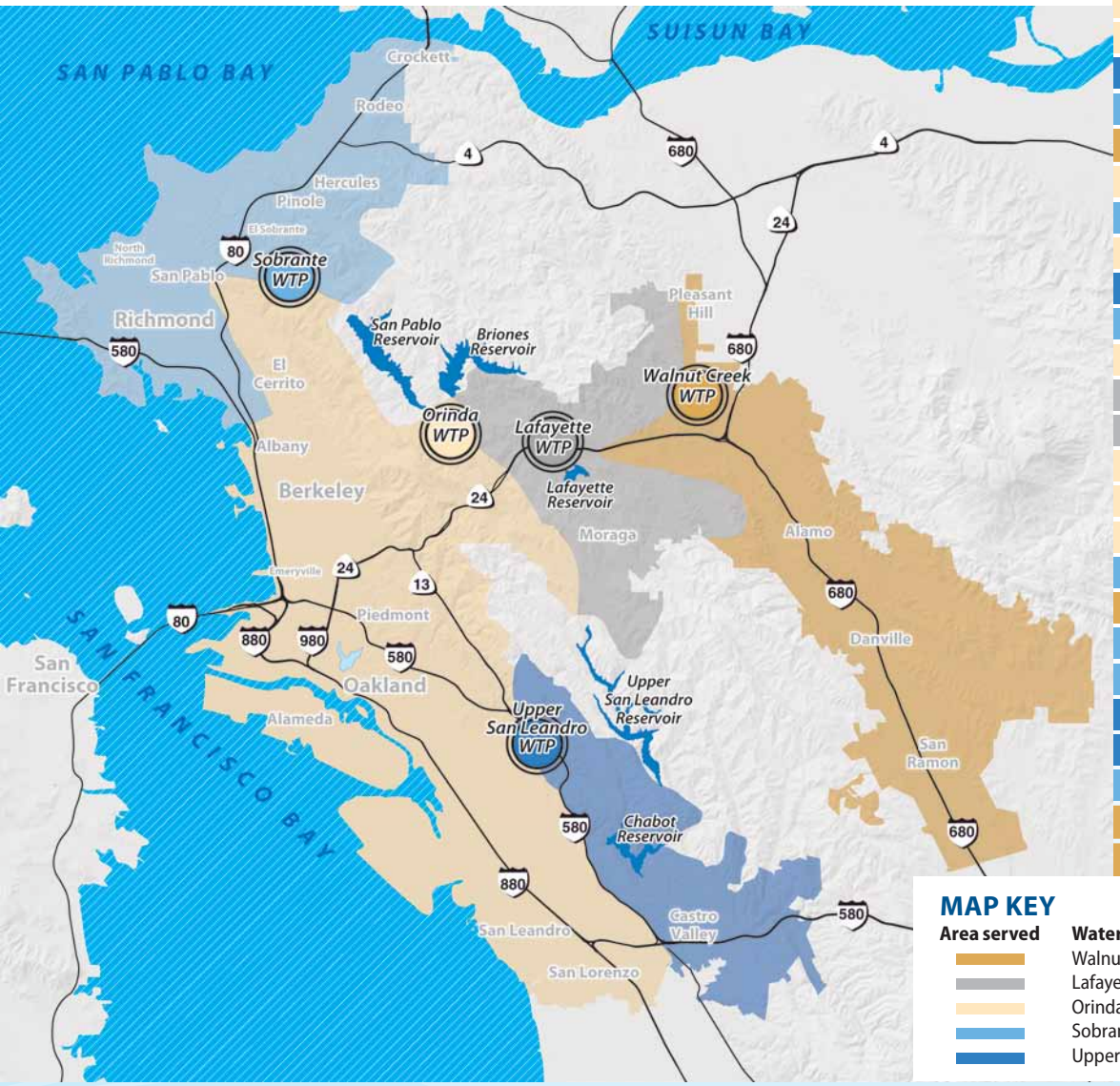
FOOTNOTES

a) Uranium was detected at 1.1 pCi/L and gross alpha was detected at 4.6 pCi/L in Chabot Reservoir. This is an emergency standby reservoir that has not been used for water supply in more than 30 years. **b)** CDPH considers 50 pCi/L to be the level of concern for gross beta particles. **c)** Highest running annual average. **d)** Chloramine residuals in the distribution system are measured as an equivalent quantity of chlorine. When the chloramine residual is less than 0.05 ppm, the sample is further analyzed to ensure that microbiological water quality is in compliance with the regulations. **e)** Fluoride is also added to help prevent dental decay in consumers. Regulations require that fluoride levels in the treated water be maintained between 0.7 to 1.4 ppm with an optimum dose of 0.8 ppm. Information about fluoridation, oral health and current issues is available from www.cdph.ca.gov/certlic/drinkingwater/pages/fluoridation.aspx. **f)** Sampling locations are chosen to represent worst-case scenarios. **g)** See *Water Quality Regulations* page for additional information about lead in drinking water. **h)** Grains per gallon (gpg) is a measure of water hardness. Knowing the amount can help improve the function of dishwashers, cooling equipment and other process applications.

MEETING DAILY WATER DEMAND

EBMUD provides high-quality drinking water to 1.3 million customers in Alameda and Contra Costa counties. EBMUD's water treatment plants are capable of filtering and processing a combined total of more than 375 million gallons of water daily.

This map of the EBMUD service area shows which water treatment plants serve your neighborhood. Lafayette, Sobrante and Upper San Leandro water treatment plants operate during periods of high demand or operational needs.



WHICH WATER TREATMENT PLANTS SERVE YOUR CITY?

City	Treatment plants
Alameda	Orinda/Upper San Leandro
Alamo	Walnut Creek
Albany	Orinda
Berkeley	Orinda
Castro Valley	Upper San Leandro/Orinda
Crockett	Sobrante/Orinda
Danville	Walnut Creek
El Cerrito	Orinda
El Sobrante	Sobrante/Orinda
Emeryville	Orinda
Hayward	Upper San Leandro/Orinda
Hercules	Sobrante/Orinda
Kensington	Orinda
Lafayette	Lafayette/Walnut Creek
Moraga	Lafayette/Orinda
Oakland	Orinda/Upper San Leandro
Orinda	Orinda/Lafayette
Piedmont	Orinda/Upper San Leandro
Pinole	Sobrante/Orinda
Pleasant Hill	Walnut Creek
Richmond	Sobrante/Orinda
Rodeo	Sobrante/Orinda
San Leandro	Upper San Leandro/Orinda
San Lorenzo	Upper San Leandro/Orinda
San Pablo	Sobrante/Orinda
San Ramon	Walnut Creek
Walnut Creek	Walnut Creek/Lafayette

MAP KEY

Area served	Water treatment plant	Source reservoir(s)
	Walnut Creek WTP	Pardee (in Sierra foothills)
	Lafayette WTP	Pardee
	Orinda WTP	Pardee, Briones
	Sobrante WTP	San Pablo
	Upper San Leandro WTP	Upper San Leandro

ABBREVIATIONS

gpg – grains per gallon
NA – not applicable
NS – no standard established
NTU – nephelometric turbidity unit, a measure of the cloudiness of water.
pCi/L – pico curies per liter, a measure of radioactivity.
ppm – parts per million, a proportion equivalent to about 30 seconds in one year. (mg/L)
ppb – parts per billion, a proportion equivalent to about 30 seconds in 1,000 years. (µg/L)
ppt – parts per trillion, a proportion equivalent to about 30 seconds in 1,000,000 years. (ng/L)
TON – threshold odor number, a measure of odor in water.
µmhos/cm – micromhos per centimeter, a measure of electrical conductance.

5 Other water quality parameters	Unit	Water treatment plants				
		Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro
Alkalinity, bicarbonate as $CaCO_3$	ppm	20	18	22 – 29	80	120
Alkalinity, carbonate as $CaCO_3$	ppm	1.2	1.4	3.3 – 4.1	3.8	6.6
Calcium	ppm	3.9 – 5.8	4.3 – 5.7	3.9 – 9.6	20 – 22	33 – 35
Hardness as $CaCO_3$	gpg [h]	0.7 – 1.1	0.8 – 1.1	0.8 – 1.8	4.3 – 5.0	7.6 – 8.2
	ppm	12 – 18	14 – 18	14 – 30	73 – 85	130 – 140
Magnesium	ppm	0.6 – 1.1	0.7 – 1.1	0.7 – 2.3	6.7 – 7.4	13
pH	pH	8.8 – 9.1	8.5 – 9.1	8.8 – 9.2	8.6 – 8.8	8.6 – 8.8
Potassium	ppm	0.5 – 0.6	0.5 – 0.6	0.5 – 0.9	1.3 – 1.9	1.5 – 2.1
Silica	ppm	8.6 – 11.6	8.7 – 11.7	8.7 – 10.8	6.6 – 8.8	6.6 – 7.3
Sodium	ppm	4.9 – 5.9	5.1 – 6.4	5.1 – 10	26 – 27	30 – 32

CONTACT US

For more information about water quality or to report a water quality concern, call 866-40-EBMUD (866-403-2683) or visit www.ebmud.com.

EBMUD encourages public participation in decisions affecting drinking water quality and other matters at its Board of Directors meeting held the second and fourth Tuesdays of each month at 1:15 p.m., 375 Eleventh Street, 2nd Floor, Oakland.

Board of Directors
John A. Coleman • Katy Foulkes
Andy Katz • Doug Linney • Lesa R. McIntosh
Frank Mellon • William B. Patterson

General Manager
Alexander R. Coate

ADDITIONAL CONTACTS

California Department of Public Health
Drinking Water Branch • 510-620-3463

U.S. Environmental Protection Agency
Safe Drinking Water Hotline • 800-426-4791

Alameda County
Public Health Department • 510-267-8000

Contra Costa
Public Health Division • 925-313-6712

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This report contains important information about your drinking water. Translate it, or speak with someone who understands it. To request a copy of this report in Spanish or Chinese, please call (510) 287-0138.

SPANISH
Este informe contiene importante información sobre el agua potable que usted consume. Tradúzcalo, o hable con alguien que lo comprenda, o solicite un ejemplar de este informe en español llamando al (510) 287-0138.

CHINESE
這份報告包含有您飲用水的重要資訊。請翻譯該內容，或與了解內容的人討論，或者請致電(510) 287-0138索取中文報告。

JAPANESE
この報告書には、あなたの飲料水に関する重要な情報が含まれています。和訳するか、理解できる人に相談してください。

KOREAN
본 보고서에는 귀하의 음료수에 관한 중요한 정보가 나와 있습니다. 번역을 부탁하거나 그 내용을 이해하시는 분으로부터 설명을 들으십시오.

CAMBODIAN (KHMER)
របាយការណ៍នេះមានពត៌មានសំខាន់អំពីទឹកផឹក។ សូមរកគេធ្វើប្រតិប្រែជួនឬពិគ្រោះជាមួយអ្នកណាដែលយល់របាយការណ៍នេះ ។

THAI
รายงานฉบับนี้มีข้อมูลสำคัญเกี่ยวกับน้ำดื่มของท่าน ขอให้แปลรายงานฉบับนี้หรือพูดคุยกับผู้ที่เข้าใจเนื้อหาในรายงานนี้

LAO
ລາຍງານສະບັບນີ້ມີຂໍ້ມູນສຳຄັນກ່ຽວກັບນ້ຳດື່ມຂອງທ່ານ. ໃຫ້ທ່ານແປເອກະສານນີ້ເປັນພາສາລາວ, ຫລືໃຫ້ທ່ານເວົ້າປຶກສາກັບຜູ້ທີ່ເຂົ້າໃຈເລື່ອງ.

PUNJABI
ਇਸ ਰਿਪੋਰਟ ਵਿੱਚ ਤੁਹਾਡੇ ਪੀਣ ਵਾਲੇ ਪਾਣੀ ਬਾਰੇ ਜ਼ਰੂਰੀ ਜਾਣਕਾਰੀ ਦਿੱਤੀ ਗਈ ਹੈ। ਇਸਦਾ ਅਨੁਵਾਦ ਕਰੋ ਜਾਂ ਕਿਸੇ ਨਾਲ ਗਲ ਕਰੋ ਜੋ ਇਸਨੂੰ ਸਮਝਦਾ ਹੋਵੇ।

GUJARATI
આ રિપોર્ટમાં તમારા પીવાના પાણી વિષે મહત્વની માહિતી છે. એનો અનુવાદ કરો, અથવા જેને એની સમજણ પડતી હોય તેની સાથે વાત કરો.

HINDI
इस रिपोर्ट में आपके पीने के पानी के बारे में महत्वपूर्ण जानकारी दी हुई है। इसका अनुवाद करें, या किसी ऐसे व्यक्ति से बात करें जो इसे समझता हो।

RUSSIAN
Здесь содержится информация о вашей питьевой воде. Переведите ее, или обратитесь к тому, кто это понимает.

BOSNIAN
U ovom izvještaju nalaze se važne informacije o vašoj vodi za piće. Prevedite ga ili razgovarajte sa nekim ko razumije ovaj izvještaj.

VIETNAMESE
Bản báo cáo này có các thông tin quan trọng về nước uống của quý vị. Hãy chuyển ngữ tài liệu này, hoặc nói chuyện với người có thể hiểu được bản báo cáo này.

FRENCH
Ce rapport contient des informations importantes concernant votre eau potable. Faites-le traduire ou adressez-vous à quelqu'un qui est en mesure de le comprendre.

TAGALOG
Ang ulat na ito ay naglalaman ng importanteng impormasyon tungkol sa inyong iniinom na tubig. Isalin ito, o makipag-usap sa isang taong nakakaintindi nito.

POLISH
Ten raport zawiera ważne informacje dotyczące wody pitnej. Przetłumacz go, lub porozmawiaj z kimś, kto go rozumie.

GREEK
Η έκθεση αυτή περιέχει σημαντικές πληροφορίες σχετικά με το πόσιμο νερό σας. Μεταφράστε την έκθεση ή μιλήστε με κάποιο άτομο που την κατανοεί.

HMONG
Daim ntawv qhia no muaj cov lus qhia tseem ceeb txog koj cov dej haus. Muab txhais, los sis nrog ib tug neeg uas nkag siab txog qhov no tham.

HEBREW
דו"ח זה מכיל מידע חשוב על מי שתייה. תרגמו אותו או שאלו מישהו שמבין את תוכנו.

ARABIC
يحتوي هذا التقرير على معلومات هامة حول مياه الشرب التي تتناولها. ترجم التقرير أو تحدث إلى شخص يستطيع فهمه.

FARSI
این گزارش حاوی اطلاعات مهمی درمورد آب آشامیدنی است. آن را ترجمه کنید. یا از کسی که مطالب آن را می فهمد سئوال کنید.

URDU
اس رپورٹ میں آپ کے پینے کے پانی سے متعلق اہم معلومات ہیں. اس کا ترجمہ کریں، یا کسی ایسے شخص سے بات کریں جو اسے سمجھتا ہو.

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

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Educational Information

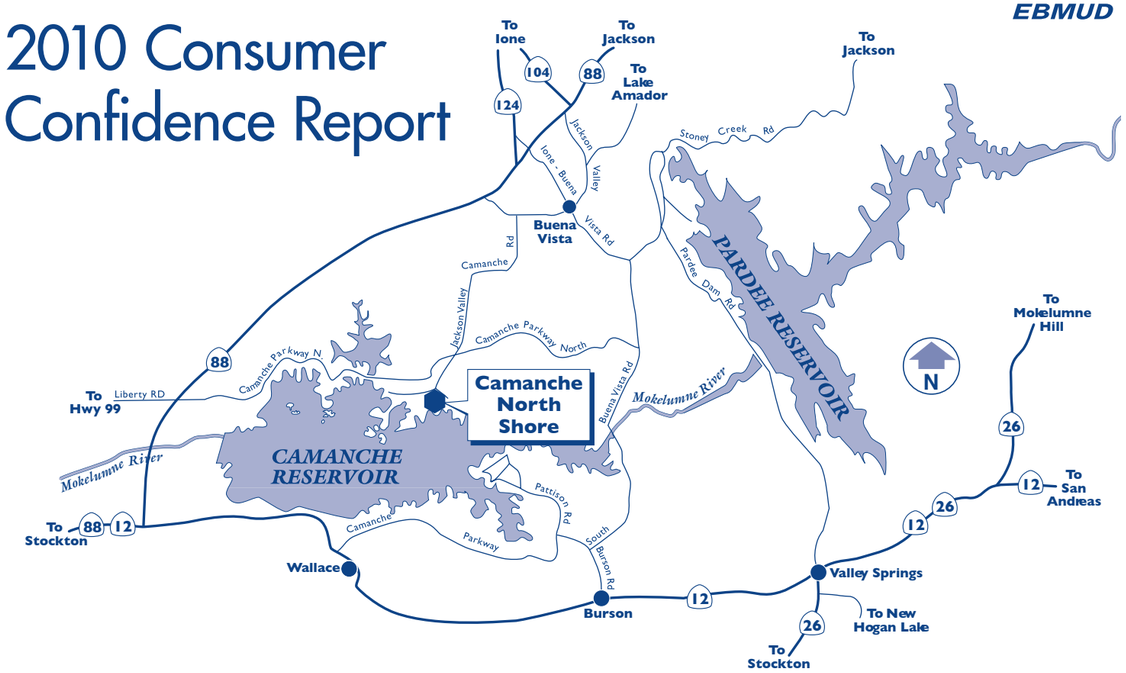
Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Camanche North Shore

2010 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Three deep wells are the main water sources for Camanche North Shore Recreation Area. Water is treated at the Camanche North Shore Water Treatment Plant. Treatment includes addition of potassium permanganate and filtration through a pyrolusite filter system for removal of iron and manganese, and addition of chlorine for disinfection. The distribution system is served by two 140,000 gallon storage tanks. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Camanche North Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All primary water quality regulations were met in 2010.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District aquifer, and found that the source is most vulnerable to gas stations. In 2010, no contaminants associated with these activities were detected in EBMUD's drinking water sources.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Camanche North Shore 2010 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2010, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Fluoride (mg/L)	2.0	1	<0.1	<0.1–0.18	2008	Erosion of natural deposits; discharge from fertilizer and aluminum factories
Barium (mg/L)	1	2	0.1	0.1	2010	Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits
Lead (µg/L)*	Al=15	0.2	90th Percentile =4	No sites out of 5	2010	Internal corrosion of household plumbing system; erosion of natural deposits; discharges from industrial manufacturers
Copper (µg/L)	Al=1300	300	90th Percentile =13	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Organic Contaminants						
Xylenes (mg/L)	1.750	1.8	0.0007	0.0006–0.0009	2010	Discharges from petroleum refineries and chemical factories; fuel solvent
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NS	17†	17	2010	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NS	5†	5	2010	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.4-2.4	2010	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		13	13	2010	Runoff/leaching from natural deposits
Color (Color Unit)	15		2	2	2010	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	6.9	1.7–38††	2010	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		305	305	2010	Substances that form ions when in water
Sulfate (mg/L)	250		30	30	2010	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (mg/L)	500		260	260	2010	Runoff/leaching from natural deposits
Turbidity (NTU)	5		0.14	0.14	2010	Soil runoff

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON values of 4.4, 4.6, 4.7, 6.2, 7.1,7.2 and 38 were detected on 1/12, 10/19, 7/20, 6/29, 11/16, 8/10 and 5/11 2010.

Unregulated Contaminants

	NL	PHG	Average	Range	Sample Year	Typical Sources
Boron (µg/L)	1,000	NS	226	226	2010	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	120
Alkalinity, carbonate (mg/L)	1.1
Calcium (mg/L)	31
Hardness (mg/L)	96

	Average & Range
Magnesium (mg/L)	5.5
pH (pH units)	8
Potassium (mg/L)	6.4
Sodium (mg/L)	31

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NS = No Standard (MCL or PHG for example) established.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. Detectable levels of xylenes were found in 2010, well below the health-related MCL limit. The xylene results from the rehabilitation of the old water tank. Monitoring will continue until detectable levels are eliminated from the old water tank.

Secondary Contaminants, that affects aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The Department waived monitoring requirements for Thiobencarb.

Unregulated Contaminants are monitored for water quality information and to help the USEPA and the Department determine where certain contaminants occur and whether the contaminants need to be regulated.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

In the past five years, EBMUD has led successful efforts to strengthen state and federal environmental laws that protect consumers from lead exposure. In January 2011, President Obama signed the Reduction of Lead in Drinking Water Act requiring manufacturers to reduce lead in plumbing products used for drinking water to 0.25 percent by 2014. California's lead regulations require all such products currently sold in the state to meet those requirements.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead*.

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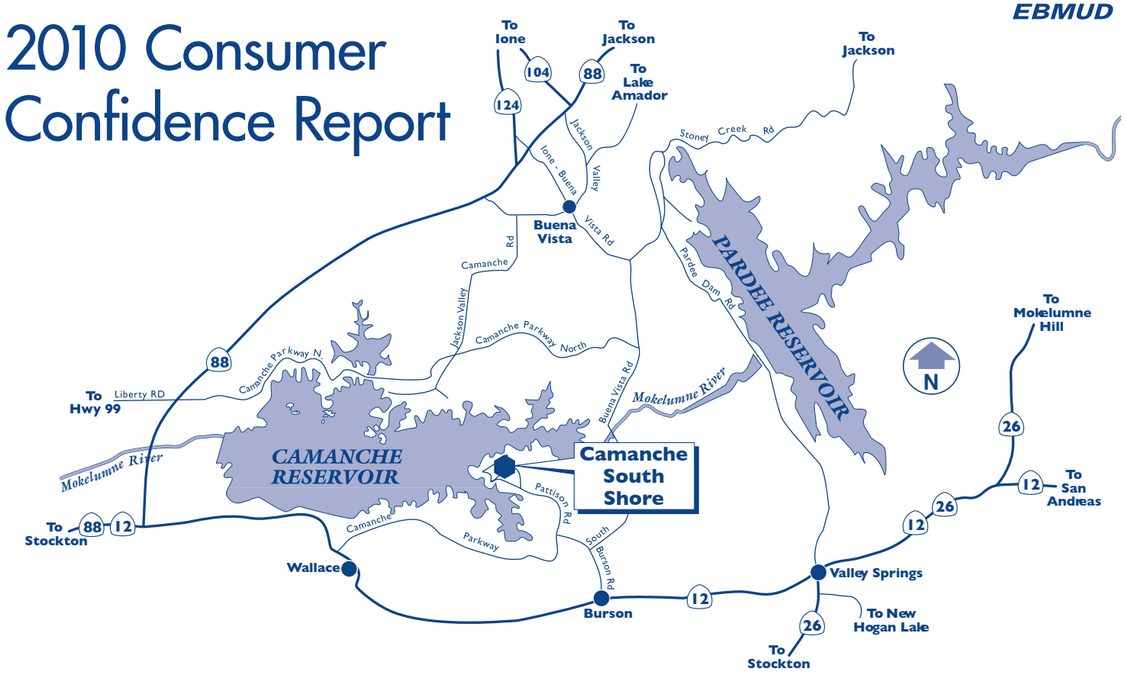
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Camanche South Shore

2010 Consumer Confidence Report

EBMUD



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Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Camanche Reservoir is the water source for Camanche South Shore Recreation Area. The Recreation Area is served by Camanche South Shore Water Treatment Plant. Treatment includes: coagulation, filtration and chlorination. The water treatment facility and distribution system are operated by state certified operators. The distribution system is served by two 240,000 gallon storage tanks.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Camanche South Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All primary drinking water standards were met in 2010.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to the following activities: boating and marina gas stations, wastewater treatment and disposal facilities, historic gas stations, known contaminant plumes and historical mining. In 2010, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Camanche South Shore 2010 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2010, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (µg/L)	Al=1300	300	90th Percentile =28	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (µg/L)*	Al=15	0.2	90th Percentile =1.9	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; discharges from industrial manufacturers
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NS	53†	53	2010	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NS	40†	40	2010	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.5–1.1	2010	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		3.8	3.8	2010	Runoff/leaching from natural deposits
Odor–Threshold (TON)	3	††	4.2	2.3–7.7	2010	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		46.2	46.2	2010	Substances that form ions when in water
Sulfate (mg/L)	250		1.8	1.8	2010	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (mg/L)	500		29	29	2010	Runoff/leaching from natural deposits

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON value of 7.7 was detected on 5/18/2010.

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	20
Calcium (mg/L)	4.8
Hardness (mg/L)	20
Magnesium (mg/L)	1.2
pH (pH units)	7.8
Potassium (mg/L)	0.7
Sodium (mg/L)	2.7

Treatment of Surface Water Sources

Treatment Technique	Direct Filtration (dual media filtration with anthracite and sand)
Turbidity Performance Standards	1. Be less than or equal to 0.3 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.1 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NS = No Standard (MCL or PHG for example) established.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The Department waived monitoring requirements for Thiobencarb.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

In the past five years, EBMUD has led successful efforts to strengthen state and federal environmental laws that protect consumers from lead exposure. In January 2011, President Obama signed the Reduction of Lead in Drinking Water Act requiring manufacturers to reduce lead in plumbing products used for drinking water to 0.25 percent by 2014. California's lead regulations require all such products currently sold in the state to meet those requirements.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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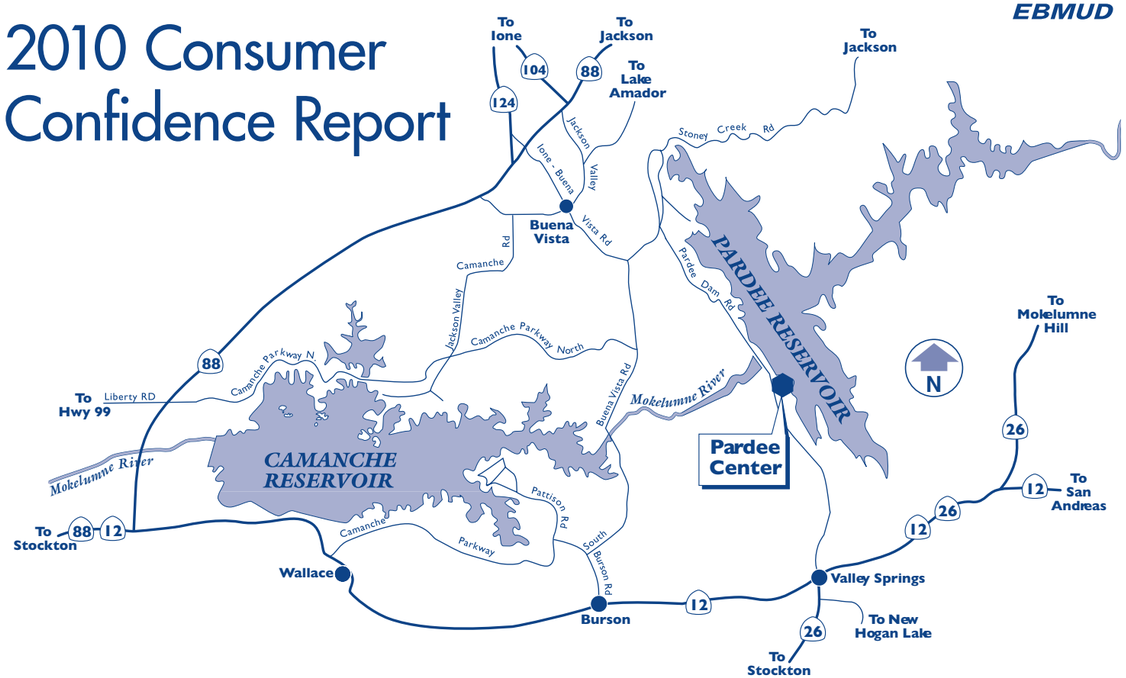
Pardee Center

2010 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Pardee Reservoir is the water source for Pardee Center. Pardee Center has a dual water distribution system. The non-potable system serves the fire hydrants, irrigation system, chemical buildings, and various other uses throughout Pardee Center. Pardee Center is served by a state-of-the-art nanofiltration membrane water treatment facility. Nanofiltration can remove particles as small as 0.001 microns. Water treatment also includes the addition of soda ash for corrosion control. The distribution system is served by a 13,900 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Pardee Center water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2010.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to boating and marina gas stations. In 2010, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Center Water Treatment Plant (WTP) does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.001 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Pardee Center 2010 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2010, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (µg/L)	Al=1300	300	90th Percentile =25	No sites above AL out of 5 sites sampled	2008	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (µg/L)*	Al=15	0.2	90th Percentile =1.2	No sites above AL out of 5 sites sampled	2008	Internal corrosion of household plumbing system; erosion of natural deposits; discharges from industrial manufacturers
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NS	16†	16	2010	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NS	18†	18	2010	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.4-1.1	2010	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		2.1	2.1	2010	Runoff/leaching from natural deposits
Color (Color Unit)	15		13	13	2008	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	2	1.1–3.5††	2008	Naturally occurring organic materials
Specific Conductance (µS/cm)	1600		37.7	37.7	2009	Substances that form ions when in water
Total Dissolved Solids (mg/L)	500		26	26	2010	Runoff/leaching from natural deposits

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON value of 3.5 was detected on 4/22/2008.

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	14
Alkalinity, carbonate (mg/L)	0.1
Calcium (mg/L)	1.2
Hardness (mg/L)	5
Magnesium (mg/L)	0.4
pH (pH units)	7.9
Potassium (mg/L)	0.3
Sodium (mg/L)	4.6

Treatment of Surface Water Sources

Treatment Technique	Nanofiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.1 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.1 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NS = No Standard (MCL or PHG for example) established.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

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Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for nontransient-noncommunity water systems such as Pardee Center.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

In the past five years, EBMUD has led successful efforts to strengthen state and federal environmental laws that protect consumers from lead exposure. In January 2011, President Obama signed the Reduction of Lead in Drinking Water Act requiring manufacturers to reduce lead in plumbing products used for drinking water to 0.25 percent by 2014. California's lead regulations require all such products currently sold in the state to meet those requirements.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

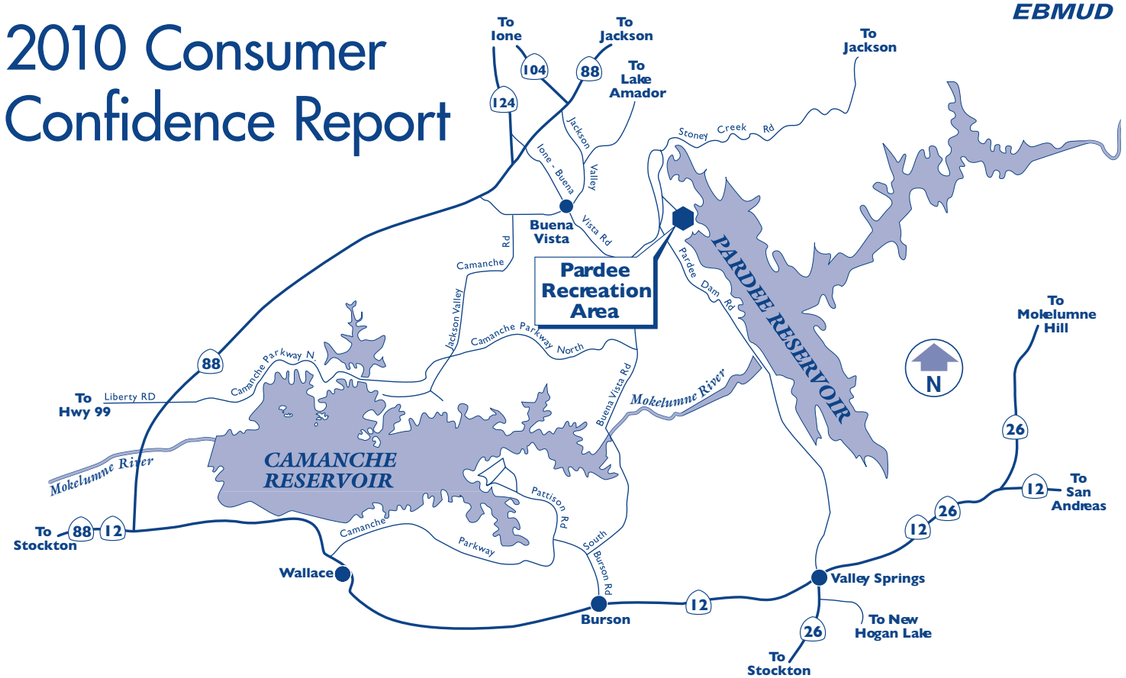
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Recreation Water Treatment Plant (WTP) does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.01 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Pardee Recreation Area

2010 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

The Recreation Area is served by a state-of-the-art ultrafiltration membrane water treatment facility. Ultrafiltration can remove particles as small as 0.01 microns. The distribution system is served by a 97,000 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Pardee Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2010.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to gasoline storage and dispensing at the recreation area marina and boating. In 2010, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Pardee Recreation Area 2010 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2010, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Disinfection Byproducts, Disinfectant Residuals						
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	1.0†	0.5–1.3	2010	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		3.5	3.5	2010	Runoff/leaching from natural deposits
Color (Color Unit)	15		3	3	2006	Naturally occurring organic materials
Odor Threshold (TON)	3		1.6	1.6	2009	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		41	41	2010	Substances that form ions when in water
Sulfate (mg/L)	250		1.2	1.2	2010	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (mg/L)	500		31	31	2009	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	15
Alkalinity, carbonate (mg/L)	<0.1
Calcium (mg/L)	3.3
Hardness (mg/L)	12
Magnesium (mg/L)	1.1
pH (pH units)	7.5
Potassium (mg/L)	0.5
Sodium (mg/L)	3.8

Treatment of Surface Water Sources

Treatment Technique	Ultrafiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.1 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.05 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

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NS = No Standard (MCL or PHG for example) established.

NTU = Nephelometric Turbidity Units.

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PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

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Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

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Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived monitoring requirements for inorganic contaminants, except for nitrate and nitrite. Regulations do not require lead and copper monitoring at the consumer's tap for transient-noncommunity water systems such as Pardee Recreation Area.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities. Regulations do not require monitoring for radioactive contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. The Department waived monitoring requirements for organic chemical contaminants.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Other Parameters are water quality measurements which may be of interest to some consumers.

Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

In the past five years, EBMUD has led successful efforts to strengthen state and federal environmental laws that protect consumers from lead exposure. In January 2011, President Obama signed the Reduction of Lead in Drinking Water Act requiring manufacturers to reduce lead in plumbing products used for drinking water to 0.25 percent by 2014. California's lead regulations require all such products currently sold in the state to meet those requirements.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead*.



EAST BAY MUNICIPAL UTILITY DISTRICT

2011 ANNUAL WATER QUALITY REPORT

In 2011, EBMUD water met or surpassed every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

PROTECTED SOURCE

Ninety percent of EBMUD's water comes from the 577-square mile watershed of the Mokelumne River on the western slope of the Sierra Nevada. This area is mostly national forest, EBMUD-owned lands and other undeveloped lands little affected by human activity. The Mokelumne watershed collects snowmelt from Alpine, Amador and Calaveras counties. The snowmelt flows into Pardee Reservoir near the town of Valley Springs.

Three large aqueducts carry water more than 90 miles from Pardee Reservoir to the East Bay and protect it from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges. When water demand is high or during times of operational need, EBMUD also draws water from protected local watersheds.

FOCUS ON WATER QUALITY

Regardless of source, all raw water is treated and filtered at one of EBMUD's water treatment plants before entering the East Bay's distribution system and reaching your tap. EBMUD takes many steps to ensure water quality including managing watershed lands and reservoirs, treating the water, operating a complex distribution system, maintaining facilities and addressing customer concerns.

In laboratories and in the field, EBMUD samples and tests your water extensively to make sure it is safe to drink. We look for more than 100 substances in the water including microorganisms, pesticides, herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water treatment processes. More than 20,000 annual laboratory tests ensure the safety of your drinking water.

EBMUD

WATER QUALITY REGULATIONS

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the California Department of Public Health (CDPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The CDPH regulations also establish limits for contaminants in bottled water.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects is available from the USEPA's Safe Drinking Water Hotline at 800-426-4791 or online at www.epa.gov/safewater.

Contaminants in drinking water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants, such as viruses, bacteria and protozoa, such as *Cryptosporidium*, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Synthetic organic contaminants, such as pesticides and herbicides that may come from a variety of sources, including agriculture, urban storm water and residential uses.

Volatile organic chemical contaminants from industrial processes and petroleum production, and from gas stations, urban storm water runoff, agricultural application and septic systems.

Radioactive contaminants that can be naturally occurring or be the result of oil and gas production and mining activities.

Cryptosporidium

Cryptosporidium is a microbial contaminant found in surface water throughout the United States. Although filtration is highly effective in removing *Cryptosporidium*, the most commonly used filtration methods cannot guarantee 100 percent removal.

Our monitoring indicates the presence of these organisms in one of our source waters. Current test methods cannot determine if the organisms are dead or are capable of causing disease. Ingestion of *Cryptosporidium* may cause abdominal infection with symptoms including nausea, diarrhea and abdominal cramps.

Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants and small children, and the elderly are at greater risk of developing life-threatening illness. We encourage these individuals to consult their physician regarding appropriate precautions to take to avoid infection.



Low resistance

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, and some elderly and infants can be particularly at risk from infections.

These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the USEPA Safe Drinking Water Hotline at 800-426-4791 or www.epa.gov/safewater.

Lead

If present, elevated levels of lead can cause serious health problems. Pregnant women, infants and young children are typically more vulnerable to lead in drinking water than the general population.

Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high-quality drinking water and has replaced all known lead service lines in its service area, but cannot control the variety of materials used in existing home plumbing components. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing.

If you are concerned about elevated lead levels in your home's water, or if your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to 2 minutes before using water for drinking or cooking. You also may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline at 800-426-4791 or online at www.epa.gov/safewater/lead.

EBMUD 2011 ANNUAL WATER QUALITY REPORT

SURPASSING REGULATIONS

In 2011, EBMUD water met or surpassed every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

The five tables show the measured levels of constituents detected in 2011 or in the most recent required year at EBMUD source waters, water treatment plants or in the distribution system.

Table 1 – Health-Related Standards
Constituents with primary maximum contaminant levels (MCLs) are regulated to protect your health.

Table 2 – Aesthetic Standards
Constituents with secondary maximum contaminant levels (MCLs) are regulated to maintain aesthetic standards for drinking water, such as odor, taste and appearance.

Table 3 – Unregulated constituents
Water agencies are required to report these substances if detected, but no maximum contaminant levels have been established.

Table 4 – Lead and copper
Lead and copper are regulated at the customer's tap and were most recently sampled in 2011 as required.

Table 5 – Other water quality parameters
These water measurements, such as pH, hardness and alkalinity, may be of interest to some consumers.

KEY TERMS

DBP – Disinfection by-products. These are formed when chlorine and/or ozone reacts with natural constituents in water. Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products.
MCL – Maximum contaminant level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs are set to protect odor, taste and appearance of drinking water.
MCLG – Maximum contaminant level goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.
MRDL – Maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG – Maximum residual disinfectant level goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
Notification level – A health-based advisory level established by the California Department of Public Health for chemicals in drinking water that lack MCLs.
Primary drinking water standard – These standards regulate contaminants that affect health by setting MCLs and MRDLs along with their monitoring, reporting and water treatment requirements.
PHG – Public health goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. Public health goals are set by the California Environmental Protection Agency.
Regulatory action level – The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.
TOC – Total organic carbon. A measure of organic compounds that could form by-products after disinfection.
Turbidity – A measure of the cloudiness of water. Turbidity is monitored because it is a good indication of the effectiveness of our filtration systems.
TT – Treatment technique. A required process intended to reduce the level of a contaminant in drinking water.
90th percentile – A measure that indicates 90 percent of the samples had a lower result.

1 Constituents with primary MCLs

	Constituents with primary MCLs	Unit	Year sampled	MCL or [MRDL]	PHG, (MCLG) or [MRDLG]	Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Microbiological	Cryptosporidium in source water	#/liter	2008	TT	(0)	NA	0	0	0	0.3	0	Naturally present in the environment
	Total Coliform	—	2011	5%	(0)	NA	zero detections found in more than 4,500 samples from the distribution system					Naturally present in the environment
	Turbidity	NTU	2011	1	NS	0.03	0.02 – 0.10	0.02 – 0.09	0.02 – 0.10	0.02 – 0.10	0.03 – 0.10	Soil runoff
		—		95% ≤0.3	NS	100%	100%	100%	100%	100%	100%	
Radioactive	Gross alpha in source water [a]	pCi/L	2006, 2007	15	(0)	<3	<3	<3	<3	<3 – 11	<3	Erosion of natural deposits
	Gross beta in source water	pCi/L	2006, 2007	50 [b]	(0)	<4	<4	<4	<4	<4 – 9	<4	Decay of natural and man-made deposits
	Uranium in source water [a]	pCi/L	2006, 2007	20	0.43	NA	<1	<1	<1	<1	<1	Erosion of natural deposits
Inorganic	Aluminum	ppb	2011	1000	600	<50	<50	<50	<50	<50 – 83	<50 – 57	Erosion of natural deposits; water treatment residue
	Chloramine as Cl_2	ppm	2011	[4]	[4]	1.9 [c]			<0.05 – 3.4 [d]			Drinking water disinfectant added for treatment
	Fluoride in source water [e]	ppm	2011	2	1	<0.1	<0.1	<0.1	<0.1	<0.1	0.16	Erosion of natural deposits [e]
Organic	Acrylamide	—	2011	TT	(0)	NA	met req.	NA	NA	NA	NA	Added to water during water treatment
	Control of DBP precursors/TOC	—	2011	TT	NS	NA	NA	NA	NA	met req.	met req.	Various natural and man-made sources
	Haloacetic acids, 5 species	ppb	2011	60	NS	25 [c]	14 – 34	17 – 35	16 – 22	26 – 40	16 – 41	By-product of drinking water disinfection
	Trihalomethanes	ppb	2011	80	NS	44 [c]	37 – 60	35 – 49	39 – 48	42 – 53	28 – 70	By-product of drinking water disinfection

2 Constituents with secondary MCLs

Constituents with secondary MCLs	Unit	Year sampled	MCL	PHG	Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Aluminum	ppb	2011	200	NS	<50	<50	<50	<50	<50 – 83	<50 – 57	Erosion of natural deposits; water treatment residue
Chloride	ppm	2011	250	NS	9	3	4	4 – 6	15	16	Runoff/leaching from natural deposits
Color	color units	2011	15	NS	1	2	<1	2	<1	2	Naturally-occuring organic materials
Foaming agents (MBAS)	ppb	2011	500	NS	<50	<50	<50	<50 – 140	<50	<50	Municipal and industrial waste discharges
Odor	TON	2011	3	NS	2	2	2	2	1	1	Naturally-occuring organic materials
Specific conductance	µS/cm	2011	900	NS	177	42	45	73 – 116	321	382	Substances that form ions when in water
Sulfate	ppm	2011	250	NS	16	0.6	0.6	3.7 – 10	33	38	Runoff/leaching from natural deposits
Total dissolved solids	ppm	2011	500	NS	106	33	29	53 – 67	170	240	Runoff/leaching from natural deposits
Turbidity	NTU	2011	5	NS	0.03	0.02 – 0.10	0.02 – 0.09	0.02 – 0.10	0.02 – 0.10	0.03 – 0.10	Soil runoff

3 Unregulated constituents

Unregulated constituents	Unit	Year sampled	Notification level	PHG	Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Boron	ppb	2011	1000	NS	<100	<100	<100	<100	<100	116	Runoff/leaching from natural deposits
Chlorate	ppb	2011	800	NS	143	120	98	79 – 170	100 – 210	140 – 270	By-product of sodium hypochlorite decomposition
N-Nitrosodimethylamine [f] (NDMA)	ppt	2011	10	3	2	<1 – 7	1 – 3	1 – 4	2 – 3	<1 – 6	By-product of drinking water chlorination

4 Lead and copper

Lead and copper	Unit	Year sampled	Regulatory action level	PHG	90th percentile	Sites above regulatory action level	Typical sources
Copper	ppb	2011	1300	300	66	0 out of 51	Internal corrosion of household plumbing systems ; erosion of natural deposits; leaching from wood preservatives
Lead [g]	ppb	2011	15	0.2	7	3 out of 51	Internal corrosion of household plumbing systems ; erosion of natural deposits

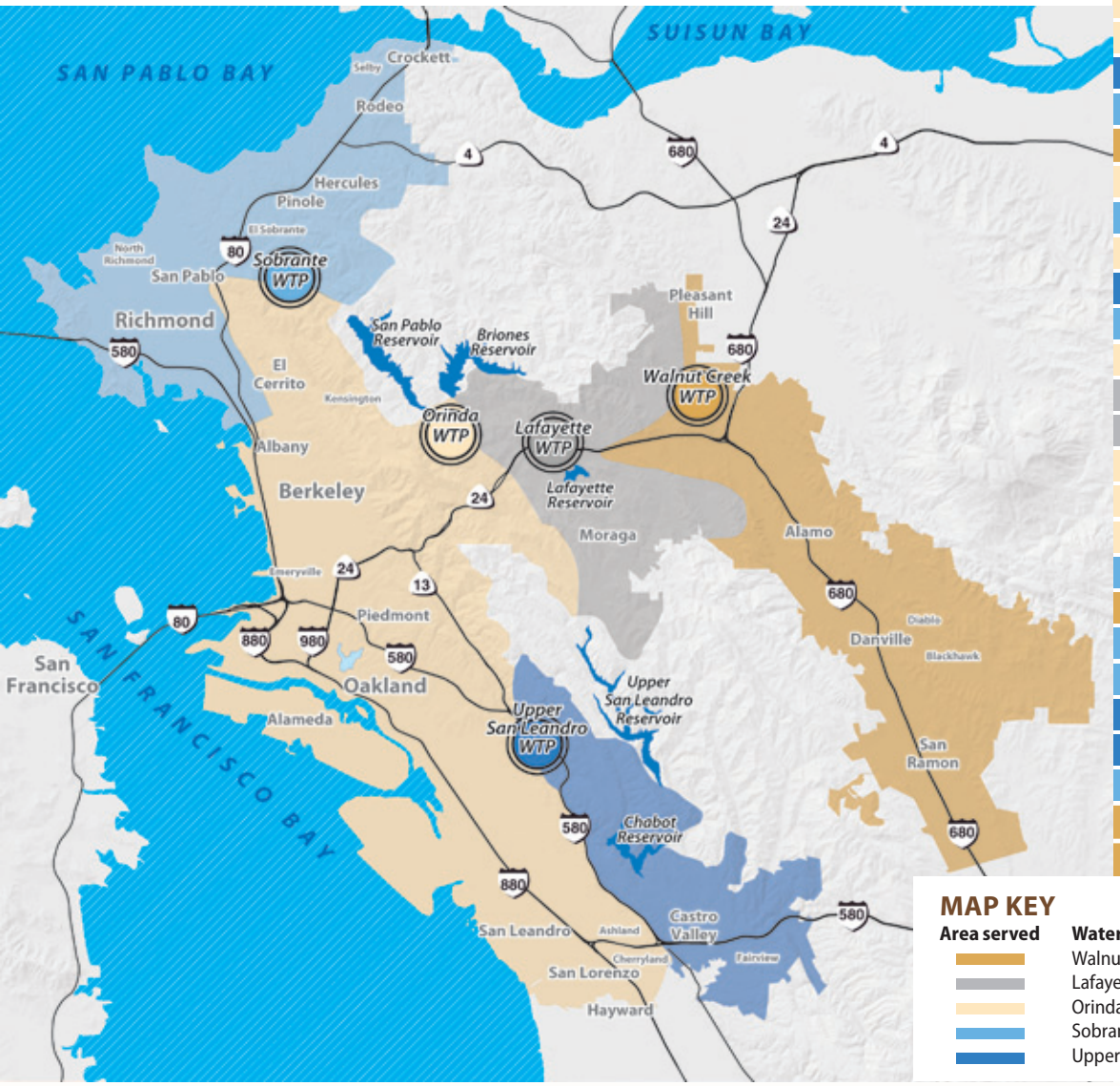
FOOTNOTES

a) Uranium was detected at 1.1 pCi/L and gross alpha was detected at 4.6 pCi/L in Chabot Reservoir. This is an emergency standby reservoir that has not been used for water supply in more than 30 years. **b)** CDPH considers 50 pCi/L to be the level of concern for gross beta particles. **c)** Highest running annual average. **d)** Chloramine residuals in the distribution system are measured as an equivalent quantity of chlorine. When the chloramine residual cannot be detected, the sample is further analyzed to ensure that microbiological water quality is in compliance with the regulations. **e)** Fluoride is also added to help prevent dental decay in consumers. Current regulations require that fluoride levels in the treated water be maintained between 0.7 to 1.4 ppm with an optimum dose of 0.8 ppm. Information about fluoridation, oral health and current issues is available from www.cdph.ca.gov/certlic/drinkingwater/pages/fluoridation.aspx. **f)** Sampling locations are chosen to represent worst-case scenarios. **g)** See *Water Quality Regulations* page for additional information about lead in drinking water. **h)** Grains per gallon (gpg) is a measure of water hardness. Knowing the amount can help improve the function of dishwashers, cooling equipment and other industrial processes.

MEETING DAILY WATER DEMAND

EBMUD provides high-quality drinking water to 1.3 million customers in Alameda and Contra Costa counties. EBMUD's water treatment plants are capable of filtering and processing a combined total of more than 375 million gallons of water daily.

This map of the EBMUD service area shows which water treatment plants serve your neighborhood. Lafayette, Sobrante and Upper San Leandro water treatment plants operate during periods of high demand or for operational needs.



WHICH WATER TREATMENT PLANTS SERVE YOUR CITY?

City	Treatment plants
Alameda	Orinda/Upper San Leandro
Alamo	Walnut Creek
Albany	Orinda
Berkeley	Orinda
Castro Valley	Upper San Leandro/Orinda
Crockett	Sobrante/Orinda
Danville	Walnut Creek
El Cerrito	Orinda
El Sobrante	Sobrante/Orinda
Emeryville	Orinda
Hayward	Upper San Leandro/Orinda
Hercules	Sobrante/Orinda
Kensington	Orinda
Lafayette	Lafayette/Walnut Creek
Moraga	Lafayette/Orinda
Oakland	Orinda/Upper San Leandro
Orinda	Orinda/Lafayette
Piedmont	Orinda/Upper San Leandro
Pinole	Sobrante/Orinda
Pleasant Hill	Walnut Creek
Richmond	Sobrante/Orinda
Rodeo	Sobrante/Orinda
San Leandro	Upper San Leandro/Orinda
San Lorenzo	Upper San Leandro/Orinda
San Pablo	Sobrante/Orinda
San Ramon	Walnut Creek
Walnut Creek	Walnut Creek/Lafayette

MAP KEY

Area served	Water treatment plant	Source reservoir(s)
	Walnut Creek WTP	Pardee (in Sierra foothills)
	Lafayette WTP	Pardee
	Orinda WTP	Pardee, Briones
	Sobrante WTP	San Pablo
	Upper San Leandro WTP	Upper San Leandro

ABBREVIATIONS

gpg – grains per gallon
NA – not applicable
NS – no standard established
NTU – nephelometric turbidity unit, a measure of the cloudiness of water.
pCi/L – picocuries per liter, a measure of radioactivity.
ppm – parts per million, a proportion equivalent to about 30 seconds in one year. (mg/L)
ppb – parts per billion, a proportion equivalent to about 30 seconds in 1,000 years. (µg/L)
ppt – parts per trillion, a proportion equivalent to about 30 seconds in 1,000,000 years. (ng/L)
TON – threshold odor number, a measure of odor in water.
µS/cm – microsiemens per centimeter, a measure of electrical conductance.

5 Other water quality parameters	Unit	Water treatment plants				
		Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro
Alkalinity, bicarbonate as $CaCO_3$	ppm	16	12	25 – 31	78	130
Alkalinity, carbonate as $CaCO_3$	ppm	1.8	1.2	2.4 – 3.6	3.8	6.4
Calcium	ppm	3.4 – 5.7	3.3 – 6.2	3.4 – 10.8	20 – 23	32 – 35
Hardness as $CaCO_3$	gpg [h]	0.7 – 1.2	0.7 – 1.2	0.8 – 2.2	4.8 – 5.2	7.1 – 9.4
	ppm	12 – 20	12 – 21	14 – 37	81 – 88	120 – 160
Magnesium	ppm	0.5 – 1.3	0.5 – 1.5	0.6 – 2.5	6.7 – 7.9	14
pH	pH	8.8 – 9.3	8.8 – 9.3	8.8 – 9.4	8.6 – 9.0	8.6 – 9.3
Potassium	ppm	0.4 – 0.7	0.4 – 0.8	0.4 – 1.0	1.0 – 1.7	1.4 – 2.0
Silica	ppm	8.0 – 13.2	7.9 – 14.1	7.9 – 12.3	8.6 – 10.5	10.3 – 10.6
Sodium	ppm	4.4 – 6.2	4.1 – 6.3	4.5 – 10	24 – 26	29 – 31

ENGLISH
This report contains important information about your drinking water. Translate it, or speak with someone who understands it. To request a copy of this report in Spanish or Chinese, please call 510-287-0138.

SPANISH
Este informe contiene información muy importante sobre su agua potable. Tradúzcalo, hable con alguien que lo entienda bien, o solicite un ejemplar de este informe en español llamando al 510-287-0138.

CHINESE
這份報告包含有您飲用水的重要資訊。請翻譯該內容，或與了解內容的人討論，或者請致電 510-287-0138 索取中文報告。

TAGALOG
Ang ulat na ito ay naglalaman ng importanteng impormasyon tungkol sa inyong iniinom na tubig. Isalin ito, o makipag-usap sa isang taong nakakaintindi nito.

VIETNAMESE
Bản báo cáo này có các thông tin quan trọng về nước uống của quý vị. Hãy chuyển ngữ tài liệu này, hoặc nói chuyện với người có thể hiểu được bản báo cáo này.

KOREAN
본 보고서에는 귀하의 음료수에 관한 중요한 정보가 나와 있습니다. 번역을 부탁하거나 그 내용을 이해하시는 분으로부터 설명을 들으십시오.

FARSI
این گزارش حاوی اطلاعات مهمی در مورد آب آشامیدنی است. آن را ترجمه کنید، یا ازکسی که مطالب آن را می فهمد سئوال کنید.

JAPANESE
この報告書には、あなたの飲料水に関する重要な情報が含まれています。和訳するか、理解できる人に相談してください。

RUSSIAN
Здесь содержится информация о вашей питьевой воде. Переведите ее, или обратитесь к тому, кто это понимает.

CAMBODIAN
របាយការណ៍នេះមានព័ត៌មានសំខាន់អំពីទឹកផឹក។ សូមរកគេឲ្យបកប្រែជូនឬពិគ្រោះជាមួយអ្នកណាដែលយល់របាយការណ៍នេះ។

PORTUGUESE
Este relatório contém informações importantes sobre sua água potável. Traduza o relatório ou fale com alguém que o compreenda.

ARABIC
يحتوي هذا التقرير على معلومات هامة حول مياه الشرب التي تتناولها. ترجم التقرير أو تحدث إلى شخص يستطيع فهمه.

HINDI
इस रिपोर्ट में आपके पीने के पानी के बारे में महत्वपूर्ण जानकारी दी हुई है। इसका अनुवाद करें, या किसी ऐसे व्यक्ति से बात करें जो इसे समझता हो।

FRENCH
Ce rapport contient des informations importantes concernant votre eau potable. Faites-le traduire ou adressez-vous à quelqu'un qui est en mesure de le comprendre.

THAI
รายงานฉบับนี้มีข้อมูลสำคัญเกี่ยวกับน้ำดื่มของท่านขอให้แปลรายงานฉบับนี้หรือพูดคุยกับผู้ที่เข้าใจเนื้อหาในรายงานนี้

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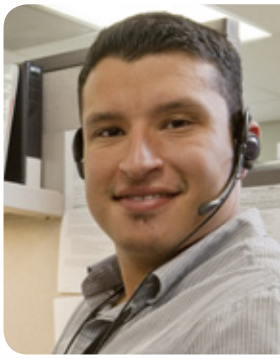

For more information about water quality or to report a water quality concern, call 866-40-EBMUD (866-403-2683) or visit www.ebmud.com.

EBMUD encourages public participation in decisions affecting drinking water quality and other matters at its Board of Directors meeting held the second and fourth Tuesdays of each month at 1:15 p.m., 375 Eleventh Street, 2nd Floor, Oakland.

Board of Directors
John A. Coleman • Katy Foulkes
Andy Katz • Doug Linney • Lesa R. McIntosh
Frank Mellon • William B. Patterson

General Manager
Alexander R. Coate

ADDITIONAL CONTACTS

California Department of Public Health
Drinking Water Branch • 510-620-3463

U.S. Environmental Protection Agency
Safe Drinking Water Hotline • 800-426-4791

Alameda County
Public Health Department • 510-267-8000

Contra Costa
Public Health Division • 925-313-6712

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Educational Information

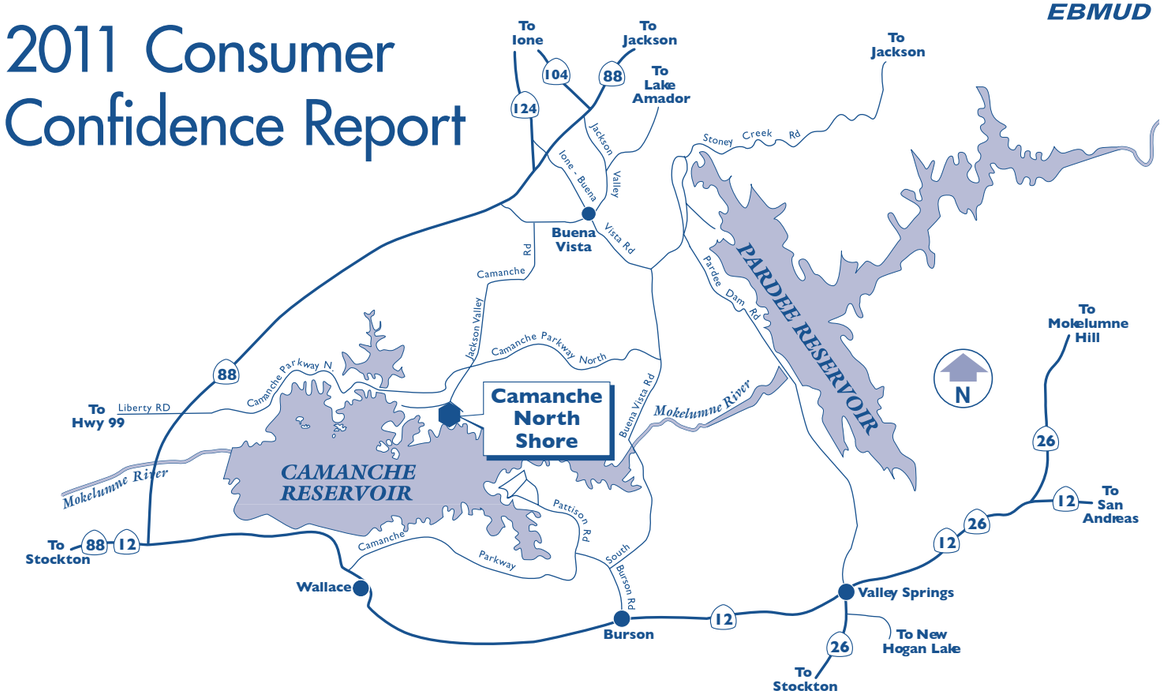
Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Camanche North Shore

2011 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Three deep wells are the main water sources for Camanche North Shore Recreation Area. Water is treated at the Camanche North Shore Water Treatment Plant. Treatment includes addition of potassium permanganate and filtration through a pyrolusite filter system for removal of iron and manganese, and addition of chlorine for disinfection. The distribution system is served by two 140,000 gallon storage tanks. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Camanche North Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All primary water quality regulations were met in 2011.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District aquifer, and found that the source is most vulnerable to gas stations. In 2011, no contaminants associated with these activities were detected in EBMUD's drinking water sources.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Camanche North Shore 2011 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2011, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Fluoride (mg/L)	2.0	1	0.12	<0.1–0.15	2011	Erosion of natural deposits; discharge from fertilizer and aluminum factories
Lead (µg/L)*	Al=15	0.2	90th Percentile =4	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; discharges from industrial manufacturers
Copper (µg/L)	Al=1300	300	90th Percentile =13	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Organic Contaminants						
Xylenes (mg/L)	1.750	1.8	0.0008	0.0005–0.0015	2011	Discharges from petroleum refineries and chemical factories; fuel solvent
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NS	16†	16	2011	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NS	6†	6	2011	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	1.0†	0.3–1.9	2011	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		12	5–17	2011	Runoff/leaching from natural deposits
Color (Color Unit)	15		2	1–3	2011	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	**3.7**	**1.7–12**††	2011	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		308	298–315	2011	Substances that form ions when in water
Sulfate (mg/L)	250		34	16–47	2011	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (mg/L)	500		250	250	2011	Runoff/leaching from natural deposits
Turbidity (NTU)	5		0.145	0.13–0.14	2011	Soil runoff

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON values of 1.7, 2.6, 2.8, 2.6, 2.9, 1.8, 12 and 2.9 were detected on 1/11, 2/8, 3/15, 4/12, 5/17, 6/28, 7/12 and 10/18 2011.

Unregulated Contaminants

	NL	PHG	Average	Range	Sample Year	Typical Sources
Boron (µg/L)	1,000	NS	345	345	2011	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	100–120
Alkalinity, carbonate (mg/L)	0.5–0.6
Calcium (mg/L)	29–30
Hardness (mg/L)	98–99

	Average & Range
Magnesium (mg/L)	2.7–5.6
pH (pH units)	7.7
Potassium (mg/L)	4.9
Sodium (mg/L)	30–31

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NS = No Standard (MCL or PHG for example) established.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. Detectable levels of xylenes were found in 2011, well below the health-related MCL limit. The xylene results from the rehabilitation of the old water tank. Monitoring will continue until detectable levels are eliminated from the old water tank.

Secondary Contaminants, that affects aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The Department waived monitoring requirements for Thiobencarb.

Unregulated Contaminants are monitored for water quality information and to help the USEPA and the Department determine where certain contaminants occur and whether the contaminants need to be regulated.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead*.

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Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

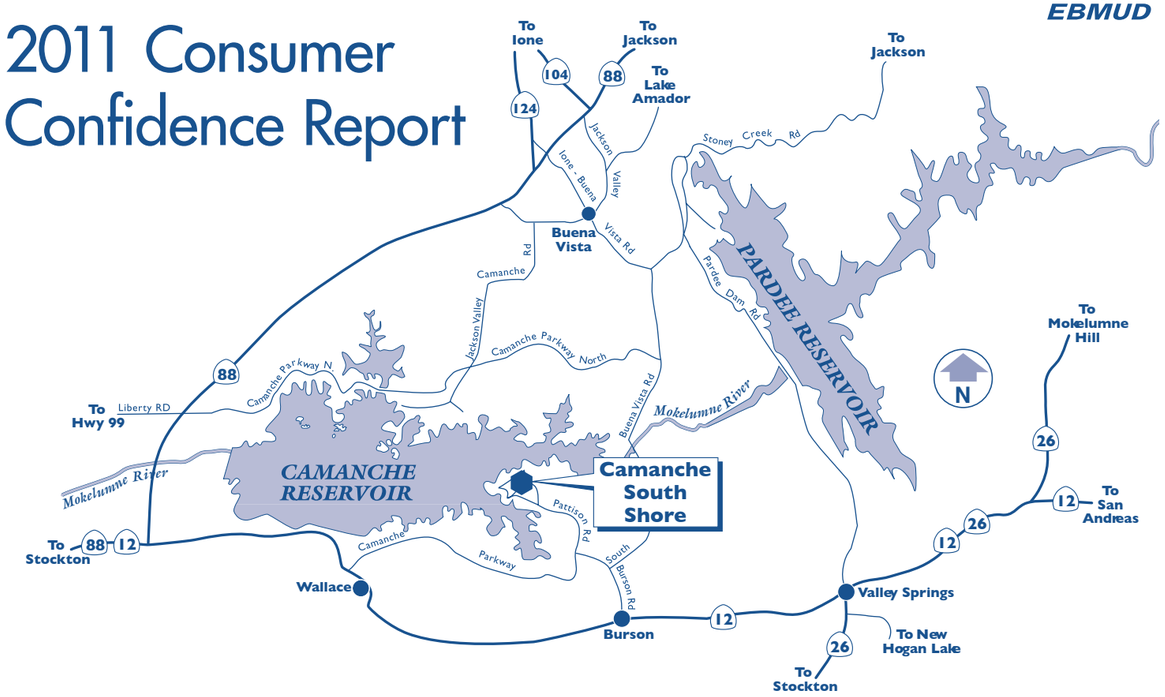
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Camanche South Shore

2011 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Camanche Reservoir is the water source for Camanche South Shore Recreation Area. The Recreation Area is served by Camanche South Shore Water Treatment Plant. Treatment includes: coagulation, filtration and chlorination. The water treatment facility and distribution system are operated by state certified operators. The distribution system is served by two 240,000 gallon storage tanks.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Camanche South Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All primary drinking water standards were met in 2011.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to the following activities: boating and marina gas stations, wastewater treatment and disposal facilities, historic gas stations, known contaminant plumes and historical mining. In 2011, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Camanche South Shore 2011 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2011, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (µg/L)	Al=1300	300	90th Percentile =28	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (µg/L)*	Al=15	0.2	90th Percentile =1.9	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; discharges from industrial manufacturers
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NS	35†	35	2011	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NS	31†	31	2011	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.5–1.3	2011	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		3.8	3.8	2011	Runoff/leaching from natural deposits
Color (Color Unit)	15		5	5	2011	Naturally occurring organic mater
Odor–Threshold (TON)	3		2.2	1.5–2.8	2011	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		50	50	2011	Substances that form ions when in water
Sulfate (mg/L)	250		1.7	1.7	2011	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (mg/L)	500		33	33	2011	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	19
Alkalinity, carbonate (mg/L)	0.1
Calcium (mg/L)	5.3
Hardness (mg/L)	18

	Average & Range
Magnesium (mg/L)	1.4
pH (pH units)	7.8
Potassium (mg/L)	0.7
Sodium (mg/L)	2.6

Treatment of Surface Water Sources

Treatment Technique	Direct Filtration (dual media filtration with anthracite and sand)
Turbidity Performance Standards	1. Be less than or equal to 0.3 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.1 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NS = No Standard (MCL or PHG for example) established.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The Department waived monitoring requirements for Thiobencarb.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Center Water Treatment Plant (WTP) does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.001 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Pardee Center
2011 Consumer Confidence Report

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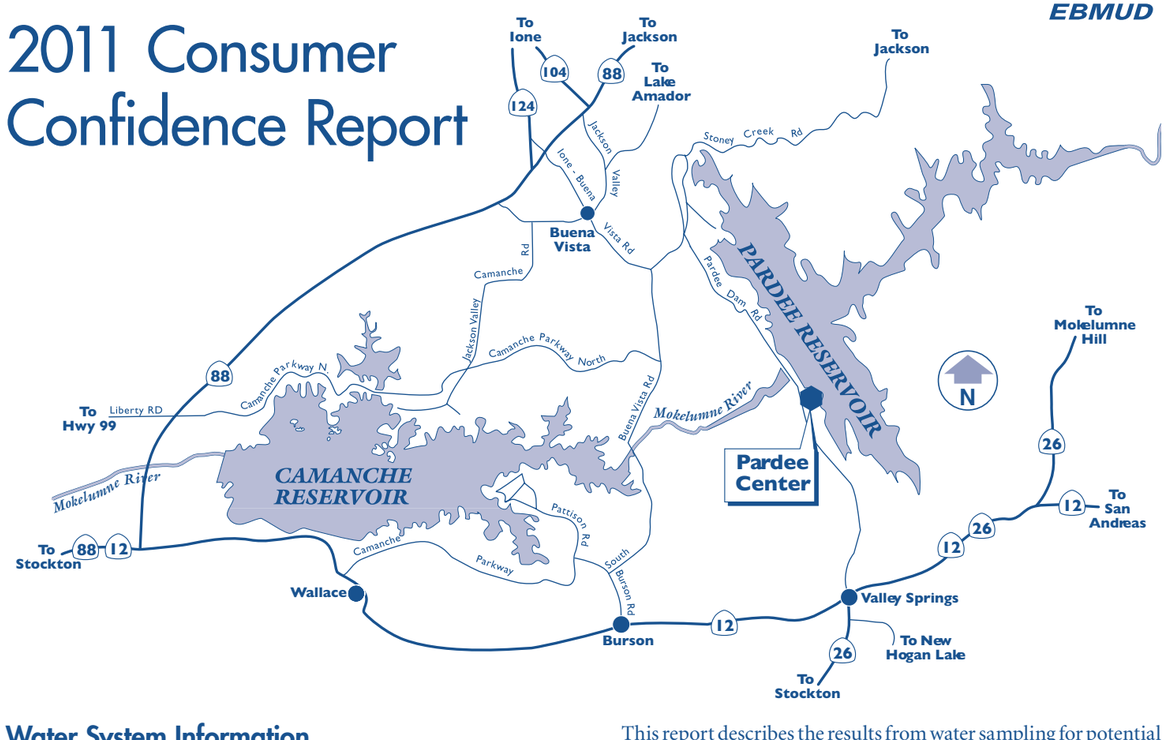

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Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Pardee Reservoir is the water source for Pardee Center. Pardee Center has a dual water distribution system. The non-potable system serves the fire hydrants, irrigation system, chemical buildings, and various other uses throughout Pardee Center. Pardee Center is served by a state-of-the-art nanofiltration membrane water treatment facility. Nanofiltration can remove particles as small as 0.001 microns. Water treatment also includes the addition of soda ash for corrosion control and chlorine for disinfection. The distribution system is served by a 13,900 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Pardee Center water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2011.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to boating and marina gas stations. In 2011, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Pardee Center 2011 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2011, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (µg/L)	Al=1300	300	90th Percentile =67	No sites above AL out of 5 sites sampled	2011	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (µg/L)*	Al=15	0.2	90th Percentile =4	No sites above AL out of 5 sites sampled	2011	Internal corrosion of household plumbing system; erosion of natural deposits; discharges from industrial manufacturers
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NS	7†	7	2011	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NS	9†	9	2011	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.6–1.1	2011	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		1.7	1.7	2011	Runoff/leaching from natural deposits
Color (Color Unit)	15		13	13	2008	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	**2**	**1.1–3.5††**	2008	Naturally occurring organic materials
Specific Conductance (µS/cm)	1600		27	27	2011	Substances that form ions when in water
Total Dissolved Solids (mg/L)	500		18	18	2011	Runoff/leaching from natural deposits

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON value of 3.5 was detected on 4/22/2008.

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	16
Alkalinity, carbonate (mg/L)	<0.1
Calcium (mg/L)	0.7
Hardness (mg/L)	6

	Average & Range
Magnesium (mg/L)	0.2
pH (pH units)	7.7–7.9
Potassium (mg/L)	0.3
Sodium (mg/L)	4.3

Treatment of Surface Water Sources

Treatment Technique	Nanofiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.1 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.05 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NS = No Standard (MCL or PHG for example) established.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for nontransient-noncommunity water systems such as Pardee Center.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

EAST BAY
MUNICIPAL UTILITY DISTRICT
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Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

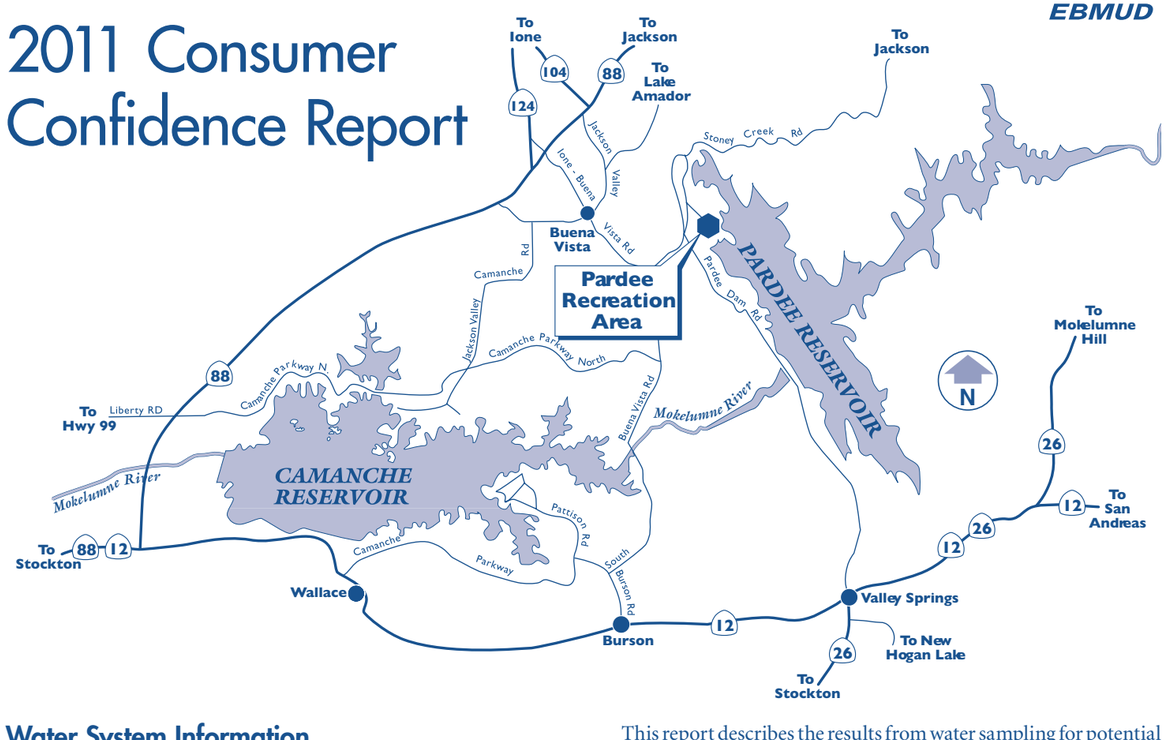
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Recreation Water Treatment Plant (WTP) does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.01 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Pardee Recreation Area

2011 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

The Recreation Area is served by a state-of-the-art ultrafiltration membrane water treatment facility with chlorine for disinfection. Ultrafiltration can remove particles as small as 0.01 microns. The distribution system is served by a 97,000 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Pardee Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2011.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to gasoline storage and dispensing at the recreation area marina and boating. In 2011, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Pardee Recreation Area 2011 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2011, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Disinfection Byproducts, Disinfectant Residuals						
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.8†	0.3–1	2011	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		4	4	2011	Runoff/leaching from natural deposits
Color (Color Unit)	15		3	3	2006	Naturally occurring organic materials
Odor Threshold (TON)	3		1.6	1.6	2009	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		53	53	2011	Substances that form ions when in water
Sulfate (mg/L)	250		1.6	1.6	2011	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (mg/L)	500		40	40	2011	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	20
Alkalinity, carbonate (mg/L)	<0.1
Calcium (mg/L)	4.2
Hardness (mg/L)	18
Magnesium (mg/L)	1.5
pH (pH units)	7.3
Potassium (mg/L)	0.6
Sodium (mg/L)	3.9

Treatment of Surface Water Sources

Treatment Technique	Ultrafiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.1 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.05 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NS = No Standard (MCL or PHG for example) established.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived monitoring requirements for inorganic contaminants, except for nitrate and nitrite. Regulations do not require lead and copper monitoring at the consumer's tap for transient-noncommunity water systems such as Pardee Recreation Area.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities. Regulations do not require monitoring for radioactive contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. The Department waived monitoring requirements for organic chemical contaminants.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*



EAST BAY MUNICIPAL UTILITY DISTRICT

2012 ANNUAL WATER QUALITY REPORT

In 2012, EBMUD water met or surpassed every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

PROTECTED SOURCE

EBMUD provides high-quality drinking water to 1.3 million customers in Alameda and Contra Costa counties. Ninety percent of EBMUD's water comes from the 578-square mile watershed of the Mokelumne River on the western slope of the Sierra Nevada. This area is mostly national forest, EBMUD-owned lands and other undeveloped lands little affected by human activity.

The Mokelumne watershed collects snowmelt from Alpine, Amador and Calaveras counties. The snowmelt flows into Pardee Reservoir near the town of Valley Springs.

Three large aqueducts carry water more than 90 miles from Pardee Reservoir to the East Bay and protect it from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges. When water demand is high or during times of operational need, EBMUD also draws water from protected local watersheds.

FOCUS ON WATER QUALITY

Regardless of source, all raw water is treated and filtered at one of EBMUD's water treatment plants before entering the East Bay's distribution system and reaching your tap. EBMUD's water treatment plants are capable of filtering and processing a combined total of more than 425 million gallons of water daily.

EBMUD takes many steps to ensure water quality including managing watershed lands and reservoirs, treating the water, operating a complex distribution system, maintaining facilities and addressing customer concerns.

In laboratories and in the field, EBMUD samples and tests your water extensively to ensure it is safe to drink. We look for more than 100 substances in the water including microorganisms, pesticides, herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water treatment processes. More than 20,000 annual laboratory tests ensure the safety of your drinking water.

EBMUD

WATER QUALITY REGULATIONS

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the California Department of Public Health (CDPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The CDPH regulations also establish limits for contaminants in bottled water.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects is available from the USEPA's Safe Drinking Water Hotline at 800-426-4791 or online at www.epa.gov/safewater.

Contaminants in drinking water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity. Contaminants that may be present in source water include:

Microbial contaminants, such as viruses, bacteria and protozoa, such as *Cryptosporidium*, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Synthetic organic contaminants, such as pesticides and herbicides that may come from a variety of sources, including agriculture, urban storm water and residential uses.

Volatile organic chemical contaminants from industrial processes and petroleum production, and from gas stations, urban storm water runoff, agricultural application and septic systems.

Radioactive contaminants that can be naturally occurring or be the result of oil and gas production and mining activities.

Cryptosporidium

Cryptosporidium is a microbial contaminant found in surface water throughout the United States. Although filtration is highly effective in removing *Cryptosporidium*, the most commonly used filtration methods cannot guarantee 100 percent removal.

Our monitoring indicates the presence of these organisms in one of our source waters. Current test methods cannot determine if the organisms are dead or are capable of causing disease. Ingestion of *Cryptosporidium* may cause abdominal infection with symptoms including nausea, diarrhea and abdominal cramps.

Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants and small children, and the elderly are at greater risk of developing life-threatening illness. We encourage these individuals to consult their physician regarding appropriate precautions to take to avoid infection.



Low resistance

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, and some elderly and infants can be particularly at risk from infections.

These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the USEPA Safe Drinking Water Hotline at 800-426-4791 or www.epa.gov/safewater.

Lead

If present, elevated levels of lead can cause serious health problems. Pregnant women, infants and young children are typically more vulnerable to lead in drinking water than the general population.

Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high-quality drinking water and has replaced all known lead service lines in its service area, but cannot control the variety of materials used in existing home plumbing components. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing.

If you are concerned about elevated lead levels in your home's water, or if your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to 2 minutes before using water for drinking or cooking. You also may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline at 800-426-4791 or online at www.epa.gov/safewater/lead.

EBMUD 2012 ANNUAL WATER QUALITY REPORT

SURPASSING REGULATIONS

In 2012, EBMUD water met or surpassed every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

The five tables show the measured levels of constituents detected in 2012 or in the most recent required year at EBMUD source waters, water treatment plants or in the distribution system.

Table 1 – Health-Related Standards
These constituents with primary maximum contaminant levels (MCLs) are regulated to protect your health.

Table 2 – Aesthetic Standards
These constituents with secondary maximum contaminant levels (MCLs) are regulated to maintain aesthetic standards for drinking water, such as odor, taste and appearance.

Table 3 – Unregulated constituents
Water agencies are required to report these substances if detected, but no maximum contaminant levels have been established.

Table 4 – Lead and copper
Lead and copper are regulated at the customer's tap and were most recently sampled in 2011 as required.

Table 5 – Other water quality parameters
These water measurements, such as pH, hardness and alkalinity, may be of interest to some consumers.

KEY TERMS

DBP – Disinfection by-products. These are formed when chlorine and/or ozone reacts with natural constituents in water. Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products.
MCL – Maximum contaminant level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs are set to protect odor, taste and appearance of drinking water.
MCLG – Maximum contaminant level goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.
MRDL – Maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG – Maximum residual disinfectant level goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
Notification level – A health-based advisory level established by the California Department of Public Health for chemicals in drinking water that lack MCLs.
Primary drinking water standard – These standards regulate contaminants that affect health by setting MCLs and MRDLs along with their monitoring, reporting and water treatment requirements.
PHG – Public health goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. Public health goals are set by the California Environmental Protection Agency.
Regulatory action level – The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.
TOC – Total organic carbon. A measure of organic compounds that could form by-products after disinfection.
Turbidity – A measure of the cloudiness of water. Turbidity is monitored because it is a good indication of the effectiveness of our filtration systems.
TT – Treatment technique. A required process intended to reduce the level of a contaminant in drinking water.
90th percentile – A measure that indicates 90 percent of the samples had a lower result.

1 Constituents with primary MCLs		Unit	Year sampled	MCL or [MRDL]	PHG, (MCLG) or [MRDLG]	System Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Microbiological	Cryptosporidium in source water	#/liter	2008	TT	(0)	NA	0	0	0	0.3	0	Naturally present in the environment
	Total Coliform	—	2012	5%	(0)	NA	0.3% was highest percentage found in any month					Naturally present in the environment
	Turbidity	NTU	2012	1	NA	0.03	0.02 – 0.10	0.02 – 0.10	0.02 – 0.10	0.03 – 0.10	0.04 – 0.10	Soil runoff
		—		95% ≤0.3	NA	100%	100%	100%	100%	100%	100%	
Radioactive	Gross alpha in source water [a]	pCi/L	2006, 2007	15	(0)	<3	<3	<3	<3	<3 – 11	<3	Erosion of natural deposits
	Gross beta in source water	pCi/L	2006, 2007	50 [b]	(0)	<4	<4	<4	<4	<4 – 9	<4	Decay of natural and man-made deposits
	Uranium in source water [a]	pCi/L	2006, 2007	20	0.43	NA	<1	<1	<1	<1	<1	Erosion of natural deposits
Inorganic	Aluminum	ppb	2012	1000	600	<50	<50	<50	<50	<50 – 53	<50 – 64	Erosion of natural deposits; water treatment residue
	Chloramine as Cl_2	ppm	2012	[4]	[4]	1.9 [c]	<0.05 – 3.1 [d]					Drinking water disinfectant added for treatment
	Fluoride in treated water [e]	ppm	2012	2	1	0.9	0.8 – 1.0					Erosion of natural deposits; water additive [e]
Organic	Control of DBP precursors/TOC	—	2012	TT	NA	NA	NA	NA	NA	met req.	met req.	Various natural and man-made sources
	Haloacetic acids, 5 species	ppb	2012	60	NA	22 [c]	15 – 24	19 – 22	15 – 30	18 – 33	12 – 24	By-product of drinking water chlorination
	Trihalomethanes	ppb	2012	80	NA	40 [c]	25 – 47	32 – 42	31 – 53	29 – 66	30 – 43	By-product of drinking water chlorination

2 Constituents with secondary MCLs	Unit	Year sampled	MCL	PHG	System Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Aluminum	ppb	2012	200	NA	<50	<50	<50	<50	<50 – 53	<50 – 64	Erosion of natural deposits; water treatment residue
Chloride	ppm	2012	250	NA	9	4 – 5	4 – 5	4 – 6	15 – 17	16 – 18	Runoff/leaching from natural deposits
Color	color units	2012	15	NA	2	2	2	1 – 2	1	3	Naturally-occuring organic materials
Foaming agents (MBAS)	ppb	2012	500	NA	<50	<50	81	<50	<50	<50	Municipal and industrial waste discharges
Manganese	ppb	2012	50	NA	<20	<20	<20	<20	<20	<20 – 31	Leaching from natural deposits
Odor	TON	2012	3	NA	1	1	1	<1 – 1	1	1	Naturally-occuring organic materials
Specific conductance	µS/cm	2012	900	NA	169	56	60	64 – 108	274	369	Substances that form ions when in water
Sulfate	ppm	2012	250	NA	16	1	1	1 – 10	30 – 37	39 – 43	Runoff/leaching from natural deposits
Total dissolved solids	ppm	2012	500	NA	108	21 – 58	35 – 46	35 – 72	160 – 190	230 – 240	Runoff/leaching from natural deposits
Turbidity	NTU	2012	5	NA	0.03	0.02 – 0.10	0.02 – 0.10	0.02 – 0.10	0.03 – 0.10	0.04 – 0.10	Soil runoff

3 Unregulated constituents	Unit	Year sampled	Notification level	PHG	System Average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Boron	ppb	2012	1000	NA	<100	<100	<100	<100	<100	123	Runoff/leaching from natural deposits
Chlorate	ppb	2012	800	NA	224	210	160	170 – 200	200 – 310	230 – 350	By-product of sodium hypochlorite decomposition
N-Nitrosodimethylamine [f] (NDMA)	ppt	2012	10	3	2	<1 – 2	1 – 2	<1 – 6	<1 – 3	<1 – 6	By-product of drinking water chlorination

4 Lead and copper	Unit	Year sampled	Regulatory action level	PHG	90th percentile	Sites above regulatory action level	Typical sources
Copper	ppb	2011	1300	300	66	0 out of 51	Internal corrosion of household plumbing systems ; erosion of natural deposits; leaching from wood preservatives
Lead [g]	ppb	2011	15	0.2	7	3 out of 51	Internal corrosion of household plumbing systems ; erosion of natural deposits

FOOTNOTES

a) Uranium was detected at 1.1 pCi/L and gross alpha was detected at 4.6 pCi/L in Chabot Reservoir. This is an emergency standby reservoir that has not been used for water supply in more than 30 years. **b)** CDPH considers 50 pCi/L to be the level of concern for gross beta particles. **c)** Highest running annual average. **d)** Chloramine residuals in the distribution system are measured as an equivalent quantity of chlorine. When the chloramine residual cannot be detected, the sample is further analyzed to ensure that microbiological water quality is in compliance with the regulations. **e)** Fluoride is added to help prevent dental decay in consumers. Current regulations require that fluoride levels in the treated water be maintained between 0.7 to 1.4 ppm with an optimum dose of 0.8 ppm. Information about fluoridation, oral health and current issues is available from www.cdph.ca.gov/certlic/drinkingwater/pages/fluoridation.aspx. **f)** Sampling locations are chosen to represent worst-case scenarios. **g)** See *Water Quality Regulations* page for additional information about lead in drinking water. **h)** Grains per gallon (gpg) is a measure of water hardness. Knowing the amount can help improve the function of dishwashers, cooling equipment and other industrial processes.

WHERE IS MY WATER TREATED?

Much of the year, your drinking water comes from Pardee Reservoir in the Sierra. Before reaching your tap, it is treated at a plant in Walnut Creek or Orinda. During times of high water demand, system maintenance or for operational needs, some neighborhoods' drinking water may come from the local watershed and/or be treated at a different plant.



Water treatment plant (WTP)	Area served	Source reservoir
Walnut Creek		Pardee (in Sierra)
Lafayette		Pardee
Orinda		Pardee, Briones
Sobrante		San Pablo
Upper San Leandro		Upper San Leandro

Walnut Creek Water Treatment Plant

- Orinda
- Moraga
- Lafayette
- Pleasant Hill
- Walnut Creek

served as needed by **Lafayette Treatment Plant**

- Alamo
- Danville
- San Ramon

Orinda Water Treatment Plant

- Crockett
- Rodeo
- Hercules
- Pinole
- El Sobrante
- San Pablo
- Richmond

served as needed by **Sobrante Treatment Plant**

- El Cerrito
- Kensington
- Orinda
- Moraga
- Albany
- Berkeley
- Emeryville
- Piedmont

- Oakland
- Alameda
- San Leandro
- San Lorenzo
- Castro Valley
- Hayward

served as needed by **Upper San Leandro Treatment Plant**

ABBREVIATIONS

gpg – grains per gallon
NA – not applicable
NTU – nephelometric turbidity unit, a measure of the cloudiness of water.
pCi/L – picocuries per liter, a measure of radioactivity.
ppm – parts per million, a proportion equivalent to about 30 seconds in one year. (mg/L)
ppb – parts per billion, a proportion equivalent to about 30 seconds in 1,000 years. (µg/L)
ppt – parts per trillion, a proportion equivalent to about 30 seconds in 1,000,000 years. (ng/L)
TON – threshold odor number, a measure of odor in water.
µS/cm – microsiemens per centimeter, a measure of electrical conductance.

5 Other water quality parameters	Unit	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro
Alkalinity, bicarbonate as $CaCO_3$	ppm	17	18	18 – 29	80	140
Alkalinity, carbonate as $CaCO_3$	ppm	3.5	3.2	4.3 – 5.5	4.0	6.5
Calcium	ppm	4.2 – 6.2	4.9 – 5.9	4.0 – 9.2	20 – 24	31 – 35
Hardness as $CaCO_3$	gpg [h]	0.8 – 1.3	0.9 – 1.3	0.8 – 1.9	4.9 – 5.6	7.6 – 8.8
	ppm	14 – 22	16 – 22	14 – 32	84 – 96	130 – 150
Magnesium	ppm	0.8 – 1.2	0.8 – 1.2	0.8 – 2.1	7.0 – 8.1	13 – 15
pH	pH	9.2 – 9.4	9.2 – 9.4	9.1 – 9.5	8.4 – 8.8	8.6 – 8.8
Potassium	ppm	0.5 – 0.6	0.5 – 0.6	0.5 – 0.9	1.0 – 1.7	1.4 – 2.2
Silica	ppm	8.1 – 11.4	8.5 – 11.0	7.6 – 11.0	7.9 – 9.2	9.7 – 10.8
Sodium	ppm	4.7 – 6.8	5.4 – 7.6	5.0 – 11	27 – 30	30 – 34

This report contains important information about your drinking water. Translate it, or speak with someone who understands it. To request a copy of this report in Spanish or Chinese, please call 866-403-2683.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo, hable con alguien que lo entienda bien, o solicite un ejemplar de este informe en español llamando al 866-403-2683.

這份報告包含有您飲用水的重要資訊。請翻譯該內容，或與了解內容的人討論，或者請致電 866-403-2683 索取中文報告。

Ang ulat na ito ay naglalaman ng importanteng impormasyon tungkol sa inyong iniinom na tubig. Isalin ito, o makipag-usap sa isang taong nakakaintindi nito.

Bản báo cáo này có các thông tin quan trọng về nước uống của quý vị. Hãy chuyển ngữ tài liệu này, hoặc nói chuyện với người có thể hiểu được bản báo cáo này.

본 보고서에는 여러분의 식수에 대한 중요한 정보가 담겨져 있습니다. 번역 또는 지인을 통해 반드시 본 내용을 읽어보시기 바랍니다.

این گزارش حاوی اطلاعات مهمی در مورد آب آشامیدنی است. آن را ترجمه کنید، یا ازکسی که مطالب آن را می فهمد سئوال کنید.

この報告書には、あなたの飲料水に関する重要な情報が含まれています。和訳するか、理解できる人に相談してください。

В настоящем отчете содержится важная информация о питьевой воде. Переведите этот текст или покажите его тому, кто знает английский язык.

របាយការណ៍នេះមានព័ត៌មានសំខាន់ អំពីទឹកផឹក។ សូមរកគេឲ្យបកប្រែជូន ឬពិគ្រោះជាមួយនឹង អ្នកណាដែលយល់របាយការណ៍នេះ។

Este relatório contém informações importantes sobre sua água potável. Traduza o relatório ou fale com alguém que o compreenda.

يحتوي هذا التقرير على معلومات هامة حول مياه الشرب التي تتناولها. ترجم التقرير أو تحدث إلى شخص يستطيع فهمه.

इस रिपोर्ट में आपके पीने के पानी के बारे में महत्वपूर्ण जानकारी दी हुई है। इसका अनुवाद करें, या किसी ऐसे व्यक्ति से बात करें जो इसे समझता हो।

Ce rapport contient des informations importantes concernant votre eau potable. Faites-le traduire ou adressez-vous à quelqu'un qui est en mesure de le comprendre.

รายงานฉบับนี้มีข้อมูลสำคัญเกี่ยวกับน้ำดื่มของท่าน ขอให้แปลรายงานฉบับนี้หรือพูดคุยกับผู้ที่เข้าใจเนื้อหาในรายงานนี้

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Water for life in the East Bay

375 11th Street, Oakland, CA 94607
1-866-40-EBMUD www.ebmud.com

CONTACT US



For more information about water quality or to report a water quality concern, call 866-40-EBMUD (866-403-2683) or visit www.ebmud.com. If you would like this report mailed to you, call 510-986-7555.

EBMUD encourages public participation in decisions affecting drinking water quality and other matters at its Board of Directors meeting held the second and fourth Tuesdays of each month at 1:15 p.m., 375 Eleventh Street, 2nd Floor, Oakland.

Board of Directors
John A. Coleman • Katy Foulkes
Andy Katz • Doug Linney • Lesa R. McIntosh
Frank Mellon • William B. Patterson

General Manager
Alexander R. Coate

ADDITIONAL CONTACTS

California Department of Public Health
Drinking Water Branch • 510-620-3463

U.S. Environmental Protection Agency
Safe Drinking Water Hotline • 800-426-4791

Alameda County
Public Health Department • 510-267-8000

Contra Costa
Public Health Division • 925-313-6712

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Educational Information

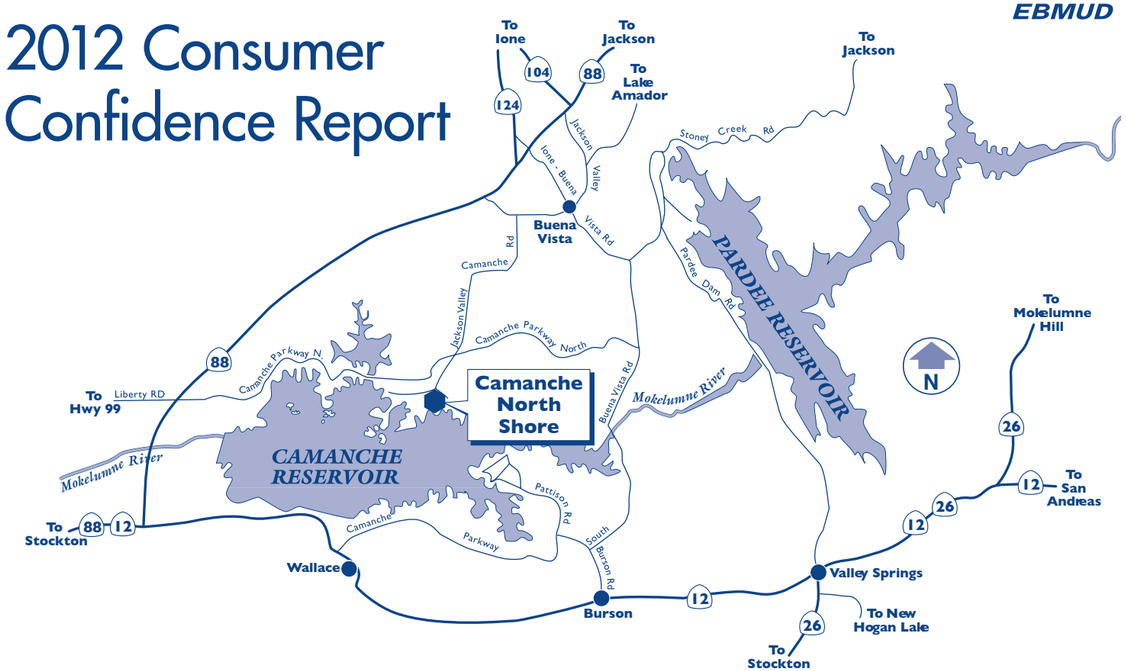
Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Camanche North Shore

2012 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Three deep wells are the main water sources for Camanche North Shore Recreation Area. Water is treated at the Camanche North Shore Water Treatment Plant. Treatment includes addition of potassium permanganate and filtration through a pyrolusite filter system for removal of iron and manganese, and addition of chlorine for disinfection. The distribution system is served by two 140,000 gallon storage tanks. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Camanche North Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All primary water quality regulations were met in 2012.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District aquifer, and found that the source is most vulnerable to gas stations. In 2012, no contaminants associated with these activities were detected in EBMUD's drinking water sources.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Camanche North Shore 2012 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2012, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Microbiological Contaminants						
Total Coliform (number of samples detected, highest month)	More than 1 sample	(0)	NA	0-1	2012	Naturally present in the environment
Inorganic Contaminants						
Fluoride (mg/L)	2.0	1	0.12	<0.1–0.15	2011	Erosion of natural deposits
Barium (mg/L)	1	2	0.1	0.1	2012	Erosion of natural deposits
Lead (µg/L)*	AL=15	0.2	90th Percentile =4	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits;
Copper (µg/L)	AL=1300	300	90th Percentile =13	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Organic Contaminants						
Ethyl Benzene (µg/L)	300	300	0.6	<0.5–1.4	2012	Discharges from petroleum refineries and chemical factories; fuel solvent
Xylenes (mg/L)	1.750	1.8	0.003	<0.0005–0.008	2012	Discharges from petroleum refineries and chemical factories; fuel solvent
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NA	17	17	2012	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NA	6	6	2012	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.5–1.1	2012	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		13	13	2012	Runoff/leaching from natural deposits
Color (Color Unit)	15		2	2	2012	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	**22**	**12-35††**	2012	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		322	322	2012	Substances that form ions when in water
Sulfate (mg/L)	250		29	29	2012	Runoff/leaching from natural deposits;
Total Dissolved Solids (mg/L)	500		240	240	2012	Runoff/leaching from natural deposits
Turbidity (NTU)	5		0.14	0.14	2012	Soil runoff

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON values of 12, 17, 35 and 24 were detected on 1/17, 5/1, 7/24 and 10/16/2012.

Unregulated Contaminants

	NL	PHG	Average	Range	Sample Year	Typical Sources
Boron (µg/L)	1,000	NA	211	211	2012	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	120
Alkalinity, carbonate (mg/L)	0.4
Calcium (mg/L)	29
Hardness (mg/L as $CaCO_3$)	96

	Average & Range
Magnesium (mg/L)	5
pH (pH units)	7.6
Potassium (mg/L)	6
Sodium (mg/L)	31

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. Detectable levels of xylenes were found in 2012, well below the health-related MCL limit. The xylene and ethyl benzene may result from the rehabilitation of the old water tank. Monitoring will continue until detectable levels are eliminated from the old water tank.

Secondary Contaminants, that affects aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The Department waived monitoring requirements for Thiobencarb.

Unregulated Contaminants are monitored for water quality information and to help the USEPA and the Department determine where certain contaminants occur and whether the contaminants need to be regulated.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Camanche South Shore

2012 Consumer Confidence Report

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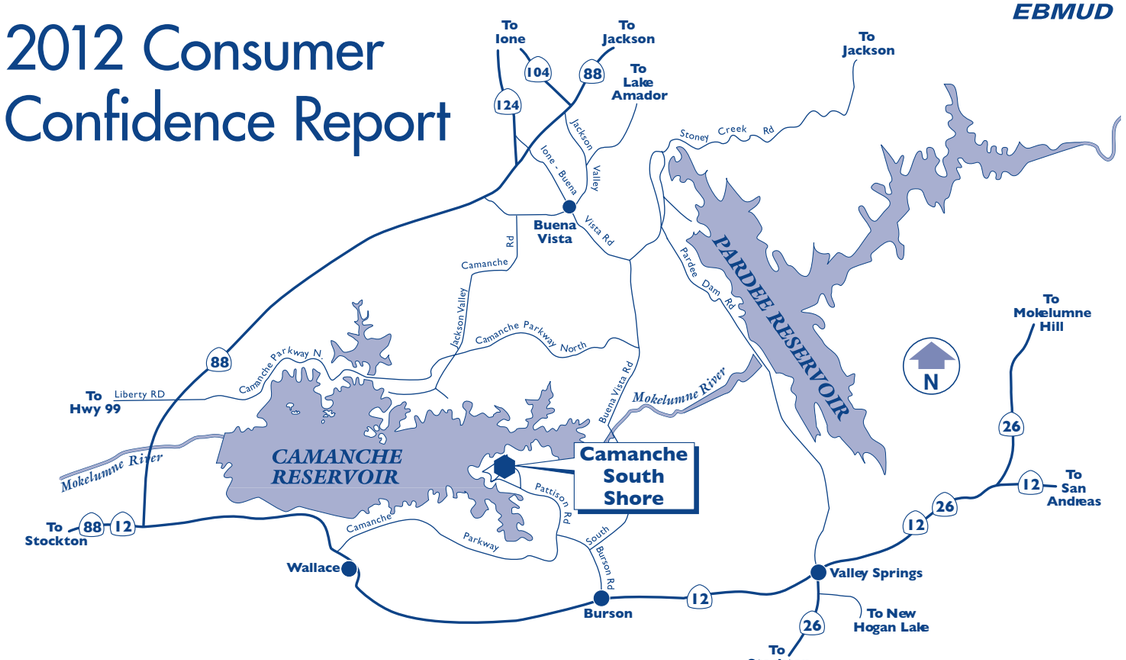

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Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Camanche Reservoir is the water source for Camanche South Shore Recreation Area. The Recreation Area is served by Camanche South Shore Water Treatment Plant. Treatment includes: coagulation, filtration and chlorination. The water treatment facility and distribution system are operated by state certified operators. The distribution system is served by two 240,000 gallon storage tanks.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Camanche South Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All primary drinking water standards were met in 2012.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to the following activities: boating and marina gas stations, wastewater treatment and disposal facilities, historic gas stations, known contaminant plumes and historical mining. In 2012, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Camanche South Shore 2012 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2012, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (µg/L)	AL=1300	300	90th Percentile =28	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (µg/L)*	AL=15	0.2	90th Percentile =1.9	No sites above AL out of 5 sites sampled	2010	Internal corrosion of household plumbing system; erosion of natural deposits
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NA	29	29	2012	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NA	25	25	2012	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.6–0.8	2012	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		6	6	2012	Runoff/leaching from natural deposits
Color (Color Unit)	15		2	2	2012	Naturally occurring organic mater
Odor–Threshold (TON)	3	††	**14**	**4-35††**	2012	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		60	60	2012	Substances that form ions when in water
Sulfate (mg/L)	250		2	2	2012	Runoff/leaching from natural deposits
Total Dissolved Solids (mg/L)	500		43	43	2012	Runoff/leaching from natural deposits

††MCL exceedances for TON did not coincide with any odor complaints by consumers. TON values of 4, 35, and 4 were detected on 5/29, 9/30 and 11/27/2012.

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	20
Alkalinity, carbonate (mg/L)	<0.1
Calcium (mg/L)	4
Hardness (mg/L as $CaCO_3$)	14

	Average & Range
Magnesium (mg/L)	1
pH (pH units)	7.6
Potassium (mg/L)	1
Silica (mg/L)	8
Sodium (mg/L)	6

Treatment of Surface Water Sources

Treatment Technique	Direct Filtration (dual media filtration with anthracite and sand)
Turbidity Performance Standards	1. Be less than or equal to 0.3 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.10 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The Department waived monitoring requirements for Thiobencarb.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

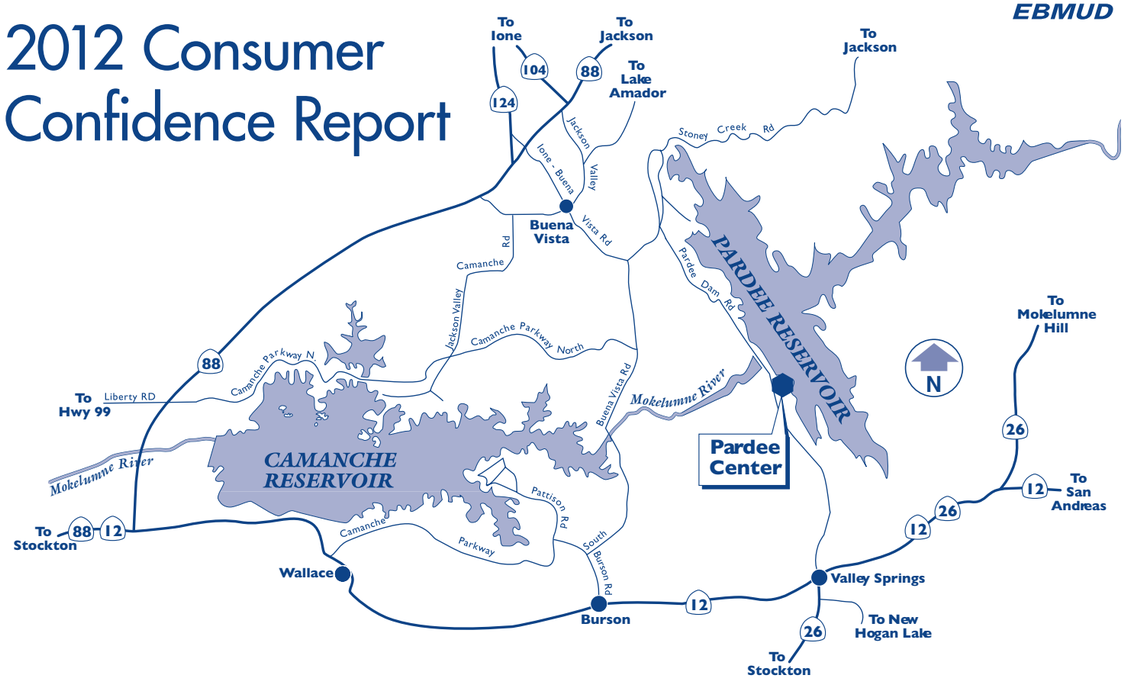
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Center Water Treatment Plant (WTP) does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.001 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Pardee Center

2012 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Pardee Reservoir is the water source for Pardee Center. Pardee Center has a dual water distribution system. The non-potable system serves the fire hydrants, irrigation system, chemical buildings, and various other uses throughout Pardee Center. Pardee Center is served by a state-of-the-art nanofiltration membrane water treatment facility. Nanofiltration can remove particles as small as 0.001 microns. Water treatment also includes the addition of soda ash for corrosion control and chlorine for disinfection. The distribution system is served by a 13,900 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Pardee Center water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2012.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to boating and marina gas stations. In 2012, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Pardee Center 2012 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2012, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (µg/L)	AL=1300	300	90th Percentile =67	No sites above AL out of 5 sites sampled	2011	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (µg/L)*	AL=15	0.2	90th Percentile =4	No sites above AL out of 5 sites sampled	2011	Internal corrosion of household plumbing system; erosion of natural deposits
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NA	8	8	2012	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NA	9	9	2012	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.5–1.2	2012	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		2	2	2012	Runoff/leaching from natural deposits
Color (Color Unit)	15		13	13	2008	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	**2**	**1.1–3.5††**	2008	Naturally occurring organic materials
Specific Conductance (µS/cm)	1600		26	26	2012	Substances that form ions when in water
Total Dissolved Solids (mg/L)	500		38	38	2012	Runoff/leaching from natural deposits

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON value of 3.5 was detected on 4/22/2008.

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	16
Alkalinity, carbonate (mg/L)	<0.1
Calcium (mg/L)	1
Hardness (mg/L as $CaCO_3$)	4

	Average & Range
Magnesium (mg/L)	0.3
Potassium (mg/L)	0.4
Sodium (mg/L)	6

Treatment of Surface Water Sources

Treatment Technique	Nanofiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.1 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.05 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for nontransient-noncommunity water systems such as Pardee Center.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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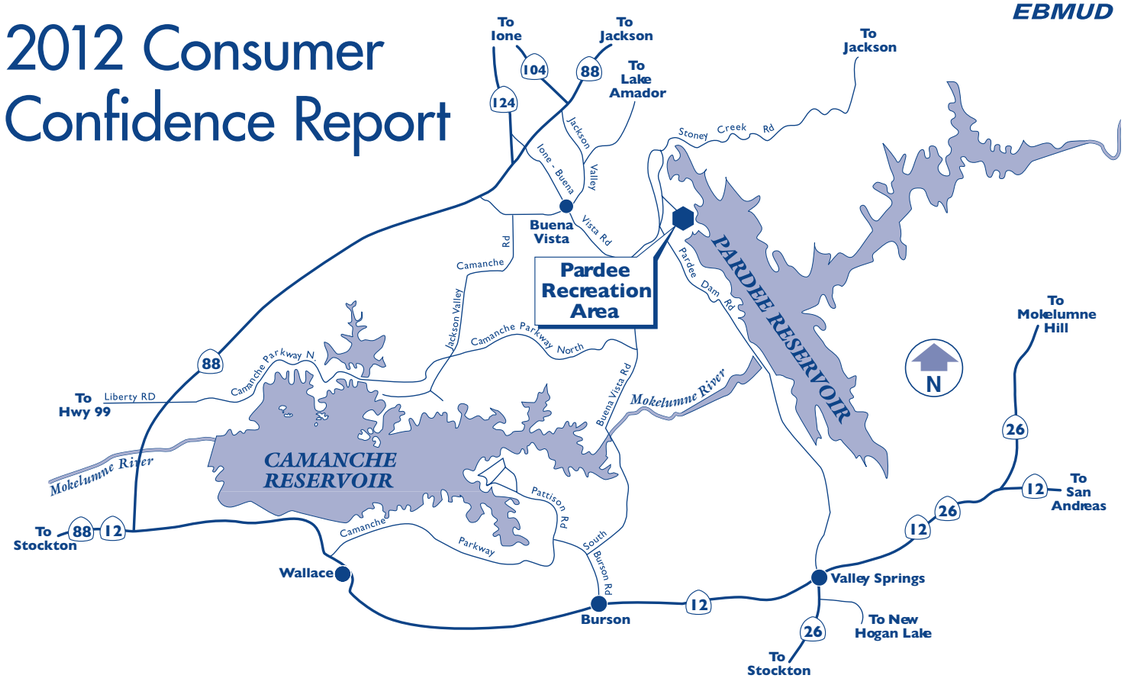
Pardee Recreation Area

2012 Consumer Confidence Report

EBMUD



Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Recreation Water Treatment Plant (WTP) does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.01 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

The Recreation Area is served by a state-of-the-art ultrafiltration membrane water treatment facility with chlorine for disinfection. Ultrafiltration can remove particles as small as 0.01 microns. The distribution system is served by a 97,000 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Pardee Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2012.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to gasoline storage and dispensing at the recreation area marina and boating. In 2012 , no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Pardee Recreation Area 2012 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2012, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Disinfection Byproducts, Disinfectant Residuals						
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.9†	0.5–0.9	2012	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		2.9	2.9	2012	Runoff/leaching from natural deposits
Color (Color Unit)	15		3	3	2006	Naturally occurring organic materials
Odor Threshold (TON)	3		1.6	1.6	2009	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		53	53	2011	Substances that form ions when in water
Sulfate (mg/L)	250		1	1	2012	Runoff/leaching from natural deposits;
Total Dissolved Solids (mg/L)	500		22	22	2012	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	16
Alkalinity, carbonate (mg/L)	0.1
Calcium (mg/L)	3
Hardness (mg/L as $CaCO_3$)	14
Magnesium (mg/L)	1
Potassium (mg/L)	0.5
Sodium (mg/L)	4

Treatment of Surface Water Sources

Treatment Technique	Ultrafiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.1 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.06 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

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Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived monitoring requirements for inorganic contaminants, except for nitrate and nitrite. Regulations do not require lead and copper monitoring at the consumer's tap for transient-noncommunity water systems such as Pardee Recreation Area.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities. Regulations do not require monitoring for radioactive contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. The Department waived monitoring requirements for organic chemical contaminants.

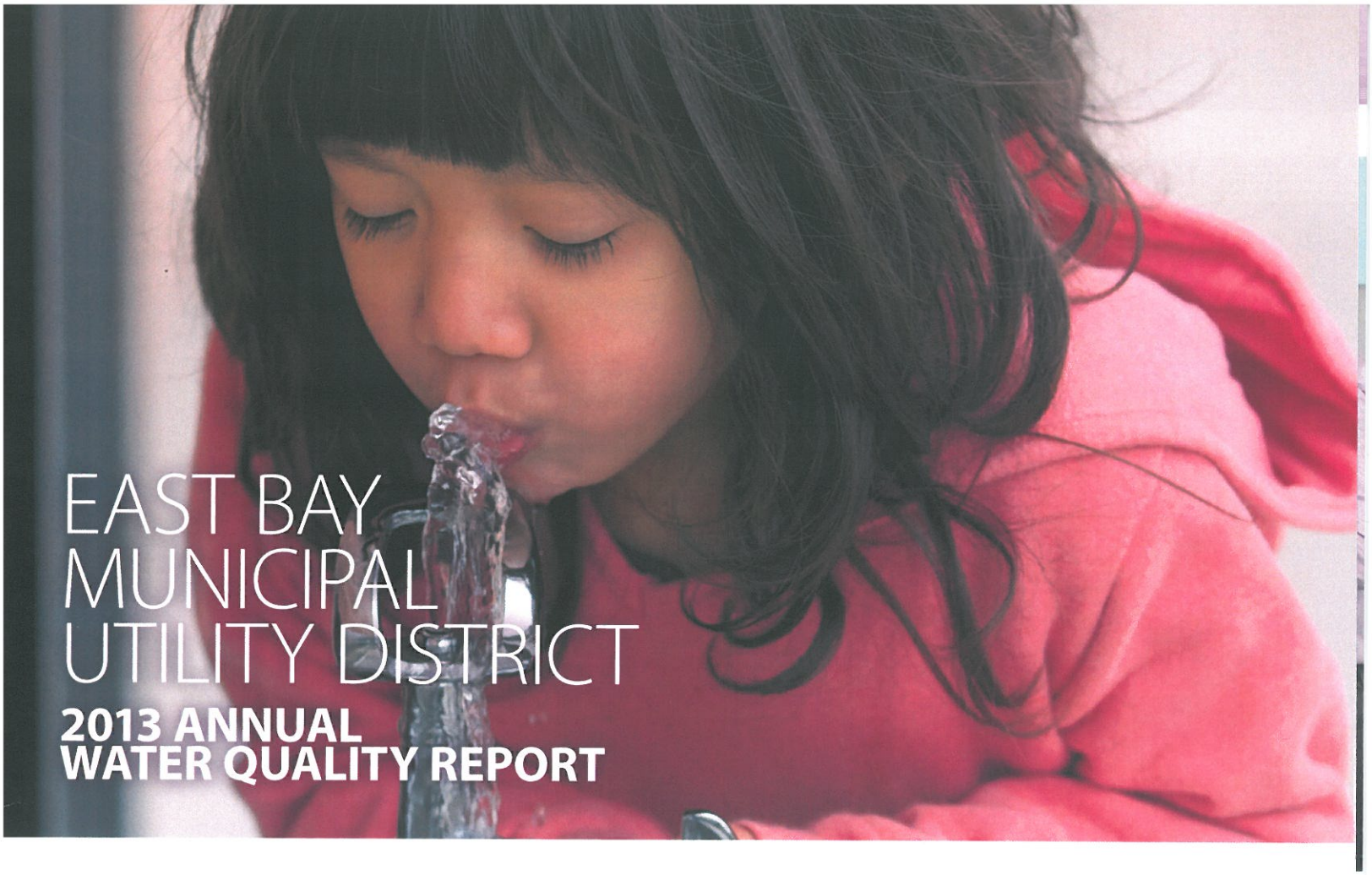
Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*



EAST BAY MUNICIPAL UTILITY DISTRICT

2013 ANNUAL WATER QUALITY REPORT

EBMUD provides high-quality drinking water to 1.3 million customers in Alameda and Contra Costa counties. In 2013, your drinking water was consistently of the highest quality, meeting every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

WHERE YOUR WATER COMES FROM

Ninety percent of EBMUD's water comes from the 578-square mile watershed of the Mokelumne River on the western slope of the Sierra Nevada. This area is mostly national forest, EBMUD-owned lands and other undeveloped lands little affected by human activity.

The Mokelumne watershed collects snowmelt from Alpine, Amador and Calaveras counties. The snowmelt flows into Pardee Reservoir near the town of Valley Springs.

Three large aqueducts carry water more than 90 miles from Pardee Reservoir to the East Bay and protect it from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges. During times of high water demand, system maintenance or operational needs, EBMUD also draws water from local watersheds.

HOW WE MANAGE WATER QUALITY

Regardless of source, all water is treated at one of EBMUD's water treatment plants before entering the East Bay's distribution system and reaching your tap.

EBMUD takes many steps to ensure water quality including managing watershed lands and reservoirs, treating the water, operating a complex distribution system, maintaining facilities and addressing customer concerns.

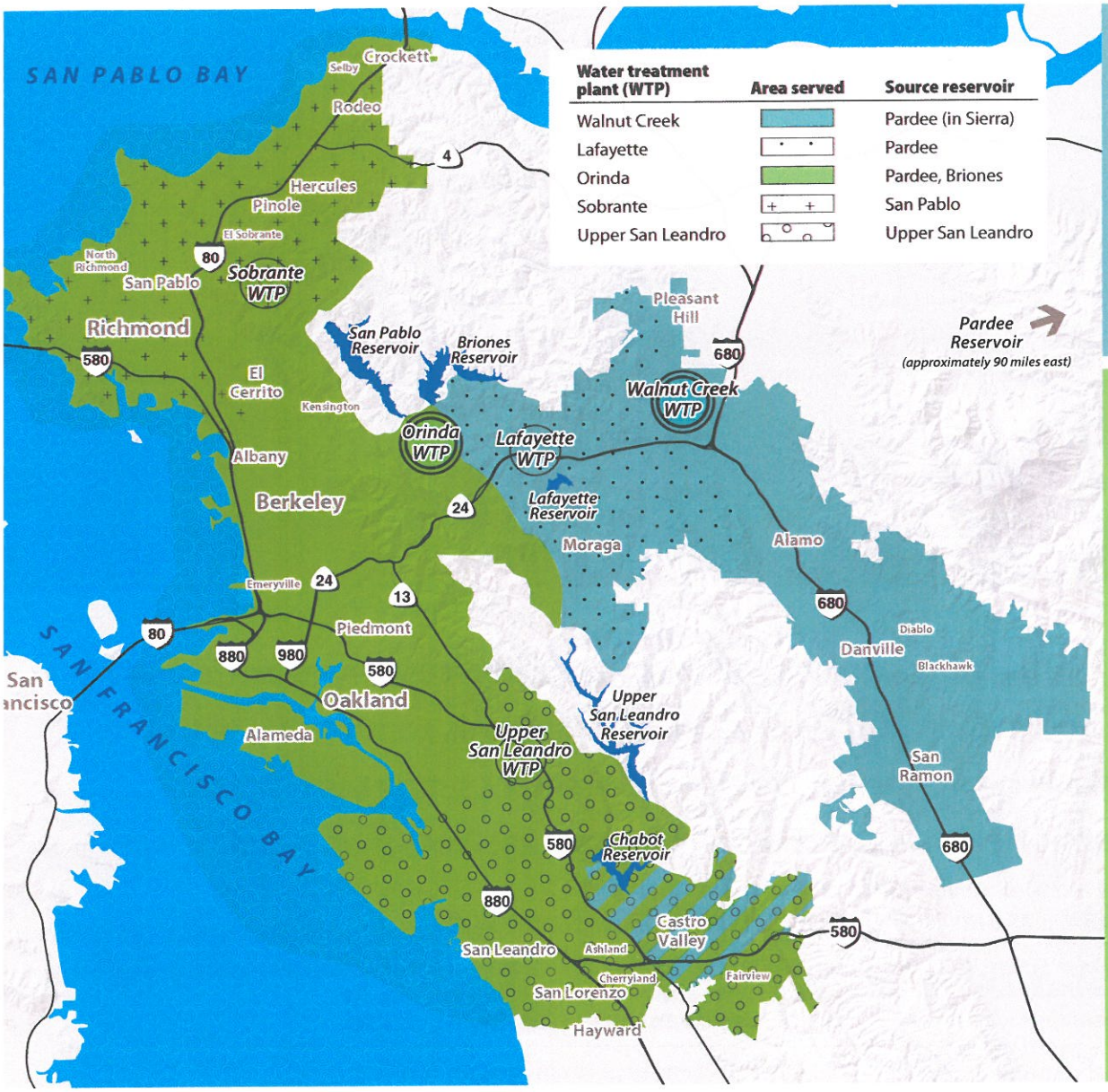
In laboratories and in the field, EBMUD samples and tests your water extensively to ensure it is safe to drink. We look for more than 100 substances in the water including microorganisms, pesticides, herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water treatment processes. More than 20,000 annual laboratory tests ensure the safety of your drinking water.

EBMUD

WHERE YOUR WATER IS TREATED

Most of the year, your drinking water comes from Pardee Reservoir in the Sierra Nevada mountains. Before reaching your tap, most water is treated at a facility in Walnut Creek, Orinda or Lafayette.

During times of high water demand, system maintenance or for operational needs, some neighborhoods' drinking water comes from protected local watersheds and is treated at a different facility.



Water treatment plant (WTP)	Area served	Source reservoir
Walnut Creek		Pardee (in Sierra)
Lafayette		Pardee
Orinda		Pardee, Briones
Sobrante		San Pablo
Upper San Leandro		Upper San Leandro

Area served by Walnut Creek Water Treatment Plant

- Orinda
- Moraga
- Lafayette
- Pleasant Hill
- Walnut Creek

also served as needed by Lafayette Treatment Plant

- Alamo
- Danville
- San Ramon
- Castro Valley

Area served by Orinda Water Treatment Plant

- Crockett
- Rodeo
- Hercules
- Pinole
- El Sobrante
- San Pablo
- Richmond

also served as needed by Sobrante Treatment Plant

- El Cerrito
- Kensington
- Orinda
- Moraga
- Albany
- Berkeley
- Emeryville
- Piedmont

- Oakland
- Alameda
- San Leandro
- San Lorenzo
- Castro Valley
- Hayward

also served as needed by Upper San Leandro Treatment Plant

ARE YOU READY FOR A WATER EMERGENCY?

Natural disasters or other emergencies could temporarily cut off the East Bay's water supply or affect water quality. Be prepared.

You need at least one gallon per day per person in your household. Store enough for at least 3-7 days. Store extra water for pets and frequent visitors. Store water in clean, airtight, food-grade plastic containers and keep in a dark, cool place. This will be your water supply meanwhile emergency management agencies set up temporary water distribution in your community.

In case of a water quality emergency, be prepared to disinfect your tap water. In your emergency supplies include a heat source, such as a camping stove, plus a clean pot that can be used to boil water. If power supplies are disrupted or boiling water is not possible, you can disinfect your water with liquid bleach. Have measuring spoons, a clean medicine dropper and a sealed bottle of regular, unscented liquid bleach with no additives in your emergency supplies.



WHAT WAS DETECTED AND REPORTED

In 2013, your drinking water was consistently of the highest quality, meeting every public health requirement set by the California Department of Public Health (CDPH) and the U.S. Environmental Protection Agency (EPA).

The tables on the following pages show the measured amounts of contaminants detected in 2013 or in the most recent required year. Water is sampled in EBMUD's source waters, at water treatment plants, in the distribution system or at customers' taps.

Table 1 – Regulated for public health

These listed contaminants are regulated to protect your health. They have maximum contaminant levels, also known as primary MCLs, set by CDPH or EPA. These levels are set as close to the established public health goals as is economically and technologically feasible.

Table 2 – Regulated for drinking water aesthetics

These listed contaminants are regulated to maintain aesthetic standards for drinking water. They have maximum contaminant levels, also known as secondary MCLs, set by CDPH. These levels are set to maintain the odor, taste and appearance of drinking water.

Table 3 – Unregulated with no established maximum contaminant level

Water agencies are required to report these contaminants if detected, but no maximum contaminant levels have been established by CDPH or EPA.

Table 4 – Other parameters of interest to customers

These water measurements, such as pH, hardness and alkalinity, may be of interest to some consumers.



WHAT IS MISSING FROM THIS REPORT?

Although EBMUD tests for more than 100 substances, this report only lists those detected at or above the state or federal level required for reporting. In this case, no news is good news!

HOW TO READ THE WATER QUALITY TABLE

Find the location of your home or area of interest on the map on page 2. Note which water treatment plant(s) serve that area.

(1) On the next page's table, find the contaminant you are interested in.

(2) Column two notes the unit of measurement.

(3) Column three lists the most recent year the contaminant was sampled and tested.

(4) Column four lists the public health goal for the contaminant. At that amount or lower, there is no known or expected risk to health from its presence in drinking water. Not all listed contaminants have public health goals set by CDPH or EPA.

(5) Column five notes the highest amount CDPH or EPA allows of that contaminant in drinking water. This amount is set as close as is economically and technologically feasible to, but usually not as low as, the public health goal listed in the fourth column.

(6) Column six lists the average amount detected across the EBMUD service area or at designated locations.

(7) Find the column that corresponds to the water treatment plant you noted on the map. This is the amount of the contaminant detected in your area's tap water. All reported contaminants were detected at amounts lower than the highest amount allowed (column 5) by CDPH and EPA.

Differences in water quality between areas may be due to different water sources. Some areas draw water year-round from EBMUD's Sierra Nevada supply. Other areas draw water from protected local watersheds during times of high water demand, system maintenance or for operational needs. Some consumers receive water from both sources at different times throughout the year.

(8) The last column lists how the contaminant typically gets into your drinking water.

	(1) Regulated for public health *primary MCL*	(2) Unit	(3) Year sampled	(4) State or Federal goal *PHG, MCLG or MRDLG*	(5) Highest amount allowed *MCL, MRDL, AL or NL*	(6) System average	(7) Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	(8) Typical sources
Microbiological	Cryptosporidium in source water	#/liter	2008	0	TT	NA	0	0	0	0.3	0	Naturally present in the environment
	Total Coliform	—	2013	0	5%	NA	0.6% was the highest percentage found in any month					Naturally present in the environment
	Turbidity	NTU	2013	NA	1	0.03	0.02 – 0.10	0.02 – 0.10	0.02 – 0.10	0.03 – 0.10	0.04 – 0.10	Soil runoff
		—	2006, 2007	NA	95% ≤0.3	100%	100%	100%	100%	100%	100%	
Radiological	Gross alpha in source water*	pCi/L	2006, 2007	0	15	<3	<3	<3	<3	<3 – 11	<3	Erosion of natural deposits

EBMUD 2013 ANNUAL WATER QUALITY REPORT

In 2013, your drinking water was consistently of the highest quality, meeting every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

KEY TERMS

AL Regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

DBP Disinfection by-products. These are formed when chlorine and/or ozone reacts with natural constituents in water. Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products.

MCL Maximum contaminant level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs address odor, taste and appearance of drinking water.

MCLG Maximum contaminant level goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

MRDL Maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG Maximum residual disinfectant level goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Notification level A health-based advisory level established by the California Department of Public Health for chemicals in drinking water that lack MCLs.

Primary drinking water standard These standards regulate contaminants that affect health by setting MCLs and MRDLs along with their monitoring, reporting and water treatment requirements.

PHG Public health goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. Public health goals are set by the California Environmental Protection Agency.

TOC Total organic carbon. A measure of organic compounds that could form by-products after disinfection.

Turbidity A measure of the cloudiness of water. Turbidity is monitored because it is a good indication of the effectiveness of our filtration systems.

TT Treatment technique. A required process intended to reduce the level of a contaminant in drinking water.

90th percentile A measure that indicates 90 percent of the samples had a lower result.

ABBREVIATIONS

gpg grains per gallon
NA not applicable
NL notification level
NTU nephelometric turbidity unit, a measure of the cloudiness of water.
pCi/L picocuries per liter, a measure of radioactivity.
ppm parts per million. One ppm is like two-thirds of a gallon in an Olympic-size swimming pool. (mg/L)
ppb parts per billion. One ppb is like half a teaspoon in an Olympic-size swimming pool. (µg/L)
ppt parts per trillion. One ppt is like a drop in 25 Olympic-size swimming pools. (ng/L)
TON threshold odor number, a measure of odor in water.
µS/cm microsiemens per centimeter, a measure of electrical conductance.

1 Regulated for public health *Primary MCL*		Unit	Year sampled	State or federal goal *PHG, MCLG or MRDLG*
Microbiological	Cryptosporidium in source water	#/liter	2008	0
	Total Coliform	—	2013	0
	Turbidity	NTU	2013	NA
		—	2013	NA
Radioactive	Gross alpha in source water [a]	pCi/L	2007	0
	Uranium in source water [a]	pCi/L	2006, 2007	0.43
Inorganic	Aluminum	ppb	2013	600
	Bromate	ppb	2013	0.1
	Chloramine as chlorine [b]	ppm	2013	4
	Copper	ppb	2011	300
	Fluoride in source water [d]	ppm	2013	1
	Lead [e]	ppb	2011	0.2
	Nitrate and nitrite as nitrogen	ppm	2013	10
Organic	Control of DBP precursors/TOC	—	2013	NA
	Haloacetic acids, 5 species	ppb	2013	NA
	Trihalomethanes	ppb	2013	NA

2 Regulated for drinking water aesthetics *Secondary MCL*	Unit	Year sampled	State or federal goal *PHG or MCLG*
Aluminum	ppb	2013	NA
Chloride	ppm	2013	NA
Color	color units	2013	NA
Odor	TON	2013	NA
Specific conductance	µS/cm	2013	NA
Sulfate	ppm	2013	NA
Total dissolved solids	ppm	2013	NA
Turbidity	NTU	2013	NA

3 Unregulated with no established maximum contaminant level	Unit	Year sampled	State or federal goal *PHG or MCLG*
Boron	ppb	2013	NA
Chlorate	ppb	2013	NA
Chromium, hexavalent [e]	ppt	2013	20
Molybdenum	ppb	2013	NA
N-Nitrosodimethylamine [g] (NDMA)	ppt	2013	3
Strontium	ppb	2013	NA
Vanadium	ppb	2013	NA

NOTES

a) Gross alpha was detected at 4.6 pCi/L and uranium was detected at 1.1 pCi/L in Chabot Reservoir. Chabot Reservoir is an emergency standby reservoir that has not been used for water supply in more than 30 years. **b)** Chloramine residuals in the distribution system are measured as an equivalent quantity of chlorine. When the chloramine residual cannot be detected, the sample is further analyzed to ensure that microbiological water quality is in

ghest amount allowed *MCL, MRDL or AL*	System average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
TT	NA	0	0	0	0.3	0	Naturally present in the environment
5%	[a]NA	0.6% was the highest percentage found in any month					Naturally present in the environment
1	0.03	0.02 – 0.10	0.02 – 0.09	0.02 – 0.10	0.03 – 0.10	0.03 – 0.10	Soil runoff
95% ≤0.3	100%	100%	100%	100%	100%	100%	
15	<3	<3	<3	<3	<3	<3	Erosion of natural deposits
20	NA	<1	<1	<1	<1	<1	Erosion of natural deposits
1000	<50	<50	<50	<50	<50 – 92	53 – 62	Erosion of natural deposits; water treatment residue
10	1	NA	NA	NA	1 – 3	1	By-product of drinking water disinfection
4	1.9[c]	<0.05 – 3.3					Drinking water disinfectant added for treatment
1300	90th percentile = 66	0 out of 51 sites were above the regulatory action level					Corrosion of household plumbing; erosion of natural deposits
2	<0.1	<0.1	<0.1	<0.1	0.1	0.2	Erosion of natural deposits; water additive[d]
15	90th percentile = 7	3 out of 51 sites were above the regulatory action level					Corrosion of household plumbing; erosion of natural deposits
10	<0.4	<0.4	<0.4	<0.4	<0.4	0.4	Erosion of natural deposits; runoff and leaching from fertilizer use
TT	NA	NA	NA	NA	met req.	met req.	Various natural and man-made sources
60	33[f]	19 – 34	21 – 37	19 – 39	10 – 55	20 – 36	By-product of drinking water disinfection
80	55[f]	24 – 44	35 – 43	30 – 50	33 – 71	35 – 52	By-product of drinking water disinfection

ghest amount allowed *MCL*	System average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
200	<50	<50	<50	<50	<50 – 92	53 – 62	Erosion of natural deposits; water treatment residue
250	10	4 – 5	4 – 5	5 – 6	16 – 20	16 – 17	Runoff/leaching from natural deposits
15	1	1	<1	2 – 4	<1	1	Naturally-occurring organic materials
3	1	<1	<1	<1	2	2	Naturally-occurring organic materials
900	185	69	65	72 – 147	299	384	Substances that form ions when in water
250	17	1	1	1 – 13	30 – 39	41 – 42	Runoff/leaching from natural deposits
500	117	31 – 57	30 – 60	36 – 80	160 – 200	250	Runoff/leaching from natural deposits
5	0.03	0.02 – 0.10	0.02 – 0.09	0.02 – 0.10	0.03 – 0.10	0.03 – 0.10	Soil runoff

ghest amount allowed *NL*	System average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
1000	<100	<100	<100	<100	<100	137	Runoff/leaching from natural deposits
800	176	150 – 160	120 – 150	140 – 200	180 – 380	130 – 190	By-product of drinking water disinfection
NA	40	45 – 66	50 – 54	50 – 56	32 – 42	NA	Erosion of natural deposits; release of industrial chemicals
NA	<1	<1	<1	<1	1	NA	Erosion of natural deposits; release of industrial chemicals
10	2	<1 – 1	1 – 2	3	1 – 3	<1 – 2	By-product of drinking water disinfection
NA	59	36	35 – 37	35 – 40	180 – 190	NA	Erosion of natural deposits; release of industrial chemicals
50	0.6	0.4	0.4	0.4	2	NA	Erosion of natural deposits; release of industrial chemicals

compliance with the regulations. **c)** Highest running annual average. **d)** EBMUD is required by state law to add fluoride to drinking water to help prevent dental decay in consumers. Current regulations require that fluoride levels in the treated water be maintained between 0.7 to 1.4 ppm with an optimum dose of 0.8 ppm. Our monitoring showed that the fluoride levels in the treated water distribution system ranged from 0.7 to 1.0 ppm with an average of 0.9 ppm. Information about fluoridation, oral health and current issues is available at http://bit.ly/1feAu0R. **e)** See page 7 for additional information about lead and chromium in drinking water. **f)** Highest locational running annual average. **g)** Sampling locations are chosen to represent worst-case scenarios.

4 Other parameters of interest to customers	Unit	Water treatment plants				
		Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro
Alkalinity, bicarbonate as $CaCO_3$	ppm	21	22	21 – 33	95	120
Alkalinity, carbonate as $CaCO_3$	ppm	4	3	6 – 7	3	5
Calcium	ppm	5 – 6	5 – 6	5 – 11	23 – 26	31 – 33
Hardness[h]	gpg	1	1 – 2	1 – 2	5 – 7	8 – 11
	ppm	16 – 24	16 – 29	18 – 42	83 – 120	140 – 190
Magnesium	ppm	1	1	1 – 3	7 – 9	14
pH	pH	9.3	9.1	9.1 – 9.5	8.3 – 8.7	8.7
Potassium	ppm	1	1	1	1 – 2	2
Silica	ppm	9 – 10	9 – 10	8 – 10	7 – 11	11
Sodium	ppm	5 – 7	5 – 7	6 – 12	25 – 28	26 – 28

h) Grains per gallon (gpg) is a measure of water hardness. Knowing the amount can help improve the function of dishwashers, cooling equipment and other industrial processes. Refer to your appliance manufacturer's instruction manual for the optimum grains per gallon level.

WATER QUALITY REGULATIONS

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the California Department of Public Health (CDPH) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The CDPH regulations also establish limits for contaminants in bottled water.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Synthetic organic contaminants, such as pesticides and herbicides that may come from a variety of sources, including agriculture, urban storm water and residential uses.

Volatile organic chemical contaminants from industrial processes and petroleum production, and from gas stations, urban storm water runoff, agricultural application and septic systems.

Radioactive contaminants that can be naturally occurring or be the result of oil and gas production and mining activities.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects is available from the USEPA's Safe Drinking Water Hotline at 800-426-4791 or online at www.epa.gov/safewater.

Cryptosporidium

Cryptosporidium is a microbial contaminant found in surface water throughout the United States. Although filtration is highly effective in removing Cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal.

Our monitoring indicates the presence of these organisms in one of our source waters. Current test methods cannot determine if the organisms are dead or are capable of causing disease. Ingestion of Cryptosporidium may cause abdominal infection with symptoms including nausea, diarrhea and abdominal cramps.

Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants and small children, and the elderly are at greater risk of developing life-threatening illness. We encourage these individuals to consult their physician regarding appropriate precautions to take to avoid infection.

Populations with low resistance

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, and some elderly and infants can be particularly at risk to infections.

These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the USEPA Safe Drinking Water Hotline at 800-426-4791 or www.epa.gov/safewater.



REPORT A WATER QUALITY CONCERN

EBMUD investigates water quality complaints within one day. Report a water quality problem by calling 866-403-2683. EBMUD inspectors respond to calls within one business day regarding water which appears to be dirty, colored, have foreign particles, or have peculiar tastes and odors.

Lead in drinking water

If present, elevated levels of lead can cause serious health problems. Pregnant women, infants and young children are typically more vulnerable to lead in drinking water than the general population.

Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD has replaced all lead water lines in its service area, but you may have lead in your home plumbing. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing.

If you are concerned about elevated lead levels in your home's water, or if your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to 2 minutes before using water for drinking or cooking. You also may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline at 800-426-4791 or online at www.epa.gov/safewater/lead.

Fluoride and infant formula

Water fluoridation is a widely accepted practice and mandated by state law. It is proven to be safe and effective for preventing and controlling tooth decay. According to the American Dental Association and Centers for Disease Control and Prevention (CDC), it is safe to use optimally fluoridated water for preparing infant formula. If an infant is primarily fed infant formula prepared with fluoridated water, there may be an increased chance for mild enamel fluorosis, but enamel fluorosis does not affect the health of the infant or the health of the infant's teeth. To lessen this chance, deionized, purified, distilled or demineralized bottled water can be used some of the time to prepare infant formula.

If you have additional questions please contact your health provider. Additional information can be found at the CDPH website www.cdph.ca.gov/certlic/drinkingwater/pages/fluoridation.aspx or the CDC website www.cdc.gov/fluoridation.

Chromium

Chromium is found naturally in the environment, in two forms: trivalent and hexavalent chromium. Both forms of chromium find their way into bodies of water through mineral deposits. Hexavalent chromium is also a byproduct of industrial manufacturing. Trivalent chromium is an essential human dietary element. When ingested, hexavalent chromium is a suspected carcinogen.

Currently, trivalent and hexavalent chromium are regulated together by the federal and state agencies. As of the publication of this report, there is a proposed California maximum contaminant level for hexavalent chromium of 10,000 ppt. EBMUD monitors for total chromium at our five treatment plants. In October 2013, EBMUD began collecting and testing samples for hexavalent chromium.

This report contains important information about your drinking water. Translate it, or speak with someone who understands it. To request a copy of this report in Spanish or Chinese, please call 866-403-2683.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo, hable con alguien que lo entienda bien, o solicite un ejemplar de este informe en español llamando al 866-403-2683 o visitando www.ebmud.com/wqr-es.

這份報告包含有您飲用水的重要資訊。 請翻譯該內容，或與了解內容的人討論。 如需瀏覽中文版本可上網站 www.ebmud.com/wqr-zh 或致電 866-403-2683 索取中文報告。

Ang ulat na ito ay naglalaman ng importanteng impormasyon tungkol sa inyong iniinom na tubig. Isalin ito, o makipag-usap sa isang taong nakakaintindi nito.

Bản báo cáo này có các thông tin quan trọng về nước uống của quý vị. Hãy chuyển ngữ tài liệu này, hoặc nói chuyện với người có thể hiểu được bản báo cáo này.

본 보고서에는 여러분의 식수에 대한 중요한 정보가 담겨져 있습니다. 번역 또는 지인을 통해 반드시 본 내용을 읽어보시기 바랍니다.

این گزارش حاوی اطلاعات مهمی در مورد آب آشامیدنی است. آن را ترجمه کنید، یا ازکسی که مطالب آن را می فهمد سئوال کنید

この報告書には、あなたの飲料水に関する重要な情報が含まれています。和訳するか、理解できる人に相談してください。

В настоящем отчете содержится важная информация о питьевой воде. Переведите этот текст или покажите его тому, кто знает английский язык.

របាយការណ៍នេះមានព័ត៌មានសំខាន់ អំពីទឹកផឹក។ សូមរកគេឲ្យបកប្រែជូន ឬពិគ្រោះជាមួយនឹង អ្នកណាដែលយល់របាយការណ៍នេះ។

Este relatório contém informações importantes sobre sua água potável. Traduza o relatório ou fale com alguém que o compreenda.

يحتوي هذا التقرير على معلومات هامة حول مياه الشرب التي تتناولها. ترجم التقرير أو تحدث إلى شخص يستطيع فهمه.

इस रिपोर्ट में आपके पीने के पानी के बारे में महत्वपूर्ण जानकारी दी हुई है। इसका अनुवाद करें, या किसी ऐसे व्यक्ति से बात करें जो इसे समझता हो।

Ce rapport contient des informations importantes concernant votre eau potable. Faites-le traduire ou adressez-vous à quelqu'un qui est en mesure de le comprendre.

รายงานฉบับนี้มีข้อมูลสำคัญเกี่ยวกับน้ำดื่มของท่าน ขอให้แปลรายงานฉบับนี้หรือพูดคุยกับผู้ที่เข้าใจเนื้อหาในรายงานนี้

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HOW TO CONTACT US



For more information about water quality or to report a water quality concern, call 866-40-EBMUD (866-403-2683) or visit www.ebmud.com.

If you would like this report mailed to you, call 510-986-7555 or email custsvc@ebmud.com. View this report online at www.ebmud.com/wqr.

EBMUD encourages public participation in decisions affecting drinking water quality and other matters at its Board of Directors meeting held the second and fourth Tuesdays of each month at 1:15 pm, 375 Eleventh Street, 2nd Floor, Oakland.

Board of Directors
John A. Coleman • Katy Foulkes • Andy Katz • Doug Linney
Lesa R. McIntosh • Frank Mellon • William B. Patterson

General Manager
Alexander R. Coate

FOR MORE WATER QUALITY INFORMATION

California Department of Public Health
Drinking Water Branch • 510-620-3463

U.S. Environmental Protection Agency
Safe Drinking Water Hotline • 800-426-4791

Alameda County
Public Health Department • 510-267-8000

Contra Costa
Public Health Division • 925-313-6712

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Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Camanche North Shore

2013 Consumer Confidence Report

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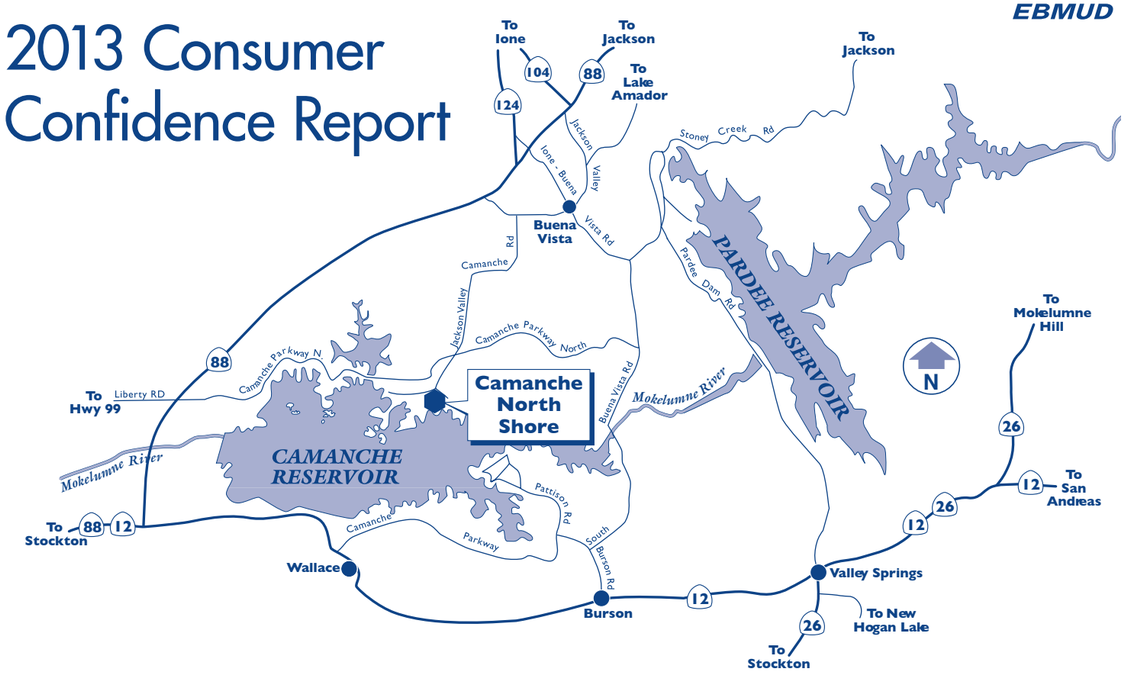

Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

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Water Source and Treatment

Three deep wells are the main water sources for Camanche North Shore Recreation Area. Water is treated at the Camanche North Shore Water Treatment Plant. Treatment includes addition of potassium permanganate and filtration through a pyrolusite filter system for removal of iron and manganese, and addition of chlorine for disinfection. The distribution system is served by two 140,000 gallon storage tanks. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Camanche North Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All primary water quality regulations were met in 2013.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District aquifer, and found that the source is most vulnerable to gas stations. In 2013, no contaminants associated with these activities were detected in EBMUD's drinking water sources.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Camanche North Shore 2013 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2013, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Fluoride (mg/L)	2.0	1	0.2	0.2	2013	Erosion of natural deposits
Barium (mg/L)	1	2	0.1	0.1	2013	Erosion of natural deposits
Lead (µg/L)*	AL=15	0.2	90th Percentile =1	No sites above AL out of 5 sites sampled	2013	Internal corrosion of household plumbing system; erosion of natural deposits;
Copper (µg/L)	AL=1300	300	90th Percentile =26	No sites above AL out of 5 sites sampled	2013	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Organic Contaminants						
Ethyl Benzene (µg/L)	300	300	<0.5	<0.5–1	2013	Discharges from petroleum refineries and chemical factories; fuel solvent
Xylenes (mg/L)	1.750	1.8	0.003	<0.001–0.006	2013	Discharges from petroleum refineries and chemical factories; fuel solvent
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NA	21	21	2013	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NA	6	6	2013	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.8†	0.3–1.1	2013	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		15	15	2013	Runoff/leaching from natural deposits
Color (Color Unit)	15		1	1	2013	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	**31** †††	**1-71**††	2013	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		340	340	2013	Substances that form ions when in water
Sulfate (mg/L)	250		32	32	2013	Runoff/leaching from natural deposits;
Total Dissolved Solids (mg/L)	500		240	240	2013	Runoff/leaching from natural deposits
Turbidity (NTU)	5		0.14	0.14	2013	Soil runoff

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON values of 71 and 24 were detected on 1/5 and 1/29/2013.

††† Highest Running Annual Average (calculations include some 2012 data).

Unregulated Contaminants

	NL	PHG	Average	Range	Sample Year	Typical Sources
Boron (µg/L)	1,000	NA	229	229	2013	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	120
Alkalinity, carbonate (mg/L)	0.7
Calcium (mg/L)	30
Hardness (mg/L as $CaCO_3$)	100

	Average & Range
Magnesium (mg/L)	5
pH (pH units)	7.0-7.8
Potassium (mg/L)	7
Sodium (mg/L)	30

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. Detectable levels of xylenes were found in 2013, well below the health-related MCL limit. The xylene and ethyl benzene may result from the rehabilitation of the old water tank. Monitoring will continue until detectable levels are eliminated from the old water tank.

Secondary Contaminants, that affects aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The Department waived monitoring requirements for Thiobencarb.

Unregulated Contaminants are monitored for water quality information and to help the USEPA and the Department determine where certain contaminants occur and whether the contaminants need to be regulated.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Camanche South Shore

2013 Consumer Confidence Report

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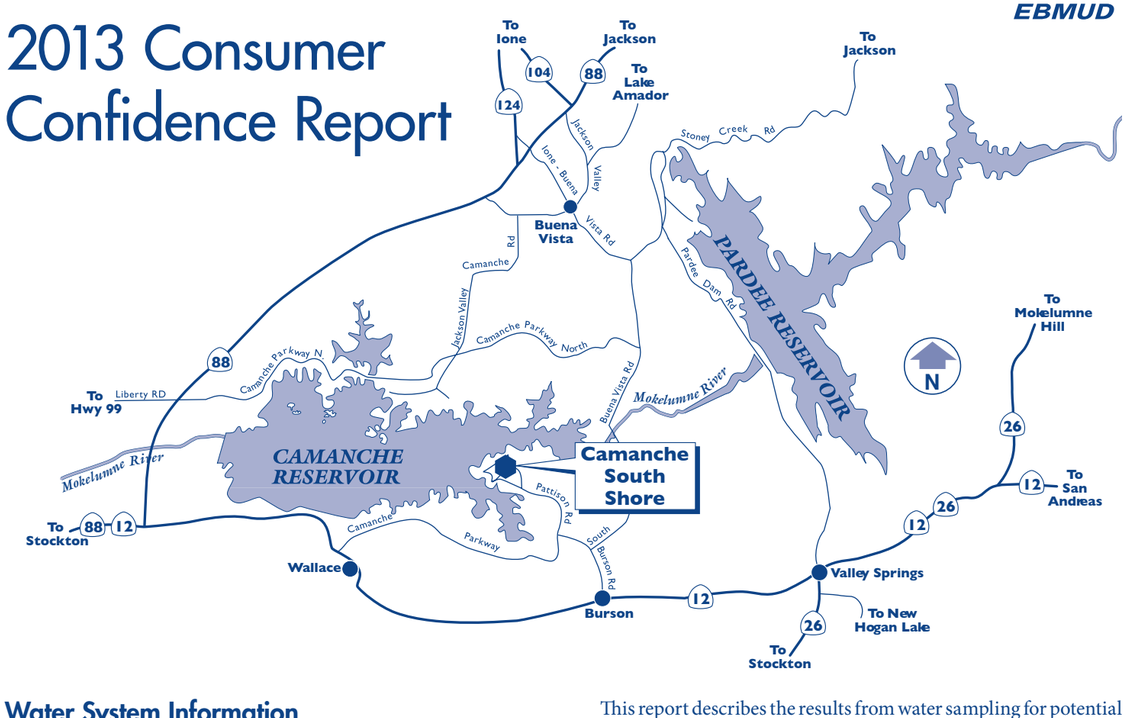

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The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

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Water Source and Treatment

Camanche Reservoir is the water source for Camanche South Shore Recreation Area. The Recreation Area is served by Camanche South Shore Water Treatment Plant. Treatment includes: coagulation, filtration and chlorination. The water treatment facility and distribution system are operated by state certified operators. The distribution system is served by two 240,000 gallon storage tanks.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Camanche South Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All primary drinking water standards were met in 2013.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to the following activities: boating and marina gas stations, wastewater treatment and disposal facilities, historic gas stations, known contaminant plumes and historical mining. In 2013, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Camanche South Shore 2013 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2013, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (µg/L)	AL=1300	300	90th Percentile =41	No sites above AL out of 5 sites sampled	2013	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (µg/L)*	AL=15	0.2	90th Percentile =3	No sites above AL out of 5 sites sampled	2013	Internal corrosion of household plumbing system; erosion of natural deposits
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NA	50	50	2013	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NA	37	37	2013	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.8†	0.4–1.6	2013	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		6	6	2013	Runoff/leaching from natural deposits
Color (Color Unit)	15		3	3	2013	Naturally occurring organic mater
Odor–Threshold (TON)	3		**11††**	**1**	2013	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		60	60	2013	Substances that form ions when in water
Sulfate (mg/L)	250		2	2	2013	Runoff/leaching from natural deposits
Total Dissolved Solids (mg/L)	500		43	43	2013	Runoff/leaching from natural deposits

†† Highest Running Annual Average (calculations include some 2012 data).

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	21
Alkalinity, carbonate (mg/L)	0.2
Calcium (mg/L)	4
Hardness (mg/L as $CaCO_3$)	14

	Average & Range
Magnesium (mg/L)	1
pH (pH units)	7.3–8.0
Potassium (mg/L)	1
Silica (mg/L)	9
Sodium (mg/L)	6

Treatment of Surface Water Sources

Treatment Technique	Direct Filtration (dual media filtration with anthracite and sand)
Turbidity Performance Standards	1. Be less than or equal to 0.3 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.10 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

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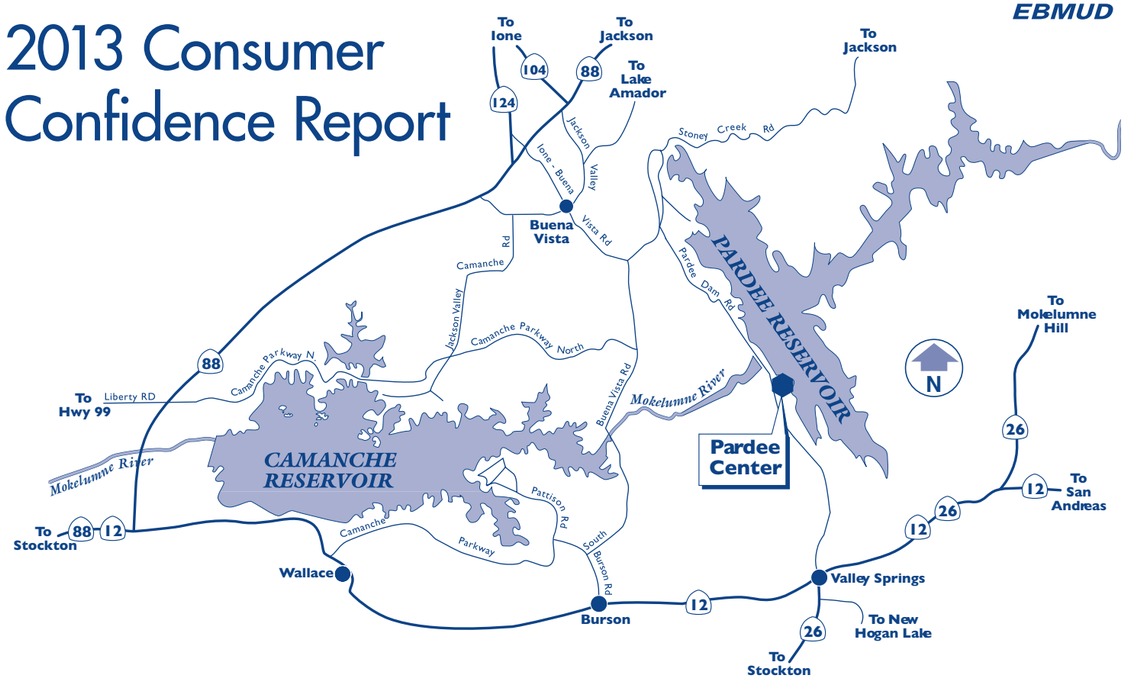

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Water Source and Treatment

Pardee Reservoir is the water source for Pardee Center. Pardee Center has a dual water distribution system. The non-potable system serves the fire hydrants, irrigation system, chemical buildings, and various other uses throughout Pardee Center. Pardee Center is served by a state-of-the-art nanofiltration membrane water treatment facility. Nanofiltration can remove particles as small as 0.001 microns. Water treatment also includes the addition of soda ash for corrosion control and chlorine for disinfection. The distribution system is served by a 13,900 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Pardee Center water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2013.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to boating and marina gas stations. In 2013, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by Cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Center Water Treatment Plant (WTP) does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.001 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Pardee Center 2013 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2013, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (µg/L)	AL=1300	300	90th Percentile =67	No sites above AL out of 5 sites sampled	2011	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (µg/L)*	AL=15	0.2	90th Percentile =4	No sites above AL out of 5 sites sampled	2011	Internal corrosion of household plumbing system; erosion of natural deposits
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (µg/L)	80	NA	6	6	2013	By-product of drinking water chlorination
Haloacetic Acids, 5 species (µg/L)	60	NA	8	8	2013	By-product of drinking water chlorination
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.8†	0.4–1.1	2013	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		3	3	2013	Runoff/leaching from natural deposits
Color (Color Unit)	15		13	13	2008	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	3†	1.1–3.5††	2008	Naturally occurring organic materials
Specific Conductance (µS/cm)	1600		26	26	2012	Substances that form ions when in water
Total Dissolved Solids (mg/L)	500		30	30	2013	Runoff/leaching from natural deposits

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON value of 3.5 was detected on 4/22/2008.

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	18
Alkalinity, carbonate (mg/L)	0.1
Calcium (mg/L)	1
Hardness (mg/L as $CaCO_3$)	8

	Average & Range
Magnesium (mg/L)	0.3
Potassium (mg/L)	0.4
Sodium (mg/L)	7

Treatment of Surface Water Sources

Treatment Technique	Nanofiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.1 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.05 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for nontransient-noncommunity water systems such as Pardee Center.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

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General Manager
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Educational Information

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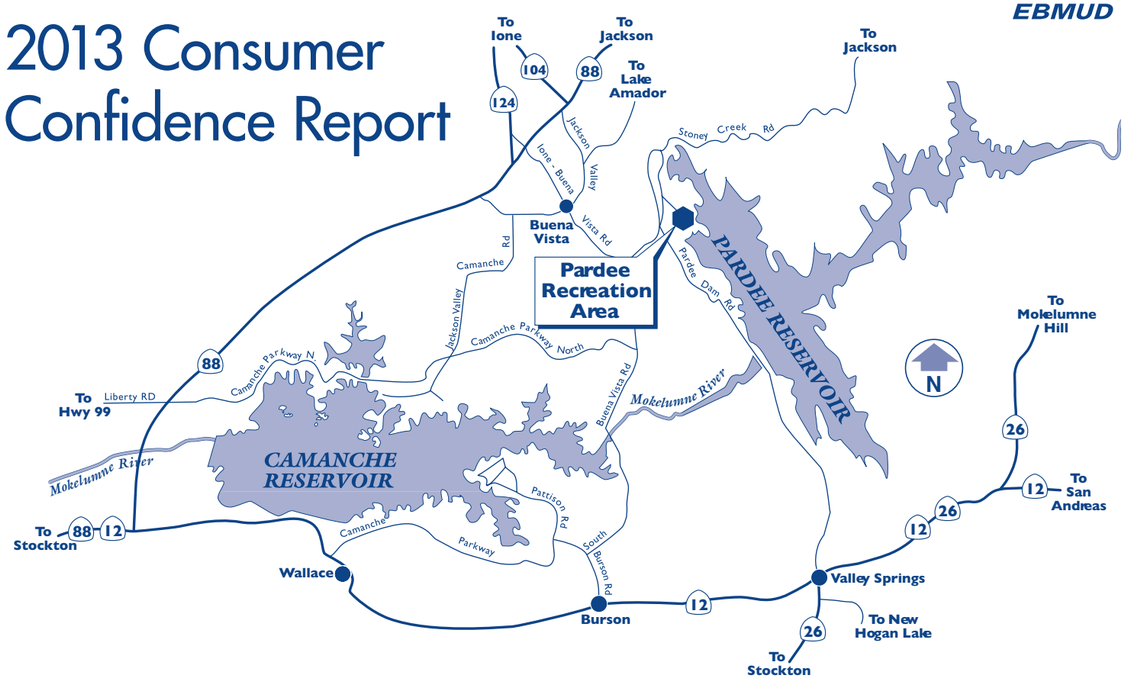
Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes cryptosporidium, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Recreation Water Treatment Plant (WTP) does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.01 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of cryptosporidium may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water.

Pardee Recreation Area

2013 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to State and Federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

The Public Health Security and Bioterrorism Response Act of 2003 requires community water systems to conduct vulnerability assessments and develop/revise Emergency Response Plans. In compliance with the Act, the District has prepared vulnerability assessments of the Mokelumne Area systems. In addition, revision of current Emergency Response Plans were completed within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-0881.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

The Recreation Area is served by a state-of-the-art ultrafiltration membrane water treatment facility with chlorine for disinfection. Ultrafiltration can remove particles as small as 0.01 microns. The distribution system is served by a 97,000 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The California Department of Public Health (Department) sets water quality requirements for the Pardee Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2013.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the Department prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The Department requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to gasoline storage and dispensing at the recreation area marina and boating. In 2013 , no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton Department office.

Pardee Recreation Area 2013 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2013, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Disinfection Byproducts, Disinfectant Residuals						
Chlorine residual as Cl_2 (mg/L)	[4]	[4]	0.8†	0.5–1.1	2013	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (mg/L)	250		5	5	2013	Runoff/leaching from natural deposits
Color (Color Unit)	15		3	3	2006	Naturally occurring organic materials
Odor Threshold (TON)	3		1.6	1.6	2009	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		50	50	2013	Substances that form ions when in water
Sulfate (mg/L)	250		1	1	2013	Runoff/leaching from natural deposits;
Total Dissolved Solids (mg/L)	500		25	25	2013	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (mg/L)	16
Alkalinity, carbonate (mg/L)	<0.1
Calcium (mg/L)	4
Hardness (mg/L as $CaCO_3$)	17
Magnesium (mg/L)	1
Potassium (mg/L)	1
Sodium (mg/L)	4

Treatment of Surface Water Sources

Treatment Technique	Ultrafiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.1 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.05 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

mg/L = milligrams per liter, or parts per million (ppm).

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µg/L = micrograms per liter, or parts per billion (ppb).

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as Cryptosporidium, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The Department waived monitoring requirements for inorganic contaminants, except for nitrate and nitrite. Regulations do not require lead and copper monitoring at the consumer's tap for transient-noncommunity water systems such as Pardee Recreation Area.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities. Regulations do not require monitoring for radioactive contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The Department waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. The Department waived monitoring requirements for organic chemical contaminants.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

EAST BAY MUNICIPAL UTILITY DISTRICT

2014 ANNUAL WATER QUALITY REPORT



EBMUD is proud to report that in 2014, your drinking water surpassed every state and federal public health requirement.

YOUR WATER

In the East Bay, 1.3 million customers rely on high-quality EBMUD water. Almost all of EBMUD's water comes from the 577-square mile watershed of the Mokelumne River on the western slope of the Sierra Nevada. This area is mostly national forest, EBMUD-owned lands and other undeveloped lands little affected by human activity.

The Mokelumne watershed collects snowmelt from Alpine, Amador and Calaveras counties, which flows into Pardee Reservoir near the town of Valley Springs. During times of high water demand, system maintenance or for operational needs, EBMUD may draw water from local watersheds. During drought emergencies, EBMUD may use water from the Sacramento River to meet customer needs.

Three large aqueducts carry water 90 miles from Pardee Reservoir to the East Bay. EBMUD's network of reservoirs, pipelines, pumps and water treatment plants are put to work to provide great water quality every day, as reflected in this report.

Dismal precipitation in 2014 meant EBMUD reservoirs did not refill back to normal levels. EBMUD used supplemental water supplies from the Sacramento River for the first time. In early summer, 23,000 acre-feet of Sacramento River water was diverted into Upper San Leandro and San Pablo reservoirs in the East Bay — about a month's supply. A half-billion dollar investment by ratepayers for dry-year infrastructure combined with solid efforts by customers to conserve precious water helped us weather one of the driest years in California history. Drought conditions have worsened. Visit ebmud.com/drought for the latest news.

HOW WE MANAGE WATER QUALITY

Regardless of source, all water is treated at an EBMUD water treatment plant before it reaches your tap.

EBMUD takes many steps to ensure high water quality including managing watershed lands and reservoirs, treating the water, operating a complex distribution system, maintaining facilities and addressing customer concerns.

In laboratories and in the field, EBMUD samples and tests your water extensively to ensure it is safe to drink. We look for more than 100 substances including microorganisms, pesticides, herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water treatment processes. More than 20,000 laboratory tests each year ensure the safety of your drinking water.

EBMUD

WHERE YOUR WATER IS TREATED

Most of the year, your drinking water comes from Pardee Reservoir in the Sierra Nevada mountains. Before reaching your tap, most water is treated at a facility in Walnut Creek, Orinda or Lafayette.

Some parts of EBMUD's service area draw water year-round from EBMUD's Sierra Nevada supply. During times of high water demand, system maintenance or for operational needs, drinking water may come from local watersheds and may be treated at a different facility. Some customers receive water from multiple sources at different times of the year.





Water treatment plant (WTP)	Area served	Source reservoir
Walnut Creek		Pardee (in Sierra)
Lafayette		Pardee
Orinda		Pardee, Briones
Sobrante		San Pablo
Upper San Leandro		Upper San Leandro

Area served by Walnut Creek Water Treatment Plant

Orinda, Moraga, Lafayette, Pleasant Hill, Walnut Creek, Alamo, Danville, San Ramon, Castro Valley

also served as needed by Lafayette Treatment Plant

Area served by Orinda Water Treatment Plant

Crockett, Rodeo, Hercules, Pinole, El Sobrante, San Pablo, Richmond, El Cerrito, Kensington, Orinda, Moraga, Albany, Berkeley, Emeryville, Piedmont, Oakland, Alameda, San Leandro, San Lorenzo, Castro Valley, Hayward

also served as needed by Sobrante Treatment Plant

also served as needed by Upper San Leandro Treatment Plant

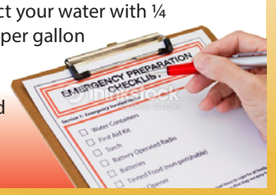
During times of high demand, maintenance, or for other operational needs, regions shown in more than one color or pattern may be served from a different treatment plant drawing from a different source reservoir.

ARE YOU READY FOR A WATER EMERGENCY?

Natural disasters or other emergencies can temporarily cut off the East Bay's water supply or affect water quality. Be prepared with your own supplies until water is restored. This will be your water supply while emergency management agencies set up temporary water distribution in your community.

You need one to two gallons per day per person for at least 3-7 days. Store extra water for pets and frequent visitors. Store water in clean, airtight, food-grade plastic containers and keep in a dark, cool place.

In case of a water quality emergency, be prepared to disinfect your tap water. In your emergency kit include a heat source, such as a camping stove, plus a clean pot to boil water for two minutes before consuming. If power supplies are disrupted or boiling water is not possible, disinfect your water with ¼ teaspoon (16 drops) of liquid bleach per gallon of water and then let stand for 30 minutes. Add measuring spoons, a clean medicine dropper and a sealed bottle of regular, unscented liquid bleach to your emergency supplies.



WHAT WAS DETECTED AND REPORTED

In 2014, EBMUD treated raw water from multiple sources, including Sacramento River water, and consistently provided high-quality drinking water, surpassing every public health requirement set by the State Water Resources Control Board (State Board) and the U.S. Environmental Protection Agency.

Drinking water requirements were formerly set by the California Department of Public Health. On July 1, 2014, the Drinking Water Program was transferred to the State Board.

The tables on the following pages show the measured amounts of contaminants detected in 2014 or in the most recent year sampling was required. Water is sampled in EBMUD's source waters, at water treatment plants, in the distribution system or at customers' taps.

Although EBMUD tests for more than 100 substances, this report only lists those detected at or above the state or federal level required for reporting. In this case, no news is good news!

Table 1 – Regulated for public health

These contaminants are regulated to protect your health. They have maximum contaminant levels, known as primary MCLs, set by the State Board or U.S. Environmental Protection Agency. These levels are set as close to the established public health goals as is economically and technologically feasible.

Table 2 – Regulated for drinking water aesthetics

These contaminants are regulated to maintain aesthetic standards to maintain the odor, taste and appearance of drinking water. They have maximum contaminant levels, also known as secondary MCLs, set by the State Board.



Table 3 – Unregulated with no established maximum contaminant level

Water agencies are required to report these contaminants if detected, but no maximum contaminant levels have been established by the State Board or U.S. Environmental Protection Agency.

Table 4 – Other parameters of interest to customers

These water measurements, such as pH, hardness and alkalinity, may be of interest to customers.

HOW TO READ THE WATER QUALITY TABLE

Find your location on the map on page 2. Note which water treatment plant(s) serve that area.

1. Go to the table on page 4 to find the contaminant you are interested in.
2. Column two notes the unit of measurement.
3. Column three lists the most recent year the contaminant was tested.
4. Column four lists the state or federal goal. At that amount or lower, there is no known or expected risk to health from its presence in drinking water. Not all listed contaminants have goals set by the California or US Environmental Protection Agency.
5. Column five notes the highest amount the State Board or U.S. Environmental Protection Agency allows. This amount is usually not as low as the public health goal in column four.
6. Column six lists the average amount detected across the EBMUD service area or at designated locations.
7. Find the column that corresponds to the water treatment plant(s) that serve you. This is the amount of the contaminant detected in your area's water. All reported contaminants were detected at amounts lower than the highest amount allowed (column 5) by the State Board and U.S. Environmental Protection Agency.
8. The last column lists how the contaminant typically gets into your drinking water.

1 Regulated for public health *Primary MCL*	2 Unit	3 Year sampled	4 State or federal goal *PHG, MCLG or MRDLG*	5 Highest amount allowed *MCL, MRDL or AL*	6 System average	7 Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	8 Typical sources
Microbiological	Cryptosporidium in source water	#/liter	2008	0	TT	NA	0	0	0	0 – 0.3[b]	0	Naturally present in the environment
	Total Coliform	—	2014	0	5%	NA	1.4% was the highest percentage found in any month					Naturally present in the environment
	Turbidity	NTU	2014	NA	1	0.03	0.02 – 0.10	0.02 – 0.07	0.02 – 0.07	0.03 – 0.08	0.03 – 0.10	Soil runoff
		—	2014	NA	95% ≤0.3	100%	100%	100%	100%	100%	100%	
Inorganic	Aluminum	ppb	2014	600	1000	<50	<50	<50	<50	<50	<50 – 120	Erosion of natural deposits; water treatment residue
	Bromate	ppb	2014	0.1	10	1.9[b]	NA	NA	NA	<1 – 2	<1 – 6	By-product of drinking water disinfection
	Chloramine as chlorine [a]	ppm	2014	4	4	1.9[b]	<0.05 – 3.8					Drinking water disinfectant added for treatment
	Copper	ppb	2014	300	1300	90th percentile = 45	0 out of 58 sites were above the regulatory action level					Corrosion of household plumbing; erosion of natural deposits

In 2014, your drinking water was consistently the highest quality, surpassing every public health requirement set by the State Water Resources Control Board (State Board), Division of Drinking Water and the U.S. Environmental Protection Agency.

KEY TERMS

AL Regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

DBP Disinfection by-products. These are formed when chlorine and/or ozone reacts with natural constituents in water. Trihalomethanes (THMs), haloacetic acids (HAAs), chlorate, and bromate are disinfection by-products.

MCL Maximum contaminant level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs or MCLGs as is economically and technologically feasible. Secondary MCLs address odor, taste and appearance of drinking water.

MCLG Maximum contaminant level goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

MRDL Maximum residual disinfectant level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial pathogens.

MRDLG Maximum residual disinfectant level goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial pathogens.

Notification level A health-based advisory level established by the State Board for chemicals in drinking water that lack MCLs.

Primary drinking water standard These standards regulate contaminants that affect health by setting MCLs and MRDLs along with their monitoring, reporting and water treatment requirements.

PHG Public health goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. Public health goals are set by the California Environmental Protection Agency.

TOC Total organic carbon. A measure of organic compounds that are present in the water.

Turbidity A measure of the cloudiness of water. Turbidity is monitored because it is a good indication of the effectiveness of our filtration systems.

TT Treatment technique. A required process intended to reduce the level of a contaminant in drinking water.

90th percentile A measure that indicates 90 percent of the samples had a lower result.

ABBREVIATIONS

gpg grains per gallon
NA not applicable
NL notification level
NTU nephelometric turbidity unit, a measure of the cloudiness of water.
pCi/L picocuries per liter, a measure of radioactivity.
ppm parts per million. One ppm is like 32 seconds in one year.
ppb parts per billion. One ppb is like 3 seconds in 100 years.
ppt parts per trillion. One ppt is like 3 seconds in 100,000 years.
TON threshold odor number, a measure of odor in water.
µS/cm microsiemens per centimeter, a measure of electrical conductance.

1 Regulated for public health *Primary MCL*		Unit	Year sampled	State or federal goal *PHG, MCLG or MRDLG*	Highest amount allowed *MCL, MRDL or AL*	System average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Microbiological	Cryptosporidium in source water	#/liter	2008	0	TT	NA	0	0	0	0 – 0.3[h]	0	Naturally present in the environment
	Total Coliform	—	2014	0	5%	NA	1.4% was the highest percentage found in any month					Naturally present in the environment
	Turbidity	NTU	2014	NA	1	0.03	0.02 – 0.10	0.02 – 0.07	0.02 – 0.07	0.03 – 0.08	0.03 – 0.10	Soil runoff
		—	2014	NA	95% ≤0.3	100%	100%	100%	100%	100%	100%	
Inorganic	Aluminum	ppb	2014	600	1000	<50	<50	<50	<50	<50	<50 – 120	Erosion of natural deposits; water treatment residue
	Bromate	ppb	2014	0.1	10	1.9[b]	NA	NA	NA	<1 – 2	<1 – 6	By-product of drinking water disinfection
	Chloramine as chlorine [a]	ppm	2014	4	4	1.9[b]	<0.05 – 3.8					Drinking water disinfectant added for treatment
	Copper	ppb	2014	300	1300	90th percentile = 45	0 out of 58 sites were above the regulatory action level					Corrosion of household plumbing; erosion of natural deposits
	Fluoride in source water [c]	ppm	2014	1	2	<0.1	<0.1	<0.1	<0.1	<0.1	0.2	Erosion of natural deposits; water additive [c]
	Lead [d]	ppb	2014	0.2	15	90th percentile = 3	0 out of 58 sites were above the regulatory action level					Corrosion of household plumbing; erosion of natural deposits
Organic	Control of DBP precursors/TOC	—	2014	NA	TT	NA	NA	NA	NA	met req.	met req.	Various natural and man-made sources
	Haloacetic acids, 5 species	ppb	2014	NA	60	28[e]	13 – 31	11 – 21	11 – 31	13 – 47	12 – 26	By-product of drinking water disinfection
	Trihalomethanes	ppb	2014	NA	80	47[e]	26 – 42	23 – 32	23 – 41	25 – 58	23 – 42	By-product of drinking water disinfection

2 Regulated for drinking water aesthetics *Secondary MCL*	Unit	Year sampled	State or federal goal *PHG or MCLG*	Highest amount allowed *MCL*	System average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Aluminum	ppb	2014	NA	200	<50	<50	<50	<50	<50	<50 – 120	Erosion of natural deposits; water treatment residue
Chloride	ppm	2014	NA	250	10	4 – 5	5 – 6	4 – 8	15 – 16	17 – 20	Runoff/leaching from natural deposits
Color	color units	2014	NA	15	3	3	4	<1 – 3	4	4	Naturally-occurring organic materials
Odor	TON	2014	NA	3	1	1	1	<1 – 2	<1	1 – 4	Naturally-occurring organic materials
Specific conductance	µS/cm	2014	NA	900	173	66	62	68 – 134	237	397	Substances that form ions when in water
Sulfate	ppm	2014	NA	250	14	1	1	1 – 21	23 – 28	31 – 45	Runoff/leaching from natural deposits
Total dissolved solids	ppm	2014	NA	500	109	33 – 89	35 – 87	37 – 110	120 – 230	190 – 290	Runoff/leaching from natural deposits
Turbidity	NTU	2014	NA	5	0.03	0.02 – 0.10	0.02 – 0.07	0.02 – 0.07	0.03 – 0.08	0.03 – 0.10	Soil runoff

3 Unregulated with no established maximum contaminant level	Unit	Year sampled	State or federal goal *PHG or MCLG*	Highest amount allowed *NL*	System average	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro	Typical sources
Boron	ppb	2014	NA	1000	<100	<100	<100	<100	<100	135	Runoff/leaching from natural deposits
Chlorate	ppb	2014	NA	800	194	91 – 220	84 – 210	68 – 170	100 – 380	96 – 630	By-product of drinking water disinfection
Chromium, hexavalent [d,g]	ppb	2014	0.02	NA	0.05	0.04 – 0.07	0.03 – 0.06	<0.03 – 0.06	0.04 – 0.09	<0.03 – 0.22	Erosion of natural deposits; release of industrial chemicals
Molybdenum	ppb	2014	NA	NA	<1	<1	<1	<1	<1	<1 – 1	Erosion of natural deposits; release of industrial chemicals
N-Nitrosodimethylamine [f] (NDMA)	ppt	2014	3	10	1	<1	<1 – 1	<1 – 2	1 – 4	<1 – 3	By-product of drinking water disinfection
Strontium	ppb	2014	NA	NA	88	31 – 44	38 – 100	32 – 110	41 – 140	44 – 320	Erosion of natural deposits; release of industrial chemicals
Vanadium	ppb	2014	NA	50	0.6	0.3 – 0.4	0.2 – 0.4	0.2 – 0.3	0.4 – 1	0.3 – 2	Erosion of natural deposits; release of industrial chemicals



NOTES

a) Chloramine residuals in the distribution system are measured as an equivalent quantity of chlorine. When the chloramine residual cannot be detected, the sample is further analyzed to ensure that microbiological water quality is in compliance with the regulations. **b)** Highest running annual average. **c)** EBMUD is required by state law to add fluoride to drinking water to help prevent dental decay in consumers. Current regulations require that fluoride levels in the treated water be maintained between 0.7 to 1.4 ppm with an optimum dose of 0.8 ppm. Our monitoring showed that the fluoride levels in the treated water distribution system ranged from 0.05 to 1.0 ppm with an average of 0.8 ppm. Information about fluoridation, oral health and current issues is available at www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Fluoridation.shtml. **d)** See page 7 for additional information about lead and chromium in drinking water. **e)** Highest locational running annual average. **f)** Sampling locations are chosen to represent worst-case scenarios. **g)** All hexavalent chromium samples are in compliance with the new California MCL of 10 ppb. **h)** Sobrante water treatment plant was not in service when *Cryptosporidium* was detected.

4 Other parameters of interest to customers	Unit	Water treatment plants: Walnut Creek	Lafayette	Orinda	Sobrante	Upper San Leandro
Alkalinity, bicarbonate as $CaCO_3$	ppm	18	17	19 – 35	70	130
Alkalinity, carbonate as $CaCO_3$	ppm	3	3	3 – 5	2	6
Calcium	ppm	5 – 6	5 – 6	5 – 15	18 – 19	26 – 36
Hardness*	gpg	1	1	1 – 3	4 – 5	5 – 9
	ppm	16 – 20	16 – 20	16 – 52	70 – 80	90 – 150
Magnesium	ppm	1	1	1 – 4	6 – 7	12 – 15
pH	pH	8.9 – 9.7	9.0 – 9.8	8.8 – 9.6	8.2 – 9.4	8.2 – 9.6
Potassium	ppm	1	1	1	1 - 2	2
Silica	ppm	8 – 10	8 – 10	7 – 9	8 – 11	12 – 15
Sodium	ppm	6 – 7	6 – 7	5 – 17	22 – 27	27 – 35

* Grains per gallon (gpg) is a measure of water hardness. Knowing the amount can help improve the function of dishwashers, cooling equipment and other industrial processes. Refer to your appliance manufacturer's instruction manual for the optimum grains per gallon level.

WATER QUALITY REGULATIONS

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. State Board regulations also establish limits for contaminants in bottled water.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial contaminants, such as viruses, bacteria and protozoa, such as *Cryptosporidium*, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.

Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban storm water runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.

Synthetic organic contaminants, such as pesticides and herbicides that may come from a variety of sources, including agriculture, urban storm water and residential uses.

Volatile organic chemical contaminants from industrial processes and petroleum production, and from gas stations, urban storm water runoff, agricultural application and septic systems.

Radioactive contaminants that can be naturally occurring or be the result of oil and gas production and mining activities.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects is available from the U.S. Environmental Protection Agency's Safe Drinking Water Hotline at 800-426-4791 or online at www.epa.gov/safewater. Contact your healthcare provider or visit the Centers for Disease Control and Prevention website for guidelines on using tap water for health or medical purposes.

Cryptosporidium
Cryptosporidium is a microbial contaminant found in surface water throughout the United States. Although filtration is highly effective in removing *Cryptosporidium*, the most commonly used filtration methods cannot guarantee 100 percent removal.

Our monitoring indicates the presence of these organisms in one of our source waters. Current test methods cannot determine if the organisms are dead or are capable of causing disease. Ingestion of *Cryptosporidium* may cause abdominal infection with symptoms including nausea, diarrhea and abdominal cramps.

Cryptosporidium must be ingested to cause disease, and it may be spread through means other than drinking water. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants and small children, and the elderly are at greater risk of developing life-threatening illness. We encourage these individuals to consult their physician regarding appropriate precautions to take to avoid infection.

Populations with low resistance
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, and some elderly and some infants can be particularly at risk to infections.

These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the USEPA Safe Drinking Water Hotline at 800-426-4791 or www.epa.gov/safewater.



REPORT A WATER QUALITY CONCERN

Do you have a question or concern about your water quality? If so call 866-403-2683. EBMUD inspectors respond to calls within one day regarding water which appears dirty, colored, or has foreign particles or unusual taste or odor.

Lead in drinking water
If present, elevated levels of lead can cause serious health problems. Pregnant women, infants and young children are typically more vulnerable to lead in drinking water than the general population.

Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD has replaced all lead water lines in its service area, but you may have lead in your home plumbing. It is possible that lead levels at your home may be higher than at other homes in the community as a result of materials used in your home's plumbing.

If you are concerned about elevated lead levels in your home's water, you may wish to have your water tested. If your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to 2 minutes before using water for drinking or cooking. Capture and reuse this water for other uses such as watering ornamental plants.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the U.S. Environmental Protection Agency Safe Drinking Water Hotline at 800-426-4791 or online at www.epa.gov/safewater/lead.

Fluoride and infant formula
Water fluoridation is a widely accepted practice and mandated by state law. It is proven to be safe and effective for preventing and controlling tooth decay. According to the American Dental Association and Centers for Disease Control and Prevention (CDC), it is safe to use optimally fluoridated water for preparing infant formula. If an infant is primarily fed infant formula prepared with fluoridated water, there may be an increased chance for mild enamel fluorosis, but enamel fluorosis does not affect the health of the infant or the health of the infant's teeth. To lessen this chance, deionized, purified, distilled or demineralized bottled water can be used some of the time to prepare infant formula.

If you have additional questions about flouride, contact your health provider. Additional information can be found at the State Board www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Fluoridation.shtml or the CDC www.cdc.gov/fluoridation websites.

Chromium
Chromium is found naturally in the environment, in two forms: trivalent and hexavalent chromium. Both forms of chromium find their way into bodies of water through mineral deposits. Hexavalent chromium is also a byproduct of industrial manufacturing. Trivalent chromium is an essential human dietary element. When ingested, hexavalent chromium is a suspected carcinogen.

Currently, trivalent and hexavalent chromium are regulated together by the federal and state agencies. As of July 1,2014, there is also a California maximum contaminant level (MCL) for hexavalent chromium of 10 parts per billion. EBMUD monitors for total chromium at our five treatment plants. Beginning in October 2013, EBMUD began collecting samples for hexavalent chromium. EBMUD is in compliance with the California MCL and will continue to meet all regulatory requirements.

This report contains important information about your drinking water. Translate it, or speak with someone who understands it. To request a copy of this report in Spanish or Chinese, please call 866-403-2683.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo, hable con alguien que lo entienda bien, o solicite un ejemplar de este informe en español llamando al 866-403-2683 o visitando www.ebmud.com/wqr-es.

這份報告包含有您飲用水的重要資訊。 請翻譯該內容，或與了解內容的人討論。 如需瀏覽中文版本可上網站 www.ebmud.com/wqr-zh 或致電 866-403-2683 索取中文報告。

Ang ulat na ito ay naglalaman ng importanteng impormasyon tungkol sa inyong iniinom na tubig. Isalin ito, o makipag-usap sa isang taong nakakaintindi nito.

Bản báo cáo này có các thông tin quan trọng về nước uống của quý vị. Hãy chuyển ngữ tài liệu này, hoặc nói chuyện với người có thể hiểu được bản báo cáo này.

본 보고서에는 여러분의 식수에 대한 중요한 정보가 담겨져 있습니다. 번역 또는 지인을 통해 반드시 본 내용을 읽어보시기 바랍니다.

این گزارش حاوی اطلاعات مهمی در مورد آب آشامیدنی است. آن را ترجمه کنید، یا ازکسی که مطالب آن را می فهمد سئوال کنید.

この報告書には、あなたの飲料水に関する重要な情報が含まれています。和訳するか、理解できる人に相談してください。

В настоящем отчете содержится важная информация о питьевой воде. Переведите этот текст или покажите его тому, кто знает английский язык.

របាយការណ៍នេះមានព័ត៌មានសំខាន់ អំពីទឹកផឹក។ សូមរកគេឲ្យបកប្រែជូន ឬពិគ្រោះជាមួយនឹង អ្នកណាដែលយល់របាយការណ៍នេះ។

Este relatório contém informações importantes sobre sua água potável. Traduza o relatório ou fale com alguém que o compreenda.

يحتوي هذا التقرير على معلومات هامة حول مياه الشرب التي تتناولها. ترجم التقرير أو تحدث إلى شخص يستطيع فهمه.

इस रिपोर्ट में आपके पीने के पानी के बारे में महत्वपूर्ण जानकारी दी हुई है। इसका अनुवाद करें, या किसी ऐसे व्यक्ति से बात करें जो इसे समझता हो।

Ce rapport contient des informations importantes concernant votre eau potable. Faites-le traduire ou adressez-vous à quelqu'un qui est en mesure de le comprendre.

รายงานฉบับนี้มีข้อมูลสำคัญเกี่ยวกับน้ำดื่มของท่าน ขอให้แปลรายงานฉบับนี้หรือพูดคุยกับผู้ที่เข้าใจเนื้อหาในรายงานนี้

EBMUD
375 Eleventh Street
Oakland, CA 94607
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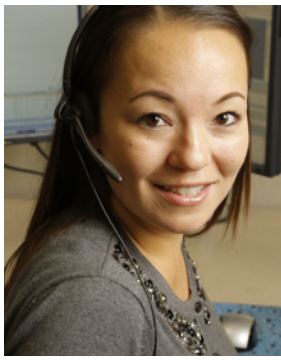
HOW TO CONTACT US



For more information about water quality or to report a water quality concern, call 866-403-2683 or visit www.ebmud.com.

If you would like this report mailed to you, call 510-986-7555 or email custsvc@ebmud.com. View this report online at www.ebmud.com/wqr.

EBMUD encourages public participation in decisions affecting drinking water quality and other matters at its Board of Directors meeting held the second and fourth Tuesdays of each month at 1:15 pm, 375 Eleventh Street, 2nd Floor, Oakland.

Board of Directors
John A. Coleman • Andy Katz • Doug Linney • Lesa R. McIntosh
Frank Mellon • William B. Patterson • Marguerite Young

General Manager
Alexander R. Coate

FOR MORE WATER QUALITY INFORMATION

State Water Resources Control Board
Division of Drinking Water • 510-620-3463

U.S. Environmental Protection Agency
Safe Drinking Water Hotline • 800-426-4791

Alameda County
Public Health Department • 510-267-8000

Contra Costa
Public Health Division • 925-313-6712

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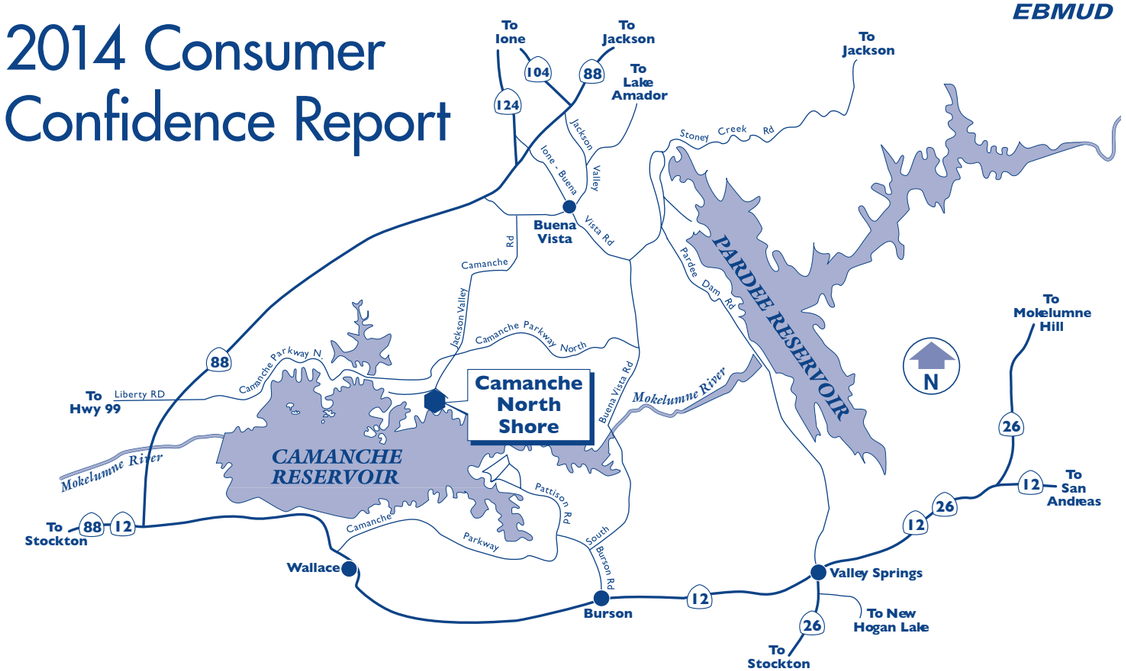
Camanche North Shore

2014 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to state and federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Three deep wells are the main water sources for Camanche North Shore Recreation Area. Water is treated at the Camanche North Shore Water Treatment Plant. Treatment includes addition of potassium permanganate and filtration through a pyrolusite filter system for removal of iron and manganese, and addition of chlorine for disinfection. The distribution system is served by two 140,000 gallon storage tanks. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The State Water Resources Control Board (State Board), Division of Drinking Water (formerly the California Department of Public Health) sets water quality requirements for the Camanche North Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2014.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Board prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. State Board regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The State Board requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District aquifer, and found that the source is most vulnerable to gas stations. In 2014, no contaminants associated with these activities were detected in EBMUD's drinking water sources.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton State Board office.

DROUGHT ALERT ⚠

Our water supply is critically low for 2015.

The drought continues. Tougher measures are needed. Please visit *ebmud.com/drought* for the latest information and tips to conserve.

Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Camanche North Shore 2014 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2014, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The State Board requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Fluoride (ppm)	2.0	1	0.2	0.1–0.2	2014	Erosion of natural deposits
Barium (ppm)	1	2	0.1	<0.1–0.2	2014	Erosion of natural deposits
Lead (ppb)*	AL=15	0.2	90th Percentile =1	No sites above AL out of 5 sites sampled	2013	Internal corrosion of household plumbing system; erosion of natural deposits;
Copper (ppb)	AL=1300	300	90th Percentile =16	No sites above AL out of 5 sites sampled	2013	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Organic Contaminants						
Ethyl Benzene (ppb)	300	300	<0.5	<0.5–0.8	2014	Discharges from petroleum refineries and chemical factories; fuel solvent
Xylenes (ppm)	1.750	1.8	0.0008	<0.0005–0.004	2014	Discharges from petroleum refineries and chemical factories; fuel solvent
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (ppb)	80	NA	15	15	2014	By-product of drinking water chlorination
Haloacetic Acids, 5 species (ppb)	60	NA	4	4	2014	By-product of drinking water chlorination
Chlorine residual as Cl_2 (ppm)	[4]	[4]	0.8†	0.3–1.0	2014	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (ppm)	250		12	5–14	2014	Runoff/leaching from natural deposits
Color (Color Unit)	15		<1	<1	2014	Naturally occurring organic materials
Odor–Threshold (TON)	3		1	1	2014	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		319	299–338	2014	Substances that form ions when in water
Sulfate (ppm)	250		28	13–41	2014	Runoff/leaching from natural deposits
Total Dissolved Solids (ppm)	500		253	240–270	2014	Runoff/leaching from natural deposits
Turbidity (NTU)	5		0.16	0.16	2014	Soil runoff

Unregulated Contaminants

	NL	PHG	Average	Range	Sample Year	Typical Sources
Boron (ppb)	1,000	NA	220	220	2014	Runoff/leaching from natural deposits

Other Parameters

	Range
Alkalinity, bicarbonate (ppm)	93–140
Alkalinity, carbonate (ppm)	0.1–0.7
Calcium (ppm)	29–32
Hardness (ppm as $CaCO_3$)	85–120

	Range
Magnesium (ppm)	3–8
pH (pH units)	7–7.8
Potassium (ppm)	7
Sodium (ppm)	22–33

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

ppb = parts per billion.

ppm = parts per million.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as *Cryptosporidium*, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The State Board waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The State Board waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. Detectable levels of xylenes were found in 2014, well below the health-related MCL limit. The xylene and ethyl benzene may result from the rehabilitation of the old water tank. Monitoring will continue until detectable levels are eliminated from the old water tank.

Secondary Contaminants, that affects aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The State Board waived monitoring requirements for Thiobencarb.

Unregulated Contaminants are monitored for water quality information and to help the USEPA and the Department determine where certain contaminants occur and whether the contaminants need to be regulated.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

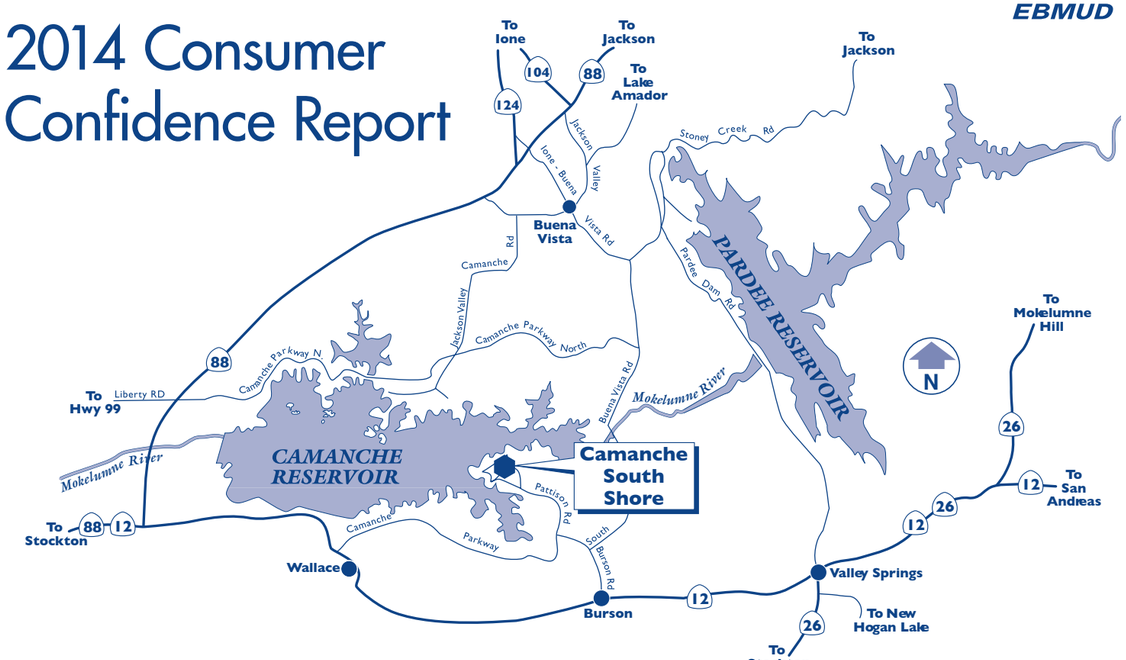
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes *Cryptosporidium*, the most commonly used filtration methods cannot guarantee 100 percent removal. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. *Cryptosporidium* must be ingested to cause disease, and it may be spread through means other than drinking water.

Camanche South Shore

2014 Consumer Confidence Report

EBMUD



Water System Information

This report includes information such as the source water, its water quality and comparisons to state and federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

Camanche Reservoir is the water source for Camanche South Shore Recreation Area. The Recreation Area is served by Camanche South Shore Water Treatment Plant. Treatment includes: coagulation, filtration and chlorination. The water treatment facility and distribution system are operated by state certified operators. The distribution system is served by two 240,000 gallon storage tanks.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The State Water Resources Control Board (State Board), Division of Drinking Water (formerly the California Department of Public Health) sets water quality requirements for the Camanche South Shore Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All drinking water standards were met in 2014.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Board prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. State Board regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The State Board requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to the following activities: boating and marina gas stations, wastewater treatment and disposal facilities, historic gas stations, known contaminant plumes and historical mining. In 2014, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton State Board office.

DROUGHT ALERT ⚠

Our water supply is critically low for 2015.

The drought continues. Tougher measures are needed. Please visit *ebmud.com/drought* for the latest information and tips to conserve.

Camanche South Shore 2014 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2014, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The State Board requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (ppb)	AL=1300	300	90th Percentile =32	No sites above AL out of 5 sites sampled	2013	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (ppb)*	AL=15	0.2	90th Percentile =2	No sites above AL out of 5 sites sampled	2013	Internal corrosion of household plumbing system; erosion of natural deposits;
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (ppb)	80	NA	37	37	2014	By-product of drinking water chlorination
Haloacetic Acids, 5 species (ppb)	60	NA	35	35	2014	By-product of drinking water chlorination
Chlorine residual as Cl_2 (ppm)	[4]	[4]	0.8†	0.6–1.1	2014	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (ppm)	250		7	7	2014	Runoff/leaching from natural deposits
Color (Color Unit)	15		2	2	2014	Naturally occurring organic materials
Odor–Threshold (TON)	3		1	1	2014	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		20	20	2014	Substances that form ions when in water
Sulfate (ppm)	250		2	2	2014	Runoff/leaching from natural deposits
Total Dissolved Solids (ppm)	500		49	49	2014	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (ppm)	20
Alkalinity, carbonate (ppm)	<0.1
Calcium (ppm)	4
Hardness (ppm as $CaCO_3$)	17

	Average & Range
Magnesium (ppm)	1
pH (pH units)	7.5
Potassium (ppm)	1
Silica (ppm)	7
Sodium (ppm)	6

Treatment of Surface Water Sources

Treatment Technique	Direct Filtration (dual media filtration with anthracite and sand)
Turbidity Performance Standards	1. Be less than or equal to 0.3 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.10 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

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NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

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ppb = parts per billion.

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Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as *Cryptosporidium*, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The State Board waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The State Board waived monitoring requirements for pesticides and herbicides, except for Atrazine and Simazine.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. The State Board waived monitoring requirements for Thiobencarb.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

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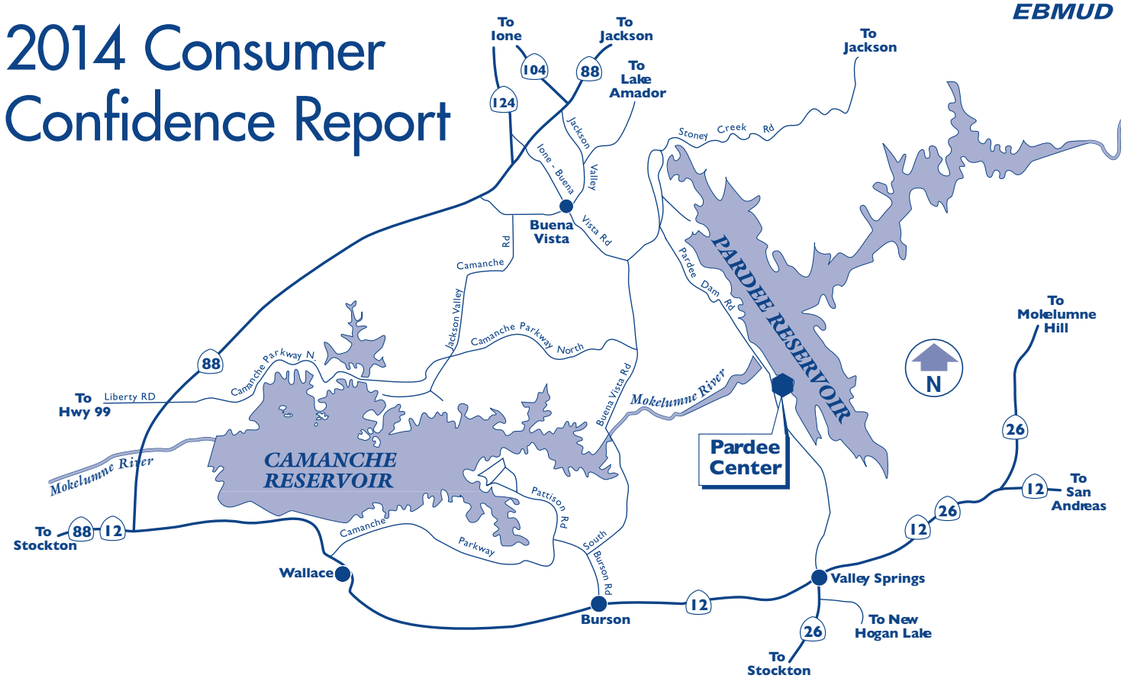
Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes *Cryptosporidium*, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Center Water Treatment Plant (WTP) does remove *Cryptosporidium* and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.001 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. *Cryptosporidium* must be ingested to cause disease, and it may be spread through means other than drinking water.

Pardee Center
2014 Consumer Confidence Report

EBMUD



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Water Source and Treatment

Pardee Reservoir is the water source for Pardee Center. Pardee Center has a dual water distribution system. The non-potable system serves the fire hydrants, irrigation system, chemical buildings, and various other uses throughout Pardee Center. Pardee Center is served by a state-of-the-art nanofiltration membrane water treatment facility. Nanofiltration can remove particles as small as 0.001 microns. Water treatment also includes the addition of soda ash for corrosion control and chlorine for disinfection. The distribution system is served by a 13,900 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The State Water Resources Control Board (State Board), Division of Drinking Water (formerly the California Department of Public Health) sets water quality requirements for the Pardee Center water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2014.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Board prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The State Board regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The State Board requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to boating and marina gas stations. In 2014, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton State Board office.

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Pardee Center 2014 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2014, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The State Board requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Inorganic Contaminants						
Copper (ppb)	AL=1300	300	90th Percentile =22	No sites above AL out of 5 sites sampled	2014	Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives
Lead (ppb)*	AL=15	0.2	90th Percentile =1	No sites above AL out of 5 sites sampled	2014	Internal corrosion of household plumbing system; erosion of natural deposits;
Disinfection Byproducts, Disinfectant Residuals						
Trihalomethanes (ppb)	80	NA	10	10	2014	By-product of drinking water chlorination
Haloacetic Acids, 5 species (ppb)	60	NA	8	8	2014	By-product of drinking water chlorination
Chlorine residual as Cl_2 (ppm)	[4]	[4]	0.8†	0.7–1.0	2014	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (ppm)	250		3	3	2014	Runoff/leaching from natural deposits
Color (Color Unit)	15		13	13	2008	Naturally occurring organic materials
Odor–Threshold (TON)	3	††	**3†††**	**1.1–3.5††**	2008	Naturally occurring organic materials
Specific Conductance (µS/cm)	1600		38	38	2014	Substances that form ions when in water
Total Dissolved Solids (ppm)	500		38	38	2014	Runoff/leaching from natural deposits

†† MCL exceedance for TON did not coincide with any odor complaints by consumers. TON value of 3.5 was detected on 4/22/2008.
††† Highest Running Annual Average (calculations include some 2007 data).

Other Parameters

	Average & Range
Alkalinity, bicarbonate (ppm)	17
Alkalinity, carbonate (ppm)	0.2
Calcium (ppm)	2
Hardness (ppm as $CaCO_3$)	9

	Average & Range
Magnesium (ppm)	1
pH (pH units)	8.2–8.4
Potassium (ppm)	0.4
Sodium (ppm)	6

Treatment of Surface Water Sources

Treatment Technique	Direct Filtration (dual media filtration with anthracite and sand)
Turbidity Performance Standards	1. Be less than or equal to 0.3 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.05 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

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The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

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Microbial Contaminants, such as viruses, bacteria and protozoa, such as *Cryptosporidium*, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The State Board waived the monitoring requirement for cyanide.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The State Board waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for nontransient-noncommunity water systems such as Pardee Center.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

EAST BAY
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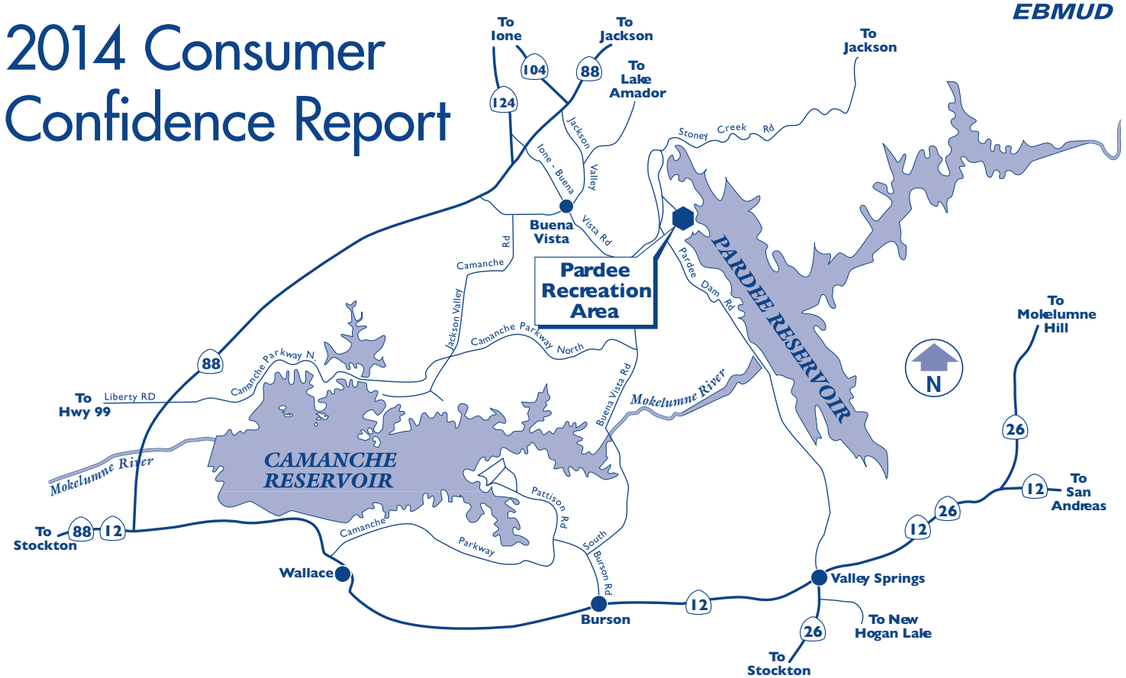
Pardee Recreation Area

2014 Consumer Confidence Report

EBMUD



Educational Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Cryptosporidium is a microbial pathogen found in surface water throughout the U.S. Although filtration removes *Cryptosporidium*, the most commonly used filtration methods cannot guarantee 100 percent removal. Pardee Recreation Water Treatment Plant (WTP) does remove *Cryptosporidium* and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the filtration membrane which is 0.01 micron. Current test methods do not allow us to determine if the organisms are dead or if they are capable of causing disease. Ingestion of *Cryptosporidium* may cause cryptosporidiosis, an abdominal infection. Symptoms of infection include nausea, diarrhea, and abdominal cramps. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people, infants, small children, and the elderly are at greater risk of developing life threatening illness. We encourage immuno-compromised individuals to consult their doctor regarding appropriate precautions to take to avoid infection. *Cryptosporidium* must be ingested to cause disease, and it may be spread through means other than drinking water.

Water System Information

This report includes information such as the source water, its water quality and comparisons to state and federal drinking water standards. For more information, please call the Pardee Water/Wastewater Supervisor at (209) 772-8368.

The Park Advisory Board meets in March, July and November at Pardee Center to discuss matters relating to water quality. For exact dates and times, please call (209) 772-8203. Public participation is encouraged.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguién que lo entienda bien.

Water Source and Treatment

The Recreation Area is served by a state-of-the-art ultrafiltration membrane water treatment facility with chlorine for disinfection. Ultrafiltration can remove particles as small as 0.01 microns. The distribution system is served by a 97,000 gallon water storage tank. The water treatment facility and distribution system are operated by state certified operators.

This report describes the results from water sampling for potential contaminants and gives information on water related activities. The State Water Resources Control Board (State Board), Division of Drinking Water (formerly the California Department of Public Health) sets water quality requirements for the Pardee Recreation Area water system, in order to ensure that the water is safe to drink. Complying with regulations requires an extensive monitoring program in both the source and treated waters. All water quality regulations were met in 2014.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the State Board prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. State Board regulations also establish limits for contaminants in bottled water that provide the same protection for public health.

Source Water Protection Activities

The State Board requires water utilities to determine the types of activities that can pollute their drinking water sources. EBMUD evaluated more than 100 activities that take place near this District reservoir, and found that the source is most vulnerable to gasoline storage and dispensing at the recreation area marina and boating. In 2014, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of the source water assessment completed in 2002 can be reviewed at the District's headquarters at Pardee Center, northeast of Valley Springs, or at the Stockton State Board office.

DROUGHT ALERT ⚠

Our water supply is critically low for 2015.

The drought continues. Tougher measures are needed. Please visit *ebmud.com/drought* for the latest information and tips to conserve.

Pardee Recreation Area 2014 Water Quality Data

The tables list all the drinking water contaminants that we detected from January 1 through December 31, 2014, unless noted otherwise. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The State Board requires us to monitor certain contaminants less than once per year because the concentration of these contaminants is not expected to vary significantly from year to year. Some of the data, though representative of the water quality, is more than one year old.

Primary Contaminants

	MCL or [MRDL]	PHG (MCLG) or [MRDLG]	Average	Range	Sample Year	Typical Sources
Disinfection Byproducts, Disinfectant Residuals						
Chlorine residual as Cl_2 (ppm)	[4]	[4]	0.8†	0.5–1.1	2014	Drinking water disinfectant added for treatment

†Highest Running Annual Average

Secondary Contaminants

	MCL	Violation	Average	Range	Sample Year	Typical Sources
Chloride (ppm)	250		5	5	2014	Runoff/leaching from natural deposits
Odor–Threshold (TON)	3		1.6	1.6	2009	Naturally occurring organic materials
Specific Conductance (µS/cm)	900		60	60	2014	Substances that form ions when in water
Sulfate (ppm)	250		1	1	2014	Runoff/leaching from natural deposits
Total Dissolved Solids (ppm)	500		30	30	2014	Runoff/leaching from natural deposits

Other Parameters

	Average & Range
Alkalinity, bicarbonate (ppm)	17
Alkalinity, carbonate (ppm)	<0.1
Calcium (ppm)	4
Hardness (ppm as $CaCO_3$)	20

	Average & Range
Magnesium (ppm)	1
pH (pH units)	7.7
Potassium (ppm)	1
Sodium (ppm)	4

Treatment of Surface Water Sources

Treatment Technique	Ultrafiltration (membrane filtration)
Turbidity Performance Standards	1. Be less than or equal to 0.3 NTU in 95% of measurements in a month 2. Not exceed 1.0 NTU at any time
Lowest monthly percentage of samples that met Turbidity Performance Standard No. 1	100%
Highest single turbidity measurement during the year	0.05 NTU
Number of violations of any surface water treatment requirements	0

Terms Used

AL = regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

MCL = Maximum Contaminant Level. The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible.

MCLG = Maximum Contaminant Level Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency. Chloramine has a maximum residual disinfectant level goal instead of an MCLG.

MRDL = Maximum Residual Disinfectant Level. The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG = Maximum Residual Disinfectant Level Goal. The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA = Not Applicable

NL = Notification Level. Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

NTU = Nephelometric Turbidity Units.

pCi/L = pico curies per liter, a measure of radioactivity.

PDWS = Primary Drinking Water Standard. MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

PHG = Public Health Goal. The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

ppb = parts per billion.

ppm = parts per million.

Secondary drinking water standard. MCLs set to protect the odor, taste and appearance of drinking water.

TON = Threshold Odor Number, a measurement of odors in water.

TT = Treatment Technique. A required process intended to reduce the level of a contaminant in drinking water.

Turbidity = A measure of cloudiness of the water. See NTU.

µS/cm = micro siemens per centimeter (measure of conductivity).

Contaminants in Drinking Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses, bacteria and protozoa, such as *Cryptosporidium*, that may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. Treatment Techniques (TT) are used to ensure disinfection and inactivation of coliforms and waterborne pathogens. These include: turbidity removal and sufficient disinfectant residual concentrations and time of contact.

Inorganic Contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming. The State Board waived monitoring requirements for inorganic contaminants, except for nitrate and nitrite. Regulations do not require lead and copper monitoring at the consumer's tap for transient-noncommunity water systems such as Pardee Recreation Area.

Private plumbing and fixtures may add lead or copper levels above the level delivered by the District. Hot water systems can contain elevated levels of lead and copper so it is not advisable to drink from hot water faucets. For additional information see the Note about Lead on the bottom of this page.

Radioactive Contaminants, that can be naturally occurring or be the result of oil and gas production and mining activities. Regulations do not require monitoring for radioactive contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Pesticide and Herbicide Contaminants, that may come from a variety of sources, such as agriculture, urban stormwater and residential uses. The State Board waived monitoring requirements for pesticides and herbicides.

Organic Chemical Contaminants, from industrial processes and petroleum production, and can also come from gas stations, urban storm water runoff, agricultural application, and septic systems. The State Board waived monitoring requirements for organic chemical contaminants.

Secondary Contaminants affect aesthetic qualities such as taste, odor, or appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Regulations do not require monitoring for secondary contaminants for transient-noncommunity water systems such as Pardee Recreation Area.

Other Parameters are water quality measurements which may be of interest to some consumers.

* Note about Lead

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with lead service lines and home plumbing. EBMUD is responsible for providing high quality drinking water and has replaced all known lead service lines in the District, but cannot control the variety of materials used in existing home plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by running your faucet for 30 seconds to two minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested.

Information on lead in drinking water, testing methods and steps you can take to minimize exposure is available from the USEPA Safe Drinking Water Hotline 800-426-4791 or at *www.epa.gov/safewater/lead.*

2013 - 2014 BI-ANNUAL REPORT
LANDFILL GROUNDWATER MONITORING

Penn Mine Environmental Restoration Project

Prepared by

EBMUD

East Bay Municipal Utility District
Oakland, California

October 2014

1.0 INTRODUCTION

The East Bay Municipal Utility District (EBMUD or District) conducts groundwater monitoring and maintenance activities at the Penn Mine Landfill, located in Calaveras County, California, as shown on Figure 1, in accordance with California Code of Regulations (CCR) Title 27 requirements for landfill monitoring and the *Penn Mine Landfill Post-Closure Operations and Maintenance Plan* dated December 1999 (TRC 1999). Previous monitoring data were reported in annual and biannual reports prepared in 2000, 2001, 2002, 2003, 2006, 2008, 2010, and 2012. This report summarizes the maintenance activities and presents the results of groundwater monitoring and sampling performed at the Penn Mine Landfill for the period of September 2012 through August 2014.

2.0 FIELD PROCEDURES

The District has been conducting groundwater sampling on a bi-annual basis since 2004. Quarterly monitoring of groundwater levels also began in Q4 2010.

The depth to groundwater was measured using an electronic sounder. The depth and top of casing elevation data were used to calculate the groundwater elevation in each well in reference to mean sea level. Groundwater elevation measurements from January 2000 to the present are presented in Table 1. Groundwater elevations, as measured on June 9, 2014, are shown on Figure 2.

Before groundwater sample collection, each well was purged of approximately three casing volumes or until field readings of pH, temperature, electrical conductivity and turbidity stabilized. Groundwater samples were collected for laboratory analysis by lowering a bottom-fill, disposable bailer to just below the water level in each well. The samples were transferred from the bailer into laboratory-supplied containers and transported to EBMUD's laboratory for analysis of water quality parameters under chain-of-custody documentation. The water sampling field survey forms and chain of custody records for the June 9, 2014 sampling event are presented in Appendix A.

3.0 SUMMARY OF RESULTS

The results of groundwater monitoring and analysis are discussed in the following sections and summarized in Tables 1 and 2. Table 3 summarizes the quantity of leachate removed from the landfill and transported offsite for disposal from January 2001 to July 2014. The locations of the four groundwater monitoring wells (LF-1 through LF-4) at the Penn Mine Landfill are shown on Figure 2.

3.1 Groundwater Elevation and Flow Direction

Monitoring data collected on June 9, 2014 suggest that groundwater flows towards the center of the landfill from wells LF-1 and LF-3. There appears to be a groundwater trough beneath the center of the landfill in an east-west direction transecting Wells LF-4 and LF-2.

during previous sampling events and significantly less than the 190 µg/L measured in 2006 at the same location. Overall, dissolved zinc concentrations in all four wells have either been decreasing or stable since 2006.

- **Total Dissolved Solids**

The total dissolved solids (TDS) concentrations reported for the samples collected in June 2014 ranged from 270 milligrams per liter (mg/L) in LF-3 to 720 mg/L in LF-2. These concentrations fell generally within the ranges observed during previous sampling events.

3.3 Subdrain Water Quality

The landfill subdrain (vadose zone trench) was constructed to ensure that groundwater did not reach within 5 feet of the landfill liner per CCR Title 27 regulations. Little or no flow was observed in the subdrain during the past two years. No water samples were collected for laboratory analysis.

3.4 Leachate Quality and Quantity

Based on the concentration of cadmium in the leachate samples collected in 2000, the leachate is classified as a Resource Conservation and Recovery Act (RCRA) hazardous waste for off-site disposal. No additional samples of the leachate have been collected and analyzed since 2000.

EBMUD has retained a contractor to remove and manage the leachate to comply with Title 27 of CCR, which specifically requires that the hydraulic head on the landfill liner shall be no more than 1 foot at any given time. The contractor measures the water depth in the landfill sump prior to and after pumping. The removal frequency is stepped up or down in accordance with the leachate production rate.

Between January 2001 and July 2014, approximately 653,909 gallons of leachate were removed from the sump using a vacuum truck and transported to an offsite disposal facility, corresponding to an average of approximately 48,438 gallons of leachate extracted and disposed of per year. The quantity of leachate extracted through July 2014 is summarized in Table 3[1]. Figure 7 graphically depicts the incremental and cumulative volume of leachate extracted from January 2001 to June 2014.

Figure 7 shows the extraction frequency was higher earlier on in the life of the landfill and during the springs of 2005 and 2006[2]. Based on data from 2001 to the present, the off-haul rate has decreased from a monthly rate of 10,487 gallons in calendar year 2001 to 1,346 gallons so far in 2014 (Figure 8). While it used to take less than one week to collect and remove 2,000 gallons, so far in 2014, it is taking 6.4 weeks. Figure 9 compares the amount of leachate removed to local rainfall in terms of water years (WYs). The leachate removal rate's decreasing trend is apparent here as well. However, the figure also illustrates a general

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[1] For 2001, only the total monthly leachate quantities are available, without specific amounts for the individual off-haul events.

[2] Details for the individual off-haul events in 2001 are not available. However, it is reasonable to assume that the frequency of pump-out was high given that the monthly totals were even more than those in 2002.

Section 4.2 below discusses the potential for surface water to enter the landfill.

4.2 Investigation of Excess Leachate

The landfill cap consists of, from bottom to top, a foundation layer, a 60-mil textured LDPE geomembrane, a doubled-sided geocomposite drainage layer, 3 feet of vegetative soil cover sloped to drain, and vegetation. The bottom liner consists of, from top to bottom, a 2-foot operations layer, a double-sided geocomposite drainage layer, a 60-mil textured HDPE geomembrane, a geosynthetic clay liner, a 30-mil textured HDPE geomembrane, and a layer of 16-ounce geotextile.

An increase in the amount of leachate generated during the springs of 2005 and 2006 prompted EBMUD and the Regional Water Quality Control Board (RWQCB) to investigate the cause(s). As a result of the 2006 investigation, two radial drains on the southwestern and southern sides of the landfill were repaired.

EBMUD's contractor also uncovered a construction flaw with the landfill cap in July 2008. It was determined that the cap did not extend beyond the liner underneath the southern end of the landfill as designed. As such, any surface water running off the landfill cover and collecting in the perimeter V-notch trench, when impeded from draining away from the landfill, as was the case with non-functioning radial drains, could overflow the trench and infiltrate downward directly into the landfill. In addition, rain water falling locally, directly overhead, could percolate down through the soil and into the landfill.

This issue was addressed in August 2009 when EBMUD's contractor welded on a new piece of LDPE material to extend the cover radially outward on the south side, and beyond the landfill's bottom liner anchor trench. The cover's perimeter drain (the V-notch trench) at that location was relocated and recreated on the extended cover. Similarly, the double-sided geocomposite drainage layer was extended to the depth of the newly created perimeter drain. A new radial drain connected to a perforated pipe within the newly reconstructed perimeter drain was also installed approximately 6 feet from the lowest point on the southern edge of the landfill in order to convey water from the cover system. In all, over 160 feet of the landfill cover's southern perimeter was affected by this repair.

As shown in Figures 8 and 9, these repairs yielded a marked drop in leachate production. Nevertheless, there was evidence that water of an outside source continued to enter the landfill, albeit at a slower rate. As a result, in late 2012, EBMUD's contractor investigated the landfill's entire perimeter for cover and drainage construction conformance with the as-built drawings. The investigation found some blockage in sections of the landfill cover's perimeter drain. In addition, the radial drains extending outward from the perimeter drain were compromised at several locations. The investigation concluded that the primary source of continuing rainwater infiltration into the landfill was likely the gap that existed, by design, between the landfill cap and liner at the outer perimeter of the landfill.

Consequently, from August to October 2013, EBMUD's contractor excavated and welded the 60-mil LDPE landfill cap to the bottom 60-mil HDPE liner to completely seal the waste

REFERENCES

CH2M HILL. 2000. *Technical Memorandum. Penn Mine Leachate Removal and Treatment Alternatives.* August 3.

TRC. 1999. *Penn Mine Landfill Post-Closure Operations and Maintenance Plan, prepared for East Bay Municipal Utility District and the Central Valley Regional Water Quality Control District.* December.

TRC. 1999. *Penn Mine Landfill As-Builts, Sheets 1 through 19.* August.

Table 1
Groundwater Elevation Data Summary

	LF-1	LF-2	LF-3	LF-4
Date	Elevation (feet above MSL)			
1/21/2000	340.89	326.13	326.66	321
2/24/2000	340.45	333.37	339.68	323.26
3/17/2000	340.3	332.65	339.23	324.29
4/24/2000	337.4	332.57	338.83	315.96
5/31/2000	339.95	331.97	338.01	323.76
6/23/2000	339.7	330.07	337.13	323.86
7/19/2000	337.93	326.53	336.26	322.16
8/24/2000	338.88	325.21	328.36	323.26
9/18/2000	338.63	324.09	327.46	323.11
10/20/2000	338.25	323.26	325.5	317.9
11/20/2000	338.45	327.77	334.58	321.21
12/19/2000	337.33	327.97	334.56	322.31
1/22/2001	336.75	332.72	334.68	322.01
2/26/2001	336.85	333.07	339.42	322.81
3/22/2001	336.65	332.96	339.14	323.83
4/16/2001	336.8	332.65	338.3	323.86
5/14/2001	336.73	331.2	337.28	323.58
6/18/2001	336.35	327.94	333.48	323.57
7/16/2001	336.3	325.56	328.7	323.38
8/22/2001	335.87	323.43	326.83	323.01
9/21/2001	335.63	322.67	326.08	322.76
10/22/2001	334.88	321.95	325.18	322.04
11/21/2001	334.88	321.66	326.96	321.94
12/20/2001	334.65	328.07	329.38	321.84
1/14/2002	334.47	332.52	338.98	322.82
2/21/2002	334.45	333.17	339.07	322.61
3/15/2002	335.05	333.55	340.08	323.86
4/19/2002	336.4	332.97	338.3	324.41
5/13/2002	336.6	332.17	337.28	324.38
6/13/2002	336.28	329.78	334.72	324.41
7/22/2002	331.88	326.12	328.2	315.21
8/22/2002	335.32	324.25	326.87	323.51
9/26/2002	335.25	322.87	325.68	323.51
10/28/2002	334.87			
11/22/2002	334.6	321.92	325.03	322.66
12/23/2002	335.65	326.06	331.28	322.81
1/23/2003	334.15	331.12	336.16	322.41
2/25/2003	333.95	331.75	336.38	322.01
3/24/2003	333.8	331.75	335.42	322.21
4/17/2003	333.73	332.22	334.66	322.29
5/16/2003	332.95	332.05	334.48	322.21
6/30/2003	333.35	327.97	328.03	321.79
7/24/2003	327.3	325.52	326.98	313.01
8/22/2003	333.25	323.51	325.98	321.29
9/18/2003	333.25	322.48	325.2	321.43
10/16/2003	332.15	320.97	323.88	321.86
11/25/2003	332.93	321.03	323.31	320.86
12/23/2003	333.05	326.27	331.38	320.81
1/26/2004	332.6	331.87	336.98	321.91
2/24/2004	332.75	333.02	338.4	322.66
3/22/2004	334.11	334.23	338.33	324.01
4/15/2004	335.05	333.75	336.78	323.86
5/21/2004	335.45	330.27	335.08	324.11

Table 1
Groundwater Elevation Data Summary

	LF-1	LF-2	LF-3	LF-4
Date	Elevation (feet above MSL)			
11/18/2008	340.35	321.77	324.08	323.61
12/4/2008	340.05	321.77	323.68	323.31
1/7/2009	339.65	321.87	326.98	323.01
2/3/2009	339.25	326.27	331.18	322.81
3/2/2009	338.95	330.77	337.68	323.71
4/23/2009	339.15	331.97	336.38	325.31
6/3/2009	339.25	329.57	334.28	325.21
7/22/2009	339.05	325.27	327.18	324.91
9/2/2009	338.85	322.87	325.58	324.51
10/7/2009	338.55	321.87	324.68	324.11
11/10/2009	338.15	321.37	324.18	323.61
12/2/2009	337.95	321.17	323.78	323.31
1/13/2010	337.55	322.47	327.38	322.81
3/3/2010	337.45	333.37	339.18	324.31
4/15/2010	337.45	333.07	337.98	324.71
5/5/2010	337.85	332.87	338.28	326.41
6/1/2010	338.75	332.37	336.88	327.01
6/15/2010	339	331.27	336.28	326.89
7/6/2010	339.35	329.17	334.78	326.71
8/3/2010	339.45	326.57	328.98	326.41
9/1/2010	339.55	324.57	327.08	326.11
11/2/2010	338.95	322.67	326.08	325.11
2/2/2011	338.95	334.47	338.78	328.61
5/1/2011	345.35	333.97	338.28	333.91
8/3/2011	345.85	328.37	328.88	329.61
11/3/2011	343.15	323.17	325.08	326.41
2/1/2012	342.55	325.67	327.88	325.71
5/3/2012	341.55	333.17	337.48	326.61
5/17/2012	341.59	332.54	336.75	326.96
8/1/2012	341.55	325.67	329.68	326.41
11/11/2012	340.95	322.17	324.78	325.21
2/5/2013	339.15	331.47	335.58	324.91
5/2/2013	340.55	306.57	329.48	325.81
8/14/2013	339.95	322.87	324.98	324.51
11/7/2013	339.25	320.97	323.28	323.31
2/6/2014	337.85	320.37	321.98	322.11
5/6/2014	337.25	329.37	333.98	321.81
8/6/2014	335.85	320.97	324.28	320.01

Table 2A
Groundwater, Subdrain, and Leachate Laboratory Analysis Summary
Landfill Monitoring
Penn Mine Environmental Site Restoration Project

WELL ID	Sample Date	Sample Type	Depth to Water (feet)	FIELD PARAMETER READINGS				GENERAL CHEMISTRY PARAMETERS			LAB.
				Temp. (°C)	pH	E.C. (µmhos/cm)	Turbidity (NTU)	TSS (mg/L)	TDS (mg/L)	Alkalinity (mg/L)	
LF-2	7/18/2002	P	--	21	6.4	690	7	U 1.5	490	280	EBMUD
	7/18/2002	R	--	--	--	--	--	1.5	490	280	EBMUD
	1/30/2003	P	--	20	6.6	710	--	U 2.0	460	280	EBMUD
	7/18/2003	P	41.39	21	6.9	660	1	2.7	470	290	EBMUD
	2/24/2004	P	30.85	19.7	8.02	709	4	U 1.2	450	320	EBMUD
	8/24/2004	P	--	20.1	7.16	437	--	6.3	590	370	EBMUD
	5/4/2006	R	28.06	20.3	6.78	687	4	U 10	490	300	EBMUD
	5/14/2008	P	33.18	18.8	6.37	1013	6	3	710	370	EBMUD
	6/15/2010	P	32.6	19.4	6.33	999	12	U 1.7	690	360	EBMUD
	5/17/2012	P	31.33	20.5	6.47	1053	0.67	1.4	690	360	EBMUD
	6/9/2014	P	37.43	19.79	6.38	1113	0.86	< 1.2	720	420	EBMUD
LF-3	10/14/1999	P	27.13	24.9	7.75	712	--	--	421	159	EBMUD
	10/20/1999	P	29.05	19.1	7.11	592	49.2	6	310	170	MCC/GEO
	10/20/1999	S	--	--	--	--	--	2.4	390	150	EBMUD
	1/21/2000	P	27.62	25.1	7.77	549	27.62	10	440	150	EBMUD
	4/21/2000	P	15.5	19	7.3	550	2.2	7.2	440	390	EBMUD
	7/20/2000	P	21.02	19.2	7.1	760	16.1	4	460	160	EBMUD
	10/19/2000	P	28.22	21.4	7	643	0.7	U 1.2	450	170	EBMUD
	1/18/2001	P	22.42	18.3	6.2	168	6.9	U 3.0	110	52	EBMUD
	4/17/2001	P	16.16	19.1	7.06	254	1.3	U 1.5	180	80	EBMUD
	7/26/2001	P	26.7	20.2	6.05	291	7	3	140	81	EBMUD
	10/17/2001	P	28.95	19.8	7.25	198	1	6	150	83	EBMUD
	1/31/2002	P	--	20	7.7	520	2	6.5	210	80	EBMUD
	7/18/2002	P	--	20	6.7	580	10	3.2	430	150	EBMUD
	1/30/2003	P	--	20	6.9	190	--	5.5	170	74	EBMUD
	7/18/2003	P	29.08	20	7.2	450	1	3.7	350	150	EBMUD
	2/24/2004	P	15.88	19.7	7.93	524	6	2.4	370	150	EBMUD
	8/24/2004	P	--	19.7	7.13	233	--	18	300	130	EBMUD
	5/4/2006	R	14.50	19.9	7.02	99	30	U 10	84	56	EBMUD
	5/14/2008	P	19.51	17.8	6.97	348	6	2.5	220	140	EBMUD
	6/15/2010	P	18.00	17.9	6.94	355	5	U 2.5	220	120	EBMUD
	5/17/2012	P	17.53	21.5	7.69	474	6.99	15	270	160	EBMUD
	6/9/2014	P	23.12	20.16	7.48	435	9.1	11	270	170	EBMUD
LF-4	10/14/1999	P	55.55	23.8	7.79	801	--	--	486	172	APPL
	10/20/1999	P	73.73	19.1	7.22	718	47.1	10	480	340	MCC/GEO
	10/20/1999	R	--	--	--	--	--	13	440	340	MCC/GEO
	10/20/1999	S	--	--	--	--	--	5.6	500	220	EBMUD
	10/20/1999	S, R	--	--	--	--	--	13	490	320	EBMUD
	1/21/2000	P	56.21	25.6	7.69	704	74.2	190	530	360	EBMUD
	1/21/2000	R	--	--	--	--	--	200	510	360	EBMUD
	4/21/2000	P	57.02	19	6.9	710	42	350	520	370	EBMUD
	4/21/2000	R	--	--	--	--	--	700	550	410	EBMUD
	7/20/2000	P	55.05	19.9	6.83	856	7.1	14	540	420	EBMUD

Table 2B
Groundwater, Subdrain, and Leachate Laboratory Analysis Summary
Landfill Monitoring
Penn Mine Environmental Site Restoration Project

WELL ID	Sample Date	Sample Type	Depth to Water (feet)	DISSOLVED METALS							TOTAL METALS						LAB
				Al (µg/L)	Cd (µg/L)	Cu (µg/L)	Hg (µg/L)	Ni (µg/L)	Pb (µg/L)	Zn (µg/L)	Sulfate (mg/L)	Na (µg/L)	K (µg/L)	Mg (µg/L)	Ca (µg/L)	Chloride (mg/L)	
LF-1	10/14/1999	P	64.2	U 100	U 5	U 5	U 0.2	U 5	U 3	U 50	21.3	48400	5100	44300	40200	45.3	APPL
	10/20/1999	P	67.97	300	U 5	U 5	U 0.8	U 50	U 5	U 50	24	40000	5400	44000	37000	40	MCC/GEO
	10/20/1999	S	--	19.9	0.578	U 2.08	U 0.02	U 5.2	22.4	12.1	23	B 52000	5830	B 49800	B 41400	46	EBMUD
	1/21/2000	P	66.56	U 10.4	U 0.832	5.9	U 0.02	U 5.2	U 9.36	10.8	25	52200	6210	B 50400	40000	41	EBMUD
	4/21/2000	P	67.02	23.8	U 0.728	6.27	U 0.02	2.38	11.2	B 4.18	31	69800	6640	44700	33900	42	EBMUD
	7/20/2000	P	69.52	43	U 0.728	6.55	U 0.02	21.9	U 3.0	24	27	61100	6380	B 47300	41100	43	EBMUD
	10/19/2000	P	69.82	26.3	U 0.728	9.26	U 0.02	12.5	11.7	5.99	32	63300	6180	43600	35100	42	EBMUD
	10/19/2000	R	--	26.3	U 0.728	7.24	U 0.02	10.9	8.72	5.38	32	63600	6270	45100	35100	43	EBMUD
	1/18/2001	P	72.12	B 29.7	U 0.728	7.97	U 0.02	6.17	12	278	400	47000	6730	36500	33800	420	EBMUD
	4/17/2001	P	70.75	29.4	U 0.728	7.61	U 0.02	B 14.6	6.31	81.8	350	B 69000	6430	B 44800	35100	250	EBMUD
	7/26/2001	P	71.71	U 9.0	U 0.728	8.73	U 0.02	7.92	U 0.3	117	31	66700	6400	41100	34400	34	EBMUD
	10/17/2001	P	72.21	18.2	U 0.728	8.41	U 0.02	5.92	U 0.3	91.3	32	69600	6650	B 40800	B 33900	34	EBMUD
	1/31/2002	P	--	26.9	U 0.728	10.4	U 0.02	U 2.08	U 0.9	57.8	28	77000	7270	41900	31400	26	EBMUD
	1/31/2002	R	--	31	U 0.728	10.1	U 0.02	U 2.08	U 0.90	55.7	30	79500	7170	39900	31900	26	EBMUD
	7/18/2002	P	--	15	--	9.3	U 0.02	--	U 0.90	46.6	76	75000	6780	44700	31900	69	EBMUD
	1/30/2003	P	--	U 10.4	--	9.53	U 0.02	--	U 0.90	9.60	30	77500	6340	43100	32100	29	EBMUD
	7/18/2003	P	74.20	U 10.4	--	U 6.24	U 0.02	--	U 0.90	2.95	32	76500	6650	45000	B 35400	29	EBMUD
	2/24/2004	P	74.70	U 10.4	--	U 6.24	U 0.02	--	U 0.90	164	5.8	40500	7950	21700	33700	3.6	EBMUD
	2/24/2004	R	--	79.7	--	9.85	--	--	--	278	--	21600	8880	7980	31000	--	EBMUD
	8/24/2004	P	--	U 8.32	--	14.7	U 0.02	--	U 0.8	111	24	54700	7570	28500	B 33500	19	EBMUD
	8/24/2004	R	--	152	--	25.8	--	--	--	196	--	51600	7630	24900	33200	--	EBMUD
	5/4/2006	P	69.19	48	--	9.42	U 0.02	--	3.4	260	32	8900	11000	3300	29000	29	EBMUD
	5/4/2006	R	--	U 14	--	U 8.32	--	--	--	230	32	8000	10000	3000	28000	29	EBMUD
	5/14/2008	P	64.95	U 22	--	13	U 0.02	--	--	160	15	48000	8800	22000	33000	23	EBMUD
	6/15/2010	P	68.45	U 17	--	16.6	U 0.02	--	--	91	19	48000	9200	25000	33000	23	EBMUD
	5/17/2012	P	65.86	15.2	--	U 7.31	U 0.02	--	--	U 6.27	44	71200	5590	41300	32500	40	EBMUD
	6/9/2014	P	69.94	U 11.4	--	U 6.24	U 0.04	--	--	U 4.16	54	66700	6380	48600	41500	34	EBMUD

Table 2B
Groundwater, Subdrain, and Leachate Laboratory Analysis Summary
Landfill Monitoring
Penn Mine Environmental Site Restoration Project

WELL ID	Sample Date	Sample Type	Depth to Water (feet)	DISSOLVED METALS							TOTAL METALS						LAB
				Al (µg/L)	Cd (µg/L)	Cu (µg/L)	Hg (µg/L)	Ni (µg/L)	Pb (µg/L)	Zn (µg/L)	Sulfate (mg/L)	Na (µg/L)	K (µg/L)	Mg (µg/L)	Ca (µg/L)	Chloride (mg/L)	
LF-3	10/14/1999	P	27.13	U 100	U 5	U 5	U 0.2	U 5	U 3	U 50	135	37600	2600	34400	41100	9.8	EBMUD
	10/20/1999	P	29.05	290	U 5	U 5	U 0.8	U 50	U 5	U 50	120	37000	3100	31000	36000	13	MCC/GEO
	10/20/1999	S	--	24.7	1.03	2.24	U0.02	U 5.2	U 0.3	13.9	130	B 47500	3710	B 36100	39200	11	EBMUD
	1/21/2000	P	27.62	11.1	U 0.832	3.04	B 0.04	5.83	U 9.36	25.2	130	47000	5190	B 38900	39700	11	EBMUD
	4/21/2000	P	15.5	30.7	U 0.728	U 3.12	0.02	U 2.08	10.6	B 22.4	130	43800	3320	33500	41400	12	EBMUD
	7/20/2000	P	21.02	71.6	U 0.728	U 3.12	U 0.02	5.27	19.6	19.6	160	46000	7960	B 38000	49200	11	EBMUD
	10/19/2000	P	28.22	27.7	U 0.728	U 3.12	U 0.02	U 2.08	U 5.2	5.23	170	45200	3780	36100	46200	9.6	EBMUD
	1/18/2001	P	22.42	B 18.8	2.46	8.32	U 0.02	9.03	U 5.2	307	400	5100	2490	4960	12600	640	EBMUD
	4/17/2001	P	16.16	17.8	6.52	6.34	0.02	B 7.04	U 5.2	380	450	B 13300	2970	B 12500	20900	280	EBMUD
	7/26/2001	P	26.7	10.6	13.4	7.64	U 0.02	4.36	U 0.30	438	18	7800	3440	10800	19400	2.1	EBMUD
	10/17/2001	P	28.95	12.2	5.86	9.07	U 0.02	3.75	U 0.30	395	19	8310	3540	B 10800	B 19600	2.1	EBMUD
	1/31/2002	P	--	24	U 0.728	U 3.12	U 0.02	U 2.08	U 0.90	51.7	45	14300	4470	17000	24400	6.9	EBMUD
	7/18/2002	P	--	14	--	U 3.12	U 0.02	--	U 0.90	9.17	140	43900	3620	35600	45000	10	EBMUD
	1/30/2003	P	--	2310	--	10.4	0.069	--	U 0.90	71.1	9.8	5960	6890	9420	17200	2	EBMUD
	7/18/2003	P	29.08	13	--	U 6.24	U 0.02	--	U 0.90	7.97	100	38300	3100	26700	B 40600	12	EBMUD
	2/24/2004	P	15.88	10.4	--	U 6.24	U 0.02	--	U 0.90	1.04	140	35600	3010	30100	38000	6.4	EBMUD
	2/24/2004	R	--	92	--	U 4.4	--	--	--	B 21.6	--	35900	3210	B 28700	B 35600	--	EBMUD
	8/24/2004	P	--	U 8.32	--	7.01	U 0.02	--	U 0.8	56.8	100	28400	3500	25200	B 31800	4.4	EBMUD
	8/24/2004	R	--	390	--	11.1	--	--	--	99.4	--	28800	3480	25400	31100	--	EBMUD
	5/4/2006	P	14.50	48	--	U 8.32	U 0.02	--	0.24	140	98	1200	2700	4800	13000	16	EBMUD
	5/4/2006	R	--	16	--	U 8.32	--	--	--	99	98	1100	2700	4900	12000	16	EBMUD
	5/14/2008	P	19.51	U 22	--	U 3.3	U 0.02	--	--	40	31	20000	2800	17000	29000	2.5	EBMUD
	6/15/2010	P	18	U 17	--	4.78	U 0.02	--	--	52	40	21000	2500	19000	26000	3.3	EBMUD
	5/17/2012	P	17.53	U 12.5	--	U 7.31	U 0.02	--	--	U 6.27	58	34000	2730	19400	28600	4	EBMUD
	6/9/2014	P	23.12	U 11.4	--	U 6.24	U 0.04	--	--	U 4.16	56	34700	2740	19800	32200	4.5	EBMUD

Table 2B
Groundwater, Subdrain, and Leachate Laboratory Analysis Summary
Landfill Monitoring
Penn Mine Environmental Site Restoration Project

WELL ID	Sample Date	Sample Type	Depth to Water (feet)	DISSOLVED METALS							TOTAL METALS						LAB
				Al (µg/L)	Cd (µg/L)	Cu (µg/L)	Hg (µg/L)	Ni (µg/L)	Pb (µg/L)	Zn (µg/L)	Sulfate (mg/L)	Na (µg/L)	K (µg/L)	Mg (µg/L)	Ca (µg/L)	Chloride (mg/L)	
Subdrain	9/23/1998	P	--	U 50	U 0.25	4.3	U 0.20	1.3	U 1.5	U 25	22	37000	5900	5100	46000	42	APPL
	2/4/1999	P	--	--	--	13.8	--	--	--	U 50	--	--	--	--	--	--	APPL
	4/28/1999	P	--	--	--	72.7	--	--	--	123	--	--	--	--	--	--	APPL
	7/19/1999	P	--	--	--	11.2	--	--	--	U 50	--	--	--	--	--	--	APPL
	3/1/2000	P	--	59.4	U 0.728	6.87	U 0.02	U 2.08	16.8	27.3	68	40300	1980	48300	44900	9.5	EBMUD
	5/4/2006	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--	
	5/14/2008	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--	
	6/15/2010	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--	
	5/17/2012	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--	
	6/9/2014	--	X	--	--	--	--	--	--	--	--	--	--	--	--	--	
Leachate	8/24/1999	P	--	--	10900	3E+05	--	2910	116	1630000	--	--	--	--	--	--	APPL
	3/30/2000	P	--	--	10000	1E+05	U 0.8	2800	75	1900000	--	--	--	--	--	--	MCC
	6/5/2000	P	--	--	11000	57000	1	2900	86	80000	--	--	--	--	--	--	MCC
	10/25/2000	P	--	--	6800	3E+05	0.64	2400	99	1900000	--	--	--	--	--	--	Chromalab
	10/25/2000	P	--	--	11000	3E+05	2.8	3800	170	2000000	--	--	--	--	--	--	Chromalab
	10/25/2000	P	--	--	11000	3E+05	2.8	4000	U 500	1900000	--	--	--	--	--	--	Chromalab

Key

µg/L	micrograms per liter
mg/L	milligrams per liter
--	Not analyzed/available/applicable
MCC	McCampbell Analytical
GEO	GeoAnalytical Laboratories
EBMUD	District Laboratory
APPL	Agriculture & Priority Pollutants Laboratories

B	Analyte detected in method blank
P	Primary sample
R	Lab Replicate sample
S	Split sample
U	Not detected
QC	Field duplicate
QCR	Lab replicate of Field duplicate
X	Insufficient water present for sample collection

Table 3
Leachate Removal - January 2001 to July 2014

Date	Volume Hauled	Annual Volume Hauled (Gallons)
1/30/03	2,596	
2/13/03	2,578	
2/27/03	2,592	
3/13/03	2,206	
3/27/03	2,088	
4/14/03	2,297	
4/24/03	1,513	
5/8/03	1,987	
5/22/03	1,923	
6/5/03	1,914	
6/26/03	2,124	
7/10/03	2,437	
7/24/03	1,850	
8/14/03	2,090	
8/28/03	2,267	
9/18/03	2,225	
10/2/03	2,264	
10/23/03	2,307	
11/13/03	2,133	
11/24/03	2,460	
12/15/03	2,199	
12/29/03	2,284	52,823
1/15/04	2,293	
1/22/04	2,344	
1/29/04	2,248	
2/10/04	2,154	
3/1/04	2,244	
3/4/04	5,818	
3/18/04	3,154	
4/1/04	2,154	
4/15/04	1,803	
4/29/04	1,799	
5/13/04	1,683	
5/27/04	1,630	
6/10/04	1,641	
6/24/04	1,641	
7/8/04	1,628	
7/29/04	2,281	
8/12/04	1,567	
9/2/04	2,230	
9/23/04	2,283	
10/7/04	1,594	
10/25/04	2,094	
11/15/04	2,226	
12/2/04	1,848	
12/20/04	2,026	52,383
1/6/05	2,336	
1/20/05	2,393	
1/24/05	2,276	
1/27/05	2,269	

Table 3
Leachate Removal - January 2001 to July 2014

Date	Volume Hauled	Annual Volume Hauled (Gallons)
5/18/07	2,572	
6/7/07	2,236	
6/29/07	1,939	
7/24/07	2,134	
8/21/07	2,165	
9/13/07	1,907	
10/11/07	2,204	
11/8/07	2,283	
12/6/07	2,367	36,163
1/3/08	2,145	
2/5/08	4,050	
2/28/08	3,320	
3/20/08	2,621	
4/10/08	1,919	
05/01/08	1,698	
05/22/08	1,520	
06/19/08	1,905	
07/17/08	1,849	
08/21/08	2,352	
09/25/08	2,384	
10/30/08	2,571	
12/04/08	2,442	30,774
01/05/09	2,329	
02/05/09	2,422	
03/05/09	4,348	
04/02/09	4,573	
05/07/09	3,835	
06/11/09	1,699	
07/16/09	2,200	
08/20/09	1,974	
09/24/09	1,967	
10/29/09	2,101	
12/03/09	2,199	29,647
01/07/10	2,162	
02/11/10	2,275	
03/18/10	2,759	
03/25/10	1,997	
04/29/10	2,477	
6/3/2010	2,053	
7/8/2010	1,842	
8/12/2010	1,785	
9/16/2010	1,726	
10/21/2010	1,767	
11/18/2010	1,446	
12/16/2010	1,478	23,767
1/14/2011	1,936	
1/18/2011	7,109	
2/10/2011	2,262	
2/17/2011	1,900	
3/10/2011	4,285	

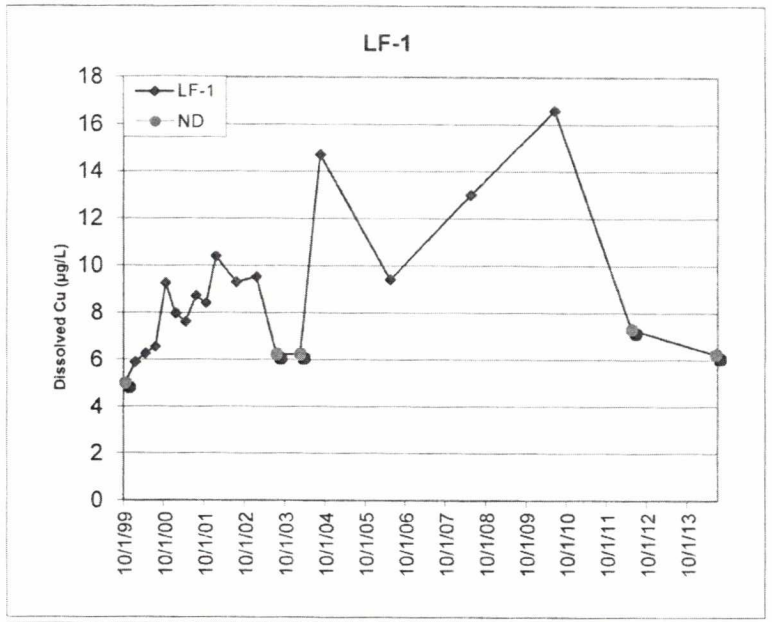
Figures

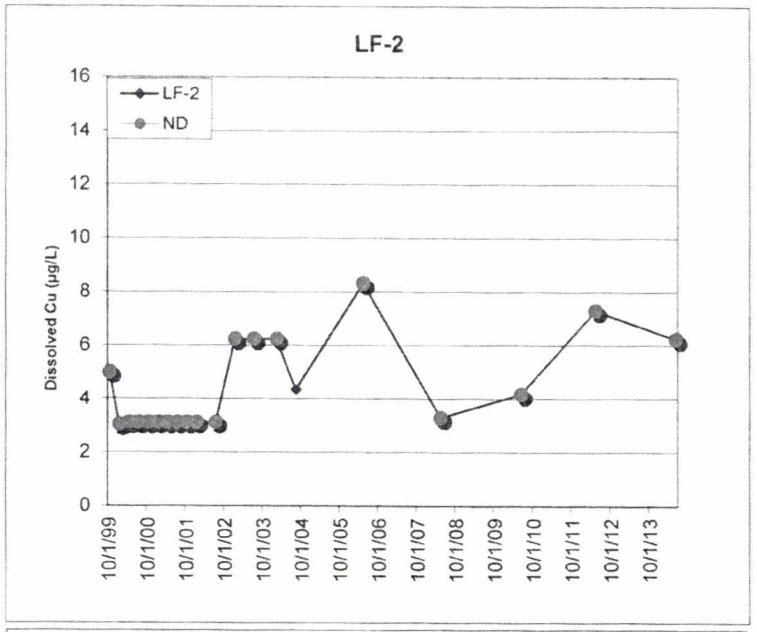


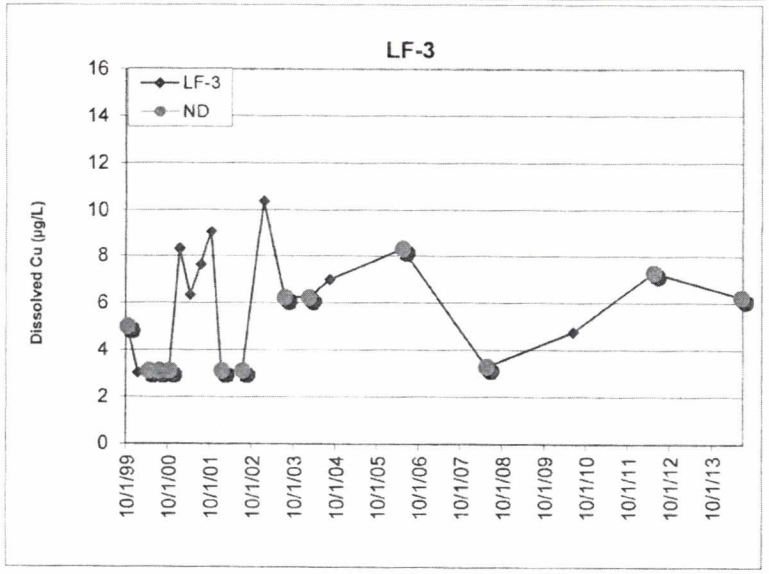
Figure 2 – Site Plan and Groundwater Elevation
June 9, 2014

Figure 4
Dissolved Copper Concentrations Years 1999-2014

Penn Mine Environmental Restoration Project







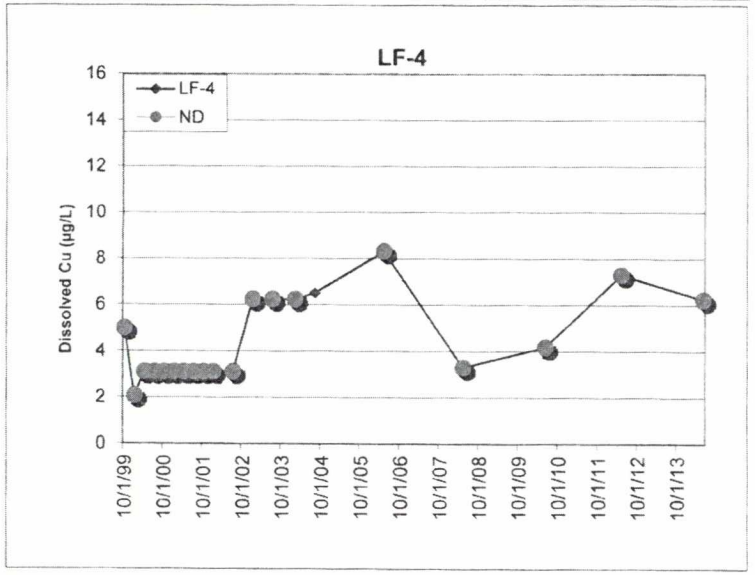
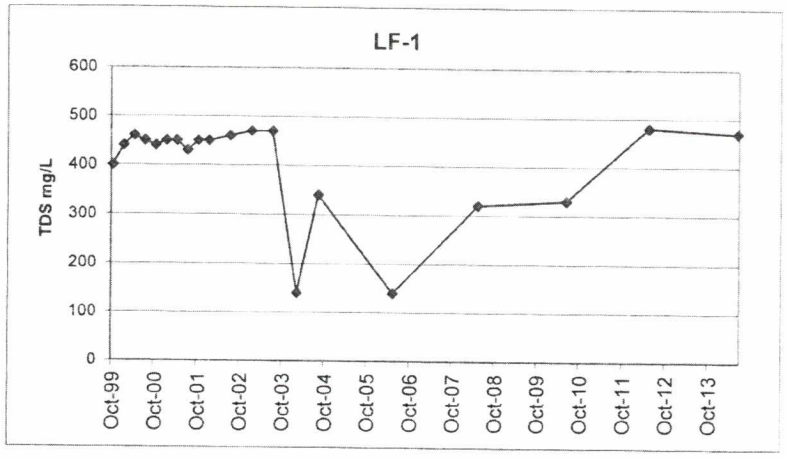
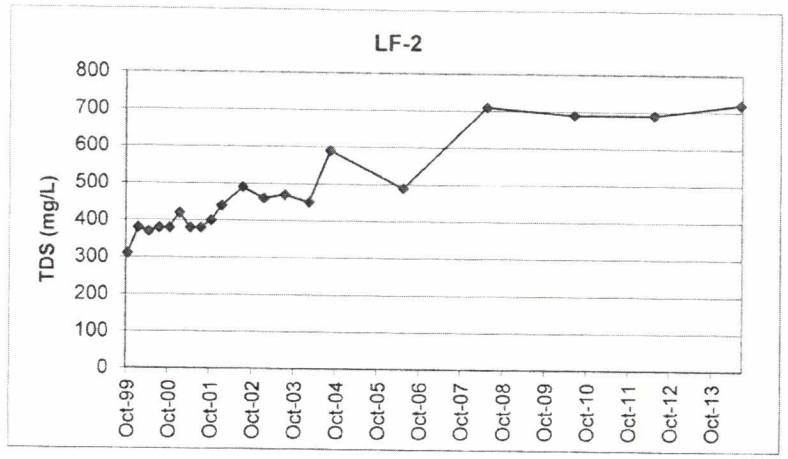
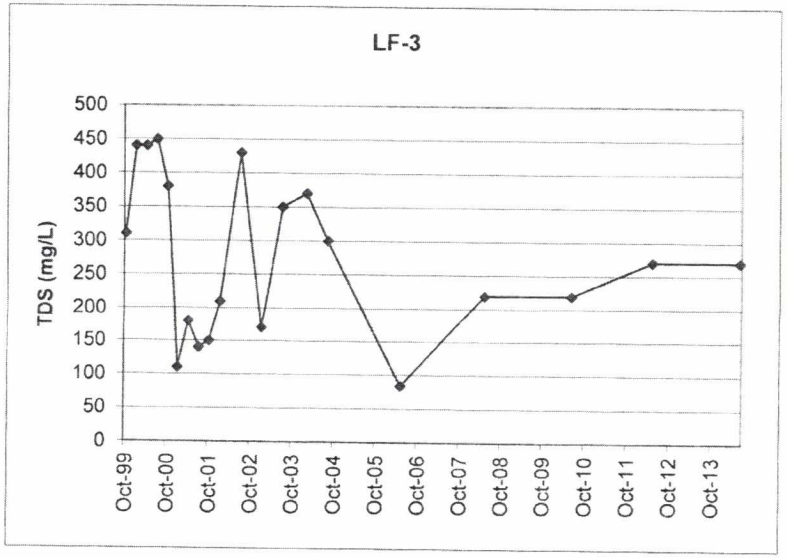


Figure 6
TDS Concentrations Years 1999-2014

Penn Mine Environmental Restoration Project







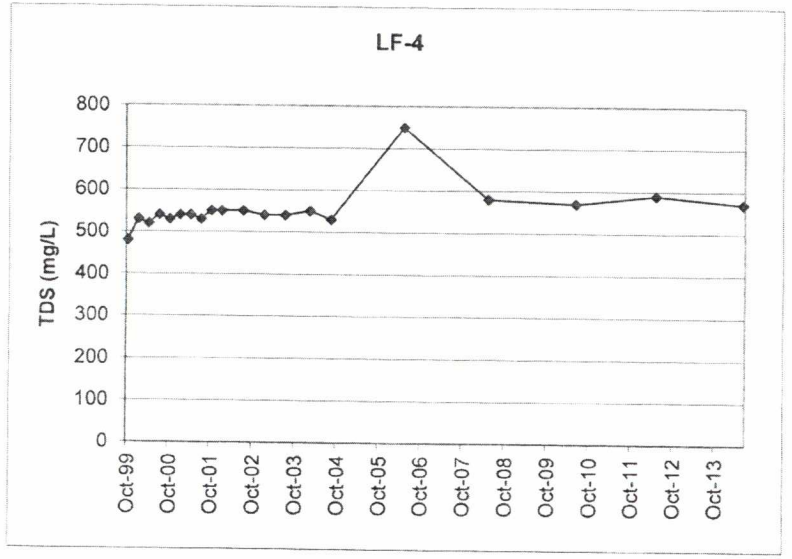
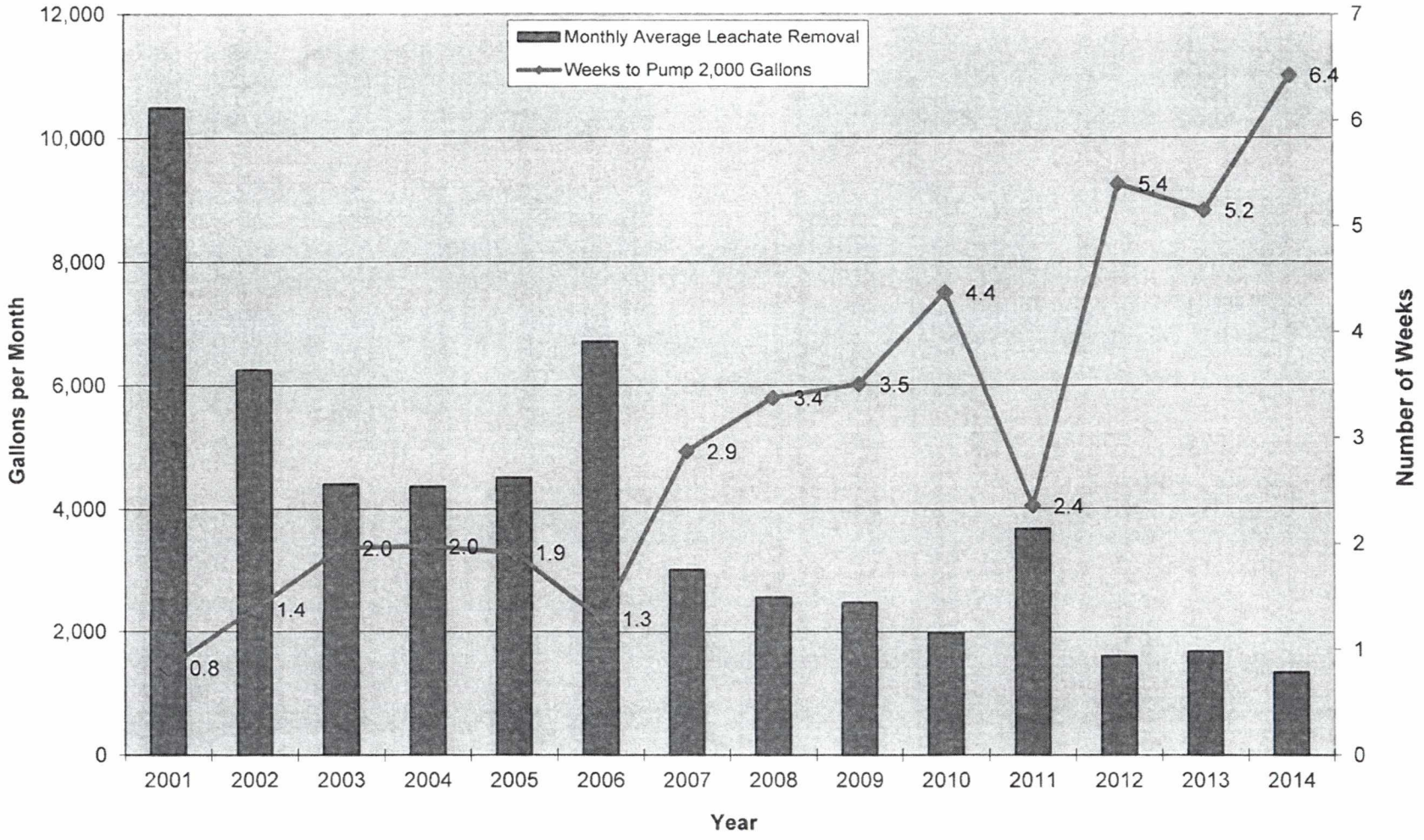


Figure 8 - Leachate Removal Rate: 2001 - 2014



Appendix A

Field Sampling Forms & Chain of Custody Records

Environmental
Sampling Services, LLC

WATER QUALITY SAMPLE LOG SHEET | WELL IDENTIFICATION: LF-1 DATE: 06/09/2014

Project Name: Penn Mine Landfill, Calaveras, CA
Client: URS Corpoation / East Bay Municipal District
Laboratory: East Bay Minicipal Utility District
Weather Conditions: Hot & muggy ~99°F
Well Diameter 1" 2" (4") 6" Other: _____
Well Type (PVC) / Stainless Steel / Other: _____
Is Well Secured? (Yes) No Bolt Size: 3/4"
Type of lock / Lock number: Master Lock
Screen Interval (Ft., BGS): NA
Set pump intake @ _____ (Ft., BTOC) (Total Depth)
Purge Method NA Disp. PE Bailer Centrifugal Pump Peristaltic Pump Bladder Pump (SS Submersible Pump)
Pump Lines NA (PE) / Teflon / Other (New) Cleaned / Dedicated Bailer Line NA (New) Cleaned / Dedicated
Method of Cleaning Pump NA (Liqui-nox / Tap Water / DI Rinse) Other: _____
Sampling Method (Disp. PE Bailer) Peristaltic Pump Bladder Pump SS Submersible Pump PDBs
Multi-Parameter Meter / Probe Serial No.: 556 MPS - 09C100611 / (556 MPS - 09C100612)
Equipment Calibration: See Daily Equipment Calibration Sheet OVM 580B P.I.D. Reading: NA ppm
Water Level Meter Serial No.: OW 9371-1 / 25083 / 25742 / 49914 / 56500 / Other: 35904
Beginning Water Level (DTW): 69.94 @ 10:43 Ending Water Level: 127.03
TD = 137.00 - 69.94 (DTW) = 67.06 (Ft. of water) x "K" = 43.79 (Gals./CV) x 3 (No. of CV) = 131.37 (Gals.)
"K" = 0.04 (1" well) "K" = .163 (2" well) ("K" = 0.653 (4" well)) "K" = 1.46 (6" well)

FIELD WATER QUALITY PARAMETERS

Date	Time	Discharge (Gallons)	Temp (°C) ± 1° C	Specific Conductivity (µS/cm^c) ± 10%	pH (SU) ± 0.1 SU	Turbidity (NTU)	Color	Comments
6/9/14	13:34	20	19.74	841	7.30	5.31	Clear	
	13:43	40	19.88	842	7.30	4.96	"	
	13:49	60	20.03	829	7.32	9.30	"	
↓	13:55	70	20.14	833	7.33	11.7	Slightly cloudy	purged dry @ 70 gallons

Total Discharge: 70 Gallons 1.6 CV Removed
Disposal of discharged water: To ground surface
Date / Time Sampled: 6/09/14 @ 16:55
Analysis: Dissolved Metals, Total Metals, TSS, TDS, and Alkalinity

Notes: EBMUD ID: 196493-1

QA/QC: None @ ——— as a Duplicate Equipment Blank Field Blank MS/MSD
Recorded by (Stephen Penman) / Jacqueline Lee Signature: [signature]

6680 Alhambra Avenue, # 102 • Martinez, CA 94553-6105 • (925) 372-8108
www.envsampling.com

Environmental
Sampling Services, LLC

WATER QUALITY SAMPLE LOG SHEET | WELL IDENTIFICATION: LF-3 DATE: 06/09/2014

Project Name: Penn Mine Landfill, Calaveras, CA
Client: URS Corpoation / East Bay Municipal District
Laboratory: East Bay Minicipal Utility District
Weather Conditions: Hot + muggy ~ 101°F
Well Diameter: 1" 2" (4") 6" Other: _____
Well Type: (PVC) / Stainless Steel / Other: _____
Is Well Secured? (Yes) / No Bolt Size: 3/4"
Type of lock / Lock number: No Lock
Screen Interval (Ft., BGS): NA
Set pump intake @ _____ (Ft., BTOC) (Total Depth)
Purge Method: NA Disp. PE Bailer Centrifugal Pump Peristaltic Pump Bladder Pump (SS Submersible Pump)
Pump Lines: NA (PE) Teflon / Other (New) / Cleaned / Dedicated Bailer Line: NA (New) / Cleaned / Dedicated
Method of Cleaning Pump: NA (Liqui-nox / Tap Water / DI Rinse) / Other: _____
Sampling Method: (Disp. PE Bailer) Peristaltic Pump Bladder Pump SS Submersible Pump PDBs
Multi-Parameter Meter / Probe Serial No.: 556 MPS - 09C100611 / (556 MPS - 09C100612)
Equipment Calibration: See Daily Equipment Calibration Sheet OVM 580B P.I.D. Reading: NA ppm
Water Level Meter Serial No.: OW 9371-1 / 25083 / 25742 / 49914 / 56500 / Other: 35904
Beginning Water Level (DTW): 23.12 @ 10:28 Ending Water Level: 92.90
TD = 102.00 - 23.12 (DTW) = 78.88 (Ft. of water) x "K" = 51.51 (Gals./CV) x 3 (No. of CV) = 154.53 (Gals.)
"K" = 0.04 (1" well) "K" = .163 (2" well) ("K" = 0.653 (4" well)) "K" = 1.46 (6" well)

FIELD WATER QUALITY PARAMETERS

Date	Time	Discharge (Gallons)	Temp (°C) ± 1° C	Specific Conductivity (µS/cm^c) ± 10%	pH (SU) ± 0.1 SU	Turbidity (NTU)	Color	Comments
6/9/14	14:47	25	20.03	481	7.31	8.91	Clear	
↓	14:55	50	20.29	434	7.04	5.83	"	
↓	15:03	75	20.16	435	7.48	9.10	"	purged dry @ 82 gallons

Total Discharge: 82 Gallons 1.5 CV Removed
Disposal of discharged water: To ground surface
Date / Time Sampled: 06/09/2014 @ 17:20
Analysis: Dissolved Metals, Total Metals, TSS, TDS, and Alkalinity

Notes: EBMUD ID: P196493-3

QA/QC: None @ _____ as a Duplicate Equipment Blank Field Blank MS/MSD
Recorded by: (Stephen Penman) / Jacqueline Lee Signature: [signature]

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www.envsampling.com

L190851

East Bay Municipal Utility District
Laboratory Services Chain of Custody Record

Expect date: 27-May-2014

Prelog or Login No.: P196493

Project Title: PENN MINE Restoration:Landfill Wells
Account or Project: B785-0008-2

Client PM: DEREK LEE
Tel No.: (510) 287-1086
Lab PM: JACK C. LIM

Sampled by: Stephen Penman
Rcvd:
Sample Date: 06/09/2014

Lab No.	Sample Type	Time	Site	Locator	Sample Matrix	Tests Required	Container ID / Barcode	Chemical Preservative	Date pH	DueDate Initials
P196493-1	GRAB	1655	WS PENN MINE	LF-1	RawH2O	*ICP EPA 200.7;AL EPA 200.7;B EPA 200.7;BA EPA	1226507	PLSTL		
					RawH2O	200.7;BE EPA 200.7;CA EPA 200.7;CU EPA 200.7;FE				
					RawH2O	EPA 200.7;K EPA 200.7;MG EPA 200.7;MN EPA 200.7;NA				
					RawH2O	EPA 200.7;SI EPA 200.7;ZN EPA 200.7				
					RawH2O	*ICP:F EPA 200.7;AL:F EPA 200.7;B:F EPA 200.7;BA:F	1226508	PLSTM		
					RawH2O	EPA 200.7;BE:F EPA 200.7;CA:F EPA 200.7;CU:F EPA				
					RawH2O	200.7;FE:F EPA 200.7;HG:F EPA 245.1;K:F EPA 200.7;				
					RawH2O	MG:F EPA 200.7;MN:F EPA 200.7;NA:F EPA 200.7;PB:F				
					RawH2O	EPA 200.9;SI:F EPA 200.7;ZN:F EPA 200.7				
					RawH2O	ALKALINITY: CO3;ALKALINITY: HCO3;ALKALINITY:	1226509	PLSTL		
					RawH2O	TOTAL;HARDNESS: TOTAL;TDS: GRAVIMETRIC;TSS				
					RawH2O	CHLORIDE: IC;NITRATE: IC;SULFATE: IC	1226510	PLSTM		
					RawH2O	*300 IC ANIONS (1-3);-FLD DATA;-REPORT;-SAMP KIT				
ClientID:										
Sample Comments: field date: use attached data sheet Pricing: STD										
P196493-2	GRAB	1555	WS PENN MINE	LF-2	RawH2O	*ICP EPA 200.7;AL EPA 200.7;B EPA 200.7;BA EPA	1226511	PLSTL		
					RawH2O	200.7;BE EPA 200.7;CA EPA 200.7;CU EPA 200.7;FE				
					RawH2O	EPA 200.7;K EPA 200.7;MG EPA 200.7;MN EPA 200.7;NA				
					RawH2O	EPA 200.7;SI EPA 200.7;ZN EPA 200.7				
					RawH2O	*ICP:F EPA 200.7;AL:F EPA 200.7;B:F EPA 200.7;BA:F	1226512	PLSTM		
					RawH2O	EPA 200.7;BE:F EPA 200.7;CA:F EPA 200.7;CU:F EPA				
					RawH2O	200.7;FE:F EPA 200.7;HG:F EPA 245.1;K:F EPA 200.7;				
					RawH2O	MG:F EPA 200.7;MN:F EPA 200.7;NA:F EPA 200.7;PB:F				
					RawH2O	EPA 200.9;SI:F EPA 200.7;ZN:F EPA 200.7				

5.3 HCl
PLSTM

L490851

East Bay Municipal Utility District
Laboratory Services Chain of Custody Record

Expect date: 27-May-2014

Prelog or Login No.: P196493

Project Title
PENN MINE Restoration:Landfill Wells
Account or Project: B785-0008-2

Client PM: DEREK LEE
Tel No.: (510) 287-1085
Lab PM: JACK C. LIH

Sampled by: Stephen Penman
Rcvd:
Sample Date: 06/09/2014

Lab No.	Sample Type	Time	Site	Locator	Sample Matrix	Tests Required	Container ID Barcode	Chemical Preservative	Date pH	DueDate Initials
					RawH2O	EPA 200.7;BE:F EPA 200.7;CA:F EPA 200.7;CU:F EPA				
					RawH2O	200.7;FE:F EPA 200.7;HG:F EPA 245.1;K:F EPA 200.7;				
					RawH2O	MG:F EPA 200.7;MN:F EPA 200.7;NA:F EPA 200.7;PB:F				
					RawH2O	EPA 200.9;SI:F EPA 200.7;ZN:F EPA 200.7				
					RawH2O	ALKALINITY: CO3;ALKALINITY: HCO3;ALKALINITY:	1226521	PLSTL		
					RawH2O	TOTAL;HARDNESS: TOTAL;TDS: GRAVIMETRIC;TSS				
					RawH2O	CHLORIDE: IC;NITRATE: IC;SULFATE: IC	1226522	PLSTM		
					RawH2O	*300 IC ANIONS (1-3);+FLD DATA;+REPORT;+SAMP KIT				

ClientID:
Sample Comments: field date: use attached data sheet Pricing: STD

P196493-5	QCFR	15:55	MISC	MISC	RawH2O	*ICP EPA 200.7;AL EPA 200.7;B EPA 200.7;BA EPA	1226523	PLSTL		
					RawH2O	200.7;BE EPA 200.7;CA EPA 200.7;CU EPA 200.7;FE				
					RawH2O	EPA 200.7;K EPA 200.7;MG EPA 200.7;MN EPA 200.7;NA				
					RawH2O	EPA 200.7;SI EPA 200.7;ZN EPA 200.7				
					RawH2O	*ICP:F EPA 200.7;AL:F EPA 200.7;B:F EPA 200.7;BA:F	1226524	PLSTM		
					RawH2O	EPA 200.7;BE:F EPA 200.7;CA:F EPA 200.7;CU:F EPA				
					RawH2O	200.7;FE:F EPA 200.7;HG:F EPA 245.1;K:F EPA 200.7;				
					RawH2O	MG:F EPA 200.7;MN:F EPA 200.7;NA:F EPA 200.7;PB:F				
					RawH2O	EPA 200.9;SI:F EPA 200.7;ZN:F EPA 200.7				
					RawH2O	ALKALINITY: TOTAL;HARDNESS: TOTAL;TDS:	1226525	PLSTL		
					RawH2O	GRAVIMETRIC;TSS				
					RawH2O	CHLORIDE: IC;NITRATE: IC;SULFATE: IC	1226526	PLSTM		
					RawH2O	*300 IC ANIONS (1-3);+REPORT;+SAMP KIT				

ClientID:
Sample Comments: blind field rep Pricing: STD

EBMUD LABORATORY COOLER RECEIPT FORM

Login Number: L190851 Received: 10-Jun-2014 09:20
Converted from P196493

	Cooler ID:					
	233037					
SHIPPING INFORMATION						
1. Did cooler come with a shipping slip?	No					
Tracking number:						
PACKAGING AND PRESERVATION						
1. Ice present?	Yes					
2. Type of cooler packing:	None					
3. Temperature of a representative sample. Measured temp:	5.3					
Corrected temperature:	4.6					
Container type used to measure temperature:	PLSTM					
4. SWBCT cont. > 10 C received >= 2 hrs. afer collection:	No					
LOGIN PHASE						
1. Containers intact?	Yes					
2. Preservation correct?	Yes					
3. Correct sample containers?	Yes					
4. Sufficient sample volume?	Yes					
5. Labels legible?	Yes					
6. Label info agrees with COC?	Yes					
7. Label information complete?	Yes					
8. Bubbles present in VOA-type containers?	No					
Container IDs w/ bubbles:						
9. Senior Chemist notified of anomolies?	No					
Senior Chemist called						
Who called?						
CHAIN OF CUSTODY DOCUMENTATION						
1. COC signed by Lab?	Yes					
2. Project identified on COC?	Yes					
3. COC info complete?	Yes					

Comments:

Site / locator: WS PENN MINE/LF-3
Site / locator: WS PENN MINE/LF-1
Site / locator: WS PENN MINE/LF-2
Site / locator: WS PENN MINE/LF-4
Site / locator: MISC/MISC

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
Phone (510)287-1432 Fax (510)465-5462
PO Box 24055, MS 59, Oakland, CA 94623

Analytical Report Prepared for DEREK LEE

Report generated on: Jun 24, 2014 01:35 pm
Login No.: L190851

Reported by:

Jack Lim

JACK C. LIM
Laboratory Program Manager

Approved by:

NIRMELA ARSEM
Laboratory Services Division Manager

LSR B785-0008-2
Project Title: PENN MINE Restoration:Landfill Wells

Login Performance Summary
5 - Samples received by the lab on: Jun 10 2014, 09:20 am
0 - Lost Analyses
0 - Hold Time Exceedences
Turn-around-time met

Samples included in this report:

Sample	Type	Collected	Site	Locator	ClientID
L190851-1	GRAB	09-Jun-2014 16:55	WS PENN MINE	LF-1	-
L190851-2	GRAB	09-Jun-2014 15:55	WS PENN MINE	LF-2	-
L190851-3	GRAB	09-Jun-2014 17:20	WS PENN MINE	LF-3	-
L190851-4	GRAB	09-Jun-2014 16:30	WS PENN MINE	LF-4	-
L190851-5	QCFR	09-Jun-2014 15:55	MISC	MISC	-

Legend to the laboratory qualifiers used in this report:
U - Analyte not detected
Qualifiers for subcontract work - See textvalue for description

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR B785-0008-2 PENN MINE Restoration:Landfill Wells
Site: WS PENN MINE Watershed Penn Mine Monitoring
Locator: LF-1 Landfill Well #1
Lab ID: L190851-1 (L190851-1)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 09 2014, 04:55pm Sample collector: S PENMAN / URS
Date Received: Jun 10 2014, 09:20am Sample receiver: PTRUONG
Sample Comments: field date: use attached data sheet

Method Reference / Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: SM4500-CO2 D - Calculation						RawH2O	
TARGET ANALYTES							
ALKALINITY: BICARBONATE		340	mg/L	1	5		
Run ID: R252211 / Work Group No.: WG191975							
Prep Date1: 12-JUN-14 Analyzed 12-Jun-14 14:30							
Method: EPA 200.7 - Rev. 4.4, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM		870	ug/L	1.04	11.4	50	
BORON		281	ug/L	1.04	10.4	100	
BARIUM		58.1	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		41,500	ug/L	1.04	15.6		
COPPER		12.3	ug/L	1.04	6.24	50	
IRON		1,350	ug/L	1.04	3.12	100	
POTASSIUM		6,380	ug/L	1.04	15.6		
MAGNESIUM		48,600	ug/L	1.04	9.36		
MANGANESE		57.6	ug/L	1.04	0.52	20	
SODIUM		66,700	ug/L	1.04	11.4		
SILICON		15,800	ug/L	1.04	10.4		
ZINC		12.1	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 12:21							
Method: EPA 200.7: FILTERED - Rev. 4.4, Filtered, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM	U	11.4	ug/L	1.04	11.4	50	
BORON		281	ug/L	1.04	10.4	100	
BARIUM		54.3	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		39,800	ug/L	1.04	15.6		
COPPER	U	6.24	ug/L	1.04	6.24	50	
IRON	U	3.12	ug/L	1.04	3.12	100	
POTASSIUM		6,080	ug/L	1.04	15.6		
MAGNESIUM		49,400	ug/L	1.04	9.36		
MANGANESE	U	0.520	ug/L	1.04	0.52	20	
SODIUM		66,700	ug/L	1.04	11.4		
SILICON		14,500	ug/L	1.04	10.4		
ZINC	U	4.16	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 10:59							
Method: EPA 245.1: FILTERED - Filtered, Cold Vapor AA						RawH2O	
TARGET ANALYTES							
MERCURY	U	0.040	ug/L	1	0.04		
Run ID: R252458 / Work Group No.: WG192174							
Prep Date1: 13-JUN-14 Prep Date2: 19-JUN-14 Analyzed 19-Jun-14 09:00							

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462
Analytical Results Report

LSR B785-0008-2 PENN MINE Restoration:Landfill Wells
Site: WS PENN MINE Watershed Penn Mine Monitoring
Locator: LF-2 Landfill Well #2
Lab ID: L190851-2 (L190851-2)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 09 2014, 03:55pm Sample collector: S PENMAN / URS
Date Received: Jun 10 2014, 09:20am Sample receiver: PTRUONG
Sample Comments: field date: use attached data sheet

Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: SM4500-CO2 D - Calculation						RawH2O	
TARGET ANALYTES							
ALKALINITY: BICARBONATE		**420**	mg/L	1	5		
Run ID: R252211 / Work Group No.: WG191975							
Prep Date1: 12-JUN-14 Analyzed 12-Jun-14 14:30							
Method: EPA 200.7 - Rev. 4.4, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM		**57.4**	ug/L	1.04	11.4	50	
BORON		**31.4**	ug/L	1.04	10.4	100	
BARIUM		**147**	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		**131,000**	ug/L	1.04	15.6		
COPPER	U	6.24	ug/L	1.04	6.24	50	
IRON		**53.5**	ug/L	1.04	3.12	100	
POTASSIUM		**786**	ug/L	1.04	15.6		
MAGNESIUM		**62,900**	ug/L	1.04	9.36		
MANGANESE	U	0.520	ug/L	1.04	0.52	20	
SODIUM		**28,900**	ug/L	1.04	11.4		
SILICON		**18,600**	ug/L	1.04	10.4		
ZINC		**6.97**	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 12:26							
Method: EPA 200.7: FILTERED - Rev. 4.4, Filtered, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM	U	11.4	ug/L	1.04	11.4	50	
BORON		**27.8**	ug/L	1.04	10.4	100	
BARIUM		**145**	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		**134,000**	ug/L	1.04	15.6		
COPPER	U	6.24	ug/L	1.04	6.24	50	
IRON	U	3.12	ug/L	1.04	3.12	100	
POTASSIUM		**930**	ug/L	1.04	15.6		
MAGNESIUM		**63,100**	ug/L	1.04	9.36		
MANGANESE	U	0.520	ug/L	1.04	0.52	20	
SODIUM		**29,100**	ug/L	1.04	11.4		
SILICON		**18,700**	ug/L	1.04	10.4		
ZINC		**4.32**	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 11:05							
Method: EPA 245.1: FILTERED - Filtered, Cold Vapor AA						RawH2O	
TARGET ANALYTES							
MERCURY	U	0.040	ug/L	1	0.04		
Run ID: R252458 / Work Group No.: WG192174							
Prep Date1: 13-JUN-14 Prep Date2: 19-JUN-14 Analyzed 19-Jun-14 09:00							

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
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Phone (510)287-1432 Fax (510)465-5462
Analytical Results Report

LSR B785-0008-2 PENN MINE Restoration:Landfill Wells
Site: WS PENN MINE Watershed Penn Mine Monitoring
Locator: LF-3 Landfill Well #3
Lab ID: L190851-3 (L190851-3)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 09 2014, 05:20pm Sample collector: S PENMAN / URS
Date Received: Jun 10 2014, 09:20am Sample receiver: PTRUONG
Sample Comments: field date: use attached data sheet

Method Reference / Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: SM4500-CO2 D - Calculation						RawH2O	
TARGET ANALYTES							
ALKALINITY: BICARBONATE		170	mg/L	1	5		
Run ID: R252211 / Work Group No.: WG191975							
Prep Date1: 12-JUN-14 Analyzed 12-Jun-14 14:30							
Method: EPA 200.7 - Rev. 4.4, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM		436	ug/L	1.04	11.4	50	
BORON		81.0	ug/L	1.04	10.4	100	
BARIUM		11.2	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		32,000	ug/L	1.04	15.6		
COPPER	U	6.24	ug/L	1.04	6.24	50	
IRON		721	ug/L	1.04	3.12	100	
POTASSIUM		2,730	ug/L	1.04	15.6		
MAGNESIUM		19,700	ug/L	1.04	9.36		
MANGANESE		35.3	ug/L	1.04	0.52	20	
SODIUM		34,000	ug/L	1.04	11.4		
SILICON		11,600	ug/L	1.04	10.4		
ZINC		5.42	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 12:32							
Method: EPA 200.7: FILTERED - Rev. 4.4, Filtered, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM	U	11.4	ug/L	1.04	11.4	50	
BORON		80.8	ug/L	1.04	10.4	100	
BARIUM		9.73	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		32,200	ug/L	1.04	15.6		
COPPER	U	6.24	ug/L	1.04	6.24	50	
IRON	U	3.12	ug/L	1.04	3.12	100	
POTASSIUM		2,740	ug/L	1.04	15.6		
MAGNESIUM		19,800	ug/L	1.04	9.36		
MANGANESE		4.09	ug/L	1.04	0.52	20	
SODIUM		34,700	ug/L	1.04	11.4		
SILICON		11,100	ug/L	1.04	10.4		
ZINC	U	4.16	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 11:12							
Method: EPA 245.1: FILTERED - Filtered, Cold Vapor AA						RawH2O	
TARGET ANALYTES							
MERCURY	U	0.040	ug/L	1	0.04		
Run ID: R252458 / Work Group No.: WG192174							
Prep Date1: 13-JUN-14 Prep Date2: 19-JUN-14 Analyzed 19-Jun-14 09:00							

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462
Analytical Results Report

LSR B785-0008-2 PENN MINE Restoration:Landfill Wells
Site: WS PENN MINE Watershed Penn Mine Monitoring
Locator: LF-4 Landfill Well #4
Lab ID: L190851-4 (L190851-4)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 09 2014, 04:30pm Sample collector: S PENMAN / URS
Date Received: Jun 10 2014, 09:20am Sample receiver: PTRUONG
Sample Comments: field date: use attached data sheet

Method Reference / Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: SM4500-CO2 D - Calculation						RawH2O	
TARGET ANALYTES							
ALKALINITY: BICARBONATE		460	mg/L	1	5		
Run ID: R252211 / Work Group No.: WG191975							
Prep Date1: 12-JUN-14 Analyzed 12-Jun-14 14:30							
Method: EPA 200.7 - Rev. 4.4, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM		1,460	ug/L	1.04	11.4	50	
BORON		454	ug/L	1.04	10.4	100	
BARIUM		118	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		38,300	ug/L	1.04	15.6		
COPPER	U	6.24	ug/L	1.04	6.24	50	
IRON		1,770	ug/L	1.04	3.12	100	
POTASSIUM		7,180	ug/L	1.04	15.6		
MAGNESIUM		30,800	ug/L	1.04	9.36		
MANGANESE		74.4	ug/L	1.04	0.52	20	
SODIUM		134,000	ug/L	1.04	11.4		
SILICON		19,300	ug/L	1.04	10.4		
ZINC		5.88	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 12:38							
Method: EPA 200.7: FILTERED - Rev. 4.4, Filtered, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM	U	11.4	ug/L	1.04	11.4	50	
BORON		460	ug/L	1.04	10.4	100	
BARIUM		113	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		38,100	ug/L	1.04	15.6		
COPPER	U	6.24	ug/L	1.04	6.24	50	
IRON	U	3.12	ug/L	1.04	3.12	100	
POTASSIUM		7,120	ug/L	1.04	15.6		
MAGNESIUM		30,200	ug/L	1.04	9.36		
MANGANESE		0.933	ug/L	1.04	0.52	20	
SODIUM		143,000	ug/L	1.04	11.4		
SILICON		15,900	ug/L	1.04	10.4		
ZINC	U	4.16	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 11:18							
Method: EPA 245.1: FILTERED - Filtered, Cold Vapor AA						RawH2O	
TARGET ANALYTES							
MERCURY	U	0.040	ug/L	1	0.04		
Run ID: R252458 / Work Group No.: WG192174							
Prep Date1: 13-JUN-14 Prep Date2: 19-JUN-14 Analyzed 19-Jun-14 09:00							

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EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462
Analytical Results Report

LSR B785-0008-2 PENN MINE Restoration:Landfill Wells
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
Lab ID: L190851-5 (L190851-5)
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Jun 09 2014, 03:55pm Sample collector: S PENMAN
Date Received: Jun 10 2014, 09:20am Sample receiver: PTRUONG
Sample Comments: blind field rep

Method Reference / Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 200.7: FILTERED - Rev. 4.4, Filtered, ICP Scan						RawH2O	
TARGET ANALYTES							
ALUMINUM	U	11.4	ug/L	1.04	11.4	50	
BORON		**28.4**	ug/L	1.04	10.4	100	
BARIUM		**143**	ug/L	1.04	0.416	100	
BERYLLIUM	U	0.624	ug/L	1.04	0.624	1	
CALCIUM		**132,000**	ug/L	1.04	15.6		
COPPER	U	6.24	ug/L	1.04	6.24	50	
IRON	U	3.12	ug/L	1.04	3.12	100	
POTASSIUM		**946**	ug/L	1.04	15.6		
MAGNESIUM		**62,100**	ug/L	1.04	9.36		
MANGANESE	U	0.520	ug/L	1.04	0.52	20	
SODIUM		**28,800**	ug/L	1.04	11.4		
SILICON		**18,400**	ug/L	1.04	10.4		
ZINC		**5.42**	ug/L	1.04	4.16	50	
Run ID: R252308 / Work Group No.: WG192049							
Prep Date1: 16-JUN-14 Analyzed 16-Jun-14 11:31							
Method: EPA 245.1: FILTERED - Filtered, Cold Vapor AA						RawH2O	
TARGET ANALYTES							
MERCURY	U	0.040	ug/L	1	0.04		
Run ID: R252458 / Work Group No.: WG192174							
Prep Date1: 13-JUN-14 Prep Date2: 19-JUN-14 Analyzed 19-Jun-14 09:00							

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Identified Upcountry Facilities - Hazardous Materials Inventory 11/15

Camanche North Shore Recreation Area

ChemicalLocation	ChemicalName	Tra	CommonName	CASNumber	AverageDailyAı	MaximumDailyAı	DaysOnSite	SCAboveGroundTank	SCUnderGroundTa	SCTankInsideBuilding
Emergency generators-Storage Yard LS#1, MHP#1 LS#2 & #5	Diesel Fuel No. 2	N	Diesel Fuel No. 2	68476-34-6	400	458	365	Y	N	N
Water Treatment Plant	Sodium Hypochlorite >5% - 12.5%	N	Sodium Hypochlorite >5% - 12.5%	7681-52-9	238	475	365	N	N	Y

Camanche South Shore Recreation Area

ChemicalLocation	ChemicalName	Tra	CommonName	CASNumber	AverageDailyAı	MaximumDailyAı	DaysOnSite	SCAboveGroundTank	SCUnderGroundTa	SCTankInsideBuilding
Water Treatment Plant, Emergency Generator	Diesel Fuel No. 2	N	Diesel Fuel No. 2	68476-34-6	200	200	365	Y	N	N
Water Treatment Plant, Bldg J	Sodium Hypochlorite >5% - 12.5%	N	Sodium Hypochlorite >5% - 12.5%	7681-52-9	175	275	365	N	N	Y
Water Treatment Plant, Bldg J	Aluminum Chlorohydrate Hydroxide	Y	Sweetwater 8809 cationic polymer	12042-91-0	55	55	365	N	N	N
Ranger Station, south side in covered outdoor storage	Gasoline	N	Unleaded Gasoline and Diesel #2 Mixture	8006-61-9	40	55	365	N	N	N
Ranger Station	Propane		Liquefied Petroleum Gas (lpg)	74-98-6	40	40	365	Y	N	N
EBMUD Rangers Maintenance Shop, Bldg C1	Acetylene	N	Acetylene	74-86-2	378	504	365	N	N	N
EBMUD Rangers Maintenance Shop, Bldg C1	Oxygen	N	Oxygen, compressed	7782-44-7	614	896	365	N	N	N

Pardee Center

ChemicalLocation	ChemicalName	Tra	CommonName	CASNumber	AverageDailyAı	MaximumDailyAı	DaysOnSite	SCAboveGroundTank	SCUnderGroundTa	SCTankInsideBuilding
Pardee Chemical Plant - Main Chemical Building	Calcium oxide (CaO)	N	Calcium oxide, Lime	1305-78-8	5000	10000	365	Y	N	N
Fueling island	Gasoline	N	Gasoline, unleaded	8006-61-9	1250	2000	365	Y	N	N
Welding Shop and behind Maintenance Building	Oxygen	N	Oxygen, compressed	7782-44-7	830	830	365	N	N	N
Behind Maintenance Building	Air	N	Air, compressed	132259-10-0	620	620	365	N	N	N
Pardee Area Control Center Office	Bromochlorodifluoromethane	N	Bromochlorodifluoromethane, Halon 1221	353-59-3	244	244	365	N	N	N
Behind Maintenance Building	Nitrogen	N	Nitrogen	7727-37-9	1200	1800	365	N	N	N
Welding Shop and behind Maintenance Building	Argon Compressed	N	Argon Compressed	7440-37-1	520	520	365	N	N	N
Behind Maintenance Building	Carbon Dioxide	N	Carbon Dioxide	124-38-9	1042	1042	365	N	N	N
Swim Pool, MacLean Hall	Propane	N	Liquefied Petroleum Gas (lpg)	74-98-6	400	700	365	N	N	N
Fueling island	Diesel Fuel No. 2	N	Diesel Fuel No. 2	68476-34-6	618	768	365	Y	N	N
Welding Shop and behind Maintenance Building	Acetylene	N	Acetylene	74-86-2	415	500	365	N	N	N
Pardee Chemical Plant - Main Chemical Building	Sodium Hypochlorite >5% - 12.5%	N	Sodium Hypochlorite >5% - 12.5%	7681-52-9	8000	14000	365	Y	N	N
Auto Shop & Behind Maintenance Bldg - Accumulation Area	Lubricating oils, used	N	Used lubricating oils	70514-12-4	140	355	365	Y	N	N

Identified Upcountry Facilities - Hazardous Materials Inventory 11/15

Pardee Reservoir Recreation Area

ChemicalLocation	ChemicalName	Tra	CommonName	CASNumber	AverageDailyAı	MaximumDailyAı	DaysOnSite	SCAboveGroundTank	SCUnderGroundTa	SCTankInsideBuilding
Wastewater Treatment Facility, Bldg #7	Sodium Hypochlorite >5% - 12.5%	N	Sodium Hypochlorite >5% - 12.5%	7681-52-9	150	660	365	N	N	Y
Wastewater Treatment Facility, Bldg #7	Sulfuric Acid 10-49%	N	Sulfuric Acid 36%	7664-93-9	150	460	365	Y	N	N

Identified Upcountry Facilities - Hazardous Materials Inventory 11/15

Camanache Recreation Company North Shore Recreation Area

ChemicalLocation	ChemicalName	Trade	CommonName	CASNumber	AverageDailyAı	MaximumDailyAı	DaysOnSite	SCAboveGroundTank	SCUnderGrou	SCTankInsideBuilding
Shop (Area B)	Acetylene	N	Acetylene	74-86-2	126	126	365	N	N	N
Shop (Area B)	Oxygen	N	Oxygen, compressed	7782-44-7	282	564	365	N	N	N
Storage Yard - South of Building, B1	Diesel Fuel No. 2	N	Diesel Fuel No. 2	68476-34-6	300	450	365	Y	N	N
Throughout various areas	Propane	N	Liquefied Petroleum Gas (lpg)	74-98-6	3011	12705	365	N	N	N
West side of Building C, within fenced area	Petroleum Lubricating Oil	Y	Two-Cycle Lube Oil	64742-65-0	200	250	365	N	N	N
Shop (Area B) and Store (Building C)	Gasoline	N	Gasoline, unleaded	8006-61-9	3250	4500	365	Y	N	N
Storage Yard Near Building B	Lubricating oils, used	N	Used lubricating oils	70514-12-4	20	55	365	N	N	N
Maintenance Shop			Motor Oil							

Camanche Recreation Company South Shore Recreation Area

ChemicalLocation	ChemicalName	Trade	CommonName	CASNumber	AverageDailyAı	MaximumDailyAı	DaysOnSite	SCAboveGroundTank	SCUnderGrou	SCTankInsideBuilding
Maintenance Building	Diesel Fuel No. 2	N	Diesel Fuel No. 2	68476-34-6	300	300	365	Y	N	N
Concess. Office, General Store, Snack Shop #2, Mobile Home Park	Propane	N	Liquefied Petroleum Gas (lpg)	74-98-6	7750	13890	365	Y	N	N
Behind Maintenance Building & W. of Store (Bldg. F)	Gasoline		Gasoline, unleaded	8006-61-9	5500	10600	365	Y	N	N
East Maintenance Building under covered Storage Area	Lubricating oils, used	N	Used lubricating oils	70514-12-4	20	55	365	N	N	N

Pardee Lake Recreation Inc.

ChemicalLocation	ChemicalName	Trade	CommonName	CASNumber	AverageDailyAı	MaximumDailyAı	DaysOnSite	SCAboveGroundTank	SCUnderGrou	SCTankInsideBuilding
Marina	Diesel Fuel No. 2	N	Diesel Fuel No. 2	68476-34-6	200	300	365	Y	N	N
Employee Hill, Marina, Coffee Shop, Concessionaire Residence	Propane	N	Liquefied Petroleum Gas (lpg)	74-98-6	750	1620	365	Y	N	N
Marina	Gasoline		Gasoline, unleaded	8006-61-9	1400	1983	365	Y	N	N
Maintenance Shop (#19)	Oxygen	N	Oxygen, compressed	7782-44-7	150	300	365	N	N	N
Maintenance Shop (#19)	Acetylene	N	Acetylene	74-86-2	150	300	365	N	N	N
					80	110	365	N	N	N

Appendix 5-2

Waste Discharge Requirements, Monitoring and Reporting Requirements, Revised 2011:

Pardee Center WWTP

Pardee Recreation Area WWTP

Camanche North Shore WWTP

Camanche South Shore WWTP

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

11020 Sun Center Drive, #200, Rancho Cordova, California 95670-6114
(916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

ECS Received
AUG 23 2011

22 August 2011

Mr. John Schroeter
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

CERTIFIED MAIL
7010 1670 0002 0652 1176

REVISED MONITORING AND REPORTING PROGRAM, EAST BAY MUNICIPAL UTILITY DISTRICT PARDEE CENTER WASTEWATER TREATMENT FACILITY, CALAVERAS COUNTY

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff has reviewed the East Bay Municipal Utility District's 5 February 2009 request to modify the requirements of Monitoring and Reporting Program (MRP) No. R5-2003-0119. In addition, we have reviewed the self-monitoring data submitted in monthly, quarterly, and annual reports.

Our review of the data indicates that a revision of the MRP is acceptable. As indicated in the attached revised MRP, the groundwater monitoring frequency will be changed from quarterly to semi-annually.

Please note that the Revised MRP must be implemented on the first day of the month following issuance. Therefore, the September 2011 monitoring report is to conform to the requirements of this Revised MRP.

Please contact Ms. Lixin Fu at (916) 464-4689 or lfu@waterboards.ca.gov if you have any questions regarding this revised MRP. All monitoring reports and compliance and enforcement questions should be directed to Ms. Mary Boyd at (916) 464-4676 or Mboyd@waterboards.ca.gov.

ANNE OLSON, P.E.
Senior Water Resource Control Engineer

Enclosed: Revised MRP No. R5-2003-0119

cc: Brian Moss, Calaveras County Environmental Health Department, San Andreas

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM NO. R5-2003-0119

FOR
EAST BAY MUNICIPAL UTILITY DISTRICT
PARDEE CENTER WASTEWATER TREATMENT FACILITY
CALAVERAS COUNTY

This revised Monitoring and Reporting Program (MRP) describes requirements for monitoring influent, effluent, pond, land application area, groundwater, solid waste and sludge, and water supply. This MRP is issued pursuant to Water Code Section 13267. The East Bay Municipal Utility District (Discharger) shall not implement any changes to this MRP unless and until a revised MRP is issued by the Executive Officer. Section 13267 of the California Water Code states, in part:

> *"In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."*

Section 13268 of the California Water Code states, in part:

> *"(a) Any person failing or refusing to furnish technical or monitoring program reports as required by subdivision (b) of Section 13267, or failing or refusing to furnish a statement of compliance as required by subdivision (b) of Section 13399.2, or falsifying and information provided therein, is guilty of a misdemeanor and may be liable civilly in accordance with subdivision (b).*
>
> *(b)(1) Civil liability may be administratively imposed by a regional board in accordance with Article 2.5 (commencing with section 13323) of Chapter 5 for a violation of subdivision (a) in an amount which shall not exceed one thousand dollars ($1,000) for each day in which the violation occurs."*

The Discharger owns and operates the facility that is subject to Waste Discharge Requirements (WDRs) Order No. R5-2003-0119. The monitoring reports are necessary to ensure that the Discharger complies with the WDRs.

All samples shall be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each sample shall be recorded on the sample chain of custody form.

POND MONITORING

The evaporation/percolation pond shall be monitored as follows. If the pond is empty on the scheduled monitoring date, the Discharger may report the freeboard monitoring result as "dry".

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Dissolved Oxygen [1, 2]	mg/L	Grab	Weekly	Monthly
Freeboard	0.1 feet	Measurement	Weekly	Monthly
Odors	--	Observation	Weekly	Monthly
Berm condition [3]	--	Observation	Weekly	Monthly

[1] If the pond depth exceeds one foot, samples shall be collected at a depth of one foot from each pond in use, opposite the inlet. If the water depth is less than one foot, surface sampling is acceptable.
[2] Record any upset conditions that could effect monitoring interpretation, such as less than one foot of wastewater in pond.
[3] Berm shall be observed for signs of seepage or surfacing water along the exterior toe of the berm. If surfacing water is found, then a sample shall be collected and tested for total coliform organisms and total dissolved solids.

LAND APPLICATION AREA MONITORING

Monitoring of the land application area shall be conducted daily when the wastewater is applied, and the results shall be included in the monthly monitoring report. Evidence of erosion, saturation, irrigation runoff, or the presence of nuisance conditions shall be noted in the report. Effluent monitoring results shall be used in calculations to ascertain loading rates at the land application area. Monitoring of the land application area shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	Gallons	Meter	Daily	Monthly
Rainfall	Inches	Observation	Daily	Monthly
Acreage Applied	Acres	Calculated	Daily	Monthly
Water Application Rate	gal/acre/day	Calculated	Daily	Monthly

At least once per month when the land application area is being used, the entire land application area shall be inspected on the morning following an irrigation event to identify any equipment malfunction or other circumstances that might allow irrigation runoff to leave the irrigation area and/or create ponding conditions that violate the WDRs. A daily log of these inspections shall be kept at the facility and made available for review upon request.

GROUNDWATER MONITORING

Groundwater samples shall be collected from each groundwater monitoring well in accordance with an approved groundwater sampling plan. Prior to sampling, depth to groundwater shall be measured to the nearest 0.01 feet. Water table elevations shall be calculated and used to determine groundwater gradient and flow direction. Samples shall be collected and analyzed using approved EPA methods or other methods approved by the

Field test instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of this MRP.

INFLUENT MONITORING

Samples shall be collected at approximately the same time as effluent samples and shall be representative of the influent. Influent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow [1]	gpd	Meter	Daily	Monthly
BOD_5 [2]	mg/L	Grab	Monthly	Monthly

[1] Flow may be monitored from the pump station that conveys effluent into evaporation/percolation pond and/or the land application area.
[2] 5-day biochemical oxygen demand.

EFFLUENT MONITORING

Samples of effluent shall be collected from the pump station downstream of the wastewater treatment plant prior to discharge to the evaporation/percolation pond and/or the land application area. At a minimum, effluent monitoring shall consist of the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Total Coliform Organisms [1]	MPN/100 mL [2]	Grab	Weekly	Monthly
pH	Standard	Grab	Monthly	Monthly
BOD_5	mg/L	Grab	Monthly	Monthly
Electrical Conductivity	mg/L	Grab	Quarterly	Semi-annually
Total Dissolved Solids	mg/L	Grab	Quarterly	Semi-annually
Sodium	mg/L	Grab	Quarterly	Semi-annually
Chloride	mg/L	Grab	Quarterly	Semi-annually
Total Nitrogen	mg/L	Grab	Quarterly	Semi-annually
Standard Minerals [3]	mg/L	Grab	Annually	Annually

[1] Total Coliform Organisms shall be monitored when the wastewater is applied to the land application area.
[2] Most probable number per 100 mL.
[3] Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, magnesium, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.

Central Valley Water Board. Semi-annual groundwater monitoring shall occur in January and July. Groundwater monitoring shall include, at a minimum, the following:

Constituents	Units	Type of Sample	Sampling and Reporting Frequency
Depth to Groundwater	0.01 feet	Measurement	Semi-annually
Groundwater Elevation [1]	0.01 feet	Calculated	Semi-annually
Gradient Magnitude	feet/feet	Calculated	Semi-annually
Gradient Direction	degrees	Calculated	Semi-annually
Electrical Conductivity	mg/L	Grab	Semi-annually
Total Dissolved Solids	mg/L	Grab	Semi-annually
Nitrate Nitrogen	mg/L	Grab	Semi-annually
pH	pH units	Grab	Semi-annually
Total Coliform Organisms	MPN/100 mL	Grab	Semi-annually
Standard Minerals [2]	mg/L	Grab	Annually

[1] Groundwater elevation shall be determined based on depth-to-water measurements using a surveyed measuring point elevation on the well and a surveyed reference elevation.

[2] Standard Minerals shall include, at a minimum, the following elements/compounds: boron, iron, manganese, calcium, magnesium, potassium, sulfate, sodium, chloride, total alkalinity (including alkalinity series), and hardness.

SOLID WASTE AND SLUDGE MONITORING

A log shall be kept of solid waste (grits and screenings) and sludge quantities generated and of handling and disposal activities, and shall be submitted as part of the monthly monitoring reports.

WATER SUPPLY MONITORING

A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Water supply monitoring shall include at least the following for each water source used during the previous year:

Constituents	Units	Sampling Frequency
Electrical Conductivity	mg/L	Annually
Total Dissolved Solids	mg/L	Annually
pH	pH units	Annually
Standard Minerals [1]	mg/L	Annually

[1] Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, magnesium, sodium, potassium, chloride, nitrogen, sulfate, total alkalinity (including alkalinity series), and hardness.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, pond, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate

compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the MRP shall be reported in the next scheduled monitoring report.

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a California Registered Engineer or Geologist and signed by the registered professional.

A. Monthly Monitoring Reports

Monthly monitoring reports shall be submitted to the Central Valley Water Board by the **1st day of the second month** following the end of the reporting period (e.g., the January monthly report is due by 1 March). At a minimum, the reports shall include:

1. Results of the influent, effluent, pond, solid waste and sludge, and land application area monitoring;
2. A comparison of the monitoring data to the discharge specifications and an explanation of any violation of those requirements;
3. If requested by staff, copies of laboratory analytical report(s);
4. A calibration log verifying calibration of all monitoring instruments and devices used to fulfill the prescribed monitoring program; and
5. Whether wastewater was discharged to the land application area during that month.
6. Loading rates at the land application area.

B. Semi-Annual Monitoring Reports

In addition to the monthly monitoring reports, the Discharger shall establish a semi-annual sampling schedule for groundwater monitoring such that samples are obtained approximately every six months. Semi-Annual Monitoring Reports shall be submitted to the Central Valley Water Board by the **1st day of March and September.** The Semi-Annual Monitoring Reports shall include the following:

1. Results of the quarterly effluent monitoring;
2. Results of groundwater monitoring;
3. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for the groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this revised MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater and method of sampling;
4. Calculation of groundwater elevations, an assessment of groundwater flow direction and gradient on the date of measurement, comparison of previous flow direction and gradient data, and discussion of seasonal trends if any;
5. A narrative discussion of the analytical results for all groundwater locations monitored including spatial and temporal tends, with reference to summary data tables, graphs, and

appended analytical reports (as applicable);

6. Summary data tables of historical and current water table elevations and analytical results;
7. A comparison of monitoring data to the groundwater limitations and an explanation of any violation of those requirements;
8. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum; and
9. Copies of laboratory analytical report(s) for groundwater monitoring.

C. Annual Report

In addition to the monthly and semi-annual monitoring reports, an Annual Report shall be prepared. The Annual Report shall be submitted to the Central Valley Water Board by **1 February** each year. The Annual Report shall include the following:

1. If requested by staff, tabular and graphical summaries of all data collected during the year;
2. An evaluation of the groundwater quality beneath the wastewater treatment facility and the land application area;
3. A discussion of compliance and the corrective actions taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements;
4. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program;
5. A copy of the certification for each certified wastewater treatment plant operator working at the facility and a statement about whether the Discharger is in compliance with Title 23, CCR, Division 3, Chapter 26.
6. The results from annual monitoring of the groundwater wells and water supply;
7. The results from any sludge monitoring required by the disposal facility;
8. Equipment maintenance and calibration records, as described in Standard Provision No. C.4;
9. A forecast of influent flows, as described in Standard Provision No. E.4; and
10. The results to date of the Upcountry Wastewater Collection System Condition Assessment.

A letter transmitting the self-monitoring reports shall accompany each report. The letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time

schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program on the first day of the month following issuance of this revised MRP.

Ordered by: _____
PAMELA C. CREEDON, Executive Officer

_____
(Date)

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

11020 Sun Center Drive, #200, Rancho Cordova, California 95670-6114
(916) 464-3291 • FAX (916) 464-4645
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Linda S. Adams
Acting Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

RCO - Received

MAY 02 2011

26 April 2011

Mr. John Schroeter, Manager,
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

CERTIFIED MAIL
7010 1670 0002 0652 1138

REVISED MONITORING AND REPORTING PROGRAM NO. 5-01-270, EAST BAY MUNICIPAL UTILITY DISTRICT PARDEE RESERVOIR RECREATION AREA, AMADOR COUNTY

Central Valley Regional Water Quality Control Board (Central Valley Water Board) staff has revised the Monitoring and Reporting Program (MRP) Order No. 5-01-270 as requested by East Bay Municipal Utility District for the Pardee Reservoir Recreation Area in Amador County. The draft MRP was transmitted on 3 February 2011; the comment period ended on 1 April 2011.

Please note that the Revised MRP must be implemented on the first day of the month following issuance. Therefore, the May 2011 monitoring report shall conform to the requirements of this Revised MRP. It is also necessary that Lysimeters L1, L2 and L3 be properly destroyed. Therefore, please submit a work plan for the lysimeter destruction by **31 July 2011**.

Please contact Ms. Lixin Fu at (916) 464-4689 or lfu@waterboards.ca.gov if you have any questions regarding this Revised MRP. All MRP reports and compliance and enforcement questions should be directed to Ms. Mary Boyd. Ms. Boyd can be reached at (916) 464-4676 or mboyd@waterboards.ca.gov.

Robert Busby
Supervising Engineering Geologist
Permitting Title 27 & Confined Animals Section

Enclosure: Revised Monitoring and Reporting Program No. 5-01-270

cc: Michael Israel, Amador County Environmental Health Department, Jackson

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM NO. 5-01-270

FOR
EAST BAY MUNICIPAL UTILITY DISTRICT
PARDEE RESERVOIR RECREATION AREA
AMADOR COUNTY

This Revised Monitoring and Reporting Program (Revised MRP) describes requirements for monitoring influent, lagoons, effluent, land application area, groundwater, sludge and water supply. This Revised MRP is issued pursuant to Water Code Section 13267. The East Bay Municipal Utility District (Discharger) shall not implement any changes to this Revised MRP unless and until another revision is issued by the Executive Officer. Section 13267 of the California Water Code states, in part:

> *"In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."*

Section 13268 of the California Water Code states, in part:

> *"(a) Any person failing or refusing to furnish technical or monitoring program reports as required by subdivision (b) of Section 13267, or failing or refusing to furnish a statement of compliance as required by subdivision (b) of Section 13399.2, or falsifying and information provided therein, is guilty of a misdemeanor and may be liable civilly in accordance with subdivision (b).*
>
> *(b)(1) Civil liability may be administratively imposed by a regional board in accordance with Article 2.5 (commencing with section 13323) of Chapter 5 for a violation of subdivision (a) in an amount which shall not exceed one thousand dollars ($1,000) for each day in which the violation occurs."*

The Discharger owns and operates the facility that is subject to Waste Discharge Requirements (WDRs) Order No. 5-01-270, and the reports are necessary to ensure that the Discharger complies with the WDRs.

All samples should be representative of the volume and nature of the discharge or matrix of material sampled. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

Field test instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of this Revised MRP.

INFLUENT MONITORING

Influent monitoring shall be performed at the headworks. Influent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	gpd	Meter	Daily	Monthly
20°C BOD_5 [1]	mg/L	Grab	Monthly	Monthly

[1] 5-day Biochemical Oxygen Demand.

LAGOON MONITORING

Samples shall be collected from an established sampling station. Freeboard shall be measured vertically from the surface of the water to the lowest elevation of the surrounding berm and shall be measured to the nearest 0.1 feet. Monitoring of each lagoon shall include, at a minimum, the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Dissolved Oxygen [1, 2]	mg/ L	Grab	Weekly	Monthly
pH [1, 2]	Standard units	Grab	Weekly	Monthly
Freeboard	0.1 feet	Measurement	Weekly	Monthly
Odors	--	Observation	Weekly	Monthly

[1] Samples shall be collected at a depth of one foot from each pond in use, opposite the inlet. If the water depth is less than one foot, surface sampling is acceptable. Samples shall be collected between 0700 and 0900 hours.

[2] Record any conditions that could effect the monitoring interpretation, such as less than one foot of wastewater in the lagoon.

EFFLUENT MONITORING

Effluent samples shall be collected from April through October. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form. Effluent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency [1]	Reporting Frequency
Biological Oxygen Demand $_5$	mg/L	Grab	Weekly	Monthly
Total Coliform Organisms	MPN /100 mL	Grab	Weekly	Monthly
Settleable Solids	mL/L	Grab	Monthly	Monthly
Total Dissolved Solids	mg/L	Grab	Monthly	Monthly
Nitrate as Nitrogen	mg/L	Grab	Monthly	Monthly
Total Kjeldahl Nitrogen	mg/L	Grab	Monthly	Monthly
pH	Std units	Grab	Monthly	Monthly
Formaldehyde	mg/L	Grab	Monthly, May-Sept.	Monthly, May-Sept.
Zinc	mg/L	Grab	Monthly, May-Sept.	Monthly, May-Sept.
Phenol	mg/L	Grab	Monthly, May-Sept.	Monthly, May-Sept.
Standard Minerals [2]	mg/L	Grab	Annually	Annually

[1] Samples shall be collected between the months of April and October, unless described otherwise.
[2] Standard Minerals shall include, at a minimum, the following elements/compounds: boron, iron, manganese, calcium, magnesium, potassium, sodium, chloride, sulfate, total alkalinity (including alkalinity series), and hardness.

LAND APPLICATION AREA MONITORING

Monitoring of the land application area shall be conducted daily when wastewater is applied (April through October), and the results shall be included in the monthly monitoring report. Evidence of erosion, field saturation, runoff, or the presence of nuisance conditions shall be noted in the report. The tailwater collection ditch and valves shall be checked for leaks and overflows. Effluent monitoring results shall be used to calculate loading rates at the application area. Monitoring of the land application area shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	Gallons	Continuous	Daily	Monthly
Rainfall	Inches	Measurement	Daily	Monthly
Acreage Applied	Acres	Calculated	Daily	Monthly
Application Rate	gal/acre•day	Calculated	Daily	Monthly
BOD Loading Rate	lbs/acre•day	Calculated	Monthly	Monthly
TN Loading Rate	lbs/ac/month	Calculated	Monthly	Monthly
TDS Loading Rate	lbs/ac/month	Calculated	Monthly	Monthly

BOD denotes Biological Oxygen Demand. TN denotes Total Nitrogen. TDS denotes Total Dissolved Solids.

GROUNDWATER MONITORING

Groundwater samples shall be collected from each groundwater monitoring well in accordance with an approved groundwater monitoring workplan. Prior to sampling, depth to groundwater shall be measured to the nearest 0.01 feet. Water table elevations shall be calculated and used to determine groundwater gradient and flow direction. Samples shall be collected and analyzed using approved EPA methods or other methods approved by the

Central Valley Water Board. Groundwater monitoring shall include, at a minimum, the following:

Constituents	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Depth to Groundwater	± 0.01 feet	Measurement	Quarterly	Semi-annually
Groundwater Elevation	± 0.01 feet	Calculated	Quarterly	Semi-annually
Gradient	feet/feet	Calculated	Quarterly	Semi-annually
Gradient Direction	degrees	Calculated	Quarterly	Semi-annually
pH	pH units	Grab	Semi-annually	Semi-annually
Chloride	mg/L	Grab	Semi-annually	Semi-annually
Sodium	mg/L	Grab	Semi-annually	Semi-annually
Total Coliform Organisms	MPN/100 mL	Grab	Semi-annually	Semi-annually
Total Dissolved Solids	mg/L	Grab	Semi-annually	Semi-annually
Nitrate-N	mg/L	Grab	Semi-annually	Semi-annually
Total Trihalomethanes	µg/L	Grab	Semi-annually	Semi-annually
Zinc	mg/L	Grab	Semi-annually	Semi-annually
Total Phenols	mg/L	Grab	Semi-annually	Semi-annually
Formaldehyde	mg/L	Grab	Semi-annually	Semi-annually
Standard Minerals [1]	mg/L	Grab	Annually	Annually

[1] Standard Minerals shall include the following compounds: boron, iron, manganese, calcium, magnesium, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.

SLUDGE MONITORING

A composite sample of sludge shall be collected when removed from the lagoons in accordance with EPA's POTW Sludge Sampling and Analysis Guidance Document, August 1989, and tested for the following metals:

Cadmium	Copper	Nickel
Chromium	Lead	Zinc

Sampling records shall be retained for a minimum of five years. A log shall be kept of sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.

WATER SUPPLY MONITORING

A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Water supply monitoring shall include at least the following:

Constituents	Units	Sampling Frequency
Total Dissolved Solids	mg/L	Annually
pH	pH units	Annually
Standard Minerals [1]	mg/L	Annually

[1] Standard Minerals shall include, at a minimum, the following constituents: boron, iron, manganese, calcium, magnesium, potassium, sulfate, chloride, sodium, total alkalinity (including alkalinity series), and hardness.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, pond, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Revised MRP shall be reported to the Central Valley Water Board.

A. Monthly Monitoring Reports

Daily, weekly, and monthly monitoring data shall be reported in monthly monitoring reports. Monthly reports shall be submitted to the Regional Board on the **1st day of the second month following sampling** (i.e. the January Report is due by 1 March). At a minimum, the reports shall include:

1. Results of influent, lagoon, effluent, and land application area monitoring;

2. A comparison of monitoring data to the discharge specifications and an explanation of any violation of those requirements. Data shall be presented in tabular format; and

3. If requested by staff, copies of laboratory analytical report(s).

B. Semi-annual Monitoring Reports

In addition to the monthly monitoring reports, the Discharger shall establish quarterly and semi-annual sampling schedules for groundwater monitoring such that samples are obtained approximately every three and six months. Semi-annual monitoring reports shall be submitted to the Board by the **1st day of February and August.** The semi-annual reports shall include the following:

1. Results of groundwater monitoring;

2. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this Revised MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater and method of sampling;

3. Calculation of groundwater elevations, an assessment of the groundwater flow direction and gradient on the date of measurement, comparison to previous flow direction and gradient data, and discussion of seasonal trends, if any;

4. A narrative discussion of the analytical results for all media and locations monitored, including spatial and temporal trends, with reference to summary data tables, graphs, and appended analytical reports (as applicable);

5. Summary data tables of historical and current groundwater table elevations and analytical results;

6. A comparison of monitoring data to the groundwater limitations and an explanation of any violation of those requirements; and

7. Copies of laboratory analytical report(s) for groundwater monitoring.

C. Annual Report

In addition to the monthly and semi-annual monitoring reports, an Annual Report shall be prepared. The Annual Report shall be submitted to the Regional Board by **1 February** each year. The Annual Report shall include the following:

1. If requested by staff, tabular and graphical summaries of all data collected during the year;

2. A discussion of compliance and the corrective actions taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements;

3. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program;

4. A copy of the certification for each certified wastewater treatment plant operator working at the facility and a statement about whether the Discharger is in compliance with Title 23, CCR, Division 3, Chapter 26;

5. Summary of information on the disposal of sludge and/or solid waste;

6. The results from any sludge monitoring required by the disposal facility; and

7. The results from annual monitoring of the effluent, groundwater and water supply.

A letter transmitting the self-monitoring reports shall accompany each report. Such a letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty

of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program on the first day of the month following issuance of this Revised MRP.

Ordered by: _____
for PAMELA C. CREEDON, Executive Officer

26 April 2017
(Date)

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

11020 Sun Center Drive, #200, Rancho Cordova, California 95670-6114
(916) 464-3291 • FAX (916) 464-4645
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Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

ECS - Received

NOV 10 2011

8 November 2011

Mr. John Schroeter
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

CERTIFIED MAIL
7010 1670 0002 0652 1190

REVISED MONITORING AND REPORTING PROGRAM, EAST BAY MUNICIPAL UTILITY DISTRICT CAMANCHE NORTH SHORE WASTEWATER TREATMENT PLANT, AMADOR COUNTY

Central Valley Regional Water Quality Control Board staff has reviewed the East Bay Municipal Utility District's 5 February 2009 request to modify the requirements of Monitoring and Reporting Program (MRP) No. 95-175. In addition, we have reviewed the self-monitoring data submitted in monthly, quarterly, and annual reports.

Our review of the data indicates that a revision of the MRP is acceptable. As indicated in the attached revised MRP, the groundwater monitoring frequency will be changed from quarterly to semi-annually.

Please note that the Revised MRP must be implemented on the first day of the month following issuance. Therefore, the December 2011 monitoring report is to conform to the requirements of this Revised MRP.

Please contact Ms. Lixin Fu at (916) 464-4689 or lfu@waterboards.ca.gov if you have any questions regarding this revised MRP. All monitoring reports and compliance and enforcement questions should be directed to Ms. Mary Boyd at (916) 464-4676 or mboyd@waterboards.ca.gov.

Anne Olson

ANNE OLSON, P.E.
Senior Water Resource Control Engineer

Enclosed: Revised MRP No. 95-175

cc: Mike Israel, Amador County Environmental Health Department, Jackson

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM NO. 95-175 (REV. 2)

FOR
EAST BAY MUNICIPAL UTILITY DISTRICT
CAMANCHE NORTH SHORE WASTEWATER TREATMENT PLANT
AMADOR COUNTY

This Revised Monitoring and Reporting Program (Revised MRP) presents requirements for monitoring of the wastewater influent, wastewater treatment and storage ponds, spray disposal area, groundwater, and water supply. This Revised MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this Revised MRP unless and until another revised MRP is issued by the Executive Officer. Section 13267 of the California Water Code states, in part:

> *"In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports."*

Section 13268 of the California Water Code states, in part:

> *"(a) Any person failing or refusing to furnish technical or monitoring program reports as required by subdivision (b) of Section 13267, or failing or refusing to furnish a statement of compliance as required by subdivision (b) of Section 13399.2, or falsifying and information provided therein, is guilty of a misdemeanor and may be liable civilly in accordance with subdivision (b).*
>
> *(b)(1) Civil liability may be administratively imposed by a regional board in accordance with Article 2.5 (commencing with section 13323) of Chapter 5 for a violation of subdivision (a) in an amount which shall not exceed one thousand dollars ($1,000) for each day in which the violation occurs."*

The Discharger owns and operates the facility that is subject to Waste Discharge Requirements (WDRs) Order No. 95-175. The monitoring reports are necessary to ensure that the Discharger complies with the WDRs.

All samples shall be representative of the volume and nature of the discharge. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

Field testing instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are field calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of this Revised MRP.

INFLUENT MONITORING

Samples shall be collected at approximately the same time as effluent samples. Influent monitoring shall be conducted from the last lift station prior to discharge into the wastewater treatment ponds and shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	gpd	Meter Observation	Daily	Monthly
BOD_5 [1]	mg/L	Grab	Monthly	Monthly

[1] 5-day biochemical oxygen demand.

EFFLUENT MONITORING

Samples of effluent shall be collected from the effluent storage pond (Pond 6). At a minimum, effluent monitoring shall consist of the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Total Coliform Organisms [1]	MPN/100 ml [2]	Grab	Weekly	Monthly
pH	Standard	Grab	Monthly	Monthly
BOD_5	mg/L	Grab	Monthly	Monthly
Total Dissolved Solids	mg/L	Grab	Quarterly	Quarterly [4]
Sodium	mg/L	Grab	Quarterly	Quarterly [4]
Chloride	mg/L	Grab	Quarterly	Quarterly [4]
Nitrate as Nitrogen	mg/L	Grab	Quarterly	Quarterly [4]
Standard Minerals [3]	mg/L	Grab	Annually	Annually

[1] Monitoring for Total Coliform Organisms shall occur when the treated wastewater is discharged to the spray disposal area.

[2] Most probable number per 100 mL.

[3] Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, manganese, magnesium, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.

[4] Quarterly results shall be reported in the Monthly Monitoring Report for the month during which sampling occurs.

POND MONITORING

Each wastewater treatment and storage pond shall be monitored as follows. If the pond is empty on the scheduled monitoring date, the Discharger may report the freeboard monitoring result as "dry".

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Dissolved Oxygen [1, 2]	mg/L	Grab	Weekly	Monthly
Freeboard	0.1 feet	Measurement	Weekly	Monthly
Odors	--	Observation	Weekly	Monthly
Berm condition [3]	--	Observation	Weekly	Monthly

[1] If the pond depth exceeds one foot, samples shall be collected at a depth of one foot from each pond in use, opposite the inlet. If the water depth is less than one foot, surface sampling is acceptable.

[2] Record any conditions that could affect monitoring interpretation, such as less than one foot of wastewater in pond.

[3] Containment berms shall be observed for signs of seepage or surfacing water along the exterior toe of the levees. If surfacing water is found, then a sample shall be collected and tested for total coliform organisms and total dissolved solids.

SPRAY DISPOSAL AREA MONITORING

Monitoring of the spray disposal area shall be conducted daily when the wastewater is applied, and the results shall be included in the monthly monitoring report. Evidence of erosion, saturation, irrigation runoff, or the presence of nuisance conditions shall be noted in the report. Effluent monitoring results shall be used in calculations to ascertain loading rates at the spray disposal area. Monitoring of the spray disposal area shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Flow	Gallons	Meter Observation	Daily	Monthly
Rainfall	Inches	Observation	Daily	Monthly
Acreage Applied	Acres	Calculated	Daily	Monthly
Wastewater Application Rate	gal/acre/day	Calculated	Daily	Monthly

At least once per week when the spray disposal area is being used, the entire area shall be inspected to identify any equipment malfunction or other circumstances that might allow irrigation runoff to leave the irrigation area and/or create ponding conditions that violate the WDRs. A daily log of these inspections shall be kept at the facility and made available for review upon request.

GROUNDWATER MONITORING

Groundwater samples shall be collected from each groundwater monitoring well in accordance with an approved groundwater sampling plan. Prior to sampling, depth to groundwater shall be measured to the nearest 0.01 feet. Water table elevations shall be calculated and used to determine groundwater gradient and flow direction. Samples shall be collected and analyzed using EPA methods or other methods approved by the Central Valley Water Board. Groundwater monitoring shall include, at a minimum, the following:

Constituent	Units	Type of Sample	Sampling and Reporting Frequency
Depth to Groundwater	0.01 feet	Measurement	Semi-annually [3]
Groundwater Elevation [1]	0.01 feet	Calculated	Semi-annually [3]
Gradient	feet/feet	Calculated	Semi-annually [3]
Gradient Direction	degrees	Calculated	Semi-annually [3]
Total Dissolved Solids	mg/L	Grab	Semi-annually [3]
Nitrate as Nitrogen	mg/L	Grab	Semi-annually [3]
Iron	mg/L	Grab	Semi-annually [3]
Manganese	mg/L	Grab	Semi-annually [3]
pH	pH units	Grab	Semi-annually [3]
Total Coliform Organisms	MPN/100 mL	Grab	Semi-annually [3]
Standard Minerals [2]	mg/L	Grab	Annually [4]

[1] Groundwater elevation shall be determined based on depth-to-water measurements using a surveyed measuring point elevation on the well and a surveyed reference elevation.

[2] Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, chloride, magnesium, potassium, sodium, sulfate, total alkalinity (including alkalinity series), and hardness.

[3] Semi-annual groundwater monitoring shall occur in the first and the third quarter of each calendar year.

[4] Annual groundwater monitoring shall occur in the first quarter of each calendar year.

SLUDGE MONITORING

Prior to the removal of sludge from any pond, a composite sample shall be collected in accordance with EPA's POTW Sludge Sampling and Analysis Guidance Document (August 1989) and tested for the following metals:

Cadmium	Copper	Nickel
Chromium	Lead	Zinc

Sampling records shall be retained for a minimum of five years. A log shall be kept if solid waste (grits and screenings) and sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log should be complete enough to serve as a basis for part of the annual report.

WATER SUPPLY MONITORING

A sampling station shall be established where a representative sample of the municipal water supply can be obtained. Water supply monitoring shall include at least the following for each water source used during the previous year:

Constituents	Units	Sampling Frequency
Total Dissolved Solids	mg/L	Annually
Electrical Conductivity	mg/L	Annually
pH	pH units	Annually
Standard Minerals [1]	mg/L	Annually

[1] Standard Minerals shall include, at a minimum, the following elements/compounds: boron, calcium, chloride, iron, manganese, magnesium, nitrogen, potassium, sodium, sulfate, total alkalinity (including alkalinity series), and hardness.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, pond, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Revised MRP shall be reported in the next scheduled monitoring report.

A. Monthly Monitoring Reports

Monthly reports shall be submitted to the Central Valley Water Board by the **1st day of the second month** following the end of the reporting period (i.e. the January monthly report is due by 1 March). At a minimum, the reports shall include:

1. Results of the influent, effluent, pond, sludge, and spray disposal area monitoring;
2. A comparison of the monitoring data to the discharge specifications and an explanation of any violation of those requirements;
3. If requested by staff, copies of laboratory analytical report(s);
4. A calibration log verifying calibration of all monitoring instruments and devices used to fulfill the prescribed monitoring program; and
5. Whether wastewater was discharged to the spray disposal area during that month.

B. Semi-Annual Monitoring Reports

In addition to the monthly monitoring reports, semi-annual monitoring reports shall be submitted to the Central Valley Water Board by the **1st day of May and October each year.**

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Engineer or Geologist and signed by the registered professional.

The semi-annual reports shall include the following:

1. Results of groundwater monitoring;
2. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDRs, this Revised MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater and method of sampling;

3. Calculation of groundwater elevations, an assessment of the groundwater flow direction and gradient on the date of measurement, comparison to previous flow direction and gradient data, and discussion of seasonal trends, if any;

4. A narrative discussion of the analytical results for all groundwater and locations monitored, including spatial and temporal trends, with reference to summary data tables, graphs, and appended analytical reports (as applicable);

5. Summary data tables of historical and current groundwater table elevations and analytical results;

6. A comparison of monitoring data to the groundwater limitations and an explanation of any violation of those requirements; and

7. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum.

8. Copies of laboratory analytical report(s) for groundwater monitoring.

D. Annual Report

An Annual Report shall be submitted to the Central Valley Water Board by **1 February** each year. The Annual Report shall include the following:

1. The results from annual monitoring of the effluent, groundwater, and water supply;

2. Tabular and graphical summaries of all data collected during the year;

3. A digital database (Microsoft Excel) containing historic groundwater data;

4. An evaluation of the groundwater quality beneath the wastewater treatment facility and spray disposal area;

5. An evaluation of the performance of the wastewater treatment plant;

6. A discussion of compliance and the corrective actions taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements;

7. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program;

8. A copy of the certification for each certified wastewater treatment plant operator working at the facility and a statement about whether the Discharger is in compliance with Title 23, CCR, Division 3, Chapter 26.

9. The results from any sludge monitoring required by the disposal facility;

10. Equipment maintenance and calibration records, as described in Standard Provision No. C.4; and
11. A forecast of influent flows, as described in Standard Provision No. E.4.

A letter transmitting the self-monitoring reports shall accompany each report. The letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above revised monitoring program on the first day of the month following adoption of this Order.

Ordered by: 

PAMELA C. CREEDON, Executive Officer

11-8-11

(Date)

LF: 11/3/2011

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

REVISED MONITORING AND REPORTING PROGRAM NO. R5-2002-0070

FOR
EAST BAY MUNICIPAL UTILITY DISTRICT
CAMANCHE RESERVOIR SOUTH SHORE RECREATION AREA
WASTEWATER TREATMENT PLANT
CALAVERAS COUNTY

This Revised Monitoring and Reporting Program (Revised MRP) presents requirements for monitoring of the wastewater influent, wastewater treatment and storage ponds, effluent, surface water, sludge, groundwater, and water supply. This Revised MRP is issued pursuant to Water Code Section 13267. The Discharger shall not implement any changes to this Revised MRP unless and until another revised MRP is issued by the Executive Officer.

All samples shall be representative of the volume and nature of the discharge. The time, date, and location of each grab sample shall be recorded on the sample chain of custody form.

Field testing instruments (such as those used to test pH and dissolved oxygen) may be used provided that:

1. The operator is trained in proper use and maintenance of the instruments;
2. The instruments are field calibrated prior to each monitoring event;
3. Instruments are serviced and/or calibrated by the manufacturer at the recommended frequency; and
4. Field calibration reports are submitted as described in the "Reporting" section of this Revised MRP.

INFLUENT MONITORING

Influent monitoring shall be performed at each location where influent is discharged into Pond 1. Samples shall be collected at approximately the same time as effluent samples and shall be representative of the influent. Influent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Total Flow	gpd	Meter Observation	Daily	Monthly
20°C BOD [1]	mg/L	Grab	Quarterly	Quarterly [2]

[1] 5-day Biochemical Oxygen Demand.
[2] Quarterly results shall be reported in the Monthly Monitoring Report for the month during which sampling occurs.

POND MONITORING

Each wastewater treatment and storage pond shall be monitored as follows. If the pond is empty on the scheduled monitoring date, the Discharger may report the freeboard monitoring result as "dry".

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
Dissolved Oxygen [1, 2]	mg/L	Grab	Weekly	Monthly
pH	Standard units	Grab	Weekly	Monthly
Freeboard	0.1 feet	Measurement	Weekly	Monthly
Berm Seepage [3]	NA	Observation	Weekly	Monthly
Odors	--	Observation	Weekly	Monthly

[1] If the pond depth exceeds one foot, samples shall be collected at a depth of one foot from each pond in use, opposite the inlet. If the water depth is less than one foot, surface sampling is acceptable.
[2] Record any conditions that could affect monitoring interpretation, such as less than one foot of wastewater in pond.
[3] Containment berms shall be observed for signs of seepage or surfacing water along the exterior toe of the levees. If surfacing water is found, then a sample shall be collected and tested for total coliform organisms and total dissolved solids.

EFFLUENT MONITORING

Effluent samples shall be collected from an established sampling station located in an area that shall provide a sample representative of the water in Pond 3. Effluent monitoring shall include the following:

Constituent	Units	Type of Sample	Sampling Frequency	Reporting Frequency
BOD [1]	mg/L	Grab	Monthly	Monthly
Total Coliform Organisms	MPN [2]/100 mL	Grab	Monthly	Monthly
pH	Standard unit	Grab	Monthly	Monthly
Total Dissolved Solids	mg/L	Grab	Monthly	Monthly
Nitrate as Nitrogen	mg/L	Grab	Monthly	Monthly
Sodium	mg/L	Grab	Monthly	Monthly
Chloride	mg/L	Grab	Monthly	Monthly
Standard Minerals [3]	mg/L	Grab	Annually	Annually

[1] 5-day Biochemical Oxygen Demand.
[2] Using a minimum of 15 tubes or three dilutions.
[3] Standard Minerals shall include, at a minimum, the following elements/compounds: Barium, Calcium, Iron, Magnesium, Manganese, Potassium, Sulfate, Total Alkalinity (including alkalinity series), and Hardness.

SURFACE WATER MONITORING

The Discharger shall monitor surface water in the two terminal freshwater ponds (the "Trout Pond" and "Western Pond", which is also known as "Beaver Pond") surrounding the wastewater ponds. Grab samples shall be collected from the terminal ponds where the pond water flows into the Camanche Reservoir. Surface water monitoring shall include following:

Constituent	Units	Type of Sample	Sampling and Reporting Frequency
Surface Water Elevation	± 0.1 feet	Measurement	Semi-annual [1]
Nitrate Nitrogen	mg/l	Grab	Semi-annual [1]
Total Alkalinity	mg/l	Grab	Semi-annual [1]
Chloride	mg/l	Grab	Semi-annual [1]
Total Dissolved Solids	mg/l	Grab	Semi-annual [1]

[1] Semi-annual monitoring shall occur in the first and the third quarter of each calendar year.

GROUNDWATER MONITORING

Prior to construction and/or sampling of any groundwater monitoring wells, the Discharger shall submit plans and specifications to the Board for review and approval. Once installed, all new wells shall be added to the MRP and shall be sampled and analyzed according to the schedule below.

Samples shall be collected in the wells MW-5 through MW-12. Prior to sampling, depth to groundwater shall be measured to the nearest 0.01 feet. Water table elevations shall be calculated and used to determine groundwater gradient and flow direction. Samples shall be collected and analyzed using approved EPA methods or other methods approved by the Central Valley Water Board. Groundwater monitoring shall include, at a minimum, the following:

Constituents	Units	Type of Sample	Sampling and Reporting Frequency
Groundwater Elevation [1]	0.01 feet	Measured	Semi-annually [3]
Depth to groundwater	0.01 feet	Measured	Semi-annually [3]
Gradient	feet/feet	Calculated	Semi-annually [3]
Gradient Direction	degrees	Calculated	Semi-annually [3]
pH	pH units	Grab	Semi-annually [3]
Chloride	mg/L	Grab	Semi-annually [3]
Sodium	mg/L	Grab	Semi-annually [3]
Total Coliform Organisms	MPN/100 mL	Grab	Semi-annually [3]
Total Dissolved Solids	mg/L	Grab	Semi-annually [3]
Nitrate Nitrogen	mg/L	Grab	Semi-annually [3]
Standard Minerals [2]	mg/L	Grab	Annually [4]

[1] Groundwater elevation shall be determined based on depth-to-water measurements using a surveyed measuring point elevation on the well and a surveyed reference elevation.
[2] Standard Minerals shall include, at a minimum, the following elements/compounds: Barium, Calcium, Iron, Manganese, Magnesium, Potassium, Sulfate, Total Alkalinity (including alkalinity series), and Hardness.
[3] Semi-annual groundwater monitoring shall occur in the first and the third quarter of each calendar year.

[4] Annual groundwater monitoring shall occur in the first quarter of each calendar year.

SLUDGE MONITORING

A composite sample of sludge shall be collected when removed from the treatment and storage/disposal ponds in accordance with EPA's POTW Sludge Sampling and Analysis Guidance Document, August 1989, and tested for the following metals:

Cadmium	Copper	Nickel
Chromium	Lead	Zinc

Sampling and analytical records shall be retained for a minimum of five years. A log shall be kept of sludge quantities generated and of handling and disposal activities. The frequency of entries is discretionary; however, the log shall be complete enough to serve as a basis for part of the annual report.

WATER SUPPLY MONITORING

A sampling station shall be established where a representative sample of the public water supply can be obtained. Water supply monitoring shall include at least the following:

Constituents	Units	Sampling Frequency
Electrical Conductivity [1]	µmhos/cm	Annually
pH	pH units	Annually
Standard Minerals [2]	mg/L	Annually

[1] If the source water is from more than one well, the EC shall be reported as a weighted average and include copies of supporting calculations.

[2] Standard Minerals shall include, at a minimum, the following elements/compounds: Barium, Calcium, Chloride, Manganese, Magnesium, Iron, Sodium, Potassium, Nitrate, Sulfate, Total Alkalinity (including alkalinity series), and Hardness.

REPORTING

In reporting monitoring data, the Discharger shall arrange the data in tabular form so that the date, sample type (e.g., effluent, pond, etc.), and reported analytical result for each sample are readily discernible. The data shall be summarized in such a manner to clearly illustrate compliance with waste discharge requirements and spatial or temporal trends, as applicable. The results of any monitoring done more frequently than required at the locations specified in the Revised MRP shall be reported in the next scheduled monitoring report.

A. Monthly Monitoring Reports

Monthly reports shall be submitted to the Central Valley Water Board by the **1st day of the second month** following the end of the reporting period (i.e. the January monthly report is due by 1 March). At a minimum, the reports shall include:

1. Results of influent, pond, and effluent monitoring;

2. A comparison of monitoring data to the discharge specifications and effluent limitations and an explanation of any violation of those requirements. Data shall be presented in tabular format;

3. If requested by staff, copies of laboratory analytical report(s);

4. A calibration log verifying calibration of all hand-held monitoring instruments and devices used to comply with the prescribed monitoring program; and

5. A discussion on whether the wastewater contingency plan has been implemented.

B. Semi-Annual Monitoring Reports

Semi-annual monitoring reports shall be submitted to the Central Valley Water Board by the **1st day of August** (for the period of January through June) and **February** (for the period of July through December).

As required by the California Business and Professions Code Sections 6735, 7835, and 7835.1, all Groundwater Monitoring Reports shall be prepared under the direct supervision of a Registered Engineer or Geologist and signed by the registered professional.

The semi-annual reports shall include the following:

1. Results of groundwater monitoring;

2. Results of surface water monitoring;

3. A narrative description of all preparatory, monitoring, sampling, and analytical testing activities for groundwater monitoring. The narrative shall be sufficiently detailed to verify compliance with the WDR, this MRP, and the Standard Provisions and Reporting Requirements. The narrative shall be supported by field logs for each well documenting depth to groundwater; parameters measured before, during, and after purging; method of purging; calculation of the casing volume; and total volume of water purged;

4. Calculation of groundwater elevations, an assessment of the groundwater flow direction and gradient on the date of measurement, comparison to previous flow direction and gradient data, and discussion of seasonal trends, if any;

5. A narrative discussion of the analytical results for all media and locations monitored, including spatial and temporal trends, with reference to summary data tables, graphs, and appended analytical reports (as applicable);

6. Summary data tables of historical and current groundwater table elevations and analytical results;

7. A comparison of monitoring data to the groundwater limitations and an explanation of any violation of those requirements;

8. A scaled map showing relevant structures and features of the facility, the locations of monitoring wells and any other sampling stations, and groundwater elevation contours referenced to mean sea level datum; and

9. Copies of laboratory analytical report(s) for groundwater monitoring.

C. Annual Report

An Annual Report shall be submitted to the Central Valley Water Board by **1 February** each year. The Annual Report shall include the following:

1. The results from annual monitoring of the effluent, groundwater, and water supply;

2. Tabular and graphical summaries of all data collected during the year;

3. A digital database (Microsoft Excel) containing historic groundwater data;

4. An evaluation of the groundwater quality beneath the wastewater treatment facility and land application area;

5. A discussion of compliance and the corrective actions taken, as well as any planned or proposed actions needed to bring the discharge into full compliance with the waste discharge requirements;

6. A discussion of any data gaps and potential deficiencies/redundancies in the monitoring system or reporting program;

7. A copy of the certification for each certified wastewater treatment plant operator working at the facility and a statement about whether the Discharger is in compliance with Title 23, CCR, Division 3, Chapter 26;

8. The results from any sludge monitoring required by the disposal facility;

9. Equipment maintenance and calibration records, as described in Standard Provision No. C.4; and

10. A forecast of influent flows, as described in Standard Provision No. E.4.

A letter transmitting the self-monitoring reports shall accompany each report. The letter shall include a discussion of requirement violations found during the reporting period, and actions taken or planned for correcting noted violations, such as operation or facility modifications. If the Discharger has previously submitted a report describing corrective actions and/or a time schedule for implementing the corrective actions, reference to the previous correspondence will be satisfactory. The transmittal letter shall contain the penalty of perjury statement by the Discharger, or the Discharger's authorized agent, as described in the Standard Provisions General Reporting Requirements Section B.3.

The Discharger shall implement the above monitoring program on the first day of the month following adoption of this Order.

Ordered by: Original signed by

PAMELA C. CREEDON, Executive Officer

14 December 2011
(Date)

LF: 12/14/2011

All FSCC Job Numbers

PROGRAM NO.	PROGRAM NAME	OP JOB #	OP JOB NAME
4421	Operate Aqueducts & Raw Wtr Lin	1011218	FSCC Pipeline Operation
		1011219	FSCC Pipeline Startup/Shutdown
		1011220	Brandt Flow Control Facility Startup/Shutdown
		1011221	Gerber Pipeline FSCC Operation
		1011222	Gerber Pipeline Startup/Shutdown
		1011223	Mok/Laf Aqueducts for FSCC Startup/Shutdown
		1014124	Mok/Laf Aqueducts for FSCC Operations
		1013821	Bixler FSCC CO2 System Startup/Shutdown
		1013822	Bixler FSCC CO2 System Operation
		1013823	Bixler FSCC CO2 System Maint/Repairs
		1013824	Walnut Creek FSCC CO2 Startup/Shutdown
		1013825	Walnut Creek FSCC CO2 System Operation
		1013826	Walnut Creek FSCC CO2 System Maint/Repairs
		1013914	PCWA Water Purchases
		1013917	CVP Water Purchases
4423	Operate Raw Wtr Pumping Plants	1011224	FSCC System-wide Operation
		1011737	Clay Station RWPP Stdby Energy
		1011225	Clay Station RWPP FSCC Operation
		1011226	Clay Station RWPP Startup/Shutdown
		1011736	Camanche RWPP Stdby Energy
		1011227	Camanche RWPP FSCC Operation
		1011228	Camanche RWPP Startup/Shutdown
		1011229	Walnut Creek RWPP Operations
		1011244	FRWA Intake & Pipeline Operations
		1014025	Moraga RWPP FSCC Operations
		1014026	Briones RWPP FSCC Operations
4427	Corrosion Control Rwtr Transmn	1011230	FSCC Pipeline Cathodic Systems
		1011232	Gerber Pipeline Cathodic Systems
4439	Maintain Other Aqueduct Structures	1011233	FSCC Pipeline Fac Maint/Repairs
		1011235	Gerber Pipeline Fac Maint/Repairs
4441	FSCC R-O-W Encroachments		
4442	Gerber R-O-W Encroachments		
4451	Maint Aqued & Raw Water Lines	1011234	FSCC Pipeline Routine Maint/Reprs
		1011236	Gerber Pipeline Routine Maint/Rpr
		1011237	Brandt Flow Control Facility Routine Maint/Rpr
4453	Maint Raw Water Pumping Plants	1011238	Clay Station RWPP Switchyard Rout Mnt/Rpr
		1011239	Clay Station RWPP Structure & Grounds
		1011240	Clay Station RWPP Pumps & Motors
		1011215	Clay Station RWPP Systems
		1011241	Camanche RWPP Switchyard
		1011242	Camanche RWPP Structure & Grounds
		1011243	Camanche RWPP Pumps & Motors
		1011216	Camanche RWPP Systems
		1013820	FRWA Intake & Pipeline Maintenance
4455	Grndskpng Aqdcts & Rw Water Pmp Plts	1011245	FSCC Pipeline GrndsRoutMntImpRpr
		1011246	Gerber Pipeline GrndsRoutMaintImpRpr
		1011247	Brandt Flow Control Facility GrdsRouMntImpRpr
		1011248	Clay Station RWPP GrdsRoutMntImpRpr
		1011249	Camanche RWPP GrdsRoutMntImpRpr

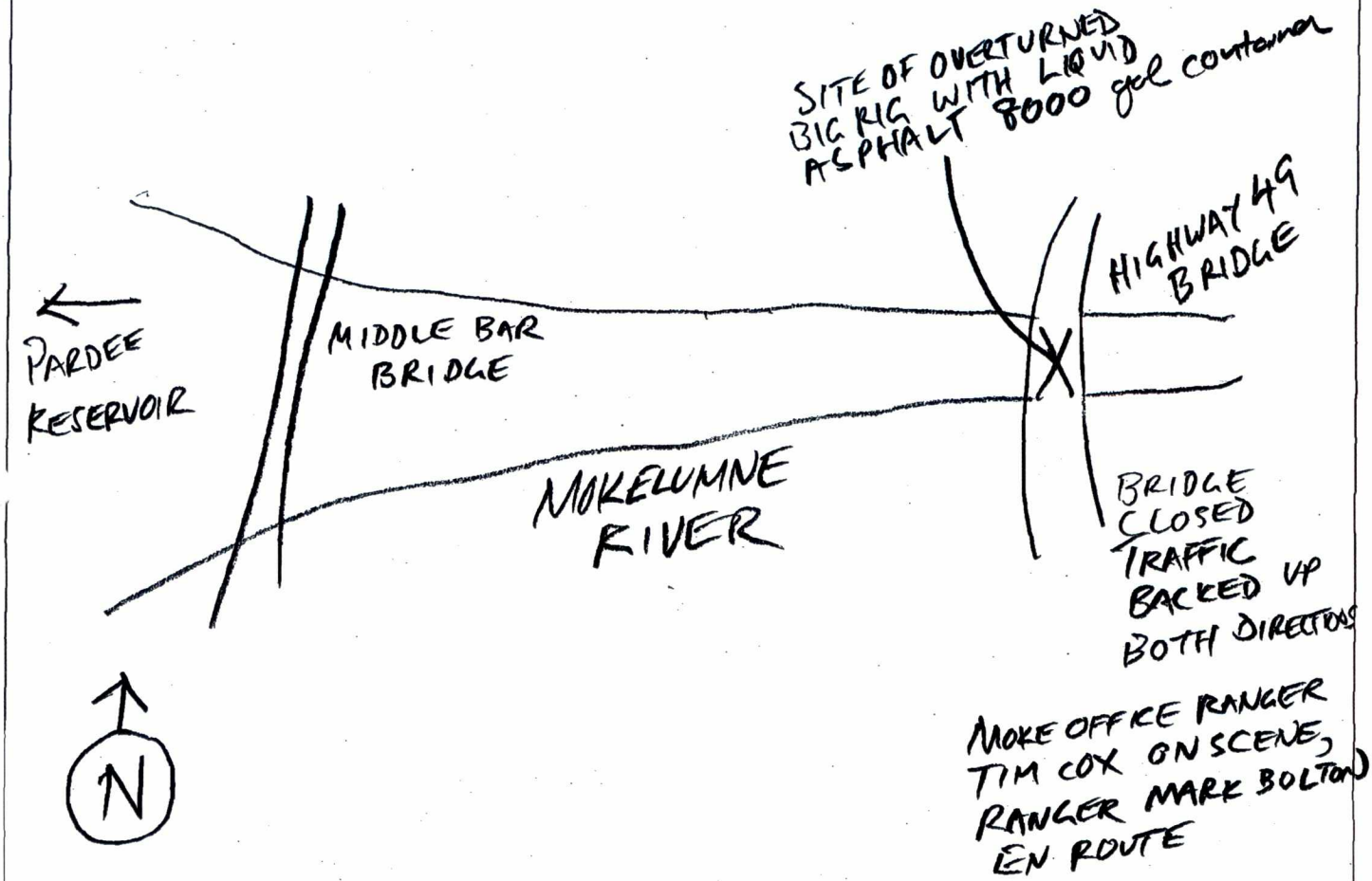
Appendix 5-3

Incident Briefings, 2011 Tanker Truck Overturned, Hwy 49 at Mokelumne River Bridge

INCIDENT BRIEFING (ICS 201)

1. INCIDENT BASE or INCIDENT FIELD SITE NAME:	2. INCIDENT NAME:	3-A. INCIDENT ACTION PLAN #:	3-B. INCIDENT BASE or FIELD REPORT #:
Moke River Hiway 49 Bridge	Moke River - Hiway 49 Bridge Haz Mat Spill		
4. OPERATIONAL PERIOD (DATE & TIME): FROM 9/26/11 12:20 TO 9/26/11 1600		**5. DATE & TIME PREPARED:** 9/26/11 12:20 PM	

6. SKETCH/MAP/PHOTO: Hand-draw a sketch, or insert a B-Map sheet and/or digital photo to depict the boundaries of the specific incident site. Label the Incident Command Post, Staging Area, and Work Unit locations. Mark any hazards or impacted/threatened areas on the map. Depict other situational status factors, unified/mutual aid forces, and other resources in the area of operations.
Note: Unlock the form to insert a map and/or photo. Remember to lock the form before continuing on to the next block.



7. SAFETY AND HEALTH BRIEFING: Protect responders by briefing potential Incident Health and Safety Hazards and develop necessary risk reduction/mitigation measures (e.g. remove hazard, provide PPE, or institute administrative measures. Use ICS 215A and ICS 206, if available.)

PREPARED BY (NAME, POSITION/TITLE):	APPROVED BY INCIDENT COMMANDER (NAME):
SIGNATURE: PARDEE ASST SUPT.	SIGNATURE:

INCIDENT BRIEFING (ICS 201)

11. SITUATION STATUS SUMMARY: Highlight significant updates (events, actions, decisions) and changes (personnel, equipment, resources) that occurred since the last reporting period. Provide current status and projection (check box, then add narrative).

☐ No Change to Situation ☐ Situation Improving ☐ Situation Worsening

CURRENT INFO IS TRUCK OVERTURNED ON BRIDGE. TRUCK HAS 6000 GALLON CONTAINER WITH UNKNOWN QUANTITY OF LIQUID ASPHALT ON BOARD. APPROX 200 GALLONS IS REPORTED TO HAVE SPILLED ONTO ROAD. BRIDGE IS CLOSED DUE TO INCIDENT, SO ACCESS IS LIMITED, ONE EBMUD RANGER, TIM COX IS ON SCENE, RANGER MARK BOLTON EN ROUTE.
12:31 PM LOCAL RADIO STATION KVGC REPORTS ACCIDENT IS SOUTH OF HIWAY 49 BRIDGE.

12. RESOURCES SUMMARY

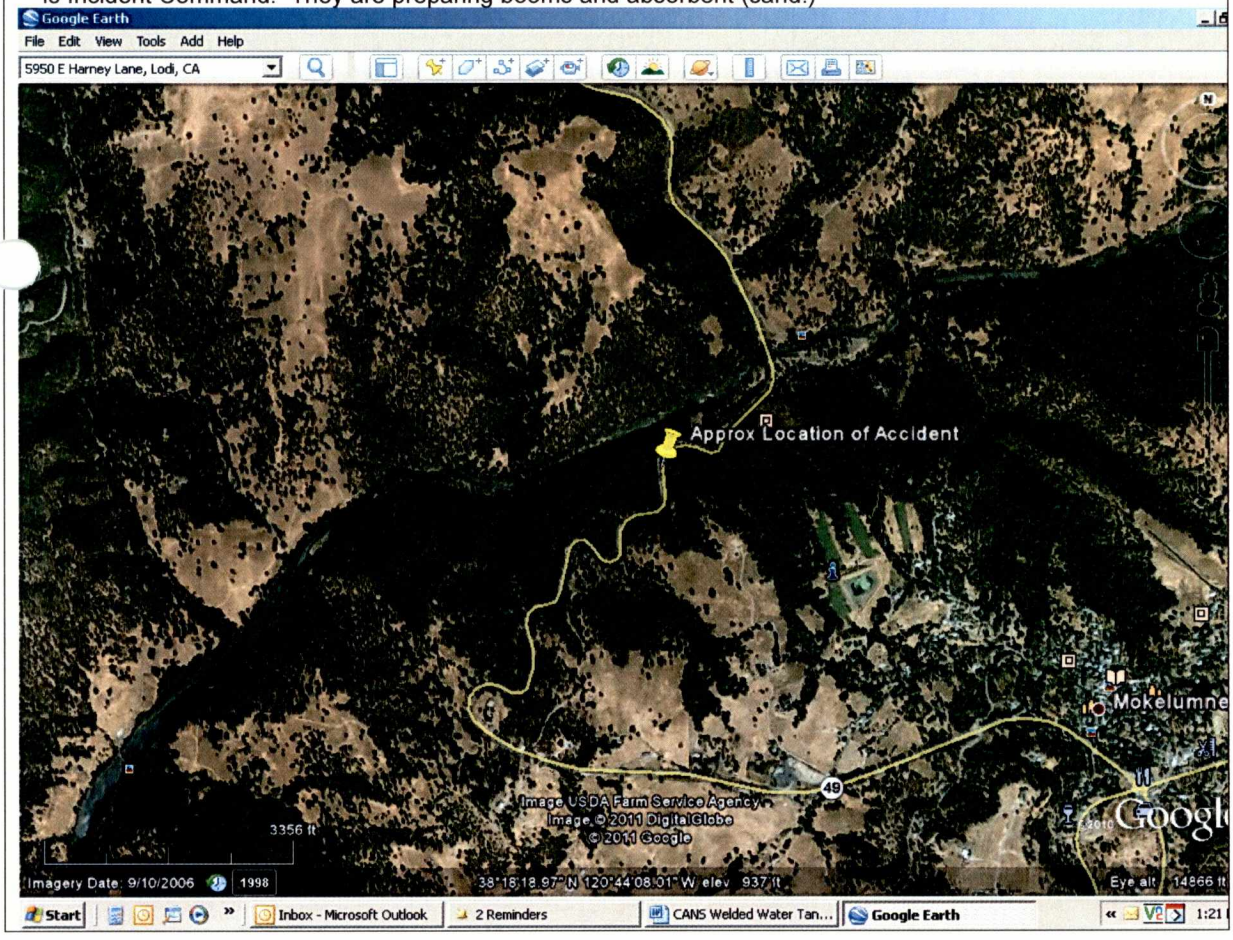
Item #	Qty	Resource Requested (people, equipment, materials)	Type/Kind	Date/Time Ordered	Date/Time Arrived	Date/Time Departed	Work Location Assignment/Status

INCIDENT BRIEFING (ICS 201)

1. INCIDENT BASE or INCIDENT FIELD SITE NAME: Moke River Highway 49 Bridge	2. INCIDENT NAME: Moke River-Highway 49 Bridge Haz-Mat Spill	3-A. INCIDENT ACTION PLAN #:	3-B. INCIDENT BASE or FIELD REPORT #: Field Report #2
4. OPERATIONAL PERIOD (DATE & TIME): FROM 9/26/11 12:20 TO 16:00 P.M.		5. DATE & TIME PREPARED: 9/26/11 13:35 P.M.	

6. SKETCH/MAP/PHOTO: Hand-draw a sketch, or insert a B-Map sheet and/or digital photo to depict the boundaries of the specific incident site. Label the Incident Command Post, Staging Area, and Work Unit locations. Mark any hazards or impacted/threatened areas on the map. Depict other situational status factors, unified/mutual aid forces, and other resources in the area of operations.
Note: Unlock the form to insert a map and/or photo. Remember to lock the form before continuing on to the next block.

Update relayed from Moke' Ranger Mark Bolton:
Location of overturned truck ~1,600 feet south of Highway 49 bridge on Roadway… approx 400 to 500 feet south of Mokelumne River. (Not on bridge) Tanker has ruptures on top and bottom of tank, but is still leaking very slowly, or not at all. Highway curbing is containing material already spilled. However, CHP on scene is planning to upright truck to get it out of the roadway. We have asked that they consider transferring product into another tanker before attempting to upright truck. Product is reported to be " Seal Guard Mineral reinforced Inorganic Polymer" aka Asphalt Sealant. It is still not known if tanker is full or empty. County OES is Incident Command. They are preparing booms and absorbent (sand.)



PREPARED BY (NAME, POSITION/TITLE):	APPROVED BY INCIDENT COMMANDER (NAME):
SIGNATURE:	SIGNATURE:

INCIDENT BRIEFING (ICS 201)

7. SAFETY AND HEALTH BRIEFING: Protect responders by briefing potential Incident Health and Safety Hazards and develop necessary risk reduction/mitigation measures (e.g. remove hazard, provide PPE, or institute administrative measures. Use ICS 215A and ICS 206, if available.)

8. CURRENT AND PLANNED OBJECTIVES		
Standard Operational Priorities applicable to ***ALL INCIDENTS and OPERATIONAL PERIODS***:		
A. Life Safety	B. Incident Stabilization	C. Protection of Property/Environment
Current Objectives:	**S**pecific (Is the wording precise and unambiguous?) **M**easurable (How will achievements be measured?) **A**ction Oriented (Is an action verb used to describe expected accomplishments?) **R**ealistic (Is the outcome achievable with given available resources?) **T**ime Sensitive (What is the timeframe?)	
1.		
2.		
3.		

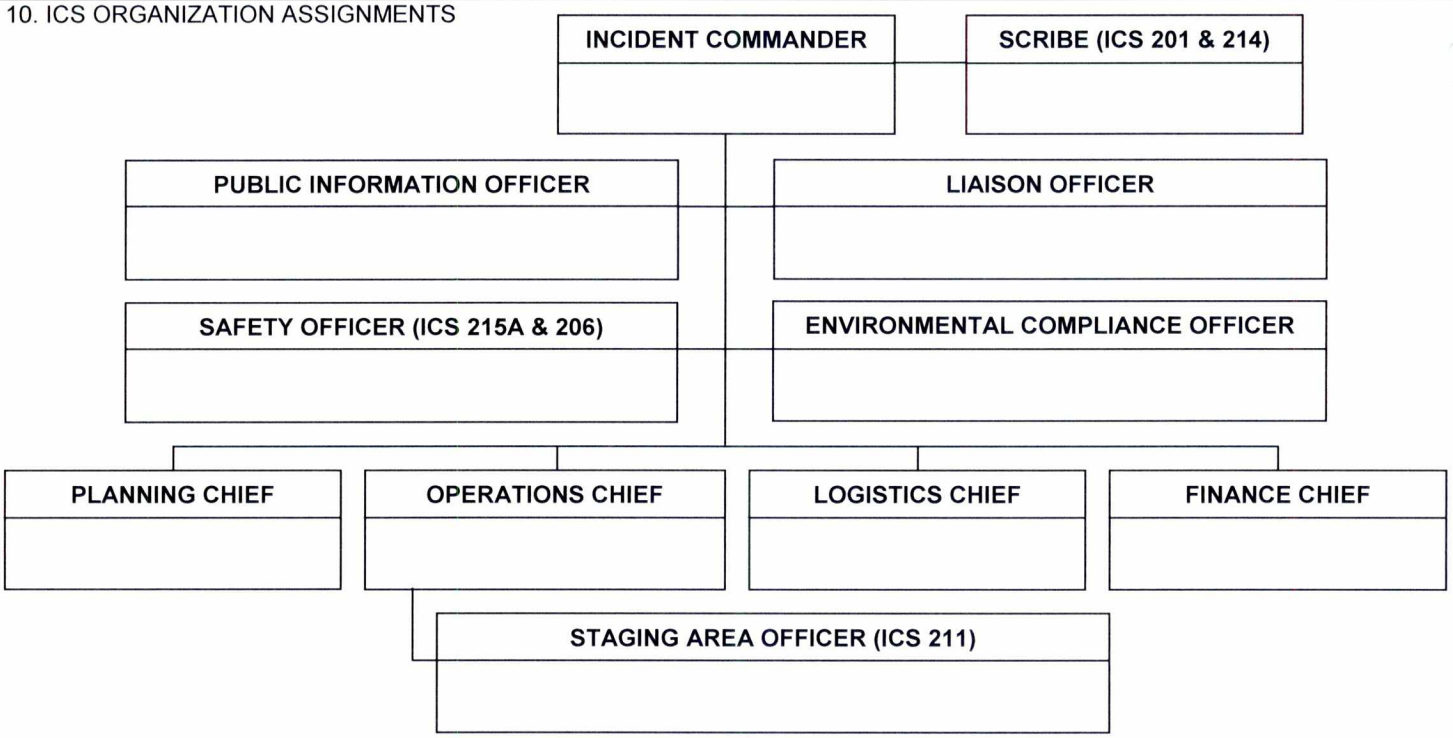
INCIDENT BRIEFING (ICS 201)

9. OPERATIONAL PERIOD TASKS, ACTIONS, STRATEGIES, AND TACTICS LINKED TO OBJECTIVES ABOVE:

Obj #	TASKS	STATUS
1.		
2.		
3.		

INCIDENT BRIEFING (ICS 201)

10. ICS ORGANIZATION ASSIGNMENTS



POSITION TITLE	NAME

POSITION TITLE	NAME

Use what portion of the above diagram as necessary to outline the Incident Command Structure.

INCIDENT BRIEFING (ICS 201)

11. SITUATION STATUS SUMMARY: Highlight significant updates (events, actions, decisions) and changes (personnel, equipment, resources) that occurred since the last reporting period. Provide current status and projection (check box, then add narrative).

☐ No Change to Situation ☐ Situation Improving ☐ Situation Worsening

12. RESOURCES SUMMARY

Item #	Qty	Resource Requested (people, equipment, materials)	Type/Kind	Date/Time Ordered	Date/Time Arrived	Date/Time Departed	Work Location Assignment/Status

INCIDENT BRIEFING (ICS 201)

Instructions

Purpose: The Incident Briefing (ICS 201) provides the Incident Commander/Response Team with basic information regarding the incident. It documents the response, tasks, and resources requested/allocated to the incident. The ICS 201 serves as a permanent record of the initial and ongoing response to the incident and is used to brief responders and the Emergency Operations Center (EOC).

Preparation: The ICS 201 is prepared by the Incident Commander for presentation to all incident site responders; to transfer command to the incoming Incident Commander (along with a more detailed oral briefing); and to report situation status to the Incident Commander's higher authority/District Emergency Operations Center.

Distribution: When possible, duplicate the ICS 201 before briefing Incident Staff and responders. The Field Incident Commander delivers a copy to the Incident Base (if activated) and the District EOC (if activated). If neither is activated, then a copy is sent to the immediate supervisor. Deliver copies by the quickest means available: fax, email, or hand-carry to the chain of command. If the EOC is activated, the ICS 201 MUST be delivered to the Documentation Unit Leader.

- Primary EOC Fax #s: (510) 287-0571 and (510) 287-0346
- Alternate EOC Fax #s: (925) 943-6016 and (925) 943-6021
- E-Mail to: Operations@ebmud.com; Copy to: Planning@ebmud.com and Logistics@ebmud.com

Notes:

- The ICS 201 can serve as part of the initial Incident Action Plan (IAP).
- If additional pages are needed for any form page, use a blank sheet or a blank ICS 201 and repaginate as needed.

<table>
<tr><th>Block Number</th><th>Block Title</th><th>Instructions</th></tr>
<tr><td>1</td><td>Incident Base or Incident Field Site Name</td><td>Enter the Incident Base or the home of the physical location in the field, as applicable.
<table>
<tr><th>LOCATION/FUNCTION</th><th>CODE</th></tr>
<tr><td>Pardee</td><td>PAR</td></tr>
<tr><td>Stockton</td><td>STK</td></tr>
<tr><td>Walnut Creek Water Treatment Plant</td><td>WCWTP</td></tr>
<tr><td>Lafayette Water Treatment Plant</td><td>LAFWTP</td></tr>
<tr><td>Orinda Water Treatment Plant</td><td>ORWTP</td></tr>
<tr><td>Sobrante Water Treatment Plant</td><td>SOBWTP</td></tr>
<tr><td>Upper San Leandro Water Treatment Plant</td><td>USLWTP</td></tr>
<tr><td>North Area Service Center</td><td>NASC</td></tr>
<tr><td>South Area Service Center</td><td>SASC</td></tr>
<tr><td>East Area Service Center</td><td>EASC</td></tr>
<tr><td>Adeline Maintenance Center</td><td>AMC</td></tr>
<tr><td>Administration Building</td><td>AB</td></tr>
<tr><td>Wastewater Plant</td><td>WW</td></tr>
<tr><td>Orinda Watershed</td><td>WHQ</td></tr>
<tr><td>Alternate Worksite</td><td>AW</td></tr>
<tr><td>San Pablo Recreation Area</td><td>SPRA</td></tr>
<tr><td>Lafayette Recreation Area</td><td>LRA</td></tr>
<tr><td>Chabot Recreation Area</td><td>CRA</td></tr>
<tr><td>Mutual Assistance Forces</td><td>MA – (Name of Agency)</td></tr>
<tr><td>EOT Management Staff</td><td>EOT MGT</td></tr>
<tr><td>EOT Planning Section</td><td>EOT PLANS</td></tr>
<tr><td>EOT Operations Section</td><td>EOT OPS</td></tr>
<tr><td>EOT Logistics Section</td><td>EOT LOG</td></tr>
<tr><td>EOT Finance Section</td><td>EOT FIN</td></tr>
<tr><td>EOT General Orders</td><td>EOT GO</td></tr>
</table>
</td></tr>
</table>

INCIDENT BRIEFING (ICS 201)

<table>
<tr><th>Block Number</th><th>Block Title</th><th>Instructions</th></tr>
<tr><td>2</td><td>Incident Name</td><td>Enter the name assigned to the incident provided by the EOT or by the Incident Commander, using the geographical street address or intersection of the incident.</td></tr>
<tr><td rowspan="2">3</td><td>A. Incident Action Plan Number</td><td>Enter the Incident Action Plan number (derived sequentially by the incident bases) pertaining to the operational period for which this form applies. Incident Action Plans sent to Incident Commanders from the EOT are listed sequentially as “EOT-1, 2, 3…” (E.g., EOT-1, EOT-2, etc.)</td></tr>
<tr><td>B. Incident Base or Field Report Number</td><td>Enter the Incident Base or Field report number, which is the Location/Function Code (see the table in Block 1) followed by a sequential number for each new report. (E.g., WC-1, WC-2, etc.)</td></tr>
<tr><td>4</td><td>Operational Period
• Date, Time</td><td>Enter the time interval for which the form applies. Record the start time and end time, using the 24-hour clock, and include date(s) (e.g., 07/01/11, 1700 to 07/14/11, 0930).

<table><tr><td>0000 = 12:00 AM</td><td>1200 = 12:00 PM</td></tr><tr><td>0100 = 1:00 AM</td><td>1300 = 1:00 PM</td></tr><tr><td>0200 = 2:00 AM</td><td>1400 = 2:00 PM</td></tr><tr><td>0300 = 3:00 AM</td><td>1500 = 3:00 PM</td></tr><tr><td>0400 = 4:00 AM</td><td>1600 = 4:00 PM</td></tr><tr><td>0500 = 5:00 AM</td><td>1700 = 5:00 PM</td></tr><tr><td>0600 = 6:00 AM</td><td>1800 = 6:00 PM</td></tr><tr><td>0700 = 7:00 AM</td><td>1900 = 7:00 PM</td></tr><tr><td>0800 = 8:00 AM</td><td>2000 = 8:00 PM</td></tr><tr><td>0900 = 9:00 AM</td><td>2100 = 9:00 PM</td></tr><tr><td>1000 = 10:00 AM</td><td>2200 = 10:00 PM</td></tr><tr><td>1100 = 11:00 AM</td><td>2300 = 11:00 PM</td></tr></table></td></tr>
<tr><td>5</td><td>Date & Time Prepared
• Date, Time</td><td>Enter the date and time this report was prepared, using the 24-hour clock (e.g., 07/13/11, 1305).</td></tr>
<tr><td>6</td><td>Sketch/Map/Photo</td><td>Show perimeter and other graphics depicting situational status, resource assignments, incident facilities, and other special information on a map/sketch or with attached maps. Utilize commonly accepted ICS map symbology. North should be at the top of page unless noted otherwise.

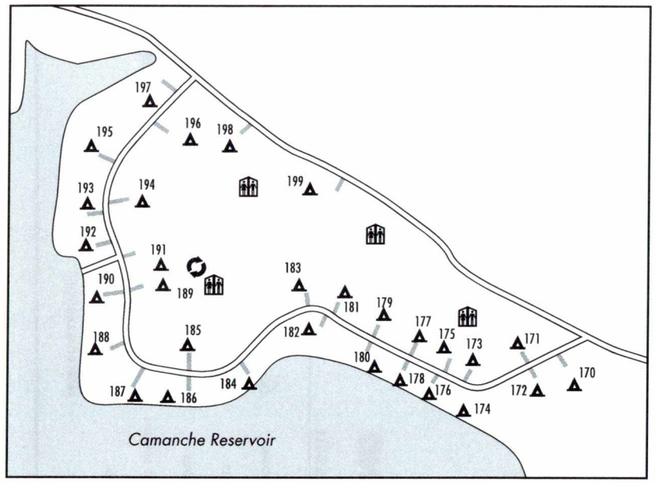
Note: Unlock the form to insert a map and/or photo. Remember to lock the form before continuing on to the next block.</td></tr>
<tr><td>7</td><td>Safety and Health Briefing</td><td>Protect responders by briefing potential Incident Health and Safety Hazards and develop necessary risk reduction/mitigation measures through the use of engineering controls, administrative controls, and personal protective equipment. When the complexity of the response warrants it, the Incident Commander requests a Safety Officer, who completes the ICS 208 and ICS 215A.</td></tr>
<tr><td>8</td><td>Current and Planned Objectives</td><td>Enter the objectives used on the incident and note any specific problem areas. If additional pages are needed, use a blank sheet or a blank ICS 201 (Page 2), and adjust the numbering sequence of the objectives and the page numbers accordingly.</td></tr>
<tr><td>9</td><td>Operational Period Actions, Strategies, and Tactics linked to Objectives</td><td>Enter the current and planned actions, strategies, and tactics linked to the objectives in Box 8 (Current and Planned Objectives). If additional pages are needed, use a blank sheet or a blank ICS 201 (Page 2), and adjust the numbering sequence of the tasks and the page numbers accordingly.</td></tr>
<tr><td>10</td><td>ICS Organization Assignments</td><td>• Handwrite the names of the individuals assigned to each position on the organization chart.
• Fill in the table below the organization chart with the position title and name of other designated positions.
• If Unified Command is being used, split the Incident Commander (IC) box and handwrite the names and agencies of the ICs from the other jurisdictions.</td></tr>
</table>

INCIDENT BRIEFING (ICS 201)

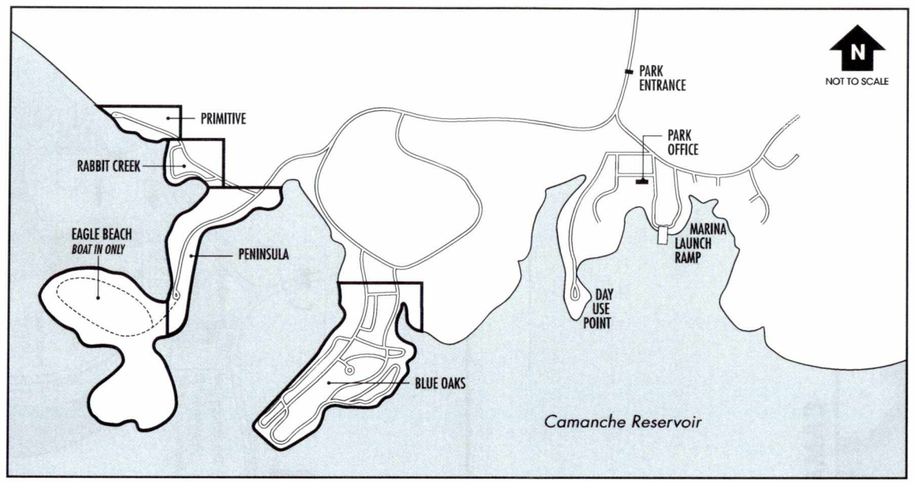
Block Number	Block Title	Instructions
11	Situation Status Summary	Provide updates on the Critical Elements of Information. Enter assessment of the situation by checking the box that most predicts incident status. Then highlight situation changes by reviewing previous ICS 201, Activity Log (ICS 214), other briefings, information from local jurisdiction, and from the Incident Base/EOC. Finally, describe any new situation status of assigned tasks, personnel, and equipment to provide a Common Operating Picture to everyone.
12	Resource Summary	Enter the following information about the resources requested/allocated to the incident. If additional pages are needed, use a blank sheet or a blank ICS 201 (Page 4), and adjust the page numbers accordingly.
	• Item Number	Enter the number of resource ordered sequentially, starting with number one.
	• Resource Requested	Enter the description of resource ordered.
	• Type/Kind	Enter the type/kind (if known). • *Type* refers to one of the four levels of resource capability (Type I, II, III, and IV). Capability defines the resource's attributes (size, capacity, power). A Type I resource has the greatest capability; a Type IV has the least. A large diameter repair crew is a Type I crew, while service lateral repair teams are Type IV. • *Kind* refers to broad categories of resources, such as vehicles (pick-up truck, dump truck, etc.); supplies (fuel, food, etc.); and personnel (Strike Team, Task Force, Individual, etc.).
	• Date/Time Ordered	Enter the date and time the resource was ordered, using the 24-hour clock (e.g., 07/13/11, 1305).
	• Date/Time Arrived	Enter the date and time the resource arrived to the incident site, using the 24-hour clock (e.g., 07/13/11, 1305).
	• Date/Time Departed	Enter the date and time the resource departed from the incident site, using the 24-hour clock (e.g., 07/13/11, 1305).
	• Work Location Assignment/Status	Enter notes such as the assigned location of the resource and/or the actual assignment and status.
First Page Footer	Prepared by • Name, Position/Title • Signature Approved by Incident Commander • Name • Signature	Handwrite the name, ICS position/title, and obtain the signature of the person preparing the form. Handwrite the name and obtain the signature of the Incident Commander before this form is submitted.

CAMANCHE NORTH SHORE CAMPGROUNDS

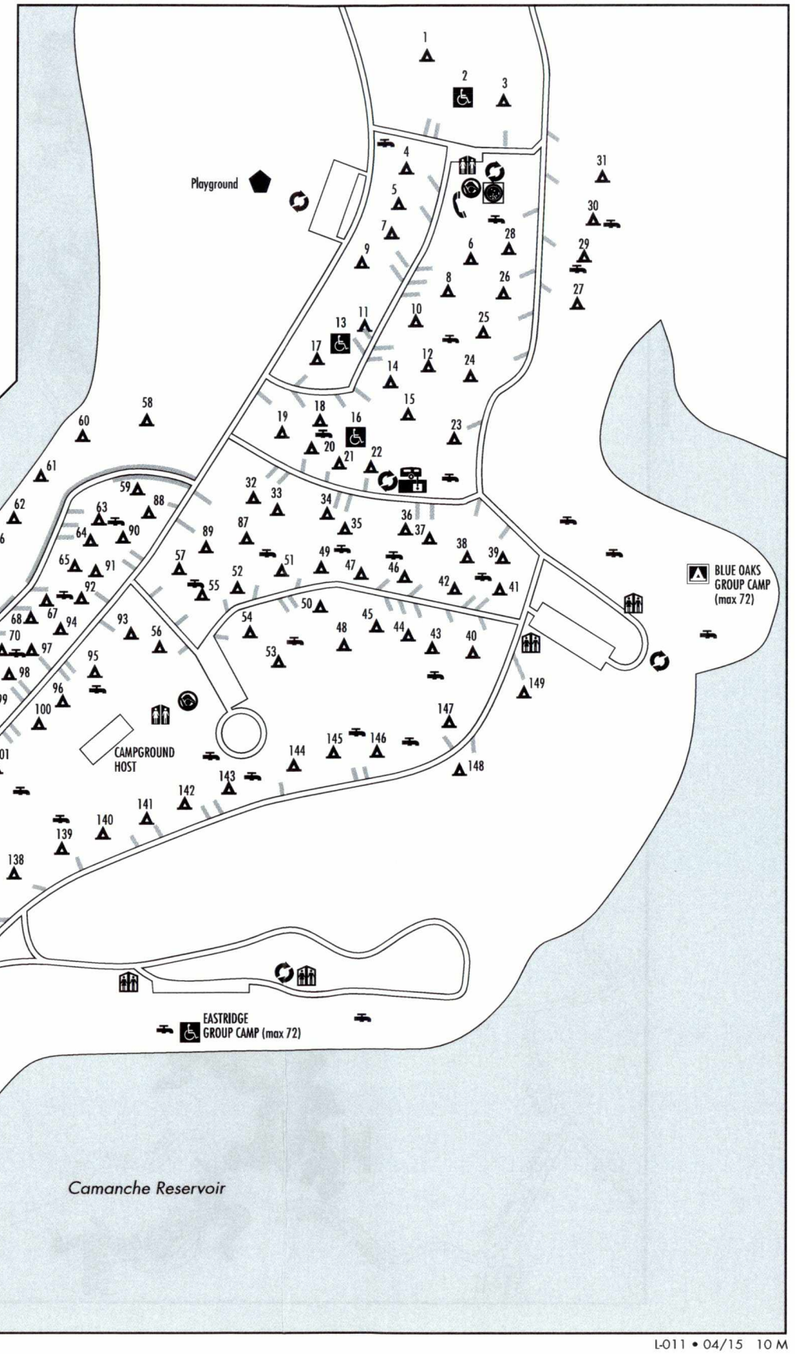
RABBIT CREEK 170–199



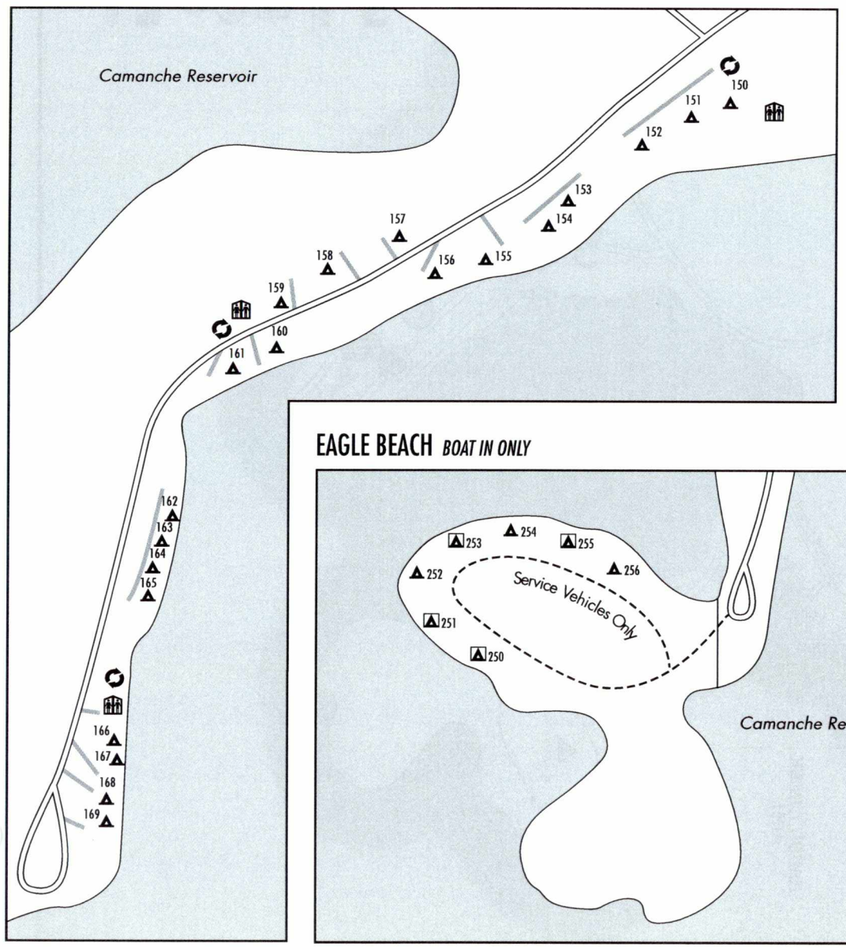
LOCATION MAP - NORTH



BLUE OAKS 1–149



PENINSULA 150-169

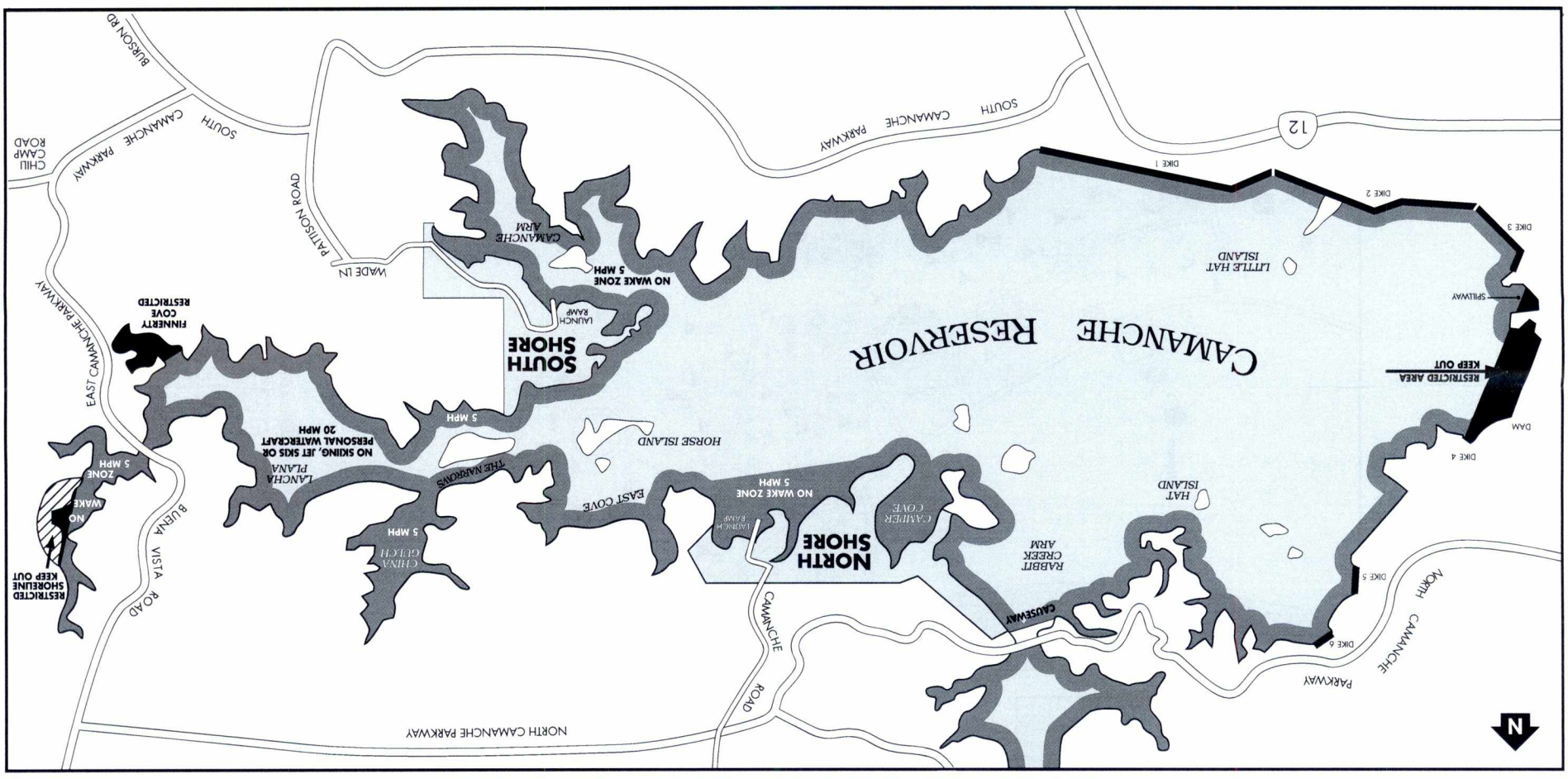


LEGEND

CAMPSITES
- SINGLE
- DOUBLE
- TRIPLE
- QUAD
- GROUP
- DISABLED

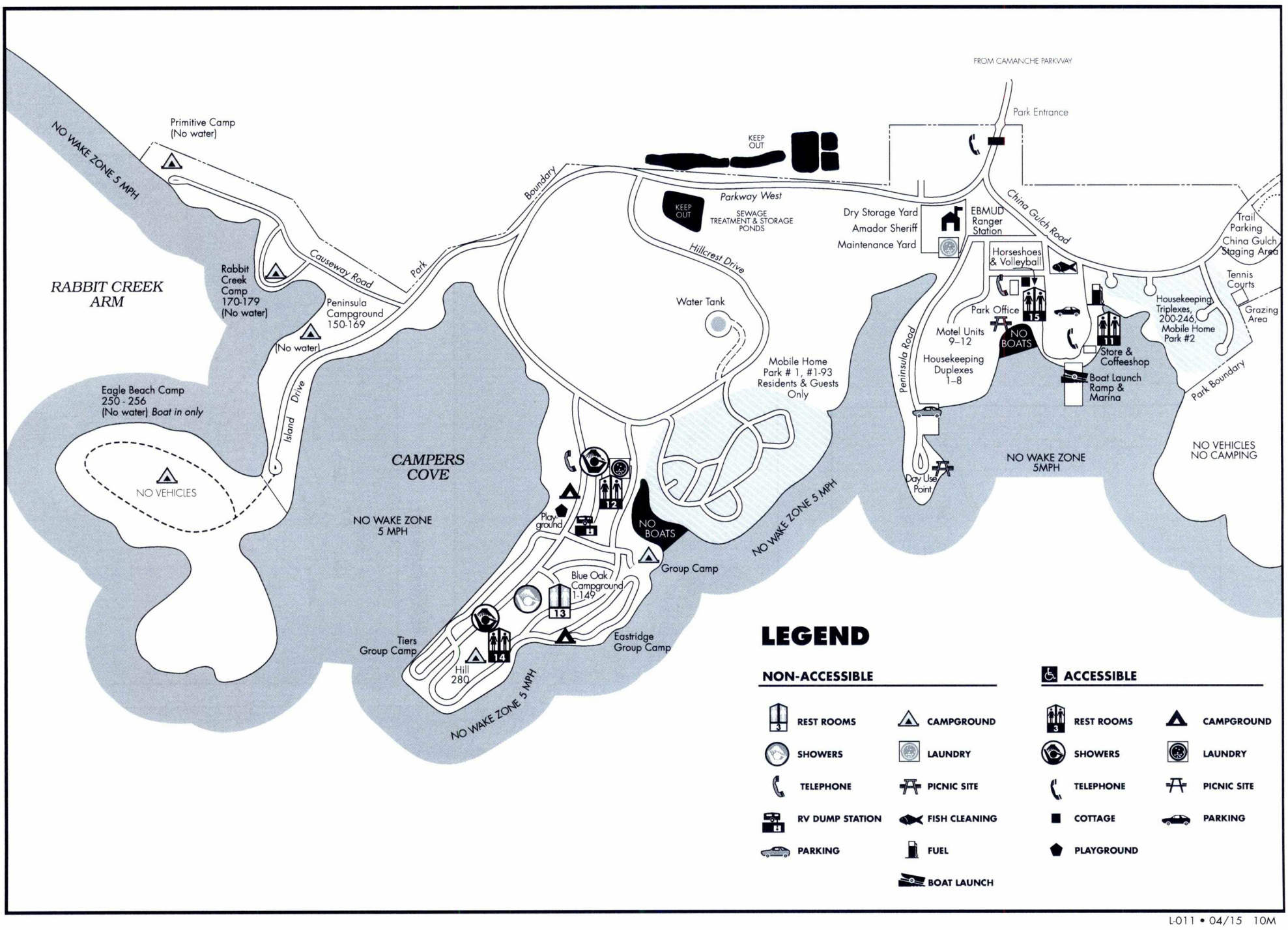
AMENITIES
- RESTROOMS
- SHOWERS
- WATER
- RV DUMP STATION
- RECYCLING STATION
- PLAYGROUND
- PORTABLE TOILET
- LAUNDRY

EAGLE BEACH *BOAT IN ONLY* 250-256



CAMANCHE RESERVOIR RECREATION AREAS

CAMANCHE NORTH SHORE



LEGEND

NON-ACCESSIBLE

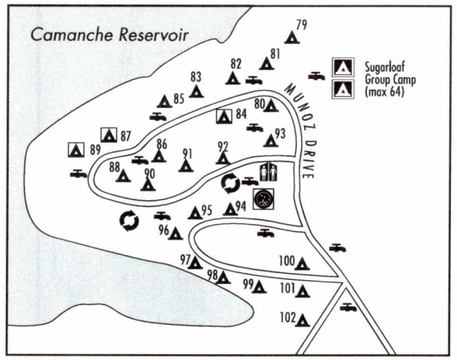
- REST ROOMS
- SHOWERS
- TELEPHONE
- RV DUMP STATION
- PARKING
- CAMPGROUND
- LAUNDRY
- PICNIC SITE
- FISH CLEANING
- FUEL
- BOAT LAUNCH

ACCESSIBLE

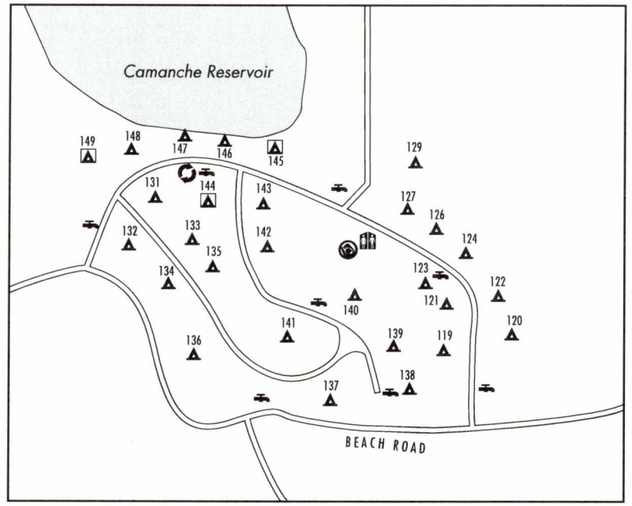
- REST ROOMS
- SHOWERS
- TELEPHONE
- COTTAGE
- PLAYGROUND
- CAMPGROUND
- LAUNDRY
- PICNIC SITE
- PARKING

CAMANCHE SOUTH SHORE CAMPGROUNDS

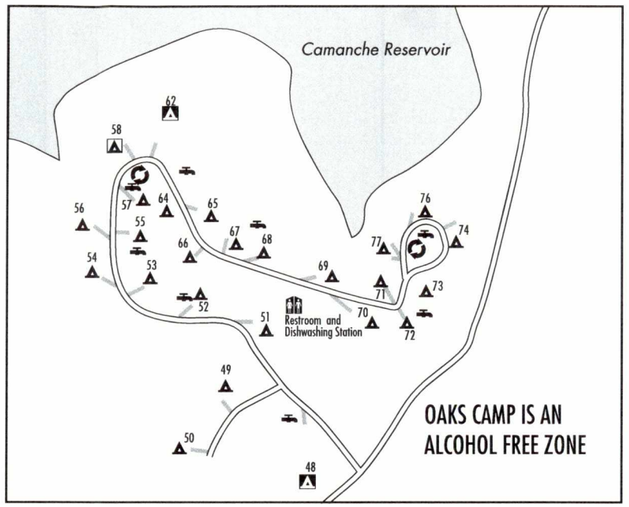
SUGARLOAF 79–102



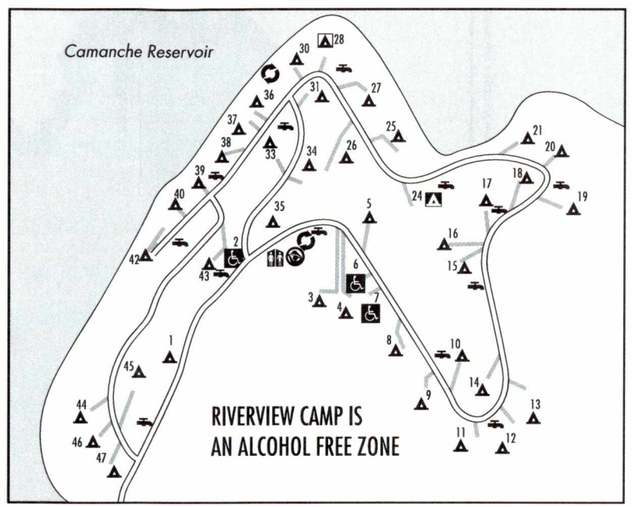
CAMANCHE & ARROWHEAD 119–149



OAKS 48–77



RIVERVIEW 1–47



LEGEND

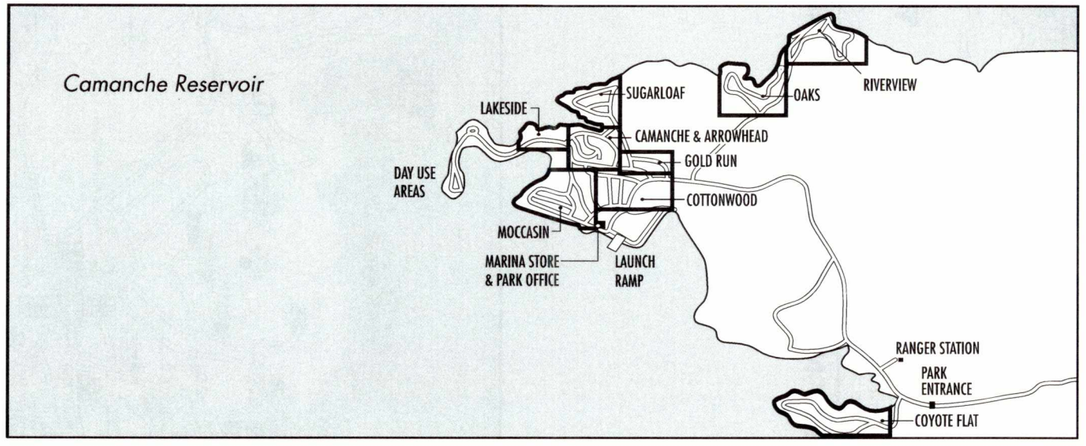
CAMPSITES

- SINGLE
- DOUBLE
- TRIPLE
- QUAD
- GROUP
- DISABLED

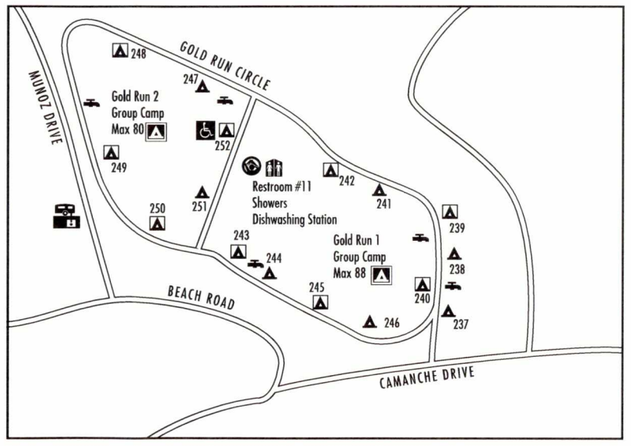
AMENITIES

- RESTROOMS
- PORTABLE TOILET
- SHOWERS
- LAUNDRY
- WATER
- RV DUMP STATION
- RECYCLING STATION
- PLAYGROUND

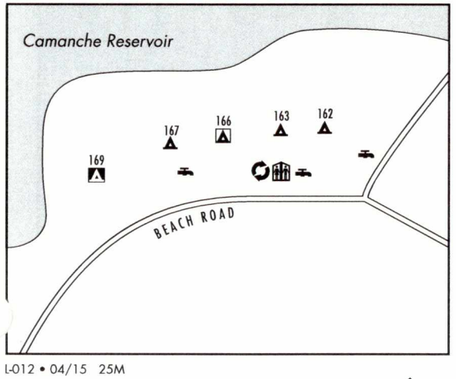
LOCATION MAP - SOUTH



GOLD RUN 237-251



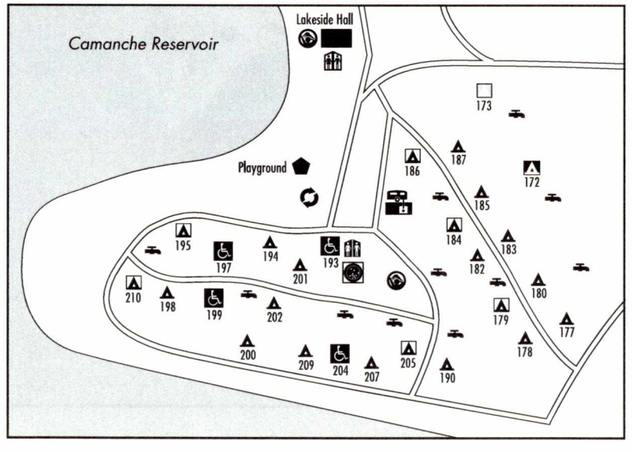
LAKESIDE 162–169



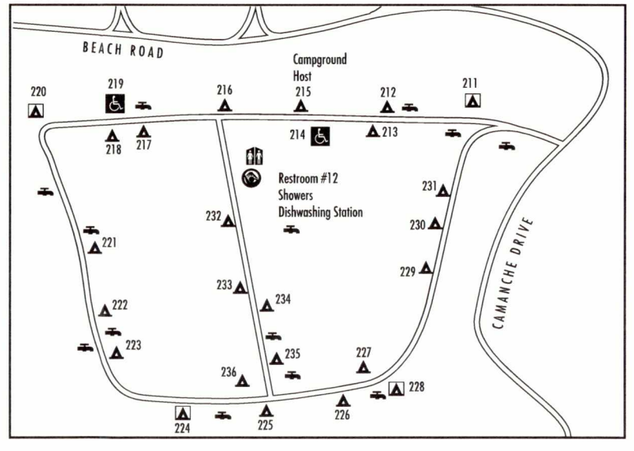
L-012 • 04/15 25M

N
NOT TO SCALE

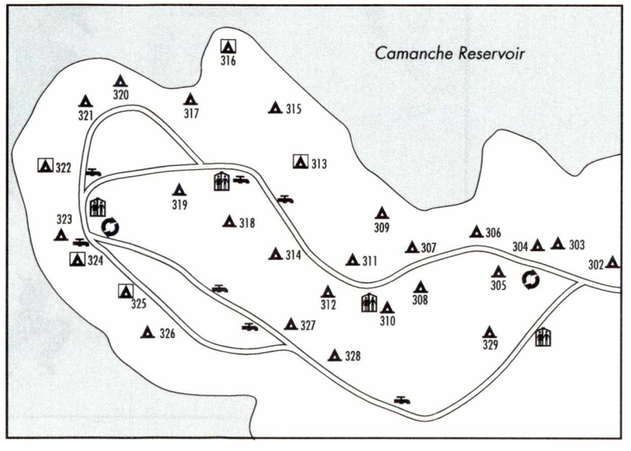
MOCCASIN 172–210



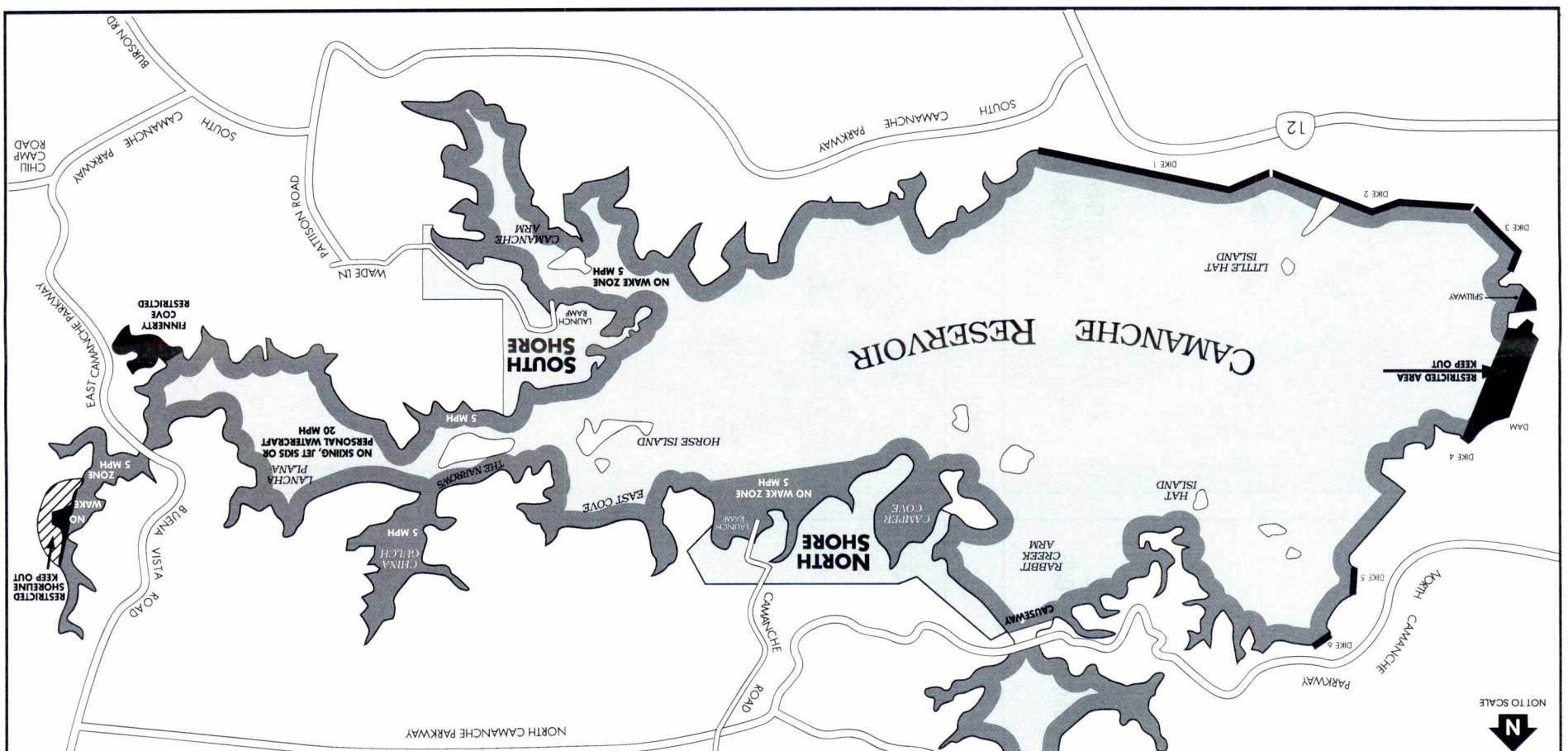
COTTONWOOD 211–236



COYOTE FLAT 302–329

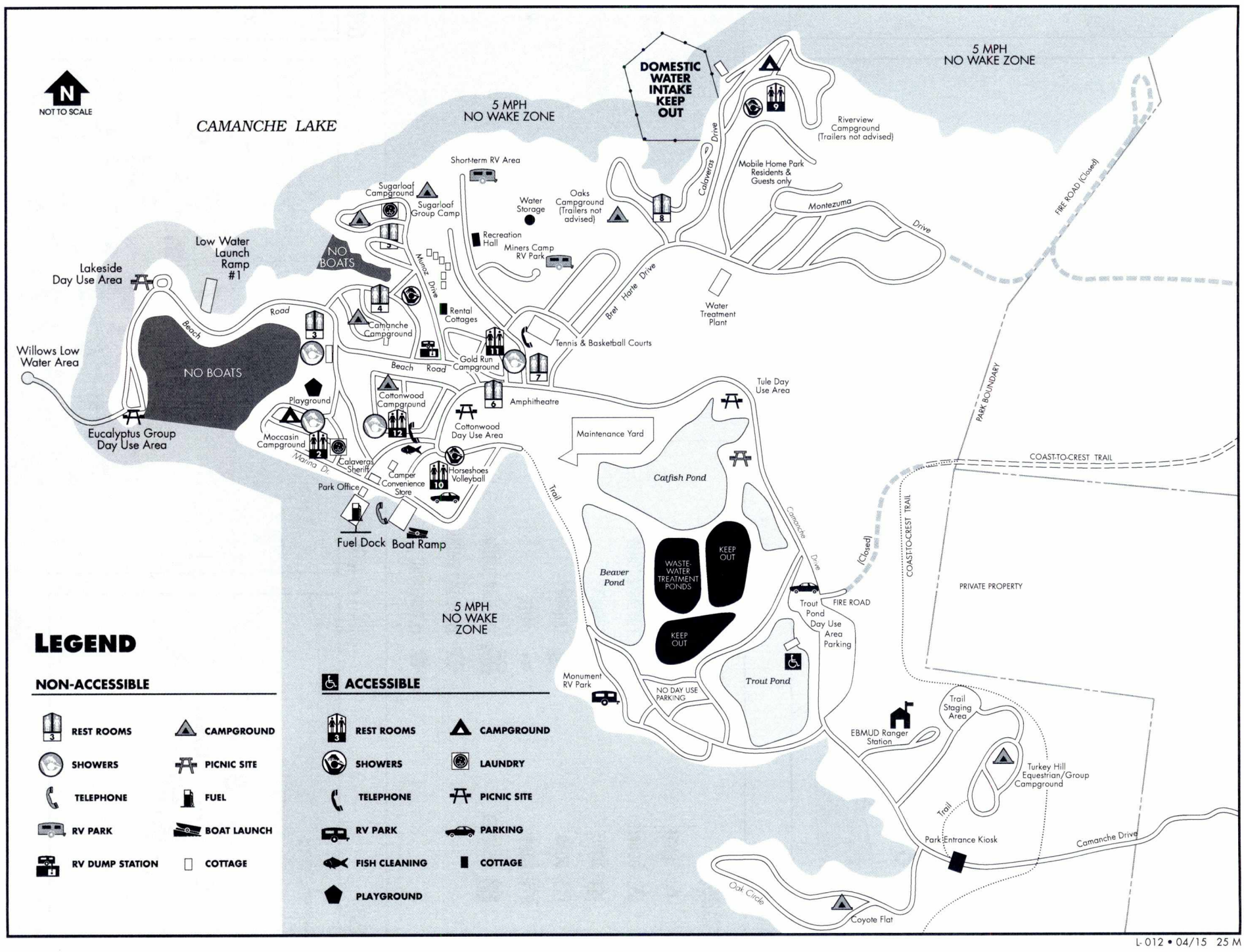


SPEED ZONES MAY FLUCTUATE WITH LAKE ELEVATION • SPEED LIMIT IS 5MPH – NO WAKE WITHIN 200' OF ALL SHORELINES



CAMANCHE RESERVOIR RECREATION AREAS

CAMANCHE SOUTH SHORE



L-012 • 04/15 25 M

Appendix 6-1

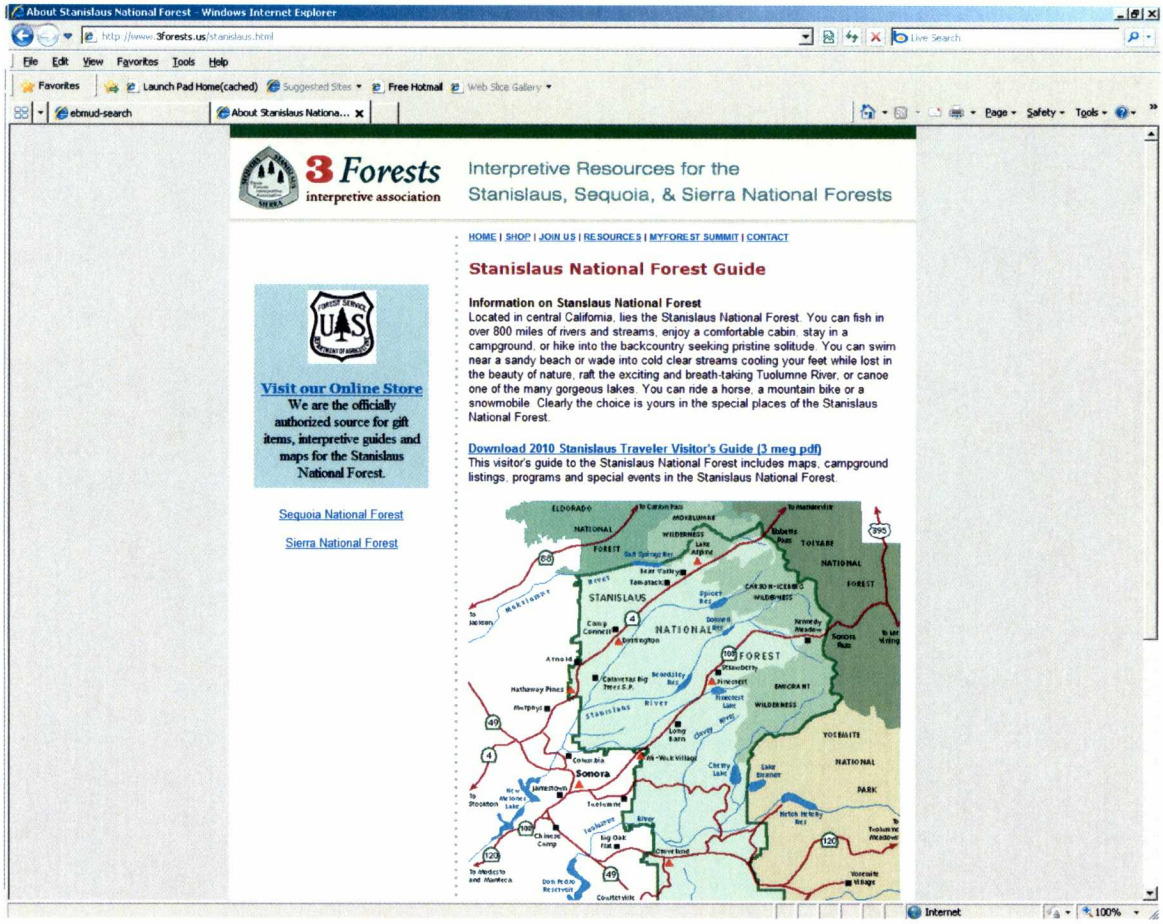
National Forest and Wilderness Map

Source: http://www.3forests.us/stanislaus.html

Three-Forests Interpretive Association [3-FIA] is a non-profit educational organization that helps visitors and users of the Stanislaus, Sequoia and Sierra National Forests.

National Forest and Wilderness Map





http://www.3forests.us/stanislaus.html

Appendix 6-2

BLM Maps, Sierra Resource Management Plan, Mokelumne River
Motorized Vehicle Route Designations
Recommended Wild & Scenic River

Source:
http://www.blm.gov/style/medialib/blm/ca/pdf/folsom/ohv.Par.65438.File.dat/routes_11x17_rodmap6e.pdf

R10E R11E R12E R13E R14E R15E

T7N T6N T5N T4N

Amador City
Pine Grove
Pioneer
West Point
Jackson
Mokelumne Hill
Rail Road Flat
Arnold

Sutter Creek
Amador Co
Jackson Creek
Mokelumne River
Calaveras Co
North Fork Calaveras River
North Fork Mokelumne River
Middle Fork Mokelumne River
South Fork Mokelumne River
Little Mokelumne River
Pardee Reservoir
Jesus Maria Creek
Calaveritas Creek
San Antonio Creek
Murray Creek
Moran Creek

Lily Gap-Happy Valley Connector Road
Eganhoff Lane
Silver Mountain Road
Ponderosa Way
(street legal vehicles only)
Indian River Road
(street legal vehicles only)
Summit Level Ridge Access Road

104 88 49 26 4

0 1 2 4 6 8 Miles

R10E R11E R12E R13E R14E R15E

E

Bureau of Land Management
Designated Interim Route
Designated Open Route

Sierra Resource Management Plan

Motorized Vehicle Route Designations

Mokelumne River Area
BLM Sierra RMP

US Department of the Interior
BUREAU OF LAND MANAGEMENT
Folsom Field Office
Folsom, California
(916) 985-4474
www.ca.blm.gov/folsom
Date Prepared: 12/12/2007
Project: routes_11x17_rodmap6e.mxd

R10E R11E R12E R13E R14E R15E

T7N T6N T5N T4N

Pioneer

No Classification

North Fork Mokelumne River

Recreation
Classification (3.04 mi.)

Amador City

Pine Grove

104

88

Sutter Creek

Amador Co

Wild
Classification (9.17 mi.)

Middle Fork Mokelumne River

Jackson

49

Scenic
Classification (2.89 mi.)

Rail Road Flat

26

Recreation
Classification (2.94 mi.)

No Classification

North Fork Calaveras River

Jackson Creek

Mokelumne River

Calaveras Co

Mokelumne Hill

South Fork Mokelumne River

Little Mokelumne River

Pardee Reservoir

Jesus Maria Creek

Calaveritas Creek

San Antonio Creek

4

Arnold

Murray Creek

Moran Creek

N W E S

0 1 2 4 6 8 Miles

R11E R12E R13E R14E R15E

Bureau of Land Management

County Line

River Segment Classification

No Classificaion

Recreation

Scenic

Wild

Sierra Resource Management Plan
Recommended Wild & Scenic River
Main and North Fork Mokelumne
BLM Sierra RMP

US Department of the Interior
BUREAU OF LAND MANAGEMENT
Folsom Field Office
Folsom, California
(916) 985-4474
www.ca.blm.gov/folsom
Date Prepared: 11/8/2007
Project: wsr_recommended_11x17_rodmap8b.mxd

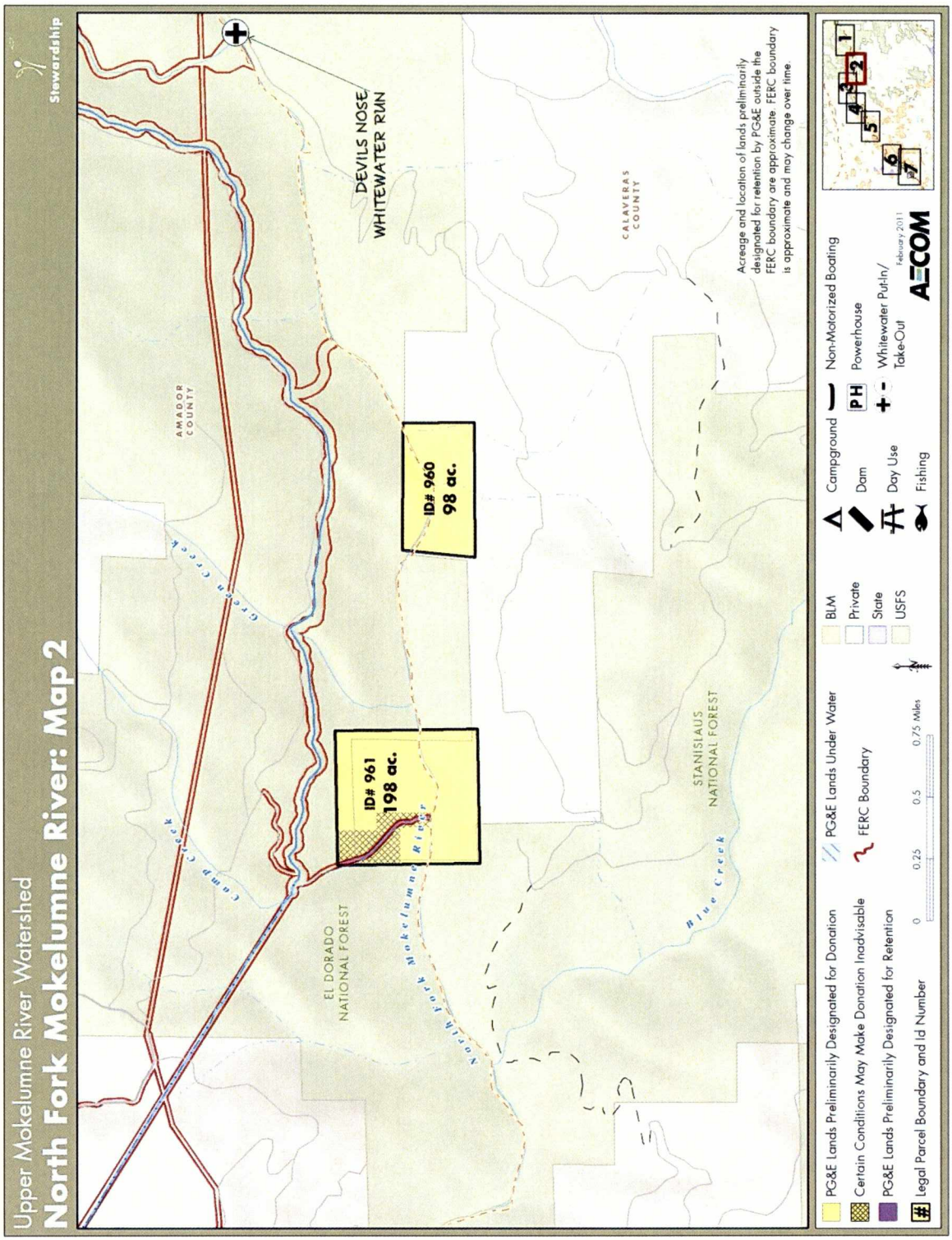
Appendix 6-3

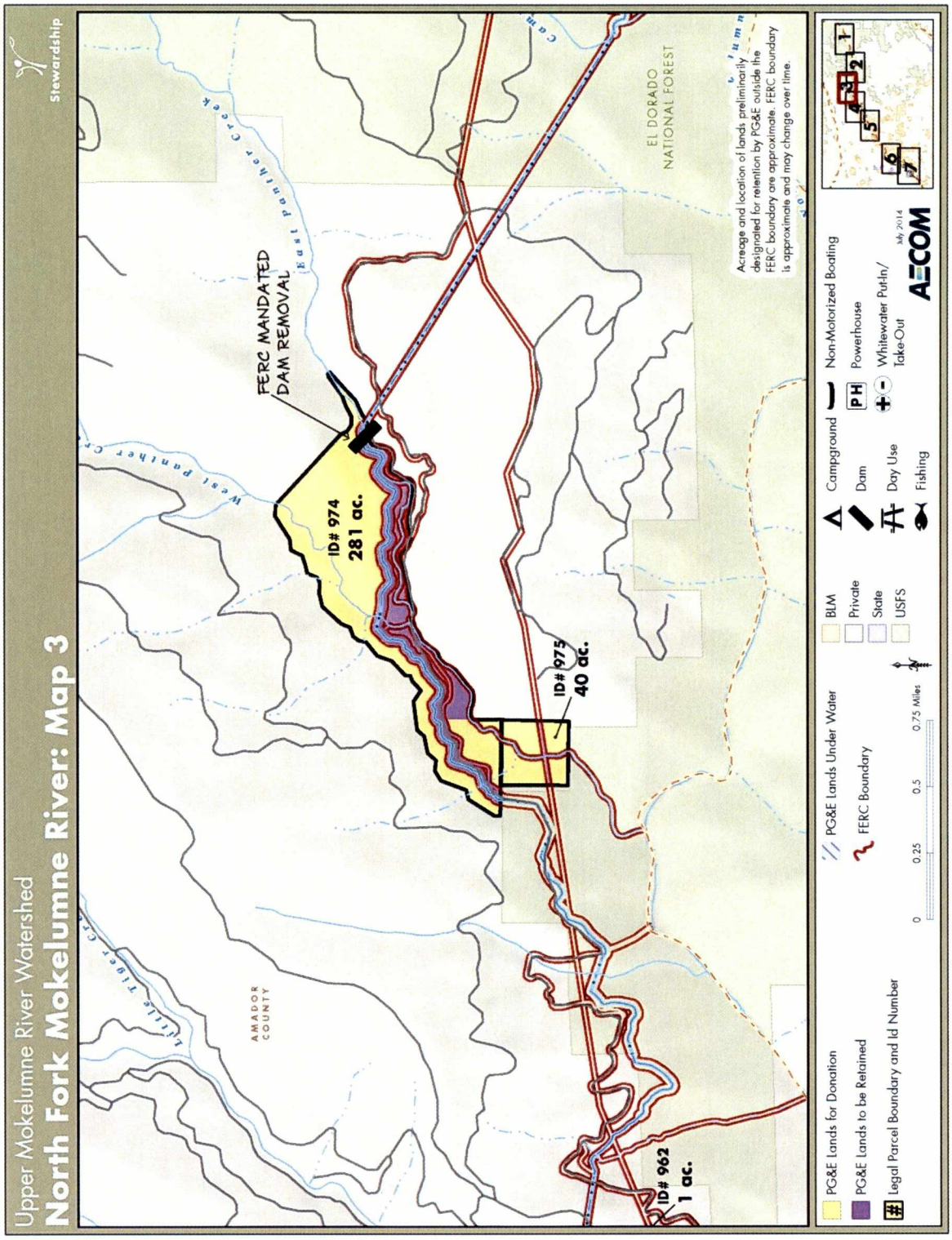
Stewardship Council

Final Land Conservation and Conveyance Plan (LCCP) excerpts:

- North Fork Mokelumne River Planning Unit, Maps (3 pages)
- Lower Bear Area Planning Unit, Map (1 page)
- Blue Lakes Planning Unit, Map (1 page)

Exhibit 1. Map of the Property




Upper Mokelumne River Watershed
North Fork Mokelumne River: Map 3
Stewardship
FERC MANDATED DAM REMOVAL
ID# 974
281 ac.
ID# 975
40 ac.
ID# 962
1 ac.
EL DORADO NATIONAL FOREST
AMADOR COUNTY
West Panther Creek
East Panther Creek
Little Tiger Creek
Acreage and location of lands preliminarily designated for retention by PG&E outside the FERC boundary are approximate. FERC boundary is approximate and may change over time.
PG&E Lands for Donation
PG&E Lands to be Retained
Legal Parcel Boundary and Id Number
PG&E Lands Under Water
FERC Boundary
BLM
Private
State
USFS
Campground
Dam
Day Use
Fishing
Non-Motorized Boating
Powerhouse
Whitewater Put-In/ Take-Out
0
0.25
0.5
0.75 Miles
May 2014
AECOM

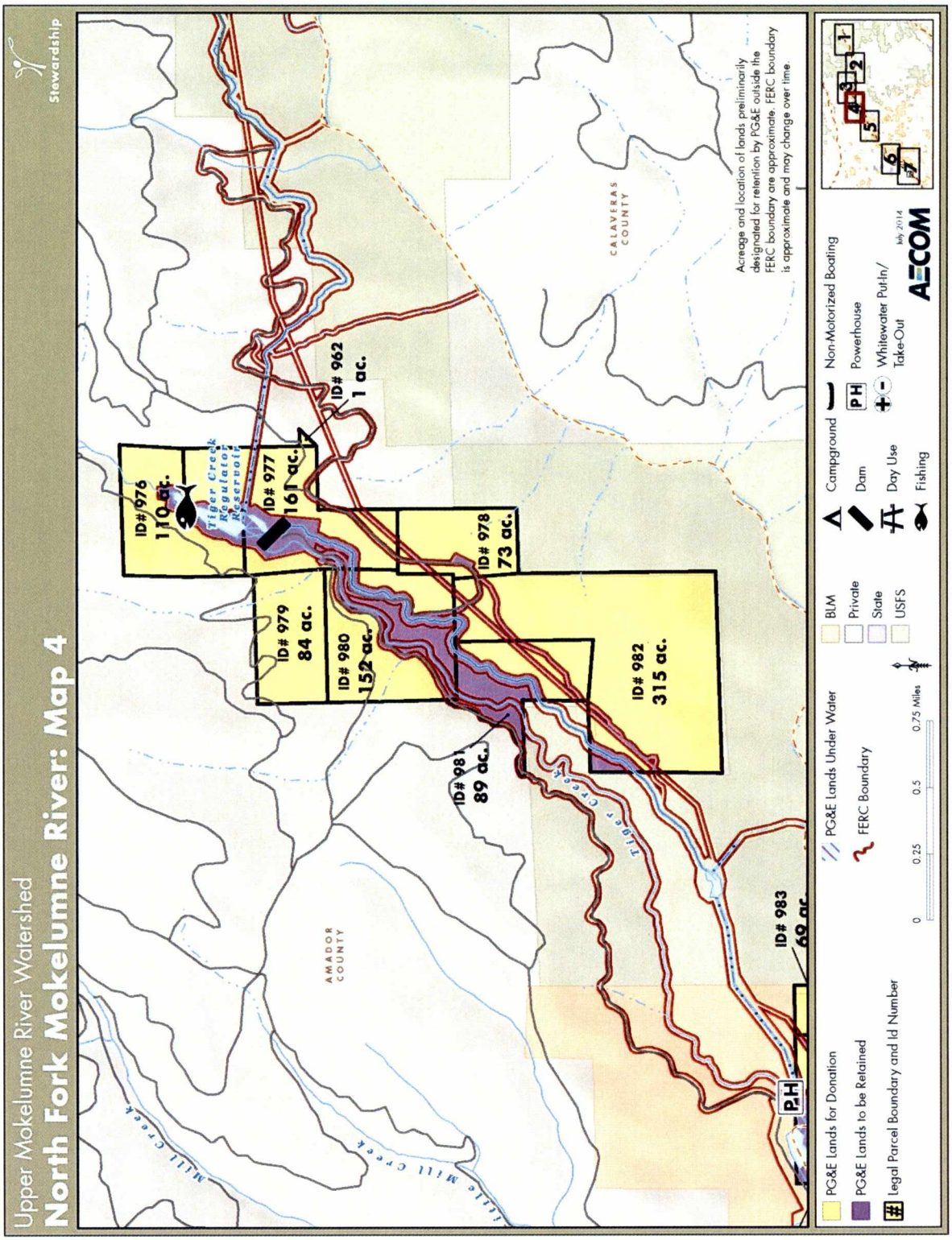

Upper Mokelumne River Watershed
North Fork Mokelumne River: Map 4
Stewardship
ID#976
110 ac.
Tiger Creek Regulator Reservoir
ID# 977
161 ac.
ID# 962
1 ac.
ID# 978
73 ac.
ID# 979
84 ac.
ID# 980
152 ac.
ID# 982
315 ac.
ID# 981
89 ac.
ID# 983
69 ac.
AMADOR COUNTY
CALAVERAS COUNTY
Little Mill Creek
Mill Creek
Tiger Creek
PH
Acreage and location of lands preliminarily designated for retention by PG&E outside the FERC boundary are approximate. FERC boundary is approximate and may change over time.
PG&E Lands for Donation
PG&E Lands to be Retained
Legal Parcel Boundary and Id Number
PG&E Lands Under Water
FERC Boundary
BLM
Private
State
USFS
Campground
Dam
Day Use
Fishing
Non-Motorized Boating
Powerhouse
Whitewater Put-In/ Take-Out
0
0.25
0.5
0.75 Miles
July 2014
AECOM

Exhibit 1. Map of the Property

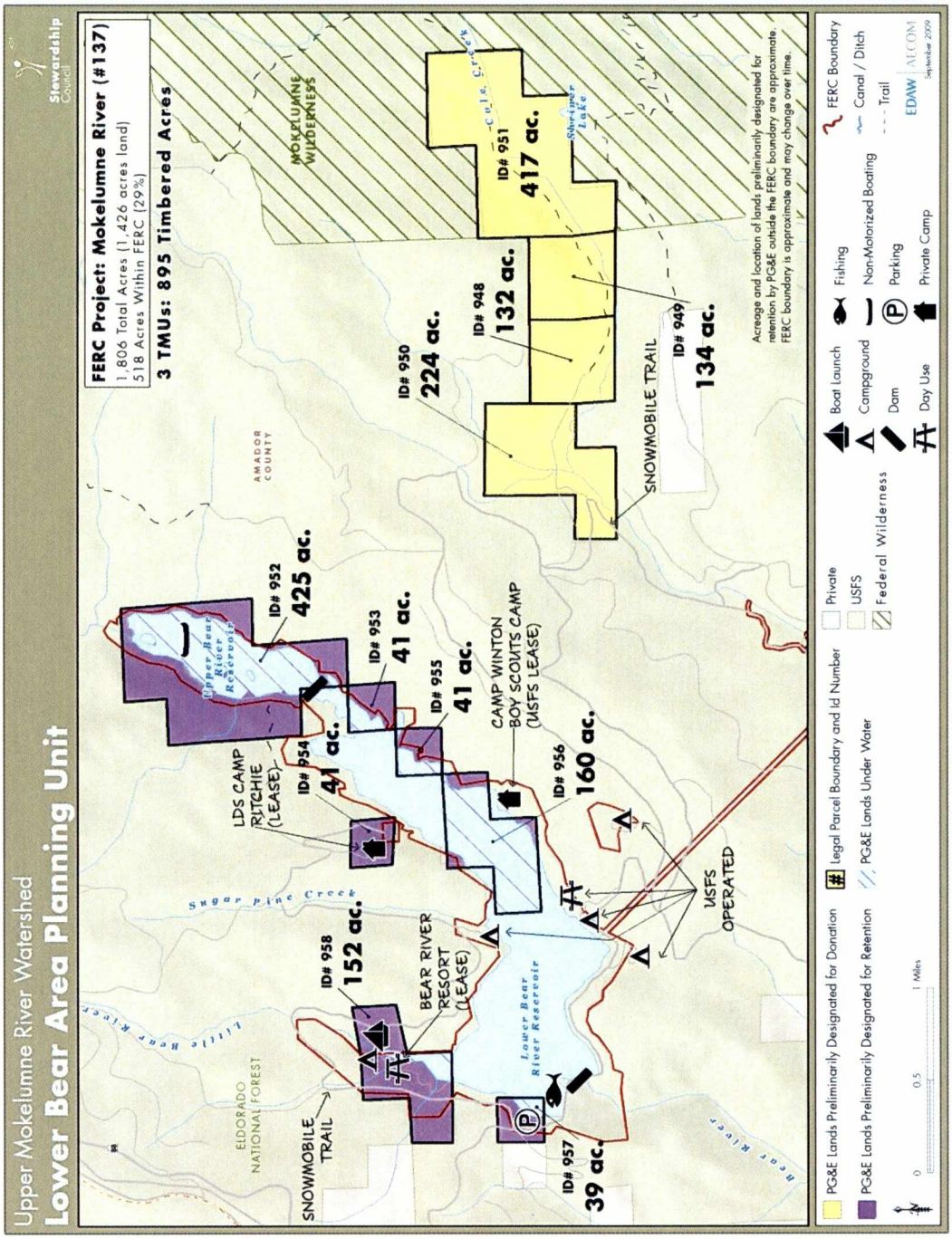
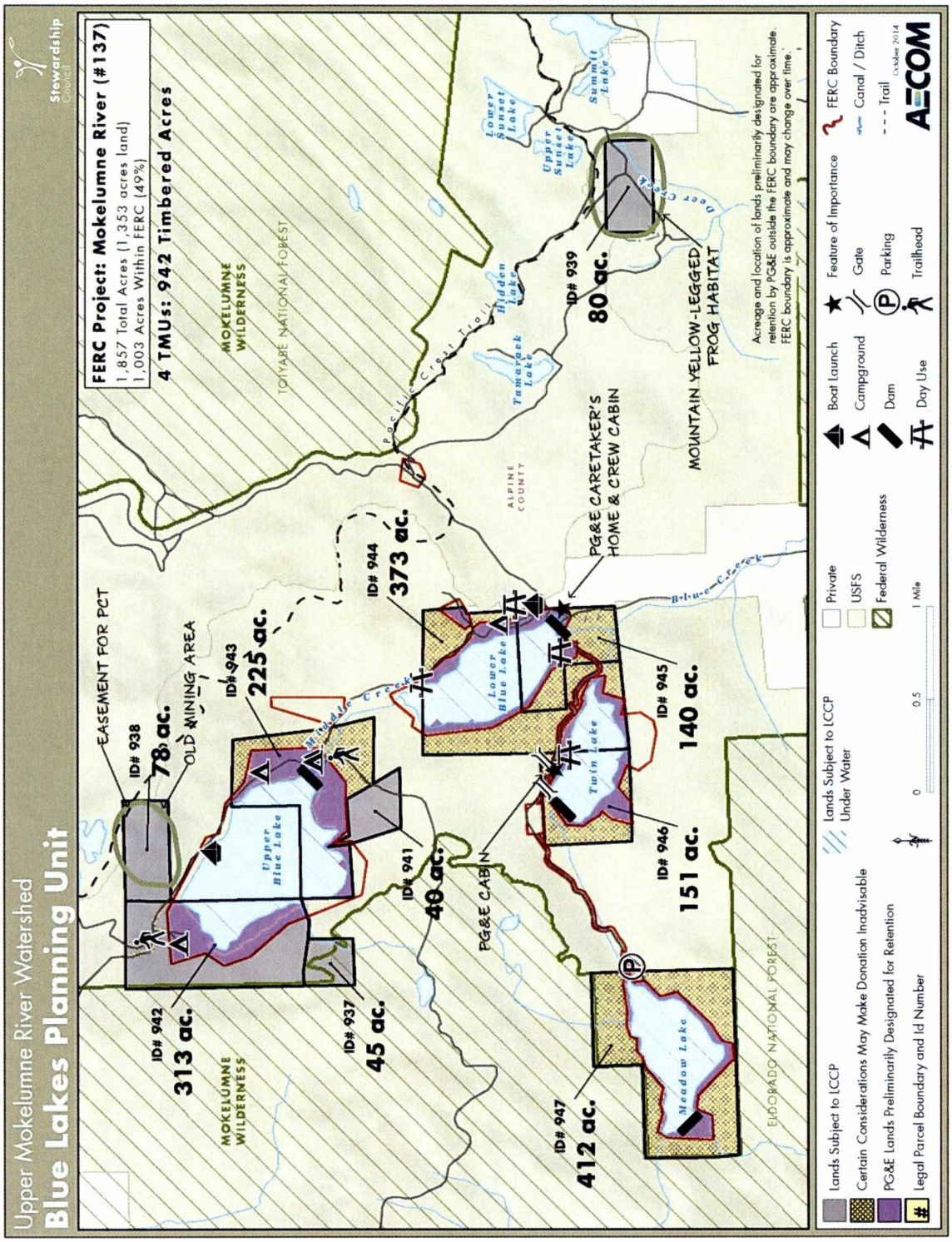


Exhibit 1. Map of the Property



Appendix 6-4 Signs & EBMUD Trail Permit Requirements



Signs Posted Along Public Road, Area of Illegal Dumping

Appendix 6-4 Signs & EBMUD Trail Permit Requirements







Signs Posted on EBMUD Property, Education Recreational Users

Appendix 6-4 Signs & EBMUD Trail Permit Requirements

TRAIL USER SHALL

1. Sign in on Trail Register form (at Staging Area) prior to using EBMUD trails.
2. Have in their possession at all times a valid Trail Use Permit or be accompanied by a valid permit holder.
3. Exhibit and/or surrender permit upon request of an EBMUD Ranger, County/Local Law Enforcement Officer, or any other person duly authorized by EBMUD.
4. Stay on designated trails.
5. Use trails between sunrise and sunset only.
6. Close all gates after passing through them.
7. Use only designated restroom facilities.
8. Carry out and properly dispose of all litter.
9. Remove and dispose of all animal waste products (generated from trail user's animal) from staging area.
10. Report unsafe conditions or other hazards to EBMUD.
11. Keep dogs adequately leashed and controlled at all times when hiking on designated dog trails and in staging areas.

TRAIL USER SHALL NOT

1. Smoke while on the trails.
2. Build or light any fire on EBMUD property.
3. Make body contact with the waters of any reservoir or tributary stream on EBMUD property, except at Camanche Reservoir and the Mokelumne River Day Use Area.
4. Fish from any reservoir or tributary stream on EBMUD property.
5. Disturb livestock, wildlife, or vegetation on EBMUD property.
6. Bring pets, firearms, motorized vehicles, stallions or colts onto EBMUD trails.
7. Damage or destroy any EBMUD property; including (but not limited to) gates, fences, signs, locks, structures, buildings, etc.
8. Ride or lead any saddle or pack animal in a manner that might endanger any person or animal, or allow any such animal to stand unattended or untethered on EBMUD property.
9. Permit any saddle or pack animal to swim or wade in any reservoir or tributary stream on EBMUD property.
10. Ride a bicycle on any portion of the watershed closed to bicycle use.
11. Use any other EBMUD recreational facilities without paying applicable fees.
12. Use conveyances with wheels, tracks, or skids on unpaved roads or trails.



Appendix 6-5

Waste Discharge Requirements Order & Associated Documents

Examples:

Camanche North Shore Recreation Area, General Waste Discharge Requirements Order for Dewatering and Other Low Threat Discharges to Surface Waters

Pardee Reservoir Recreation Area, Limited Threat General Waste Discharge Requirements Order

Associated Documents:

- Best Management Practices, Water Treatment Plant, Pardee Recreation Area
- Salinity Management Plan for Limited Threat Discharge, Pardee Recreation Area, Water Treatment Plant,

Linda S. Adams
Secretary for Environmental Protection

California Regional Water Quality Control Board
Central Valley Region

Karl E. Longley, ScD, P.E., Chair

11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
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http://www.waterboards.ca.gov/centralvalley

Arnold Schwarzenegger
Governor

15 December 2008

Mr. John H. Schroeter, P.E.
Manager of Environmental Compliance
East Bay Municipal Utility District
375 Eleventh Street
Oakland, CA 94607-4240

CERTIFIED MAIL
7008 1140 0002 8806 2405

NOTICE OF APPLICABILITY; GENERAL WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2008-0081; DEWATERING AND OTHER LOW THREAT DISCHARGES TO SURFACE WATERS; CAMANCHE NORTH SHORE RECREATION AREA, AMADOR COUNTY

Our office received a Notice of Intent (NOI) on 12 September 2008 from the East Bay Municipal Utility District (Discharger) for the Camanche North Shore Recreation Area Project. Based on the information in the submittal, we have determined that the project meets the required conditions for approval under the General Order for Dewatering and Other Low Threat Discharges to Surface Waters (General Order No. R5-2008-0081). This project is hereby assigned General Order No. R5-2008-0081-018 and National Pollutant Discharge Elimination System (NPDES) Permit No. CAG995001.

CALIFORNIA TOXIC RULE / STATE IMPLEMENTATION POLICY SAMPLING

General Order No. R5-2008-0081 (enclosed) prescribes mandatory discharge monitoring requirements. The project activities shall be operated in accordance with the requirements contained in the General Order and with the information submitted by the Discharger. This General Order incorporates the requirements of the *California Toxic Rule (CTR) and the State Water Resources Control Board's (State Water Board), Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California, 2005*, also know as the *State Implementation Policy* (SIP). The Discharger requested a categorical exception to the requirement for meeting the CTR pollutant criteria in the General Order, as authorized by Section 5.3 of the SIP. The Discharger certified that its discharges are necessary to implement drinking water control measures conducted to fulfill statutory requirements under the federal Safe Drinking Water Act and the California Health and Safety Code.

PROJECT DESCRIPTION

The Discharger operates the Camanche North Shore Recreation Area water treatment plant which currently provides potable water to a cafe, camping and recreation facilities, the marina, and two mobile home parks. The Recreation Area is located on the north shore of Camanche Reservoir in Amador County. The discharge consists of backwash water from the water treatment plant filters. The backwash water is discharged to two unlined storage ponds operated in series. Discharge to Camanche Reservoir only occurs when the storage pond overflows during wet weather conditions.

MONITORING AND REPORTING

Quarterly Reports shall be submitted to the Regional Water Board by the first day of the second month following each calendar quarter. Reporting requirements are found in Attachment E.

According to the Clean Water Act Section 303(d), Camanche Reservoir is impaired for copper and zinc. One time monitoring of the discharge for copper, zinc, and hardness is required upon initial discharge. Method detection limits shall be below the corresponding screening level in Attachment B, Section II of the General Order. If the lowest minimum level (ML) published in Appendix 4 of the SIP is not below the screening level, the detection limit shall be the lowest ML.

GENERAL INFORMATION AND REQUIREMENTS

The Discharger will be required to follow their Pollution Prevention and Monitoring and Reporting Plan. Effluent and receiving water monitoring of this dewatering/low threat discharge shall be conducted and submitted to the Regional Water Board, quarterly, until completion of the project. The Regional Water Board shall be notified immediately if any violation, nuisance or detriment to the receiving water is observed during implementation of the project.

Failure to comply with the conditions of the Effluent Limitations and Receiving Water Monitoring found in the General Order No. R5-2008-0081 could result in an enforcement action as authorized by provisions of the California Water Code. Discharge of material other than what is described in the NOI is prohibited.

The required annual fee (as specified in the annual billing you will receive from the State Water Board) shall be submitted until this NOA is officially terminated. You must notify this office in writing when the project has been completed and the discharge is no longer necessary, so we may terminate applicability of this General Order.

Effective January 2004, any NPDES effluent monitoring report received more that 30 days after its due date is subject to a $3,000 Mandatory Minimum Penalty (MMP) [Water Code Section 13385]. An additional $3,000 MMP is required for each additional 30 days a report is late. If you have no discharge, you must still submit a report indicating that no discharge occurred, or you will be subject to the MMP.

If you have any question or comments regarding this notification, please contact David Kirn at (916) 464-4761 or at dwkirn@waterboards.ca.gov.

PAMELA C. CREEDON
Executive Officer

Enclosure: General Order No. R5-2008-0081

cc: U.S. Environmental Protection Agency, Region IX, San Francisco
U.S. Army Corps of Engineers, Sacramento
Mr. Phil Isorena, Division of Water Quality, State Water Board, Sacramento

EAST BAY MUNICIPAL UTILITY DISTRICT

BEST MANAGEMENT PRACTICES

WATER TREATMENT PLANT
PARDEE RECREATION AREA



July 2009

Prepared by:

Water Supply Division
and
Environmental Compliance Section
Operations and Maintenance Department

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Figure 1: Water Treatment Schematic
Figure 2: Filter Backwash Flow Diagram

Attachment A
Environmental Emergency Response and Release Prevention Plan

Water Treatment Plant
Best Management Practices

The California Regional Water Quality Control Board, Central Valley Region, adopted the General Order No. R5-2008-0082-010, Waste Discharge Requirements for Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water on June 12, 2008. Facilities covered under this permit must develop and implement a site-specific Best Management Practices (BMPs) Plan for controlling pollutant discharges to surface waters. The purpose of the BMPs Plan is to: 1) ensure proper operations and maintenance for storage and handling of chemicals; 2) prevent additional chemicals or other substances from being introduced into the discharge; and 3) prevent the addition of pollutants from other non-permitted process waters, spills, or other sources of pollutants from being introduced into surface waters.

This is the BMPs Plan for the East Bay Municipal Utility District (EBMUD) Pardee Recreation Area Water Treatment Plant (WTP). Described below are:

- Facility Operations;
- Potential Pollutants;
- Pollution Control and Effluent Treatment Methods;
- Chlorine Management; and
- Responsibility and Training

1.0 FACILITY OPERATION

Descriptions of the raw water source, water treatment processes, filter backwashing process, chemical handling procedures, and spill response procedures are summarized in the table and discussed below.

Facility Operations Summary	
Address	4900 Stony Creek Rd, Ione, CA
Raw water source	Pardee Reservoir
Treatment capacity, average (maximum)	94 – 98 gpm (100 gpm)
Treatment processes	Prefiltration, ultrafiltration, disinfection
Number of available filters (type)	Four (4) ultrafiltration hollow fiber, cellulose derivative
Backwash water treatment method	Dechlorination, discharge to plant effluent
Types of discharges	Routine and Non-Routine (unplanned or emergency)
Receiving Water	Pardee Reservoir

Detailed operational procedures are documented in the current WTP's Operations and Maintenance Manual (March 20, 2007) which constitutes the Operations Plan required by the California Department of Public Health. In addition to the treatment plant procedures and monitoring plan, equipment preventive maintenance and record keeping procedures are provided which also supplement the intent of BMPs. The plant is normally un-manned and only staffed during daily inspections for several hours.

Raw Water Source. Raw water is pumped from Pardee Reservoir. The reservoir collects surface water drainage and Sierra Mountain snow melt throughout the 370,000 acre Mokelumne watershed. The majority of the watershed's land is undeveloped open space and its use is limited in accordance with the Mokelumne Watershed Master Plan and specific management area plans.

Water Treatment. The treatment processes consist of prefiltration, ultrafiltration, and disinfection contact. A coarse prefilter is 250 microns to remove suspended particles prior to ultrafiltration.

Under typical water quality conditions (i.e. turbidity <1.0 NTU and low algae/organic content), raw water will be filtered once through the ultrafilter ("dead-end" filtration) and the product water delivered to the finished water storage tank. However, during poor water quality conditions, the raw water is separated into two streams: the product water for filtration and the reject water for recirculation. The recirculated raw water is blended and then filtered. Under extreme water quality conditions, the reject water may be discharged directly into the backwash pond. An emergency sand pressure filter is also available for pre-filtration during extreme conditions.

Sodium hypochlorite is the disinfecting agent to maintain a minimum target free chlorine residual of 0.70 mg/L in the storage tank. The residual deactivates bacteria, viruses, and other pathogens that may cause harm to public health and removes taste and odor causing substances. Figure 1 is a flow diagram of the treatment process at the WTP and backwash flows.

Electrical power is supplied by P.G. & E. There is no backup power because the storage reservoir of treated water would be expected to last for several days and there is a plan to have potable water trucked in to supply the public.

Filter Backwashing. Filters are backwashed with produced treated water from the distribution storage tank. Sodium hypochlorite is added to the backwash water at a concentration of 3 mg/L as free chlorine to protect the membrane against biological fouling and increase backwash efficiency. Backwash water is discharged to the backwash pond which serves as an evaporation and percolation pond (see Figure 2). The pond overflow is dechorinated with sodium sulfite prior to overland flow and contact with the reservoir. Instrument analyzer water continuously flows into the same backwash discharge system.

Chemical Handling. Hazardous materials, hazardous wastes, and spill response equipment (e.g., absorbents, sodium sulfite dechlorination tablets) are handled, stored, and disposed in accordance with guidance contained in the Material Safety Data Sheets (MSDSs), site specific Environmental Emergency Response and Release Prevention Plan, and the Pardee Area Control Center (ACC) Emergency Notification Guidelines, which are maintained at the facility and ACC.

The Treatment Plant Specialists (TPSs) transport a 5 gallon container of sodium hypochlorite from the Pardee Center Chemical Plant to the WTP as the supply in the crock on site becomes depleted. The process chemicals are stored separated from incompatible chemicals, in secondary containment. The TPSs monitor and control the water treatment processes, including process chemical tank levels and feed rates by conducting daily visual checks of the equipment. The operators also inventory the process chemicals on a daily basis and conduct visual inspections concurrently.

Spill Response. Leaks, spills, or releases are handled following the Environmental Emergency Response and Release Prevention Plan that is part of the Hazardous Materials Business Plan (HMBP) and the ACC Emergency Notification Guidelines. The HMBP identifies the chemicals stored onsite; emergency response procedures (e.g., for notifications, containment, cleanup, evacuation, re-entry, and employee exposure); and release prevention procedures (e.g., storage and handling, training, and emergency response equipment) and is reviewed annually and submitted to the county certified unified program agency (CUPA).

Should a leak, spill, or release occur, staff will act as soon as possible, if safe to enter the spill area, to secure equipment, contain the leak, spill, or release, or otherwise minimize conditions that may pose a hazard to employee health and safety, public health and safety, or the environment. They then report the leak, spill, release, or threatened release to the EBMUD Environmental Compliance Section (ECS). ECS staff will notify the appropriate agencies and prepare timely written follow-up notification to the agencies as necessary. If onsite resources are not sufficient for safely handling the response, ECS will initiate the on-call emergency response contractor to provide the required services. Once contained, the leak, spill, or release is recycled, or hauled to an offsite disposal facility as appropriate. Releases to any storm drain system or to the environment are prohibited.

2.0 POTENTIAL POLLUTANTS

The primary pollutant source is storm water runoff flowing over landscaped, unpaved, or paved areas into natural drainages and low land depressions, including the backwash discharge pond and downgradient areas. There are no sanitary sewer systems within one-half mile of the WTP. Thus, pollutants having a reasonable potential to be present in storm water discharges include: sediments and other residuals from vehicles or operations and maintenance activities.

There is not a reasonable potential for significant quantities of other pollutants to be present in storm water discharges as the WTP has implemented a combination of

engineering and design controls, as well as operational procedures, for this purpose (see next Section).

2.1 Chemical Use At The Facility
Chemicals used in the treatment process are listed below. Sodium hypochlorite is used as the disinfecting agent, and handling of this chemical is discussed in the section below. Other chemicals used at the facility and stored in bulk are:

Type of chemical	Maximum amount and container type
Liquid sodium hypochlorite	15 gallon crock
Dry sodium sulfite tabs	40 gallon pail

2.2 Discharge Associated With Operation And Maintenance Of Equipment
There is a low risk of discharge and contamination from any routine operations and maintenance of equipment. All maintenance is conducted using BMPs to contain any hazardous materials or waste, and areas where maintenance is performed is in bermed areas. All generated waste is stored and disposed of in accordance with hazardous waste regulations. All construction activities that are performed onsite must use construction BMPs, and, a Notice of Intent (NOI) must be submitted for projects disturbing greater than 1 acre in size.

3.0 POLLUTION CONTROL AND EFFLUENT TREATMENT METHODS

All potential discharges and facility stormwater runoff discharge to the surrounding ground surface or into low depressions leading to natural drainages to the reservoir. There has been no evidence of erosion to the backwash pond at the point of discharge.

Described below are key engineering and design controls, as well as operation procedures, that have been implemented to minimize pollutants in the storm water runoff discharges.

- Chemical loading/unloading, storage, and injection feed systems are designed and constructed in accordance with applicable standards and guidelines, which includes secondary containment systems to isolate the systems from potential release into the environment;

- No hazardous waste are generated at the plant; however, if any are, they are contained in appropriate containers and are removed from the plant in a timely manner;

- The operators routinely inspect the chemical storage and injection feed systems, and hazardous waste containment areas (if any);

- The storm drains, if any, are labeled to indicate "No dumping. Drains to reservoir";

- The storm drain inlets, if any, are routinely inspected prior to the rainy season and after each storm event. Under extreme storm conditions, staff may place gravel-bags and filter fabric at the storm drain inlets as an additional protective measure against excess amounts of sediments from entering the storm drains;

- The operators control, treat, and monitor water releases to the maximum extent practicable to prevent water quality impacts and stream bank erosion;

- The WTP area is surrounded by chain-link fencing and/or by a secured entrance gate. The WTP building access is monitored by the ACC/OCC 24-hours per day, 7-days per week;

- The WTP has designated parking areas, landscaping to minimize exposed soils and limit erosion, and lighting to facilitate the discovery of leaks, spills, or releases;

- The EBMUD Regulatory Compliance Office staff conducts an audit every year to ensure hazards are eliminated and to ensure compliance with applicable environment, health and safety regulations and BMPs.

The HMBP is updated annually for the facility and identifies all chemicals stored in quantities greater than 55 gallons, 500 pounds or 200 cubic feet of compressed gas. An Environmental Emergency Response and Release Prevention Plan has been prepared for the facility, and a copy is attached. In the event of a release, staff are trained to control and stop the release, and contain the release. The District retains hazardous waste contractors to respond and clean up the spill and properly dispose of the material.

4.0 SODIUM HYPOCHLORITE MANAGEMENT

Storage and Transportation. Sodium hypochlorite (liquid chlorine or "hypo") is used as the disinfecting agent. Sodium hypochlorite is stored indoors in 5 gallon pails. Off-loading of the sodium hypochlorite is outside the chemical storage room. Signs are posted to avoid mixing of incompatible chemicals.

Spill Or Leakage Prevention. The chemical storage room is fitted with secondary containment pads. All chemical feed piping is contained within a chase. As with all chemical storage, the pails and piping are visually inspected on a daily basis.

The attached emergency response plan describes the steps to be conducted in the event of a release of any chemical at the facility. As noted above, staff are trained to respond to chemical releases, and a contractor is available 24 hours to clean up the release if necessary.

Chlorinated Water Spill. Chlorinated water spills may be from the filters, (through filter backwash) or associated pipelines. Any discharge resulting from a filter overflow would

overflow into the floor drains, which flow into the backwash water holding pond. On rare occasions, non-routine chlorinated releases may occur that are unplanned or emergency in nature such as a broken water line or a process upset or overflow. Should those types of releases occur, the water would be automatically dechlorinated using the same sodium sulfite table feed system that dechlorinates the backwash water discharge.

In the event of a release, staff would stop the activity causing the discharge as quickly as possible. Staff would then obtain samples from a point downstream from the discharge location. Samples would be collected and analyzed for total suspended solids, pH, and total chlorine, using the field test method. The flow rate and total volume discharged would be estimated, based on review of flow data. Flow from the source of the discharge would be automatically monitored for Total Chlorine and pH by the process monitors in place. Additionally, samples could be manually collected and analyzed for constituents of concern if warranted.

5.0 RESPONSIBILITY AND TRAINING

Environmental compliance is a shared responsibility. The operators are responsible for operating and monitoring the plant including: conducting drinking water quality and WDR permit required sampling and monitoring; being aware of and responding to alarms, spills, or other unusual conditions; coordinating and overseeing chemical deliveries; coordinating equipment repairs; and conducting chemical and process inspections. The facility supervisor is responsible for operations oversight. The operators and maintenance crew are responsible for maintaining the grounds, including the storm drains inlets. ECS is responsible for environmental compliance oversight including WDR Permit compliance and reporting, BMP Plan, and annual training.

Employees who come into contact with hazardous materials or wastes as part of their job are trained annually on proper handling, storage, and disposal; incident prevention; MSDSs; personal protective equipment; and emergency response procedures. Training is documented and maintained in the employee records (with hard copies of applicable certificates), as well as in an electronic training documentation file.

WDR Compliance Responsibilities	
Operations and monitoring the plant	**Operators**
Operations oversight	John C. Johnson, Assistant Superintendent, Pardee Section
Operations and maintenance	Tony Boitano, Pardee Water/Wastewater Supervisor
Environmental compliance oversight	Colin Moy, EHS Specialist

Attachment A

Environmental Emergency Response and Release Prevention Plan

'nda S. Adams
Secretary for Environmental Protection

California Regional Water Quality Control Board
Central Valley Region

Karl E. Longley, ScD, P.E., Chair

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Arnold Schwarzenegger
Governor

ECS - Received
APR 3 0 2009

28 April 2009

Mr. John H. Schroeter, P.E.
Manager of Environmental Compliance
East Bay Municipal Utility District
P.O. Box 24055, M.S. #704
Oakland, CA 94623

CERTIFIED MAIL
7008 1140 0002 8805 9726

NOTICE OF APPLICABILITY (NOA); LIMITED THREAT GENERAL WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2008-0082; EAST BAY MUNICIPAL UTILITY DISTRICT (EBMUD), AMADOR COUNTY

Our office received application forms on 19 November 2008 from the EBMUD for the Pardee Reservoir Recreation Area Water Treatment Plant (PWTP) for the management of its potable water system. Based on the application package and subsequent information submitted by the Discharger, we have determined that the project meets the required conditions for approval under the General Order for Limited Threat Discharges of Treated/Untreated Groundwater from Cleanup Sites, Wastewater from Superchlorination Projects, and Other Limited Threat Wastewaters to Surface Water (Limited Threat General Order). This project is hereby assigned Limited Threat General Order No. R5-2008-0082-010 and National Pollutant Discharge Elimination System (NPDES) Permit No. CAG995002.

The Limited Threat General Order (enclosed) may also be viewed at the following web address: http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2008-0082.pdf. You are urged to familiarize yourself with the contents of the entire document. The Limited Threat General Order prescribes mandatory discharge monitoring requirements. The project activities shall be operated in accordance with the requirements contained in this NOA, the Limited Threat General Order, and with the information submitted by the Discharger.

CALIFORNIA TOXIC RULE / STATE IMPLEMENTATION POLICY MONITORING

The Limited Threat General Order incorporates the requirements of the California Toxic Rule (CTR) and the State Water Resources Control Board's (State Water Board), *Policy for Implementation of Toxic Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, 2005, also known as the State Implementation Policy (SIP). The Discharger requested a categorical exception to the requirement for meeting the CTR pollutant criteria in the Limited Threat General Order, as authorized by Section 5.3 of the SIP. The Discharger certified that its discharges are necessary to implement drinking water control measures conducted to fulfill statutory requirements under the federal Safe Drinking Water Act and the California Health and Safety Code.

The receiving waters are not listed under the Clean Water Act 303(d) List of impaired water bodies. Therefore, no additional effluent limitations or additional monitoring requirements will be added to this Limited Threat General Order.

PROJECT DESCRIPTION

The PWTP treats raw water drawn from the Mokelumne River watershed and provides potable water to the Pardee Reservoir Recreation Area which includes 107 mobile home/recreation vehicle connections and 95 campsites. There is shower, laundry, and public restroom facilities available, as-well-as a concessionaire operated coffee shop, marina, and swimming pool. The PWTP and Recreation Area are adjacent to Pardee Reservoir.

This NOA provides regulatory coverage for the discharge of backwash water from the PWTP. The backwash water is discharged into an unlined pond and then flows overland to Pardee Reservoir. The discharge is greatest during the summer. The PWTP has been in operation since 1958 and the discharge was previously permitted under Low Threat General Order No. 5-00-175.

MONITORING AND REPORTING

The Discharger is required to comply with all the monitoring and reporting requirements contained in the Limited Threat General Order. This includes notifying Central Valley Regional Water Quality Control Board (Regional Water Board) staff 24 hours before the start of each new discharge, notification of noncompliance or anticipated noncompliance, and quarterly reporting of monitoring results.

Effluent and receiving water monitoring shall be conducted and submitted to the Regional Water Board on a quarterly basis. You must submit quarterly reports, even if there is no discharge or receiving water flow during the reporting quarter, until Regional Water Board staff formally terminate your coverage under the Limited Threat General Order. Most reporting requirements are found in Attachment E of the Limited Threat General Order. Please reference your unique order number, R5-2008-0082-010, in your correspondence and submitted documents.

GENERAL INFORMATION AND REQUIREMENTS

The Discharger will be required to implement its Pollution Prevention and Monitoring and Reporting Plan, if applicable. Discharge of material other than what is described in the application is prohibited.

The required annual fee (as specified in the annual billing you will receive from the State Water Board) shall be submitted until this NOA is officially terminated. You must notify this office in writing if the discharge regulated by this Limited Threat General Order is no longer necessary, so we may terminate applicability of this Limited Threat General Order and avoid additional unnecessary billing.

Dischargers authorized to discharge under this Limited Threat General Order who have been granted an exception to the priority pollutant criteria and objectives in the CTR and SIP, as

allowed by Section 5.3 of the SIP, must provide certification by a qualified biologist that the beneficial uses of the receiving water have been restored upon completion of the discharge.

Failure to comply with the Limited Threat General Order may result in enforcement actions, which could include civil liability. Some late reporting and effluent limitation violations are subject to a Mandatory Minimum Penalty (MMP) of $3,000 per violation [California Water Code Section 13385(h) and (i)]. If you have no discharge during a quarterly monitoring period, you must still submit a report indicating that no discharge occurred, or you may be subject to MMPs.

All monitoring reports submittals, discharge notifications, and any questions regarding compliance or enforcement, shall be to Oscar Biondi, who may be reached at (916) 464-4663 or at obiondi@waterboards.ca.gov. If you have any questions regarding the permitting aspects of your Limited Threat General Order coverage, please contact Anand Mamidi of our office at (916) 464-4853 or at amamidi@waterboards.ca.gov.

Pamela C. Creedon
Executive Officer

Enclosure: General Order No. R5-2008-0082 (Discharger only)

cc: U.S. Environmental Protection Agency, Region IX, San Francisco
Mr. Phil Isorena, Division of Water Quality, State Water Board, Sacramento

Salinity Management Plan

for the Limited Threat Discharge

Pardee Recreation Area Water Treatment Plant

East Bay Municipal Utility District
July 2009

Introduction

The East Bay Municipal Utility District (EBMUD) operates the Pardee Reservoir Recreation Area (PARA) water treatment plant (WTP) under the Limited Threat General Waste Discharge Order No. R5-2008-0082-010 and National Pollutant Discharge Elimination System (NPDES) Permit No. CAG995002, issued on April 28, 2009. The discharge consists of the following treatment of raw water.

- Raw water to the WTP originates from the upper Mokelumne River watershed in Amador, Calaveras, and Alpine counties. The river flow supplies the Pardee Reservoir used for drinking water transfer to the Bay Area communities of Alameda and Contra Costa counties.
- Freshwater is derived from precipitation and annual snow melts from the Sierra Mountains.
- Freshwater is treated by prefiltration, ultrafiltration, and disinfection. No chemicals are added to treat the filter backwash water except for dechlorination chemicals. Instrument analyzer water is combined with the backwash water discharges.
- The combined discharge flows directly into an unlined pond and disposed by evapotranspiration and percolation. Limited overland flow is observed before reaching the reservoir shoreline.

Filter backwash occurs automatically every two hours when the treatment plant is operating, and every four hours when the plant is not operating. Instrument analyzer water flows continuously into the discharge pipes at approximately 0.5 to 1 gpm. Each backwash cycle lasts approximately 45 seconds and uses 500 gallons of finished water. Backwash water volume ranges from 3,000 gpd (winter months) to a maximum of 6,000 gpd (summer months). The backwash water is discharged to an unlined 10,000-gallon capacity combination storage/disposal pond that contains extensive amounts of rooted aquatic plants and organic matter.

Sources of Salinity and Backwash Water Quality

Dissolution of minerals in the soils and bedrock from the watershed and Sierra Mountains are the major sources of cation species which define the level of salinity. Minor sources may be contributed from precipitation. Historical monitoring data of representative

constituents in raw water at the influent to the WTP, finished potable water, and the backwash overflow at the pond discharge is summarized in Table 1 below.

Table 1 Summary of Salinity Constituents at Pardee Recreation WTP

	Influent (Raw Water)	Finished (Potable Water)	Backwash Water At Pond Overflow
Collection Dates / Parameter	3/3/98, 4/3/03	4/20/04, 4/19/05, 4/11/06, 4/29/09	1/12/06, 2/8/06, 3/9/06, 4/13/06, 5/11/06, 6/8/06, 7/13/06, 8/10/06, 9/14/06, 10/12/06, 11/9/06, 12/15/06, 1/17/07, 2/10/07, 3/8/07, 4/12/07, 5/10/07, 6/14/07, 7/12/07, 8/9/07, 9/13/07, 10/11/07, 11/8/07, 12/13/07, 1/10/08, 2/14/08, 4/10/08, 5/8/08, 6/12/08, 7/10/08, 8/14/08, 9/11/08, 10/9/08, 11/13/08, 12/11/08, 1/22/09, 2/5/09, 4/9/09, 5/14/09, 7/9/09
Calcium, mg/L	4.65, 3.27	3.44, 4.2, 4.0, 3.3	--
Chloride, mg/L	--, 1.7	4.0, 4.2, 3.9, 4.0	--
Conductivity, µmhos/cm	--, 35.7	45.8, 56.6, 55.2, 46.2	44, 45, 61, 59, 55, 40, 36, 59, 43, 42, 47, 66, 43, 45, 33, 58, 61, 71, 53, 56, 61, 55, 50, 48, 12, 80, 72, 67, 55, 54, 48, 55, 68, 41, 52, 80, 137, 56, 46, 231
Hardness, Total, mg/L	17, 14	13, 17, 17, 14	--
Magnesium, mg/L	1.62, 0.98	1.02, 1.4, 1.4, 1.1	--
Potassium, mg/L	1.43, 0.562	0.65, 0.64, 0.68, 0.62	--
Sodium, mg/L	2.26, 1.95	3.75, 4.0, 4.2, 3.7	--

Salinity Control/Reduction

The average conductivity of the backwash water effluent at the pond overflow is 60 µmhos/cm, which is within 17% of the average finished water conductivity (51 µmhos/cm) and 40% higher than the raw water. Other salinity constituents in the backwash water would be expected to be in the same concentration ranges as in the raw and finished levels and below water quality objectives. The USEPA primary drinking water maximum contaminant level for conductivity is 900 µmhos/cm and for surface water agriculture use is 700 µmhos/cm. The discharge water conductivity is over 10 times lower than these objectives; hence the discharge of the backwash water into Pardee Reservoir is not expected to impact the surface water quality. No salinity control and/or reduction are required.

Appendix 6-6
Hazardous Material Business Plan, Example:
Camanche North Shore

EBMUD - Camanche North Shore Recreation (CERSID: 10238980)

Facility Information **Accepted Jan 13, 2015**

Submitted on 1/13/2015 7:08:57 AM by *Robert Newman* of East Bay Municipal Utility District (Oakland, CA)
Submittal was ***Accepted*** on 1/13/2015 7:49:31 AM by Joselyn Dunklee

- Business Activities
- Business Owner/Operator Identification

Emergency Response and Training Plans **Accepted Jan 13, 2015**

Submitted on 1/13/2015 7:08:57 AM by *Robert Newman* of East Bay Municipal Utility District (Oakland, CA)
Submittal was ***Accepted*** on 1/13/2015 7:49:38 AM by Joselyn Dunklee

- Emergency Response/Contingency Plan
  - *Emergency Response/Contingency Plan* (Adobe PDF, 2293KB)
  - *Emergency Response/Contingency Plan* (Adobe PDF, 3655KB)
- Employee Training Plan
  - *Employee Training Plan* (Adobe PDF, 3655KB)

California Environmental Reporting System (CERS) — Business Activities

Site Identification

EBMUD - Camanche North Shore Recreation
2000 Camanche Rd
Ione, CA 95640
County
Amador

CERS ID
10238980
EPA ID Number
CAL000317330

Submittal Status

Submitted on 1/13/2015 by *Robert Newman* of East Bay Municipal Utility District (Oakland, CA)
Submittal was ***Accepted***; Processed on 1/13/2015 by *Joselyn Dunklee* for Amador County Environmental Health

Hazardous Materials

Does your facility have on site (for any purpose) at any one time, hazardous materials at or above 55 gallons for liquids, 500 pounds for solids, or 200 cubic feet for compressed gases (include liquids in ASTs and USTs); or is regulated under more restrictive inventory local reporting requirements (shown below if present); or the applicable Federal threshold quantity for an extremely hazardous substance specified in 40 CFR Part 355, Appendix A or B; or handle radiological materials in quantities for which an emergency plan is required pursuant to 10 CFR Parts 30, 40 or 70?	**Yes**

Underground Storage Tank(s) (UST)

Does your facility own or operate underground storage tanks?	**No**

Hazardous Waste

Is your facility a Hazardous Waste Generator?	**No**
Does your facility treat hazardous waste on-site?	**No**
Is your facility's treatment subject to financial assurance requirements (for Permit by Rule and Conditional Authorization)?	**No**
Does your facility consolidate hazardous waste generated at a remote site?	**No**
Does your facility need to report the closure/removal of a tank that was classified as hazardous waste and cleaned on-site?	**No**
Does your facility generate in any single calendar month 1,000 kilograms (kg) (2,200 pounds) or more of federal RCRA hazardous waste, or generate in any single calendar month, or accumulate at any time, 1 kg (2.2 pounds) of RCRA acute hazardous waste; or generate or accumulate at any time more than 100 kg (220 pounds) of spill cleanup materials contaminated with RCRA acute hazardous waste.	**No**
Is your facility a Household Hazardous Waste (HHW) Collection site?	**No**

Excluded and/or Exempted Materials

Does your facility recycle more than 100 kg/month of excluded or exempted recyclable materials (per HSC 25143.2)?	**No**
Does your facility own or operate ASTs above these thresholds? Store greater than 1,320 gallons of petroleum products (new or used) in aboveground tanks or containers.	**No**
Does your facility have Regulated Substances stored onsite in quantities greater than the threshold quantities established by the California Accidental Release prevention Program (CalARP)?	**No**

Additional Information

Hazardous waste was generated as a one-time event, typically during facility maintenance and/or improvement projects. Camanche Recreation Company is the LEAD USER under a separately prepared HMBP.

California Environmental Reporting System (CERS) — Business Owner Operator

Facility/Site

EBMUD - Camanche North Shore Recreation
2000 Camanche Rd
Ione, CA 95640

CERS ID
10238980

Submittal Status

Submitted on 1/13/2015 by *Robert Newman* of East Bay Municipal Utility District (Oakland, CA)
Submittal was ***Accepted***; Processed on 1/13/2015 by *Joselyn Dunklee* for Amador County Environmental Health

Identification

EBMUD - Camanche North Shore Recreation

Operator Phone	Business Phone	Business Fax
(209) 772-8208	(209) 772-8200	(209) 772-8280

Beginning Date	Ending Date	
Dun & Bradstreet	**SIC Code**	**Primary NAICS**
827073883	7999	

Facility/Site Mailing Address

P. O. Box 24055, MS #704
Oakland, CA 94623-1055

Primary Emergency Contact

EBMUD Pardee Area Control Center
Title
Supervisor On-Call, Rotates Weekly

Business Phone	24-Hour Phone	Pager Number
(209) 772-8200	(209) 772-8208	

Owner

East Bay M.U.D.
(866) 403-2683
P. O. Box 24055, MS 704
Oakland, CA 94623-1055

Secondary Emergency Contact

Pat Lydon
Title
Superintendent Pardee Section

Business Phone	24-Hour Phone	Pager Number
(209) 772-8201	(209) 772-8208	

Billing Contact

Chandra Johannesson
(510) 287-0412 cjohanne@ebmud.com
P. O. Box 24055, MS 704
Oakland, CA 94623-1055

Environmental Contact

Robert Newman
(510) 287-1641 rnewman@ebmud.com
P.O. Box 24055, 375 - 11th Street, M.S. #704
Oakland, CA 94623-1055

Name of Signer	Signer Title	Document Preparer
Pat Lydon	Superintendent Pardee Section	Colin Moy

Additional Information

Locally-collected Fields

Some or all of the following fields may be required by your local regulator(s).

Property Owner

Phone

Mailing Address

Assessor Parcel Number (APN)
003-460-004-000

Number of Employees

Facility ID

EAST BAY MUNICIPAL UTILITY DISTRICT



Pardee

Pardee Area Control Center
Emergency Notification Guidelines

July 2013

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Pardee Area Control Center Emergency Notification Guidelines

PURPOSE:

*These guidelines are for **determining who to notify** under various emergency conditions.*

- *The assumption is that notification of an emergency or potential emergency is received by phone, radio, alarm or other means to the Pardee Area Control Center (ACC) Operator or the Oakland Control Center (OCC) Operator.*
- Staff within each department, division or section that is designated as the "facility owner" of the EBMUD owned facility is ultimately responsible for ensuring that emergency notifications, emergency response and incident follow-up are carried out to the extent necessary regardless of the origin of the incident.
- For EBMUD owned facilities operated under contract or agreements to EBMUD, the designated manager(s) shall ensure that EBMUD "Initial Contact" person(s) are notified immediately. These include private concessionaire companies at the four recreation areas (Camanche North / South Shores, Pardee, and Camanche Hills Hunting Preserve) and the California Department of Fish and Wildlife at the fish installation in the counties of Amador, Calaveras, and San Joaquin.

INSTRUCTIONS:

1. Record all pertinent information on the Emergency Event Report (Appendix #2)

2. Determine and look up type of emergency in the attached tables.
    a. If there is more than one type of emergency happening simultaneously, treat each event as a separate emergency, following the instructions for each type of emergency.

2. Call the appropriate people listed in the "Initial Contact" column.
    a. The role of the initial contact is to verify and/or assess the emergency as necessary to determine what further resources are needed to respond.
    b. If there is not already a person at the scene of the emergency, the initial contact will be the incident commander until relieved by other District personnel or responders from outside agencies.
    c. If there is already a District employee onsite in communication with ACC / OCC, this person is the Incident Commander until relieved by the initial contact or others.
    d. **Keep the Incident Commander informed as to what notifications have been/are being made.**

3. Fully explain the situation to the initial contact, conveying all known information:
    a. Identity of caller (if known)
    b. Location, date and time of spill, release or threatened release
    c. Substance and quantity involved
    d. Chemical name (if known, it should be reported if the chemical is extremely hazardous)
    e. Description of what happened

4. Maintain contact with the Incident Commander and communicate any requests of the Incident Commander for support or resources to the appropriate District personnel or

outside agencies or contractors who can fulfill such requests. To the extent of your authority, make every effort to fulfill the expressed needs of the Incident Commander. If you feel fulfilling the request would exceed your authority or conflict with procedures, as you understand them, COMMUNICATE the request up the chain of command immediately until it is resolved. **DO NOT DELAY THIS PROCESS**.

5. As soon as the emergency is confirmed, by either the first report from the observer or from information provided by the initial contact, and the initial emergency contact has been made, begin making further notifications to secondary field (response) personnel, management and the Regulatory Compliance Office as prescribed in the Post-Assessment Notification column.

   - **If the emergency is serious**, requiring continual efforts of the ACC / OCC operator, or staffing is inadequate and there isn't time to make further notifications, call the Oakland Emergency Dispatch Center 1-866-403-2683. Direct the Emergency Dispatch Center to make Post-Assessment Notifications as necessary. The Emergency Dispatch Center has been provided with a copy of PACC Emergency Notification Guidelines.

   - **If time is not exceptionally critical**, call down the appropriate management list, in the listed order, until you reach someone. Then, if necessary, notify one person on the Regulatory Compliance Office list.
     - It is the responsibility of whomever you reach on either list to notify others on that list as necessary. When the ACC / OCC operator's available time is limited, the ACC / OCC operator may request that the first person contacted on either list contact others on both lists as necessary.
     - Fully explain the situation to the Emergency Dispatch Center, management contact and/or Regulatory Compliance contact, conveying all known information. To the extent possible and practical, take the time to answer the contact's questions to avoid unnecessary callbacks. If there are any outstanding requests of the Incident Commander requiring authorization from District management, be sure to make these issues known. Similarly, if you have had requests that specific District staff be notified from either the Incident Commander, your supervisor, or others involved in the emergency, convey this information to your contact.

6. Record date, time, name of all persons contacted, information transmitted and actions taken in the Pardee or Oakland Operator Journals.

Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
1. CHEMICAL RELEASE Possible scenarios: • Chemical spill during chemical delivery • Highway accident involving District vehicle carrying chemicals • Leak from propane tank • Leaking container at District facility • Hazardous material release on or along a District maintained roadway or on the watershed • Chemical spill by concessionaire or visitor at recreation area to water or ground • Highway 49 accident that releases chemicals into the Mokelumne River.	**If source of spill is equipment or facilities owned, operated or maintained by the District, call Pardee Maintenance Supervisors.** ***Working Hours:*** **For power plant-related events contact:** Dave Oldham, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8213 Nextel: 209-684-5036 Radio: 7018, channel 4 **For non-power plant-related events contact:** Todd Cearley, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8212 Cell: 209-601-5298 Radio: 7013, channel 4 ——————— ***Off Hours:*** Refer to Standby On-Call Supervisor List If Operations assistance needed contact: **For power plant-related events contact:** Pat Lydon, Superintendent Office: 209-772-8201 Cell: 916-835-1699 Radio: 7010, channel 4 Steve Rowan, Assist Superintendent Office: 209-772-8202 Cell: 209-217-4401 Radio: 7012, channel 4 **For non-power plant-related events contact:** John C. Johnson, Assistant Superintendent Office: 209-772-8267 Cell: 209-601-5193 Radio: 7011, channel 4	**SECONDARY FIELD CONTACTS (Per Incident Commander)** PLEASE NOTE: If release is to the environment (not fully contained within a building) incident commander should request notification of: Water Quality Unit to assess water quality impacts • John C. Johnson, Assistant Superintendent Office: 209-772-8267 Cell: 209-601-5193 Radio: 7011, channel 4 *AND:* Fisheries & Wildlife to assess impacts to fish and wildlife. • Jose Setka, Supervising F/W Biologist Office: 209-365-1467 Cell: 510-517-2169 Radio: 3820, channel 4 Home: 707-678-2612 **MANAGEMENT CONTACTS** Notify Pardee Section management first if spill involves a District facility that is not a recreation area. Notify Watershed & Recreation management first if spill is at a recreation area. The first management contact notified will be responsible for notifying other management personnel as necessary. See attached Emergency Notification Flowchart for numbers. **REGULATORY COMPLIANCE/ EMERGENCY PREPAREDNESS OFFICE CONTACTS** • **24 hour emergency pager 510-437-7363** Notify Environmental Compliance immediately so that regulatory agency notifications can be made within the required time. • If emergency assessment; containment; and/or cleanup resources are beyond those available contact Environmental Compliance so that post-emergency cleanup activities arrangements can be made. • Environmental Compliance will be responsible for notifying Workplace Health & Safety and Emergency Preparedness unless the ACC / OCC operator requires specific information from these units in which case they may be contacted directly. In any case, both Workplace Health & Safety and Emergency Preparedness should always be notified.

Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
	If release is at any of the recreation areas or impacting watershed lands call Watershed & Recreation Division. ***All Hours:*** Call Resource Patrol Unit (RPU) RPU Supervisor, Tim Cox Office: 209-772-8256 Cell: 209-610-0898 Radio: 3830, channel 4 Home: 209-754-0604 -OR- RPU Senior Ranger, Greg Persons Office: 209-772-8307 Cell: 209-202-1627 Radio: 3831, channel 4	• See attached Emergency Notification Flowchart for contact numbers.
2. FUEL OR OIL SPILL Possible sources: • Release from power house due to system failure • Boat sunk in Pardee or Camanche Reservoirs • Vehicle enters Pardee or Camanche Reservoir at boat ramp. • Motor vehicle accident on or nearby recreation areas • Airplane crash into Pardee or Camanche Reservoir Reporting and response guidelines for fuel and oil spills to water: Legally, fuel/oil spill to water that causes sheen must be reported. Practically, anything "beyond normal operations" that causes a sheen should be responded to and reported providing we are implementing all prescribed measures to minimize spills due to "normal operations".	**If source of spill is equipment or facilities owned, operated or maintained by the District, call Pardee Maintenance Supervisors.** ***Working Hours:*** **For power plant-related events contact:** Dave Oldham, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8213 Nextel: 209-684-5036 Radio: 7018, channel 4 **For non-power plant-related events contact:** Todd Cearley, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8212 Cell: 209-601-5298 Radio: 7013, channel 4 ***Off Hours:*** Refer to Standby On-Call Supervisor List *AND:* **If spill is at a recreation area or impacting watershed lands, call Watershed & Recreation**	**SECONDARY FIELD CONTACTS (Per Incident Commander)** PLEASE NOTE: If release is to the environment (not fully contained within a building) incident commander should request notification of: Water Quality Unit to assess water quality impacts • John C. Johnson, Assistant Superintendent Office: 209-772-8267 Cell: 209-601-5193 Radio: 7011, channel 4 *AND:* Fisheries & Wildlife to assess impacts to fish and wildlife. • Jose Setka, Supervising F/W Biologist Office: 209-365-1467 Cell: 510-517-2169 Radio: 3820, channel 4 Home: 707-678-2612 **MANAGEMENT CONTACTS** • Notify Pardee Section management (209-772-8201) first if spill involves a District facility that is not a recreation area. • Notify Watershed & Recreation Manager, Kent Lambert (209-772-8203) first if spill is at a recreation area. The first management contact notified will be responsible for notifying other management

Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
Removal with absorbents or by mechanical means is preferred over use of surfactants. If use of surfactants is deemed necessary, approval in advance of use must be obtained from California Dept. of Fish & Game (DFG) **in each instance**. Call Environmental Compliance so that arrangements can be made for cleanup activities. Only surfactants licensed for use as oil spill cleanup agents by DFG may be used. **Reference Attachment #4**	**Division.** **If a vehicle or plane enters either reservoir notify Watershed & Recreation contacts first and Pardee Superintendent or Standby Supervisor.** ***All Hours:*** Call Resource Patrol Unit (RPU) RPU Supervisor, Tim Cox Office: 209-772-8256 Cell: 209-610-0898 Radio: 3830, channel 4 Home: 209-754-0604 -OR- RPU Senior Ranger, Greg Persons Office: 209-772-8307 Cell: 209-202-1627 Radio: 3831, channel 4	personnel as necessary. See attached Emergency Notification Flowchart for contact numbers. **REGULATORY COMPLIANCE/ EMERGENCY PREPAREDNESS OFFICES CONTACTS** • **24 hour emergency pager 510-437-7363** Notify Environmental Compliance immediately so that regulatory agency notifications can be made within the required time. If emergency assessment; containment; and/or cleanup resources are beyond those available contact Environmental Compliance so that post-emergency cleanup activities arrangements can be made. Environmental Compliance will be responsible for notifying Workplace Health & Safety and Emergency Preparedness unless the PACC operator requires specific information from these units in which case they may be contacted directly. In any case, both Workplace Health & Safety and Emergency Preparedness should always be notified. See attached Emergency Notification Flowchart for numbers.
3. MEDICAL EMERGENCY Possible sources: • Any life threatening incident on or nearby EBMUD property	**Call 911 if not already called** **If Pardee Section personnel involved at all times notify:** Pat Lydon, Superintendent Office: 209-772-8201 Cell: 916-835-1699 Radio: 7010, channel 4 **If at a recreation area and if a major injury or fatality notify Watershed & Recreation Division at all times**: ***All Hours:*** Call Resource Patrol Unit (RPU) RPU Supervisor, Tim Cox Office: 209-772-8256 Cell: 209-610-0898 Radio: 3830, channel 4 Home: 209-754-0604 -OR- RPU Senior Ranger, Greg Persons Office: 209-772-8307 Cell: 209-202-1627 Radio: 3831, channel 4	**SECONDARY FIELD CONTACTS (Per Incident Commander)** Usually none but respond as requested by Incident Commander **MANAGEMENT CONTACTS** If District employee(s) involved, notify employee's supervisor and/or manager. **REGULATORY COMPLIANCE CONTACTS** Notify Workplace Health & Safety **in the event of any work related injury.** See attached Emergency Notification Flowchart for numbers.

Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
4. MOKELUMNE RIVER FISH INSTALLATION (MRFI) EMERGENCIES **NOTE: The MRFI is operated by the California Department of Fish and Wildlife (CDFW) and the hatchery manager, or other CDFW employee in charge, would be the Incident Commander in the event of an emergency.** **CDFW:** Darrick Baker, Manager I Cell: 916-715-0184 Bill Smith, Manager II Cell: 916-718-5078	**Call 911 as necessary (if not already called) to address medical, fire, hazmat spill or other emergencies** *AND*: ***All Hours:*** Call down list in order until you reach someone: 1) Jose Setka, T/C Supervising F/W Biologist Office: 209-365-1467 Cell: 510-517-2169 Radio: 3820, channel 4 Home: 707-678-2612 2) Steve Boyd, Fisheries Biologist Office: 209-365-1089 Home: 916-853-8504 Cell: 916-216-8012 Radio: 3821, channel 4 At request of Fisheries and Wildlife staff, notify MRFI staff (if not already notified): MRFI Manager Office: 209-759-3383 **Call District maintenance and/or operations personnel as necessary** to handle downed power lines, threats to structures from major pipeline breaks or other such events. ***Off Hours:*** Refer to Standby On-Call Supervisor List ***Working Hours:*** **Maintenance** Dave Oldham, Power and Treatment Plt Maint. Supervisor, Office: 209-772-8213 Nextel: 209-684-5036 Radio: 7018, channel 4 **Operations** Pat Lydon, Superintendent Office: 209-772-8201 Cell: 916-835-1699 Radio: 7010, channel 4	**SECONDARY FIELD CONTACTS (Per Incident Commander)** • Joe Miyamoto, Manager of Fisheries and Wildlife Office: 510-287-2021 Pager: 510-437-7854 Cell: 925-813-1684 Home: 925-439-8151 If directed to do so by Fisheries & Wildlife Manager or his designee, call Water Quality Unit Supervisor to assess water quality impacts: • John C. Johnson, Assistant Superintendent Office: 209-772-8267 Cell: 209-601-5193 Radio: 7011, channel 4 **MANAGEMENT CONTACT** Call first: • Richard Sykes, Manager of Natural Resources Office: 510-287-1629 Home: 510-652- 2370 Cell: 510-390-4035 The first management contact notified will be responsible for notifying other management personnel as necessary. See attached Emergency Notification Flowchart for numbers. **REGULATORY COMPLIANCE/ EMERGENCY PREPAREDNESS OFFICES CONTACTS** Notify Environmental Compliance as necessary. See attached Emergency Notification Flowchart for numbers.

Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
5. RESERVOIR SPILL/HIGH WATER OVERFLOW/ DAM FAILURE The Federal Energy Regulatory Commission (FERC) Emergency Action Plan (EAP) for the Lower Mokelumne River Project addresses these scenarios. The first EBMUD person who learns of the emergency, judges its potential severity and makes notifications as appropriate according to the EAP notification flowchart. This chart specifies that this person or other EBMUD staff as necessary and available, including the PACC operator call in order down list below and request instructions as to whether to continue with the EAP from first person reached (see EAP for current numbers).	**Working Hours:** **The following summarizes the EAP notification contacts:** Superintendent, Pardee Section – Patrick M. Lydon 209-772-8201 Assistant Superintendent, Pardee – Steve Rowan 209-772-8202 Assistant Superintendent, Pardee – John C. Johnson 209-772-8267 Manager of Water Supply – John Hurlburt 510-287-1035 Superintendent, Aqueduct Section – Andy Enos 209-946-8001 Assistant Superintendent, Aqueduct – Roberto Cortez 209-946-8009 Manager of Wtr. and Recreation – Kent Lambert 209-772-8203 Director of Ops. & Maintenance – Mike Wallis 510-287-1615 **If the person contacted from the list above determines the EAP should be invoked**, notify (see EAP for current numbers): STATE & FEDERAL: California Emergency Management Agency (formerly OES) State Division of Safety of Dams California Highway Patrol Federal Energy Regulatory Commission U.S. Army Corps of Engineers LOCAL AGENCIES: San Joaquin County Sheriff's Office San Joaquin County Office of Emergency Services Amador County Office of Emergency Services Amador County Sheriff's Office Calaveras County Office of Emergency Services Calaveras County Sheriff's Office Jackson Valley Irrigation District Sacramento County Office of Emergency Services City of Lodi, City Manager's Office State Flood Center P.G.&E. Tiger Creek Powerhouse ***Off Hours:*** Refer to Standby On-Call Supervisor List	**The Watershed and Recreation Division staff member initially notified will immediately notify** (see EAP for current numbers): Pardee Recreation Area Camanche South Shore Recreation Area Camanche North Shore Recreation Area Mokelumne River Fish Facility Camanche Hills Hunting Preserve **When contacted, Mokelumne River Fish Facility personnel will immediately notify the users of the Mokelumne River Day Use Area.** When contacted, Jackson Valley Irrigation District personnel will immediately notify the recreation users of Lake Amador. When notified, the Office of Emergency Services and Sheriffs' Offices for the counties of San Joaquin, Amador, Calaveras, Sacramento, and the State Flood Center will immediately notify all affected downstream agencies and the public. **REGULATORY COMPLIANCE/ EMERGENCY PREPAREDNESS OFFICES CONTACTS** Notify Environmental Compliance as necessary. See attached Emergency Notification Flowchart for numbers.

Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
6. SEARCH AND RESCUE Possible scenarios: • Missing swimmer • Missing person • River rescue • Vessel in distress	**Call 911 as necessary if not already called** **Call Watershed & Recreation Division in all instances:** ***All Hours:*** Call Resource Patrol Unit (RPU) RPU Supervisor, Tim Cox Office: 209-772-8256 Cell: 209-610-0898 Radio: 3830, channel 4 Home: 209-754-0604 -OR- RPU Senior Ranger, Greg Persons Office: 209-772-8307 Cell: 209-202-1627 Radio: 3831, channel 4	**SECONDARY FIELD CONTACTS (Per Incident Commander)** Usually none but respond as requested by Incident Commander **MANAGEMENT CONTACTS** Notify Watershed & Recreation Management first. The first management contact notified will be responsible for notifying other management personnel as necessary. See attached Emergency Notification Flowchart for numbers. If District employee(s) involved, notify employee's supervisor and/or manager. **REGULATORY COMPLIANCE/ EMERGENCY PREPAREDNESS OFFICE CONTACTS** Always notify Emergency Preparedness Office to deal with inter-jurisdictional issues whenever search and rescue is needed. Notify Workplace Health & Safety as necessary if District employee involved. See attached Emergency Notification Flowchart for numbers.
7. SEWAGE RELEASE (TO WATER, DRAINAGE CHANNEL, OR GROUND) Possible scenarios: • Broken sewage pipe • Overflow of sewage from manhole • Release from fish cleaning or R/V dump station • Overturned and/or sinking floating outhouse • Release from sewage pond, wastewater pumping plant or spray field • Overflow from Lift Station • RV sewage hose leaking onto ground **Reference Attachment #3**	**If source of spill is equipment or facilities owned, operated or maintained by the District, call Maintenance:** ***Off Hours:*** Refer to Standby On-Call Supervisor List ***Working Hours:*** **All W/W events contact:** Temporary Staff, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8348 Cell: 209-969-3900 Radio: 7014, channel 4 *AND:* **For power plant-related events contact:** Dave Oldham, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8213 Nextel: 209-684-5036 Radio: 7018, channel 4	**SECONDARY FIELD CONTACTS (Per Incident Commander)** **NOTE:** If release is to the environment (not fully contained within a building) incident commander should request notification of: Water Quality Unit to assess water quality impacts • Tony Boitano, Water & Wastewater Supervisor Office: 209-772-8368 Home: 209-286-1605 Cell: 209-304-8677 Radio: 7016, channel 4 • John C. Johnson, Assistant Superintendent Office: 209-772-8267 Cell: 209-601-5193 Radio: 7011, channel 4 *AND:* Fisheries and Wildlife to assess fish and/or wildlife impacts • Jose Setka, Supervising F/W Biologist Office: 209-365-1467 Cell: 510-517-2169 Radio: 3820, channel 4 Home: 707-678-2612

Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
	For non-power plant-related events contact: Todd Cearley, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8212 Cell: 209-601-5298 Radio: 7013, channel 4 **If Operations assistance needed contact:** John C. Johnson, Assistant Superintendent Office: 209-772-8267 Cell: 209-601-5193 Radio: 7011, channel 4 *AND:* **If release is at any of the recreation areas or impacting watershed lands, call Watershed & Recreation Division, Resource Patrol Unit (RPU).** ***All Hours:*** RPU Supervisor, Tim Cox Office: 209-772-8256 Cell: 209-610-0898 Radio: 3830, channel 4 Home: 209-754-0604 -OR- RPU Senior Ranger, Greg Persons Office: 209-772-8307 Cell: 209-202-1627 Radio: 3831, channel 4	**MANAGEMENT CONTACTS** Notify Pardee Section management first if spill involves a District facility that is not a recreation area. Notify Watershed & Recreation management first if spill is at a recreation area. The first management contact notified will be responsible for notifying other management personnel as necessary. See attached Emergency Notification Flowchart for numbers. **REGULATORY COMPLIANCE/ EMERGENCY PREPAREDNESS OFFICE CONTACTS** • **24 hour emergency pager 510-437-7363** Notify Environmental Compliance immediately so that regulatory agency notifications can be made within the required time (**WITHIN 2 HOURS of discovery**). If emergency assessment; containment; and/or cleanup resources are beyond those available contact Environmental Compliance so that post-emergency cleanup activities arrangements can be made. Environmental Compliance will be responsible for notifying Workplace Health & Safety and Emergency Preparedness unless the PACC operator requires specific information from these units in which case they may be contacted directly. In any case, both Workplace Health & Safety and Emergency Preparedness should always be notified. See attached Emergency Notification Flowchart for numbers.
8. Structural Fire / Vehicle or Boat Fire (with or without hazardous materials) Possible sources: • Any incident on or nearby EBMUD property with potential to threaten life and/or property	**Call 911, if not already called.** **If at a recreation area or impacting watershed lands, call Watershed & Recreation Division.** ***All Hours:*** Call Resource Patrol Unit (RPU). RPU Supervisor, Tim Cox Office: 209-772-8256 Cell: 209-610-0898 Radio: 3830, channel 4 Home: 209-754-0604	**SECONDARY FIELD CONTACTS (Per Incident Commander)** Usually none but respond as requested by Incident Commander **MANAGEMENT CONTACTS** If at a recreation area, notify Watershed and Recreation management first; otherwise notify Pardee Section management first. The first management contact notified will be responsible for notifying other management personnel as necessary. See attached Emergency Notification Flowchart for numbers.

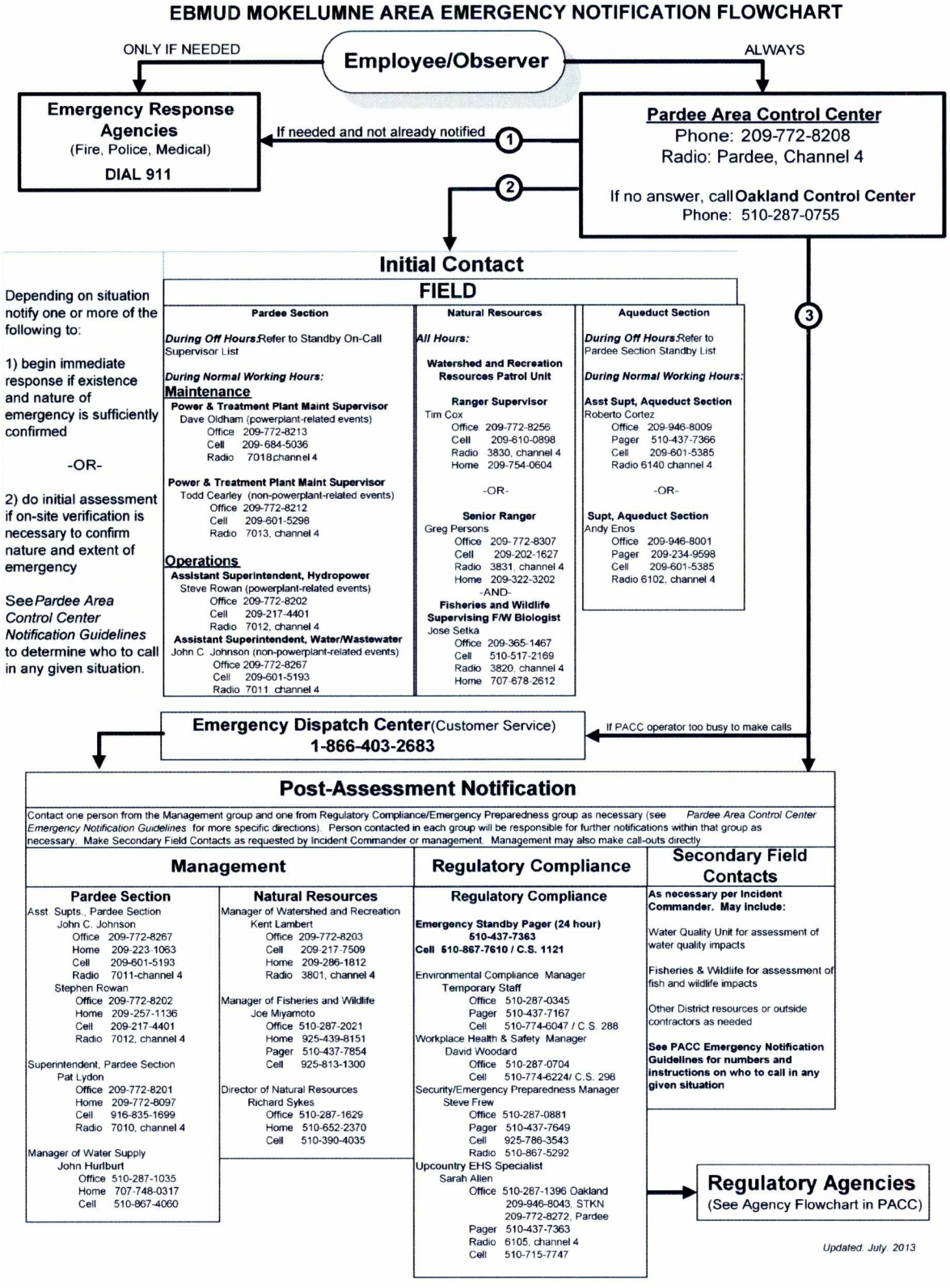
Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
	-OR- RPU Senior Ranger, Greg Persons Office: 209-772-8307 Cell: 209-202-1627 Radio: 3831, channel 4	**REGULATORY COMPLIANCE/ EMERGENCY PREPAREDNESS OFFICES CONTACTS** Notify Regulatory Compliance and Emergency Preparedness Offices only as necessary. See attached Emergency Notification Flowchart for numbers.
9. WATER/ WASTEWATER TREATMENT PROCESS UPSET Possible scenarios: • Shutdown of water plant chlorination system • Zero chlorine residual in water distribution system • High turbidity event which results in treated water turbidity in excess of regulated limits • High flows in the wastewater collection system that result in upset of wastewater treatment process units • WW pond freeboard exceedance or potential threat of • Loss of power which results in treatment process unit upsets • Notification from District lab of either a Total Coliform Rule or a Nitrate/Nitrite Rule exceedance • Water system outage or diminished pressure caused by water supply shortage, extended power failure or catastrophic treatment/distribution system failure **Reference attachments #3, #4, #5, and #6**	**Notify Water Quality Unit Supervisor first:** Tony Boitano, Water & Wastewater Supervisor Office: 209-772-8368 Home: 209-286-1605 Cell: 209-304-8677 Radio: 7016, channel 4 John C. Johnson, Assistant Superintendent Office: 209-772-8267 Cell: 209-601-5193 Radio: 7011, channel 4 **If maintenance assistance is needed call:** ***Off Hours:*** Refer to Standby On-Call Supervisor List ***Working Hours:*** **All water treatment events contact:** Todd Cearley, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8212 Cell: 209-601-5298 Radio: 7013, channel 4 **All wastewater treatment events contact:** Temporary Staff, Power & Treatment Plant Maintenance Supervisor Office: 209-772-8348 Cell: 209-969-3900 Radio: 7014, channel 4	**<u>SECONDARY FIELD CONTACTS (Per Incident Commander)</u>** **NOTE:** If there is a discharge from the water or wastewater treatment process to the environment (not fully contained within a building) the incident commander should request notification of: Fisheries and Wildlife to assess fish and/or wildlife impacts. • Jose Setka, Supervising F/W Biologist Office: 209-365-1467 Pager: 510-540-4048 Radio: 3820, channel 4 **MANAGEMENT CONTACTS** Notify Pardee Section management first. The first management contact notified will be responsible for notifying other management personnel as necessary. See attached Emergency Notification Flowchart for numbers. **REGULATORY COMPLIANCE/EMERGENCY PREPAREDNESS OFFICE CONTACTS** • **24 hour emergency pager 510-437-7363** Notify Environmental Compliance immediately so that regulatory agency notifications can be made within the required time **(WITHIN 2 HOURS of discovery)**. • If emergency assessment; containment; and/or cleanup resources are beyond those available contact Environmental Compliance so that post-emergency cleanup activities arrangements can be made. • Environmental Compliance will be responsible for notifying Workplace Health & Safety and Emergency Preparedness unless the ACC operator requires specific information from these units in which case they may be contacted directly. • <u>In any case, both Workplace Health & Safety and Emergency Preparedness should always be notified</u>. See attached Emergency Notification Flowchart for numbers.

Type of Emergency	*Initial (Field) Contact(s)*	*Post-Assessment Notification (Secondary Field, Management, Emergency Preparedness & Regulatory Compliance Office)*
10. WILDLAND FIRE Possible sources: • Any incident on or nearby EBMUD property with potential to threaten life and/or property • Local/regional fire with potential to spread onto EBMUD property	**Call 911, if not already notified.** ***All Hours:*** Call Resource Patrol Unit (RPU) RPU Supervisor, Tim Cox Office: 209-772-8256 Cell: 209-610-0898 Radio: 3830, channel 4 Home: 209-754-0604 -or- RPU Senior Ranger, Greg Persons Office: 209-772-8307 Cell: 209-202-1627 Radio: 3831, channel 4	**SECONDARY FIELD CONTACTS (Per Incident Commander)** Usually none but respond as requested by Incident Commander **MANAGEMENT CONTACTS** Notify Watershed & Recreation Management first. • The first management contact notified will be responsible for notifying other management personnel as necessary. See attached Emergency Notification Flowchart for numbers. **REGULATORY COMPLIANCE/ EMERGENCY PREPAREDNESS OFFICE CONTACTS** Always notify Emergency Preparedness if fire crosses county lines or involves multiple agencies (the Emergency Preparedness Officer is responsible for dealing with inter-jurisdictional issues). Notify Regulatory Compliance Office as necessary for environmental or workplace health and safety issues. See attached Emergency Notification Flowchart for numbers.

ATTACHMENT LISTING

#1 Emergency Notification Flowchart
#2 EBMUD Emergency Event Report
#3 Spill Reporting Requirements Summary
#4 California Hazardous Material Spill/Release Notification Guidance
#5 Response Procedure for Water System Outage/Pressure Loss
#6 Consumer Alert During Water Outages or periods of Low Pressure

Attachment #1



Attachment #2

EBMUD Emergency Event Report

Instructions: *This form is to be used by Control Center Staff to record information reported by the observer about any emergency or potential emergency such as fire, medical emergency or release of a hazardous material at any EBMUD facility.*

Record all information asked for below, if known. Ask any other questions that appear pertinent but do not delay notifying outside emergency response agencies and EBMUD staff if necessary.

1. Name of person and title (if EBMUD employee) reporting incident, date, and time:

   NAME/TITLE:_____DATE:_____TIME:_____

2. Location or street address and phone number of person reporting incident:

   _____

3. Location of incident (address and nearest cross street to which any emergency response agencies or personnel may need to respond):

   _____

4. Type of incident:

Chemical or Waste?	*Yes____*	*No____*	*If yes, go to section 5, below.*
Fire?	*Yes____*	*No____*	*If yes, go to section 6, below.*
Medical Emergency?	*Yes____*	*No____*	*If yes, go to section 7, below.*
Other?	*Yes____*	*No____*	*If yes, go to section 8, below.*

5. **If Hazardous Chemical or Waste Release:**
   a. What is the chemical or waste released (if known)? _____
   b. What is the physical state (circle all that apply): Solid, Liquid, Gas, Vapor
   c. Quantity of material released (overestimate rather than underestimate) _____
   d. Wind speed? _____ (estimate if necessary)
   e. Wind direction? Blowing from the _____ to the _____.
   f. Is the material contained (circle one)? Yes No
   g. Is the material entering or threatening a waterway (circle one)? Yes No
   h. Is an evacuation order required (circle one)? Yes No
   i. Is medical attention required for anyone (circle one)? Yes No If yes complete section 7.
   j. Is a MSDS for the chemical available (circle one)? Yes No
   k. What action, if any, has been taken?

      _____

      _____

   l. Any other pertinent information?

      _____

      _____

6. **If Fire:**
   a. Size and nature of fire (if known)?

      _____

   b. Has the fire department been notified (circle one)? Yes No Call if not notified
   c. Is the fire department on site (circle one)? Yes No
   d. Wind speed? _____ (estimate if necessary)
   e. Wind direction? Blowing from the _____ to the _____.
   f. What, if any, action has been, is being or will be taken by facility staff or EBMUD personnel?

      _____

      _____

   g. Are there any hazardous materials stored in the fire area (circle one)? Yes No
   h. What type of, if any, hazardous materials are threatened?

      _____

   i. Is an evacuation order required (circle one)? Yes No
   j. Is medical attention required for anyone (circle one)? Yes No If yes complete section 7.
   k. Any other pertinent information?

      _____

      _____

      _____

      _____

      _____

      _____

7. **If Medical Emergency:**
   a. Nature of injury/illness and number of individuals affected (if known)?

      _____

   b. Has emergency medical personnel been notified (circle one)? Yes No Call if not notified
   c. Is emergency medical personnel on site (circle one)? Yes No
   d. What, if any, action has been, is being or will be taken by facility staff or EBMUD personnel?

      _____

      _____

   e. Have victims been exposed to hazardous materials (circle one)? Yes No
   f. If victims have been exposed, what is the material?

      _____

   g. Is a MSDS for the material available (circle one)? Yes No If yes, provide to medical personnel.
   h. Any other pertinent information?

      _____

      _____

      _____

      _____

      _____

      _____

8. **If "Other" Type of Incident:**
   Descried in as much detail as possible and determine if notification of emergency response agencies or EBMUD management or support personnel is required. For sanitary sewer overflow(SSO), document the estimated start/end times, estimated flow rate (GPM), estimated volume released and recovered, distance to nearest manhole (upstream and downstream), and direction of flow to a surface drainage channel or receiving water body. Answer questions in other sections as appropriate:

Attachment #3

SUMMARY OF SEWAGE SPILL REPORTING REQUIREMENTS

Direct Facility Reporting – Water Quality Enforcement Policy

California Water Code Section 13271[1] requires any person who, without regard to intent or negligence, causes or permits any hazardous substance or sewage to be discharged in or on any waters of the state, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the state to notify the Office of Emergency Services of the discharge as specified in that section. The Office of Emergency Services then immediately notifies the appropriate RWQCB and the local health officer and administrator of environmental health of the discharge.

WDRs including NPDES permits, should require regulated facilities to report to the RWQCB by phone within a specified time [within 24 hours], followed by a written report [7-14 days] and/or a discussion in the next Self Monitoring Report, when certain events occur, such as:

a) Discharges that are not in accordance with WDRs and that pose an immediate public health threat;
b) Bypass of raw or partially treated sewage or other waste from a treatment unit or discharge of wastewater from a collection system in a manner inconsistent with WDRs;
c) Treatment unit failure or loss of power that threatens to cause a bypass; and
d) Any other operational problems that threaten to cause significant violations of WDRs or impacts to receiving waters or public health.

Attachment #4

California Hazardous Material Spill/Release Notification Guidance – OES

All significant spills or threatened releases of hazardous materials, including oil, must be **immediately** reported. Notification should be made by phone, followed by written reports:

- Discharges or threatened discharges of oil in marine waters
- Any spill or other release of one barrel or more of petroleum products at a tank facility
- Discharges of any hazardous substances or sewage, into or on any waters of the state
- Discharges that may threaten or impact water quality
- Discharges of oil or petroleum products, into or on any waters of the state
- Hazardous Liquid Pipeline releases and every rupture, explosion or fire involving a pipeline

---

[1] Title 23, Waters, Division 3, Chapter 9.2, §2250: **(b) For the purposes of Section 13271, an unauthorized discharge is defined to be a discharge, not regulated by waste discharge requirements, of treated, partially treated, or untreated wastewater resulting form the intentional or unintentional diversion of wastewater from a collection, treatment or disposal system.**

Attachment #5

Response Procedure for Water System Outage/Pressure Loss

Outages and diminished delivery pressure within public drinking water systems may be brought on by a number of potential causes. Included amongst the potential causes may be: Major failure of breakage of major water main or facility, reduction or loss of raw water supply from an extended drought, dam failure, catastrophic and extended power failure, major contamination of the water supply, and many other causes. All of these potential causes may be precipitated by any number of natural or man-made disaster events such as earthquakes, storms, fires, transportation accidents, acts of terrorism, etc.

If it becomes apparent that continuous delivery of properly and adequately treated and disinfected water has been, or will be, disrupted in any of the four upcountry water systems (CANS, CASS, PACT or PARA), it will be necessary to initiate action to make all required notifications to internal and external authorities and the public; and to initiate response to provide safe water for drinking and non potable use to the service area customers.

- If there is contaminated water has entered the distribution system immediate public notification is the highest priority
- If water system outage or diminished pressure caused by water supply shortage, extended power failure or catastrophic treatment/distribution system failure:
    - All affected customers must be notified as quickly as possible to curtail usage.
    - All non-essential usage should be ceased immediately, and essential usage should be reduced to an absolute minimum. Reduction of water usage and demand to an absolute minimum will greatly extend the duration that the stored treated water and back-up systems can sustain the customer needs.
    - Distribute the District's procedure for Consumer Alert During Water Outages or Periods of Low Pressure Caused by Water Supply Shortages and/or Power Outages. (Attachment #6)
        - This notice should be distributed to all water customers and consumers including: residents, campers and other guests, employees, contractors and vendors.
        - The notice should also be posted in any and all conspicuous locations, particularly near points of potential water usage such as: restrooms, stores, Laundromats, RV dump stations, District and concessionaire offices, on bulletin boards throughout campgrounds and recreation areas, and at the main entry gates. The Mokelumne Office Watershed and Rangers, and Concessionaires should be recruited to distribute and post these notices immediately as Pardee Section staff is responding to deal with the outage /shortage itself.

Attachment #6

PUBLIC NOTICE

CONSUMER ALERT DURING WATER OUTAGES OR PERIODS OF LOW PRESSURE CAUSED BY WATER SUPPLY SHORTAGES AND/OR POWER OUTAGES

Revised October 2010

1. If you are experiencing water outages or low water pressure, immediately discontinue any and all non-essential water usage. This includes all outdoor irrigation and car washing. Minimizing usage will reduce the potential for the water system to lose pressure or completely run out of water. Please notify your water system of the outage or low pressure.

2. If the water looks cloudy or dirty, you should not drink it. Upon return of normal water service, you should flush the hot and cold water lines until the water appears clear and the water quality returns to normal.

3. If you are concerned about the water quality or are uncertain of its safety, you may add eight drops of household bleach to one gallon of water and let it sit for 30 minutes or alternatively, if you are able, water can be boiled for one minute at a rolling boil to ensure its safety.

4. Use of home treatment devices does not guarantee the water supply is safe after low-pressure situations.

5. Do not be alarmed if you experience higher than normal chlorine concentrations in your water supply. The California Department of Public Health (Department) is advising public water utilities to increase chlorine residuals in areas that may be subject to low pressure or outages.

6. The Department has also advised public water systems to increase the bacteriological water quality monitoring of the distribution system in areas subject to low pressure. You may see EBMUD personnel collecting extra samples in your area to provide confirmation that the water is safe. You will be advised if the results of the sampling reveal a water quality problem.

7. Your water system is committed to make certain that an adequate quantity of clean, wholesome, and potable water is delivered to you. We recommend that you discuss the information in this notice with members of your family to ensure that all family members are prepared should water outages or low water pressure occur.

CALIFORNIA ENVIRONMENTAL REPORTING SYSTEM (CERS)

CONSOLIDATED EMERGENCY RESPONSE / CONTINGENCY / SLUG PLAN

Prior to completing this Plan, please refer to the INSTRUCTIONS FOR COMPLETING A CONSOLIDATED CONTINGENCY PLAN

A. FACILITY IDENTIFICATION AND OPERATIONS OVERVIEW

FACILITY ID # — — 1.

CERS ID A1. 10238980

DATE OF PLAN PREPARATION/REVISION A2. 10/3/14

BUSINESS NAME *(Same as Facility Name or DBA - Doing Business As)* 3.
EBMUD Camanche North Shore Recreation Area

BUSINESS SITE ADDRESS 103.
2000 Camanche Road

BUSINESS SITE CITY 104. Ione

CA

ZIP CODE 105. 95640

TYPE OF BUSINESS (e.g., Painting Contractor) A3. Water Treatment

INCIDENTAL OPERATIONS (e.g., Fleet Maintenance) A4.

THIS PLAN COVERS CHEMICAL SPILLS, FIRES, AND EARTHQUAKES INVOLVING: (Check all that apply) A5.

☒ 1. HAZARDOUS MATERIALS; ☒ 2. HAZARDOUS WASTES

B. INTERNAL RESPONSE

INTERNAL FACILITY EMERGENCY RESPONSE WILL OCCUR VIA: (Check all that apply) B1.

☒ 1. CALLING PUBLIC EMERGENCY RESPONDERS (i.e., 9-1-1)
☒ 2. CALLING HAZARDOUS WASTE CONTRACTOR (NRC Environmental) or General Environmental Services on-call Contractor (URS Corporation)
☐ 3. ACTIVATING IN-HOUSE EMERGENCY RESPONSE TEAM

C. EMERGENCY COMMUNICATIONS, PHONE NUMBERS AND NOTIFICATIONS

Whenever there is an imminent or actual emergency situation such as an explosion, fire, or release, the Emergency Coordinator (or his/her designee when the Emergency Coordinator is on call) shall:

1. Activate internal facility alarms or communications systems, where applicable, to notify all facility personnel.
2. Notify appropriate local authorities (i.e., call 9-1-1)..
3. Notify the California Emergency Management Agency at (800) 852-7550.

Before facility operations are resumed in areas of the facility affected by the incident, the emergency coordinator shall notify the California Department of Toxic Substances Control (DTSC), the local Unified Program Agency (UPA), and the local fire department's hazardous materials program that the facility is in compliance with requirements to:

1. Provide for proper storage and disposal of recovered waste, contaminated soil or surface water, or any other material that results from an explosion, fire, or release at the facility; and
2. Ensure that no material that is incompatible with the released material is transferred, stored, or disposed of in areas of the facility affected by the incident until cleanup procedures are completed.

INTERNAL FACILITY EMERGENCY COMMUNICATIONS OR ALARM NOTIFICATION WILL OCCUR VIA: (Check all that apply) C1.

☒ 1. VERBAL WARNINGS; ☐ 2. PUBLIC ADDRESS OR INTERCOM SYSTEM; ☒ 3. TELEPHONE;
☐ 4. PAGERS; ☐ 5. ALARM SYSTEM; ☒ 6. PORTABLE RADIO

NOTIFICATIONS TO NEIGHBORING FACILITIES THAT MAY BE AFFECTED BY AN OFF-SITE RELEASE WILL OCCUR BY: (Check all that apply) C2.

☒ 1. VERBAL WARNINGS; ☐ 2. PUBLIC ADDRESS OR INTERCOM SYSTEM; ☒ 3. TELEPHONE (via CUPA);
☐ 4. PAGERS; ☐ 5. ALARM SYSTEM; ☐ 6. PORTABLE RADIO

EMERGENCY RESPONSE PHONE NUMBERS:

AMBULANCE, FIRE, POLICE AND CHP	**9-1-1**
CALIFORNIA EMERGENCY MANAGEMENT AGENCY (CAL/EMA)	**(800) 852-7550**
NATIONAL RESPONSE CENTER (NRC)	(800) 424-8802
POISON CONTROL CENTER	(800) 222-1222
LOCAL UNIFIED PROGRAM AGENCY (UPA/CUPA) – Amador County OES	(209) 223-6384 C3.
OTHER (Specify): C4.	C5.
NEAREST MEDICAL FACILITY / HOSPITAL NAME: C6.	( ) C7.

AGENCY NOTIFICATION PHONE NUMBERS:

CALIFORNIA DEPT. OF TOXIC SUBSTANCES CONTROL (DTSC)	(916) 255-3545
REGIONAL WATER QUALITY CONTROL BOARD	(916) 464-3291 C8.
U.S. ENVIRONMENTAL PROTECTION AGENCY (US EPA)	(800) 300-2193
CALIFORNIA DEPT OF FISH AND GAME (DFG)	(831) 649-2817
U.S. COAST GUARD	(202) 267-2180
CAL/OSHA	(925) 602-6517
STATE FIRE MARSHAL	(916) 445-8200
OTHER: C9.	C10.
OTHER: C11.	C12.

D. EMERGENCY CONTAINMENT AND CLEANUP PROCEDURES

SPILL PREVENTION, CONTAINMENT, AND CLEANUP PROCEDURES: (Check all boxes that apply to indicate your procedures for containing spills, releases, fires or explosions; and. preventing and mitigating associated harm to persons, property, and the environment.)

D1.

- ☒ 1. MONITOR FOR LEAKS, RUPTURES, PRESSURE BUILD-UP, ETC.;
- ☒ 2. PROVIDE STRUCTURAL PHYSICAL BARRIERS (e.g., Portable spill containment walls);
- ☒ 3. PROVIDE ABSORBENT PHYSICAL BARRIERS (e.g., Pads, pigs, pillows);
- ☐ 4. COVER OR BLOCK FLOOR AND/ OR STORM DRAINS;
- ☒ 5. BUILT-IN BERM IN WORK / STORAGE AREA;
- ☐ 6. AUTOMATIC FIRE SUPPRESSION SYSTEM; only in storage room (room 116)
- ☒ 7. ELIMINATE SOURCES OF IGNITION FOR FLAMMABLE HAZARDS (e.g. Flammable liquids, Propane);
- ☒ 8. STOP PROCESSES AND/OR OPERATIONS;
- ☒ 9. AUTOMATIC / ELECTRONIC EQUIPMENT SHUT-OFF SYSTEM;
- ☒ 10. SHUT-OFF WATER, GAS, ELECTRICAL UTILITIES AS APPROPRIATE;
- ☒ 11. CALL 9-1-1 FOR PUBLIC EMERGENCY RESPONDER ASSISTANCE / MEDICAL AID;
- ☒ 12. NOTIFY AND EVACUATE PERSONS IN ALL THREATENED AREAS;
- ☒ 13. ACCOUNT FOR EVACUATED PERSONS IMMEDIATELY AFTER EVACUATION CALL;
- ☒ 14. PROVIDE PROTECTIVE EQUIPMENT FOR ON-SITE RESPONSE TEAM;
- ☒ 15. REMOVE OR ISOLATE CONTAINERS / AREA AS APPROPRIATE;
- ☒ 16. HIRE LICENSED HAZARDOUS WASTE CONTRACTOR;
- ☒ 17. USE ABSORBENT MATERIAL FOR SPILLS WITH SUBSEQUENT PROPER LABELING, STORAGE, AND HAZARDOUS WASTE DISPOSAL AS APPROPRIATE;
- ☐ 18. SUCTION USING SHOP VACUUM WITH SUBSEQUENT PROPER LABELING, STORAGE, AND HAZARDOUS WASTE DISPOSAL AS APPROPRIATE;
- ☒ 19. WASH / DECONTAMINATE EQUIPMENT W/ CONTAINMENT and DISPOSAL OF EFFLUENT / RINSATE AS HAZARDOUS WASTE;
- ☒ 20. PROVIDE SAFE TEMPORARY STORAGE OF EMERGENCY-GENERATED WASTES;
- ☐ 21. OTHER (Specify):

D2.

E. FACILITY EVACUATION

THE FOLLOWING ALARM SIGNAL(S) WILL BE USED TO BEGIN EVACUATION OF THE FACILITY (CHECK ALL THAT APPLY): E1.

- ☒ 1. BELLS / ALARMS;
- ☐ 2. HORNS / SIRENS / AUDIBLE ALARMS;
- ☒ 3. VERBAL (i.e., SHOUTING);
- ☒ 4. OTHER (Specify): radio

E2.

THE FOLLOWING LOCATION(S) IS/ARE EVACUEE EMERGENCY ASSEMBLY AREA(S) (i.e., Front parking lot, specific street corner, etc.) E3.

See attached Evacuation Map

Note: The Emergency Coordinator must account for all on site employees and/or site visitors after evacuation.

☒ EVACUATION ROUTE MAP(S) POSTED AS REQUIRED E4.

Note: The map(s) must show primary and alternate evacuation routes, emergency exits, and primary and alternate staging areas, and must be prominently posted throughout the facility in locations where it will be visible to employees and visitors.

F. ARRANGEMENTS FOR EMERGENCY SERVICES

Explanation of Requirement: Advance arrangements with local fire and police departments, hospitals, and/or emergency services contractors should be made as appropriate for your facility. You may determine that such arrangements are not necessary.

ADVANCE ARRANGEMENTS FOR LOCAL EMERGENCY SERVICES (Check one of the following) F1.

- ☐ 1. HAVE BEEN DETERMINED NOT NECESSARY; *or*
- ☒ 2. THE FOLLOWING ARRANGEMENTS HAVE BEEN MADE (Specify):

F2

The Regulatory Compliance Office maintains staff on-call 24-hours a day (pager is 510-437-7363). The standby person is authorized to activate the on-call emergency contract responder at anytime to provide response, conduct spill cleanup, and/or perform other related tasks, as needed.

G. EMERGENCY EQUIPMENT

Check all boxes that apply to list emergency response equipment available at the facility and identify the location(s) where the equipment is kept and the equipment's capability, if applicable. [e.g., ☒ CHEMICAL PROTECTIVE GLOVES | Spill response kit | One time use, Oil & solvent resistant only.]

TYPE	EQUIPMENT AVAILABLE G1.	LOCATION	CAPABILITY *(If applicable)*
Safety and First Aid	1. ☒ CHEMICAL PROTECTIVE SUITS, APRONS, OR VESTS	Water treatment Facility G2.	G3.
	2. ☒ CHEMICAL PROTECTIVE GLOVES	Water treatment Facility G4.	G5.
	3. ☒ CHEMICAL PROTECTIVE BOOTS	Water treatment Facility G6.	G7.
	4. ☒ SAFETY GLASSES / GOGGLES / SHIELDS	Water treatment Facility G8.	G9.
	5. ☒ HARD HATS	Water treatment Facility G10.	G11.
	6. ☐ CARTRIDGE RESPIRATORS	G12.	G13.
	7. ☐ SELF-CONTAINED BREATHING APPARATUS (SCBA)	G14.	G15.
	8. ☒ FIRST AID KITS / STATIONS	Throughout facility G16.	G17.
	9. ☒ PLUMBED EYEWASH FOUNTAIN / SHOWER	Water treatment Facility G18.	G19.
	10. ☐ PORTABLE EYEWASH KITS	G20.	G21.
	11. ☐ OTHER	G22.	G23.
	12. ☐ OTHER	G24.	G25.
Fire Fighting	13. ☒ PORTABLE FIRE EXTINGUISHERS	Throughout facility & in District vehicles G26.	G27.
	14. ☐ FIXED FIRE SYSTEMS / SPRINKLERS / FIRE HOSES	) G28.	G29.
	15. ☐ FIRE ALARM BOXES OR STATIONS	G30.	G31.
	16. ☐ OTHER	G32.	G33.
Spill Control and Clean-Up	17. ☒ ALL-IN-ONE SPILL KIT	Water treatment Facility G34.	G35.
	18. ☐ ABSORBENT MATERIAL	G36.	G37.
	19. ☐ CONTAINER FOR USED ABSORBENT	G38.	G39.
	20. ☐ BERMING / DIKING EQUIPMENT	G40.	G41.
	21. ☒ BROOM	G42.	G43.
	22. ☒ SHOVEL	G44.	G45.
	23. ☐ SHOP VAC	G46.	G47.
	24. ☐ EXHAUST HOOD	G48.	G49.
	25. ☒ EMERGENCY SUMP / HOLDING TANK	Water Treatment Facility G50.	G51.
	26. ☐ CHEMICAL NEUTRALIZERS	G52.	G53.
	27. ☐ GAS CYLINDER LEAK REPAIR KIT	G54.	G55.
	28. ☐ SPILL OVERPACK DRUMS	G56.	G57.
	29. ☒ OTHER – Hazardous Waste Storage Locker	See Facility Diagram G58.	G59.
Communi-cations and Alarm Systems	30. ☒ TELEPHONES (Includes cellular)	Throughout facility G60.	G61.
	31. ☐ INTERCOM / PA SYSTEM	G62.	G63.
	32. ☒ PORTABLE RADIOS	G64.	G65.
	33. ☒ AUTOMATIC ALARM CHEMICAL MONITORING EQUIPMENT	G66.	G67.
her	34. ☐ OTHER – Emergency generator	G68.	G69.
	35. ☐ OTHER – Emergency lighting	G70.	G71.

H. EARTHQUAKE VULNERABILITY

Identify areas of the facility that are vulnerable to hazardous materials releases / spills due to earthquake-related motion. These areas require immediate isolation and inspection.

VULNERABLE AREAS: (Check all that apply) H1.	LOCATIONS (e.g., shop, outdoor shed, forensic lab)
☒ 1. HAZARDOUS MATERIALS / WASTE STORAGE AREA	H2.
☒ 2. PROCESS LINES / PIPING	H3.
☐ 3. LABORATORY	H4.
☐ 4. WASTE TREATMENT AREA	H5.

Identify mechanical systems vulnerable to releases / spills due to earthquake-related motion. These systems require immediate isolation and inspection.

VULNERABLE SYSTEMS: (Check all that apply) H6.	LOCATIONS
☒ 1. SHELVES, CABINETS AND RACKS	H7.
☒ 2. TANKS (EMERGENCY SHUTOFF)	H8.
☐ 3. PORTABLE GAS CYLINDERS	H9.
☐ 4. EMERGENCY SHUTOFF AND/OR UTILITY VALVES	H10.
☐ 5. SPRINKLER SYSTEMS	H11.
☐ 6. STATIONARY PRESSURIZED CONTAINERS (e.g., Propane dispensing tank)	H12.

I. EMPLOYEE TRAINING

Explanation of Requirement: Employee training is required for all employees handling hazardous materials and hazardous wastes in day-to-day or clean-up operations including volunteers and/or contractors. Training must be:

- Provided within 6 months for new hires;
- Amended as necessary prior to change in process or work assignment;
- Given upon modification to the Emergency Response / Contingency Plan, and updated/refreshed annually for all employees.

Required content includes all of the following:

- Material Safety Data Sheets;
- Hazard communication related to health and safety;
- Methods for safe handling of hazardous substances;
- Fire hazards of materials / processes;
- Conditions likely to worsen emergencies;
- Coordination of emergency response;
- Notification procedures;
- Applicable laws and regulations;
- Communication and alarm systems;
- Personal protective equipment;
- Use of emergency response equipment (e.g. Fire extinguishers, respirators, etc.);
- Decontamination procedures;
- Evacuation procedures;
- Control and containment procedures;
- UST monitoring system equipment and procedures (if applicable).

INDICATE HOW EMPLOYEE TRAINING PROGRAM IS ADMINISTERED (Check all that apply) I1.

☒ 1. FORMAL CLASSROOM; ☐ 2. VIDEOS; ☒ 3. SAFETY / TAILGATE MEETINGS;

☐ 4. STUDY GUIDES / MANUALS (Specify): _____ I2.

☐ 5. OTHER (Specify): _____ I3.

☐ 6. NOT APPLICABLE BECAUSE FACILITY HAS NO EMPLOYEES

Large Quantity Generator (LQG) Training Records: Large quantity hazardous waste generators (i.e., who generate more than 270 gallons/1,000 kilograms of hazardous waste per month) must retain written documentation of employee hazardous waste management training sessions which includes:

- A written outline/agenda of the type and amount of both introductory and continuing training that will be given to persons filling each job position having responsibility for the management of hazardous waste (e.g., labeling, manifesting, compliance with accumulation time limits, etc.).
- The name, job title, and date of training for each hazardous waste management training session given to an employee filling such a job position; and
- A written job description for each of the above job positions that describes job duties and the skills, education, or other qualifications required of personnel assigned to the position.
- Current employee training records must be retained until closure of the facility.
- Former employee training records must be retained at least three years after termination of employment.

J. LIST OF ATTACHMENTS

(Check one of the following) J1.

☒ 1. NO ATTACHMENTS ARE REQUIRED; *or*

☐ 2. THE FOLLOWING DOCUMENTS ARE ATTACHED: J2.

K. SIGNATURE / CERTIFICATION

Certification: Based on my inquiry of those individuals responsible for obtaining the information, I certify under penalty of law that I have personally examined and am familiar with the information submitted and believe the information is true, accurate, and complete, and that a copy is available on site.

SIGNATURE OF OWNER/OPERATOR	DATE SIGNED K1.
	11/21/17
NAME OF SIGNER (print) K2.	TITLE OF SIGNER K3.
Robert Newman	Sr. Environmental H&S Specialist

CALIFORNIA ENVIRONMENTAL REPORTING SYSTEM (CERS)

CONSOLIDATED EMERGENCY RESPONSE / CONTINGENCY / SLUG PLAN

Prior to completing this Plan, please refer to the INSTRUCTIONS FOR COMPLETING A CONSOLIDATED CONTINGENCY PLAN

A. FACILITY IDENTIFICATION AND OPERATIONS OVERVIEW

FACILITY ID # — — 1.

CERS ID A1. 10238980

DATE OF PLAN PREPARATION/REVISION A2. 10/3/14

BUSINESS NAME *(Same as Facility Name or DBA - Doing Business As)* 3.
EBMUD Camanche North Shore Recreation Area

BUSINESS SITE ADDRESS 103.
2000 Camanche Road

BUSINESS SITE CITY 104. Ione

CA

ZIP CODE 105. 95640

TYPE OF BUSINESS (e.g., Painting Contractor) A3. Water Treatment

INCIDENTAL OPERATIONS (e.g., Fleet Maintenance) A4.

THIS PLAN COVERS CHEMICAL SPILLS, FIRES, AND EARTHQUAKES INVOLVING: (Check all that apply) A5.

☒ 1. HAZARDOUS MATERIALS; ☒ 2. HAZARDOUS WASTES

B. INTERNAL RESPONSE

INTERNAL FACILITY EMERGENCY RESPONSE WILL OCCUR VIA: (Check all that apply) B1.

☒ 1. CALLING PUBLIC EMERGENCY RESPONDERS (i.e., 9-1-1)
☒ 2. CALLING HAZARDOUS WASTE CONTRACTOR (NRC Environmental) or General Environmental Services on-call Contractor (URS Corporation)
☐ 3. ACTIVATING IN-HOUSE EMERGENCY RESPONSE TEAM

C. EMERGENCY COMMUNICATIONS, PHONE NUMBERS AND NOTIFICATIONS

Whenever there is an imminent or actual emergency situation such as an explosion, fire, or release, the Emergency Coordinator (or his/her designee when the Emergency Coordinator is on call) shall:

1. Activate internal facility alarms or communications systems, where applicable, to notify all facility personnel.
2. Notify appropriate local authorities (i.e., call 9-1-1)..
3. Notify the California Emergency Management Agency at (800) 852-7550.

Before facility operations are resumed in areas of the facility affected by the incident, the emergency coordinator shall notify the California Department of Toxic Substances Control (DTSC), the local Unified Program Agency (UPA), and the local fire department's hazardous materials program that the facility is in compliance with requirements to:

1. Provide for proper storage and disposal of recovered waste, contaminated soil or surface water, or any other material that results from an explosion, fire, or release at the facility; and
2. Ensure that no material that is incompatible with the released material is transferred, stored, or disposed of in areas of the facility affected by the incident until cleanup procedures are completed.

INTERNAL FACILITY EMERGENCY COMMUNICATIONS OR ALARM NOTIFICATION WILL OCCUR VIA: (Check all that apply) C1.

☒ 1. VERBAL WARNINGS; ☐ 2. PUBLIC ADDRESS OR INTERCOM SYSTEM; ☒ 3. TELEPHONE;
☐ 4. PAGERS; ☐ 5. ALARM SYSTEM; ☒ 6. PORTABLE RADIO

NOTIFICATIONS TO NEIGHBORING FACILITIES THAT MAY BE AFFECTED BY AN OFF-SITE RELEASE WILL OCCUR BY: (Check all that apply) C2.

☒ 1. VERBAL WARNINGS; ☐ 2. PUBLIC ADDRESS OR INTERCOM SYSTEM; ☒ 3. TELEPHONE (via CUPA);
☐ 4. PAGERS; ☐ 5. ALARM SYSTEM; ☐ 6. PORTABLE RADIO

EMERGENCY RESPONSE PHONE NUMBERS:

AMBULANCE, FIRE, POLICE AND CHP	**9-1-1**
CALIFORNIA EMERGENCY MANAGEMENT AGENCY (CAL/EMA)	**(800) 852-7550**
NATIONAL RESPONSE CENTER (NRC)	(800) 424-8802
POISON CONTROL CENTER	(800) 222-1222
LOCAL UNIFIED PROGRAM AGENCY (UPA/CUPA) – Amador County OES	(209) 223-6384 C3.
OTHER (Specify): C4.	C5.
NEAREST MEDICAL FACILITY / HOSPITAL NAME: C6.	( ) C7.

AGENCY NOTIFICATION PHONE NUMBERS:

CALIFORNIA DEPT. OF TOXIC SUBSTANCES CONTROL (DTSC)	(916) 255-3545
REGIONAL WATER QUALITY CONTROL BOARD	(916) 464-3291 C8.
U.S. ENVIRONMENTAL PROTECTION AGENCY (US EPA)	(800) 300-2193
CALIFORNIA DEPT OF FISH AND GAME (DFG)	(831) 649-2817
U.S. COAST GUARD	(202) 267-2180
CAL/OSHA	(925) 602-6517
STATE FIRE MARSHAL	(916) 445-8200
OTHER: C9.	C10.
OTHER: C11.	C12.

D. EMERGENCY CONTAINMENT AND CLEANUP PROCEDURES

SPILL PREVENTION, CONTAINMENT, AND CLEANUP PROCEDURES: (Check all boxes that apply to indicate your procedures for containing spills, releases, fires or explosions; and. preventing and mitigating associated harm to persons, property, and the environment.)

D1.

- ☒ 1. MONITOR FOR LEAKS, RUPTURES, PRESSURE BUILD-UP, ETC.;
- ☒ 2. PROVIDE STRUCTURAL PHYSICAL BARRIERS (e.g., Portable spill containment walls);
- ☒ 3. PROVIDE ABSORBENT PHYSICAL BARRIERS (e.g., Pads, pigs, pillows);
- ☐ 4. COVER OR BLOCK FLOOR AND/ OR STORM DRAINS;
- ☒ 5. BUILT-IN BERM IN WORK / STORAGE AREA;
- ☐ 6. AUTOMATIC FIRE SUPPRESSION SYSTEM; only in storage room (room 116)
- ☒ 7. ELIMINATE SOURCES OF IGNITION FOR FLAMMABLE HAZARDS (e.g. Flammable liquids, Propane);
- ☒ 8. STOP PROCESSES AND/OR OPERATIONS;
- ☒ 9. AUTOMATIC / ELECTRONIC EQUIPMENT SHUT-OFF SYSTEM;
- ☒ 10. SHUT-OFF WATER, GAS, ELECTRICAL UTILITIES AS APPROPRIATE;
- ☒ 11. CALL 9-1-1 FOR PUBLIC EMERGENCY RESPONDER ASSISTANCE / MEDICAL AID;
- ☒ 12. NOTIFY AND EVACUATE PERSONS IN ALL THREATENED AREAS;
- ☒ 13. ACCOUNT FOR EVACUATED PERSONS IMMEDIATELY AFTER EVACUATION CALL;
- ☒ 14. PROVIDE PROTECTIVE EQUIPMENT FOR ON-SITE RESPONSE TEAM;
- ☒ 15. REMOVE OR ISOLATE CONTAINERS / AREA AS APPROPRIATE;
- ☒ 16. HIRE LICENSED HAZARDOUS WASTE CONTRACTOR;
- ☒ 17. USE ABSORBENT MATERIAL FOR SPILLS WITH SUBSEQUENT PROPER LABELING, STORAGE, AND HAZARDOUS WASTE DISPOSAL AS APPROPRIATE;
- ☐ 18. SUCTION USING SHOP VACUUM WITH SUBSEQUENT PROPER LABELING, STORAGE, AND HAZARDOUS WASTE DISPOSAL AS APPROPRIATE;
- ☒ 19. WASH / DECONTAMINATE EQUIPMENT W/ CONTAINMENT and DISPOSAL OF EFFLUENT / RINSATE AS HAZARDOUS WASTE;
- ☒ 20. PROVIDE SAFE TEMPORARY STORAGE OF EMERGENCY-GENERATED WASTES;
- ☐ 21. OTHER (Specify): D2.

E. FACILITY EVACUATION

THE FOLLOWING ALARM SIGNAL(S) WILL BE USED TO BEGIN EVACUATION OF THE FACILITY (CHECK ALL THAT APPLY): E1.

- ☒ 1. BELLS / ALARMS;
- ☐ 2. HORNS / SIRENS / AUDIBLE ALARMS;
- ☒ 3. VERBAL (i.e., SHOUTING);
- ☒ 4. OTHER (Specify): radio E2.

THE FOLLOWING LOCATION(S) IS/ARE EVACUEE EMERGENCY ASSEMBLY AREA(S) (i.e., Front parking lot, specific street corner, etc.) E3.

See attached Evacuation Map

Note: The Emergency Coordinator must account for all on site employees and/or site visitors after evacuation.

☒ EVACUATION ROUTE MAP(S) POSTED AS REQUIRED E4.

Note: The map(s) must show primary and alternate evacuation routes, emergency exits, and primary and alternate staging areas, and must be prominently posted throughout the facility in locations where it will be visible to employees and visitors.

F. ARRANGEMENTS FOR EMERGENCY SERVICES

Explanation of Requirement: Advance arrangements with local fire and police departments, hospitals, and/or emergency services contractors should be made as appropriate for your facility. You may determine that such arrangements are not necessary.

ADVANCE ARRANGEMENTS FOR LOCAL EMERGENCY SERVICES (Check one of the following) F1.

- ☐ 1. HAVE BEEN DETERMINED NOT NECESSARY; *or*
- ☒ 2. THE FOLLOWING ARRANGEMENTS HAVE BEEN MADE (Specify): F2.

The Regulatory Compliance Office maintains staff on-call 24-hours a day (pager is 510-437-7363). The standby person is authorized to activate the on-call emergency contract responder at anytime to provide response, conduct spill cleanup, and/or perform other related tasks, as needed.

G. EMERGENCY EQUIPMENT

Check all boxes that apply to list emergency response equipment available at the facility and identify the location(s) where the equipment is kept and the equipment's capability, if applicable. [e.g., ☒ CHEMICAL PROTECTIVE GLOVES | Spill response kit | One time use, Oil & solvent resistant only.]

TYPE	EQUIPMENT AVAILABLE G1.	LOCATION	CAPABILITY *(If applicable)*
Safety and First Aid	1. ☒ CHEMICAL PROTECTIVE SUITS, APRONS, OR VESTS	Water treatment Facility G2.	G3.
	2. ☒ CHEMICAL PROTECTIVE GLOVES	Water treatment Facility G4.	G5.
	3. ☒ CHEMICAL PROTECTIVE BOOTS	Water treatment Facility G6.	G7.
	4. ☒ SAFETY GLASSES / GOGGLES / SHIELDS	Water treatment Facility G8.	G9.
	5. ☒ HARD HATS	Water treatment Facility G10.	G11.
	6. ☐ CARTRIDGE RESPIRATORS	G12.	G13.
	7. ☐ SELF-CONTAINED BREATHING APPARATUS (SCBA)	G14.	G15.
	8. ☒ FIRST AID KITS / STATIONS	Throughout facility G16.	G17.
	9. ☒ PLUMBED EYEWASH FOUNTAIN / SHOWER	Water treatment Facility G18.	G19.
	10. ☐ PORTABLE EYEWASH KITS	G20.	G21.
	11. ☐ OTHER	G22.	G23.
	12. ☐ OTHER	G24.	G25.
Fire Fighting	13. ☒ PORTABLE FIRE EXTINGUISHERS	Throughout facility & in District vehicles G26.	G27.
	14. ☐ FIXED FIRE SYSTEMS / SPRINKLERS / FIRE HOSES	) G28.	G29.
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	20. ☐ BERMING / DIKING EQUIPMENT	G40.	G41.
	21. ☒ BROOM	G42.	G43.
	22. ☒ SHOVEL	G44.	G45.
	23. ☐ SHOP VAC	G46.	G47.
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	33. ☒ AUTOMATIC ALARM CHEMICAL MONITORING EQUIPMENT	G66.	G67.
·her	34. ☐ OTHER – Emergency generator	G68.	G69.
	35. ☐ OTHER – Emergency lighting	G70.	G71.

H. EARTHQUAKE VULNERABILITY

Identify areas of the facility that are vulnerable to hazardous materials releases / spills due to earthquake-related motion. These areas require immediate isolation and inspection.

VULNERABLE AREAS: (Check all that apply)	H1.	LOCATIONS (e.g., shop, outdoor shed, forensic lab)
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☐ 4. WASTE TREATMENT AREA		H5.

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I. EMPLOYEE TRAINING

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- Provided within 6 months for new hires;
- Amended as necessary prior to change in process or work assignment;
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Required content includes all of the following:

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- Hazard communication related to health and safety;
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- Fire hazards of materials / processes;
- Conditions likely to worsen emergencies;
- Coordination of emergency response;
- Notification procedures;
- Applicable laws and regulations;
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- Personal protective equipment;
- Use of emergency response equipment (e.g. Fire extinguishers, respirators, etc.);
- Decontamination procedures;
- Evacuation procedures;
- Control and containment procedures;
- UST monitoring system equipment and procedures (if applicable).

INDICATE HOW EMPLOYEE TRAINING PROGRAM IS ADMINISTERED (Check all that apply) I1.

☒ 1. FORMAL CLASSROOM; ☐ 2. VIDEOS; ☒ 3. SAFETY / TAILGATE MEETINGS;

☐ 4. STUDY GUIDES / MANUALS (Specify): _____ I2.

☐ 5. OTHER (Specify): _____ I3.

☐ 6. NOT APPLICABLE BECAUSE FACILITY HAS NO EMPLOYEES

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- Current employee training records must be retained until closure of the facility.
- Former employee training records must be retained at least three years after termination of employment.

J. LIST OF ATTACHMENTS

(Check one of the following) J1.

☒ 1. NO ATTACHMENTS ARE REQUIRED; *or*

☐ 2. THE FOLLOWING DOCUMENTS ARE ATTACHED: J2.

K. SIGNATURE / CERTIFICATION

Certification: Based on my inquiry of those individuals responsible for obtaining the information, I certify under penalty of law that I have personally examined and am familiar with the information submitted and believe the information is true, accurate, and complete, and that a copy is available on site.

SIGNATURE OF OWNER/OPERATOR	DATE SIGNED K1.
	11/21/17
NAME OF SIGNER (print) K2.	TITLE OF SIGNER K3.
Robert Newman	Sr. Environmental H&S Specialist

Appendix 6-7

Caltrans Stormwater Management Program

District 10 Work Plan

Excerpts (7 pages):

Drinking Water Reservoirs and Recharge Facilities

Slopes Prone to Erosion

California Department of Transportation
Stormwater Management Program
District 10 Work Plan

Fiscal Year

2015-2016

CTSW-RT-14-316.11.1

California Department of Transportation
Division of Environmental Analysis
Stormwater Management Program
1976 E. Drive Martin Luther King Jr. Blvd., Stockton, California 95205
http://www.dot.ca.gov/hq/env/stormwater



For individuals with sensory disabilities, this document is available in alternate formats upon request. Please call or write to the Stormwater Liaison, Caltrans Division of Environmental Analysis, MS-27, P.O. Box 942874, Sacramento, CA 94274-0001, (916) 653-8896 Voice, or dial 711 to use a relay service.

District 10

2014 Areas Prone to Erosion

NOTE:

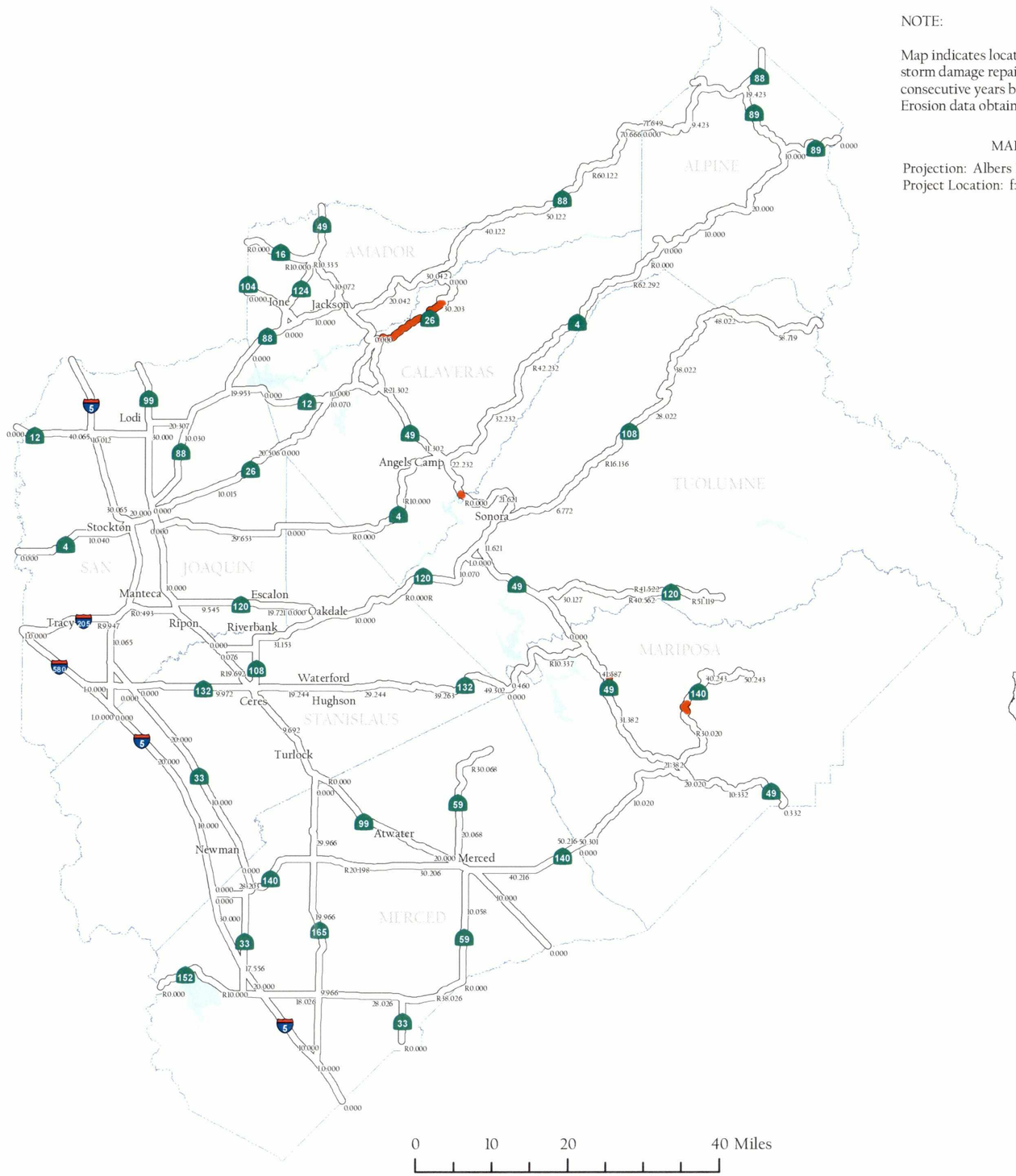
Map indicates locations of Major/Minor storm damage repair activities conducted on three (3) consecutive years by the Division of Maintenance. Erosion data obtained from IMMS.

MAP INFORMATION

Projection: Albers Meters NAD 83
Project Location: f:\gis\2014_Erosion_District10.mxd

Legend

- State Highway
- 3 Yr. Consecutive Erosion
- Water Feature
- County Boundary





0 10 20 40 Miles

Areas Prone to Erosion

DIST	CO	RTE	BPREFX	BPM	EPREFX	EPM
10	CAL	26		18.203		29.705
10	CAL	49	R	0.102	R	0.506
10	MPA	49		38.998		39.098
10	MPA	140		33.243		34.743

State of California
Department of Transportation
Division of Maintenance GIS
August 14, 2014

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3 District Facilities and Water Bodies 3-1

4 Drinking Water Reservoirs and Recharge Facilities 4-1

5 Slopes Prone to Erosion 5-1

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4 Drinking Water Reservoirs and Recharge Facilities

Section 4 of the DWP describes and identifies the high-risk areas, which are locations where spills or other releases from District-owned rights-of-way, roadways, or facilities may discharge directly to municipal or domestic water supply reservoirs or ground water percolation facilities. Projects that potentially drain to these high-risk areas consider project features that enhance spill response.

Drinking water reservoirs and recharge facilities are areas such as locations where spills from District-owned ROWs or facilities can discharge directly to municipal or domestic water supply reservoirs or ground water percolation facilities. To generate the list of municipal, domestic water supply reservoirs, and ground water percolation facilities, the District first contacted known public and private water supply providers. From the information received, the District determined which facilities were susceptible to a direct spill from a District activity or facility. This determination was based on proximity between the water body and the District's facility, use characteristics of the facility, and the probable spill response time.

When planning projects within these defined areas, District 10 considers project design features for aiding in the prevention of accidental spills that could impact the area; these features are typically commensurate with safety improvements for reducing vehicle accidents. Examples of these features may include, but are not limited to, median barrier, guardrail, signalization, and vehicle restrictions. Features considered for improving spill response time typically include elongated drainage paths, call boxes, signage, or video surveillance. A list of drinking water reservoirs and recharge facilities within District 10 is presented in Table 4-1.

Table 4-1: District 10 Drinking Water Reservoirs and Recharge Facilities

Road Segment/ Facility	County	Regional Board	Drinking Water Reservoir or Recharge Facility Area	Description	Comments
Route 152 PM 2.5/ 11.0	Merced	5	San Luis Reservoir/ O'Neill Forebay	The San Luis Reservoir/O'Neill Forebay provides a domestic water supply source for approximately 3,000 residents of the municipalities of Santa Nella and Dos Palos. The road segment is a heavily used trucking route and accidental spills have the potential to immediately impact the drinking water resource before response actions could be initiated.	No projects are planned within these facilities in the upcoming year.
Route 49 AMA – PM R0.142 CAL – PM 30.820/ 30.865	Amador, Calaveras	5	Pardee Reservoir	Pardee Reservoir is the main water supply reservoir, fed entirely by the Mokelumne River. Pardee Reservoir is located in Amador and Calaveras counties, just west of Highway 49. The Pardee Reservoir spillway is at elevation 568 feet. At high water, the reservoir begins approximately 1 mile downstream from the Highway 49 bridge.	East Bay Municipal Utility District (EBMUD) serves 1.3 million people in Alameda and Contra Costa counties. EBMUD is concerned an accidental spill near the Highway 49 Mokelumne River Bridge would discharge into the Mokelumne River which would flow directly and rapidly into Pardee Reservoir.

Table 4-1: District 10 Drinking Water Reservoirs and Recharge Facilities

Road Segment/ Facility	County	Regional Board	Drinking Water Reservoir or Recharge Facility Area	Description	Comments
Route 26 PM 30.000/ 30.23	Calaveras	5	Pardee Reservoir	Pardee Reservoir begins approximately 13 miles downstream from the Highway 26 bridge.	EBMUD is concerned an accidental spill near the Highway 26 South Fork Mokelumne River Bridge would discharge into the Mokelumne River which would flow into Pardee Reservoir.
Route 26 PM 33.601/ 33.627	Calaveras	5	Pardee Reservoir	Pardee Reservoir begins approximately 17 miles downstream from the Highway 26 bridge.	EBMUD is concerned an accidental spill near the Highway 26 Middle Fork Mokelumne River Bridge would discharge into the Mokelumne River which would flow into Pardee Reservoir.

5 Slopes Prone to Erosion

Section 5 of the DWP identifies the road segments within District 10 that have slopes which are prone to erosion and sediment discharge. The road segments that are located in sensitive watersheds, or where there is an existing or potential threat to water quality, will be prioritized for implementing appropriate controls to the maximum extent practicable. In each Annual Report, the status of stabilization activities where applicable will be reported. Table 5-1 is District 10's inventory of vulnerable road segments where erosion occurs and stabilization may be required, or where rock cut slopes are located and rock falls have occurred.

Table 5-1: District 10 Inventory of Road Segments Prone to Erosion

Road Segment	County	Regional Board	Watershed	Scheduled Stabilization Date
Route 120	TUO	5	Tuolumne River	TBD
Route 140	MPA	5	Mariposa Creek	TBD
Route 049	CAL	5	Stanislaus River/Calaveras River/Mokelumne River	TBD
Route 026	CAL	5	Calaveras River/Mokelumne River	TBD

Figure 5-1 is a map showing California State Highway System areas that required maintenance within District 10 in 2014, including rock cut slopes, landslides, and moderate soil erosion.

Appendix 6-8

Marijuana Cultivation in the Central Valley, RWQCB Fact Sheet
Cannabis Cultivation, RWQCB Best Management Practices

CALIFORNIA Water Boards

Fact Sheet

Marijuana Cultivation in the Central Valley Threatens Water Quality and Wildlife

Cultivation of marijuana in the Central Valley Region has grown exponentially in recent years, both in the number of grows and the size of grow operations. The growing operations are appearing on both private and public land.

The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is not interested in entering the debate over the legality of growing marijuana in California, other than to note that any growing operation on public land is illegal regardless of the crop. The Central Valley Water Board has jurisdiction over discharges of waste that could affect waters of the State, regardless of what activity is generating the waste. The Central Valley Water Board does not in any way authorize, endorse, sanction, permit or approve the cultivation, use, or sale of marijuana or any other illegal activity.

The Central Valley Water Board has serious concerns about the water quality impacts from the dramatic increase in growing activity on both public and private land.

The Problem

Growers have engaged in a variety of activities that can threaten or damage riparian and aquatic habitat and groundwater, including:

- grading, terracing, dam, and road construction without permits, leading to the filling of streams through erosion and sediment deposition;
- deforestation and habitat fragmentation;
- 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.

These activities impair beneficial uses of waters of the state, from municipal drinking water to swimming, and from agriculture to preserving habitat for endangered fish and wildlife.

Isn't Marijuana Cultivation a Big Economic Boost to the Region?

That may be true, but marijuana growers cannot be allowed to circumvent environmental regulations that other industries must follow. Water quality, fish, and wildlife are public trust assets that shouldn't be sacrificed for private economic gain.

How Big is The Problem?

No one knows the true scope of the increased growing activity and the related quantity of water being diverted from local streams, because most growers do not register or apply for permits from the various agencies involved in protecting water quality, existing water rights, and wildlife.

A Department of Fish and Wildlife study of two small watersheds in Humboldt County that used aerial imagery indicated that the number of acres devoted to marijuana growing almost doubled from 2009 to 2012, with an estimated 550 individual growing operations and 19,000 plants in each watershed. Similar numbers have been reported in watersheds throughout the Central Valley Region.

What's Being Done About It?

Just like any other person who develops their property, marijuana cultivators must first obtain all the appropriate permits to ensure that their site development activities are done in a manner that is consistent with federal, state, and local laws and regulations. The attached information sheet identifies several types of permits that marijuana cultivators may need to obtain before developing their property, and explains some of the steps that marijuana cultivators must take to comply with site development requirements and the state regulations that apply to reporting diversions of water. These permits and requirements apply to *any* site preparation work, regardless of crop.

In addition to these existing laws and regulations, the Central Valley Water Board is also developing a regulatory program designed to ensure that marijuana cultivation activities do not result in adverse water quality impacts. Medicinal marijuana cultivation may eventually become part of the Board's existing Irrigated Lands Regulatory Program, or the Board may develop a different regulatory approach for dealing with marijuana cultivation activities.

The Central Valley Water Board is also increasing the resources that it will devote to investigating and prosecuting marijuana cultivation activities that threaten to impact water quality, aquatic life, or wildlife habitat. Furthermore, it is also worth noting that the Board's regulatory activities can only provide permit coverage for growing operations on private lands; marijuana cultivation on public lands will not be authorized.

The State and Regional Boards, including the North Coast Water Board and the Central Valley Water Board, are committed to helping educate both the public and the cultivators about proper permitting and growing practices in their respective water board regions. Additionally, local, state and federal agencies, including the State and Regional Boards, are working together in task forces to find illegal growing operations and enforce applicable laws.

What Can the Public Do to Help?

The public can help in two ways: making friends and neighbors aware of the issues; and reporting water quality violations they see to the Central Valley Regional Water Quality Control Board.

To file an environmental complaint, contact the Central Valley Water Board at the appropriate office listed below:

Sacramento Office
11020 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114
Phone: (916)464-3291
Fax: (916) 464-4645

Fresno Office
1685 "E" Street
Fresno, CA 93706-2007
Phone: (559) 445-5116
Fax: (559) 445-5910

Redding Office
364 Knollcrest Drive, Suite 205
Redding, CA 96002
Phone: (530) 224-4845
Fax: (530) 224-4857

Or, you can submit an environmental complaint to Cal/EPA via the following web link: http://www.dtsc.ca.gov/database/CalEPA_Complaint/index.cfm (This site can also be used for water right complaints)

Following is an informational sheet on how to comply with necessary permitting requirements:

Water Boards

Fact Sheet

To: Interested parties and agencies

SUBJECT: 215 Grow-Related Activities Which May Need a Regional Water Board Permit or Special Planning for Water Quality Protection

The cultivation of marijuana can harm our State's waters if it is not carried out in a responsible manner. If you are planning to develop land to grow marijuana in compliance with State law and local ordinances, there are several agencies you should contact BEFORE you get started. The Central Valley Regional Water Quality Control Board (Central Valley Water Board) is one of the agencies that may need to review and permit the activities associated with your project. The State Water Resources Control Board's Division of Water Rights is another. Before you start developing your property to conduct your growing project, here is a series of questions you should ask yourself to see whether your activities may need a permit from the Central Valley Water Board.

1) Will I be doing any work that involves digging or heavy equipment work in a watercourse/wetland or in a location where rain could wash dirt into a year-round or seasonal creek, river, wetland, or wet feature?
2) Will I be placing any type of material or structure in a stream, either year-round or seasonal (e.g., stream crossing, culvert, water intake, dam, etc.)?
3) Will I be diverting water from a stream?
4) Will I be building any roads, landings, terraces or other features that involve placement of earthen fill material on my land?
5) Will I be grading, excavating, or otherwise moving earth on my property?
6) Will I be using and/or storing pesticides, herbicides, fertilizers, fuel, or other chemicals on my property?
7) Will I be generating and/or storing solid waste (e.g., amendment bags, boxes, containers, dead plant material, waste soil, etc.) on my property?

If you have answered yes to questions 1, 2, or 3, you will probably need a permit from the State or Regional Water Board, and we suggest that you contact us at one of the three offices listed above to get further information about how to apply for the appropriate permits. Note that any person who discharges waste to waters of the State without a permit may be subject to enforcement and possible penalties. Information about California water rights is available on the State Water Resources Control Board's Division of Water Rights website at: http://www.waterboards.ca.gov/waterrights/. Any diversion and use of water without a water right, and a failure to report the diversion and use of water are also subject to enforcement and penalties.

If you have answered yes to questions 4 or 5, you may need a permit from the Water Board, and your project may harm water quality if not constructed carefully, subjecting you to enforcement and possible penalties. It would be advisable to hire a qualified professional with experience in erosion control to help you design and construct your project in a way that will avoid allowing sediment to get into waterways. We recommend that you contact the Central Valley Water Board to review your project and identify whether your project will need a water quality permit.

Finally, a yes answer to question 6 or 7 will not necessarily require that you get a permit from the Water Board if you manage these materials in such a way that they will not threaten to impact surface waters or groundwater in any way. If impacts do occur, you are subject to liability for the water quality impacts associated with these activities. We recommend that as you design your project, you consider and identify suitable location(s) on your property, possibly within a container or structure, where you can safely contain such materials away from surface and/or ground waters in a manner that eliminates the possibility of discharge.

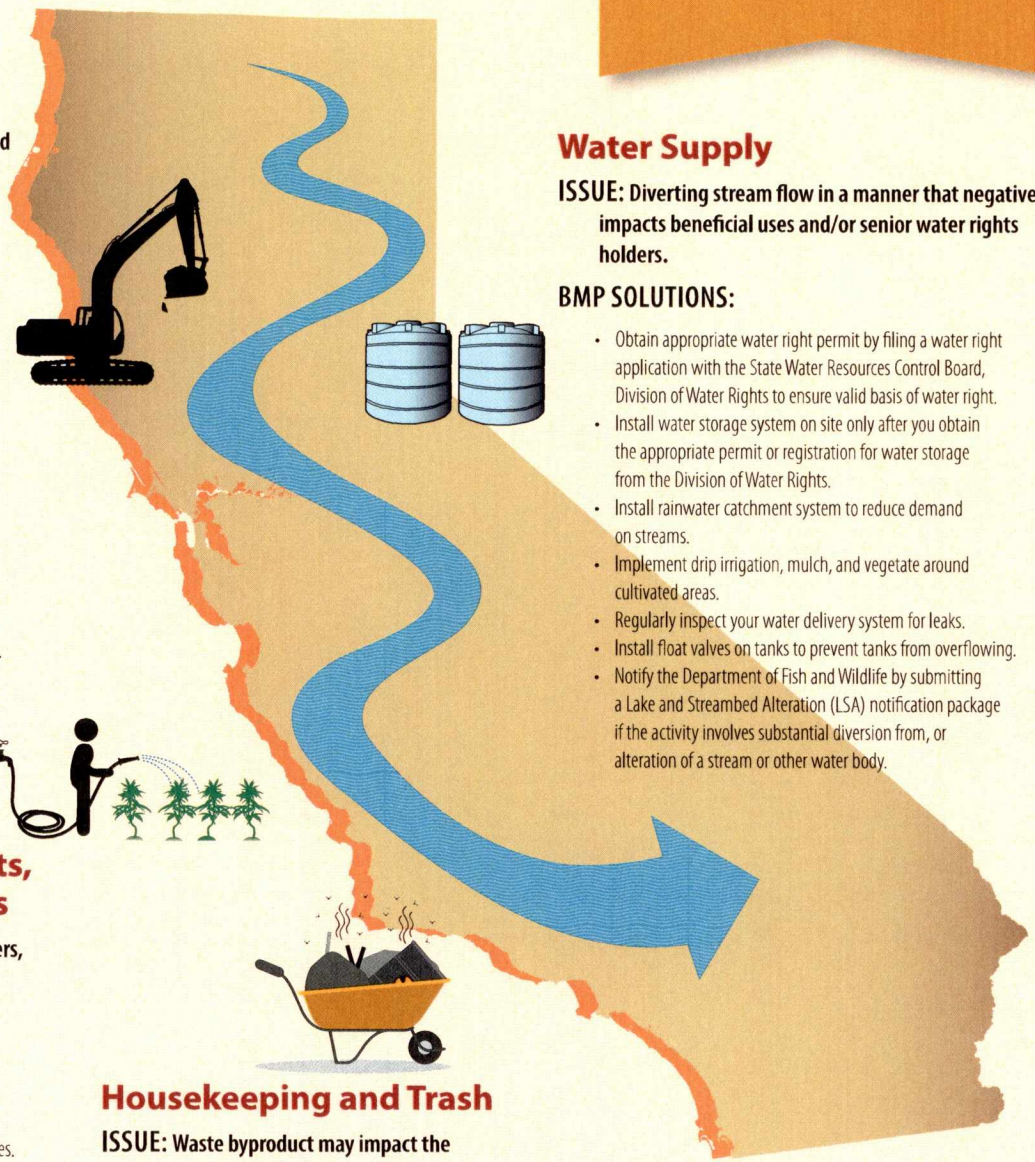
Dumping or allowing sediment or other wastes to enter surface water, including streams or groundwater is illegal, as is discharging any of the materials noted above to surface water or groundwater. If you have any questions or would like assistance in reviewing your compliance with water quality laws and requirements and/or need for permits, please contact the Central Valley Water Board at (530) 224-4845. Information about the Central Valley Water Board can be found at our website: http://www.waterboards.ca.gov/centralvalley/.

Updated 5.12.14

Cannabis Cultivation
Best Management Practices

These best management practices (BMPs) may help mitigate water pollution from cannabis cultivation activities. We recommend that you consult a professional engineer/contractor before starting an advanced BMP.

LIABLE PARTIES:
Property Owner
Site Caretaker
Property Resident
Construction Contractors



Erosion & Sediments

ISSUE: Poorly maintained or badly constructed roads and excavation sites are a major source of sediment pollution.

BMP SOLUTIONS:

- Minimize disturbed area and protect natural soil.
- Provide temporary cover for disturbed areas that are not being worked on.
- Divert runoff away from unprotected slopes or loose soils.
- Use mats, geotextiles, and erosion control blankets to protect slopes.
- Control the perimeter with silt fences and fiber rolls.
- Install a sediment basin, check dams, or vegetative buffer strips.
- Roughen the surface of a road with gravel.
- Protect ditches and inlet/outlet from erosion with rock armour.
- Plan and design new roads away from watercourses.
- Design roads to allow for sheet flow and use water bars and rolling dips to break up slope length.
- Inspect roads, slopes, and culverts regularly.

Water Supply

ISSUE: Diverting stream flow in a manner that negatively impacts beneficial uses and/or senior water rights holders.

BMP SOLUTIONS:

- Obtain appropriate water right permit by filing a water right application with the State Water Resources Control Board, Division of Water Rights to ensure valid basis of water right.
- Install water storage system on site only after you obtain the appropriate permit or registration for water storage from the Division of Water Rights.
- Install rainwater catchment system to reduce demand on streams.
- Implement drip irrigation, mulch, and vegetate around cultivated areas.
- Regularly inspect your water delivery system for leaks.
- Install float valves on tanks to prevent tanks from overflowing.
- Notify the Department of Fish and Wildlife by submitting a Lake and Streambed Alteration (LSA) notification package if the activity involves substantial diversion from, or alteration of a stream or other water body.

Potting Soil, Amendments, Fertilizers, and Pesticides

ISSUE: Potting soil, soil amendments, fertilizers, and pesticides can be mobilized by runoff and be discharged into surface waters.

BMP SOLUTIONS:

- Plant cover crop to boost soil fertility and protect from storm events.
- Follow the manufacturer's suggested application rates.
- Install buffer strips, bio-swales, or vegetation downslope of grow site to filter runoff of chemicals from irrigation.
- Do not apply pesticides. Instead, use safe pesticide alternatives recommended by Department of Pesticide Regulation.
- Implement Integrated Pest Management practices to avoid the need for pest control.
- Store all products that impact water quality in a manner that does not allow for runoff to surface waters.

Housekeeping and Trash

ISSUE: Waste byproduct may impact the environment and water quality.

BMP SOLUTIONS:

- Dispose of solid waste properly.
- Store paint, antifreeze, oil filters, fuels and other miscellaneous items indoors.
- Store other products that may affect water quality indoors.

Your responsibilities do not stop after BMPs are installed. You should routinely inspect your site.

More Information: State Water Resources Control Board
(916) 341-5272 Erin.Mustain@waterboards.ca.gov
www.waterboards.ca.gov/water_issues/programs/enforcement/cannabis_enforcement.shtml

CALIFORNIA Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

Appendix 6-9

Power Fire Restoration Project 2014

- Proposed Action
- Scoping Map
- Data Table

Background:

The Power Fire was reported in the afternoon of October 6, 2004, on the north side of Salt Springs Reservoir Dam, located approximately 17 air miles east of Pioneer, California, in Amador County. The fire burned up an extremely steep, south facing, brush covered slope, spreading into timber and heavy fuels. The fire subsequently burned west to the Panther Creek drainage, fueled by strong east winds. The fire burned approximately 17,005 acres on the Eldorado National Forest (ENF) and on private timberlands.

The fire burned with varying intensity. Approximately 38 percent of the land area burned at low intensity (killing less than 25% of the trees), as measured using aerial photos and field sampling. Nearly 50 percent of the area burned at high intensity, killing 75% to 100% of the trees and burning the duff and litter that protects the soil. Another 13 percent burned at moderate intensity, killing 25 to 75 percent of the trees. In the high and moderate intensity areas the fire resulted in high rates of soil erosion, sedimentation to streams, and loss of old forest habitat for sensitive species.

Subsequent to the fire, the Eldorado National Forest prepared an environmental impact statement (EIS), the Power Fire Restoration FEIS and Record of Decision (ROD), signed August 1, 2005, to address long-term fuel loading, dead tree removal, road repair and public safety. The Power Fire Restoration FEIS was implemented during the summer and fall of 2005.

On August 11, 2005 a lawsuit was filed against the Power Fire Restoration Project. On August 18, 2005 a temporary restraining order was granted until the hearing for a preliminary injunction. The District court denied the preliminary injunction and vacated the temporary restraining order on August 25, 2005. An appeal of the District Courts decision was filed with the Ninth Circuit Court on September 13, 2005. The Ninth Circuit Court issued an emergency injunction on January 11, 2006. The Ninth Circuit Court reversed the District Court decision and issued a preliminary injunction halting falling on March 24, 2006. On August 30, 2006 the District Court issued a preliminary injunction prohibiting logging operations. Consequently, only sixty percent of the project was harvested.

Currently the unlogged salvage sale units contain large numbers of snags which are falling at an increasing rate, as well as dense vegetation regrowth with highly variable amounts of natural conifer and oak regeneration. Logged units and pre-fire plantations have mostly been replanted and had brush and grass removed by hand at least once. Surveys show that some of these plantations

have failed because the brush and grasses consumed the limited water and nutrients and the seedlings died. Tree survival and growth in the remainder of the plantations are at continued risk of mortality due to high levels of competing vegetation. Some logged areas have not been replanted due to rapid post-fire return of highly competitive vegetation.

The Eldorado National Forest Land and Resource Management Plan (LRMP) as amended by the Sierra Nevada Forest Plan Amendment Record of Decision (SNFP ROD, 2004) provides for ecosystem restoration following catastrophic events. These restoration activities are included in all land allocations and call for managing disturbed areas for long term fuel profiles, and restoring habitat (SNFP ROD, pg. 6). The LRMP land allocations within the Power Fire boundary are 58 percent old forest emphasis, 27 percent threat zone, 4 percent defense zone, and 11 percent wilderness (Land Allocation Map). Protected activity centers (PACs) for spotted owls and goshawks, spotted owl home range core areas (HRCAs), and riparian conservation areas (RCAs) adjacent to perennial, seasonal and ephemeral, streams overlay the other land allocations. A portion of the Mokelumne Wilderness and the Salt Springs State Game Refuge is within the fire area. The Mokelumne River, Bear River, Beaver Creek, Cole Creek, and Green Creek, have outstandingly remarkable cultural resource values, making these waterways eligible for possible inclusion in the National Wild and Scenic River system. Of the 15,398 acre Mokelumne River Canyon Archaeological District, 11,131 acres are located within the Power Fire. This District has been determined to be eligible for inclusion in the National Register of Historic Places. Due to its high archaeological significance, the Mokelumne Canyon is designated as a Special Interest Area within the ENF LRMP. The statement of significance concluded that the "Mokelumne Canyon is one of the most significant archaeological areas within the Eldorado National Forest". (McLemore 1980)

The goal is to move the project area toward desired future conditions for the land allocations listed above. Table 1 below describes in detail the desired conditions by land allocation and they are defined in the SNFP ROD on pages 36 through 48.

Removal of some of the dead and dying tree component of the landscape was the first step in reducing long-term fuel loading and restoring the historic Fire Regime Condition Class on sixty percent of the Power Fire Area. This Environmental Impact Statement (EIS) addresses reforestation of a portion of the landscape.

Table 1 - Land Allocations and Desired Conditions (SNFP Rod, pgs. 45-48)

Land Allocation	Desired Conditions	Management Intent	Management Objectives
Old Forest Emphasis Areas	Forest structure and function generally resemble pre-settlement conditions. High levels of horizontal and vertical diversity exist within 10,000 acre landscapes. Stands are composed of roughly even-aged vegetation groups, varying in size, species composition, and structure. Individual vegetation groups range from less than 0.5 to more than 5 acres in size. Tree sizes range from seedlings to very large diameter trees. Species composition varies by elevation, site productivity, and related environmental factors. Multi-tiered canopies, particularly in older forests, provide vertical heterogeneity. Dead trees, both standing and fallen, meet habitat needs of old-forest-associated species. Where possible, areas treated for fuels also provide for the successful establishment of early seral stage vegetation.	Maintain or develop old forest habitat in: areas containing the best remaining large blocks or landscape concentrations of old forest and/or areas that provide old forest functions (such as connectivity of habitat over a range of elevations to allow migration of wide-ranging old-forest-associated species). Establish and maintain a pattern of area treatments that is effective in: modifying fire behavior. culturing stand structure and composition to generally resemble pre-settlement conditions. reducing susceptibility to insect/pathogen drought-related tree mortality. Focus management activities on the short-term goal of reducing the adverse effects of wildfire. Acknowledge the need for a longer-term strategy to restore both the structure and processes of these ecosystems.	Establish and maintain a pattern of area treatments that is effective in modifying wildfire behavior. Maintain and/or establish appropriate species composition and size classes. Reduce the risk of insect/pathogen drought-related mortality by managing stand density levels. Design economically efficient treatments to reduce hazardous fuels.
Wildland Urban Interface Threat Zones	Under high fire weather conditions, wildland fire behavior in treated areas is characterized as follows: Flame lengths at the head of the fire are less than 4 feet. The rate of spread at the head of the fire is reduced to at least 50% of pre-treatment levels. Hazards to firefighters are reduced by managing snag levels in locations likely to be used for control in prescribed fire and fire suppression, consistent with safe practices guidelines. Production rates for fire line construction are doubled from pre-treatment levels.	Threat zones are priority area for fuels treatments. Fuels treatments in the threat zone provide a buffer between developed areas and wildlands. Fuels treatments protect human communities from wildland fires as well as minimize the spread of fires that might originate in urban areas. The highest density and intensity of treatments are located within the WUI.	Establish and maintain a pattern of area treatments that is effective in modifying wildfire behavior. Design economically efficient treatments to reduce hazardous fuels.

WUI Defense Zones	Stands are fairly open and dominated primarily by larger, fire tolerant trees. Surface and ladder fuel conditions are such that crown fire ignition is highly unlikely. The openness and discontinuity of crown fuels, both horizontally and vertically, result in very low probability of sustained crown fire.	Protect communities from wildfire and prevent the loss of life and property. WUI defense zones have highest priority for treatment (along with threat zones). The highest density and intensity of treatments are located within the WUI.	Create defensible space near communities, and provide a safe and effective area for suppressing fire. Design economically efficient treatments to reduce hazardous fuels.
California spotted owl and northern goshawk PACs	At least two tree canopy layers are present. Dominant and co-dominant trees average at least 24 inches dbh. Area within PAC has at least 60 to 70 percent canopy cover. Some very large snags are present (greater than 45 inches dbh). Levels of snags and down woody material are higher than average.	Maintain PACs so that they continue to provide habitat conditions that support successful reproduction of California spotted owls and northern goshawks.	Avoid vegetation and fuels management activities within PACs to the greatest extent feasible. Reduce hazardous fuels in PACs in defense zones when they create an unacceptable fire threat to communities. Where PACs cannot be avoided in the strategic placement of treatments, ensure effective treatment of surface, ladder, and crown fuels within treated areas. If nesting or foraging habitat in PACs is mechanically treated, mitigate by adding acreage to the PAC equivalent to the treated acreage wherever possible. Add adjacent acres of comparable quality wherever possible.
HRCAs	Within home ranges, HRCAs consist of large habitat blocks having: at least two tree canopy layers. at least 24 inches dbh in dominant and co-dominant trees. a number of very large (>45 inches dbh) old trees. at least 50-70% canopy cover. higher than average levels of snags and down woody material.	Treat fuels using a landscape approach for strategically placing area treatments to modify fire behavior. Retain existing suitable habitat, recognizing that habitat within treated areas may be modified to meet fuels objectives. Accelerate development of currently unsuitable habitat (in non-habitat inclusions, such as plantations) into suitable condition. Arrange treatment patterns and design treatment prescriptions to avoid the highest quality habitat (CWHR types 5M, 5D, and 6) wherever possible	Establish and maintain a pattern of fuels treatments that is effective in modifying wildfire behavior. Design treatments in HRCAs to be economically efficient and to promote forest health where consistent with habitat objectives.

Purpose and Need:

There is a need to reestablish a forested landscape that is fire resilient.

One of the primary objectives of the Power Fire Reforestation Project is to move the project area from its existing condition, which is primarily early-seral conditions, toward the desired future conditions described above.

Historically, fires burned in this landscape on a frequent basis (every 11-26 years) and were of low severity, characterized by Fire Regime Condition Class I (Fire Regime Condition Class Interagency Handbook Version 1.0.5). Low-severity fire regimes typically had large fires but small patch sizes (Agee 2002). Fires burned frequently in these forests, and by regularly consuming fuels, killing small trees, and pruning the boles of residual trees, maintained a relatively fire-resistant landscape (Agee 2002). Forests with significant components of ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.) had very small patch sizes, ranging from 0.05 to 0.86 acres (Agee 2002). Over time, as fires were suppressed, vegetation became more dense and surface and ladder fuels increased; the fire regime changed to one characterized by infrequent, mixed severity fires (Condition Class III), with large areas of high mortality, as demonstrated by the Power Fire.

To move the project area towards a frequent fire regime of a fire resilient forest requires the survival and growth of individual trees and forested stands for many years without the occurrence of stand replacing fires. Currently, trees are at high risk of fire-related mortality due to their small size. Competing vegetation also greatly affects tree growth rates. Control of competing vegetation would increase conifer growth rates. Increased growth would accelerate the development of key habitat and old forest characteristics and reduce the risk of loss to wildland fire (SNFP ROD, page 49).

Tree mortality is also affected by both the intensity and size of wildfires that occur in the project area. Treatments that reduce fire intensity and rate of spread would reduce tree mortality in wildland fire conditions. Increased fire line production rates would limit the size of wildland fires in the area, further reducing tree mortality and allow trees to continue to accelerate their development of old forest conditions .

There is a distinct difference between the desired conditions for forested landscapes and the existing condition of vegetation within the project area. Based on this difference, there is a need to reestablish a forested landscape that is fire resilient.

There is a need to reestablish this forested landscape effectively and efficiently.

Logged units and pre-fire plantations have mostly been replanted and had brush and grass removed by hand at least once. Surveys show that some of these plantations have failed because the brush and grasses consumed the limited water and nutrients and the seedlings died. Tree survival and growth in the remainder of the plantations are at continued risk of mortality due to high levels of competing vegetation. Some logged areas have not been replanted due to rapid post-fire return of highly competitive vegetation. Competing vegetation could persist for the long term, negatively affecting both planted and natural seedling survival, inhibiting tree growth, and delaying the achievement of the LRMP desired conditions.

Currently the establishment of grasses, shrubs, and other vegetation, while variable, is approaching 100 percent cover over the project area. Establishment of greater than 30 percent cover of vegetation presents a potential lethal environment to the establishment of conifer seedlings. Currently 20 percent of the planted areas have failed.

Examination of the planted areas in the project area indicates survival and growth are threatened by competing vegetation. Management of competing vegetation is essential to assure continued survival and growth of the remaining conifers seedlings and to allow planting in units currently understocked to meet desired future conditions for all of the land allocations.

There is a need to restore wildlife habitats and provide for the native plant and animal species associated with these ecosystems.

Nearly 50 percent of the Power Fire burned at high intensity, killing 75 to 100 percent of the trees and burning the duff and litter that protects the soil. Another 13 percent burned at moderate intensity, killing 25 to 75 percent of the trees. In the high and moderate intensity areas the fire resulted in loss of old forest habitat for sensitive species. Some dead trees standing today may contribute to the decaying, fallen log component of future old forest and spotted owl habitat. Decomposing logs contribute to the structural complexity of old forests, provide habitat for old forest dependent wildlife species and their prey, and contribute to soil productivity.

A portion of the high and moderate intensity burned area (about 2,500 acres, 18 percent of the National Forest System lands within the fire area) has been planted with seedlings. Surveys show that over 20 percent of these plantations have failed. Competition with brush and grasses for the limited soil moisture during the dry summer months caused insufficient growth and mortality in the conifer seedlings. Tree survival and growth in the remainder of the plantations are at continued risk of mortality due to high levels of competing vegetation.

Desired conditions that apply to old forest emphasis areas include dead trees, both standing and fallen, that meet habitat needs of old-forest-associated species. In HRCAs and PACs desired conditions include some very large snags, and higher than

average levels of snags and down woody material. Over the long term, desired conditions in PACs and HRCAs include areas of suitable habitat with large trees, and multi-layered, dense canopy cover. Long term desired conditions for old forest emphasis include high levels of structural diversity over large areas comprised of roughly even-aged vegetation groups, varying in size, species composition, and structure. Where possible, areas treated for fuels also provide for the successful establishment of early seral stage vegetation (SNFP ROD pg. 41).

There is a dramatic difference between the desired conditions and the existing condition of the project area. There is a need to restore/reestablish wildlife habitats and provide for species associated with these ecosystems.

There is a need to control or eliminate invasive species in the project area to reduce the potential for spread of invasive species to other areas in the forest.

The project area had documented invasive species infestations prior to the fire. They included yellow starthistle, French broom, skeletonweed, ripgut brome, cheatgrass, medusahead, Klamathweed, bull thistle, woolly mullein, and Himalayan blackberry. After the fire and salvage logging invasive species infestations have increased.

Goals (desired conditions) for noxious weed management are to manage weeds using an integrated weed management approach according to the priority set forth in FSM 2902: Priority 1 – prevent the introduction of new invaders; Priority 2 – conduct early treatment of new infestations; Priority 3 – contain and control established infestations; and Priority 4 – proactively manage aquatic and terrestrial areas of the National Forest to increase the ability of those areas to be self-sustaining and resistant to the establishment of invasive species (SNFP ROD, pg. 36 and FSM 2900). There is a need to control or eliminate invasive species in the project area to move the project area in a trajectory toward the desired condition.

Proposed Action

Hand planting and inter-planting would occur on approximately 1,580 acres. Inter-planting would occur on 500 acres within the 2,500 acres previously planted. Approximately 1,080 acres would be planted by hand using one of three tree planting arrangements. Additional acres would be inter-planted if monitoring shows desired stocking levels have not been met on any of the plantations.

> **Planting Arrangement A** is designed to accelerate the development of old forest conditions without establishing dense, homogenous stands that are at greatest risk to loss in future fires. The prescription is also designed to allow for development of structural diversity over the next several decades as planted areas grow into mature stands. For this purpose trees are planted in small clusters at wider spacing, which would allow for the inclusion of small openings

and shrub habitats within planted areas. This arrangement is intended to provide for an interspersion of habitats used by wildlife associated with early forest conditions and for development of heterogeneity in mature forest stands.

The following guidelines for planting would apply on 1,400 acres in areas outside of California spotted owl Protected Activity Centers, sensitive plant occurrences and potential habitat areas, deer critical winter range and riparian areas. Plant approximately 200 to 400 trees per acre by hand. Trees would be planted in groups of 2 to 4 trees with approximately 21 feet apart from the center of the clusters. Planting would be reduced on unproductive ridge tops.

Planting Arrangement B is designed to establish habitat suitable for California spotted owl nesting. Accelerating the development of dense, old forest conditions is the primary objective in these areas. Conifers would be planted at denser spacing to ensure sufficient survival for establishing dense canopied, old forest habitat in a relatively rapid timeframe.

The following guidelines for planting would apply in the approximately 125 acres that are within currently unsuitable habitat occurring in California spotted owl PACs. Plant approximately 300 to 350 trees per acre by hand. Trees would be planted individually at a spacing of approximately 10 to 15 feet.

Planting Arrangement C is designed to accelerate development of more open forest conditions and provide shrub and oak habitats important for wildlife associated with early forest habitats. The Power Fires occurred within a State Game Refuge that includes critical deer winter ranges for the Salt Springs Deer Herd. This planting arrangement is intended to maintain high quality foraging within this area.

The following guidelines for planting would apply on 60 acres of critical deer winter range and a portion of the winter range and areas that are within sensitive plant occurrences and potential habitat. Plant 100 to 150 trees per acre in identified sensitive plant potential habitat areas and deer critical winter and winter range areas. Individual trees would be planted on 17 to 20 foot wide spacing.

Within all planting arrangements a mixture of conifer species (ponderosa pine, Jeffrey pine, sugar pine, Douglas fir, incense cedar, white fir, and red fir) would be planted depending on elevation and seedling availability. Planted seedlings would be grown from seed produced from Region 5 seed orchards or seed of local origin (collected within the same seed zone and 500 foot elevation band as the planting site). Seedlings grown from these sources would exhibit higher levels of genetic variability and broader adaptability. When unavailable, seed would be transferred in compliance with seed

transfer rules based on California Tree Seed Zones (1971, J. Buck, et al) and in reference to R-5 Forest Service Handbook 2409.26, Section 42.2.

Inter-planting would be implemented where seedling mortality threatens plantation failure (less than 60 percent stocking at 100 trees per acre within planting Arrangements A and C or 60 percent stocking at 200 trees per acre within planting Arrangement B). Opportunities to provide patches of early seral vegetation less than one acre in size by limiting inter-planting on some sites with high seedling mortality would be evaluated.

Site preparation (mechanical and chemical) is proposed on approximately 1,080 acres. Mechanical methods include mastication and tractor piling and burning on approximately 610 acres. Chemical site preparation would involve ground application of glyphosate or aminopyralid/glyphosate on approximately 450 acres prior to planting. Prior to chemical application, brush may be cut on portions of units for access.

Chemical application would be restricted to ground-based methods. Colorants would be added to the herbicide mixtures to provide visibility for applicators to track coverage. Adjuvants would be added to herbicide mixtures to improve herbicide effectiveness. Table 2, below, displays the herbicides, application rates, and additives proposed for use. Table 3 displays herbicide exclusion zones adjacent to streams and other aquatic features.

Table 2- Herbicide Formulations, Application Rates and Additives

Herbicide Formulation	Application Rate (acid equivalent/acre)	Additives
glyphosate (Rodeo or equivalent formulation)	2.7 - 4.8 lbs/acre	NPE-based, MSO-based, or silicone/MSO based blend surfactant, dye
aminopyralid (Milestone or equivalent formulation)	0.11 lbs/acre	NPE-based, MSO-based, or silicone/MSO based blend surfactant, dye
triclopyr (Garlon 4 or equivalent formulation)	3.0 lbs/acre	NPE-based, MSO-based, or silicone/MSO based blend surfactant, dye

clopyralid (Transline or equivalent formulation)	0.25 lbs/acre	NPE-based, MSO-based, or silicone/MSO based blend surfactant, dye

Table 3- Exclusion Zones for Herbicide Application.

Aquatic Feature Type	Herbicide Formulation	Distance (Feet)
Perennial Streams and Special Aquatic Features	Aminopyralid	100
	Glyphosate	50
	Triclopyr	100
	Clopyralid	100
Intermittent Streams	Aminopyralid	100 if wet, 50 if dry
	Glyphosate	50 if wet, 25 if dry
	Triclopyr	100 if wet, 50 if dry
	Clopyralid	100 if wet, 50 if dry
Ephemeral Streams	Aminopyralid	50 if wet, 25 if dry
	Glyphosate	25 if wet, 10 if dry
	Triclopyr	50 if wet, 25 if dry
	Clopyralid	50 if wet, 25 if dry

Release of conifer seedlings from competing vegetation would involve targeted area ground application of herbicide on approximately 3,025 acres. Prior to herbicide application, brush may be cut on portions of units for access. Follow-up herbicide applications would occur if monitoring results show competing vegetation (grasses and/or brush) is projected to exceed 40 percent ground cover of the plantation within 3 to 5 years of planting. Follow-up applications would include the following methods by vegetation type:

Table 4- Application Methods by Vegetation Type

Completing Vegetation Type	Herbicide application method
Bearclover/grass	Targeted area ground application
White thorn, and manzanita	First follow-up would be 8 foot radial ground application
Deerbrush	First follow-up would be targeted area ground application and additional follow-up would be

	8 foot radial ground application

Hand grubbing or cutting would be used for conifer seedlings within no spray buffers and within approximately 500 acres of critical habitat for Sierra Nevada Yellow legged Frog (SNYLF). Within no spray buffers, hand grubbing or cutting would occur in a radius around conifer seedlings. Within SNYLF critical habitat, hand grubbing or cutting would occur according to competing vegetation types, as in Table 5.

Control of invasive plant species would follow integrated pest management principles including manual, mechanical, and chemical control methods. Chemical control methods may include directed foliar and radius application using clopyralid, aminopyralid, or glyphosate.

Oak stand improvement would include oak pruning/thinning or fencing as needed to improve oak regeneration and growth within approximately 900 acres of deer winter range and critical winter range. Conifer trees (up to 10 inches diameter at breast height (DBH)) would be removed within 20' feet of existing oaks within the deer winter and critical winter ranges. Fencing would be used to protect individual oaks from deer and cattle browsing with small cages 2-4' in diameter or by fencing areas ¼ acre to 2 acres in size.

Design Criteria:

Cultural Resources:
Cultural resource sites would be flagged and avoided during planting and herbicide spraying. Follow standard protection measures outlined in appendix E of the Region 5 Programmatic Agreement. No ground disturbing activities will occur within flagged site boundaries. Work within the Mokelumne Canyon Archaeological District shall follow guidelines in the LRMP SMA guidelines for Management Area 4.

Fence the sensitive area at the end of 7N01, approximately 2.5 acres, for resource protection.

Wildlife:
No trees would be planted within the Mokelumne Wilderness Area or presently suitable California spotted owl habitat.

A limited operating period (LOP) for California spotted owls (March 1 through August 15) and for northern goshawks (February 15 through September 15) would restrict activities for units, or portions of units, that are located within ¼ mile of spotted owl or goshawk nests, unless surveys confirm that owls or goshawks are not nesting. In

the absence of recent nest location data, units, or portions of units, or within ¼ mile from PAC boundaries have been covered by the LOPs. Depending on the tools used (hand tools vs. power tools, or machinery), and pre-implementation surveys, these LOPs may be lifted if activities, and distance are determined by the district biologist to be unlikely to affect nesting activity within the potentially affected PACs.

No planting would occur within 20 feet of the drip line of mature living oaks, the dominant stem of stump sprouting oaks, and oak sapling stems greater than or equal to 1 inch in diameter.

Botanical Resources:
All known *Calochortus clavatus var. avius* would be flagged and avoided during site prep, planting, and release treatments. Where necessary, hand thinning of overgrown *Calochortus clavatus var. avius* populations may occur at the direction of a Forest Service Botanist. Reforestation activities would be excluded from any newly discovered Sensitive plant species. All potential habitat for Sensitive plant species will flagged and avoided during reforestation activities unless area has been surveyed for Sensitive plants.

New infestations of barbed goatgrass (*Aegilops triuncialis*) and medusahead (*Elymus caput-medusae*) would be treated using a combination manual, mechanical, and/or herbicides (aminopyralid, clopyralid, or glyphosate). Other priority 1, 2, or 3 invasive plant species would be treated based on forest-wide invasive plant strategies and methods analyzed in the Eldorado National Forest Invasive plant Eradication and Control decision.

Invasive plant occurrence found within the project area will be marked with flagging and mapped. Where feasible, all invasive plant occurrences would be excluded from direct ground disturbance or other project related activities in order to reduce the potential spread of invasive plants within the project area.

All off-road equipment would be cleaned to insure they are free of soil, seeds, vegetative matter, or other debris prior to entering National Forest System land. Equipment would also be cleaned prior to moving from infested to unifested areas within the project area.

Native seed mixes and/or certified weed free straw will be used when needed for erosion control purposes.

Sand, gravel and fill material would come from weed-free sources. Consult with the Forests Botanist for sources of weed-free material.

Broadcast seeding of native grass and forb species would be considered three years after initial herbicide release if the cover of native grasses and forbs is < 40 percent within proposed reforestation units. Broadcast seeding would adhere to Forest Service

native material policy which requires the use of a mix of genetically appropriate native materials. Seeding would not occur when grasses are expected to be targeted during future herbicide release.

Project area would be monitored annually for invasive plant species for the first 5 years following initial site prep.

Consult annually with American Indian tribes as treatments are scheduled so that tribal members may provide input and/or be notified prior to gathering cultural plants. Any areas identified for avoidance will be buffered similar to the design criteria for Sensitive Plants or an alternative, non-herbicide method for treatment will be utilized.

Hydrologic Resources:
For perennial streams, no planting would occur within 25 feet of streambanks or associated riparian vegetation and no planting would occur within 20 feet of existing natural tree regeneration.

For special aquatic features (springs, meadows, wetlands, etc.), no planting would occur within 50 feet of the edge of the features or within 20 feet of associated riparian/wetland vegetation, whichever is greater.

For intermittent streams, no planting would occur within 20 feet of associated riparian vegetation (if present) or within 20 feet of existing natural tree regeneration.

There are no restrictions on planting near ephemeral streams.

All distances are slope distance.

Table 5- Exclusion Zones for Ground-Based Equipment.

Aquatic Feature Type	Distance (Feet)
Perennial Streams and Special Aquatic Features	100
Intermittent Streams	50
Ephemeral Streams	25

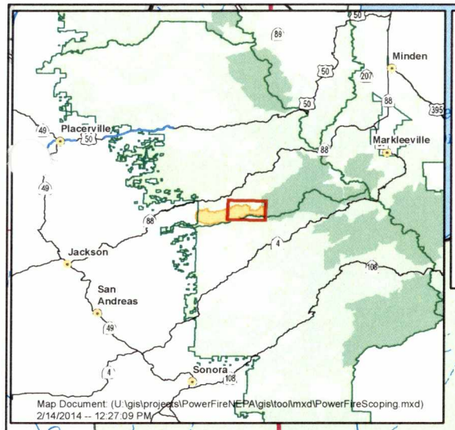
Aquatics:
No drafting out of Cole Creek if the water flow is 0.5 cubic feet per second or below.

No chemical release or chemical site prep would occur within SNYLF critical habitat. The following units or portions of units are affected (approximately 500 acres): 1230016, 1230028, 1230032, 1230045, 1230047, 1230048, 1230049, 1230210, 1230211, 1240018, 1240020, 1240120, 1240210, 1420001, 1420210, 1430010, 1430013, 1430039, 1430210, 1430211, 1430212, 1430213, 1430214, 1430250, and 1430254.

Power Fire Reforestation Project -East

Proposed Action

Amador Ranger District - Eldorado National Forest



Road Allowed Uses

- Roads Open to All Vehicles, Yearlong
- Roads Open to All Vehicles, Seasonal
- Roads Open to Highway Legal Vehicles Only, Yearlong
- Roads Open to Highway Legal Vehicles Only, Seasonal
- State or US Highway

Hydrology

- Artificial Path
- Canal Ditch
- Pipeline
- Intermittent
- Perennial
- Ephemeral

- Ranger District Boundary
- Proposed Treatment Units
- Power Fire Project Boundary
- Wilderness
- National Forest Land

0 0.25 0.5 1 Miles

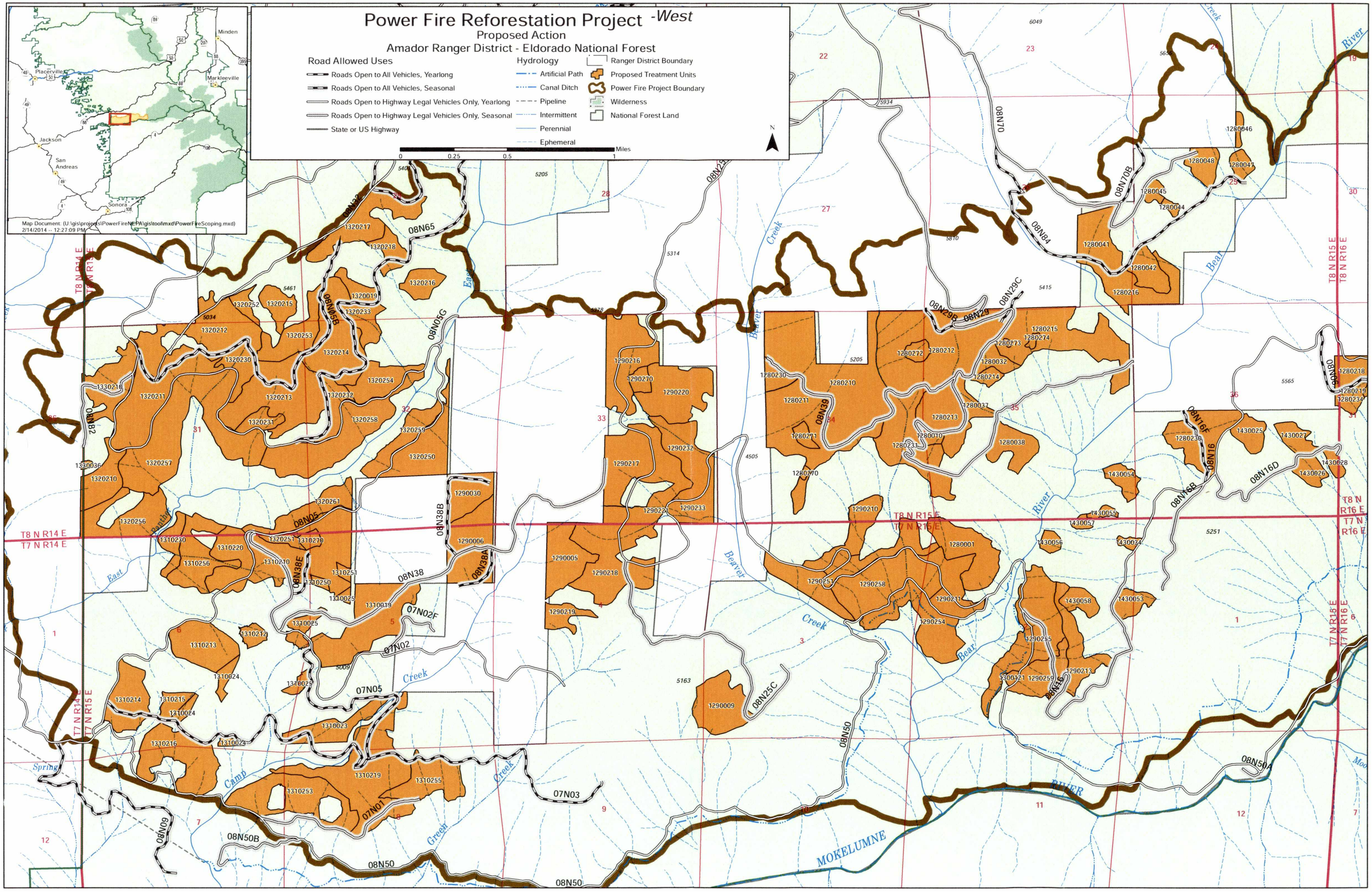
N

Mokelumne Wilderness

SALT SPRINGS RESERVOIR

T8 N R15 E
T7 N R15 E

T8 N R16 E
T7 N R16 E



Power Fire Reforestation Project -West
Proposed Action
Amador Ranger District - Eldorado National Forest
Road Allowed Uses
Roads Open to All Vehicles, Yearlong
Roads Open to All Vehicles, Seasonal
Roads Open to Highway Legal Vehicles Only, Yearlong
Roads Open to Highway Legal Vehicles Only, Seasonal
State or US Highway
Hydrology
Artificial Path
Canal Ditch
Pipeline
Intermittent
Perennial
Ephemeral
Ranger District Boundary
Proposed Treatment Units
Power Fire Project Boundary
Wilderness
National Forest Land
Miles
0
0.25
0.5
1
Map Document: (U:\gis\projects\PowerFireNEPA\gis\tool\mxd\PowerFireScoping.mxd)
2/14/2014 -- 12:27:09 PM
Placerville
Minden
Markleeville
Jackson
San Andreas
Sonora
T8 N R14 E
T7 N R14 E
T8 N R15 E
T7 N R15 E
T8 N R16 E
T7 N R16 E
08N65
08N05G
08N05B
08N82
08N05
08N38B
08N38E
08N38A
08N38
07N02F
07N02
07N05
07N01
07N03
08N50B
08N50
08N50A
08N25C
08N39
08N29B
08N29
08N29C
08N84
08N70
08N70B
08N16F
08N16
08N16B
08N16D
08N06
MOKELUMNE
RIVER
Beaver
Creek
Bear
River
East
Panther
Spring
Camp
Green

Power Fire Reforestation Project Data Table

		Acres by Activity							Acres by Planting Arrangement				
Stand Number	Stand Acres	Site Prep (Mechanical)	Site Prep (Chemical)	Hand Planting	Interplant	Release (Mechanical)	Release (Chemical)	No Treatment	1@10'	1@15'	3@21'	No Plant	Primary Vegetation
1230016	6	6		6		6					6		UGUF
1230028	3					3						3	CECO
1230032	6	4		4		4		2			4	2	UGUF
1230045	5					5						5	CECO
1230047	4					4						4	CECO
1230048	7					7						7	CECO
1230049	7					7						7	CECO
1230210	47	47		47		47					47		UGUF
1230211	10				10	10			10				UGUF
1240002	3						1	2				2	UGUF
1240003	16						16						UGUF
1240009	8				8		8				8		UGUF
1240018	3					3						3	CECO
1240020	22	8		8	5	22					13	9	CECO
1240120	2					2						2	CECO
1240210	48	4		4		48			4				CECO
1240211	17	13		13	4		17		17				CECO
1240212	89	47		47			81	8	47			8	CECO
1240213	106						93	13				13	CECO
1280001	38				38		38				38		UGUF
1280009	5				5		5				5		UGUF
1280010	5				5		5				5		UGUF
1280032	10	10		10			10				10		UGUF
1280037	11				11		11				11		UGUF
1280038	22				22		22				22		UGUF
1280041	29				29		29				29		UGUF
1280042	17				17		17				17		UGUF

Power Fire Reforestation Project Data Table -continued

		Acres by Activity							Acres by Planting Arrangement				
Stand Number	Stand Acres	Site Prep (Mechanical)	Site Prep (Chemical)	Hand Planting	Interplant	Release (Mechanical)	Release (Chemical)	No Treatment	1@10'	1@15'	3@21'	No Plant	Primary Vegetation
1280044	3		3	3			3				3		CHFO
1280045	6		6	6			6				6		CHFO
1280046	3		3	3			3				3		UGUF
1280047	7		7	7			7				7		UGUF
1280048	14		14	14			14				14		UGUF
1280210	115	37		37			85	30			37	30	UGUF
1280211	67	15		15			42	25			15	25	UGUF
1280212	113	106		106			106	7			106	7	UGUF
1280213	29						29						UGUF
1280214	6	6		6			6				6		UGUF
1280215	70	23		23			65	5			23	5	UGUF
1280216	32	32		32			32				32		UGUF
1280217	82	26		26			82				26		CECO
1280218	71	45		45			45	26			45	26	CHFO
1280219	12	6		6			6	6			6	6	CHFO
1280230	49				9		9	40			9	40	UGUF
1280231	55		10	10			10	45			10	45	UGUF
1280234	10		10	10			10				10		CHFO
1280235	23				11		11	12			11	12	CHFO
1280270	1	1		1			1				1		UGUF
1280271	5	5		5			5				5		UGUF
1280272	6	6		6			6				6		UGUF
1280273	1	1		1			1				1		UGUF
1280274	2	2		2			2				2		UGUF
1290001	7				4		7				4	3	CECO
1290005	32		32	32			32				32		UGUF
1290006	47						47						UGUF

Power Fire Reforestation Project Data Table -continued

		Acres by Activity							Acres by Planting Arrangement				
Stand Number	Stand Acres	Site Prep (Mechanical)	Site Prep (Chemical)	Hand Planting	Interplant	Release (Mechanical)	Release (Chemical)	No Treatment	1@10'	1@15'	3@21'	No Plant	Primary Vegetation
1290009	36		36	36			36				36		CHFO
1290030	25						25						CEIN
1290210	28				18		18	10			18	10	UGUF
1290211	30		19	19			19	11			19	11	UGUF
1290213	27		14	14			14	13			14	13	UGUF
1290216	42						23	19				19	UGUF
1290217	38				38		38				38		UGUF
1290218	60				26		60				26		CEIN
1290219	12						12						UGUF
1290220	45						45						UGUF
1290221	44						44						UGUF
1290232	34		4	4			4	30	4			30	UGUF
1290233	19						10	9				9	UGUF
1290251	48		4	4			4	44			4	44	UGUF
1290254	45		17	17			17	28			17	28	CHFO
1290255	63				12		12	51			12	51	CEIN
1290258	56		56	56			56				56		CEIN
1290259	27				12		12	15			12	15	CEIN
1290270	6	6		6			6				6		CEIN
1300121	2						2					2	CEIN
1310019	61						32	29				29	CHFO
1310023	24				16		16	8			16	8	CEIN
1310024	13		6	6			10	3		4	6	3	CHFO
1310025	17						15	2				2	UGUF
1310061	26		14	14			14	12		14		12	CHFO
1310210	76						76						CEIN
1310212	6						6						UGUF

Power Fire Reforestation Project Data Table -continued

		Acres by Activity							Acres by Planting Arrangement				
Stand Number	Stand Acres	Site Prep (Mechanical)	Site Prep (Chemical)	Hand Planting	Interplant	Release (Mechanical)	Release (Chemical)	No Treatment	1@10'	1@15'	3@21'	No Plant	Primary Vegetation
1310213	35						35						CEIN
1310214	32						11	21				21	CEIN
1310215	8				8		8			8			CHFO
1310216	49		6	6			6	43		6		43	CHFO
1310219	87						19	68				68	UGUF
1310220	27						27						CEIN
1310230	12				12		12		12				CEIN
1310250	2						2						CEIN
1310251	2						2						CEIN
1310253	51		33	33			33	18		33		18	CHFO
1310256	34						34						CEIN
1310270	4						4						CEIN
1320002	2				2		2				2		UGUF
1320003	1				1		1				1		UGUF
1320019	8		8	8			8				8		UGUF
1320200	3				3		3				3		CEIN
1320210	23						23						UGUF
1320211	54						54						UGUF
1320212	65						65						UGUF
1320213	70						70						UGUF
1320214	43						32	11				11	UGUF
1320215	14						14						UGUF
1320216	13				13		13		13				UGUF
1320217	38						38						UGUF
1320218	12						12						UGUF
1320230	16		16	16			16				16		CEIN
1320231	9				9		9				9		CHFO

Power Fire Reforestation Project Data Table -continued

		Acres by Activity							Acres by Planting Arrangement				
Stand Number	Stand Acres	Site Prep (Mechanical)	Site Prep (Chemical)	Hand Planting	Interplant	Release (Mechanical)	Release (Chemical)	No Treatment	1@10'	1@15'	3@21'	No Plant	Primary Vegetation
1320232	15						15						CEIN
1320233	27				27		27				27		CEIN
1320250	38						38						CEIN
1320251	6						6						CEIN
1320252	7		7	7			7				7		CEIN
1320253	27				27		27				27		UGUF
1320254	23						23						CHFO
1320256	37						37						CEIN
1320257	104		24	24			104				24		CEIN
1320258	65						56	9				9	CEIN
1320259	22						22						CEIN
1320261	25						25						CEIN
1330036	1						1						UGUF
1330210	26						26						CEIN
1420001	2					2							UGUF
1420210	6	6		6		6					6		UGUF
1430001	18		18	18			18				18		CHFO
1430002	14		14	14			14				14		CHFO
1430006	5	5		5			5				5		CHFO
1430007	6	6		6			6				6		CHFO
1430009	5	5		5			5				5		CHFO
1430010	13					13						13	CECO
1430013	24				6	24					6	18	CECO
1430018	10						10						ARPA
1430020	10				10		10				10		UGUF
1430025	13		13	13			13				13		UGUF
1430026	10		10	10			10				10		CHFO

Power Fire Reforestation Project Data Table -continued

		Acres by Activity							Acres by Planting Arrangement				
Stand Number	Stand Acres	Site Prep (Mechanical)	Site Prep (Chemical)	Hand Planting	Interplant	Release (Mechanical)	Release (Chemical)	No Treatment	1@10'	1@15'	3@21'	No Plant	Primary Vegetation
1430027	12		12	12			12				12		CHFO
1430028	5		5	5			5				5		CHFO
1430034	3		3	3			3				3		UGUF
1430039	6					6						6	CECO
1430040	3				3		3				3		CHFO
1430042	8						8						UGUF
1430043	2						2						UGUF
1430050	3						3					3	CECO
1430051	4		4	4			4				4		CHFO
1430052	7		7	7			7				7		CHFO
1430053	12				12		12				12		CHFO
1430054	11				11		11		11				CEIN
1430055	3				3		3		3				CEIN
1430056	5				5		5		5				CEIN
1430057	3				3		3		3				CEIN
1430058	10				10		10				10		CEIN
1430059	3		3	3			3				3		CHFO
1430060	6				6		6				6		CECO
1430200	4						4						CECO
1430210	39				7	7		32			7	32	UGUF
1430211	13					13							UGUF
1430212	113	15		15		113					15		CECO
1430213	107					107							CECO
1430214	100						39	61				61	CECO
1430216	54	54		54			54				54		CHFO
1430217	48	22		22			22	26			22	26	CECO
1430218	13	8		8			8	5			8	5	CHFO

Power Fire Reforestation Project Data Table -continued

		Acres by Activity							Acres by Planting Arrangement				
Stand Number	Stand Acres	Site Prep (Mechanical)	Site Prep (Chemical)	Hand Planting	Interplant	Release (Mechanical)	Release (Chemical)	No Treatment	1@10'	1@15'	3@21'	No Plant	Primary Vegetation
1430230	17		10	10			10	7			10	7	CHFO
1430231	47		3	3			3	44			3	44	CHFO
1430250	37				14	7	7	23			14	23	ARPA
1430251	12				5		5	7			5	7	CECO
1430253	11						11						CECO
1430254	37					37							CECO
1430255	20	20		20			20				20		CECO
1430273	2	2		2			2				2		CECO
1430275	4	4		4			4				4		CECO
1430285	27	27		27			27				27		CECO
TOTALS	4,408	630	451	1,081	497	503	3, 025	880	129	65	1,388	965	

Hand Planting – Planting of bare root or container seedlings in a stand using hand tools.
Interplanting – Planting to increase stocking levels of previously planted stands. Also referred to as fill-in planting or replanting
Site Preparation – Treatments to remove competing vegetation and/or reduce fuel levels prior to planting.
Release – Treating competing vegetation after planting to enhance seedling survival and growth.
No Plant – Areas within a stand not proposed for planting.
Primary vegetation – The primary competing vegetation species in a stand (refer to table, below).

Primary Vegetation codes	
ARPA	Greenleaf manzanita
CECO	Whitethorn
CEIN	Deerbrush
CHFO	Bearclover
UGUF	Grasses and Forbs