# Mokelumne River
# Watershed Sanitary Survey
# Update 2010

Photo: Pardee Reservoir

East Bay Municipal Utility District
January 2011

# Table of Contents
# Mokelumne River Watershed Sanitary Survey
# Update 2010

## EXECUTIVE SUMMARY

**BACKGROUND** ..... **1**

**WATER QUALITY CONDITIONS** ..... **1**

**WATER TREATMENT FACILITIES** ..... **2**

**WATERSHED CONDITIONS** ..... **3**

Water Supply, Conveyance, and Treatment Systems: Summary ..... 3
Watershed Description: Summary ..... 4
Potential Contaminant Sources: Summary ..... 4
Watershed Management and Control: Summary ..... 5

**CONCLUSIONS AND RECOMMENDATIONS** ..... **6**

## SECTION 1 - INTRODUCTION

**SURVEY REQUIREMENTS** ..... **1**

**OBJECTIVES** ..... **1**

**SURVEY METHODS** ..... **2**

**REPORT ORGANIZATION** ..... **2**

## SECTION 2 - WATER SUPPLY, CONVEYANCE, AND TREATMENT SYSTEMS

**OVERVIEW** ..... **1**

**RAW WATER SYSTEM, STORAGE, AND OPERATION** ..... **1**

Upper Mokelumne Watershed Area Facilities ..... 1
North Fork of the Mokelumne River ..... 2
Middle and South Forks of the Mokelumne River ..... 3
Mainstem of the Mokelumne River ..... 4
Camanche Watershed Area Facilities ..... 5
Reservoir Operations ..... 5
Pardee Reservoir Operations 2005-2009 ..... 5
Camanche Reservoir Operations 2005-2009 ..... 5
Outlet Tower Locations and Protection Freatures ..... 6
Chemical Additions to Raw Water ..... 6
Water Treatment Facilities ..... 7

## SECTION 3 - WATERSHED DESCRIPTION

**BACKGROUND** ..... **1**

**NATURAL RESOURCES OF THE UPPER MOKELUMNE RIVER WATERSHED** ..... **1**

Location ..... 1
Geology ..... 1
Soils ..... 2
Vegetation ..... 2
Wildlife ..... 2
Drainage Basins ..... 3
Precipitation and Evaporation ..... 3
Local Runoff and Diversions ..... 4
Land Uses ..... 4
Landownership and Jurisdictional Authority ..... 5

**NATURAL RESOURCES OF THE CAMANCHE WATERSHED** ..... **6**

Location ..... 6
Geology and Soils ..... 6
Vegetation and Wildlife ..... 6
Drainage Basins ..... 7
Precipitation and Evaporation ..... 7
Local Runoff and Diversions ..... 7
Land Uses ..... 8
Landownership and Jurisdictional Authority ..... 8

## SECTION 4- WATER QUALITY

**INTRODUCTION** ..... **1**

**SUMMARY OF DRINKING** ..... **1**

**WATER REGULATIONS** ..... **1**

Existing Regulations ..... 1
Arsenic Regulation ..... 2
Stage 1 and 2 - Disinfectant/Disinfection By-Products Rule ..... 3
Long Term, Stage 2 Enhanced Surface Water Treatment Rule ..... 4
Unregulated Compounds ..... 5
Ground Water Rule ..... 12
Regulations Summary ..... 6
Anticipated Regulations ..... 12
Revised Total Coliform Rule ..... 13
Drinking Water Candidate Contaminant Lists (CCL) ..... 14

**SUMMARY OF AVAILABLE RAW WATER QUALITY DATA** ..... **20**

Water Quality Data ..... 20
Title 22 Monitoring Program ..... 20

**RAW WATER QUALITY MONITORING ..... 21**

Special Studies ..... 24
Penn Mine ..... 24
Methyl Tertiary-Butyl Ether ..... 18
Upper Mokelumne River and Tributaries ..... 25

**UPPER MOKELUMNE RIVER AND TRIBUTARIES ..... 38**

**PARDEE RESERVOIR - EVALUATION OF WATER QUALITY ..... 38**

Trends in Water Quality ..... 61
Comparison of Raw/Treated Water to Standards ..... 64

**CAMANCHE RESERVOIR - EVALUATION OF WATER QUALITY ..... 64**

Trends in Water Quality ..... 83
Comparison of Raw/Treated Water to Standards ..... 83

**EVALUATION OF EBMUD COMPLIANCE ..... 85**

**CONCLUSIONS ..... 91**

## SECTION 5 - POTENTIAL CONTAMINANT SOURCES

**INTRODUCTION ..... 1**

**UPPER MOKELUMNE RIVER WATERSHED ..... 1**

District (EBMUD) Facilities ..... 2
Water Resources Development ..... 6
Sanitation Facilities ..... 6
Hazardous Materials ..... 10
Urban Area Runoff ..... 12
Rural Area Runoff ..... 14
Utilities - Hydropower Generation ..... 14
Transportation Corridors ..... 15
Agriculture ..... 17
Wildlife and Livestock ..... 17
Recreation ..... 19
Mines ..... 23
Geologic Hazards ..... 23
Fire and Fuels Management ..... 24
Power Fire (2004) ..... 25
Logging ..... 25
Pesticides ..... 28
Unauthorized Activities ..... 29

**CAMANCHE WATERSHED ..... 30**

District (EBMUD) Facilities ..... 31
Water Resources Development ..... 35
Sanitation Facilities ..... 36

Hazardous Materials ....36
Urban Area Runoff ....36
Rural Area Runoff....36
Utilities - Hydroelectric Power ....37
Transportation Corridors....37
Agriculture ....37
Wildlife and Livestock....37
Recreation ....38
Mines....38
Geologic Hazards....39
Fire and Fuels Management....40
Logging....41
Unauthorized Activities ....41

**SIGNIFICANCE OF POTENTIAL CONTAMINANT SOURCES .... 41**

Sanitation Facilities....43
Urban and Rural Area runoff ....43
EBMUD Facilities ....44
Utilities - Hydroelectric Power ....44
Wildlife and Livestock....44
Recreation ....44
Geologic Hazards and Fires and Fire Management....45

**SECTION 6 - WATERSHED CONTROL AND MANAGEMENT**

**INTRODUCTION.... 1**

**ORGANIZATIONAL STRUCTURE .... 1**

Jurisdictional Authority in the Watershed ....1
EBMUD Organizational Structure....2

**WATERSHED MANAGEMENT PRACTICES.... 2**

U.S. Forest Service ....3
Bureau of Land Management ....6
PG&E Land Conservation Commitment Stewardship Council....7
Upper Mokelumne River Watershed Authority....7
Integrated Regional Water Management Plan ....10
National Wild and Scenic River Designation Recommendation....11
Sierra Nevada Conservancy....12
Upper Moklumne River Watershed Council ....12
Central Sierra Resource Conservation and Development....13
Mokelumne Coast to Crest Trail....13
District (EBMUD) ....15
Mokelumne Watershed Master Plan....15
Access Control....17
Fire and Fuels Management....19
Grazing....21

Erosion Control....22
Pest Management....23
Stormwater Management....25
Waste Management....26
Inspection, Surveillance, and Enforcement....28
Emergency Response....28
Public Education....29
Land Use Planning....29
Access Control....32
Off-Highway Vehicle Use Restrictions....34
Erosion Control....34
Pest Management....36
Logging Practices....37
Grazing and Livestock Management....39
Mining....40
Stormwater Management....42
Waste Management....45
Septic Tank Regulation and AB885....47
Structures, Dredging and Fill Management....49
Inspection, Surveillance, and Enforcement Procedures....50
Emergency Response....50
Public Education....52
Fire and Fuels Management....53

## SECTION 7 - POTENTIAL CORRECTIVE ACTIONS

**INTRODUCTION....1**

**STATUS OF POTENTIAL CORRECTIVE ACTIONS....3**

Water Quality....3
Watershed Control and Management Practices....6
Interjurisdictional Coordination....11
Public Education....13

## APPENDICES

Title 22 Monitoring Schedule....4-1
Annual Water Quality Reports (2005 – 2009)....4-2
Coliform Data Comparison – Colilert vs Multiple Tube Fermentation....4-3
Penn Mine Environmental Restoration Project 2009/10 Bi-annual Report....4-4
References....5-1
District (EBMUD) Hazardous Materials Inventory....5-2
District (EBMUD) Wastewater Treatment Plant Monitoring Requirements....5-3
Map of Stanislaus National Forest....6-1
Bureau of Land Management, Sierra Resource Management Plan Maps....6-2
PG&E Land Conservation Stewardship Council Planning Unit Maps....6-3

District (EBMUD) Trail Signs and Permit Requirements ..... 6-4
District (EBMUD) Recreation Management Plan Excerpt ..... 6-5
District (EBMUD) Safe Harbor Agreement Map ..... 6-6
Waste Discharge Requirements Order and Associated Documents (example) ..... 6-7
Hazardous Material Business Plan (example) ..... 6-8

# MRWSS Acronyms

| Acronym | Definition |
|---|---|
| AAL | Archived Advisory Levels |
| AF | Acre-Feet |
| AFY | Acre-Feet per Year |
| AIP | Agreement in Principle |
| ATV | All-Terrain Vehicle |
| AWA | Amador (County) Water Agency |
| AWAG | Amador Weed Advisory Group |
| AWWA | American Water Works Association |
| AWWARF | Water Research Foundation |
| BAT | Best Available Technology |
| BLM | Bureau of Land Management |
| BMP | Best Management Practices |
| BPV | Beneficial Public Value |
| CAL FIRE | California Dept. of Forestry and Fire Protection |
| CANS | Camanche North Shore |
| CASQA | California Stormwater Quality Association |
| CASRN | Chemical Abstract Series Registry Numbers |
| CASS | Camanche South Shore |
| CASSIN | CASS WTP influent |
| CAWP | Central Amador Water Project |
| CCC | Chlorine Contact Chamber |
| CCL | Candidate Contaminant List |
| CCR | Consumer Confidence Report |
| CCT | Corrosion Control Treatment |
| CCWD | Calaveras County Water District |
| CDC | Center for Disease Control |
| CDFG | California Department of Fish and Game |
| CDPH | California Department of Public Health |
| CEQA | California Environmental Quality Act |
| CFR | Code of Federal Regulations |
| CFU | Colony Forming Units |
| CHHP | Camanche Hills Hunting Preserve |
| CHP | California Highway Patrol |
| CNDD | California Natural Diversity Database |
| CPUD | Calaveras Public Utility District |
| CSIP | Capital Security Improvement Project |
| CSRC&D | Central Sierra Resource Conservation and Development District |
| CVRWQCB or CWQCB | Central Valley RWQCB |
| CYA | California Youth Authority |
| DBP | Disinfection By-Product |
| DFG | Department of Fish and Game |
| District | East Bay Municipal Utility District |

| Acronym | Definition |
|---|---|
| DLR | Detection Limit for Reporting |
| DOC | Dissolved Organic Carbon |
| DWP | District Work Plan |
| *E. coli* | *Escherichia coli* |
| EAP | Emergency Action Plan |
| EBMUD | East Bay Municipal Utility District |
| EBWSS | East Bay Watershed Sanitary Survey |
| EIR | Environmental Impact Report |
| EIS | Environmental Impact Statements |
| EMA | California Emergency Management Agency |
| EOC | Emergency Operations Center |
| EOP | Emergency Operations Plan |
| EOT | Emergency Operations Team |
| ESP | Environmental Stewardship Plan |
| FERC | Federal Energy Regulatory Commission |
| FMP | Fire Management Plan |
| FMU | Fire Management Unit |
| FPA | Flavor Profile Analysis or Fire Prevention Agency |
| FRAP | CAL FIRE Resource Assessment Program |
| FRWP | Freeport Regional Water Project |
| FWS | US Fish and Wildlife Services |
| GIS | Geographic Information System |
| GSL | Gravity Supply Line |
| GWDR | Ground Water Disinfection Rule |
| GWR | Ground Water Rule |
| HAA | Halogenated Acetic Acids |
| HMBP | Hazardous Material Business Plan |
| HPC | Heterotrophic Plate Count |
| ICS | Incident Command System |
| IDSE | Individual Distribution System Evaluation |
| IESWTR | Interim Enhanced Surface Water Treatment Rule |
| IPM | Integrated Pest Management |
| IRWMP | Integrated Regional Water Management Plan |
| IVM | Integrated Vegetation Management |
| JSA | Joint Settlement Agreement |
| JVID | Jackson Valley Irrigation District |
| LADWP | Los Angeles Dept. of Water and Power |
| LCP | Land Conservation Plan |
| LRAA | Locational Running Annual Average |
| LT1ESWTR | Long Term Stage 1 ESWTR |
| LT2ESWTR | Long Term Stage 2 ESWTR |
| LUST | Leaking Underground Storage Tank |
| MAC | Mokelumne / Amador / Caliveras |
| MCCT | Mokelumne Coast to Crest Trail |
| MCL | Maximum Contaminant Level |

| Acronym | Definition |
|---|---|
| MCLG | Maximum Contaminant Level Goal |
| MDL | Method Detection Level |
| MFL | Million Fibers per Liter |
| MGD | Million Gallons per Day |
| MHMP | Mobile Home Park Management Plan |
| MORE | Mokelumne River Regional Water Storage and Conjunctive Use |
| MOU | Memorandum of Understanding |
| MPN | Most Probable Number |
| MRDL | Maximum Residual Disinfectant Levels |
| MRDLG | Maximum Residual Disinfectant Level Goal |
| MRWPA | Mokelumne River Water and Power Authority |
| MRWSS | Mokelumne River Watershed Sanitary Survey |
| MSL | Mean Sea Level |
| MTBE | Methyl Tertiary-Butyl Ether |
| MTF | Multiple Tube Fermentation |
| MWMP | Mokelumne Watershed Master Plan |
| NAS | National Academy of Science |
| NEPA | National Environmental Policy Act |
| NFS | National Forest Service |
| NIMS | National Incident Management Systems |
| NOI | Notice of Intent |
| NOP | Notice of Preparation |
| NPDES | National Pollution Discharge Elimination System |
| NRCS | National Resources Conservation Service |
| NRD | National Resources Department |
| NRP | National Response Plan |
| NSSF | National Shooting Sports Foundation |
| NTU | Nephelometric Turbidity Units |
| NWIS | National Water Information System |
| OES | Office of Emergency Services |
| OHV | Off-Highway Vehicle |
| OMD | Operations and Maintenance Department |
| OMR | California Dept. of Conservation’s Office of Mine Reclamation |
| OWTS | On-site Waste Treatment Systems |
| PARA | Pardee Recreation Area |
| PCB | Poly-Chlorinated Biphenyls |
| PG&E | Pacific Gas & Electric |
| Project 137 | PG&E Mokelumne Hydroelectric Project |
| RAA | Running Annual Average |
| RDM | Residual Dry Matter |
| RMP | Resource Management Plan |
| ROD | Record of Decision |
| RPU | Resource Patrol Unit |
| RWQCB | Regional Water Quality Control Board |
| S1DBPR | Stage 1 – Disinfectant/Disinfection By-Products Rule |

| Acronym | Definition |
|---|---|
| S2DBPR | Stage 2 – Disinfectant/Disinfection By-Products Rule |
| SCS | US Soil Conservation Service |
| SDWA | Safe Drinking Water Act |
| SDWR | Summary of Drinking Water Regulations |
| SEMS | Standardized Emergency Management System |
| SFR | Single Family Residential |
| SHA | Safe Harbor Agreement |
| SMARA | California Surface Mining and Reclamation Act of 1975 |
| SMCL | Secondary Maximum Contaminant Level |
| SMGB | State Mining and Geology Board |
| SNC | Sierra Nevada Conservancy |
| SNFP | Sierra Nevada Forest Plan |
| SNFPA | Sierra Nevada Forest Plan Amendment |
| SOC | Synthetic Organic Chemicals |
| SOCC | Security Operations Control Center |
| SPI | Sierra Pacific Industries |
| SSMP | Sewer System Management Plan |
| SUVA | Specific Ultraviolet Absorbance |
| SWAT | Stormwater Advisory Team |
| SWDR | Stormwater Data Report |
| SWMP | Stormwater Management Program |
| SWRCB | State Water Resources Control Board |
| SWTR | Surface Water Treatment Rule |
| TAF | Thousand Acre-Feet |
| TCR | Total Coliform Rule |
| TDS | Total Dissolved Solids |
| THM | Trihalomethane |
| THP | Timber Harvest Plan |
| TOC | Total Organic Carbon |
| TON | Threshold Odor Number |
| TPZ | Timberland Production Zone |
| TSS | Total Suspended Solids |
| TT | Treatment Technique |
| TTHM | Total Trihalomethane |
| UCMR | Unregulated Contaminant Monitoring Rule |
| UMRWA | Upper Mokelumne River Watershed Authority |
| UMRWAP | Upper Mokelumne River Watershed Authority Project |
| USACE | US Army Corps of Engineers |
| USDA | US Dairy Association |
| USEPA | US Environmental Protection Agency |
| USFS | US Forest Service |
| USGS | US Geological Survey |
| USL | Upper San Leandro |
| UST | Underground Storage Tank |
| UWMP | Urban Water Management Plan |

| Acronym | Definition |
|---|---|
| VOC | Volatile Organic Chemicals |
| WDR | California General Waste Discharge Requirements for Sanitary Sewer Systems |
| WEF | Water Environment Federation |
| WOD | Water Operations Department |
| WQI | Water Quality Index |
| WRPD | Water Resources Planning Division |
| WSS | Watershed Sanitary Survey |
| WTP | Water Treatment Plant |
| WUI | Wildland Urban Interface |
| WWTP | Wastewater Treatment Plant |

# Executive Summary

## Background

The California Department of Public Health (CDPH) required that all surface water systems conduct a watershed sanitary survey (WSS) by January 1, 1996, to be supplemented by updates every five years thereafter. The purpose of a WSS is to assess a system's ability to meet the United States Environmental Protection Agency's (USEPA) Surface Water Treatment Rule (SWTR), the Interim Enhanced SWTR (IESWTR) for large water systems; the Long Term 1 Enhanced SWTR (LT1ESWTR) for water small systems; and the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) for all water systems. This assessment is performed through a detailed evaluation of water quality data, treatment facilities, and watershed conditions. The East Bay Municipal Utility District (District) submitted the first Mokelumne River Watershed Sanitary Survey (MRWSS) to CDPH in December 1995, followed by a five-year update in 2000 (MRWSS Update 2000) and a second five-year update in 2005 (MRWSS Update 2005). The document herein is the District's third five-year update of the original WSS.

The MRWSS Update 2010 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 Quality Conditions

Pardee and Camanche Reservoirs exhibit excellent raw water quality characteristics. The raw waters met the primary treated water Maximum Contaminant Levels (MCLs) for all inorganics except for aluminum, iron, and manganese, organics, and radionuclide parameters monitored. Although a few organic compounds were detected in Pardee and Camanche Reservoirs, their levels were well below the Detection Limit for Reporting (DLR). The raw water turbidity and coliform levels were above the treated water MCLs in both reservoirs. In Pardee Reservoir, aluminum was detected in the raw water at concentrations above primary MCLs, while iron and manganese were detected at concentrations above their secondary MCLs. In Camanche Reservoir, manganese was detected at concentrations above the secondary MCLs. Secondary MCLs are primarily concerned with taste or appearance of water rather than public health concerns.

The District's Water Treatment Plants (WTPs), Pardee Center, Pardee Recreation Area, Camanche North and South Shore, Walnut Creek, Lafayette, and Orinda WTPs, are very effective and reliable in removing particulates and microorganisms. The monthly reports,

annual water quality reports, and annual inspection reports submitted to CDPH indicate that treated waters from these WTPs met all treated water quality regulations. In addition, disinfection residual and microbiological data from the District's distribution systems, as stated in the monthly reports, showed that the District had no problems meeting the detectable disinfectant residual requirement.

Adopted in 2006, LT2ESWTR requires large surface water systems to monitor their source water at least monthly for *Cryptosporidium*, *Escherichia coli (E. coli)*, and turbidity for a period of two years. Based on the highest arithmetic 12 month mean of *Cryptosporidium* sampled at Pardee Reservoir, the District's Walnut Creek, Lafayette, and Orinda WTPs qualify for Bin 1 classification, for which no additional treatment for *Cryptosporidium* is required. Pardee Reservoir is also the source for the District's small water systems, Pardee Center and Pardee Recreation Area, for which no *Cryptosporidium* monitoring was required, because the mean *E. coli* level, collected at least twice monthly for a 12-month period, was not greater than 10 *E. coli*/100mL. Similarly, Camanche Reservoir is the source for the District's small water system, Camanche South Shore, for which no *Cryptosporidium* monitoring was required, because the mean *E. coli* level was not greater than 10 *E. coli*/100mL.

With regards to the Stage 1 – Disinfectant/Disinfection Byproducts Rule (S1DBPR), the source water total organic carbon (TOC) concentrations in both Pardee and Camanche Reservoirs with median TOC values of 1.6 mg/L and 1.8 mg/L, respectively, indicate that the District will not be required to pursue enhanced coagulation at any of the WTPs treating these source waters.

In Pardee and Camanche Reservoirs, the historical water quality monitoring data indicated that MTBE concentrations declined to trace levels after the District initiated a program that required all District-owned and concessionaire-owned 2-stroke high emission engines be replaced with 4-stroke low emission engines. Additionally, all fuel sold at the Pardee Marina beginning in 1999 was MTBE-free. No MTBE was detected in either Pardee or Camanche Reservoir between 2005 and 2009.

## *Water Treatment Facilities*

The District operates a total of six WTPs, three East Bay systems and three upcountry systems that treat water from Pardee or Camanche Reservoirs. The three large systems, serving over 10,000 people each, are Walnut Creek, Orinda, and Lafayette WTPs located in the District's East Bay service area. These facilities treat Mokelumne River water that is stored in Pardee Reservoir and transported through the Mokelumne Aqueducts. In 2007, filters 1 through 6 at Lafayette WTP underwent a Filter Improvement Project, which included the replacement of filter media and the filter underdrains. During the 2010 update period, major plant expansion and improvements were made at Walnut Creek WTP. These include new filters, filter backwash wastewater treatment facilities replacement, chlorine contactor addition, clearwell replacement, process control upgrade, new supply pipes, and chemical storage and feed facilities replacement. The last two new filters will be completed

in 2011, which will increase the permitted capacity of the plant from the current maximum capacity of 100 MGD to 115 MGD.

The small systems, serving less than 10,000 people each, are the Pardee Recreation Area, Pardee Center, Camanche South Shore, and Camanche North Shore WTPs. Pardee Recreation Area and Pardee Center WTPs treat water from Pardee Reservoir. Camanche South Shre WTP treats Camanche Reservoir water. Camanche North Shore WTP treats groundwater from three wells. At Camanche North Shore WTP, green sand filters were replaced with pyrolucite filters in 2005 and the calcium hypochlorite chlorination system was replaced with sodium hypochlorite in 2009. Additionally, potassium permanganate is no longer used.

# Watershed Conditions

Evaluation of watershed conditions is organized into four sections in the MRWSS Update 2010: Section 2 - Water Supply, Conveyance, and Treatment Systems, Section 3 - Watershed Description, Section 5 - Potential Contaminant Sources, and Section 6 - Watershed Management and Control. Each of these sections is briefly summarized below.

## Water Supply, Conveyance, and Treatment Systems: Summary

The District has water rights to the 578 square-mile Upper Mokelumne River watershed up to 325 million gallons per day (MGD). The Mokelumne River, representing the District's major source of supply, provided the District with an average annual draft 2005-2009 of 183 MGD. 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 within the Upper Mokelume 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).

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 as well as power generation, while maintaining sufficient carryover storage for emergencies such as droughts or facility outages.

Due to high inflow in the winter of 2005/2006, and in May 2009, Pardee Reservoir spilled. Despite significantly lower inflows in 2007 and 2008, Pardee Reservoir elevation is filled to above 560 feet at the beginning of each summer, maximizing water available to the District's service area and the water available for cold water release to Camanche Reservoir in the autumn. Above-median inflow in 2005 and 2006 resulted in above-median releases to Camanche Reservoir each spring; similarly, lower inflow in 2007 and 2008 resulted in lower releases into Camanche Reservoir. In December 2008, Camanche Reservoir was at

187.73 ft or 33 percent of capacity due to two consecutive dry years. The District experienced no interruption in Mokelumne Aqueduct flow between 2005 and 2009.

## Watershed Description: Summary

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. Including the District, six major institutional landowners and 81 major private landowners have been identified in the Upper Mokelumne River Watershed. Of these landowners, District property accounts for approximately 3 percent, Sierra Pacific Industries approximately 24 percent, Bureau of Land Management (BLM) approximately 3 percent, PG&E approximately 1 percent, National Forest Service approximately 54 percent, and others approximately 15 percent.

The total precipitation in December 2005 was 20.9 inches, based on a four-station average, ranking in the 99$^{th}$ percentile for any month in the past 80 years. The average precipitation during the 2005-2009 period was 48.3 inches, comparable to the historical (1930-2004) average of 48.3 inches. The average Caples Lake snow depth during this period was 82.7 inches, again comparable to the historical (1993-2004) average of 79.4 inches. The average Caples Lake snowpack water content during this period was 28.9, again comparable to historical (1993- 2004) average of 30.5 inches. However, the overall Caples Lake snowpack water content exhibited a slight downward trend for the past 17 years.

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.

## Potential Contaminant Sources: Summary

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 5-24 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 potential impacts to water quality include wastewater collection and treatment systems, recreation, and grazing. The District's wastewater treatment and collection systems have undergone major improvements during the update period. Recreation on District lands continues to be popular at the boating take-out facility on the Middle Bar Bridge upstream of Pardee Reservoir, Camanche North and South Shore Recreation Areas. The District continues to use rangeland management for fire prevention

and control of grassland and brushland habitat. Annual grazing plans for each pasture are developed to determine allowable stocking levels and residual dry matter to be retained to minimize erosion.

In the non-District watershed lands above Pardee Reservoir, new development continues in both incorporated and unincorporated parts of Amador and Calaveras counties, increasing the potential for contamination by urban runoff, especially during construction, though at a much lower rate than in the past. Another concern related to developments in unincorporated parts of those counties is the increasing number of septic systems. Logging and grazing continue to be major activities in the watersheds. On both public and private lands in the upper watershed, erosion from off-highway vehicle (OHV) use continues to be a concern, but may decrease over the next few years as changes in National Forest Service and BLM OHV policies are implemented. The National Forest Service has implemented its Travel Management Rule and BLM has updated its Sierra Resource Management Plan, both of which now only permit OHV use on designated roads and trails; however, the effectiveness of these measures will depend on successfully enforcing them.

## *Watershed Management and Control: Summary*

Management practices by the District, Calaveras and Amador Counties, Stanislaus and Eldorado National Forests, California Department of Transportation (Caltrans), Sierra Pacific Industries, and PG&E were reviewed and summarized. These documents included county general plans, fire plans, grading ordinances, land use elements, housing elements, stormwater management plans, and best management practices (BMPs). As a whole, the documents presented thoughtful and proactive approaches to protecting water quality.

In 2008, the District completed the Mokelumne Watershed Master Plan (MWMP). The MWMP establishes District policy and provides long-term management direction for District–owned lands within the Mokelumne Watershed, with the goal of protecting water quality and ecologic health. The natural resources condition was evaluated to identify evidence of impacts from land use activities such as recreation and grazing. As strategies of the MWMP, several management plans have or will be developed including Recreation Management Plan 2010, Rangeland Management Plan, and Fire Management Plan (FMP). The Recreation Management Plan identifies measures to provide quality recreational experience while protecting water quality.

In order to meet the new State requirement, the District prepared a Sewer System Management Plan (SSMP) for three District facilities: Camanche North Shore (CANS) Recreation Area, Camanche South Shore (CASS) Recreation Area, and Pardee Recreation Area (PARA). The SSMP is composed of eleven elements that fulfill the State requirements in an effort to manage wastewater systems to protect drinking water supplies.

The Upper Mokelumne River Watershed Authority (UMRWA) is a coalition of stakeholders (Alpine County, Alpine County Water Agency, Amador County, AWA, Calaveras County, CCWD, CPUD, JVID, and the District) for the purpose of preserving and enhancing Mokelumne River water supply, water quality, and environment. The UMRWA completed

the Upper Mokelumne River Watershed Assessment and Planning Project, which also included a Septic System Management Program, in 2007. The project developed watershed assessment methodologies, compiled existing data on watershed conditions, performed water quality analysis, developed a Geographic Information Systems (GIS) database, created the Watershed Analysis and Risk Management Framework, Fire Behavior, and Water Quality Vulnerability Zones models, and the results recommend further actions and management practices.

Signed into law in 2000, AB885 authorized regulation of Onsite Waste Treatment Systems (OWTS) through the State Water Resources Control Board (SWRCB). A revised draft of the regulation, waiver, and Draft Environmental Impact Report (EIR) was released in November 2008. In February 2009, the SWRCB closed the public comment period. The SWRCB is expected to draft revised regulations based on comments received. Implementation of the regulation is likely to occur in 2010 or later. Proposed regulation is expected to reduce the potential contamination of OWTS through required inspection and maintenance.

The Pacific Forest and Watershed Lands Stewardship Council was founded in 2004 as part of a bankruptcy settlement reached between PG&E and the State of California in 2003. The settlement required PG&E to make a Land Conservation Commitment and protect more than 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. PG&E was directed to fund an independent nonprofit organization with $70 million over ten years to oversee this process. Three planning units totaling 7,096 acres lie within the Upper Mokelumne River Watershed; however, the specific land conservation and/or disposition requirements have not been finalized.

## *Conclusions and Recommendations*

Raw water quality in Pardee and Camanche Reservoirs is generally excellent, and all District WTPs are capable of reliably treating or removing particulates, pathogens, and other water quality contaminants; however, with increased regulatory pressure and improved understanding of water quality parameters and related health effects, source protection has become an integral part of water quality management.

As part of this MRWSS Update 2010, status reports were written for potential corrective actions that were presented in the past MRWSS updates. These recommendations, which pertain to ongoing activities in the Upper Mokelumne River and Camanche Watersheds, are summarized in Table ES-1 and discussed at length in Section 7. The recommendations take into account watershed characteristics, type and magnitude of potential contaminants, and potential risk to public health. No new potential corrective action is added in the 2010 Update, based on the evaluation of the collected data and information regarding the generally excellent water quality and relatively pristine watershed conditions.

**Table ES-1: Summary of Potential Corrective Actions**

| # | CORRECTIVE ACTION | Priority | STATUS |
|---|---|---|---|
| | *Water Quality Monitoring* | | |
| 1 | Monitoring Related to Specific Land Use and Activities | Medium/High | Ongoing |
| 2 | Reservoir Temperature Monitoring | High | Implemented |
| 3 | Total organic carbon (TOC) Monitoring | Medium | Implemented |
| 4 | Pesticide and Herbicide Monitoring | Medium | Implemented |
| 5 | Land Disposal Monitoring | Medium | Implemented |
| 6 | Penn Mine Monitoring | Medium | Implemented |
| 7 | Septic Tank Monitoring | Medium | Ongoing |
| 8 | Urban Stormwater Monitoring | Low | Not started |
| 9 | Storm-Related Turbidity Monitoring | Low | Initiated |
| 10 | Runoff from Historic Mines | Low | Ongoing |
| | *Watershed Control and Management Practices* | | |
| 11 | Forest Practices and Logging | Medium | Ongoing |
| 12 | Grazing Practices | Medium | Ongoing |
| 13 | Access Control Programs | Medium | Ongoing |
| 14 | In-Reservoir Recreation | Medium | Ongoing |
| 15 | Seismic Evaluation | Medium | Ongoing |
| 16 | Off-Road Vehicle Usage | Medium | Ongoing |
| 17 | Road and Landing Construction and Maintenance | Medium | Ongoing |
| 18 | Fire Roads and Hiking Trails | Medium | Ongoing |
| 19 | Hazardous Materials Storage and Transfer Facilities | Medium | Ongoing |
| 20 | Runoff from Parking Lots and Roads | Medium | Ongoing |
| 21 | Reservoir Shoreline | Medium | Ongoing |
| 22 | Protection of Riparian Corridors | Medium | Under Development |
| 23 | Equestrian Use | Low | Under Development |
| 24 | Concentrated Animal Facility Best Management Practices (BMPs) | Low | Under Development |
| | *Inter-jurisdictional Coordination* | | |
| 25 | Upper Mokelumne River Watershed Authority (UMRWA) | Medium | Ongoing |
| 26 | Emergency Response | Medium | Implemented |
| 27 | Future Development | Medium | no action |
| 28 | Stormwater Runoff | Medium | Under Development |
| 29 | Erosion Control | Medium | Ongoing |
| | *Public Education* | | |
| 30 | Residential and Commercial Neighbors | Medium | Ongoing |
| 31 | Recreational Trail Users | Medium | Ongoing |
| 32 | Community Outreach | Medium | Ongoing |

# Section 1: Introduction

## Sanitary Survey Requirements

The SWTR, approved by the USEPA in 1989, included a recommendation for all surface water systems to conduct watershed control plans. As the primacy agency for the implementation of the SWTR, the CDPH specified that all surface water utilities shall prepare a 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 includes 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, and recommendations for corrective actions.

In December 1995, the District submitted the first MRWSS to CDPH in compliance with all regulations and 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 lay between Pardee Dam and Camanche Dam that drain into Camanche Reservoir. Submitted in January 2006, the MRWSS Update 2005 was the second five-year update of the 1995 MRWSS. It carried forward the expanded scope of the MRWSS Update 2000.

MRWSS Update 2010 is the third five-year update of the 1995 MRWSS, and carries forward the same scope of the MRWSS Update 2005, and meets all requirements for preparation as described in Title 22. The major emphasis in MRWSS Update 2010 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 2010 parallel those from the first update in 2000:

1. Satisfy all SWTR requirements for a WSS.
2. Document changes that have taken place in the Pardee and Camanche watersheds during the 2005-2009 update period.

3. Produce a report that updates the 1995 MRWSS, MRWSS Update 2000, and MRWSS Update 2005, while retaining pertinent information from these previous documents.
4. Evaluate the water quality concerns pertaining to District's Pardee and Camanche Reservoirs.
5. Develop a document that complements the District's Year 2010 Update of the East Bay Watershed Sanitary Survey (EBWSS Update 2010).

Additional objectives were established for MRWSS Update 2005 and carried forward to MRWSS Update 2010. The first additional objective was to identify trends in water quality and contaminant sources. With the proliferation of 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 2010 was conducted by District staff in the Water Operations Department (WOD). The 1995 MRWSS, MRWSS Update 2000, and MRWSS Update 2005 were reviewed; all text, tables, and figures that required updating were identified. The project team was formed and District staff were identified to provide key elements of the report. Information was gathered from internal and external sources, 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: Potential Corrective Actions** lists recommended actions which have been generated based on review of recommendations in past MRWSSs and current conditions in the watersheds. It also provides current status and describes related actions that occurred during the 2005-2009 update period.

# Section 2: Water Supply, Conveyance, and Treatment Systems

## Overview

The District supplies water to approximately 1.4 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.

On average, approximately 90 percent of the District's water supply originates from Pardee Reservoir on the Mokelumne River as shown on Figure 2-1. 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 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. 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.

## Raw Water System, Storage, and Operation

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 578 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 2005-2009 average annual draft of 183 MGD.

# 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. For the purposes of this document, the sub-basin immediately surrounding Pardee Reservoir and extending upstream to include the Main Stem of the Mokelumne River is referred to as the Pardee Watershed. 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. Conditions that restrict the District's ability to use its 325 MGD entitlement include upstream water use by prior rights holders; downstream water use by riparian and senior appropriators and other downstream obligations; drought, or less than normal rainfall for more than one year; and emergency outage.

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 future 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 streamflows, pulse flow requirements, short-term power generation constraints, new ramping rates, and summer releases for river recreation. Many of the instream 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.

### 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. A new Buckhorn WTP was completed in May 2005 and expanded in November 2007. This microfiltration facility was originally designed to produce 5 MGD; however, water demands have not required implementation of its full capacity. Currently, it has a maximum capacity of 3 MGD. AWA is currently exploring the possibility of replacing the existing CAWP supply line from Tiger Creek Afterbay with a proposed gravity supply line from Tiger Creek Regulator. 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 future water demands of these agencies and Table 2-2 summarizes the storage reservoir capacities and associated engineering data for these facilities.

### CPUD

CPUD currently services approximately 1,800 households in the communities of San Andreas and Mokelumne Hill. 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. Current water deliveries vary from 19 million gallons (MG) per month in the winter to

60 MG per month in the summer. 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).

### 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. However, Bear Creek cannot support a 4 cubic feet per second (cfs) diversion during seasonal dry periods. To supplement 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 CPUD'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 future water demands of these agencies and Table 2-2 summarizes the storage reservoir capacities and associated engineering data for these facilities.

### 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 at the Jackson Creek spillway structure on the north arm of Pardee Reservoir into Carson Creek for export to Lake Amador. 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.

### 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, as described in the Appendix A.

## *Pardee Reservoir Operations 2005-2009*

Figure 2-7 shows a summary of Pardee Reservoir operations for the 2010 update period compared to historical operations. Hydrologically, the five years can be described as above average in 2005 and 2006, below average in 2007 and 2008, and average in 2009. More on hydrology can be found in Section 3 of this report. Due to high inflow in the winter of 2005/2006, and in May 2009, Pardee Reservoir spilled. Despite the significantly lower inflows in 2007 and 2008, Pardee Reservoir elevation is filled above 560 feet at the beginning of each summer, maximizing water available to the District's service area and the water available for cold water release to Camanche Reservoir in the autumn. Above median inflow in 2005 and 2006 resulted in above median releases to Camanche Reservoir each spring, as shown on the bottom graph of Figure 2-7. Similarly, lower inflow in 2007 and 2008 resulted in lower releases into Camanche Reservoir.

## *Camanche Reservoir Operations 2005-2009*

Camanche Reservoir operations for the update period are shown in Figure 2-8. The reservoir did not overtop its spillway during this period, and has only done so twice in the past 25 years (February 1986 and January 1997). Due to the above median releases from Pardee Reservoir in 2005 and 2006, shown as inflow to Camanche Reservoir, above median releases were made from Camanche Reservoir during the same time period. The lowest end-of-month elevation during this period occurred in December 2008, when the reservoir was at 187.73 ft or 33 percent of capacity. Two consecutive years of below normal inflow resulted in relatively few releases for flood control after 2006. 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 conveyed directly to several WTPs or stored in the District's Briones, San Pablo, and Upper San Leandro (USL) Reservoirs, as shown in Figure 2-3.

In 2011, the Freeport Regional Water Project (FRWP) is expected to be completed and ready for service. The FRWP will 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. Because the FRWP will only be delivering water to the East Bay terminal reservoirs, it is discussed in more detail in EBWSS Update 2010.

## Chemical Additions to Raw Water

The Pardee Chemical Building located at Pardee Center is 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.

The District adds 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. Sodium hypochlorite is added at Pardee Center, and again if needed downstream of Walnut Creek Pumping Plant before Walnut Creek WTP.

## WTP Facilities and Operations

The District operates a total of seven WTPs that treat water from either the Pardee or Camanche Reservoirs – three large systems and four small systems. The three large system WTPs, serving over 10,000 people each, 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. Also 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.

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.

## 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 two 100-gpm pumps 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 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. Calcium hypochlorite and potassium permanganate are no longer in use.

## 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, CDPH 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. The District is completing the construction of the last two new filters. On completion of construction of these filters, the permitted capacity of the plant will increase from the current maximum capacity of 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 an aboveground, cylindrical 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 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 CANS WTP, green sand filters were replaced with pyrolucite filters in 2005 and the calcium hypochlorite chlorination system was replaced with sodium hypochlorite in 2009. Additionally, potassium permanganate is no longer used.

In 2007, Filters 1 through 6 at Lafayette WTP underwent a Filter Improvement Project. Work included the removal and disposal of the existing filter media and the filter underdrains from Filters 1 through 6; repairing the interior concrete of those six filters as required; furnishing and installing new low profile stainless steel gravel-less underdrain systems; removing, modifying, and reinstalling the existing surface wash system; installing new sand (15 inches) and anthracite (24 inches) media in those six filters. The District's request to operate Filters 1 through 6 at a filtration rate up to 6 gpm/sqft was approved by CDPH on February 23, 2009; however, the maximum permitted plant flow rate would remain at 35 MGD, as specified in the water supply permit, issued on March 31, 1998.

During the 2010 update period, major plant expansion and improvements were made at Walnut Creek WTP. These include new filters, filter backwash wastewater treatment facilities replacement, chlorine contactor addition, clearwell replacement, process control upgrade, new supply pipes, and chemical storage and feed facilities replacement. The last two new filters will be completed in 2011, which will increase the permitted capacity of the plant from the current maximum capacity of 100 MGD to 115 MGD.

**Figure 2-1: Pardee Watershed Facilities**

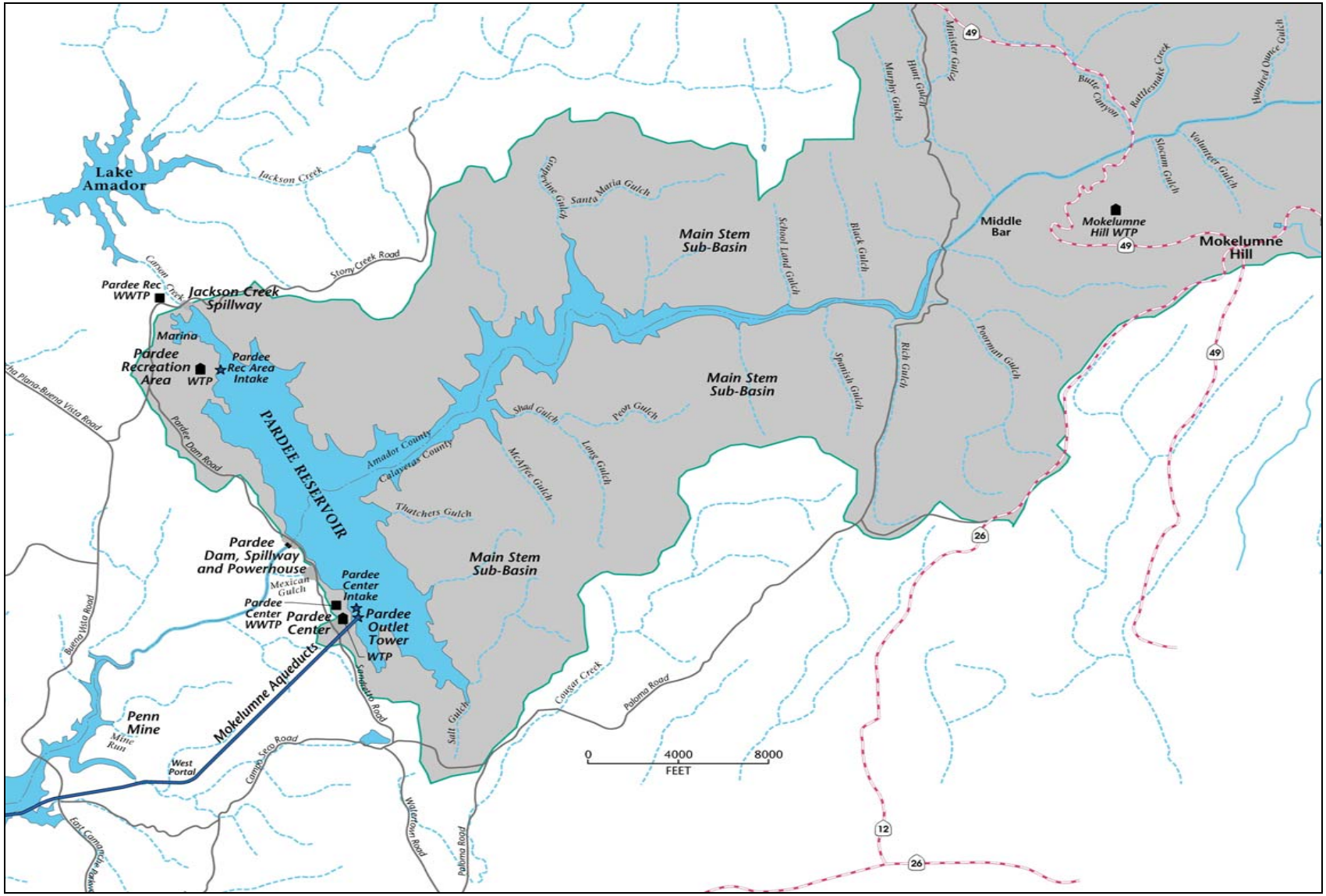


**Figure 2-2: Camanche Watershed**

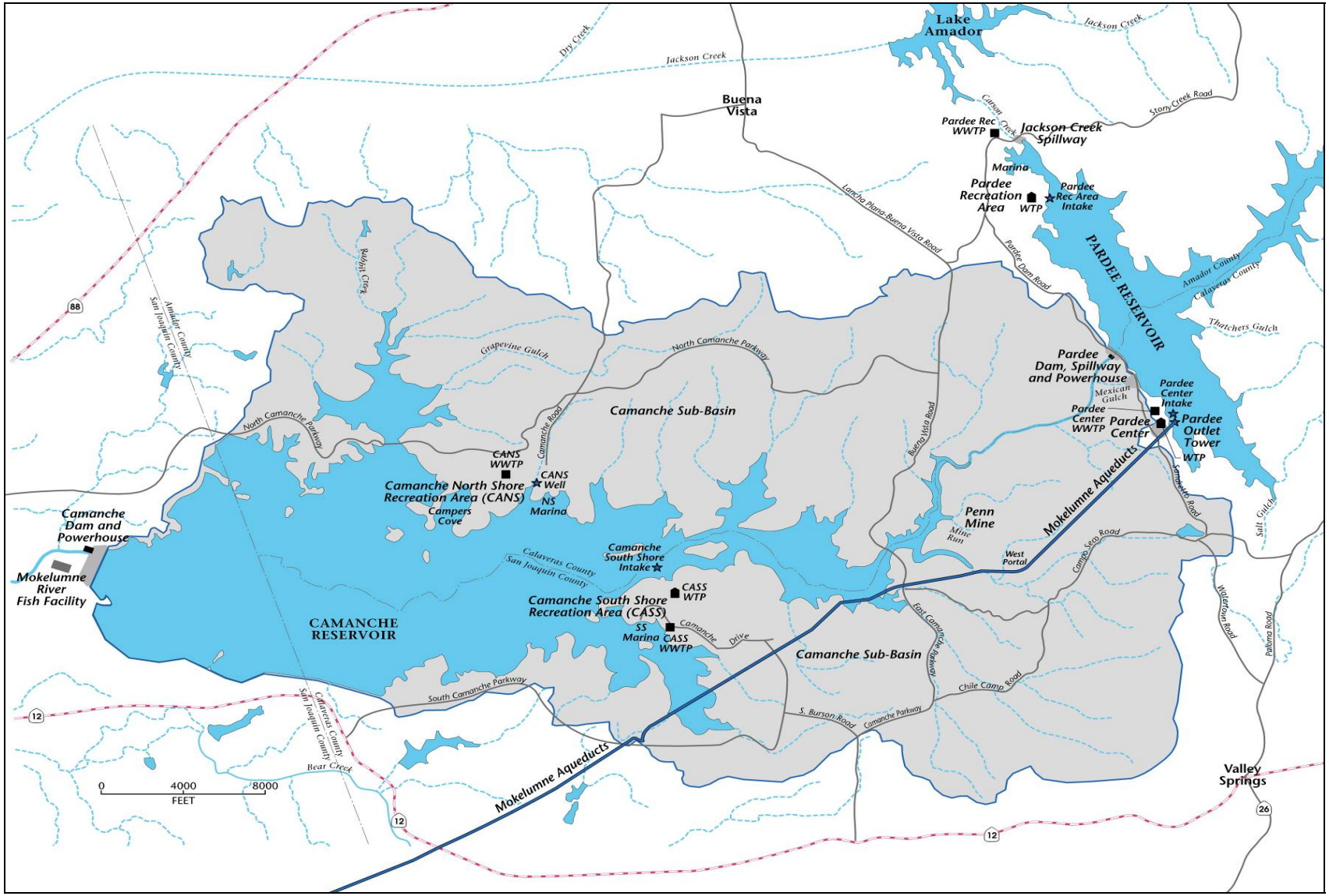


**Figure 2-3: Flow and Distribution Diagram, Year Ending June 30, 2008**

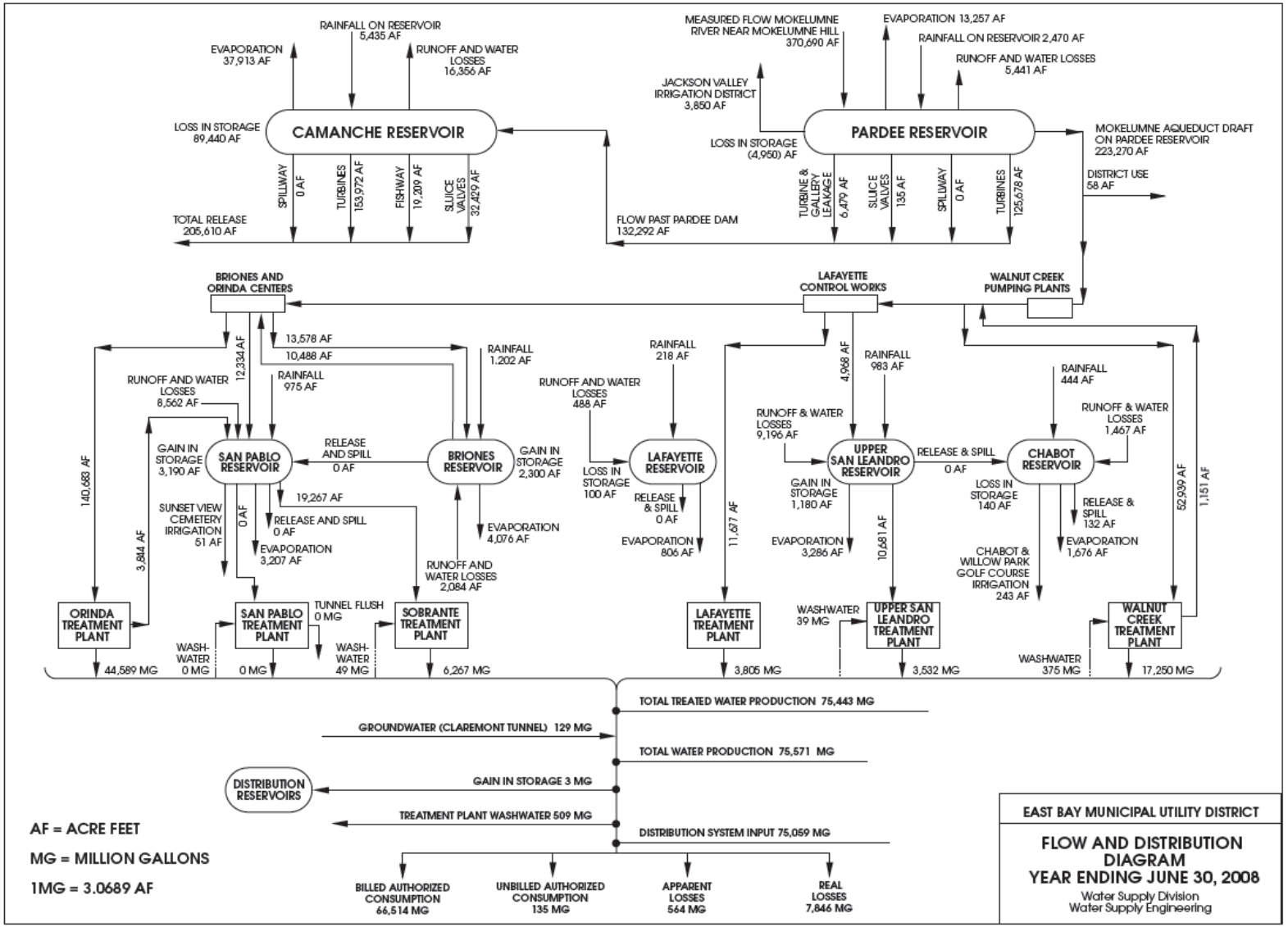


**Figure 2-4: Upper Mokelumne River Watersheds Basemap with Hydrologic Features**

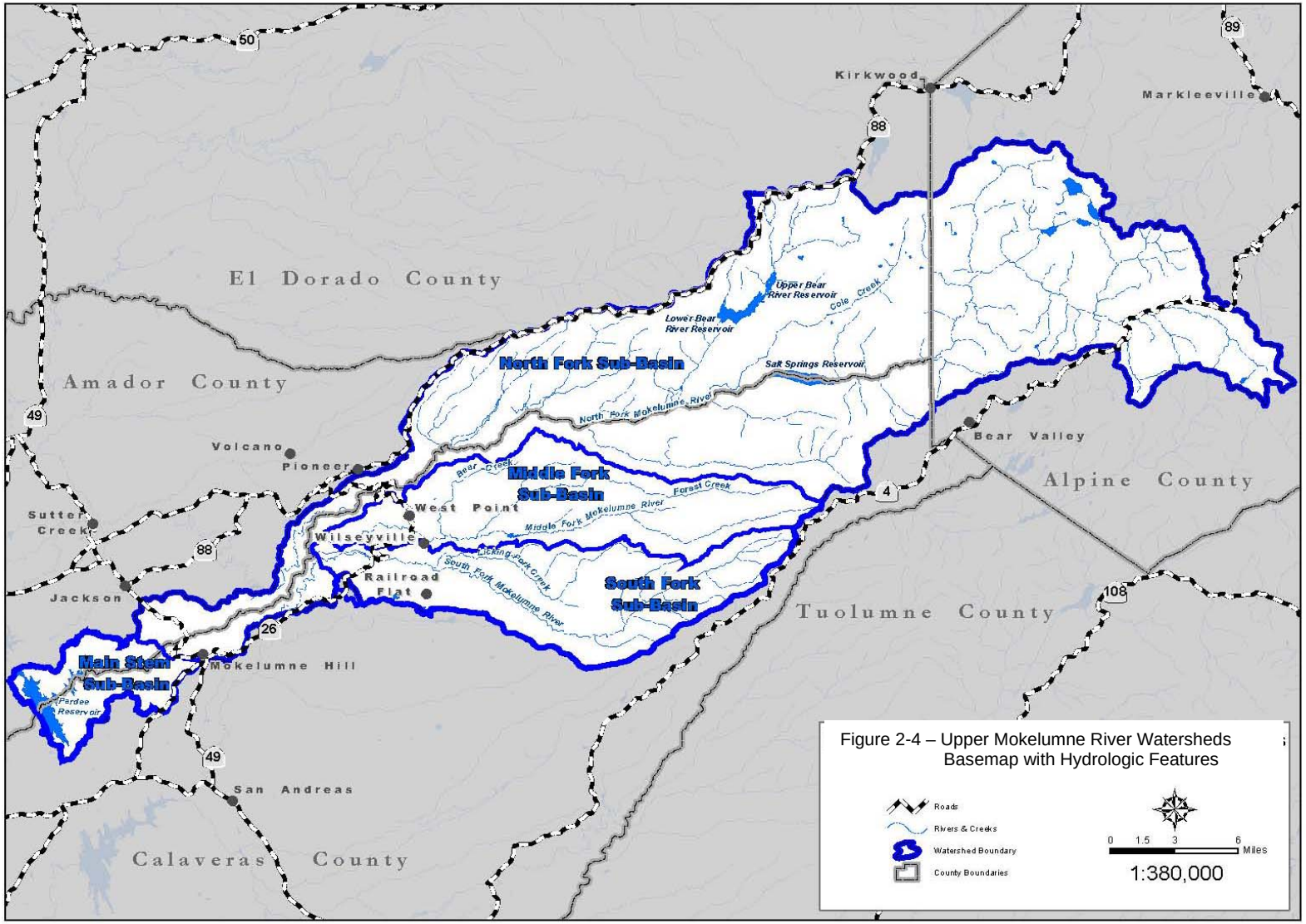
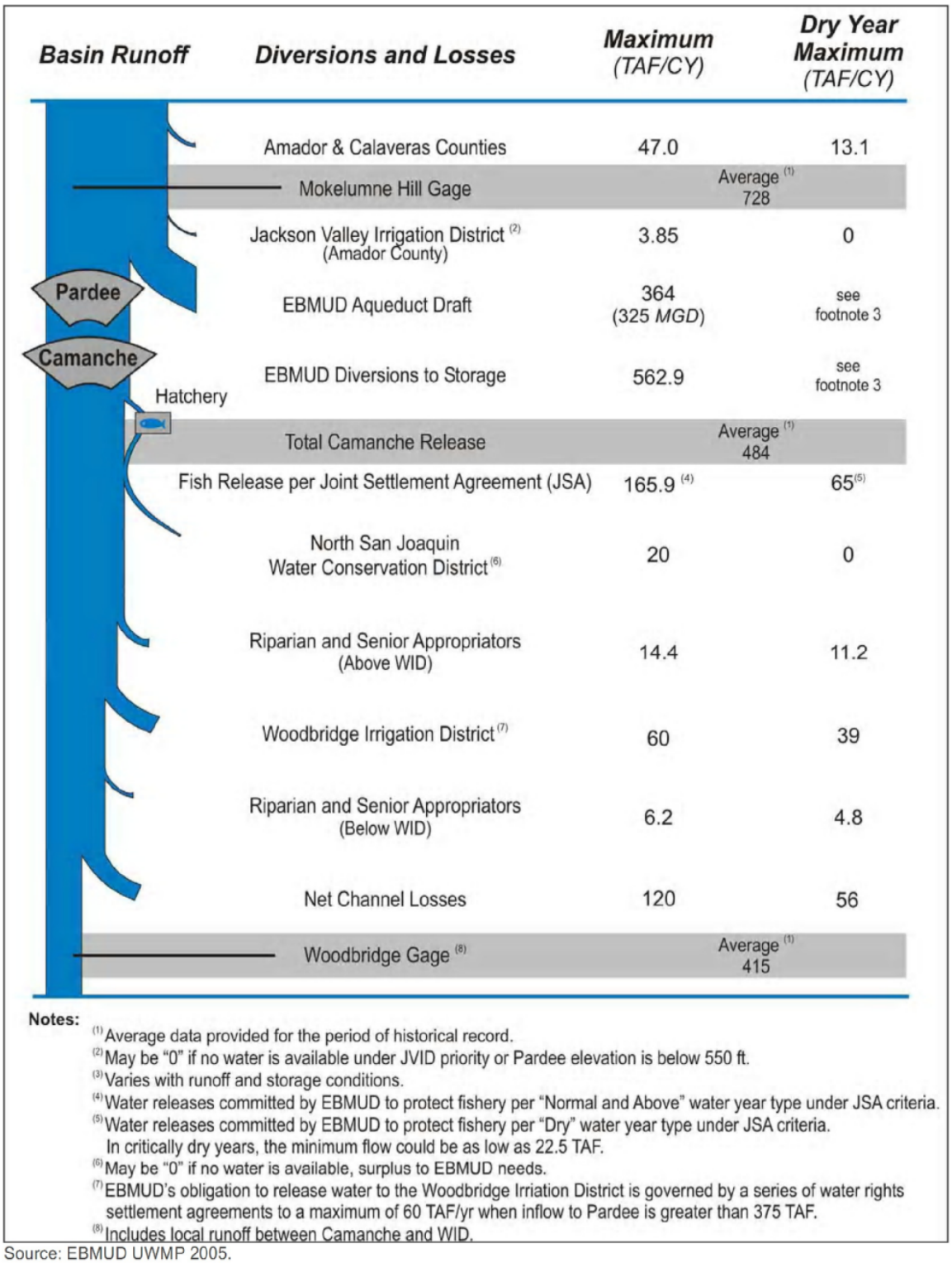


**Figure 2-5: Upper Mokelumne River Diversions and Flow**

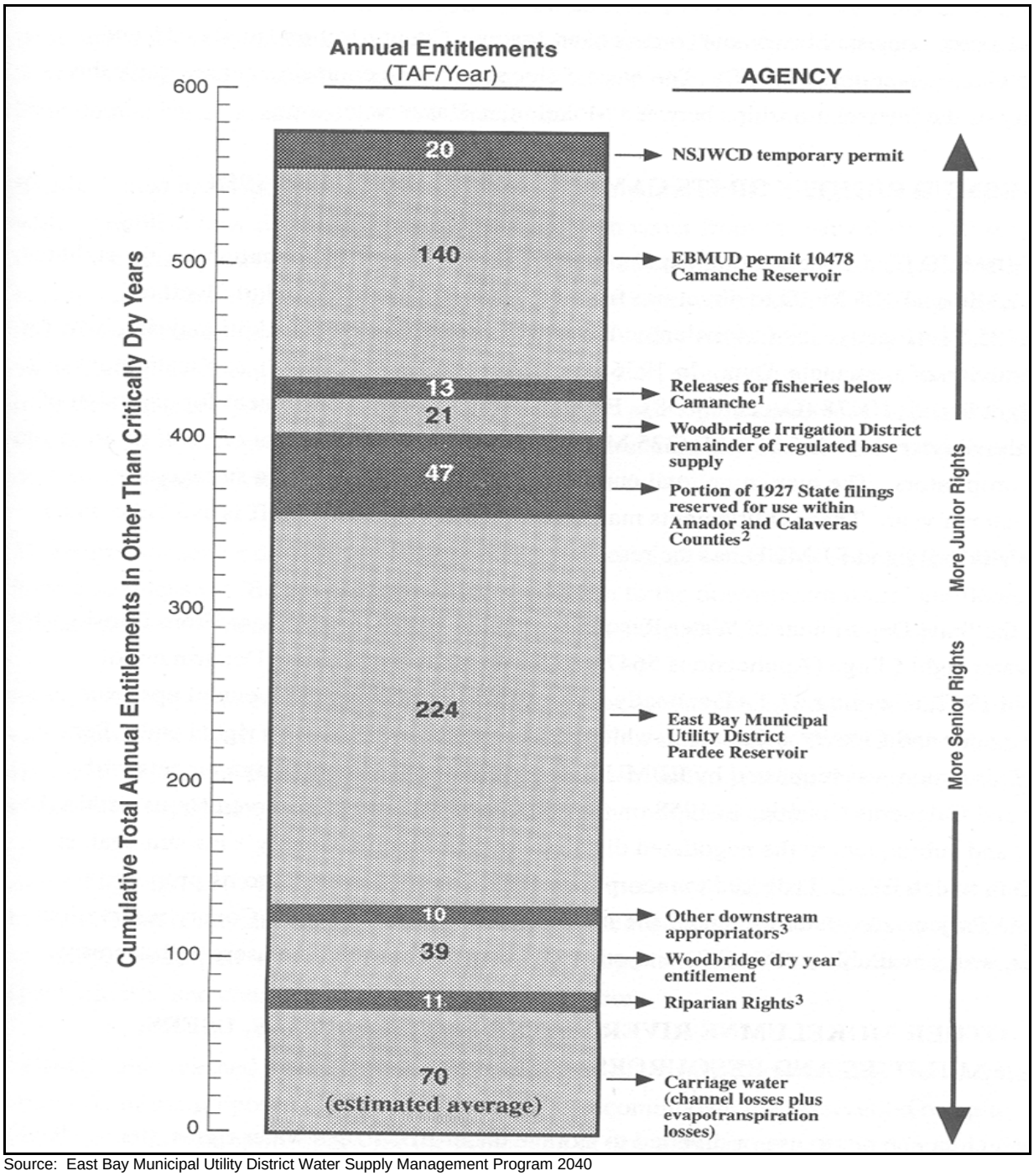



**Notes:**

(1) Average data provided for the period of historical record.
(2) May be "0" if no water is available under JVID priority or Pardee elevation is below 550 ft.
(3) Varies with runoff and storage conditions.
(4) Water releases committed by EBMUD to protect fishery per "Normal and Above" water year type under JSA criteria.
(5) Water releases committed by EBMUD to protect fishery per "Dry" water year type under JSA criteria. In critically dry years, the minimum flow could be as low as 22.5 TAF.
(6) May be "0" if no water is available, surplus to EBMUD needs.
(7) EBMUD's obligation to release water to the Woodbridge Irriation 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.
(8) Includes local runoff between Camanche and WID.

Source: EBMUD UWMP 2005.

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




Source: East Bay Municipal Utility District Water Supply Management Program 2040

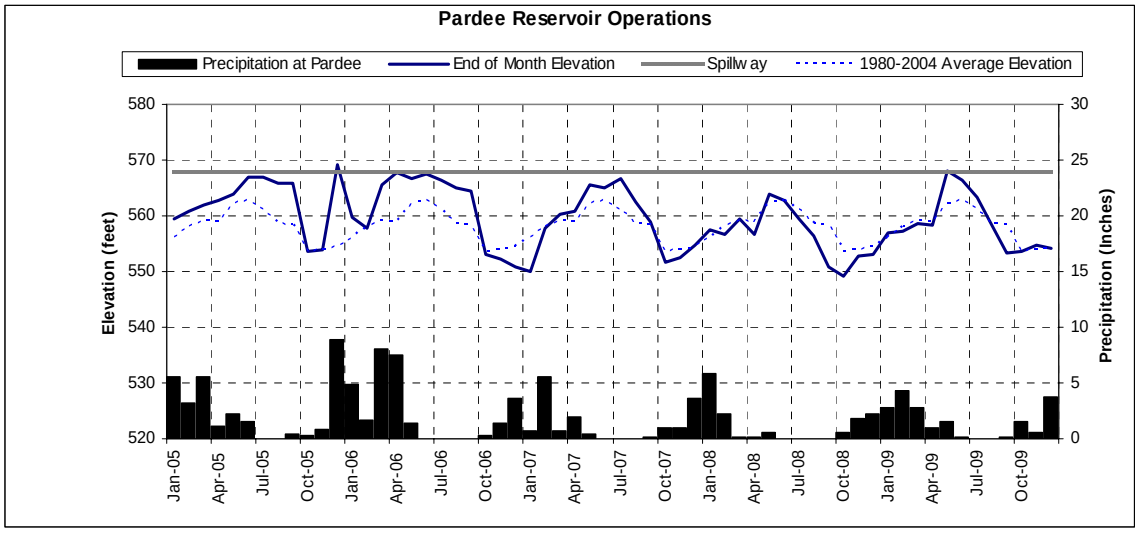
NOTES:

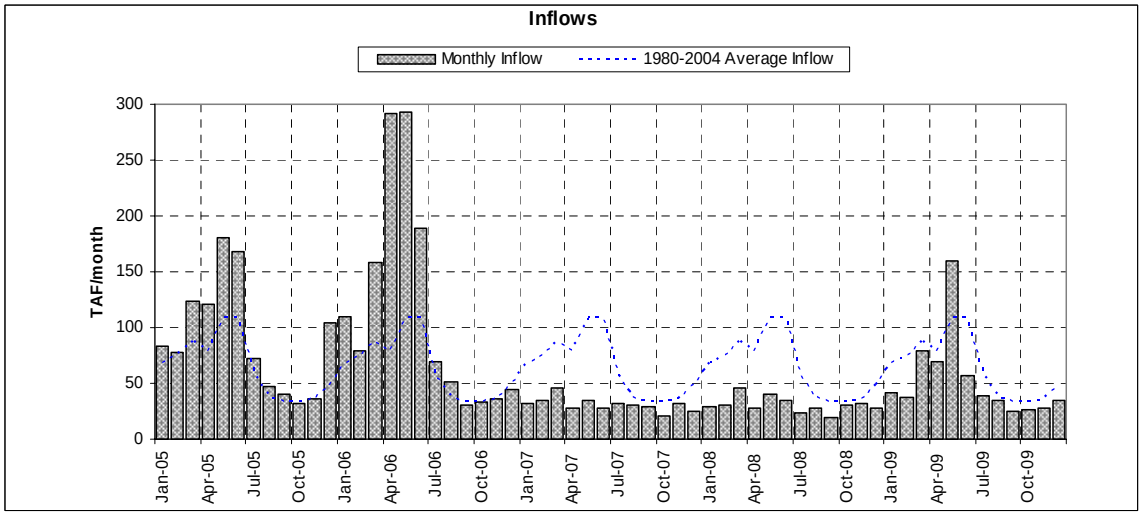
[1] Fish agreement is related to the Camanche permit.

[2] Includes pre-1914 water rights.

[3] Total of riparian and other downstream appropriations is estimated to be approximately 21 TAF total (10 TAF appropriations + 11 TAF riparian).

**Figure 2-7: Pardee Operations Summary 2005-2009**



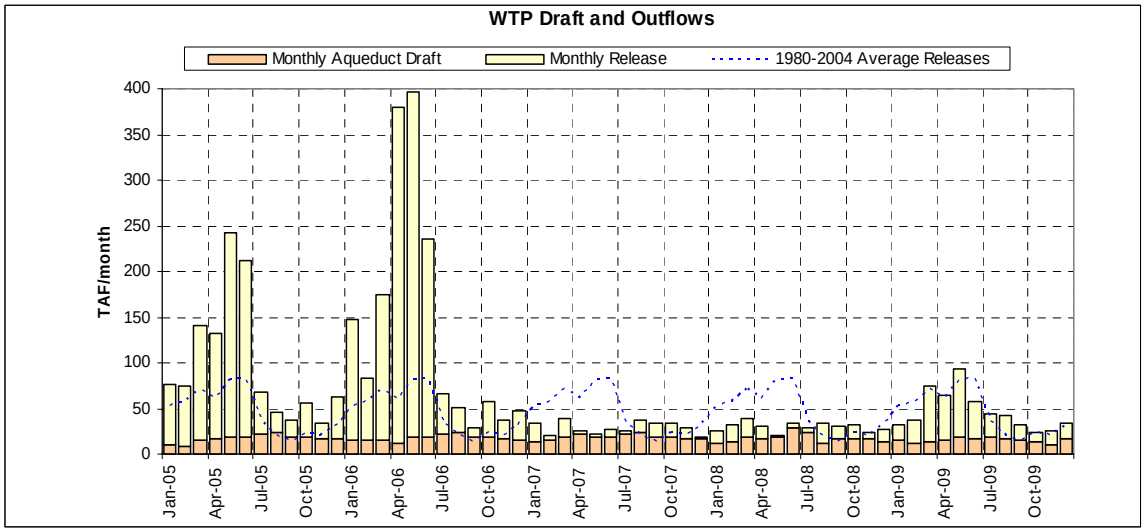



**Figure 2-8: Camanche Reservoir Operations 2005-2009**

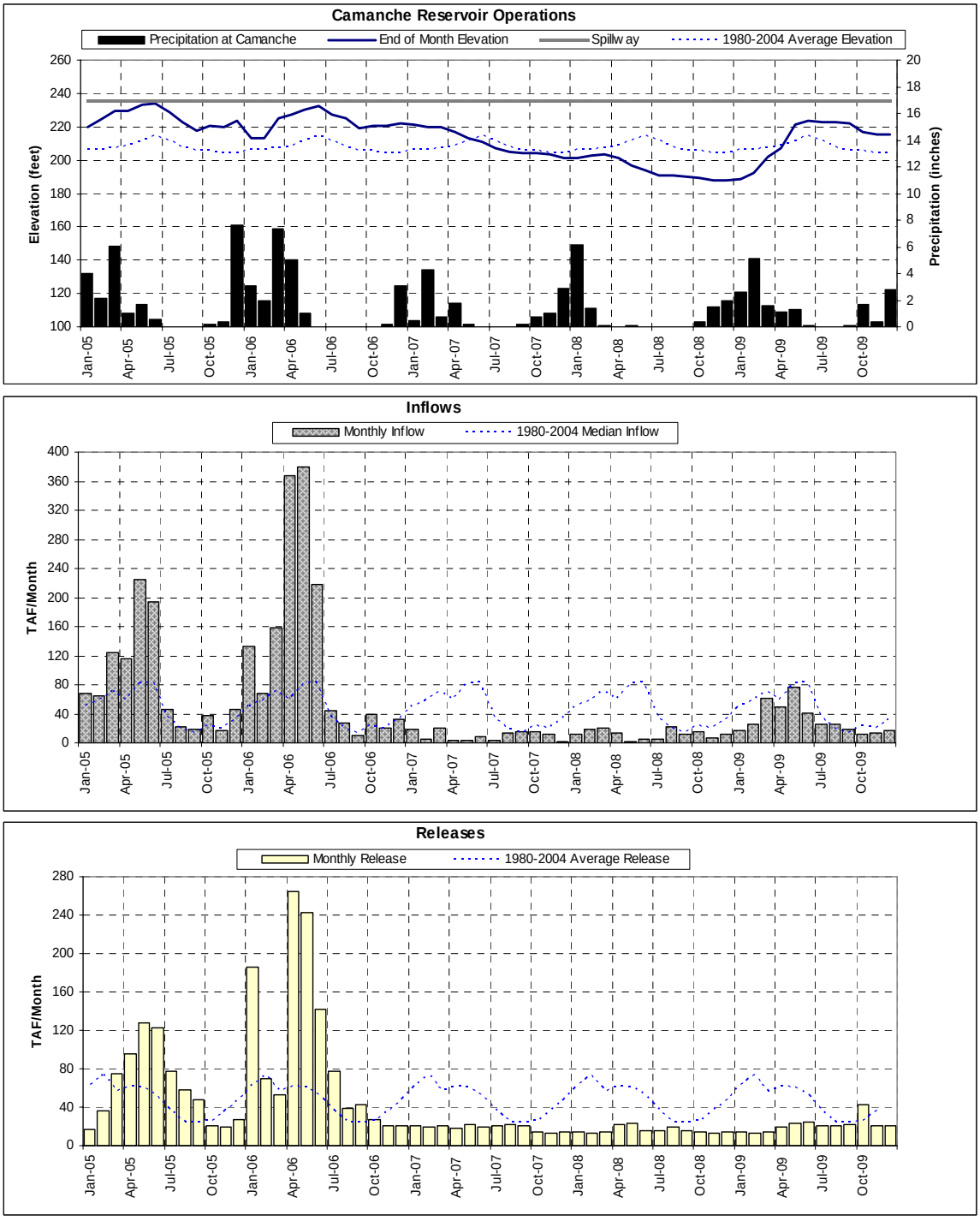


**Table 2-1: Present and Future Demands of Agencies Other than the District (By Type of Water Year)**

| Agency | 1990[1] | | 2020[2] | |
|---|---|---|---|---|
| | Wet & Normal (AFY) | Dry (AFY) | Wet & Normal (AFY) | Dry (AFY) |
| Amador Water Agency | 10,000 | 10,000 | 18,040 | 18,040 |
| Central Amador Water Project | 600 | 600 | 1,960 | 1,960 |
| Jackson Valley Irrigation District | 3,850 | 3,850[3] | 3,850[3] | 3,850[3] |
| Calaveras Public Utility District | 1,482 | 1,482 | 4,910 | 4,910 |
| Calaveras County Water District | 498 | 498 | 6,762 | 6,762 |
| **TOTAL** | 16,430 | 12,580 | 31,672 | 31,672 |

Source: EDAW, December 1992

NOTES:
[1] 1990 demands represent an average of actual use from 1980-1989.
[2] Demands based on projected growth.
[3] Estimate based on projected shortages in Mokelumne River supplies, no water would be available from this source to satisfy JVID demands.

**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 ft), near the crest of the Sierras, to Camanche Reservoir (crest elevation 235 ft), 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 of the 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. More details regarding the impacts of these mammals and other wildlife are provided in Section 5-Potential Contaminant Sources.

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.

## Precipitation and Evaporation

Figure 3-1 shows the locations of important climate stations for the Upper Mokelumne River Watershed. Figure 3-2 shows average monthly rainfall at Pardee Reservoir from 1927-2004 against the 2005-2009 recorded period. Figure 3-2 also shows the temperatures from 1953-2004 against 2005-2009 records. Figures 3-3a to 3-3e show the same information for other climate stations at different elevations in the Upper Mokelumne River Watershed with their starting years noted on each graph. More discussion of historic precipitation and climate can be found in the previous MRWSS and its updates. Graphs were reformatted for the 2010 MRWSS Update to display trends in precipitation and air temperatures. Caples Lake snowpack's water content exhibited a slight downward trend over the past 17 years (Figure 3-3f). The December 2005 precipitation resulted in a 20.9 inch monthly total for the

4-Stations composite (Figure 3-3g), ranking in the 99th percentile for any month in the past 80 years, and is the third highest December rainfall on record.

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 3-4 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 3-5 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.

## 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. 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 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. These intensely developed areas are continuing to grow as

the population increases. As noted in the 1995 MRWSS, the foothill and mountain counties of California have experienced an unexpectedly rapid population growth surge. The counties of Upper Mokelumne River Watershed (Alpine, Amador, and Calaveras) are no exception. Table 3-2 summarizes both historical and projected watershed populations by county for the decades from 2000 through 2050. Population figures were also updated using 2000 census data and more current projections from the California Department of Finance. Growth rates over the 1990-2000 decade for Amador and Calaveras County were 14 percent and 26 percent respectively, which lagged behind projections and population increases in excess of 50 percent experienced from 1980-1990. Current growth projections are around 2 percent per year.

The county-wide population growth rates may not be representative of growth within the Upper Mokelumne Watershed. Most of the fast-growing areas in Amador and Calaveras counties fall outside the watershed boundaries. Using a 2000 Census GIS dataset overlaid on the watershed boundary, estimated populations within the Upper Mokelumne River Watershed and each of the sub-watersheds were compiled in Table 3-3. The totals for the watershed are 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 3-7 shows which parcels are owned by whom. 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. Figure 3-7 shows 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.

The names of the 81 private landowners within the Upper Mokelumne River Watershed with more than 160-acre holdings are listed in Table 3-4. 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.

Releases from Pardee Dam flow into Camanche Reservoir. These releases averaged 565,780 AFY from 1974 through 1999. Local runoff for the Camanche Watershed is computed based on natural runoff, rainfall on the reservoir, and unaccounted for water between Pardee and Camanche dams. This runoff averaged 53,450 AFY between 1974 and 1999. Groundwater resources are adequate within Camanche Watershed and are used as a source for drinking water at the CANS Recreation Area.

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

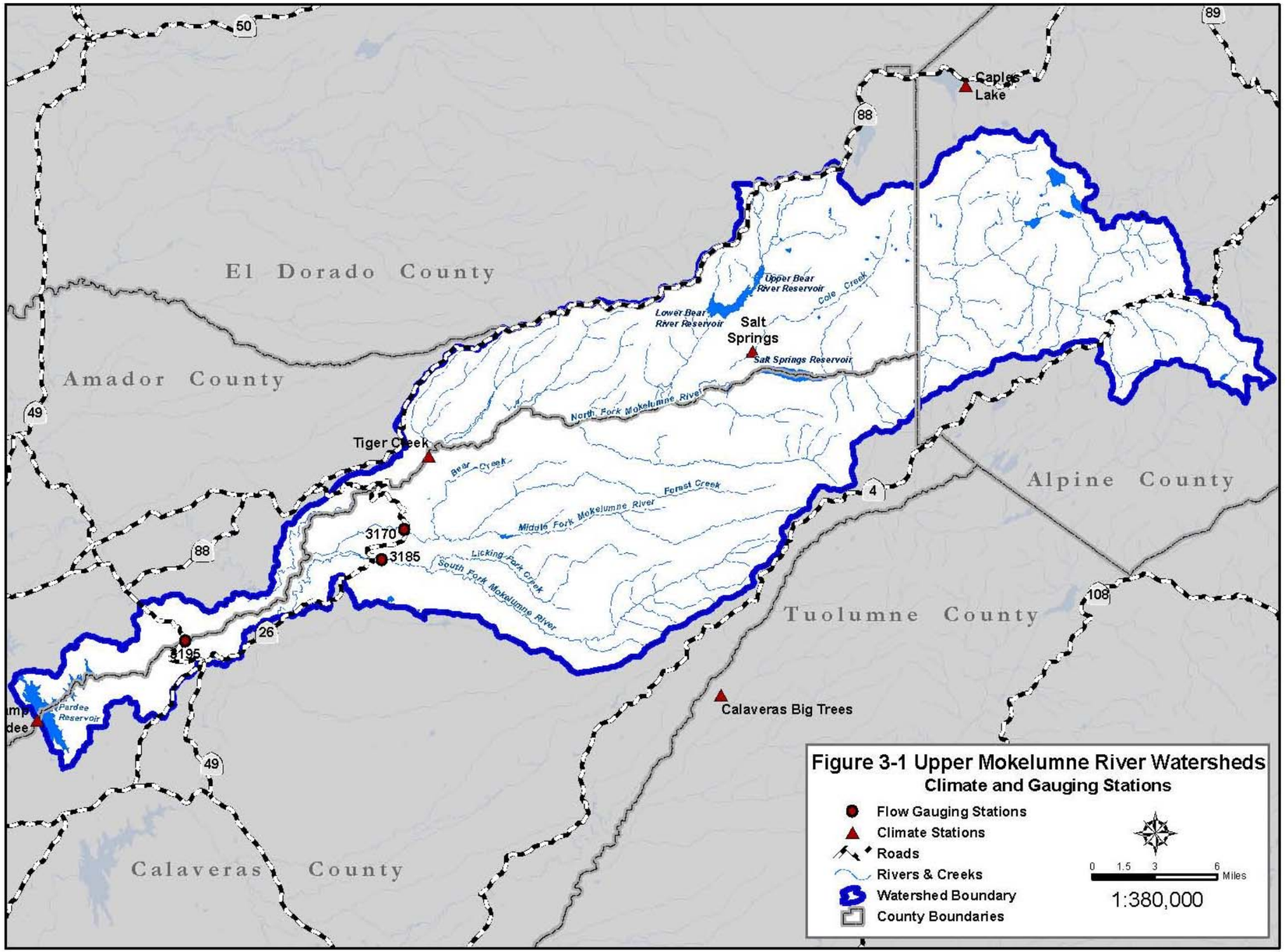
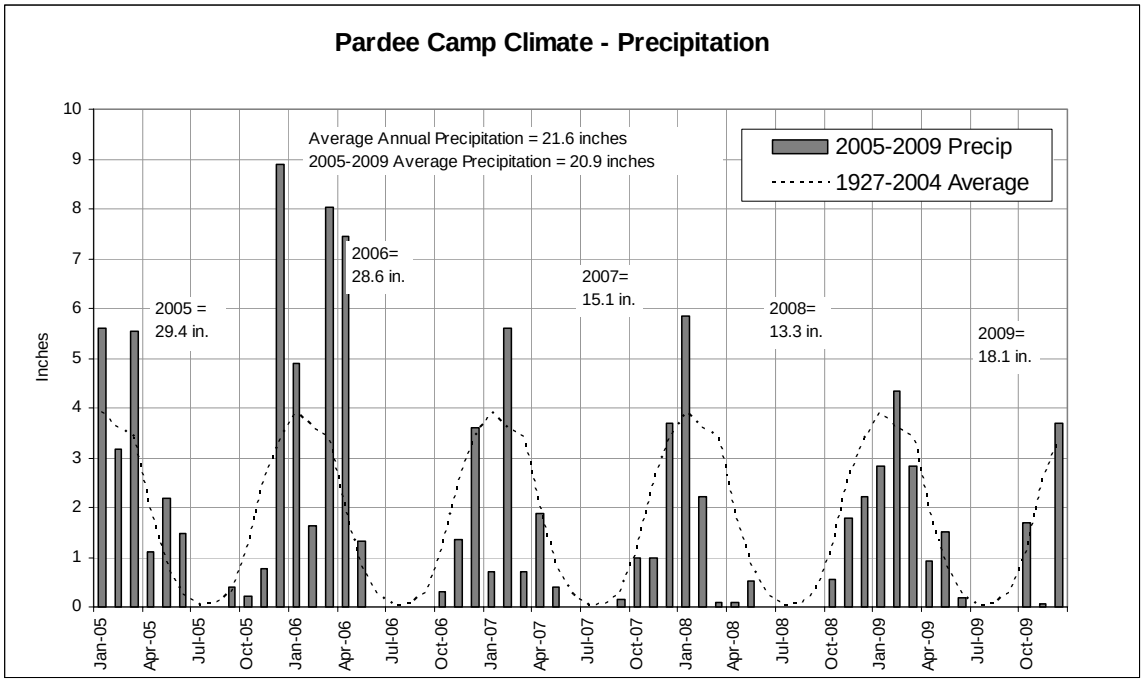


**Figure 3-2: Pardee Climate**



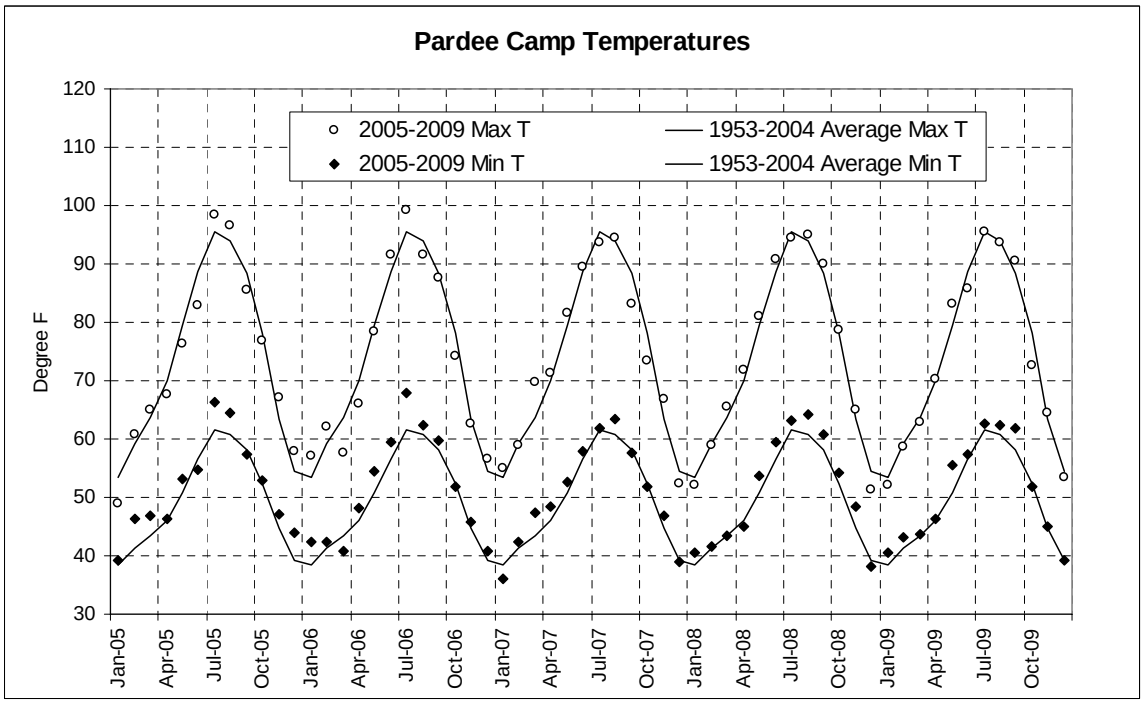
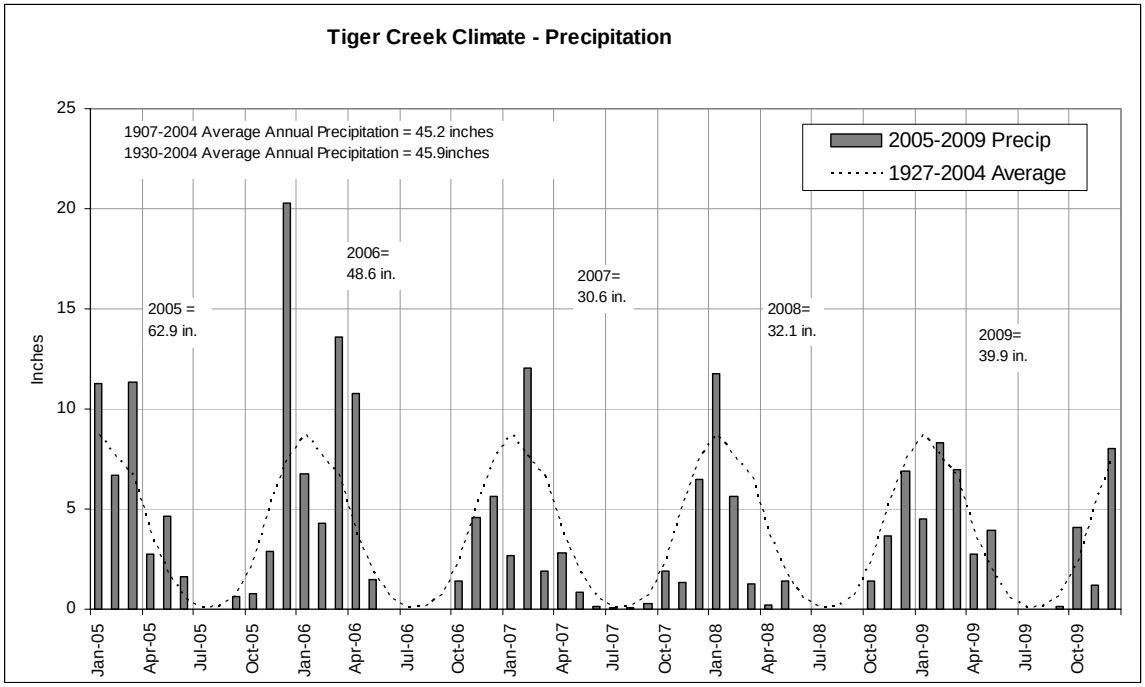



**Figure 3-3a: Upper Mokelumne Watershed Climate (Tiger Creek Station)**



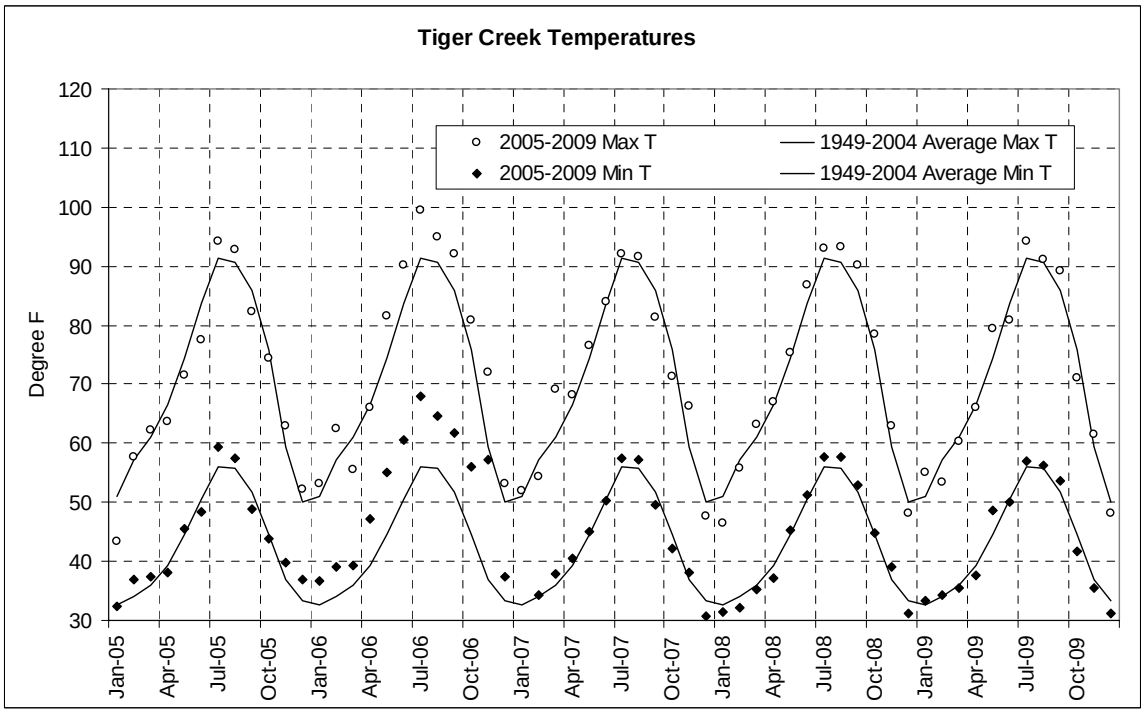
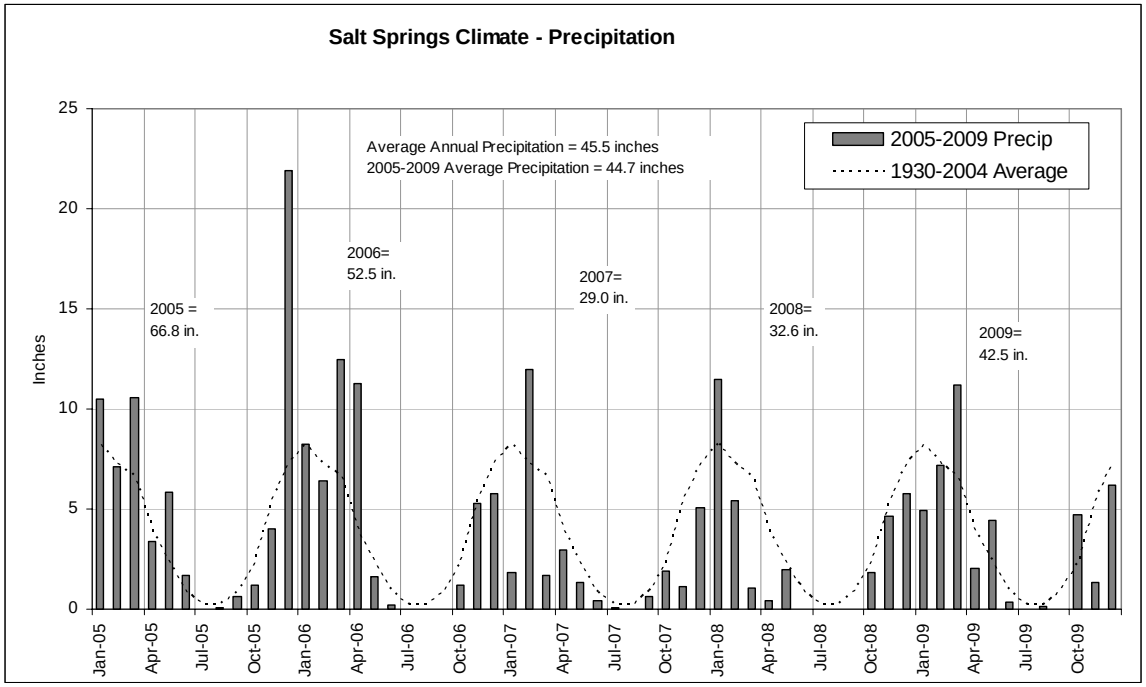



**Figure 3-3b: Upper Mokelumne Watershed Climate (Salt Springs Station)**



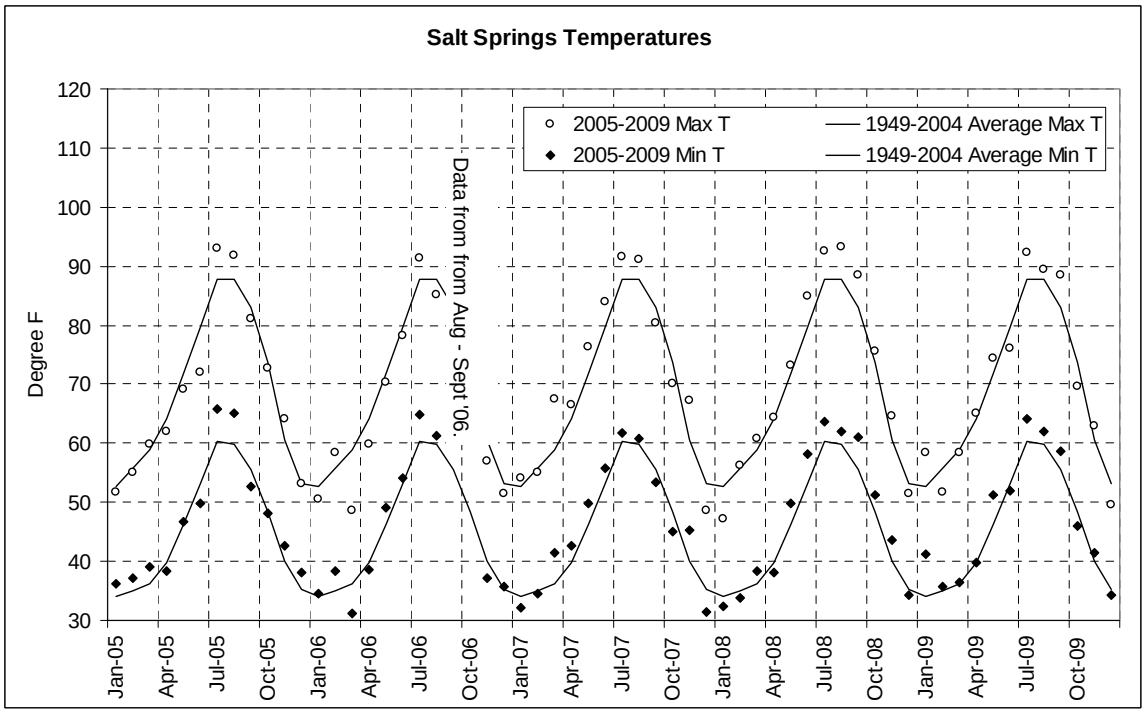
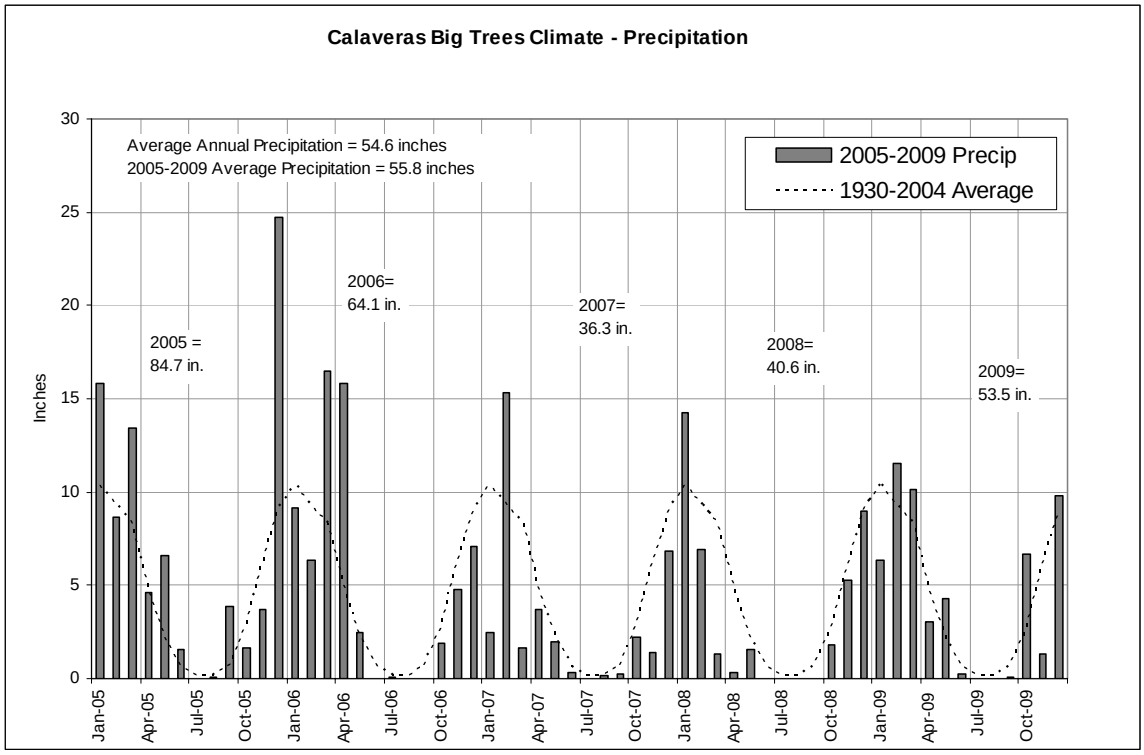



**Figure 3-3c: Upper Mokelumne Watershed Climate (Calaveras Big Trees)**



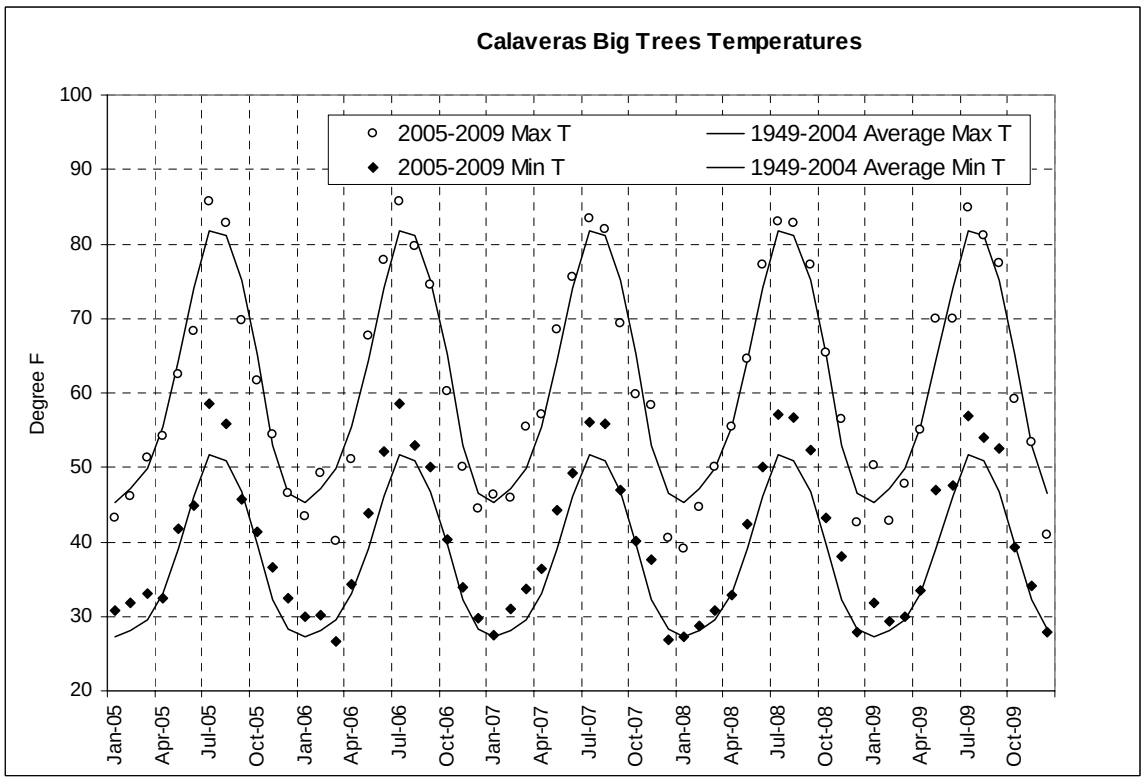
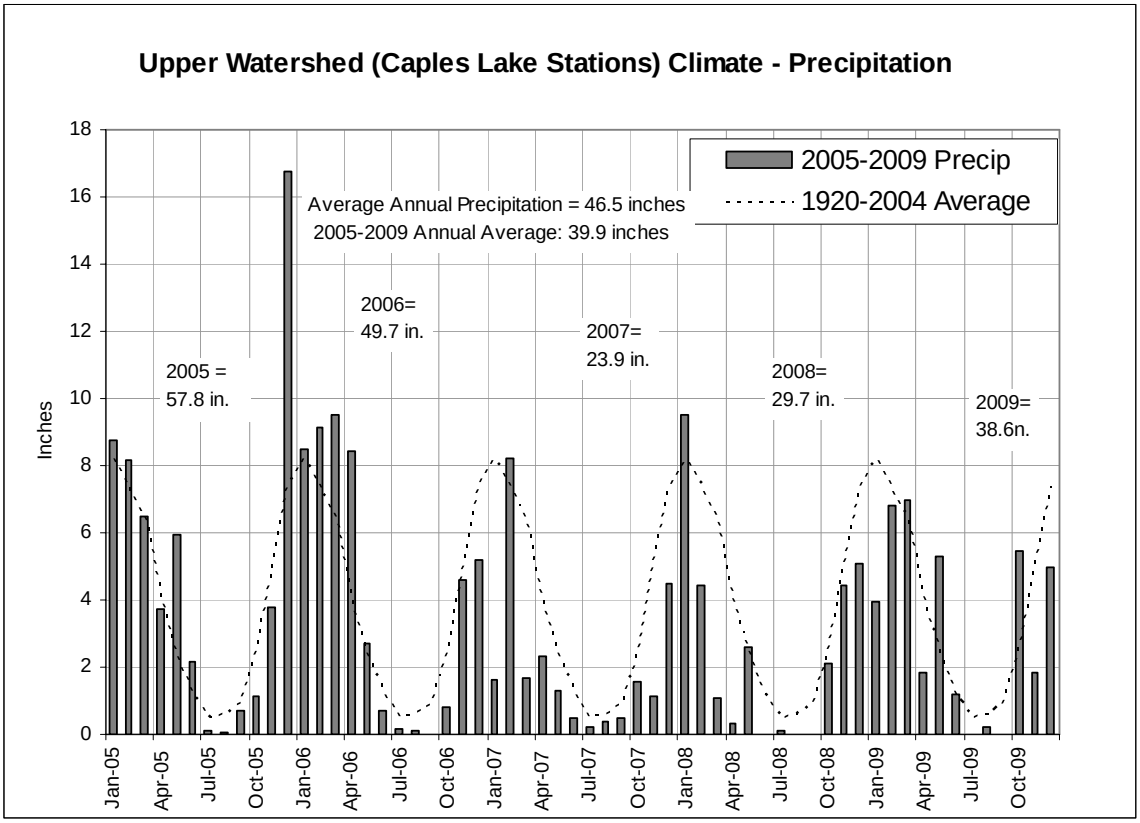



**Figure 3-3d: Upper Mokelumne Watershed Climate (Caples Lake Stations)**



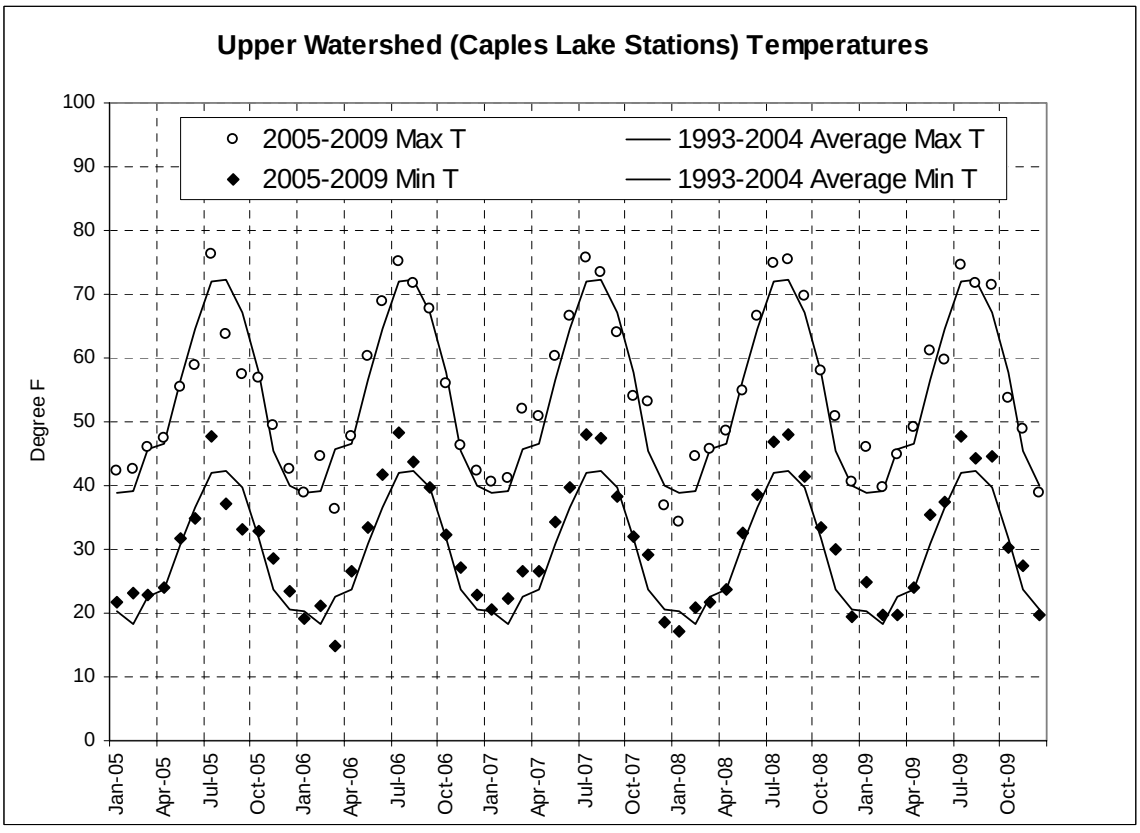
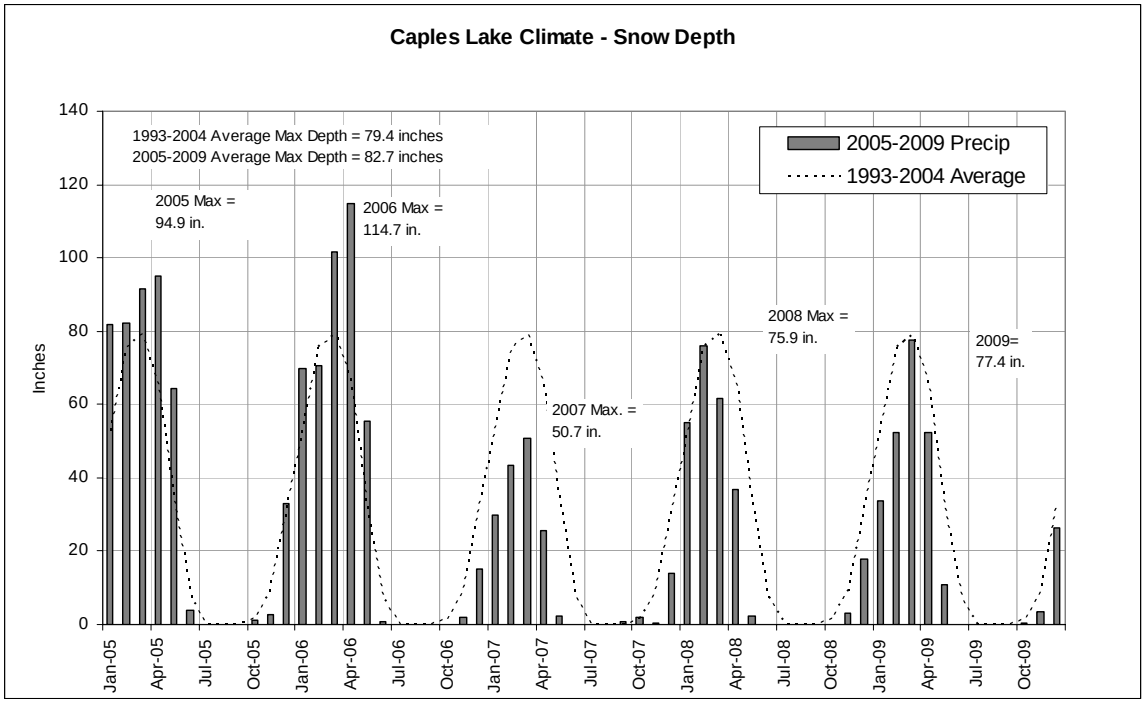



**Figure 3-3e: Upper Mokelumne Watershed Climate (Caples Snow)**



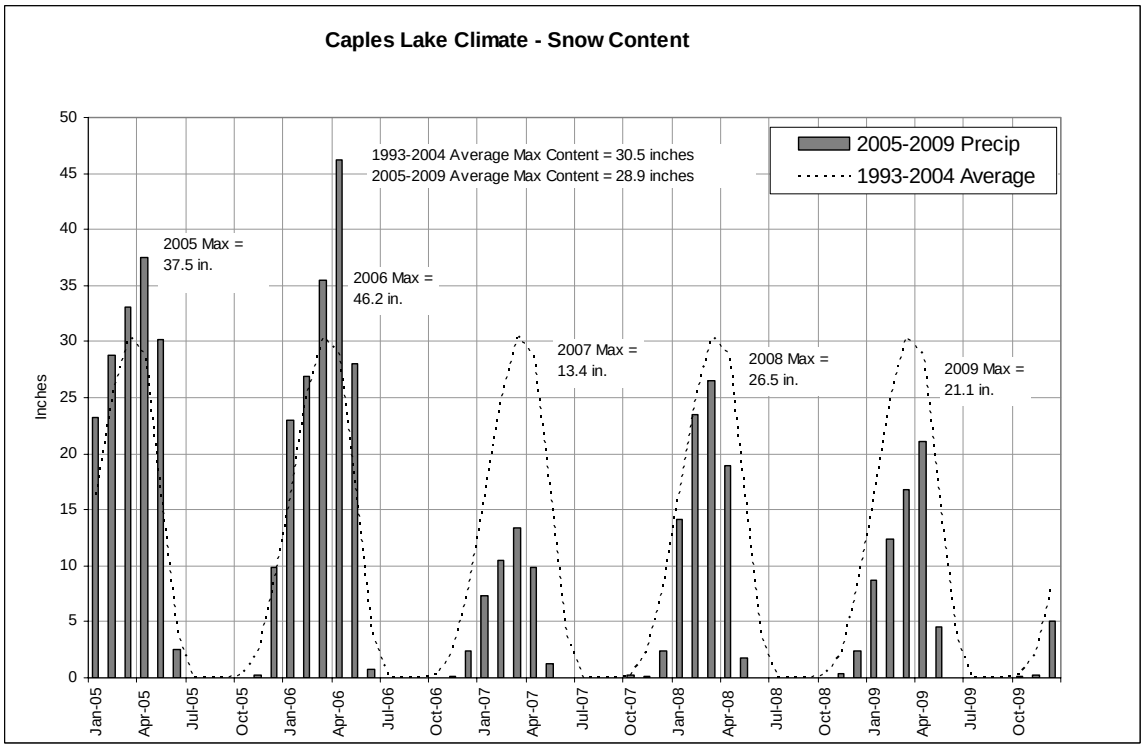



**Figure 3-3f: Upper Mokelumne Watershed Climate Trends**

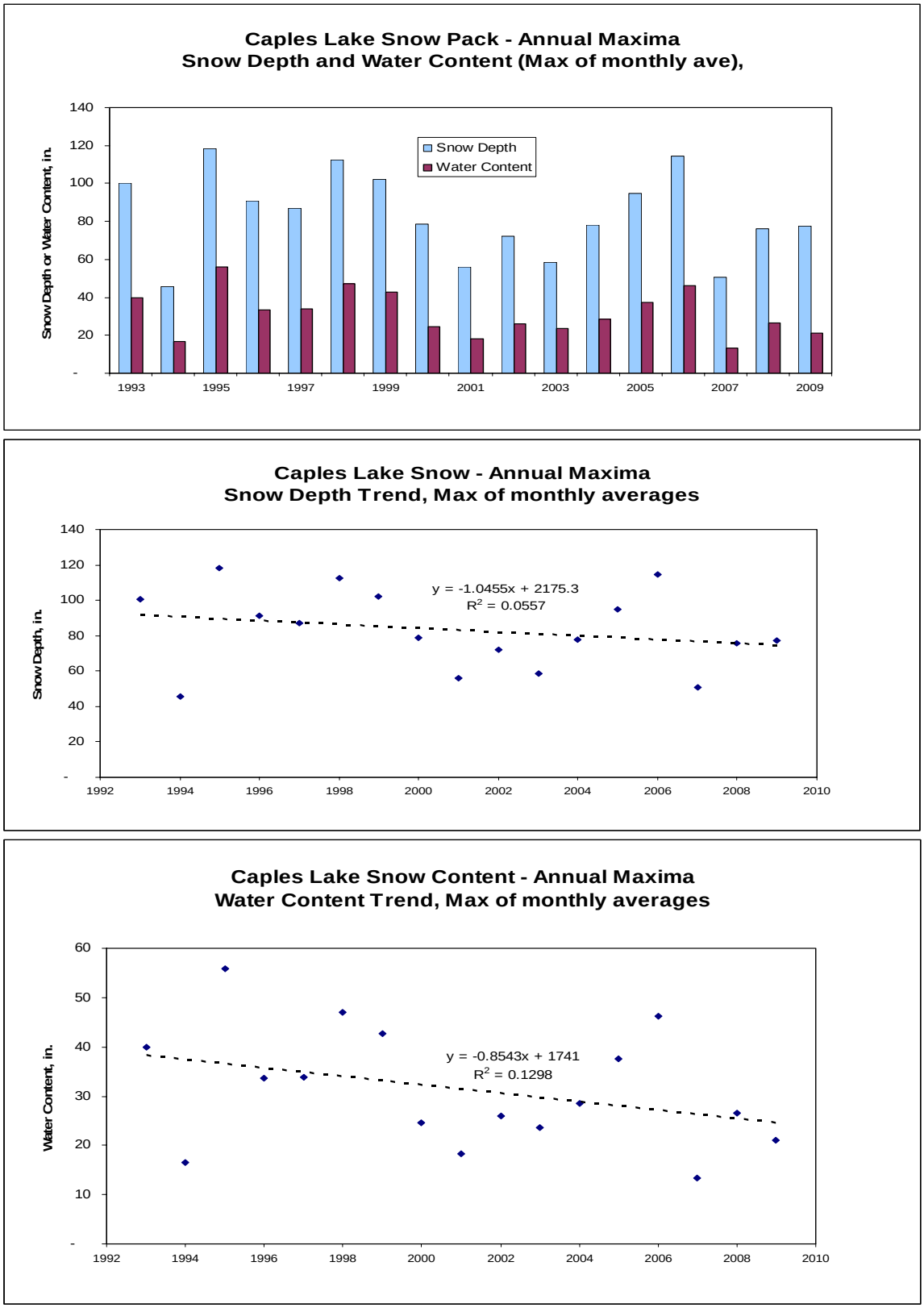
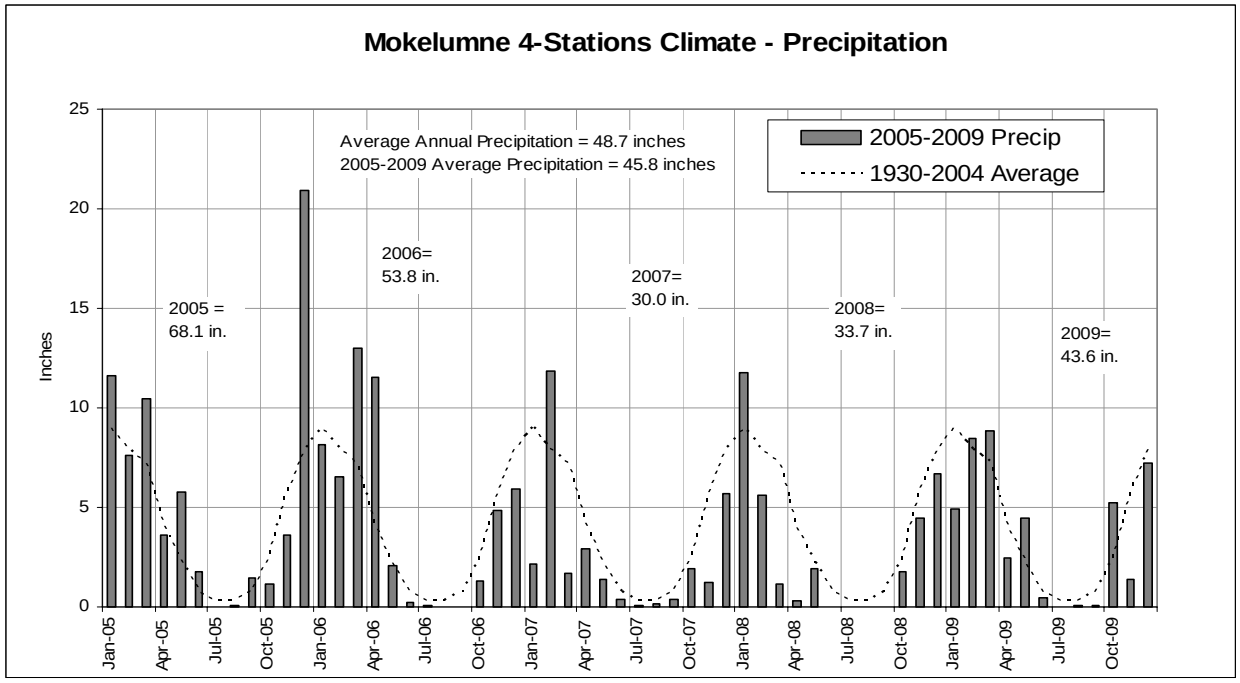
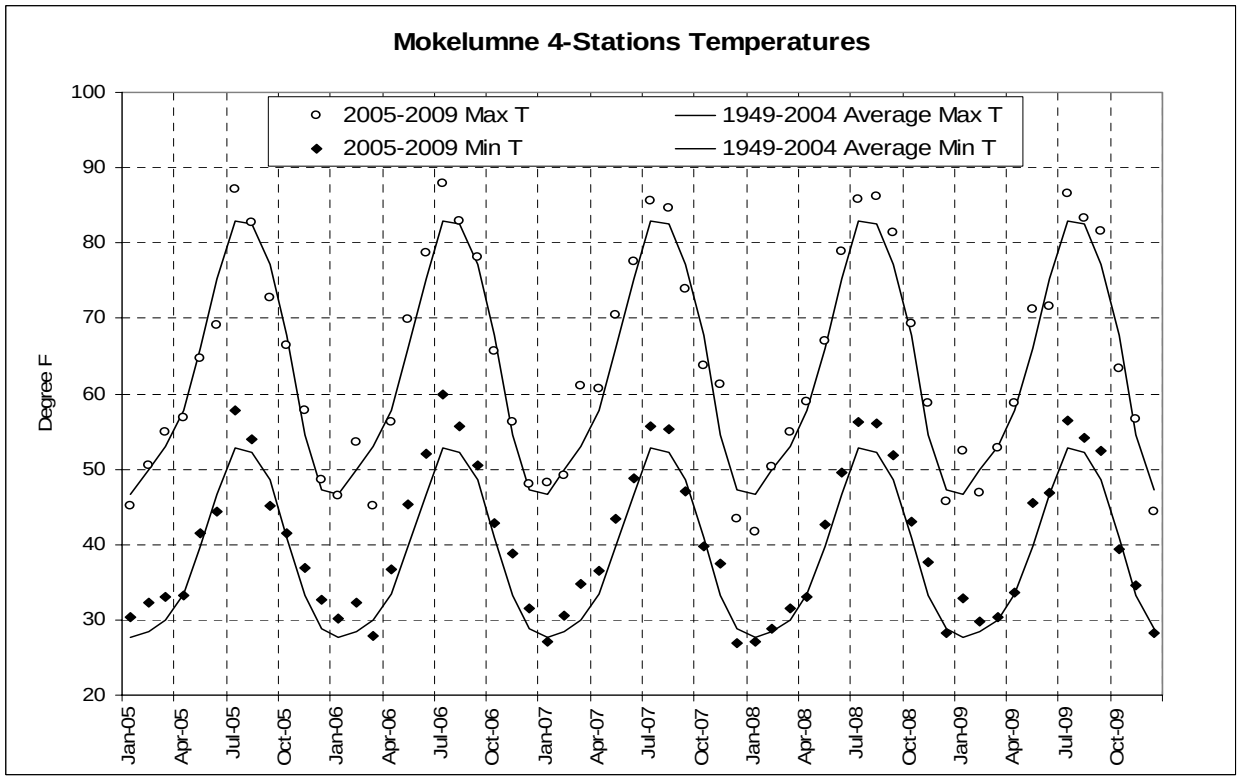


**Figure 3-3g: Upper Mokelumne Watershed Climate (4-Station Average)**




Note: Mokelumne 4-Stations include:

| Name | Elevation (ft) | Longitude | Latitude |
|---|---|---|---|
| Tiger Creek Powerhouse | 2360’ | -120.483 | 38.45 |
| Salt Springs Powerhouse | 3700’ | -120.219 | 38.498 |
| Calaveras Big Trees | 4700’ | -120.311 | 38.277 |
| Caples Lake | 8000’ | -120.042 | 38.71 |

**Figure 3-4: Mokelumne River Releases, Diversions, and Losses**

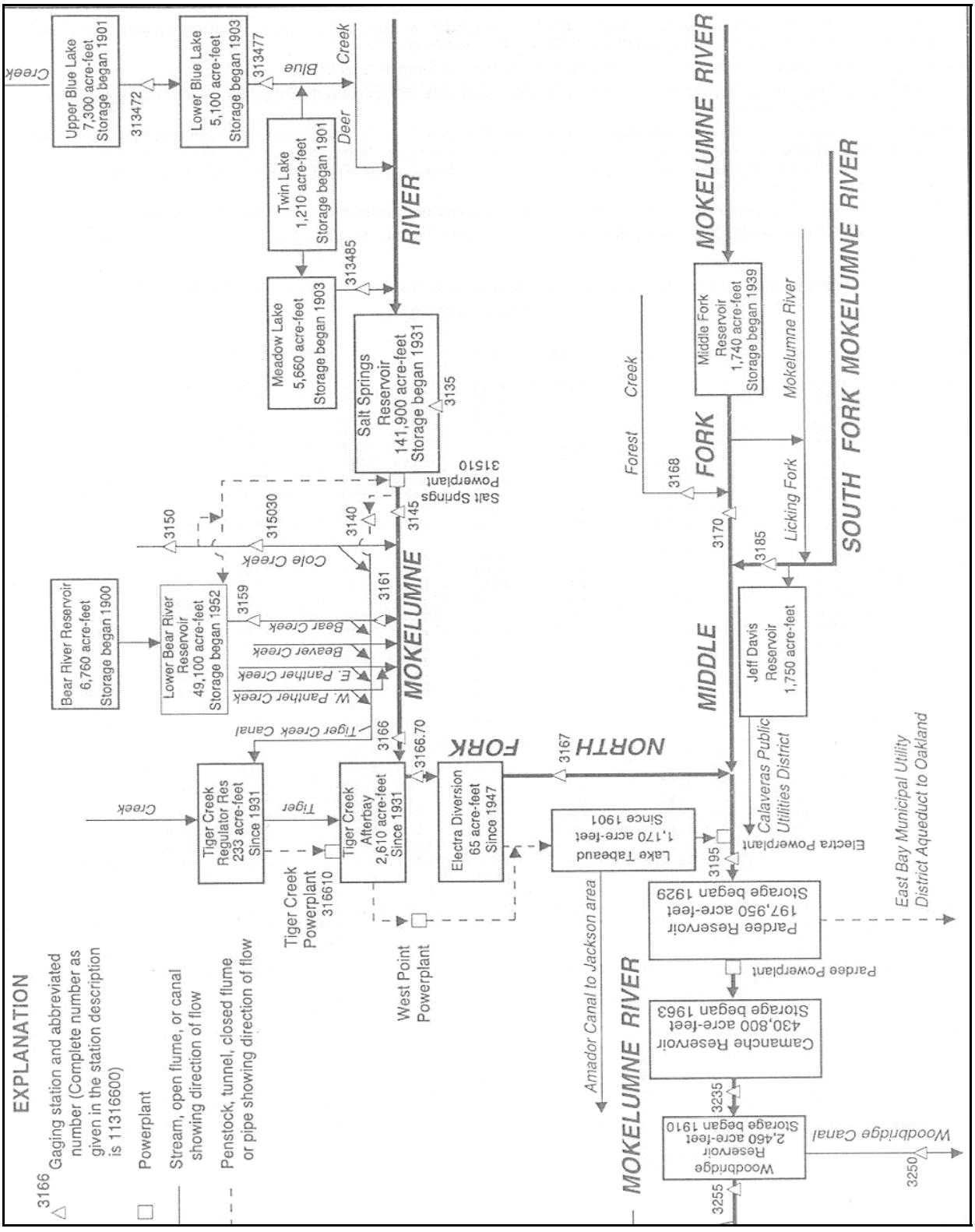
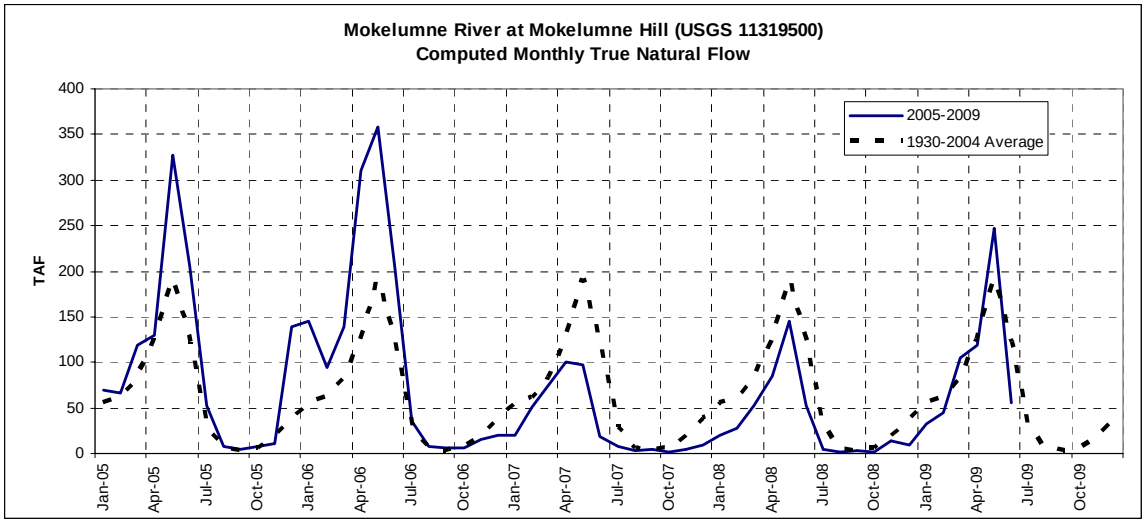
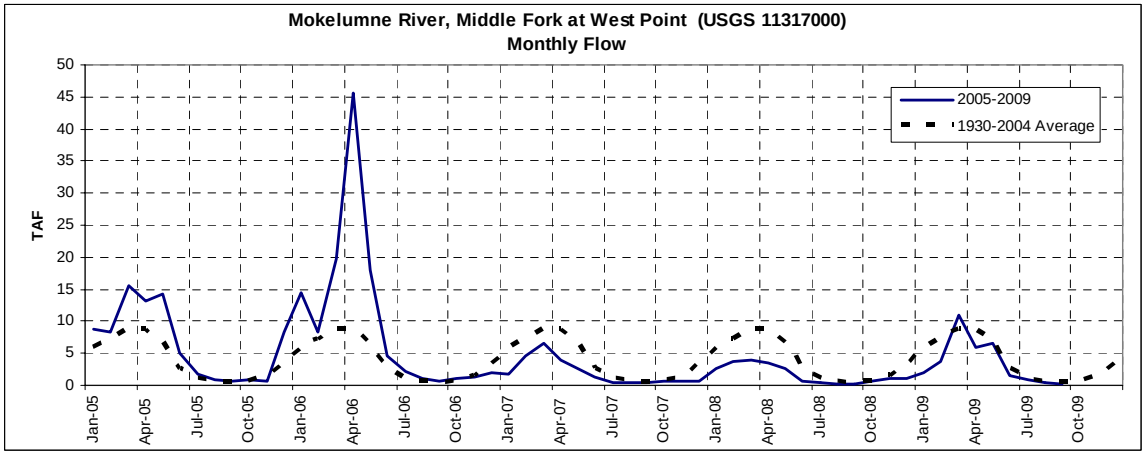
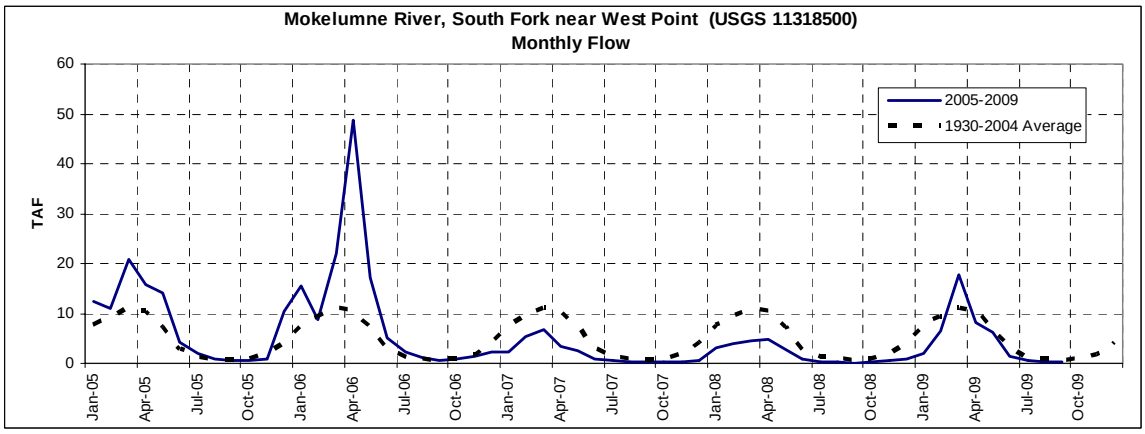


**Figure 3-5: Mokelumne Flows 2005-2009**

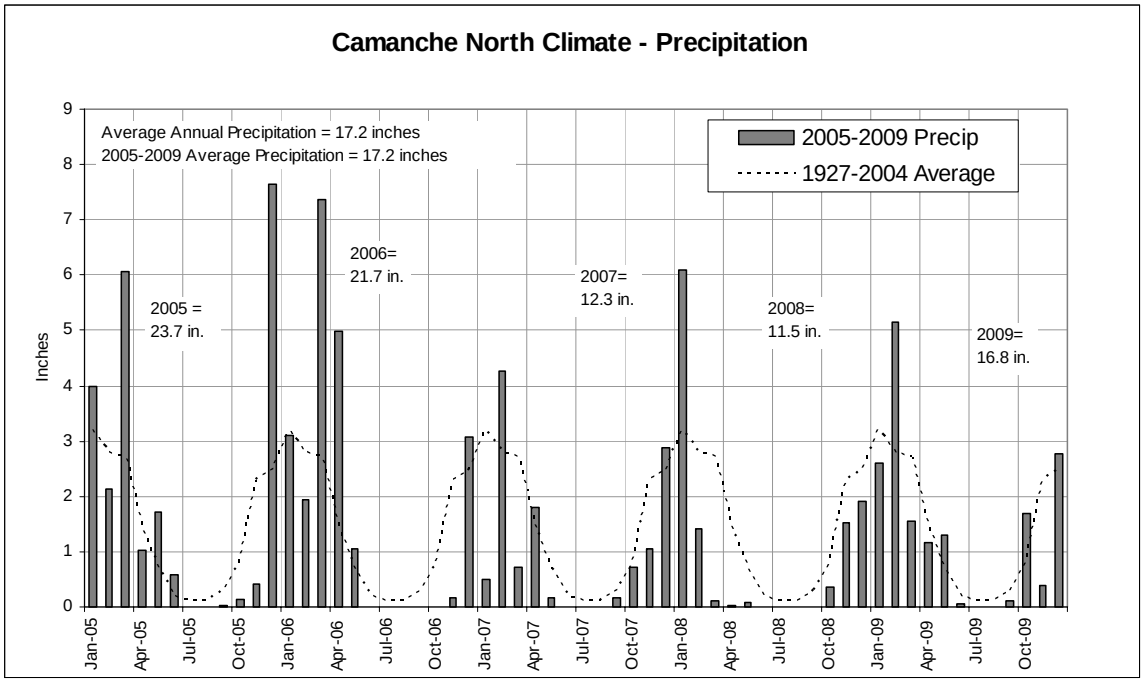



Note: Data for October 2009 to December 2009 being processed by Water Supply.

**Figure 3-6: Camanche Climate**



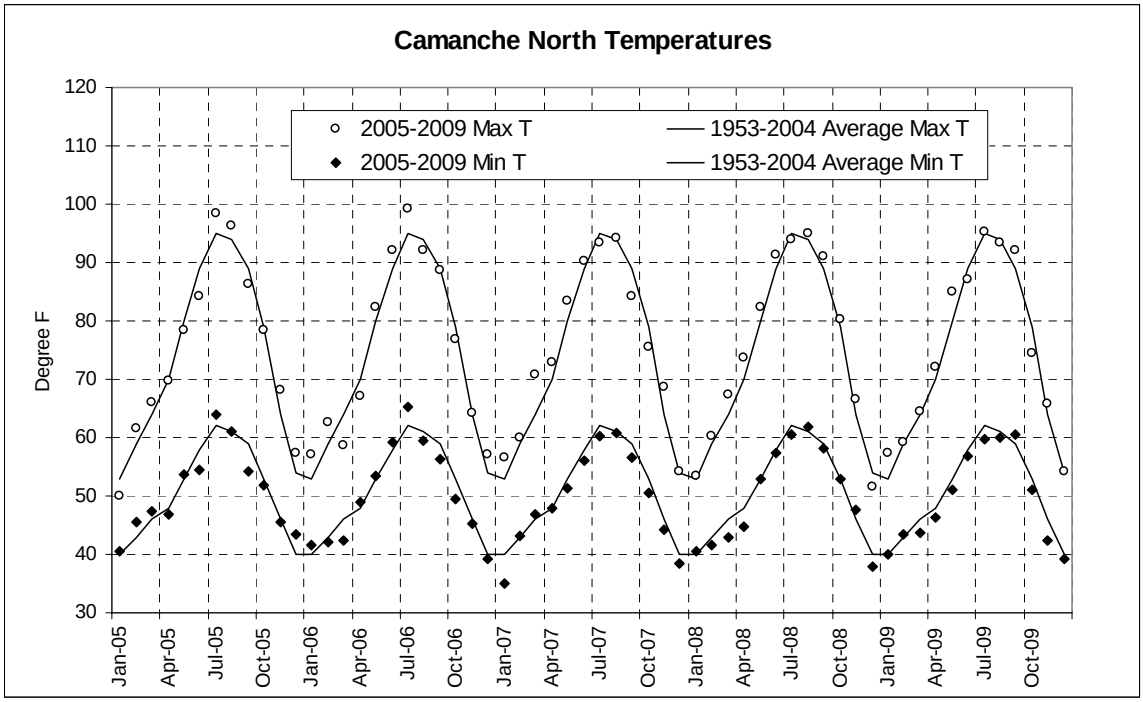



**Figure 3-7: Upper Mokelumne River Watershed Land Ownership**

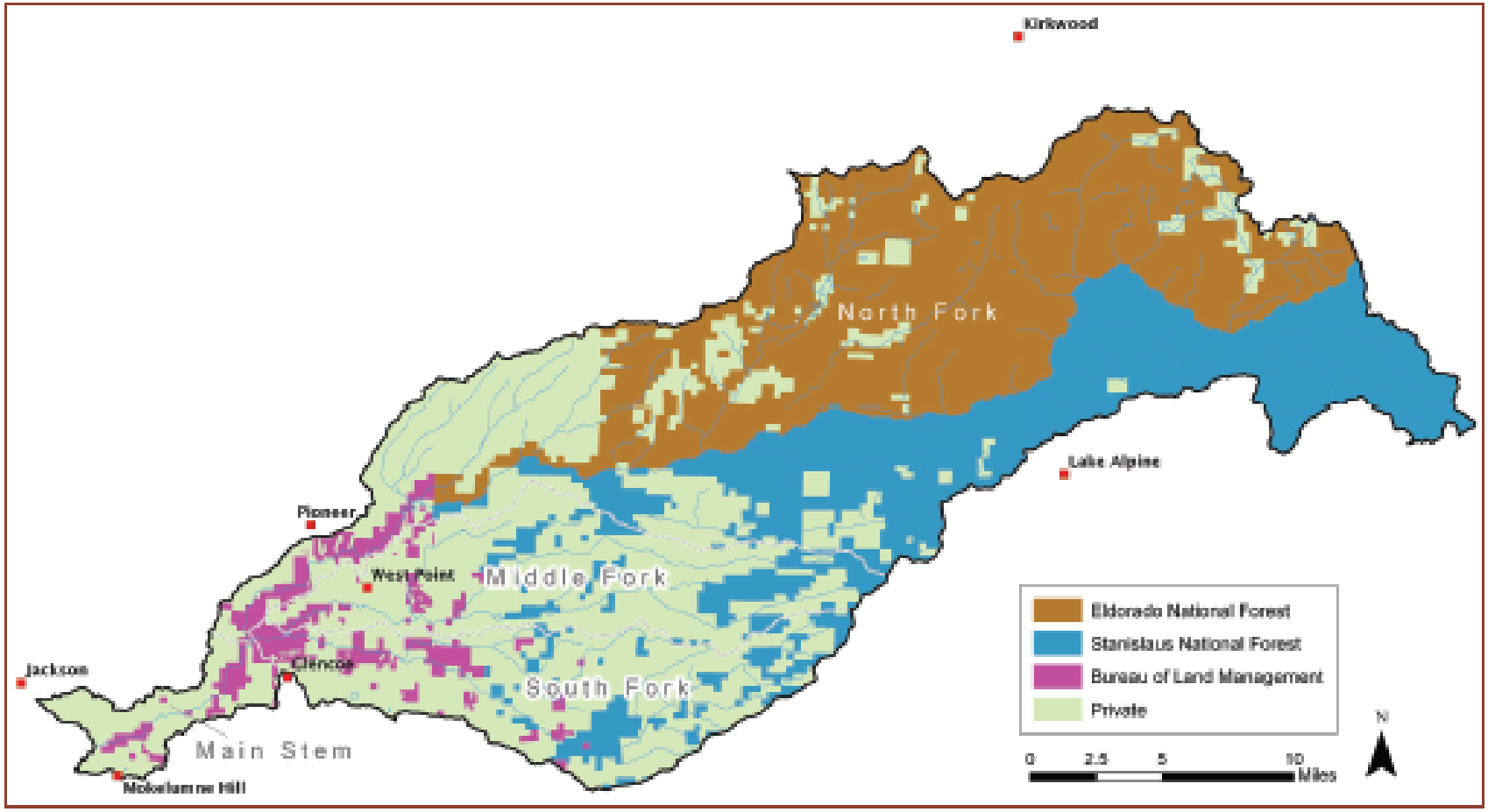


**Table 3-1: Land Use in the Upper Mokelumne River Watershed**

| 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**

**Table from 2000 MRWSS:**

| 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 |

**Current Census data from California Department of Finance:**

| | TOTAL POPULATION | | | | | |
|---|---|---|---|---|---|---|
| **County** | **2000** | **2010** | **2020** | **2030** | **2040** | **2050** |
| Alpine | 1,247 | 1,377 | 1,441 | 1,413 | 1,322 | 1,263 |
| Amador | 35,434 | 39,287 | 42,257 | 44,404 | 45,929 | 47,829 |
| Calaveras | 40,890 | 49,599 | 59,691 | 70,577 | 81,886 | 92,856 |

CensusTables.xls

**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 |

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

| Sub-Basin | BLM | District | PG&E | SPI | USFS | Other | Total |
|---|---|---|---|---|---|---|---|
| Main Stem | 216 | 10,399 | 0 | 0 | 55 | 5,763 | 16,432 |
| North Fork | 3,840 | 945 | 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. Gaps in data yield a smaller acreage (less than 1 percent) than the actual watershed.
file: LandOwnerAcres.xls

# Section 4: Water Quality

## Introduction

This section begins with an updated review of relevant drinking water regulations that apply to the District's system. Monitoring programs are reviewed and documented. Raw water quality data and trends from 2005 to 2009 were evaluated for the Camanche and Pardee Watershed Areas. As part of the evaluation of the District's source water, raw water quality parameters are compared to the drinking water standards. The results of this evaluation indicate the water quality parameters that require removal through treatment.

Finally, a general evaluation of the District's WTPs was conducted with regards to the SWTR and IESWTR performance standards, monitoring requirements, and operating criteria. Four of the WTPs serve small systems (less than 10,000 people served) and three WTPs serve large systems (greater than 10,000 people served). The four small system WTPs include: Pardee Center, Pardee Recreation, CANS, and CANS, but CANS uses only groundwater supplies. The three large system WTPs are the Walnut Creek, Lafayette, and Orinda WTPs in the East Bay which treat imported Mokelumne River water from Pardee Reservoir.

While the SWTR and IESWTR were written for large systems using surface water, each of the six systems discussed in this report will be evaluated based on the content of these two regulations. In particular, the requirements which address small systems are similar to the IESWTR but developed under the LT1ESWTR. In addition, LT2ESWTR *Cryptosporidium* and *E. coli* monitoring is discussed.

## Summary of Drinking Water Regulations

### Existing Regulations

The most significant regulations finalized to-date as a result of the Safe Drinking Water Act (SDWA), the National Interim Primary Drinking Water Regulations, the 1986 SDWA Amendments, and the 1996 SDWA Amendments are presented in Table 4-1.

**Table 4-1. Existing Drinking Water Regulations**

| Regulation | Targeted Contaminants |
|---|---|
| Arsenic | Arsenic |
| Filter Backwash Recycling Rule | Microbes and Turbidity |
| Ground Water Rule | Microbes |
| Information Collection Rule | Microbes and D/DBPs |
| IESWTR | Microbes and Turbidity |
| Lead and Copper Rule | Corrosion By-Products |

| Regulation | Targeted Contaminants |
|---|---|
| LT1ESWTR | Microbes and Turbidity |
| LT2ESWTR | Microbes and Turbidity |
| Methyl Tertiary-Butyl Ether (MTBE) | MTBE |
| Phase I, II, and V Regulations | VOCs, SOCs, and IOCs |
| Public Notification Rule | Contaminants - acute & chronic health effects |
| Radionuclides | Uranium, Radium 226 & 228, Gross beta, Gross alpha |
| Stage 1 - Disinfectant/Disinfection By-Product Rule (S1DBPR) | Disinfectants & Disinfection By-Products |
| Stage 2 - Disinfectant/Disinfection By-Product Rule (S2DBPR) | Disinfectants & Disinfection By-Products |
| Surface Water Treatment Rule (SWTR) | Microbes and Turbidity |
| Total Coliform Rule (TCR) | Microbes |
| Trihalomethanes | Trihalomethanes |
| Unregulated Contaminant Monitoring Rule (UCMR 1) | IOCs, SOCs, and VOCs (List 1) |
| Unregulated Contaminant Monitoring Rule (UCMR 2) | DBPs, IOCs, SOCs, and VOCs (Lists 1 & 2) |

Since the publication of the MRWSS Update 2005, several regulations were finalized by CDPH and USEPA and added to the list in Table 4-1. These regulations include: Arsenic Regulation, Filter Backwash Recycling Rule, GWR, and UCMR 2. In addition, the LT2ESWTR and S2DBPR were finally promulgated by USEPA in January 2006. Brief descriptions of each of these new regulations are provided below.

The Filter Backwash Recycling Rule was finalized in June 2001 after the IESWTR and LT1ESWTR to ensure the protections provided those treatment techniques are not jeopardized by improper handling of recycling and backwash solids. CDPH combined the rules together in the Title 22 regulations. The GWR was promulgated to provide for increased protection against microbial pathogens in public water systems that use ground water sources. USEPA is particularly concerned about groundwater systems that are susceptible to fecal contamination since disease-causing pathogens may be found in fecal contamination.

## Arsenic Regulation

The MCL for arsenic was 50 µg/L, but the National Academy of Science (NAS) determined that this concentration does not adequately protect public health. Based on more recently developed scientific information, USEPA set a final MCL at 10 µg/L in January 2001 and it became effective on January 23, 2006.

# Disinfectant/Disinfection By-Products Rule

## S1DBPR & S2DBPR

The S1DBPR was promulgated in December 1998, and became effective on January 1, 2002 for large systems and on January 1, 2004 for small systems. S2DBPR was proposed in August 2003; a final version was promulgated in January 2006; and will become effective as of April 2012 for large systems and April 2013 for small systems. With S2DBPR, MCLs for THMs and HAA5 are now based on Locational Running Annual Average (LRAA) at each compliance monitoring location instead of the entire system-wide average. Testing for locations with potentially higher HAA5 and THMs was required as part of the Individual Distribution System Evaluation (IDSE) requirement. IDSE monitoring occurred in 2007-2008. These regulations include MCL and MCL goals (MCLGs) for the following DBPs and chlorite.

S2DBPR regulations include MCL for THMs, HAA5, bromate, and chlorite. Bromate and chlorite MCLs remain the same, but their criteria for reduced monitoring changed to reflect improved analytical capability for each parameter. Bromate is required for treatment plants using ozone and chlorite is required for treatment plants using chlorine dioxide. MCL goals (MCLGs) were established for one of the four species of THMs and for two of the five individuals species of HAA5 as shown in Table 1a.

IDSE monitoring results from sampling in November 2007 to September 2008 indicated that the highest LRAAs were located in the eastern portion of the District's distribution service area: Walnut Creek, Danville and San Ramon. Per S2DBPR regulations and from IDSE results, most of the required 16 S2DBPR proposed sampling sites will come from those zones with similar high levels. S2DBPR sampling will start in April 2012. Since the S2DBPR proposed sampling sites are in the areas of highest DBPs, the overall average is expected be higher than the present average.

Under S1DBPR, CANS, CANS, and Pardee Center monitor at one location each for THMs and HAA5. For S2DBPR, CANS, CANS, and Pardee Center will increase their monitoring to two locations for THMs and HAA5 starting in 2013.

**Table 4-1a. DBPs: Trihalomethanes, Halogenated Acetic Acids, Bromate and Chlorite**

| | MCL (mg/L) | MCLG (mg/L) |
|---|---|---|
| Total Trihalomethanes (TTHMs) | 0.080 | |
| Chloroform | | 0.07 [1] |
| Bromodichloromethane | | 0 |
| Dibromochloromethane | | 0.06 |
| Bromoform | | 0 |
| Haloacetic Acids (HAAs) | 0.060 | |
| Dichloroacetic acid | | 0 |
| Monochloroacetic acid | | 0.070 [1] |
| Trichloroacetic acid | | 0.020 [1] |

| | MCL (mg/L) | MCLG (mg/L) |
|---|---|---|
| Bromate (an ozonation by-product) | 0.010 | 0 |
| Chlorite (for systems using Chlorine Dioxide) | 1.0 | 0.8 |

Note: 1= S2DBPR MCLG

Also, maximum residual disinfectant levels (MRDLs) and MRDL goals (MRDLGs) for chlorine, chloramines, and chlorine dioxide were established (Table 4-1b).

**Table 4-1b. MRDL and MRDLG for Chlorine, Chloramines and Chlorine Dioxide**

| | MRDL (mg/L) | MRDLG (mg/L) |
|---|---|---|
| Chlorine as $Cl_2$ | 4.0 | 4.0 |
| Chloramine as $Cl_2$ | 4.0 | 4.0 |
| Chlorine Dioxide as $ClO_2$ (for systems using Chlorine Dioxide) | 0.8 | 0.8 |

## Long Term 2 Enhanced Surface Water Treatment Rule

While the IESWTR applies to systems serving 10,000 or more people and LT1ESWTR applies to smaller systems, the LT2ESWTR was promulgated in January 2006 for all systems with water treatment technique requirements to mitigate *Cryptosporidium* risks. LT2ESWTR combined the two prior regulations and required *Cryptosporidium* and *E. coli* monitoring for large and small systems, respectively. Depending upon those microbiological results, a suite of treatment techniques or practices are allowed for the required treatment credit to comply. Though the initial round of *Cryptosporidium* and *E. coli* monitoring occurs only for a two-year period, treatment techniques are regulated on that initial sampling, making the monitoring results very critical to treatment plant design and operations. Six years after the completion of the initial sampling, the second round of sampling is to begin.

LT2ESWTR *Cryptosporidium* monitoring results from Pardee, Briones, USL and San Pablo water sources were all non-detectable, tentatively placing required treatment credits in the Bin 1 category for the East Bay system. Table 4-2a provides log credits given for *Cryptosporidium* removal. Since the source water is relatively clean, Bin 1 allows treatment plants to operate without additional log credits needed for *Cryptosporidium* removal (Table 4-2a). For systems that do not fall in Bin 1, treatment options are specified in "Microbial Toolbox" (Table 4-2c).

On the basis of the highest monthly RAA of *E. coli* samples collected, the Pardee and Camanche small systems were tentatively assigned a Bin 1 classification. This classification will not require additional removal requirements for *Cryptosporidium*.

**Table 4-1c. Log Credits for *Cryptosporidium* Removal**

| Plant Type | Log Credit |
|---|---|
| Conventional treatment (includes softening) | 3.0 |
| Direct filtration | 2.5 |
| Slow sand or diatomaceous earth filtration | 3.0 |
| Alternative filtration technologies | Determined by state through product/site specific testing |

**Table 4-1d. LT2ESWTR Bin Classifications**

| Bin Number | *Cryptosporidium* Concentration (oocysts/L) | Additional Treatment Required[3] |
|---|---|---|
| 1 | <0.075 | No additional treatment |
| 2 | 0.075 to < 1.0 | 1 log[1] or 1.5 log[2] |
| 3 | 1.0 to <3.0 | 2.0 log[1] or 2.5 log[2] |
| 4 | >3.0 | 2.5 log[1] or 3 log[2] |

[1] For conventional, softening, slow sand, and diatomaceous earth plants
[2] For direct filtration plants
[3] Additional treatment for alternative filtration technologies will be as determined by the state, so long as the total *Cryptosporidium* removal and inactivation is at least 4.0 logs, 5.0 logs, and 5.5 logs for Bins 2, 3 and 4, respectively

**Table 4-1e. LT2ESWTR Treatment Options for Compliance**

| Microbial Toolbox Option | *Cryptosporidium* Log Credit with Design Implementation Criteria |
|---|---|
| Watershed Control Program | 0.5 log credit for state-approved program; does not apply to unfiltered systems |
| Alternative source/intake management | No presumptive credit |
| Combined filter performance | 0.5 log credit in combined effluent turbidity <= 0.15 ntu in 95% of samples in each month |
| Membranes (microfiltration, ultrafiltration, nanofiltration, and reverse osmosis) | Log credit equivalent to removal efficiency demonstrated in challenge test for device or direct integrity testing, whichever is lower. |
| Ozone | Log credit based on demonstration of log inactivation with contact time table |
| UV | Log credit based on demonstration of inactivation with UV dose table; reactor testing required to establish validated operating conditions |
| Individual filter performance | 1.0 log credit for demonstration of filtered water turbidity of <0.1 ntu in 95% of daily maximum values from individual filters and no individual filter >0.3 ntu in two consecutive measurements taken 15 minutes apart |
| Presedimentation basin with coagulation | 0.5 log credit with continuous operation and coagulant addition; basins must achieve 0.5 log turbidity reduction |
| Demonstration of performance | Credit awarded to unit process/treatment train based on demonstration to state |

The LT2ESWTR requires compliance with treatment requirements no later than April 2012 for large systems and October 2014 for small systems. The LT2ESWTR also includes requirements for disinfection profiling and benchmarking of *Giardia* and virus inactivation.

## Unregulated Compounds

USEPA requires utilities to monitor contaminants for future potential regulation. Candidate Contaminant Lists (CCLs) were determined by USEPA from health effects data and analytical capability. UCMR includes specific contaminants that USEPA periodically selects from the CCLs. The UCMR monitoring phase is intended to provide occurrence data, analytical feasibility, and treatability cost data for required benefit/cost analyses in

future proposed regulations with MCLs. Promulgation of contaminants with MCLs must consider all factors including: health effects or consumer acceptance, analytical feasibility to measure the range of concern, treatability, economics, and occurrence among water supplies.

Perchlorate and MTBE were both on CCL 1 and the past UCMR 1. Both of these contaminants are also on the CCL 2. The CCL 2 list comprises the 51 contaminants from the CCL 1 for which the data were insufficient. Both MTBE and perchlorate were scrutinized for their occurrence data from past UCMR 1 monitoring.

UCMR 1 was sampled from 2002 to 2003 and its data included in the previous WSS update, and UCMR 2, which was proposed in August 2005 and finalized in 2007, was sampled from 2008 to 2009. While UCMR 1 was monitored in source water, UCMR 2 was monitored in the District's East Bay Distribution System. UCMR 2 monitoring, which occurred at distribution system entry points and taps with maximum residence time, included 26 inorganics and organics, notably perchlorate, RDX, TNT, and various derivatives of Acetochlor, Alachlor, BDE-series flame retardants, Metolachlor and NDMA. Only NDMA was detected among the UCMR 2 monitoring results and limited to the maximum residence time distribution tap samples. The samples taken at the entry point to the distribution system did not have detectables among the UCMR 2 parameters. Table 4-1f lists the UCMR 2 Contaminants with their Chemical Abstract Series Registry Numbers (CASRN).

**Table 4-1f. UCMR 2 Contaminants**

| **Assessment Monitoring List 1 Contaminants** | **CASRN** |
|---|---|
| Dimethoate | 60-51-5 |
| Terbufos sulfone | 56070-16-7 |
| *Five Flame Retardants* | |
| 2,2',4,4'-tetrabromodiphenyl ether (BDE-47) | 5436-43-1 |
| 2,2',4,4',5-pentabromodiphenyl ether (BDE-99) | 60348-60-9 |
| 2,2',4,4',5,5'-hexabromobiphenyl (HBB) | 59080-40-9 |
| 2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153) | 68631-49-2 |
| 2,2',4,4',6-pentabromodiphenyl ether (BDE-100) | 189084-64-8 |
| *Three Explosives* | |
| 1,3-dinitrobenzene | 99-65-0 |
| 2,4,6-trinitrotoluene (TNT) | 118-96-7 |
| Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) | 121-82-4 |
| **Screening Survey List 2 Contaminants** | **CASRN** |
| *Three Parent Acetanilides* | |
| Acetochlor | 34256-82-1 |
| Alachlor | 15972-60-8 |
| Metolachlor | 51218-45-2 |
| *Six Acetanilide Degradates* | |
| Acetochlor ethane sulfonic acid (ESA) | 187022-11-3 |
| Acetochlor oxanilic acid (OA) | 184992-44-4 |
| Alachlor ethane sulfonic acid(ESA) | 142363-53-9 |

| | |
|---|---|
| Alachlor oxanilic acid (OA) | 171262-17-2 |
| **Screening Survey List 2 Contaminants (Contindued)** | **CASRN** |
| Metolachlor ethane sulfonic acid(ESA) | 171118-09-5 |
| Metolachlor oxanilic acid (OA) | 152019-73-3 |
| *Six Nitrosamines* | |
| N-nitroso-diethylamine (NDEA) | 55-18-5 |
| N-nitroso-dimethylamine (NDMA) | 62-75-9 |
| N-nitroso-di-n-butylamine (NDBA) | 924-16-3 |
| N-nitroso-di-n-propylamine (NDPA) | 621-64-7 |
| N-nitroso-methylethylamine (NMEA) | 10595-95-6 |
| N-nitroso-pyrrolidine (NPYR) | 930-55-2 |

Source: http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr2/basicinformation.cfm

## Ground Water Rule

The former Ground Water Disinfection Rule (GWDR) was restructured and renamed the Ground Water Rule (GWR). A proposed version has been available since March 2000. The final rule was issued in November 2006 and became effective in January 2007. The GWR establishes multiple barriers to protect public health against bacteria and viruses. A targeted strategy is included to identify those systems which are at high risk for fecal contamination. A 4-log (99.99 percent) removal of viruses, sanitary surveys to identify system deficiencies, source water monitoring for undisinfected systems and compliance monitoring for disinfected systems are all delineated in the final rule. Since the WSS pertains to surface water supplies, the GWR should have little impact on this document.

# Existing Regulations Summary

Table 4-2 presents both USEPA and CDPH standards for the targeted contaminants listed in Table 4-1. For the USEPA drinking water standards, MCLG, MCL, and secondary MCL (SMCL) are shown. Similarly, MCL and SMCL for the California drinking water standards are shown.

The 1986 SDWA Amendments led to the SWTR which includes a recommendation for all surface water systems to develop watershed control plans. As the primary agency for the implementation of the SWTR, CDPH required the first watershed sanitary survey be conducted by January 1996 for all surface supplies with updates every five years thereafter. The contents of this report constitute the third five-year update.

In the SWTR, USEPA targeted the control of *Giardia lamblia*, viruses, heterotrophic bacteria, *Legionella*, and turbidity. CDPH determined that all surface waters in California are subjected to potential contamination from *Giardia lamblia* and viruses. There are several species of *Giardia,* with *Giardia lamblia* being of most importance from a human health perspective. The SWTR includes the following general requirements in order to minimize human exposure to microbial contaminants in drinking water. The IESWTR added controls of *Cryptosporidium* to the watershed protection requirements. LT1ESWTR

applied similar controls for small systems. LT2ESWTR combined the two prior regulations and required *Cryptosporidium* and *E. coli* monitoring for large and small systems, respectively.

Utilities are required to achieve at least 99.9 percent (3-log) removal and/or inactivation of *Giardia lamblia* cysts and a minimum 99.99 percent (4-log) removal and/or inactivation of viruses. Utilities are required to achieve at least 99 percent (2-log) removal and/or inactivation of *Cryptosporidium*. These removals may include a combination of minimum disinfectant residual for the minimum contact time and given log removals for the treatment process used, usually coagulation, sedimentation, and filtration.

On the basis of the respective results of *Cryptosporidium* and *E. coli* samples collected, the East Bay system and the Pardee and Camanche small systems were tentatively assigned a Bin 1 classification. This classification will not require additional removal requirements for *Cryptosporidium*.

The disinfectant residual entering the distribution system must not fall below 0.2 mg/L for more than four hours during any 24-hour period. A disinfectant residual must be detectable in 95 percent of distribution system samples. The presence of heterotrophic plate count bacteria at concentrations less than or equal to 500 colony forming units per milliliter (cfu/ml) is considered equivalent to a detectable disinfectant residual.

S2DBPR required IDSE monitoring of East Bay distribution system from November 2007 to September 2008 and the sampling results indicated that the highest LRAAs were located in the eastern portion of the District's East Bay distribution service area. Removal and/or inactivation credits are contingent upon complying with turbidity treatment techniques for proven particle removal practice for operating filter systems.

**Table 4-2: Drinking Water Standards**

| | | | USEPA | | | California CDPH[2] | |
|---|---|---|---|---|---|---|---|
| **Water Quality Parameters** | **Regulation** | **Best Available Technology[1]** | **MCLG mg/L** | **MCL mg/L** | **SMCL mg/L** | **MCL mg/L** | **SMCL mg/L** |
| *General Physical* | | | | | | | |
| Color (units) | Secondary | | | | 15 | | 15 |
| Odor Threshold (TON) | Secondary | | | | 3 | | 3 |
| Specific conductance | Secondary | | | | | | 900 |
| Total dissolved solids | Secondary | | | | 500 | | 500 |
| Turbidity (NTU) | IESWTR | C-F, SSF, DEF, DF, D | | 0.3 | | 0.3 | |
| pH | Secondary | | | | 6.5-8.5 | | |
| Corrosivity | | | | | non-corrosive | | |
| Foaming Agents (MBAS) | Secondary | | | | 0.5 | | 0.5 |
| *Microbiological* | | | | | | | |
| *Cryptosporidium* | IESWTR | C-F, SSF, DEF, DF, D | 0 | TT | | | |
| *E. coli* | TCR | D | 0 | [4] | | [4] | |

| | | | USEPA | | | California CDPH[2] | |
|---|---|---|---|---|---|---|---|
| **Water Quality Parameters** | **Regulation** | **Best Available Technology[1]** | **MCLG mg/L** | **MCL mg/L** | **SMCL mg/L** | **MCL mg/L** | **SMCL mg/L** |
| *Microbiological (Continued)* | | | | | | | |
| Fecal coliform | TCR | D | 0 | [4] | | [4] | |
| *Giardia lamblia* | SWTR | C-F, SSF, DEF, DF, D | 0 | TT | | TT | |
| Heterotrophic bacteria[3] | SWTR | C-F, SSF, DEF, DF, D | | TT | | TT | |
| *Legionella* [3] | SWTR | C-F, SSF, DEF, DF, D | 0 | TT | | TT | |
| Total Coliform | TCR | D | 0 | [5] | | [5] | |
| Viruses [3] | SWTR | C-F, SSF, DEF, DF, D | 0 | TT | | TT | |
| *Radionuclides* | | | | | | | |
| Beta particle and photon emitters (mrem) | Interim Radionuclides | IX, RO | 0 | 4 | | 4 (50 pCi/L) | |
| Gross Alpha (pCi/L) | Interim Radionuclides | RO | 0 | 15 | | 15 | |
| Radium-226 + Radium 228 (pCi/L) | Interim Radionuclides | LS IX, RO | 0 | 5 | | 5 | |
| Radium-226 (pCi/L) | Radionuclides | LS IX, RO | | | | | |
| Radium-228 (pCi/L) | Radionuclides | LS, IX, RO | | | | | |
| Tritium (pCi/L) | Radionuclides | | | | | 20,000 | |
| Strontium-90 (pCi/L) | Radionuclides | | | | | 8 | |
| Uranium (pCi/L) | Radionuclides | C-F, LS, IX, RO | 0 | 30 | | 20 | |
| *Inorganic Chemicals* | | | | | | | |
| Aluminum | CDPH Inorganic & Secondary | C-F, DDF | | | 0.05-0.2 | 1 | 0.2 |
| Antimony | Phase V | C-F, RO | 0.006 | 0.006 | | 0.006 | |
| Arsenic | Final Arsenic Rule | AA, C-F, IX, LS, RO, ED, OX | 0 | 0.01 | | 0.01 | |
| Asbestos > 10µm (MFL) | Phase ll | C-F, DDF, CC | 7 | 7 | | 7 | |
| Barium | Phase ll | IX, RO, LS, ED | 2 | 2 | | 1 | |
| Beryllium | Phase V | IX, RO, C-F, LS, AA, IX | 0.004 | 0.004 | | 0.004 | |
| Bromate | S1DBPR & S2DBPR | DC | 0 | 0.01 | | 0.010 | |
| Cadmium | Phase ll | C-F,LS , IX, RO | 0.005 | 0.005 | | 0.005 | |
| Chloride | Phase 1 | | | | 250 | | 250 |
| Chlorite | D/DBP | DC | 0.8 | 1 | | 1.0 | |
| Chromium (total) | Phase II | C-F, LS, IX, RO | 0.1 | 0.1 | | 0.05 | |
| Copper | LCR | CCT, PE, SWT | 1.3 | TT AL=1.3 | 1.0 | TT AL=1.3 | 1 |
| *Inorganic Chemicals (Continued)* | | | | | | | |
| Cyanide | Phase V | IX, RO, C12 | 0.2 | 0.2 | | 0.15 | |

| | | | USEPA | | | California CDPH[2] | |
|---|---|---|---|---|---|---|---|
| **Water Quality Parameters** | **Regulation** | **Best Available Technology[1]** | **MCLG mg/L** | **MCL mg/L** | **SMCL mg/L** | **MCL mg/L** | **SMCL mg/L** |
| Fluoride | Fluoride | AA | 4 | 4 | 2 | 2.0 | |
| Iron | Secondary | | | | 0.3 | | 0.3 |
| Lead | LCR | CCT, PE, SWT, LSLR | 0 | TT AL=0.015 | | TT AL=0.015 | |
| Manganese | Secondary | | | | 0.05 | | 0.05 |
| Mercury | Phase II | C-F, GAC, LS,RO (influent ≤ 10µg/L) | 0.002 | 0.002 | | 0.002 | |
| Nickel | Phase V | LS, IX, RO | | | | 0.1 | |
| Nitrate (as N) | Phase ll | IX, RO, ED | 10 | 10 | | 45 (as NO3) | |
| Nitrite (as N) | Phase ll | IX, RO | 1 | 1 | | 1 | |
| Nitrate + nitrite (both as N) | Phase ll | IX, RO | | | | 10 | |
| Perchlorate | CDPH T22 | IX, BFBR | | | | 0.006 | |
| Selenium | Phase ll | C-F, LS, AA, RO, ED | 0.05 | 0.05 | | 0.05 | |
| Silver | Secondary | | | | 0.1 | | 0.1 |
| Sulfate | Sulfate | RO, IX, ED | 500 | 500 | 250 | | 250-500 |
| Thallium | Phase V | IX,AA | 0.0005 | 0.002 | | 0.002 | |
| Zinc | Secondary | | | | 5 | | 5 |
| *Organic Chemicals* | | | | | | | |
| Acrylamide | Phase II | PAP | 0 | TT | | | |
| Alachlor | Phase II | GAC. PTA | 0 | 0.002 | | 0.002 | |
| Aldicarb | Phase II | GAC | | | | | |
| Aldicarb sulfone | Phase II | GAC | 0.001 | 0.002 | | | |
| Aldicarb sulfoxide | Phase II | GAC | 0.001 | 0.004 | | | |
| Atrazine | Phase II | GAC | 0.003 | 0.003 | | 0.001 | |
| Bentazon | | PTA | | | | 0.018 | |
| Benzene | Phase I | GAC, PTA | 0 | 0.005 | | 0.001 | |
| Benzo(a)pyrene | Phase V | GAC | 0 | 0.0002 | | 0.0002 | |
| Bromodichloro-methane | Stage 1 & 2 D/DBP | EC | 0 | NA | | | |
| Bromoform | Stage 1 & 2 D/DBP | EC | 0 | NA | | | |
| Carbofuran | Phase II | GAC | 0.04 | 0.04 | | 0.018 | |
| Carbon tetrachloride | Phase I | GAC, PTA | 0 | 0.005 | | 0.0005 | |
| Chlordane | Phase II | GAC | 0 | 0.002 | | 0.0001 | |
| Chloroform | Stage 2 D/DBP | EC | 0.07 | NA | | | |
| 2,4-D | Phase II | GAC | 0.07 | 0.07 | | 0.07 | |
| Dalapon | Phase V | GAC | 0.2 | 0.2 | | 0.2 | |
| *Organic Chemicals (Continued)* | | | | | | | |
| Di(2-ethylhexyl) adipate | Phase V | GAC, PTA | 0.4 | 0.4 | | 0.4 | |
| Di(2-ethylhexyl) phthalate | Phase V | GAC | 0 | 0.006 | | 0.004 | |
| Dibromochloro-methane | Stage 1 & 2 | EC | 0.06 | NA | | | |

| | | | USEPA | | | California CDPH[2] | |
|---|---|---|---|---|---|---|---|
| **Water Quality Parameters** | **Regulation** | **Best Available Technology[1]** | **MCLG mg/L** | **MCL mg/L** | **SMCL mg/L** | **MCL mg/L** | **SMCL mg/L** |
| | D/DBP | | | | | | |
| Dibromochloro-propane (DBCP) | Phase II | GAC, PTA | 0 | 0.0002 | | 0.0002 | |
| Dichloroacetic acid | Stage 1 & 2 D/DBP | EC | 0 | NA | | | |
| p-Dichlorobenzene | Phase I | GAC, PTA | 0.075 | 0.075 | | 0.005 | |
| o-Dichlorobenzene | Phase II | GAC, PTA | 0.6 | 0.6 | | 0.6 | |
| 1,1-Dichloroethane | | GAC, PTA | | | | 0.005 | |
| 1,2-Dichloroethane | Phase I | GAC, PTA | 0 | 0.005 | | 0.0005 | |
| 1,1-Dichloroethylene | Phase I | GAC, PTA | 0.007 | 0.007 | | 0.006 | |
| 1,3 – Dichloropropene | | GAC, PTA | | | | 0.0005 | |
| cis-1,2-Dichloroethylene | Phase II | GAC, PTA | 0.07 | 0.07 | | 0.006 | |
| trans-1, 2-Dichloroethylene | Phase II | GAC, PTA | 0.1 | 0.1 | | 0.01 | |
| Dichloromethane (methylene chloride) | Phase V | PTA | 0 | 0.005 | | 0.005 | |
| 1, 2-Dichloropropane | Phase II | GAC, PTA | 0 | 0.005 | | 0.005 | |
| Dinoseb | Phase V | GAC | 0.007 | 0.007 | | 0.007 | |
| Diquat | Phase V | GAC | 0.02 | 0.02 | | 0.02 | |
| Endothall | Phase V | GAC | 0.1 | 0.1 | | 0.1 | |
| Endrin | Phase V | GAC | 0.002 | 0.002 | | 0.002 | |
| Epichlorohydrin | Phase II | PAP | 0 | TT | | | |
| Ethylbenzene | Phase II | GAC, PTA | 0.7 | 0.7 | | 0.7 | |
| Ethylene dibromide (EDB) | Phase II | GAC, PTA | 0 | 0.00005 | | 0.00005 | |
| Glyphosate | Phase V | OX | 0.7 | 0.7 | | 0.7 | |
| Haloacetic acids (sum of 5; HAA) | Stage 1 & 2 D/DBP | EC+GAC10, GAC20 or NF (7) | | 0.06 | | | |
| Heptachlor | Phase II | GAC | 0 | 0.0004 | | 0.00001 | |
| Heptachlor epoxide | Phase II | GAC | 0 | 0.0002 | | 0.00001 | |
| Hexachlorobenzene | Phase V | GAC | 0 | 0.001 | | 0.001 | |
| Hexachlorocyclopentadiene | Phase V | GAC, PTA | 0.05 | 0.05 | | 0.05 | |
| Lindane | Phase II | GAC | 0.0002 | 0.0002 | | 0.0002 | |
| Methoxychlor | Phase II | GAC | 0.04 | 0.04 | | 0.03 | |
| Methyl Tertiary-Butyl Ether | MTBE | PTA | | | | 0.013 | 0.005 |
| Molinate | | | | | | 0.02 | |
| Monochlorobenzene | Phase II | GAC, PTA | 0.1 | 0.1 | | 0.07 | |
| Oxamyl (vydate) | Phase V | GAC | 0.2 | 0.2 | | 0.05 | |
| Pentachlorophenol | Phase II | GAC | 0 | 0.001 | | 0.001 | |
| *Organic Chemicals (Continued)* | | | | | | | |
| Picloram | Phase V | GAC | 0.5 | 0.5 | | 0.5 | |
| Polychlorinated byphenyls (PCBs) | Phase II | GAC | 0 | 0.0005 | | 0.0005 | |

| | | | USEPA | | | California CDPH[2] | |
|---|---|---|---|---|---|---|---|
| **Water Quality Parameters** | **Regulation** | **Best Available Technology[1]** | **MCLG mg/L** | **MCL mg/L** | **SMCL mg/L** | **MCL mg/L** | **SMCL mg/L** |
| Simazine | Phase V | GAC | 0.004 | 0.004 | | 0.004 | |
| Styrene | Phase II | GAC, PTA | 0.1 | 0.1 | | 0.1 | |
| 2,3,7,8 TCDD (dioxin) | Phase V | GAC | 0 | 3 x E -8 | | 3 x E -8 | |
| 1,1,2,2-Tetrachloro- ethane | | GAC, PTA | | | | 0.001 | |
| Tetrachloroethylene | Phase II | GAC, PTA | 0 | 0.005 | | 0.005 | |
| Thiobencarb | CDPH Primary & Secondary | GAC, PTA | | | | 0.07 | 0.001 |
| Toluene | Phase II | GAC, PTA | 1 | 1 | | 0.15 | |
| Toxaphene | Phase II | GAC, PTA | 0 | 0.003 | | 0.003 | |
| 2,4,5 TP (silvex) | Phase II | GAC | 0.05 | 0.05 | | 0.05 | |
| Trichloroacetic acid | Stage 1 & 2 D/DBP | EC | 0.3 | NA | | | |
| 1,2,4-Trichlorobenzene | Phase V | GAC, PTA | 0.07 | 0.07 | | 0.005 | |
| 1,1,1-Trichloroethane | Phase I | GAC, PTA | 0.2 | 0.2 | | 0.2 | |
| 1,1,2-Trichloroethane | Phase V | GAC, PTA | 0.003 | 0.005 | | 0.005 | |
| Trichloroethylene | Phase I | GAC, PTA | 0 | 0.005 | | 0.005 | |
| Trichlorofluoromethane | | GAC, PTA | | | | 0.15 | |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | | GAC, PTA | | | | 1.2 | |
| Trihalomethanes (sum of 4; THMs) | Stage 1 & 2 D/DBP | EC+GAC10, GAC20 or NF (7) | NA | 0.080 | | 0.080 | |
| Vinyl chloride | Phase I | PTA | 0 | 0.002 | | 0.0005 | |
| Xylenes (total) | Phase II | GAC + PTA | 10 | 10 | | 1.75 | |

(1) AA-activated alumina, AR – aeration, AX – anion exchange, BFBR – Biological fluidized bed reactor, CCT – corrosion control treatment, C-F – coagulation and filtration, Cl2 – chlorination, D – disinfection., DC – disinfection system control, DDF – direct and diatomite earth filtration, EC—enhanced coagulation, ED – electrodialysis, GAC – granular activated carbon (GAC10=GAC filters with contact time of 10 minutes), IX – ion exchange, LCR – Lead and Copper Rule, LS – lime softening, LSLR – lead service line replacement, MFL – million fibers per liter, NA – not applicable, NF – Nanofiltration with MW cutoff <1K Daltons, OX – oxidation, PAP – polymer addition practices, PE – public education, PTA – packed tower aeration, RO – reverse osmosis, SSF – slow sand filtration, SWT – source water treatment, TT – treatment technique.

(2) California MCL and SMCL from California Code of Regulations Title 22, Update June, 2010

(3) Coagulation-filtration and lime softening are not Best Available Technology (BAT) for small systems for variances unless treatment is already installed.

(4) Final for systems using surface water, also being considered for groundwater systems

(5) If a repeat total coliform sample is fecal coliform- or *E. coli*-positive. The system is also in violation of the MCL for total coliform if a routine sample is a fecal coliform- or *E. coli*-positive and is followed by a total coliform-positive repeat sample.

(6) No more than 5 percent of the samples per month may be positive. For systems collecting fewer than 40 samples per month, no more than 1 sample per month may be positive.

(7) In addition to the BATs at the WTP, BAT for HAA5 and THMs in consecutive systems would include improved distribution system and storage tank management to reduce residence time.

## Anticipated Regulations

As a result of the regulatory activities initiated by the 1996 SDWA Amendments, a number of regulations have been redefined and/or rescheduled for development and promulgation. With an emphasis on strengthening the scientific basis or risk assessment information and approach being used to establish MCLs, additional time is required for development and promulgation. In addition, the emphasis on ensuring that the benefits gained from a public

health perspective outweigh or balance the costs of treatment is resulting in a more thorough public comment period. The more pertinent regulations which are scheduled for promulgation are reflected in Table 4-3 below.

**Table 4-3. Status of Anticipated Drinking Water Regulations (1)**

| Anticipated Regulation | Targeted Contaminants | Status |
|---|---|---|
| Drinking Water CCL 3 | VOCs, SOCs, IOCs, Microbes | Finalized in FR 10/8/09; pp. 51850-52862. |
| Revised TCR | *E. coli* and Fecal Coliform | Proposed rule in late 2010. Final rule expected in 2012. |

(1) Anticipated Drinking Water Regulations as of June 2010.

## Revised Total Coliform Rule

The USEPA issued notices in 2003 to revise the 1989 TCR. Issue papers were developed and workshops were conducted from 2003 to 2007 on maintaining or improving public health protection. USEPA convened a TCR Distribution System Federal Advisory Committee consisting of 15 organizations, which met 13 times from July 2007 to September 2008 to provide technical support and analyses to inform various rule recommendations. An Agreement in Principle (AIP) was made, recognizing the burden and cost to follow up on consumer confusion/mistrust of notifications associated with Total Coliform (TC) "positive results," the value of effective operators, linkages to other regulations (e.g., S2DBPR, LT2ESWTR, etc.) and various system types and sizes. The Revised TCR would require the following AIP core elements:

- System investigation and correction of any sanitary defects found whenever monitoring results show a system may be vulnerable to contamination.
- System self-assessment (Level 1) or a more detailed assessment by a qualified party (Level 2) depending on the severity and frequency of contamination.
- Establishment of a Treatment Technique (TT) in place of MCL/MCLG for TC, with Public Notification (PN) only for TT violations (failure to find-and-fix)
- Retaining *E. coli* as a health indicator based on an MCL (2 TC positives and at least 1 related *E. coli* positive) and MCLG of zero.
- TC results as a TT would be used as a system operation indicator and address the need to find and fix sanitary defects in the distribution system.
- Other elements include:
  1) more flexibility for repeat samples beyond 5 sample taps up and downstream of a TC "positive";
  2) requiring startup procedures and sampling for seasonal systems to address highly vulnerable periods; and
  3) requiring small systems on reduced monitoring to better demonstrate eligibility with specified site visits, distribution system sanitary survey issues and past history of MCL violations, TT failures and high risk system criteria.

## Drinking Water CCLs

A draft CCL was published in 1997 and the final CCL 1 was published in March 1998. The CCL 1 list contained 50 chemical and 10 microbiological contaminants being considered for future regulation. CCL 2 was finalized in February 2005 with 42 chemical and 9 microbiological contaminants. Some parameters not carried over from the CCL 1 were: Aldrin, Dieldrin, Manganese, Sodium, Sulfate and Naphthalene. CCL 3 was finalized in October 2009 with 104 chemical and 12 microbiological contaminants, including 18 contaminants on CCL 2. CCL 3 also had 14 contaminants in the UCMR 2 lists, some were in common with the CCL 2 including Acetochlor, Alachlor ethanesulfonic acid (ESA), Metolachlor and RDX.

**Table 4-3a.**

| CCL 2. Microbial Contaminants |
|---|
| Adenoviruses |
| *Aeromonas hydrophila* |
| Caliciviruses |
| *Coxsackieviruses* |
| Cyanobacteria (blue-green algae), other freshwater algae, and their toxins |
| Echoviruses |
| *Helicobacter pylori* |
| *Microsporidia (Enterocytozoon & Septata)* |
| *Mycobacterium avium intracellulare* (MAC) |

**Table 4-3b.**

| CCL 2. Chemical Contaminants | CASRN1 |
|---|---|
| 1,1,2,2-tetrachloroethane | 79-34-5 |
| 1,2,4-trimethylbenzene | 95-63-6 |
| 1,1-dichloroethane | 75-34-3 |
| 1,1-dichloropropene | 563-58-6 |
| 1,2-diphenylhydrazine | 122-66-7 |
| 1,3-dichloropropane | 142-28-9 |
| 1,3-dichloropropene | 542-75-6 |
| 2,4,6-trichlorophenol | 88-06-2 |
| 2,2-dichloropropane | 594-20-7 |
| 2,4-dichlorophenol | 120-83-2 |
| 2,4-dinitrophenol | 51-28-5 |
| 2,4-dinitrotoluene | 121-14-2 |
| 2,6-dinitrotoluene | 606-20-2 |
| 2-methyl-Phenol (o-cresol) | 95-48-7 |
| Acetochlor | 34256-82-1 |
| Alachlor ESA & other acetanilide pesticide degradation products | N/A |
| Aluminum | 7429-90-5 |

| CCL 2. Chemical Contaminants | CASRN1 |
|---|---|
| Boron | 7440-42-8 |
| Bromobenzene | 108-86-1 |
| DCPA mono-acid degradate | 887-54-7 |
| DCPA di-acid degradate | 2136-79-0 |
| DDE | 72-55-9 |
| Diazinon | 333-41-5 |
| Disulfoton | 298-04-4 |
| Diuron | 330-54-1 |
| s-ethyl-dipropylthiocarbamate (EPTC) | 759-94-4 |
| Fonofos | 944-22-9 |
| p-Isopropyltoluene (p-cymene) | 99-87-6 |
| Linuron | 330-55-2 |
| Methyl bromide | 74-83-9 |
| MTBE | 1634-04-4 |
| Metolachlor | 51218-45-2 |
| Molinate | 2212-67-1 |
| Nitrobenzene | 98-95-3 |
| Organotins | N/A |
| Perchlorate | 14797-73-0 |
| Prometon | 1610-18-0 |
| RDX | 121-82-4 |
| Terbacil | 5902-51-2 |
| Terbufos | 13071-79-9 |
| Triazines & degradation products of triazines including, but not limited to Cyanazine | 21725-46-2 |
| atrazine-desethyl | 6190-65-4 |
| Vanadium | 7440-62-2 |

Source: http://water.epa.gov/scitech/drinkingwater/dws/ccl/ccl2.cfm

**Table 4-3c.**

| CCL 3. Microbial Contaminants | Information |
|---|---|
| Adenovirus | Virus most commonly causing respiratory illness, and occasionally gastrointestinal illness |
| Caliciviruses | Virus (includes Norovirus) causing mild self-limiting gastrointestinal illness |
| *Campylobacter jejuni* | Bacterium causing mild self-limiting gastrointestinal illness |
| Enterovirus | Group of viruses including polioviruses, *coxsackieviruses* and echoviruses that can cause mild respiratory illness |
| *Escherichia coli* (0157) | Toxin-producing bacterium causing gastrointestinal illness and kidney failure |
| *Helicobacter pylori* | Bacterium sometimes found in the environment capable of colonizing human gut that can cause ulcers and cancer |
| Hepatitis A virus | Virus that causes a liver disease and jaundice |
| *Legionella pneumophila* | Bacterium found in the environment including hot water systems causing lung diseases when inhaled |
| *Mycobacterium avium* | Bacterium causing lung infection in those with underlying lung disease, and |

| CCL 3. Microbial Contaminants | Information |
|---|---|
| | disseminated infection in the severely immunocompromised |
| *Naegleria fowleri* | Protozoan parasite found in shallow, warm surface and ground water causing primary amoebic meningoencephalitis |
| *Salmonella enterica* | Bacterium causing mild self-limiting gastrointestinal illness |
| *Shigella sonnei* | Bacterium causing mild self-limiting gastrointestinal illness and bloody diarrhea |

**Table 4-3d.**

| CCL 3. Chemical Contaminants | CASRN | Information |
|---|---|---|
| 1,1,1,2-Tetrachloroethane | 630-20-6 | Industrial chemical used in production of other substances |
| 1,1-Dichloroethane | 75-34-3 | Industrial chemical used as a solvent |
| 1,2,3-Trichloropropane | 96-18-4 | Industrial chemical used in paint manufacture |
| 1,3-Butadiene | 106-99-0 | Industrial chemical used in rubber production |
| 1,3-Dinitrobenzene | 99-65-0 | Industrial chemical used in production of other substances |
| 1,4-Dioxane | 123-91-1 | Solvent or solvent stabilizer used in manufacture and processing of paper, cotton, textile products, automotive coolant, cosmetics and shampoos |
| 17alpha-estradiol | 57-91-0 | Estrogenic hormone used in pharmaceuticals. |
| 1-Butanol | 71-36-3 | Production of other substances, paint solvent and food additive |
| 2-Methoxyethanol | 109-86-4 | Consumer products, such as synthetic cosmetics, perfumes, fragrances, hair preparations, and skin lotions |
| 2-Propen-1-ol | 107-18-6 | Production of other substances; the manufacture of flavorings and perfumes. |
| 3-Hydroxycarbofuran | 16655-82-6 | Carbamate, pesticide degradate. The parent, carbofuran, used as insecticide. |
| 4,4'-Methylenedianiline | 101-77-9 | Production of other substances, corrosion inhibitor and curing agent for polyurethanes. |
| Acephate | 30560-19-1 | Insecticide |
| Acetaldehyde | 75-07-0 | Production of other substances, pesticide and food additive. |
| Acetamide | 60-35-5 | Solvent, solubilizer, plasticizer, and stabilizer |
| Acetochlor | 34256-82-1 | Herbicide for weed control on agricultural crops |
| Acetochlor ethanesulfonic acid (ESA) | 187022-11-3 | Acetanilide pesticide degradate. The parent, acetochlor, used as herbicide for weed control on agricultural crops. |
| Acetochlor oxanilic acid (OA) | 184992-44-4 | Acetanilide pesticide degradate. The parent, acetochlor, used as herbicide for weed control on agricultural crops. |
| Acrolein | 107-02-8 | Aquatic herbicide, rodenticide, and industrial chemical. |
| Alachlor ethanesulfonic acid (ESA) | 142363-53-9 | Acetanilide pesticide degradate. The parent, alachlor, used as herbicide for weed control on agricultural crops. |

| CCL 3. Chemical Contaminants | CASRN | Information |
|---|---|---|
| Alachlor oxanilic acid (OA) | 171262-17-2 | Acetanilide pesticide degradate. The parent, alachlor, used as herbicide for weed control on agricultural crops. |
| alpha-Hexachlorocyclohexane | 319-84-6 | Component of benzene hexachloride (BHC); formerly used as insecticide. |
| Aniline | 62-53-3 | Industrial chemical; solvent. Used in the synthesis of explosives, rubber products, and in isocyanates. |
| Bensulide | 741-58-2 | Herbicide |
| Benzyl chloride | 100-44-7 | Production of other substances, such as plastics, dyes, lubricants, gasoline and pharmaceuticals. |
| Butylated hydroxyanisole | 25013-16-5 | Food additive (antioxidant). |
| Captan | 133-06-2 | Fungicide. |
| Chlorate | 14866-68-3 | Chlorate compounds. Used in agriculture as defoliants or desiccants; may occur in drinking water related to use of disinfectants such as chlorine dioxide. |
| Chloromethane (Methyl chloride) | 74-87-3 | Foaming agent and in production of other substances. |
| Clethodim | 110429-62-4 | Herbicide. |
| Cobalt | 7440-48-4 | Naturally-occurring element. Formerly used as cobaltus chloride in medicines and as a germicide. |
| Cumene hydroperoxide | 80-15-9 | Industrial chemical; production of other substances. |
| Cyanotoxins (3)* | | Toxins naturally produced and released by cyanobacteria ("blue-green algae"). Various studies suggest three cyanotoxins for consideration: Anatoxin-a, Microcystin-LR, and Cylindrospermopsin. |
| Dicrotophos | 141-66-2 | Insecticide. |
| Dimethipin | 55290-64-7 | Herbicide and plant growth regulator. |
| Dimethoate | 60-51-5 | Insecticide on field crops, (such as cotton), orchard crops, vegetable crops, in forestry and for residential purposes. |
| Disulfoton | 298-04-4 | Insecticide. |
| Diuron | 330-54-1 | Herbicide. |
| equilenin | 517-09-9 | Estrogenic hormone used in pharmaceuticals. |
| equilin | 474-86-2 | Estrogenic hormone used in pharmaceuticals. |
| Erythromycin | 114-07-8 | Pharmaceutical formulations as an antibiotic. |
| Estradiol (17-beta estradiol) | 50-28-2 | Estrogenic hormone used in pharmaceuticals. |
| estriol | 50-27-1 | Estrogenic hormone used in veterinary pharmaceuticals. |
| estrone | 53-16-7 | Estrogenic hormone used in veterinary and human pharmaceuticals. |
| Ethinyl Estradiol (17-alpha ethynyl estradiol) | 57-63-6 | Estrogenic hormone used in veterinary and human pharmaceuticals. |
| Ethoprop | 13194-48-4 | Insecticide. |
| Ethylene glycol | 107-21-1 | Antifreeze, in textile manufacture and cancelled pesticide. |
| Ethylene oxide | 75-21-8 | Fungicidal and insecticidal fumigant. |
| Ethylene thiourea | 96-45-7 | Production of other substances, such as for vulcanizing |

| CCL 3. Chemical Contaminants | CASRN | Information |
|---|---|---|
| | | polychloroprene (neoprene) and polyacrylate rubbers, and as a pesticide. |
| Fenamiphos | 2224-92-6 | Insecticide. |
| Formaldehyde | 50-00-0 | It has been used as a fungicide, may be a disinfection byproduct, and can occur naturally. |
| Germanium | 7440-56-4 | Naturally-occurring element commonly used as germanium dioxide in phosphors, transistors and diodes, and in electroplating. |
| Halon 1011 (bromochloromethane) | 74-97-5 | Fire-extinguishing fluid and to suppress explosions, as well as a solvent in the manufacturing of pesticides. May also occur as a disinfection by-product in drinking water. |
| HCFC-22 | 75-45-6 | Refrigerant, as a low-temperature solvent, and in fluorocarbon resins, especially in tetrafluoroethylene polymers. |
| Hexane | 110-54-3 | Solvent, naturally-occurring alkane. |
| Hydrazine | 302-01-2 | Production of other substances, such as rocket propellants, and as an oxygen and chlorine scavenging compound. |
| Mestranol | 72-33-3 | Estrogenic hormone used in veterinary and human pharmaceuticals. |
| Methamidophos | 10265-92-6 | Insecticide. |
| Methanol | 67-56-1 | Industrial solvent, a gasoline additive and also as anti-freeze. |
| Methyl bromide (Bromomethane) | 74-83-9 | Fumigant as a fungicide. |
| Methyl tert-butyl ether | 1634-04-4 | Octane booster in gasoline, in the manufacture of isobutene and as an extraction solvent. |
| Metolachlor | 51218-45-2 | Herbicide for weed control on agricultural crops. |
| Metolachlor ethanesulfonic acid (ESA) | 171118-09-5 | Acetanilide pesticide degradate. The parent, metolachlor, is used as herbicide for weed control on agricultural crops. |
| Metolachlor oxanilic acid (OA) | 152019-73-3 | Acetanilide pesticide degradate. The parent, metolachlor, is used as herbicide for weed control on agricultural crops. |
| Molinate | 2212-67-1 | Herbicide. |
| Molybdenum | 7439-98-7 | Naturally-occurring element commonly used as molybdenum trioxide as a chemical reagent. |
| Nitrobenzene | 98-95-3 | Production of aniline, and also as solvent in manufacture of paints, shoe polishes, floor polishes, metal polishes, explosives, dyes, pesticides and drugs (such as acetaminophen), and in its re-distilled from (oil of mirbane) as an inexpensive perfume for soaps. |
| Nitroglycerin | 55-63-0 | In pharmaceuticals, production of explosives, and rocket propellants. |
| N-Methyl-2-pyrrolidone | 872-50-4 | Solvent in chemical industry, and used for pesticide application and in food packaging materials. |
| N-nitrosodiethylamine (NDEA) | 55-18-5 | Nitrosamine used as additive in gasoline and lubricants, as an antioxidant, a stabilizer in plastics, |

| CCL 3. Chemical Contaminants | CASRN | Information |
|---|---|---|
| | | and also may be a disinfection byproduct. |
| N-nitrosodimethylamine (NDMA) | 62-75-9 | Nitrosamine formerly used in production of rocket fuels; is used as an industrial solvent and an anti-oxidant, and also may be a disinfection byproduct. |
| N-nitroso-di-n-propylamine (NDPA) | 621-64-7 | Nitrosamine; may be a disinfection byproduct. |
| N-Nitrosodiphenylamine | 86-30-6 | Nitrosamine chemical reagent used as rubber and polymer additive and may be a disinfection byproduct. |
| N-nitrosopyrrolidine (NPYR) | 930-55-2 | Nitrosamine used as a research chemical and may be a disinfection byproduct. |
| Norethindrone (19-Norethisterone) | 68-22-4 | Progresteronic hormone used in pharmaceuticals. |
| n-Propylbenzene | 103-65-1 | Manufacture of methylstyrene, in textile dyeing, and as printing solvent, and a constituent of asphalt and naptha. |
| o-Toluidine | 95-53-4 | Production of other substances, such as dyes, rubber, pharmaceuticals and pesticides. |
| Oxirane, methyl- | 75-56-9 | Industrial chemical used in production of other substances. |
| Oxydemeton-methyl | 301-12-2 | Insecticide. |
| Oxyfluorfen | 42874-03-3 | Herbicide. |
| Perchlorate | 14797-73-0 | Naturally occurring and human-made chemical; used to manufacture fireworks, explosives, flares and rocket propellant. |
| Perfluorooctane sulfonic acid (PFOS) | 1763-23-1 | Fire fighting foams and various surfactant uses; few of which are still ongoing because no alternatives are available. |
| Perfluorooctanoic acid (PFOA) | 335-67-1 | Manufacture of fluoropolymers, substances which provide non-stick surfaces on cookware and waterproof, breathable membranes for clothing |
| Permethrin | 52645-53-1 | Insecticide. |
| Profenofos | 41198-08-7 | Insecticide and acaricide. |
| Quinoline | 91-22-5 | Production of other substances, as a pharmaceutical (anti-malarial) and as a flavoring agent. |
| RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine) | 121-82-4 | Explosive. |
| sec-Butylbenzene | 135-98-8 | Solvent for coating compositions, in organic synthesis, as a plasticizer and in surfactants. |
| Strontium | 7440-24-6 | Naturally-occurring element; used as strontium carbonate in pyrotechnics, in steel production, as a catalyst and as a lead scavenger. |
| Tebuconazole | 107534-96-3 | Fungicide. |
| Tebufenozide | 112410-23-8 | Insecticide. |
| Tellurium | 13494-80-9 | Naturally-occurring element commonly used as sodium tellurite in bacteriology and medicine. |
| Terbufos | 13071-79-9 | Insecticide. |
| Terbufos sulfone | 56070-16-7 | Phosphorodithioate pesticide degradate. The parent, terbufos, is used as insecticide. |
| Thiodicarb | 59669-26-0 | Insecticide. |

| CCL 3. Chemical Contaminants | CASRN | Information |
|---|---|---|
| Thiophanate-methyl | 23564-05-8 | Fungicide. |
| Toluene diisocyanate | 26471-62-5 | Manufacture of plastics. |
| Tribufos | 78-48-8 | Insecticide and as cotton defoliant. |
| Triethylamine | 121-44-8 | Production of other substances, and as a stabilizer in herbicides and pesticides, in consumer products, in food additives, in photographic chemicals and in carpet cleaners. |
| Triphenyltin hydroxide (TPTH) | 76-87-9 | Pesticide. |
| Urethane | 51-79-6 | Paint ingredient. |
| Vanadium | 7440-62-2 | Naturally-occurring element commonly used as vanadium pentoxide in the production of other substances and as a catalyst. |
| Vinclozolin | 50471-44-8 | Fungicide. |
| Ziram | 137-30-4 | Fungicide. |

Source: http://water.epa.gov/scitech/drinkingwater/dws/ccl/ccl3.cfm

# *Summary of Available Raw Water Quality Data*

The District conducts several water quality monitoring programs on Pardee and Camanche Reservoirs for regulatory compliance, water rights, environmental assessment, and water supply objectives. In addition, the District monitors general water quality parameters throughout the reservoirs to assist staff in managing reservoir operations and water treatment issues. Descriptions of the monitoring programs that pertain to the raw water quality of Pardee and Camanche Reservoirs are presented in the following sections.

## *Water Quality Data*

The District monitors reservoir water quality conditions on a weekly basis at several locations throughout Pardee and Camanche Reservoirs (Figure 4-1). The water quality parameters (temperature, pH, dissolved oxygen, specific conductance, and oxidation reduction potential) are profiled by depth. Field conditions and turbidity measurements are recorded as well. This information is analyzed and reviewed on a routine basis to assist the District's water supply operations

## *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. 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 September 1993, CDPH granted the District's request for a reduced monitoring program for certain parameters. Since the 1995 MRWSS, the District has revised the Title 22 Raw Water Monitoring Plan to reflect the changes from the Title 22 Emergency rule-making of September 1994.

In accordance with Title 22 requirements, the District prepares a Water Quality and Supply Report – also known as a Consumer Confidence Report (CCR) - that summarizes the water quality conditions being supplied to District consumers. Appendix B contains the CCRs for 2005-2005 for the District's East Bay water supply system. Appendix B also contains the District's Title 22 monitoring schedule for PARA, Pardee Center, and CANS Recreation Area.

## Raw Water Quality Monitoring

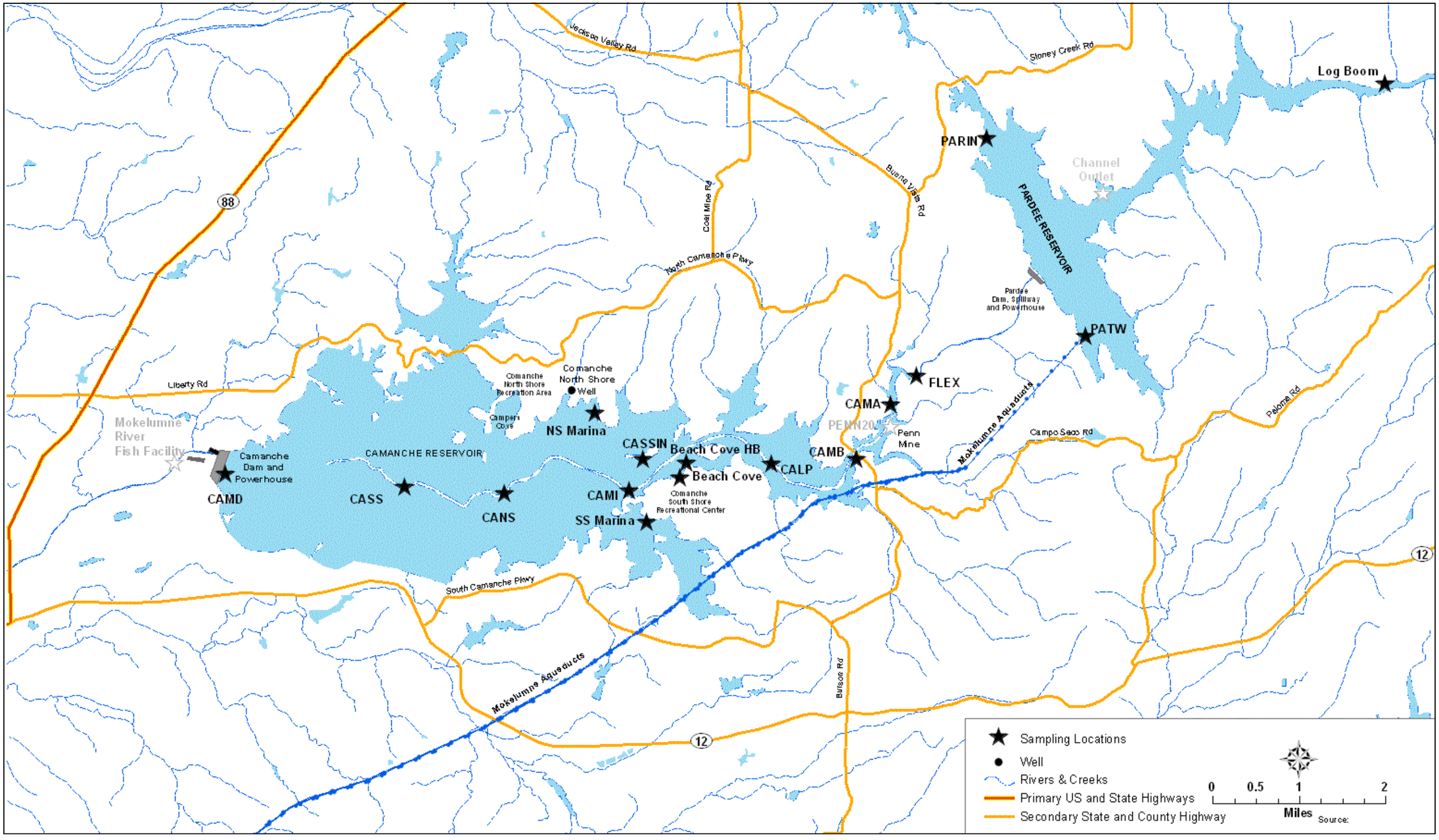
A summary of water quality is provided in the remainder of this chapter. Constituents regulated by Title 22 as well as other minerals and nutrients are addressed by site (watersheds and reservoirs) and then by category – microbial constituents, inorganic chemicals, synthetic organic chemicals, volatile organics chemicals, radionuclides, chemicals with notification levels (NL) or archived advisory levels (AAL), and EPA-UCMR constituents. Table 4-4 details the sampling locations in Pardee and Camanche Reservoirs, the water treatment plants and Mokelumne Aqueducts that receive water from these reservoirs. The reservoir sampling locations are mapped in Figure 4-1.

**Table 4-4: Pardee and Camanche Reservoir Monitoring Stations**

| 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 |

**Figure 4-1: Pardee and Camanche Reservoir Monitoring Stations.**



The data summarized herein were collected between January 2005 and December 2009, and were analyzed by laboratories certified by CDPH 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 regulatory standards, described previously in the Summary of Drinking Water Regulations (SDWR). 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).

Appendix 4-1 includes the District's Title 22 Monitoring schedule for Pardee and Camanche Reservoirs. Appendix 4-2 contains the District's CCRs for Pardee Center, PARA, CASS, Walnut Creek, Lafayette and Orinda WTPs.

## Total Coliform Methodology

Historically, the District used only multiple tube fermentation (MTF) in accordance with Standard Methods 18$^{th}$-edition 9221B (SM (18)9221B) for raw water total coliform analysis for operational and regulatory compliance monitoring. In 2006, the District began collecting duplicate total coliform samples in all its raw water sources and analyzed the samples by an alternative method: Colilert-18® Quantitray® (Colilert) in accordance with SM9223D (online edition) and IDEXX Corp instructions. Colilert was used infrequently for the systems served by the Mokelumne River Watershed. However, in the District's East Bay Watershed, where Colilert was used more extensively, Colilert gave consistently higher total coliform counts than MTF. Such discrepancies between Colilert and traditional methods have also been noted literature (Eckner 1998; Kampfer *et al*. 2008). MTF determines the presence or absence of coliforms by identifying lactose fermentation, whereas Colilert identifies coliforms by their ability to hydrolyze a chromogenic substrate. The District laboratory identified some non-coliform organisms that were capable of hydrolyzing the Colilert substrate, which caused Colilert to overestimate the number of coliforms present in environmental samples (Thompson et al., 2009). Conversely, they found that a small subset of coliforms ferment lactose too slowly to be detected using MTF. The combined result is a consistently higher reading from Colilert than MTF.

Due to the discrepancy, the District decided to continue using MTF method for monitoring of total coliform in all raw waters. Hence, only total coliform results by MTF are included in the tables, figures and discussion within this chapter. Likewise, *E. coli* results from the Colilert method are not included in this chapter. A third method, Colisure (SM9222B), was also used for *E. coli* analysis of LT2ESWTR compliance samples and those results are included in this chapter. Total coliform enumeration is a byproduct of the Colisure method for *E. coli* analysis, but those results are not included in this chapter since the samples were not diluted for proper total coliform enumeration. All total coliform and *E. coli* results from Colilert and Colisure are included in Appendix 4-3, along with MTF samples collected during the same time period.

## 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 Profiling

The District monitors reservoir water quality conditions on a weekly basis at several locations throughout Pardee and Camanche Reservoirs (Table 4-4, Figure 4-1). The water quality parameters (temperature, pH, dissolved oxygen, specific conductance, and oxidation reduction potential) are profiled by depth. Field conditions and turbidity measurements are recorded as well. This information is analyzed and reviewed on a routine basis to assist the District's water supply and treatment operations.

## Penn Mine

Penn Mine is an abandoned copper and zinc mine in the Camanche Watershed. The mine was opened in 1861, and periods of major mining activity occurred from 1899 through 1919 and during World War II. Heavy metals in stormwater runoff from the mine were linked to fish losses. Even after the mine was closed in the 1950s, problems persisted. Although the mine was not on District property, the District has worked for many years with the Regional Water Quality Control Board (RWQCB) to resolve the pollution problems and protect Camanche Reservoir and the Lower Mokelumne River. In February 1993, the District and RWQCB built an in-line treatment system to treat the acid rock drainage and avoid untreated discharges during high storm events over the spillway of Mine Run Dam. USEPA approved these efforts and provided regulatory oversight on water quality compliance. In February 1997, the District and the Central Valley RWQCB (CVRWQCB) completed environmental documentation that identified a long-term solution to the acid rock drainage from the Penn Mine site. The solution included construction of a landfill onsite, excavation of mine waste and placement of the waste in the landfill, and the restoration and revegetation of the Penn Mine site. The Penn Mine Environmental Restoration Project was initiated in summer 1997 and completed in November 1999.

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 2000-2010, 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 2010 bi-annual report is included in Appendix 4-4.

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.

## Stormwater Monitoring

In 2006, the District worked with local ranchers to evaluate BMPs on Pardee Watershed. The BMPs included the removal of livestock during the wet-weather season and/or exclusion of very young cattle (less than four months of age) from the watershed. A stormwater runoff water quality monitoring plan was designed to evaluate the extent to which cattle grazing impacts are mitigated by the BMPs. During the winters of water years (June through July) 2007, 2008 and 2009, the District sampled stormwater runoff at a total of ten locations in the Pardee Watershed. Due to drought and adjustments between each winter to improve the efficiency and efficacy of the sampling program, there has thus far been insufficient data to discern trends or make any conclusions regarding microbiological content, solids, or nutrients, or their relationship to land management.

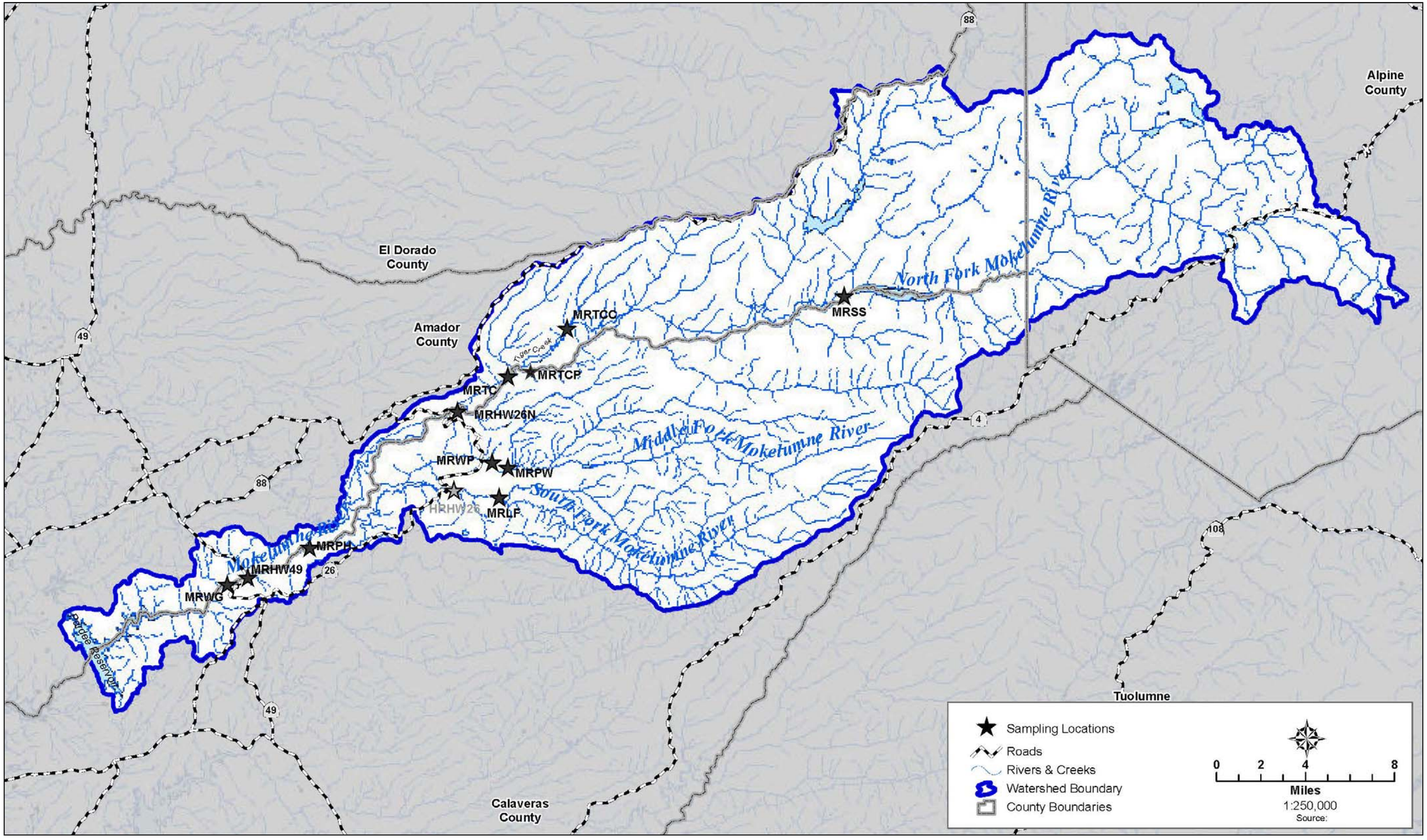
## Upper Mokelumne River and Tributaries: Evaluation of Water Quality

The District monitors water quality at several stations along the Mokelumne River and its main tributaries upstream of Pardee Reservoir. All monitoring stations are listed in Table 4-5 and mapped in Figure 4-2. Some of these locations are monitored on a monthly basis, while others are monitored less frequently. 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.

**Table 4-5: Mokelumne River and Tributary Monitoring Stations**

| Station | Description |
|---|---|
| **North Fork Mokelumne River** | |
| MRSS | North Fork Mokelumne River below Salt Springs Reservoir. |
| MRTCC | Tiger Creek Canal upstream of Tiger Creek Power House. The canal spills into North Fork Mokelumne River at the Tiger Creek Power House. |
| MRTCP | North Fork Mokelumne River, upstream of the Tiger Creek Power House. |
| MRTC | North Fork Mokelumne River, downstream of the confluence with Tiger Creek. This site has not been used for monitoring since September 2006. |
| 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. |

**Figure 4-2: Upper Mokelumne River Watershed Monitoring Stations.**



Monthly grab samples from seven of the stations in the Upper Mokelumne Watershed are analyzed for turbidity, total coliform, and *E. coli*. At MRHW49, average daily flows are recorded by an automated flow monitoring device, and at all the other stations, the instantaneous flow is measured when samples are collected. Table 4-6 is a statistical summary of turbidity, total coliform, *E. coli*, and flow at the seven sampling locations. MRTC and MRHW26 are treated as one sampling location since MRHW26N replaced MRTC in 2006. The microbiological data at all stations except MRHW49 were not reported in MRWSS Update 2005 because most of the samples were not analyzed within recommended hold times. The last time microbiological data from the Upper Mokelumne River tributaries was analyzed was in the MRWSS Update 2000.

The flows in the Middle Fork and South Fork of the Mokelumne River are significantly lower than in the North Fork as shown in Table 4-6. 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 are in the Main Stem below the confluence of all three forks. Flows in Wilson Gulch, a small drainage from Mokelumne Hill, are several orders of magnitude less than the river or its main tributaries. The turbidities at all sites were not significantly different from one another. The median total coliform and *E. coli* concentrations of the North Fork were an order of magnitude lower than the smaller tributaries. These results are consistent with MRWSS Update 2000.

The highest total coliform samples came from Wilson Gulch, with the 90$^{th}$ percentile and the maximum coliform counts one order of magnitude higher than all other sampling locations. Wilson Gulch drains from the Mokelumne Hill WWTP and spray field which may be the source of the occasional spikes in total coliform concentrations. In the past, spikes in *E. coli* concentrations have also been observed in Wilson Gulch, though in the period of this MRWSS, the range and distribution of *E. coli* in Wilson Gulch were similar to the Middle Fork of the Mokelumne River.

Figures 4-3 through 4-7 depict the fluctuations in flow, turbidity, total coliform, and *E. coli* over the MRWSS Update 2010 period:

- Figure 4-3: North Fork Mokelumne River at MRTC through September 2006 and MRHW26N for the remainder of the MRWSS Update 2010 period.
- 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 below the confluence of the forks at MRPH and MRHW49.

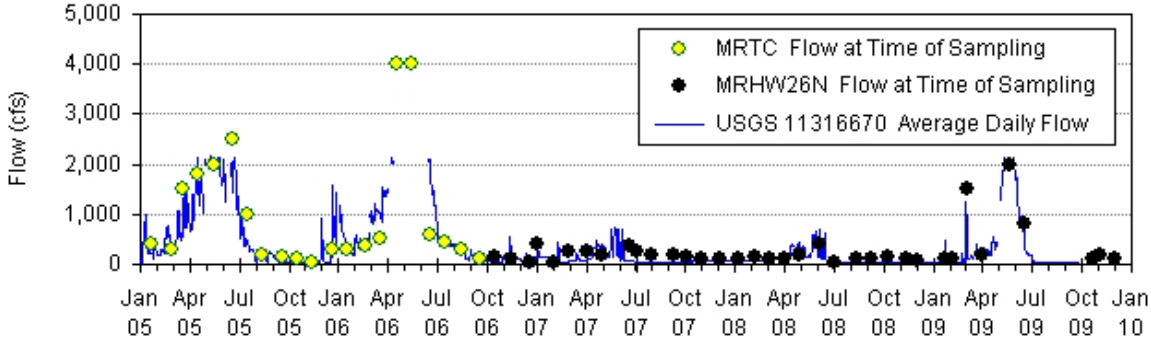
**Table 4-6. Upper Mokelumne Watershed: Statistical Summary ofTurbidity, Total Coliform, *E. coli*, and Flow Monitoring [a]**

| Parameter | River / Tributary | Sampling Station | No. Samples | Median | 90th Percentile | Max |
|---|---|---|---|---|---|---|
| *Flow [a] (cfs)* | **Main Stem** | MRHW49 | 73 | *780* | *3500* | *5000* |
| | | MRPH | 57 | *490* | *2100* | *4000* |
| | **North Fork** | MRTC / MRHW26N | 67 | *200* | *1600* | *4000* |
| | **Middle Fork** | MRPW | 57 | *30* | *190* | *900* |
| | | MRWP | 57 | *30* | *200* | *900* |
| | **South Fork** | MRLF | 57 | *25* | *210* | *700* |
| | **Wilson Gulch** | MRWG | 46 | *0.03* | *0.71* | *3* |
| *Turbidity (NTU)* | **Main Stem** | MRHW49 | 71 | *1.2* | *4.8* | *49* |
| | | MRPH | 60 | *0.87* | *5.2* | *14* |
| | **North Fork** | MRTC / MRHW26N | 71 | *0.95* | *4.1* | *21* |
| | **Middle Fork** | MRPW | 60 | *1.0* | *5.9* | *12* |
| | | MRWP | 60 | *0.93* | *4.9* | *32* |
| | **South Fork** | MRLF | 60 | *0.50* | *3.2* | *24* |
| | **Wilson Gulch** | MRWG | 46 | *0.61* | *3.5* | *6.8* |
| *Total Coliform (MPN/100 mL)* | **Main Stem** | MRHW49 | 69 | *70* | *320* | *2400* |
| | | MRPH | 58 | *70* | *290* | *5000* |
| | **North Fork** | MRTC / MRHW26N | 54 | *26* | *200* | *350* |
| | **Middle Fork** | MRPW | 58 | *170* | *800* | *3000* |
| | | MRWP | 56 | *220* | *800* | *1700* |
| | **South Fork** | MRLF | 58 | *130* | *830* | *5000* |
| | **Wilson Gulch** | MRWG | 43 | *210* | *1300* | *≥16,000* |
| *E. coli (MPN/100 mL)* | **Main Stem** | MRHW49 | 67 | *9* | *62* | *500* |
| | | MRPH | 59 | *8* | *36* | *300* |
| | **North Fork** | MRTC / MRHW26N | 55 | *4* | *27* | *170* |
| | **Middle Fork** | MRPW | 59 | *30* | *230* | *1700* |
| | | MRWP | 57 | *50* | *300* | *500* |
| | **South Fork** | MRLF | 58 | *23* | *90* | *500* |
| | **Wilson Gulch** | MRWG | 43 | *30* | *300* | *1700* |

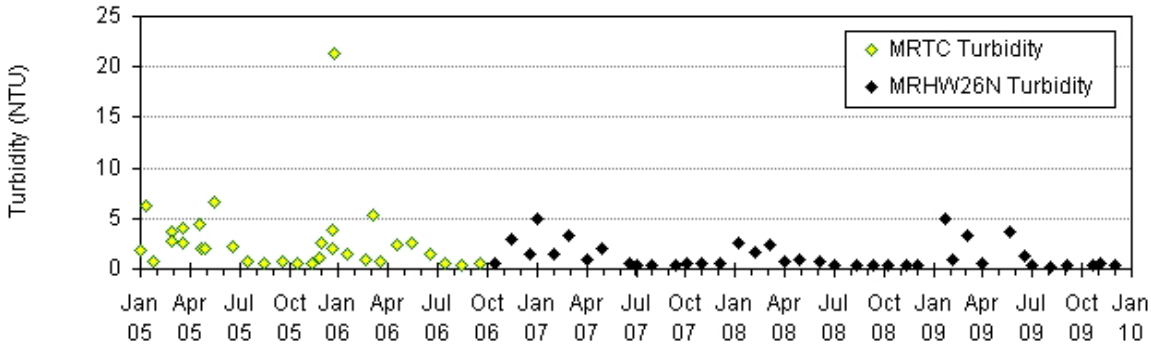
*a)* All flow statistics are for observed flows at the time of sampling except for MRHW49 where the statistics are for average daily flows on the days that samples were collected.

**Figure 4-3. Water quality and flow on North Fork Mokelumne River at MRTC (through Sep. 2006) and at MRHW26N (beginning Oct. 2006)**

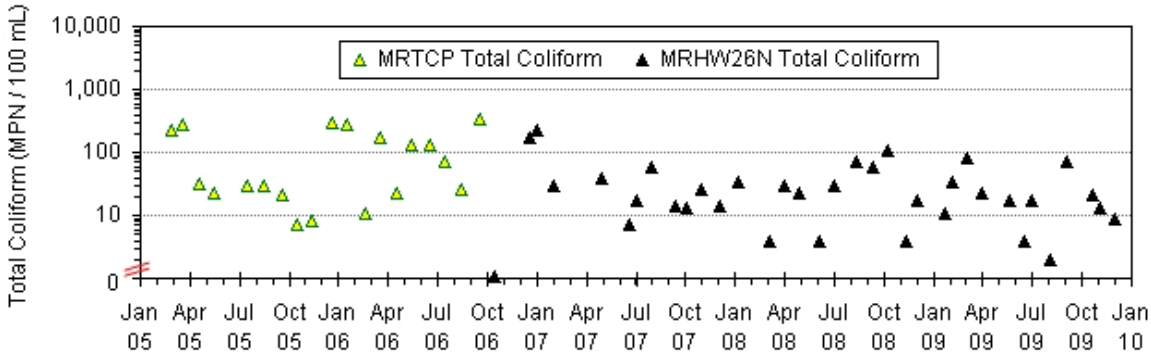
**a) Flow.** Instantaneous flow at time of sampling and average daily flow recorded by USGS 11316670 near MRTC.




**b) Turbidity**




**c) Total coliform**




**d) E. coli**

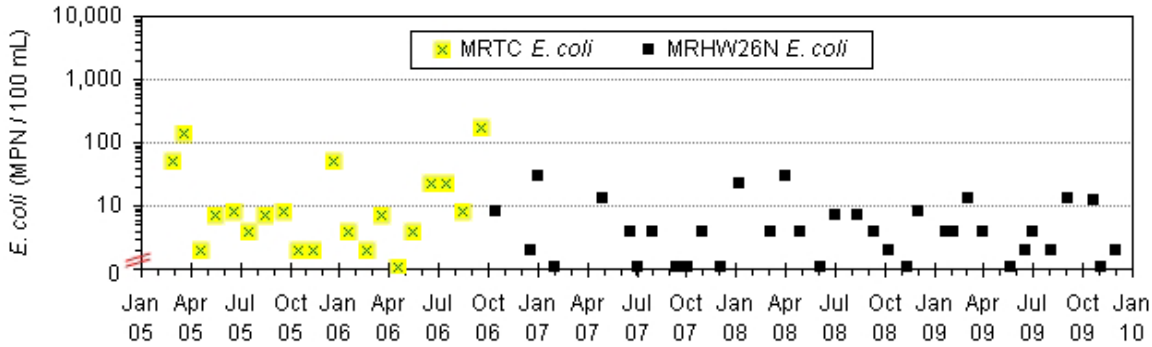
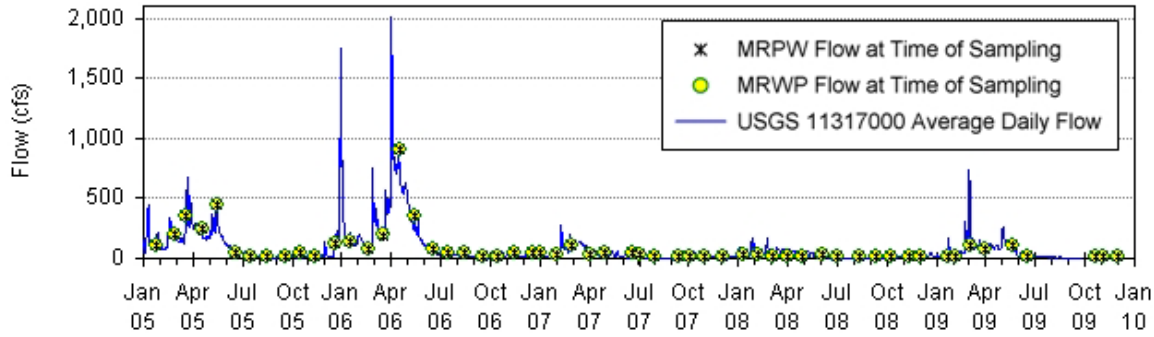
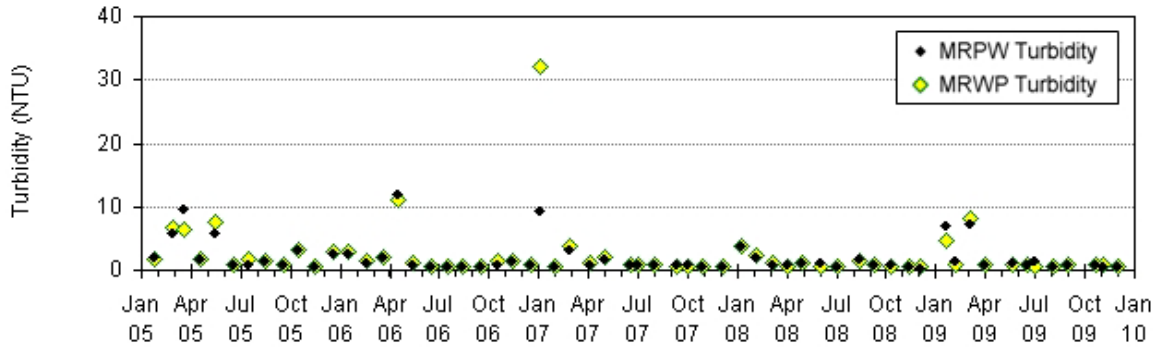


**Figure 4-4. Water Quality and Flow On Middle Fork Mokelumne River** at MRPW and MRWP

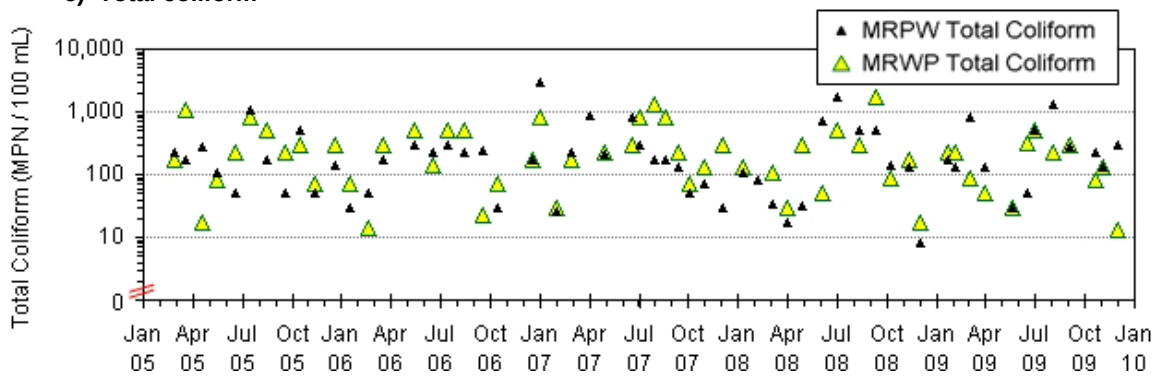
**a) Flow.** Instantaneous flow at time of sampling and average daily flow recorded by USGS 11317000 near MRWP.




**b) Turbidity**




**c) Total coliform**




**d) *E. coli***

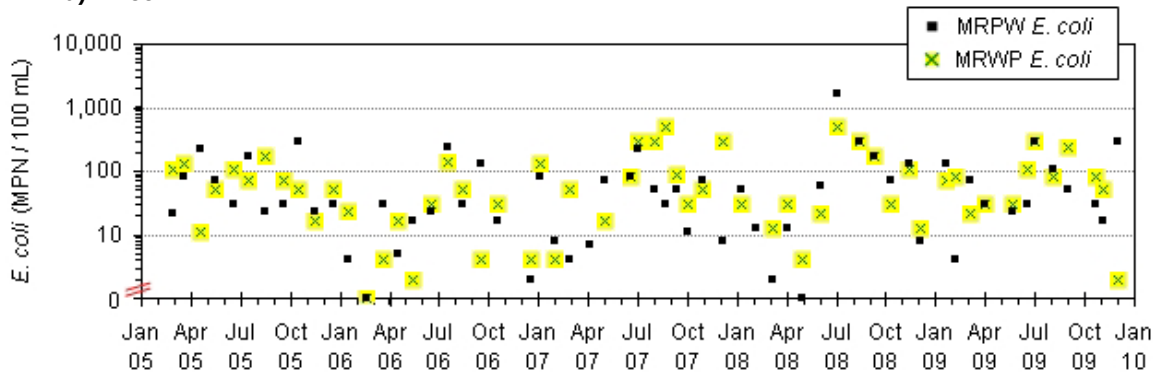
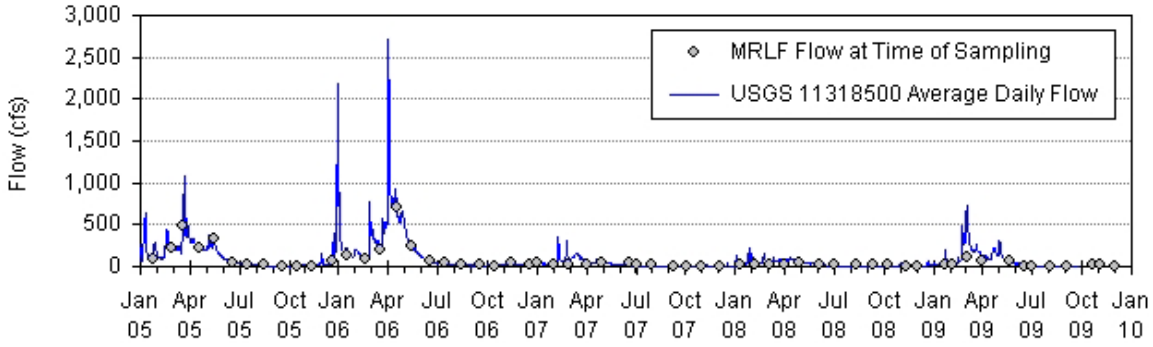
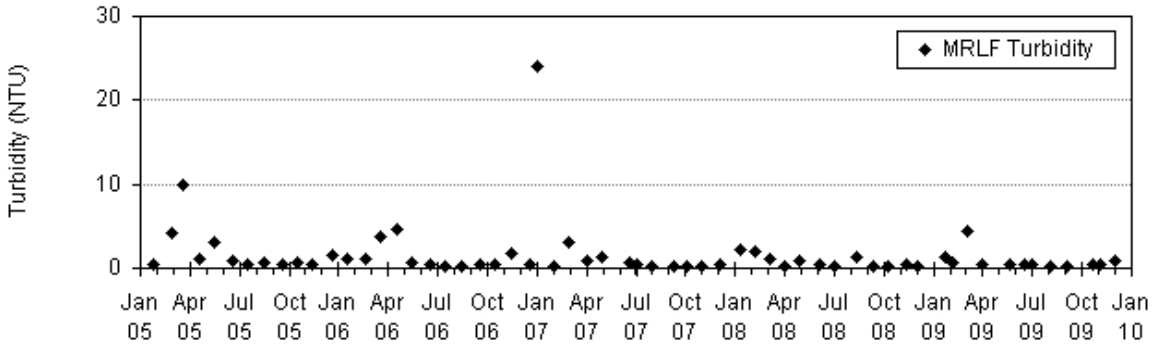


**Figure 4-5. Water quality and flow on South Fork Mokelumne River** at MRLF.

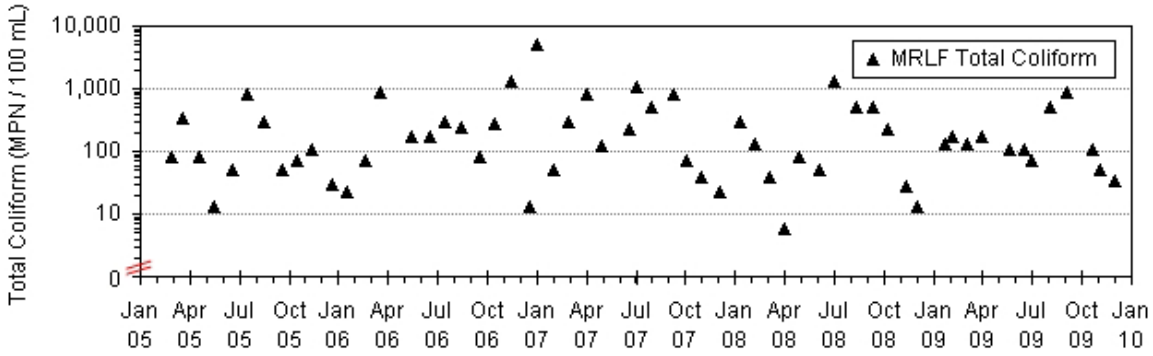
**a) Flow.** Instantaneous flow at time of sampling and average daily flow recorded by USGS 11318500 downstream of MRLF near Highway 26.




**b) Turbidity**




**c) Total coliform**




**d) *E.* coli**

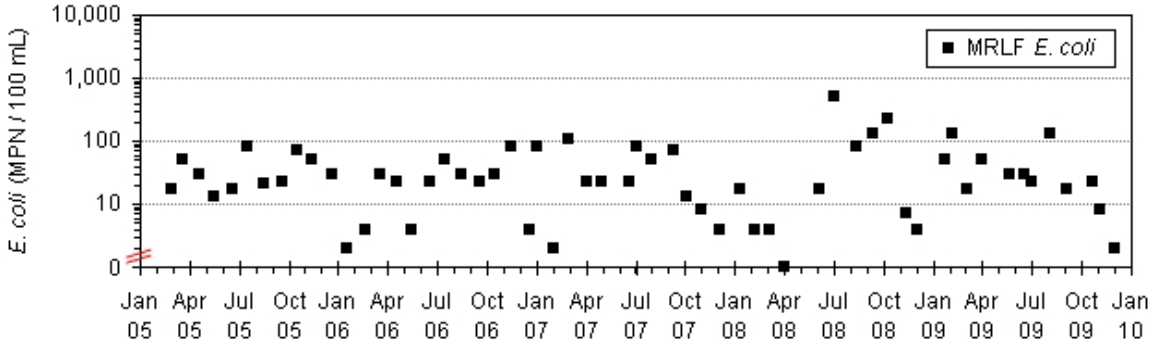
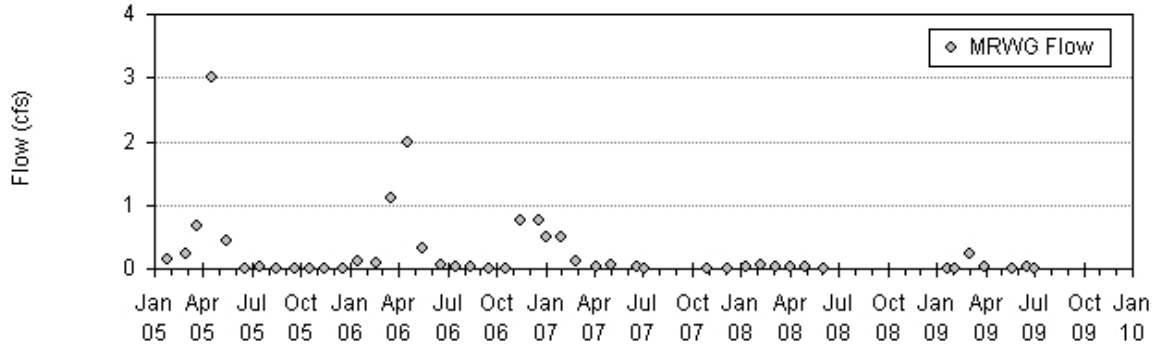
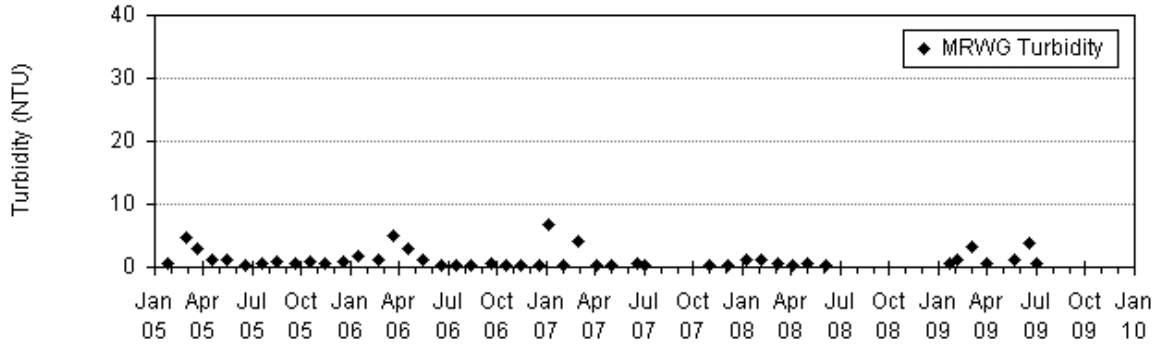


**Figure 4-6. Water quality and flow of Wilson Gulch** at MRWG.

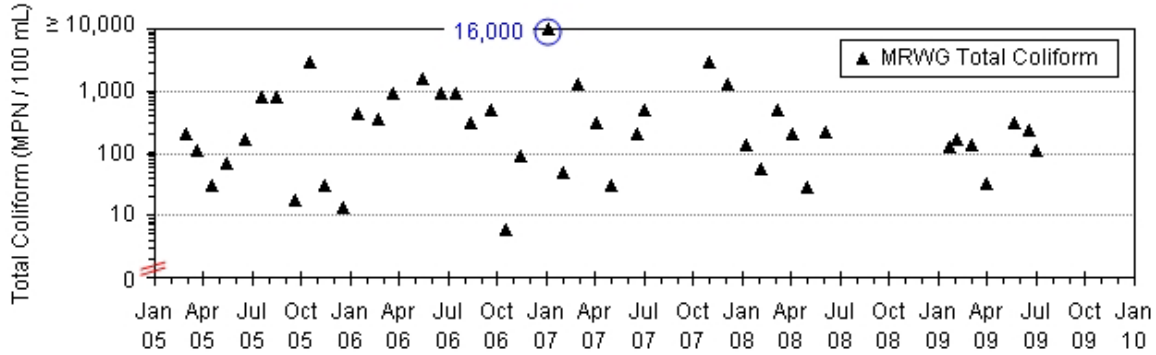
**a) Flow.** Instantaneous flow at time of sampling.




**b) Turbidity**




**c) Total coliform**




**d) *E.* coli**

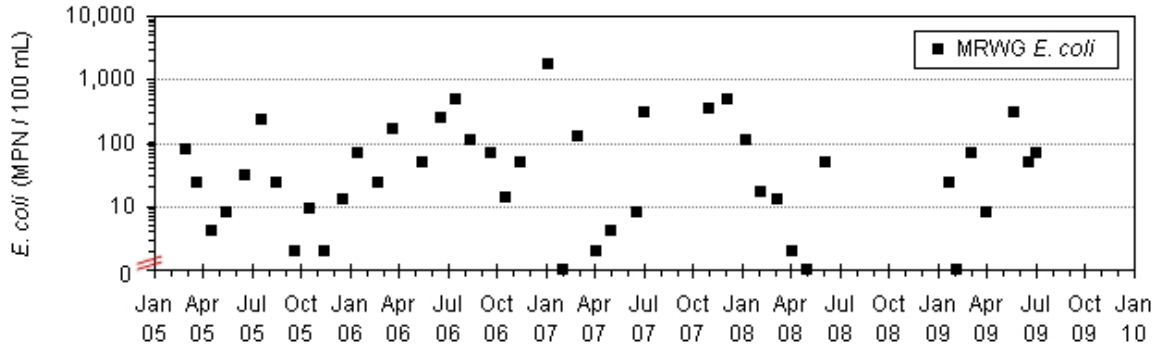
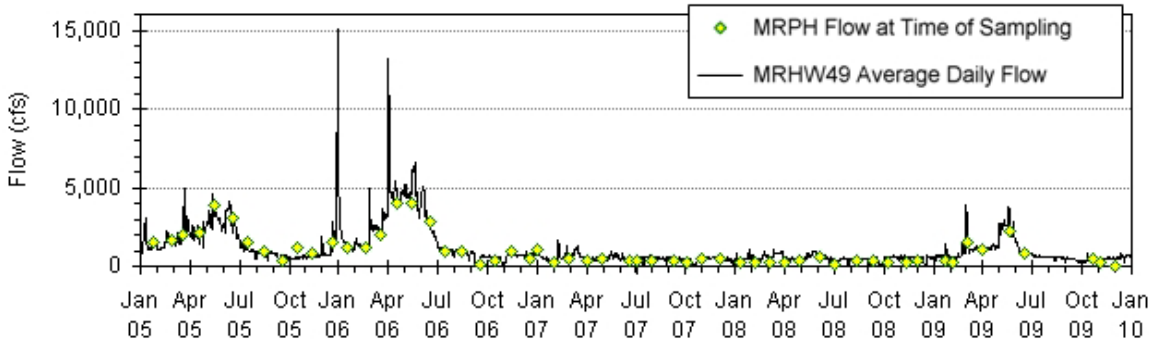
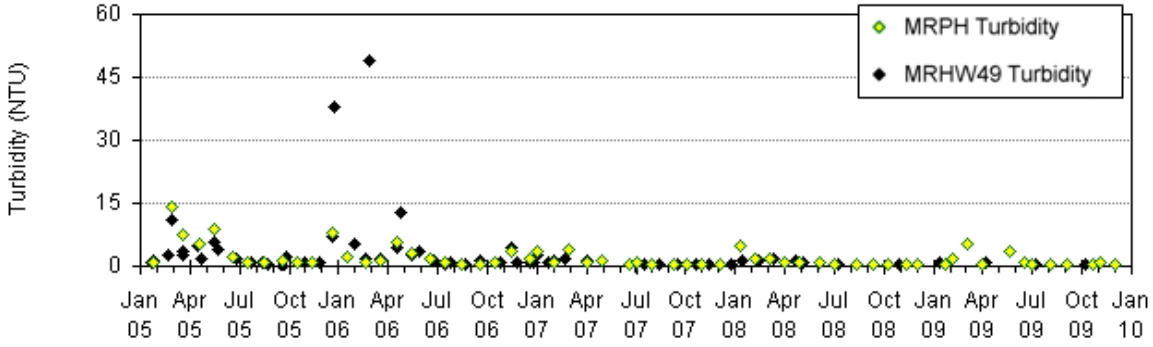


**Figure 4-7. Water quality and flow on the main stem of the Mokelumne River,** Below confluence of forks, at MRPH and MRHW49.

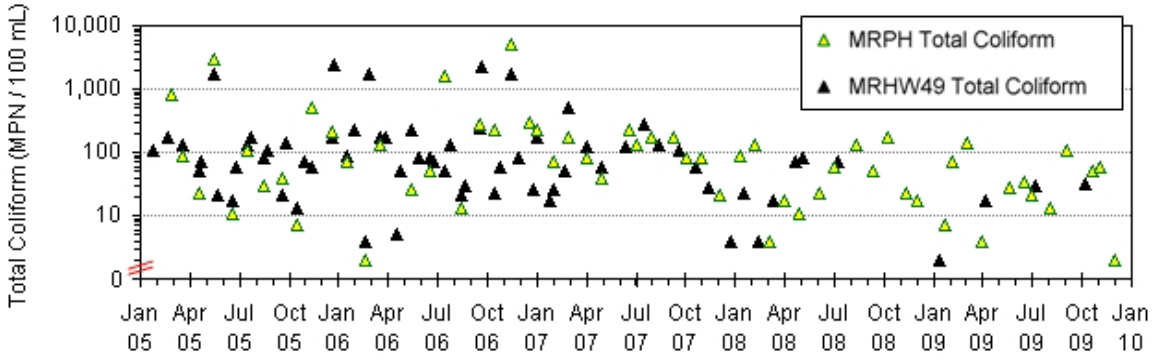
**a) Flow.** Instantaneous flow at time of sampling at MRPH andaverage daily flow recorded by the District at MRHW49.



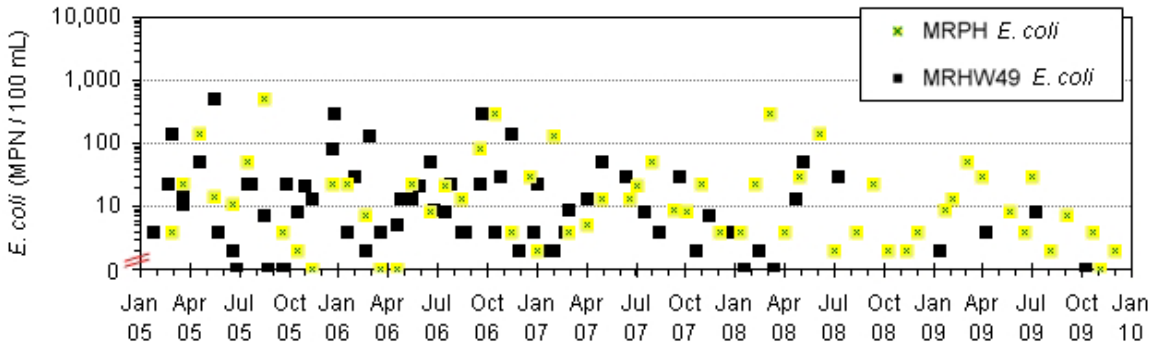

**b) Turbidity**




**c) Total coliform**




**d) *E. coli***



The fluctuations in flow in Figures 4-3 through 4-7 result from a number of watershed conditions and activities, including 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 2005-06. As discussed in Section 3, the region experienced two consecutive dry years during the winters of 2006-07 and 2007-08, resulting in only minor flow increases during the winter months of those years.

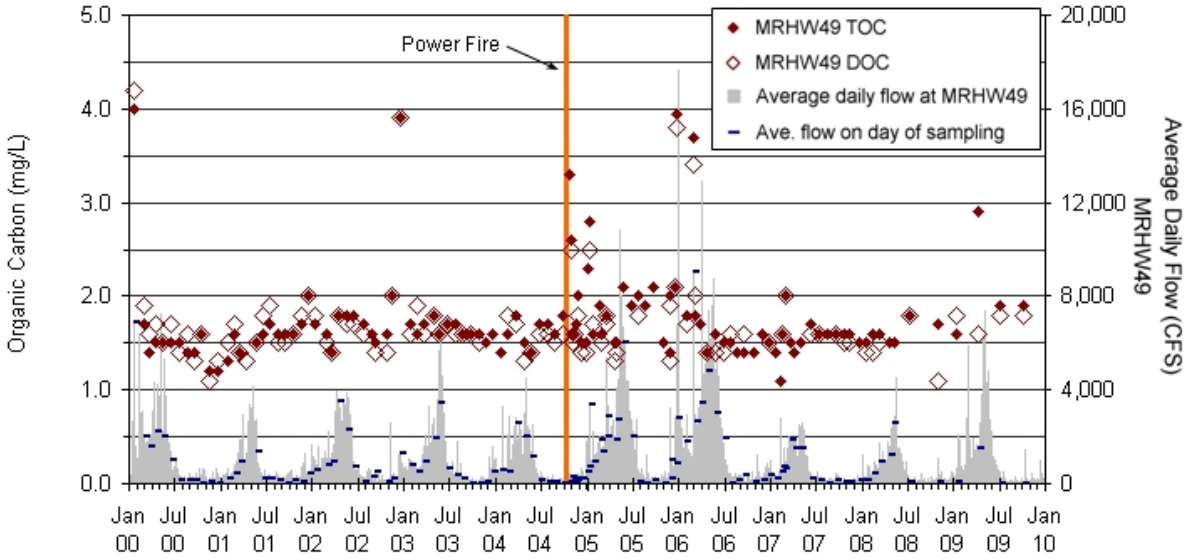
Seasonal fluctuations in turbidity are depicted in most figures with elevated turbidities generally occurring during the winter and early spring (January through April), even during the drought years. For all sampling locations, total coliform and *E. coli* did not follow the same seasonal trends from 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. In general, the range of turbidity, total coliform and *E. coli* concentrations were similar between this update period and previous ones.

TOC and DOC are routinely monitored on the Main Stem at MRHW49 every one to three months. Figure 4-8a shows the organic carbon results from 2000 through 2009, 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.

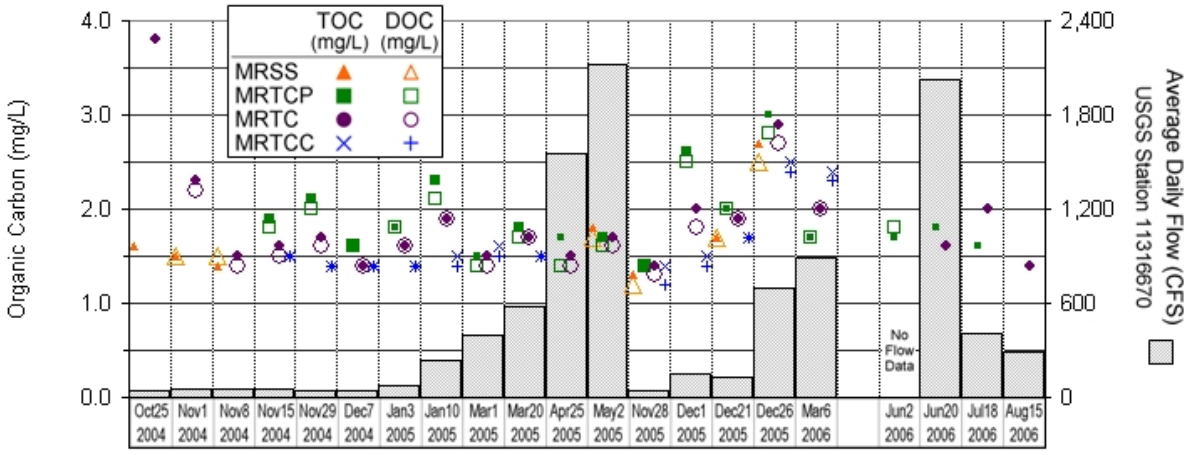
Immediately following the October 2004 Power Fire in the North Fork watershed, TOC spiked to a high of 3.3 mg/L. TOCs above 2.0 mg/L were found for the remainder of 2004. To evaluate the potential water quality effects of the Power Fire, organic carbon was also monitored beginning in October 2004 on a near-monthly basis on the North Fork (three locations), on Tiger Creek Canal, and 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.**[1]

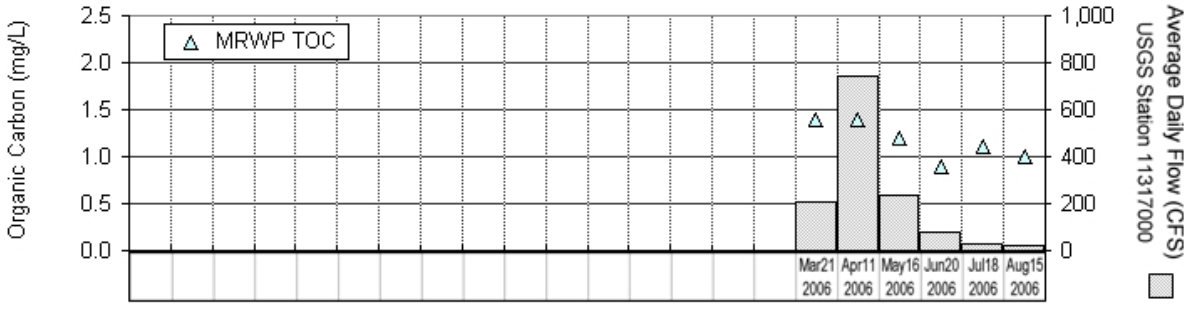
**a) Routine monitoring -- Mokelumne River at Highway 49**




**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 every one to three months at MRHW49. Out of forty-nine samples, *Cryptosporidium* was detected six times at a maximum of 0.4 oocysts/L, and *Giardia* was detected nine times at a maximum of 0.8 cysts/L (Table 4-7). The largest numbers of both were detected during the high-runoff winter of 2005-06. The section entitled *Pardee Reservoir – Evaluation of Water Quality*, and Table 4-10 provide *Cryptosporidium* sample results under LT2ESWTR that resulted in Bin 1 classification.

**Table 4-7: Non-regulatory *Cryptosporidium* and *Giardia* in the Upper Mokelumne River Sampling at MRHW49**

| Collection Date | *Cryptosporidium* Oocysts (# / L) | *Giardia* Cysts (#//L) | MDL [a] (# / L) | Collection Date | *Cryptosporidium* Oocysts (# / L) | *Giardia* Cysts (#//L) | MDL [a] (# / L) |
|---|---|---|---|---|---|---|---|
| 1/25/2005 | ND | ND | 0.1 | 2/9/2007 | ND | 0.2 | 0.1 |
| 2/22/2005 | ND | 0.1 | 0.1 | 2/22/2007 | ND | ND | 0.1 |
| 3/22/2005 | ND | ND | 0.1 | 3/1/2007 | ND | ND | 0.1 |
| 4/25/2005 | ND | ND | 0.1 | 3/27/2007 | ND | ND | 0.1 |
| 5/24/2005 | ND | ND | 0.1 | 4/5/2007 | ND | ND | 0.1 |
| 6/28/2005 | ND | ND | 0.1 | 5/3/2007 | ND | ND | 0.1 |
| 7/26/2005 | 0.1 | ND | 0.1 | 6/14/2007 | ND | ND | 0.1 |
| 8/23/2005 | ND | ND | 0.1 | 7/19/2007 | ND | ND | 0.1 |
| 9/26/2005 | ND | ND | 0.1 | 8/16/2007 | ND | ND | 0.1 |
| 10/31/2005 | ND | ND | 0.1 | 9/20/2007 | ND | ND | 0.1 |
| 11/28/2005 | ND | 0.1 | 0.1 | 10/23/2007 | ND | ND | 0.1 |
| 12/26/2005 | 0.2 | 0.8 | 0.1 | 11/15/2007 | ND | ND | 0.1 |
| 1/31/2006 | 0.3 | 0.4 | 0.1 | 12/26/2007 | ND | ND | 0.1 |
| 2/28/2006 | 0.4 | 0.2 | 0.2 | 1/17/2008 | ND | ND | 0.1 |
| 3/29/2006 | ND | ND | 0.1 | 2/14/2008 | ND | ND | 0.1 |
| 4/27/2006 | ND | ND | 0.1 | 3/13/2008 | ND | ND | 0.1 |
| 5/30/2006 | ND | ND | 0.1 | 4/24/2008 | ND | ND | 0.1 |
| 6/27/2006 | ND | ND | 0.1 | 5/8/2008 | 0.1 | ND | 0.1 |
| 7/27/2006 | ND | ND | 0.1 | 7/10/2008 | ND | ND | 0.1 |
| 8/22/2006 | ND | ND | 0.1 | 10/30/2008 | ND | ND | 0.1 |
| 9/21/2006 | ND | ND | 0.1 | 1/14/2009 | ND | ND | 0.1 |
| 10/26/2006 | ND | 0.3 | 0.1 | 4/9/2009 | ND | ND | 0.1 |
| 11/28/2006 | ND | 0.1 | 0.1 | 7/9/2009 | ND | ND | 0.1 |
| 12/26/2006 | ND | 0.1 | 0.1 | 10/8/2009 | ND | ND | 0.1 |
| 1/25/2007 | 0.1 | ND | 0.1 | | | | |

| | | | |
|---|---|---|---|
| # *Cryptosporidium* Samples | 49 | # *Giardia* Samples | 49 |
| # *Cryptosporidium* Detections | 6 | # *Giardia* Detections | 9 |
| Max *Cryptosporidium* Oocysts (# / L) | 0.4 | Max *Giardia* Cysts (# / L) | 0.8 |

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

No regulated chemicals that were monitored exceeded drinking water MCLs in the Upper Mokelumne River or its tributaries with the exception of aluminum, which is easily removed in water treatment. The only other regulated inorganic constituent detected above the DLR was cadmium, but it was far below the MCL of 5 µg/L. Herbicides/pesticides that were monitored were not detected with a few exceptions of detection at trace levels; none exceeding drinking water MCLs. Manganese was detected above the secondary MCL in 4 of 102 samples, but the median value was below the DLR. Nutrients and plankton were found to be 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 - Evaluation of Water Quality*

Pardee Reservoir water is a high-quality drinking water supply. Table 4-8 is a statistical summary of the raw water quality data of parameters regulated by Title 22 and other pertinent parameters collected from Pardee Reservoir, the Pardee Center (PACIN) and PARA (PARIN) WTP influents and the Pardee Tunnel for the five-year period of MRWSS Update 2010. 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 4-8. Pardee Reservoir Raw Water Monitoring – Jan. 2005 thru Dec. 2009 [a]

| Water Quality Parameters | MCL | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|---|
| *Microbiological Constituents* | | | | | | | | | |
| *Cryptosporidium* | TT [b] | # / 10L | 28 | 0 | ND | ND | ND | 1 | 1 |
| *E. coli* | TCR [c] | MPN/100mL | 375 | 123 | ND | ND | 13 | 2 | - - - |
| Fecal Coliform | TCR [c] | MPN/100mL | 184 | 59 | ND | ND | 50 | 2 | - - - |
| *Giardia* | TT [b] | # / 10L | 28 | 2 | ND | ND | 1 | 1 | 1 |
| *Legionella* | TT [b] | | NA | NA | NA | NA | NA | NA | - - - |
| Total Coliform | TCR [c] | MPN/100mL | 277 | 223 | 4 | ND | > 16,000 | 2 | |
| Turbidity | TT [b] | NTU | 63 | 63 | 0.80 | 0.35 | 43 | 0.07 | - - - |
| Viruses | TT [b] | | NA | NA | NA | NA | NA | NA | - - - |
| *Primary Standards – Inorganic Chemicals* | | | | | | | | | |
| Aluminum (Al) | 1000 | µg/L | 38 | 25 | 23 | ND | 2350 | 9.4 | 50 |
| Antimony (Sb) | 6 | µg/L | 38 | 0 | ND | ND | ND | 0.1 | 6 |
| Arsenic (As) | 10 | µg/L | 38 | 20 | 0.205 | ND | 1.9 | 0.2 | 2 |
| Asbestos [d] | 7 | MFL | 1 | 0 | ND | — | — | 0.2 | 0.2 |
| Barium (Ba) | 1000 | µg/L | 38 | 38 | 10.9 | 7.1 | 40.4 | 0.21 | 100 |
| Beryllium (Be) | 4 | µg/L | 38 | 0 | ND | ND | ND | 0.03 | 1 |
| Cadmium (Cd) | 5 | µg/L | 38 | 3 | ND | ND | 0.14 | 0.02 | 1 |
| Chromium (Cr) | 50 | µg/L | 35 | 14 | ND | ND | 10 | 0.2 | 10 |
| Chromium-6 (Cr (VI) ) | - - - | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Cyanide (CN) | 150 | µg/L | 4 | 0 | ND | ND | ND | 10 | 100 |
| Fluoride ($F^-$) | 2 | mg/L | 14 | 13 | 0.013 | ND | 0.085 | 0.0011 | 0.1 |
| Mercury (Hg) | 2 | µg/L | 38 | 25 | 0.0465 | ND | 0.28 | 0.02 | 1 |
| Nickel (Ni) | 100 | µg/L | 35 | 34 | 0.465 | ND | 5.8 | 0.1 | 10 |
| Nitrate+Nitrite (as N) | 10 | mg/L | 122 | 70 | 0.00915 | ND | 0.34 | 0.0019 | - - - |
| Nitrate (as N) | 10 | mg/L | 45 | 1 | ND | ND | 0.0175 | 0.00093 | 0.4 |
| Nitrite (as N) | 1 | mg/L | 45 | 37 | 0.026 | ND | 0.3575 | 0.003 | 0.4 |
| Perchlorate ($ClO_4^-$) | 6 | µg/L | 4 | 0 | ND | ND | ND | 1.3 | 4 |
| Selenium (Se) | 50 | µg/L | 38 | 0 | ND | ND | ND | 0.2 | 5 |
| Thallium (Tl) | 2 | µg/L | 37 | 0 | ND | ND | ND | 0.2 | 1 |

## Table 4-8. 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 | 5 | 0 | ND | ND | ND | 0.005 | 1 |
| Atrazine (Aatrex) | 1 | µg/L | 5 | 0 | ND | ND | ND | 0.008 | 0.5 |
| Bentazon | 18 | µg/L | 4 | 0 | ND | ND | ND | 0.22 | 2 |
| Benzo(a)pyrene | - - - | µg/L | 4 | 0 | ND | ND | ND | 0.23 | - - - |
| Carbofuran | 18 | µg/L | 4 | 0 | ND | ND | ND | 0.38 | 5 |
| Chlordane | 0.1 | µg/L | 4 | 0 | ND | ND | ND | 0.1 | 0.1 |
| Dalapon | 200 | µg/L | 4 | 0 | ND | ND | ND | 1.4 | 10 |
| 1,2-Dibromo-3-chloropropane (DBCP) | 0.2 | µg/L | 3 | 0 | ND | ND | ND | 0.005 – 0.01 | 0.01 |
| 2,4-Dichlorophenoxy-acetic acid (2,4-D) | 70 | µg/L | 4 | 0 | ND | ND | ND | 0.2 | 10 |
| Di(2-ethylhexyl)adipate | 400 | µg/L | 2 | 0 | — | ND | ND | 0.31 | 5 |
| Di(2-ethylhexyl)phthalate | 4 | µg/L | 4 | 4 | 0.62 | 0.23 | 1.9 | 0.19 – 0.2 | 3 |
| Dinoseb (DNBP) | 7 | µg/L | 4 | 0 | ND | ND | ND | 0.21 | 2 |
| Diquat | 20 | µg/L | 3 | 0 | ND | ND | ND | 0.44 | 4 |
| Endothall | 100 | µg/L | 3 | 0 | ND | ND | ND | 1 | 45 |
| Endrin | 2 | µg/L | 2 | 0 | — | ND | ND | 0.28 | 0.1 |
| Epichlorohydrin | TT [b] | | NA | NA | NA | NA | NA | NA | - - - |
| Ethylene Dibromide (EDB) | 0.05 | µg/L | 4 | 0 | ND | ND | ND | 0.15 | 0.02 |
| Glyphosate | 700 | µg/L | 4 | 0 | ND | ND | ND | 3.5 | 25 |
| Heptachlor | 0.01 | µg/L | 4 | 0 | ND | ND | ND | 0.006 | 0.01 |
| Heptachlor Epoxide | 0.01 | µg/L | 3 | 0 | ND | ND | ND | 0.009 | 0.01 |
| Hexachlorobenzene | 1 | µg/L | 4 | 0 | ND | ND | ND | 0.027 | 0.5 |
| Hexachlorocyclo-pentadiene | 50 | µg/L | 3 | 1 | ND | ND | 0.04 | 0.024 | 1 |
| Lindane | 0.2 | µg/L | 4 | 0 | ND | ND | ND | 0.0095 | 0.2 |
| Methoxychlor | - - - | µg/L | 3 | 0 | ND | ND | ND | 0.008 | - - - |
| Molinate | 20 | µg/L | 4 | 0 | ND | ND | ND | 0.011 | 2 |
| Oxamyl (Vydate) | 50 | µg/L | 4 | 0 | ND | ND | ND | 0.25 | 20 |
| Pentachlorophenol (PCP) | 1 | µg/L | 4 | 0 | ND | ND | ND | 0.1 | 0.2 |
| Picloram | 500 | µg/L | 3 | 0 | ND | ND | ND | 0.12 | 1 |
| Polychlorinated Biphenyls (PCB's) | 0.5 | µg/L | 4 | 0 | ND | ND | ND | 0.22 | 0.5 |
| Simazine | 4 | µg/L | 5 | 1 | ND | ND | 0.008 | 0.008 | 4 |
| 2,4,5-TP (Silvex) | 50 | µg/L | 4 | 0 | ND | ND | ND | 0.083 | 1 |
| 2,3,7,8-TCDD (Dioxin) | 30 | pg/L | 2 | 0 | — | ND | ND | 5 | 5 |
| Thiobencarb | 70 | µg/L | 4 | 0 | ND | ND | ND | 0.009 | 1 |
| Toxaphene | 3 | µg/L | 4 | 0 | ND | ND | ND | 0.5 – 1.0 | 1 |

## Table 4-8. 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 | 4 | 2 | 0.20 | 0 | 1.33 | 1.1 − 1.4 | 3 |
| Gross Beta/ Photon | 50 | pCi/L | 4 | 4 | 0.92 | 0.02 | 1.51 | 0.75 − 2.0 | 4 |
| Radium 226+228 | 5 | pCi/L | 4 | 1 | 0 | 0 | 0.03 | 0.71 − 1.1 | - - - |
| Radium-226 | - - - | pCi/L | 4 | 1 | 0 | 0 | 0.03 | 0.21 − 0.36 | 1 |
| Radium-228 | - - - | pCi/L | 4 | 0 | 0 | 0 | 0 | 0.35 − 0.9 | 1 |
| Strontium-90 | 8 | pCi/L | 1 | 1 | 0.32 | — | — | 0.75 | 2 |
| Tritium | 20,000 | pCi/L | 1 | 0 | 0 | — | — | 410 | 1,000 |
| Uranium | 20 | pCi/L | 2 | 1 | — | 0 | 0.41 | 0.38 − 0.62 | 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 | 21 | 0 | ND | ND | ND | 0.07 − 0.3 | 1 |
| Bromoform | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.03 − 0.4 | 1 |
| Chloroform | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.05 − 0.3 | 1 |
| Dibromochloro-methane | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.08 − 0.3 | 1 |

## Table 4-8. 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 | 21 | 1 | ND | ND | 0.1 | 0.05 – 0.3 | 0.5 |
| Carbon Tetrachloride | 0.5 | µg/L | 21 | 0 | ND | ND | ND | 0.05 – 0.4 | 0.5 |
| 1,2-Dichlorobenzene (o-DCB) | 600 | µg/L | 21 | 0 | ND | ND | ND | 0.06 – 0.3 | 0.5 |
| 1,4-Dichlorobenzene (p-DCB) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.1 – 0.4 | 0.5 |
| 1,1-Dichloroethane (1,1-DCA) | 5 | µg/L | 20 | 0 | ND | ND | ND | 0.06 – 0.5 | 0.5 |
| 1,2-Dichloroethane (1,2-DCA) | 0.5 | µg/L | 21 | 0 | ND | ND | ND | 0.07 – 0.3 | 0.5 |
| 1,1-Dichloroethylene (1,1-DCE) | 6 | µg/L | 21 | 0 | ND | ND | ND | 0.08 – 0.3 | 0.5 |
| cis-1,2-Dichlorethylene (c-1,2-DCE) | 6 | µg/L | 21 | 0 | ND | ND | ND | 0.08 – 0.3 | 0.5 |
| trans-1,2-Dichloro-ethylene (t-1,2-DCE) | 10 | µg/L | 21 | 0 | ND | ND | ND | 0.07 – 0.3 | 0.5 |
| Dichloromethane (Methylene Chloride) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.05 – 0.3 | 0.5 |
| 1,2-Dichloropropane | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.1 – 0.3 | 0.5 |
| 1,3-Dichloropropene (TOTAL) | 0.5 | µg/L | 21 | 0 | ND | ND | ND | 0.1 – 0.5 | - - - |
| Cis-1,3-Dichloro-propene | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.05 – 0.3 | 0.5 |
| Trans-1,3-Dichloro-propene | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.06 – 0.3 | 0.5 |
| Ethylbenzene | 300 | µg/L | 21 | 0 | ND | ND | ND | 0.05 – 0.3 | 0.5 |
| Methyl-tert-butyl ether (MTBE) | 13 | µg/L | 21 | 0 | ND | ND | ND | 0.09 – 0.7 | 3 |
| Monochlorobenzene (Chlorobenzene) | 70 | µg/L | 21 | 0 | ND | ND | ND | 0.07 – 0.3 | 0.5 |
| Styrene | 100 | µg/L | 21 | 0 | ND | ND | ND | 0.06 – 0.3 | 0.5 |
| 1,1,2,2-Tetra-chloroethane | 1 | µg/L | 21 | 0 | ND | ND | ND | 0.08 – 0.3 | 0.5 |
| Tetrachloroethylene (PCE) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.06 – 0.5 | 0.5 |
| Toluene | 150 | µg/L | 21 | 1 | ND | ND | 0.24 | 0.06 – 0.3 | 0.5 |
| 1,2,4-Trichlorobenzene | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.05 – 0.3 | 0.5 |
| 1,1,1-Trichloroethane (1,1,1-TCA) | 200 | µg/L | 21 | 0 | ND | ND | ND | 0.06 – 0.3 | 0.5 |
| 1,1,2-Trichloroethane (1,1,2-TCA) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.08 – 0.3 | 0.5 |
| Trichloroethylene (TCE) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.06 – 0.3 | 0.5 |
| Trichlorofluoromethane (Freon 11) | 150 | µg/L | 21 | 1 | ND | ND | 0.16 | 0.05 – 0.4 | 5 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113) | 1200 | µg/L | 21 | 0 | ND | ND | ND | 0.09 – 0.4 | 10 |
| Vinyl Chloride | 0.5 | µg/L | 21 | 0 | ND | ND | ND | 0.09 – 0.3 | 0.5 |
| Xylenes (Total) | 1750 | µg/L | 21 | 1 | ND | ND | 0.14 | 0.2 – 0.4 | - - - |
| m+p-Xylene | - - - | µg/L | 21 | 1 | ND | ND | 0.14 | 0.09 – 0.5 | 0.5 |
| o-Xylene | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.07 – 0.4 | 0.5 |

## Table 4-8. 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 | 38 | 25 | 23 | ND | 2350 | 9.4 | 50 |
| Chloride (Cl) | 250 | mg/L | 63 | 63 | 1.5 | 0.71 | 6.8 | 0.006 | - - - |
| Color | 15 | color unit | 4 | 4 | 8 | 5 | 11 | 1 | - - - |
| Specific Conductance | 900 | µS/cm | 4 | 4 | 34.1 | 27.2 | 48.7 | 0.3 | - - - |
| Copper (Cu) | 1000 | µg/L | 40 | 5 | ND | ND | 7.07 | 0.41 | 50 |
| Foaming Agents (MBAS) | 500 | µg/L | 3 | 3 | ND | ND | ND | 15 | - - - |
| Iron (Fe) | 300 | µg/L | 34 | 34 | 68 | 23 | 3160 | 5.2 | 100 |
| Manganese (Mn) | 50 | µg/L | 37 | 37 | 8.9 | 2.5 | 125 | 0.1 | 20 |
| Methyl-tert-butyl ether (MTBE) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.09 | 3 |
| Odor-Threshold | 3 | TON | 4 | 4 | 2.0 | 1.4 | 9.6 | 1.0 | 1 |
| pH | 6.5-8.5 | pH units | 63 | 63 | 7.5 | 6.4 | 8.4 | - - - | - - - |
| Silver (Ag) | 100 | µg/L | 35 | 6 | ND | ND | 0.1 | 0.01 | 10 |
| Sulfate | 250 | mg/L | 4 | 4 | 1.4 | 0.8 | 7.9 | 0.02 | 0.5 |
| Thiobencarb | 1 | µg/L | 4 | 0 | ND | ND | ND | 0.009 | 1 |
| Total Dissolved Solids (TDS) | 500 | mg/L | 36 | 36 | 33 | 9 | 78 | 6 | - - - |
| Turbidity | 5 | NTU | 63 | 63 | 0.80 | 0.35 | 43 | 0.07 | - - - |
| Zinc (Zn) | 2000 | µg/L | 40 | 27 | 9.25 | ND | 48 | 1 | 50 |
| *Lead and Copper Rule (Action Levels)* | | | | | | | | | |
| Copper (Cu) | 1300 [e] | µg/L | 45 | 10 | ND | ND | 7.1 | 0.41 | 50 |
| Lead (Pb) | 15 [e] | µg/L | 37 | 18 | ND | ND | 2.06 | 0.1 | 5 |

## Table 4-8. Pardee Reservoir Raw Water Monitoring (*continued*)

| Water Quality Parameters | MCL | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|---|
| *CDPH Drinking Water Notification Levels* | | | | | | | | | |
| Boron | 1000 | µg/L | 37 | 11 | ND | ND | 8.54 | 3.1-10 | 100 |
| n-Butylbenzene | 260 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.4 | 0.5 |
| sec-Butylbenzene | 260 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.29 | 0.5 |
| tert-Butylbenzene | 260 | µg/L | 21 | 0 | ND | ND | ND | 0.089-0.33 | 0.5 |
| Carbon disulfide | 160 | µg/L | 20 | 1 | ND | ND | 1.2 | 0.057-0.38 | 0.5 |
| Chlorate | 800 | µg/L | NA | NA | NA | NA | NA | NA | 20 |
| 2-Chlorotoluene | 140 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.34 | 0.5 |
| 4-Chlorotoluene | 140 | µg/L | 21 | 0 | ND | ND | ND | 0.086-0.27 | 0.5 |
| Dichlorodifluoromethane (Freon 12) | 1000 | µg/L | 20 | 0 | ND | ND | ND | 0.12-0.47 | 0.5 |
| 1,4-Dioxane | 3 | µg/L | NA | NA | NA | NA | NA | NA | 3 |
| Ethylene Glycol (anti-freeze) | 14 | mg/L | NA | NA | NA | NA | NA | NA | - - - |
| Formaldehyde | 100 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| HMX | 350 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Isopropylbenzene | 770 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.28 | 0.5 |
| Manganese | 500 | µg/L | 37 | 37 | 8.93 | 2.45 | 125 | 0.1-1 | 20 |
| Methyl isobutyl ketone (MIBK) | 120 | µg/L | 21 | 0 | ND | ND | ND | 0.1-0.41 | 5 |
| Naphthalene | 17 | µg/L | 21 | 0 | ND | ND | ND | 0.057-0.42 | 0.5 |
| N-Nitrosodiethyamine (NDEA) | 10 | ng/L | NA | NA | NA | NA | NA | 0.6 | 5 |
| N-Nitrosodimethylamine (NDMA) | 10 | ng/L | NA | NA | NA | NA | NA | 0.9 | 2 |
| N-Nitrosodi-n-propylamine (NDPA) | 10 | ng/L | NA | NA | NA | NA | NA | 0.8 | 7 |
| Propachlor | 90 | µg/L | 4 | 0 | ND | ND | ND | 0.008-0.009 | 0.5 |
| n-Propylbenzene | 260 | µg/L | 21 | 0 | ND | ND | ND | 0.06-0.3 | 0.5 |
| Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) | 0.3 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Tertiary butyl alcohol (TBA) | 12 | µg/L | 21 | 0 | ND | ND | ND | 0.45-2 | 2 |
| 1,2,3-Trichloropropane (1,2,3-TCP) | 5 | ng/L | NA | NA | NA | NA | NA | 20-340 | 5 |
| 1,2,4-Trimethylbenzene | 330 | µg/L | 21 | 0 | ND | ND | ND | 0.059-0.3 | - - - |
| 1,3,5-Trimethylbenzene | 330 | µg/L | 21 | 0 | ND | ND | ND | 0.04-0.32 | 0.5 |
| 2,4,6-Trinitrotoluene (TNT) | 1 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Vanadium | 50 | µg/L | NA | NA | NA | NA | NA | NA | 3 |

## Table 4-8. Pardee Reservoir Raw Water Monitoring (*continued*)

| Water Quality Parameters | MCL | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|---|
| *CDPH Archived Advisory Levels* | | | | | | | | | |
| Aldicarb | 7 | µg/L | 4 | 0 | ND | ND | ND | 0.18 | 3 |
| Aldrin | 2 | ng/L | 4 | 0 | ND | ND | ND | 14-15 | - - - |
| Baygon | 30 | µg/L | 4 | 0 | ND | ND | ND | 0.29 | - - - |
| a-Benzene Hexachloride | 15 | ng/L | NA | NA | NA | NA | NA | NA | - - - |
| b-Benzene Hexachloride | 25 | ng/L | 4 | 0 | ND | ND | ND | 7.4-7.8 | - - - |
| Captan | 15 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Carbaryl | 700 | µg/L | 4 | 0 | ND | ND | ND | 0.2 | 5 |
| Chloropicrin | 50 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Chlorpropham (CIPC) | 1.2 | mg/L | NA | NA | NA | NA | NA | NA | - - - |
| Diazinon | 6 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 1,3-Dichlorobenzene | 600 | µg/L | 21 | 0 | ND | ND | ND | 0.06-0.31 | 0.5 |
| Dieldrin | 2 | ng/L | NA | NA | NA | NA | NA | 26-27 | - - - |
| Dimethoate | 1 | µg/L | 2 | 0 | ND | ND | ND | 0.004 | - - - |
| 2,4-Dimethylphenol | 100 | µg/L | NA | NA | NA | NA | NA | NA | 5 |
| Diphenamide | 200 | µg/L | NA | NA | NA | NA | NA | NA | 100 |
| Ethion | 4 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Malathion | 160 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| N-Methyl dithiocarb-amate (Metam sodium) | 20 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Methylisothiocyanate | 50 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Methyl parathion | 2 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Parathion | 40 | µg/L | NA | NA | NA | NA | NA | NA | 20 |
| Pentachloronitro-benzene | 20 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Phenol | 4.2 | mg/L | NA | NA | NA | NA | NA | NA | 0.005 |
| 2,3,5,6-Tetrachloro-terephthalate | 3.5 | mg/L | NA | NA | NA | NA | NA | NA | - - - |
| Trithion | 7 | µg/L | NA | NA | NA | NA | NA | NA | - - - |

## Table 4-8. Pardee Reservoir Raw Water Monitoring (*continued*)

| Water Quality Parameters | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|
| *UCMR 1 Constituents* | | | | | | | | |
| Acetochlor | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| *Aeromonas* | cfu/100 mL | NA | NA | NA | NA | NA | NA | - - - |
| DCPA mono- and di-acid degradate | µg/L | 8 | 0 | ND | ND | ND | 0.01-0.1 | 1 |
| 4,4'-DDE | µg/L | 4 | 0 | ND | ND | ND | 0.004 | 0.8 |
| Diazinon | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4-Dichlorophenol | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4-Dinitrophenol | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4-Dinitrotoluene | µg/L | 3 | 0 | ND | ND | ND | 0.04 | 2 |
| 2,6-Dinitrotoluene | µg/L | 3 | 0 | ND | ND | ND | 0.04 | 2 |
| 1,2-Diphenylhydrazine | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Disulfoton | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Diuron | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| EPTC | µg/L | 4 | 0 | ND | ND | ND | 0.005 | 1 |
| Fonofos | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Linuron | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2-Methylphenol | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Molinate | µg/L | 4 | 0 | ND | ND | ND | 0.01 | 0.9 |
| Methyl-tert-butyl ether (MTBE) | µg/L | 21 | 0 | ND | ND | ND | 0.09 – 0.7 | 3 |
| Nitrobenzene | µg/L | 20 | 0 | ND | ND | ND | 0.04-10 | 10 |
| Perchlorate ($ClO_4^-$) | µg/L | 4 | 0 | ND | ND | ND | 1.3 | 4 |
| Prometon | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Terbacil | µg/L | 4 | 0 | ND | ND | ND | 0.007 | 2 |
| Terbufos | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4,6-Trichlorophenol | µg/L | NA | NA | NA | NA | NA | NA | - - - |

## Table 4-8. Pardee Reservoir Raw Water Monitoring (*continued*)

| Water Quality Parameters | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|
| *UCMR 2 Constituents* | | | | | | | | |
| Acetochlor | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| Acetochlor ethane sulfonic acid (ESA) | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Acetochlor oxanilic acid (OA) | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| Alachlor | µg/L | 5 | 0 | ND | ND | ND | 0.005 | 2 |
| Alachlor ethane sulfonic acid (ESA) | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Alachlor oxanilic acid (OA) | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| Dimethoate | µg/L | 2 | 0 | — | ND | ND | 0.004 | 0.7 |
| 1,3-dinitrobenzene | µg/L | NA | NA | NA | NA | NA | NA | 0.8 |
| 2,2',4,4',5,5'-hexabromobiphenyl (HBB) | µg/L | NA | NA | NA | NA | NA | NA | 0.7 |
| 2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153) | µg/L | NA | NA | NA | NA | NA | NA | 0.8 |
| Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Metolachlor | µg/L | 5 | 0 | ND | ND | ND | 0.008 | 1 |
| Metolachlor ethane sulfonic acid (ESA) | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Metolachlor oxanilic acid (OA) | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| N-Nitrosodiethylamine (NDEA) | ng/L | NA | NA | NA | NA | NA | 0.6 | 5 |
| N-Nitrosodimethylamine (NDMA) | ng/L | NA | NA | NA | NA | NA | 0.9 | 2 |
| N-Nitrosodi-n-butylamine (NDBA) | ng/L | NA | NA | NA | NA | NA | NA | 4 |
| N-Nitrosodi-n-propylamine (NDPA) | ng/L | NA | NA | NA | NA | NA | 0.8 | 7 |
| N-Nitrosomethylethylamine (NMEA) | ng/L | NA | NA | NA | NA | NA | 0.25 | 3 |
| N-Nitrosopyrrolidine (NPYR) | ng/L | NA | NA | NA | NA | NA | 0.65 | 2 |
| 2,2',4,4',5-pentabromodiphenyl ether (BDE-99) | µg/L | NA | NA | NA | NA | NA | NA | 0.9 |
| 2,2',4,4',6-pentabromodiphenyl ether (BDE-100) | µg/L | NA | NA | NA | NA | NA | NA | 0.5 |
| Terbufos sulfone | µg/L | NA | NA | NA | NA | NA | NA | 0.4 |
| 2,2',4,4'-tetrabromodiphenyl ether (BDE-47) | µg/L | NA | NA | NA | NA | NA | NA | 0.3 |
| 2,4,6-trinitrotoluene (TNT) | µg/L | NA | NA | NA | NA | NA | NA | 0.8 |

## Table 4-8. 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 | 67 | 67 | 16 | 12 | 26 | 4-5 | - - - |
| Ammonia | mg/L | 59 | 56 | 0.024 | ND | 0.092 | 0.006-0.3 | - - - |
| Bromide | mg/L | 4 | 0 | ND | ND | ND | 0.005-0.1 | - - - |
| Calcium (Ca) | µg/L | 43 | 43 | 3610 | 2400 | 5560 | 8-23 | - - - |
| Total Hardness (as $CaCO_3$) | mg/L | 64 | 64 | 13.5 | 8 | 25 | 2-3 | - - - |
| Magnesium (Mg) | µg/L | 37 | 37 | 1200 | 710 | 2070 | 2-15 | - - - |
| Total Organic Carbon (TOC) | mg/L | 86 | 86 | 1.6 | 1.3 | 3.9 | 0.02-0.2 | 0.3 |
| Dissolved Organic Carbon | mg/L | 30 | 30 | 1.6 | 1.3 | 3.3 | 0.02 | - - - |
| Orthophosphate (as P) | mg/L | 110 | 4 | ND | ND | 0.012 | 0.003-0.085 | - - - |
| Total Phosphate (as P) | mg/L | 52 | 48 | 0.019 | ND | 0.17 | 0.008-0.01 | - - - |
| Silica | µg/L | 71 | 71 | 8900 | 8000 | 12000 | 34-120 | - - - |
| Sodium (Na) | µg/L | 31 | 31 | 2200 | 1300 | 2900 | 11-21 | - - - |
| Total Suspended Solids (TSS) | mg/L | 33 | 9 | ND | ND | ND | 1.2-8 | - - - |
| Tert-Amyl methyl ether | µg/L | 21 | 0 | ND | ND | ND | 0.05-0.26 | 3 |
| Ethyl-tert-butyl-ether | µg/L | 21 | 0 | ND | ND | ND | 0.03-0.26 | 3 |

*a.* Abbreviations: NA = data not available, ND = not detected (i.e. value is below 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.* CDPH requires the District to monitor Asbestos once every 9 years. Data shown in table is from the latest sample collected in October 2003.

*e.* Lead and copper are regulated with an action level instead of an MCL. Per the Lead and Copper Rule, if more than 10% of home water samples exceed the action levels, water systems must take additional steps.

**Turbidity.** Pardee Reservoir has very low turbidity water most of the time with occasional spikes of moderate turbidity. The sixty-three grab samples collected from Pardee Reservoir, PACIN, PARIN, and the Pardee Tunnel ranged from 0.35 to 43 NTU with a median value of 0.80 NTU. The highest measurements came from the reservoir inlet at the Logboom location. Additional 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 0.47 NTU, though during high runoff periods, as indicated by MRHW49 flows, the turbidity increased. The maximum average daily turbidity at Campo Seco was 5.76 NTU and occurred during the wettest winter (2005-06). The lower turbidities at Campo Seco compared to the reservoir inlet samples reflects settling out of sediments in the reservoir and optimum gate selection.

**Figure 4-9. Mokelumne Aqueduct Daily Average Turbidity from Campo Seco online monitoring station and daily average flow in the Mokelumne River at MRHW49.**

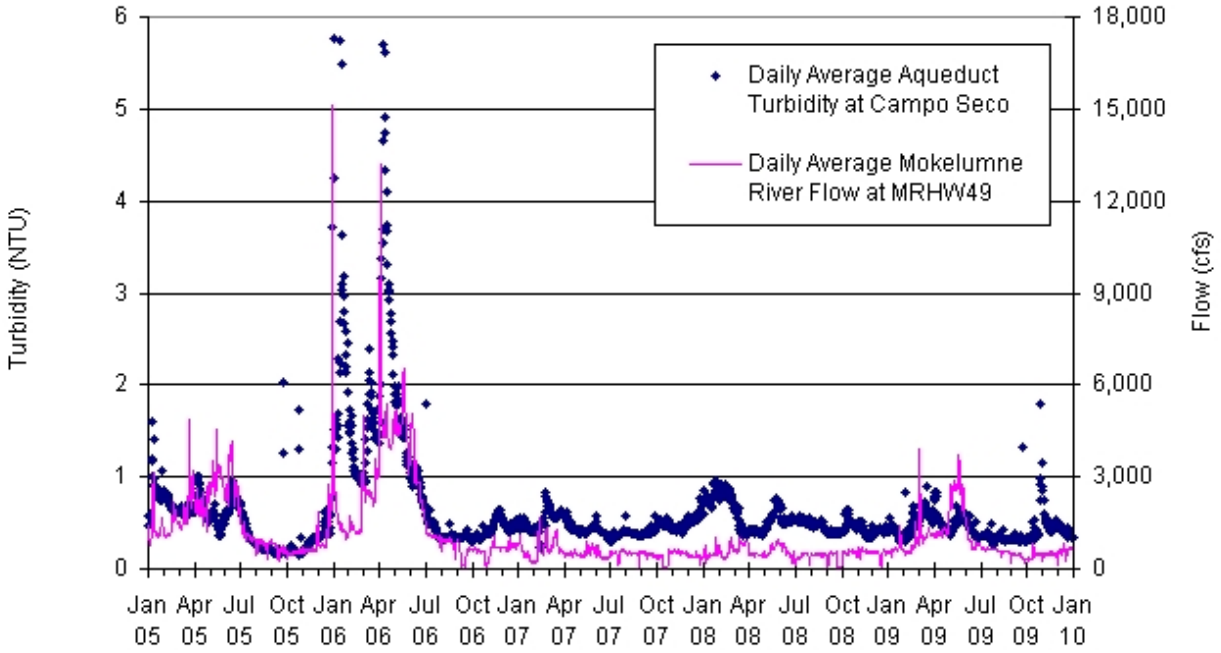



Table 4-9 compares the turbidity from Campo Seco, as well as coliform data (discussed below) during the periods of MRWSS Update 2010 and MRWSS Update 2005. In the 2005 update period, the maximum daily turbidity was 1.77 NTU, significantly lower than the highest turbidities recorded during this update period. However, the median daily turbidities were about the same for the two update periods.

**Microbiological Water Quality.** For untreated water, coliform concentrations in Pardee Reservoir water were low. The District collected monthly samples for total coliform in PACIN and PARIN prior to July 2006, then sampling frequency increased to a biweekly basis at both plants. Total coliform and *E. coli* were also sampled monthly throughout the period of this MRWSS from the reservoir surface at Pardee Tower.

For LT2ESWTR, *E. coli* samples were collected at least twice per month for 12 consecutive months in 2007 and 2008 from PACIN and PARIN to represent each small system. The data was submitted as a grandfathered data package for the two small systems at Pardee. LT2ESWTR samples were analyzed by the colisure method (SM9222B) and all others were analyzed with multiple tube fermentation (EPA 40 CFR/SM9222G). At PARIN and PACIN duplicate samples were collected during the LT2ESWTR monitoring period and analyzed by both methods. No significant difference in results for *E. coli* by either method was observed. Monthly LT2ESWTR *E. coli* samples were also collected for 24 consecutive months from the Pardee Tunnel, prior to chlorination, to represent the District's large system in the East Bay.

Table 4-9 shows the statistical summary for each microbiological parameter with all raw water sampling locations combined for the five-year periods of MRWSS Update 2010 and MRWSS Update 2005. The median coliform concentrations remained similar between the two update periods for each analyte. The maximum total coliform concentration increased, whereas the maximum *E. coli* and Fecal Coliform concentration remained similar.

**Table 4-9: Summary of Turbidity and Coliform data in Pardee Reservoir from MRWSS Update 2005 and MRWSS Update 2010** [a]

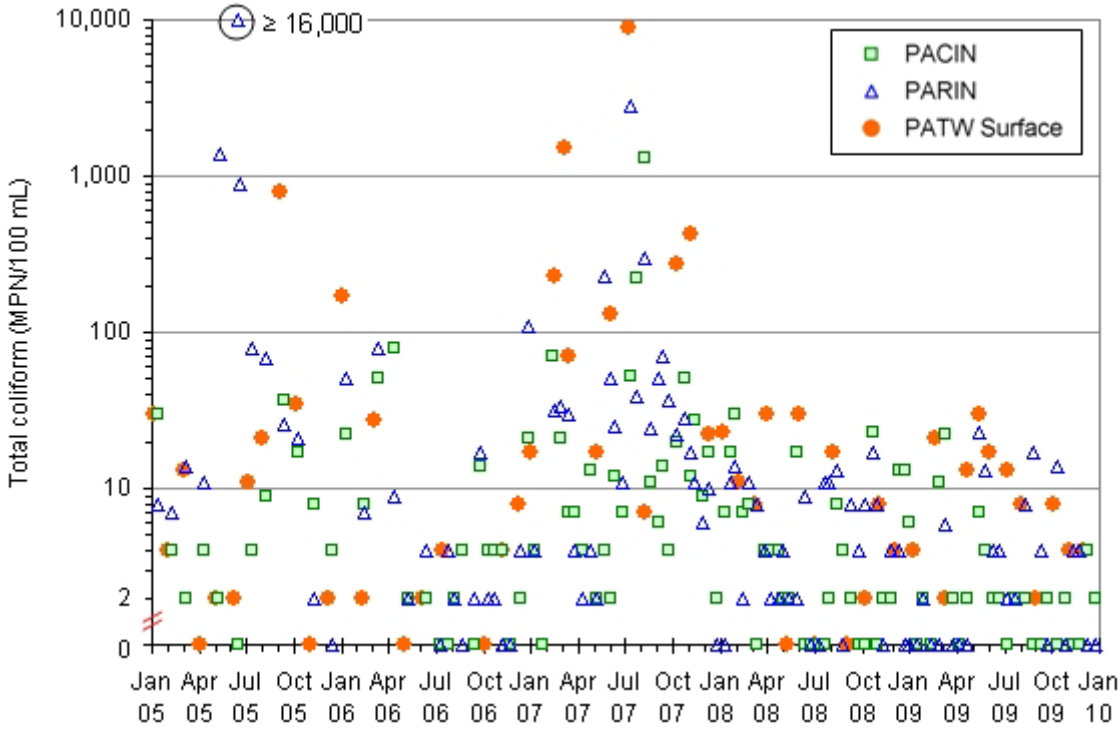
| Parameter | Units | MRWSS Update 2005 *Jun. 1999 - Dec. 2004* | | | MRWSS Update 2010 *Jan. 2005 - Dec. 2009* | | | MDL |
|---|---|---|---|---|---|---|---|---|
| | | No. of Samples | Median | Max | No. of Samples | Median | Max | |
| Turbidity (Daily Average) | NTU | NA [b] | 0.37 | 1.77 | NA [b] | 0.47 | 5.76 | |
| *E. coli* | MPN/100 mL | 224 | ND | 50 | 375 | ND | 13 | 1-2 |
| Fecal Coliform | MPN/100 mL | 236 | ND | 50 | 184 | ND | 50 | 2 |
| Total Coliform | MPN/100 mL | 244 | 8 | 2,400 | 277 | 4 | ≥ 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 4-10 and 4-11 show the results of total coliform and *E. coli* sampling, respectively. The spike in total coliform of ≥ 16,000 MPN/100 mL in the PARA WTP influent occurred on June 14, 2005. A resample one week later on June 21, 2005, had 900 MPN/100 mL total coliform. Another spike of 9,000 MPN/100 mL at PATW surface occurred in July 2007. Aside from these two occasions, total coliform were similar to those from the 2005 MRWSS update period. Ninety-five percent of the time, total coliform were at or below 50 MPN/100 mL in PACIN, 200 MPN/100 ml in PARIN, and 500 MPN/100 mL on the reservoir surface at the tower. *E. coli* was at or below 5 MPN/100 mL 95percent of the time at the reservoir surface and was even less than at PACIN, PARIN, and the Pardee Tunnel. Based on the *E. coli* results at PACIN and PARIN, both Pardee Center and PARA WTPs have been tentatively assigned a Bin 1 classification under LT2ESWTR, and the District will not be required to meet additional removal requirements for *Cryptosporidium*.

**Figure 4-10. Total coliform in Pardee Reservoir.**

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




**(b) Frequency and cumulative distribution of sample results.**

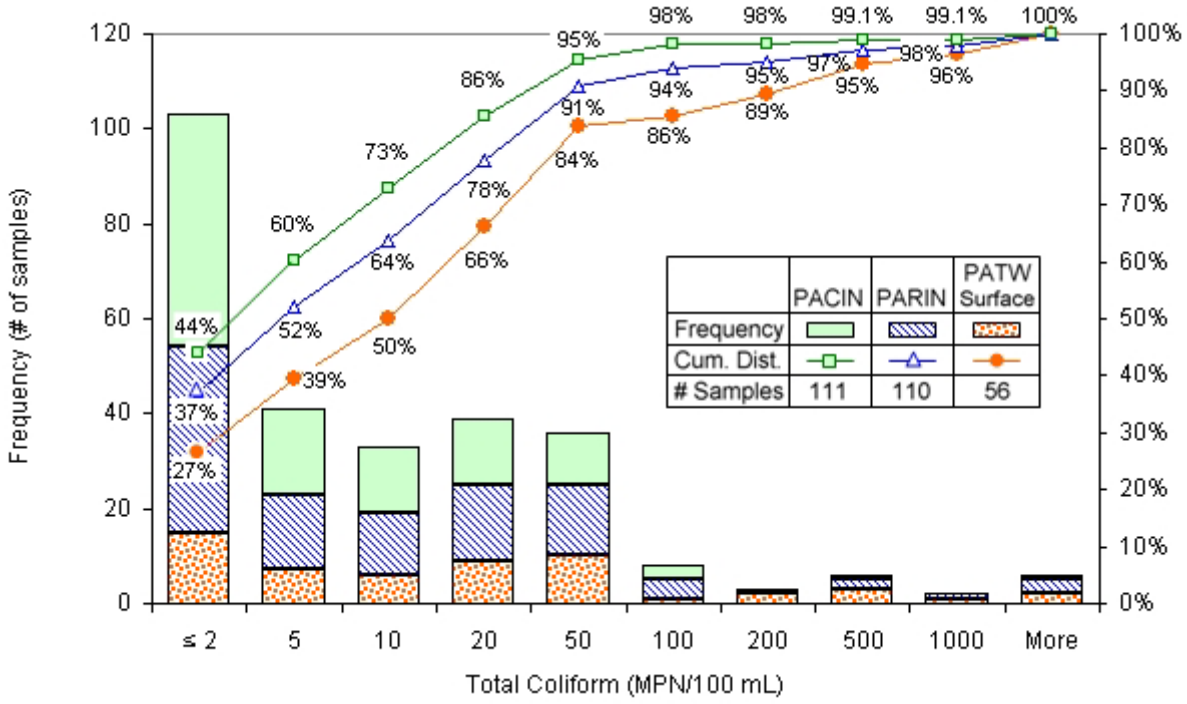
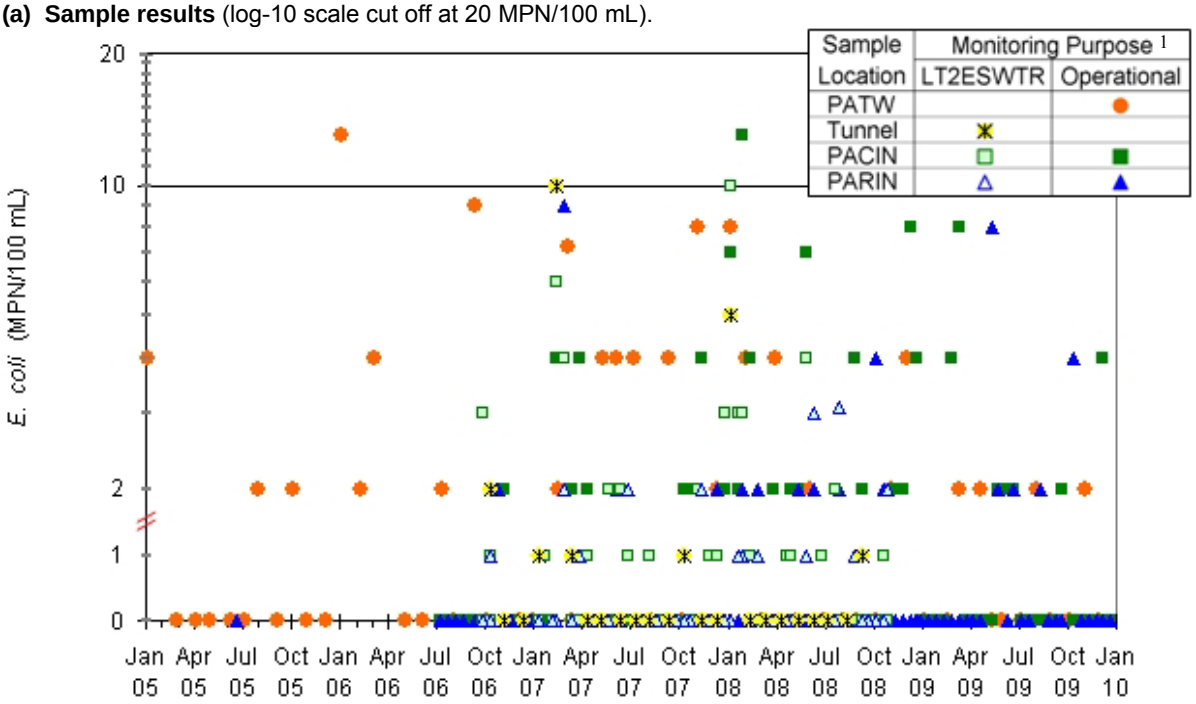
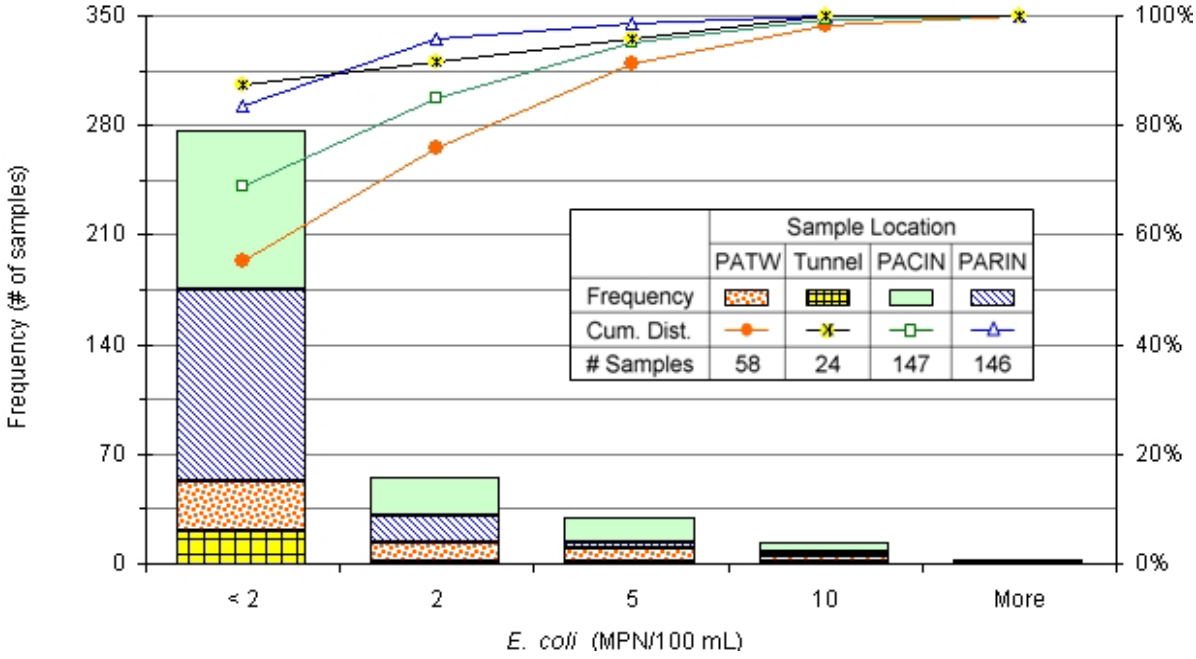


**Figure 4-11. *E. coli* in Pardee Reservoir.**

**(a) Sample results** (log-10 scale cut off at 20 MPN/100 mL).




**(b) Frequency and cumulative distribution of sample results.**




1. For LT2ESWTR compliance, samples were collected at least twice per month for 12 consecutive months from PACIN (Jan. – Dec. 2007) and PARIN (Feb. 2007 – Jan. 2008) and once per month for 24 consecutive months from Pardee Tunnel (Oct. 2006 – Sep. 2008) to represent the District's three in-line plants in the East Bay. All LT2ESWTR samples were analyzed with Colisure (MDL = 1 MPN/100 mL), while most others were analyzed with MTF (MDL = 2 MPN/100 mL).

The District has monitored *Giardia* and *Cryptosporidium* in Pardee Tunnel at varying frequencies since 1991. Most often, neither protozoa was detected and when they were detected, the levels were very low. Four *Cryptosporidium and Giardia* samples were collected during the beginning of this WSS period up through September 2006 on a bi-annual basis. Starting in October 2006, monthly samples were collected for two years as part of LT2ESWTR for the East Bay system. All of these samples were collected from Pardee Tunnel before chemical addition. In total, 28 samples were analyzed in the five-year period of this WSS (Table 4-10). *Cryptosporidium* was not detected and *Giardia* was only detected twice – right at the detection limit (1 cyst / 10-L sample). Based on these results, the District anticipates a Bin 1 classification under LT2ESWTR.

**Table 4-10: *Cryptosporidium* and *Giardia* in Pardee Tunnel**

| Collection Date | *Cryptosporidium* [a] Oocysts (# / L) | *Giardia* [a] Cysts (# / L) | DLR (# / L) |
|---|---|---|---|
| 3/29/2005 | *ND* | *ND* | *0.1* |
| 9/27/2005 | *ND* | *ND* | *0.1* |
| 3/28/2006 | *ND* | *ND* | *0.1* |
| 9/13/2006 | *ND* | *ND* | *0.1* |
| 10/11/2006 [b] | *ND* | *ND* | *0.1* |
| 11/8/2006 [b] | *ND* | *ND* | *0.1* |
| 12/13/2006 [b] | *ND* | *ND* | *0.1* |
| 1/10/2007 [b] | *ND* | *ND* | *0.1* |
| 2/14/2007 [b] | *ND* | *0.1* | *0.1* |
| 3/14/2007 [b] | *ND* | *ND* | *0.1* |
| 4/11/2007 [b] | *ND* | *ND* | *0.1* |
| 5/9/2007 [b] | *ND* | *ND* | *0.1* |
| 6/13/2007 [b] | *ND* | *ND* | *0.1* |
| 7/11/2007 [b] | *ND* | *ND* | *0.1* |
| 8/8/2007 [b] | *ND* | *ND* | *0.1* |
| 9/12/2007 [b] | *ND* | *ND* | *0.1* |
| 10/10/2007 [b] | *ND* | *ND* | *0.1* |
| 11/14/2007 [b] | *ND* | *ND* | *0.1* |
| 12/12/2007 [b] | *ND* | *ND* | *0.1* |
| 1/9/2008 [b] | *ND* | *0.1* | *0.1* |
| 2/13/2008 [b] | *ND* | *ND* | *0.1* |
| 3/12/2008 [b] | *ND* | *ND* | *0.1* |
| 4/10/2008 [b] | *ND* | *ND* | *0.1* |
| 5/14/2008 [b] | *ND* | *ND* | *0.1* |
| 6/11/2008 [b] | *ND* | *ND* | *0.1* |
| 7/9/2008 [b] | *ND* | *ND* | *0.1* |
| 8/19/2008 [b] | *ND* | *ND* | *0.1* |
| 9/10/2008 [b] | *ND* | *ND* | *0.1* |
| # Samples | 28 | 28 | |
| # Detections | 0 | 2 | |
| Maximum | *ND* | *0.1* | |

a) ND: Non-detect
b) Monthly samples from October 2006 through September 2008 were collected for LT2ESWTR to represent the District's three in-line filter plants in the East Bay.

**Regulated Inorganic Chemicals.** The maximum raw water concentrations of regulated inorganics in Pardee reservoir raw water have been non-detect or well below the federal and state MCLs with the exception of aluminum, which is easily removed in all five WTPs served by Pardee Reservoir. 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. Though not required for compliance, the District also sampled for the regulated inorganics at PATW open gates on a bimonthly or quarterly basis throughout the period of this MRWSS Update as well as in the Mokelumne Aqueducts and on the reservoir surface. All of the inorganics measured in the WTP effluents, as submitted to CDPH in the monthly WTP and annual water quality reports, have been far below the MCLs.

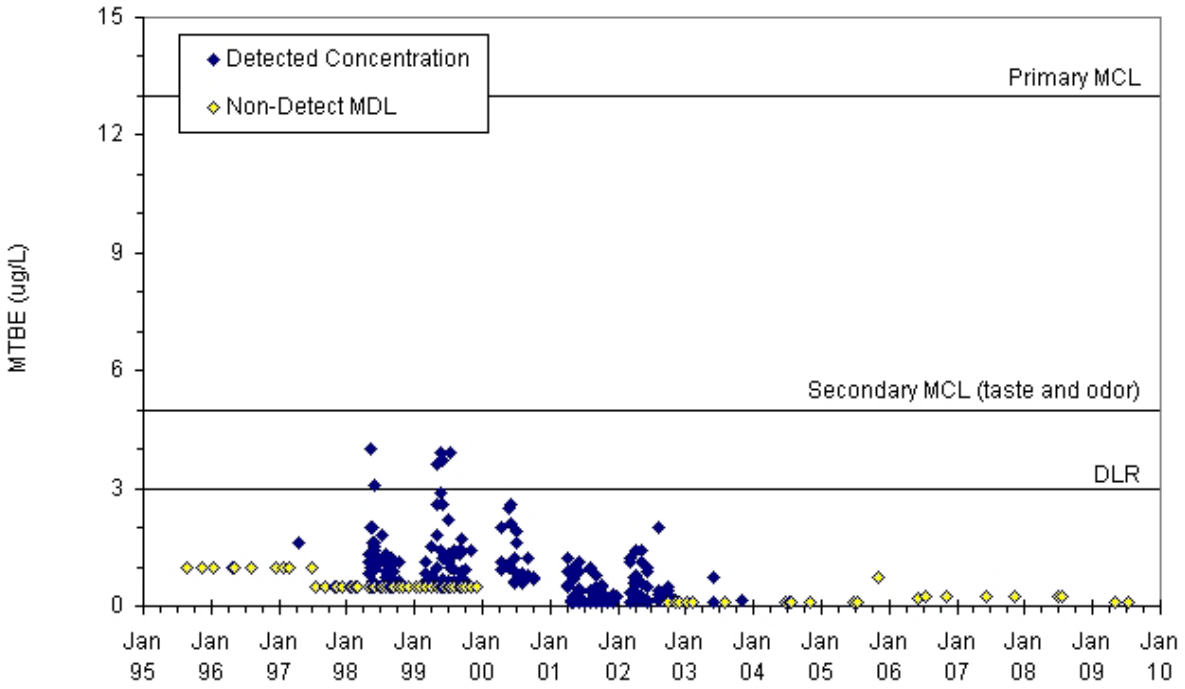
**Regulated Organic Compounds.** During the period of this MRWSS update none of the regulated SOCs or VOCs were detected above the DLR (Table 4-9).

Five SOCs are known to be used on the Pardee Watershed: atrazine, di(2-ethylhexyl)-phthalate, 2,4-dichlorophenoxyacetic acid (2,4-D), glyphosate, and simazine. CDPH requires that the District monitor these twice a year every three years at PATW open gates. The District is also required to monitor atrazine and simazine at PACIN every nine years. CDPH has waived monitoring the remaining SOCs; however, the District continues to monitor all of them as well as other unregulated pesticide and herbicides when it monitors the five required SOCs.

To comply with Title 22 requirements during the period of this MRWSS update, the District monitored VOCs five times at PATW and once at PACIN. In addition, 15 more VOC samples were collected at PATW, PACIN, PARIN and on the reservoir surface near the marina for operational purposes.

The District initiated an MTBE monitoring program in 1995 and Figure 4-12 shows the results. The highest concentrations were found in samples collected near the marina between April and September and were highest during the summer holidays (Memorial Day, Independence Day, and Labor Day). Although MTBE never exceeded the secondary drinking water MCL of 5 µg/L, and was far below the primary MCL of 13 µg/L, the District restricted high emission outboard engines and began using MTBE-free fuel at PARA three years before the statewide ban. MTBE levels decreased in Pardee Reservoir from a maximum concentration of 4 µg/L in 1998, to below the DLR of 3 µg/L in 2000, to non-detect from 2004-2009 (when the MDL ranged from 0.1 to 0.7 µg/L). The District has consequently lowered the frequency and number of sampling locations for MTBE monitoring to once a year at two locations: Pardee Tower at the open gate and at the intake to either PARA WTP or Pardee Center WTP.

**Figure 4-12. MTBE in Pardee Reservoir** (1995 through 2009)**.**

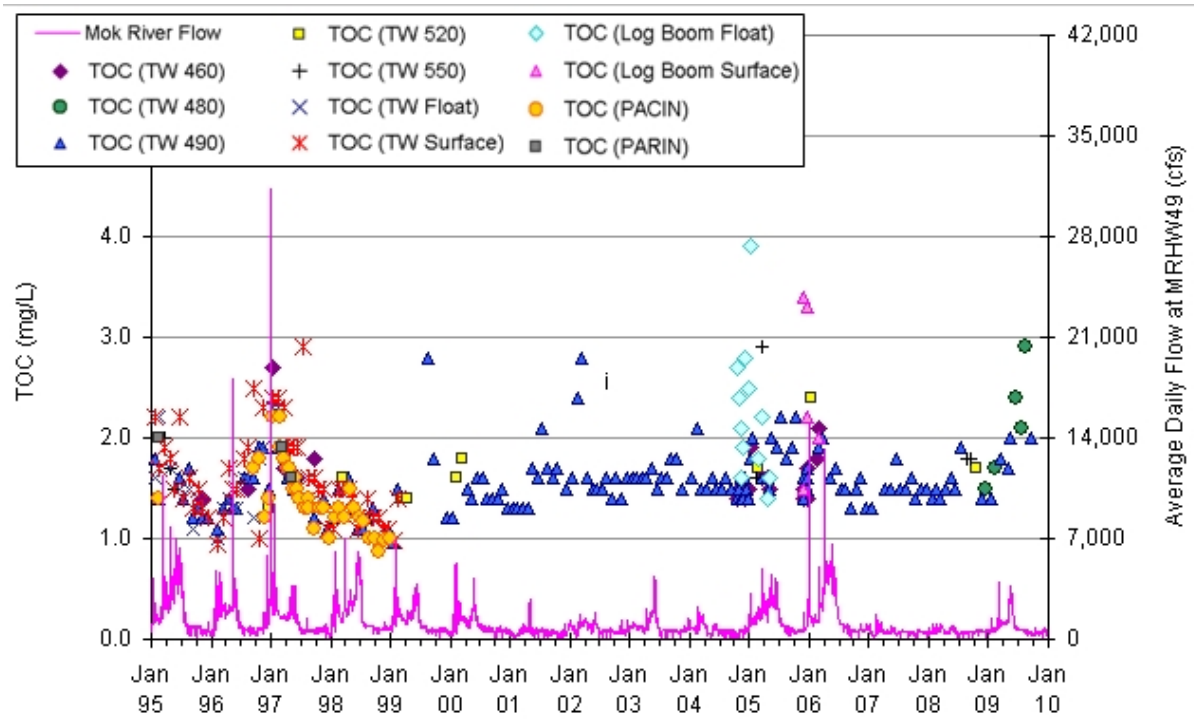



**Radioactivity.** During the period of this MRWSS update none of the regulated radioactive parameters were detected above the DLR, as shown in Table 4-8. As required by Title 22, the District collected two consecutive quarterly radioactivity samples from PACIN for analysis of gross alpha particle activity, gross beta particles and photon emitters, and combined radium 226 + 228, and from PATW for analysis of these three parameters plus uranium (the third and fourth quarters of monitoring were waived at both locations). In addition, the District collected a sample from PATW in February 2007 for analysis of two man-made radiologicals (strontium-90 and tritium); neither was detected. Under the new Radionuclide regulation in Title 22, and based on 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.

**Disinfection By-Products.** The four trihalomethanes regulated in the distribution system under the D/DBP Rule are measured in Pardee Reservoir when other VOC's are analyzed. None were detected in the MRWSS Update 2010 period.

**Total Organic Carbon.** During the period of this MRWSS update, the median TOC was 1.6 mg/L and the maximum was 3.9 mg/L. This was slightly higher than previous MRWSS updates (the median and maximum TOC of MRWSS Update 2005 were 1.2 and 2.8 mg/L, respectively); however, as shown in Figure 4-13, the highest TOC during this period was from samples collected from late 2004-2006 from the Logboom near the inlet to the reservoir. These samples were collected to evaluate the effects of the 2004 Power Fire. The Logboom location had not previously been sampled. For all 15 years shown in Figure 4-13, the TOC at PATW, PACIN, and PARIN spiked during higher runoff periods, but never exceeded 3 mg/L.

**Figure 4-13. TOC in Pardee Reservoir** (1995 through 2009).




**Taste & Odor.** TON was monitored annually in the summers of 2005 through 2008 at PACIN and ranged from 1.4 to 9.6. None of the treated water effluent samples from the East Bay WTPs exceeded the secondary drinking water MCL of 3 TON. Pardee Center WTP effluent exceeded the secondary MCL twice in the summer of 2007 with a maximum of 4.7 TON and once in April of 2008 at 3.5 TON. However, there was no recorded customer complaint that reflected a possible source water taste and odor in the East Bay distribution system during these periods.

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 4-11. This table is limited to classes of algae known to potentially pose concerns for water quality and treatment, and to major species detected in the past ten years, though typically much higher levels are needed to cause treatment concerns. Table 4-11 shows the potential water quality and treatment concerns associated with each species.

**Table 4-11. Algal Genera Detected in Pardee Reservoir from 2000 through 2009** [a, b, c]

| Algae Class / Genera | Water Treatment Concern [d] | | | Description of Taste and/or Odor [e] | EBWSS Update 2005 | | EBWSS Update 2010 | |
|---|---|---|---|---|---|---|---|---|
| | Filter-Clogging | Potential Odor | Potential Taste | | Max Quantity (#/100 mL) | % of Months Genera was Detected | Max Quantity (#/100 mL) | % of Months Genera was Detected |
| ***Bacillariophyceae*** | | | | | | | | |
| Asterionella | X | X | | **Odor:** Spicy, geranium | 14,000 | 100% | 5,900 | 100% |
| Aulacoseira [f] | X | X | X | **Odor:** Grassy, spicy, geranium; **Taste:** Sickly sweet, oily | 17,000 | 73% | 93,000 | 93% |
| Cocconeis | | | | **Odor:** Grassy, spicy, geranium; **Taste:** Sickly sweet, oily | *LL* | 23% | 2,000 | 52% |
| Cyclotella | X | X | | **Odor:** Grassy, spicy, geranium | 7,800 | 93% | 49,000 | 100% |
| Cymbella | X | | | | 4,900 | 40% | *LL* | 47% |
| Fragilaria | X | X | | **Odor:** Grassy, spicy, geranium | 69,000 | 97% | 160,000 | 100% |
| Navicula | X | | | | 5,900 | 97% | 5,400 | 98% |
| Nitzschia | | | | | 19,000 | 100% | 16,000 | 100% |
| Rhizosolenia | | | | | 6,400 | 60% | 8,300 | 75% |
| Stephanodiscus | X | X | X | **Odor:** Grassy, spicy, geranium; **Taste:** Sickly sweet, oily | 4,400 | 27% | 4,900 | 23% |
| Synedra | X | X | X | **Odor:** Grassy; **Taste:** Sickly sweet, oily | 5,400 | 20% | 6,400 | 67% |
| Tabellaria | | X | | **Odor:** Grassy, spicy, geranium | 2,400 | 27% | 9,300 | 48% |
| ***Chlorophyceae*** | | | | | | | | |
| Actinastrum | | X | | **Odor:** Grassy, musty in large quantities | 2,000 | 7% | 6,400 | 65% |
| Ankistrodesmus | | X | | **Odor:** Grassy, musty in large quantities | 5,900 | 40% | 2,400 | 28% |
| Coelastrum | | | | | 3,900 | 7% | *LL* | 20% |
| Crucigenia | | | | | 6,400 | 23% | 5,900 | 77% |
| Elakatothrix | | X | | **Odor:** Grassy, nasturtium | 11,000 | 42% | 13,000 | 92% |
| Eremosphaera | | | | | *ND* | 0% | 1,500 | 45% |
| Eudorina | | X | | **Odor:** Fishy in large quantities | 2,000 | 52% | 4,400 | 87% |
| Gonium | | X | | **Odor:** Fishy in large quantities | 2,900 | 8% | 1,500 | 35% |
| Nephrocytium | | | | | 11,000 | 23% | 2,000 | 47% |
| Oocystis | | | | | 2,000 | 53% | *LL* | 72% |
| Palmella | X | | | | 1,500 | 8% | 2,000 | 22% |
| Scenedesmus | | X | | **Odor:** Grassy in large quantities | 1,500 | 33% | 2,000 | 62% |
| Schroederia | | | | | 4,400 | 55% | 3,900 | 77% |
| Sphaerocystis | | | | | 3,900 | 37% | 5,400 | 20% |
| Spirogyra | X | X | | **Odor:** Grassy in large quantities | 4,400 | 5% | *LL* | 2% |
| Spondylosium | | | | | 16,000 | 53% | 11,000 | 65% |
| Ulothrix | | X | | **Odor:** Grassy in large quantities | 1,500 | 2% | 7,400 | 50% |
| Zygnema | | | | | *ND* | 0% | 1,500 | 3% |

| Algae Class / Genera | Water Treatment Concern [d] | | | Description of Taste and/or Odor [e] | EBWSS Update 2005 | | EBWSS Update 2010 | |
|---|---|---|---|---|---|---|---|---|
| | Filter-Clogging | Potential Odor | Potential Taste | | Max Quantity (#/100 mL) | % of Months Genera was Detected | Max Quantity (#/100 mL) | % of Months Genera was Detected |
| ***Chrysophyceae*** | | | | | | | | |
| Dinobryon | | X | X | **Odor:** Violets, fishy; **Taste:** Sickly sweet, oily | 130,000 | 100% | 140,000 | 100% |
| Mallomonas | | X | X | **Odor:** Violets; **Taste:** Bitter | *LL* | 47% | 4,400 | 90% |
| Synura | | X | X | **Odor:** Cucumber, rotten, medicinal, muskmelon; **Taste:** Bitter, dry, metallic, sickly sweet, oily | *LL* | 7% | 1,700 | 2% |
| ***Cyanophyceae*** | | | | | | | | |
| Agmenellum | | | | | 27,000 | 35% | 5,400 | 15% |
| Anabaena [g] | X | X | | **Odor:** Grassy, musty, nasturtium | 37,000 | 30% | 160,000 | 42% |
| Anabaenopsis | | X | | **Odor:** Grassy in large quantities | ND | 0% | 4,800 | 3% |
| Anacystis | | X | X | **Odor:** Grassy, musty; **Taste:** Sweet | 9,800 | 47% | 6,900 | 80% |
| Anathece | | | | | ND | 0% | 23,000 | 2% |
| Aphanizomenon | | X | X | **Odor:** Grassy, musty, nasturtium; **Taste:** Sweet | 3,600 | 13% | 610 | 10% |
| Coccochloris | | | | | 4,400 | 68% | ND | 0% |
| Merismopedia | | | | | LL | 0% | 27,000 | 28% |
| Microcystis | | X | X | **Odor:** Grassy, musty in large quantities; **Taste:** Sweet | LL | 2% | 2,400 | 5% |
| Oscillatoria | X | X | | **Odor:** Earthy, musty, spicy | 2,400 | 10% | 1,800 | 2% |
| ***Dinophyceae*** | | | | | | | | |
| Ceratium | | X | X | **Odor:** Fishy; **Taste:** Bitter | 1,500 | 68% | 4,400 | 80% |
| Gymnodinium | | | | | 2,000 | 17% | 2,400 | 8% |
| Peridinium | | X | | **Odor: Cucumber** | 980 | 28% | 2,400 | 80% |

a) This list includes all algae detected greater than 1000/100 mL at least once between Jan. 2000 and Dec. 2009. There is no significance to 1000/ 100 mL; typically much higher levels are needed to cause T&O or filter clogging. This cut off was chosen arbitrarily to reduce the length of the table.

b) At least one sample was collected during all 120 months of the period from January 2000 through December 2009.

c) Abbreviations: *LL* = low levels (< 1000 / 100 mL), *ND* = not detected

d) 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).

e) Odor description based on moderate quantities of algae, unless otherwise noted.

f) *Aulacoseira* was previously classified as *Melosira* prior to 2005 and was reported as such in prior EBWSS updates.

g) *Anabaena* count includes small cells (both straight and coiled), medium, and large size cells.

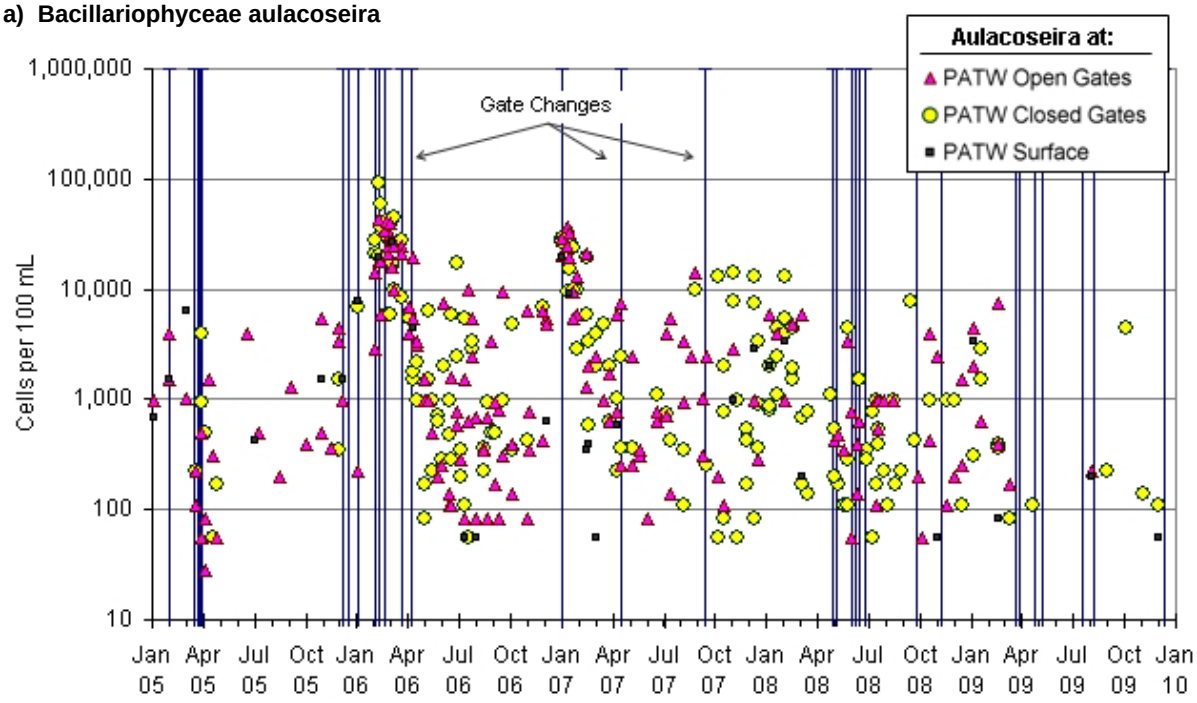
In general, more problematic algae were present in the period covered by MRWSS Update 2010 than in MRWSS 2005. One species commonly associated with odor problems, *Cyanophyceae Anabaena*, was once detected over 100,000 cells per 100 mL in this update period, an order of magnitude higher than previously detected. However, this occurred only one time in August 2007 at 160,000 cells per 100 mL, which is still below the estimated critical odor limit of 530,000 cells per 100 mL[1].

Several algae that can cause filter-clogging problems such as *Fragilaria* and *Aulacoseira* (formerly classified as *Melosira*) were also identified in quantities of potential concern (Figure 4-14). In-line filtration plants in the East Bay have experienced shorter filter run times during *Aulacoseira* and *Flagilaria* blooms in Pardee Reservoir, such as the bloom that occurred in January and February of 2006. During stratified reservoir conditions, the gates of Pardee tower can be operated to minimize the impact of these blooms. Because diatoms have a competitive advantage over other algae at low temperature, their blooms can also occur during fall/winter months.[2]

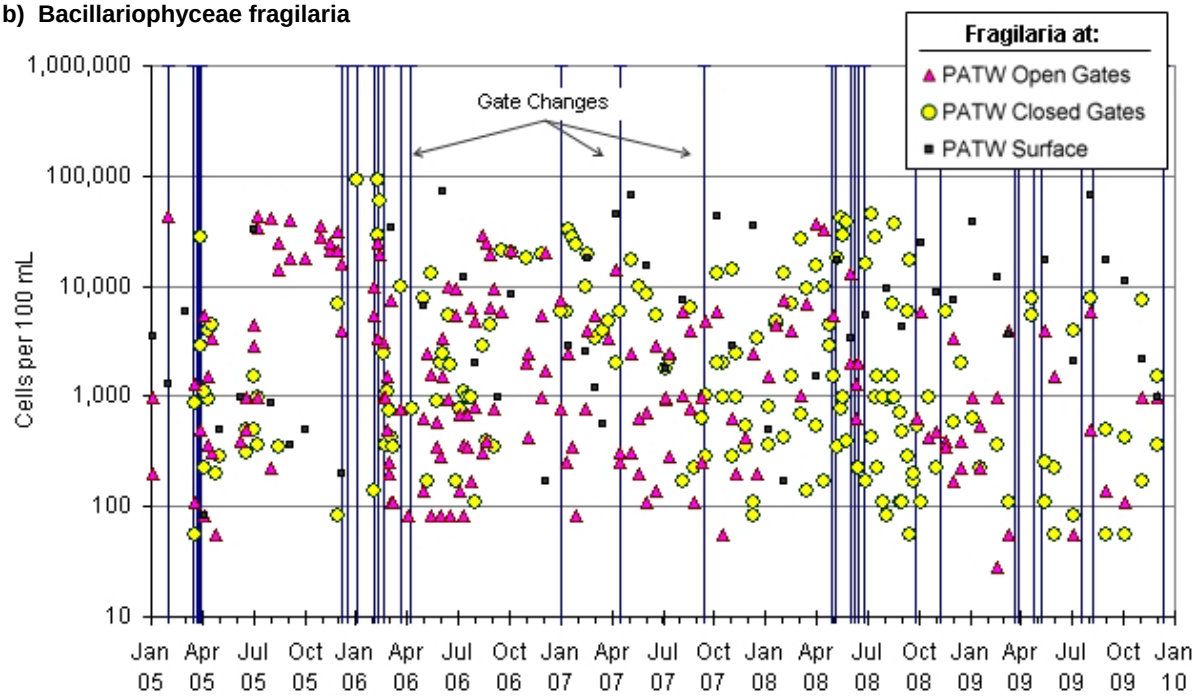
[1] AWWARF (now Water Research Foundation) and Lyonnaise des Eaux. *Identification and Treatment of Tastes and Odors in Drinking Water* (1987).
[2] Horne A. J. and C. R. Goldman. *Limnology*, 2nd Edition. McGraw-Hill (1994).

**Figure 4-14. Concentrations of two potential filter clogging bacteria at PATW.**

**a) Bacillariophyceae aulacoseira**




**b) Bacillariophyceae fragilaria**



**Other Secondary Standards.** Aluminum, iron, and/or manganese exceeded secondary drinking water MCLs in Pardee Reservoir raw water in less than 20 percent of samples during this update period. All of these exceedences were from the Logboom location near the inlet to the reservoir, sampled as part of the evaluation of the effects of the 2004 Power Fire. 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 4-8 indicates, Pardee is a soft water with hardness ranging from 8 to 25 mg/L as $CaCO_3$ during this five-year MRWSS Update period. The pH ranged from 6.4 to 8.4 and alkalinity was between 12 and 26 mg/L as $CaCO_3$.

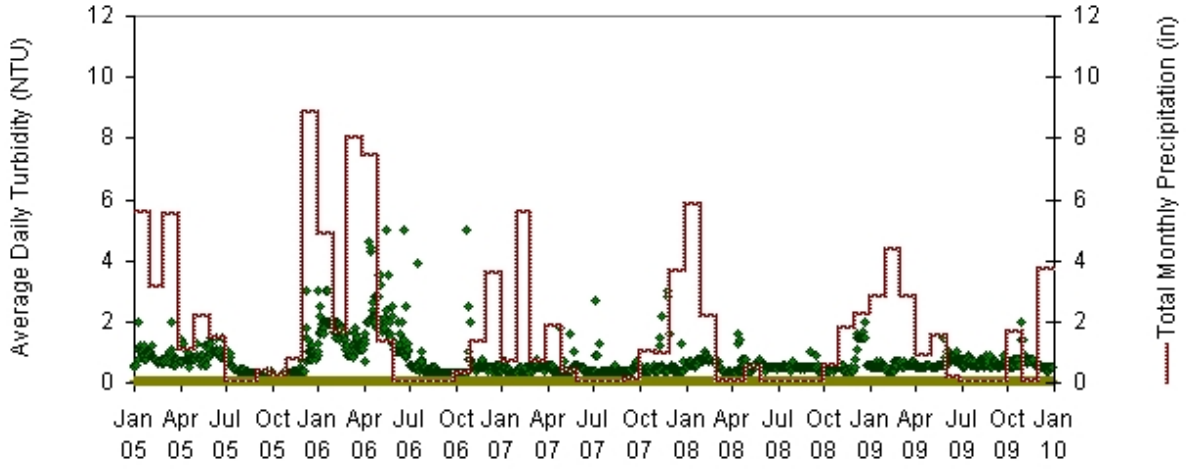
## *Trends in Water Quality*

Relationships between watershed conditions and water quality can be extracted from current water quality monitoring programs. As shown in Figures 4-15 and 4-16, elevated turbidity events at the PACIN and PARIN occurred during months of high rainfall. However, not all periods of high rainfall resulted in elevated turbidities, and storm intensity, frequency, and duration are not captured by monthly precipitation totals. Also, several isolated incidents of high turbidity were recorded at PARIN during dry summer months. This was true at PACIN as well, but there were fewer summertime diversions in turbidity at PACIN. These incidents did not last more than one day, and did not occur at both WTPs at the same time, indicating localized turbidity spikes.

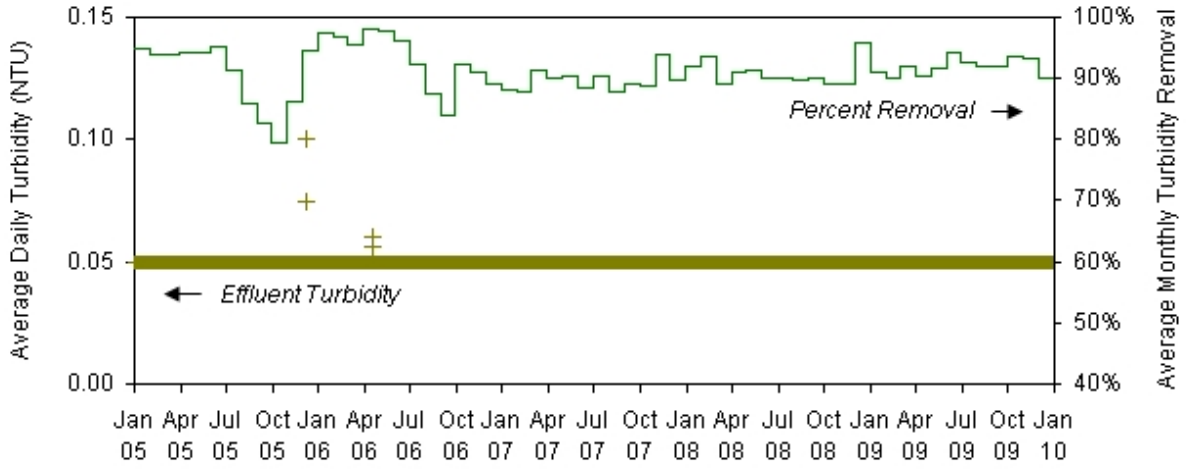
The turbidities of Pardee Center (PACEFF) and PARA (PAREFF) WTP membrane filter effluents are near constant at 0.05 NTU regardless of influent raw water turbidity, as shown in Figures 4-15 and 4-16. For the District's Walnut Creek, Lafayette, and Orinda in-line WTPs that treat Mokelumne River water diverted from Pardee Reservoir, high turbidity events pose operational difficulties of shorter filter run times. Operational procedures have been developed to mitigate the impact of turbidity spikes on treatment plant operations at these WTPs and the effluent turbidities at all East Bay WTPs always meet regulations.

**Figure 4-15. Turbidity at Pardee Center WTP.**

**a) Daily average turbidities at PACIN (raw water influent) and PACEFF (treated water effluent) [1] with Pardee Center precipitation.**




**b) PACEFF average daily turbidity (smaller scale axis) and average monthly turbidity removal.** [1]



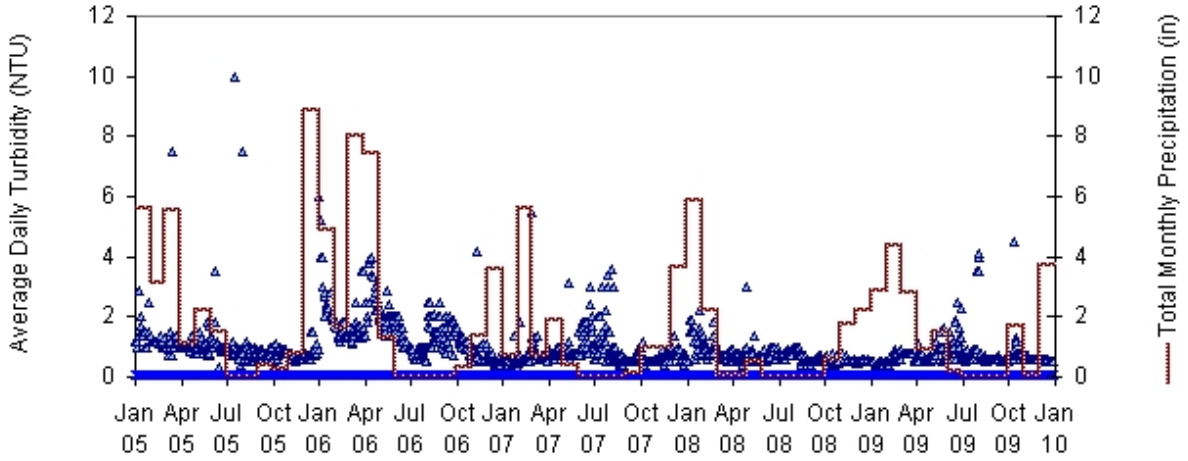

Legend and Statistics

| | Symbols | No. of Data Points | Daily Average Turbidities (NTU) | | |
|---|---|---|---|---|---|
| | | | Median | 5th Percentile | 95th Percentile |
| PACIN Turbidity | ◆ | 1721 (days) | 0.50 | 0.30 | 1.80 |
| PACEFF Turbidity | + | 1721 (days) | 0.05 | 0.05 | 0.05 |
| Turbidity Removal (Monthly Average) | — | 60 (months) | Range: *79.3 to 98.0* % | | |

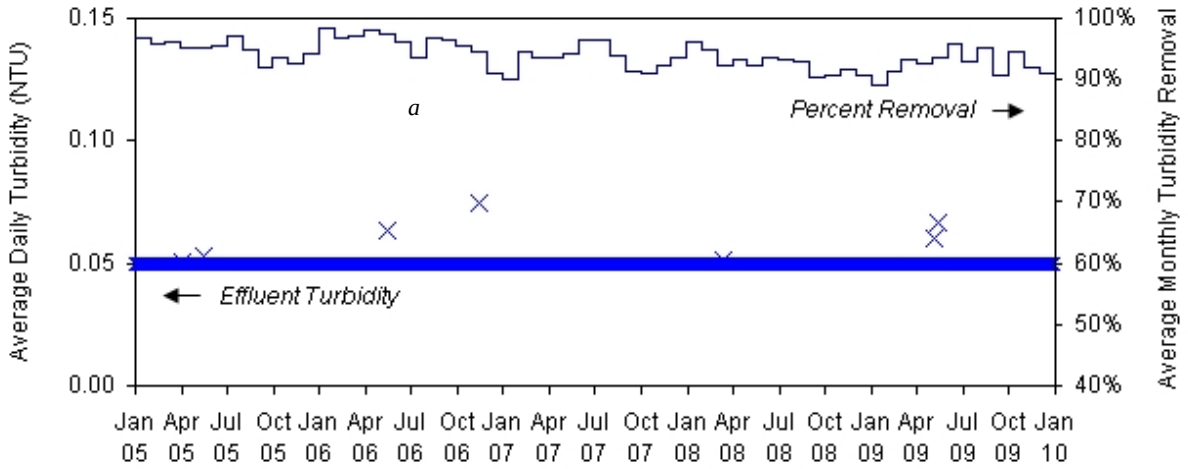
1. All but 4 of 1721 effluent turbidities (PACEFF) were at or below 0.05 NTU, the instrumentation MDL. In both plots, the symbols run together and appear as a line.

**Figure 4-15. Turbidity at PARA WTP.**

**a) Daily average turbidities at PARIN (raw water influent) and PAREFF (treated water effluent) [1] with Pardee Center precipitation.**




**b) PAREFF average daily turbidity (smaller scale axis) and average monthly turbidity removal.** [1]




Legend and Statistics

| | Symbols | No. of Data Points | Daily Average Turbidities (NTU) | | |
|---|---|---|---|---|---|
| | | | Median | 5th Percentile | 95th Percentile |
| PARIN Turbidity | △ | 1567 (days) | 0.80 | 0.50 | 2.00 |
| PAREFF Turbidity | × | 1567 (days) | 0.05 | 0.05 | 0.05 |
| Turbidity Removal (Monthly Average) | —— | 60 (months) | Range: *89.1 to 98.3* % | | |

1. All but 7 of 1567 effluent turbidities (PAREFF) were at or below 0.05 NTU, the instrumentation MDL. In both plots, the symbols run together and appear as a line.

## Comparison of Raw/Treated Water to Standards

The data collected in Pardee Reservoir and summarized in this report show that the raw water meets most treated water quality standards. The only primary MCLs exceeded in the raw water are microbiological parameters, turbidity and aluminum, all of which are effectively removed through the process trains at Pardee Center, PARA, Walnut Creek, Lafayette and Orinda WTPs. All five WTPs served by Pardee Reservoir produce consistent, high-quality treated water, regardless of seasonal variations in raw water turbidity. Aluminum, iron, and manganese concentrations occasionally exceeded secondary MCLs in the raw water, but the concentrations in the treated water effluent were well below the MCLs.

The data indicates that Pardee Center, PARA, Walnut Creek, Lafayette and Orinda WTP effectively treat Pardee Reservoir water. The District's annual CCRs for the large systems (Walnut Creek, Lafayette, and Orinda WTPs) present treated water distribution system-wide averages for many of the regulated parameters discussed herein. CCRs for the small water systems (Pardee Center and PARA WTPs) document distribution system-wide averages for the pertinent water quality parameters. The CCRs from 2005-2009 are provided in Appendix 4-2. Monthly summaries of WTP operations were used to evaluate the corresponding treated and finished water qualities.

## Camanche Reservoir - Evaluation of Water Quality

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.

Table 4-12 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 five-year period of MRWSS Update 2010. 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 4-12. Camanche Reservoir Raw Water Monitoring – Jan. 2005 thru Dec. 2009 [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 | 302 | 170 | 2 | ND | 9,000 | 1-2 | - - - |
| Fecal Coliform | TCR [c] | MPN/100mL | 226 | 147 | 2 | 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 | 252 | 243 | 29 | ND | 16,000 | 2 | |
| Turbidity | TT [b] | NTU | 65 | 65 | 1.6 | 0.6 | 6.4 | 0.04-0.07 | - - - |
| Viruses | TT [b] | | NA | NA | NA | NA | NA | NA | - - - |
| *Primary Standards – Inorganic Chemicals* | | | | | | | | | |
| Aluminum (Al) | 1000 | µg/L | 56 | 43 | 33 | ND | 170 | 14-21 | 50 |
| Antimony (Sb) | 6 | µg/L | 37 | 12 | ND | ND | 0.16 | 0.1-0.2 | 6 |
| Arsenic (As) | 10 | µg/L | 8 | 5 | 0.23 | ND | 0.48 | 0.2-0.4 | 2 |
| Asbestos [d] | 7 | MFL | 1 | 0 | ND | — | — | 0.02 | 0.2 |
| Barium (Ba) | 1000 | µg/L | 57 | 57 | 16 | 11 | 22 | 0.071-1 | 100 |
| Beryllium (Be) | 4 | µg/L | 57 | 1 | ND | ND | 0.23 | 0.03-1 | 1 |
| Cadmium (Cd) | 5 | µg/L | 37 | 3 | ND | ND | 1.1 | 0.02-0.091 | 1 |
| Chromium (Cr) | 50 | µg/L | 37 | 29 | 0.57 | 0 | 1.5 | 0.2-0.51 | 10 |
| Chromium-6 (Cr (VI) ) | - - - | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Cyanide (CN) | 150 | µg/L | 7 | 2 | ND | ND | 20 | 10 | 100 |
| Fluoride ($F^-$) | 2 | mg/L | 4 | 4 | 0.02 | 0.018 | 0.037 | 0.001-0.008 | 0.1 |
| Mercury (Hg) | 2 | µg/L | 18 | 8 | ND | ND | 0.3 | 0.02 | 1 |
| Nickel (Ni) | 100 | µg/L | 37 | 35 | 0.48 | ND | 1.4 | 0.1-0.3 | 10 |
| Nitrate+Nitrite (as N) | 10 | mg/L | 60 | 44 | 0.026 | ND | 0.093 | --- | - - - |
| Nitrate (as N) | 10 | mg/L | 78 | 48 | 0.016 | ND | 0.093 | 0.002-0.009 | 0.4 |
| Nitrite (as N) | 1 | mg/L | 61 | 13 | ND | ND | 0.014 | 0.001-0.004 | 0.4 |
| Perchlorate ($ClO_4^-$) | 6 | µg/L | 3 | 0 | ND | ND | ND | 1.3 | 4 |
| Selenium (Se) | 50 | µg/L | 6 | 0 | ND | ND | ND | 0.2-0.4 | 5 |
| Thallium (Tl) | 2 | µg/L | 37 | 0 | ND | ND | ND | 0.2-0.51 | 1 |

## Table 4-12. Camanche 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 | NA | NA | NA | NA | NA | NA | 1 |
| Atrazine (Aatrex) [d] | 1 | µg/L | 2 | 0 | — | ND | ND | 0.03-0.04 | 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 | 21 | 0 | ND | ND | ND | 0.09-0.36 | 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 | 21 | 0 | ND | ND | ND | 0.06-0.41 | 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 | NA | NA | NA | NA | NA | NA | 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 [d] | 4 | µg/L | 2 | 0 | — | ND | ND | 0.07-0.08 | 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 |
| Thiobencarb | 70 | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Toxaphene | 3 | µg/L | NA | NA | NA | NA | NA | NA | 1 |

## Table 4-12. Camanche 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 [d] | 15 | pCi/L | 4 | 3 | 0.37 | 0 | 1.86 | NA | 3 |
| Gross Beta/ Photon | 50 | pCi/L | NA | NA | NA | NA | NA | NA | 4 |
| Radium 226+228 | 5 | pCi/L | 2 | 1 | — | ND | 0.44 | 0.28-0.98 | - - - |
| Radium-226 | - - - | pCi/L | 2 | 0 | — | ND | ND | 0.28-0.29 | 1 |
| Radium-228 | - - - | pCi/L | 2 | 1 | — | ND | 0.44 | 0.49-0.98 | 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 | --- | - - - |
| Bromodichloro-methane | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.3 | 1 |
| Bromoform | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.03-0.35 | 1 |
| Chloroform | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.05-0.31 | 1 |
| Dibromochloro-methane | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.28 | 1 |

## Table 4-12. Camanche 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 | 21 | 0 | ND | ND | ND | 0.06-0.29 | 0.5 |
| Carbon Tetrachloride | 0.5 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.36 | 0.5 |
| 1,2-Dichlorobenzene (o-DCB) | 600 | µg/L | 21 | 0 | ND | ND | ND | 0.06-0.34 | 0.5 |
| 1,4-Dichlorobenzene (p-DCB) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.1-0.4 | 0.5 |
| 1,1-Dichloroethane (1,1-DCA) | 5 | µg/L | 20 | 0 | ND | ND | ND | 0.09-0.5 | 0.5 |
| 1,2-Dichloroethane (1,2-DCA) | 0.5 | µg/L | 21 | 0 | ND | ND | ND | 0.07-0.32 | 0.5 |
| 1,1-Dichloroethylene (1,1-DCE) | 6 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.34 | 0.5 |
| cis-1,2-Dichlorethylene (c-1,2-DCE) | 6 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.28 | 0.5 |
| trans-1,2-Dichloro-ethylene (t-1,2-DCE) | 10 | µg/L | 21 | 0 | ND | ND | ND | 0.07-0.34 | 0.5 |
| Dichloromethane (Methylene Chloride) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.09-0.32 | 0.5 |
| 1,2-Dichloropropane | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.1-0.31 | 0.5 |
| 1,3-Dichloropropene (TOTAL) | 0.5 | µg/L | 21 | 0 | ND | ND | ND | 0.11-0.48 | - - - |
| Cis-1,3-Dichloro-propene | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.05-0.3 | 0.5 |
| Trans-1,3-Dichloro-propene | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.06-0.28 | 0.5 |
| Ethylbenzene | 300 | µg/L | 21 | 0 | ND | ND | ND | 0.05-0.3 | 0.5 |
| Methyl-tert-butyl ether (MTBE) | 13 | µg/L | 21 | 0 | ND | ND | ND | 0.09-0.72 | 3 |
| Monochlorobenzene (Chlorobenzene) | 70 | µg/L | 21 | 0 | ND | ND | ND | 0.07-0.3 | 0.5 |
| Styrene | 100 | µg/L | 21 | 0 | ND | ND | ND | 0.06-0.29 | 0.5 |
| 1,1,2,2-Tetra-chloroethane | 1 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.33 | 0.5 |
| Tetrachloroethylene (PCE) | 5 | µg/L | 19 | 0 | ND | ND | ND | 0.08-0.5 | 0.5 |
| Toluene | 150 | µg/L | 21 | 4 | ND | ND | 0.61 | 0.08-0.28 | 0.5 |
| 1,2,4-Trichlorobenzene | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.05-0.49 | 0.5 |
| 1,1,1-Trichloroethane (1,1,1-TCA) | 200 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.34 | 0.5 |
| 1,1,2-Trichloroethane (1,1,2-TCA) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.3 | 0.5 |
| Trichloroethylene (TCE) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.06-0.32 | 0.5 |
| Trichlorofluoromethane (Freon 11) | 150 | µg/L | 21 | 0 | ND | ND | ND | 0.07-0.35 | 5 |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113) | 1200 | µg/L | 21 | 0 | ND | ND | ND | 0.1-0.38 | 10 |
| Vinyl Chloride | 0.5 | µg/L | 21 | 0 | ND | ND | ND | 0.09-0.34 | 0.5 |
| Xylenes (Total) | 1750 | µg/L | 21 | 0 | ND | ND | ND | 0.2-0.39 | - - - |
| m+p-Xylene | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.12-0.5 | 0.5 |
| o-Xylene | - - - | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.35 | 0.5 |

## Table 4-12. Camanche 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 | 56 | 43 | 33 | ND | 170 | 14-21 | 50 |
| Chloride (Cl) | 250 | mg/L | 7 | 7 | 1.8 | 1.1 | 2.3 | 0.011-0.015 | - - - |
| Color | 15 | color unit | 3 | 3 | 7 | 3 | 8 | 1 | - - - |
| Specific Conductance | 900 | µS/cm | 3 | 3 | 44 | 38 | 50 | 0.3 | - - - |
| Copper (Cu) | 1000 | µg/L | 31 | 0 | ND | ND | ND | 3.1-8.3 | 50 |
| Foaming Agents (MBAS) | 500 | µg/L | 1 | 0 | ND | — | — | 4.8 | - - - |
| Iron (Fe) | 300 | µg/L | 56 | 56 | 79 | 20 | 210 | 5.2-12 | 100 |
| Manganese (Mn) | 50 | µg/L | 56 | 56 | 9.3 | 1.9 | 190 | 0.1-1 | 20 |
| Methyl-tert-butyl ether (MTBE) | 5 | µg/L | 21 | 0 | ND | ND | ND | 0.09-0.72 | 3 |
| Odor-Threshold | 3 | TON | 11 | 11 | 6.2 | 1.5 | 12 | 1 | 1 |
| pH | 6.5-8.5 | pH units | 6 | 6 | 7.4 | 7 | 7.6 | 0 | - - - |
| Silver (Ag) | 100 | µg/L | 34 | 2 | ND | ND | 0.6 | 0.01-0.2 | 10 |
| Sulfate | 250 | mg/L | 54 | 54 | 1.9 | 1.3 | 2.8 | 0.015-0.061 | 0.5 |
| Thiobencarb | 1 | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Total Dissolved Solids (TDS) | 500 | mg/L | 4 | 4 | 33 | 23 | 35 | 6-25 | - - - |
| Turbidity | 5 | NTU | 55 | 55 | 1.8 | 0.60 | 6.4 | 0.04-0.07 | - - - |
| Zinc (Zn) | 2000 | µg/L | NA | NA | NA | NA | NA | NA | 50 |
| *Lead and Copper Rule (Action Levels)* | | | | | | | | | |
| Copper (Cu) | 1300 [e] | µg/L | 31 | 0 | ND | ND | ND | 3.1-8.3 | 50 |
| Lead (Pb) | 15 [e] | µg/L | 36 | 24 | 0.2 | ND | 2.9 | 0.1-0.2 | 5 |

## Table 4-12. Camanche Reservoir Raw Water Monitoring (*continued*)

| Water Quality Parameters | MCL | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|---|
| *CDPH Drinking Water Notification Levels* | | | | | | | | | |
| Boron | 1000 | µg/L | 58 | 49 | 4.7 | ND | 12 | 3.1-10 | 100 |
| n-Butylbenzene | 260 | µg/L | 21 | 0 | ND | ND | ND | 0.06-0.4 | 0.5 |
| sec-Butylbenzene | 260 | µg/L | 21 | 0 | ND | ND | ND | 0.07-0.29 | 0.5 |
| tert-Butylbenzene | 260 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.33 | 0.5 |
| Carbon disulfide | 160 | µg/L | 21 | 1 | ND | ND | 0.33 | 0.05-0.38 | 0.5 |
| Chlorate | 800 | µg/L | NA | NA | NA | NA | NA | NA | 20 |
| 2-Chlorotoluene | 140 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.34 | 0.5 |
| 4-Chlorotoluene | 140 | µg/L | 21 | 0 | ND | ND | ND | 0.09-0.27 | 0.5 |
| Dichlorodifluoromethane (Freon 12) | 1000 | µg/L | 21 | 0 | ND | ND | ND | 0.05-0.47 | 0.5 |
| 1,4-Dioxane | 3 | µg/L | NA | NA | NA | NA | NA | NA | 3 |
| Ethylene Glycol (anti-freeze) | 14 | mg/L | NA | NA | NA | NA | NA | NA | - - - |
| Formaldehyde | 100 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| HMX | 350 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Isopropylbenzene | 770 | µg/L | 21 | 0 | ND | ND | ND | 0.07-0.28 | 0.5 |
| Manganese | 500 | µg/L | 56 | 56 | 9.3 | 1.9 | 190 | 0.1-1 | 20 |
| Methyl isobutyl ketone (MIBK) | 120 | µg/L | 21 | 0 | ND | ND | ND | 0.1-0.41 | 5 |
| Naphthalene | 17 | µg/L | 21 | 0 | ND | ND | ND | 0.08-0.42 | 0.5 |
| N-Nitrosodiethyamine (NDEA) | 10 | ng/L | NA | NA | NA | NA | NA | NA | 5 |
| N-Nitrosodimethylamine (NDMA) | 10 | ng/L | NA | NA | NA | NA | NA | NA | 2 |
| N-Nitrosodi-n-propylamine (NDPA) | 10 | ng/L | NA | NA | NA | NA | NA | NA | 7 |
| Propachlor | 90 | µg/L | NA | NA | NA | NA | NA | NA | 0.5 |
| n-Propylbenzene | 260 | µg/L | 21 | 0 | ND | ND | ND | 0.06-0.3 | 0.5 |
| Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) | 0.3 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Tertiary butyl alcohol (TBA) | 12 | µg/L | 21 | 0 | ND | ND | ND | 0.86-2 | 2 |
| 1,2,3-Trichloropropane (1,2,3-TCP) | 5 | ng/L | 21 | 0 | ND | ND | ND | 70-340 | 5 |
| 1,2,4-Trimethylbenzene | 330 | µg/L | 21 | 0 | ND | ND | ND | 0.07-0.3 | - - - |
| 1,3,5-Trimethylbenzene | 330 | µg/L | 21 | 0 | ND | ND | ND | 0.04-0.32 | 0.5 |
| 2,4,6-Trinitrotoluene (TNT) | 1 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Vanadium | 50 | µg/L | NA | NA | NA | NA | NA | NA | 3 |

## Table 4-12. Camanche Reservoir Raw Water Monitoring (*continued*)

| Water Quality Parameters | MCL | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|---|
| *CDPH Archived Advisory Levels* | | | | | | | | | |
| Aldicarb | 7 | µg/L | NA | NA | NA | NA | NA | NA | 3 |
| Aldrin | 2 | ng/L | NA | NA | NA | NA | NA | NA | - - - |
| Baygon | 30 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| a-Benzene Hexachloride | 15 | ng/L | NA | NA | NA | NA | NA | NA | - - - |
| b-Benzene Hexachloride | 25 | ng/L | NA | NA | NA | NA | NA | NA | - - - |
| Captan | 15 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Carbaryl | 700 | µg/L | NA | NA | NA | NA | NA | NA | 5 |
| Chloropicrin | 50 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Chlorpropham (CIPC) | 1.2 | mg/L | NA | NA | NA | NA | NA | NA | - - - |
| Diazinon | 6 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 1,3-Dichlorobenzene | 600 | µg/L | 21 | 0 | ND | ND | ND | 0.04-0.31 | 0.5 |
| Dieldrin | 2 | ng/L | NA | NA | NA | NA | NA | NA | - - - |
| Dimethoate | 1 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4-Dimethylphenol | 100 | µg/L | NA | NA | NA | NA | NA | NA | 5 |
| Diphenamide | 200 | µg/L | NA | NA | NA | NA | NA | NA | 100 |
| Ethion | 4 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Malathion | 160 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| N-Methyl dithiocarb-amate (Metam sodium) | 20 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Methylisothiocyanate | 50 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Methyl parathion | 2 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Parathion | 40 | µg/L | NA | NA | NA | NA | NA | NA | 20 |
| Pentachloronitro-benzene | 20 | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Phenol | 4.2 | mg/L | NA | NA | NA | NA | NA | NA | 0.005 |
| 2,3,5,6-Tetrachloro-terephthalate | 3.5 | mg/L | NA | NA | NA | NA | NA | NA | - - - |
| Trithion | 7 | µg/L | NA | NA | NA | NA | NA | NA | - - - |

## Table 4-12. Camanche Reservoir Raw Water Monitoring (*continued*)

| Water Quality Parameters | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|
| *UCMR 1 Constituents* | | | | | | | | |
| Acetochlor | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| *Aeromonas* | cfu/100 mL | NA | NA | NA | NA | NA | NA | - - - |
| DCPA mono- and di-acid degradate | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| 4,4'-DDE | µg/L | NA | NA | NA | NA | NA | NA | 0.8 |
| Diazinon | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4-Dichlorophenol | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4-Dinitrophenol | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4-Dinitrotoluene | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| 2,6-Dinitrotoluene | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| 1,2-Diphenylhydrazine | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Disulfoton | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Diuron | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| EPTC | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Fonofos | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Linuron | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2-Methylphenol | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Molinate | µg/L | NA | NA | NA | NA | NA | NA | 0.9 |
| Methyl-tert-butyl ether (MTBE) | µg/L | 21 | 0 | ND | ND | ND | 0.09-0.72 | 3 |
| Nitrobenzene | µg/L | 20 | 0 | ND | ND | ND | 0.43-10 | 10 |
| Perchlorate ($ClO_4^-$) | µg/L | 3 | 0 | ND | ND | ND | 1.3 | 4 |
| Prometon | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| Terbacil | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| Terbufos | µg/L | NA | NA | NA | NA | NA | NA | - - - |
| 2,4,6-Trichlorophenol | µg/L | NA | NA | NA | NA | NA | NA | - - - |

## Table 4-12. Camanche Reservoir Raw Water Monitoring (*continued*)

| Water Quality Parameters | Units | No. of Samples | No. of Detections | Median | Minimum | Maximum | MDL | DLR |
|---|---|---|---|---|---|---|---|---|
| *UCMR 2 Constituents* | | | | | | | | |
| Acetochlor | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| Acetochlor ethane sulfonic acid (ESA) | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Acetochlor oxanilic acid (OA) | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| Alachlor | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| Alachlor ethane sulfonic acid (ESA) | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Alachlor oxanilic acid (OA) | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| Dimethoate | µg/L | NA | NA | NA | NA | NA | NA | 0.7 |
| 1,3-dinitrobenzene | µg/L | NA | NA | NA | NA | NA | NA | 0.8 |
| 2,2',4,4',5,5'-hexabromobiphenyl (HBB) | µg/L | NA | NA | NA | NA | NA | NA | 0.7 |
| 2,2',4,4',5,5'-hexabromodiphenyl ether (BDE-153) | µg/L | NA | NA | NA | NA | NA | NA | 0.8 |
| Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX) | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Metolachlor | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Metolachlor ethane sulfonic acid (ESA) | µg/L | NA | NA | NA | NA | NA | NA | 1 |
| Metolachlor oxanilic acid (OA) | µg/L | NA | NA | NA | NA | NA | NA | 2 |
| N-Nitrosodiethylamine (NDEA) | ng/L | NA | NA | NA | NA | NA | NA | 5 |
| N-Nitrosodimethylamine (NDMA) | ng/L | NA | NA | NA | NA | NA | NA | 2 |
| N-Nitrosodi-n-butylamine (NDBA) | ng/L | NA | NA | NA | NA | NA | NA | 4 |
| N-Nitrosodi-n-propylamine (NDPA) | ng/L | NA | NA | NA | NA | NA | NA | 7 |
| N-Nitrosomethylethylamine (NMEA) | ng/L | NA | NA | NA | NA | NA | NA | 3 |
| N-Nitrosopyrrolidine (NPYR) | ng/L | NA | NA | NA | NA | NA | NA | 2 |
| 2,2',4,4',5-pentabromodiphenyl ether (BDE-99) | µg/L | NA | NA | NA | NA | NA | NA | 0.9 |
| 2,2',4,4',6-pentabromodiphenyl ether (BDE-100) | µg/L | NA | NA | NA | NA | NA | NA | 0.5 |
| Terbufos sulfone | µg/L | NA | NA | NA | NA | NA | NA | 0.4 |
| 2,2',4,4'-tetrabromodiphenyl ether (BDE-47) | µg/L | NA | NA | NA | NA | NA | NA | 0.3 |
| 2,4,6-trinitrotoluene (TNT) | µg/L | NA | NA | NA | NA | NA | NA | 0.8 |

## Table 4-12. Camanche 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 | 59 | 59 | 19 | 14 | 48 | 5 | - - - |
| Ammonia | mg/L | 27 | 26 | 0.02 | ND | 0.14 | 0.007-0.04 | - - - |
| Bromide | mg/L | 3 | 0 | ND | ND | ND | 0.01-0.018 | - - - |
| Calcium (Ca) | µg/L | 82 | 82 | 4,300 | 3,000 | 14,000 | 3-22 | - - - |
| Total Hardness (as $CaCO_3$) | mg/L | 53 | 53 | 19 | 13 | 22 | 2-3 | - - - |
| Magnesium (Mg) | µg/L | 59 | 59 | 1,300 | 950 | 1,600 | 1-15 | - - - |
| TOC | mg/L | 1 | 1 | 1.8 | — | — | 0.02 | 0.3 |
| Dissolved Organic Carbon | mg/L | 5 | 5 | 1.7 | 1.4 | 2.1 | 0.02 | - - - |
| Orthophosphate (as P) | mg/L | 41 | 8 | ND | ND | 0.052 | 0.007-0.018 | - - - |
| Total Phosphate (as P) | mg/L | 30 | 30 | 0.019 | 0.013 | 0.034 | 0.008-0.016 | - - - |
| Silica | µg/L | 50 | 50 | 9,300 | 2,800 | 13,000 | 65-120 | - - - |
| Sodium (Na) | µg/L | 59 | 59 | 2,600 | 1,700 | 2,800 | 11-21 | - - - |
| Total Suspended Solids (TSS) | mg/L | 53 | 22 | ND | ND | 7 | 1.2-2 | - - - |
| Tert-Amyl methyl ether | µg/L | 21 | 0 | ND | ND | ND | 0.05-0.26 | 3 |
| Ethyl-tert-butyl-ether | µg/L | 21 | 0 | ND | ND | ND | 0.03-0.26 | 3 |

*a.* Abbreviations: NA = data not available, ND = not detected (i.e. value is below 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.

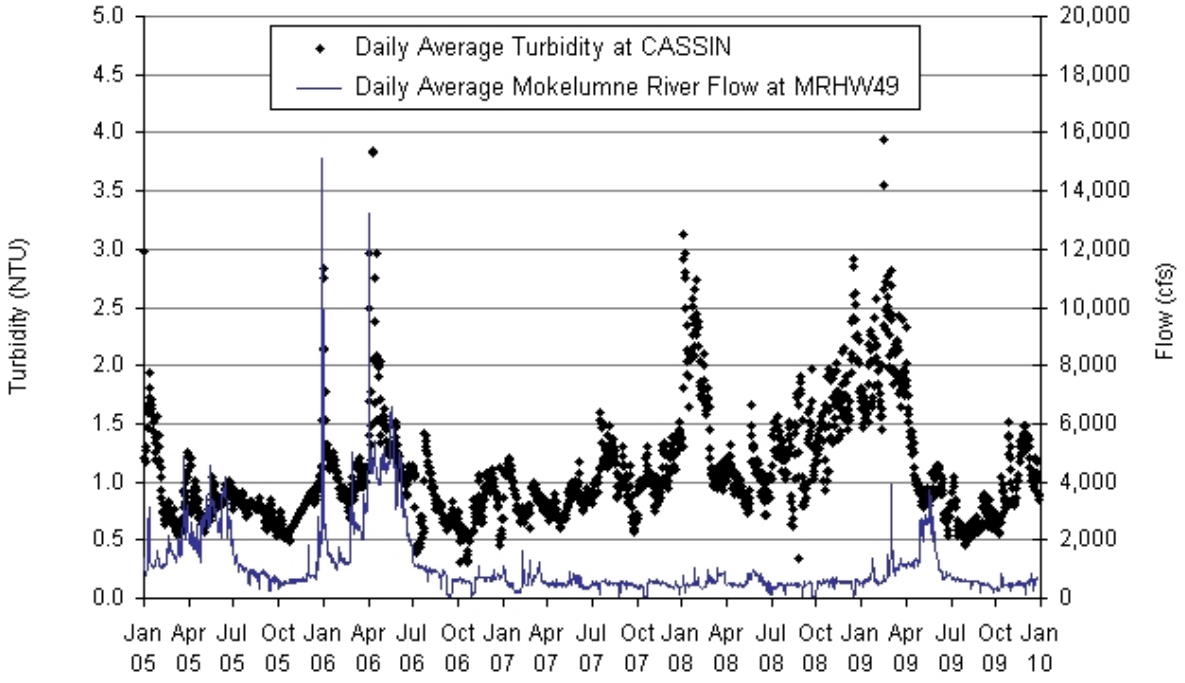
*d.* CDPH requires the District to monitor asbestos, atrazine, simazine, and gross alpha particle activity once every 9 years. Data shown in table is from the latest sample(s) collected. Asbestos results shown are from CASSIN in February 2004, atrazine and simazine results are from the reservoir at CASS Intake in February and July 2003, and gross alpha particle activity results are from quarterly samples collected in 2001.

*e.* Lead and copper are regulated with an action level instead of an MCL. Per the Lead and Copper Rule, if more than 10% of home water samples exceed the action levels, water systems must take additional steps.

**Turbidity.** Camanche Reservoir has very low turbidity water most of the time with occasional spikes of moderate turbidity. The 65 grab samples collected from Camanche Reservoir and CASSIN ranged from 0.6 to 6.4 NTU with a median value of 1.6 NTU. The highest measurements came from the reservoir inlet at the FLEX, CAMA, and CAMB locations (Figure 4-1 provides a map of these locations). Additional turbidity data collected in the CASSIN by an online turbidity monitoring station and averaged over each day are depicted in Figure 4-17. While the maximum average daily turbidity was 3.9 NTU, the median value was 0.96 NTU during this five-year period. Elevated turbidity events occurred in the winter and/or spring when elevated turbidity was also observed in the Mokelumne River and Pardee Reservoir water. The only winter without a noticeable spike in turbidity was 2006-07, one of the drought years.

Table 4-13 compares the turbidity from CASSIN on-line turbidity, as well as coliform data (discussed below) during the periods of MRWSS Update 2010 and MRWSS Update 2005. In the previous update period, the maximum and median daily average turbidities were significantly higher than those recorded during this update period. This may be partially attributable to less watershed runoff due to the drought in the winters of 2006-07 and 2007-08.

**Figure 4-17. 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 monthly samples for total coliform, fecal coliform, and *E. coli* at CASSIN prior to July 2006, then sampling frequency increased to a biweekly basis at the plant influent. The District discontinued fecal coliform sampling at CASSIN in May 2009,

but continued total coliform and *E. coli* monitoring. All three parameters were also sampled every one or two weeks during the summer in the vicinity of CASS Beach Area (Beach Cove and Beach Area HB locations).

*E. coli* samples collected at least biweekly from CASSIN for 12 months in 2007 were submitted to CDPH for LT2ESWTR bin determination. Due to the fact that CASS WTP is a small system serving less than 10,000 people, *Cryptosporidium* monitoring was not required for LT2ESWTR so long as the mean *E. coli* sample results were not greater than 10/100 mL.

Table 4-13 shows the statistical summary for each microbiological parameter with all raw water sampling locations combined for the five-year periods of MRWSS Update 2010 and MRWSS Update 2005. The median and maximum coliform concentrations remained at the same order of magnitude between periods for each parameter.

**Table 4-13: Summary of Turbidity and Coliform data in Camanche Reservoir** [a]
From MRWSS Update 2005 and MRWSS Update 2010

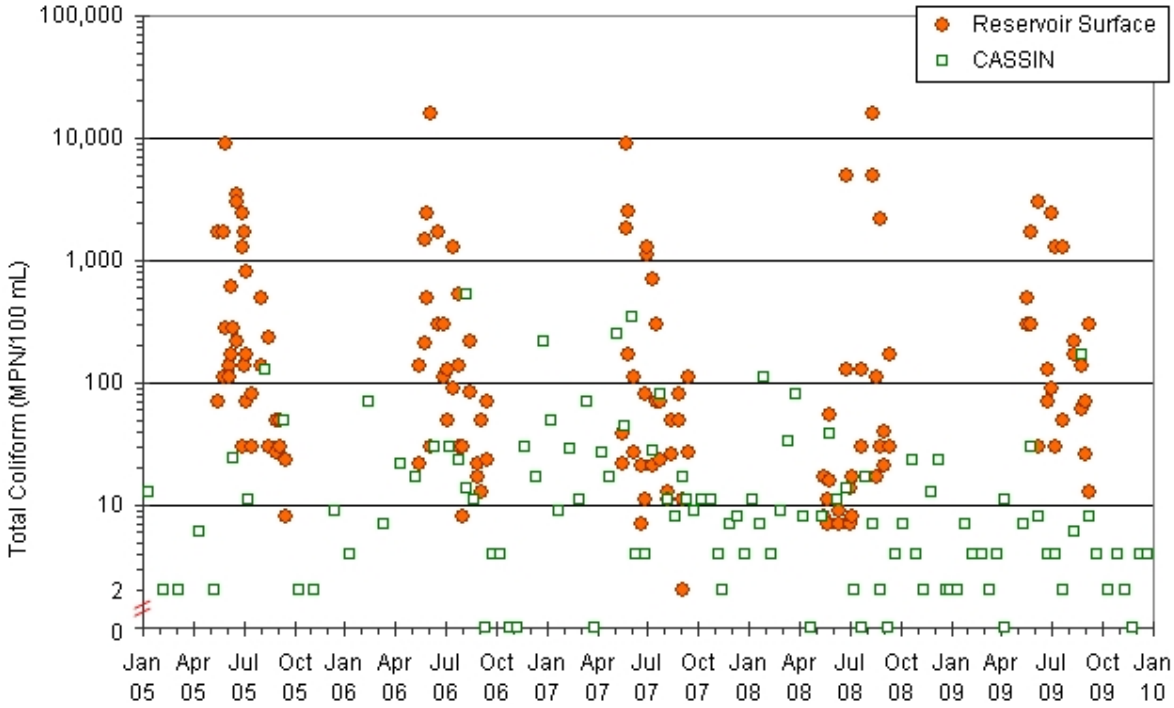
| Parameter | Units | MRWSS Update 2005 Jun. 1999 - Dec. 2004 | | | MRWSS Update 2010 Jan. 2005 - Dec. 2009 | | | MDL |
|---|---|---|---|---|---|---|---|---|
| | | No. of Samples | Median | Max | No. of Samples | Median | Max | |
| Turbidity (Daily Average) | NTU | NA [b] | 1.5 | 16.6 | NA [b] | 0.96 | 3.94 | |
| *E. coli* | MPN/100 mL | 250 | 2 | 2,400 | 302 | 2 | 9,000 | 1-2 |
| Fecal Coliform | MPN/100 mL | 248 | 2 | 3,000 | 226 | 2 | 9,000 | 2 |
| Total Coliform | MPN/100 mL | 251 | 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 4-18 and 4-19 show the results of total coliform and *E. coli* sampling, respectively. Total coliform approached or exceeded 10,000 MPN/100 mL each summer on the reservoir surface during high recreational use, while *E. coli* maxima varied considerably between years, approaching 10,000 MPN/100 mL in summer 2006, but remaining below 100 MPN/100 mL through the summer of 2007. At CASSIN, the total coliform never exceeded 1,000 MPN/100 mL and the *E. coli* never exceeded 50 MPN/100 mL, because the plant intake is in a protected location and below the reservoir surface. As illustrated by the frequency and cumulative distribution of data in 4-19b, 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 LT2ESWTR at CASSIN were well below 10 MPN/100 mL, so *Cryptosporidiium* monitoring was not required. CASS WTP has been tentatively assigned a Bin 1 classification and the District will not be required to meet additional removal requirements for *Cryptosporidium*.

**Figure 4-18. 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.**

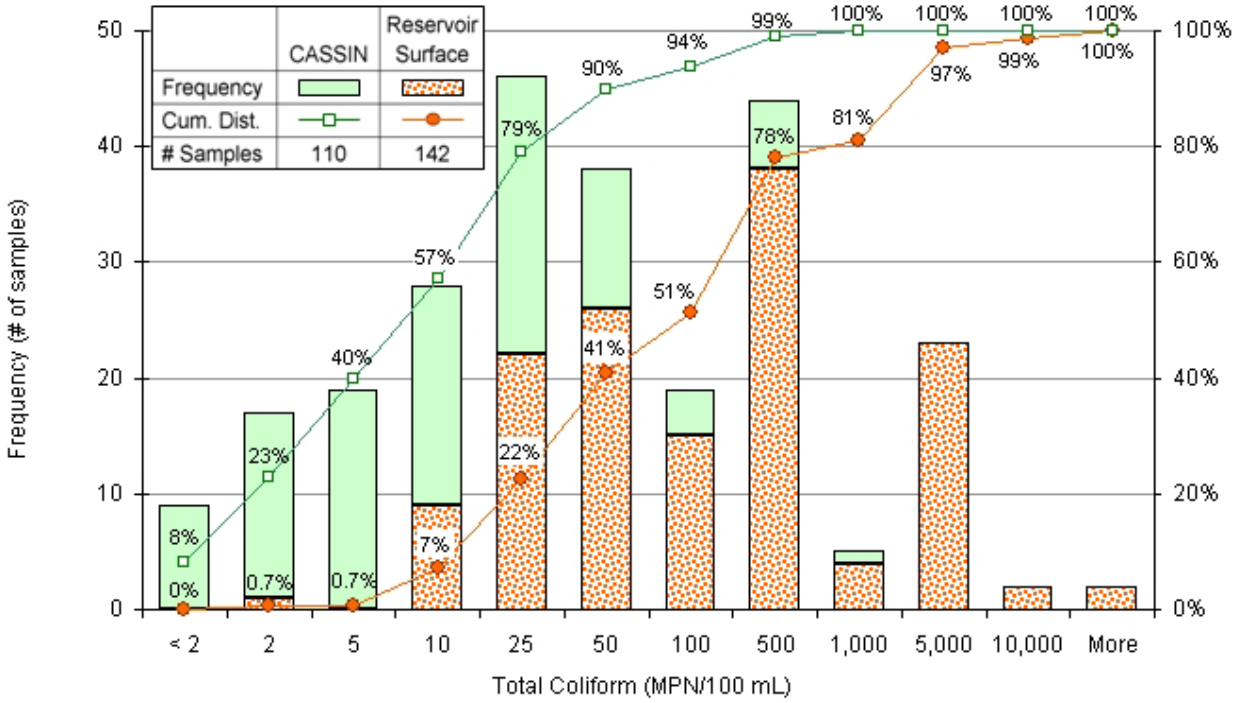
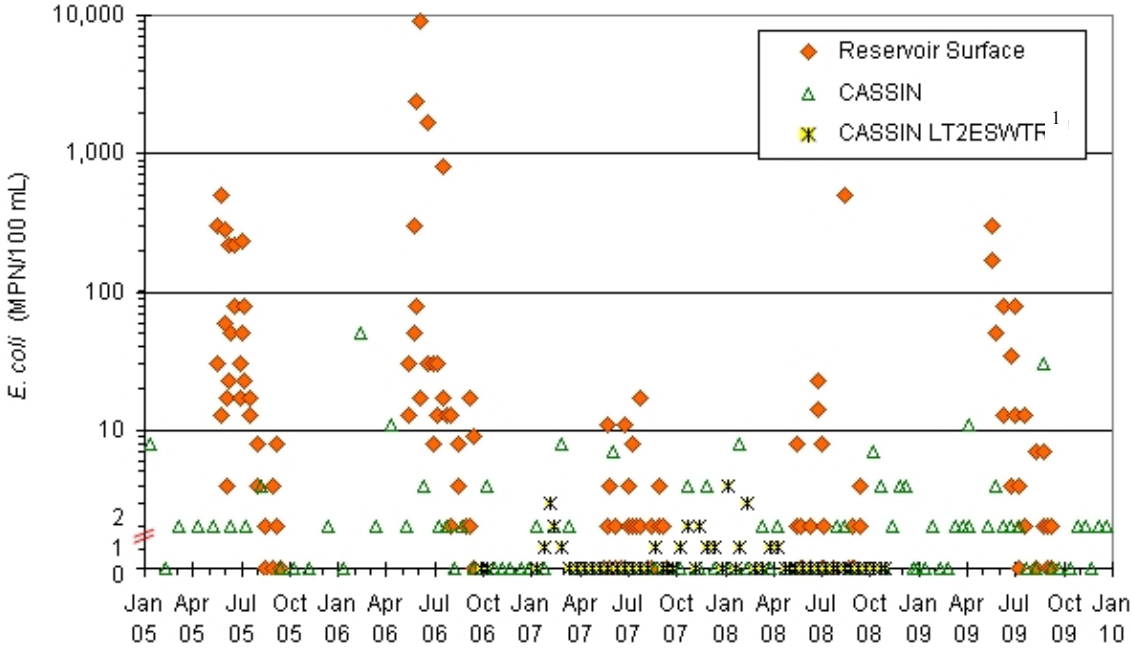
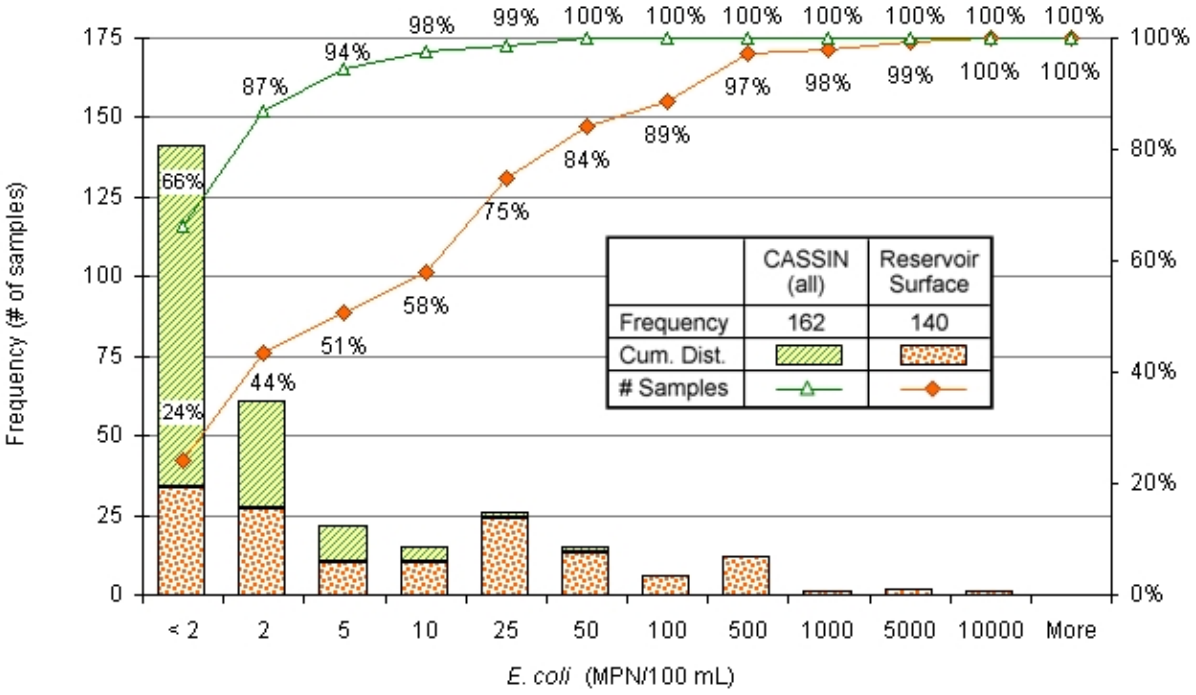


**Figure 4-19. *E. coli* in Camanche Reservoir.**

**(a) Sample results.** Non-detect samples were treated as zero.[1]




**(b) Frequency and cumulative distribution of sample results.**




1. For LT2ESWTR compliance, samples were collected at least twice per month for 12 consecutive months from CASSIN. All LT2ESWTR samples were analyzed with Colisure (MDL = 1 MPN/100 mL), while most others were analyzed with MTF (MDL = 2 MPN/100 mL).

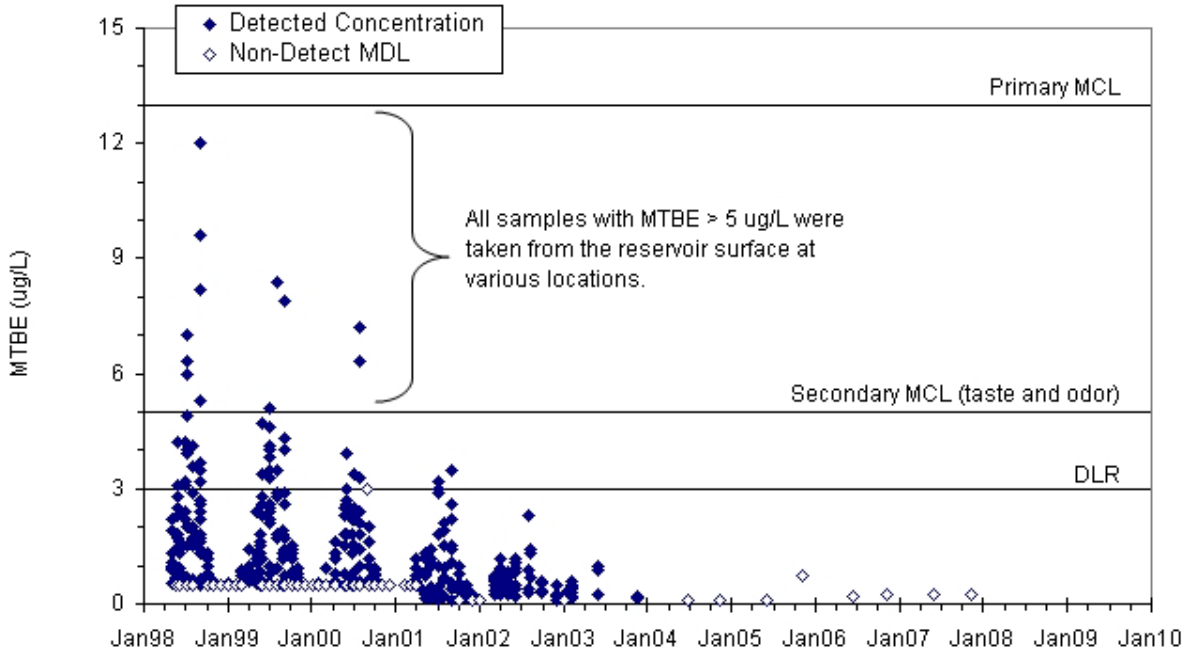
**Regulated Inorganic Chemicals.** The maximum raw water concentrations of regulated inorganics in Camanche reservoir raw water have been non-detect or well below the federal and state MCLs. These results include sampling for Title 22 annually in CASSIN. Though not required for compliance, the District also sampled for the regulated inorganics throughout the reservoir at various frequencies for operational purposes.

**Regulated Organic Compounds.** CDPH approved a monitoring waiver for the regulated SOCs (with the exception of atrazine and simazine) in Camanche Reservoir every nine years. These were last sampled in February and July 2003 and were not detected. VOCs were monitored in the reservoir and CASSIN for both regulatory and operational purposes and none were detected above the DLR.

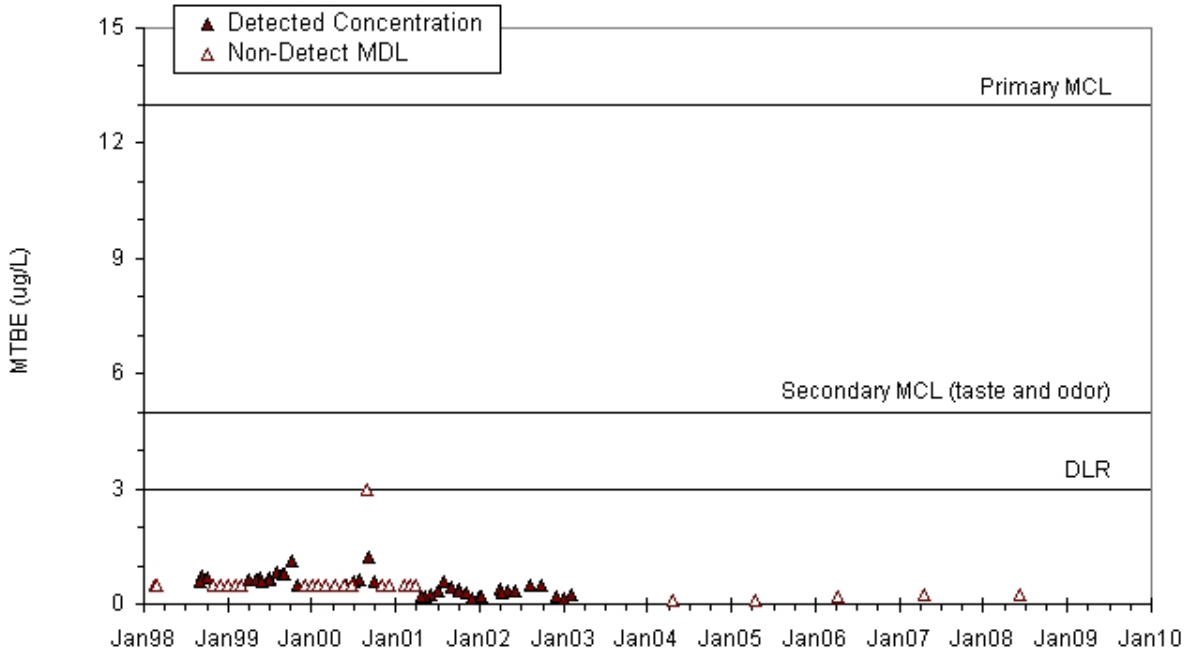
Based on monitoring initiated in 1998, the District previously detected MTBE in Camanche Reservoir frequently. Figure 4-24 depicts the results of this MTBE sampling program with a maximum concentration of 12 µg/L in 1998 from the surface of the reservoir near the South Shore Marina (SS Marina location). Other high concentrations were from the Beach Cove and Beach Area HB where jet skis are common in the summer. The concentration spiked less and less each summer following a state-wide ban on MTBE in gasoline, and no MTBE has been detected since 2003. The District has gradually reduced the monitoring frequency. Figure 4-24b also shows a decline in MTBE concentrations in CASSIN, although, because CASSIN is located in a protected area, the influent MTBE readings have always been much lower than the reservoir samples.

**Figure 4-24. MTBE in Camanche Reservoir and CASSIN.**

**a) MTBE in Camanche Reservoir at various locations.**




**b) MTBE in Camanche Reservoir at various locations.**



**Radioactivity.** The District monitored for radium 226 and 228 twice in 2005 at CASSIN, and neither isotope was detected above the DLR. Under Title 22, the District is required to monitor gross alpha particle activity at CASSIN once every nine years. CDPH will not require uranium or radium monitoring unless gross alpha particle activity exceeds 5 pCi/L. The most recent gross alpha samples were collected quarterly in 2001 and no activity was detected above the DLR of 3 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 VOC's are analyzed. None were detected in the MRWSS Update 2010 period.

**Total Organic Carbon.** A single TOC sample was collected from CASSIN during the period of this MRWSS Update and it was low at 1.8 mg/L as expected.

**Taste & Odor.** TON in CASSIN ranged from 1.5 to 12, exceeding the secondary MCL of 3 TON in 8 of the 11 samples collected. However, the odors can be removed in treatment and the annual TON collected from the plant effluent ranged from 1.1 to 2.6 TON.

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 this WSS, plankton samples were taken on five occasions in 2005 and on two occasions in 2008. Samples were collected at different locations and/or depths each time for a total of 27 samples. Results are summarized in Table 4-11. This table is limited to classes of algae known to pose concerns for water quality and treatment, and to major species detected in the past ten years, though typically much higher levels are needed to cause treatment concerns. Table 4-11 shows the potential water quality and treatment concerns associated with each species.

**Table 4-13. Algal Species Detected in Camanche Reservoir from 2000 through 2009** [a, b, c]

| Algae Class / Genera | Water Treatment Concern [d] | | | Description of Taste and/or Odor [e] | Max Quantity (#/100 mL) |
|---|---|---|---|---|---|
| | Filter-Clogging | Potential Odor | Potential Taste | | |
| **Bacillariophyceae** | | | | | |
| Aulacoseira [f] | X | X | X | **Odor:** Grassy, spicy, geranium; **Taste:** Sickly sweet, oily | 17,000 |
| Fragilaria | X | X | | **Odor:** Grassy, spicy, geranium | 15,000 |
| Nitzschia | | | | | 13,000 |
| Rhizosolenia | | | | | 3,400 |
| Navicula | X | | | | 2,900 |
| Asterionella | X | X | | **Odor:** Spicy, geranium | 2,400 |
| Cyclotella | X | X | | **Odor:** Grassy, spicy, geranium | 2,000 |
| Acnanthes | | | | | 1,500 |
| **Chlorophyceae** | | | | | |
| Ankistrodesmus | | X | | **Odor:** Grassy, musty in large quantities | 2,400 |
| Elakatothrix | | X | | **Odor:** Grassy, nasturtium | 4,400 |
| Palmella | X | | | | 2,000 |
| Scenedesmus | | X | | **Odor:** Grassy in large quantities | 2,000 |
| Schroederia | | | | | 2,000 |
| Spondylosium | | | | | 5,400 |
| Ulothrix | | X | | **Odor:** Grassy in large quantities | 2,000 |
| ***Chrysophyceae*** | | | | | |
| Dinobryon | | X | X | **Odor:** Violets, fishy; **Taste:** Sickly sweet, oily | 50,000 |
| Mallomonas | | X | X | **Odor:** Violets; **Taste:** Bitter | 3,400 |
| ***Cyanophyceae*** | | | | | |
| Aphanizomenon | | X | X | **Odor:** Grassy, musty, nasturtium; **Taste:** Sweet | 2,400,000 |
| Nodularia | | | | | 250,000 |
| Anacystis | | X | X | **Odor:** Grassy, musty; **Taste:** Sweet | 3,900 |
| Agmenellum | | | | | 1,500 |

a) This list includes all algae detected greater than 1000/100 mL in at least one of the 27 samples collected in the period of this MRWSS update. There is no significance to 1000/ 100 mL; typically much higher levels are needed to cause T&O or filter clogging. This cut off was chosen arbitrarily to reduce the length of the table.

b) It is important to note that samples were not collected regularly and many species of algae were likely present in the reservoir between January 2005 and December 2009, but not listed in this table.

c) Abbreviations: *LL* = low levels (< 1000 / 100 mL), *ND* = not detected

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

e) Odor description based on moderate quantities of algae, unless otherwise noted.

f) *Aulacoseira* was previously classified as *Melosira* prior to 2005 and was reported as such in prior EBWSS updates.

**Other Secondary Standards.** Manganese exceeded secondary drinking water MCLs in Camanche Reservoir raw water in 2 out of 56 samples. The samples with high manganese levels were from the CAMD location near the dam from deep beneath the surface and all the manganese samples from CASSIN and the plant effluent were below the DLR.

**General Water Quality.** Minerals and nutrients were detected at low to moderate concentrations in Camanche Reservoir. As noted in Table 4-12, Camanche Reservoir water is fairly neutral in nature with a median pH of 7.4. Total alkalinity was low, ranging from 14 to 48 mg/L as $CaCO_3$. Total hardness ranged from 13 to 22 mg/L as $CaCO_3$, reflecting very soft water.

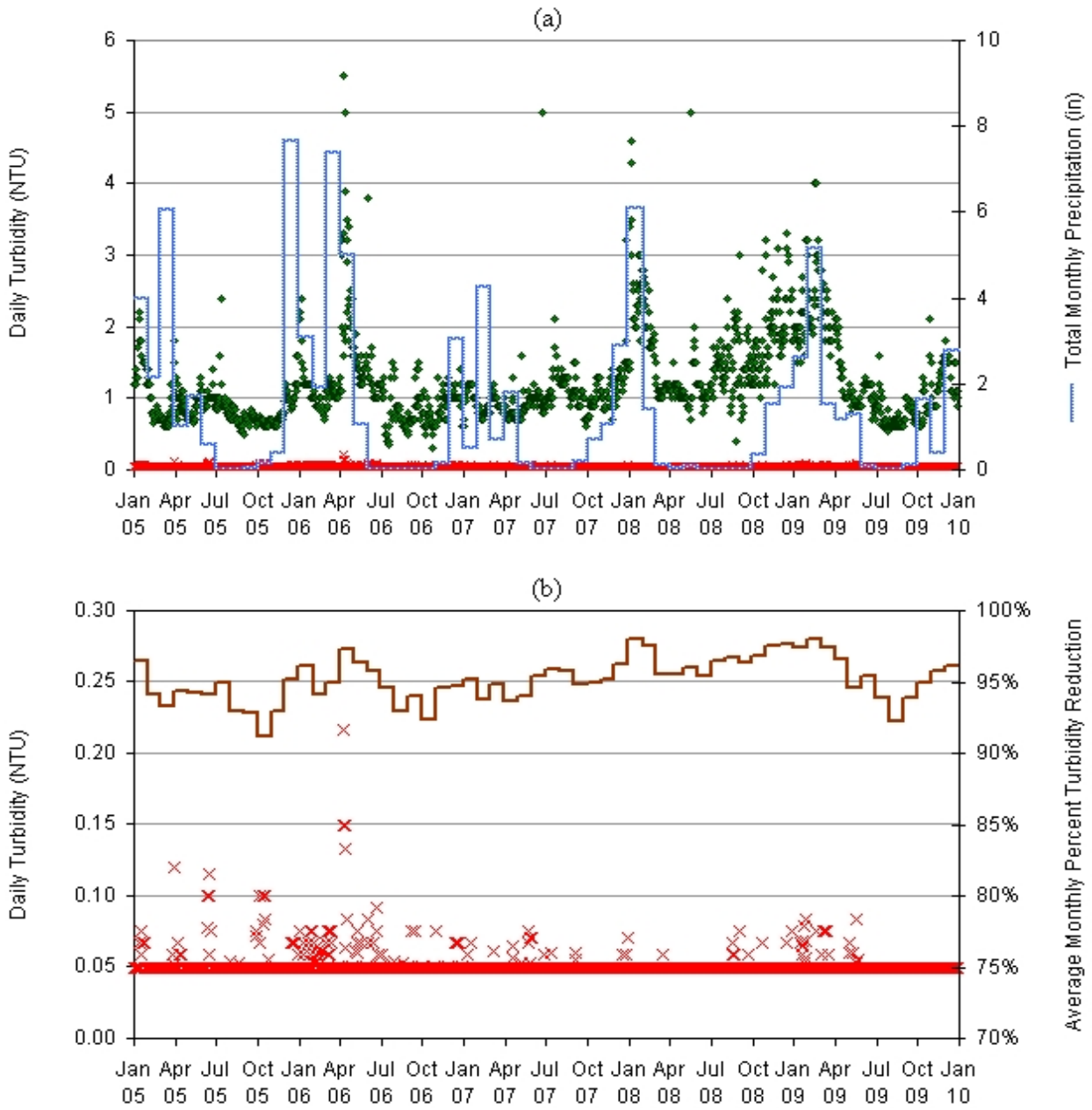
**Trends in Water Quality**. The relationship between watershed conditions and water quality may be extracted from current water quality monitoring programs. Monthly precipitation at Camanche Reservoir and turbidity at CASS WTP are plotted in Figure 4-26. As shown in this figure, a correlation is suggested between rainfall events and elevated turbidity for the reservoir. However, 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. These trends emphasize the importance of understanding the relationships between watershed activities and water quality whenever possible. In turn, watershed management practices can be modified if deemed necessary.

## *Comparison of Raw/Treated Water to Standards*

The data collected in Camanche Reservoir and summarized in this report show that the raw water meets most treated water quality standards. The only primary MCLs exceeded in the raw water are microbiological parameters and turbidity, which are effectively removed through the process train at CASS WTP. Figure 4-26 highlights the contrast between the variability of CASSIN raw water turbidities and the consistently low turbidity of the treated water from the plant effluent. CASS WTP produces consistent, high quality treated water, regardless of seasonal variation in raw water turbidity. Manganese concentrations occasionally exceeded secondary MCLs in the raw water, but the concentrations in the treated water effluent were well below the MCLs.

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




| | Symbols | Turbidities (NTU) | | |
|---|---|---|---|---|
| | | Median | 5th Percentile | 95th Percentile |
| Raw Water Influent (Daily Peak) | ◆ | *1.0* | *0.6* | *2.4* |
| Treated Water Effluent (Daily Average) | × | *0.05* | *0.05* | *0.06* |
| Monthly Turbidity Removal | — | Range: *91%* to *98%* | | |

**Figure 4-26.** Raw water turbidity trends and treated water turbidities in CASS WTP. Plot (a) shows raw water influent and treated water effluent versus time, with Camanche North precipitation on the opposite axis. Plot (b) shows effluent turbidities on a zoomed-in axis for better visualization versus time, with percent of average daily raw water turbidity removal on the opposite axis.

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

Three of the District's large system WTPs (serving over 10,000 people each) treat Mokelumne River water transported from Pardee Reservoir through the Mokelumne Aqueducts to the East Bay: Walnut Creek, Orinda, and Lafayette WTPs. The District also operates four small systems (serving less than 10,000 people each) in the vicinity of Pardee and Camanche Reservoirs. PARA and Pardee Center WTPs treat Pardee Reservoir water, CASS WTP treats Camanche Reservoir water, and CANS WTP treats groundwater. The six WTPs (not including CANS, since its supply is not under direct influence of surface water) meet USEPA's SWTR, and the subsequent regulations IESWTR for the large systems and LT1ESWTR for the small systems. Monitoring for the large East Bay system LT2ESWTR from Pardee revealed no detectable *Cryptosporidium.* Monitoring results for *E. coli* at the District's small system water sources were well under the trigger level for *Cryptosporidium* monitoring. All District WTPs have been tentatively assigned a Bin 1 classification, and the District will not be required to meet additional removal requirements for *Cryptosporidium*.

## Treatment Requirements for SWTR, IESWTR, LT2ESWTR, LT2ESWTR

As discussed in the beginning of this chapter, USEPA targeted microbial contaminants in the SWTR, and CDPH established further requirements for removal or inactivation of viruses, *Giardia,* and *Legionella* using heterotrophic plate count (HPC) bacteria, and turbidity as Treatment Technique (TT) performance parameters. With the promulgation of the IESWTR and LT1ESWTR, inactivation requirements were defined for *Cryptosporidium* with further removals for turbidity, and disinfectant residuals for large and small systems, respectively. The District has been meeting these new treatment requirements. A multi-barrier treatment must be provided for approved surface waters and reliably achieve the following TT 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
- The turbidity of a system's combined filtered waters at a WTP must be less than or equal to 0.5 NTU, 95 percent of the time each month, and 5 NTU at any time, and
- The turbidity of a system's combined filtered waters at a WTP must at no time exceed 1 NTU for two or more consecutive 4-hour grab samples.

***IESWTR and LT1ESWTR***

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

The performance standards, monitoring requirements, and operating criteria detailed in Title 22, Chapter 17 are summarized in Table 4-13 If filtration and disinfection facilities meet

these requirements, they are deemed in compliance with the SWTR. The IESWTR was more stringent with combined filtered turbidity performance standards, and also regulated turbidity for individual filters (≥1.0 NTU for more than 15 minutes requires an assessment report), calibration of on-line turbidimeters, etc.

**Performance Standards.** Water quality monitoring and operation of the water treatment processes at each of the District's WTPs is conducted in accordance with the respective Water Supply Permits. The District's SWTR Operations Plan 2010 contains the current operational criteria for compliance with the SWTR for the Walnut Creek, Lafayette, and Orinda WTPs. 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.

In compliance with the SWTR requirements, the District routinely submits a monthly water quality report to CDPH for each WTP. This report typically contains a summary of distribution system coliform results, raw and treated water turbidity, backwash/filter-to-waste records, CT compliance credits achieved, and chloramine/chlorine residual levels in the distribution system.

Based on the results presented in these reports, the treated water from Walnut Creek, Lafayette, and Orinda WTPs met the approved turbidity requirement (less than 0.2 NTU, 95 percent of the time) each month they were in operation. This requirement, defined by CDPH for the District's water supply permit, is more stringent than the turbidity removal defined by the IESWTR. The District's WTPs surpassed the operating criteria of 80 percent turbidity removal of the monthly average raw water turbidity, and all operating criteria were met when filters were returned to service. In addition, the performance standard of maintaining a disinfection residual not less than the 0.2 mg/L for more than four hours in any 24-hour period was achieved for all 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, as directed by CDPH. The results of the small water systems' monitoring programs indicate that each of the three WTPs met the filtered water turbidity requirement of the IESWTR each month of operation (less than 0.3 NTU at Pardee Center and PARA WTPs and less than 0.1 NTU at CASS WTP, 95 percent of the time). Similar to the large systems, the small WTPs' filters surpassed the operating criteria of 80 percent turbidity removal of the monthly average raw water turbidity, and 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 for more than four hours in any 24-hour period was achieved at each of the WTPs.

Finally, distribution system monitoring complied with SWTR requirements, i.e., total coliform counts were not detectable in more than 95 percent of the monthly samples, a disinfection residual was detected, and/or HPC less than or equal to 500 cfu/ml occurred in more than 95 percent of the monthly samples.

**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.

**Operating Criteria.** The SWTR Operations Plan 2010 gives criteria for length of filter runs and describes backwash procedures for each plant. Filter backwash procedures in the SWTR Operations Plan 2010 or each plant stipulate the requirements the filters must meet when being placed back in service (Table 4-13). Filtered water turbidity levels are measured continuously in all six plants: CASS, Pardee Center, PARA, Walnut Creek, Lafayette, and Orinda WTPs.

The SWTR Operations Plan 2010 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.

**Table 4-13: IESWTR Compliance Summary – Performance, Monitoring and Operations** [a,b]

| Performance Standards |
|---|
| ▪ The turbidity of filtered water shall be less than or equal to 0.3 NTU in 95 percent of the samples analyzed each month.<br>▪ Turbidity of filtered water shall not exceed 5.0 NTU at any time.*<br>▪ The turbidity levels of the combined filtered water shall not exceed 1.0 NTU in more than one continuous hour while the plant is in operation.*<br>▪ For continuous sampling, turbidity levels of the combined filtered water shall not exceed 1.0 NTU for more than eight consecutive hours while the plant is in operation.*<br>▪ Water delivered to the distribution system shall not contain a disinfectant residual of less than 0.2 mg/L. The supplier shall report whether or not the disinfectant residual was restored to at least 0.2 mg/L within four hours.*<br>▪ The residual disinfectant concentrations of samples collected from the distribution system shall be detectable in at least 95 percent of the samples taken each month.<br>▪ At any point in the distribution system, the presence of HPC bacteria at less than or equal to 500 CFU/ML shall be considered equivalent to a detectable disinfectant residual. |
| Monitoring Requirements |
| ▪ Raw waters of approved surface water sources shall be monitored for daily turbidity grab samples.<br>▪ The combined filter effluent shall be monitored for turbidity levels at least once every four hours that the system is in operation to determine compliance with performance standards.<br>▪ Continuous turbidity measurements may be substituted for grab sampling, provided the accuracy of the measurements is verified on a weekly basis.<br>▪ A monitoring program shall be developed and conducted to measure the parameters affecting the performance of the disinfection process:<br>1) temperature of the disinfected water<br>2) pH of the disinfected water if chlorine is used as a disinfectant<br>3) disinfectant contact time<br>4) residual disinfectant concentration before or at the first customer.<br>Monitoring program shall be in the operations plan.<br>▪ Disinfectant residual concentration of the water being delivered to the distribution system shall be monitored and recorded continuously.<br>▪ The residual disinfectant concentration must be measured at least at the same points in the distribution system and at the same time total coliform are sampled. |

* Notify CDPH as soon as possible, by next business day or 24 hours, whichever is less by phone or other equally rapid means.

*Continued on next page*

**Table 4-13: IESWTR Compliance Summary** *(continued)* [a,b]

| Operating Criteria |
|---|
| ▪ Treatment plant operators shall be certified in accordance with applicable Health and Safety Codes.<br>▪ Conventional and direct filtration plants shall be operated at flow rates not to exceed:<br>1) 3.0 gpm/sq. ft. for single media filters, and<br>2) 6.0 gpm/sq. ft. for deep bed, dual, or mixed media filters under gravity flow conditions.<br>▪ Filtration rates shall be increased gradually when placing filters back into service following any interruption in operation of the filter.<br>▪ When an individual filter is placed back in service, the filtered water turbidity of the effluent shall not exceed:<br>1) 2.0 NTU for ≥15 minutes.<br>2) 1.0 NTU in at least 90 percent of the interruption events during any consecutive 12-month period.<br>3) 0.3 NTU after the filter has been in operation for 60 minutes.<br>▪ Coagulation and flocculation unit processes shall be in use at all times during which conventional and direct filtration plants are in operation.<br>▪ The effectiveness of coagulation and flocculation unit processes shall be demonstrated by at least an 80 percent reduction through the filters of the monthly average raw water turbidity.<br>▪ The filtered water turbidity shall be monitored with a continuous turbidity meter and recorder, or with an approved grab sampling program.<br>▪ If a filter unit is not meeting the operating criteria, the filter shall be taken out of service, deficiencies corrected, and its operations tested to demonstrate that it is meeting the criteria.<br>▪ Disinfection facilities shall maintain a reserve supply of chemical necessary to provide continuous operation of disinfection facilities.<br>▪ Disinfection facilities shall develop an emergency plan for implementation in the event of a disinfection failure. Delivery of undisinfected or inadequately disinfected water to the distribution system shall be prevented.<br>▪ Operations plan shall include:<br>1) performance monitoring program<br>2) unit process equipment maintenance program<br>3) operating personnel, including number of staff, certification level, and responsibilities<br>4) how and when each unit process is operated<br>5) laboratory procedures<br>6) procedures used to determine chemical dose rates<br>7) records<br>8) response to plant and watershed emergencies<br>9) reliability features.<br>▪ Operations records shall include:<br>1) all monitoring results.<br>2) dates on which filter maintenance and inspection were performed and the results of any inspections.<br>3) quantity of water produced, plant flow rates, filtration rates, hours of operation, and backwash rates.<br>4) dates and descriptions of major equipment and process failures, and corrective actions taken.<br>▪ Treatment plant records shall be retained for not less than two years. |

a. Source: California Code of Regulations, Title 22, Chapter 17, June 9, 2010 update.
b. This table presents highlights of selected issues relevant to the Mokelumne River Watershed. The full text should be consulted to determine compliance with regulations.

## 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 for its Pardee Reservoir source as discussed in the raw water quality section above for its large East Bay system. As shown in Tables 4-10, *Cryptosporidium* was not detected in any of the samples collected from the reservoir for LT2ESWTR. On the basis of the highest monthly RAA, or two-year mean of samples collected, Walnut Creek, Lafayette, and Orinda WTPs should all be assigned a Bin 1 classification (Table 4-3). With a Bin 1 classification, no additional treatment requirements are necessary for conventional treatment or direct filtration plants.

*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 the results, Pardee Center, PARA, and CASS WTPs have been tentatively assigned a Bin 1 classification under LT2ESWTR, and the District will not be required to meet additional removal requirements for *Cryptosporidium*.

The LT2ESWTR requires compliance with treatment requirements no later than April 2012 for large systems if Bin 1 category status is not granted. Another round of LT2ESWTR monitoring will be required in 2014 and 2015 for the East Bay System. 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, based on system-wide RAAs. 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.

To comply with IDSE requirements, the District conducted bimonthly *Standard Monitoring* from November 2007 through September 2008 at 32 locations in the East Bay distribution system, in addition to quarterly S1DBPR monitoring. An IDSE report was submitted to USEPA in December 2008, which included a S2DBPR Compliance Monitoring Plan. This plan was developed based on the IDSE and S1DBPR LRAA of TTHMs and HAAs for each monitoring site and the peak historical month for DBPs. Of areas served by Walnut Creek, Lafayette, and Orinda WTPs, the highest LRAAs were 40 µg/L TTHM and 22 µg/L HAA and the peak month was July. Sixteen sites throughout the system were chosen for S2DBPR: four represent average residence times, six represent the highest TTHMs in the system, and six represent the highest HAAs in the system. The District will sample quarterly at these East Bay locations in 2012 to comply with S2DBPR. Since the S2DBPR proposed sampling sites will target areas of concern, the overall THM and HAA5 LRAAs will be higher than the present levels.

Camanche and Pardee water systems were not required to conduct IDSE monitoring due to small system waivers. S2DBPR monitoring in these small systems will expand THM and HAA5 monitoring from one to two sample sites to be sampled annually starting in 2013.

# Conclusion

Pardee and Camanche Reservoirs generally exhibit good quality waters. The raw water turbidity and coliform levels were expectedly above the treated water MCLs. The raw waters met all the primary treated water MCLs for radioactivity and organic chemicals. Occasionally, aluminum exceeded both primary and secondary drinking water MCLs in the raw water, and iron and manganese exceeded secondary MCLs, but these 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 CDPH 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 LT2ESWTR sampling, all systems were tentatively assigned a Bin 1 classification and the District will not be required to meet additional removal requirements for *Cryptosporidium* removal.

During IDSE and S1DBPR monitoring of DBPs in the East Bay distribution system, the TTHM and HAA5 results were well below the MCLs, indicating that the District should easily meet the S2DBPR, but system-wide THMs will increase due to the greater proportion of distribution system taps required (8 of 16 versus 1 of 8) in the zone of relatively higher DBPs.

# Section 5: Potential Contaminant Sources

## Introduction

This section summarizes the potential contaminant sources identified in the previous MRWSSs (1995, updated 2000 and 2005), and expands on those accounts using potential contaminant data made available in the update period between 2005 and 2009. Agencies with jurisdiction in the watershed were solicited for data to assess each potential contaminant source. Staff from these agencies and from within the District were interviewed and asked to fill out questionnaires to determine the status and development of contaminant sources. Sources of updates are listed in Appendix 5-1. Site visits for the purpose of evaluating the District's small water and wastewater systems were made to the watershed immediately surrounding the Pardee and Camanche Reservoirs and to the recreation areas adjacent to the reservoirs.

Since the 2000 MRWSS, there has been a substantial increase in the amount of watershed information stored on GIS, particularly by the District, SWRCB, California Department of Conservation Office of Mine Reclamation, USFS, and California Department of Forestry and Fire Protection (CAL FIRE). For some potential contaminants, this tracking tool allows for new quantification and mapping of contaminant sources, and lends itself to easier documentation of trends for future surveys.

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

- District 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
- Pesticides
- Unauthorized Activities

## District Facilities

District 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 the District in accordance with the provisions of the District'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. The District has addressed the problem by maintaining a combination of floating and shoreline toilets to meet visitor use demands. The District pumps out the toilets regularly and disposes of the effluent at its PARA WWTP. The facilities are maintained and inspected on a regular basis.

Potential contaminating incidents during the period 2005-2009:

- On August 18, 2008, a boat was found capsized in the Pardee Marina; no oil sheen was observed. Sorbent booms were deployed as a precaution. The boat was removed from the water and no environmental impacts were observed.
- On August 18, 2008, a 10 feet x 50 feet oil sheen was observed from another boat tied at the Pardee Marina dock. District staff deployed absorbent booms and spill pads to clean up the area. The boat was removed and no remaining environmental impacts were observed.

### 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. Table 5-1 summarizes the facilities at the PARA and Figure 5-1 shows the general area layout. Beginning in 2009, the marina boat

fueling facilities became on-shore only. The remaining acreage is undeveloped watershed. The PARA water and wastewater treatment plants are maintained and operated by the District. All other facilities are maintained and operated by the concessionaire, Pardee Lake Recreation.

**Recreation**. The recreation area is closed during the winter months, which is generally from the end of October until the first Friday in February. When the recreation area is open, recreation is restricted to hiking, picnicking, camping recreational vehicle (RV) park, fishing and boating. No body contact activities are allowed.

Table 5-2 summarizes visitor use at PARA between 2005 and 2009. There were an average of 96,700 visitors per year at PARA, an average of 350 per day when open. This is an increase from the previous two update periods when the average annual number of visitors was approximately 75,000.

Two small-volume sewer overflows occurred during this update period when RVs were dumping their holding tanks. These spills are listed in Table 5-2b.

**Water Supply**. PARA is served by the Pardee Recreation 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 locally in 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 2009 ER Plan is reproduced here in Appendix 5-2.

In August 1997, three underground storage tanks (UST) were removed from above the marina store at PARA. A groundwater grab sample from the excavation indicated that groundwater was impacted by hydrocarbon constituents. In November 1999, a soil boring was drilled to a depth of 50 feet and a groundwater sample was taken which indicated that hydrocarbon contamination was present. A groundwater monitoring well was installed on site in August 2000 and routine quarterly sampling was conducted for four quarters. Based on sampling results, the site closure was approved in June 2005 by the (RWQCB).

**Sanitation Facilities**. Operation of the District'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 5-3 provides an overview of the monitoring program for the PARA wastewater ponds. System improvements include:

- 2000-2004: Pond evaporation enhancements, spray irrigation disposal outside the watershed, and a pump/wet well at the low point outside the ponds that pumps any overflow back into one of the ponds.

- 2006: PARA Mainline Project was completed, including relining of the sewer mainline, epoxy coating of manholes, and replacing the lateral line to the concessionaire's home. This resulted in less infiltration and inflow to the sewer mainline and the wastewater ponds.

Two small sewer overflows occurred in the PARA campground during 2005-2009, as follows:

- On April 2, 2007, Space #20, 40 gallons of wastewater (no solids) leaked from a private RV trailer holding tank overnight when the holding tank cracked. The damaged tank was emptied into a bucket and the soil was disinfected.
- On May 25, 2009, Space #42, less than two gallons of sewage spilled when the RV owner began to dump holding tank. A rock in the dump station P-trap obstructed the flow. The affected soil was raked and disinfected.

## 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 a District 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 sodium hypochlorite and liquid calcium hydroxide (liquid lime) into the Mokelumne Aqueducts for disinfection and pH adjustment, respectively.

**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.

In June 2001, Pardee Center obtained an NPDES Industrial Storm Water Permit from the RWQCB for operations associated with the Pardee Lime Facility. The District developed and implemented a Storm Water Pollution Prevention Plan and a Monitoring and Reporting

Program in compliance with the permit conditions. A cleanup of the abandoned Pardee Lime Tower in May 2005 removed the only significant source of potential stormwater contamination from the site, thus removing any potential environmental impact from the facility. The RWQCB rescinded the storm water permit requirements in 2008 due to modifications to the chemical treatment facility and compliance history.

**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 5-3 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.** On February 1, 2007, a water pump failed in the Pardee Powerhouse containment basement for turbine units #1 and #2. The pump normally transfers seal leakage water from the #1 and #2 Pardee turbines into an oil/water separation sump. Approximately 500 gallons of water was pumped to the river afterbay to avoid flooding the powerhouse. District staff noticed a light sheen in the afterbay and oil absorbent booms were deployed approximately 1000 feet downstream of the powerhouse. The area of the sheen was approximately 700 to 800 square feet, and the National Response Center was notified. Surface water samples were collected upstream and downstream of the booms and at the base of the unit #1 discharge; oil and/or grease were not detected in any of the samples.

Potential contaminants associated with hydroelectric operations in general are discussed in the *Hydroelectric Section.*

**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 whitewater rafters. The District constructed the Middle Bar takeout facility in 2003 to improve egress of rafters from river. 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.

The eastern terminus of the Mokelumne Coast to Crest Trail is now located at the Calaveras side of the Middle Bar Bridge. Trail use requires a District permit and is open to pedestrians

and equestrians (trailers are not allowed at the trail heads, so local equestrian activity is minimal). .

## Water Resources Development

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

**Mokelumne River Regional Water Storage and Conjunctive Use (MORE WATER) Project.** San Joaquin County, as part of the Mokelumne River Water and Power Authority (MRWPA), is continuing to pursue additional water supply and power generation with their proposed 150,000 acre-foot capacity Duck Creek Reservoir as an alternative under the MORE WATER Project. The proposed Duck Creek Reservoir is currently in the engineering feasibility phase and would be located southwest of Camanche Reservoir, outside the Camanche Reservoir watershed. It would capture flood flows and regulate water supply for groundwater recharge of the over-drafted groundwater basin in eastern San Joaquin County. The MORE WATER Project previously evaluated constructing a concrete dam (Middle Bar dam), a 434,000 acre-foot reservoir, and an 80-megawatt power plant on the Mokelumne River upstream of Pardee Reservoir. This alternative was rejected because of environmental, regulatory, and political issues.

Thousands of acres of PG&E land along the Mokelumne River may be transferred to new owners by 2012, as part of PG&E's 2003 bankruptcy settlement. Section 6, Watershed Control and Management, PG&E Land Conservation Commitment Stewardship Council provides 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 also has primary responsibility for monitoring, inspection, and enforcement proceedings for each of the five systems. Pardee Center and PARA wastewater systems were discussed in more detail under *District Facilities* earlier in this section.

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.

The risk of sewage overflows from wastewater treatment and disposal facilities is associated primarily with overuse of these existing land disposal sites. Historically, this is believed to have occasionally happened in the Mokelumne River watershed, primarily from the Mokelumne Hill WWTP. A survey of incident reports from the District's Regulatory Compliance Office and the State Office of Emergency Services (OES) showed one sewage overflow from the Mokelumne Hill Wastewater WWTP during this update period:

On April 5, 2006, during heavy rains, the Mokelumne Hill WWTP final holding pond filled up and overflowed treated sewage at a rate of 20 gallons per minute. The treated sewage spilled into the adjacent creek which discharges into the Mokelumne River, just above Pardee Reservoir. Efforts were made to prevent the spill by sandbagging the effluent pond spillway and applying wastewater to spray disposal fields. Calaveras County Environmental Health, RWQCB and the District were notified.

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.

## *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 2000 census.

**Large Septic Systems.** There are five large 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. The fifth large capacity septic and leach field system is operated by AWA at the Tiger Creek Estates off Highway 88. These large capacity septic systems are shown on Figure 5-3 and summarized in Table 3a.

**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 Upper Mokelumne River Watershed Authority (UMRWA), a joint powers agency, completed the UMRWAP at a cost of nearly $1.3 million. The UMRWAP concluded that many septic systems in the watershed are old, designed for seasonal use, and so do not have permits. Furthermore, the leaking septic systems were a likely source of pathogen contamination of the Upper Mokelumne River, especially in the Middle and South Fork rivers. Section 6

provides a more detailed discussion of the UMRWAP. (See the UMRWAP report, Appendix L)

The UMRWAP potential septic system locations data is shown on Figure 5-17. The UMRWAP estimates for individual residential septic systems were based on the following information:

- Calaveras County, Environmental Health Department: 157 permitted septic systems
- UMRWAP Estimate: 1,501 total potential Calaveras County unpermitted septic systems, based on an analysis of occupied land parcels outside of centralized sewage collection and treatment areas.
- Amador County, Environmental Health Department: 1,525 submitted septic system permits.
- Alpine County: 7 permitted septic systems (construction complete)

**Previous MRWSS Septic System Estimates.** In the 1995 MRWSS, census and sewer service GIS data were used to estimate 5,376 persons in 3,205 households that rely on septic tanks in the entire upper watershed. Using the 2000 Census, estimates for the watershed varied from 4639 to 10,598 persons, depending on whether the census blocks used are entirely inside watershed boundaries or whether blocks include those merely intersecting the watershed boundaries.

**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 or groundwater bodies in quantities sufficient to impair water quality needed to protect beneficial uses, including domestic water supply.

Since 2006, Alpine County approved one septic system in their portion of the Mokelumne Watershed, bringing the total to eight. Amador County has had 106 applications for new septic systems in the entire county,

### *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 location of wastewater treatment facilities in Figure 5-17 show that many of the septic tanks are located in Amador County, along Highway 88, on the ridge separating the Mokelumne and Consumnes River drainages; with many concentrated in the Buckhorn area above Tiger Creek Reservoir. According to data collected as part of the UMRWAP, there were 1,438 septic systems in the North Fork sub-watershed as of 2006. During 2007-2009, Amador County had 106 applications for new septics and Alpine County approved one septic system in their portion of the Mokelumne Watershed.

**National Forest Special Use Permits.** Local jurisdictions have no authority over federal lands, so the USFS is not required to comply with County septic tank requirements. Currently the Eldorado National Forest requires owners of existing cabins with special use permits to obtain a county permit when a septic system is repaired or installed. If installation or repair of an existing cabin septic system to state or county code is not possible, then a forest system vault system, which requires an annual County permit, is allowed.

Approximately 48 recreational residences with individual septic systems are located on Eldorado National Forest 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; improvements 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, campground and 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 National Forestlands 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 2005-2009. The 1995 GIS analysis yielded an estimate of 1,522 persons in 856 households on septic systems. According to the UMRWAP, 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 septics as "low." According to the UMRWAP, there are 502 septic systems in the south fork sub-watershed.

### Main Stem

Most of the unsewered area of the lower sub-watershed is concentrated in the Clinton area. Other developed areas occur along Route 26, to the north of Mokelumne Hill, and to the southeast of Pardee Reservoir. According to the 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

## USTs

The 2000 MRWSS reported that USTs presented 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 storage tanks 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 three sites are located within the Upper Mokelumne Watershed. Located in West Point and Mokelumne Hill, the status of these sites is site assessment is underway.

- **Remediated LUSTs:** Six remediated LUST cleanup sites are reported on Table 5-4, two of which also currently have a permitted underground tank and so are listed in that section - Bear River Lake Resort and Caltrans Peddler Hill Maintenance Yard. Remediated LUST cleanup sites previously had leaking tanks but have now been

fully remediated. Three site remediations were completed during the 2005-2009 update period: Bear River Lake Resort, Wilseyville Food and Gas, and the Caltrans Peddler Hill Maintenance Yard. One remediation was completed in 2010 and two were completed in the 2000-2004 period but were not previously reported.

Remediated LUST cleanup sites previously reported as complete in past MRWSS updates are not repeated in this update. The 2005 MRWSS update included several LUSTs that were close to but out of the Upper Mokelumne Watershed including various LUSTs in Bear Valley Cross County, Hams Station, and Silver Lake Family Camp.

- **Abandoned Mine Land Disposal Site:** One abandoned mine land disposal site is also listed in the State Geotracker database. The Blazing Star Mine 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 six OES spill reports for the Upper Mokelumne River Watershed. Four spills involved small quantities of petroleum products and two were sewage spills. There were no drug lab related spill reports. MRWSS Sections *District Facilities, Urban Area Runoff, Utilities - Hydropower Generation, Transportation Corridors* provide additional spill report details.

During 2000-2004, the Calaveras County Fire Department and OES records reported eight hazardous materials reports from methamphetamine drug lab seizures in Calaveras County, and several in the communities of West Point, Paloma, and Railroad Flat. The OES reported drug lab waste ranging from small quantities to 55 gallon drums. Chemicals at these sites can include hydrogen chloride, liquid hydrochloric acid, trichloro-fluoro-ethane, methylamine, and red phosphorous. There were three spills on the roads during 2000-2004, which are documented under *Transportation Corridors.* The only spill reported in previous MRWSS was a fertilizer spill in the North Fork documented in the 1995 MRWSS.

Hazardous materials stored on District facilities are discussed under *District 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), consequently, the encroachment of development upon watershed lands should be carefully monitored and assessed.

### Calaveras County

Although urban development continues in the watershed, the rate has significantly slowed over the past five years, keeping pace with the economy. See Table 5-25 for residential construction activity statistics from the Calaveras County Building Department for the period between 2000 and 2009.

The potential impacts of urban areas on the watershed increase with population growth. For Calaveras County, populations in 2000 were available for Mokelumne Hill (774), Railroad Flat (549), and West Point (746). Most of the growth in Calaveras County is 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 to subdivide into 6 parcels. Calaveras County's General Plan Housing Element projects a 1.7 percent growth rate between 2010 and 2015, and a need for 2,344 residential units to fill the need of the unincorporated county's population growth.

The OES Hazardous Material Spill Reports documented several spills off Highway 26 during 2005-2009:

- In May 2006, there was a 5 gallon mineral oil spill (non-PCB) from a PG&E transformer failure. The site was cleaned up and waterways were not involved.
- In May 2009, a citizen reported that a property owner had run a pipe from a trailer and was dumping sewage directly into a creek north of Highway 26, which feeds the Middle Fork of the Mokelumne River

## Amador County

In Amador County's General Plan Housing Element, two percent annual growth is expected in unincorporated areas, which includes the communities of Pine Grove, Pioneer, and Buckhorn in the Upper Mokelumne River Watershed. Amador County's General Plan projects that 1,413 new residential units will be needed in Amador County by 2014. The population in the unincorporated county grew at a faster rate than many of the cities in the watershed compared to the City of Jackson which had a 3.3 percent decrease between 2000 and 2009. In contrast, a substantial portion of the county's future growth is expected to occur in the cities. Within the unincorporated area, 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 was 38,080 in 2009, with 22,123 residents in the unincorporated area.

Although not all in the Upper Mokelumne River watershed, there are a number of development projects planned up along Highway 88 as follows:

| Development | Area | Description | Status |
|---|---|---|---|
| Mokelumne Bluffs | Near Pine Grove | 138-acre, 95- unit development | Approved by the Amador County Board of Supervisors in 2008 |
| Silver Pointe | Buckhorn Area | 29 single family units on 148.95 acres | Tentative approval was granted on 10/9/07 |
| Black Oak Ridge | Pine Grove | 7 single family units on 40 acres | Tentative approval was granted on 8/8/06 |
| Pine Acres North | Pine Grove | 106 mixed use, single family/multi-family units on 44.2 acres | NOP/Initial study comment period closed on 1/5/09 |
| Red Tail Ridge | Pioneer | 5 single family units on 31.03 acres | Tentative approval was granted on 10/11/05 |
| Pine Grove Bluffs | Pine Grove Area; located on the NW corner of SR88 | 28 single family units on 32 acres. | Tentative approval was granted on 3/8/08 |
| The Pines at Mace Meadows | Buckhorn Area | 13 single family units on 4.09 acres. | Tentative approval was granted on 10/14/03. |
| Quail Ridge | Pioneer Area | 81 single family units on 82 acres. | Tentative approval was granted on 7/15/03. |
| Peterson Ranch | Pine Grove | 58 single family units on 141.22 acres | Phase 1 and 2 recorded |

In the southern portion of the City of Jackson, development accelerated in the period 2000-2004 and slowed down between 2005 and 2009 with the downturn in the economy. There are two projects currently under construction in the City of Jackson that are in the

Mokelumne Watershed: Jackson View Estates, a 127-unit single family residential (SFR) development along Scottsville Drive, and Pine Meadows of Jackson Creek, with 28 SFR units and 12 bungalows. Future development includes Jackson Hill, 540 homes, about half draining to Mokelumne Watersheds.

### *Construction-Related Stormwater Runoff*

Runoff from construction sites is regulated by the RWQCB which outlines BMPs for runoff management/monitoring, and can require a Storm Water Pollution Prevention Plan. City and county public works staff generally oversee construction sites and report violations.

The impacts of construction runoff can be illustrated by an incident on January 2005, when a District ranger noticed a high turbidity plume in the Mokelumne River just upstream of the Middle Bar Bridge. District staff tracked the source to a drain in the vicinity of several construction projects in the Scottsville Road, Thomas Drive area in south Jackson. Turbidity readings at the confluence of the creek adjacent with the Mokelumne River were 55 NTU. Amador County and City of Jackson public works staff were alerted about the problem.

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 that are addressed under *Sanitation Facilities*, *Agriculture*, and *Wildlife* and *Livestock*, respectively.

## *Utilities - Hydropower Generation*

While there are a number of agencies with hydroelectric facilities in Upper Mokelumne River Watershed, including the District, 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.

An OES Hazardous Material Spill Report of December 2006 reported a small spill at the PG&E West Point powerhouse on the Mokelumne River. One quart of hydraulic oil leaked into the water which leads to an intake tunnel for Lake Tabeaud.

### Canal Maintenance

PG&E encounters significant problems removing attached algae from its extensive canal and flume system. Left unchecked, the attached algae would quickly become sufficiently dense to impede flow through the canal system and clog the turbines and penstocks. This situation indicates the magnitude of the problem of 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. Of additional concern are the elevated water temperatures, which stimulated the algal growth in the first place. These increased temperatures can impact downstream fish populations, aquatic habitats, and potentially Pardee Reservoir water quality. Elevated temperatures stimulate algal growth, which can cause taste and odor (T&O) events, and elevated organic carbon concentrations, which become problems for drinking water utilities.

## 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.

New urban developments, discussed in *Urban Runoff* above, will increase traffic and pollution associated with transportation corridors. For example, the Draft Environmental Impact Report (EIR) for the Mokelumne Bluffs project near Pioneer estimates 1,124 additional daily vehicle trips in the area of the new 98-unit development.

Table 5-5 shows a comparison of highway traffic counts between 2000 and 2008 (between four to eight percent of traffic is composed of trucks, depending on the route). The table shows that traffic volume has been relatively constant between 2005 and 2008, with the exception of Highway 26 near Mokelumne Hill and the junction of Route 49 where daily traffic increased 54 percent between 2005 and 2008. Traffic also decreased 20 percent at Highway 49 near the Calaveras and Amador County lines, and 14 percent at Highway 88 near the Junction of Route 26.

## *History of Spills and Accidents*

The following transportation-related OES Hazardous Materials Spill Report was filed during this update period:

- Threatened release: In August 2006, a PG&E water truck lost control and rolled into Lower Bear Reservoir, potentially releasing gasoline and motor oil.

For comparison, three spills were recorded in 2003 as the result of vehicle accidents. The spilled materials were limited to hydraulic fluid, diesel fuel, and antifreeze. All spills were contained, and there were no known impacts to waterways and water quality.

Spills related to accidental collisions may be estimated from California Highway Patrol (CHP) Annual Reports of Fatal and Injury Motor Vehicle Traffic Collisions. The most current report for 1999-2008 summarized injury accidents by county and is shown in Table 5-6. These accidents were not broken down by watershed.

With regard to paved roads, there was very little activity on paved road construction and reconstruction, aside from some limited road widening projects, mainly on Highway 88 in 2000. Such projects are usually constructed during the dry season, repaved before prolonged wet weather sets in, and must meet fairly stringent state and/or federal mitigation requirements. Erosion associated with paved roads is insignificant when compared to unpaved roads, however, surface runoff is of a greater concern with paved roads.

**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

The MRWSS Update 2000 concluded that 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 maps 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.

PG&E does not conduct agricultural activities itself, but has entered into leases and other agreements that allow agricultural activities on PG&E lands. These activities include Christmas tree farming and grazing. In addition, PG&E has contracts through which it provides water for irrigation to support agricultural land uses. Typically these leases or agreements have terms of three to five years.

## Wildlife and Livestock

While livestock is a significant contributor of animal waste in the Upper Mokelumne River Watershed, birds and mammals can also introduce microorganisms into Pardee and Camanche Reservoir and its tributaries through direct contact or animal waste. Deer, beavers, muskrats, 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, and
(5) disturb riparian corridors and tributary stream banks by animals gaining access to water supplies.

Some of these impacts occur proximate to tributary water supplies unless reservoirs are fenced above the high water line.

## 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 areal extent.

Between District lands near Pardee Reservoir and the National Forests 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 commissioners track the head of cattle 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: 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 National Forest Lands

Both the Eldorado and Stanislaus National Forests 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 National Forests. The allotments located on the north side of the North Fork Mokelumne River are permitted by the Eldorado National Forest, while those on the south side are permitted by the Stanislaus National Forest. 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 National Forest 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 National Forest 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 National Forest land and the land is not fenced, it is common for the cattle to roam freely between National Forest 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 National Forest 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 National Forest permitted grazing allotments. Also listed are the permitted number allowed by the private agreements on the adjacent unfenced private lands. The permitted numbers has remained fairly steady during the 2000-2009 period. 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 District Lands

At this time, the District 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. The District 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. Annual spring surveys are conducted to measure the amount of forage production on each pasture. These figures may be used to modify the allowable AUMs on a lease in a given 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, whitewater rafting, and OHV use. Figure 5-8 provides some of the more heavily used recreation sites. Recreation associated with the District's facilities within the Upper

Mokelumne Watershed is addressed under the section entitled *District 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. A popular area along the North Fork occurs at 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. Whitewater 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, depending on the volume of flow. The second run (Class V), which continues from Devil's Nose to Tiger Creek, is recommended only for expert boaters. These runs receive minimal use since access is very difficult over poorly maintained logging roads, and there are no facilities.

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 whitewater releases during the whitewater boating season (May through September), and development of whitewater 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 whitewater 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 *District Facilities*, a kayak takeout for this run was constructed near the Middle Bar Bridge in 2003. 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 the District. Boating policies continue to be enforced at the District's recreation facilities to prevent invasive species such as Quagga or Zebra Mussels from being introduced into Pardee and Camanche Reservoirs. The District'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 the District's reservoirs.

Primary 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 owned lands.

Pollution controls within National Forest 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 National Forest. 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 District lands and are addressed under the section entitled *District 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 National Forests, PG&E, and the District. The recreational areas and facilities that were inspected were found to be in generally excellent hygienic condition with minimal litter and garbage residues. For the most part, hiking trails did not appear to be subject to excessively heavy use, and no areas of abuse or litter were found. Restroom facilities were generally clean and well maintained.

**Coast to Crest Trail**. The most recent extension of the Mokelumne Coast to Crest Trail (MCCT) runs eastward from James Bar (the upper log boom on Pardee Reservoir) to Middle Bar Bridge. 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 this may decrease over the next few years as new National Forest and BLM OHV policies are implemented. The National Forest 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 National Forest and BLM travel management changes.

The BLM and Eldorado National Forest 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 staffs are still in an educational mode regarding enforcing prohibited off-road travel.

Similarly, Stanislaus National Forest released their Motor Vehicle Maps in 2010 but will not have map copies available to the public until 2011, as they are still in the process of educating the public on OHV travel changes. Stanislaus National Forest reports that monitoring and enforcement activities are currently effective for controlling OHV damage.

National Forest 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. In the past, extraordinary efforts have been required in some cases to curtail damage to unpaved roads on privately controlled and patrolled lands. 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. In 2000 the USFS reported two major erosion problem areas caused by OHV vehicle use. One was in the Eldorado National Forest along the North Fork, just downstream from Salt Springs Reservoir, immediately adjacent to the river. Damages included destruction of water-bars, campground facilities, and culverts. The second area was along a segment of the Old Carson to Big Trees Wagon trail, in the vicinity of Deer Creek and Deer Valley Road. Similar damage was recorded in this area. 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. SPI is also working with adjacent property owners and with the local counties to coordinate enforcement actions.

## 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 OMR. 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. It also reported a 1997 incident when the District received notice from the owner of Gwin Mine that emergency remediation measures were being implemented to control a hydraulic discharge at the main shaft caused by the heavy rains that year. The owner had been conducting water quality sampling as the first step toward receiving approval from the RWQCB to dewater the mine. Elevated levels of arsenic and sulphur concentrations were found to exist in these waters and as the water exited the mine. Three emergency efforts were pursued by the owner - sealing the entrance points where surface waters entered the mine, interim onsite treatment of discharge from the main shaft for arsenic and sulphur, and placement of a geochemical barrier downstream to neutralize any potential acidity. No further activity has been reported to the District 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 *District: Erosion Control* provides a discussion of completed and planned 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 the District's inline WTP in the East Bay. 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 that occurred in the Upper Mokelumne Watershed during the update period as recorded by CAL FIRE and/or District staff are mapped on Figure 5-10. Statistics for these 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 National Forests belongs to the USFS. Responsibility on private lands is shared by the CAL FIRE, local fire districts, and private landowners. Prescribed burns are frequently 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 1996 California Fire Plan is currently under revision. According to the existing plan, 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

The District has an active program of fire hazard mitigation that involves disking, mowing, brush removal, prescribed burning, livestock grazing and other measures. Table 5-11 identifies the typical scope of work for these mitigations in 2009.

Figure 5-11 shows the location of fire mitigation measures in the Pardee and Camanche Watersheds during the past five years.

### Power Fire (2004)

The Power Fire occurred October 2004, during the last update period, near the Salt Springs Reservoir and was arguably the greatest potential threat to water quality in the Upper Mokelumne River watershed during the 2000-2004 update period. 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.

The District 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 the District 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 the District 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 Forest Service staff, as discussed in the Final Environmental Impact Statement (EIS) summary.

The District'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 National Forest staff have observed and implemented the following mitigations on the burned area during the 2005-2009 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

However, the fire and the restoration projects have opened new clearings, skid trails, and haul roads, which historically have been subject to illegal OHV activity. The trails and erosion caused by this activity can have lasting water quality impacts.

## 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.

In general, the slow economy and poor housing market in recent years has led to decreased timber harvests over the past 5 years. This general slowdown led SPI to temporarily close a lumber mill in nearby Sonora, although it is scheduled to reopen in 2011.

## National Forest Land Timber Harvests

Logging on the Eldorado and Stanislaus National Forests continues to decline slightly compared to previous decades. For the Stanislaus National Forest, for example, the amount of timber in the Mokelumne River watershed sold from 1990-1994 was 18.5 million board feet. This decreased to 10.2 million board feet during 1995-1999, 7.4 million board feet during 2000-2004, and 5.2 million board feet during this update period, 2005-2009. Some of the harvested stands were selected based on fuel loading and disease/insect problems. Future logging in the Stanislaus National Forest should remain about the same or slightly increase.

The Sierra National Forest Plan Amendment (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 (RCAs) and Protected Activity Centers (PACs) 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 National Forest Land. These projects consist of thinning understory growth in the North and Middle Forks of the Mokelumne River.

## 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 Timber Harvest Plans (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.

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. Timber harvest plans filed with CAL FIRE are shown on Table 5-14a for the period 2005-2009, and Figure 5-15 show corresponding areas by year. In the ten-year period since 2000 the District has been notified of proposed THPs in the Upper Mokelumne River Watershed totaling 25,827 acres (approximately 7 percent of watershed area). The majority of these THPs were submitted by SPI who owns more than 80,000 acres of the 368,000 acres in the watershed.

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 many of the properties proposed for ownership transfer under Project 137. As required by state regulation, PG&E has filed timber harvest plans with CAL FIRE for the specific timber areas. Approximately 727 acres of PG&E land was harvested in 2009 and 2010. The project was located along Doaks Ridge in Amador County. Uneven-age timber management was practiced.

**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 three NTMPs approved within the Upper Mokelumne Watershed.

## *Pesticides*

At present time there is no known usable data for the largest volume of pesticide/ herbicide used, i.e. over-the-counter sales to individuals. In the Mokelumne basin, 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 in Pardee Reservoir has shown that residual pesticides have not historically been

a pollutant of concern. Data was available from the National Forest Service, County Agricultural Commissioners, the District, PG&E, and Caltrans.

## National Forests

Stanislaus National Forest uses pesticides mainly for reforestation, to keep down competing brush and bear clover, and to promote the growth of production timber. In Eldorado National Forest, use of pesticides in recent years has been predominantly for control of star thistle and other noxious weeds. 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. Procedures for proper pesticide application that apply to National Forests are outlined in the USDA Water Quality Management for National Forest System Lands in California, 2000. Both Eldorado and Stanislaus National Forests submit monthly use reports to the state, and annual reports to the federal government.

## 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.

Specific data is available on the production agricultural pesticide use in the Upper Mokelumne River Watershed. This is because production agricultural applications users, including forest/timberland applications, are required to report pesticide and herbicide use by location, including township-range-section. 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.

The main user of pesticides in the Upper Mokelumne River watershed is SPI, which applies herbicides for treatment of regrowth sites. Quantities of pesticides used by SPI in the watershed were obtained from the State Department of Pesticide Regulation. Tables 5-15 a, 5-15b, and 5-15c, Total Production Agriculture Pesticide Use on Mokelumne River Watershed Listed by Operator present the annual pesticide use by operator and by product, using several measurement units. Tables 5-16a, 5-16b, and 5-16c, Pesticide Use by Commodity, Upper Mokelumne River Watershed, separately present data for Calaveras, Amador and El Dorado Counties. There was no pesticide use reported to the State in the Upper Mokelumne River Watershed portion of Alpine County during 2005-2009.

## PG&E

In the update period, PG&E typically applied Oust and Telar for pre-emergent treatments. Post-emergent pesticide use included Gyphosate (or Roundup), Triclopyr, Accord, Stalker and Transline. A total of 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 3 to 5 years, and

plantations are treated one to three times in the 60 year growing cycle. PG&E utilizes integrated vegetation management (IVM) techniques to select strategies that will minimize vegetation management, whether mechanical, chemical, or biological. License Condition No. 17 of PG&E's Project 137 requires the development of a specific plan for control of noxious weeds on National Forest lands and states that pesticide applications will require appropriate environmental documentation (NEPA).

### Caltrans

Caltrans District 10 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. Roundup Pro Concentrate, Goaltender, Dimension Ultra and Telar XP are applied for pre and post emergent weed control.

Previously used herbicides, as documented in previous MRWSS, included Diuron, Surflan, Goal, and Garlon. 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.

### The District

The Mokelumne Watershed and Recreation Division 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. 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 by the District's IPM Committee in the Mokelumne Division are Roundup Pro, Garlon 4, Transline, and Milestone. The Mokelumne Division has implemented a Best Management Practice with regard to herbicide application and use as described in Section 6.

## Unauthorized Activities

The previous MRWSS described illegal dumping activities and their potential impact on water quality. Personal communication with Amador and Calaveras County staff indicate that illegal dumping has become an increasing problem with the influx of population in the update period. 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 National Forest 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 National Forest portion of the Upper Mokelumne River Watershed over the past five years but no significant environmental damage was reported.

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. The Calaveras County Sheriff reports seven to ten marijuana farms removed from the Upper Mokelumne River Watershed during the period 2005-2009. 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 National Forest 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.

When potentially hazardous substances are found, the County Sheriff, CAL FIRE, or OES is notified. Calaveras County has a hazardous materials team that responds to incidents in both Amador and Calaveras Counties. Additional information regarding petroleum products and other chemicals can be found under the *Hazardous Materials* discussion of this Section. It is likely that illegal dumping increase as the population increases and as landfill and garbage disposal rates rise. Given the size of the watershed it is expected to be difficult to minimize the increase, except on those lands directly owned and managed by the District.

## 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, and 2005). Therefore, they will not be discussed here to the same level of detail.

Potential contaminant sources are discussed in the following categories:

- District 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
- Pesticides
- Unauthorized Activities

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

## District Facilities

District 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 the District's Watershed Headquarters Administration Building and Maintenance Yard. The District 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 (Figure 5-12). 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, recreational vehicles sites, campgrounds, 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 the District, 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. In 2009, the CASS Recreation Area served 69 permanent residences and an average of 515 visitors per day. In 2009, an average of 21 boats per day was observed with a peak monthly usage of 1,707 boats in July. On July 4, 2009 the total number of campers and visitors peaked at 2493. Table 5-18a presents the record of visitor use at CASS Recreation Area for the update period. Average annual visitor use for the update period was 194,619, which is a nine percent decrease over the previous five-year period. Table 5-18b lists accidental spills at Camanche Reservoir for this update period; all three incidents were related to recreation.

More recently, 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 5 quarts of oil into the water. A sheen on the water approximately a quarter mile long and 2 to 8 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 6 quarts of petroleum products.

**Water Supply.** Drinking water for the residents and visitors is provided by the District's CASS WTP that draws its supply from Camanche Reservoir, described in Section 2.

**Hazardous Materials Storage.** The WTP for the CASS Recreation Area uses a coagulant and calcium 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 is expected to be 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.

Improvements were made in 2006 to Miners Camp and Cottonwood RV Campground sanitation facilities; sewer mainlines and laterals were upgraded, new service pedestals and a new lift station were installed, resulting in less infiltration and inflow to the wastewater ponds. In 2008, approximately 209 dry tons of sludge was removed from the three wastewater disposal and treatment ponds to improve treatment and capacity. In 2009, the sewer mains, manholes and cleanouts in the southern loop of the mobile home residence area were replaced to meet current standards. Cleaning and CCTV inspection of wastewater mains is used as a preventative maintenance effort to ensure regulatory compliance and prevent sewer overflows.

Table 5-19 shows sewer six overflows for the CASS sewer system during the past five years; most overflows occurred in the mobile home park. In addition, a few more minor incidents occurred in campground restrooms. The number of spills declined significantly from the last update period, when approximately 27 spills were reported. The most substantial sewage release was a 1300-gallon overflow in 2007; the spill was removed by vacuum pump and discharged in a wastewater pond.

The CASS Solid Waste Facility is owned by the District and was operated between 1967 and 1984. It accepted household waste from the South Shore 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 (Figure 5-13). 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 water and wastewater treatment plants, ranger and sheriff stations, and maintenance yard are maintained and operated by the District. 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. Concessionaire staff perform daily and weekly inspections of the fuel tank, double wall piping, and fuel dispenser (on the floating dock). Inspection documentation is submitted weekly to the District. In 2007 a fuel tank pipe fitting corroded and leaked approximately five gallons of gasoline.

**Recreation.** Recreational activities include swimming, boating, fishing, picnicking, camping, bicycling, horseback riding, and hiking. In 2009, the CANS Recreation Area served 126 permanent residences and an average of 603 visitors per day. In 2009, an average of 36 boats per day was observed with a peak monthly usage of 2730 boats in July. On July 4, 2009, total number of campers and visitors peaked at 2316. Table 5-20 presents the record of visitors at CANS Recreation Area for this update period. Average annual visitors for the update period was 224,019, which is an eight percent increase over the previous five-year period.

In July 2009, an overloaded privately owned ski boat sank into Camanche Reservoir near CANS Launch Ramp and East of Dike No. 1, releasing approximately 20 gallons of fuel, mainly gasoline, into the water. The District retained a contractor to clean up the spill which caused a sheen extending approximately 0.5 acres, within 24 hours. The discharge was contained by booms and removed with absorbents.

**Water Supply.** Three wells provide potable and non-potable water to the CANS Recreation Area facilities, described in Section 2. The District's potable water treatment facilities provide drinking water to 211 service connections (155 general and residents, 56 seasonal).

**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 underground storage tanks 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.

Since the MRWSS Update 2005, the following improvements have been made:

- The Lift Station #2 forced main has been replaced.
- Emergency generators have been added at each lift station to provide emergency backup power.
- In 2007, approximately 200 dry tons of sludge were removed from the three wastewater ponds to improve treatment and capacity. Cleaning and CCTV inspection of wastewater mains is a preventative maintenance effort to ensure regulatory compliance and prevent sewer overflows.

Table 5-21 details sewer overflows for the CANS system during this update period. Four spills were observed during this update period, marginally lower than the nine that were observed during the previous update period. The most substantial spill was an approximate 400-gallon release that occurred as the result of a main break. Portions of the spill entered the storm drain leading to the creek and Camanche Reservoir. The main was cleaned out and repaired.

**Watershed Headquarters and Maintenance Yard**. In addition to the Ranger Stations located at the CASS and North Shore Recreation Areas, the District operates an office building that serves as the headquarters for the District'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). There are plans to upgrade the building, and at that time, both of these septic systems and leach fields will be replaced with new facilities. Construction began in 2010. The District also operates a maintenance yard that houses equipment and supplies for the District's Pardee and Camanche facilities.

## *Water Resources Development*

At this writing, there is no current water resources development project in the Camanche Watershed. All the current development projects are targeted for the Upper Mokelumne River Watershed, in particular the transfer of ownership of the extensive PG&E hydroelectric property under the Land Conservation Commitment Stewardship Council. 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, the District owns approximately half of Camanche Watershed, including the reservoir; sanitation facilities and sewer overflows within the District property are associated with the District's facilities and are discussed above. AWA (AWA) provides wastewater service to a small area north of the District North Shore 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. However, 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 District property and AWA Camanche Village Unit 6 rely on septic systems.

## Hazardous Materials

Hazardous materials stored associated with the District'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 the District's facilities and Camanche Village served by AWA, as discussed above. In addition, the area north of Camanche Hills Hunting Preserve (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-District property in Camanche Watershed is rural and relies on septic systems.

## Utilities - Hydroelectric Power

Hydroelectric power generation occurs at Camanche Dam and is part of the District'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 the District'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 2006 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 the District's CASS and CANS recreation facilities. These roads are highlighted under the *District Facilities* section above.

## Agriculture

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

## Wildlife and Livestock

While livestock are the greatest contributor of animal waste in the Camanche Watershed, birds and mammals can introduce microorganisms into Camanche Reservoir and its tributaries through direct contact or animal waste. Deer, bobcats, opossums, beavers, muskrats, skunks, coyotes, California ground and grey squirrels, gulls, and geese, which are common species occurring in the Camanche Watershed, are associated with microbial contamination of drinking water supplies. For instance, there have been several beach closures at Oak Swimming Area due to high bacteriological levels that are the result of geese feces along the shoreline entering the water when the water level rises. 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 the District-owned lands surrounding Camanche Reservoir. The District'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 5-22 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 the District's facilities at CASS and CANS Recreation Areas; these are discussed under *District 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 District 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 is scheduled be to be reclaimed for the first time in 2010; this is anticipated to be an on-going best management practice to be conducted every five years.

A new septic system was recently installed at the CHHP. This project included installation of a new septic tank for the clubhouse, a sand filter and leach field, as well as new pumps and controllers. There are two existing septic tanks, which were tied into the new system, one for the residences and one for the office. 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 off hauled 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. In May 1997, the District and the RWQCB initiated the Penn Mine Environmental Restoration Project to implement site restoration work at Penn Mine, under the oversight of the USEPA. Approximately 380,000 cubic yards of waste material were excavated and placed in a six-acre landfill. The landfill was constructed with a clay liner and leachate collection system to contain the excavated waste materials. A soil cover was placed over areas disturbed by the waste excavation, which were then revegetated with native grasses and shrubs. BMPs were

employed during and following construction for erosion control and sediment management. Existing diversion channels were removed and surface water was allowed to flow into restored streambeds which were designed to minimize erosion and restore habitat. Construction activity for the Penn Mine Environmental Restoration Project was completed in November 1999.

Three years of post-restoration monitoring of the Penn Mine facilities were conducted to ascertain the effectiveness of this environmental restoration project in returning the site to 'pre-mining' condition. Based on the results of this monitoring, the project was deemed successful and the USEPA rescinded its 309 Order. The District continued quarterly monitoring of surface water runoff from the site for metals, turbidity, and pH until January 2010. Routine monitoring of the four groundwater wells around the landfill also occurs. In addition, maintenance inspections of the landfill and site stability are conducted on a regular basis.

### Mine Tailings Ponds

A series of three tiered ponds - lower, middle and upper pond - 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 District 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 and zinc pollution. The dam at the upper pond has been breached, and surface drainage from the Upper Pond flows in the Middle and Lower Ponds 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 District land.

The District has performed Phase I and II site assessments. BLM also performed an Engineering Evaluation/Cost Analysis. Supplemental investigations and a Human Health and Ecological Risk Assessments have recently been completed. The District stabilized the lower bank of the Lower Pond in Summer 2009 with a rock wall, backfill, and native vegetation. The 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.

## 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. Additional shorelines within the recreation areas are in progressing states of sloughing off, including a large bluff adjacent to a campground where a large 25-foot tall section of earth dislodged in 2008.

Two major projects were completed by the District to decrease erosion into Camanche Reservoir during the update period. The first project was completed along the CASS Area shoreline in 2007. At this site, the District constructed a 1,000 foot long stacked-boulder retaining wall ranging from three to eight feet in height. The second project, the China Gulch Restoration Project, was completed for two main reasons: to decrease erosion caused by wave action along this portion of the Camanche shoreline and to prohibit drainage from the Mine Tailings Ponds from reaching Camanche Reservoir. This project attempted to recreate the naturally occurring geology and vegetation of the area. A rock wall was constructed close to the shoreline. Behind this wall, an area was created to improve the natural attenuation for any contaminants occurring in surface water drainage. This area includes: a layer of cobbles 2-12 inches followed by a sediment barrier, soil up to grade, and native grasses planted over the top. Willow spikes were also planted to facilitate willow tree growth. This project was completed in 2009.

## *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 5-23 lists fires that occurred during this update period in the Camanche Watershed. Only fires greater than 0.5 acres were included. The largest fire reported in the watershed during this update period, was a 100 acre fire along North Camanche Parkway

approximately a mile north of the reservoir in 2007. There were no known water quality impacts as a result of this fire.

## Logging

Logging, due to its overwhelming land use position when compared to all other uses, is the only major land use capable of producing the increases in nitrates observed in Camanche Reservoir. While logging is conducted in the Upper Mokelumne River Watershed, the Pardee and Camanche reservoirs are operated in concert, thereby allowing the impacts of logging to be transferred into the Camanche Reservoir as well.

## 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 a common ongoing problem within watersheds. In addition, commercial dumping (e.g. concrete blocks, creosote logs, tires) has also occurred. Illegal dumping will likely increase as the population increases in surrounding areas and as landfill and garbage disposal rates rise. While it is difficult to stop unauthorized activities, the District can be successful in minimizing these activities on those lands directly owned and managed by the District.

# 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 5-24. These rankings take into account watershed characteristics (size, slopes, soils, and vegetation), type of contaminant, distance to water bodies, and magnitude of source.

In addition, historical records regarding a potential contaminant source may influence a ranking; however, they may be outweighed by the perceived public health risk associated with a water quality parameter. For example, District historical records may not substantiate the potential water quality concerns associated with recreation. However, this does not reduce the potential risk to public health in the event that a recreation-related, water quality contamination event occurs in the future.

In an effort to further highlight the water quality parameters of greatest concern for a specific potential contaminant source, the water quality parameters have been prioritized. This prioritization is based on water quality concerns as they relate to public health and drinking water regulations as well as historical raw water qualities documented in Section 4. The water quality parameter of greatest concern for a specific contaminant source in Table

5-24 is identified in bold type. Below is a general listing of the prioritization assigned to the water quality parameters.

1) Microbiological contaminants with the potential for acute illness;
2) Algae and inorganic compounds which contribute to T&O problems;
3) Turbidity (particulates) which provides the transport mechanism for adsorbed contaminants;
4) DBP precursors (which include surrogates such as TOC, SUVA, DOC, etc.) when reacted with a disinfectant, may result in increased DBPs; and
5) Other organic and inorganic compounds which are known or suspected carcinogens, mutagens, or teratogens, or cause acute toxicity.

In determining the potential effects to water quality, microbiological contaminants were considered the highest priority since they are the parameters targeted by the SWTR watershed sanitary survey requirements. In addition, *Giardia* and *Cryptosporidium* monitoring and analyses are expensive to conduct and, therefore, comprehensive watershed-wide ongoing sampling programs would not likely be implemented. The District, however, conducted routine monitoring of these two parameters for specific, selected sites in Pardee Reservoir. In addition, the IESWTR established an MCLG for *Cryptosporidium*. Adopted in 2006, the LT2ESWTR further mandates additional treatment if elevated levels of *Cryptosporidium* or *E. coli* are found in surface water. Given these reasons, protecting the raw water sources from microbiological contaminants is crucial.

Second priority is assigned to algae and inorganic compounds which result in creating T&O incidences. While T&O are an aesthetic concern, the main consumer complaint to the District is attributed to T&O incidents. Algae attributed to producing T&O can also generate algal toxins, some of which are on the USEPA CCL 3 for regulatory consideration. Third priority is assigned to particulates because of their potential role as a transport mechanism for other adsorbed contaminants. Given this transport mechanism role, the IESWTR establishes more stringent removal requirements for turbidity for both individual and combined filter effluents at WTPs. TOC is designated as the fourth priority since the District's conversion to chloramines reduced the concern regarding DBP formation in the District's finished water. Fifth, and final, priority was assigned to other organics and inorganics. While serious public health concerns can be associated with many of these parameters, historical raw water quality data documented in Section 4 indicate they are at or below detection limits, and, therefore, do not pose known public health concerns for the District.

Several of the potential contaminant sources listed in Table 5-24 were given ratings of *insignificant, low* or *low to medium* with regards to their potential for affecting water quality. These sources include utilities, agriculture, mines and quarries, logging, and unauthorized activities.

Below are brief discussions regarding the rationale for assigning the other potential contaminant sources with *low to high*, *medium*, and *medium to high* ratings for impacting water quality. These sources include sanitation facilities, urban and rural area runoff,

District facilities, wildlife and livestock, recreation, geologic hazards, and fires and fire management.

## Sanitation Facilities

Sanitation facilities include wastewater collection, wastewater treatment, and septic systems. They are classified as having had *low to high* potential for affecting water quality depending upon proximity to water, watershed characteristics, concentrations of contaminants, and precipitation. Of the five community WWTPs on the Upper Mokelumne River watershed, only one (Mokelumne Hill WWTP) reported a spill during this update period. New development will increase the number of septic systems in the watershed, though larger new subdivisions will be on sewer or community wastewater systems, As existing systems age, there is a greater likelihood for failure and contamination of water resources.

In the Camanche Watershed, ten sewage overflow incidents occurred in the Camanche North and South Shore areas during this update period. Incidents of sewage overflows decreased significantly from the previous update period, particularly in the CASS likely due to infrastructure improvements. Records of these events are tracked by the District and show that cleanup efforts following these spills have typically contained the spills on land and prevented direct introduction to Camanche Reservoir water. However, these events remain a high potential threat to water quality because of their proximity to reservoir.

## Urban and Rural Area Runoff

Population growth in urban and rural areas continued steadily in Calaveras, Amador, and Alpine Counties, though more slowly than previously projected for most communities and unincorporated areas. Both the urban (residential/commercial) and rural (residential) area runoff categories received rankings of *low to high* for potentially affecting source water quality for a variety of contaminants. In general, the potential contaminant sources and corresponding water quality concerns associated with the runoff from each of these areas are similar. However, the magnitude of the rural area water quality concerns is reduced, excluding microbiological parameters, when compared to urban area runoff. This is particularly true herein because the residential component of the rural area is considered to produce the most significant impacts; however, rural areas are sparsely populated with residences dispersed over large areas.

Of most importance from an urban area runoff standpoint, however, are the microorganisms and organics - SOCs, oil and grease, and other hydrocarbons. The potential contaminant sources for the microorganisms are the occasional accidental sewerage overflows. The potential contaminant sources for the organics are the commercial areas and corresponding parking lots. With regards to rural area runoff, microorganisms are of the most concern because the residences are unsewered, and septic system leakage has been known to be a problem. When comparing these potential contaminant concerns, the microorganisms are of the most importance because they can result in acute health effects, while organics can result in chronic health effects from long-term exposure.

## District Facilities

District facilities (excluding recreation and hydroelectric) received a *low to high* rating. Because these facilities encompass a wide range of land uses and activities, they can potentially contribute a variety of contaminants into the reservoirs. Chemicals are stored on-site; however, containment measures are in place for the treatment-related chemicals. Although there are measures to prevent stormwater runoff, leaks, and accidental spills, the risk of water quality impact increases due to the proximity of these facilities to the reservoirs and their tributaries as mentioned in the Sanitary Systems Section above. In addition, watershed activities such as road and trail maintenance can cause significant erosion, which can result in higher raw water turbidities and other adsorbed contaminants.

## Utilities - Hydroelectric Power

Utilities, specifically hydroelectric power generation, received a *high* rating. Extensive hydroelectric power generation facilities exist throughout the watersheds but predominantly in the Upper Mokelumne River Watershed. These facilities incorporate a complex system of reservoirs, canals, and tunnels, which are proximate to the Mokelumne River and main tributaries. In some cases these facilities are integrated into the main tributaries. Elevated temperatures resulting from hydropower generation have a significant impact on algal growth and corresponding potential T&O events and elevated TOC concentrations. In addition, turbidity and nutrient increases due to erosion related to facility operations impacts water quality.

## Wildlife and Livestock

Wildlife and livestock received a *medium to high* rating. The pathogens (*Giardia lamblia* and *Cryptosporidium parvum*) associated with wildlife and livestock are considered significant health risks because of regulations such as the LT2ESWTR. Active range management practices on District's property around Pardee and Camanche Reservoirs reduce potential contamination, but little information is available for lands in the lower portion of the watershed where livestock is grazed on private lands. Erosion caused by livestock can result in higher raw water turbidities and other adsorbed contaminants, and inorganic compounds (nitrogen and phosphorous) associated with wildlife and livestock may impact algal blooms, some of which can cause undesirable T&O.

## Recreation

Recreation within the District, SPI, National Forests, BLM, and PG&E lands received a rating of *medium to high*. River rafting facilities on the North Fork and Main Stem of the Mokelumne River will increase the amount of public access and potential for contamination. In Pardee Reservoir, current provisions limit recreation and prohibit body contact in Pardee Reservoir in order to protect the District's raw water quality. However, body contact recreation is permitted on Camanche Reservoir under restricted conditions. Visitors using the non-District facilities enjoy activities that occur proximate to the water bodies or take

place on the water bodies. Due to the number of visitors and the proximity to water, the potential for degrading water quality increases.

The concern over erosive nature of OHV operation, (e.g., motorcycles, all-terrain vehicles, four-wheel drive vehicles, SUVs) is an issue of increasing concern among Forest Service, SPI, and District staff. The increase in popularity over other ground-based forms of trail recreation (hiking, horseback riding), along with the emphasis on unpaved trails, and the great distances covered make this recreational activity one with the potential to significantly increase erosion control problems. However, agencies, such as USFS and BLM, began to restrict OHV access in the watershed.

## Geologic Hazards and Fires and Fire Management

Geologic hazards, such as earthquakes, landslides, and fires are significant causes of elevated erosion risk. While earthquakes, landslides, and fires expose the soil and make it vulnerable to erosion, precipitation is necessary to induce erosion and, in turn, increase turbidity in the water supply. Turbidity, in turn, transports other adsorbed contaminants into the water bodies. In addition, high loads of turbidity transported into the water bodies by runoff from precipitation can cause significant treatment problems. While geologic hazards and major fires are not common occurrences, their resulting impacts can be catastrophic.

***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 |

***Table 5-2: Visitor Use Pardee Recreation Area (2005-2009)***

| | Number of Visitors | | | | |
|---|---|---|---|---|---|
| | 2005 | 2006 | 2007 | 2008 | 2009 |
| Jan | Closed | Closed | Closed | Closed | Closed |
| Feb | 7870 | 8733 | 11697 | 11104 | 12907 |
| March | 9134 | 6542 | 12344 | 12594 | 14230 |
| Apr | 9848 | 2321 (1) | 17156 | 13521 | 14835 |
| May | 11705 | 14148 | 11260 | 11435 | 14054 |
| Jun | 10920 | 11661 | 13570 | 12071 | 11465 |
| Jul | 10438 | 11962 | 12918 | 12055 | 10615 |
| Aug | 7165 | 11089 | 9760 | 10572 | 10576 |
| Sep | 6490 | 11987 | 12544 | 10216 | 8505 |
| Oct | 6445 | 8520 | 8400 | 8273 | 7681 |
| Nov | Closed | Closed | Closed | Closed | Closed |
| Dec | Closed | Closed | Closed | Closed | Closed |
| Total | 80,015 | 86,963 | 109,649 | 101,841 | 104,868 |

(1) Incomplete data, lost during concession ownership change.

Source: Marcell Moranton, Watershed Section

***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 and a 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 used occasionally | 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 | | Leech field |
| Middle Fork | Dunrovin Mobile Home Village | Private Mobile Home Park | West Point | Septic System (multiple tanks) | 30 residential connections | Leech field |
| South Fork | Silver Mountain Park | Private Mobile Home Park | W | Septic System | | Leech field |
| South Fork | Railroad Flat Elementary | Private | Railroad Flat | Septic System | | Leech field |
| South Fork | Camp Menzies (Girl Scouts) | Private | Off Highway 4 | Septic System | Seasonal camp XX residents | Leech field |
| | | | | | | |

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

*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 |
| STAR GAS | 22645 HWY 26 | WEST POINT | Calaveras | Gasoline | Soil | Open - Site Assessment | 10/25/2005 |
| WEST POINT EXXON | 347 MAIN ST | WEST POINT | Calaveras | Gasoline | Aquifer used for drinking water supply | Open - Site Assessment | 4/23/1999 |
| | | | | | | | |
| **Remediated LUST Cleanup Sites**[2][3] | | | | | | | |
| GORDON GRANT PROPERTY | 13720 HWY 26 | GLENCOE | Calaveras | Gasoline | Soil | Completed - Case Closed | 4/5/2002 |
| TOWLE PROPERTY | 600 EALEY RD | GLENCOE | Calaveras | Gasoline | Aquifer used for drinking water supply | Completed - Case Closed | 2/10/2003 |
| BEAR RIVER LAKE RESORT[3] | 40800 Hwy 26 | PIONEER | Amador | Diesel | Other Groundwater (uses other than drinking water) | Completed - Case Closed | 9/17/2008 |
| Caltrans-Peddler Hill Maint. [3] | 41951 Highway 88 | Pioneer | Amador | Oil,,Motor, Hydraulic | Aquifer used for drinking water supply | Completed - Case Closed | 6/16/2009 |
| RAILROAD FLAT GENERAL STORE | 313 RAILROAD FLAT RD | RAILROAD FLAT | Calaveras | Gasoline | Well used for drinking water supply | Completed - Case Closed | 1/25/2010 |
| WILSEYVILLE FOOD & GAS | 3961 BLIZZARD MINE RD | WILSEYVILLE | Calaveras | Gasoline | Aquifer used for drinking water supply | Completed - Case Closed | 11/17/2009 |
| | | | | | | | |
| **Permitted Underground Storage Tanks** | | | | | | | |
| BEAR RIVER LAKE RESORT[3] | 40800 Hwy 26 | 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 2005 - 2009, or if not reported in last update.
3. Site LUST has been fully remediated and new tank is now permitted. Site is listed only under Permitted Tanks. Information on substance, potential threat, status and last update apply to LUST remediation.
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 Caltrans Traffic Counts***

| | | Ahead AADT (1.) | | | Truck Traffic(3) (% of total) |
|---|---|---|---|---|---|
| **Route** | **Location** | **2000** | **2005** | **2008** | |
| 26 | Mokelumne Hill, Junction Route 49 | 1350 | 1400 | 2150 | 4.5% |
| 26 | Winton Road, West Point | 2200 | 2200 | 1950 | 4% |
| 49 | Calaveras County – Amador County | 6700 | 7000 | 5600 | |
| 49 | Jackson, South Jct. Route 88 | 17900 | 17900 | 19000 | 8.2% |
| 88 | Pine Grove, Ridge Road | 14200 | 22000 | 22500 | 6.4% |
| 88 | Junction Route 26 | 8300 | 9400 | 8100 | 7.5% |

| | | Back AADT(2) (% of total) | | |
|---|---|---|---|---|
| Route | Location | **2000** | **2005** | **2008** |
| 26 | Mokelumne Hill, Junction Route 49 | 1350 | 2150 | 2050 |
| 26 | Winton Road, West Point | 2400 | 2200 | 1950 |
| 49 | Calaveras County – Amador County | 5000 | 5200 | 5900 |
| 49 | Jackson, South Jct. Route 88 | 18600 | 19600 | 18000 |
| 88 | Pine Grove, Ridge Road | 8300 | 14000 | 13500 |
| 88 | Junction Route 26 | 9300 | 11300 | 10200 |

1. Ahead AADT: Traffic north or east of the count location
2. Back AADT : Traffic south or west of the current location
3. Truck traffic is the average truck count in ahead and back locations

Source: Caltrans, Traffic Data Branch

***Table 5-6: Injury Collisions in Upper Mokelumne River Watershed Counties***

California Highway Patrol Injury Collisions by County 1999-2008

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|
| Alpine | 40 | 35 | 37 | 42 | 41 | 46 | 46 | 44 | 30 | 35 |
| Amador | 216 | 236 | 265 | 262 | 238 | 299 | 281 | 312 | 276 | 255 |
| Calaveras | 256 | 249 | 303 | 332 | 329 | 298 | 300 | 291 | 294 | 256 |

Source: California Highway Patrol – Statewide Integrated Traffic Records System

***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] |
| Pardoe | 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 | n/a |
| 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.
(5) Vacant since 1992, Last grazed 1989
Source: El Dorado and Stanislaus National Forests

*Table 5-8 EBMUD-Managed Grazing, Pardee Reservoir Lands*

| Name | Approximate Acreage | Grazing Allowed | Estimated AUMs | Lease Expiration |
|---|---|---|---|---|
| Wildermuth House | 2300 | 45 %All Year<br>55% Apr-Oct | 1329 | October 2010 |
| Pardee Dam | 466 | 55% All Year<br>26% Apr-Dec<br>23% Apr-Oct | 158 | October 2010 |
| Watertown | 580 | All Year | 262 | October 2010 |
| Carson Creek | 245 | All Year | 75 | October 2010 |
| Chrome Mountain | 1717 | 60% All Year<br>40% Apr-Dec | 1099 | October 2010 |
| Rabbit Flat | 401 | All Year | 401 | October 2010 |
| Goat Hill | 950 | Apr-Dec | 960 | October 2010 |
| Gales Ridge | 392 | Apr-Dec | 101 | October 2010 |
| North Middle Bar | 762 | 59% All Year<br>31% Apr-Dec<br>10% Apr-Oct | 495 | October 2010 |

***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 Mokelumne Watershed***

| Date | County | Location | Type | Acreage |
|---|---|---|---|---|
| 9/21/05 | Calaveras | Rancho Paloma Road (off Goodell Road) | Woodland | 1.5 |
| 9/21/05 | Calaveras | Pardee Watershed, South of the Intake | Woodland | 3 |
| | | Total 2005 | | 4.5 |
| 7/30/06 | Calaveras | Campo Seco and Watertown | Grass | 2 |
| 9/4/06 | Calaveras | East side of Sandretto Road near trail crossing | Grass | 2 |
| | | Total 2006 | | **4** |
| 1/11/07 | Amador | SW of Plasse's property line | Grass, brush | 3 |
| 5/16/07 | Calaveras | Watertown Road and Sandretto Road | Grass, Woodland | 15 |
| 5/16/07 | Amador | Pardee Dam Road and Stony Creek Road | Brush, woodland | 40 |
| 5/17/07 | Calaveras | Near intersection of Hwy 26 and Paloma Road | Grass | 10 |
| 6/17/07 | Calaveras | 9 Oaks Road – Paloma | Grass | 15 |
| 9/3/07 | Calaveras | Paloma/Watertown Road Intersection | Grass | 10 |
| 2007 | Calaveras | Smitty Fire – Smitty Lane and West Point Road in West Point | | 20 |
| | | Total 2007 | | **113** |
| 4/20/08 | Calaveras | 7922 Gwin Street, Paloma | Grass | 1 |
| 10/9/08 | Amador | North of Pardee Rec Waste Water Treatment Plan | woodland | 10 |
| 2008 | Calaveras | Dome2 | | 120 |
| 2008 | Alpine | Clover2 | | 30 |
| 6/13/08 | Amador | Electra | | 251 |
| | | Total 2008 | | **412** |
| 8/22/09 | Calaveras | Sanderetto Road behind Pardee Chemical Building | Grass, woodland | 2 |
| | | Total 2009 | | **2** |

Source: CDF and EBMUD

***Table 5-11 Fuel Management Activities – EBMUD (2009)***

| TYPE OF TREATMENT | QUANTITY |
|---|---|
| Discing | 18.7 Miles |
| Roads/Trails Mowed | 110.6 Miles |
| Brush Removal (Hand Crews) | 15 Acres |
| Prescribed Burning | 16 Acres |
| | |

1. See Figure 5-10 Source: Chris Swann

***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 |

***Table 5-13 Timber Harvests for National Forest Service Land***

| 2005-2009 Timber Harvesting, Upper Mokelumne River Watershed within National Forest Lands | | | |
|---|---|---|---|
| | | | |
| | | | |
| **National Forest** | **acres** | **Type** | **Subwatershed** |
| Eldorado, Amador District | 357 | understory removal (smaller trees) | Bear River Reservoir (80%), Lower Bear River (15%), Lower Cole Creek (5%), North Fork |
| | | | |
| Stanislaus, Calaveras District | 875 | Thinning | Middle/North Fork |
| | 295 | Thinning | Blue Creek, North Fork |
| | | | |
| Total | 1527 | Acres | |
| | | | |

Source: El Dorado and Stanislaus Nation Forests

***Table 5-14a: Timber Harvests Plans, 2005 – 2009,***
***Upper Mokelumne River Watershed***

| **YEAR** | **TIMBER HARVEST PLANS** |
|---|---|
| | (total acres) |
| 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 – 2009)***
***Upper Mokelumne River Watershed***

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

Source: California Department of Fire

***Table 5-15a: Total Production Agriculture Pesticide Use on Mokelumne River Watershed Listed by Operator***

| | Sum of LBS_PRODUCT | | | | |
|---|---|---|---|---|---|
| **OPERATOR_ID** | **2005** | **2006** | **2007** | **2008** | **2009** |
| 0290011 / 0900023[1] | 23,339 | 34,054 | 9,671 | 16,216 | 11,528 |
| 0300086 | 2,424 | | | 2 | 1 |
| 0500101 | | 1,787 | 269 | | |
| 0500276 | 21 | | 1,523 | 44 | 23 |
| 0500026 | 533 | 557 | 82 | | |
| 0500087 | 605 | 439 | | | |
| 0500153 | | 37 | 39 | | 808 |
| 2900012 | | 453 | | 179 | 98 |
| 5006338 | 250 | 152 | 283 | 44 | |
| 0300426 | | | | 500 | |
| 0300398 | 457 | | | | |
| 0500016 | | 120 | 305 | | |
| 500026 | | | 339 | | |
| 5006338 | 320 | 10 | 2 | 2 | |
| 0500251 | | | 320 | | |
| 0500015 | 126 | 70 | 64 | 47 | |
| 0500357 | | | | | 300 |
| 0500123 | 45 | 102 | 51 | 66 | 15 |
| 300398 | 246 | | | | |
| 0500263 | | 246 | | | |
| 0500050 | | | 240 | | |
| 0500051 | 46 | 5 | 153 | 5 | |
| 0500325 | | | | | 156 |
| 0300570 | 153 | | | | |
| 0500114 | 20 | 20 | 15 | 20 | 20 |
| 0500126 | 25 | | 36 | 32 | |
| 0500320 | | 78 | | | |
| 0300125 | 23 | 17 | 18 | 2 | 14 |
| 500015 | 40 | 17 | | 13 | |
| 300607 | | | 64 | | |
| 500101 | | 60 | | | |
| 0500028 | 7 | 23 | 24 | | |
| 0300010 | 11 | | 11 | 16 | 17 |
| 500051 | | 53 | | | |
| 0500328 | | | | 32 | |
| 300125 | | | | 14 | |
| 500028 | 12 | | | | |
| 500126 | 4 | | | 2 | |
| 0500235 | | 5 | 1 | | |
| 500348 | | | | | 5 |
| 300570 | 4 | | | | |
| 500235 | | | | 1 | |
| Grand Total | 28,711 | 38,303 | 13,510 | 17,237 | 12,984 |

1. Sierra Pacific Industries operator ID's are 0290011 (Calaveras County) and 0900023 (Amador County).

Source: California State Department of Pesticides

***Table 5-15b: Total Production Agriculture Pesticide Use on Mokelumne River Watershed Applied by Sierra Pacific Industries, Total Pounds Listed by Product***

| | | Sum of LBS_PRODUCT | | | | |
|---|---|---|---|---|---|---|
| **PRODUCT_NAME** | **REGISTRATION NUMBER** | **2005** | **2006** | **2007** | **2008** | **2009** |
| AATREX 4L | 100-497-AA | 1,109 | 673 | | 206 | |
| ALBAUGH SEE 2,4D | 42750-22-AA | | 1,291 | 906 | 476 | |
| ARSENAL HERBICIDE APPLICATORS CONCENTRATE | 241-299-AA | 43 | 12 | | | |
| BUCCANEER GLYPHOSATE HERBICIDE | 524-445-ZA-55467 | 6,968 | 12,221 | 117 | 263 | |
| | 55467-10-AA | | | 3,775 | 302 | 219 |
| BUCCANEER PLUS GLYPHOSATE HERBICIDE | 524-454-ZA-55467 | 430 | | | | |
| CHOPPER HERBICIDE | 241-296-AA | 159 | | 44 | | |
| DU PONT VELPAR DF HERBICIDE | 352-581-AA | 4,609 | | | | |
| DU PONT VELPAR L HERBICIDE | 352-392-ZA | | | | 147 | |
| DU PONT VELPAR L WEED KILLER | 352-392-AA | 6,131 | 5,454 | 1,355 | 6,257 | 4,134 |
| DYNE-AMIC | 5905-50071-AA | | 17 | | 347 | 353 |
| GARLON 3A | 62719-37-ZC | | | | 383 | |
| GARLON 3A HERBICIDE | 62719-37-ZA | 76 | 123 | | 837 | |
| GLY STAR ORIGINAL | 42750-60-AA | | | | 928 | 5,627 |
| GLYFOS HERBICIDE | 4787-31-AA | 116 | | | | |
| HASTEN | 2935-50160-AA | | 3,316 | | | |
| HELENA AGRI-DEX | 5905-50017-AA | | 5 | | | |
| INDUCE | 5905-50091-AA | | | 211 | 86 | |
| INLET | 5905-50099-AA | | | 35 | 195 | |
| KLEENUP PRO GRASS WEED KILLER | 524-445-AA-65783 | 48 | 100 | | | |
| MON-35085 | 524-445-AA | 146 | 643 | | | |
| NUFARM WEEDONE L V 4 EC BROADLEAF HERBICIDE | 228-139-AA-71368 | 1,344 | 875 | | 939 | 581 |
| R-11 SPREADER-ACTIVATOR | 2935-50142-AA | 319 | 998 | 73 | | 96 |
| RATTLER HERBICIDE | 524-445-ZE-5905 | | 2,812 | | | |
| RIVERDALE 2, 4-D L.V. 6 ESTER | 228-95-AA | | 289 | | | |
| RIVERDALE RAZOR HERBICIDE | 228-366-ZA | | 532 | | | |
| RIVERDALE RAZOR SPI | 228-366-AA | 657 | 503 | 2,079 | 4,106 | 58 |
| RIVERDALE TAHOE 3A HERBICIDE | 228-384-AA | | 1,001 | 170 | | |
| RIVERDALE TAHOE 4E HERBICIDE | 228-385-AA | | 9 | | | |
| SYL-TAC | 2935-50167-AA | 547 | 929 | 455 | | |
| TENKOZ BUCCANEER HERBICIDE | 524-445-ZE-55467 | 557 | 1,614 | | | |
| TENKOZ BUCCANEER PLUS HERBICIDE | 524-454-AA-55467 | | 488 | 293 | 645 | |
| TRANSLINE | 62719-259-AA | | | | 45 | |
| TRI-FOL | 2935-50152-AA | | 24 | | 18 | |
| WILCO GOPHER GETTER AG BAIT | 36029-7-AA | 38 | 37 | 70 | 35 | |
| WILCO "GOPHER GETTER" BAIT | 36029-1-AA | 41 | | | | |
| WILCO GOPHER GETTER RESTRICTED USE BAIT | 36029-50005-AA | | 89 | 89 | | 87 |
| FIRST CHOICE SOLAR METHYLATED SEED OIL WITH ORGANOSILICONE | 11656-50100-AA | | | | | 15 |
| RED-TOP NU-FILM-P | 2935-50147-AA | | | | | 29 |
| FIRST CHOICE EXCEL 90-NF | 11656-50108-AA | | | | | 105 |
| WILCO 'GOPHER GETTER' TYPE 2 BAIT | 36029-50003-AA | | | | | 6 |
| 0.5% STRYCHNINE TREATED GRAIN BAIT FOR POCKET GOPHERS | 56228-20-AA | | | | | 208 |
| RED-TOP AD-FIRST | 2935-50143-AA | | | | | 11 |
| Grand Total | | 23,339 | 34,054 | 9,671 | 16,216 | 11,528 |

Source: California State Department of Pesticides

***Table 5-15c: Total Production Agriculture Pesticide Use on Mokelumne River Watershed Applied by Sierra Pacific Industries, Total Gallons/Pounds Listed by Product***

| Sum of AMT_PRD_USED | | | Sum of AMT_PRD_USED | | | | |
|---|---|---|---|---|---|---|---|
| PRODUCT NAME | REGISTRATION NUMBER | UNIT | 2005 | 2006 | 2007 | 2008 | 2009 |
| AATREX 4L | 100-497-AA | GA | 121 | 74 | | 23 | |
| ALBAUGH SEE 2,4D | 42750-22-AA | GA | | 141 | 99 | 52 | |
| ARSENAL HERBICIDE APPLICATORS CONCENTRATE | 241-299-AA | GA | 5 | 1 | | | |
| BUCCANEER GLYPHOSATE HERBICIDE | 524-445-ZA-55467 | GA | 716 | 1,256 | 12 | 27 | |
| | 55467-10-AA | GA | | | 388 | 31 | 23 |
| BUCCANEER PLUS GLYPHOSATE HERBICIDE | 524-454-ZA-55467 | GA | 44 | | | | |
| CHOPPER HERBICIDE | 241-296-AA | GA | 18 | | 5 | | |
| DU PONT VELPAR DF HERBICIDE | 352-581-AA | LB | 4,609 | | | | |
| DU PONT VELPAR L HERBICIDE | 352-392-ZA | GA | | | | 18 | |
| DU PONT VELPAR L WEED KILLER | 352-392-AA | GA | 767 | 682 | 170 | 783 | 517 |
| DYNE-AMIC | 5905-50071-AA | GA | | 2 | | 46 | 47 |
| GARLON 3A | 62719-37-ZC | GA | | | | 40 | |
| GARLON 3A HERBICIDE | 62719-37-ZA | GA | 8 | 13 | | 89 | |
| GLY STAR ORIGINAL | 42750-60-AA | GA | | | | 95 | 576 |
| GLYFOS HERBICIDE | 4787-31-AA | GA | 12 | | | | |
| HASTEN | 2935-50160-AA | GA | | 437 | | | |
| HELENA AGRI-DEX | 5905-50017-AA | GA | | 1 | | | |
| INDUCE | 5905-50091-AA | GA | | | 26 | 11 | |
| INLET | 5905-50099-AA | GA | | | 5 | 27 | |
| KLEENUP PRO GRASS AND WEED KILLER | 524-445-AA-65783 | GA | 6 | 12 | | | |
| MON-35085 | 524-445-AA | GA | 15 | 66 | | | |
| NUFARM WEEDONE L V 4 EC BROADLEAF HERBICIDE | 228-139-AA-71368 | GA | 156 | 102 | | 109 | 67 |
| R-11 SPREADER-ACTIVATOR | 2935-50142-AA | GA | 38 | 120 | 9 | | 12 |
| RATTLER HERBICIDE | 524-445-ZE-5905 | GA | | 289 | | | |
| RIVERDALE 2, 4-D L.V. 6 ESTER | 228-95-AA | GA | | 31 | | | |
| RIVERDALE RAZOR HERBICIDE | 228-366-ZA | GA | | 55 | | | |
| RIVERDALE RAZOR SPI | 228-366-AA | GA | 68 | 52 | 215 | 425 | 6 |
| RIVERDALE TAHOE 3A HERBICIDE | 228-384-AA | GA | | 106 | 18 | | |
| RIVERDALE TAHOE 4E HERBICIDE | 228-385-AA | GA | | 1 | | | |
| SYL-TAC | 2935-50167-AA | GA | 70 | 120 | 59 | | |
| TENKOZ BUCCANEER HERBICIDE | 524-445-ZE-55467 | GA | 66 | 190 | | | |
| TENKOZ BUCCANEER PLUS HERBICIDE | 524-454-AA-55467 | GA | | 50 | 30 | 66 | |
| TRANSLINE | 62719-259-AA | GA | | | | 5 | |
| TRI-FOL | 2935-50152-AA | GA | | 3 | | 2 | |
| WILCO GOPHER GETTER AG BAIT | 36029-7-AA | LB | 38 | 37 | 70 | 35 | |
| WILCO "GOPHER GETTER" BAIT | 36029-1-AA | LB | 41 | | | | |
| WILCO GOPHER GETTER RESTRICTED USE BAIT | 36029-50005-AA | LB | | 89 | 89 | | 87 |
| FIRST CHOICE SOLAR METHYLATED SEED OIL WITH ORGANOSILICONE | 11656-50100-AA | GA | | | | | 2 |
| RED-TOP NU-FILM-P | 2935-50147-AA | GA | | | | | 4 |
| FIRST CHOICE EXCEL 90-NF | 11656-50108-AA | GA | | | | | 12 |
| WILCO 'GOPHER GETTER' TYPE 2 BAIT | 36029-50003-AA | LB | | | | | 6 |
| 0.5% STRYCHNINE TREATED GRAIN BAIT FOR POCKET GOPHERS | 56228-20-AA | LB | | | | | 208 |
| RED-TOP AD-FIRST | 2935-50143-AA | GA | | | | | 1 |

Source: California Department of Pesticide Regulation

***Table 5-16a Pesticide Use By Commodity***
***Upper Mokelumne River Watershed, Calaveras County***

| | Acres Treated by Commodity | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Forest/Timberland | Wine Grapes | Pistachios | Walnuts | Rangeland | Other | Total |
| 2005 | 3329 | 21 | 4 | 746 | 20 | 4 | 4124 |
| 2006 | 8976 | 81 | 0 | 943 | 1106 | 162 | 11268 |
| 2007 | 2697 | 193 | 0 | 542 | 12 | 2 | 3446 |
| 2008 | 4967 | 34 | 0 | 310 | 170 | 2 | 5483 |
| 2009 | 1604 | 38 | 0 | 74 | 6 | 0 | 1722 |

Source: State of California, Department of Pesticide Regulation

***Table 5-16b Pesticide Use By Commodity***
***Upper Mokelumne River Watershed, Amador County***

| | Acres Treated by Commodity | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Forest/Timberland | Wine Grapes | Cucumber | Tomato | Pastureland | Rights of Way[1] | Total |
| 2005 | 4064 | 23 | 9 | 18 | 5 | 11 | 4130 |
| 2006 | 4349 | 16 | 0 | 0 | 0 | 336 | 4701 |
| 2007 | 1477 | 17 | 0 | 0 | 10 | 0 | 1504 |
| 2008 | 2001 | 15 | 0 | 0 | 10 | 0 | 2026 |
| 2009 | 4533 | 14 | 0 | 0 | 10 | 0 | |

1. Sierra Pacific Industires

Source: State of California, Department of Pesticide Regulation

***Table 5-16c Pesticide Use By Commodity***
***Upper Mokelumne River Watershed, El Dorado County***

| | Acres Treated by Commodity | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Forest/Timberland | Wine Grapes | Pistachios | Walnuts | Rangeland | Other | Total |
| 2005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2006 | 124 | 0 | 0 | 0 | 0 | 0 | 124 |
| 2007 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2008 | 116 | 0 | 0 | 0 | 0 | 0 | 116 |
| 2009 | 63 | 0 | 0 | 0 | 0 | 0 | 63 |

Source: State of California, Department of Pesticide Regulation

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

| FACILITY | SOUTH SHORE | NORTH SHORE |
|---|---|---|
| | Existing Size/Qnty | Existing Size/Qnty |
| Tent Campsites | 292 | 241 |
| RV Campsites (short term) | 120 | 0 |
| RV Campsites (seasonal) | 87 | 0 |
| Picnic Sites | 99 | 29 |
| Roads (paved) | 11 mi. | 9 mi. |
| Total Day Use Parking Spaces | 400 | 450 |
| Paved Parking Spaces | 156 | 202 |
| Fishing Docks | 2 | 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 | 1 |
| 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 | 4 |
| Toilets | 53 | 27 |
| Urinals | 18 | 6 |
| Sinks | 60 | 29 |
| Showers (Locations) | 7 | 2 |
| Heads | 30 | 16 |
| 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 | 0 | 44 |
| Covered Berths | 34 | 40 |
| Rental Boats | 8 | 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 | 4 |
| 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 (2005-2009)***

| Month | 2005 | 2006 | 2007 | 2008 | 2009 | average |
|---|---|---|---|---|---|---|
| Jan | 8641 | 10353 | 10730 | 9033 | 10075 | 9766 |
| Feb | 10917 | 11949 | 11284 | 12073 | 9907 | 11226 |
| Mar | 13880 | 11855 | 16758 | 16549 | 13842 | 14577 |
| Apr | 14256 | 16924 | 18357 | 16388 | 16035 | 16392 |
| May | 19469 | 24340 | 22225 | 20191 | 20505 | 21346 |
| Jun | 21980 | 26832 | 24323 | 18788 | 18973 | 22179 |
| Jul | 31696 | 34821 | 27268 | 23150 | 28115 | 29010 |
| Aug | 20483 | 21177 | 24741 | 21602 | 22247 | 22050 |
| Sep | 16948 | 19257 | 15783 | 10913 | 16870 | 15954 |
| Oct | 11673 | 11339 | 11104 | 10003 | 10129 | 10850 |
| Nov | 12191 | 11376 | 12953 | 11164 | 11818 | 11900 |
| Dec | 8992 | 9480 | 10207 | 8531 | 9630 | 9368 |
| Total | 191126 | 209703 | 205733 | 178385 | 188146 | 194619 |

Source: Mark Bolton (EBMUD)

***Table 5-18b: Accidental Spills at Camanche Reservoir 2005-2009***

| Date | Location | Volume/Type | Cause | Follow-up Action |
|---|---|---|---|---|
| 4/23/2007 | Boat ramp | 2 cups/Petroleum | Spill caused by boat slipping off the trailer back into the water. | Absorbents placed in water and contained |
| 5/26/2007 | South Shore | Unknown/Petroleum | A boat caught fire, sank, resulting in a small sheen | Contained with booms |
| 3/21/2007 | North Shore | 5 gal/Petroleum | Above ground fuel tank fitting corroded and leaked. | Excavated and removed soil. (Porous concrete containment vault not sealed.) |
| 7/25/2009 | North Shore | 20 gal/Petroleum | Boat sunk in reservoir | Contained by booms and removed with absorbents |

***Table 5-19: Sewer Overflows at Camanche Reservoir South Shore***

| Date | Location | Volume and Cause | Corrective Action |
|---|---|---|---|
| 9/13/05 | CASS, MHP Space #4; | Approx 2 gallons due to root infiltration into the service lateral causing partial blockage | Spill vacuumed and disinfected. |
| 10/12/05 | CASS, Monument Campground Space #53 | 1 gallon due to accidental release from trailer holding tank. | NA |
| 12/4/05 | CASS, MHP Space #14 | Less than 20 gallons due to blocked lateral. | Spill removed and area disinfected |
| 1/10/07 | CASS, MHP Space #53 | Approx 50 gallons due to blocked lateral from roots and debris at service connection | Cleaned out and repaired |
| 2/25/07 | CASS main from MHP #1 | Overflow of sewage due to manhole overflow from blocked sag bend, resulted in a 2400 gallon spill, of which 200 gallons made it into a creek that goes into a holding pond next to Camanche Reservoir | Cleaned out and repaired |
| 11/3/08 | CASS Space #23-24 | Less than 500 gallons from manhole overflow due to blocked collection pipeline. | Cleaned out and repaired |

CASS = Camanche South Shore, MHP = Mobile Home Park
Source: Pat Lydon, EBMUD

***Fig 5-20: Visitor Use of Camanche North Shore Recreation Area (2005-2009)***

| Month | 2005 | 2006 | 2007 | 2008 | 2009 | average |
|---|---|---|---|---|---|---|
| Jan | 12037 | 11928 | 13021 | 10047 | 12021 | 11811 |
| Feb | 12604 | 13192 | 12434 | 12965 | 10807 | 12400 |
| Mar | 15929 | 11859 | 17064 | 15292 | 13569 | 14743 |
| Apr | 15588 | 16967 | 18565 | 16111 | 16829 | 16812 |
| May | 26127 | 27768 | 25038 | 20340 | 25231 | 24901 |
| Jun | 29022 | 32701 | 32522 | 21924 | 25531 | 28340 |
| Jul | 40591 | 42035 | 37121 | 25484 | 32834 | 35613 |
| Aug | 27691 | 28424 | 27966 | 20317 | 26873 | 26254 |
| Sep | 20096 | 22079 | 20111 | 13362 | 20539 | 19237 |
| Oct | 12126 | 12448 | 11608 | 11123 | 12212 | 11903 |
| Nov | 10250 | 11177 | 11364 | 10534 | 12508 | 11167 |
| Dec | 10626 | 11726 | 10571 | 10115 | 11153 | 10838 |
| Total | 232687 | 242304 | 237385 | 187614 | 220107 | 224019 |

Source: Mark Bolton, EBMUD

***Table 5-21: Sewer Overflows Camanche North Shore***

| Date | Location | Volume and Cause | Corrective Action |
|---|---|---|---|
| 10/9/05 | CANS, MHP #1, Space #77 | 1 gallon due to service connection backup from root blockage | Cleanout and repaired |
| 11/3/05 | CANS; MHP #1, Space #58 | 2 gallons due to backup from root blockage | Cleanout and repaired |
| 11/14/05 | CANS; MHP #1, Space #77 | 1 gallon due to downstream service connection m blockage | Cleanout and repaired |
| 1/1/2006 | CANS; SW corner of Hillcrest and Miwok | Approximately 500 gallons due to force main break; sewage entered storm drain leading to creek and reservoir | Cleanout and repaired |

CANS = Camanche North Shore, MHP = Mobile Home Park
Source: Pat Lydon, EBMUD

***Table 5-22: Active Grazing Leases on EBMUD land around Camanche Reservoir***

| **Name** | **Approximate Acreage** | **Estimated AUMs** | **Lease Expiration** |
|---|---|---|---|
| West Portal | 52 | 35 | October 2010 |
| Arkansas Bend | 243 | 170 | October 2010 |
| China Gulch | 1118 | 580 | October 2010 |
| Camanche Dam | 438 | 492 | October 2010 |
| North Camanche Dikes | 697 | 670 | October 2010 |
| South Camanche Dikes | 420 | 490 | October 2010 |
| Camanche Creek | 1243 | 575 | October 2010 |
| South Lancha Plana | 797 | 201 | October 2010 |

***Table 5-23: Fires in Camanche Watershed***

| Date | County | Location | Type | Acreage |
|---|---|---|---|---|
| 6/25/05 | Calaveras | Penn Mine | Grass, Brush, Woodland | 60 |
| 6/26/05 | Amador | Mohawk and Village Drive | Grass | 0.75 |
| 7/18/05 | Calaveras | 12500 Pattison Road | Grass | 4 |
| 7/23/05 | Calaveras | Intersection of Quartz and Limestone Drives off of Camanche Parkway | Grass | 4 |
| 8/4/05 | Amador | 6905 N. Camanche Pkwy | Grass, Brush | 17 |
| 10/5/05 | Calaveras | 7273 Hwy 12, Wallace | Woodland | 10 |
| 10/7/05 | Amador | Grapevine Gulch Road | Grass | 1 |
| | | Total 2005 | | **96.75** |
| 5/15/06 | Calaveras | 10097 Quartz Road | Grass | 1.5 |
| 5/18/06 | | Hwy 12 approx ½ mile west of Cord Road | Grass | 2 |
| 7/7/06 | Calaveras | Hwy 12, near Davis Road | Grass | 3 |
| 7/10/06 | Amador | 5770 N. Camanche Parkway | Brush, Woodland | 100 |
| 8/14/06 | Calaveras | Camanche Pkwy and Slate Drive | Woodland | 2 |
| 10/12/06 | Amador | CHHP Zone E | Grass | 2.4 |
| | | Total 2006 | | **110.9** |
| 5/29/07 | Amador | 2000 Camanche Road, End of Peninsula Campground | Grass | 2 |
| 8/4/07 | Calaveras | Brady Lane, Just outside Camanche South Shore | Grass; woodland | 3 |
| 8/7/07 | Amador | North Camanche Parkway, approximately ¼ mile east of county line | grass | 1 |
| | | Total 2007 | | **6** |
| 4/18/08 | Amador | 6941 N. Camanche Pkwy | Brush | 4.5 |
| 5/8/08 | Calaveras | Camanche North Shore entrance | Grass | 4.5 |
| 7/23/08 | Amador | Village Drive and Fox Court, NW District property line at CHHP | Grass | 12 |
| | | Total 2008 | | **21** |
| 5/21/09 | Amador | 2870 Grapevine Gulch, Ione | Grass | 2 |
| 7/29/09 | Calaveras | Arapaho Dr. and Stedman Ranch Road | Woodland | 1 |
| 8/7/09 | Amador | Camanche North Shore – Blue Oaks Campground below Hill 280 | woodland | 1 |
| | | Total 2009 | | **4** |

Source: Chris Swann, EBMUD, 2010

*Table 5-24: Summary of Contaminant Sources and Their Impact on Water Quality*

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

*Table 5-24: Summary of Contaminant Sources and Their Impact on Water Quality (continued)*

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

*Table 5-24: 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**<br>General minerals and Metals<br>TOC<br>SOCs, VOCs, pesticides, herbicides<br>**Oil and grease, other hydrocarbons** | *Low to Medium*<br>-Increasing development increases road utilization<br>-Main thorough-fares proximate to reservoirs.<br>-Storm water drains feed directly into the reservoirs.<br>-Accidents occur along main thoroughfares.<br>-Maintenance activities can contribute contaminants.<br>-Logging activities create roads throughout watershed<br>-Trends toward integrated pest management for road maintenance |
| Unauthorized Activities (Illegal Dumping) | Turbidity<br>Algae<br>Microorganisms<br>General minerals and Metals<br>TOC<br>SOCs, VOCs, pesticides, herbicides<br>Oil and grease, other hydrocarbons | *Low to Medium*<br>Access roads to the reservoirs increase risks of impacting water quality.<br>Illegal dumping increasing with additional populations and increasing dump fees. |
| Agriculture | Turbidity<br>Algae/Taste and Odor<br>General minerals<br>TOC<br>SOCs, VOCs, pesticides, herbicides | *Insignificant*<br>Agricultural properties are few and small.<br>Some agricultural activities have eliminated the use of pesticides and herbicides. |

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.

**Table 5-25**
**Residential Construction Activity**

**Calaveras County Building Department**
**Mountain Ranch, West Point, Railroad Flat Area[1]**

| Year | New Residential | Manufactured Housing | Duplex | Total |
|---|---|---|---|---|
| 2000 | 63 | 11 | 0 | **74** |
| 2001 | 110 | 17 | 0 | **127** |
| 2002 | 75 | 18 | 0 | **93** |
| 2003 | 85 | 16 | 0 | **101** |
| 2004 | 79 | 21 | 1 | **101** |
| 2005 | 54 | 15 | 0 | **69** |
| 2006 | 39 | 16 | 0 | **55** |
| 2007 | 26 | 16 | 0 | **42** |
| 2008 | 15 | 10 | 0 | **25** |
| 2009 | 19 | 1 | 0 | **20** |
| Totals | 502 | 43 | 0 | **633** |

1. Partly in and partly out of the Upper Mokelumne River Watershed.

Source: Calaveras County Building Department website, Valuation Statistics

**FIGURE 5-1 - Pardee Recreation Area Map (source: MRWSS Update 2005)**

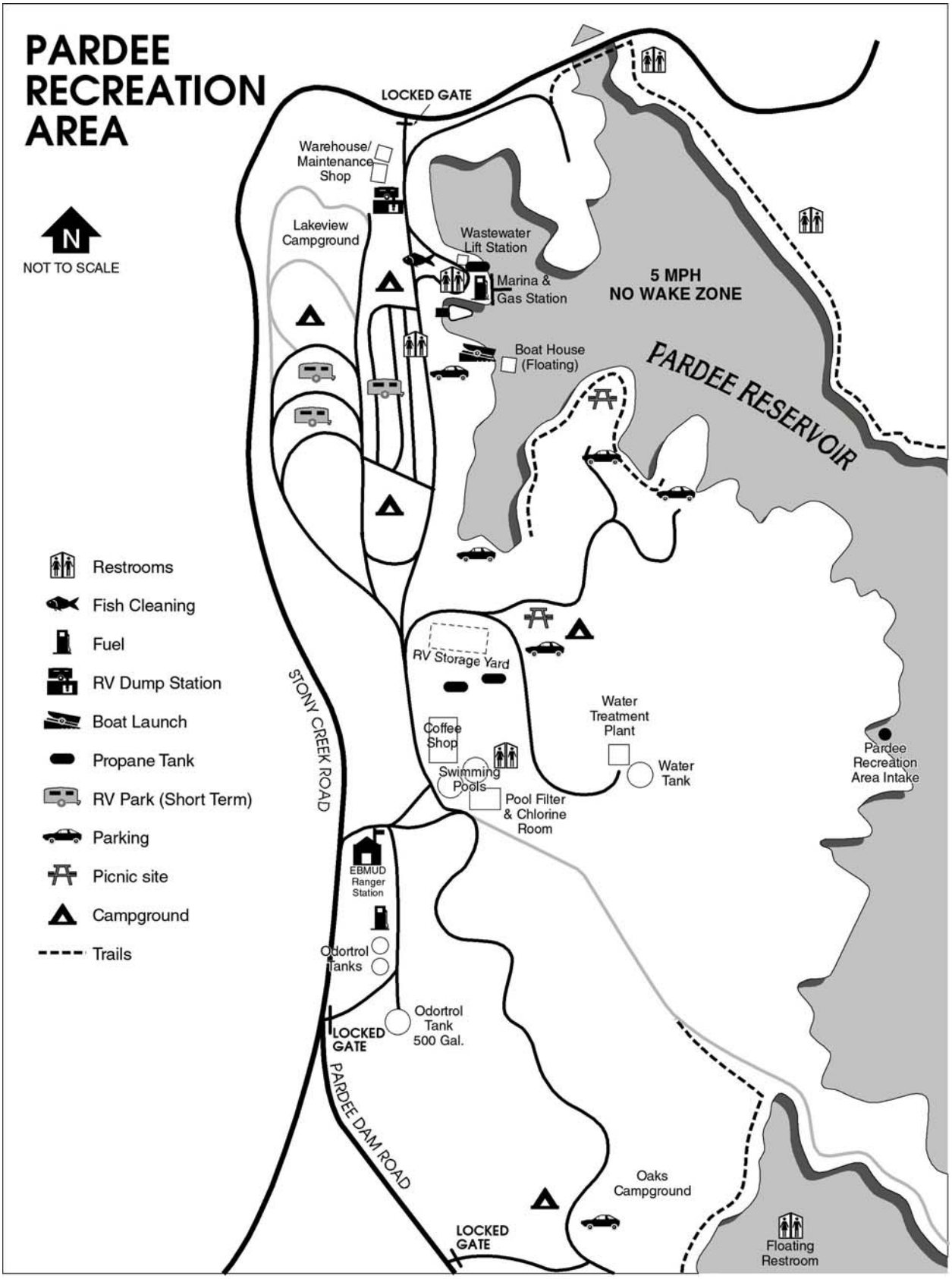
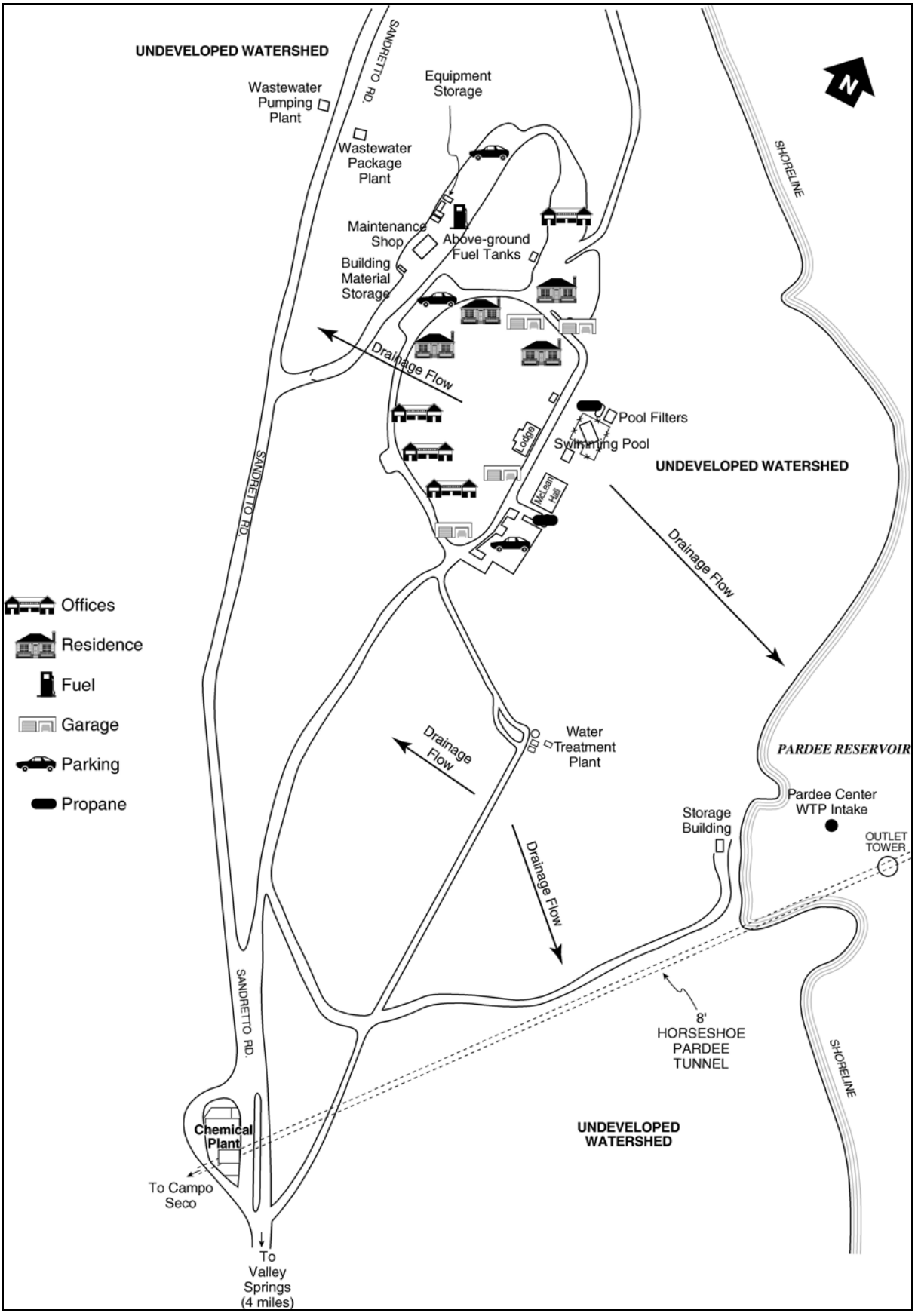
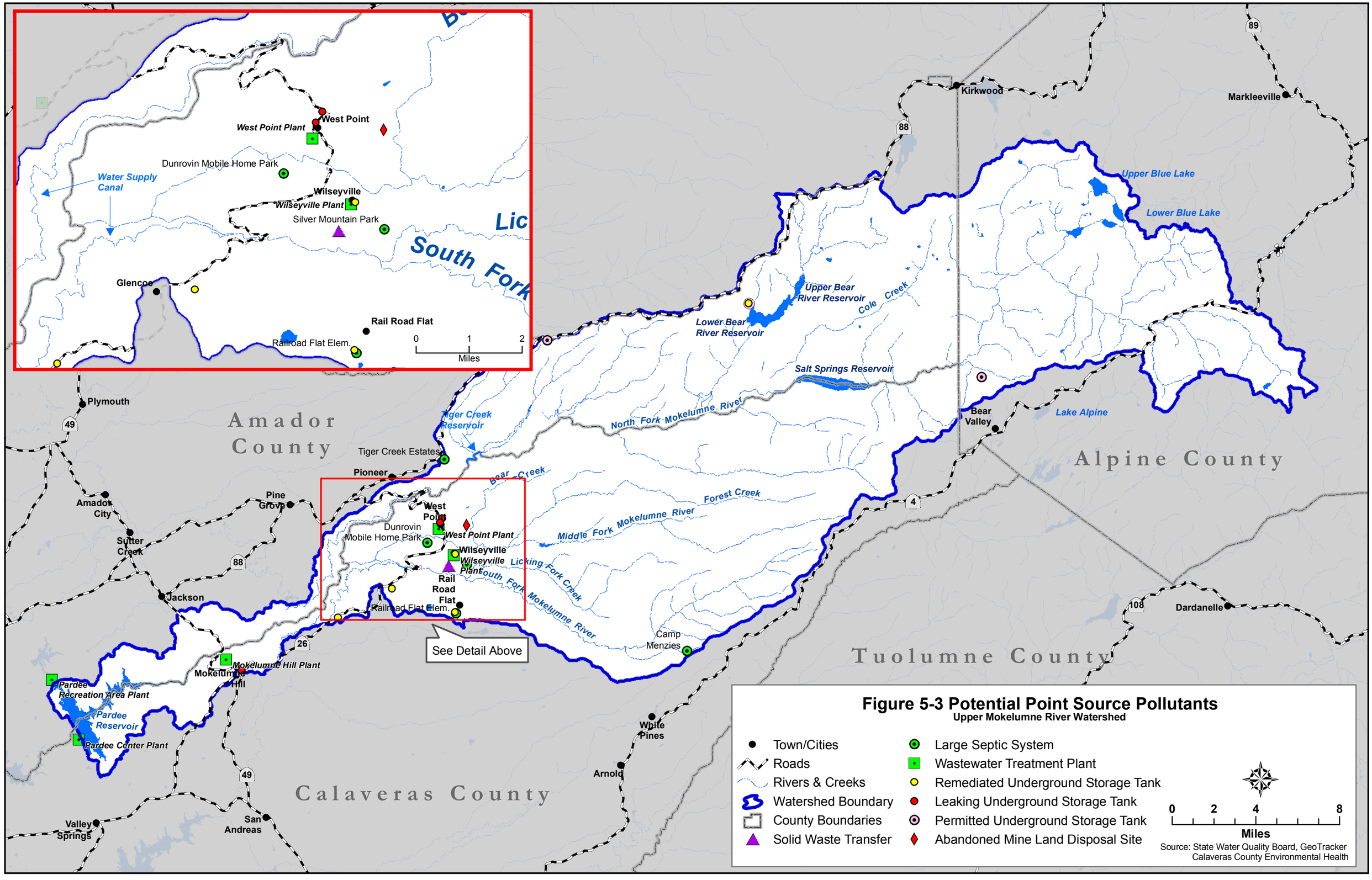
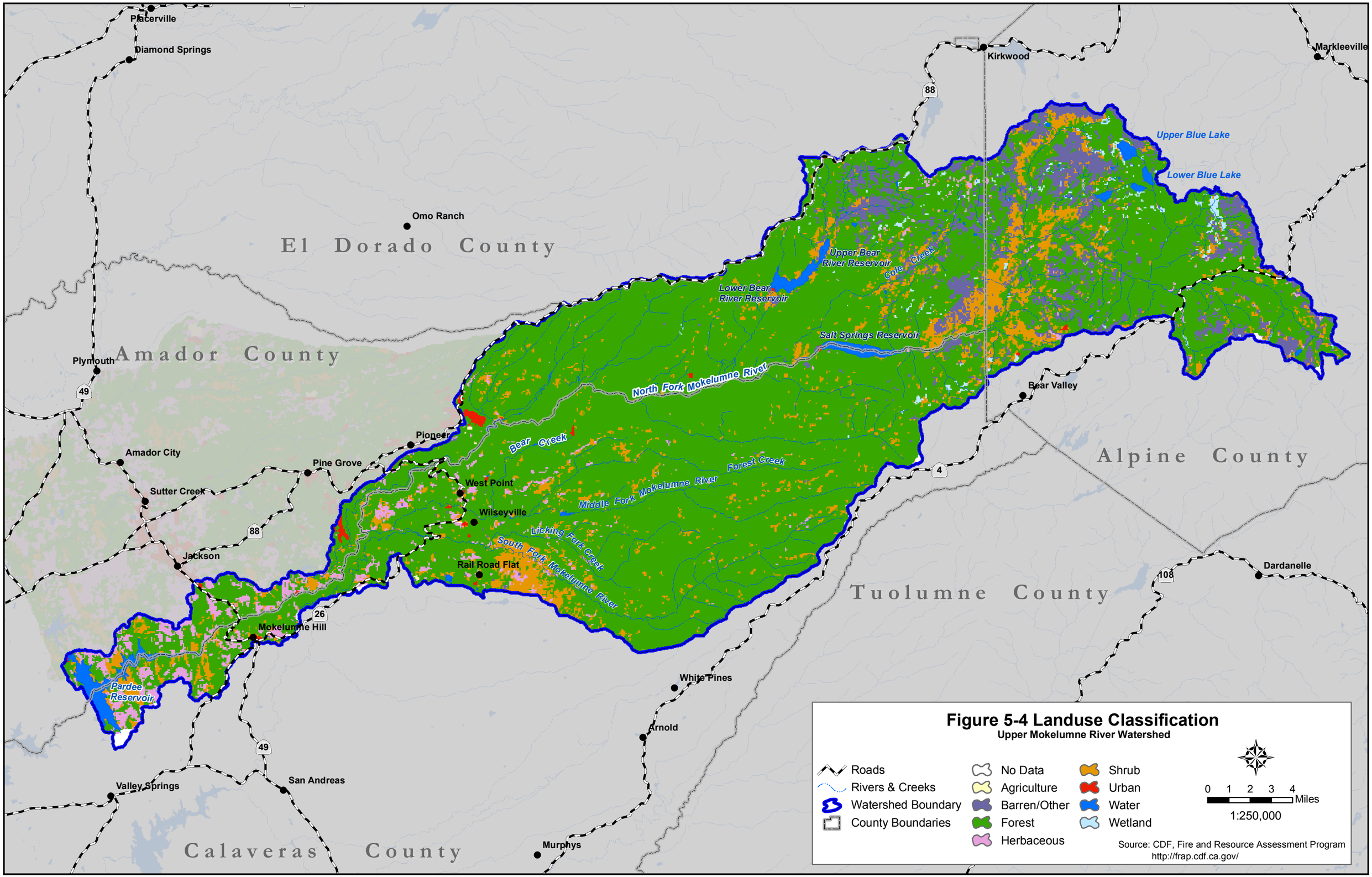


**FIGURE 5-2 - Pardee Center Area Map (source: MRWSS Update 2005)**




West Point
West Point Plant
Dunrovin Mobile Home Park
Water Supply Canal
Wilseyville
Wilseyville Plant
Silver Mountain Park
Glencoe
Rail Road Flat
Railroad Flat Elem.
0 1 2
Miles
Lic
South Fork
Kirkwood
Markleeville
88
89
Upper Blue Lake
Lower Blue Lake
Upper Bear River Reservoir
Cole Creek
Lower Bear River Reservoir
Salt Springs Reservoir
Plymouth
49
Amador County
Tiger Creek Reservoir
North Fork Mokelumne River
Bear Creek
Tiger Creek Estates
Pioneer
Forest Creek
Middle Fork Mokelumne River
Licking Fork Creek
South Fork Mokelumne River
Amador City
Pine Grove
Sutter Creek
Jackson
26
See Detail Above
Mokelumne Hill Plant
Mokelumne Hill
Pardee Recreation Area Plant
Pardee Reservoir
Pardee Center Plant
Camp Menzies
Bear Valley
Lake Alpine
4
Alpine County
108
Dardanelle
Tuolumne County
White Pines
Arnold
Calaveras County
Valley Springs
San Andreas
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
Remediated Underground Storage Tank
Leaking 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

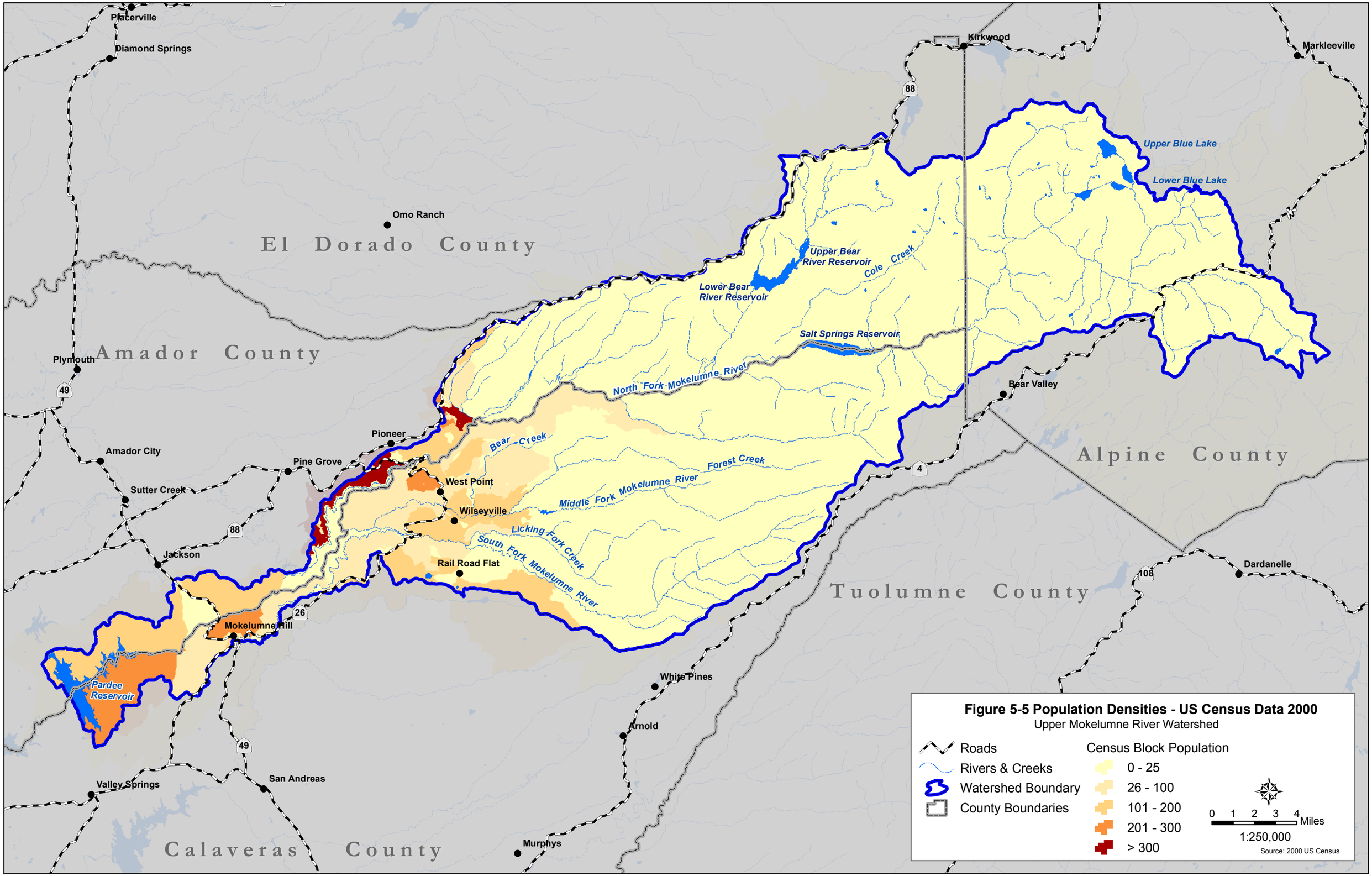
**Upper Mokelumne River Watershed**

- 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/


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
Sutter Creek
West Point
Forest Creek
Middle Fork Mokelumne River
Wilseyville
Licking Fork Creek
South Fork Mokelumne River
Jackson
88
Rail Road Flat
Bear Valley
4
Alpine County
Dardanelle
108
Tuolumne County
26
Mokelumne Hill
Pardee Reservoir
White Pines
Arnold
49
Valley Springs
San Andreas
Calaveras County
Murphys
Figure 5-5 Population Densities - US Census Data 2000
Upper Mokelumne River Watershed
Roads
Rivers & Creeks
Watershed Boundary
County Boundaries
Census Block Population
0 - 25
26 - 100
101 - 200
201 - 300
> 300
0 1 2 3 4 Miles
1:250,000
Source: 2000 US Census

Diamond Springs
Kirkwood
Markleeville
88
Upper Blue Lake
Lower Blue Lake
Corral Flat
Omo Ranch
El Dorado County
Pardoe
Indian Valley
Upper Bear River Reservoir
Cole Creek
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
Middle Fork Mokelumne River
Alpine County
4
West Point
Sutter Creek
Lower Blue
Wilseyville
Licking Fork Creek
88
South Fork Mokelumne River
Jackson
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

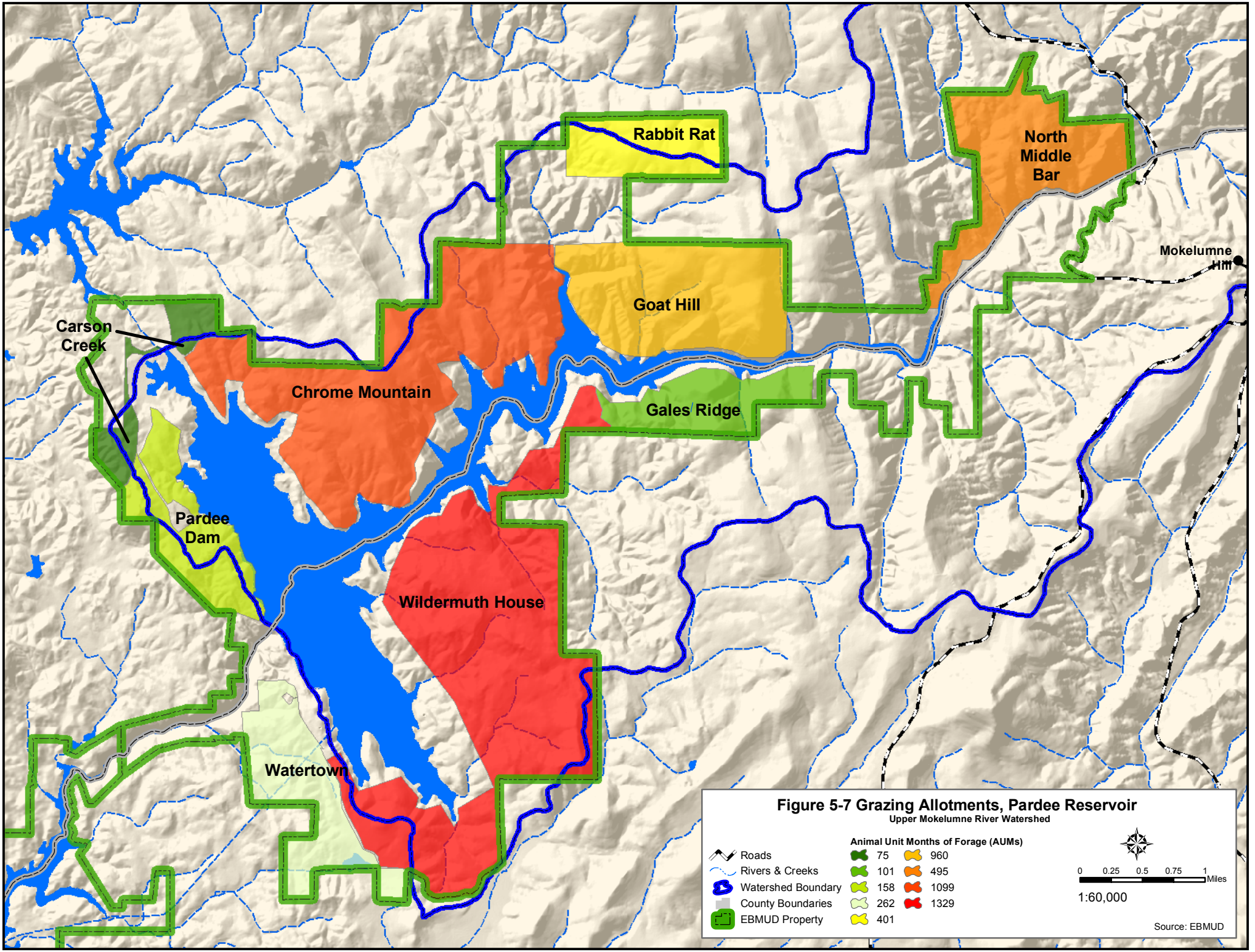
**Upper Mokelumne River Watershed**

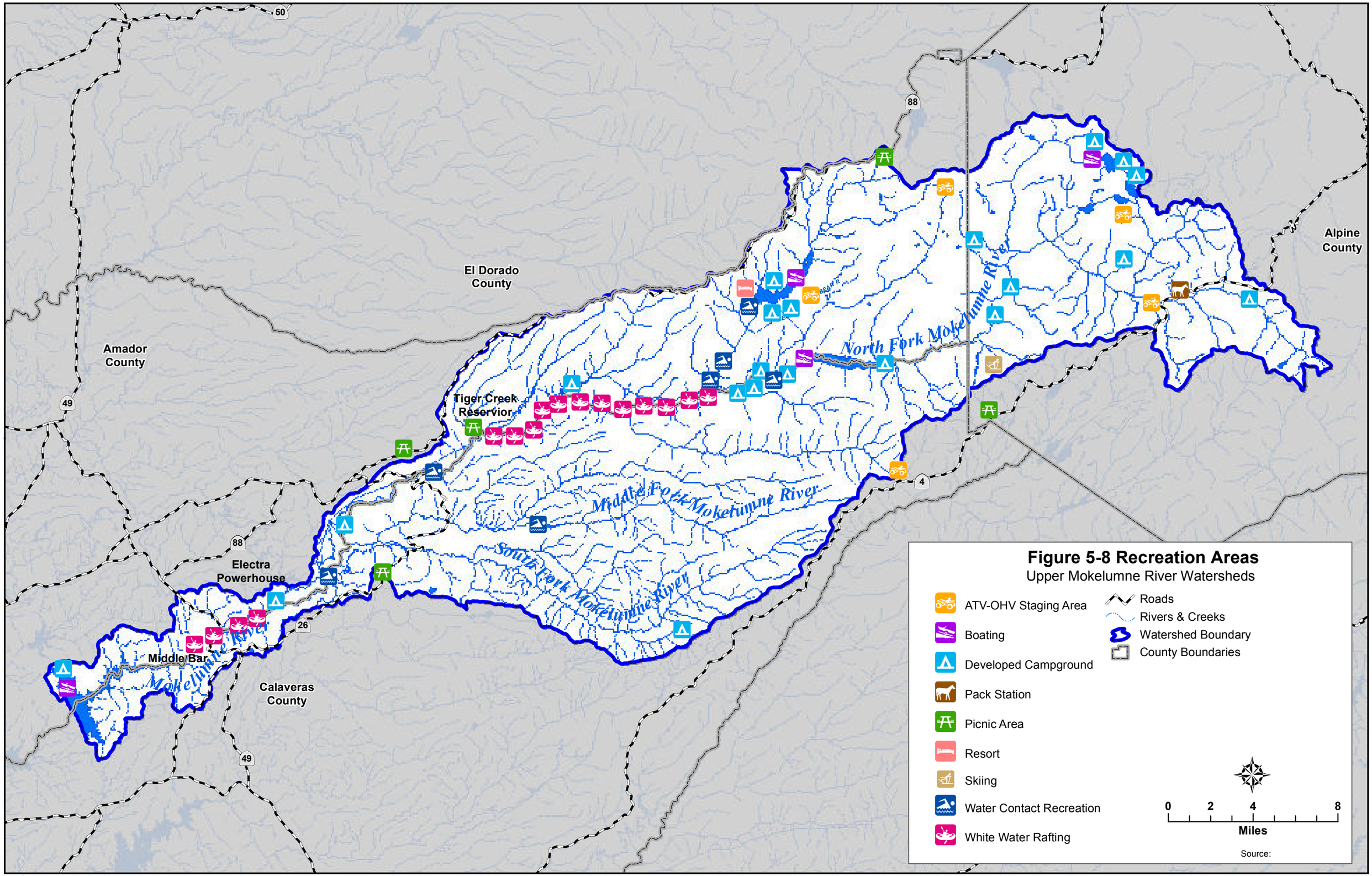
Roads
Rivers & Creeks
Watershed Boundary
County Boundaries

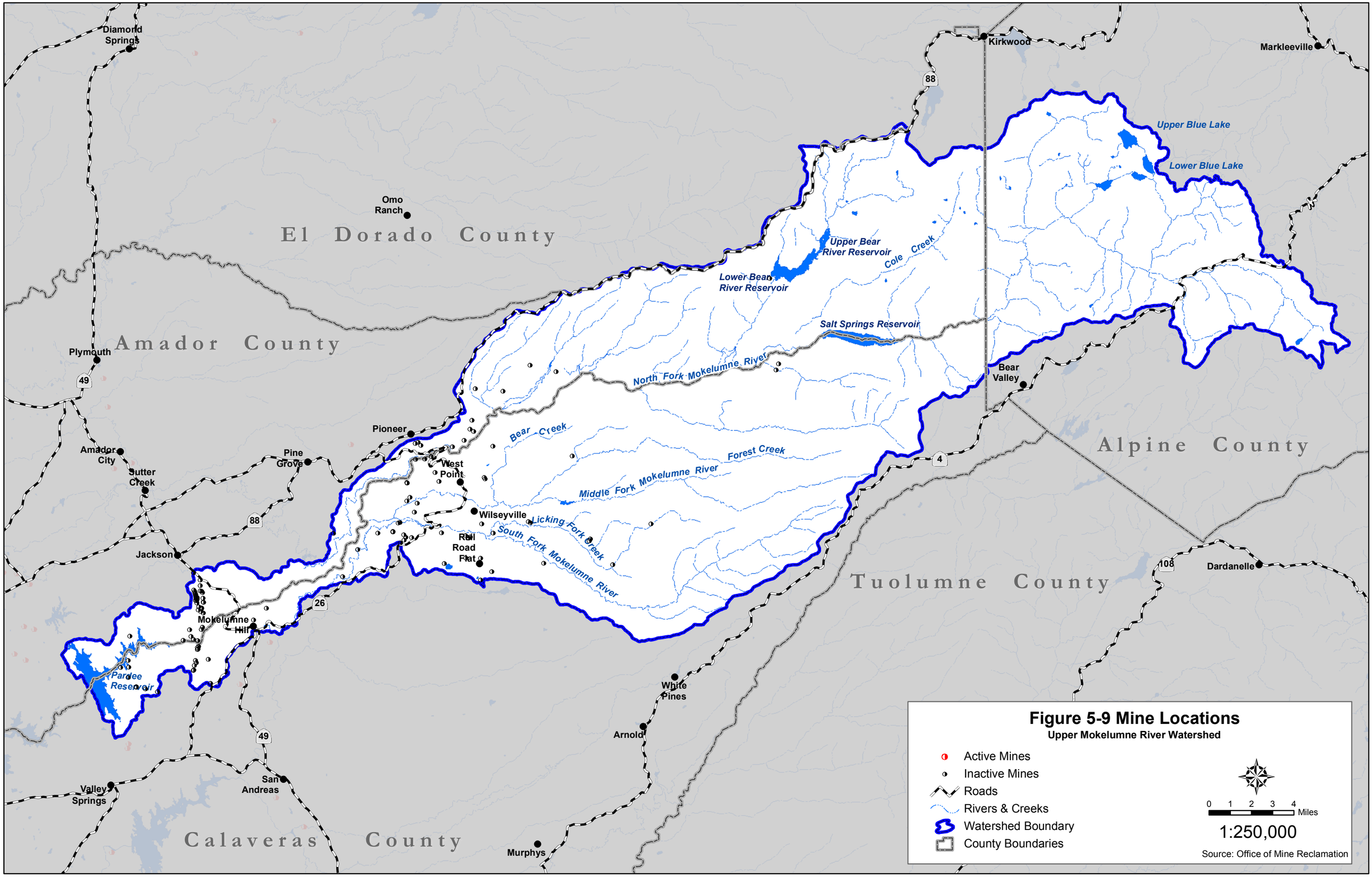
0 1 2 3 4 Miles

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
Animal Unit Months of Forage (AUMs)
Roads
Rivers & Creeks
Watershed Boundary
County Boundaries
EBMUD Property
75
101
158
262
401
960
495
1099
1329
0 0.25 0.5 0.75 1 Miles
1:60,000
Source: EBMUD


50
88
El Dorado County
Amador County
Alpine County
North Fork Mokelumne River
Tiger Creek Reservior
49
Middle Fork Mokelumne River
South Fork Mokelumne River
4
Electra Powerhouse
26
Middle Bar
Mokelumne River
Calaveras County
49
Figure 5-8 Recreation Areas
Upper Mokelumne River Watersheds
ATV-OHV Staging Area
Boating
Developed Campground
Pack Station
Picnic Area
Resort
Skiing
Water Contact Recreation
White Water Rafting
Roads
Rivers & Creeks
Watershed Boundary
County Boundaries
0
2
4
8
Miles
Source:




## Figure 5-9 Mine Locations

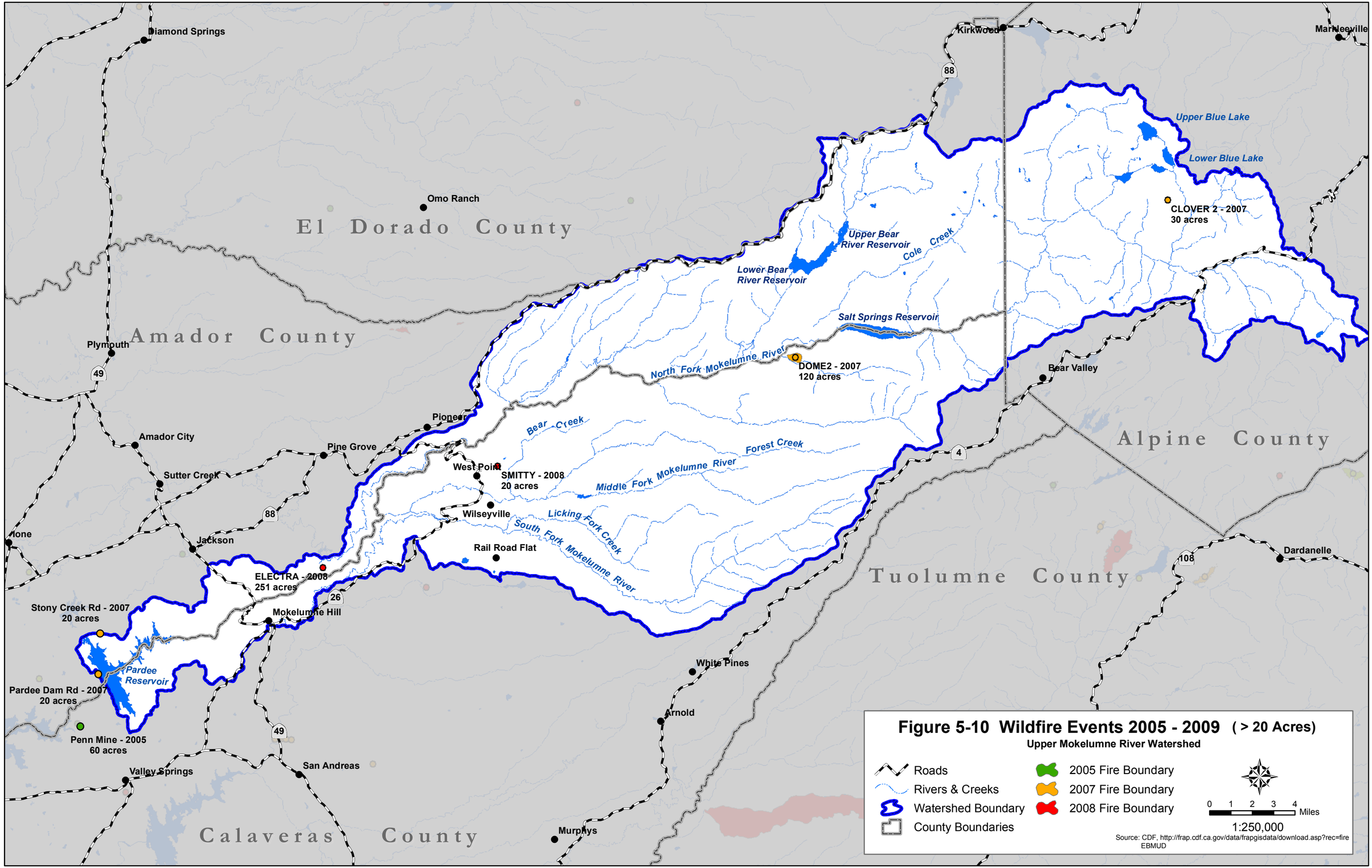
**Upper Mokelumne River Watershed**

- 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




## Figure 5-10 Wildfire Events 2005 - 2009 ( > 20 Acres)

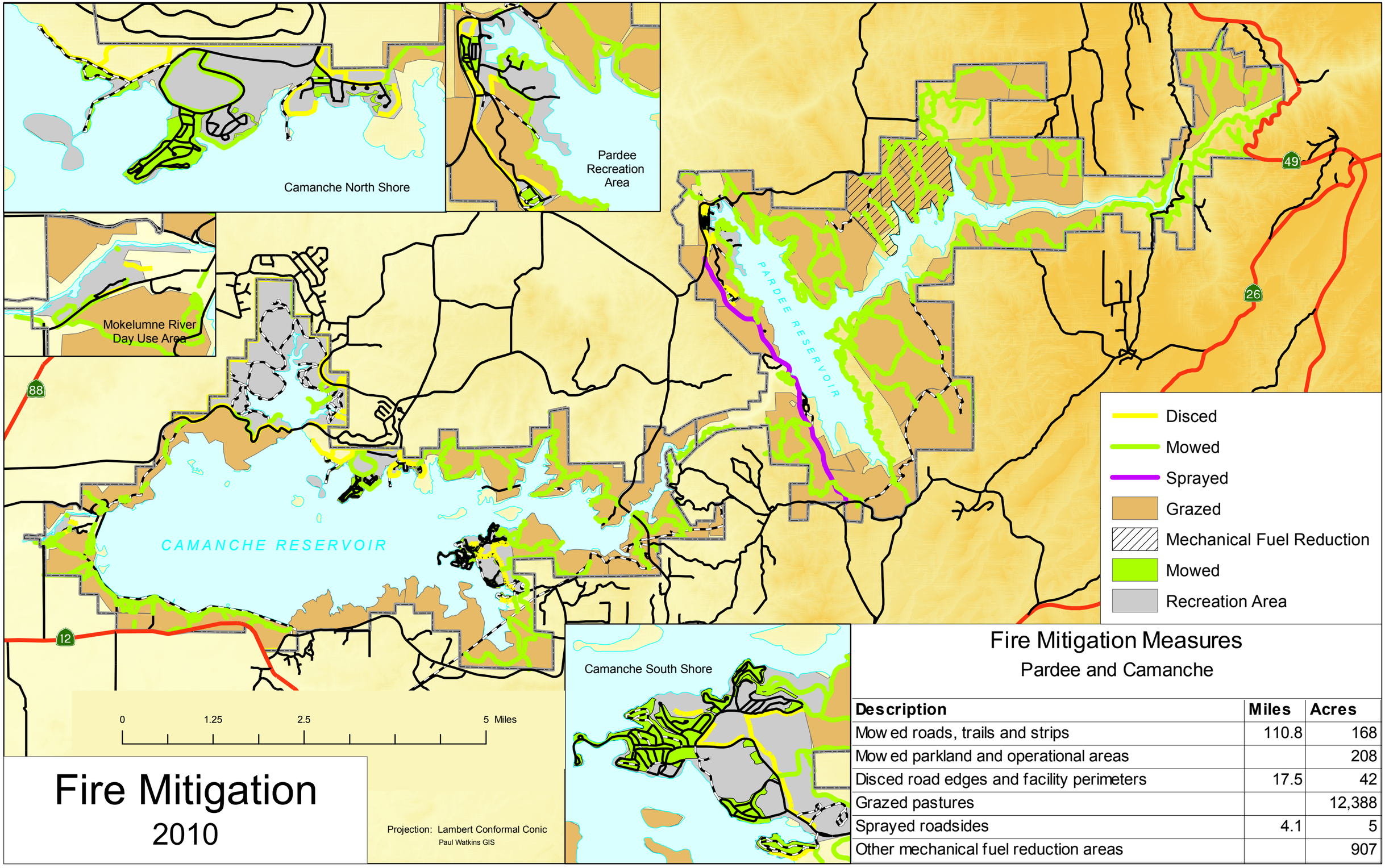
**Upper Mokelumne River Watershed**

- Roads
- Rivers & Creeks
- Watershed Boundary
- County Boundaries
- 2005 Fire Boundary
- 2007 Fire Boundary
- 2008 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
2010

Projection: Lambert Conformal Conic
Paul Watkins GIS

## 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 (source: MRWSS Update 2005)**

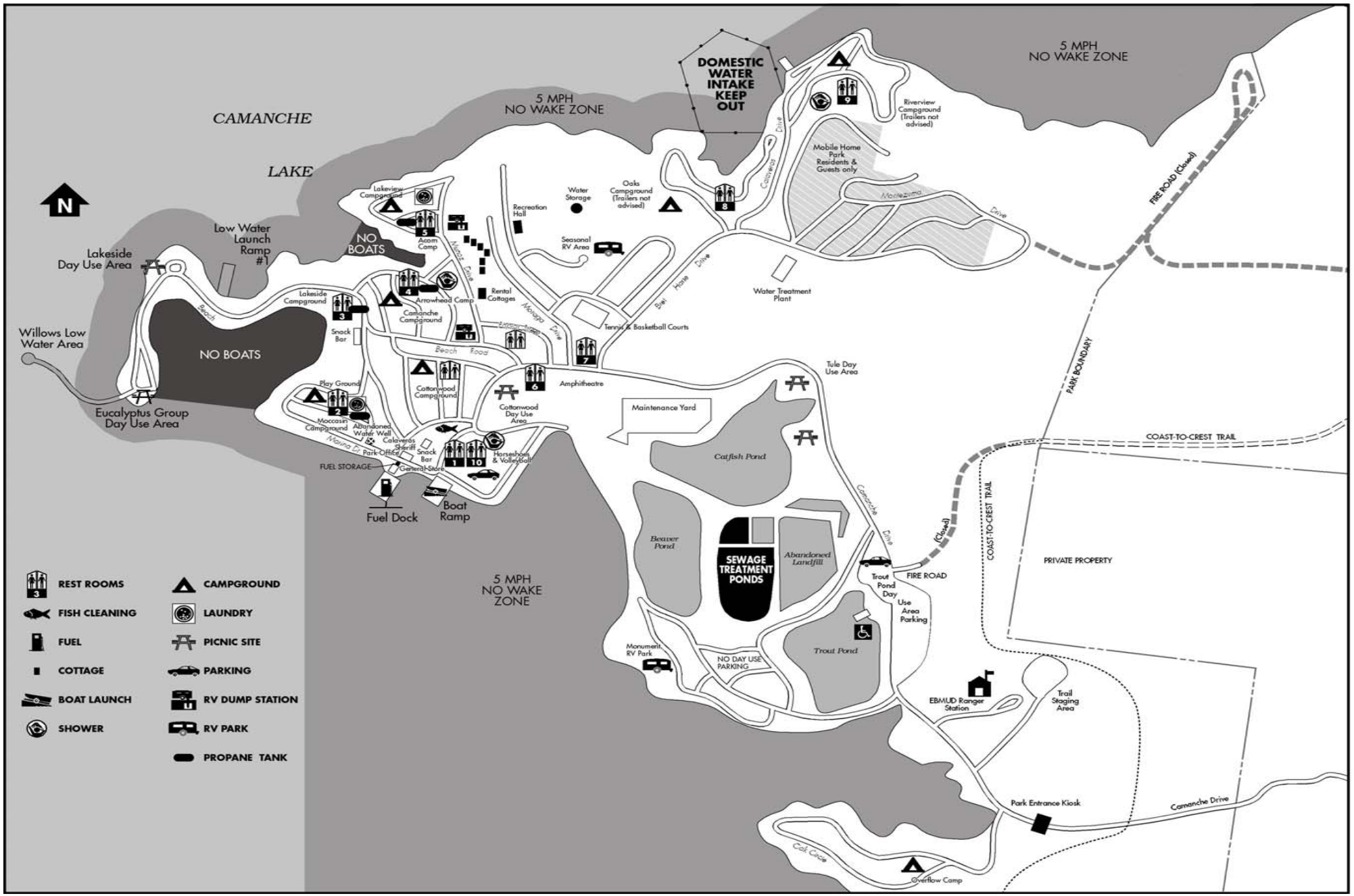
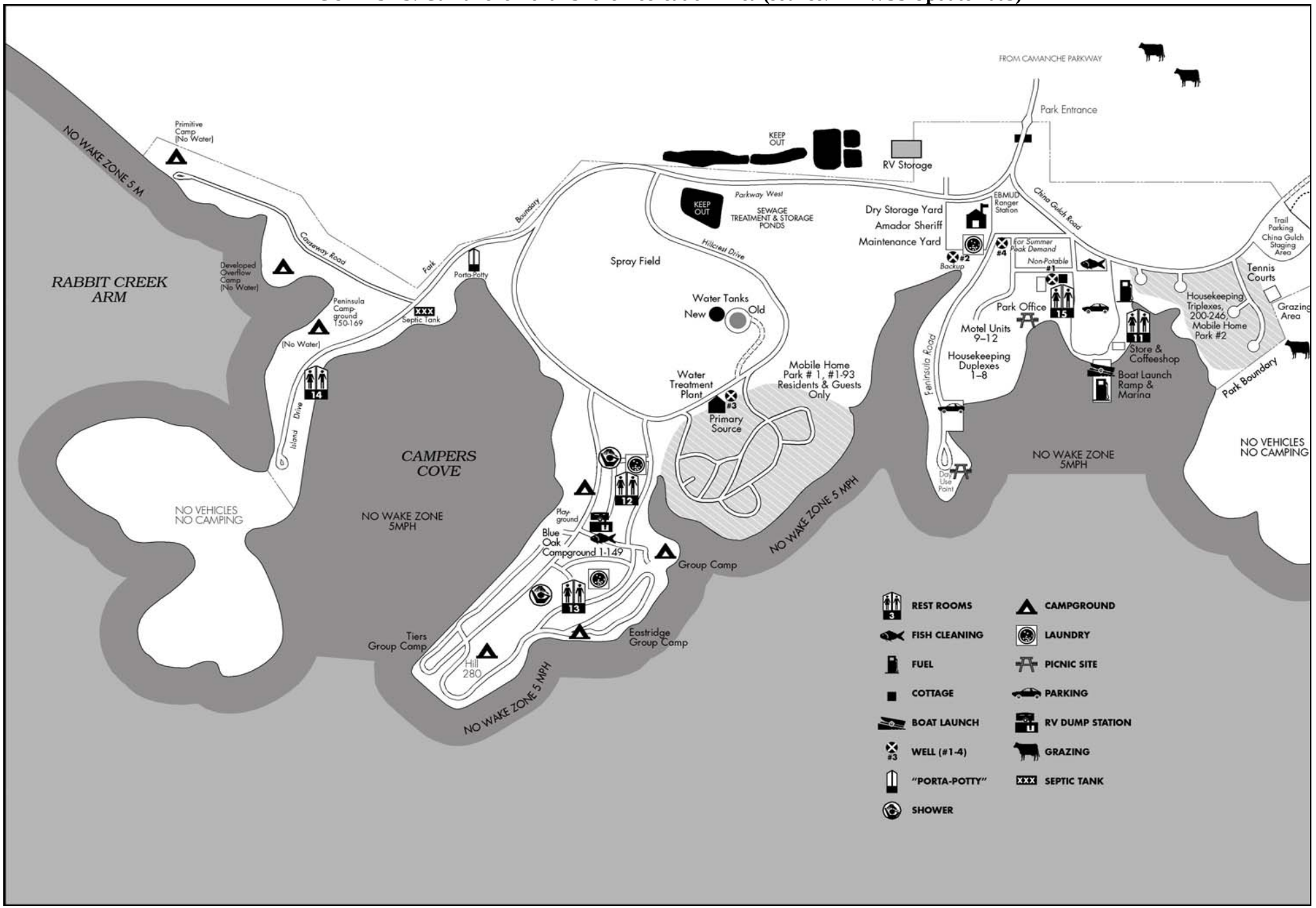


**FIGURE 5-13: Camanche North Shore Recreation Area (source: MRWSS Update 2005)**



DRAFT

DRAFT

Pardee Dam

North Camanche Dikes

China Gulch

Arkansas Bend

Camanche Dam

Camanche Dam

South Lancha Plana

South Camanche Dikes

Camanche Creek

DRAFT

## Figure 5-14 Upper Mokelumne River Watershed

**Camanche Reservoir Grazing Allotments**

- Roads
- Rivers & Creeks
- 75 AUMs
- 101
- 158
- 262
- 334
- 416
- 495
- 1099
- 1329
- EBMUD Property
- Watershed Boundary
- County Boundaries

0 0.25 0.5 0.75 1 Miles

1:43,000

Source:

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
Bear Valley
Amador City
Sutter Creek
Pine Grove
Forest Creek
Middle Fork Mokelumne River
West Point
Wilseyville
Licking Fork Creek
South Fork Mokelumne River
Rail Road Flat
4
Alpine County
Jackson
88
108
Dardanelle
Tuolumne County
26
Mokelumne Hill
Pardee Reservoir
White Pines
Arnold
49
San Andreas
Valley Springs
Calaveras County
Murphys

## Figure 5-15 Timber Harvest Plans 2000-2009

**Upper Mokelumne River Watershed**

- Roads
- Rivers & Creeks
- Watershed Boundary
- County Boundaries

2000 2001 2002 2003 2004 2005 2006 2007 2008 2009

0 1 2 3 4 Miles

1:250,000

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

Diamond Springs
Kirkwood
Markleeville
88
Upper Blue Lake
Lower Blue Lake
Omo Ranch
El Dorado County
Upper Bear River Reservoir
Cole Creek
Mokelumne Wilderness
Lower Bear River Reservoir
Salt Springs Reservoir
Amador County
Plymouth
49
North Fork Mokelumne River
Bear Creek
Bear Valley
Alpine County
Amador City
Pine Grove
Pioneer
Forest Creek
4
Sutter Creek
2005
Middle Fork Mokelumne River
West Point
Wilseyville
Licking Fork Creek
88
Rail Road Flat
South Fork Mokelumne River
2002
Jackson
108
Dardanelle
2003
26
Tuolumne County
Mokelumne Hill
Pardee Reservoir
White Pines
Arnold
49
Valley Springs
San Andreas
Calaveras County
Murphys

## Figure 5-16 Non-Industrial Timber Management Plans 1989-2009

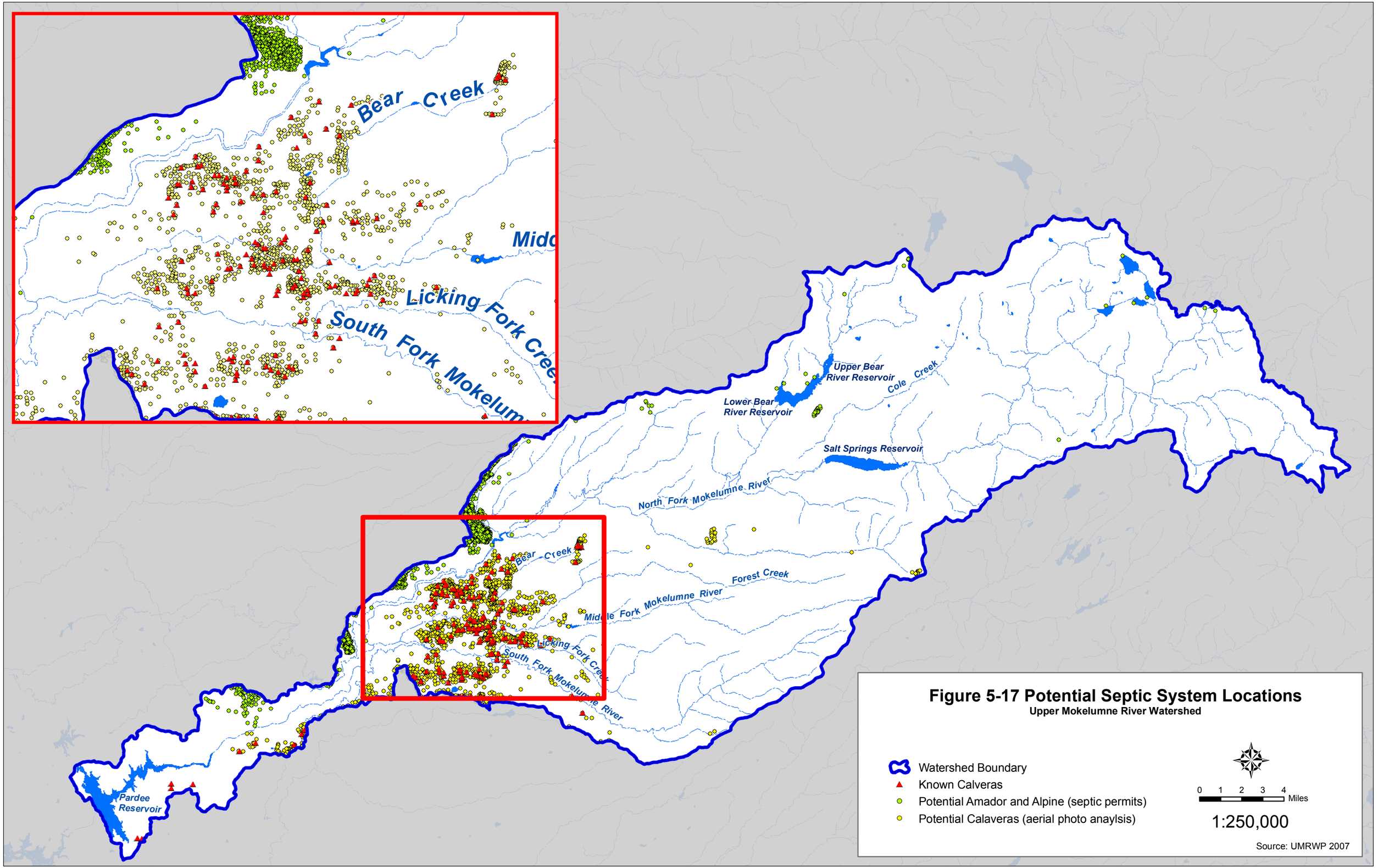
**Upper Mokelumne River Watershed**

- Roads
- Rivers & Creeks
- Watershed Boundary
- 2002
- 2003
- 2005

0 1 2 3 4 Miles

1:250,000

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


Bear Creek
Licking Fork Creek
South Fork Mokelumne River
Upper Bear River Reservoir
Lower Bear River Reservoir
Cole Creek
Salt Springs Reservoir
North Fork Mokelumne River
Forest Creek
Middle Fork Mokelumne River
Pardee Reservoir
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

# Section 6: Watershed Control and Management

## *Introduction*

Section 6 documents watershed management practices of the District, 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 2010 update, management practices and information from the District 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 organizational structure and jurisdictional authority for the various responsible agencies, including the District. Then the Watershed Management policies and practices are summarized, broken into three groups:

- Organizational Structure
- Watershed Management
    1. Watershed Management (general)
    2. Watershed Management by District (by category)
    3. Watershed Management by Others (by category)

## Organizational Structure

One component of a watershed sanitary survey is to define the "lines of communication" between responsible agencies as well as within the District. 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 of understanding their responsibilities with regard to water quality.

This section also provides an overview of the specific divisions within the District that are responsible for managing the land uses and activities within the watersheds, operating the reservoirs, monitoring water quality, and providing water treatment and distribution. Several divisions within the District are responsible for water quality - from source water through treatment and distribution - identification of these divisions, their responsibilities, and areas of overlap is important to define for the overall management of source water quality.

### *Jurisdictional Authority in the Watershed*

Table 6-1 summarizes the local/regional, state, and federal agencies and utilities, and their concerns or jurisdictional authority that is relevant to the Camanche and Upper Mokelumne River Watershed lands. This information can assist the District 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.

## District Organizational Structure

From a water quality and watershed management perspective, the two most critical departments within the District are the Operations and Maintenance Department (OMD) and the Natural Resources Department (NRD). These departments have as part of their primary responsibilities the management of the District-owned lands and facilities surrounding Pardee and Camanche Reservoirs. Figure 6-1 gives an overview of the organizational structures of both of these departments.

The mission of OMD is to operate and maintain, manage, and improve the District's water system infrastructure, processes, and assets; provide safe, reliable, and high quality drinking water; engage and educate the District's stakeholders; and reflect sound environmental and financial stewardship.

The Water Operations Department within the OMD includes groups whose activities impact and/or pertain to the water quality and watershed management of the District's water supply facilities. For the Camanche and Pardee water supply facilities, the Water Supply Division is responsible for the daily operations and maintenance functions for the Camanche and Pardee Reservoir water supply, and associated water and wastewater services. These facilities include Pardee and Camanche dams and power plants, reservoir operations, water supply system outlet towers, treatment plants, distributions systems, wastewater collection, treatment and disposal facilities, and the facilities that monitor water quality and quantity data to support operations.

The Natural Resources Department (NRD) is divided into three divisions -- East Bay Watershed and Recreation Division, the Fisheries and Wildlife Services Division, and the Mokelumne Watershed and Recreation Division (MW&RD).

## 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 the District and other public entities were reviewed.

The documents listed in Table 6-2 were obtained and reviewed for the 2010 MRWSS update. First, these policies and documents are described generally if they pertain to multiple watershed management categories. Next the District 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 the District, six major institutional landowners and 81 major private landowners. Of these landowners, District 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 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 National Forests which together encompass all national forest lands within the watershed. Specific national forests 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.

The Stanislaus National Forest, Forest Plan Direction, April 2010, summarizes specific required Management Practices, including water quality management, and requires the use of the USDA BMPs (described below). A road ecosystem travel analysis should be complete by 2012. The analyses will evaluate the Stanislaus National Forest road system, which may result in some roads being eliminated or abandoned. Water quality is one of the factors that will be considered in the analysis.

The Eldorado National Forest Monitoring and Evaluation report for FY 2008, issued March 2009, summarizes water quality monitoring which is used to evaluate the adequacy and effectiveness of the USFS vegetation and water quality management programs, including implementation of the USDA BMPs (described below). In 2007, the monitoring showed that water quality BMPs were implemented and effective 93.3 percent of the time (2007 was a drier than normal year).

## Travel Management Rule

The US Forest Service finalized the Travel Management Rule in 2005 requiring each national forest or ranger district to designate those roads, trails and areas open to motor vehicle use. Years of unmanaged motorized use on national forest land has resulted in unplanned roads and trails, erosion, and watershed and habitat degradation. The Travel Management Rule restricts motor vehicles (cars, trucks, ATV's, motorcycles, RV's, 4WD's, 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 are or will be implemented as follows:

- The Eldorado National Forest Final EIS and Record of Decision were released in 2008 while the associated Motor Vehicle Map was released in 2009. The Motor Vehicle Map identifies which roads and trails allow motor vehicle travel, both surfaced and dirt.
- The Stanislaus National Forest Forest-wide Forest Plan Amendment Record of Decision was released in 2009 while the associated Motor Vehicle Map will be released late 2010.

## SNFPA

The 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 November 2009 court order, a new focused Supplemental EIS is being prepared to correct specific deficiencies in the original Supplemental EIS. The new Supplemental EIS, expected by 2011, will properly model all alternatives and will consider the "new" objectives of reducing stand density and restoring ecosystems after catastrophic disturbance events (fire) in evaluation of alternatives. Several other lawsuits are also pending against the 2004 SNFPA.

## USDA Water Quality Management for Forest Lands in California: BMPs

The document "USDA Water Quality Management for Forest Lands in California: Best Management Practice" establishes uniform BMPs for protection of USFS lands in California from nonpoint source contaminants. As part of the water quality management program, the following actions will be carried out:

- Existing and potential nonpoint pollution sources will be identified and evaluated for the necessity and schedule of improvement or treatment projects. Watershed improvement funds will be used if no other funds are available for these projects.
- BMPs will be perpetually implemented through training of employees about BMPs, keeping BMPs current, and BMP monitoring and evaluation
- BMPs will be improved or developed as a result of management practice monitoring and evaluations.
- BMPs for the resource activities that may affect water quality are provided. Each BMP provides a description of the activity, the potential effects on water quality, method for implementation of actions to mitigate or eliminate the effects of the activity. BMPs were identified for the following resources and activities:
    - Timber Management
    - Road and Building Site Construction
    - Mining
    - Recreation
    - Vegetation Manipulation
    - Fire Suppression
    - Watershed Management
    - Range Management

Watershed management most directly affects water quality. It provides procedures to repair watershed conditions and improve water quality and soil stability. For example, studies will be undertaken to activities that adversely affect water quality, such as occupancy and modification to the floodplains and wetlands. Activities in wetlands will also be restricted where practical alternatives are available. If necessary, USFS will exclude activities that impair quality as a last resort.

Furthermore, multiple management activities which individually will not create unacceptable effects, but collectively degrade water quality, will be identify for their cumulative off-site watershed effects. Water quality monitoring programs will collect and evaluate data to establish baseline conditions for comparison with established water quality standards. These programs are usually part of an environmental document, management plan, special use permit, or as a response to other needs.

## *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 the District's Upper Mokelumne River Watershed area is within the Mokelumne Wilderness as shown in Figure 5-16. See Appendix 6-1 for a national forest and wilderness location map. Designated in 1964, the Mokelumne Wilderness is managed by the National Forests. 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 National Forest approach). The RMP has Motorized Vehicle Route Designations maps to show paved and unpaved roads approved for motorized vehicles. RMP maps also show the sections of the Mokelumne River 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 (USDA)

The Natural Resources Conservation Service (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.

## CDFG

The California Department of Fish and Game (CDFG) is responsible for conserving, protecting and managing California's fish, wildlife, and native plant resources. In addition to other responsibilities, CDFG 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 debris or waste materials where it can pass into any river, stream or lake are also activities regulated by CDFG, and may require a permit prior to start of such activities.

In January 2010 the District was issued the most recent Streambed Alteration Agreement (valid for five years), covering routine maintenance within Amador, Calaveras and San Joaquin Counties. This Agreement details CDFG notifications, time periods,

conditions, and descriptions of authorized work (debris removal, sand/silt/sediment removal, vegetation control, erosion control repair, and structure maintenance).

## PG&E Land Conservation Commitment Stewardship Council.

The Pacific Forest and Watershed Lands Stewardship Council (Stewardship Council) was founded in 2004, as part of a bankruptcy settlement reached between PG&E and the State in 2003. The settlement required PG&E to make a Land Conservation Commitment and protect more than 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). PG&E was directed to fund an independent nonprofit organization with $70 million over ten years to oversee this process. The Stewardship Council's goals also include investing in outdoor programs serving California's young people

The Stewardship Council's main task is to develop the Land Conservation Plan (LCP). The LCP overall objective is to preserve and enhance a broad range of Beneficial Public Values (BPV), including recreation, sustainable forestry, open space, protection of habitat, agricultural uses, and protection of cultural resources on these lands. The LCP is being developed as a series of three volumes.

- **LCP Volume I:** The Land Conservation Framework establishes the overall framework for the LCP, including legal requirements, the planning process, methodologies, public involvement, and discussion of relevant regulatory processes.
- **LCP Volume II:** Planning Unit Concepts documents existing conditions and presents management objectives, potential measures, and conceptual plans to preserve or enhance the BPVs of the more than 140,000 acres of lands referred to as the Watershed Lands. Final requirements will be detailed in the Disposition Packages.
- **LCP Volume III:** Disposition Packages will encompass a series of real estate transaction packages that will detail the specific land conservation and/or disposition requirements for each parcel or parcel cluster.

The Stewardship Council's Board of Directors adopted LCP Volumes I and II in 2007. Four Pilot Disposition Packages (not in the Mokelumne Watershed) are scheduled for recommendations in 2010, with the remainder of the 47 planning unit disposition package recommendations to be adopted by the Stewardship Board by 2013. The following three planning units (7,096 acres total) lie within the Mokelumne River Watershed (see Appendix 6-3 for detailed disposition packages):

- North Fork Mokelumne River Planning Unit: 3,400 acres scattered along a 30-mile section of the North Fork and main stem of the Mokelumne River. Disposition package 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 reduce timber harvest.

- Lower Bear Area Planning Unit: 1,800 acres. Disposition package may close unauthorized OHV area
- Blue Lakes Planning Unit: Disposition package may protect Twin Lake shoreline from vehicle access, restrict recreation use by Deer Creek, add day use area at Upper Blue Lake and formalize or close OHV trails.

Volume II of the LCP also identifies a number of preservation and/or enhancement measures that may contribute to the conservation management program for each planning unit. These measures are intended to be illustrative in nature, not prescriptive, and will be amended, deleted, or augmented over time in coordination with future land owners and managers to best meet the objective for each planning unit. Extensive community input and coordination with future land stewards will precede implementation of the Stewardship Council's recommendations, and the disposition packages created for LCP Volume III will fully describe the actual preservation and/or enhancement measures to be undertaken or overseen by future land stewards.

## *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, Amador County, AWA, Calaveras County, CCWD, CPUD, JVID and the District. The UMRWA has established a planning and budget process to address 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.

In 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 has been run by teachers and funded by local water agencies and East Bay Municipal Utility District.

## *UMRWAP*

The UMRWAP was a three-year effort costing nearly $1.3 million. Completed by UMRWA in 2007, the UMRWAP was to advance a broader understanding of watershed water quality issues and develop a method and tools for the long-term evaluation of Upper Mokelumne River water quality. The project funding included grants provided by the CALFED Bay-Delta Program and by Propositions 13 and 50.

The highlights of UMRWAP report are summarized below:

**Land Use:** A comprehensive land cover and land use GIS database and map was created by overlaying vegetation information with anthropogenic land use data , including grazing locations, timber harvesting, formal and informal recreation areas,

abandoned mines, paved and unpaved roads/trails as well as areas burned during the 2004 fire.

**Monitoring:** Historical and existing monitoring data for a variety of sources were collected and integrated into a master database. In order to provide a consistent dataset for similar monitoring sites on four major river segments a monitoring program was created and implemented.

**Baseline Water Quality:** The water quality database was used to develop statistical analyses of water quality for 51 parameters within the 4 major river segments. Benchmarks were established based in drinking water, public health, and environmental concerns. Baseline water quality was assessed to identify historical, seasonal and hydrologic trends as well as benchmark exceedances.

**Modeling: WARMF:** The Watershed Analysis and Risk Management Framework (WARMF) model was applied to the watershed and used to simulate water quality concentrations and loads for over 202 river segments. Historical data were used to calibrate the model, which was then used to simulate water quality in unmonitored areas of the watershed. The District has been named the WARMF Steward and so houses and maintains the WARMF model**.**

**Fire Behavior**: The behavior of potential wildland fires was simulated for potential ignition sites using the modeling tools FARSITE and FlamMap. WARMF was then used to analyze potential water quality impacts from these simulated fires.

**Water Quality Vulnerability Zones** - Soil, vegetation, slope, and proximity to water data layers were composted to identify variations in vulnerability to contaminant transport to surface waters.

**Draft Septic System Management Program (UMRWP Appendix K) -** A draft Septic System Management Plan was developed for implementation by the Alpine, Amador and Calaveras Counties. This draft plan includes a suggested community outreach plan, a recommended septic survey, and possible septic management practices. The additional septic survey would first target the areas where the suspected problematic septic systems are located. The suggested management practices include identifying suitable septic zones, rigorous siting standards, mandatory inspections and pumping and fee collection.

**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. If small, high intensity fires that occur frequently in the watershed could be reduced, an improvement to water quality is likely. Areas near water bodies with very steep slopes are most susceptible to transporting contaminants. River water quality must be protected by implementing management measures; the detection of degraded water quality is often too late to correct the problem.

**Key Recommendations/Tools:** Key watershed management recommendations and tools to address existing and potential water quality concerns included:

**Land Use Management:** Include watershed water quality protection policies in the General Plan updates. Encourage compact development to minimize the total area of new disturbed vegetation/soil and impervious surfaces.

**Monitoring:** Implement water quality and temperature monitoring in river segments identified as having elevated parameters of interest, particularly pathogens. Data collected can be used to enhance the WARMF model as well as identify water quality impacts caused by changes in the watershed.

**Septic Management:** Develop and implement a septic management program: Conduct a septic system survey. Institute management practices such as more rigorous siting standards. Implement a community outreach program. Expand sewer collection systems where feasible.

**Fire Management:** Manage the fuels for landowner and water quality objectives through measures such as prescribed burns, harvesting of biomass fuels, etc. Fire modeling conducted shows that reduction of fire occurrences and intensities will contribute to improved water quality.

**Stormwater Management:** Implement "green street" design principals to support increased infiltration of storm water and decreased runoff and erosion. Implement road maintenance programs to minimize loadings of sediment, contaminants, and trash. Standards needed for roadside pesticide use.

**Trash Management**: Increase bulky waste pickup programs, collection of illegally dumped trash, and pharmaceutical drop-offs to reduce contamination of water bodies. Provide toilets and trash receptacles at informal recreation sites.

**Public Outreach:** Inform the public of common pollutant sources and transport mechanisms to water bodies along with implementing integrated pest management, hazardous waste and recyclable materials and stormwater awareness programs. Highest priority is informing residents about septic system management practices.

## *Integrated Regional Water Management Plan (IRWMP)*

Integrated Regional Water Management Plans (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 are a result of Proposition 50, the Water Security, Clean Drinking Water, Coastal and Beach Protection Act, 2002.

The Mokelumne, Amador & Calaveras region was formed in 2006 and the Mokelumne, Amador & Calaveras IRWMP was issued in November 2006. MOU signatories for implementing the IRWMP include AWA CCWD, the District, Amador County, Amador Regional Sanitation Authority, and Cities of Jackson, Plymouth and Sutter Creek. Over 12 public stakeholder workshops were held between 2005 and 2007.

Substantial funds are designated to implement IRWMP projects (Proposition 50, Proposition 84 (2006), and Proposition 1E). With the subsequent passage of Proposition 84, the Department of Water Resources is revising its regional planning guidelines and criteria, which necessitates an update of the MAC IRWMP. Currently the UMRWA is leading an effort to prepare an update to the Mokelumne/Amador/Calaveras IRWMP. A list of proposed projects has been developed and will be updated, for the purposes of applying for IRWMP project funding.

## 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 the USFS. BLM and the USFS have both recommended the National Wild and Scenic River designation for these Mokelumne River sections due to its 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.

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 & Scenic River - Main & 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, U.S. Forest Service-managed segment of the North Fork that is eligible for inclusion in the Wild and Scenic Rivers system. The land between the Forest Service and BLM sections is mostly owned by PG&E and associated with Tiger Creek Powerhouse.

Sixty percent of the land in these reaches is managed by the BLM now. 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.

"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 well-being 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 84, 2006). The SNC has been allocated a total of $54 million of Proposition 84 funds for grant distribution and necessary administration of the grants. In its first year of grant-making (2007-08), the SNC distributed nearly $17 million to 146 projects throughout the Sierra Nevada. SNC Prop 84 funds have supported various activities within the Mokelumne Watershed.

## Upper Mokelumne River Watershed Council

The Upper Mokelumne River Watershed Council (Council) is located in Jackson and is coordinated by the District. 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.

## CSRC&D

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 2009 Annual Report:

- Water quality monitoring training and sampling for eight locations on the Upper Mokelumne and Dry Creek Watersheds, with support from RWQCB.
- Stewardship Through Education programs in Amador and Calaveras Counties, using a publication called Circles and Cycles, which describes Mokelumne Watershed
- Helped provide grant application assistance to the Amador Calaveras Consensus Group for their work fostering partnerships and promoting environmental stewardship on forested lands

## 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 the District. 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.

Among other benefits, the MCCT will provide:

- Natural resource protection ensures a wildlife corridor and a legacy of open space, riparian areas, old-growth forest and wildlife habitat for future generations by defining some areas free of development.

- Educational opportunities along the trail foster public appreciation, protection and stewardship of the region's rich natural environment and cultural heritage.

There will ultimately be approximately 30 miles of MCCT route on the District watershed property. Where possible, the route used existing roads. Between 1991 and 2009, 28.1 miles of continuous MCCT trail has been developed on District property by staff and the Mokelumne Trailbusters, a volunteer organization managed by the District. The remaining couple of miles should be complete by 2012.

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. Figure 6-2 shows a photo of the new trail bridge at Poormans Gulch, installed by the District to facilitate year-round access and to minimize erosion on a tributary of the main stem of the Mokelumne River. Native vegetation is also planted for erosion control. As with all the District trails, public access is gained through one of the staging areas and requires a District trail permit. See Appendix 6-4 for examples of sign postings. (See the District Access Management section for additional details.)

On Stanislaus National Forest lands, the MCCT Committee and USFS spent more than a year exploring and mapping potential routes for the MCCT on existing roads and trails. The USFS has developed 17 miles of this MCCT trail segment. In 2009, $225K was approved for approximately two miles of trail construction in Stanislaus National Forest, to be completed in 2012.

Proposition 40 grant funding was approved by the Calaveras Board of Supervisors in 2008 for $10,000 worth of trail signs and kiosks, and the trail posts and signs should be 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. National Forest maps summarize rules such as proper locations for stock animals and minimum distances or buffer zone for protection of water courses.

## *District Watershed Management*

For the 2010 update, the District's management practices were documented for access control, fire and fuels management, erosion control, pest management, grazing, inspection, surveillance, control, and emergency response. The District manages District-owned watershed lands surrounding Pardee and Camanche Reservoirs. The Watershed and Recreation Rules and Regulations, last updated in 2009, outline the specific rules pertaining to access, boating, camping, commercial uses, dangerous activities, sanitation, trails, vehicles, bicycles, and hunting.

## Mokelumne Watershed Master Plan

The MWMP was completed in 2008, replacing the 1970 the District Land Use Master Plan (described in the 2005 MRWSS update). The MWMP provides long-term policy and guidance for future use and management of the lands and water owned by the District 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 eight detailed management plans. The following management plans will be completed in the next several years:

- Rangeland management plan
- Fire management plan
- Water quality monitoring program
- Ecological integrity/natural resources plan

The following detailed management plans have been completed:

**Recreation Management Plan, January 2010.** The Recreation Management Plan identifies specific measures to meet the MWMP recreation and water quality goals to provide a quality recreational experience while protecting water quality and the environment, including:

- Water Quality Index. Calculate a water quality index (WQI) to provide a measure of the performance of management practices designed to ensure the maintenance of water quality in the reservoirs. Maintain a WQI of at least 80 in Pardee Reservoir (no body contact) and at least 65 in Camanche Reservoir (body contact allowed). WQI calculated based on formula for 8 water quality parameters of interest, identified based on the benchmark water quality data developed by the Upper Mokelumne River Watershed Authority. The parameters include methyl tert-butyl ether and a number of metals (arsenic, lead, copper, cadmium, mercury, nickel, and zinc).
- Potential management actions to achieve water quality targets may include informing and modifying boater activities, fishing activities. Implement specific Best Management Practices to limit potential recreation impacts to ecological health, such as prohibiting shore boat access in specific areas, and limiting access of free-roaming pets. See Appendix 6-5 for a list excerpted from the Recreation Management Plan**.**
- Complete the MCCT on District lands in the Mokelumne Watershed.
- Implement specific recreation trail construction, maintenance, and repair standards.
- Continue monitoring invasive species presence/absence in Pardee and Camanche reservoirs
- Install and operate floating restrooms at Camanche Reservoir and continue operation of floating restrooms at Pardee Reservoir contingent on funding.

- Continue the recycle/reuse/conservation program within the Mokelumne Watershed.
- Evaluate transitioning the Camanche Regional Park Advisory Board to a forum that includes recreation stakeholders and encompasses all watershed recreation facilities and uses.

**Infrastructure Management Plan, January 2010.** The Infrastructure Management Plan provides an infrastructure asset management system, identifies preliminary assets to be inventoried and managed and provides guidance on asset assessments. The MWMP Asset Management (Infrastructure) goal is to "Prevent asset failure due to deferred or otherwise inadequate maintenance."

**Financial Management Plan, January 2010.** The Financial Management Plan provides an accounting framework to track revenues and expenditures based on watershed management programs. It also identifies key watershed management programs with targets to guide financial decisions, striving for financially sustainable management of watershed assets and resources.

**Mobile Home Park Management Plan, January 2010.** The Mobile home Park Management Plan (MHMP) identifies specific management practices including reviewing, revising, and enforcing mobile home park rules and regulations to ensure construction, repair, and maintenance activities by mobile home owners meet legal and District standards and align with District water quality and ecologic integrity goals. The MWMP goals for Mobile home Park Management require that revenues generated meet or exceed the cost.

## *Safe Harbor Agreements*

Safe Harbor Agreements (SHA) are overseen by FWS. Landowners can sign up to restore or enhance habitat on their property which contribute to the recovery of threatened and endangered species. In exchange, the landowner receives formal assurances from FWS that they will not require additional or different management activities. The landowners receive permission to incidentally take (injure or kill) threatened and endangered species in the course of specific maintenance and operation activities. In addition, landowners can return the land to the baseline condition and remove habitat enhancements at the end of the SHA. The SHA increases the District's maintenance flexibility and implements various MWMP objectives.

In 2007 the District signed the Lower Mokelumne Watershed SHA along with the Lodi-Woodbridge Winegrape Commission, Lange Twins Wine Estates, Inc., and other landowners. This was California's first multi-landowner SHA. It will provide elderberry bushes, the sole food of the federally threatened Valley elderberry longhorn beetle, among other species.

In 2009, the District signed an historic 28,000-acre SHA to protect and enhance three listed species in the Mokelumne watershed around Pardee and Camanche Reservoirs (see Appendix 6-6 SHA map summary). This is the largest SHA in California and among the

largest single party SHAs developed in the nation. The 30-year SHA will cover three federally protected species: Valley elderberry longhorn beetle, California red-legged frog, and the California tiger salamander.

- The first major SHA project was completed in 2009, developing a quarter-acre pond in the McIntire Wildlife Corridor in San Joaquin County below Camanche Reservoir. More than 200 native trees were also planted in the Wildlife corridor. The site was seeded with native grasses and mulched. This SHA implementation project establishes suitable breading habitat for California tiger salamanders and other native wildlife species.
- In the next five years within the watershed the District plans to document existing endangered species habitat, plant approximately 5000 new elderberry bushes, and develop two areas of new spawning habitat.

## *District: Access Control*

In the period since 1995 the District added two new parcels to properties around Pardee Reservoir: the 540 acre Anderson Ranch property in Grapevine Gulch and the 160 acre Goose Hill parcel adjacent to the PARA. In addition, the District acquired two conservation easements on the Pardee Reservoir Watershed: the 329 acre Garamendi Conservation Easement in Poormans Gulch and the 9 acre Pitto Conservation Easement in Rich Gulch.

All Camanche and Upper Mokelumne River watershed lands owned by the District are fenced and posted, with human access strictly controlled. The shorelines of Pardee Reservoir and the Mokelumne River where it passes through District 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 the District watershed lands are fenced along the entire passage through District lands except in the Recreation Areas.

In 2003, the District officially sanctioned the use of a portion of the property in the Middle Bar Bridge area as a take out for river rafters and kayakers to exit the river. As noted in Section 5, the Middle Bar Take-Out Facility includes a 20-space gravel parking area (including two paved handicapped spots), a two station handicapped accessible toilet and a short trail to the rivers edge. No permits, fees or access passes are required for the general public use of these facilities.

**Trail Permits.** The District trail use requires a permit. The District Trail Use Rules and Conditions outline that the users shall, when on the District 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 the District 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). In the past 5 years, road signs were installed along Gwen Mine Road above Pardee saying "No

Dumping, Drains to Pardee Reservoir and the Mokelumne River". The signs were installed by the District, Calaveras County and The Paloma Community Group. See Appendix 6-4 for examples of sign postings.

**Equestrian Access and Camping.** Horses are allowed on most the District trails and fire roads and in the equestrian campground, but they are not allowed in the rest of the recreation areas. Based on sign-ins on the trail registers, about 80 to 85 percent of the Mokelumne area trail users are equestrians. Trail use requires a permit when on the District property. The District 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. Turkey Hill Equestrian/Group Campground is operated by concessionaire and has seven sites which together can accommodate a total of 32 horses and 128 people. All sites have picnic tables, fire ring/barbecue grill, a paddock for each horse, lantern stands and close access to water. Campground features include a group dining area, campfire ring/amphitheater assembly area, regulation horseshoe pit, a horse wash station, bins for horse waste, and portable toilets. Permit rules require that horse waste be cleaned up and disposed of in waste bins.

**District Capital Security Improvements.** In the past 5 years, the District completed phase one of its Capital Security Improvement Projects (CSIP), a result of the 2003 District Vulnerability Assessment (VA). The phase one CSIP projects primarily involved the installation of the backbone security system and establishment of a 24 hour Security Operations Control Center (SOCC). Much progress has been made toward hardening the targets of the District'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 District facilities. Staffed and more critical facilities as well as some of the more remote facilities that have been targets of trespass and theft have been completed, and these improvement projects will be ongoing for ten or more years.

A CSIP for the District's Mokelumne Watershed Headquarters is included in the new building design beginning construction in 2011. The security improvements will include building access control and CCTV cameras. No other security improvements for the East Bay or Mokelumne Watersheds are currently planned for the next five years. However, an internal VA update planned for 2011 could add security projects for watershed facilities.

## *District: Fire and Fuels Management*

CAL FIRE has the primary wildland fire suppression responsibility for all District lands within the Mokelumne Area. Local Fire Districts and Volunteer Fire Departments (Local Agencies) have the primary structure fire suppression responsibility for all District properties within the Mokelumne Area. MW&RD firefighters are responsible for assisting with the suppression of wildland fires within the Mokelumne Area on District property. In addition, District 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 District property to the extent reasonable and appropriate. In the years 2005-2009, the MW&RD Firefighters responded to 88 fires.

**MW&RD Fire Plan.** The District MW&RD Fire Plan is updated annually. The Fire Plan documents current District 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 the District as well as with outside agencies.

The Fire Plan appendices include Mokelumne Mowing/Weed Abatement Procedure (Fire Plan Appendix K). The purpose of the mowing procedure and fire prevention plans are to set guidelines for District, 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. Concessionaires follow their respective Fire Prevention Plans (Appendixes L, M, & N, CHHP Fire Prevention Plan, Pardee Lake Recreation Fire Prevention Plan, and the Camanche Recreation Company Fire Prevention Plan.). The Fire Plan appendices also detail grazing lease locations and environmentally sensitive locations. Some additional Fire Plan details include:

- **Environmentally Sensitive Areas.** The Fire plan contains a map of Environmentally Sensitive Areas (Fire Plan Appendix Q), which shows the 100’ No Fire Retardant Buffer Zone around Pardee Reservoir. Fire suppression chemicals are only used at substantial distances (greater than 100 feet) from the District’s reservoirs and tributaries with standing water. District staff regularly remind CAL FIRE of this requirement when aerial fire suppressants are needed.
- All District firefighters must complete a minimum of 40 hours of initial training and a minimum of 16 hours of annual wildland firefighting training. There are nine vehicles equipped with fire suppression equipment and necessary radios to conduct effective communication with all responding agencies.
- **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 District property in the Mokelumne Area. The purpose of this procedure is to ensure that the District takes all prudent measures necessary to reduce fire hazards on District property and to maintain firefighting capability, equipment and patrols. All Mokelumne area employees, concessionaire employees, and recreational visitors are notified when a Red Flag Warning is issued. Operational changes include extra patrols by rangers,

increased water storage at recreation areas, and the prohibiting of activities that create sparks such as outdoor cutting, welding or mowing.

- **Disking**. Disking is accomplished on an annual basis in the late spring in order to provide fuel breaks on portions of the property boundary that are bordered by residential developments and other urban interfaces. Recreation Area road edges most susceptible to fire starts are also disked. During the 2010 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 the District operating within about 2,500 acres of developed Recreation Areas also have an active program of mowing and line trimming estimated to cost them about $85,000 per year.

**Woody Fuels Management Program**. The Woody Fuels Management Program was reinstituted in late 1995 as a means of removing down and dead wood from areas where it could constitute a fire hazard. The program is open to all members of the public and the District employees. There is a two-cord limit per person and cost $10.00 per permit. The exception to this fee is driftwood whereas permits are issued at no cost and there is no limit on the amount of driftwood that may be taken. In the five-year period 2005-2009, a total of 149 permits were issued and 239 cords of wood were removed from District property. Of this amount, there were no driftwood permits offered, due to small amounts of available driftwood.

**Brush Removal.** The District 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 District staff. Figure 6-3 shows an area of brush removal on Rocky Ridge near Pardee Reservoir. Brush is removed to recreate a pattern typical for an area under natural fire influence, a mosaic of open space areas, interspersed with trees, grass and bush. A brush masticator was used in 2009 to test a more efficient method of brush removal.

**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 the District lands. The Fire Atlas has been distributed within the District and to various agencies, including CAL FIRE. The Fire Atlas consolidates very detailed fire response information and will significantly improve emergency fire response by the District 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, the District property lines and defined Fire Response Zones (the zone immediately outside the District property).
- Aerial Photos and Maps by Recreation Areas: For each the District 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, the District water sources, fire weather zones and an index.

## *District: Grazing*

Livestock grazing on 12,900 acres of District 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.

A Mokelumne Watershed Rangeland Management Plan (Rangeland Management Plan) is being developed, similar to the 2001 East Bay Range Resource Management Plan. A number of stakeholder and focus group meetings have already been held with ranchers and District staff, with the final meetings expected in 2010. The new Rangeland Management Plan, expected complete in 2011, will be a written summary of current best management practices related to grazing and pest management.

*Cryptosporidium* and nitrates are water quality parameters of interests that may be connected to grazing activities. Since 2006 several changes have been made to reduce cattle grazing during wet months and to utilize “attractants”, projects that encourage the cattle to spread out and graze away from waterways and drainages. The following projects were implemented 2006-2009:

- **Seasonal Grazing Lease Periods:** Beginning in 2006, several annual grazing leases were modified to allow seasonal grazing only (grazing 7 months or 9 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. Monitoring is being conducted in the various seasonal regimes to assess the influence of seasonal grazing on water quality. The limited water quality data has been inconclusive so far.
- Two solar-powered pumps were recently added to develop water sources away from natural riparian areas. At one source a new well was drilled. The other pump was added to an existing spring, pumping the water vertically up 350 feet to a more desirable location.
- Salt blocks and food supplement stations are being deployed to further improve cattle distribution.

## *District: Erosion Control*

BMPs for erosion control are being developed/adopted for use on the District owned watershed. Current BMPs on the watershed 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 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 erosion control improvement projects were implemented in recent years, including the Mokelumne Coast to Crest Trail construction (see earlier section). The following projects are examples of erosion control and environmental restoration BMPs:

- **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. This head cut restoration project is located where the pond tailing creek flows into the reservoir and consists of a multi-layer retaining wall built using all local materials. The retaining wall layers include a 1-foot base of cobbled rocks, topped by 5-feet of soil, and covered with jute netting. Finally, native plants cover the top of the bank. Live willow stakes 1’ to 3’ long have also been inserted, so that they will sprout and further stabilize the bank restoration. CDFG, Army Corps and RWQCB permits were issued for this project.
- **Camanche Shoreline Stabilization Project.** The Camanche Shoreline Stabilization Project is located adjacent to the South Shore Campground and was completed by

contract in 2006 in accordance with CDFG and Army Corp of Engineers permits. This approximately $100,000 reservoir bank stabilization project protects approximately 1200 feet of Camanche Reservoir shoreline from waves caused by prevailing winds and high levels of boat traffic. Large boulders were installed to form rock banks, placed several separate sections, allowing pedestrian access down to the reservoir shoreline between sections. Trees were planted along the wall.

- **Salt Gulch Creek**: The Salt Gulch Creek contributed a significant sediment load into Pardee Reservoir during period of high creek flows. The District staff and the Mokelumne Trailbusters modified Salt Gulch Creek contours and reintroduce native vegetation on a 20 acre portion of the gulch right above Pardee Reservoir, to minimize erosion and provide long-term stabilization.
- **Natural Asbestos Stabilized**: In 2009, a soil stabilization product, Road Oyl, was applied over approximately one-quarter mile of unpaved fire road/trail where the soil has naturally occurring asbestos. This section of road/trail is also used as the MCCT near Pardee Reservoir, between McAfee Gulch and Olive Orchard. The asbestos can pose a health risk if fibers are disturbed and released into the air. Road Oyl is an environmentally-friendly pine resin and pitch emulsion, called a dust palliative, that binds particles together then dries hard. Road Oyl was applied directly to the dirt road/trail, followed by an application of 2-inches of standard road base gravel, and then topped with a final layer of Road Oyl. An air sampling program is planned for summer 2010 to evaluate the oil cap effectiveness.

**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 to fully stabilize the access roads, especially during late winter early spring high water periods. Substantial earthwork will be needed. Staff is currently looking for grant opportunities to fund this project.

## *District: Pest Management*

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 Best Management Practice with regard to herbicide application and use. Two 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 3 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 3 foot zone, spot spray application is allowed provided drift does not occur. Wind speeds shall essentially be near zero.

The District has also partnered with the Amador Weed Advisory Group (AWAG). AWAG is a collection of agencies, organizations, companies, and private citizens committed to collaborate in activities to prevent and control noxious weeds in Amador County. Noxious weeds pose a threat to Amador County crops, rangelands, irrigation systems, roadsides, wild lands, recreation areas and private residences. AWAG's activities focus on exclusion, detection, suppression, and eradication of species listed as noxious weeds by the California Department of Food and Agriculture. Public outreach and education is a major emphasis. The District is a principal participating agency of AWAG, and has been since it's formation in 2000.

AWAG has proposed a Memorandum of Understanding which states the following goals:

1. Promote the control and treatment of noxious weeds using approved Integrated Pest Management techniques.
2. Identify and map noxious weed occurrences.
3. Support AWAG's efforts to control and prevent noxious weeds in Amador County.

**Quagga/Zebra Mussel Prevention Program.** The District has a Quagga/Zebra Mussel Prevention Program to protect District 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 the District 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 the District reservoir without having an additional physical inspection (a new vessel history survey is still required with each launch).

First, the Vessel Inspection Program requires a vessel history survey, with boat operators completing the District Recreation Area Private Boat Launch Inspection Form (available at reservoirs and from the District website). The form asks for 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 the District 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 have 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.

Next, qualified District staff perform a physical vessel inspection. 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. CDFG will be notified if Quagga or Zebra Mussels are suspected.

The District is also asking all boaters to follow the CDFG 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 geese 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 geese 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. The District staff plan on monitoring the goose population and water contaminant levels to adapt the goose management program as needed in the future.

## *District: Stormwater Management*

Between 2001 and 2008, Pardee Center had a NPDES Industrial Storm Water Permit from the RWQCB for discharges associated with the Pardee lime facility, the result of legal proceedings with Calaveras County. A Storm Water Pollution Prevention Plan and a Monitoring and Reporting Program was implemented in compliance with the permit conditions including monitoring samples twice per year. A clean up of the abandoned Pardee Lime Tower in May 2005 removed the only significant source of potential storm water contamination from the site. In 2008 the Calaveras County Superior Court dissolved the injunction.

In 2005 six bio-retention filter basins were constructed in two CASS campgrounds (Monument and Cottonwood) to capture and treat road, campsite and parking lot runoff. Installed during a campground renovation project, the bio-retention basins are shallow planted depressions designed to retain storm water. The bio-retention basins have vegetated

strips and swales upstream of the basin to capture sediment and reduce basin maintenance. The lowest portions of the basins are 24 inches deep with 9 inches of rock base covered by topsoil and bark. The overall basins are relatively large (approximately 10 feet by 140 feet, or 15 feet by 50 feet) and sized for the identified accumulation area. Treated stormwater from the basins discharge into Camanche Reservoir.

Several future projects are considering using pervious pavement to reduce storm water runoff, including the paving pending Proposition 84 grant funds. Pervious pavement is porous asphalt or concrete paving material that allows rainwater to seep into the soil below.

## *District: Waste Management*

The District 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 District Environmental Compliance Manual was updated in 2008, containing 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 sedimentation control, dechlorination, hazardous waste storage locker use and storm water management.

A Sewer System Management Plan (SSMP) was certified by the District 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 the District 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.

**WDRs Order.** RWQCB WDRs 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 5-3 for WDR monitoring details.

WDR activities over the past five years include:

- In 2005 groundwater monitoring wells and monitoring program was added to the permit requirements for all 4 WWTP facilities.
- The CANS WWTP effluent reuse was improved in 2007, adding an additional 1.5 acre spray field to increase disposal capacity. Timers were also added to replace manual land application control. (Pardee Recreation Center WWTP has used timers for some time.)

- In 2009 the CANS and CASS WWTP ponds were desludged, with the solids hauled to landfill. This resulted in increased pond treatment and improved WWTP effluent water quality.

**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. Originally issued in 2003, the NPDES permits were last updated in 2009 because of changing regulations. 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. Separate facility BMP documents are required for CASS and the PARA because of the limited threat rating. See Appendix 6-7 for NPDES permit examples.

The separate facility BMP documents (CASS and PARA) 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 2010 a CANS Report of WDR individual permit was requested from the RWQCB to allow landscape irrigation for the backwash water. A grassy area is planned near the Blue Oak campground, to be watered with the backwash water. Specialized turf has been selected 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 (HMBPs) 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 Hazardous Material Business Plans are updated annually and can be found in Appendix 6-8. 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 the District upcountry facilities has a 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.** Ten floating toilets are currently in use at Pardee Reservoir. 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.

## District: Inspection, Surveillance, and Enforcement

The MW&RD has Resource Patrol Units (RPU) whose primary responsibility is to protect the public and District 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. From 2005-2009, on average the RPU logs 49,407 total vehicle miles per year. Four permanent rangers are tasked to maintain coverage 7 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 District lands.

## District: Emergency Response

This section discusses District 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 the District response to wildland fires on or near our property. Along with fire response, the RPU responds to 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 District offices to the recreation areas, the RPU is often first on scene of a variety of medical emergencies. This quick response by District staff has justified the acquisition of Automatic External Defibrillators now carried on RPU patrol vehicles. Drowning, physical assaults, bee stings, boating and vehicle accidents are just some of the medical emergencies attended by RPU staff.

**Security Shift Supervisors.** Security Shift Supervisors at the District are trained first responders for any security or emergency response incident and have access to the full range of resources available to the District. 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, the District 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 support in keeping with the Standardized Emergency

Management System (SEMS), National Incident Management System (NIMS) and the National Response Plan (NRP).

### District: Public Education

Rangers from the Mokelumne Division participate in several annual events. Rangers attend a career days at local elementary schools and talk about their career field and their own career at the District. Rangers attend Fire Prevention week and describe to the public our role in fire prevention efforts from our own offices to methods incorporated in the campgrounds and watershed lands. District rangers also co-host an annual River Clean-up 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 the District, 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 clean-up in the Pardee/Camanche area. The Trailbuster Work Schedule (every other Saturday through out the year) includes outings such as Bald Eagle tours; Wildflower hikes; Native American Cave Paintings tours; Gold Rush History tours; the annual California & 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).

NPDES C.3 development-related stormwater impact requirements started taking effect in 2004, with planning implications for each new development or significant redevelopment. The timing of feedback from review for each permit is crucial since conditions of approval can only be changed in the planning phase, with the California Environmental Quality Act (CEQA) documentation, if required. Only during the planning department or planning commission approval stage can the project have attached Conditions of Approval with BMPs effectively implemented. After that initial approval phase, more Conditions of Approval are not possible.

## *Amador County General Plan - Housing Element Update (2010)*

The Amador County General Plan Housing Element 2009-2014 identifies and analyzes current and future housing demands in the county. Of the 38,000 residents, the majority (58%) inhabit the unincorporated portions of the county. The projected overall annual population growth in the county is expected to be around 1.3 percent between 2000 and 2050, with the unincorporated population growing approximately 2 percent annually.

In the past 5 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.

The AWA (AWA) provides the majority of water to Amador County. AWA has three water treatment plants at Buckhorn, Tanner, and Ione. The primary source of water is the Mokelumne River. AWA has an allocation of 15,000 acre-ft of water from Lake Tabeaud. However, only 7000 acre-ft actually reached customers due to evaporation and seepage from open miner's ditches constructed in the 1850's. As a result, the water supply was at or near-capacity.

To meet increasing demand for water, the Amador Transmission Project replaced 23.5 miles of deteriorating open ditch transmission system with 30" pipeline. The pipeline became operational June 2007. Furthermore, expansions in the three treatment plants will increase available capacity.

AWA is moving forward with a raw water Gravity Supply Line (GSL) project to improve efficiency in the delivery of municipal water supply to its CAWP service area, the Buckhorn WTP. Currently raw water is pumped from the Tiger Creek Afterbay up to Buckhorn WTP. The GSL project will install a new intake structure at PG&E's Tiger Creek Regulator Reservoir and then gravity feed the raw water to Buckhorn WTP. Construction should be complete by 2012.

AWA wastewater effluent discharges are disposed via subsurface leach fields and spray disposal fields. A review to expand or share of facilities with the District near Camanche Reservoir began in the period 2000-2004. Also, a county-wide regional wastewater

management plan was begun with the cities. Although still under consideration, because of the current economic climate these proposals have not moved forward in recent years.

### *Calaveras County General Plan - Housing Element Update (2010)*

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 has the capacity to serve the community for 40-50 years.

The Calaveras County General Plan Water Element Baseline Report Supplement 2009 sets goals to protect water quality, to ensure wastewater and storm water management infrastructure is available, and to protect watersheds. The Water Element requires program implementation over the next 25 to 30 years, identifying specific county departments responsible to implement the best management practices for construction, industrial, agricultural, logging and stormwater activities.

### *City of Jackson Land Use Element (2008)*

The 2008 Land Use Element is intended to provide guidance for planning development in the next 20 years. Eleven distinct neighborhoods were identified in the element in conjunction with the Land Use Designations Map. Concerns pertaining to the watershed include the development of agricultural areas in Southwest Jackson, requiring careful handling of wetlands and vegetation and disrupting geological slopes, and encroachment of commercial and residential areas onto Jackson Creek and the floodplains.

The Land Use Element recommends the establishment of a City grading ordinance, encourages the public use of the city's many creeks, recommends development only if environmental impacts are adequately mitigated,, and requires new development proposal in the Creek/Floodplain overlay to obtain Planning Commission approval.

## *Access Control*

**Land Ownership.** 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 National Forest, SPI, PG&E, and Stanislaus National Forest.

**Fencing Restricted Watershed Areas/Riparian Lands.** 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 National Forest 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 National Forest, the Forest Service 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). This was done with fencing and large boulders as part of an ecosystem management program, the Coordinated Resource Management Areas (CRMA), to evaluate the current health of the watershed ecology and to evaluate what steps must be taken in the future to improve the ecology of the watershed.

**Gating of Roadways**. 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 National Forest 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 National Forest 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 national forest 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 national forest lands. Any illegal use is reported to appropriate law enforcement staff (national forest or county sheriff's department).

**Hunting and Fishing Regulations**. The CDFG issues licenses to regulate all fishing and hunting in the watershed. The seasons and limits on take are imposed by CDFG Code by means of the licenses, and enforced by CDFG wardens. While not designed to control soil and vegetation conservation and consequent water quality impacts per se, the regulations do serve to limit the extent and severity of such impacts by regulating the intensity of use and limiting the number of users to those willing to pay for licenses.

**Wilderness Area Restrictions.** Mokelumne wilderness is jointly administered by Eldorado and Stanislaus National Forests. 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 county 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.

**Rights-of-Way.** 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 National Forest has "cooperative" roads, some of which have restricted access where they cross private land. Stanislaus National Forest 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 Forest Service lands.

**Ski Area Special Use Permits.** The Mt. Reba - Bear Valley Ski Resort operates under a special use permit from the Stanislaus National Forest. Activities are limited to recreational skiing and the construction and maintenance of the necessary support facilities. Terms of the permit require any potentially adverse impacts of the development to be minimized or mitigated as fully as possible. An erosion control plan that includes requirements for revegetation/runoff control and slope stabilization is required for ski slopes.

**Big Bar Mokelumne River Access.** New boat put-in/take-out facilities are being developed by BLM along the Mokelumne River, just west of the Big Bar Bridge on Highway 49. Currently river boaters and kayakers 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. These improvements are being located on two acres of private land, leased to PG&E for us to 25 years. The work is being funded by grants from PG&E and the California Department of Boating and Waterways. Construction should be complete by 2011.

## *OHV Use Restrictions*

As of 2009, the USFS prohibits all off-road vehicles on the Eldorado and Stanislaus National Forest lands, unless it is an area specifically designated for off-road use as shown on the forest Motor Vehicle Map. Motor vehicles (cars, trucks, ATV’s, motorcycles, RV’s, 4WD’s, 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 National Forest 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.

The 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 $5,000 fine and/or six months in jail.

As discussed in the earlier Access Control - Gating paragraph, SPI lands are having fewer problems with unauthorized activities such as OHV use because of locked gates.

The Stewardship Council is protecting watershed lands, and one of the potential measures is to "identify and disclose unauthorized uses and develop strategies to address future management and/or eradication". The specific details will be defined for each site as the LCP Volume III is detailed.

## Erosion Control

On National Forest lands, the USFS is primarily responsible for the control of erosion and other potential sources of pollution. Both the Eldorado and Stanislaus National Forests use the national standards and guidelines for these purposes, proposed best management practices developed by the State of California's Department of Forestry and Fire Protection, and their own Land and Resource Management Plans. 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 National Forest lands.

The 2004 SNFPA defines a strategy for attaining desired conditions in aquatic, riparian, and meadow ecosystems. These goals especially pertinent to water quality are listed below:

- Water Quality: Maintain and restore water quality to meet goals of the Clean Water Act and Safe Drinking Water Act, providing water that is fishable, swimmable, and suitable for drinking water after normal treatment.
- Watershed Condition: Maintain and restore soils with favorable infiltration characteristics and diverse vegetative cover to absorb and filter precipitation and to sustain favorable conditions of stream flows.
- Stream Banks and Shorelines: Maintain and restore the physical structure and condition of stream banks and shorelines to minimize erosion and sustain desired habitat diversity.

Guidelines and standards in the 2004 SNFPA prohibit or mitigate ground-disturbing activities within Riparian Conservation Areas (RCAs) and Coordinated Resource Management Areas (CRMAs). Guidelines direct forest staff to prevent disturbance to stream banks and shorelines (see Grazing section), minimize exposure of bare soil during

post-fire treatments, ensure existing roads and skid trails meet all Forest Service Lands in California BMPs, and restore areas with excess compaction and gullying.

As mentioned previously, the Forest Plan Direction: Motor Vehicle Travel Management published in 2004 supersedes previous OHV Management Practices for Stanislaus National Lands. Guidelines and standards are provided to limit erosion, monitor conditions, and for rehabilitation. For example, the guidelines for Restricted Motor Vehicle Management include encouraging users to seek opportunities for hill-climbs and motocross events on lands other than National Forest, and to use Adopt-a-Trail programs to maintain routes, and to maintain and update the Forest OHV mailing list and make related information available to the public. The document also contains a monitoring and evaluation plan for OHV trails to update the condition rating (green=ok, brown=needs maintenance, orange=needs major attention).

On private lands, the CAL FIRE is responsible for enforcing the regulations of the California FPA to control erosion impacts. The regulations require submittal and advance approval of THPs for all significant harvesting efforts for each three-year time segment.

## *Amador County Grading Ordinance - Revised 2005*

Amador County requires all projects that move more than 50 cy of grading to obtain a Grading Permit. Projects exceeding 5000 cy are defined as engineered grading and require a soils engineering and an engineering geology report. All plans must comply with standards set by NPDES Storm Water Prevention Requirements. Projects exceeding one acre must file Notice of Intent (NOI) with the RWQCB and provide a Storm Water Pollution Prevention Plan. The grading ordinance requires all projects to provide plans for prevention of erosion that may exceed levels prior to the start of the project. Furthermore, projects undertaken during the rainy season must submit erosion control plans and receive approval prior to Oct. 15. Erosion control plans must include revegetation and drainage structures to control erosion and sedimentation.

The grading permits are issued in three ways:

1. Over-the-counter for projects not exceeding 250 cy;
2. Issued with the building and septic permit; or
3. If none of the above, issued by Public Works

## *Calaveras County Grading Ordinance 2007*

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 cy, are defined as engineered grading

### Stanislaus Forest Scale Roads Analysis

This document discusses effects of roads on watershed ecosystems, defines Stanislaus National Forest S priorities in road construction, and provides guidelines road analyses. It states that the inventory of hydrologically connected segments on the road system on the Stanislaus National Forest is largely incomplete. A more intensive inventory is essential in developing an improvement plan to address the effects of roads on the watershed. The Stanislaus GIS library contains erosion data that may be used in conjunction with road system maps for effective road management planning. One guideline established in the Central Stanislaus Watershed Analysis establishes a desired density of less than 2.5 miles of road per square mile. This guideline leaves room for further road development and improvements. Additional guidelines in this document are included for planning and accomplishing needed road development, reconstruction, maintenance, and decommissioning.

## 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. Because agricultural lands constitute a small area of the watershed lands, any associated pesticide spraying is not of significant concern. There are no active programs within the watershed lands for mosquito or rodent abatement, nor aerial pesticide spraying.

Any property owner or operator who wishes to use a pesticide designated as a "Restricted Material" on a specific crop or site must first obtain a Restricted Materials Permit from the county agricultural commissioner. A list of restricted materials is found in Title 3, California Code of Regulations, Section 6400. Restricted materials are those pesticides which the Director of the California Environmental Protection Agency finds to be 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. The County Agricultural Commissioner enforces pesticide laws and regulations at the local level. 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.

There are two types of permits an applicant may obtain. The first is an agricultural permit that is to be used for agricultural purposes such as the production of food, feed and fiber; or the maintenance of golf courses, parks, cemeteries, or right-of-ways. The second type of permit is for non-agricultural uses, which include industrial and institutional uses. Amador County is considering creating a Vector Control Department to control mosquitoes to stem the threat of West Nile Virus.

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.

National Forest procedures for proper pesticide application can be found in the document "USDA Water Quality Management for Forest Lands in California: Best Management Practice" 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. Water quality monitoring shall be considered during the planning process to ensure application accuracy and lack of impact on water quality.

## Logging Practices

National Forest timber which includes trees, portions of trees, and other forest products on National Forest 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 National Forest.

The USFS will insure that each permit for timber use is consistent with applicable land and resource management plans 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.

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. Solid-wood forest products include saw logs, veneer logs, poles, pilings, timbers, posts, tanbark, chips, fuel woods, split products, root-crown burls, and pulp-logs. Timberland is non-federally owned land capable of bearing designated commercial forest tree species. Designated commercial forest tree species vary between regions.

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. The CVRWQCB continues to require a discharge waiver for all THPs and all Emergency harvest operations. They 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.

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.

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.

## *Timberland Conversion*

Any person who owns timberlands which are to be devoted to uses other than the growing of timber, or who applies for immediate rezoning from Timberland Production Zone (TPZ) (whether timber operations are involved or not), must obtain a Timberland Conversion Permit from the Director of CAL FIRE. Examples of activities requiring a Timberland Conversion Permit include development of a ski area or other development of recreational facilities, the construction of a housing development, changing the designation of timberland to grazing land, or applying for immediate rezoning from TPZ.

The Director of CAL FIRE evaluates applications for Timberland Conversion Permits to assure that the proposed timberland conversion meets the requirements of the Forest

Practices Act, related Board of Forestry regulations, and provisions, rules, and regulations requiring stocking for continued forest production, or to enable a county to finalize approval of immediate rezoning from TPZ.

Owners proposing a conversion of a timber stand of less than three acres within a single ownership to other uses need not obtain a Timberland Conversion Permit if the conversion conforms to the local general plan and zoning ordinances. Timber owners may not use this exemption more than once for a parcel in a single ownership. Public agencies proposing to convert timberland to construct rights-of-way across public property, and landowners granting easements for constructing and maintaining utility transmission lines need not obtain a Timberland Conversion Permit. Additionally, landowners who have satisfied all local CEQA requirements for a subdivision development are exempt from Timberland Conversion Permit requirements.

## 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 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 National Forest 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 National Forest System administered lands is subject to 43 CFR 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 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. The State Mining and Geology Board (SMGB) reviews these lead agency ordinances. SMARA is applicable to federal lands regulated by BLM and the USFS.

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 the District property, the District 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. The landfill cover was repaired and improved in 2009 to minimize rainwater infiltration. Best management practices 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.

In the past the District 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 second quarter 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.

## Mine Tailings Impoundment

There are three impoundment areas (ponds) just north of Camanche Watershed above China Gulch, suspected to have mine tailing from historical mining activities. Although the main pond is mostly on BLM property, a small section is on the District property. The lower two ponds are entirely on the District 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 threes 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 & Ecological Risk Assessment is planned in the near future.

**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 earlier section under the District Watershed Management, Erosion Control for additional details. This shoreline is downstream of the lower mine tailing impoundment pond.

## Suction Dredging Moratorium

The State of California passed SB 670 which prohibits the use of vacuum or other suction dredging equipment for in stream mining in any California river, stream or lake effective August 2009. This moratorium will remain in effect until the CDFG completes an environmental review of its dredging permitting program and revises its regulations. CDFG's existing regulations governing suction dredge were promulgated after preparing and certifying an environmental impact report under CEQA in 1994. However, the 1997 Draft SEIR was never completed or certified. In response to a 2006 lawsuit and court order pertaining to Coho salmon in the Klamath, Scott and Salmon River watersheds, CDFG plans on updating the 1994 EIR to also address statewide issues. CDFG plans to issue the Draft Supplemental Environmental Impact Report and regulatory updates with a final Notice of Determination expected in 2011. The BLM will not issue recreational use permits for suction dredging in the Mokelumne Watershed until this moratorium is lifted.

# 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 and focus on grading and construction requirements.

## 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 issued by the Regional Board. Eligible activities include:

- Facilities subject to stormwater effluent guidelines (40 CFR 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 storm water discharge facilities.

## Calaveras County Storm Water Management Plan

In 2007, Calaveras County developed a Storm Water Management Plan, as required for all regulated jurisdictions by the SWRCB as a condition of coverage under California's statewide General Permit for Storm Water Discharges. The Calaveras County Storm Water Management Plan requires that all Calaveras County ordinances, permitting processes, design guidelines and operating procedures be modified to meet specific BMPS for storm water control. Although the specific municipal separate storm sewer systems (MS4s) storm water discharge permit areas defined by the SWRCB are outside the District 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 storm water 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 storm water quality and grading and drainage requirements.

## Caltrans Stormwater Management Program

Caltrans must comply with the regulations and policies established in its own Statewide Storm Water Management Program (SWMP) and the stormwater NPDES Permit. The Mokelumne River watershed falls into Caltrans District 10. The SWMP describes annual inspection and cleaning of culverts, drains, inlets, gutters, and downdrains as necessary. Caltrans has a vegetative control program based on integrated pest management principals. The main goal of the program is to reduce use of herbicides wherever possible. The SWMP prohibits use of chemical vegetative control unless directed by the California Department of Food and Agriculture to eliminate invasive weeds.

The California Stormwater Quality Association (CASQA) publishes a detailed Construction Handbook with very detailed BMPs covering stormwater pollution prevention and erosion and sediment control. Formed in 1989 as the California Stormwater Quality Task Force, CASQA became a nonprofit organization in 2002, with membership open to various groups and individuals (NPDES Stormwater permit holders, MS4 permittees, etc). The CASQA BMPs are used by Caltrans and by other construction projects within the watershed.

**Storm Water Advisory Teams.** As part of the program management, Storm Water Advisory Teams (SWAT) were created for the following areas of Caltrans' operations: water quality, project design, construction, maintenance, and encroachment. The basic functions of the teams are to:

- Design procedures and guidance for the implementation of the SWMP;
- Gather and disseminate information on new or updated regulations or policies, and;
- Review and improve BMPs.

**Storm Water Treatment BMP Technology Report.** Caltrans identifies and screens candidate BMPs for future pilot studies and research. The Storm Water Treatment BMP Technology Report provides information on the new technologies not yet approved.

**Storm Water Data Report.** A Storm Water Data Report (SWDR) is prepared for every project. Projects that do not have the potential to create storm water impacts, and have little or no soil disturbance may utilize a shorter form. Caltrans fulfills the permit requirements through storm water management throughout the entire project delivery process. Design pollution BMPs are incorporated in all new projects or expansions and are considered in all phases of a project, from initiation through to Plans, Specification and Estimates (PS&E). Caltrans evaluates permanent BMPs for all projects and documents the evaluation process in the SWDR. Implementation of the treatment BMPs will be based on the SWDR.

**Stormwater Management Program Annual Report 2008-2009. T**he SWMP and NPDES permit require Caltrans to provide one annual statewide status report to describe the specific measures Caltrans took during the year to implement water quality control measures and assess the effectiveness of each activity performed. Highlights from the Stormwater Management Program Annual Report 2008-2009 include:

- Treatment BMPs that were incorporated included detention basins, infliltration basins, infiltration trenches, biofiltration swales, biofiltration strips, and gross solid removal devices.

- Caltrans continued to implement the "Don't Trash California" stormwater public education program.
- Caltrans has reduced the total amount of herbicides applied by about 35-40 percent since 1992

Caltrans has established BMPs for the application of traction sand and deicing salt.

**Stormwater Management Program District 10 Work Plan 2010-2011.** Each Caltrans district issues an annual District Work Plans (DWPs). The DWP describes the storm water organization of each Caltrans District and outlines the planned stormwater activities for the upcoming fiscal year. The DWP presents information about Caltrans District's water bodies, BMPs and monitoring programs. The annual DWP describes how the Caltrans District will specifically implement the requirements of the SWMP during the fiscal year.

The DWP describes Caltrans District personnel with responsibilities for stormwater operations. Chapter 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 water body and the Caltrans facility, use characteristics of the facility, and the probably spill response time. Chapter 4 does not discuss any areas in the Mokelumne watershed.

Chapter 5 of the DWP lists specific District 10 projects in design or construction phases, with summary tables including information on the road route number and water bodies within or adjacent to the project limits. Design and construction projects listed in the 2010-2011 DWP do not impact the District Mokelumne watershed.

Chapter 5 of the DWP also lists specific District 10 maintenance projects. There is maintenance work planned in 2010-2011 for route SR-26 and Caltrans lists this work as within or adjacent to the South, Middle and North Fork Mokelumne Rivers. The work involves slide material removal, crack sealing, dig outs, ditch cleaning, ice control and sanding.

## *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 waste discharge requirements from the RWQCB.

The Regional Board issues NPDES permits and adopts waste discharge requirements to protect the waters of the state for all designated beneficial uses in the watershed. The SWRCB and Regional Board 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 Regional Board, 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 Regional Board evaluates the "Report of Waste Discharge" to determine whether the proposed discharge is consistent with the Regional Board'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.

**Pharmaceutical Disposal Programs.** Both Amador and Calaveras County accept pharmaceutical products at their household hazardous waste drop off facilities. The Calaveras County recycling literature lists pharmaceuticals as an accepted product, although the Amador County Integrated Solid Waster Management Agency 2007 Waste Reduction & Recycling Guide specifically lists pharmaceuticals as not accepted.

**Underground Tanks and Chemical/Fuel Storage**. The underground tank law established state regulations requiring permits to be issued by the RWQCB to underground tank owners. A developer-applicant will need this permit if they own, operate, or intend to construct an underground storage tank containing a hazardous substance.

All new underground storage tanks 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 underground storage tanks that store hazardous substances.

Certain specific actions and evaluations must be completed by the underground storage tank owner when the underground storage tank is either temporarily or permanently taken out of service. Temporary closure allows an underground storage tank to be taken out of service for up to one year without implementing permanent closure. Leaking underground storage tanks must be repaired or permanently closed.

**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, but the RWQCB is attempting to update and standardize all discharge requirements. Discharge monitoring requirement for Pardee Center WWTP are shown in Appendix 5-3.

**Mokelumne Hill Sanitation District Improvements.** Mokelumne Hill Sanitation District treats wastewater in two aerated ponds. There is a treated effluent storage pond four spray disposal fields. The Mokelumne Hill Sanitation District has made a number of land disposal improvements in the past 5 years. The access roads were improved to allow better field monitoring. Effluent irrigation lines were added to the last of the 4 fields, expanding the land application capacity to 20 acres. The primary treatment ponds will be cleaned in 2010 and the solids hauled to landfill.

## *Calaveras County Groundwater Protection Plan*

The Calaveras County Environmental Health Department (Department) is the designated Local Primary Agency to carry out the Federal and California Safe Drinking Water Acts. Groundwater is a major focus of the Department since it is a significant source of potable water. As part of the 2004 Groundwater Protect Program Plan, the Department inspected, mapped, plotted and tabulated data on:

- Class V injection wells
- Well Program including Domestic and Salt Water Wells
- Small Public Water Systems, including Drinking Water Source Assessment and Protection Program element
- On-Site Septic Failures and Installation
- Solid Waste Sites
- Ground water source adversely affecting surface waters

Since the adoption of the SWTR, small public water systems (<200 connection) have been encouraged to use groundwater. Around 75 percent of homes and 20 percent of businesses in Calaveras County utilize on-site septic sewage disposal. On-site septic sewage design, placement and installation are regulated by the Calaveras County Building Department. These septic system presents a potential problem to surface waters when these systems breakdown. When a failure is reported, bacteriological analyses must be done to determine origin and level of contamination by coliform counts. Owner must contact On-Site Sewage

Division of the County Building Department and the Environmental Health Department for repair or replacement.

Groundwater mixing with the metals and chemicals in mines adversely leach out acidic, metal-heavy water into the surface waters, of which Penn Mine was an example. In the past Penn Mine contributed to fish kills in Mokelumne River and required an expensive cleanup. Royal Mountain King Gold Mine in Salt Spring Valley also presents potential problems with naturally-occurring salts. Under the Calaveras County Well Construction Ordinance, all abandoned wells are required to be destroyed under permit to protect ground water and surface water.

## *Septic Tank Regulations and AB885*

Approximately 1 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.

Signed into law in 2000, AB885 authorized regulation of OWTS through the SWRCB. A draft EIR was released in 2008, and draft regulations were out for comment through early 2009. Because of extensive public comments, the AB885 draft regulations are currently being rewritten. Revised AB885 draft regulations will again be circulated for public comments in late 2010 or early 2011. AB885 regulations may go into effect by 2013.

The proposed regulations currently require:

- Owners of existing septic systems to have their septic tanks inspected every five years by a qualified service provider
- Owners with an existing septic systems and an onsite domestic well to have a state certified analytical laboratory analyze well water for specified constituents once every five years (report electronically to CWQCB)
- Permits for new or replacement OWTSs, specifying effluent concentration and dispersal solids size limitations, designer, operator and evaluator professional certification, groundwater monitoring in vicinity of the OWTS discharge and installation of supplemental treatment systems to meet effluent limitations.

In Calaveras County, individual septic tanks fall under the jurisdiction of the Building Department, On-Site Sewage Division. The regulations for septic systems in Calaveras County pertain only to the installation of new systems. No regulations or management of existing systems are present, although the County is aware that maintenance regulations are needed and are working to that end.

In Amador County, the Environmental Health Department regulates the siting, design, construction and performance of septic systems. Since 2008, Amador County has a new policy which requires newly installed proprietary package septic systems to be maintained per the manufacturer's recommendations by a recognized service provider. In Alpine

County, the County Health Department regulations detail requirements for septic system construction, alteration or repair.

## Lead Shot Use and Recovery Program

The 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 the District. The District 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 “Best Management Practices 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 an Environmental Stewardship Plan (ESP) for submission to the USEPA. In July 2009 CHHP submitted the CHHP Draft ESP to USEPA for review. The ESP documents the present environmental conditions, identifies issues of potential environmental concern, and prioritizes appropriate actions to manage these issues. Furthermore, the ESP documents management actions and provides for periodic plan revisions. Later in 2009 USEPA announced that the Environmental Stewardship program has been canceled. The NSSF may fund the USEPA Environmental Stewardship program.

CHHP also issued preliminary CHHP Lead Management Practices, March 2009. The preliminary CHHP Lead Management Practices provide that:

- 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 sot 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, preventing the lead shot from moving into areas where it will be more difficult to recover.
- Periodically all vegetation will be cut or mowed from the 75-foot strip. Then a lead reclamation contractor will bring in soil removal equipment and remove the lead shot along with the top soil. The lead will either be reused (reloaded ammunition) or shipped to a lead reclamation facility.
- The soil will be replaced in the areas requiring lead reclamation.

The first lead recovery should take place at CHHP in 2010. 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 will be 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

The District's programs for inspection, surveillance, and enforcement are described in the *District* portion of this section.

## Emergency Response

The SEMS in California and the NIMS used across the country require all-hazards planning to enable local government agencies like the District 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.

The District's Emergency Operations Plan (EOP) was completely rewritten in 2009 to fully adopt SEMS and NIMS, and to describe the overall District 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 District business during the response, and recovery. The EOP outlines an all-hazards approach to a broad range of emergency scenarios. EOP Annexes describe District 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, the District 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, the District 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).

The District uses the SEMS/NIMS Incident Command Systems (ICS) to standardize response. Between 2005 and the present, the District 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. The District 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 the District, and dramatically improved its ability to communicate during an emergency. Through training, exercise and pre-planning coordination, the District has great improved its ability to work in unified command with other first-responder agencies during emergencies.

The District rangers are classified by the state as "wildland firefighters" and have the responsibility for initial response and mop-up of all fires on District-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 the District Emergency Response for additional details.

## *FERC Emergency Action Plan*

At the District Pardee and Camanche Dams on the Mokelumne River in Amador and Calaveras Counties, the District owns and operates the Dams and associated hydro-electric facilities, and small water treatment plants to serve local population and District facilities. These dams are regulated by FERC and the District 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, the District Pardee and Camanche Dam facilities. FERC requires a Comprehensive EAP Exercise Program be held face-to-face once every 5 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. The last Comprehensive EAP Exercise Program was held August 2008. Although not required, the District chooses to hold a face-to-face tabletop exercise annually. In 2010, the District is working to develop a set of site-specific security plans to cover these FERC-regulated locations. The District 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 the District's facilities in this region.

The RWQCB, CDFG, Caltrans, and CDPH 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. As of the 2011 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. The County maintains three household hazardous waste disposal sites and has developed a brochure on this topic. Residents can dispose of latex paints, used oil and depleted batteries at these sites. County public schools have presented students with information on appropriate recycling and recycling practices, groundwater contamination prevention, and composting.

The Amador County Farm Bureau co-sponsors workshops with the County Agricultural Commissioner in English and Spanish on the proper use and disposal/discharge of

pesticides. Beginning in 2009 the County Agricultural Department is holding several pesticide container recycling days per year.

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.

The District has recognized since the early 1970's 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 the District's Public Information Division and for their NRD. The District has been a co-sponsor at both Amador and Calaveras County Fairs for a number of years, although this funding will stop in 2011 due to budget constraints. The District is a leader in providing curricular materials to schools on the subjects of protecting and conserving the water supply. In addition, the District provides ranger-naturalists to lead field trips to District reservoirs and watershed lands.

The Stanislaus National Forest has begun erecting informational signs to help restrict access to riparian areas. They have placed signs and provided other educational material for the public informing them of the need to prevent livestock access to areas with steep slopes, fragile vegetation and sensitive riparian areas. The Eldorado National Forest has maps and other information to instruct the public about sensitive resources and designated trails.

**School Watershed Education Program**. In 2005 local teachers, the Central Sierra Resource Conservation and Development District Council, and the UMRWA began a watershed education program for local schools. The Stewardship through Education Program will be run by teachers and funded by local water agencies and East Bay Municipal Utility District. A curriculum-based Mokelumne River Watershed Guide was developed called "Circles and Cycles", which is used in local schools.

In 2007 the UMRWA, Upper Mokelumne River Watershed Council (Council) and CSRC&D held a joint workshop to provide watershed residents and interested parties with an update on activities completed as part of the UMRWAP, and Council and CSRC&D activities. The many land uses and activities in the Upper Mokelumne watershed were discussed, along with how they affect the watershed water quality and what steps can be taken to help reduce or avoid such impacts. Watershed water quality management recommendations were presented, as well as information about the efforts of the sponsoring organizations. Participants had the opportunity to ask questions and give feedback.

The Citizen Volunteer Water Monitoring Program has been teaching volunteers how to test water quality in local rivers and streams

The Foothill Conservancy co-sponsors an annual Mokelumne River Cleanup Day, along with the District, the MCCT Council and various local businesses. In 2009 nearly 170 volunteers worked in six areas along the Mokelumne River and removed 2,290 pounds of trash and 1,400 pounds of recyclables. This year's volunteers included kayakers, anglers,

and other river lovers; representatives of the Foothill Conservancy, Mokelumne Wilderness Volunteers, Mokelumne Trailbusters, U.S. Forest Service, Sierra Nevada Conservancy, EBMUD, and Trout Unlimited. They also included teams from local businesses and elected officials.

## Fire and Fuels Management

### BLM

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 Fire Management Plan 2008 outlines wildland fire management strategies, including fire suppression and prescribed burn policies. Specific fire management strategies are listed for Fire Management Units (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.).

In 2009 a $25,000 BLM Community Service Grant to the Amador Fire Safe Council provided free roadside chipper service to chip and disburse clippings left near the street for fire hazard reduction.

### National Forests

National Forest BMPs for fire suppression and fuels management can be found in the document “USDA Water Quality Management for Forest Lands in California: Best Management Practice” 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 wild fires, considering fragile soils and steep slopes whenever possible.

In the 2004 Sierra Nevada Forest Plan Amendment (SNFPA), described earlier, 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.

The SNFPA also defines strategies for restoration of ecosystems after events such as the 2004 Power Fire. Specific consideration for long-term fuel profiles, erosion control, and water quality are to be included in restoration plans.

## Power Fire Restoration: Final EIS

The 2004 SNFPA provides direction on restoration following a catastrophic event such as the 2004 Power Fire. The EIS proposes actions to treat fire-killed and damaged trees to increase ground cover, reduce the effects of future fire, provide for public and worker safety, and recover economic value of the trees. The proposed action is for approximately 8,900 acres within the 17,000-acre burned area. Under the proposed action 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. Roadside hazard trees would be removed, and salvage logging would occur using helicopter, skyline, and ground-based machinery. 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.

With the proposed action area, approximately 28 miles of roads would be reconstructed. Stream crossings would be rocked, and the existing road system would be improved, reducing chronic sources of sedimentation. Slash cover on hill slopes could decrease sediment loads to streams, and the most hydrologically sensitive areas and steep slopes would be protected through exclusion zones. Roads would be reconstructed and maintained to improve watershed condition.

## Amador County Fire Reduction Plan

The rapid growth of communities expands the extent of the WUI. At this boundary, building and structures are brought closer to areas of high fuel loading and fire risk. To reduce fuel and fire risk, the Amador County Fire Hazard Reduction Plans provides foundation for justifying and prioritizing future fuel reduction projects throughout the county. The plan focuses on nine administration units and now includes the Up-Country Administration Unit (eastern portion of county). The plan primarily relies on a vegetative management strategy consisting of the development of shaded fuel breaks and roadside clearing of vegetation to control fuel and fire risks. As funding is available, more detailed Community Conservation Wildfire Protection Plans will be drafted for each of the nine administrative units.

Shaded fuel breaks are areas where overstory crowns are trimmed and surface and ladder fuels are reduced or completely removed to establish discontinuity in available fuel and the first line of defense against a fire outbreak. Methods of prevention and control may involve the use herbicides, prescribed burning, mastication and grazing.

Roadside clearing will focus on maintaining accessibility during fires to paved roads used for evacuation, fire response, and fuel break development. Main goals will consist of establishing clearings of 25-50 ft width from road's edge, removing all brush and trees less than 8 ft from road's edge, pruning trees to at least 10 ft, and spacing trees to maximum allowed by property owners.

Projects were identified in each of the eight administrative units and prioritized according the fuel hazard rank, probability of fire, and the housing density near WUI. Top priorities were established in conjunction with CAL FIRE. Future projects will be prioritize according to available funds, community participation, changes in fuel conditions due to fire and vegetative growth, and location of fuel reduction projects from other state and federal agencies.

## *Stanislaus National Forest Fire Management Plan*

The Stanislaus National Forest Fire Management Plan is operational document that implements the recommendations determined by the Stanislaus National Forest Land and Resource Management Plan. The objectives of the plans are to reduce the amount and intensity of severe wildland fires, reintroduce fire into fire-dependant ecosystem (if appropriate), and reduce the threat of wildland fires to human communities and natural resource.

Wildland fire will be suppressed if they are human-caused or if protection objective is required. Strategies of response are outlined in Section IV. Naturally occurring wildland fires will be allowed if they meet beneficial resource management objectives. A Wildland Fire Implementation Plan must be approved for any wildland fire use.

Fuel and vegetation management will be use to treat landscapes to meet resource management objectives, such as reintroducing fuel for wildland fire use, establishing defensive fuel profile and reducing fuel in zones near communities and other valuable resources.

Fuel and vegetation management can consist of:

- Prescribed fire to manage natural and activity fuels for the establishment of fuel profiles for cost-effective fire suppression, or;
- Non-fire or mechanical treatments to disrupt continuity of fuels, removing large fuels, and selectively treat large areas.

Three FMUs were defined to meet different management objectives within each area according to the resources to be protected, fire and fuel characteristic, and management and operational strategy.

Table 6-1: Agencies with Influence Over Source Water Quality

| Agency | Jurisdiction or Issues of Concern |
|---|---|
| ***Local / Regional Agencies*** | |
| the District | 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.<br>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 & 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 Game | Protection of state listed species |
| | Monitoring of water quality for aquatic species |
| | Regulation of alterations to natural state of rivers, streams, or lakes. |
| CA Department of Forestry and Fire Prevention | Fire prevention and suppression on all state-responsible lands (includes all District-owned watershed lands, except Lafayette Watershed) |
| | Regulation of timber harvesting activity on private lands |
| CA Department of Public Health | Primacy for setting safe drinking water standards |
| | Protection of drinking water supplies |
| | Regulation of public water supply, treatment, and distribution systems |
| CA Department of Toxic Substances Control | Regulation of hazardous waste generation and storage |
| CA Office of Emergency Services | Coordination of regional emergency response |
| CA Regional Water Quality Control Board - Central Valley Region | Regulation of waste discharge into surface waters<br>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) |
| ***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<br>Natural Resources Conservation Service | Resource conservation and soils |
| U.S. Forest Service | Management of national forests |
| U.S. Department of Interior<br>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 | Primacy for setting safe drinking water standards |
| | Protection of drinking water supplies |
| | Regulation of public water supply, treatment, and distribution systems |

Table 6-2: Documents Reviewed for MRWSS Update 2010

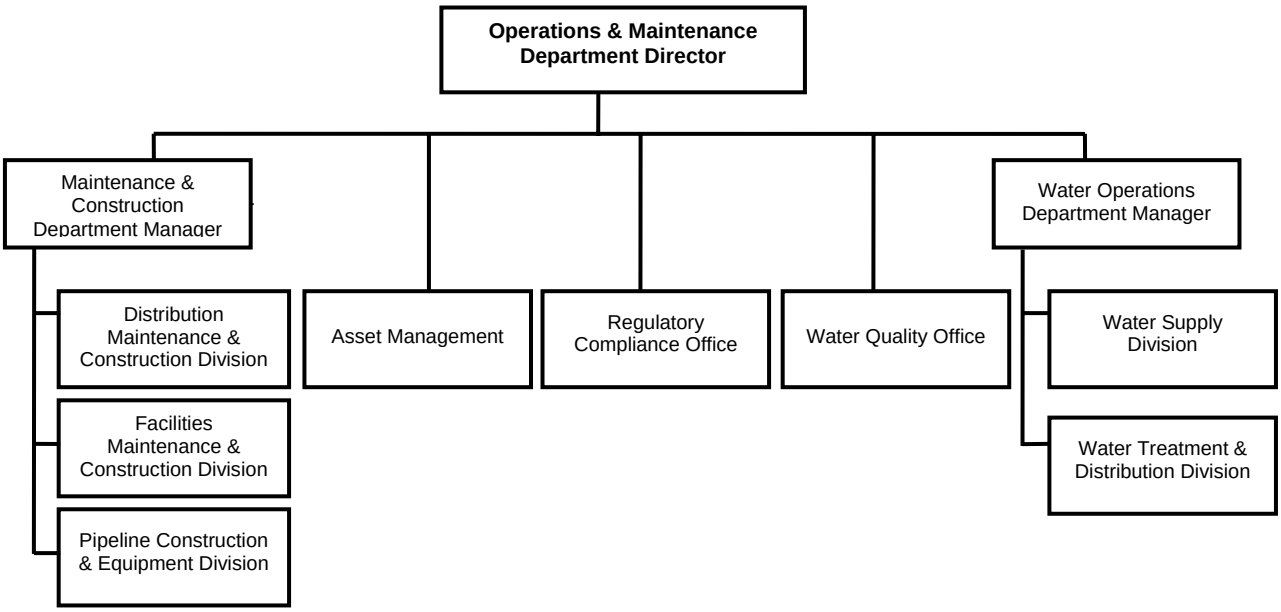
| ID | Agency | Title | Date | Affected Management Practice |
|---|---|---|---|---|
| 1 | Amador County | Erosion Control Ordinance, Grading Permit | 2005 | Erosion Control |
| 2 | Amador County | General Plan, Housing Element Update 2009-2014 | 2010 | Land Use |
| 3 | Amador County | Hydrology and Water Quality General Plan Update Working Paper | 2007 | Land Use, Stormwater Management |
| 4 | Amador County Integrated Solid Waster Management Agency | Waste Reduction & Recycling Guide | 2008 | Waste Management |
| 5 | Amador Firesafe Council | Amador County Fire Hazard Reduction Plan | 2004 | Fire & Fuel Management |
| 6 | Bureau of Land Management | Sierra Resource Management Plan | 2008 | Land Use, Access Control, Erosion Control |
| 7 | Bureau of Land Management | Fire Management Plan | 2008 | Fire & Fuel Management |
| 8 | Calaveras County | General Plan, Housing Element Update | 2009 | Land Use |
| 59 | Calaveras County | General Plan Water Element Baseline Report Supplement | 2009 | Land Use, Stormwater Management |
| 10 | Calaveras County | Local Agency Ground Water Protection Program | 2004 | Waste Management |
| 11 | Calaveras County | Storm Water Management Plan, Storm Water Quality Ordinance | 2007 | Stormwater Management |
| 12 | Calaveras County | Design Manual Grading, Drainage and Erosion Control | 2007 | |
| 13 | Calaveras County | Grading and Drainage Ordinance | 2007 | |
| 14 | Caltrans | Stormwater Program Annual Report | 2005 | Stormwater Management |
| 15 | City of Jackson | Land Use Element | 2008 | Land Use |
| 16 | the District | Various watershed management practices and BMPs | 2010 | Access Control, Pest Management, Recreation, Public Education, Erosion Control, Inspection, Surveillance, & Emergency Response, Grazing, Fire and Fuels Management |

| | | | | |
|---|---|---|---|---|
| 17 | USDA Forest Service | Record of Decision (ROD) for Sierra Nevada Forest Plan Amendment | 2004 | Grazing, Fire and Fuels Management, Pest Management |
| 18 | USDA Forest Service | Water Quality Management For Forest System Lands in California Best Management Practices | 2000 | Logging, Grazing |
| 19 | Stanislaus NFS | Stanislaus National Forest, Forest Plan Direction | 2010 | Land Use, Erosion Control, Logging, Grazing |
| 20 | Eldorado NFS | Eldorado National Forest Final Environmental Impact Statement and Record of Decision Motor Vehicle Map | 2008<br>2009 | Land Use, Access Control, Erosion Control |
| 21 | Eldorado NFS | Eldorado National Forest Monitoring and Evaluation Report | 2008 | Erosion Control, Fire & fuel management |
| 22 | Eldorado NFS | Final Environmental Impact Statement - Power Fire Restoration | 2005 | Fire & fuel management |
| 23 | PG&E Pacific Forest and Watershed Lands Stewardship Council | Land Conservation Plan | 2007 | Land Use |
| 24 | PG&E | Mokelumne River Project, FERC Project No. 137 Relicensing Agreement | 2004 | Land Use |
| 25 | Stanislaus NFS | Stanislaus Fire Plan | 2004 | Fire & fuel management |
| 26 | Stanislaus NFS | Forest Plan Direction: Motor Vehicle Travel Management | 2004 | Erosion Control, Access Control |
| 27 | SPI Industries | Pesticide Use BMPs | 2010 | Pest Management |
| 28 | Upper Mokelumne River Watershed Authority | Upper Mokelumne River Watershed Assessment and Planning Project (3 reports including Septic System Management Program) | 2007 | Access Control, Pest Management, Recreation, Public Education, Erosion Control, Grazing, Fire and Fuels Management |
| 29 | Various, Led by Upper Mokelumne River Watershed Authority | Mokelumne, Amador & Calaveras Integrated Regional Water Management Plan (MAC IRWMP) | 2006 | Water Supply, Water Quality, Stormwater Management |

Table 6-3: the District Residual Dry Matter Requirements by Slope

| **Grazing Slope [%]** | **Residual Dry Matter (RDM) [Pounds/Acre]** |
|---|---|
| Flat Slopes (0-5%) | 600 |
| Medium Slopes (6-35%) | 800 |
| Steep Slopes (>35%) | 1,000 |

FIGURE 6-1: Water Operations & Maintenance Department and NRD Organization Charts



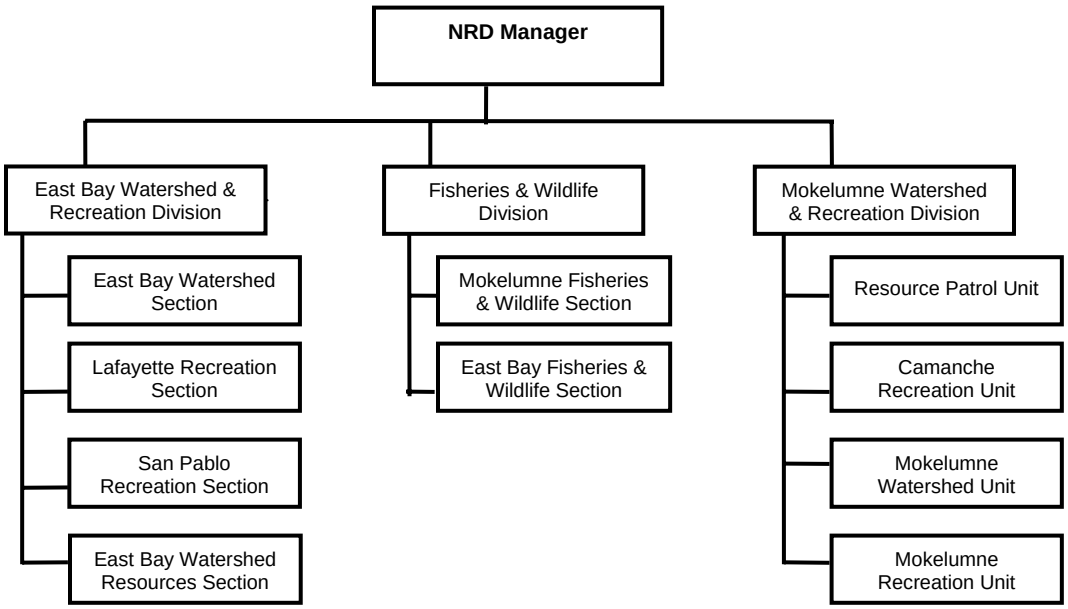



Figure 6-2: Bridge across Poormans Gulch, Erosion Control Example

Figure 6-3: Brush removal on Rocky Ridge near Pardee Reservoir.

# Section 7: Potential Corrective Actions

## *Introduction*

The potential corrective actions contained in this section were developed to strengthen source protection for the District's watersheds. *Section 4: Water Quality* showed that Pardee and Camanche Reservoirs store high-quality Mokelumne River water. A vigilant and active source protection program in the watershed is critical to maintaining this high quality.

The District's WTPs (both small systems and large systems) are effective at removing contaminants and meeting all federal and state drinking water regulations; however, the potential always exists for an unexpected mechanical breakdown or an act of nature to impair their ability to treat water which could ultimately impact the quality of water supplied to the District's customers. In addition to the contaminants in the source water, regulations for controlling treatment-related by-products continue to increase due to improving technology for detection and data for relating water quality parameters to health effects. Through source protection, concerns associated with process failures and by-products formation are reduced.

The potential corrective actions are grouped according to the following subjects: water quality, watershed control and management practices, inter-jurisdictional coordination, and public education. The District and other agencies with jurisdiction in the watershed should consider these potential corrective actions when additional land uses or changes to existing land uses within the watersheds are proposed. The potential corrective actions are prioritized into low, medium, and high priority categories as shown in Table 7-1. These rankings are subjective; and take into account watershed characteristics (slope, soils, etc.), type and magnitude of potential contaminants, distance to water bodies, current and future drinking water regulations, and primary use of the reservoir (water supply or flood control). Annotations are included to indicate recent progress made for each recommended action.

**Table 7-1: Summary of Potential Corrective Actions**

| # | CORRECTIVE ACTION | Priority | STATUS |
|---|---|---|---|
| | *Water Quality Monitoring* | | |
| 1 | Monitoring Related to Specific Land Use and Activities | Medium/High | Ongoing |
| 2 | Reservoir Temperature Monitoring | High | Implemented |
| 3 | TOC Monitoring | Medium | Implemented |
| 4 | Pesticide and Herbicide Monitoring | Medium | Implemented |
| 5 | Land Disposal Monitoring | Medium | Implemented |
| 6 | Penn Mine Monitoring | Medium | Implemented |
| 7 | Septic Tank Monitoring | Medium | Ongoing |
| 8 | Urban Stormwater Monitoring | Low | Not started |
| 9 | Storm-Related Turbidity Monitoring | Low | Initiated |
| 10 | Runoff from Historic Mines | Low | Ongoing |
| | *Watershed Control and Management Practices* | | |
| 11 | Forest Practices and Logging | Medium | Ongoing |
| 12 | Grazing Practices | Medium | Ongoing |
| 13 | Access Control Programs | Medium | Ongoing |
| 14 | In-Reservoir Recreation | Medium | Ongoing |
| 15 | Seismic Evaluation | Medium | Ongoing |
| 16 | Off-Road Vehicle Usage | Medium | Ongoing |
| 17 | Road and Landing Construction and Maintenance | Medium | Ongoing |
| 18 | Fire Roads and Hiking Trails | Medium | Ongoing |
| 19 | Hazardous Materials Storage and Transfer Facilities | Medium | Ongoing |
| 20 | Runoff from Parking Lots and Roads | Medium | Ongoing |
| 21 | Reservoir Shoreline | Medium | Ongoing |
| 22 | Protection of Riparian Corridors | Medium | Under Development |
| 23 | Equestrian Use | Low | Under Development |
| 24 | Concentrated Animal Facility BMPs | Low | Under Development |
| | *Inter-jurisdictional Coordination* | | |
| 25 | UMRWA | Medium | Ongoing |
| 26 | Emergency Response | Medium | Implemented |
| 27 | Future Development | Medium | no action |
| 28 | Stormwater Runoff | Medium | Under Development |
| 29 | Erosion Control | Medium | Ongoing |
| | *Public Education* | | |
| 30 | Residential and Commercial Neighbors | Medium | Ongoing |
| 31 | Recreational Trail Users | Medium | Ongoing |
| 32 | Community Outreach | Medium | Ongoing |

# Status of Potential Corrective Actions

## Water Quality

Watershed water quality monitoring programs are critical to identifying contaminant sources and quantifying the concentrations of undesirable water quality parameters entering the reservoirs. Monitoring programs should be developed to assess long-term trends and, if possible, the contaminants generated by runoff, such as particulates, microorganisms, heavy metals, DBPs, precursors, nutrients, and synthetic organic compounds, including VOCs, pesticides, and herbicides. Below are a number of potential monitoring programs for consideration by the District and other agencies where applicable.

**(1) Monitoring Related to Specific Land Use and Activities**. Monitoring programs for the following land uses and activities should be developed to determine the contribution of particular water quality contaminants of concern, and to work with adjacent landowners in reducing contributions of contaminants.

- ***Mokelumne River Project No. 137:*** (High Priority)
  FERC Project 137 – dissolved oxygen, pH, sediment, temperature, inorganic chemicals, nutrients, organic chemicals, total organic carbon, microorganisms.

  **Status 2010:** The District continued an on-going extensive water quality-monitoring (Section 4) and temperature monitoring (Action No. 2) program for Pardee and Camanche Reservoirs.

- ***Grazing:*** Microorganisms (Medium Priority)

  **Status 2010**: In 2006, the District initiated a Watershed Stormwater Monitoring Program in the grazed parcels adjacent to Pardee Reservoir. The goal of this program is to assess the effectiveness of grazing-related BMPs implemented on these parcels. The program is on-going in 2010 (Section 4).

**(2) Reservoir Temperature Monitoring.** Continue collecting temperature data of Pardee and Camanche Reservoirs. In order to fully evaluate the effect of FERC Project 137 on the District's beneficial uses, detailed information on reservoir thermal stratification and increased water temperatures due to PG&E hydroelectric power plant operations is necessary. Increased water temperatures could adversely affect the District's ability to manage the hypolimnion (cold water pool) in Pardee and Camanche Reservoirs with resultant impacts on raw water quality and the anadromous fishery in the lower Mokelumne River. (High Priority)

**Status 2010**: The District continues to collect routine water quality profiles at several locations in Pardee and Camanche Reservoirs. In addition, the District developed a two-dimensional hydrodynamic model for the Pardee-Camanche system. The model simulates effects of various operations on temperature and dissolved oxygen, and can provide guidance to the reservoir operations planning. In 2009, an on-line temperature

profiler was added at Pardee Dam to facilitate modeling, management of the cold water pool, and subsequent releases to Camanche Reservoir.

**(3) TOC Monitoring.** Continue monitoring TOC levels entering and residing within Pardee Reservoir. Expand monitoring to upstream tributaries, when warranted. TOC is a parameter that is targeted in the regulatory process as a surrogate for the presence of all other organics, particularly DBP precursors. (Medium Priority)

**Status 2010**: The District continues to monitor TOC at Highway 49 and designated locations within Pardee Reservoir. No expansion to upstream tributaries is warranted at this time (Section 4).

**(4) Pesticide and Herbicide Monitoring.** Request adequate monitoring of pesticide applications within the watershed as well as the buildup of residuals or the runoff of any residues into watershed water bodies, courses, and streams. Prompt action should be demanded of the enforcement agencies if any potentially adverse concentrations are detected at any point in the watershed. (Medium Priority)

**Status 2010:** The District continues monitoring of some pesticides and herbicides known to have been used on the watershed (Section 4).

**(5) Land Disposal Monitoring.** Increased surveillance of wastewater collection and land disposal systems by the CVRWQCB may be necessary. Although the Mokelumne Hill Sanitary District has ample pond capacity and land disposal area, coliform levels in the Wilson Gulch sample location adjacent to Mokelumne Hill are elevated relative to the rest of the river. Further studies should be conducted to determine the source of the contamination. (Medium Priority)

**Status 2010:** The District continues to collect bacteriological data at designated sampling locations throughout the lower regions of the Upper Mokelumne River and tributaries, particularly at Wilson Gulch (Section 4).

**(6) Penn Mine Monitoring.** Continue ongoing compliance monitoring of the Penn Mine Environmental Restoration Project. (Medium Priority)

**Status 2010:** The District continued quarterly monitoring of surface water runoff from the site for metals, turbidity, and pH until January 2010. Routine monitoring of the four groundwater wells around the landfill continues. In addition, the maintenance inspections of the landfill and site stability are conducted on a regular basis (Section 5).

**(7) Septic Tank Monitoring.** Improved monitoring, water quality assessment, and enforcement of septic tank regulations by the counties to help assure proper maintenance of existing systems should be implemented. Possible seepage from septic tanks near the river in the South Fork sub-watershed should be investigated. Pit toilets and vault toilets in campgrounds should be inspected, and old or malfunctioning ones replaced. (Medium Priority)

Develop on-site waste management programs for septic systems and leach fields or OWTS within the watershed basins. Encourage the public works and the land use planning departments with jurisdictional controls to adopt, implement, and enforce these management strategies. The program could include the following components:

- identify and locate all OWTS
- regularly inspect each system for integrity and adequacy
- review pumping records
- require upgrades to bring existing OWTS into compliance with current codes
- establish minimum setbacks from tributary streams
- establish on-going septic tank pumping requirements
- develop funding alternatives for low-income property owners
- evaluate retrofit of existing OWTS with leak alarms
- conduct on-going monitoring programs in surface waters (and groundwater, if possible) to identify failed or inadequate OWTS
- and establish enforcement schedules and penalties.

(Medium Priority)

**Status 2010**: The District continues to collect bacteriological data at designated sampling locations throughout the lower regions of the Upper Mokelumne River and tributaries to further develop a dataset of bacteriological conditions (Section 4).

Signed into law in 2000, AB885 authorized regulation of OWTS through the SWRCB. A revised draft of the regulation, waiver, and Draft EIR was released in November 2008. In February 2009, the SWRCB closed the public comment period. The SWRCB is expected to draft revised regulations based on comments received. Implementation of the regulation is likely to occur in 2010 or later. Proposed regulation is expected to reduce the potential contamination of OWTS through required inspection and maintenance. (Section 6)

UMRWA and Planning Project Septic System Management Program (2008) developed a draft Septic System Management Plan for implementation by the Alpine, Amador and Calaveras Counties. This draft plan includes a suggested community outreach plan, a recommended septic survey, and possible septic management practices. The community outreach plan is intended to educate residents, garner public support, and solicit input on program implementation. The additional septic survey would first target the areas where the suspected problematic septic systems are located. The suggested management practices include identifying suitable septic zones, rigorous siting standards, mandatory inspections, and pumping and fee collection. (Section 6)

**(8) Urban Stormwater Monitoring.** Limited monitoring data are available that document the concentrations and loadings of urban stormwater constituents. As development within the Pardee and Camanche watersheds increases, it will be important to assess the potential impacts of urban stormwater. (Low Priority)

**Status 2010**: Not started.

**(9) Storm-Related Turbidity Monitoring.** The District should monitor rainfall and inflow to Pardee Reservoir to evaluate the possible trends between rainfall and raw water turbidity and other contaminants including TOC, pesticides and herbicides, and other organic contaminants. (Low Priority)

**Status 2010**: The District currently monitors rainfall at Camp Pardee and inflow to Pardee Reservoir. As previously mentioned, in 2006 the District initiated a Watershed Stormwater Monitoring Program in the grazed parcels adjacent to Pardee Reservoir. The contaminants monitored include turbidity, TOC, and TSS. In addition, Pardee Reservoir raw water turbidity is monitored continuously at Campo Seco, and is plotted with precipitation in Section 4.

**(10) Runoff from Historic Mines.** Develop a watershed-wide map that locates historic mines, particularly those in proximity to tributaries and those that continue to be active. Coordinate the map with the RWQCB to maintain a record of those mines that have historical drainage pollution problems or have the potential to develop a drainage problem. (Low Priority)

**Status 2010**: The California Department of Conservation's OMR and the SMGB jointly administer the California SMARA of 1975. 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 to OMR. 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. (Section 6)

## *Watershed Control and Management Practices*

Land uses and activities within the watershed have the potential to impact reservoir water quality. Tailoring management and control efforts within the watershed is required to minimize risks associated with specific land uses and activities. The following potential corrective actions may be considered in implementing changes to the existing land uses and activities, or in providing input for future land uses and activities within the watersheds.

**(11) Forest Practices and Logging**. Continue to insure adequate CEQA and Board of Forestry protection measures to protect forest resources and associated vegetation, wildlife, and aquatic resources. Measures should focus on the need to understand the nutrient release process that may be accelerated by timber harvesting operations. More data should be collected and research programs funded by those responsible for timber harvesting to document this phenomenon and its effects on watershed streams, lakes, and reservoirs and associated zoological and botanical species. (Medium Priority)

**Status 2010**: CAL FIRE enforces the laws that regulate logging on privately-owned lands in California. These laws were enacted to ensure that logging is done 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. THP is submitted by landowners to CAL FIRE, outlining harvesting procedure and steps to be taken to prevent damage to the environment. CAL FIRE continues to operate its eight demonstration forests, which represent the most common forest type in the state. These forests provide research and demonstration projects on forest management. In addition, revenue from these harvests funds a variety of CAL FIRE's Resource Management Programs. CAL FIRE has begun implementation of a new fuels reduction program funded by Proposition 40. The goal of the CAL FIRE Proposition 40 Fuels Reduction Program is to reduce wildland fuel loadings that pose a threat to watershed resources and water quality.

The CVRWQCB regulates the discharges associated with timber harvesting operations that have received a permit from CAL FIRE. In 2010, the CVRWQCB adopted the *Waiver of Waste Discharge Requirements for Discharges Related to Timber Harvest Activities (Order No. R5-2010-0022)*. The waiver specifies eligibility criteria and conditions that must be met by dischargers engaged in timber harvesting activities on private and USFS lands. The waiver includes a monitoring and reporting program to ensure that high standards of water quality protection are achieved. In 2010, the CVRWQCB published *Guidelines for Conducting Required Monitoring for Timber Harvest Related Discharges Enrolled under the Waiver of Waste Discharge Requirements* (Monitoring Guidelines). The Monitoring Guidelines focus on impairment of beneficial uses through increased erosion and sedimentation. (Section 6)

**(12) Grazing Practices.** The District has a RMP for their East Bay watersheds, which focuses on BMPs for grazing to prevent degradation of water quality. Wherever applicable, these BMPs should be implemented by the District, private, and public entities that allow grazing on their properties. Specifically, the District should recommend the inclusion of provisions in grazing permits to insure that grazing livestock are kept out of riparian corridors to avoid damage to sensitive streamside riparian vegetation, stream banks and streambeds, as well as the water column itself. The District should encourage and promote the installation of fences as the only sure means of accomplishing this goal; however, the responsibility for this improvement lies solely with those private and public entities allowing the land use. As another example, cattle use should be minimized on lands with high erosion risk when the soil is saturated. (Medium Priority)

**Status 2010**: The District has applied portions of its East Bay RMP to a range management program in the Pardee and Camanche watersheds. Stocking levels are set based on rainfall and subsequent forage production each year, and lease agreements contain a RDM requirement to provide ground cover and minimize erosion. Since 2006, several changes have been made to reduce cattle grazing during wet months and to create "attractants" that encourage the cattle to spread out and graze away from

waterways and drainages. The Mokelumne Rangeland Management Plan is currently under development and is expected to be released in 2011. (Section 6)

**(13) Access Control Programs.** Continue watershed management programs that control human access and continue to fence riparian and sensitive watershed land, particularly on grazing lands. Encourage the implementation of similar programs already in existence at Stanislaus National Forest and the formation of similar programs by other large landowners. Encourage SPI to continue its access control program and promote adoption of the same approach by the USFS. (Medium Priority)

**Status 2010**: All Camanche and Upper Mokelumne River watershed lands owned by the District are fenced and posted, with human access strictly controlled. The shorelines of Pardee Reservoir and the Mokelumne River where it passes through District land are also fenced to exclude cattle. All roadways within District watershed lands are either gated or fenced along their entire passage through District lands. The District should maintain these access control barriers and continue to patrol its lands to minimize illegal access.

Beginning in 2006, the Forest Service implemented travel management decisions to restrict motor vehicles (cars, trucks, ATV's, motorcycles, RV's, 4WD's, etc.) to designated roads and trails and to prohibit cross country travel. Designated trails and dirt roads are also closed seasonally to prevent damage during wet conditions (Section 6). The District should continue to monitor access control programs implemented by various agencies throughout the watershed.

**(14) In-Reservoir Recreation.** Privately-owned boats that can introduce various contaminants from different recreational water bodies is a serious issue for the District to consider. (Medium Priority)

**Status 2010**: Boating policies continued to be enforced at the District's recreation facilities to prevent the introduction of invasive species to Pardee and Camanche Reservoirs. The District'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 the District's reservoirs.

**(15) Seismic Evaluation.** Perform a seismic evaluation for facilities within the watershed, including pipelines and conveyances, dams, intake structures, and other facilities critical for maintaining safety and water service. (Medium Priority)

**Status 2010**: The District is completing a study of Camanche Dam; based on preliminary assessment, it is expected that Camanche Dam is seismically adequate for the potential loads. The District expects minor repairs at the toe of the main dam to prevent failure of the relief wells; however, failure of the wells will not compromise dam safety.

**(16) Off-Road Vehicle Usage**. Encourage SPI and USFS to continue their programs to curtail and control the damage caused by indiscriminate and irresponsible four-wheel

drive vehicle operators. Holders of other lands subject to the same type of damage should be encouraged to take similar steps. (Medium Priority)

**Status 2010**: As of 2009, the USFS prohibits the use of all off-road vehicles on the Eldorado and Stanislaus National Forest lands, unless it is in an area specifically designated for off-road use. Motor vehicles (cars, trucks, ATV's, motorcycles, RV's, 4WD's, 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 (Section 6). The District should continue to monitor off-road vehicles practices in the watershed.

**(17) Road and Landing Construction and Maintenance.** Develop site-specific management guidelines addressing soil erosion and sediment delivery potential from roads near streams, roads crossing streams, roads crossing unstable slopes, and roads crossing erodible soils. Prevent severe surface erosion events caused by road building that directly impacts any stream. Maintenance of existing roads and landings should be improved after timber operations. (Medium Priority)

**Status 2010**: The CASQA publishes a detailed Construction Handbook with very detailed BMPs covering stormwater pollution prevention and erosion and sediment control. The CASQA BMPs are used by Caltrans and by other construction projects within the watershed. The Stanislaus National Forest is planning a road ecosystem travel analysis in 2012 to evaluate their road system, which may result in some roads being eliminated or abandoned. Water quality is one of the factors that will be considered in the analysis. In 2009, a soil stabilization product was applied by the District over approximately a quarter mile of unpaved fire road/trail where the soil has naturally occurring asbestos; this section of road/trail is located near Pardee Reservoir between McAfee Gulch and Olive Orchard (Section 6).

**(18) Fire Roads and Hiking Trails**. Review and identify BMPs and standards for fire road and hiking trail construction, maintenance, and use. Prohibit trail uses that would increase erosion above current levels. Protection of water quality and supply impacts of this plan should be considered. (Medium Priority)

**Status 2010**: The MCCT, currently under construction, 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. The MCCT is being built by the MCCT Council, a coalition of volunteers and public and private agencies, including the District. The 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 follow the BMPs embraced by each agency, following industry standards set by USFS, especially regarding erosion and access control. Bare slopes are seeded and covered with jute netting (Section 6).

The January 2010 RMP identifies specific measures to meet the District MWMP recreation and water quality goals to provide a quality recreational experience while protecting water quality and the environment, including: implementing specific recreation trail construction, maintenance, and repair standards (Section 6)

**(19) Hazardous Materials Storage and Transfer Facilities**. Conduct site visits of hazardous materials storage and transfer facilities within the watersheds that may be owned by the District, public works departments, Sierra Pacific, PG&E, golf courses, industries, etc. Collaborate with other responsible agencies in the training of personnel and inspectors on how to identify risks to drinking water and how to choose effective protective measures. (Medium Priority)

**Status 2010**: The District performs annual updates of its Environmental Emergency Response and Release Prevention Plans for all facilities where hazardous materials are handled or stored (Section 5). Site visits to non-District facilities have not been conducted and should be considered.

**(20) Runoff from Parking Lots and Roads.** Review stormwater collection systems from parking lots and roads serving watershed facilities. Consider pretreatment options or rerouting discharge away from reservoirs. (Medium Priority)

**Status 2010**: A cleanup of the abandoned Pardee Lime Tower in May 2005 removed the only significant source of potential stormwater contamination from the site, thus removing any potential environmental impact from the facility. The RWQCB rescinded the stormwater permit requirements in 2008 due to modifications to the chemical treatment facility and compliance history (Section 5). In 2005, six bio-retention filter basins were constructed in two Camanche South Shore campgrounds, Monument and Cottonwood, to capture and treat road, campsite and parking lot runoff (Section 6). Review of non-District facilities has not been conducted and should be considered.

**(21) Reservoir Shoreline.** Assess measures to restore and protect eroded reservoir shorelines. Public access for fishing could be restricted to piers. In addition, establishing a narrow margin of plants or rocks would protect the shoreline from erosive wave action particularly in reservoirs that allow boating. (Medium Priority)

**Status 2010**: Boating policies to restrict speeds are enforced at the recreation areas of Pardee and Camanche Reservoirs for public safety and environmental protection. The Camanche Shoreline Stabilization Project is located adjacent to the South Shore Campground and was completed in 2006; it protects approximately 1,200 feet of Camanche Reservoir shoreline from waves caused by prevailing winds and high levels of boat traffic. 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 (Section 6). The District should continue to monitor the shoreline for additional erosion and observe these restoration projects for their effectiveness.

**(22) Protection of Riparian Corridors.** Promote protection of riparian corridors through the establishment of setbacks. Review various approaches and encourage the implementation of effective BMPs for protecting riparian zones. (Medium Priority)

**Status 2010**: The District's Mokelumne Rangeland Plan, to be completed in 2011, will address this issue.

**(23) Equestrian Use.** Develop integrated policies with regard to equestrian use of watershed lands. Conduct a census on number of horses stabled or pastured within watersheds, and annual use of equestrian facilities. Because of the potential for transmission of pathogens, horses are prohibited from access to reservoirs. This affords the maximum advantage of the filtering capacity of the soil (Low Priority).

**Status 2010**: Horses are allowed on DISTRICT trails and fire roads, but they are not allowed at the reservoirs. The District's Mokelumne Rangeland Management Plan, to be completed in 2011, will further address this issue.

**(24) Concentrated Animal Facilities.** BMPs should be developed for concentrated animal facilities such as stables, corrals, paddocks, riding arenas, and equestrian camping facilities. Recommendations should be developed, tailored to each site (Low Priority).

**Status 2010**: The District's Mokelumne Rangeland Management Plan, to be completed in 2011, should address this issue.

## *Inter-jurisdictional Coordination*

The District has several outreach activities to establish proactive lines of communication with neighboring agencies and those with overlapping jurisdictions. This is important for responding rapidly and efficiently to emergencies, as well as for instilling the value of water quality protection within the watersheds.

**(25) Upper Mokelumne River Watershed Authority.** UMRWA is a coalition of stakeholders – Alpine County, Alpine County Water Agency, Amador County, AWA, Calaveras County, CCWD, CPUD, the District, and JVID. UMRWA is entrusted with stakeholder and Propositions 13 and 50 grant funding to develop the UMRWAP, whose objective is to provide a broader understanding of watershed water quality issues of concern and to develop a method for the long-term evaluation of the Upper Mokelumne River watershed water quality. (Medium Priority)

**Status 2010:** The UMRWAP, along with the Upper Mokelumne Septic System Management Program, was completed in December 2007. As discussed under (9) Septic Tank Monitoring, the Upper Mokelumne Septic System Management Program was developed to address the assessment that septic tanks were likely significant contributors of fecal coliform loadings along the Middle and South Forks (Section 6).

**(26) Emergency Response.** Emergency response procedures for various scenarios that can affect raw water quality must be identified and coordinated with local, state, and federal agencies. Ongoing coordination with Alpine, Amador, and Calaveras Counties, AWA, CPUD, CCWD, JVID, SPI, PG&E, and BLM, and Eldorado and Stanislaus National Forests, in advance of any emergencies to clearly define and prioritize the most critical actions and responses, is essential and should be maintained. (Medium Priority)

To ensure that the District staff will have adequate time to take appropriate actions during emergencies, the notification procedures from other agencies such as Caltrans, OES, California Highway Patrol, County Health Departments, County Agricultural Commissions, DFG, and RWQCB, need to be reviewed. (Medium Priority)

**Status 2010:** The SEMS in California and the NIMS used across the country, require all-hazards planning to enable local government agencies like the District to respond to, work through, and recover from the impact of disasters and other planned or unplanned emergency events. The District's Emergency Operations Plan (EOP) was completely rewritten in 2009 to fully adopt SEMS and NIMS, and to describe the overall District emergency management program through a phased approach. The District EOP outlines an all-hazards approach to a broad range of emergency scenarios. EOP Annexes describe District 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 (Section 6).

The EBMUD Mokelumne Watershed and Recreation Division 2007 Fire Atlas (Fire Atlas) was created to facilitate emergency response to incidents on or threatening District lands. The Fire Atlas has been distributed within the District and to various agencies, including CAL FIRE. The Fire Atlas consolidates very detailed fire response information and will significantly improve emergency fire response by the District and other agencies. (Section 6)

**(27) Future Development.** Foster cooperation from landowners, developers, and managers by further opening good lines of communication, and by providing educational information on the impacts certain development practices may have on the watershed. As new developments are being planned, the District should assume a proactive role in commenting on the proposed plans and emphasizing the potential impacts on water quality. Specifically, sanitation facilities need to be reviewed and parcels which are key to water quality protection should be identified. (Medium Priority)

**Status :** No action.

**(28) Stormwater Runoff.** Review stormwater collection systems on county roads adjacent to the reservoirs. Rank roads by risk and consequence of potential impacts. For highest priority roads, evaluate the alternatives to minimize contaminants identified in

road runoff from entering the water supply, including treatment alternatives in the reservoir or at the WTPs. Consider the development of spill containment basins to sequester any hazardous substances prior to entering reservoirs. (Medium Priority)

**Status 2010:** As part of the UMRWAP, key watershed management recommendations and tools to address existing and potential water quality concerns, including stormwater management, were addressed. Recommendations include implementing "green street" design principals to support increased infiltration of stormwater and decreased runoff and erosion, and implementing road maintenance programs to minimize loadings of sediment, contaminants, and trash (Section 6).

**(29) Erosion Control.** Continue efforts to require landowners and those with legal control authority to restrict or control road building, which initiates or accelerates soil erosion. Emphasis should be placed on private and USFS areas, which do not have successful erosion control plans in effect. Known problem areas should continue to be the focus of land remediation efforts supported by adequate funding from private and public agencies responsible for the impacts. All of the entities with activity control authority should be encouraged to continue meeting and working together to share the benefits of resource and problem area inventories, and to share or exchange ideas on control strategies. (Medium Priority)

**Status 2010:** As part of the UMRWAP, the WARMF model was applied to the watershed and used to simulate water quality concentrations and loads for over 202 river segments. Soil, vegetation, slope, and proximity to water data layers were composed to identify variations in vulnerability to contaminant transport to surface waters. Stanislaus National Forest is planning a road ecosystem travel analysis in 2010 to evaluate their road system, which may result in some roads being eliminated and abandoned. Water quality is one of the factors that will be considered in the analysis. (Section 6)

The District's shoreline erosion projects are discussed under (21) Reservoir Shoreline. Erosion related to ORVs is discussed under (16) Off-Road Vehicle Usage.

## *Public Education*

Materials for public education on the importance of water supply, activities that affect water quality, and potential protection measures should be developed and distributed. These public education materials can either be targeted to District-owned and managed facilities and/or to the entire watershed lands. For lands outside District's jurisdiction, coordination with other agencies is essential. A number of public education components should be considered each targeting a specific audience.

**(30) Residential and Commercial Neighbors**. Develop a public information campaign for residents a**n**d neighbors on the unique advantages and responsibilities of living on watershed lands. (Medium Priority)

**Status 2010:** In 2007, UMRWA, the Upper Mokelumne River Watershed Council (Council), and Central Sierra Resource Conservation and Development (CSRC&D) held a joint workshop to provide watershed residents and interested parties with an update on activities completed as part of the UMRWAP, and Council and CSRC&D activities. The many land uses and activities in the Upper Mokelumne watershed were discussed, along with their effects on the watershed water quality and steps that can be taken to help reduce or avoid such impacts.

The Amador County Farm Bureau co-sponsors workshops with the County Agricultural Commissioner in English and Spanish on the proper use and disposal/discharge of pesticides. In 2009, the County Agricultural Department began holding several pesticide container recycling days each year. Amador County maintains three household hazardous waste disposal sites and has developed a brochure on this topic (Section 6).

**(31) Recreational Trail Users.** Trail users of District, SPI, Eldorado and Stanislaus National Forests, and PG&E watershed lands must be educated through pamphlets and signage on the importance of protecting their drinking water supplies, activities that may threaten water quality, and measures to minimize risk, e.g. appropriate methods of human sanitation in areas not equipped with toilets, minimizing erosion by staying on trails, cleaning up after dogs, etc. (Medium Priority)

**Status 2010:** The District requires that all hiking and equestrian trail users obtain a Trail Use Permit from the District; trail use rules are detailed in the permit. The Stanislaus National Forest has begun erecting informational signs to help restrict access to riparian areas. They have placed signs and provided other educational material for the public informing them of the need to prevent livestock access to areas with steep slopes, fragile vegetation and sensitive riparian areas. The Eldorado National Forest has maps and other information to instruct the public about sensitive resources and designated trails (Section 6).

**(32) Community Outreach.** The District, in concert with other agencies, may want to consider developing community outreach efforts. A number of water quality concerns should be embraced by neighborhood coalitions for action including erosion, deteriorating metals, and inadequate septic systems. Enlisting residents to participate in the Friends of the Watershed may also raise awareness and stimulate action on these problems. (Medium Priority)

**Status 2010:** The District has been a co-sponsor at both Amador and Calaveras County Fairs for a number of years to provide environmental education to the public, although this funding will stop in 2011 due to budgetary constraints. The District is a leader in providing curricular materials to schools on the subjects of protecting and conserving the water supply. In addition, the District provides ranger-naturalists to lead field trips to District reservoirs and watershed lands. In 2005, local teachers, CSRC&D, and the UMRWA began a watershed education program for local schools.

BLM has a program whereby specialists are available to talk to schools when requested. BLM also participates in county fairs to answer questions from the public.

In addition to the workshop discussed under (37) Residential and Commercial Neighbors, the UMRWA completed the UMRWAP, which included a Septic System Management Program, which includes a suggested community outreach plan that has yet to be implemented (Section 6).

The Mokelumne Trailbusters, a group of volunteers managed by the District, is involved with diverse land stewardship projects in Amador and Calaveras Counties. 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. The Foothill Conservancy co-sponsors an annual Mokelumne River Cleanup Day, along with the District, the MCCT Council, and various local businesses (Section 6).

# APPENDICES

East Bay Municipal Utility District
Pardee Reservoir
Title 22 Monitoring Schedule

| Parameter | 2010 Projected Sampling Frequency [1] | Sampling Location [2] | Sample Collection [3] | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Completed Monitoring | | | | | | 2010 Monitoring Projections through 2019 | | | | | | | | |
| | | | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Inorganics (IOCs) | | | | | | | | | | | | | | | | | |
| Asbestos | 1 X 9Y | PATW | | | | | | | | X | | | | | | | |
| Fluoride | A | PATW | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Perchlorate | A | PATW | W | | | C | C | C | X | X | X | X | X | X | X | X | X |
| Remaining IOCs | A | LAWTP Eff, ORWTP Eff, WCWTP Eff [4] | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Synthetic Organics (SOCs) | | | | | | | | | | | | | | | | | |
| All SOCs | 2 X 3Y (spring and fall) | PATW | | C C | | | C C | | | X X | | | X X | | | X X | |
| Radionuclides | | | | | | | | | | | | | | | | | |
| Gross alpha, gross beta, Radium 226+228, uranium | 1 X 9Y | PATW | | C C W | W | | | | | | | | **X** | | | | |
| Strontium-90, Tritium | 1 X 9Y | PATW | | | C | | | | | | | | | **X** | | | |
| Volatile Organics ( VOCs) | | | | | | | | | | | | | | | | | |
| All VOCs | A | PATW | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Secondary Contaminants | | | | | | | | | | | | | | | | | |
| Thiobencarb | 2 X 3Y (spring and fall) | PATW | W | C C | W | W | C C | W | W | X X | X | X | X X | X | X | X X | X |
| Remaining secondary contaminants | A | LAWTP Eff, ORWTP Eff, WCWTP Eff [4] | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |

1) Symbols for sampling frequency:
A = Annually, once per year
2 X 3Y = Twice per year every 3 years

2) Abbreviations for Sampling Locations:
PATW = Pardee Tower in Pardee Reservoir
LAWTP Eff = Lafayette Water Treatment Plant Effluent
ORWTP Eff = Orinda Water Treatment Plant Effluent
WCWTP Eff = Walnut Creek Water Treatment Plant Effluent

3) Symbols for sample collection:
C = monitoring completed
W = monitoring waived
X = monitoring required

4) Primary IOC's and secondary contaminants to be measured in the treated water effluent of each water treatment plant, in lieu of sampling at the reservoirs, for compliance purposes.

East Bay Municipal Utility District
Camanche South Shore Water Treatment Plant Influent
Title 22 Monitoring Schedule

| Parameter | 2010 Projected Sampling Frequency [1] | Sampling Location [2] | Sample Collection [3] | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Completed Monitoring | | | | | | 2010 Monitoring Projections through 2019 | | | | | | | | |
| | | | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| **Inorganics (IOCs) [4]** | | | | | | | | | | | | | | | | | |
| Asbestos | 1 X 9Y | CASSIN | | | | | | | | | X | | | | | | |
| Nitrate | A | CASSIN | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Nitrite (for nitrate and nitrite) | 1 X 3Y | CASSIN | C | C | C | C | C | | | X | | | X | | | X | |
| Perchlorate | A | CASSIN | | | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Remaining IOCs | A | CASSIN | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |
| **Synthetic Organics (SOCs) [4]** | | | | | | | | | | | | | | | | | |
| Atrazine, simazine | 1 X 9Y | CASS Intake | | | | | | | | X | | | | | | | |
| **Radionuclides [4]** | | | | | | | | | | | | | | | | | |
| Gross alpha | 1 X 9Y | CASSIN | | | | | | C | | | | | | | | | X |
| Radium 226+228, uranium | 1 X 9Y [5] | CASSIN | CC | | | | | W | | | | | | | | | X |
| **Volatile Organics ( VOCs)** | | | | | | | | | | | | | | | | | |
| All VOCs | 1 X 3Y | CASSIN | C | C | C | C | C | | | X | | | X | | | X | |
| **Secondary Contaminants [4]** | | | | | | | | | | | | | | | | | |
| Secondary contaminants | A | CASSEFF [6] | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |

1) Symbols for sampling frequency:
A = Annually
1 X 9Y = Once per year every 9 years

2) Abbreviations for Sampling Locations:
CASSIN = Camanche South Shore WTP Influent
CASS Intake = Camanche Res at intake to Camanche South Shore WTP
CASSEFF = Camanche South Shore WTP Effluent

3) Symbols for sample collection:
C = monitoring completed
W = monitoring waived
X = monitoring required

4) In the source water for Camanche South Shore WTP, some regulated parameters are not required for monitoring:
IOCs: Cyanide and lead monitoring are not required. All other regulated IOCs must be monitored.
SOCs: Atrazine and simazine monitoring is required. All other regulated SOC monitoring has been waived or is not required.
Radionuclides: Tritium, strontium-90, and gross beta are not required for monitoring.
Secondary contaminants: All secondary contaminants must be monitored except Thiobencarb.

5) Monitoring of gross alpha particle activity may be substituted for measurement of Radium-226, Radium-228, and uranium so long as gross alpha remains below 5 pci/L. After gross alpha exceeds 5 pCi/L, monitoring for uranium is required. If the difference of gross alpha and uranium is greater than 5, Radium-226 and Radium-228 analyses are required.

6) Secondary contaminants to be measured in the treated water effluent of the water treatment plant, in lieu of sampling at the influent, for compliance purposes.

East Bay Municipal Utility District
Pardee Center Water Treatment Plant Influent
Title 22 Monitoring Schedule

| Parameter | 2010 Projected Sampling Frequency [1] | Sample Collection [2] | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Completed Monitoring | | | | | | 2010 Monitoring Projections through 2019 | | | | | | | | |
| | | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Inorganics (IOCs) [3] | | | | | | | | | | | | | | | | |
| Asbestos | 1 X 9Y | | | | | | | | | X | | | | | | |
| Nitrate | A | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Nitrite (for nitrate and nitrite) | 1 X 3Y | C | C | C | C | C | C | | X | | | X | | | X | |
| Perchlorate | A | | | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Remaining IOCs | A | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Synthetic Organics (SOCs) [3] | | | | | | | | | | | | | | | | |
| Radionuclides [3] | | | | | | | | | | | | | | | | |
| Gross alpha | 1 X 9Y | | | CCW W | | | | | | | | | X | | | |
| Radium 226+228, uranium | 1 X 9Y [4] | CC | | W | | | | | | | | | X | | | |
| Volatile Organics ( VOCs) | | | | | | | | | | | | | | | | |
| All VOCs | 1 X 6Y | | | | C | | | | | | X | | | | | |
| Secondary Contaminants [3] | | | | | | | | | | | | | | | | |

1) Symbols for sampling frequency:
A = Annually
1 X 9Y = Once per year every 9 years

2) Symbols for sample collection:
C = monitoring completed
W = monitoring waived
X = monitoring required

3) In the source water for Pardee Center WTP, some regulated parameters are not required for monitoring or monitoring has been waived:

| | |
|---|---|
| IOCs: | Cyanide and lead monitoring are not required. All other regulated IOCs must be monitored. |
| SOCs: | All regulated SOC monitoring has been waived or is not required. |
| Radionuclides: | Tritium, strontium-90, and gross beta are not required for monitoring. |
| Secondary contaminants: | No secondary contaminants are required for monitoring. |

4) Monitoring of gross alpha particle activity may be substituted for measurement of Radium-226, Radium-228, and uranium so long as gross alpha remains below 5 pci/L. After gross alpha exceeds 5 pCi/L, monitoring for uranium is required. If the difference of gross alpha and uranium is greater than 5, Radium-226 and Radium-228 analyses are required.

East Bay Municipal Utility District
Pardee Recreation Area Water Treatment Plant Influent
Title 22 Monitoring Schedule

| Parameter | 2010 Projected Sampling Frequency [1] | Sample Collection [2] | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Completed Monitoring | | | | | | 2010 Monitoring Projections through 2019 | | | | | | | | |
| | | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| Inorganics (IOCs) [3] | | | | | | | | | | | | | | | | |
| Nitrate | A | C | C | C | C | C | C | X | X | X | X | X | X | X | X | X |
| Nitrite (for nitrate and nitrite) | 1 X 3Y | | | C | | | C | | | X | | | X | | | X |
| Remaining Inorganics | 1 X 9Y | | | | | C | | | | | | | | | X | |
| Synthetic Organics (SOCs) [3] | | | | | | | | | | | | | | | | |
| Radionuclides [3] | | | | | | | | | | | | | | | | |
| Volatile Organics ( VOCs) [3] | | | | | | | | | | | | | | | | |
| Secondary Contaminants [3] | | | | | | | | | | | | | | | | |
| Secondary Contaminants | 1 X 9Y | | | | | C | | | | | | | | | X | |

1) Symbols for sampling frequency:
A = Annually
1 X 3Y = Once per year every 3 years

2) Symbols for sample collection:
C = monitoring completed
W = monitoring waived
X = monitoring required

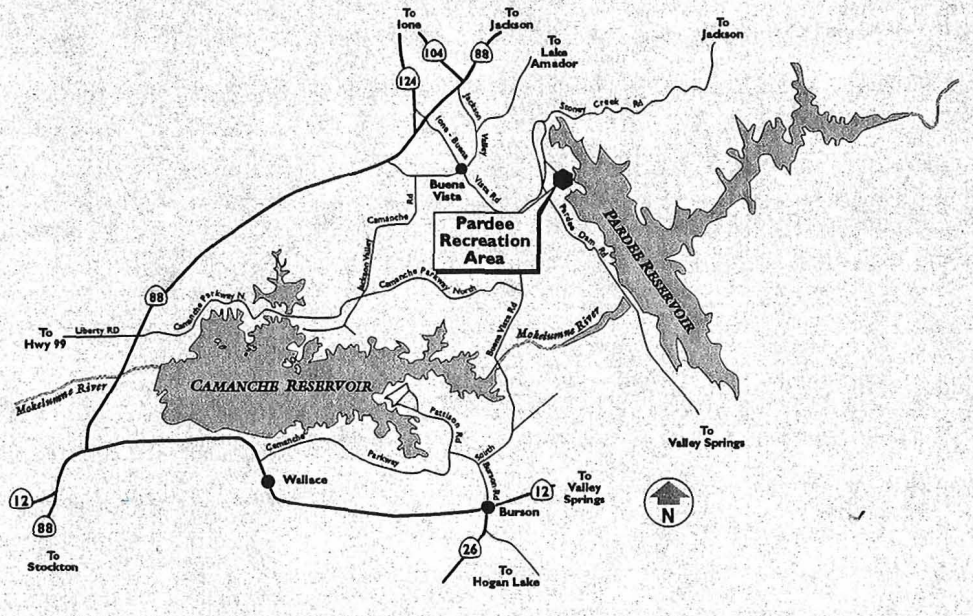
3) In the source water for Pardee Recreation Area WTP, some regulated parameters are not required for monitoring or monitoring has been waived:

| | |
|---|---|
| IOCs: | Cyanide and lead monitoring are not required. All other regulated IOCs must be monitored. |
| SOCs: | All regulated SOC monitoring has been waived or is not required. |
| Radionuclides: | No radionuclides are required for monitoring. |
| VOCs: | No VOCs are required for monitoring. |
| Secondary contaminants: | No secondary contaminants are required for monitoring. |

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE RECREATION AREA
# 2005 CONSUMER CONFIDENCE REPORT




## 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 is in-progress for completion within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-1327.

***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 Recreation Area. 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 State Department of Health Services (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 2005.

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 2005, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 WTP does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which 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. We found no coliform bacteria in the system in 2005.

**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.

Sampling for all inorganic chemicals is waived by the Department except for nitrate (annually) and nitrite (once every three years).

Monitoring was waived by the Department for Lead and Copper at the consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. The Department has waived radiological monitoring for Pardee Recreation Area.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Recreation Area.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The Department has waived monitoring of these chemicals for Pardee Recreation Area.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is waived by the Department.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated.

## Pardee Recreation Area 2005 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2005 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2005.***

EBMUD

**Board of Directors**

William B. Patterson
***President***
Lesa R. McIntosh
***Vice President***
Dennis M. Diemer
***General Manager***

John A. Coleman
Katy Foulkes
Doug Linney
Frank Mellon
David Richardson

# Pardee Recreation Area 2005 Water Quality Data

| Primary Contaminants | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Typical Sources |
|---|---|---|---|---|---|
| **Microbial Contaminants** | | | | | |
| Turbidity (NTU)* | TT = 5 NTU<br>TT = 95% of samples ≤0.5 NTU | NS<br>NS | 0.05<br>100% | All samples were 0.05<br>100% | Soil runoff |

*Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of water quality. High turbidity can hinder the effectiveness of disinfectants.

| | | | | | |
|---|---|---|---|---|---|
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Chlorine Residual as $Cl_2$ (mg/L) | [4] | [4] | 0.7 | 1.2† | By-product of drinking water chlorination |

†Maximum level found

| Secondary Parameters | MCL | Average | Typical Sources |
|---|---|---|---|
| Chloride (mg/L) | 500 | 4.2 | Runoff/leaching from natural deposits; seawater influence |
| Specific Conductance (µmhos/cm) | 1600 | 57 | Substances that form ions when in water; seawater influence |
| Sulfate (mg/L) | 500 | 1.7 | Runoff/leaching from natural deposits; industrial wastes |

| Other Parameters | Level Found | Other Parameters | Level Found |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 20.8 | pH (pH units) | 7.9 |
| Calcium (mg/L) | 4.2 | Potassium (mg/L) | 0.7 |
| Hardness (mg/L) | 17 | Silica (mg/L) | 12 |
| Magnesium (mg/L) | 1.4 | Sodium (mg/L) | 4 |

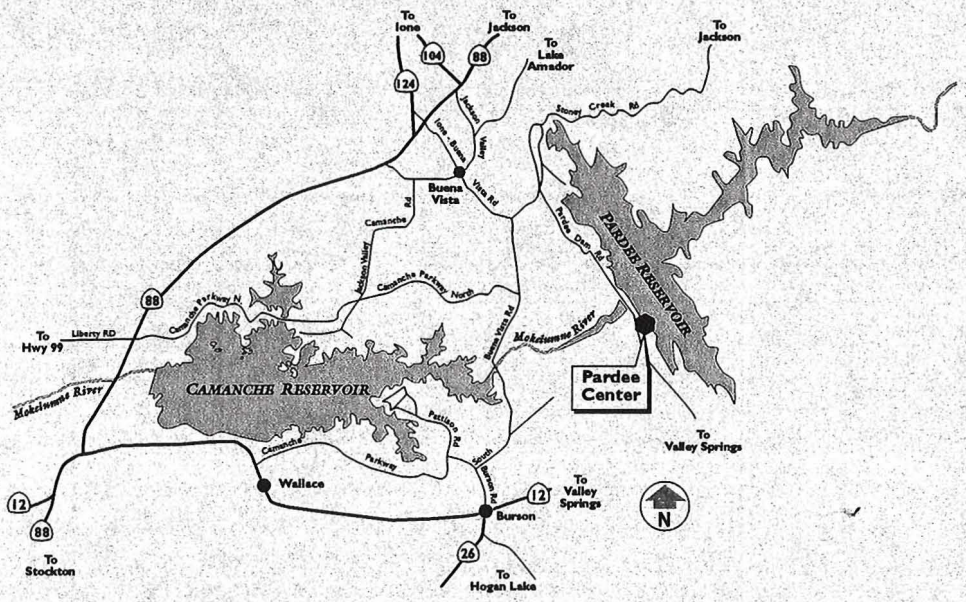
## Key

**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG** = Public Health Goal
**TT** = Treatment Technique
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µmhos/cm** = micro mhos per centimeter (measure of conductivity)

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE CENTER
# 2005 CONSUMER CONFIDENCE REPORT




## 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 is in-progress for completion within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-1327.

***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 State Department of Health Services (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 2005.

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 2005, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

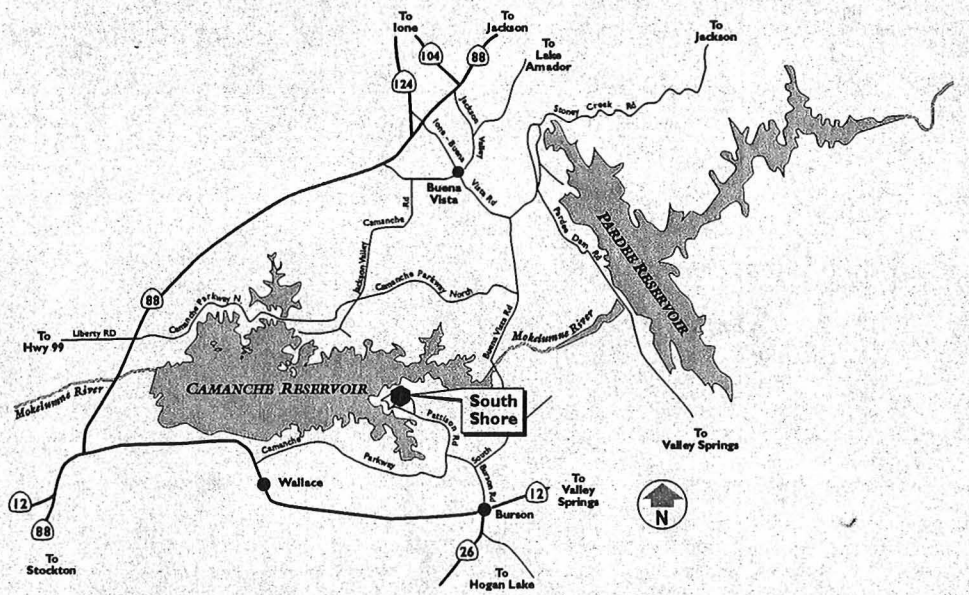
**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# CAMANCHE SOUTH SHORE 2005 CONSUMER CONFIDENCE REPORT




## 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 is in-progress for completion within the mandated guidelines of the Act. Questions regarding District compliance with the Act should be referred to the Security Section at (510) 287-1327.

***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 Department of Health Services (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 2005.

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 2005, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring

and reporting requirements, and water treatment requirements.

**Regulatory Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, 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. **We found no coliform bacteria in our system in 2005.**

**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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years) and cyanide (requirement waived by the Department).

Lead and copper were monitored in 2004 at consumer taps, as required by the Lead & Copper Rule, and the next round of sampling will occur in 2007. Results were within standards. No lead was detected at consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. Radiological sampling of source water was performed in 2005 and all results were below detection level.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department waived monitoring requirements for these chemicals, except Simazine and Atrazine that are monitored once every three years, and the next round of sampling is in 2006.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural applications and septic systems. The latest monitoring occurred in 2003 and no detectable levels of these chemicals (including MTBE) were found at the drinking water intake or in the reservoir. The Department granted a one-time 3-year waiver and the next monitoring will be due in 2009.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is required once every 12 months except Thiobencarb which is waived by the Department. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department.

EBMUD

**Board of Directors**

William B. Patterson
***President***
Lesa R. McIntosh
***Vice President***
Dennis M. Diemer
***General Manager***

John A. Coleman
Katy Foulkes
Doug Linney
Frank Mellon
David Richardson

## Camanche South Shore 2005 Water Quality Data

The table below lists all the drinking water contaminants that we detected during the 2005 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2005.*** The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants are 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.

## Camanche South Shore 2005 Water Quality Data

| Primary Contaminants | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Typical Sources |
|---|---|---|---|---|---|
| **Microbial Contaminants** | | | | | |
| Turbidity (NTU)* | TT = 5.0 NTU | NS | 0.05 | 0.14† | Soil runoff |
| | TT = 95% of samples ≤0.5 NTU | NS | 100% | 100% | |
| *Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of water quality. High turbidity can hinder the effectiveness of disinfectants. | | | | | |
| †Maximum level found | | | | | |
| **Inorganic Contaminants** | | | | | |
| Copper (mg/L) Sampled in June 2004 | AL = 1.3 | 0.17 | 90th percentile = 0.083 | No sites above the AL out of 5 sites sampled | Corrosion of household plumbing |
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 32†† | 23–27 | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 28†† | 19–33 | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.7 | 1.2† | By-product of drinking water chlorination |
| †Maximum level found | | | | | |
| ††Highest running annual average | | | | | |

| Secondary Parameters | MCL | Average | Typical Sources |
|---|---|---|---|
| Chloride (mg/L) | 500 | 3.7 | Runoff/leaching from natural deposits; seawater influence |
| Odor–Threshold (TON) | 3 | 1.2 | Naturally-occurring organic materials |
| Specific Conductance (µmhos/cm) | 1600 | 54 | Substances that form ions when in water; seawater influence |
| Sulfate (mg/L) | 500 | 2.1 | Runoff/leaching from natural deposits; industrial wastes |
| Total Dissolved Solids (mg/L) | 1000 | 36 | Runoff/leaching from natural deposits |

| Other Parameters | Level Found | Other Parameters | Level Found |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 23 | pH (pH units) | 7.9 |
| Calcium (mg/L) | 4.8 | Potassium (mg/L) | 0.7 |
| Hardness (mg/L) | 19.5 | Silica (mg/L) | 5.9 |
| Magnesium (mg/L) | 1.4 | Sodium (mg/L) | 2.8 |

### Key

**AL** = Regulatory Action Level
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG** = Public Health Goal
**TON** = Threshold Odor Number
**TT** = Treatment Technique
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µmhos/cm** = micro mhos per centimeter (measure of conductivity)

## 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 WTP does remove cryptosporidium and giardia as their sizes are larger (crypto 3-5 micron, giardia 7-14 micron) than the 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. We found no coliform bacteria in the system in 2005.

**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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years) and cyanide (requirement waived by the Department). No inorganic contaminants were found in 2005.

Lead and copper were monitored in 2005 at consumer taps, as required by the Lead & Copper Rule, and results were below regulatory limit. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally-occurring or be the result of oil and gas production and mining activities. Monitoring of radiological contaminants in 2005 showed no detection.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Center.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The latest monitoring showed no detection of these chemicals.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of parameters with secondary MCLs are required by Department once a year. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department. Samples were taken from treated water.

## Pardee Center 2005 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2005 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2005.***

EBMUD

**Board of Directors**

William B. Patterson
***President***
Lesa R. McIntosh
***Vice President***
Dennis M. Diemer
***General Manager***

John A. Coleman
Katy Foulkes
Doug Linney
Frank Mellon
David Richardson

# Pardee Center 2005 Water Quality Data

| Primary Contaminants | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Typical Sources |
|---|---|---|---|---|---|
| **Microbial Contaminants** | | | | | |
| Turbidity (NTU)* | TT = 5 NTU<br>TT = 95% of samples ≤0.5 NTU | NS<br>NS | 0.05<br>100% | All samples were 0.05<br>100% | Soil runoff |

*Turbidity is a measure of the cloudiness of water. We monitor it because it is a good indicator of water quality. High turbidity can hinder the effectiveness of disinfectants.

| | | | | | |
|---|---|---|---|---|---|
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 27 | | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 20 | | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.6 | 1† | By-product of drinking water chlorination |

†Maximum level found

| Secondary Parameters | MCL | Average | Typical Sources |
|---|---|---|---|
| Chloride (mg/L) | 500 | 2.2 | Runoff/leaching from natural deposits; seawater influence |
| Color (color units) | 15 | 3 | Naturally occurring organic materials |
| Odor–Threshold (TON) | 3 | 1.3 | Naturally occurring organic materials |
| Specific Conductance (µmhos/cm) | 1600 | 39.6 | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 29 | Runoff/leaching from natural deposits |

| Other Parameters | Average | Other Parameters | Average |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 17.9 | pH (pH units) | 7.6 |
| Calcium (mg/L) | 1.8 | Potassium (mg/L) | 0.4 |
| Hardness (mg/L) | 7 | Silica (mg/L) | 9 |
| Magnesium (mg/L) | 0.6 | Sodium (mg/L) | 5.2 |

## Key

**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG** = Public Health Goal
**TON** = Threshold Odor Number
**TT** = Treatment Technique
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µmhos/cm** = micro mhos per centimeter (measure of conductivity)

**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 importante información sobre el agua potable que usted consume. Tradúzcalo, 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)**
របាយការណ៍នេះមានព័ត៌មានសំខាន់អំពីទឹកផឹក។ សូមរកគេធ្វើប្រកប្រែជួនឬពិគ្រោះជាមួយអ្នកណាដែលយល់របាយការណ៍នេះ ។

**THAI**
รายงานฉบับนี้มีข้อมูลสำคัญเกี่ยวกับน้ำดื่มของท่าน ขอให้แปลรายงานฉบับนี้หรือพูดคุยกับผู้ที่เข้าใจเนื้อหาในรายงานนี้.

**LAO**
ລາຍງານສະບັບນີ້ມີຂໍ້ມູນສຳຄັນກ່ຽວກັບນ້ຳດື່ມຂອງທ່ານ. ໃຫ້ທ່ານແປເອກະສານນີ້ເປັນພາສາລາວ, ຫລືໃຫ້ທ່ານເວົ້າປຶກສາກັບຜູ້ທີ່ເວົ້າໃຈເລື້ອງ.

**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 વિશેની 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**
ین گزارش حاوی اطلاعات مهمی در مورد آب آشامیدنی است. آن را ترجمه کنید، یا ازکسی 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.

## Public Participation

EBMUD encourages public participation in decisions affecting drinking-water quality and other matters at its Board meetings, which take place the second and fourth Tuesdays of each month at 1:15 p.m., 2nd floor, 375 Eleventh Street, Oakland.

To speak with someone who can provide more information about water quality or to report a water quality concern, call 1-866-40-EBMUD (1-866-403-2683).

For comments and suggestions on ways to improve this report, call (510) 287-0143.

## Additional Contacts

**California Department of Health Services Drinking Water Branch** - (510) 620-3463

**U.S. Environmental Protection Agency Safe Drinking Water Hotline** - (800) 426-4791

**Local Health Departments:**
Alameda County - (510) 267-8000
Contra Costa County - (925) 313-6712

PUB. 108 (4/06) 600M

EBMUD
375 Eleventh Street
Oakland, CA 94607
1-866-40-EBMUD
*www.ebmud.com*

PRESORTED
STANDARD
U.S. POSTAGE
PAID
DMI

**Board of Directors**
John A. Coleman Katy Foulkes Doug Linney Lesa R. McIntosh
Frank Mellon William B. Patterson David Richardson

**General Manager**
Dennis M. Diemer

# EAST BAY MUNICIPAL UTILITY DISTRICT

## WHY SHOULD I READ THIS REPORT?

This report provides important information about your water. It describes what is in it, where it comes from and how it is treated.

EBMUD

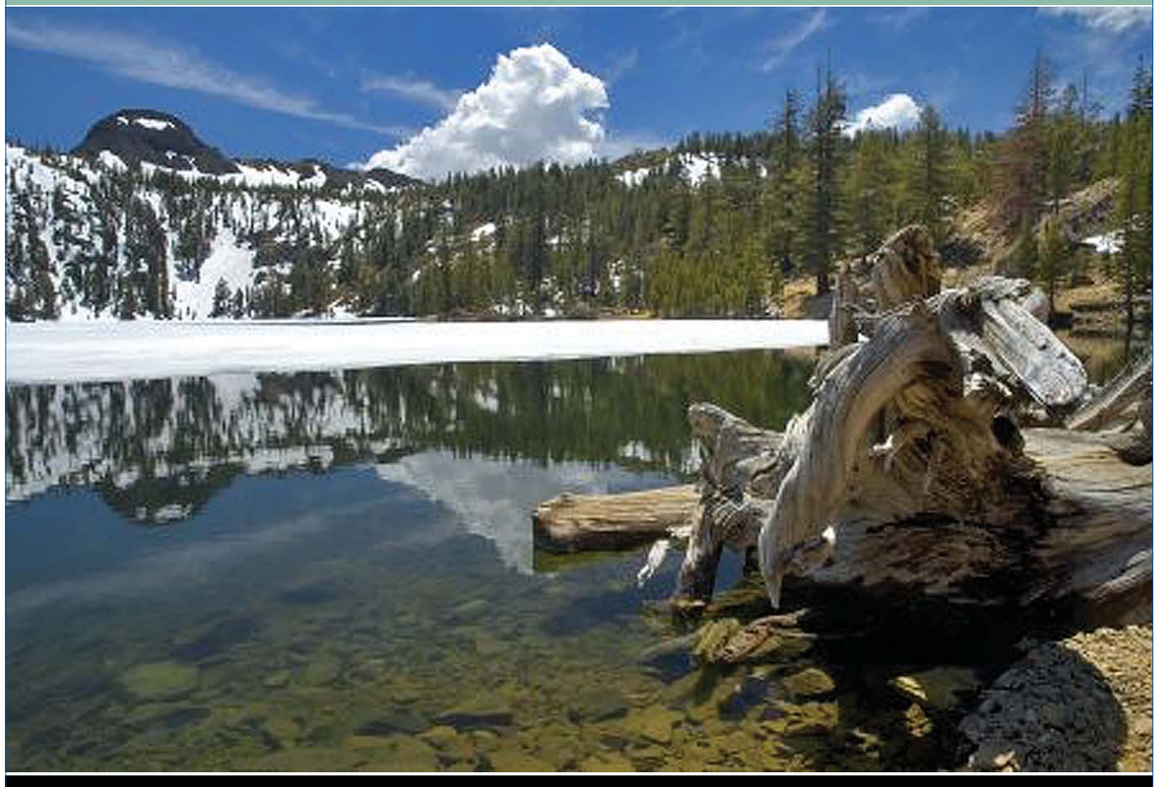
## HOW DO I KNOW IF MY WATER IS SAFE?

The California Department of Health Services (CDHS) and the United States Environmental Protection Agency (USEPA) set standards that water providers must meet to protect your health.

**In 2005, EBMUD water met every public health requirement set by CDHS and USEPA.**

CDHS also requires all water suppliers in California to report water quality information each year to its customers through this water quality report.

Please read on or call 1-866-40-EBMUD for more information.



*Nearly all of EBMUD water comes from the Mokelumne River watershed (shown above) in the Sierra Nevada, beginning about 90 miles east of the East Bay. A small amount also comes from rainfall and runoff into local reservoirs.*

# 2005 WATER QUALITY REPORT

One of the most important factors in water quality is its source: the purer the source, the better the water. Ninety percent of EBMUD's water comes from the 577-square-mile watershed of the Mokelumne River, which collects Sierra Nevada snowmelt and flows into Pardee Reservoir in the Sierra foothills near the town of Valley Springs. The watershed on the west slope of the Sierra Nevada is mostly undeveloped land, little affected by human activity. The water travels to the East Bay in pipelines and is protected from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges. Local East Bay watershed rainfall and runoff accounts for about 10 percent of the District's water supply.

Before the water comes to your tap, EBMUD takes many steps to ensure its quality and safety. This includes carefully managing and protecting watershed lands, treating the water, sampling and monitoring, analyzing results of the sampling and adjusting treatment, flushing pipes and reservoirs, and repairing pipes. See the diagram on pages 6-7 for more information on the water treatment process that EBMUD uses to protect your water.

## LEAD & COPPER PROTECTIONS

Lead levels in EBMUD water are low and in 2005 were well within regulated limits. However, some customers tell us they want to know what they can do to reduce their exposure to lead in the home.

EBMUD is a water industry leader in lead reduction, and began 20 years ago replacing pipes, fittings and meters containing lead with other types of material. But, it is still possible that lead levels in your drinking water may be higher than other homes in your area as a result of material used in your home plumbing. There are a number of ways that you can reduce your potential exposure to lead:

- Use only the cold water tap for drinking, cooking or mixing infant formula. Flush the tap for 15 seconds or more before using.
- If you purchase new faucets, check with your plumbing supplier about products that are certified by NSF and comply with California Proposition 65 requirements to assure that they are made of no-lead brass.
- Soil, dust and older leaded paint can be significant sources of lead.

For information about reducing your exposure to lead in your home, contact the lead poisoning prevention programs of Alameda County - (510) 567-8280, or Contra Costa County - 1-866-FIX-LEAD.

Additional information, including information on home lead testing, is available from the USEPA Safe Drinking Water Hotline at (800) 426-4791 or from EBMUD at 1-866-40-EBMUD.

Like lead, levels of copper in EBMUD water are generally low and in 2005 fell well below regulated limits.

Use this table or the map on page 3 to find out which treatment plant serves your neighborhood. Then go to the chart on pages 4-5 (match the color and/or treatment plant name) to find water quality data for the water treatment plant that serves your neighborhood.

| City Served | Treatment Plant |
|---|---|
| Alameda | Orinda |
| Alamo | Walnut Creek |
| Albany | Orinda |
| Berkeley | Orinda |
| Castro Valley | Upper San Leandro |
| Crockett | Sobrante |
| Danville | Walnut Creek |
| El Cerrito | Orinda |
| El Sobrante | Sobrante |
| Emeryville | Orinda |
| Hayward | Upper San Leandro |
| Hercules | Sobrante |
| Kensington | Orinda |
| Lafayette | Lafayette |
| Moraga | Lafayette |
| Oakland | Orinda/Upper San Leandro |
| Orinda | Orinda/Lafayette |
| Piedmont | Orinda |
| Pinole | Sobrante |
| Pleasant Hill | Walnut Creek |
| Richmond | Sobrante/Orinda |
| Rodeo | Sobrante |
| San Leandro | Upper San Leandro |
| San Lorenzo | Upper San Leandro |
| San Pablo | Sobrante |
| San Ramon | Walnut Creek |
| Walnut Creek | Walnut Creek/Lafayette |

*This map of the EBMUD service area shows which water treatment plant serves your neighborhood under normal operations. There may be occasional changes in areas served due to operational or water demand changes.*

EBMUD tests your water daily to make sure it is safe to drink. We look for more than 100 substances in the water, including bacteria, pesticides and herbicides, asbestos, lead, copper, petroleum products, and by-products of industrial and water-treatment processes.

This table shows the measured level of substances detected at EBMUD water treatment plants *(see table or map on p. 2-3 to see which treatment plant normally serves your neighborhood)*. Only the substances that we detected in 2005 are listed in this chart.

You will see in the chart that there are different types of substances we're looking for. Regulations for *Primary Constituents* are designed to protect public health. Regulations for *Secondary Constituents* relate to the aesthetic qualities of your water such as taste and odor. *Unregulated Constituents* are chemical or microbial constituents that EBMUD is required to monitor, but no maximum contamintant levels (MCL) have been established. *In 2005 EBMUD met or surpassed all water quality regulations set by the California Department of Health Services (CDHS) and the United States Environmental Protection Agency (USEPA).*

**Tables below list all drinking water constituents detected at the source, the treatment plant or the distribution system, where appropriate, in 2005**

| What did we find in your water? | What's the regulation? | | What did we measure? | | | | | | | Did we meet the Regulation? | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Primary Drinking Water Constituents** | **MCL or [MRDL]** | **PHG [MCLG] or [MRDLG]** | **Average** | **Walnut Creek Treatment Plant** | **Lafayette Treatment Plant** | **Orinda Treatment Plant** | **San Pablo Treatment Plant** | **Sobrante Treatment Plant** | **USL Treatment Plant** | | **Typical Sources** |
| **Microbiological Constituents** - **No coliform bacteria were detected in the water system in 2005. Turbidity has no health effects, but high levels of turbidity can interfere with disinfection and provide a medium for microbial growth.** | | | | | | | | | | | |
| Turbidity (NTU), maximum level, except for Average | TT = 1 NTU | NS | 0.04 | 0.08 | 0.06 | 0.06 | 0.05 | 0.13 | 0.12 | YES | Soil runoff |
| Turbidity | TT ≥ 95% of the samples ≤ 0.3 NTU | NS | NR | 100% | 100% | 100% | 100% | 100% | 100% | YES | Soil runoff |
| **Inorganic Constituents** | | | | | | | | | | | |
| Aluminum (ug/L) | 1000 | 600 | <50 | <50 | <50 | <50 | <50-61 | <50-64 | <50-66 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Fluoride (naturally occuring) (mg/L)* | 2 | 1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.14 | YES | Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories |
| Chloramine Residual as $Cl_2$ (mg/L), maximum level, except for Average | [4] | [4] | 1.9 | 2.4 | 2.2 | 3.3 | 2.8 | 3.3 | 3.0 | YES | Drinking water disinfectant added for treatment |
| *Fluoride reported above reflect levels in the source waters. Fluoride was added in the range of 0.9 to 1.0 mg/L, to help prevent dental decay in consumers. | | | | | | | | | | | |
| **Organic Constituents** | | | | | | | | | | | |
| Acrylamide monomer in treatment chemical (percent of maximum dose allowed) | TT = Max. dose allowed | (zero) | 0 | 0 | 0 | 0-1% | 0 | 0-1% | 0 | YES | Added to water during water treatment |
| Control of DBP precursors (TOC) | TT | NS | NR | NR | NR | NR | Met reqmt | Met reqmt | Met reqmt | YES | Various natural and manmade sources |
| Haloacetic acids, 5 species (ug/L) | 60 | NS | 16** | 18-20 | 13-20 | 13-16 | 7 | 4-16 | 13-17 | YES | By-product of drinking water chlorination |
| Trihalomethanes (ug/L) | 80 | NS | 38** | 36-53 | 38-58 | 27-51 | 29 | 21-40 | 27-42 | YES | By-product of drinking water chlorination |
| **Highest Running Annual Average | | | | | | | | | | | |

| **Constituents which have Secondary MCLs** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum (ug/L) | 200 | NS | <50 | <50 | <50 | <50 | <50-61 | <50-64 | <50-66 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Chloride (mg/L) | 500 | NS | 7.7 | 3.8 | 3.7 | 4.3-6.3 | 11 | 13 | 12 | YES | Runoff/leaching from natural deposits; seawater influence. |
| Color, color units | 15 | NS | 2 | 3 | <1 | <1-5 | 2 | 3 | <1 | YES | Naturally-occurring organic materials |
| Odor–Threshold Odor Number (T.O.N.) | 3 | NS | 2.1 | 1.1 | 1.3 | <1-2.7 | 2.8 | 3 | 2.7 | YES | Naturally-occurring organic materials |
| Specific Conductance (umhos/cm) | 1600 | NS | 164 | 52 | 53 | 61-140 | 239 | 268 | 335 | YES | Substances that form ions when in water; seawater influence. |
| Sulfate (mg/L) | 500 | NS | 16.3 | 0.8 | 0.8 | 1.3-16 | 25 | 33 | 37 | YES | Runoff/leaching from natural deposits; industrial wastes |
| Total Dissolved Solids (mg/L) | 1000 | NS | 101 | 40 | 38 | 40-88 | 140 | 160 | 200 | YES | Runoff/leaching from natural deposits |
| Turbidity (NTU) | 5 | NS | 0.04 | 0.08 | 0.06 | 0.06 | 0.05 | 0.13 | 0.12 | YES | Soil runoff |

| **Unregulated Constituents** | **NL** | **PHG (MCLG)** | **Average** | **Walnut Creek** | **Lafayette** | **Orinda** | **San Pablo** | **Sobrante** | **USL** | | **Typical Sources** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Boron (ug/L) | 1000 | NS | <100 | <100 | <100 | <100 | <100 | <100 | <100-103 | NS | Runoff/leaching from natural deposits |
| N-Nitrosodimethylamine (NDMA), ng/L*** | 10 | NS | 3 | <2-6 | <2-9 | <2-5 | NR | <2-6 | <2-6 | NS | NDMA is widespread in the environment, but it is rapidly decomposed by sunlight. NDMA is used to plasticize polymers and may be produced as a by-product of chloramine and polymer use in water treatment. |

***Sampled at representative distribution system taps.

| **Lead and Copper** | **AL** | **PHG** | **90th percentile Level Found** | **# of Sites found above the AL** | | | **Typical Sources** |
|---|---|---|---|---|---|---|---|
| Copper (ug/L) (regulated at 90th percentile) | 1300 | 170 | 51 | No sites out of 52 sites | | YES | Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives |
| Lead (ug/L)**** (regulated at 90th percentile) | 15 | 2 | 5 | 3 sites out of 52 sites | | YES | Internal corrosion of household plumbing systems; discharge from industrial manufacturers; erosion of natural deposits |

****Infants and young children are typically more vulnerable to lead in drinking water than the general population. 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 and flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the USEPA Safe Drinking Water Hotline, (800) 426-4791.

## TERMS USED

**AL =** regulatory action level. The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

**$Cl_2$ =** Chlorine, measured disinfectant residual equivalent

**DBP = disinfection by-products.** Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products, formed when chlorine and/or ozone reacts with natural constituents in water.

**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 a MCLG.

**mg/L = milligrams per liter**, or parts per million (ppm)

**MRDL = maximum residual disinfectant level.** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**MRDLG = maximum residual disinfectant level goal.** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the U.S. Environmental Protection Agency.

**ng/L = nanograms per liter, or parts per trillion (ppt).**

**NL = notification level.** Notification levels are health-based advisory levels established by CDHS for chemicals in drinking water that lack MCLs.

**NR = not required for meeting regulations**

**NS = no standard** (MCL or PHG for example) established

**NTU = nephelometric turbidity units**

**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.

**PDWS = Primary Drinking Water Standard**. MCLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Secondary Drinking Water Standard.** MCLs set to protect odor, taste and appearance of drinking water.

**TOC = total organic carbon.** A measurement of organic compounds which could form by-products after disinfection. See DBP.

**T.O.N. = threshold odor number,** a measurement of odors in water.

**Trihalomethanes =** A group of contaminants in drinking water formed as a by-product of disinfection. See DBP.

**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.

**ug/L = micrograms per liter, or parts per billion (ppb)**

**umhos/cm =** micromhos per centimeter, a measure of electrical conductance.

**USL =** Upper San Leandro

**90th percentile =** 90% of samples had lower values than required by the regulatory Action Level

## INFORMATION FROM THE USEPA & CDHS

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (USEPA) and the California Department of Health Services (CDHS) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The CDHS 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 the USEPA's Safe Drinking Water Hotline at (800) 426-4791.

## 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 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.

The following table includes measurements of other water quality constituents that might be of interest to our consumers:

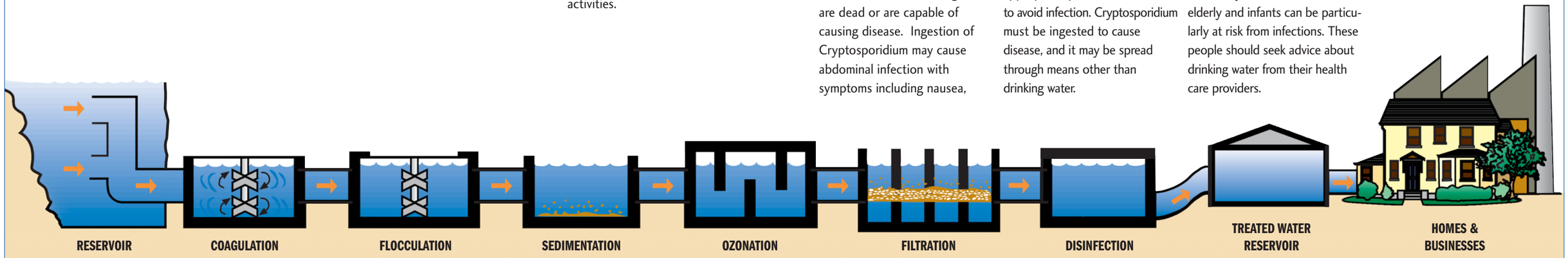
| OTHER WATER QUALITY PARAMETERS | Walnut Creek Treatment Plant | Lafayette Treatment Plant | Orinda Treatment Plant | San Pablo Treatment Plant | Sobrante Treatment Plant | USL Treatment Plant |
|---|---|---|---|---|---|---|
| Alkalinity, Bicarbonate (mg/L as CaCO3) | 17.2 | 17 | 16.9-37.5 | 63.8 | 75 | 113 |
| Alkalinity, carbonate (mg/L as CaCO3) | 0.6 | 0.8 | 1.6-2.2 | 2.4 | 2.8 | 4.2 |
| Calcium (mg/L) | 3.7-5.5 | 3.9-5.5 | 4.3-11 | 16.3-17.8 | 16-20 | 22.4-29 |
| Hardness (mg/L as CaCO3) | 14-23 | 12-23 | 14-58 | 63-86 | 60-77 | 93-120 |
| Magnesium (mg/L) | 0.7-1.3 | 0.7-1.3 | 0.8-2.7 | 5.0-5.7 | 4.9-6.7 | 9.0-12 |
| pH (pH units) | 8.7-9.4 | 8.7-9.0 | 8.6-9.3 | 8.6-8.9 | 8.5-8.8 | 8.6-8.9 |
| Potassium (mg/L) | 0.4-0.7 | 0.4-0.7 | 0.4-0.9 | 1-1.1 | 0.9-1.2 | 1.3-1.6 |
| Silica (mg/L) | 8.8-13.1 | 9.0-13.3 | 8.5-13.7 | 10.6-12.2 | 10.9-12.3 | 5.8-11.3 |
| Sodium (mg/L) | 4.3-6.1 | 4.3-6.2 | 5.3-12 | 22-23.7 | 20-25 | 22.9-28 |

Dishwashers and industrial cooling and process applications often need to know the hardness of the water in "grains per gallon." To convert the hardness values into grains per gallon, divide the values shown in the tables in milligrams per liter by 17. For example, hardness for areas served by Orinda Water Treatment Plant had a range from 14 to 58 mg/L, which is equivalent to 0.8 to 3.4 grains per gallon.

**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. 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. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people are at greater risk of developing life-threatening illness. We encourage immuno-compromised individuals to consult their physician 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.

**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, 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: (800) 426-4791 or www.epa.gov/safewater.




## The Water Treatment Process

**Source Water Protection** EBMUD protects the watershed lands surrounding our reservoirs so that the water delivered to treatment plants is as clean as possible.

**Coagulation** Coagulants such as alum neutralize very small particles, allowing them to clump together.

**Flocculation** After coagulants are added, the water is gently mixed to cause sediment particles to combine and grow large enough to settle.

**Sedimentation** Water flows very slowly in sedimentation basins, allowing the particles to settle to the bottom.

**Ozonation** At the Sobrante and Upper San Leandro water treatment plants, ozone is used for disinfection, and taste and odor control.

**Filtration** Water flows through filter beds made up of layers of coal (anthracite), and sand. The coal and sand trap any particles remaining in the water.

**Disinfection** The addition of chlorine and chloramines (chlorine and ammonia) kills remaining microorganisms, providing protection against disease-causing organisms, such as bacteria or viruses.

**Fluoridation** Fluoride is added to prevent dental cavities.

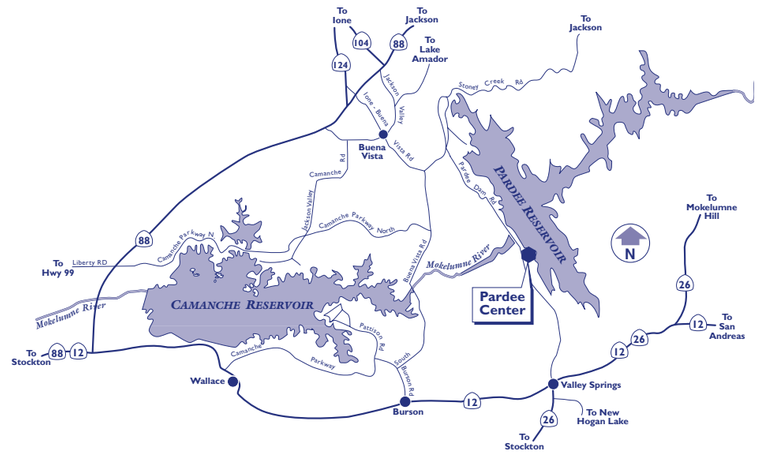
**Corrosion Control** EBMUD adds calcium hydroxide (lime) or sodium hydroxide to the water to control corrosion in distribution pipes and consumers' plumbing. This also keeps substances like lead and copper from leaching out of plumbing into the drinking water.

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE CENTER
# 2006 CONSUMER CONFIDENCE REPORT




## 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 State Department of Health Services (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 2006.

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 2006, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. We found no coliform bacteria in the system in 2006.

**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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years). No inorganic contaminants were found in 2006.

Lead and copper were monitored in 2005 at consumer taps, as required by the Lead & Copper Rule, and results were below regulatory limit. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally-occurring or be the result of oil and gas production and mining activities. Monitoring of radiological contaminants in 2005 showed no detection.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Center.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The latest monitoring showed no detection of these chemicals.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of parameters with secondary MCLs are required by Department once a year. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department. Samples were taken from treated water.

## Pardee Center 2006 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2006 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2006.***

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Pardee Center 2006 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Typical Sources |
|---|---|---|---|---|---|
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 46 | | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 16 | | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.5 | 1.1† | By-product of drinking water chlorination |

†Maximum level found

| Secondary Parameters | MCL | Average | Typical Sources |
|---|---|---|---|
| Chloride (mg/L) | 500 | 2.4 | Runoff/leaching from natural deposits; seawater influence |
| Color (color units) | 15 | 5 | Naturally occurring organic materials |
| Odor–Threshold (TON) | 3 | 1 | Naturally occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 64 | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 35 | Runoff/leaching from natural deposits |

| Other Parameters | Average | Other Parameters | Average |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 25 | pH (pH units) | 9.3 |
| Alkalinity, carbonate (mg/L) | 4.7 | Potassium (mg/L) | 0.4 |
| Calcium (mg/L) | 2.1 | Silica (mg/L) | 9 |
| Hardness (mg/L) | 10 | Sodium (mg/L) | 12 |
| Magnesium (mg/L) | 0.6 | | |

| Treatment Technique | Turbidity Performance Standards | |
|---|---|---|
| **Nanofiltration** (Membrane filtration) | 1 – Be less than or equal to 0.1 NTU in 95% of measurements in a month.<br>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: | | 0.08 NTU |
| Number of violations of any surface water treatment requirements: | | 0 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

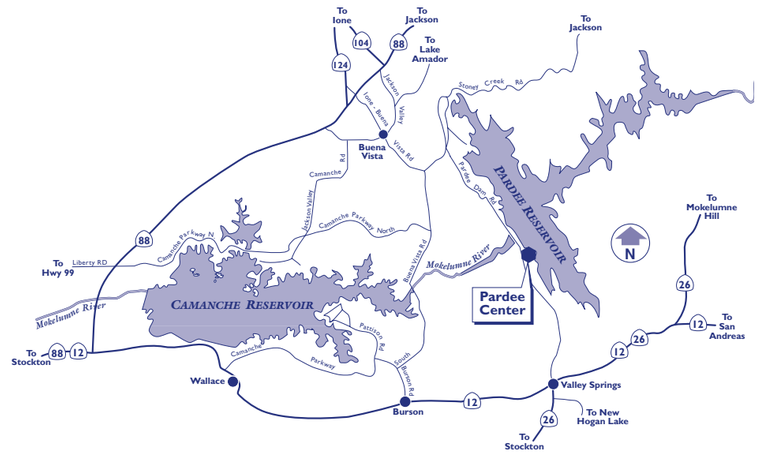
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE CENTER
# 2006 CONSUMER CONFIDENCE REPORT




## 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 State Department of Health Services (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 2006.

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 2006, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. We found no coliform bacteria in the system in 2006.

**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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years). No inorganic contaminants were found in 2006.

Lead and copper were monitored in 2005 at consumer taps, as required by the Lead & Copper Rule, and results were below regulatory limit. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally-occurring or be the result of oil and gas production and mining activities. Monitoring of radiological contaminants in 2005 showed no detection.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Center.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The latest monitoring showed no detection of these chemicals.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of parameters with secondary MCLs are required by Department once a year. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department. Samples were taken from treated water.

## Pardee Center 2006 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2006 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2006.***

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Pardee Center 2006 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Typical Sources |
|---|---|---|---|---|---|
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 46 | | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 16 | | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.5 | 1.1† | By-product of drinking water chlorination |

†Maximum level found

| Secondary Parameters | MCL | Average | Typical Sources |
|---|---|---|---|
| Chloride (mg/L) | 500 | 2.4 | Runoff/leaching from natural deposits; seawater influence |
| Color (color units) | 15 | 5 | Naturally occurring organic materials |
| Odor–Threshold (TON) | 3 | 1 | Naturally occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 64 | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 35 | Runoff/leaching from natural deposits |

| Other Parameters | Average | Other Parameters | Average |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 25 | pH (pH units) | 9.3 |
| Alkalinity, carbonate (mg/L) | 4.7 | Potassium (mg/L) | 0.4 |
| Calcium (mg/L) | 2.1 | Silica (mg/L) | 9 |
| Hardness (mg/L) | 10 | Sodium (mg/L) | 12 |
| Magnesium (mg/L) | 0.6 | | |

| Treatment Technique | Turbidity Performance Standards | |
|---|---|---|
| **Nanofiltration** (Membrane filtration) | 1 – Be less than or equal to 0.1 NTU in 95% of measurements in a month.<br>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: | | 0.08 NTU |
| Number of violations of any surface water treatment requirements: | | 0 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

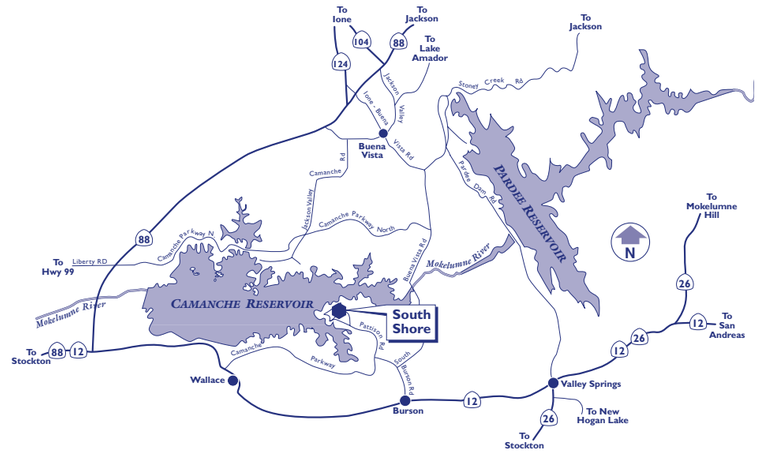
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# CAMANCHE SOUTH SHORE 2006 CONSUMER CONFIDENCE REPORT




## 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 State Department of Health Services (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 2006.

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 2006, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Regulatory Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, 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. We found no coliform bacteria in our system in 2006.

**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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years).

Lead and copper were monitored in 2004 at consumer taps, as required by the Lead & Copper Rule, and the next round of sampling will occur in 2007. Results were within standards. No lead was detected at consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. Radiological sampling of source water was performed in 2005 and all results were below detection level.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department waived monitoring requirements for these chemicals, except Simazine and Atrazine that are monitored once every three years, and were not detected in 2006.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural applications and septic systems. The latest monitoring occurred in 2003 and no detectable levels of these chemicals (including MTBE) were found at the drinking water intake or in the reservoir. The Department granted a one-time 3-year waiver and the next monitoring will be due in 2009.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is required once every 12 months except Thiobencarb which is waived by the Department. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department.

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Camanche South Shore 2006 Water Quality Data

The table below lists all the drinking water contaminants that we detected during the 2006 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2006.*** The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants are 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.

## Camanche South Shore 2006 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Typical Sources |
|---|---|---|---|---|---|
| **Inorganic Contaminants** | | | | | |
| Copper (mg/L) Sampled in June 2004 | AL = 1.3 | 0.17 | 90th percentile = 0.083 | No sites above the AL out of 5 sites sampled | Corrosion of household plumbing |
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 36†† | 26–44 | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 35†† | 23–35 | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.7 | 1.1† | By-product of drinking water chlorination |

†Maximum level found
††Highest running annual average

| Secondary Parameters | MCL | Average | Typical Sources |
|---|---|---|---|
| Chloride (mg/L) | 500 | 3 | Runoff/leaching from natural deposits; seawater influence |
| Color (color unit) | 15 | 3 | |
| Odor–Threshold (TON) | 3 | 2 | Naturally-occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 50 | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 35 | Runoff/leaching from natural deposits |

| Other Parameters | Level Found | Other Parameters | Level Found |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 17 | Potassium (mg/L) | 0.8 |
| Calcium (mg/L) | 4.6 | Silica (mg/L) | 5.9 |
| Hardness (mg/L) | 18 | Sodium (mg/L) | 2.5 |
| Magnesium (mg/L) | 1.3 | | |

| Treatment Technique | Turbidity Performance Standards |
|---|---|
| **Direct Filtration** (Dual Media Filtration with Anthracite and Sand) | 1 – Be less than or equal to 0.3 NTU in 95% of measurements in a month.<br>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 measxurement during the year: | 0.35 NTU |
| Number of violations of any surface water treatment requirements: | 0 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

**Key**

**AL** = Regulatory Action Level
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

**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 importante información sobre el agua potable que usted consume. Tradúzcalo, 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)**
របាយការណ៍នេះមានព័ត៌មានសំខាន់អំពីទឹកផឹក។ សូមរកគេធ្វើប្រពន្ធប្រែជួនប្រពិត្រគ្រោះជាមួយអ្នកណាដែលយល់របាយការណ៍នេះ ។

**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.

## Public Participation

EBMUD encourages public participation in decisions affecting drinking-water quality and other matters at its Board meetings, which take place the second and fourth Tuesdays of each month at 1:15 p.m., 2nd floor, 375 Eleventh Street, Oakland.

To speak with someone who can provide more information about water quality or to report a water quality concern, call 1-866-40-EBMUD (1-866-403-2683).

## Additional Contacts

**California Department of Health Services Drinking Water Branch** - (510) 620-3463

**U.S. Environmental Protection Agency Safe Drinking Water Hotline** - (800) 426-4791

**Local Health Departments:**
Alameda County - (510) 267-8000
Contra Costa County - (925) 313-6712

PUB. 114 4.07 600M

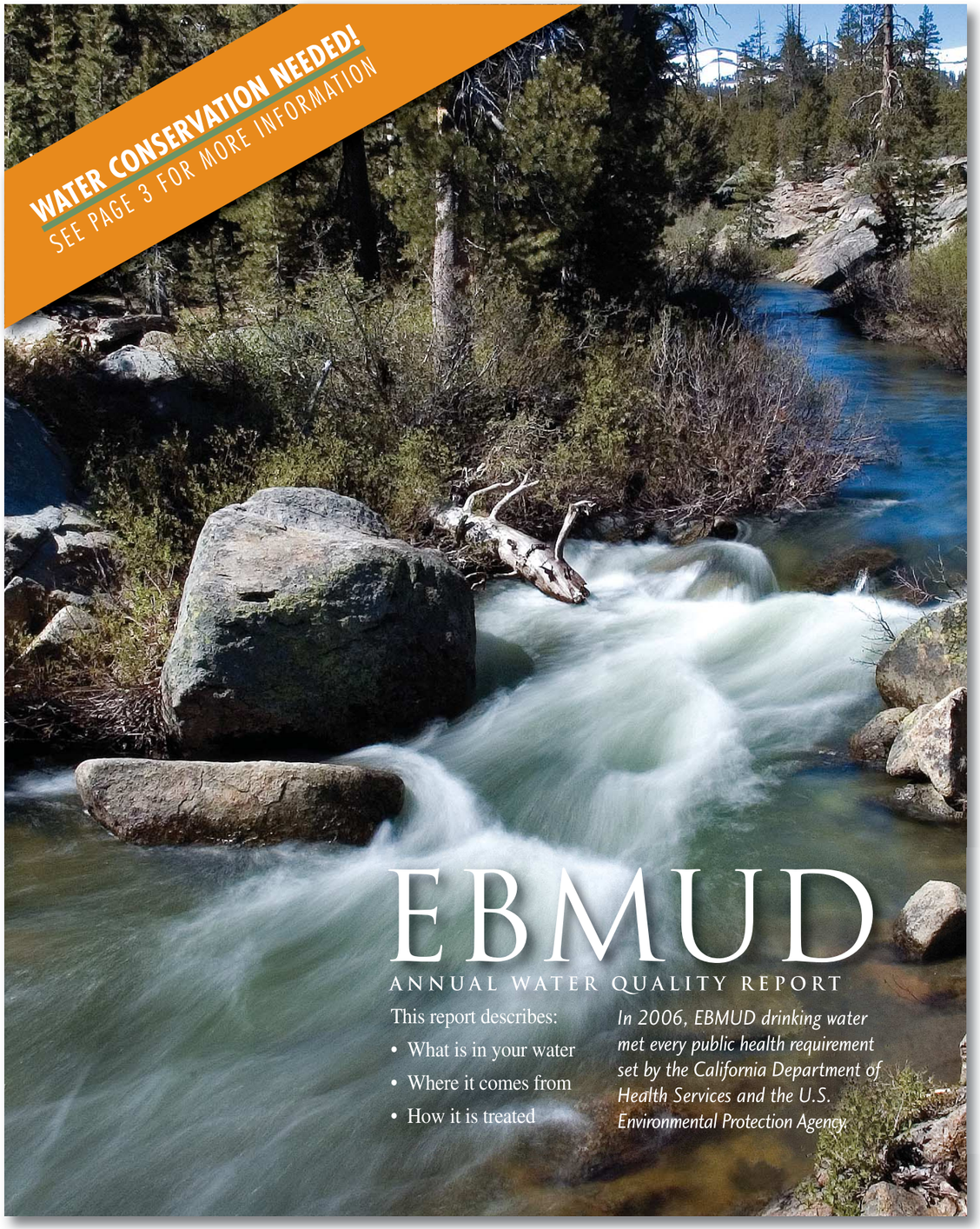
EBMUD
375 Eleventh Street
Oakland, CA 94607
1-866-40-EBMUD
*www.ebmud.com*

PRESORTED
STANDARD
U.S. POSTAGE
PAID
DMI

**Board of Directors**
John A. Coleman Katy Foulkes Andy Katz Doug Linney
Lesa R. McIntosh Frank Mellon William B. Patterson

**General Manager**
Dennis M. Diemer

EAST BAY MUNICIPAL UTILITY DISTRICT




# EBMUD

## ANNUAL WATER QUALITY REPORT

This report describes:
- What is in your water
- Where it comes from
- How it is treated

*In 2006, EBMUD drinking water met every public health requirement set by the California Department of Health Services and the U.S. Environmental Protection Agency.*

2006

One of the most important factors in water quality is its source: the purer the source, the better the water. Ninety percent of EBMUD's water comes from the 577-square-mile watershed of the Mokelumne River, which collects Sierra Nevada snowmelt and flows into Pardee Reservoir in the Sierra foothills near the town of Valley Springs. The watershed on the west slope of the Sierra Nevada is mostly undeveloped land, little affected by human activity. The water travels to the East Bay in pipelines and is protected from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges. Local East Bay watershed rainfall accounts for about 10 percent of the District's water supply.

Before the water comes to your tap, EBMUD takes many steps to ensure its quality and safety. This includes carefully managing and protecting watershed lands, treating the water, sampling and monitoring, analyzing results of the sampling and adjusting treatment, flushing pipes and reservoirs, and repairing pipes. See the diagram on pages 6-7 for more information on the water treatment process.

## SUCCESSFUL EARTHQUAKE UPGRADES

This past winter EBMUD shut down its most critical water pipeline, the Claremont Tunnel, to complete the tunnel's three-year seismic upgrade. The 3.4 mile-long tunnel brings water east to west for 800,000 customers, crossing through the Oakland-Berkeley hills directly over the Hayward Fault.

Use this table or the map on page 3 to find out which treatment plant serves your neighborhood. Then go to the chart on pages 4-5 (match the color and/or treatment plant name) to find water quality data for your neighborhood.

The shutdown required running back up facilities, portable pumps and stand by treatment facilities (including San Pablo Water Treatment Plant) on the western side of the hills at capacity.

The shutdown resulted in a narrow margin of water reliability for the northwest part of EBMUD's service area. Customers responded to requests to cut back on water use, and their efforts assured operational reliability, averting the need for mandatory rationing.

## PROTECTING WATERSHED LANDS

In the fall of 2006, EBMUD worked together with the East Bay Regional Park District and ranchers who lease grazing land in the Pardee Reservoir watershed. Wet-season cattle grazing practices were altered to reduce the likelihood of Cryptosporidium and other contaminants entering drinking-water reservoirs. Monitoring and testing during this past and future wet seasons will help develop the best long-term methods for protecting the reservoirs.

| City Served | Treatment Plant |
|---|---|
| Alameda | Orinda/Upper San Leandro |
| Alamo | Walnut Creek |
| Albany | Orinda/San Pablo |
| Berkeley | Orinda/San Pablo |
| Castro Valley | Upper San Leandro/Orinda |
| Crockett | Sobrante/Orinda |
| Danville | Walnut Creek |
| El Cerrito | Orinda/San Pablo |
| El Sobrante | Sobrante/Orinda |
| Emeryville | Orinda/San Pablo |
| Hayward | Upper San Leandro/Orinda |
| Hercules | Sobrante/Orinda |
| Kensington | Orinda/San Pablo |
| 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 |

## EBMUD ADVOCATES HIGHER LEAD PROTECTIONS

A new EBMUD-sponsored law (introduced by Assembly member Wilma Chan and signed into law by Governor Arnold Schwarzenegger last September) will reduce exposure to lead from drinking water in customers' homes, workplaces and schools by phasing out the lead in drinking water plumbing sold in California. Lead levels in EBMUD's water are consistently low, but brass plumbing in homes may leach lead into the water at the faucet.

Assembly Bill 1953 adds to the strict regulatory testing requirements for reducing lead in drinking water that water utilities must meet and provides added protection by removing lead from plumbing parts sold to customers and utilities. The parts will be required to contain no more than 0.25 percent lead beginning in January 2010.

*This map of the EBMUD service area shows which water treatment plant serves your neighborhood under normal operations. There may be occasional changes in areas served due to operational or water demand changes.*

## WATER CONSERVATION NEEDED

This past winter was one of the driest years in our 84-year history – with little snow in the mountainous watershed that supplies our water. We will not be able to refill water supply reservoirs this year. If next winter is also dry, the supply could drop to levels that would lead to mandatory rationing.

Be WaterSmart - there is never enough to waste:

- Water lawns and gardens just three days a week, never on consecutive days and only at night or early morning before dawn.
- Check for leaks in toilets and sink fixtures, and fix them. A new toilet tank flapper ball can save thousands of gallons a day. New faucet washers help, too.
- Inspect your sprinkler system spray patterns, irrigation heads and controls. Water plants, not pavement.
- Take advantage of EBMUD rebates for clothes washers, high efficiency toilets, and landscaping and irrigation upgrades.
- Plant waterwise gardens with the help of EBMUD's plant and landscape book (order at www.ebmud.com) or advice from your local nursery or landscape professional.

*For more information, visit www.ebmud.com (select Conserving & Recycling) or call 1-866-40-EBMUD.*

EBMUD tests your water daily to make sure it is safe to drink. We look for more than 100 substances in the water, including bacteria, pesticides and herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water-treatment processes.

This table shows the measured level of substances detected at EBMUD source waters, water treatment plants (see table or map on pages 2-3 to see which treatment plant normally serves your neighborhood) or in the distribution system. Only the substances detected in 2006 are listed in this chart.

Regulations for *Primary Drinking Water Constituents* are designed to protect public health. Regulations for *Constituents Which Have Secondary MCLs* relate to the aesthetic qualities of your water such as taste and odor. *Unregulated Constituents* are chemical or microbial constituents that water agencies are required to monitor, but no maximum contaminant levels (MCL) have been established. *In 2006 EBMUD met or surpassed all water quality regulations set by the California Department of Health Services and the United States Environmental Protection Agency.*

**Table below lists all drinking water constituents detected at the source, the treatment plant or the distribution system in 2006.**

| What did we find in your water? | What's the regulation? | | How much did we find? | | | | | | | Did we meet the Regulation? | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary Drinking Water Constituents | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Walnut Creek Treatment Plant | Lafayette Treatment Plant | Orinda Treatment Plant | San Pablo Treatment Plant | Sobrante Treatment Plant | USL Treatment Plant | | Typical Sources |
| **Microbiological Constituents** - Turbidity has no health effects, but high levels of turbidity can interfere with disinfection and provide a medium for microbial growth. | | | | | | | | | | | |
| Total Coliforms, percent positive detected | 5% | (0) | <0.1% | NA | NA | NA | NA | NA | NA | YES | Naturally present in the environment |
| Turbidity (NTU), maximum level, except for Average | 1 NTU | NS | 0.04 | 0.08 | 0.07 | 0.07 | 0.06 | 0.09 | 0.10 | YES | Soil runoff |
| Turbidity | 95% of the samples ≤ 0.3 NTU | NS | NR | 100% | 100% | 100% | 100% | 100% | 100% | YES | Soil runoff |
| **Radioactive Constituents** | | | | | | | | | | | |
| Gross Alpha particle activity (pCi/L) | 15 | (0) | <3 | <3 | <3 | <3 | <3-11 | <3-11 | <3 | YES | Erosion of natural deposits |
| Gross Beta particle activity (pCi/L) | 50 | (0) | <4 | <4 | <4 | <4 | <4-9.1 | <4-9.1 | <4 | YES | Decay of natural deposits |
| **Inorganic Constituents** | | | | | | | | | | | |
| Aluminum (ug/L) | 1000 | 600 | <50 | <50-72 | <50 | <50 | <50 | <50-74 | <50-56 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Fluoride (naturally occurring) (mg/L)* | 2 | 1 | <0.1 | <0.1 | <0.1 | <0.1-0.15 | 0.13 | 0.13 | 0.15 | YES | Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories |
| Chloramine Residual as $Cl_2$ (mg/L), maximum level, except for Average | [4] | [4] | 1.9 | 2.5 | 2.1 | 2.8 | 2.7 | 3.2 | 3.0 | YES | Drinking water disinfectant added for treatment |
| **Organic Constituents** | | | | | | | | | | | |
| Acrylamide in treatment chemical (percent of maximum dose allowed) | TT | (0) | NA | Met reqmt | NA | Met reqmt | NA | Met reqmt | NA | YES | Added to water during water treatment |
| Control of DBP precursors (TOC Reduction) | TT | NS | NR | NR | NR | NR | Met reqmt | Met reqmt | Met reqmt | YES | Various natural and man-made sources |
| Haloacetic acids, 5 species (ug/L) | 60 | NS | 19** | 13-42 | 13-33 | 10-34 | 17-36 | 9-25 | 6-13 | YES | By-product of drinking water chlorination |
| Trihalomethanes (ug/L) | 80 | NS | 47** | 50-72 | 44-59 | 41-53 | 38-110 | 28-55 | 23-60 | YES | By-product of drinking water chlorination |
| **Constituents Which Have Secondary MCLs** | | | | | | | | | | | |
| Aluminum (ug/L) | 200 | NS | <50 | <50-72 | <50 | <50 | <50 | <50-74 | <50-56 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Chloride (mg/L) | 500 | NS | 8.4 | 3.8 | 3.4 | 4.0-5.4 | 11 | 14 | 14 | YES | Runoff/leaching from natural deposits; seawater influence |
| Color, color units | 15 | NS | 1 | 1 | 1 | 1-2 | 2 | 1 | 1 | YES | Naturally-occurring organic materials |
| Odor–Threshold Odor Number (T.O.N.) | 3 | NS | 1.9 | 1.4 | 1.9 | 1.3-2.5 | 1.7 | 2.5 | 1.9 | YES | Naturally-occurring organic materials |
| Specific Conductance (umhos/cm) | 1600 | NS | 182 | 55 | 50 | 62-112 | 256 | 364 | 374 | YES | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | NS | 108 | 39 | <25 | 53-68 | 150 | 210 | 210 | YES | Runoff/leaching from natural deposits |
| Turbidity (NTU) | 5 | NS | 0.04 | 0.08 | 0.07 | 0.07 | 0.06 | 0.09 | 0.10 | YES | Soil runoff |
| **Unregulated Constituents** | NL | | | | | | | | | | |
| Boron (ug/L) | 1000 | NS | <100 | <100 | <100 | <100 | <100 | <100 | <100-109 | YES | Runoff/leaching from natural deposits |
| N-Nitrosodimethylamine (NDMA), ng/L*** | 10 | 3.0 | 3.0 | <2-16 | <2-11 | <2-14 | NS | <2-4 | <2-5 | YES | Runoff/leaching from natural deposits |
| **Lead and Copper: Sampled last in 2005. Required every three years.** | **AL** | **PHG** | **90th Percentile Level Found** | **# of Sites found above the AL** | | | | | | | |
| Copper (ug/L) (regulated at 90th percentile) | 1300 | 170 | 51 | No sites out of 52 sites | | | | | | YES | Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives |
| Lead (ug/L)**** (regulated at 90th percentile) | 15 | 2 | 5 | 3 sites out of 52 sites | | | | | | YES | Internal corrosion of household plumbing systems; discharges from industrial manufacturers; erosion of natural deposits |

*Fluoride reported above reflect levels in the source waters. Fluoride was added in the range of 0.9 to 1.0 mg/L, to help prevent dental decay in consumers. **Highest Running Annual Average. ***Sampled at representative distribution system taps.
****Infants and young children are typically more vulnerable to lead in drinking water than the general population. 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 and flush your tap for 30 seconds to 2 minutes before using tap water. Additional information is available from the USEPA Safe Drinking Water Hotline: (800-426-4791).

## TERMS USED

**AL = regulatory action level.** The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

**$Cl_2$ = chlorine**, measured disinfectant residual equivalent.

**DBP = disinfection by-products.** Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products, formed when chlorine and/or ozone reacts with natural constituents in water.

**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 a MCLG.

**mg/L = milligrams per liter**, or parts per million (ppm).

**MRDL = maximum residual disinfectant level.** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**MRDLG = maximum residual disinfectant level goal.** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the U.S. Environmental Protection Agency.

**NA = not applicable.**

**ng/L = nanograms per liter, or parts per trillion (ppt).**

**NL = notification level.** Notification levels are health-based advisory levels established by CDHS for chemicals in drinking water that lack MCLs.

**NR = not required for meeting regulations.**

**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 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 odor, taste and appearance of drinking water.

**TOC = total organic carbon.** A measurement of organic compounds which could form by-products after disinfection. See DBP.

**T.O.N. = 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.

**Trihalomethanes =** A group of contaminants in drinking water formed as a by-product of disinfection. See DBP.

**Turbidity =** A measure of cloudiness of the water. See NTU.

**ug/L = micrograms per liter, or parts per billion (ppb).**

**umhos/cm = micromhos per centimeter,** a measure of electrical conductance.

**USL =** Upper San Leandro.

**90th percentile =** 90% of samples had lower values than required by the regulatory Action Level.

## INFORMATION FROM THE USEPA & CDHS

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (USEPA) and the California Department of Health Services (CDHS) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The CDHS 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 the USEPA's Safe Drinking Water Hotline at (800) 426-4791.

## 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 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.

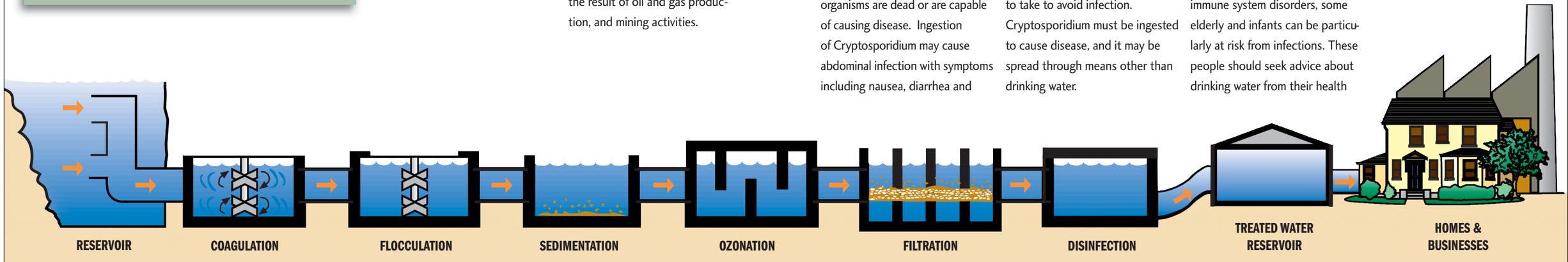
The following table includes measurements of other water quality constituents that might be of interest to our consumers:

| OTHER WATER QUALITY PARAMETERS | Walnut Creek Treatment Plant | Lafayette Treatment Plant | Orinda Treatment Plant | San Pablo Treatment Plant | Sobrante Treatment Plant | USL Treatment Plant |
|---|---|---|---|---|---|---|
| Alkalinity, bicarbonate (mg/L as CaCO3) | 15.8 | 13.6 | 17-30 | 74 | 104 | 125 |
| Alkalinity, carbonate (mg/L as CaCO3) | 2.4 | 0.8 | 2-2.2 | 2.2 | 6.1 | 4.7 |
| Calcium (mg/L) | 4.3-6.4 | 4.2-6.4 | 4.5-16.0 | 15-24 | 16-30 | 31-33 |
| Hardness (mg/L as CaCO3) | 14-26 | 13-20 | 15-62 | 58-84 | 66-120 | 130-140 |
| Magnesium (mg/L) | 0.7-1.5 | 0.7-1.5 | 0.9-4.2 | 4.4-7.7 | 5.0-10.0 | 12.0-14.0 |
| pH (pH units) | 9.2-9.5 | 8.6-9.1 | 8.9-9.4 | 7.3-8.9 | 8.6-8.8 | 8.5-8.8 |
| Potassium (mg/L) | 0.5-0.7 | 0.5-0.8 | 0.6-1.2 | 1.0-1.3 | 1.2-1.5 | 1.6-1.7 |
| Silica (mg/L) | 8.6-14.3 | 8.8-13.9 | 8.1-13.7 | 10.3-12.4 | 10.3-13.1 | 8.1-13.1 |
| Sodium (mg/L) | 5.3-6.8 | 4.1-6.0 | 5.4-15.0 | 18.0-25.0 | 20.0-32.0 | 29.0-31.0 |

Dishwashers and industrial cooling process applications often perform better when programmed with information on water hardness in "grains per gallon." To convert the hardness values into grains per gallon, divide the values shown in the tables in milligrams per liter by 17. For example, hardness for areas served by Orinda Water Treatment Plant had a range from 15 to 62 mg/L, which is equivalent to 0.9 to 3.6 grains per gallon.

**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. 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. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people are at greater risk of developing life-threatening illness. We encourage immuno-compromised individuals to consult their physician 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.

**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, 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: (800) 426-4791 or www.epa.gov/safewater.




## THE WATER TREATMENT PROCESS

**Source Water Protection** EBMUD protects the watershed lands surrounding reservoirs so that the water delivered to treatment plants is as clean as possible.

**Coagulation** Coagulants such as alum neutralize very small particles, allowing them to clump together.

**Flocculation** After coagulants are added, the water is gently mixed to cause sediment particles to combine and grow large enough to settle.

**Sedimentation** Water flows very slowly in sedimentation basins, allowing the particles to settle to the bottom.

**Ozonation** At the Sobrante and Upper San Leandro water treatment plants, ozone is used for disinfection, and taste and odor control.

**Filtration** Water flows through filter beds made up of layers of coal (anthracite), and sand. The coal and sand trap any particles remaining in the water.

**Disinfection** The addition of chlorine and chloramines (chlorine and ammonia) kills remaining microorganisms, providing protection against disease-causing organisms, such as bacteria or viruses.

**Fluoridation** Fluoride is added to prevent dental cavities.

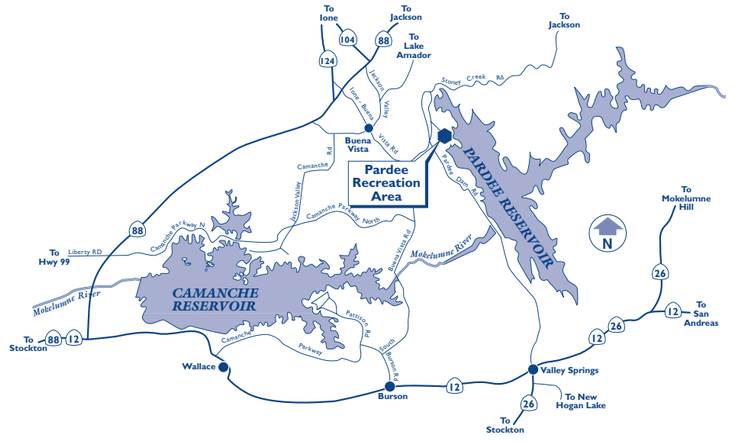
**Corrosion Control** EBMUD adds calcium hydroxide (lime) or sodium hydroxide to the water to control corrosion in distribution pipes and consumers' plumbing. This also keeps substances like lead and copper from leaching out of plumbing into the drinking water.

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE RECREATION AREA
# 2007 CONSUMER CONFIDENCE REPORT




## 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 Recreation Area. 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 2007.

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 2007, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which 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. We found no coliform bacteria in the system in 2007.

**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.

Sampling for all inorganic chemicals is waived by the Department except for nitrate (annually) and nitrite (once every three years).

Monitoring was waived by the Department for Lead and Copper at the consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. The Department has waived radiological monitoring for Pardee Recreation Area.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Recreation Area.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The Department has waived monitoring of these chemicals for Pardee Recreation Area.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is waived by the Department.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated.

## Pardee Recreation Area 2007 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2007 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2007.***

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Pardee Recreation Area 2007 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Typical Sources |
|---|---|---|---|---|---|
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Chlorine Residual as $Cl_2$ (mg/L) †Maximum level found | [4] | [4] | 0.7 | 1.3† | By-product of drinking water chlorination |
| **Secondary Parameters** | **MCL** | | **Average** | **Sample Date** | **Typical Sources** |
| Chloride (mg/L) | 500 | | 2.9 | | Runoff/leaching from natural deposits; seawater influence |
| Color (color unit) | 15 | | 3 | 2006 | Naturally-occurring organic materials |
| Odor–Threshold (TON) | 3 | | 2.8 | 2006 | Naturally-occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | | 45.8 | | Substances that form ions when in water; seawater influence |
| Total dissolved solids (mg/L) | 1000 | | 45 | | Runoff/leaching from natural deposits |

| Other Parameters | Level Found | Other Parameters | Level Found |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 18.7 | Magnesium (mg/L) | 1.3 |
| Calcium (mg/L) | 3.8 | Potassium (mg/L) | 0.6 |
| Hardness (mg/L) | 14 | Sodium (mg/L) | 3.3 |

| Treatment Technique | Turbidity Performance Standards |
|---|---|
| **Ultrafiltration** (Membrane filtration) | 1 – Be less than or equal to 0.1 NTU in 95% of measurements in a month.<br>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 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

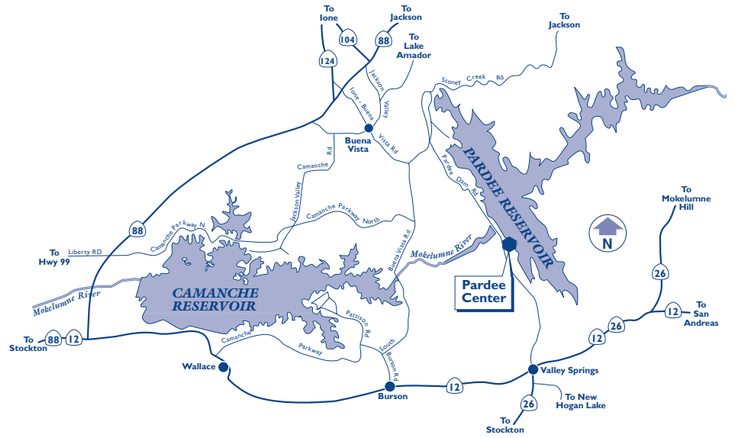
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µS/cm** = micro siemens per centimeter (measure of conductivity)

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE CENTER
# 2007 CONSUMER CONFIDENCE REPORT




## 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 2007.

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 2007, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. We found no coliform bacteria in the system in 2007.

**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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years). No inorganic contaminants were found in 2007.

Lead and copper were monitored in 2005 at consumer taps, as required by the Lead & Copper Rule, and results were below regulatory limit. The next round of lead and copper sampling is scheduled in 2008. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally-occurring or be the result of oil and gas production and mining activities. Monitoring of radiological contaminants in 2007 showed no detection.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Center.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The latest monitoring showed no detection of these chemicals.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of parameters with secondary MCLs are required by Department once a year. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department. Samples were taken from treated water.

## Pardee Center 2007 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2007 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2007.***

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Pardee Center 2007 Water Quality Data

| | MCL OR [MRDL] | PHG (MCLG) OR [MRDLG] | AVERAGE | RANGE | TYPICAL SOURCES |
|---|---|---|---|---|---|
| **DISINFECTION BYPRODUCTS, DISINFECTANT RESIDUALS** | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 33 | | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 17 | | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.7 | 1.9† | By-product of drinking water chlorination |

†Maximum level found

| SECONDARY PARAMETERS | MCL | AVERAGE | RANGE | VIOLATION | TYPICAL SOURCES |
|---|---|---|---|---|---|
| Chloride (mg/L) | 500 | 2.7 | | | Runoff/leaching from natural deposits; seawater influence |
| Color (color units) | 15 | 3 | | | Naturally occurring organic materials |
| Odor–Threshold (TON) | 3 | 3.7 | 2–4.7 | †† | Naturally occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 57 | | | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 51 | | | Runoff/leaching from natural deposits |

††MCL exceedance for TON did not coincide with any odor complaints or detection by consumers. TON values of 4.4 and 4.7 were detected on 6/13 and 9/12, 2007.

| OTHER PARAMETERS | AVERAGE | OTHER PARAMETERS | AVERAGE |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 28 | Magnesium (mg/L) | 0.9 |
| Alkalinity, carbonate (mg/L) | 0.2 | pH (pH units) | 7.9 |
| Calcium (mg/L) | 2.8 | Potassium (mg/L) | 0.6 |
| Hardness (mg/L) | 11 | Sodium (mg/L) | 8.8 |

| TREATMENT TECHNIQUE | TURBIDITY PERFORMANCE STANDARDS |
|---|---|
| **NANOFILTRATION** (Membrane filtration) | 1 – Be less than or equal to 0.1 NTU in 95% of measurements in a month.<br>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 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

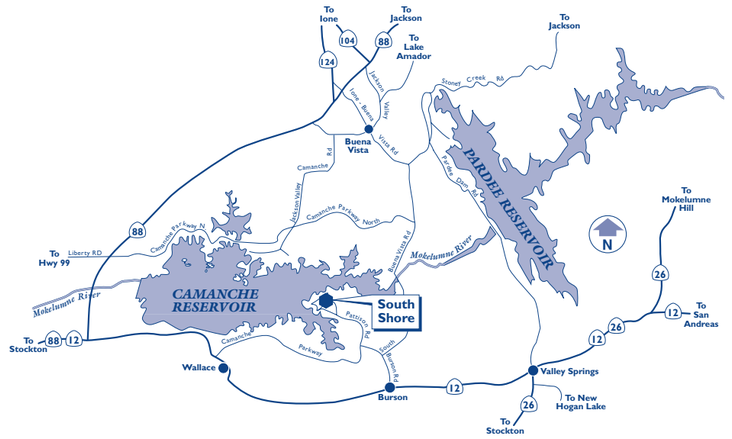
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# CAMANCHE SOUTH SHORE 2007 CONSUMER CONFIDENCE REPORT




## 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 2007.

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 2007, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Regulatory Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, 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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years). Aluminum was not detected in the water supplied to the public.

Lead and copper were monitored in 2007 at consumer taps, as required by the Lead & Copper Rule. Results were within standards. No lead was detected at consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. Radiological sampling of source water was performed in 2005 and all results were below detection level.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department waived monitoring requirements for these chemicals, except Simazine and Atrazine that are monitored once every three years, and were not detected in 2006.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural applications and septic systems. The latest monitoring occurred in 2003 and no detectable levels of these chemicals (including MTBE) were found at the drinking water intake or in the reservoir. The Department granted a one-time 3-year waiver and the next monitoring will be due in 2009.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is required once every 12 months except Thiobencarb which is waived by the Department. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department.

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Camanche South Shore 2007 Water Quality Data

The table below lists all the drinking water contaminants that we detected during the 2007 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2007.*** The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants are 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.

## Camanche South Shore 2007 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Typical Sources |
|---|---|---|---|---|---|
| **Microbial Contaminants** | | | | | |
| Total Coliform Bacteria | No more than 1 positive monthly sample | (0) | NA | 0–1 | Naturally present in environment |
| **Inorganic Contaminants** | | | | | |
| Aluminum (mg/L) | 1 | 0.6 | 0.066 | <0.05–0.066 | Erosion of natural deposits |
| Copper (mg/L) | AL = 1.3 | 0.17 | 90th percentile = 0.058 | No sites above the AL out of 5 sites sampled | Corrosion of household plumbing |
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 34†† | 25–36 | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 31†† | 20–32 | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.7 | 1.2† | By-product of drinking water chlorination |

†Maximum level found
††Highest running annual average

| Secondary Parameters | MCL | Average | Typical Sources |
|---|---|---|---|
| Chloride (mg/L) | 500 | 2.7 | Runoff/leaching from natural deposits; seawater influence |
| Color (color unit) | 15 | 3 | Naturally-occurring organic materials |
| Odor–Threshold (TON) | 3 | 1.4 | Naturally-occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 45 | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 38 | Runoff/leaching from natural deposits |

| Other Parameters | Level Found | Other Parameters | Level Found |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 17.6 | Magnesium (mg/L) | 1.2 |
| Calcium (mg/L) | 4.3 | Potassium (mg/L) | 0.8 |
| Hardness (mg/L) | 16 | Sodium (mg/L) | 2.3 |

| Treatment Technique | Turbidity Performance Standards |
|---|---|
| **Direct Filtration** (Dual Media Filtration with Anthracite and Sand) | 1 – Be less than or equal to 0.3 NTU in 95% of measurements in a month.<br>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 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

**AL** = Regulatory Action Level
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goa
**NA** = Not Applicablel
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

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 importante información sobre el agua potable que usted consume. Tradúzcalo, 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។ សូមរកគេឲ្យបកប្រែជូនឬពិគ្រោះជាមួយអ្នកណាដែលយល់របាយការណ៍នេះ ។

THAI
รายงานฉบับนี้มีข้อมูลสำคัญเกี่ยวกับน้ำดื่มของท่าน ขอให้แปลรายงานฉบับนี้หรือพูดคุยกับผู้ที่เข้าใจเนื้อหาในรายงานนี้.

LAO
ລາຍງານສະບັບນີ້ມີຂໍ້ມູນສຳຄັນກ່ຽວກັບນ້ຳດື່ມຂອງທ່ານ. ໃຫ້ທ່ານແປເອກະສານນີ້ເປັນພາສາລາວ, ຫລືໃຫ້ທ່ານເວົ້າປຶກສາກັບຜູ້ທີ່ເວົ້າໃຈເລື່ອງ.

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.

## Public Participation

EBMUD encourages public participation in decisions affecting drinking-water quality and other matters at its Board meetings, which take place the second and fourth Tuesdays of each month (exceptions: September 10, 2008 and November 12, 2008) at 1:15 p.m., 2nd floor, 375 Eleventh Street, Oakland.

To speak with someone who can provide more information about water quality or to report a water quality concern, call 1-866-40-EBMUD (1-866-403-2683).

**Board of Directors**
John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

**General Manager**
Dennis M. Diemer

## Additional Contacts

**California Department of Health Services Drinking Water Branch** - (510) 620-3463

**U.S. Environmental Protection Agency Safe Drinking Water Hotline** - (800) 426-4791

**Local Health Departments:**
Alameda County - (510) 267-8000
Contra Costa County - (925) 313-6712

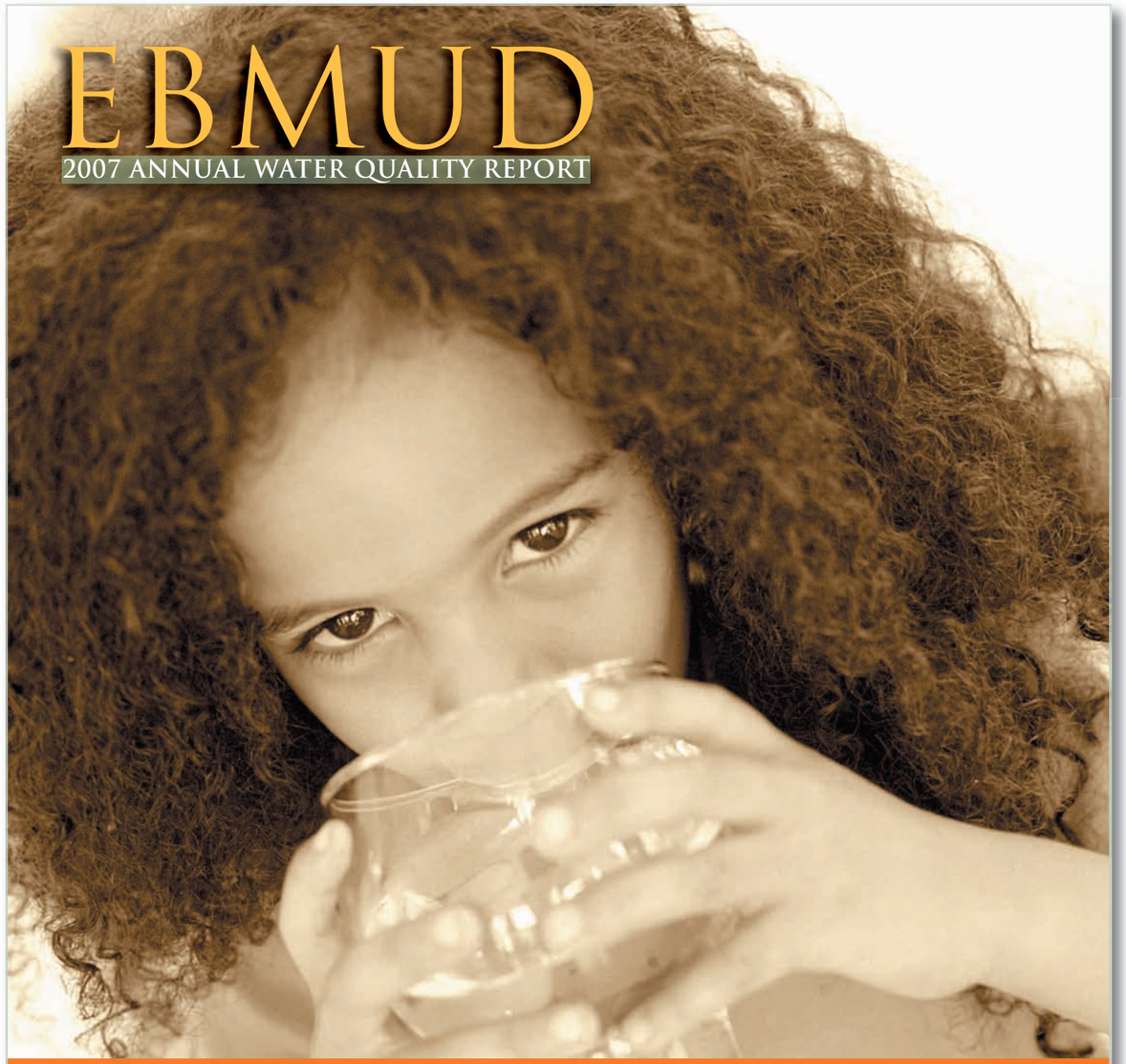
EBMUD
375 Eleventh Street
Oakland, CA 94607
1-866-40-EBMUD
*www.ebmud.com*

PUB. 118 5.08 600M

PRESORTED
STANDARD
U.S. POSTAGE
PAID
DMI

# EBMUD

## 2007 ANNUAL WATER QUALITY REPORT



## DROUGHT DECLARED - WATER RESTRICTIONS IN PLACE!

*see inside for more information*

This report is our chance to tell you more about the water you use every day – how it gets treated, where it comes from and what is in it. In 2007, EBMUD water met every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.

Hundreds of people at EBMUD are dedicated to making sure you get the best water quality possible. They include the rangers who protect watersheds and reservoirs, treatment plant operators, distribution operators, laboratory chemists and biologists, and the engineers and craftsmen who design, build and maintain our infrastructure. Water quality is so important to us that we set our own water quality goals that are more stringent than state and federal regulations.

Please read on for more information - we take pride in delivering high water quality to you every day.

| City Served | Treatment Plant | City Served | Treatment Plant |
|---|---|---|---|
| Alameda | Orinda/Upper San Leandro | Moraga | Lafayette/Orinda |
| Alamo | Walnut Creek | Oakland | Orinda/Upper San Leandro |
| Albany | Orinda/San Pablo | Orinda | Orinda/Lafayette |
| Berkeley | Orinda/San Pablo | Piedmont | Orinda/Upper San Leandro |
| Castro Valley | Upper San Leandro/Orinda | Pinole | Sobrante/Orinda |
| Crockett | Sobrante/Orinda | Pleasant Hill | Walnut Creek |
| Danville | Walnut Creek | Richmond | Sobrante/Orinda |
| El Cerrito | Orinda/San Pablo | Rodeo | Sobrante/Orinda |
| El Sobrante | Sobrante/Orinda | San Leandro | Upper San Leandro/Orinda |
| Emeryville | Orinda/San Pablo | San Lorenzo | Upper San Leandro/Orinda |
| Hayward | Upper San Leandro/Orinda | San Pablo | Sobrante/Orinda |
| Hercules | Sobrante/Orinda | San Ramon | Walnut Creek |
| Kensington | Orinda/San Pablo | Walnut Creek | Walnut Creek/Lafayette |
| Lafayette | Lafayette/Walnut Creek | | |

*Use table or map above to find out which treatment plant serves your neighborhood.*
*Then go to the chart on pages 4-5 (match the color and/or treatment plant name) to find water quality data for your neighborhood.*





One of the most important factors in water quality is its source: the purer the source, the better the water. Ninety percent of EBMUD's water comes from the 577-square-mile watershed of the Mokelumne River, which collects Sierra Nevada snowmelt and flows into Pardee Reservoir in the Sierra foothills near the town of Valley Springs. The watershed on the west slope of the Sierra Nevada is mostly undeveloped land, little affected by human activity. The water travels to the East Bay in pipelines and is protected from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges. Local East Bay watershed rainfall and runoff accounts for about 10 percent of the District's water supply.

Before the water comes to your tap, EBMUD takes many steps to ensure its quality and safety. This includes carefully managing and protecting watershed lands, treating the water, sampling and monitoring, analyzing results of the sampling and adjusting treatment, flushing pipes and reservoirs, and repairing pipes. See the diagram on pages 6-7 for more information on the water treatment process.

*Hundreds of employees at EBMUD, including chemists who analyze laboratory water samples, work each day to ensure you have the best water quality possible.*

## Protecting Source Waters

For the past two years EBMUD has been working cooperatively with the East Bay Regional Park District and ranchers in the area of Pardee Reservoir to alter wet-season cattle grazing practices. The changes are intended to reduce the likelihood of sediment, nutrients and pathogens such as Cryptosporidium from entering drinking-water reservoirs. Monitoring and testing results, available in the coming years, will help develop the best long-term methods for protecting reservoirs and improving water quality.

## Pharmaceuticals in Water

This spring the issue of pharmaceuticals and personal care products in drinking water received national media attention. In limited testing, EBMUD has not detected medications in its water, and it consistently meets or surpasses all health-based water quality standards of the US Environmental Protection Agency and the State of California.

Pharmaceuticals and personal care products in water typically come from wastewater—but there are no municipal wastewater discharges upstream from any of our water intakes. Nevertheless, EBMUD will continue its leadership role in the American Water Works Association Research Foundation to establish reliable methods to measure pharmaceutical and personal care products, determine any risks they may pose, develop effective ways of preventing their entry into drinking water sources and identify effective treatment processes.

EBMUD tests your water daily to make sure it is safe to drink. We look for more than 100 substances in the water, including bacteria, pesticides and herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water-treatment processes.

This table shows the measured level of substances detected at EBMUD source waters, water treatment plants (see table or map on page 2 to see which treatment plant normally serves your neighborhood) or in the distribution system. Most substances listed in this table were detected in 2007. Data for constituents with longer sampling cycles may be from previous years.

Regulations for *Primary Drinking Water Constituents* are designed to protect public health. Regulations for *Constituents Which Have Secondary MCLs* relate to the aesthetic qualities of your water such as taste and odor. *Unregulated Constituents* are chemical or microbial constituents that water agencies are required to monitor, but no maximum contaminant levels (MCL) have been established.

*In 2007 EBMUD met or surpassed all water quality regulations set by the California Department of Public Health (CDPH) and the United States Environmental Protection Agency (USEPA).*

Table below lists all drinking water constituents detected at the source, the treatment plant or the distribution system in 2007.

| Primary Constituents | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Walnut Creek | Lafayette | Orinda | San Pablo | Sobrante | USL | Did we meet the Regulation? | Typical Sources |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Microbiological Constituents** | | | | | | | | | | | |
| Total Coliforms, percent positive detected | 5% | (0) | <0.1% | NA | NA | NA | NA | NA | NA | YES | Naturally present in the environment |
| Turbidity (NTU), maximum level, except for Average | 1 NTU | NS | 0.04 | 0.07 | 0.06 | 0.07 | 0.05 | 0.06 | 0.08 | YES | Soil runoff |
| Turbidity | 95% of the samples ≤ 0.3 NTU | NS | NR | 100% | 100% | 100% | 100% | 100% | 100% | YES | Soil runoff |
| **Radioactive Constituents - sampled in 2006-2007** | | | | | | | | | | | |
| Gross Alpha particle activity (pCi/L) | 15 | (0) | <3 | <3 | <3 | <3 | <3-11 | <3-11 | <3 | YES | Erosion of natural deposits |
| Gross Beta particle activity (pCi/L) | 20 | (0) | <4 | <4 | <4 | <4 | <4-9.1 | <4-9.1 | <4 | YES | Decay of natural deposits |
| Uranium (pCi/L) | 20 | 0.43 | NR | <1 | <1 | <1 | <1 | <1 | <1 | YES | Erosion of natural deposits |
| Uranium was detected at 1.1 pCi/L in Chabot Reservoir, an emergency standby reservoir, which has not been used for water supply in more than 20 years. | | | | | | | | | | | |
| **Inorganic Constituents** | | | | | | | | | | | |
| Aluminum (ug/L) | 1000 | 600 | <50 | <50 | <50 | <50 | <50 | <50-72 | <50-110 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Bromate (ug/L) | 10 | (0) | <5** | NR | NR | NR | NR | <5 | <5-11***** | YES | By-product of drinking water disinfection |
| Chloramine Residual as $Cl_2$ (mg/L), maximum level, except for Average | [4] | [4] | 1.9 | 2.8 | 2.1 | 2.7 | 2.5 | 2.9 | 3.6 | YES | Drinking water disinfectant added for treatment |
| Fluoride (naturally occurring) (mg/L)* | 2 | 1 | <0.1 | <0.1 | <0.1 | <0.1-0.14 | 0.1 | 0.1 | 0.13 | YES | Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories |
| **Organic Constituents** | | | | | | | | | | | |
| Acrylamide in treatment chemical (percent of maximum dose allowed) | TT | (0) | NR | Met reqmt | NR | Met reqmt | NR | NR | NR | YES | Added to water during water treatment |
| Control of DBP precursors (TOC Reduction) | TT | NS | NR | NR | NR | NR | Met reqmt | Met reqmt | Met reqmt | YES | Various natural and man-made sources |
| Haloacetic acids, 5 species (ug/L) | 60 | NS | 18** | 16-21 | 9-22 | 11-22 | 10 | 10-17 | 5-25 | YES | By-product of drinking water chlorination |
| Trihalomethanes (ug/L) | 80 | NS | 40** | 30-41 | 33-37 | 20-36 | 20 | 18-27 | 10-31 | YES | By-product of drinking water chlorination |
| **Constituents Which Have Secondary MCLs** | | | | | | | | | | | |
| Aluminum (ug/L) | 200 | NS | <50 | <50 | <50 | <50 | <50 | <50-72 | <50-110 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Chloride (mg/L) | 500 | NS | 7.1 | 5 | 5 | 5-6 | 8 | 10 | 11 | YES | Runoff/leaching from natural deposits; seawater influence |
| Color, color units | 15 | NS | 1.4 | 3 | 3 | <1-1 | 1 | <1 | 2 | YES | Naturally-occurring organic materials |
| Odor–Threshold Odor Number (T.O.N.) | 3 | NS | 1.5 | 2 | 1.7 | 1.4-1.5 | 1.5 | 1.2 | 1.3 | YES | Naturally-occurring organic materials |
| Specific Conductance (umhos/cm) | 1600 | NS | 135 | 75 | 72 | 73-133 | 128 | 178 | 283 | YES | Substances that form ions when in water; seawater influence |
| Sulfate (mg/L) | 500 | NS | 13 | 2.0 | 2.0 | 2.0-15 | 18 | 20 | 31 | YES | Runoff/leaching from natural deposits, industrial wastes |
| Total Dissolved Solids (mg/L) | 1000 | NS | 89 | 61 | 54 | 51-91 | 95 | 94 | 180 | YES | Runoff/leaching from natural deposits |
| Turbidity (NTU) | 5 | NS | 0.04 | 0.07 | 0.06 | 0.07 | 0.05 | 0.06 | 0.08 | YES | Soil runoff |
| **Unregulated Constituents** | **NL** | **PHG (MCLG)** | | | | | | | | | |
| N-Nitrosodimethylamine (NDMA), ng/L*** | 10 | 3 | 2 | <2 | <2-8 | 3 | NV | <2-6 | 2-3 | NR | Runoff/leaching from natural deposits |
| **Lead and Copper: Sampled last in 2005. Required every three years.** | **AL** | **PHG** | **90th Percentile Level Found** | **# of Sites found above the AL** | | | | | | | |
| Copper (ug/L) (regulated at 90th percentile) | 1300 | 170 | 51 | No sites out of 52 sites | | | | | | YES | Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives |
| Lead (ug/L)**** (regulated at 90th percentile) | 15 | 2 | 5 | 3 sites out of 52 sites | | | | | | YES | Internal corrosion of household plumbing systems; discharges from industrial manufacturers; erosion of natural deposits |

*Fluoride reported above reflect levels in the source waters. Fluoride was added in the range of 0.9 to 1.0 mg/L, to help prevent dental decay in consumers. **Highest Running Annual Average. ***Sampling locations chosen to represent worst-case scenario.

****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 service lines and home plumbing. EBMUD is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 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 Safe Drinking Water Hotline, (800) 426-4791, or at www.epa.gov/safewater/lead. *****Regulation based on running annual average. A single sample result of 11 ug/L did not violate the regulation of 10 ug/L

## TERMS USED

**AL = regulatory action level.** The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

**$Cl_2$ = chlorine**, measured disinfectant residual equivalent.

**DBP = disinfection by-products.** Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products, formed when chlorine and/or ozone reacts with natural constituents in water.

**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 level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**MRDLG = maximum residual disinfectant level goal.** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the U.S. Environmental Protection Agency.

**NA = not applicable.**

**ng/L = nanograms per liter, or parts per trillion (ppt).**

**NL = notification level.** Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

**NR = not required for meeting regulations.**

**NS = no standard** (MCL or PHG for example) established.

**NTU = nephelometric turbidity units.**

**NV = no value**

**pCi/L = pico curies per liter,** a measure of radioactivity.

**PDWS = primary drinking water standard.** MCLs 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 odor, taste and appearance of drinking water.

**TOC = total organic carbon.** A measurement of organic compounds which could form by-products after disinfection. See DBP.

**T.O.N. = 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.

**Trihalomethanes =** A group of contaminants in drinking water formed as a by-product of disinfection. See DBP.

**Turbidity =** A measure of cloudiness of the water. See NTU.

**ug/L = micrograms per liter, or parts per billion (ppb).**

**umhos/cm = micromhos per centimeter,** a measure of electrical conductance.

**USL =** Upper San Leandro.

**90th percentile =** 90 percent of samples had lower values than required by the regulatory action level.

## INFORMATION FROM THE USEPA & CDPH

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 the USEPA's Safe Drinking Water Hotline at (800) 426-4791.

## 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 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.

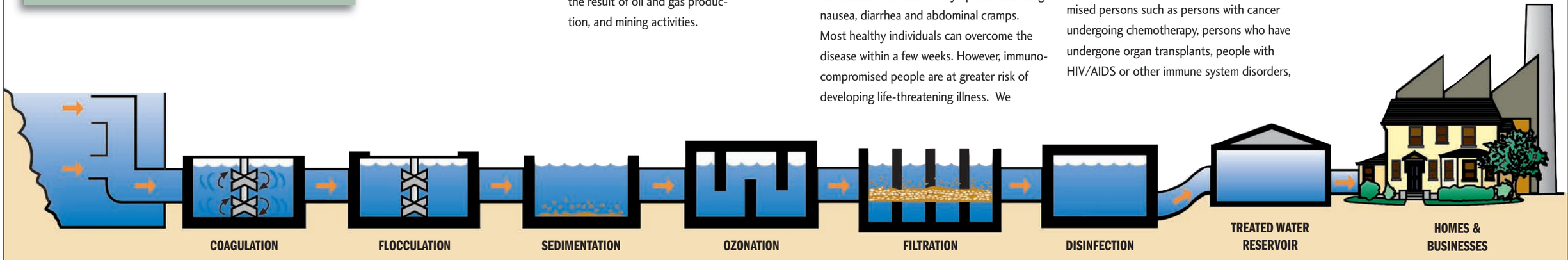
The following table includes measurements of other water quality constituents that might be of interest to our consumers:

| OTHER WATER QUALITY PARAMETERS | Walnut Creek | Lafayette | Orinda | San Pablo | Sobrante | USL |
|---|---|---|---|---|---|---|
| Alkalinity, bicarbonate (mg/L as CaCO3) | 27 | 27.6 | 27-40.4 | 48.5 | 53.3 | 97.4 |
| Alkalinity, carbonate (mg/L as CaCO3) | 0.8 | 0.7 | 1-1.2 | 0.5 | 0.8 | 2.3 |
| Calcium (mg/L) | 4-6 | 4-6 | 4-13 | 12-13 | 12-14 | 23-30 |
| Hardness (mg/L as CaCO3) | 14-22 | 14-22 | 16-44 | 46-57 | 46-60 | 96-130 |
| Magnesium (mg/L) | 0.9-1.3 | 0.9-1.4 | 0.9-3.3 | 3.7-4.1 | 3.7-4.2 | 7.1-12 |
| pH (pH units) | 8.9-9.4 | 8.6-9.1 | 8.7-9.3 | 8.7-9.0 | 8.5-8.9 | 8.7-8.8 |
| Potassium (mg/L) | 0.5-0.7 | 0.5-0.8 | 0.5-1.0 | 0.8-0.9 | 0.8-0.9 | 1.2-1.5 |
| Silica (mg/L) | 8.8-12.2 | 8.8-12.4 | 9.4-12.0 | 9.6-10.0 | 8.6-11.4 | 4.1-10.9 |
| Sodium (mg/L) | 5.4-7 | 4.8-6.6 | 5.6-12 | 16-17 | 16-18 | 22-28 |

Dishwashers and industrial cooling process applications often perform better when programmed with information on water hardness in "grains per gallon." To convert the hardness values into grains per gallon, divide the values shown in the tables in milligrams per liter by 17. For example, hardness for areas served by Orinda Water Treatment Plant had a range from 16 to 44 mg/L, which is equivalent to 0.9 to 2.6 grains per gallon.

**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. 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. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people are at greater risk of developing life-threatening illness. We encourage immuno-compromised individuals to consult their physician 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.

**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, 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: (800) 426-4791 or www.epa.gov/safewater.




## The Water Treatment Process

**Source Water Protection** EBMUD protects the watershed lands surrounding reservoirs so that the water delivered to treatment plants is as clean as possible.

**Coagulation** Coagulants such as alum neutralize very small particles, allowing them to clump together.

**Flocculation** After coagulants are added, the water is gently mixed to cause sediment particles to combine and grow large enough to settle.

**Sedimentation** Water flows very slowly in sedimentation basins, allowing the particles to settle to the bottom.

**Ozonation** At the Sobrante and Upper San Leandro water treatment plants, ozone is used for disinfection, and taste and odor control.

**Filtration** Water flows through filter beds made up of layers of coal (anthracite) and sand, trapping any particles remaining in the water.

**Disinfection** The addition of chlorine and chloramines (chlorine and ammonia) kills remaining microorganisms, providing protection against disease-causing organisms, such as bacteria or viruses.

**Fluoridation** Fluoride is added to prevent dental cavities.

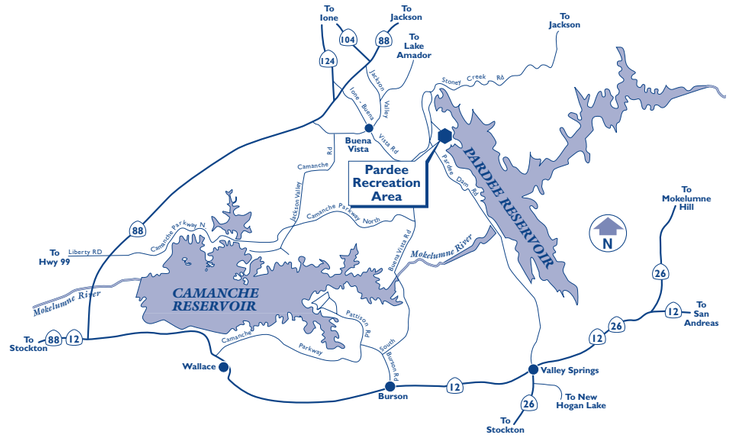
**Corrosion Control** EBMUD adds calcium hydroxide (lime) or sodium hydroxide to the water to control corrosion in distribution pipes and consumers' plumbing. This also keeps substances like lead and copper from leaching out of plumbing into the drinking water.

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE RECREATION AREA
# 2008 CONSUMER CONFIDENCE REPORT




## 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 Recreation Area. 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 2008.

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 2008, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Secondary Drinking Water Standards (SDWS):** MCLs for contaminants that affect taste, odor, or appearance of the drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which 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. We found no coliform bacteria in the system in 2008.

**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.

Sampling for all inorganic chemicals is waived by the Department except for nitrate (annually) and nitrite (once every three years).

Monitoring was waived by the Department for Lead and Copper at the consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. The Department has waived radiological monitoring for Pardee Recreation Area.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Recreation Area.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The Department has waived monitoring of these chemicals for Pardee Recreation Area.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is waived by the Department.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated.

## Pardee Recreation Area 2008 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2008 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2008.***

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Pardee Recreation Area 2008 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Major Sources in Drinking Water |
|---|---|---|---|---|---|
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Chlorine Residual as $Cl_2$ (mg/L) †Maximum level found | [4] | [4] | 0.7 | 1.0† | By-product of drinking water chlorination |
| **Secondary Parameters** | **MCL** | **Average** | | **Sample Date** | **Typical Sources** |
| Chloride (mg/L) | 500 | 3.7 | | | Runoff/leaching from natural deposits; seawater influence |
| Color (color unit) | 15 | 3 | | 2006 | Naturally-occurring organic materials |
| Odor–Threshold (TON) | 3 | 2.8 | | 2006 | Naturally-occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 51.7 | | | Substances that form ions when in water; seawater influence |
| Total dissolved solids (mg/L) | 1000 | 40 | | | Runoff/leaching from natural deposits |

| Other Parameters | Level Found | Other Parameters | Level Found |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 19.5 | Magnesium (mg/L) | 1.3 |
| Calcium (mg/L) | 4.3 | Potassium (mg/L) | 0.6 |
| Hardness (mg/L) | 20 | Sodium (mg/L) | 4 |

| Treatment Technique | Turbidity Performance Standards |
|---|---|
| **Ultrafiltration** (Membrane filtration) | 1 – Be less than or equal to 0.1 NTU in 95% of measurements in a month.<br>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 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µS/cm** = micro siemens per centimeter (measure of conductivity)

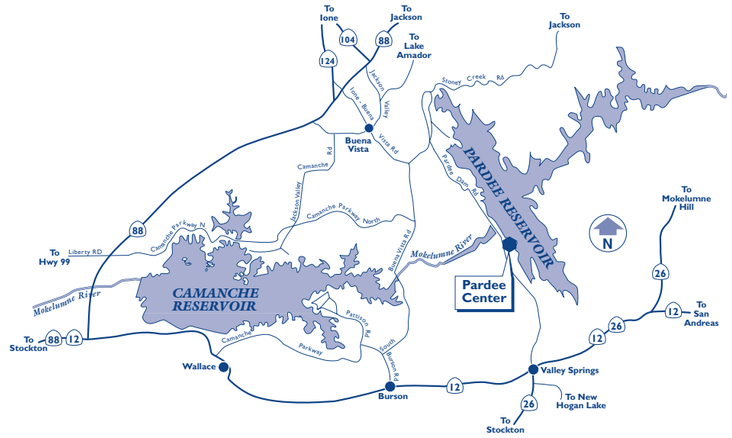
If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. EBMUD is responsible for providing the high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap water for 30 seconds to 2 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 Safe Drinking Water hotline (800), 426-4791, or at *http://www.epa.gov/safewater/lead.*

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE CENTER
# 2008 CONSUMER CONFIDENCE REPORT




## 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 2008.

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 2008, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Secondary Drinking Water Standards (SDWS):** MCLs for contaminants that affect taste, odor, or appearance of the drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

**Regulatory Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that the water system must follow.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. We found no coliform bacteria in the system in 2008.

**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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years). No inorganic contaminants were found in 2008 in treated water.

Lead and copper were monitored at consumer taps as required by the Lead & Copper Rule. No lead was detected in sample results. The next round of lead and copper sampling is scheduled in 2008. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally-occurring or be the result of oil and gas production and mining activities. Monitoring of radiological contaminants in 2007 showed no detection.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Center.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The latest monitoring showed no detection of these chemicals.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of parameters with secondary MCLs are required by the Department once a year. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department. Samples were taken from treated water.

## Pardee Center 2008 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2008 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2008.***

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Pardee Center 2008 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Major Sources in Drinking Water |
|---|---|---|---|---|---|
| **Inorganic Contaminants** | | | | | |
| Lead (µg/L) | AL = 15 | 2 | 90th percentile = 2.5 | No site above AL out of 5 sites sampled | Internal corrosion of household plumbing system; discharges from industrial manufacturers; erosion of natural deposits |
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 21 | | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 13 | | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.6 | 1.2† | By-product of drinking water chlorination |

†Maximum level found

| Secondary Parameters | MCL | Average | Range | Violation | Typical Sources |
|---|---|---|---|---|---|
| Chloride (mg/L) | 500 | 3.1 | | | Runoff/leaching from natural deposits; seawater influence |
| Color (color units) | 15 | 13 | | | Naturally occurring organic materials |
| Odor–Threshold (TON) | 3 | 2 | 1.1–3.5 | †† | Naturally occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 51 | | | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 31 | | | Runoff/leaching from natural deposits |

††MCL exceedance for TON did not coincide with any odor complaints or detection by consumers.
TON value of 3.5 was detected on 4/22/2008.

| Other Parameters | Average | Other Parameters | Average |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 24 | Magnesium (mg/L) | 0.6 |
| Alkalinity, carbonate (mg/L) | 0.5 | pH (pH units) | 8.3 |
| Calcium (mg/L) | 1.9 | Potassium (mg/L) | 0.51 |
| Hardness (mg/L) | 10 | Sodium (mg/L) | 7.6 |

| Treatment Technique | Turbidity Performance Standards |
|---|---|
| **Nanofiltration** (Membrane filtration) | 1 – Be less than or equal to 0.1 NTU in 95% of measurements in a month.<br>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 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

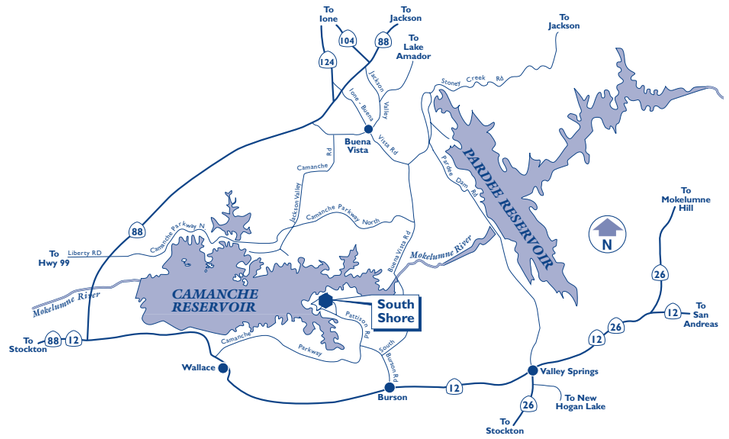
**AL** = Regulatory Action Level
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

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 service lines and home plumbing. EBMUD is responsible for providing the high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap water for 30 seconds to 2 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 Safe Drinking Water hotline (800), 426-4791, or at *http://www.epa.gov/safewater/lead*.

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

# EAST BAY MUNICIPAL UTILITY DISTRICT
# CAMANCHE SOUTH SHORE 2008 CONSUMER CONFIDENCE REPORT




## 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 2008.

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 2008, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Secondary Drinking Water Standards (SDWS):** MCLs for contaminants that affect taste, odor, or appearance of the drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

**Regulatory Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, 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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years). Aluminum was not detected in the water supplied to the public.

Lead and copper were monitored in 2007 at consumer taps, as required by the Lead & Copper Rule, with the next round of sampling in 2010. Results were within standards. No lead was detected at consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. Radiological sampling of source water was performed in 2005 and all results were below detection level. The next round of monitoring is scheduled in 2010.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department waived monitoring requirements for these chemicals, except Simazine and Atrazine that are monitored once every three years, and were not detected in 2006.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural applications and septic systems. The latest monitoring occurred in 2008 and no detectable levels of these chemicals were found at the drinking water intake or in the reservoir. The next round of monitoring is scheduled in 2011.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is required once every 12 months except Thiobencarb which is waived by the Department. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department.

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Camanche South Shore 2008 Water Quality Data

The table below lists all the drinking water contaminants that we detected during the 2007 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2008.*** The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants are 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.

## Camanche South Shore 2008 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Sample Date | Major Sources in Drinking Water |
|---|---|---|---|---|---|---|
| **Inorganic Contaminants** | | | | | | |
| Copper (mg/L) | AL = 1.3 | 0.3 | 90th percentile = 0.058 | No sites above the AL out of 5 sites sampled | 2007 | Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives |
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 51†† | | | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 14†† | | | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.6 | 1.1† | | By-product of drinking water chlorination |

†Maximum level found
††Highest running annual average

| Secondary Parameters | MCL | Average | Typical Sources |
|---|---|---|---|
| Chloride (mg/L) | 500 | 4 | Runoff/leaching from natural deposits; seawater influence |
| Color (color unit) | 15 | 6 | Naturally-occurring organic materials |
| Odor–Threshold (TON) | 3 | 2.6 | Naturally-occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 57.4 | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 39 | Runoff/leaching from natural deposits |

| Other Parameters | Level Found | Other Parameters | Level Found |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 20.1 | Magnesium (mg/L) | 1.5 |
| Calcium (mg/L) | 5.7 | Potassium (mg/L) | 0.9 |
| Hardness (mg/L) | 20 | Sodium (mg/L) | 3.2 |

| Treatment Technique | Turbidity Performance Standards |
|---|---|
| **Direct Filtration** (Dual Media Filtration with Anthracite and Sand) | 1 – Be less than or equal to 0.3 NTU in 95% of measurements in a month.<br>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: | 0.15 NTU |
| Number of violations of any surface water treatment requirements: | 0 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

**Key**

**AL** = Regulatory Action Level
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NA** = Not Applicablel
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

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 service lines and home plumbing. EBMUD is responsible for providing the high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap water for 30 seconds to 2 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 Safe Drinking Water hotline (800), 426-4791, or at *http://www.epa.gov/safewater/lead.*

# East Bay Municipal Utility District

## 2008 Annual Water Quality Report

This report tells you about the water you use every day – how it gets treated, where it comes from and what is in it.

*In 2008, EBMUD water met or surpassed every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.*

One of the most important factors in water quality is its source: the purer the source, the better the water. Ninety percent of EBMUD's water comes from the 577-square-mile watershed of the Mokelumne River, which collects Sierra Nevada snowmelt and flows into Pardee Reservoir in the Sierra foothills near the town of Valley Springs. The watershed on the west slope of the Sierra Nevada is mostly undeveloped land, little affected by human activity.

The water travels to the East Bay in pipelines and is protected from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges. Local East Bay watershed rainfall and runoff accounts for about 10 percent of the District's water supply.

Before the water comes to your tap, EBMUD takes many steps to ensure its quality. This includes carefully managing and protecting watershed lands and reservoirs, treating the water, operating the complex distribution system (pipes, pumping plants and reservoirs), sampling and analyzing for water quality, maintaining and replacing facilities, and investigating and correcting consumer concerns.

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.

### Drought Emergency Ending July 1

See Inside for Details

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 at (800) 426-4791 or visiting www.epa.gov/safewater.

EBMUD

# EBMUD 2008 ANNUAL WATER QUALITY REPORT

EBMUD tests your water daily to make sure it is safe to drink. We look for more than 100 substances in the water, including bacteria, pesticides and herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water-treatment processes.

This table shows the measured level of substances detected at EBMUD source waters, water treatment plants or in the distribution system (map on reverse side shows which treatment plant normally serves your neighborhood).

Regulations for *Primary Drinking Water Constituents* are designed to protect public health. Regulations for *Constituents Which Have Secondary MCLs* relate to the aesthetic qualities of your water such as taste and odor. *Unregulated Constituents* are chemical or microbial constituents that water agencies are required to monitor, but no maximum contaminant levels (MCL) have been established. *In 2008 EBMUD met or surpassed all water quality regulations set by the California Department of Public Health (CDPH) and the United States Environmental Protection Agency (USEPA).*

Table below lists all drinking water constituents detected at the source, the treatment plant or the distribution system in 2008.

| Primary Constituents | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Walnut Creek | Lafayette | Orinda | Sobrante | USL | Met Regulation | Typical Sources |
|---|---|---|---|---|---|---|---|---|---|---|
| **Microbiological Constituents** | | | | | | | | | | |
| Turbidity (NTU), maximum level, except for Average | 1 NTU | NS | 0.03 | 0.10 | 0.10 | 0.08 | 0.09 | 0.09 | YES | Soil runoff |
| Turbidity (NTU) | 95% of the samples ≤ 0.3 NTU | NS | NR | 100% | 100% | 100% | 100% | 100% | YES | Soil runoff |
| Cryptosporidium in Source Water, (#/L) | TT | 0 | NA | 0 | 0 | 0 | 0.3 | 0 | YES | Naturally present in the environment |
| **Radioactive Constituents - sampled in 2006-2007** | | | | | | | | | | |
| Gross Alpha particle activity (pCi/L) | 15 | (0) | <3 | <3 | <3 | <3 | <3-11 | <3 | YES | Erosion of natural deposits |
| Gross Beta particle activity (pCi/L) | 20 | (0) | <4 | <4 | <4 | <4 | <4-9.1 | <4 | YES | Decay of natural and man-made deposits |
| Uranium (pCi/L) | 20 | 0.43 | NR | <1 | <1 | <1 | <1 | <1 | YES | Erosion of natural deposits |
| Uranium was detected at 1.1 pCi/L in Chabot Reservoir, an emergency standby reservoir, which has not been used for water supply in more than 20 years. | | | | | | | | | | |
| **Inorganic Constituents** | | | | | | | | | | |
| Aluminum (µg/L) | 1000 | 600 | <50 | <50 | <50 | <50-55 | <50-120 | <50-95 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Chloramine Residual as $Cl_2$ (mg/L), maximum level, except for Average | [4] | [4] | 1.8 | 2.8 | 2.4 | 2.8 | 3.2 | 3.1 | YES | Drinking water disinfectant added for treatment |
| Fluoride (naturally occurring) (mg/L)* | 2 | 1 | <0.1 | <0.1 | <0.1 | <0.1-0.1 | <0.1 | 0.13 | YES | Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories |
| **Organic Constituents** | | | | | | | | | | |
| Acrylamide in treatment chemical (one hundredth of one percent) | TT = 5 @ Max. Dose allowed | (zero) | NR | Met reqmt | NR | Met reqmt | NR | NR | YES | Added to water during water treatment |
| Control of DBP precursors (TOC) | TT | NS | NR | NR | NR | NR | Met reqmt | Met reqmt | YES | Various natural and man-made sources |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 16** | 7-28 | <2-26 | 8-27 | <2-38 | 6-22 | YES | By-product of drinking water chlorination |
| Trihalomethanes (µg/L) | 80 | NS | 28** | 13-58 | 20-59 | 18-56 | 22-40 | 12-43 | YES | By-product of drinking water chlorination |

**Highest Running Annual Average

| Constituents Which Have Secondary MCLs | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum (µg/L) | 200 | NS | <50 | <50 | <50 | <50-55 | <50-120 | <50-95 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Chloride (mg/L) | 500 | NS | 7.9 | 5 | 5 | 5-7 | 13 | 13 | YES | Runoff/leaching from natural deposits; seawater influence |
| Color, color units | 15 | NS | 4.7 | 6 | 4 | 1-6 | 5 | 6 | YES | Naturally-occurring organic materials |
| Odor–Threshold Odor Number (T.O.N.) | 3 | NS | 1.6 | 1.1 | 1.9 | 1.9-2.5 | 1 | 1.2 | YES | Naturally-occurring organic materials |
| Specific Conductance (umhos/cm) | 1600 | NS | 156 | 70 | 72 | 65-131 | 248 | 348 | YES | Substances that form ions when in water; seawater influence |
| Sulfate (mg/L) | 500 | NS | 13 | 1.2 | 1.2 | 1-13 | 26 | 37 | YES | Runoff/leaching from natural deposits, industrial wastes |
| Total Dissolved Solids (mg/L) | 1000 | NS | 93 | 52 | 48 | 39-78 | 150 | 190 | YES | Runoff/leaching from natural deposits |
| Turbidity (NTU), maximum level, except for Average | 5 | NS | 0.03 | 0.10 | 0.17 | 0.13 | 0.11 | 0.09 | YES | Soil runoff |

| Unregulated Constituents | NL | PHG (MCLG) | Average | Walnut Creek | Lafayette | Orinda | Sobrante | USL | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Boron (µg/L) | 1000 | NS | NA | <100 | <100 | <100 | <100 | <100-109 | NR | Runoff/leaching from natural deposits |
| Chlorate (µg/L) | 800 | NS | NA | NV | NV | NV | 200-410 | 200-680 | NR | By-product of sodium hypochlorite decomposition |
| N-Nitrosodimethylamine (NDMA), (ng/L)*** | 10 | 3 | NA | <0.9-2.4 | 1.2-4.9 | 3.0-4.2 | <0.9-2.3 | 1.8-3.6 | NR | By-product of drinking water chlorination |

| Lead and Copper: | AL | PHG | 90th Percentile Level Found | # of Sites found above the AL | | | |
|---|---|---|---|---|---|---|---|
| Copper (µg/L) | 1300 | 300 | 65 | No sites out of 53 sites | | YES | Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives |
| Lead (µg/L)**** | 15 | 2 | 4 | 2 sites out of 53 sites | | YES | Internal corrosion of household plumbing systems; discharges from industrial manufacturers; erosion of natural deposits |

* Fluoride reported above reflects levels in source waters. Fluoride was added in the range of 0.7 to 1.1 mg/L, to help prevent dental decay in consumers. **Highest Running Annual Average. ***Sampling locations chosen to represent worst-case scenarios.

**** 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 service lines and home plumbing. EBMUD is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 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 Safe Drinking Water Hotline, (800) 426-4791, or www.epa.gov/safewater/lead.

## TERMS USED

**AL = regulatory action level.** The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

**Cl2 = chlorine**, measured disinfectant residual equivalent.

**DBP = disinfection by-products.** Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products, formed when chlorine and/or ozone reacts with natural constituents in water.

**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 level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**MRDLG = maximum residual disinfectant level goal.** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the U.S. Environmental Protection Agency.

**NA = not applicable.**

**ng/L = nanograms per liter, or parts per trillion (ppt).**

**NL = notification level.** Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

**NR = not required for meeting regulations.**

**NS = no standard** (MCL or PHG for example) established.

**NTU = nephelometric turbidity units.**

**NV = no value**

**pCi/L = pico curies per liter,** a measure of radioactivity.

**PDWS = primary drinking water standard.** MCLs 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.

**TOC = total organic carbon.** A measurement of organic compounds which could form by-products after disinfection. See DBP.

**T.O.N. = 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.

**Trihalomethanes =** A group of contaminants in drinking water formed as a by-product of disinfection. See DBP.

**Turbidity =** A measure of cloudiness of the water. See NTU.

**µg/L = micrograms per liter, or parts per billion (ppb).**

**umhos/cm = micromhos per centimeter,** a measure of electrical conductance.

**USL =** Upper San Leandro.

**90th percentile =** 90 percent of samples had lower values.

## 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 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** 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 some 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. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people are at greater risk of developing life-threatening

illness. We encourage immuno-compromised individuals to consult their physician 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.

**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 U.S. EPA Safe Drinking Water Hotline: (800) 426-4791 or *www.epa.gov/safewater.*

**Lead**—Routine testing shows that EBMUD is in compliance with state and federal lead regulations. However, household and utility plumbing can still contain lead (for additional information see footnote beneath table at left).

To further reduce consumer exposure to lead, California enacted a new "lead-free" plumbing law. Beginning on January 1, 2010, the lead content of plumbing products sold in California will be limited to 0.25% or less, a significant reduction from the 4% lead content currently allowed.

Several faucet and plumbing product manufacturers, including Chicago Faucets, Delta, Kohler, Moen, and Price Pfister, have indicated that they already have products which comply with the new California standard. If you decide to purchase plumbing products before January 1, 2010, check with the manufacturer or your plumbing supplier to ensure you are purchasing a "lead-free" product.

EBMUD 2008 ANNUAL WATER QUALITY REPORT

| City | Treatment Plants |
|---|---|
| Alameda | Orinda/Upper San Leandro |
| Alamo | Walnut Creek |
| Albany | Orinda/San Pablo |
| Berkeley | Orinda/San Pablo |
| Castro Valley | Upper San Leandro/Orinda |
| Crockett | Sobrante/Orinda |
| Danville | Walnut Creek |
| El Cerrito | Orinda/San Pablo |
| El Sobrante | Sobrante/Orinda |
| Emeryville | Orinda/San Pablo |
| Hayward | Upper San Leandro/Orinda |
| Hercules | Sobrante/Orinda |
| Kensington | Orinda/San Pablo |
| Lafayette | Lafayette/Walnut Creek |
| Moraga | Lafayette/Walnut Creek |
| 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 |

The following table includes measurements of other water quality constituents that might be of interest to our consumers:

| OTHER WATER QUALITY PARAMETERS | Walnut Creek | Lafayette | Orinda | Sobrante | USL |
|---|---|---|---|---|---|
| Alkalinity, bicarbonate (mg/L as CaCO3) | 22.6 | 25.2 | 20.2-36.4 | 66.8 | 108 |
| Alkalinity, carbonate (mg/L as CaCO3) | 1.1 | 1.5 | 0.5-0.6 | 2 | 2 |
| Calcium (mg/L) | 3.8-5.7 | 3.8-5.6 | 4-20 | 14-20 | 20-29 |
| Hardness (mg/L as CaCO3) | 14-21 | 14-19 | 15-78 | 54-74 | 90-120 |
| Magnesium (mg/L) | 0.8-1.3 | 0.8-1.3 | 0.8-5.6 | 4.3-6.1 | 8.5-12 |
| pH (pH units) | 8.7-9.1 | 8.9-9.1 | 8.2-9.3 | 7.6-8.8 | 8.6-8.8 |
| Potassium (mg/L) | 0.5-0.7 | 0.5-0.7 | 0.5-1.3 | 1.0-1.4 | 1.1-1.7 |
| Silica (mg/L) | 8.3-11 | 8.3-11 | 8.3-11 | 9.4-15 | 1.8-8.5 |
| Sodium (mg/L) | 5.7-6.8 | 6.1-7.1 | 5.5-19 | 17-24 | 21-27 |

The table above provides useful information for certain industrial and home applications. Information on water hardness in "grains per gallon" can help improve the function of dishwashers, cooling equipment and other process applications. To convert the hardness values into grains per gallon, divide the values shown in the tables in milligrams per liter by 17. For example, water hardness in areas served by the Orinda Water Treatment Plant had a range from 15 to 78 mg/L, or 0.9 to 4.6 grains per gallon.

## MANDATORY RATIONING TO END JULY 1

This past winter's precipitation, combined with good work by customers in cutting back under mandatory water rationing rules, has improved the water supply outlook for our area. The drought emergency that prohibited certain water uses, such as watering more than three times per week, will end July 1.

*EBMUD wants to thank its customers for their continued commitment to saving water and helping preserve our limited water supplies.*

Drought rates will be phased out during July and August. Since customer billing cycles vary, customers may still see drought rates on bills that are sent out through August. Contact us at 1-866-40-EBMUD (1-866-403-2683) or visit *www.ebmud.com* for help determining your billing cycle or to get water-saving tips and learn about rebates that can help you save water and save money.

## Public Participation

EBMUD encourages public participation in decisions affecting drinking-water quality and other matters at its Board meetings, which take place the second and fourth Tuesdays of each month at 1:15 p.m., 2nd floor, 375 Eleventh Street, Oakland.

To speak with someone who can provide more information about water quality or to report a water quality concern, call 1-866-40-EBMUD (1-866-403-2683).

**Board of Directors**
John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

**General Manager**
Dennis M. Diemer

## 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

**Local Health Departments:**
Alameda County - (510) 267-8000
Contra Costa County - (925) 313-6712

375 Eleventh Street
Oakland, CA 94607
1-866-40-EBMUD
*www.ebmud.com*

Presorted
Standard
U.S. Postage
**PAID**
Permit No.530
Concord, CA

PUB.125 5.09 620M

**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 importante información sobre el agua potable que usted consume. Tradúzcalo, 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)**
របាយការណ៍នេះមានព័ត៌មានសំខាន់អំពីទឹកផឹក។ សូមរកគេឲ្យបកប្រែជូនឬពិគ្រោះជាមួយអ្នកណាដែលយល់របាយការណ៍នេះ ។

**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.

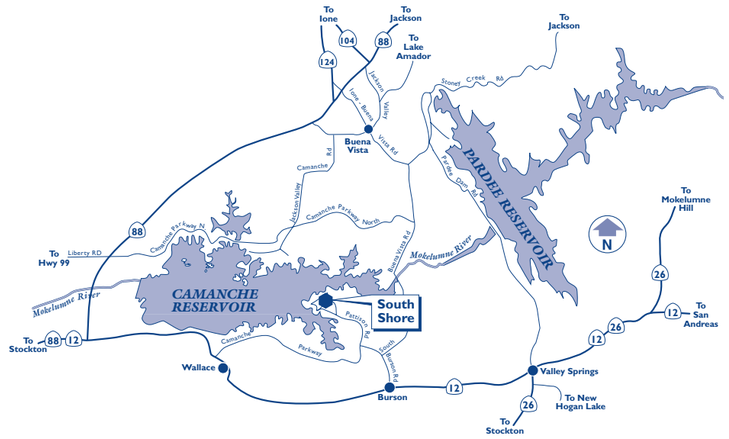
**FARSI**
این گزارش حاوی اطلاعات مهمی درمورد آب آشامیدنی است. آن را ترجمه کنید. یا از کسی که مطالب آن را می فهمد سئوال کنید.

**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

EBMUD

# EAST BAY MUNICIPAL UTILITY DISTRICT
# CAMANCHE SOUTH SHORE 2009 CONSUMER CONFIDENCE REPORT




## 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 2009.

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 2009, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Secondary Drinking Water Standards (SDWS):** MCLs for contaminants that affect taste, odor, or appearance of the drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

**Regulatory Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, 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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years). Aluminum was not detected in the water supplied to the public.

Lead and copper were monitored in 2007 at consumer taps, as required by the Lead & Copper Rule, with the next round of sampling in 2010. Results were within standards. No lead was detected at consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. Radiological sampling of source water was performed in 2005 and all results were below detection level. The next round of monitoring is scheduled in 2010.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department waived monitoring requirements for these chemicals, except Simazine and Atrazine; these are monitored once every nine years, and were not detected when last monitored in 2006.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural applications and septic systems. The latest monitoring occurred in 2008 and no detectable levels of these chemicals were found at the drinking water intake or in the reservoir. The next round of monitoring is scheduled in 2011.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is required once every 12 months except Thiobencarb which is waived by the Department. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department.

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Camanche South Shore 2009 Water Quality Data

The table below lists all the drinking water contaminants that we detected during the 2009 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2009.*** The Department requires us to monitor certain contaminants less than once per year because the concentration of these contaminants are 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.

| | MCL OR [MRDL] | PHG (MCLG) OR [MRDLG] | AVERAGE | RANGE | SAMPLE DATE | TYPICAL MAJOR SOURCES |
|---|---|---|---|---|---|---|
| **INORGANIC CONTAMINANTS** | | | | | | |
| Copper (µg/L) | AL = 1300 | 300 | 90th percentile =58 | No sites above the AL out of 5 sites sampled | 2007 | Internal corrosion of household plumbing system; erosion of natural deposits; leaching from wood preservatives |
| Lead (µg/L) | AL = 15 | 0.2 | 90th percentile =0.8 | No sites above the AL out of 5 | 2007 | 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 | | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 36 | 36 | | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.7† | 0.4-1.5 | | By-product of drinking water chlorination |

†Highest running annual average

| SECONDARY PARAMETERS | MCL | AVERAGE | TYPICAL SOURCES |
|---|---|---|---|
| Chloride (mg/L) | 500 | 4.4 | Runoff/leaching from natural deposits; seawater influence |
| Color (color unit) | 15 | 3 | Naturally-occurring organic materials |
| Odor–Threshold (TON) | 3 | 1.1 | Naturally-occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 56.1 | Substances that form ions when in |
| Sulfate (mg/L) | 500 | 2.1 | Run-off/leaching from natural deposits; industrial wastes |
| Total Dissolved Solids (mg/L) | 1000 | 38 | Runoff/leaching from natural deposits |

| OTHER PARAMETERS | LEVEL FOUND | OTHER PARAMETERS | LEVEL FOUND |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 22 | Magnesium (mg/L) | 1.4 |
| Calcium (mg/L) | 5.6 | Potassium (mg/L) | 0.8 |
| Hardness (mg/L) | 21 | Sodium (mg/L) | 3.1 |

| TREATMENT TECHNIQUE | TURBIDITY PERFORMANCE STANDARDS |
|---|---|
| **DIRECT FILTRATION** (Dual Media Filtration with Anthracite and Sand) | 1 – Be less than or equal to 0.3 NTU in 95% of measurements in a month.<br>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 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

**Key**

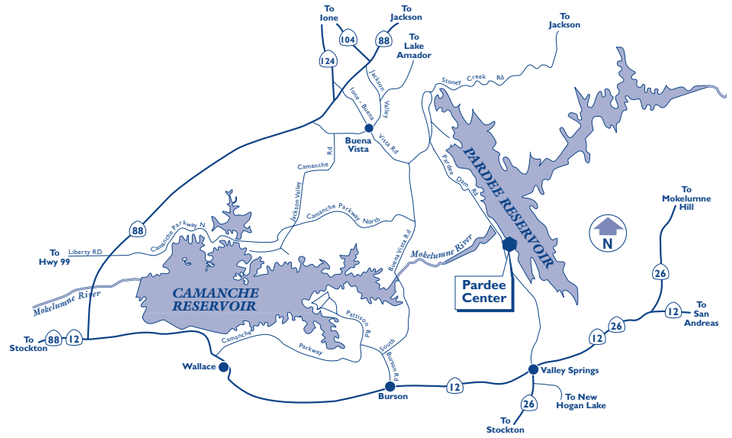
**AL** = Regulatory Action Level
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NA** = Not Applicablel
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

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 service lines and home plumbing. EBMUD is responsible for providing the high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap water for 30 seconds to 2 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 Safe Drinking Water hotline (800), 426-4791, or at *http://www.epa.gov/safewater/lead*.

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

# EAST BAY MUNICIPAL UTILITY DISTRICT
# PARDEE CENTER
# 2009 CONSUMER CONFIDENCE REPORT




## 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 2009.

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 2009, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Secondary Drinking Water Standards (SDWS):** MCLs for contaminants that affect taste, odor, or appearance of the drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

**Regulatory Action Level (AL):** The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that the water system must follow.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife. We found no coliform bacteria in the system in 2009.

**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.

Sampling for all inorganic chemicals is required once every 12 months, except asbestos (required once every 9 years). No inorganic contaminants were found in 2009 in treated water.

Lead and copper were monitored at consumer taps as required by the Lead & Copper Rule. No lead was detected in sample results. The next round of lead and copper sampling is scheduled in 2008. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally-occurring or be the result of oil and gas production and mining activities. Monitoring of radiological contaminants in 2007 showed no detection.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Center.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The latest monitoring showed no detection of these chemicals.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of parameters with secondary MCLs are required by the Department once a year. Samples were taken from treated water.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated. General minerals and chemicals are monitored once a year as required by the Department. Samples were taken from treated water.

## Pardee Center 2009 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2009 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2009.***

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Pardee Center 2009 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Date | Major Sources in Drinking Water |
|---|---|---|---|---|---|---|
| **Inorganic Contaminants** | | | | | | |
| Lead (µg/L) | AL = 15 | 0.2 | 90th percentile = 2.5 | No site above AL out of 5 sites sampled | 2008 | Internal corrosion of household plumbing system; discharges from industrial manufacturers; erosion of natural deposits |
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | | |
| Trihalomethanes (µg/L) | 80 | NS | 26 | 26 | | By-product of drinking water chlorination |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 22 | 22 | | By-product of drinking water chlorination |
| Chlorine residual as $Cl_2$ (mg/L) | [4] | [4] | 0.7† | 0.2 -1.2 | | By-product of drinking water chlorination |

†Highest Running Annual Average

| Secondary Parameters | MCL | Average | Range | Violation | Date | Typical Sources |
|---|---|---|---|---|---|---|
| Chloride (mg/L) | 500 | 2.8 | | | | Runoff/leaching from natural deposits; seawater influence |
| Color (color units) | 15 | 13 | | | | 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 | | | | Substances that form ions when in water; seawater influence |
| Total Dissolved Solids (mg/L) | 1000 | 31 | | | | Runoff/leaching from natural deposits |

††MCL exceedance for TON did not coincide with any odor complaints or detection by consumers.
TON value of 3.5 was detected on 4/22/2008.

| Other Parameters | Average | Other Parameters | Average |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 19.7 | Magnesium (mg/L) | 0.4 |
| Alkalinity, carbonate (mg/L) | 0.2 | pH (pH units) | 8.3 |
| Calcium (mg/L) | 1.1 | Potassium (mg/L) | 0.81 |
| Hardness (mg/L) | 6 | Sodium (mg/L) | 5.8 |

| Treatment Technique | Turbidity Performance Standards | |
|---|---|---|
| **Nanofiltration** (Membrane filtration) | 1 – Be less than or equal to 0.1 NTU in 95% of measurements in a month.<br>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 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

**AL** = Regulatory Action Level
**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NS** = No Standards
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON** = Threshold Odor Number
**µg/L** = micrograms per liter, or parts per billion (ppb)
**µS/cm** = micro siemens per centimeter (measure of conductivity)

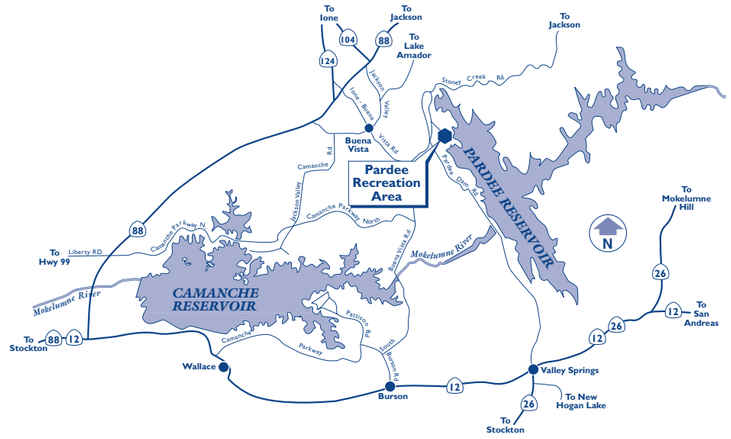
If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. EBMUD is responsible for providing the high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap water for 30 seconds to 2 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 Safe Drinking Water hotline (800), 426-4791, or at *http://www.epa.gov/safewater/lead*.

EAST BAY
MUNICIPAL UTILITY DISTRICT
PARDEE CENTER • VALLEY SPRINGS, CA 95252
(209) 772-8200 • FAX (209) 772-8280

EBMUD

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# PARDEE RECREATION AREA
# 2009 CONSUMER CONFIDENCE REPORT




## 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 Recreation Area. 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 2009.

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 2009, no contaminants associated with these activities were detected in EBMUD's drinking water.

The detailed results of this 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.

## Definitions

**Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the Public Health Goals (PHGs) or Maximum Contaminant Level Goals (MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

**Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the USEPA.

**Public Health Goal (PHG):** 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.

**Maximum Residual Disinfectant Level (MRDL):** The level of a disinfectant added for water treatment that may not be exceeded at the consumer's tap.

**Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a disinfectant added for water treatment below which there is no known or expected risk to health. MRDLGs are set by the USEPA.

**Primary Drinking Water Standard (PDWS):** MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

**Secondary Drinking Water Standards (SDWS):** MCLs for contaminants that affect taste, odor, or appearance of the drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

**Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

## 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 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 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.

## 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 the source water include:

**Microbial Contaminants,** such as viruses and bacteria, which 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. We found no coliform bacteria in the system in 2009.

**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.

Sampling for all inorganic chemicals is waived by the Department except for nitrate (annually) and nitrite (once every three years).

Monitoring was waived by the Department for Lead and Copper at the consumer taps. 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. Selection of faucets and plumbing materials should be based on the use of approved materials for potable consumption and installed according to local building codes.

**Radioactive Contaminants,** which can be naturally occurring or be the result of oil and gas production and mining activities. The Department has waived radiological monitoring for Pardee Recreation Area.

**Pesticides and herbicides,** which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses. The Department has waived monitoring of these chemicals for Pardee Recreation Area.

**Organic Chemical Contaminants,** including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application and septic systems. The Department has waived monitoring of these chemicals for Pardee Recreation Area.

**Secondary Parameters** include aesthetic qualities such as taste and odor and appearance. The clarity of the water can be measured by color, turbidity and aluminum content. Monitoring of secondary standards is waived by the Department.

**Other Parameters** include unregulated contaminants and general minerals and chemicals. Unregulated contaminant monitoring helps the USEPA and the Department to determine where certain contaminants occur and whether the contaminants need to be regulated.

## Pardee Recreation Area 2009 Water Quality Data

The table at right lists all the drinking water contaminants that we detected during the 2009 calendar year. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. ***Unless otherwise noted, the data presented in this table is from testing done January 1 through December 31, 2009.***

EBMUD

**Board of Directors**

John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

Dennis M. Diemer
***General Manager***

## Pardee Recreation Area 2009 Water Quality Data

| | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Range | Major Sources in Drinking Water |
|---|---|---|---|---|---|
| **Disinfection Byproducts, Disinfectant Residuals** | | | | | |
| Chlorine Residual as $Cl_2$ (mg/L) | [4] | [4] | 0.8† | 0.3-1.3 | By-product of drinking water chlorination |
| †Highest Running Annual Average | | | | | |

| Secondary Parameters | MCL | Average | Sample Date | Typical Sources |
|---|---|---|---|---|
| Chloride (mg/L) | 500 | 4.0 | | Runoff/leaching from natural deposits; seawater influence |
| Color (color unit) | 15 | 3 | 2006 | Naturally-occurring organic materials |
| Odor–Threshold (TON) | 3 | 1.6 | 2006 | Naturally-occurring organic materials |
| Specific Conductance (µS/cm) | 1600 | 46.2 | | Substances that form ions when in water; seawater influence |
| Sulfate (mg/L) | 500 | 1.2 | | Runoff/leaching from natural deposits, industrial wastes |
| Total dissolved solids (mg/L) | 1000 | 31 | | Runoff/leaching from natural deposits |

| Other Parameters | Level Found | Other Parameters | Level Found |
|---|---|---|---|
| Alkalinity, bicarbonate (mg/L) | 16.9 | Magnesium (mg/L) | 1.1 |
| Alkalinity, carbonate (mg/L) | 0.1 | Potassium (mg/L) | 0.62 |
| Calcium (mg/L) | 3.3 | Sodium (mg/L) | 3.7 |
| Hardness (mg/L) | 14 | | |

| Treatment Technique | Turbidity Performance Standards |
|---|---|
| Ultrafiltration (Membrane filtration) | 1 – Be less than or equal to 0.1 NTU in 95% of measurements in a month.<br>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 |

Turbidity (measured in NTU) is a measurement of the cloudiness of water and is a good indicator of water quality and filtration performance.

### Key

**MCL** = Maximum Contaminant Level
**MCLG** = Maximum Contaminant Level Goal
**mg/L** = milligrams per liter, or parts per million (ppm)
**MRDL** = Maximum Residual Disinfectant Level
**MRDLG** = Maximum Residual Disinfectant Level Goal
**NTU** = Nephelometric Turbidity Units
**PHG =** Public Health Goal
**TON =** Threshold Odor Number
**µS/cm** = micro siemens per centimeter (measure of conductivity)

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 service lines and home plumbing. EBMUD is responsible for providing the high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap water for 30 seconds to 2 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 Safe Drinking Water hotline (800), 426-4791, or at *http://www.epa.gov/safewater/lead*.

# East Bay Municipal Utility District

## 2009 Annual Water Quality Report

This report tells you more about the water you use every day – how it gets treated, where it comes from and what is in it.

*In 2009, EBMUD water met or surpassed every public health requirement set by the California Department of Public Health and the U.S. Environmental Protection Agency.*

One of the most important factors in water quality is its source: the purer the source, the better the water. Ninety percent of EBMUD's water comes from the 577-square-mile watershed of the Mokelumne River, which collects Sierra Nevada snowmelt and flows into Pardee Reservoir in the Sierra foothills near the town of Valley Springs. The watershed on the west slope of the Sierra Nevada is mostly undeveloped land, little affected by human activity.

The water travels to the East Bay in pipelines and is protected from pesticides, agricultural and urban runoff, municipal sewage and industrial discharges. Local East Bay watershed rainfall and runoff accounts for about 10 percent of the District's water supply.

Before the water comes to your tap, EBMUD takes many steps to ensure its quality. This includes carefully managing and protecting watershed lands and reservoirs, treating the water, operating the complex distribution system (pipes, pumping plants and reservoirs), sampling and analyzing for water quality, maintaining and replacing facilities, and investigating and correcting consumer concerns.

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 the USEPA's Safe Drinking Water Hotline at (800) 426-4791 or visiting *www.epa.gov/safewater.*

EBMUD

# EBMUD 2009 ANNUAL WATER QUALITY REPORT

EBMUD tests your water daily to make sure it is safe to drink. We look for more than 100 substances in the water, including bacteria, pesticides and herbicides, asbestos, lead, copper, petroleum products and by-products of industrial and water-treatment processes.

This table shows the measured level of substances detected at EBMUD source waters, water treatment plants or in the distribution system (map on reverse side shows which treatment plant normally serves your neighborhood).

Regulations for *Primary Drinking Water Constituents* are designed to protect public health. Regulations for *Constituents Which Have Secondary MCLs* relate to the aesthetic qualities of your water such as taste and odor. *Unregulated Constituents* are chemical or microbial constituents that water agencies are required to monitor, but no maximum contaminant levels (MCL) have been established. *In 2009 EBMUD met or surpassed all water quality regulations set by the California Department of Public Health (CDPH) and the United States Environmental Protection Agency (USEPA).*

Table below lists all drinking water constituents detected at the source, the treatment plant or the distribution system in 2009.

| Primary Constituents | MCL or [MRDL] | PHG (MCLG) or [MRDLG] | Average | Walnut Creek | Lafayette | Orinda | Sobrante | USL | Met Regulation | Typical Sources |
|---|---|---|---|---|---|---|---|---|---|---|
| **Microbiological Constituents** | | | | | | | | | | |
| Total Coliforms in Distribution System (percent positive detected, highest month) | 5% | (zero) | 1.7%* | NR | NR | NR | NR | NR | YES | Naturally present in the environment |
| Turbidity (NTU), maximum level, except for Average | 1 NTU | NS | 0.03 | 0.10 | 0.16 | 0.10 | 0.09 | 0.11 | YES | Soil runoff |
| Turbidity (NTU) | 95% of the samples ≤ 0.3 NTU | NS | NR | 100% | 100% | 100% | 100% | 100% | YES | Soil runoff |
| Cryptosporidium in Source Water, (#/L) (sampled in 2008, most recent required monitoring) | TT | zero | NA | zero | zero | zero | 0.3 | zero | YES | Naturally present in the environment |
| **Radioactive Constituents - sampled in 2006-2007, most recent required monitoring** | | | | | | | | | | |
| Gross Alpha particle activity (pCi/L) | 15 | (zero) | <3 | <3 | <3 | <3 | <3-11 | <3 | YES | Erosion of natural deposits |
| Gross Beta particle activity (pCi/L) | 20 | (zero) | <4 | <4 | <4 | <4 | <4-9.1 | <4 | YES | Decay of natural and man-made deposits |
| Uranium (pCi/L) | 20 | 0.43 | NR | <1 | <1 | <1 | <1 | <1 | YES | Erosion of natural deposits |
| Uranium was detected at 1.1 pCi/L and Gross Alpha was detected at 4.6 pCi/L in Chabot Reservoir, an emergency standby reservoir, which has not been used for water supply in more than 20 years. | | | | | | | | | | |
| **Inorganic Constituents** | | | | | | | | | | |
| Aluminum (µg/L) | 1000 | 600 | <50 | <50 | <50 | <50 | <50-100 | <50-130 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Chloramine Residual as $Cl_2$ (mg/L), maximum level, except for Average | [4] | [4] | 1.9*** | 2.6 | 2.3 | 3.3 | 3.3 | 3.2 | YES | Drinking water disinfectant added for treatment |
| Fluoride (naturally occurring) (mg/L)** | 2 | 1 | <0.1 | <0.1 | <0.1 | <0.1 | <0.1 | 0.14 | YES | Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories |
| **Organic Constituents** | | | | | | | | | | |
| Acrylamide in treatment chemical (one hundredth of one percent) | TT = 5 @ Max. Dose allowed | (zero) | NR | Met reqmt | NR | NR | NR | NR | YES | Added to water during water treatment |
| Control of DBP precursors (TOC) | TT | NS | NR | NR | NR | NR | Met reqmt | Met reqmt | YES | Various natural and man-made sources |
| Haloacetic acids, 5 species (µg/L) | 60 | NS | 18*** | 15-21 | 15-23 | 12-30 | 6-25 | 6-23 | YES | By-product of drinking water disinfection |
| Trihalomethanes (µg/L) | 80 | NS | 32*** | 29-44 | 31-42 | 28-44 | 25-29 | 14-38 | YES | By-product of drinking water disinfection |
| **Constituents Which Have Secondary MCLs** | | | | | | | | | | |
| Aluminum (µg/L) | 200 | NS | <50 | <50 | <50 | <50 | <50-100 | <50-130 | YES | Erosion of natural deposits; residue from some surface water treatment processes |
| Chloride (mg/L) | 500 | NS | 7.5 | 4 | 5 | 5-6 | 13 | 13 | YES | Runoff/leaching from natural deposits; seawater influence |
| Color, color units | 15 | NS | 0.7 | 1 | 1 | <1 | 1 | 1 | YES | Naturally-occurring organic materials |
| Foaming Agents (MBAS) (µg/L) | 500 | NS | <50 | <50 | <50 | 83 | <50 | <50 | YES | Municipal and industrial waste discharges |
| Odor–Threshold Odor Number (T.O.N.) | 3 | NS | 1.2 | 1 | 1.3 | 1-1.6 | 1.1 | 1.1 | YES | Naturally-occurring organic materials |
| Specific Conductance (umhos/cm) | 1600 | NS | 140 | 53 | 55 | 57-112 | 231 | 331 | YES | Substances that form ions when in water; seawater influence |
| Sulfate (mg/L) | 500 | NS | 12 | 0.8 | 0.7 | 0.8-10 | 30 | 33 | YES | Runoff/leaching from natural deposits, industrial wastes |
| Total Dissolved Solids (mg/L) | 1000 | NS | 91 | 45 | 46 | 42-72 | 130 | 210 | YES | Runoff/leaching from natural deposits |
| Turbidity (NTU), maximum level, except for Average | 5 | NS | 0.03 | 0.10 | 0.16 | 0.10 | 0.09 | 0.11 | YES | Soil runoff |

| Unregulated Constituents | NL | PHG (MCLG) | Average | Walnut Creek | Lafayette | Orinda | Sobrante | USL | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Boron (µg/L) | 1000 | NS | NA | <100 | <100 | <100 | <100 | <100-110 | NR | Runoff/leaching from natural deposits |
| Chlorate (µg/L) | 800 | NS | NA | 160 | 260 | 150-160 | 150-360 | 230-410 | NR | By-product of sodium hypochlorite decomposition |
| N-Nitrosodimethylamine (NDMA), (ng/L)**** | 10 | 3 | NA | 1.5-2.3 | 1.1-3.1 | 1.8-6.1 | <2-3.3 | <2-3.2 | NR | By-product of drinking water chlorination |

| Lead and Copper (sampled in 2008, most recent required monitoring) | AL | PHG | 90th Percentile Level Found | # of Sites found above the AL | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Copper (µg/L) | 1300 | 300 | 65 | No sites out of 53 sites | | | | YES | Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives |
| Lead (µg/L)***** | 15 | 0.2 | 4 | 2 sites out of 53 sites | | | | YES | Internal corrosion of household plumbing systems; discharges from industrial manufacturers; erosion of natural deposits |

*Highest month

** Fluoride reported above reflects levels in source waters. Fluoride was added in the range of 0.3 to 1.2 mg/L, to help prevent dental decay in consumers. Information about fluoridation, oral health, and current issues is available from www.cdph.ca.gov/certlic/drinkingwater/pages/fluoridation.aspx.

***Highest Running Annual Average.

****Sampling locations chosen to represent worst-case scenarios.

***** 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 service lines and home plumbing. EBMUD is responsible for providing high-quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 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 Safe Drinking Water Hotline, (800) 426-4791, or www.epa.gov/safewater/lead.

## TERMS USED

**AL = regulatory action level.** The concentration which, if exceeded, triggers treatment or other requirements that a water system must follow.

**Cl2 = chlorine**, measured disinfectant residual equivalent.

**DBP = disinfection by-products.** Trihalomethanes (THMs), haloacetic acids (HAAs) and bromate are disinfection by-products, formed when chlorine and/or ozone reacts with natural constituents in water.

**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.**

**ng/L = nanograms per liter,** or parts per trillion (ppt).

**NL = notification level.** Notification levels are health-based advisory levels established by CDPH for chemicals in drinking water that lack MCLs.

**NR = not required for meeting regulations.**

**NS = no standard** (MCL or PHG for example) established.

**NTU = nephelometric turbidity units.**

**NV = no value.**

**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.

**TOC = total organic carbon.** A measurement of organic compounds which could form by-products after disinfection. See DBP.

**T.O.N. = 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.

**Trihalomethanes =** A group of contaminants in drinking water formed as a by-product of disinfection. See DBP.

**Turbidity =** A measure of cloudiness of the water. See NTU.

**µg/L = micrograms per liter,** or parts per billion (ppb).

**umhos/cm = micromhos per centimeter,** a measure of electrical conductance.

**USL =** Upper San Leandro.

**90th percentile =** 90 percent of samples had lower values.

## 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 or 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 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** 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. Most healthy individuals can overcome the disease within a few weeks. However, immuno-compromised people are at greater risk of developing life-threatening illness. We encourage immuno-compromised individuals to consult their physician 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.

**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**—Routine testing shows that EBMUD is in compliance with state and federal lead regulations. However, household and utility plumbing can still contain lead (for additional information see footnote beneath table at left).

To further reduce consumer exposure to lead, California enacted a new "lead-free" plumbing law. Beginning on January 1, 2010, the lead content of plumbing products sold in California is limited to 0.25% or less, a significant reduction from the 4% lead content which was previously allowed.

# EBMUD 2009 ANNUAL WATER QUALITY REPORT

| 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 |

The following table includes measurements of other water quality constituents that might be of interest to our consumers:

| OTHER WATER QUALITY PARAMETERS | Walnut Creek | Lafayette | Orinda | Sobrante | USL |
|---|---|---|---|---|---|
| Alkalinity, bicarbonate (mg/L as CaCO3) | 18.4 | 17.5 | 17.3-31.3 | 73.5 | 107 |
| Alkalinity, carbonate (mg/L as CaCO3) | 0.4 | 0.4 | 1.3-2.3 | 1.4 | 2.5 |
| Calcium (mg/L) | 3.9-4.8 | 3.8-4.8 | 3.9-8.9 | 16-19 | 23-31 |
| Hardness (mg/L as CaCO3) | 12-20 | 11-16 | 13-31 | 47-73 | 100-120 |
| Magnesium (mg/L) | 0.6-1.0 | 0.6-0.9 | 0.7-2.0 | 4.8-6.1 | 10-12 |
| pH (pH units) | 8.4-9.3 | 8.4-9.3 | 7.9-9.6 | 8.5-9.0 | 8.1-9.1 |
| Potassium (mg/L) | 0.4-0.6 | 0.5-0.7 | 0.5-0.8 | 1.1-2.0 | 1.4-2.0 |
| Silica (mg/L) | 8.3-11.3 | 8.4-10.8 | 8.3-11.5 | 6.8-11.5 | 1.4-5.2 |
| Sodium (mg/L) | 4.8-5.7 | 4.9-7.1 | 5.3-9.4 | 18-22 | 24-28 |

The table above provides useful information for certain industrial and home applications. Information on water hardness in "grains per gallon" can help improve the function of dishwashers, cooling equipment and other process applications. To convert the hardness values into grains per gallon, divide the values shown in the tables in milligrams per liter by 17. For example, water hardness in areas served by the Orinda Water Treatment Plant had a range from 13 to 31 mg/L, or 0.8 to 1.8 grains per gallon.

## ADDITIONAL WATER SOURCE FOR 2009

EBMUD has emergency connections with other local agencies to provide back-up water supplies. In 2009, EBMUD received 870 million gallons of treated water (about one percent of EBMUD's water supply) from the San Francisco Public Utilities Commission (SFPUC) system through a connection in Hayward in advance of SFPUC's planned need for back-up supply in 2010. Water quality and source information for the SFPUC is available at *www.sfwater.org* or (415) 554-3289.

## AWARD WINNING WATER TREATMENT PLANTS

The Orinda Water Treatment Plant is one of only six plants in the country that has received an Excellence in Water Treatment Award in the nationwide Partnership for Safe Water (PSF). In 1996, EBMUD joined with the American Water Works Association, the USEPA and over 230 other water utilities nationwide in PSF. Through the Partnership, EBMUD works to optimize water treatment plant operations to maximize drinking water quality. EBMUD's other active water treatment plants are recognized with the Partnership Directors Award for meeting higher voluntary water quality standards.

# Public Participation

EBMUD encourages public participation in decisions affecting drinking-water quality and other matters at its Board meetings, which take place the second and fourth Tuesdays of each month at 1:15 p.m., 2nd floor, 375 Eleventh Street, Oakland.

To speak with someone who can provide more information about water quality or to report a water quality concern, call 1-866-40-EBMUD (1-866-403-2683).


**Board of Directors**
John A. Coleman
Katy Foulkes
Andy Katz
Doug Linney
Lesa R. McIntosh
Frank Mellon
William B. Patterson

**General Manager**
Dennis M. Diemer


# 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

**County Public Health Departments:**
Alameda County - (510) 267-8000
Contra Costa County - (925) 313-6712


375 Eleventh Street
Oakland, CA 94607
1-866-40-EBMUD
*www.ebmud.com*



PRESORTED STANDARD
U.S. POSTAGE
**PAID**
CONCORD, CA
PERMIT NO. 530

PUB. 128 5.10 615M


**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 importante información sobre el agua potable que usted consume. Tradúzcalo, 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)**
របាយការណ៍នេះមានព័ត៌មានសំខាន់អំពីទឹកផឹក។ សូមរកគេឲ្យបកប្រែជូនឬពិគ្រោះជាមួយអ្នកណាដែលយល់របាយការណ៍នេះ ។

**THAI**
รายงานฉบับนี้มีข้อมูลสำคัญเกี่ยวกับน้ำดื่มของท่าน ขอให้แปลรายงานฉบับนี้หรือพูดคุยกับผู้ที่เข้าใจเนื้อหาในรายงานนี้.

**LAO**
ລາຍງານສະບັບນີ້ມີຂໍ້ມູນສຳຄັນກ່ຽວກັບນ້ຳດື່ມຂອງທ່ານ. ໃຫ້ທ່ານແປເອກະສານນີ້ເປັນພາສາລາວ, ຫລືໃຫ້ທ່ານເວົ້າປຶກສາກັບຜູ້ທີ່ເວົ້າໃຈເລື່ອງ.

**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.

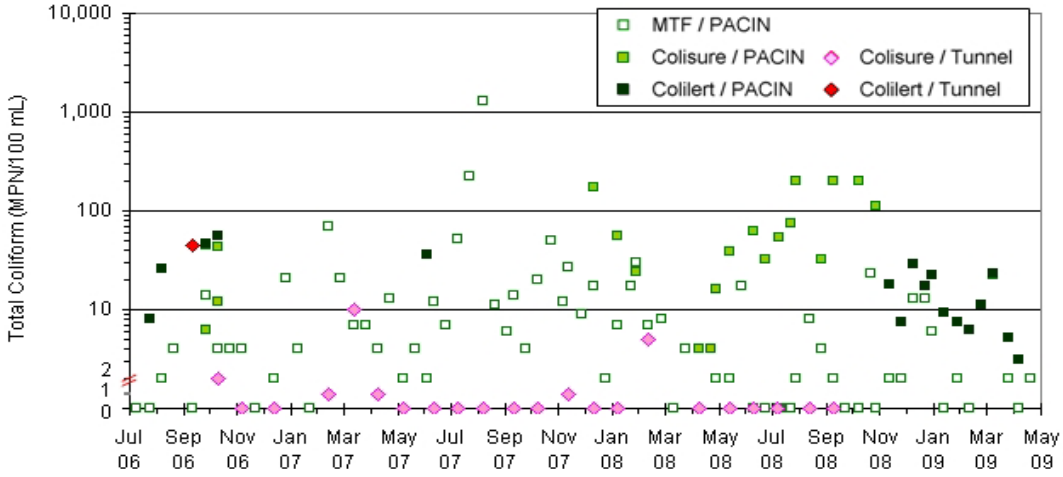
**ARABIC**
يحتوي هذا التقرير على معلومات هامة حول مياه الشرب التي تتناولها. ترجم التقرير أو تحدث إلى شخص يستطيع فهمه.

**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.

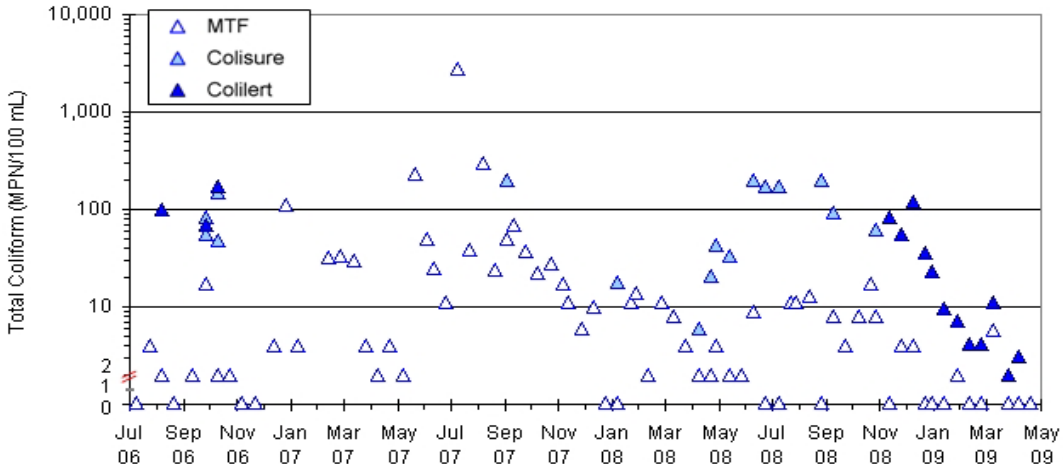
**URDU**
اس رپورٹ میں آپ کے پینے کے پانی سے متعلق اہم معلومات ہیں. اس کا ترجمہ کریں، یا کسی ایسے شخص سے بات کریں جو اسے سمجھتا ہو.

## Appendix 4-3a. Total coliform results from three analytical methods: multiple tube fermentation (MTF, SM9221B), *Colisure* (SM 9222B) and *Colilert* (SM 9223B) [1]

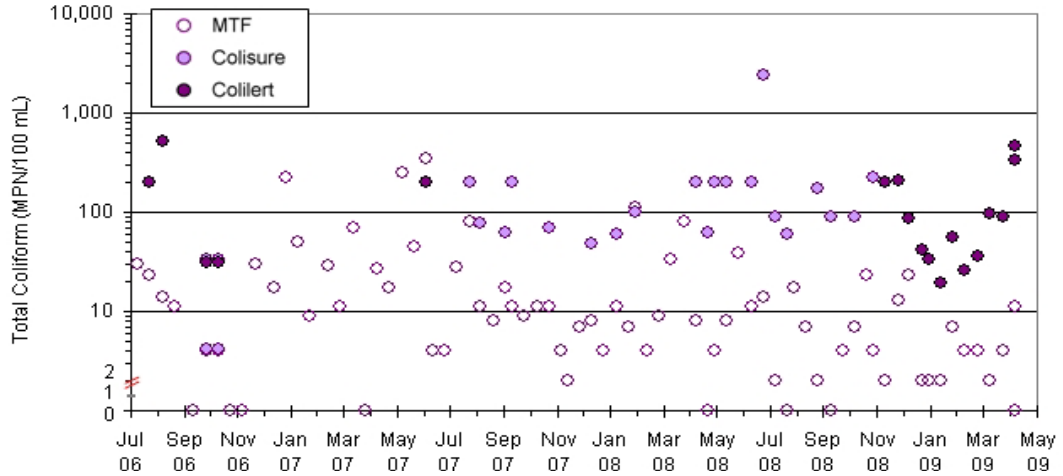
**a) Total coliform at PACIN and Tunnel Locations**




**b) Total coliform at PARIN**



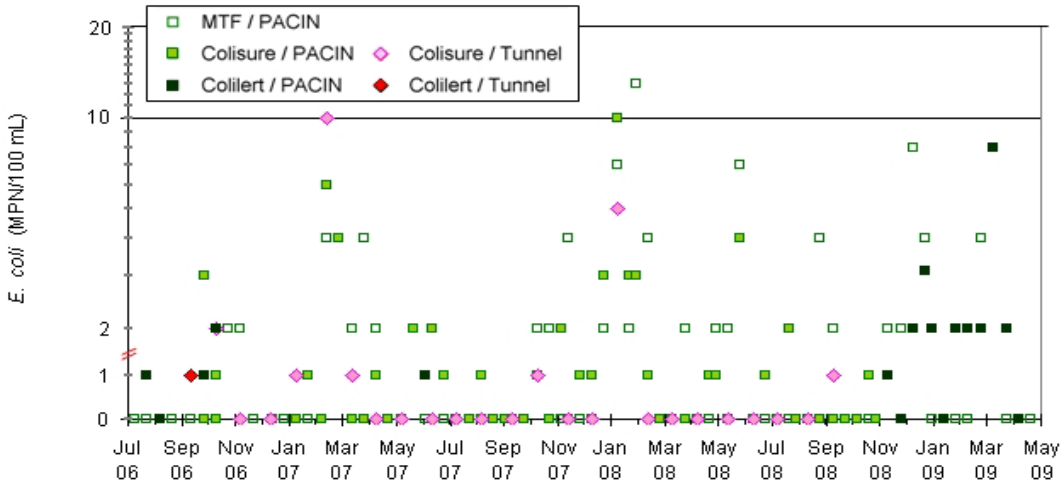

**c) Total coliform at CASSIN**



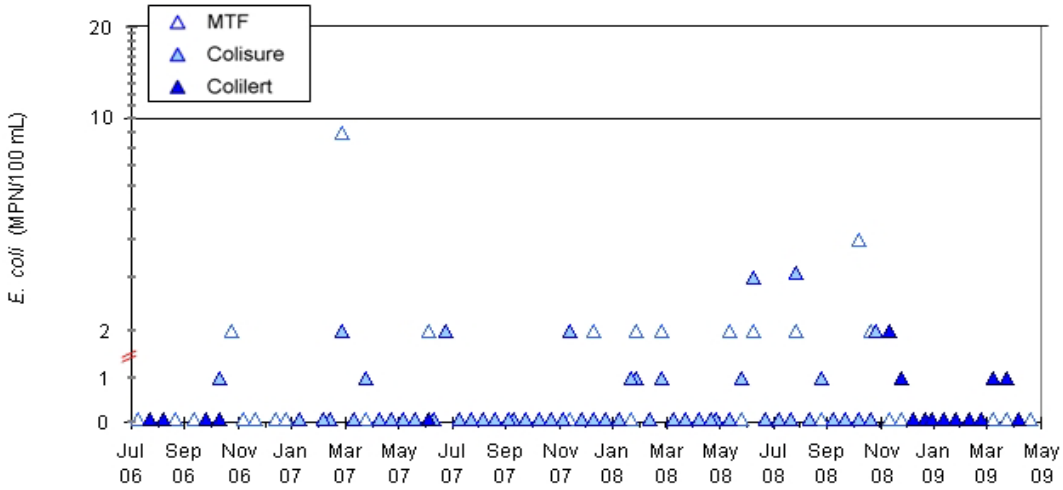

1. The time period displayed on these plots are limited to the time when samples were analyzed by either colisure or colilert. For all total coliform samples analyzed by MTF, see Chapter 4.

**Appendix 4-3b. *E. coli* results from three analytical methods: multiple tube fermentation (MTF, SM9221B), *Colisure* (SM 9222B) and *Colilert* (SM 9223B)** [1]

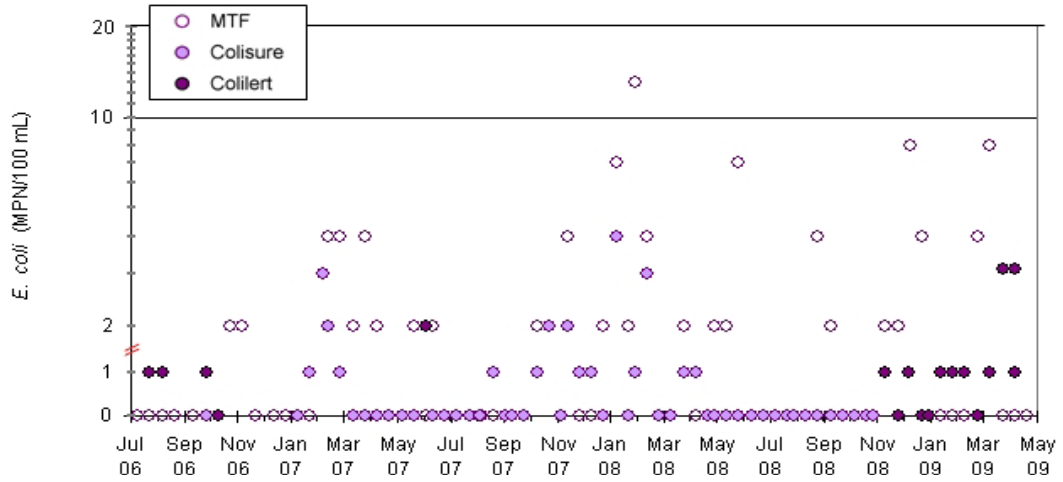
**a) *E. coli* at PACIN and Tunnel Locations**




**b) *E. coli* at PARIN**




**c) *E. coli* at CASSIN**




1. The time period displayed on these plots are limited to the time when samples were analyzed by colilert. For all *E. coli* samples analyzed by colisure or MTF, see Chapter 4.

*Contents of Poster:*

# Discrepancies Between Colilert® Total Coliform Quantitative Results and Those of Traditional Methods for Several Samples From Two Ambient Fresh Water Sites

**April 20 – 22**
**Huntington Beach, CA**

Clayton C. Thompson, Daniel C. Mills, Yanru Yang,
and Daniel E. Jackson

East Bay Municipal Utility
District (EBMUD) Laboratory
2020 Wake Avenue
Oakland, CA 94607
email: dejackso@ebmud.com
(510) 287-1427
(510) 465-5462 (FAX)

## Introduction and Objectives

**California regulations require monitoring of marine recreational waters for Total Coliform, in addition to Fecal Coliform/*E. coli* and *Enterococcus*. Many California jurisdictions extend this monitoring to recreational fresh water. These indicators have been typically measured with traditional methods including Multiple Tube Fermentation (MTF) and Membrane Filtration (MF). The use of rapid methods, such as Colilert-18® (IDEXX, Westbrook, ME), however, is desirable to facilitate timely closure or reopening of beaches.**

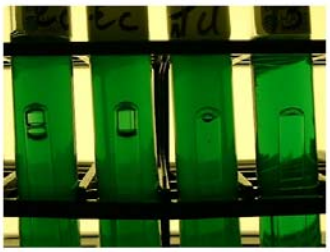
**Routine enumeration of Total Coliforms for two fresh water lakes in early 2008 gave consistently higher results by Colilert-18® Quantitray® (Colilert) than by MTF (see charts). Such discrepancies between Colilert and traditional methods have also been noted previously in the literature (Eckner 1998; Kampfer *et al.* 2008).**

**In this study, we compared TC results yielded by Colilert with those of MF using m-Endo and MTF using Lauryl Tryptose Broth (LTB) confirmed in Brilliant Green Lactose Bile Broth (BGB). The objectives of the study were:**

- **Determine the origin of discrepancies among different methods in Total Coliform enumeration.**
- **Identify the organisms responsible for the discrepancies.**

# MTF / Colilert Comparison: Methods and Materials

Sampling: Daily water samples were collected in 290 mL sterile plastic bottles from the centers of two pristine freshwater lakes (lakes "A" and "B") in the San Francisco Bay Area in the spring of 2008. 100 mL aliquots from each sample were analyzed for TC by both Colilert and MF.



Multiple Tube Fermentation: Samples were analyzed in accordance with Standard Methods (18th ed.) 9221B, using LTB. LTB tubes showing either gas production or turbid growth after 48 hours incubation at 35 °C were transferred to BGB broth for confirmation.

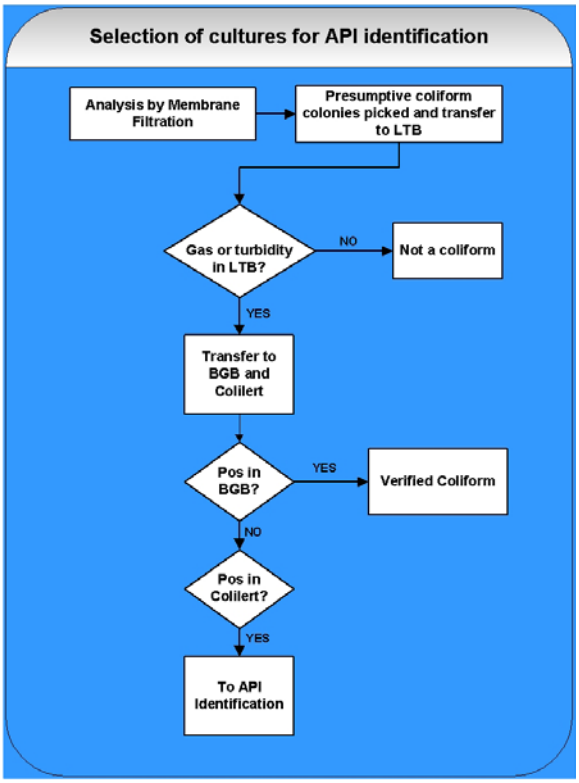
Colilert: 100 mL samples were analyzed for TC using Colilert-18 media in Quantitrays, in accordance with Standard Methods (online ed.) 9223D and IDEXX Corp. instructions.

# Cause of Discrepancies: Methods and Materials

Membrane Filtration (MF): Lake water samples were analyzed in accordance with Standard Methods (20th ed.) 9222B. Aliquots of 100, 10 and 1 mL were filtered, and filters were transferred directly to m-Endo agar and incubated for 22-24 hours at 35 °C. Presumptive coliform colonies were picked with sterile loops and transferred to LTB for verification.

Colilert and BGB Comparison: LTB tubes with either gas production or turbid growth after 48 hours incubation were transferred with sterile loops to both BGB and to tubes containing 10 mL of Colilert-18 media. Gas production in BGB after 48 hours incubation at 35 °C and color change in Colilert media after 20 hours incubation at 35 °C were interpreted as positive results.

API Identification: LTB cultures that tested positive in Colilert but negative in BGB (see flowchart below) were carried through the API 20E ® (BioMérieaux SA) identification system for *Enterobacteriaceae*, in accordance with the manufacturer's instructions.

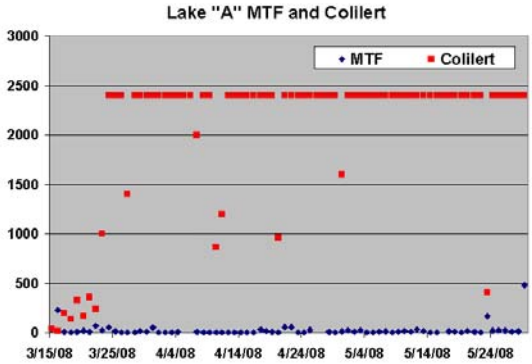


# Results

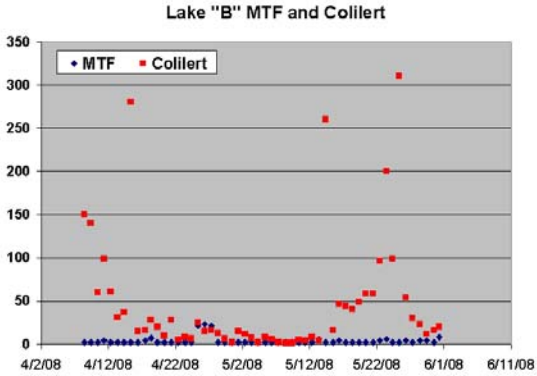
<u>Results varied significantly between the two lakes</u>

- Lake "A": For 23 discrepant colony-forming organisms, 20 were identified as *Enterobacter amnigenus,* and 3 were identified as *Aeromonas hydrophila. E. amnigenus* is a true coliform, so the discrepancies between methods due to this organism can be described as FALSE NEGATIVES in MTF.

- Lake "B": For 9 discrepant colony-forming organisms that could be identified, 8 were identified as *Aeromonas hydrophila,* and 1 identified to genus as *Pantoea*. Neither of these organisms are classified as coliforms, so discrepancies in methods due to these organisms can be described as FALSE POSITIVES in Colilert.




In 66 out of 67 split samples from Lake "A", Colilert results were higher than MTF results, with 79% of Colilert results being > 2400 MPN/100mL.




In 51 out of 54 split samples from Lake "B", Colilert results were higher than MTF results, with 43% being at least an order of magnitude higher.

## Discussion

**Detection of "Total Coliform" bacteria is important for public health as an indicator of possible fecal contamination. However, the definition of these organisms is method-dependant. For traditional methods such as MTF and MF, it is the ability to ferment lactose within 48 hours at 35 °C that determines the presence or absence of coliforms, whereas the activity of the enzyme β-D-galactosidase is used to indicate the presence of coliforms for chromogenic substrate methods such as Colilert.**

**Past studies have indicated that certain non-coliform organisms, such as *A. hydrophila,* are capable of hydrolyzing the o-nitrophenyl β-D-galactopyranaside substrate, which can cause Colilert and similar methods to overestimate the number of coliforms present in environmental samples. Our study provides another example of this, but also suggests that the coliform organisms that are slow lactose fermenters may be another possible cause for discrepancies between methods.**

**The detection of coliforms in treated drinking water samples by either method justifies corrective actions. However, the significance of the presence of either non-coliforms or slow lactose-fermenters in recreation water and drinking water source samples is less clear yet.**

**The selection of Total Coliform methods for analysis of environmental water samples should be made after a review of the Data Quality Objectives for a given monitoring program.**

## References


- **APHA, AWWA & WEF. (1999) Standard Methods for the Examination of Water and Wastewater. APHA, AWWA, and WEF, Washington, DC.**
- **Eckner, K. F. (1998) "Comparison of Membrane Filtration and Multiple-Tube Fermentation by the Colilert and Enterolert Methods for Detection of Waterborne Coliform Bacteria, *Escherichia coli*, and *Enterococci* Used in Drinking and Bathing Water Quality Monitoring in Southern Sweden." *Applied and Environmental Microbiology* 64: 3079–3083.**
- **Kampfer, P., Nienhuser, A., Packroff, G., Wernicke, F., Mehling, A., Nixdorf, K., Fiedler, S., Kolauch, C., Esser. M. (2008) "Molecular identification of coliform bacteria isolated from drinking water reservoirs with traditional methods and the Colilert-18 system." *International Journal of Hygiene and Environmental Health* 211: 374-384.**
- **Leclerc, H., Mossel, D. A. A., Edberg, S. C., Struijk, C. B. (2001) "Advances in the Bacteriology of the Coliform Group: Their Suitability as Markers of Microbial Water Safety." *Annuual Reviews of Microbiology* 55: 201–34.**
- **Rompre, A., Servais, P., Baudart, J., de-Roubin, M., Laurent, P. (2002) "Detection and Enumeration of Coliforms in Drinking Water: Current Methods and Emerging Approaches." *Journal of Microbiological Methods* 49: 31–54.**
- **US Environmental Protection Agency, "Guidance for the Data Quality Objectives Process" EPA QA/G-4.**

# 2009 - 2010 BI-ANNUAL REPORT
# LANDFILL GROUNDWATER MONITORING

## Penn Mine Environmental Restoration Project

Prepared by

EBMUD

## East Bay Municipal Utility District
## Oakland, California

**August 2010**

# TABLE OF CONTENTS


**1.0 INTRODUCTION** ..... **1**

**2.0 FIELD PROCEDURES** ..... **1**

**3.0 SUMMARY OF RESULTS** ..... **1**

3.1 Groundwater Elevation and Flow Direction ..... 1

3.2 Groundwater Quality ..... 2

3.3 Subdrain Water Quality ..... 3

3.4 Leachate Quality and Quantity ..... 3

**4.0 LANDFILL INSPECTION** ..... **4**

4.1 Potential for Surface Water and Groundwater Infiltration into Landfill ..... 4

4.2 Investigation of Excess Leachate ..... 5

**5.0 CONCLUSIONS AND RECOMMENDATIONS** ..... **5**

**REFERENCES**

**TABLES**

1 Groundwater Elevation Data Summary

2A Groundwater, Subdrain, and Leachate Laboratory Analysis Summary

2B Groundwater, Subdrain, and Leachate Laboratory Analysis Summary

3 Leachate Removal - January 2002 to July 2010

**FIGURES**

1 Site Vicinity Map

2 Site Plan and Groundwater Elevation - June 15, 2010

3 Monitoring Well Hydrographs, Years 2000-2010

4 Dissolved Copper Concentrations, Years 1999-2010

5 Dissolved Zinc Concentrations, Years 1999-2010

6 TDS Concentrations, Years 1999-2010

7 Quantity of Leachate Removed: 2002 - 2010

8 Leachate Removal Rate: 2002 - 2010

**APPENDIX**

A Field Sampling Forms and Chain of Custody Record

B Laboratory Report

## 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, and 2008. 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 August 2008 through July 2010.

## 2.0 FIELD PROCEDURES

As proposed in the 2003 annual report, the District modified the groundwater sampling program to once every two years. Groundwater levels, however, continued to be monitored in the four wells on a monthly basis.

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 collected starting in January 2000 are presented in Table 1. Groundwater elevations, as measured during the June 15, 2010 sampling event, are shown on Figure 2.

Before groundwater sample collection, each well was purged of approximately three casing volumes 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 15, 2010 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 2002 to July 2010. 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 15, 2010 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.

The groundwater levels and flow directions at the site are most likely influenced by geologic structural controls (e.g., fracture zone orientation) as well as the presence of the landfill (i.e., reduction of infiltration and physical obstruction of flow). In addition, differences in monitoring well completion depths and screened intervals may influence groundwater levels measured in the monitoring wells.

As shown on Figure 3, groundwater levels in LF-2 and LF-3, along the topographically downgradient side of the landfill, fluctuate seasonally, with the highest water levels measured during winter and spring, and decreasing during the summer to the lowest level in the fall. Water levels in LF-1 and LF-4 do not mirror seasonal precipitation patterns as closely. However, after peaking out in the spring of 2006 after the exceptionally wet winters of 2004-2005 and 2005-2006, the water levels had been on a downward trend during the drier recent years, with the exception of a slight increase in early 2010 after a wetter than normal rainy season.

## 3.2 Groundwater Quality

Groundwater samples were collected from Wells LF-1 through LF-4 on June 15, 2010. All water samples were submitted to the EBMUD laboratory for analysis of water quality monitoring parameters under chain of custody documents prepared by the EBMUD laboratory. The results of historical field measurements and laboratory analysis for dissolved metals, cation/anion parameters, and general chemistry parameters are summarized in Tables 2A and 2B. The laboratory report for the June 15, 2010 sampling event is presented in Appendix B.

As described in the *Penn Mine Landfill Post-Closure Operations and Maintenance Plan*, the primary constituents of concern are copper, zinc, and total dissolved solids (TDS). The concentrations of these constituents over time (October 1999 to June 2010) are graphically shown on Figures 4, 5, and 6 for copper, zinc, and TDS, respectively. The analytical results for the samples collected from the landfill monitoring wells are summarized below.

- **Copper**

  Copper was not detected above the reported laboratory detection limits in the various samples collected from the four monitoring wells during several sampling events. In fact, most of the samples collected from LF-2 through LF-4 have all been non-detect (ND). The only exception is LF-1. This location has yielded quantifiable concentrations of dissolved copper most of the time. The most recent sample collected on June 15, 2010 contained 16.6 micrograms/liter (µg/L). Even though this concentration is higher than concentrations in the other wells and represents potentially a slight increasing trend, LF-1 is considered upgradient of the landfill. Any detected copper at this location, therefore, likely represents background conditions.

- **Zinc**

Zinc concentrations detected in the groundwater samples collected in June 2010 were generally within the range of concentrations detected during previous sampling events. The upgradient well, LF-1, contained a zinc concentration of 91 µg/L, which was down from the 160 µg/L concentration detected in 2008. The downgradient well LF-3 had a concentration of 52 µg/L, up from the 40 µg/L concentration recorded in 2008. However, this concentration was still significantly lower than the historical high of 438 µg/L recorded in July 2001.

- **Total Dissolved Solids**

The total dissolved solids (TDS) concentrations reported for the samples collected in June 2010 ranged from 220 milligrams per liter (mg/L) in LF-3 to 690 mg/L in LF-2. These concentrations fall generally within the ranges observed during previous sampling events. As shown on Figure 6, the TDS concentration at LF-2 decreased slightly to 690 mg/L from a high of 710 mg/L in 2008.

## 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. Between January 2002 and July 2010, approximately 426,945 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 49,743 gallons of leachate extracted and disposed of per year. The quantity of leachate extracted through July 2010 is summarized in Table 3. Figure 7 graphically depicts the incremental and cumulative volume of leachate extracted from January 2002 to July 2010.

As described in the annual report for 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.

EBMUD's contractor measures the water depth in the sump prior to and after pumping. The removal frequency is stepped up or down in accordance with the leachate production rate. Figure 7 shows the extraction frequency was higher earlier on in the life of the landfill and during the springs of 2005 and 2006. Based on data from 2002 to the present, the off-haul rate is approximately 2,000 gallons every one to four weeks (Figure 8). At this rate, a hydraulic head of less than 1 foot can generally be maintained on the landfill liner.

As stated above, more leachate was removed early in the operation of the landfill during 2002. The removal frequency then stayed rather constant at around 2,000 gallons every two weeks for three years, with a slight increase in 2005. Then, the exceptionally wet 2005-2006 wet season drove up the pumping rate significantly. During the past four years, the opposite situation has occurred. With a few dry years in a row and repairs completed on the landfill's cap and drainage system, leachate production has slowed significantly. Currently, the contractor is removing 2,000 gallons approximately every four weeks.

At the closure of the landfill, there was estimated to be 1.5 to 2 million gallons of leachate contained within the landfill based on the residual moisture of the mine waste at the beginning of the removal operation. At a rate of 2,000 gallons every week, the shortest estimated time for complete removal is in excess of 14 years. In reality, a much longer time horizon may be in effect as the total available leachate likely increased over the past few years as a result of rain intrusion due to landfill construction defects. However, with the recent repairs to minimize surface water intrusion, leachate production has decreased to approximately 500 gallons per week. Section 4 below discusses efforts taken so far to investigate and address surface water instrusion.

## 4.0 LANDFILL INSPECTION

The *Penn Mine Landfill Post-Closure Operations and Maintenance Plan* requires an annual inspection to ensure that the landfill cover is properly maintained. EBMUD has been exceeding this requirement by performing monthly landfill inspections.

### 4.1 Potential for Surface Water and Groundwater Infiltration into Landfill

The elevation of the prepared sub-grade beneath the landfill varies in Tier One from 338 to 324 feet above mean sea level (MSL); from 350 to 340 feet above MSL in Tier Two, and from 379 to 374 feet above MSL in Tier Three (TRC 1999). The water level in monitoring well LF-3 was, at times, above the lowest point of the landfill in that area. In addition, the bottom of the sump is at an elevation of approximately 325.6 feet above MSL (CH2M HILL 2000), which was mostly below the range of seasonal fluctuation in groundwater level in the nearby LF-3 during the past two years. However, groundwater in this area occurs in fractures that are not everywhere connected. Considering that the likely groundwater flow direction is towards a trough beneath the center of the landfill, and yet no significant amount of water was observed in the landfill subdrain, it is therefore reasonable to conclude that groundwater was not uniformly above the base of the liner and that it was unlikely that the groundwater pressure (head) alone was sufficient to cause groundwater to enter the landfill without any physical breaches or other mechanical faults in the liner's integrity. There is no evidence that such breaches or faults exist.

Because the landfill is not sealed at the perimeter, the potential exists for either surface water or rising groundwater to enter the landfill through this gap. As far as rising groundwater is concerned, the observed groundwater level in LF-1, LF-2, and LF-4 has never risen within 15 feet of the top of the casing. At LF-3, groundwater has never come within 10 feet of the top of

the casing, not even after the exceptionally wet 2005-2006 winter, and has only rarely gotten within 15 feet. As such, it was unlikely for rising groundwater to enter the landfill.

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 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 landfill cover is inspected regularly and maintained by EBMUD.

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 a 2006 investigation, two radial drains on the southwestern and southern sides of the landfill were repaired. The details of those repairs were included in the 2007-2008 biannual report.

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 Figure 8, repairs since 2007 have yielded a marked drop in leachate production. EBMUD and its contractor will continue to assess the situation and remove the accumulated leachate for transport to an offsite disposal facility as required to maintain compliance with the Post-Closure Operations & Maintenance Plan.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of monitoring and site inspections performed from 2000 through 2010, there is no evidence of release of landfill leachate to groundwater.

From 2004 to 2010, groundwater sampling was performed bi-annually and water levels were monitored in the wells on a monthly basis as stated in the 2003 annual landfill monitoring report. Water samples were collected and analyzed for the same water quality parameters as during previous sampling events. The analytical data collected to date provide the baseline conditions for both groundwater level and water quality, which indicate that the closed landfill is functioning as designed.

EBMUD has continued to remove leachate from the landfill at a rate adjusted to match the production rate. The extracted leachate has been transported to an offsite RCRA hazardous waste-permitted treatment and disposal facility.

EBMUD will continue to perform the bi-annual groundwater sampling and analysis and will start quarterly water level monitoring in Q4 2010. The groundwater monitoring results will be submitted to the SWRCB in bi-annual reports. The next monitoring report is scheduled to be submitted to SWRCB in August/September of 2012 for the period of August 2010 to July 2012.

## 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.

# Tables

# 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) | | | |
| 6/24/2004 | 335.75 | 327.71 | 328.58 | 323.94 |
| 7/29/2004 | 335.65 | 324.77 | 326.98 | 323.81 |
| 8/12/2004 | 335.55 | 324.07 | 326.45 | 323.71 |
| 9/28/2004 | 335.1 | 322.17 | 325.1 | 323.16 |
| 10/29/2004 | 334.95 | 321.93 | 326.51 | 322.89 |
| 11/19/2004 | 334.85 | 324.15 | 331.08 | 322.61 |
| 12/29/2004 | 334.6 | 328.07 | 324.78 | 322.51 |
| 1/26/2005 | 334.43 | 333.87 | 338.41 | 324.21 |
| 2/23/2005 | 335.87 | 335.22 | 340.28 | 325.66 |
| 3/18/2005 | 337.5 | 334.97 | 339.38 | 326.91 |
| 4/29/2005 | 339.85 | 334.17 | 338.43 | 328.41 |
| 5/31/2005 | 340.45 | 332.67 | 336.68 | 327.61 |
| 6/23/2005 | 340.8 | 331.67 | 335.08 | 327.31 |
| 7/22/2005 | 340.55 | 329.22 | 329.58 | 326.86 |
| 8/18/2005 | 340.7 | 329.47 | 327.68 | 326.71 |
| 9/19/2005 | 340.45 | 327.87 | 326.78 | 326.21 |
| 10/28/2005 | 339.45 | 324.27 | 326.78 | 325.21 |
| 11/7/2005 | 339.35 | 323.97 | 325.48 | 325.11 |
| 12/4/2005 | 338.75 | 323.92 | 325.88 | 324.61 |
| 1/26/2006 | 338.73 | 336.47 | 339.87 | 326.53 |
| 2/16/2006 | 340.05 | 334.27 | 337.58 | 327.55 |
| 3/13/2006 | 341.27 | 335.37 | 340.23 | 327.97 |
| 4/14/2006 | 343.66 | 338.99 | 341.78 | 331.16 |
| 5/4/2006 | 340.45 | 332.67 | 336.68 | 327.61 |
| 5/15/2006 | 345.9 | 334.67 | 338.87 | 334.01 |
| 6/22/2006 | 346.95 | 334.45 | 336.83 | 331.58 |
| 7/25/2006 | 346.72 | 329.07 | 333.45 | 330.29 |
| 8/14/2006 | 346.72 | 329.07 | 333.45 | 330.29 |
| 9/21/2006 | 345.87 | 326.05 | 327.38 | 328.94 |
| 10/23/2006 | 345.13 | 325.07 | 326.5 | 328.11 |
| 11/21/2006 | 344.64 | 324.75 | 325.93 | 327.51 |
| 12/18/2006 | 344.53 | 324.47 | 326.86 | 327.07 |
| 1/16/2007 | 343.55 | 328.37 | 331.98 | 326.51 |
| 2/6/2007 | 342.95 | 328.57 | 331.48 | 326.11 |
| 3/7/2007 | 342.65 | 333.97 | 337.68 | 326.41 |
| 4/3/2007 | 343.05 | 332.97 | 336.38 | 327.01 |
| 6/13/2007 | 343.55 | 328.97 | 333.78 | 326.61 |
| 7/18/2007 | 343.15 | 325.97 | 327.88 | 326.31 |
| 8/18/2007 | 342.95 | 324.77 | 326.88 | 326.01 |
| 9/5/2007 | 342.65 | 323.67 | 325.98 | 325.81 |
| 10/18/2007 | 341.85 | 322.67 | 324.78 | 324.91 |
| 12/5/2007 | 341.25 | 322.37 | 324.28 | 324.21 |
| 1/2/2008 | 340.85 | 324.37 | 330.38 | 323.91 |
| 2/7/2008 | 340.55 | 333.97 | 338.58 | 325.21 |
| 3/5/2008 | 340.85 | 333.67 | 337.98 | 326.21 |
| 4/3/2008 | 341.75 | 332.87 | 336.58 | 326.31 |
| 5/5/2008 | 342.45 | 331.27 | 335.48 | 326.41 |
| 5/14/2008 | 342.5 | 330.69 | 334.77 | 326.3 |
| 6/4/2008 | 342.55 | 329.17 | 331.48 | 326.11 |
| 7/2/2008 | 342.35 | 326.67 | 327.78 | 325.81 |
| 8/6/2008 | 341.95 | 324.17 | 326.28 | 325.31 |
| 9/3/2008 | 341.65 | 323.17 | 325.58 | 325.01 |
| 10/3/2008 | 341.15 | 322.47 | 324.78 | 324.41 |

## 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 |
| 3/3/10 | 337.45 | 333.37 | 339.18 | 324.31 |
| 4/15/10 | 337.45 | 333.07 | 337.98 | 324.71 |
| 5/5/10 | 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 |

Data missing for 5/09, 8/09, and 2/10.

**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-1 | 10/14/1999 | P | 64.2 | 22.8 | 7.65 | 803 | -- | -- | 443 | 297 | APPL |
| | 10/20/1999 | P | 67.97 | 19.7 | 6.94 | 709 | 29.6 | U 4 | 400 | 310 | MCC/GEO |
| | 10/20/1999 | S | -- | -- | -- | -- | -- | 2.6 | 420 | 290 | EBMUD |
| | 1/21/2000 | P | 66.56 | 25 | 7.72 | 633 | 5.2 | 3.5 | 440 | 290 | EBMUD |
| | 4/21/2000 | P | 67.02 | 19 | 7.5 | 650 | 3.3 | 47 | 460 | 320 | EBMUD |
| | 7/20/2000 | P | 69.52 | 21.4 | 7.13 | 708 | 12.2 | 3 | 450 | 310 | EBMUD |
| | 10/19/2000 | P | 69.82 | 21.9 | 7.41 | 661 | 5.23 | 1.4 | 440 | 330 | EBMUD |
| | 10/19/2000 | R | -- | -- | -- | -- | -- | U 1.2 | 440 | 320 | EBMUD |
| | 1/18/2001 | P | 72.12 | 17.3 | 7.53 | 663 | 12.6 | U 1.5 | 450 | 300 | EBMUD |
| | 4/17/2001 | P | 70.75 | 19 | 7.09 | 644 | 0.6 | 1.7 | 450 | 320 | EBMUD |
| | 7/26/2001 | P | 71.71 | 19.7 | 7.6 | 741 | 3 | 4.3 | 430 | 300 | EBMUD |
| | 10/17/2001 | P | 72.21 | 19.6 | 7.6 | 658 | 3 | 3 | 450 | 310 | EBMUD |
| | 1/31/2002 | P | -- | 21 | 7.6 | 750 | 1 | 10 | 450 | 300 | EBMUD |
| | 1/31/2002 | R | -- | -- | -- | -- | -- | 11 | 440 | 300 | EBMUD |
| | 7/18/2002 | P | -- | 21 | 7.1 | 720 | 6 | U 1.5 | 460 | 320 | EBMUD |
| | 1/31/2003 | P | -- | 19 | 7.3 | 730 | -- | 4.7 | 470 | 330 | EBMUD |
| | 7/18/2003 | P | 74.20 | 21 | 7.7 | 720 | 1 | 11 | 470 | 340 | EBMUD |
| | 2/24/2004 | P | 74.70 | 19 | 6.36 | 589 | 4 | 2.4 | 140 | 120 | EBMUD |
| | 8/24/2004 | P | -- | 19.4 | 7.31 | 277 | -- | 6 | 340 | 190 | EBMUD |
| | 5/4/2006 | P | 69.19 | 20.1 | 7.45 | 230 | 2 | U 6.2 | 140 | 110 | EBMUD |
| | 5/14/2008 | P | 64.95 | 18.1 | 7.11 | 718 | 4 | 5.7 | 320 | 230 | EBMUD |
| | 6/15/2010 | P | 68.45 | 18.9 | 7.14 | 668 | 3 | U 2.5 | 330 | 240 | EBMUD |
| LF-2 | 10/14/1999 | P | 38.68 | 24.9 | 7.25 | 630 | -- | -- | 365 | 253 | APPL |
| | 10/20/1999 | P | 40.68 | 20.3 | 6.65 | 547 | 59.6 | U 4 | 310 | 260 | MCC/GEO |
| | 10/20/1999 | S | -- | -- | -- | -- | -- | 4.4 | 310 | 230 | EBMUD |
| | 1/21/2000 | P | 37.74 | 24.8 | 7.39 | 479 | 12.1 | 2.7 | 380 | 230 | EBMUD |
| | 4/21/2000 | P | 31.14 | 19 | 5.9 | 480 | 1.7 | 15 | 370 | 250 | EBMUD |
| | 7/20/2000 | P | 37.34 | 21.7 | 6.71 | 542 | 7.6 | U 3.0 | 380 | 260 | EBMUD |
| | 10/19/2000 | P | 41.04 | 21.4 | 7.16 | 593 | 14.53 | 1.2 | 380 | 270 | EBMUD |
| | 1/18/2001 | P | 33.43 | 17.9 | 7.34 | 588 | 3.04 | U 6.0 | 420 | 260 | EBMUD |
| | 1/18/2001 | R | -- | -- | -- | -- | -- | U 2.0 | 390 | 260 | EBMUD |
| | 4/17/2001 | P | 31.31 | 19.3 | 6.66 | 554 | 0.7 | U 1.5 | 380 | 260 | EBMUD |
| | 7/26/2001 | P | 39.39 | 19.8 | 6.8 | 627 | 8 | U 2.0 | 380 | 260 | EBMUD |
| | 10/17/2001 | P | 42.02 | 19.8 | 7.17 | 678 | 3 | 15 | 400 | 280 | EBMUD |
| | 10/17/2001 | R | -- | -- | -- | -- | -- | 26 | 400 | 270 | EBMUD |
| | 1/31/2002 | P | -- | 20 | 6.8 | 640 | 2 | U 1.2 | 440 | 270 | EBMUD |

**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 |
| 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 |
| 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 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-4** | 7/20/2000 | R | -- | -- | -- | -- | -- | 36 | 540 | 420 | EBMUD |
| | 10/19/2000 | P | 55 | 20.7 | 7.41 | 755 | 8.5 | 14 | 530 | 420 | EBMUD |
| | 1/18/2001 | P | 55.25 | 17.3 | 6.9 | 821 | 30.2 | 210 | 540 | 410 | EBMUD |
| | 4/17/2001 | P | 53.5 | 18.6 | 7.19 | 778 | 0.9 | 120 | 540 | 420 | EBMUD |
| | 4/17/2001 | R | -- | -- | -- | -- | -- | 210 | 530 | 420 | EBMUD |
| | 7/26/2001 | P | 54.32 | 19.7 | 6.79 | 902 | 140 | 230 | 530 | 410 | EBMUD |
| | 7/26/2001 | R | -- | -- | -- | -- | -- | 9 | 530 | 410 | EBMUD |
| | 10/17/2001 | P | 54.94 | 19.7 | 7.08 | 930 | 6 | 130 | 550 | 410 | EBMUD |
| | 1/31/2002 | P | -- | 21 | 7.5 | 840 | 1 | 9.3 | 550 | 380 | EBMUD |
| | 7/18/2002 | P | -- | 20 | 7 | 820 | 12 | 44 | 550 | 380 | EBMUD |
| | 1/30/2003 | P | -- | 20 | 7.1 | 810 | -- | 33 | 540 | 380 | EBMUD |
| | 7/18/2003 | P | 55.78 | 20 | 7.3 | 820 | 6 | 36 | 540 | 400 | EBMUD |
| | 2/24/2004 | P | 54.55 | 19.3 | 7.9 | 850 | 31 | 30 | 550 | 440 | EBMUD |
| | 8/24/2004 | P | -- | 19.8 | 7.74 | 435 | -- | 110 | 530 | 450 | EBMUD |
| | 5/4/2006 | P | 41.68 | 20.5 | 7.23 | 1290 | 17 | 240 | 750 | 650 | EBMUD |
| | 5/14/2008 | P | 50.91 | 18 | 6.98 | 871 | 120 | 340 | 580 | 460 | EBMUD |
| | 6/15/2010 | P | 50.32 | 17.8 | 6.91 | 822 | 42 | U 2 | 570 | 470 | EBMUD |
| **Subdrain** | 9/23/1998 | P | -- | -- | -- | 787 | -- | -- | 515 | 289 | APPL |
| | 2/4/1999 | P | -- | -- | 7.9 | 722 | -- | -- | -- | -- | APPL |
| | 4/28/1999 | P | -- | -- | 7.5 | 467 | -- | -- | -- | -- | APPL |
| | 7/19/1999 | P | -- | -- | 7.8 | 849 | -- | -- | -- | -- | APPL |
| | 3/1/2000 | P | -- | 16 | 7.08 | 691 | 8.4 | U 1.2 | 450 | 280 | EBMUD |
| | 5/4/2006 | X | -- | -- | -- | -- | -- | -- | -- | -- | |
| | 5/14/2008 | X | -- | -- | -- | -- | -- | -- | -- | -- | |
| | 6/15/2010 | X | -- | -- | -- | -- | -- | -- | -- | -- | |
| **Leachate** | 8/24/1999 | P | -- | -- | -- | -- | -- | -- | -- | -- | APPL |
| | 3/30/2000 | P | -- | -- | 3.28 | -- | -- | -- | -- | -- | MCC |
| | 6/5/2000 | P | -- | -- | 3.6 | -- | -- | -- | -- | -- | MCC |
| | 10/25/2000 | P | -- | -- | 3.7 | -- | -- | -- | -- | -- | Chromalab |
| | 10/25/2000 | P | -- | -- | 3.8 | -- | -- | -- | -- | -- | Chromalab |
| | 10/25/2000 | P | -- | -- | 3.7 | -- | -- | -- | -- | -- | 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 | Replicate sample |
| S | Split sample |
| U | Not detected |
| X | Insufficient water present for sample collection |

**Table 2B**
**Groundwater, Subdrain, and Leachate Laboratory Analysis Summary**
**Landfill Monitoring**
**Penn Mine Environmental Site Restoration Project**

| WELL | Sample | Sample | Depth to | DISSOLVED METALS | | | | | | | TOTAL METALS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Date | Type | Water (feet) | 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) | LAB |
| 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 |

**Table 2B**
**Groundwater, Subdrain, and Leachate Laboratory Analysis Summary**
**Landfill Monitoring**
**Penn Mine Environmental Site Restoration Project**

| WELL | Sample | Sample | Depth to | DISSOLVED METALS | | | | | | | TOTAL METALS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Date | Type | Water (feet) | 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) | LAB |
| LF-2 | 10/14/1999 | P | 38.68 | U 100 | U 5 | U 5 | U 0.2 | U 5 | U 3 | U 50 | 34.5 | 20200 | 1300 | 27300 | 61200 | 13.2 | APPL |
| | 10/20/1999 | P | 40.68 | 500 | U 5 | U 5 | U 0.8 | U 50 | U 5 | U 50 | 33 | 21000 | 1600 | 29000 | 61000 | 13 | MCC/GEO |
| | 10/20/1999 | S | -- | U 10.4 | U 0.4 | U 2.08 | U 0.02 | U 5.2 | 9.43 | 6.12 | 35 | B 22900 | 1870 | B 30500 | B 61900 | 15 | EBMUD |
| | 1/21/2000 | P | 37.74 | U 10.4 | U 0.832 | 3.04 | B 0.04 | U 5.2 | 10.9 | U 50 | 35 | 20300 | 2010 | B 32400 | 63600 | 12 | EBMUD |
| | 4/21/2000 | P | 31.14 | 26.8 | U 0.728 | U 3.12 | 0.02 | U 2.08 | 8.96 | U 50 | 35 | 18700 | 763 | 30600 | 61500 | 15 | EBMUD |
| | 7/20/2000 | P | 37.34 | 55.2 | U 0.728 | U 3.12 | U 0.02 | 2.89 | 18.1 | U 50 | 28 | 19000 | 1110 | B 29800 | 72700 | 14 | EBMUD |
| | 10/19/2000 | P | 41.04 | 34.7 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | 6.5 | U 50 | 37 | 18900 | 1360 | 29300 | 65900 | 33 | EBMUD |
| | 1/18/2001 | P | 33.43 | B 38.4 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | 11.8 | 78.1 | 400 | 17200 | 4390 | 29800 | 65800 | 550 | EBMUD |
| | 1/18/2001 | R | -- | B 37.2 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | 14.8 | 80 | 300 | 17100 | 4670 | 28700 | 64400 | 220 | EBMUD |
| | 4/17/2001 | P | 31.31 | 31.4 | U 0.728 | U 3.12 | 0.02 | B 5.65 | U 5.20 | 5.52 | 510 | B 18000 | 682 | B 30000 | 65900 | 320 | EBMUD |
| | 7/26/2001 | P | 39.39 | 64.7 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | U 0.30 | 5.8 | 34 | 19800 | 1120 | 31100 | 70100 | 15 | EBMUD |
| | 10/17/2001 | P | 42.02 | 41.4 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | U 0.30 | 8.98 | 33 | 20400 | 1580 | B 32300 | B 72800 | 15 | EBMUD |
| | 10/17/2001 | R | -- | 33 | U 0.728 | U 3.12 | U 0.02 | 3.76 | U 0.30 | 6.41 | 34 | 20400 | 1400 | B 32600 | B 72000 | 15 | EBMUD |
| | 1/31/2002 | P | -- | 45.6 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | U 0.90 | 3.1 | 41 | 21700 | 633 | 35100 | 77800 | 16 | EBMUD |
| | 7/18/2002 | P | -- | 8.96 | -- | U 3.12 | U 0.02 | -- | U 0.90 | 10.7 | 60 | 22600 | 583 | 42700 | 85300 | 54 | EBMUD |
| | 7/18/2002 | R | -- | U 6.24 | -- | U 3.12 | U 0.02 | -- | U 0.90 | 18.2 | 55 | 22100 | 606 | 42500 | 84500 | 20 | EBMUD |
| | 1/30/2003 | P | -- | 1740 | -- | U 6.24 | U 0.02 | -- | U 0.90 | 6.34 | 47 | 21300 | 733 | 39100 | 85500 | 24 | EBMUD |
| | 7/18/2003 | P | 41.39 | 15.1 | -- | U 6.24 | U 0.02 | -- | U 0.90 | 3.33 | 51 | 20800 | 603 | 38900 | B 84900 | 280 | EBMUD |
| | 2/24/2004 | P | 30.85 | U 10.4 | -- | U 6.24 | U 0.02 | -- | U 0.90 | 3.51 | 49 | 21100 | 701 | 40500 | 86500 | 23 | EBMUD |
| | 2/24/2004 | R | -- | 28.5 | -- | 4.4 | -- | -- | -- | B 17 | -- | 20800 | 652 | 38500 | B 79700 | -- | EBMUD |
| | 8/24/2004 | P | -- | U 8.32 | -- | 4.35 | U 0.02 | -- | U 0.8 | 17.3 | 53 | 23400 | 1590 | 45400 | B 99500 | 26 | EBMUD |
| | 8/24/2004 | R | -- | 98.2 | -- | 10.4 | -- | -- | -- | 31.8 | -- | 25100 | 1880 | 46900 | 101000 | -- | EBMUD |
| | 5/4/2006 | P | 28.06 | U 14 | -- | U 8.32 | U 0.02 | -- | 0.21 | 190 | 54 | 21000 | 2000 | 39000 | 99000 | 20 | EBMUD |
| | 5/4/2006 | R | -- | 17 | -- | U 8.32 | -- | -- | -- | 190 | -- | 18000 | 2200 | 35000 | 91000 | -- | EBMUD |
| | 5/14/2008 | P | 33.18 | U 22 | -- | U 3.3 | U 0.02 | -- | -- | 8.5 | 110 | 27000 | 1100 | 58000 | 130000 | 26 | EBMUD |
| | 6/15/2010 | P | 32.6 | U 17 | -- | U 4.18 | U 0.02 | -- | -- | U 4.2 | 99 | 25000 | 680 | 53000 | 130000 | 19 | EBMUD |

**Table 2B**
**Groundwater, Subdrain, and Leachate Laboratory Analysis Summary**
**Landfill Monitoring**
**Penn Mine Environmental Site Restoration Project**

| WELL | Sample | Sample | Depth to | DISSOLVED METALS | | | | | | | TOTAL METALS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Date | Type | Water (feet) | 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) | LAB |
| 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 |

**Table 2B**
**Groundwater, Subdrain, and Leachate Laboratory Analysis Summary**
**Landfill Monitoring**
**Penn Mine Environmental Site Restoration Project**

| WELL | Sample | Sample | Depth to | DISSOLVED METALS | | | | | | | TOTAL METALS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Date | Type | Water (feet) | 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) | LAB |
| LF-4 | 10/14/1999 | P | 55.55 | 122 | U 5 | U 5 | U 0.2 | U 5 | U 3 | U 50 | 27.4 | 127000 | 7100 | 17000 | 23900 | 26.8 | APPL |
| | 10/20/1999 | P | 73.73 | 170 | U 5 | U 5 | U 0.8 | U 50 | U 5 | U 50 | 29 | 110000 | 7000 | 19000 | 22000 | 29 | MCC/GEO |
| | 10/20/1999 | R | -- | 180 | U 5 | U 5 | U 0.8 | U 50 | U 5 | U 50 | 28 | 110000 | 6900 | 20000 | 24000 | 28 | MCC/GEO |
| | 10/20/1999 | S | -- | U 10.4 | U 0.832 | U 2.08 | U 0.02 | U 5.2 | 0.5 | 9.48 | 27 | B 128000 | 7450 | B 21600 | U 0.104 | 28 | EBMUD |
| | 10/20/1999 | S, R | -- | 14.8 | 1.01 | 3.98 | U 0.02 | U 5.2 | U 0.3 | 8.92 | 36 | B 128000 | 7550 | B 21100 | U 0.104 | 29 | EBMUD |
| | 1/21/2000 | P | 56.21 | U 10.4 | U 0.832 | U 2.08 | U 0.02 | 5.38 | U 9.36 | 3.06 | 19 | 141000 | 8140 | B 29500 | 26600 | 36 | EBMUD |
| | 1/21/2000 | R | -- | U 10.4 | U 0.832 | 3.76 | -- | U 5.2 | U 9.36 | 3.41 | 18 | 142000 | 8330 | B 29600 | 26800 | 38 | EBMUD |
| | 4/21/2000 | P | 57.02 | 13.9 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | U 5.20 | B 7.57 | 17 | 131000 | 6560 | 28100 | 27300 | 35 | EBMUD |
| | 4/21/2000 | R | -- | 15 | U 0.728 | U 3.12 | U 0.02 | 3.05 | U 5.20 | U 2.08 | 15 | 132000 | 6300 | 29700 | 27700 | 32 | EBMUD |
| | 7/20/2000 | P | 55.05 | 35.8 | U 0.728 | U 3.12 | U 0.02 | 3.35 | 12.3 | 7.74 | 16 | 138000 | 10400 | 30000 | 31700 | 32 | EBMUD |
| | 7/20/2000 | R | -- | 36.4 | U 0.728 | U 3.12 | -- | 3.18 | 15.9 | 6.34 | 16 | 139000 | 7050 | B 30900 | 32600 | 32 | EBMUD |
| | 10/19/2000 | P | 55 | 18.2 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | 7.98 | U 2.08 | 18 | 128000 | 6440 | 27600 | 27300 | 34 | EBMUD |
| | 1/18/2001 | P | 55.25 | B 22.1 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | 8.37 | 24.5 | 760 | 111000 | 6430 | 28100 | 28800 | 570 | EBMUD |
| | 4/17/2001 | P | 53.5 | 17.1 | U 0.728 | U 3.12 | 0.02 | B 8.26 | U 5.20 | 3.32 | 260 | B 132000 | 6140 | B 29700 | 29600 | 290 | EBMUD |
| | 4/17/2001 | R | -- | 16.6 | U 0.728 | U 3.12 | 0.02 | B 7.41 | U 5.20 | 4.74 | 260 | B 134000 | 6220 | B 30300 | 30000 | 170 | EBMUD |
| | 7/26/2001 | P | 54.32 | 35.5 | U 0.728 | U 3.12 | U 0.02 | 4.25 | 0.5 | 6.93 | 18 | 132000 | 6000 | 29800 | 31200 | 31 | EBMUD |
| | 7/26/2001 | R | -- | 35.5 | 0.978 | U 3.12 | U 0.02 | 2.68 | U 0.30 | 7.2 | 17 | 134000 | 6100 | 29900 | 31100 | 30 | EBMUD |
| | 10/17/2001 | P | 54.94 | 15.4 | U 0.728 | U 3.12 | U 0.02 | 2.26 | U 0.30 | 22.6 | 17 | 139000 | 6440 | B 29400 | B 31200 | 30 | EBMUD |
| | 1/31/2002 | P | -- | 25.5 | U 0.728 | U 3.12 | U 0.02 | U 2.08 | U 0.90 | U 2.08 | 17 | 147000 | 7010 | 29100 | 32800 | 36 | EBMUD |
| | 7/18/2002 | P | -- | U 6.24 | -- | U 3.12 | U 0.02 | -- | U 0.90 | 43.9 | 17 | 138000 | 6480 | 28600 | 30200 | 2.5 | EBMUD |
| | 1/30/2003 | P | -- | U 10.4 | -- | U 6.24 | U 0.02 | -- | U 0.90 | 5.15 | 17 | 136000 | 6410 | 26800 | 31300 | 37 | EBMUD |
| | 7/18/2003 | P | 55.78 | 19.4 | -- | U 6.24 | U 0.02 | -- | U 0.90 | 21.2 | 23 | 135000 | 6680 | 30000 | B 33600 | 37 | EBMUD |
| | 2/24/2004 | P | 54.55 | U 10.4 | -- | U 6.24 | U 0.02 | -- | 1.1 | 9.18 | 19 | 13300 | 6190 | 30200 | 32400 | 30 | EBMUD |
| | 2/24/2004 | R | -- | 1340 | -- | U 4.4 | -- | -- | -- | -- | -- | 13700 | 6600 | B 30200 | B 31300 | -- | EBMUD |
| | 8/24/2004 | P | -- | 8.62 | -- | 6.52 | U 0.02 | -- | U 0.8 | 5.4 | 16 | 133000 | 6040 | 30400 | B 31200 | 25 | EBMUD |
| | 8/24/2004 | R | -- | 4120 | -- | 12.4 | -- | -- | -- | 22.5 | -- | 135000 | 6470 | 33500 | 32500 | -- | EBMUD |
| | 5/4/2006 | P | 41.68 | 1400 | -- | 10.3 | U 0.02 | -- | 0.20 | 49 | 23 | 160000 | 7400 | 55000 | 50000 | 37 | EBMUD |
| | 5/4/2006 | R | -- | 15 | -- | U 8.32 | -- | -- | -- | 9.7 | 23 | 160000 | 7000 | 55000 | 49000 | 37 | EBMUD |
| | 5/4/2006 | QC | -- | 2900 | -- | U 8.32 | -- | -- | -- | 52 | 28 | 160000 | 7700 | 58000 | 52000 | 35 | EBMUD |
| | 5/4/2006 | QCR | -- | 15 | -- | U 8.32 | U 0.02 | -- | 0.26 | 8.7 | 28 | 160000 | 7200 | 58000 | 50000 | 35 | EBMUD |
| | 5/14/2008 | P | 50.91 | U 22 | -- | U 3.3 | U 0.02 | -- | -- | 46 | 14 | 150000 | 6700 | 39000 | 35000 | 27 | EBMUD |
| | 6/15/2010 | P | 50.32 | U 17 | -- | U 4.18 | U 0.02 | -- | -- | U 4.2 | 15 | 140000 | 6400 | 34000 | 33000 | 29 | EBMUD |

**Table 2B**
**Groundwater, Subdrain, and Leachate Laboratory Analysis Summary**
**Landfill Monitoring**
**Penn Mine Environmental Site Restoration Project**

| WELL | Sample | Sample | Depth to | DISSOLVED METALS | | | | | | | TOTAL METALS | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ID | Date | Type | Water (feet) | 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) | LAB |
| **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 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| **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 | B | Analyte detected in method blank |
| mg/L | milligrams per liter | P | Primary sample |
| -- | Not analyzed/available/applicable | R | Lab Replicate sample |
| MCC | McCampbell Analytical | S | Split sample |
| GEO | GeoAnalytical Laboratories | U | Not detected |
| EBMUD | District Laboratory | QC | Field duplicate |
| APPL | Agriculture & Priority Pollutants Laboratories | QCR | Lab replicate of Field duplicate |
| | | X | Insufficient water present for sample collection |

# Table 3
## Leachate Removal - January 2002 to July 2010

| Date | Volume Hauled | Annual Volume Hauled (Gallons) |
|---|---|---|
| 1/3/02 | 2398 | |
| 1/10/02 | 3957 | |
| 1/17/02 | 2321 | |
| 1/25/02 | 2204 | |
| 1/31/02 | 1484 | |
| 2/7/02 | 1847 | |
| 2/14/02 | 1808 | |
| 2/21/02 | 2098 | |
| 2/28/02 | 1981 | |
| 3/7/02 | 1784 | |
| 3/14/02 | 1727 | |
| 3/21/02 | 1736 | |
| 3/28/02 | 1652 | |
| 4/4/02 | 1573 | |
| 4/11/02 | 1482 | |
| 4/18/02 | 1468 | |
| 4/25/02 | 1360 | |
| 5/2/02 | 1400 | |
| 5/9/02 | 1496 | |
| 5/16/02 | 1400 | |
| 5/23/02 | 1353 | |
| 5/30/02 | 1343 | |
| 6/13/02 | 2628 | |
| 6/27/02 | 2588 | |
| 7/11/02 | 2547 | |
| 7/25/02 | 2537 | |
| 8/8/02 | 2456 | |
| 8/22/02 | 2470 | |
| 9/5/02 | 2427 | |
| 9/19/02 | 2410 | |
| 10/7/02 | 2513 | |
| 10/24/02 | 2489 | |
| 11/7/02 | 2827 | |
| 11/22/02 | 2871 | |
| 12/5/02 | 2134 | |
| 12/19/02 | 2271 | 75,040 |
| 1/6/03 | 2218 | |
| 1/16/03 | 2271 | |
| 1/30/03 | 2596 | |
| 2/13/03 | 2578 | |
| 2/27/03 | 2592 | |
| 3/13/03 | 2206 | |
| 3/27/03 | 2088 | |
| 4/14/03 | 2297 | |
| 4/24/03 | 1513 | |
| 5/8/03 | 1987 | |
| 5/22/03 | 1923 | |
| 6/5/03 | 1914 | |
| 6/26/03 | 2124 | |
| 7/10/03 | 2437 | |

# Table 3
## Leachate Removal - January 2002 to July 2010

| Date | Volume Hauled | Annual Volume Hauled (Gallons) |
|---|---|---|
| 7/24/03 | 1850 | |
| 8/14/03 | 2090 | |
| 8/28/03 | 2267 | |
| 9/18/03 | 2225 | |
| 10/2/03 | 2264 | |
| 10/23/03 | 2307 | |
| 11/13/03 | 2133 | |
| 11/24/03 | 2460 | |
| 12/15/03 | 2199 | |
| 12/29/03 | 2284 | 52,823 |
| 1/15/04 | 2293 | |
| 1/22/04 | 2344 | |
| 1/29/04 | 2248 | |
| 2/10/04 | 2154 | |
| 3/1/04 | 2244 | |
| 3/4/04 | 5818 | |
| 3/18/04 | 3154 | |
| 4/1/04 | 2154 | |
| 4/15/04 | 1803 | |
| 4/29/04 | 1799 | |
| 5/13/04 | 1683 | |
| 5/27/04 | 1630 | |
| 6/10/04 | 1641 | |
| 6/24/04 | 1641 | |
| 7/8/04 | 1628 | |
| 7/29/04 | 2281 | |
| 8/12/04 | 1567 | |
| 9/2/04 | 2230 | |
| 9/23/04 | 2283 | |
| 10/7/04 | 1594 | |
| 10/25/04 | 2094 | |
| 11/15/04 | 2226 | |
| 12/2/04 | 1848 | |
| 12/20/04 | 2026 | 52,383 |
| 1/6/05 | 2336 | |
| 1/20/05 | 2393 | |
| 1/24/05 | 2276 | |
| 1/27/05 | 2269 | |
| 2/7/05 | 2281 | |
| 2/10/05 | 2600 | |
| 2/17/05 | 1843 | |
| 2/28/05 | 2125 | |
| 3/10/05 | 2142 | |
| 3/24/05 | 2212 | |
| 4/7/05 | 2083 | |
| 4/14/05 | 4481 | |
| 5/2/05 | 2117 | |
| 5/12/05 | 1465 | |
| 5/26/05 | 1509 | |
| 6/13/05 | 1836 | |

# Table 3
## Leachate Removal - January 2002 to July 2010

| Date | Volume Hauled | Annual Volume Hauled (Gallons) |
|---|---|---|
| 6/30/05 | 1711 | |
| 7/18/05 | 1725 | |
| 8/8/05 | 1960 | |
| 8/29/05 | 1960 | |
| 9/22/05 | 2229 | |
| 10/20/05 | 2183 | |
| 11/15/05 | 2313 | |
| 12/5/05 | 2216 | |
| 12/22/05 | 1815 | 54,080 |
| 1/10/06 | 2245 | |
| 1/16/06 | 5717 | |
| 1/26/06 | 2211 | |
| 2/14/06 | 4693 | |
| 3/2/06 | 2147 | |
| 3/21/06 | 6907 | |
| 3/30/06 | 2036 | |
| 4/6/06 | 9420 | |
| 4/13/06 | 4962 | |
| 4/18/06 | 9439 | |
| 4/27/06 | 6610 | |
| 5/11/06 | 1866 | |
| 5/25/06 | 3757 | |
| 6/13/06 | 1962 | |
| 6/29/06 | 1762 | |
| 7/25/06 | 1919 | |
| 8/17/06 | 2110 | |
| 9/7/06 | 1741 | |
| 10/3/06 | 1921 | |
| 10/26/06 | 2677 | |
| 11/21/06 | 2288 | |
| 12/14/06 | 2080 | 80,470 |
| 1/9/07 | 2254 | |
| 2/1/07 | 2055 | |
| 2/28/07 | 2336 | |
| 3/22/07 | 2334 | |
| 3/29/07 | 2672 | |
| 4/17/07 | 2210 | |
| 5/15/07 | 2495 | |
| 5/18/07 | 2572 | |
| 6/7/07 | 2236 | |
| 6/29/07 | 1939 | |
| 7/24/07 | 2134 | |
| 8/21/07 | 2165 | |
| 9/13/07 | 1907 | |
| 10/11/07 | 2204 | |
| 11/8/07 | 2283 | |
| 12/6/07 | 2367 | 36,163 |
| 1/3/08 | 2145 | |
| 2/5/08 | 4050 | |
| 2/28/08 | 3320 | |

## Table 3
## Leachate Removal - January 2002 to July 2010

| Date | Volume Hauled | Annual Volume Hauled (Gallons) |
|---|---|---|
| 3/20/08 | 2621 | |
| 4/10/08 | 1919 | |
| 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 | 2384 | |
| 10/30/08 | 2571 | |
| 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 | 15,565 |

**Total Volume (Jan 3, 2002 - July 8, 2010) = 426,945 Gallons**

The 2010 sum only accounts for seven months of leachate off-hauled.

# Figures

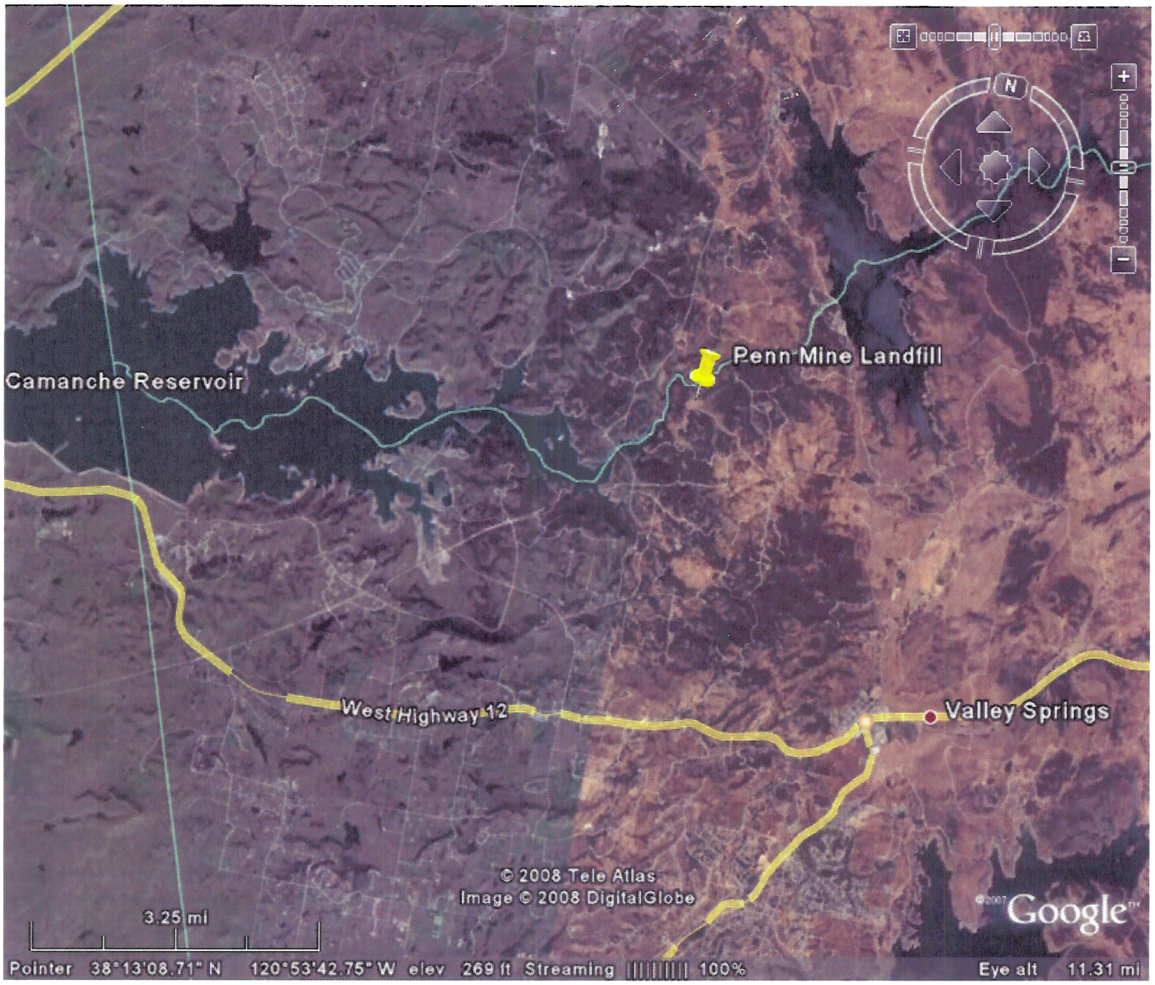



**Figure 1 – Site Vicinity Map**

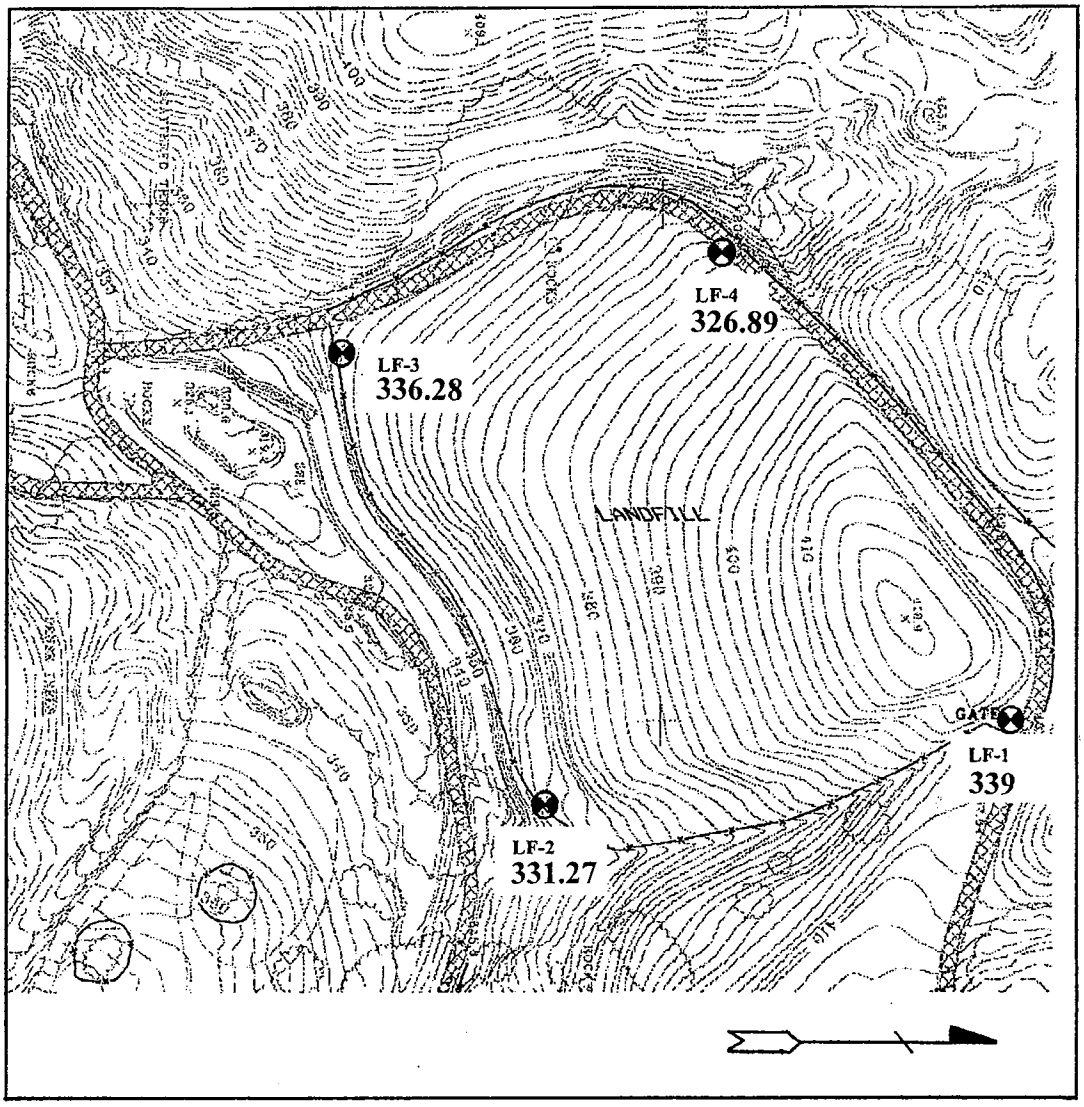
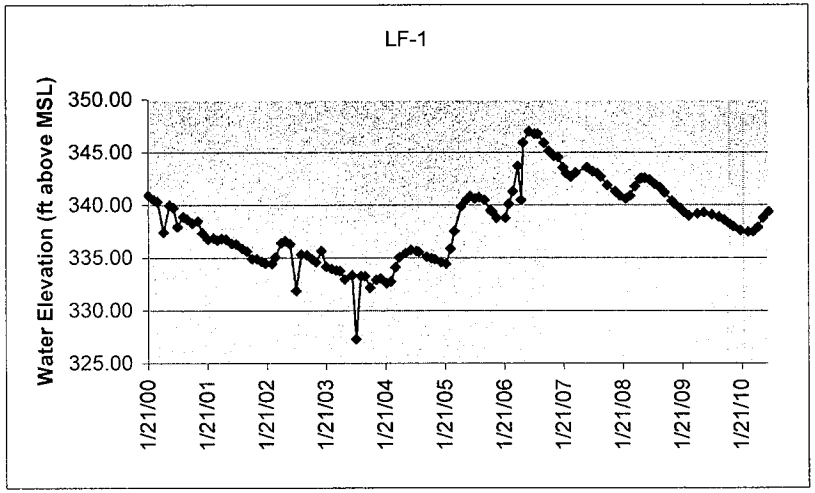
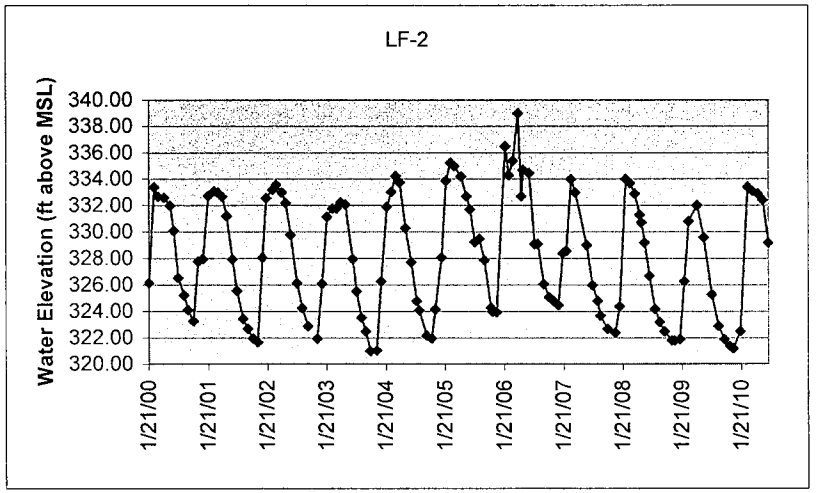


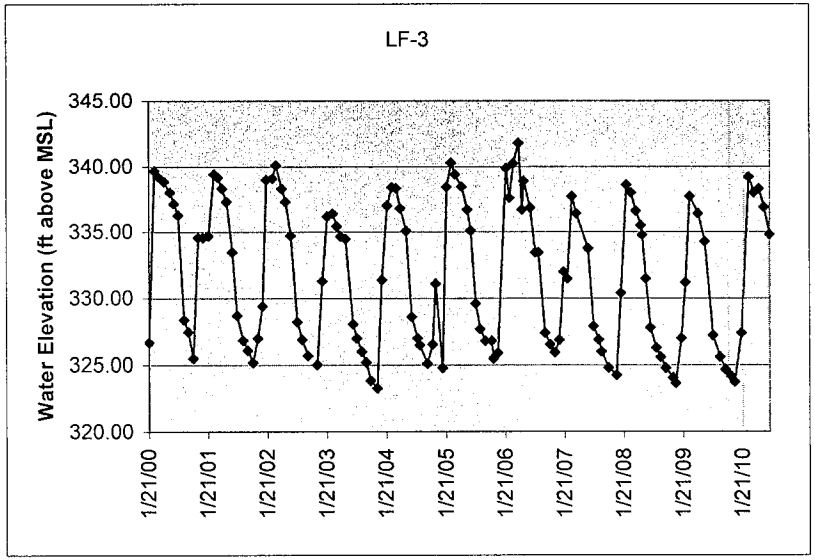

**Figure 2 – Site Plan and Groundwater Elevation**
**June 15, 2010**

**Figure 3**
**Well Hydrographs Years 2000-2010**

**Penn Mine Environmental Restoration Project**



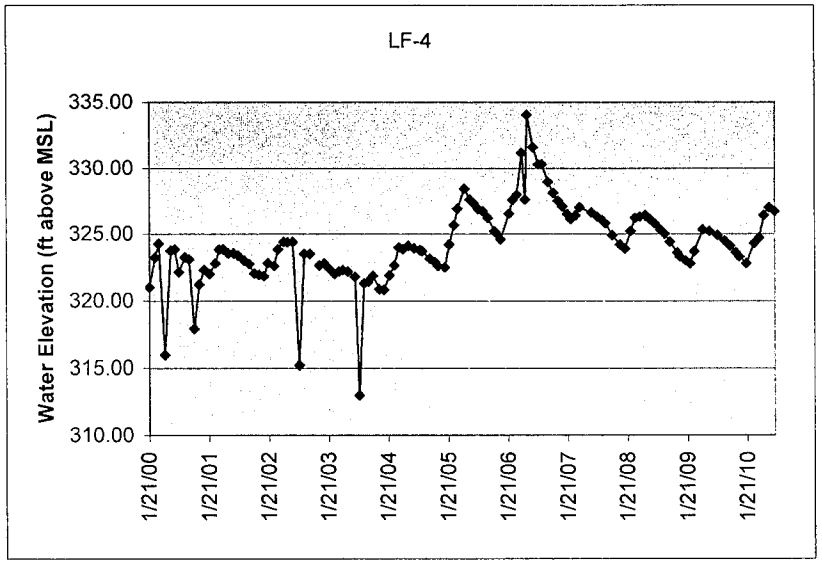
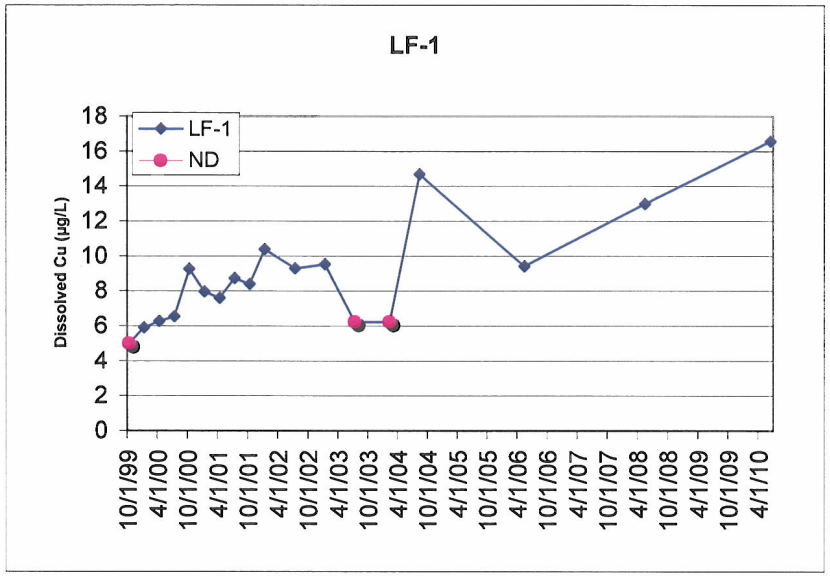
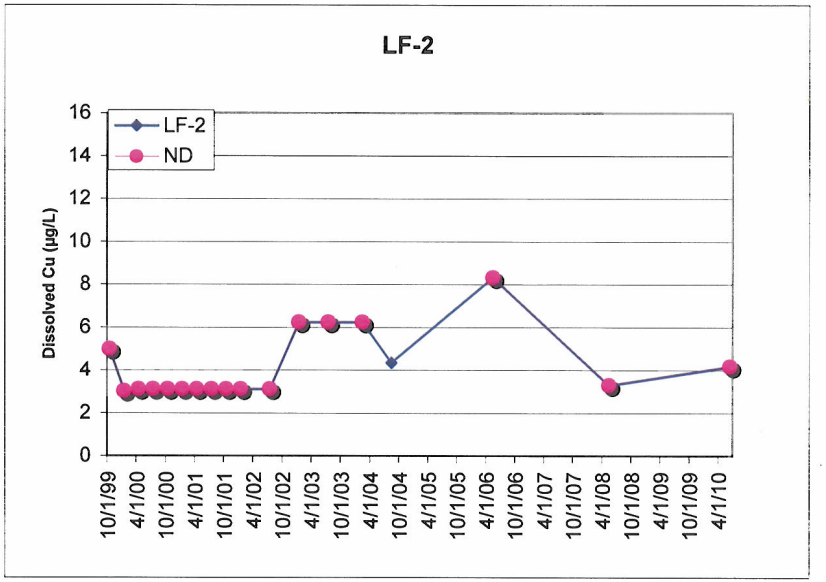
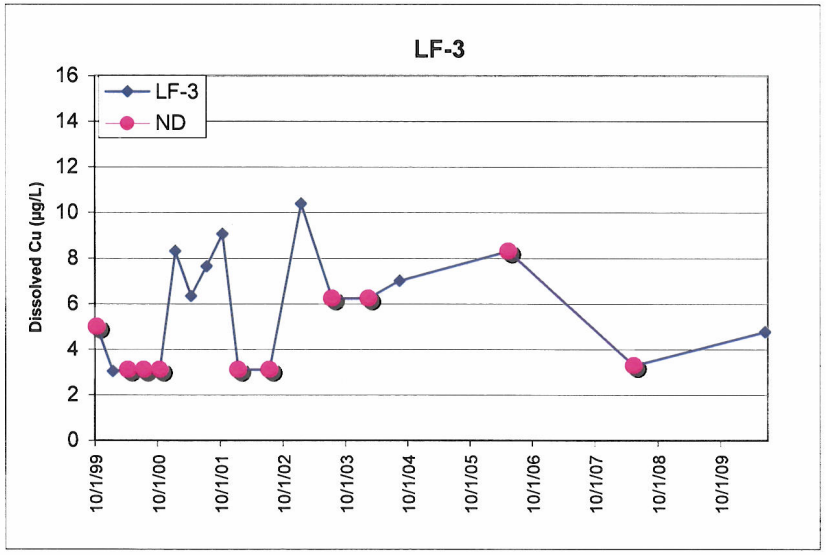



**Figure 4**
**Dissolved Copper Concentrations Years 1999-2010**

**Penn Mine Environmental Restoration Project**



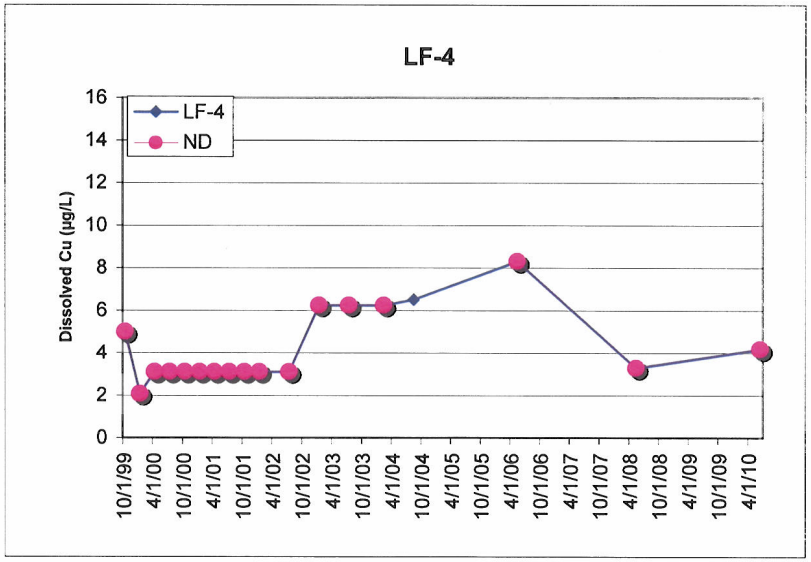
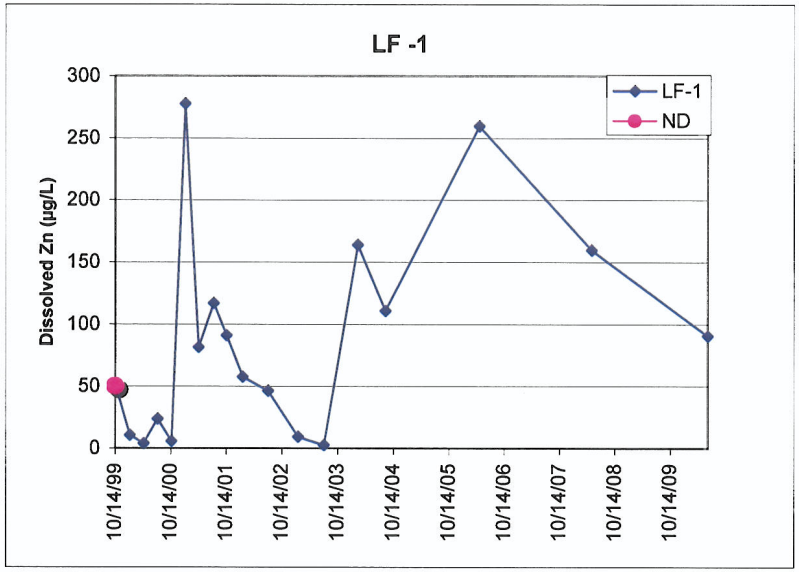
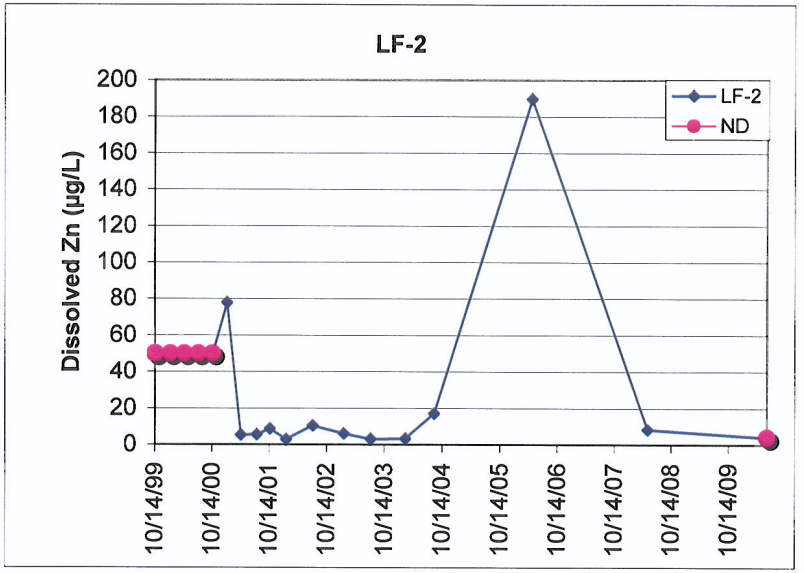
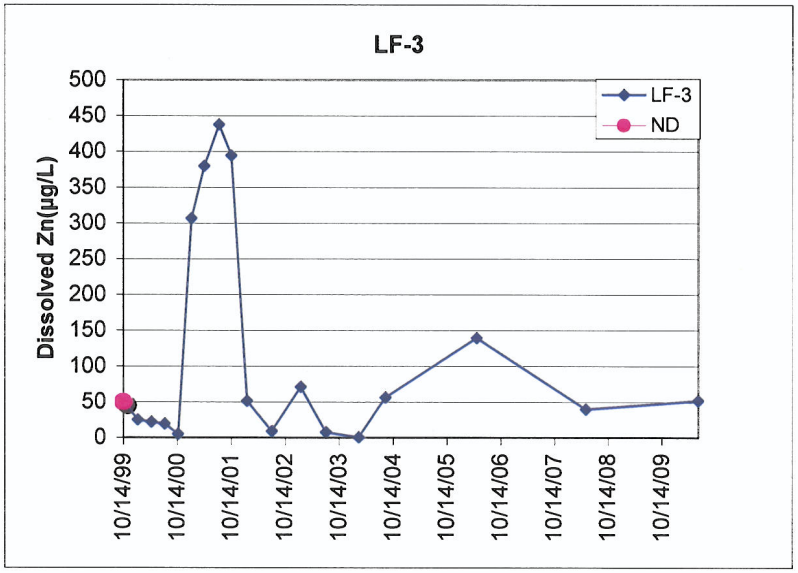



**Figure 5**
**Dissolved Zinc Concentrations Years 1999-2010**

**Penn Mine Environmental Restoration Project**



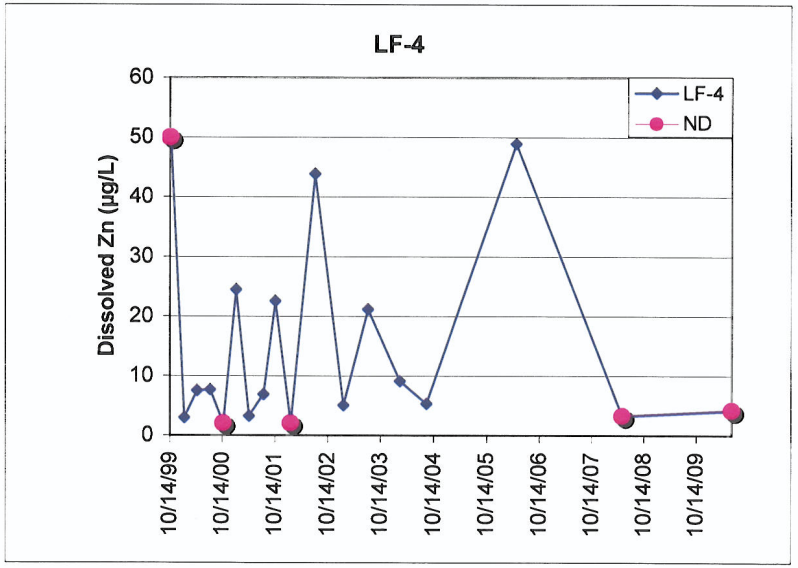
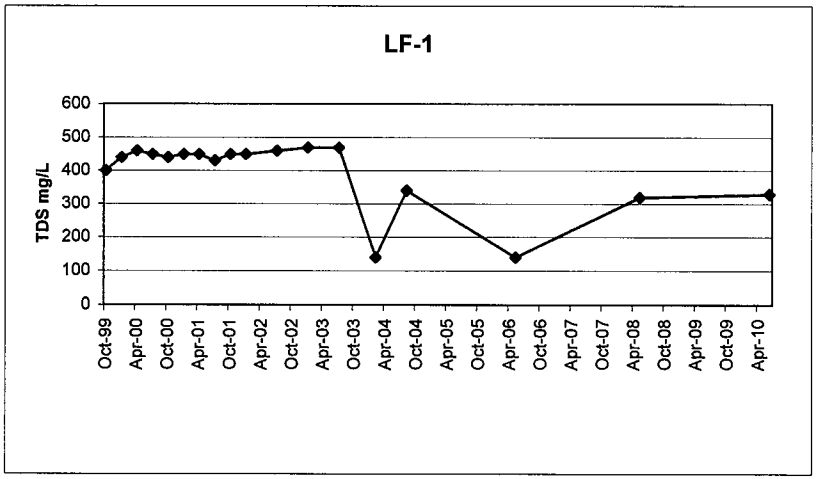
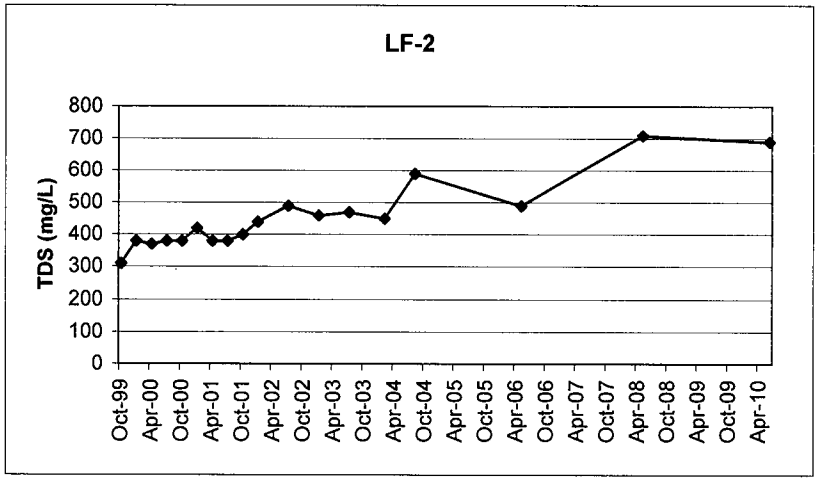
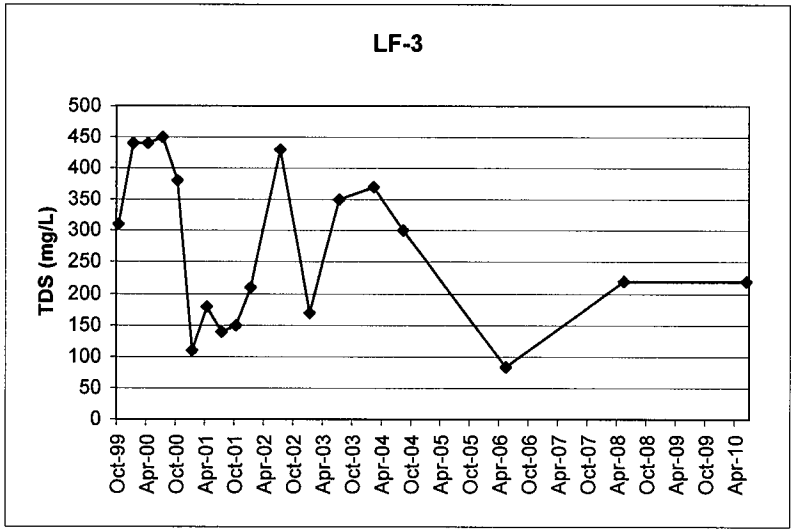



**Figure 6**
**TDS Concentrations Years 1999-2010**

**Penn Mine Environmental Restoration Project**



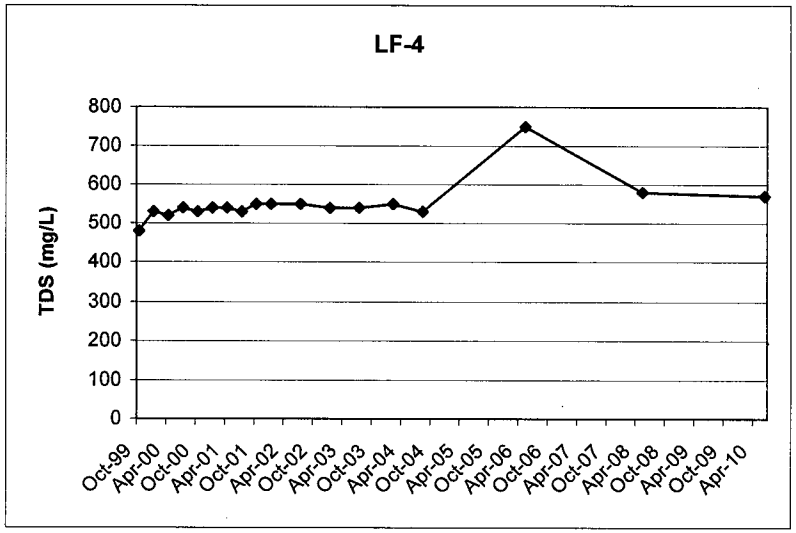



**Figure 7 - Quantity of Leachate Removed: 2002 - 2010**

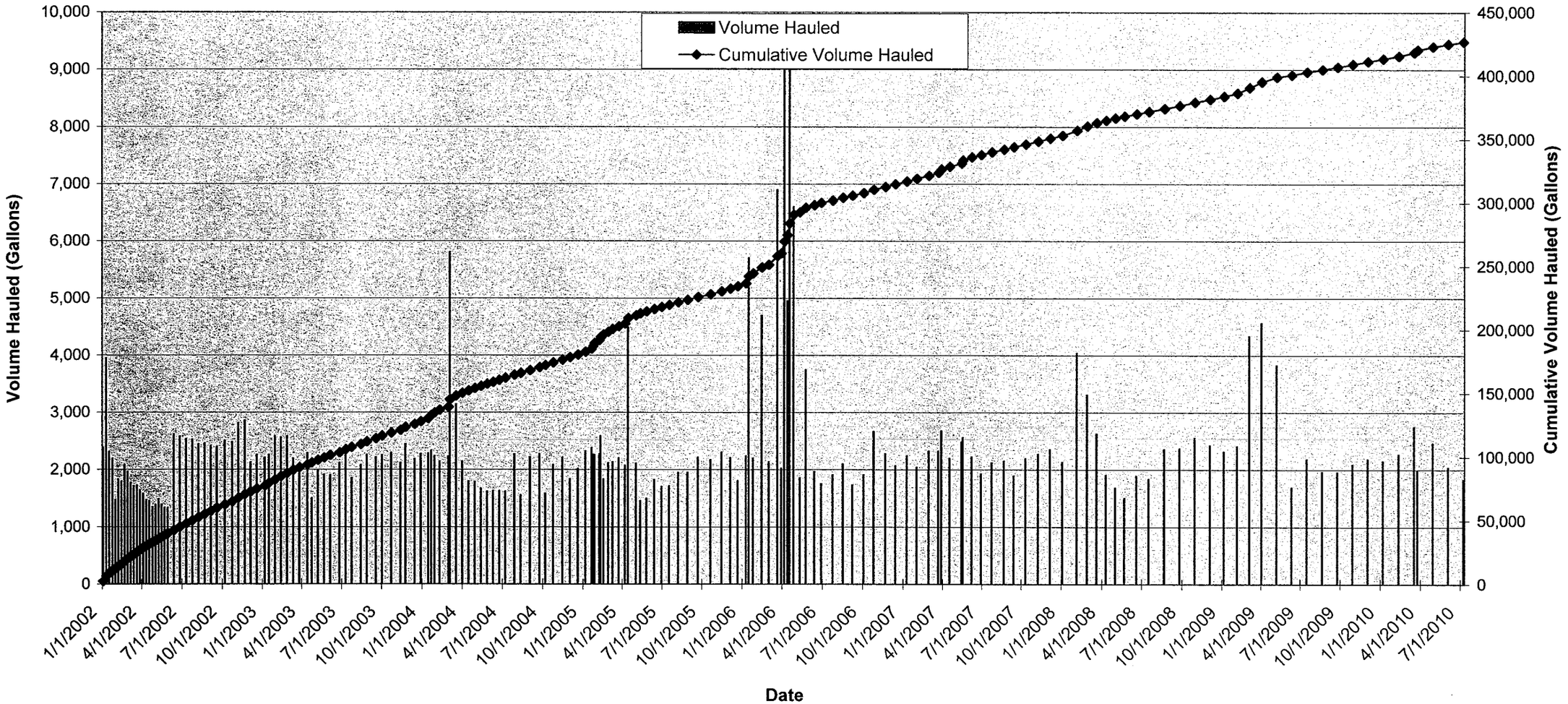
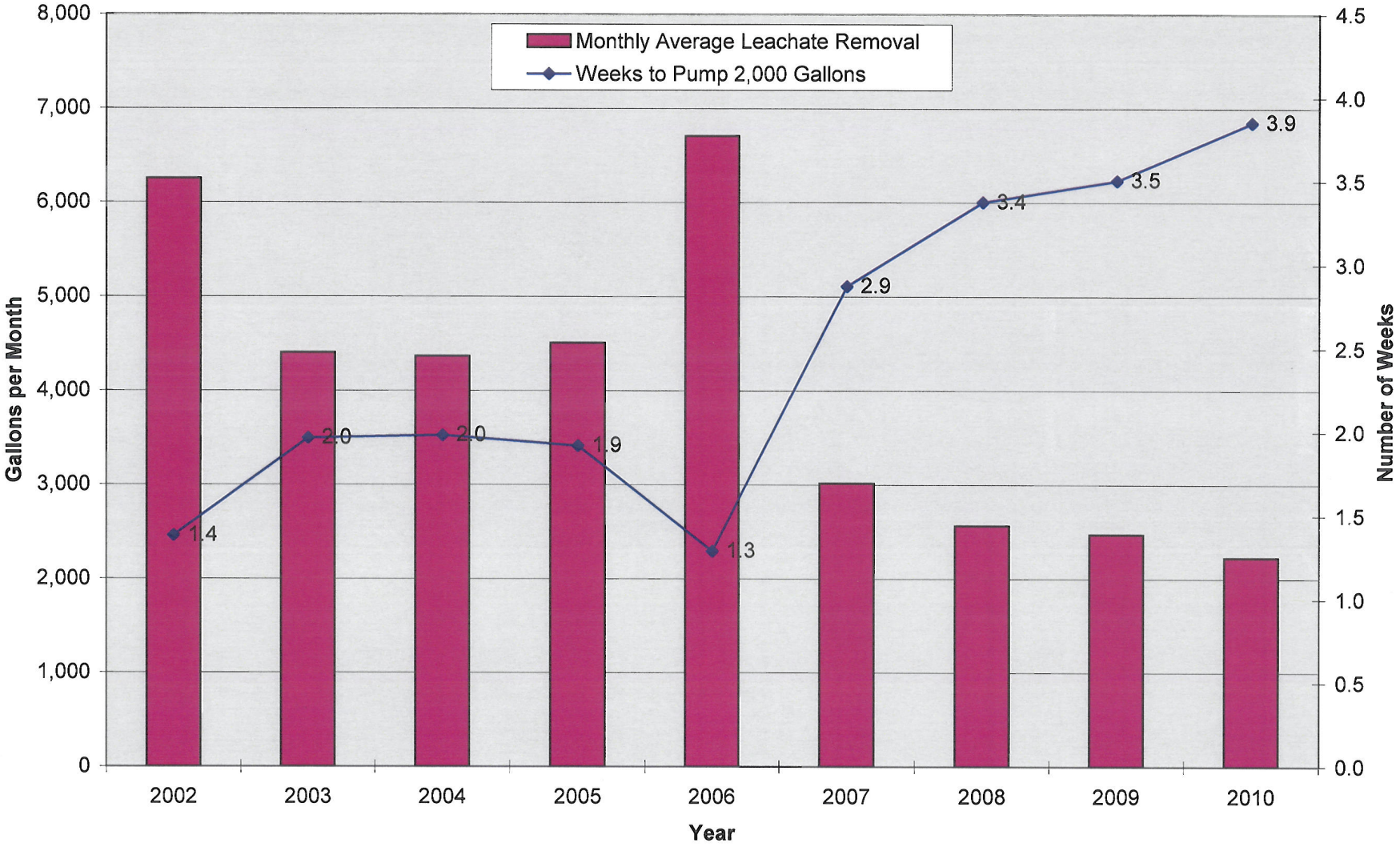


**Figure 8 - Leachate Removal Rate: 2002 - 2010**



# Appendix A
## Field Sampling Forms & Chain of Custody Records

# ALISTO

## Field Report / Sampling Data Sheet

ENGINEERING GROUP
2737 NORTH MAIN ST., Suite 100
WALNUT CREEK, CA 94597
PHONE (925) 279-5000 FAX (925) 279-5001

Project No: 10-654-27 Date: 6/5/10
Address: Penn Mine Rd Day: M T W TH F
Site: PENN MINE LANDFILL City:
Sampler: C REINHEIMER

### DEPTH TO GROUNDWATER SUMMARY

| WELL ID | Sample ID | Well Diameter | Total Depth | DEPTH TO WATER | PRODUCT THICKNESS | TIME MONITORED | COMMENTS |
|---|---|---|---|---|---|---|---|
| LF-1 | Same | 4" | 137 | 68.45 | NA | 10:08 | |
| LF-4 | Same | " | 169.9 | 50.32 | " | 11:24 | |
| LF-2 | Same | " | 56.9 | 32.60 | " | 1:27 | Duplicate sample from LF-2 |
| LF-3 | Same | " | 102 | 18.00 | " | 2:16 | |

### FIELD INSTRUMENT CALIBRATION DATA

pH METER Horiba U-10 4.00 ✓ 7.00 7.00 10.00 ✓ TEMPERATURE COMPENSATED N TIME 10:06

D.O. METER NA ZERO d.O. SOLUTION NA BAROMETRIC PRESSURE ____ TEMP 77° WEATHER clear

CONDUCTIVITY METER U-10 ~~10,000~~ 1780 micros 1782 TURBIDITY METER Horiba U-10 ~~5.0~~ 0.0 NTU 0.0 Eh METER NA



F:\Standard forms\Field forms\Field Form_mw_DTW

# ALISTO

ENGINEERING GROUP
2737 N. Main Street, Suite 100
Walnut Creek, CA 94597
(925) 279-5000 PHONE FAX (925) 279-5001

## Field Report / Sampling Data Sheet

Project No. 10-654-27 Date: 6/15/10
Address Penn Mine Road Day: M T W TH F
Contract No. PENN MINE LANDFILL City: Valley Springs
Site

### LF-1

| Well ID | Depth to Water | Diam | Total Depth | Cap / Lock |
|---|---|---|---|---|
| LF-1 | 68.45 | 4" | 137 | OK |

Total Depth - Water Level= x Well Vol. Factor= x#vol. to Purge= Purge Vol.

137 - 68.45 = 68.55 x 0.65 = 44.5 x 3 = 133.6

Purge with 12V pump sample w/ disp.

Purge Method: ODedicated Pump ODisp.Tube ODisp. Bailer(s)___ OSys Port
Comments:

| Gal. | Time | Temp °C | pH | E.C. ms/cm us/cm | Turb (NTU) | D.O. (mg/l) | Eh (millivolts) |
|---|---|---|---|---|---|---|---|
| 50 | 10:48 | 18.0 | 7.11 | 666 | 4 | | |
| 60 | 10:52 | 18.0 | 7.13 | 664 | 2 | | |
| 70 | 10:56 | 18.3 | 7.08 | 662 | 5 | | |
| 80 | 11:00 | 18.9 | 7.14 | 668 | 3 | | |
| | | End purge parameters | | | | stable | |

TIME SAMPLED 11:05

### LF-4

| Well ID | Depth to Water | Diam | Total Depth | Cap / Lock |
|---|---|---|---|---|
| LF-4 | 50.32 | 4" | 169.8 | OK |

Total Depth - Water Level= x Well Vol. Factor= x#vol. to Purge= Purge Vol.

169.8 - 50.32 = 119.48 x 0.65 = 77.6 x 3 = 232

Purge with 12V pump & sample w/ disp.

Purge Method: ODedicated Pump ODisp.Tube ODisp. Bailer(s)___ OSys Port
Comments:

| Gal. | Time | Temp °C | pH | E.C. ms/cm us/cm | Turb (NTU) | D.O. (mg/l) | Eh (millivolts) |
|---|---|---|---|---|---|---|---|
| 80 | 12:40 | 17.9 | 6.91 | 821 | 30 | | |
| 100 | 12:50 | 17.9 | 6.89 | 823 | 40 | | |
| 120 | 1:00 | 17.8 | 6.93 | 821 | 36 | | |
| 130 | 1:10 | 17.8 | 6.91 | 822 | 42 | | |
| | | End purge parameters stable | | | | | |

TIME SAMPLED 1:17

### LF-2

| Well ID | Depth to Water | Diam | Total Depth | Cap / Lock |
|---|---|---|---|---|
| LF-2 | 32.60 | 4" | 56.8 | OK |

Total Depth - Water Level= x Well Vol. Factor= x#vol. to Purge= Purge Vol.

56.8 - 32.6 = 24.2 x 0.65 = 15.7 x 3 = 47

Purge w/ 12V pump & sample w/ disp

Duplicate sample from this well

Purge Method: ODedicated Pump ODisp.Tube ODisp. Bailer(s)___ OSys Port
Comments:

| Gal. | Time | Temp °C | pH | E.C. ms/cm us/cm | Turb (NTU) | D.O. (mg/l) | Eh (millivolts) |
|---|---|---|---|---|---|---|---|
| 30 | 1:40 | 19.4 | 6.38 | 1000 | 12 | | |
| 35 | 1:44 | 19.6 | 6.38 | 999 | 7 | | |
| 40 | 1:48 | 19.4 | 6.41 | 1003 | 11 | | |
| 50 | 1:56 | 19.4 | 6.33 | 999 | 12 | | |

TIME SAMPLED 2:00

### LF-3

| Well ID | Depth to Water | Diam | Total Depth | Cap / Lock |
|---|---|---|---|---|
| LF-3 | 18.00 | 4" | 102 | OK |

Total Depth - Water Level= x Well Vol. Factor= x#vol. to Purge= Purge Vol.

102 - 18.00 = 84 x 0.65 = 54.6 x 3 = 163

~~purge with 12V pump & sample w/ disp~~

Purge Method: ODedicated Pump ODisp.Tube ODisp. Bailer(s)___ OSys Port
Comments:

| Gal. | Time | Temp °C | pH | E.C. ms/cm us/cm | Turb (NTU) | D.O. (mg/l) | Eh (millivolts) |
|---|---|---|---|---|---|---|---|
| 60 | 2:44 | 17.9 | 6.94 | 354 | 4 | | |
| 70 | 2:47 | 17.9 | 6.93 | 359 | 5 | | |
| 80 | 2:50 | 17.9 | 6.96 | 351 | 3 | | |
| 90 | 2:55 | 17.9 | 6.94 | 355 | 5 | | |

TIME SAMPLED 3:07

P162291

# LABORATORY SERVICES DIVISION

## PENN MINE GROUND WATER FIELD DATA



ANALYSIS DATE: 6/15/10

| LOG # | L | L | L | L |
|---|---|---|---|---|
| SITE | WS PENN MINE | WS PENN MINE | WS PENN MINE | WS PENN MINE |
| LOCATOR | LF-1 | LF-2 | LF-3 | LF-4 |
| TIME | | | | |
| ANALYTE | RESULT | RESULT | RESULT | RESULT |
| TURBIDITY, NTU | 3 | 12 | 5 | 42 |
| COND, ~~MilliS/cm~~ uS/cm | 668 | 999 | 355 | 822 |
| TDS, mg/L | NA | NA | NA | NA |
| pH - units | 7.04 | 6.33 | 6.94 | 6.91 |
| TEMP, deg C | 18.9 | 19.4 | 17.9 | 17.8 |
| Water Level | 68.45 | 32.60 | 18.00 | 50.52 |
| ID of field analyst | CR | CR | CR | CR |

| LOG # | L | L | L | L |
|---|---|---|---|---|
| SITE | | | | |
| LOCATOR | | | | |
| TIME | | | | |
| ANALYTE | RESULT | RESULT | RESULT | RESULT |
| TURBIDITY, NTU | | | | |
| COND, MilliS/cm | | | | |
| TDS, mg/L | | | | |
| pH - units | | | | |
| TEMP, deg C | | | | |
| Water Level | | | | |
| ID of field analyst | | | | |

| WG | R | | | |
|---|---|---|---|---|
| WORK GROUP | RUNID | DATA ENTRY / DATE | REVIEWED BY / DATE | APPROVED BY / DATE |

East Bay Municipal Utility District
Laboratory Services Chain of Custody Record



Prelog or Login No.: P162291

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: CREINHEIMER
Rcvd:
Sample Date: 6/5/10

| Lab No. | Sample Type | Time | Site | Locator | Sample Matrix | Tests Required | Container ID Barcode | Chemical Preservative | Date pH | DueDate Initials |
|---|---|---|---|---|---|---|---|---|---|---|
| P162291-2 | GRAB | | WS PENN MINE | LF-2 | RawH2O | ALKALINITY: CO3;ALKALINITY: HCO3;ALKALINITY: | 974915 PLSTL | | | |
| | | | | | RawH2O | TOTAL;HARDNESS: TOTAL;TDS: GRAVIMETRIC;TSS | | | | |
| | | | | | RawH2O | CHLORIDE: IC;NITRATE: IC;SULFATE: IC | 974916 PLSTM | | | |
| | | | | | RawH2O | *300 IC ANIONS (1-3);+FLD DATA;+REPORT;+SAMP KIT | | | | |
| ClientID: | | | | | | | | | | |
| Sample Comments: field date: use attached data sheet Pricing: STD | | | | | | | | | | |
| P162291-3 | GRAB | 3:07 | WS PENN MINE | LF-3 | RawH2O | *ICP EPA 200.7;AL EPA 200.7;B EPA 200.7;BA EPA | 974917 PLSTL | | 6.94 pH | CR |
| | | | | | 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 | 974918 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: | 974919 PLSTL | | | |
| | | | | | RawH2O | TOTAL;HARDNESS: TOTAL;TDS: GRAVIMETRIC;TSS | | | | |
| | | | | | RawH2O | CHLORIDE: IC;NITRATE: IC;SULFATE: IC | 974920 PLSTM | | | |
| | | | | | RawH2O | *300 IC ANIONS (1-3);+FLD DATA;+REPORT;+SAMP KIT | | | | |
| ClientID: | | | | | | | | | | |
| Sample Comments: field date: use attached data sheet Pricing: STD | | | | | | | | | | |
| P162291-4 | GRAB | 1:17 | WS PENN MINE | LF-4 | RawH2O | *ICP EPA 200.7;AL EPA 200.7;B EPA 200.7;BA EPA | 974921 PLSTL | | 6.91 pH | CR |
| | | | | | 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 | 974922 PLSTM | | | |

East Bay Municipal Utility District
Laboratory Services Chain of Custody Record



Prelog or Login No.: P162291

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: CREIGHTON
Rcvd:
Sample Date: 6/15/10

| Lab No. | Sample Type | Time | Site | Locator | Sample Matrix | Tests Required | Container ID Barcode | Chemical Preservative | Date pH | DueDate Initials |
|---|---|---|---|---|---|---|---|---|---|---|
| P162291-1 | GRAB | 11:18 | WS PENN MINE | LF 1 | RawH2O | *ICP EPA 200.7;AL EPA 200.7;B EPA 200.7;BA EPA | 974902 | PLSTL | 7.14 pH | |
| | | | | | 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 | 974903 | 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: | 974904 | PLSTL | | |
| | | | | | RawH2O | TOTAL;HARDNESS: TOTAL;TDS: GRAVIMETRIC;TSS | | | | |
| | | | | | RawH2O | CHLORIDE: IC;NITRATE: IC;SULFATE: IC | 974905 | PLSTM | | |
| | | | | | RawH2O | *300 IC ANIONS (1-3);+FLD DATA;+REPORT;+SAMP KIT | | | | |
| ClientID: | | | | | | | | | | |
| Sample Comments: field date: use attached data sheet Pricing: STD | | | | | | | | | | |
| P162291-2 | GRAB | 2:08 | WS PENN MINE | LF-2 | RawH2O | *ICP EPA 200.7;AL EPA 200.7;B EPA 200.7;BA EPA | 974913 | PLSTL | 6.33 pH | |
| | | | | | 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 | 974914 | 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 | | | | |

East Bay Municipal Utility District
Laboratory Services Chain of Custody Record



Prelog or Login No.: P162291

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: C REINHEIMER
Rcvd:
Sample Date: 6/15/10

| 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: | 974923 | PLSTL | | | |
| | | | | | RawH2O | TOTAL;HARDNESS: TOTAL;TDS: GRAVIMETRIC;TSS | | | | | |
| | | | | | RawH2O | CHLORIDE: IC;NITRATE: IC;SULFATE: IC | 974924 | PLSTM | | | |
| | | | | | RawH2O | *300 IC ANIONS (1-3);+FLD DATA;+REPORT;+SAMP KIT | | | | | |
| ClientID: | | | | | | | | | | | |
| Sample Comments: field date: use attached data sheet Pricing: STD | | | | | | | | | | | |
| P162291-5 | QCFR | 2:16 | MISC | MISC | RawH2O | *ICP EPA 200.7;AL EPA 200.7;B EPA 200.7;BA EPA | 974925 | PLSTL | | | CR |
| | | | | | 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 | 974926 | 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: | 974927 | PLSTL | | | |
| | | | | | RawH2O | GRAVIMETRIC;TSS | | | | | |
| | | | | | RawH2O | CHLORIDE: IC;NITRATE: IC;SULFATE: IC | 974928 | PLSTM | | | |
| | | | | | RawH2O | *300 IC ANIONS (1-3);+REPORT;+SAMP KIT | | | | | |
| ClientID: | | | | | | | | | | | |
| Sample Comments: blind field rep Pricing: STD | | | | | | | | | | | |

East Bay Municipal Utility District
Laboratory Services Chain of Custody Record



Prelog or Login No.: P162291

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: CREINHEIMER
Rcvd:
Sample Date: 6/15/10

Total containers received: 20

| | Signature | Print Name | Time | Date |
|---|---|---|---|---|
| Relinquished by | | CHRIS REINHEIMER | | |
| Received by | | | | |
| Relinquished by | | | | |
| Received by | | | | |
| Relinquished by | | | | |
| Received by | | | | |

Sample Type Descriptions:
GRAB - Instantaneous Grab
QCFR - Field Replicate Grab

Container Type Descriptions:
PLSTM - Plastic, WM, 500 mL
PLSTL - Plastic, WM, 1000 mL

Samples will be retained beyond the approval process only if requested by the client.

# Appendix B
## Laboratory Report

# EBMUD Laboratory
# Analytical Report

**EAST BAY MUNICIPAL UTILITY DISTRICT**
**Laboratory Services Division**
**PO Box 24055, MS 59, Oakland, CA 94623**
**Phone (510)287-1432 Fax (510)465-5462**

**California Environmental Laboratory Accreditation Program Certificate Number 1060**

**Laboratory Report - L160410**

**LSR # - B785-0008-2 Project Title: PENN MINE Restoration:Landfill Wells**

**Report generated on: Jul 20, 2010 01:23 pm**

**5 - Samples received by the lab on: Jun 16 2010, 10:50 am**
**0 - Lost Analyses**
**0 - Hold Time Exceedences**
**Turn-around-time met**

Client PM: DEREK LEE Lab PM: JACK C. LIM

This is an electronic transmittal of a Laboratory Analytical Report

Samples included in this report:

| Sample | Type | Collected | Site | Locator | ClientID |
|---|---|---|---|---|---|
| L160410-1 | GRAB | 15-Jun-2010 11:18 | WS PENN MINE | LF-1 | - |
| L160410-2 | GRAB | 15-Jun-2010 14:08 | WS PENN MINE | LF-2 | - |
| L160410-3 | GRAB | 15-Jun-2010 15:07 | WS PENN MINE | LF-3 | - |
| L160410-4 | GRAB | 15-Jun-2010 13:17 | WS PENN MINE | LF-4 | - |
| L160410-5 | QCFR | 15-Jun-2010 14:16 | MISC | MISC | - |

Legend to the laboratory qualifiers used in this report:
U - Analyte not detected
Qualifiers for subcontract work - See textvalue for description

RESULTS IN THIS REPORT ARE REPORTED IN ACCORDANCE WITH TITLE 22, SECTION 64819

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: L160410-1 (P162291-1)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 15 2010, 11:18am Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: field date: use attached data sheet

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: SAMPLER PROVIDED FIELD MEASUREMENTS - DATA ENTRY LIST FOR FIELD DATA | | | | | | RawH2O | |
| *FIELD ANALYSIS/OBSERVATION DATA PARAMETERS* | | | | | | | |
| PH | | **7.14** | pH units | 1 | | | |
| TEMPERATURE | | **18.9** | deg C | 1 | | | |
| CONDUCTIVITY | | **668** | umhos/cm | 1 | | | |
| DEPTH | | **68.45** | feet | 1 | | | |
| TURBIDITY | | **3** | NTU | 1 | | | |
| Run ID: R200070 / Work Group No.: WG162572 | | | | | | | |
| Prep Date1: 15-JUN-10 Analyzed 15-Jun-10 11:18 | | | | | | | |
| Method: EPA 300.1 - Anions by IC: EPA 300.1 | | | | | | RawH2O | |
| *Instrument calibrated 15-JUN-10* | | | | | | | |
| *TARGET ANALYTES* | | | | | | | |
| CHLORIDE | | **23** | mg/L | 100 | 0.42 | | |
| NITRATE AS N | | **2.1** | mg/L | 100 | 0.31 | 0.4 | |
| SULFATE | | **19** | mg/L | 100 | 0.8 | 0.5 | |
| *SURROGATE* | | | | | | | |
| DICHLOROACETATE | | 99 | % recovery | 100 | | | |
| Run ID: R200196 / Work Group No.: WG162573 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 16-Jun-10 21:30 | | | | | | | |
| Method: SM(20)2320 B - Alkalinity: Total, Titration | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: TOTAL AS CACO3 | | **240** | mg/L | 1 | 5 | | |
| Run ID: R200129 / Work Group No.: WG162596 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 12:10 | | | | | | | |
| Method: SM(20)2340 C - HARDNESS: TOTAL, TITRATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| HARDNESS: TOTAL AS CACO3 | | **200** | mg/L | 1 | 2 | | |
| Run ID: R200132 / Work Group No.: WG162595 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 09:10 | | | | | | | |
| Method: SM(20)2540 C - Solids: Total Dissolved | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL DISSOLVED SOLIDS | | **330** | mg/L | .5 | 9 | | |
| Run ID: R200302 / Work Group No.: WG162680 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 09:00 | | | | | | | |
| Method: SM(20)2540 D - Solids: Total Suspended, Gravimetric | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL SUSPENDED SOLIDS | U | 2.5 | mg/L | .5 | 2.5 | | |
| Run ID: R200127 / Work Group No.: WG162577 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 16-Jun-10 13:55 | | | | | | | |
| Method: SM(20)4500-CO2 D - Carbonate, Calculation | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: CARBONATE | | **0.31** | mg/L | 1 | 0.1 | | |
| Run ID: R200261 / Work Group No.: WG162677 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 07:50 | | | | | | | |

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-1 Landfill Well #1
Lab ID: L160410-1 (P162291-1)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 15 2010, 11:18am Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: field date: use attached data sheet

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: SM(20)4500-CO2 D - BICARBONATE, CALCULATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: BICARBONATE | | 240 | mg/L | 1 | 5 | | |
| Run ID: R200261 / Work Group No.: WG162677 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 07:50 | | | | | | | |
| Method: EPA 200.7 - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | | 27 | ug/L | 1.04 | 17 | 50 | |
| BORON | | 213 | ug/L | 1.04 | 5.2 | 100 | |
| BARIUM | | 53.6 | ug/L | 1.04 | 0.52 | 100 | |
| BERYLLIUM | U | 0.416 | ug/L | 1.04 | 0.416 | 1 | |
| CALCIUM | | 33,000 | ug/L | 1.04 | 23 | | |
| COPPER | | 24.6 | ug/L | 1.04 | 4.16 | 50 | |
| IRON | | 88 | ug/L | 1.04 | 8.3 | 100 | |
| POTASSIUM | | 9,200 | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | 25,000 | ug/L | 1.04 | 8.3 | | |
| MANGANESE | | 3.46 | ug/L | 1.04 | 0.728 | 20 | |
| SODIUM | | 48,000 | ug/L | 1.04 | 17 | | |
| SILICON | | 8,980 | ug/L | 1.04 | 22.9 | | |
| ZINC | | 150 | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200319 / Work Group No.: WG162715 | | | | | | | |
| Prep Date1: 23-JUN-10 Analyzed 23-Jun-10 13:50 | | | | | | | |
| Method: EPA 200.7: FILTER - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | U | 17 | ug/L | 1.04 | 17 | 50 | |
| BORON | | 262 | ug/L | 1.04 | 5.22 | 100 | |
| BARIUM | | 55.9 | ug/L | 1.04 | 0.522 | 100 | |
| BERYLLIUM | U | 0.418 | ug/L | 1.04 | 0.418 | 1 | |
| CALCIUM | | 36,000 | ug/L | 1.04 | 23 | | |
| COPPER | | 16.6 | ug/L | 1.04 | 4.18 | 50 | |
| IRON | U | 8.4 | ug/L | 1.04 | 8.4 | 100 | |
| POTASSIUM | | 8,100 | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | 32,000 | ug/L | 1.04 | 8.4 | | |
| MANGANESE | U | 0.731 | ug/L | 1.04 | 0.731 | 20 | |
| SODIUM | | 59,000 | ug/L | 1.04 | 17 | | |
| SILICON | | 10,400 | ug/L | 1.04 | 23 | | |
| ZINC | | 91 | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200241 / Work Group No.: WG162654 | | | | | | | |
| Prep Date1: 21-JUN-10 Analyzed 21-Jun-10 12:16 | | | | | | | |
| Method: EPA 245.1: FILTER - Hg: Cold Vapor | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| MERCURY | U | 0.020 | ug/L | 1 | 0.02 | | |
| Run ID: R200669 / Work Group No.: WG162897 | | | | | | | |
| Prep Date1: 18-JUN-10 Prep Date2: 01-JUL-10 Analyzed 01-Jul-10 08:15 | | | | | | | |

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: L160410-2 (P162291-2)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 15 2010, 02:08pm Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: field date: use attached data sheet

| Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: SAMPLER PROVIDED FIELD MEASUREMENTS - DATA ENTRY LIST FOR FIELD DATA | | | | | | RawH2O | |
| *FIELD ANALYSIS/OBSERVATION DATA PARAMETERS* | | | | | | | |
| PH | | 6.33 | pH units | 1 | | | |
| TEMPERATURE | | 19.4 | deg C | 1 | | | |
| CONDUCTIVITY | | 999 | umhos/cm | 1 | | | |
| DEPTH | | 32.6 | feet | 1 | | | |
| TURBIDITY | | 12 | NTU | 1 | | | |
| Run ID: R200070 / Work Group No.: WG162572 | | | | | | | |
| Prep Date1: 15-JUN-10 Analyzed 15-Jun-10 14:08 | | | | | | | |
| Method: EPA 300.1 - Anions by IC: EPA 300.1 | | | | | | RawH2O | |
| *Instrument calibrated 15-JUN-10* | | | | | | | |
| *TARGET ANALYTES* | | | | | | | |
| CHLORIDE | | 19 | mg/L | 100 | 0.42 | | |
| NITRATE AS N | | 22 | mg/L | 100 | 0.31 | 0.4 | |
| SULFATE | | 99 | mg/L | 100 | 0.8 | 0.5 | |
| *SURROGATE* | | | | | | | |
| DICHLOROACETATE | | 98 | % recovery | 100 | | | |
| Run ID: R200196 / Work Group No.: WG162573 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 16-Jun-10 22:05 | | | | | | | |
| Method: SM(20)2320 B - Alkalinity: Total, Titration | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: TOTAL AS CACO3 | | 360 | mg/L | 1 | 5 | | |
| Run ID: R200129 / Work Group No.: WG162596 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 12:10 | | | | | | | |
| Method: SM(20)2340 C - HARDNESS: TOTAL, TITRATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| HARDNESS: TOTAL AS CACO3 | | 520 | mg/L | 1 | 2 | | |
| Run ID: R200132 / Work Group No.: WG162595 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 09:10 | | | | | | | |
| Method: SM(20)2540 C - Solids: Total Dissolved | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL DISSOLVED SOLIDS | | 690 | mg/L | .5 | 9 | | |
| Run ID: R200302 / Work Group No.: WG162680 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 09:00 | | | | | | | |
| Method: SM(20)2540 D - Solids: Total Suspended, Gravimetric | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL SUSPENDED SOLIDS | U | 1.7 | mg/L | .333 | 1.7 | | |
| Run ID: R200127 / Work Group No.: WG162577 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 16-Jun-10 13:55 | | | | | | | |
| Method: SM(20)4500-CO2 D - Carbonate, Calculation | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: CARBONATE | U | 0.10 | mg/L | 1 | 0.1 | | |
| Run ID: R200261 / Work Group No.: WG162677 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 07:50 | | | | | | | |

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: L160410-2 (P162291-2)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 15 2010, 02:08pm Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: field date: use attached data sheet

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: SM(20)4500-CO2 D - BICARBONATE, CALCULATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: BICARBONATE | | 360 | mg/L | 1 | 5 | | |
| Run ID: R200261 / Work Group No.: WG162677 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 07:50 | | | | | | | |
| Method: EPA 200.7 - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | U | 17 | ug/L | 1.04 | 17 | 50 | |
| BORON | | 25.0 | ug/L | 1.04 | 5.2 | 100 | |
| BARIUM | | 105 | ug/L | 1.04 | 0.52 | 100 | |
| BERYLLIUM | U | 0.416 | ug/L | 1.04 | 0.416 | 1 | |
| CALCIUM | | 120,000 | ug/L | 10.4 | 230 | | |
| COPPER | U | 4.16 | ug/L | 1.04 | 4.16 | 50 | |
| IRON | | 21 | ug/L | 1.04 | 8.3 | 100 | |
| POTASSIUM | | 390 | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | 51,000 | ug/L | 1.04 | 8.3 | | |
| MANGANESE | U | 0.728 | ug/L | 1.04 | 0.728 | 20 | |
| SODIUM | | 24,000 | ug/L | 1.04 | 17 | | |
| SILICON | | 17,800 | ug/L | 1.04 | 22.9 | | |
| ZINC | U | 4.2 | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200319 / Work Group No.: WG162715 | | | | | | | |
| Prep Date1: 23-JUN-10 Analyzed 23-Jun-10 14:03 | | | | | | | |
| Method: EPA 200.7: FILTER - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | U | 17 | ug/L | 1.04 | 17 | 50 | |
| BORON | | 25.8 | ug/L | 1.04 | 5.22 | 100 | |
| BARIUM | | 108 | ug/L | 1.04 | 0.522 | 100 | |
| BERYLLIUM | U | 0.418 | ug/L | 1.04 | 0.418 | 1 | |
| CALCIUM | | 130,000 | ug/L | 10.4 | 230 | | |
| COPPER | U | 4.18 | ug/L | 1.04 | 4.18 | 50 | |
| IRON | U | 8.4 | ug/L | 1.04 | 8.4 | 100 | |
| POTASSIUM | | 680 | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | 53,000 | ug/L | 1.04 | 8.4 | | |
| MANGANESE | U | 0.731 | ug/L | 1.04 | 0.731 | 20 | |
| SODIUM | | 25,000 | ug/L | 1.04 | 17 | | |
| SILICON | | 17,800 | ug/L | 1.04 | 23 | | |
| ZINC | U | 4.2 | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200241 / Work Group No.: WG162654 | | | | | | | |
| Prep Date1: 21-JUN-10 Analyzed 21-Jun-10 12:29 | | | | | | | |
| Method: EPA 245.1: FILTER - Hg: Cold Vapor | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| MERCURY | U | 0.020 | ug/L | 1 | 0.02 | | |
| Run ID: R200669 / Work Group No.: WG162897 | | | | | | | |
| Prep Date1: 18-JUN-10 Prep Date2: 01-JUL-10 Analyzed 01-Jul-10 08:15 | | | | | | | |

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-3 Landfill Well #3
Lab ID: L160410-3 (P162291-3)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 15 2010, 03:07pm Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: field date: use attached data sheet

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: SAMPLER PROVIDED FIELD MEASUREMENTS - DATA ENTRY LIST FOR FIELD DATA | | | | | | RawH2O | |
| *FIELD ANALYSIS/OBSERVATION DATA PARAMETERS* | | | | | | | |
| PH | | 6.94 | pH units | 1 | | | |
| TEMPERATURE | | 17.9 | deg C | 1 | | | |
| CONDUCTIVITY | | 355 | umhos/cm | 1 | | | |
| DEPTH | | 18 | feet | 1 | | | |
| TURBIDITY | | 5 | NTU | 1 | | | |
| Run ID: R200070 / Work Group No.: WG162572 | | | | | | | |
| Prep Date1: 15-JUN-10 Analyzed 15-Jun-10 15:07 | | | | | | | |
| Method: EPA 300.1 - Anions by IC: EPA 300.1 | | | | | | RawH2O | |
| *Instrument calibrated 15-JUN-10* | | | | | | | |
| *TARGET ANALYTES* | | | | | | | |
| CHLORIDE | | 3.3 | mg/L | 100 | 0.42 | | |
| NITRATE AS N | | 1.7 | mg/L | 100 | 0.31 | 0.4 | |
| SULFATE | | 40 | mg/L | 100 | 0.8 | 0.5 | |
| *SURROGATE* | | | | | | | |
| DICHLOROACETATE | | 98 | % recovery | 100 | | | |
| Run ID: R200196 / Work Group No.: WG162573 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 16-Jun-10 22:40 | | | | | | | |
| Method: SM(20)2320 B - Alkalinity: Total, Titration | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: TOTAL AS CACO3 | | 120 | mg/L | 1 | 5 | | |
| Run ID: R200129 / Work Group No.: WG162596 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 12:10 | | | | | | | |
| Method: SM(20)2340 C - HARDNESS: TOTAL, TITRATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| HARDNESS: TOTAL AS CACO3 | | 140 | mg/L | 1 | 2 | | |
| Run ID: R200132 / Work Group No.: WG162595 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 09:10 | | | | | | | |
| Method: SM(20)2540 C - Solids: Total Dissolved | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL DISSOLVED SOLIDS | | 220 | mg/L | .5 | 9 | | |
| Run ID: R200302 / Work Group No.: WG162680 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 09:00 | | | | | | | |
| Method: SM(20)2540 D - Solids: Total Suspended, Gravimetric | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL SUSPENDED SOLIDS | U | 2.5 | mg/L | .5 | 2.5 | | |
| Run ID: R200127 / Work Group No.: WG162577 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 16-Jun-10 13:55 | | | | | | | |
| Method: SM(20)4500-CO2 D - Carbonate, Calculation | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: CARBONATE | | 0.10 | mg/L | 1 | 0.1 | | |
| Run ID: R200261 / Work Group No.: WG162677 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 07:50 | | | | | | | |

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-3 Landfill Well #3
Lab ID: L160410-3 (P162291-3)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 15 2010, 03:07pm Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: field date: use attached data sheet

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: SM(20)4500-CO2 D - BICARBONATE, CALCULATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: BICARBONATE | | **120** | mg/L | 1 | 5 | | |
| Run ID: R200261 / Work Group No.: WG162677 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 07:50 | | | | | | | |
| Method: EPA 200.7 - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | | **57** | ug/L | 1.04 | 17 | 50 | |
| BORON | | **28.9** | ug/L | 1.04 | 5.2 | 100 | |
| BARIUM | | **46.7** | ug/L | 1.04 | 0.52 | 100 | |
| BERYLLIUM | U | 0.416 | ug/L | 1.04 | 0.416 | 1 | |
| CALCIUM | | **26,000** | ug/L | 1.04 | 23 | | |
| COPPER | U | 4.16 | ug/L | 1.04 | 4.16 | 50 | |
| IRON | | **89** | ug/L | 1.04 | 8.3 | 100 | |
| POTASSIUM | | **2,500** | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | **19,000** | ug/L | 1.04 | 8.3 | | |
| MANGANESE | | **4.77** | ug/L | 1.04 | 0.728 | 20 | |
| SODIUM | | **21,000** | ug/L | 1.04 | 17 | | |
| SILICON | | **9,590** | ug/L | 1.04 | 22.9 | | |
| ZINC | | **55** | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200319 / Work Group No.: WG162715 | | | | | | | |
| Prep Date1: 23-JUN-10 Analyzed 23-Jun-10 14:08 | | | | | | | |
| Method: EPA 200.7: FILTER - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | U | 17 | ug/L | 1.04 | 17 | 50 | |
| BORON | | **28.6** | ug/L | 1.04 | 5.22 | 100 | |
| BARIUM | | **45.4** | ug/L | 1.04 | 0.522 | 100 | |
| BERYLLIUM | U | 0.418 | ug/L | 1.04 | 0.418 | 1 | |
| CALCIUM | | **25,000** | ug/L | 1.04 | 23 | | |
| COPPER | | **4.78** | ug/L | 1.04 | 4.18 | 50 | |
| IRON | U | 8.4 | ug/L | 1.04 | 8.4 | 100 | |
| POTASSIUM | | **2,600** | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | **18,000** | ug/L | 1.04 | 8.4 | | |
| MANGANESE | U | 0.731 | ug/L | 1.04 | 0.731 | 20 | |
| SODIUM | | **22,000** | ug/L | 1.04 | 17 | | |
| SILICON | | **9,090** | ug/L | 1.04 | 23 | | |
| ZINC | | **52** | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200241 / Work Group No.: WG162654 | | | | | | | |
| Prep Date1: 21-JUN-10 Analyzed 21-Jun-10 12:34 | | | | | | | |
| Method: EPA 245.1: FILTER - Hg: Cold Vapor | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| MERCURY | U | 0.020 | ug/L | 1 | 0.02 | | |
| Run ID: R200669 / Work Group No.: WG162897 | | | | | | | |
| Prep Date1: 18-JUN-10 Prep Date2: 01-JUL-10 Analyzed 01-Jul-10 08:15 | | | | | | | |

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: L160410-4 (P162291-4)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 15 2010, 01:17pm Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: field date: use attached data sheet

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: SAMPLER PROVIDED FIELD MEASUREMENTS - DATA ENTRY LIST FOR FIELD DATA | | | | | | RawH2O | |
| *FIELD ANALYSIS/OBSERVATION DATA PARAMETERS* | | | | | | | |
| PH | | 6.91 | pH units | 1 | | | |
| TEMPERATURE | | 17.8 | deg C | 1 | | | |
| CONDUCTIVITY | | 822 | umhos/cm | 1 | | | |
| DEPTH | | 50.32 | feet | 1 | | | |
| TURBIDITY | | 42 | NTU | 1 | | | |
| Run ID: R200070 / Work Group No.: WG162572 | | | | | | | |
| Prep Date1: 15-JUN-10 Analyzed 15-Jun-10 13:17 | | | | | | | |
| Method: EPA 300.1 - Anions by IC: EPA 300.1 | | | | | | RawH2O | |
| *Instrument calibrated 15-JUN-10* | | | | | | | |
| *TARGET ANALYTES* | | | | | | | |
| CHLORIDE | | 29 | mg/L | 50 | 0.21 | | |
| NITRATE AS N | | 2.1 | mg/L | 50 | 0.16 | 0.4 | |
| SULFATE | | 15 | mg/L | 50 | 0.4 | 0.5 | |
| *SURROGATE* | | | | | | | |
| DICHLOROACETATE | | 99 | % recovery | 50 | | | |
| Run ID: R200196 / Work Group No.: WG162573 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 17-Jun-10 05:05 | | | | | | | |
| Method: SM(20)2320 B - Alkalinity: Total, Titration | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: TOTAL AS CACO3 | | 470 | mg/L | 1 | 5 | | |
| Run ID: R200129 / Work Group No.: WG162596 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 12:10 | | | | | | | |
| Method: SM(20)2340 C - HARDNESS: TOTAL, TITRATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| HARDNESS: TOTAL AS CACO3 | | 220 | mg/L | 1 | 2 | | |
| Run ID: R200132 / Work Group No.: WG162595 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 09:10 | | | | | | | |
| Method: SM(20)2540 C - Solids: Total Dissolved | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL DISSOLVED SOLIDS | | 570 | mg/L | .5 | 9 | | |
| Run ID: R200302 / Work Group No.: WG162680 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 09:00 | | | | | | | |
| Method: SM(20)2540 D - Solids: Total Suspended, Gravimetric | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL SUSPENDED SOLIDS | U | 2.0 | mg/L | .4 | 2 | | |
| Run ID: R200127 / Work Group No.: WG162577 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 16-Jun-10 13:55 | | | | | | | |
| Method: SM(20)4500-CO2 D - Carbonate, Calculation | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: CARBONATE | | 0.36 | mg/L | 1 | 0.1 | | |
| Run ID: R200261 / Work Group No.: WG162677 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 07:50 | | | | | | | |

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: L160410-4 (P162291-4)
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Jun 15 2010, 01:17pm Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: field date: use attached data sheet

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: SM(20)4500-CO2 D - BICARBONATE, CALCULATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: BICARBONATE | | 470 | mg/L | 1 | 5 | | |
| Run ID: R200261 / Work Group No.: WG162677 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 07:50 | | | | | | | |
| Method: EPA 200.7 - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | | 470 | ug/L | 1.04 | 17 | 50 | |
| BORON | | 411 | ug/L | 1.04 | 5.2 | 100 | |
| BARIUM | | 100 | ug/L | 1.04 | 0.52 | 100 | |
| BERYLLIUM | U | 0.416 | ug/L | 1.04 | 0.416 | 1 | |
| CALCIUM | | 33,000 | ug/L | 1.04 | 23 | | |
| COPPER | U | 4.16 | ug/L | 1.04 | 4.16 | 50 | |
| IRON | | 650 | ug/L | 1.04 | 8.3 | 100 | |
| POTASSIUM | | 6,400 | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | 34,000 | ug/L | 1.04 | 8.3 | | |
| MANGANESE | | 19.9 | ug/L | 1.04 | 0.728 | 20 | |
| SODIUM | | 140,000 | ug/L | 1.04 | 17 | | |
| SILICON | | 15,200 | ug/L | 1.04 | 22.9 | | |
| ZINC | | 5.4 | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200319 / Work Group No.: WG162715 | | | | | | | |
| Prep Date1: 23-JUN-10 Analyzed 23-Jun-10 14:12 | | | | | | | |
| Method: EPA 200.7: FILTER - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | U | 17 | ug/L | 1.04 | 17 | 50 | |
| BORON | | 413 | ug/L | 1.04 | 5.22 | 100 | |
| BARIUM | | 100 | ug/L | 1.04 | 0.522 | 100 | |
| BERYLLIUM | U | 0.418 | ug/L | 1.04 | 0.418 | 1 | |
| CALCIUM | | 35,000 | ug/L | 1.04 | 23 | | |
| COPPER | U | 4.18 | ug/L | 1.04 | 4.18 | 50 | |
| IRON | U | 8.4 | ug/L | 1.04 | 8.4 | 100 | |
| POTASSIUM | | 6,200 | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | 35,000 | ug/L | 1.04 | 8.4 | | |
| MANGANESE | U | 0.731 | ug/L | 1.04 | 0.731 | 20 | |
| SODIUM | | 140,000 | ug/L | 1.04 | 17 | | |
| SILICON | | 14,000 | ug/L | 1.04 | 23 | | |
| ZINC | U | 4.2 | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200241 / Work Group No.: WG162654 | | | | | | | |
| Prep Date1: 21-JUN-10 Analyzed 21-Jun-10 12:39 | | | | | | | |
| Method: EPA 245.1: FILTER - Hg: Cold Vapor | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| MERCURY | U | 0.020 | ug/L | 1 | 0.02 | | |
| Run ID: R200669 / Work Group No.: WG162897 | | | | | | | |
| Prep Date1: 18-JUN-10 Prep Date2: 01-JUL-10 Analyzed 01-Jul-10 08:15 | | | | | | | |

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: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
Lab ID: L160410-5 (P162291-5)
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Jun 15 2010, 02:16pm Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: blind field rep

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: EPA 300.1 - Anions by IC: EPA 300.1 | | | | | | RawH2O | |
| *Instrument calibrated 15-JUN-10* | | | | | | | |
| *TARGET ANALYTES* | | | | | | | |
| CHLORIDE | | **20** | mg/L | 50 | 0.21 | | |
| NITRATE AS N | | **23** | mg/L | 50 | 0.16 | 0.4 | |
| SULFATE | | **100** | mg/L | 50 | 0.4 | 0.5 | |
| *SURROGATE* | | | | | | | |
| DICHLOROACETATE | | 100 | % recovery | 50 | | | |
| Run ID: R200196 / Work Group No.: WG162573 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 17-Jun-10 01:00 | | | | | | | |
| Method: SM(20)2320 B - Alkalinity: Total, Titration | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALKALINITY: TOTAL AS CACO3 | | **360** | mg/L | 1 | 5 | | |
| Run ID: R200129 / Work Group No.: WG162596 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 12:10 | | | | | | | |
| Method: SM(20)2340 C - HARDNESS: TOTAL, TITRATION | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| HARDNESS: TOTAL AS CACO3 | | **520** | mg/L | 1 | 2 | | |
| Run ID: R200132 / Work Group No.: WG162595 | | | | | | | |
| Prep Date1: 17-JUN-10 Analyzed 17-Jun-10 09:10 | | | | | | | |
| Method: SM(20)2540 C - Solids: Total Dissolved | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL DISSOLVED SOLIDS | | **690** | mg/L | .5 | 9 | | |
| Run ID: R200302 / Work Group No.: WG162680 | | | | | | | |
| Prep Date1: 22-JUN-10 Analyzed 22-Jun-10 09:00 | | | | | | | |
| Method: SM(20)2540 D - Solids: Total Suspended, Gravimetric | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| TOTAL SUSPENDED SOLIDS | U | 1.7 | mg/L | .333 | 1.7 | | |
| Run ID: R200127 / Work Group No.: WG162577 | | | | | | | |
| Prep Date1: 16-JUN-10 Analyzed 16-Jun-10 13:55 | | | | | | | |
| Method: EPA 200.7 - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | U | 17 | ug/L | 1.04 | 17 | 50 | |
| BORON | | **24.5** | ug/L | 1.04 | 5.2 | 100 | |
| BARIUM | | **106** | ug/L | 1.04 | 0.52 | 100 | |
| BERYLLIUM | U | 0.416 | ug/L | 1.04 | 0.416 | 1 | |
| CALCIUM | | **120,000** | ug/L | 10.4 | 230 | | |
| COPPER | U | 4.16 | ug/L | 1.04 | 4.16 | 50 | |
| IRON | | **23** | ug/L | 1.04 | 8.3 | 100 | |
| POTASSIUM | | **620** | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | **51,000** | ug/L | 1.04 | 8.3 | | |
| MANGANESE | U | 0.728 | ug/L | 1.04 | 0.728 | 20 | |
| SODIUM | | **24,000** | ug/L | 1.04 | 17 | | |
| SILICON | | **17,600** | ug/L | 1.04 | 22.9 | | |
| ZINC | U | 4.2 | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200319 / Work Group No.: WG162715 | | | | | | | |
| Prep Date1: 23-JUN-10 Analyzed 23-Jun-10 14:30 | | | | | | | |

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: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
Lab ID: L160410-5 (P162291-5)
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Jun 15 2010, 02:16pm Sample collector: CREINHEIMER
Date Received: Jun 16 2010, 10:50am Sample receiver: MLEE
Sample Comments: blind field rep

| Method Reference / Parameter | Qualifier | Result | Units | Dilution | MDL | Matrix RL/ML | Tag |
|---|---|---|---|---|---|---|---|
| Method: EPA 200.7: FILTER - ICP Scan | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| ALUMINUM | U | 17 | ug/L | 1.04 | 17 | 50 | |
| BORON | | **24.7** | ug/L | 1.04 | 5.22 | 100 | |
| BARIUM | | **106** | ug/L | 1.04 | 0.522 | 100 | |
| BERYLLIUM | U | 0.418 | ug/L | 1.04 | 0.418 | 1 | |
| CALCIUM | | **130,000** | ug/L | 10.4 | 230 | | |
| COPPER | U | 4.18 | ug/L | 1.04 | 4.18 | 50 | |
| IRON | U | 8.4 | ug/L | 1.04 | 8.4 | 100 | |
| POTASSIUM | | **420** | ug/L | 1.04 | 11 | | |
| MAGNESIUM | | **52,000** | ug/L | 1.04 | 8.4 | | |
| MANGANESE | U | 0.731 | ug/L | 1.04 | 0.731 | 20 | |
| SODIUM | | **25,000** | ug/L | 1.04 | 17 | | |
| SILICON | | **17,800** | ug/L | 1.04 | 23 | | |
| ZINC | | **4.4** | ug/L | 1.04 | 4.2 | 50 | |
| Run ID: R200241 / Work Group No.: WG162654 | | | | | | | |
| Prep Date1: 21-JUN-10 Analyzed 21-Jun-10 12:43 | | | | | | | |
| Method: EPA 245.1: FILTER - Hg: Cold Vapor | | | | | | RawH2O | |
| *TARGET ANALYTES* | | | | | | | |
| MERCURY | U | 0.020 | ug/L | 1 | 0.02 | | |
| Run ID: R200669 / Work Group No.: WG162897 | | | | | | | |
| Prep Date1: 18-JUN-10 Prep Date2: 01-JUL-10 Analyzed 01-Jul-10 08:15 | | | | | | | |

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

## Appendix 5-1: References for Section 5

Note: Documents and websites referenced in text are not repeated in this Appendix.


**EBMUD Facilities**

- EBMUD staff

**Water Resources Development**

- Mokelumne River Regional Water Storage and Conjunctive Use (MORE WATER) Project website
- PG&E Land Conservation Commitment Stewardship Council website

**Sanitation Facilities**

- Calaveras County GIS data from Calaveras County Local Agency Ground Water Protection Program 2004
- Mike Israel, Amador County Environmental Health, Personal Communication. 2010
- Brian Moss, Calaveras County Environmental Health, Personal Communication. 2010
- Doug Polzoni, Calaveras County GIS, Personal Communication. 2010
- Mark Pons, El Dorado National Forest, Special Use permits, Personal Communication. 2010
- Amador Water Agency website, Wastewater Systems in Amador County map
- State Office of Emergency Services, Hazardous Materials Spill Reports 2005-2009
- RWQCB Detailed Violations Report

**Solid Waste Disposal Sites**

- Cynthia Knapp, Calaveras County Recycling Program Coordinator, Personal Communication. 2010

**Hazardous Materials**

- GeoTracker database website, California State Water Resources Control Board, leaking and remediated underground storage tanks
- Victor Izzo Sr, Central RWQCB, Blazing Star Mine, Personal Communication. 2010
- Robert Fourt, Environment Health Unified Program, Amador County, Calaveras County GIS, UST and LUST actual locations (GeoTracker incorrect), Personal Communication. 2010
- Hazardous Materials Spill Reports 2005-2009, California Emergency Management Agency, Office of Emergency Services, Hazardous Material Spill Reports http://www.calema.ca.gov/WebPage/oeswebsite.nsf/OpenBranchContent/1875F70B820CE18788 25742F005BE26B?OpenDocument
- Brian Moss, Calaveras County Environmental Health, Personal Communication. 2010
- Doug Polzoni, Calaveras County GIS, Personal Communication. 2010

**Urban Area Runoff**

- Calaveras County, Planning and Building Departments, Personal Communication. 2010
- Amador County, Planning and Building Departments, Personal Communication. 2010
- State Office of Emergency Services, Hazardous Materials Spill Reports 2005-2009

**Transportation Corridors**

- Governor's Office of Emergency Services - Hazardous Materials Spill Reports (now Emergency Management Agency)

- Marissa Nishikawa, Caltrans Region NPDES/Storm Water Coordinator, Personal Communication. 2010

**Agriculture**

- Mary Mutz, Calaveras County Agricultural Commissioners Office, Personal Communication. 2010

**Grazing on National Forest Lands**

- Kristina J Garcia, Eldorado National Forest, Personal Communication. 2010
- Susan Forbes, Stanislaus National Forest, Personal Communication. 2010

**Recreation**

- Jay Powers, Stanislaus National Forest, Law Enforcement & Travel Management, Personal Communication. 2010
- Scott Macentile, El Dorado National Forest, Law Enforcement & Travel Management, Personal Communication. 2010
- Craig Ostergaard, Sierra Pacific Industries, Personal Communication. 2010

**Mines**

- Victor Izzo Sr, Central RWQCB, Blazing Star Mine, Personal Communication. 2010
- Ann Giovacchini, Lead Agency Review, Office of Mine Reclamation California Department of Conservation, Personal Communication. 2010

## Logging

- California Department of Forestry and Fire Protection. Timber Harvest Plans (www.fire.ca.gov)
- Suzanne Lang, Cal Fire California Dept. of Forestry and Fire Protection, Timber Harvest Plans GIS, Personal Communication. 2010
- Bill Solinsky, Cal Fire California Dept. of Forestry and Fire Protection, Timber Harvest Plans, Personal Communication. 2010
- Craig Ostergaard, Sierra Pacific Industries, Personal Communication. 2010
- John Sweetman, El Dorado National Forest, Logging, Personal Communication. 2010
-

**Pesticides**

- Mary Mutz, Calaveras County Agricultural Commissioners Office, Personal Communication. 2010
- State Department of Pesticide Regulation website
- Craig Ostergaard, Sierra Pacific Industries, Personal Communication. 2010

**Unauthorized Activities**

- Jay Powers, Stanislaus National Forest, Law Enforcement & Travel Management, Personal Communication. 2010
- Scott Macentile, El Dorado National Forest, Law Enforcement & Travel Management, Personal Communication. 2010
- Mark Young, El Dorado National Forest, Travel Management, Personal Communication. 2010
- Sgt. Sturm, Calaveras County Sherriff, Illegal Marijuana Growing, Personal Communication. 2010

- Craig Ostergaard, Sierra Pacific Industries, Personal Communication. 2010


## Camanche Wildlife and Livestock


- U.S. EPA. Source Water Protection Practices Bulletin – Managing Pet and Wildlife Waste to Prevent Contamination of Drinking Water. EPA 916-F-01-027. July 2001.
- Atwill, E.R., R. Phillips, and F. Rulofson. 2002. Environmental Loading Rates of the Waterborne Pathogenic Protozoa *Cryptosporidium parvum* in Certain Domestic and Wildlife Species in California. Proceedings of the 20th Vertebrate Pest Conference.

## Appendix 5-2 Hazardous Materials Inventory -Pardee Reservoir Recreation Area, Environmental Emergency Response and Release Prevention Plan, Hazardous Materials Inventory January 2010

There are no acutely hazardous materials stored and/or handled at the Pardee Reservoir Recreation Area. The hazardous materials stored and/or handled at the facility in quantities above the California Hazardous Materials Release Response and Inventory Program specified quantities are identified below.

| CAS # | Chemical Name | DOT # | Form | Type | Max Qty | Ave Qty | Container |
|---|---|---|---|---|---|---|---|
| 68334-30-5 | diesel fuel | 1993 | liquid | mixture | 300 gal | 150 gal | abvgrnd tank |
| Not Specified | odortrol | NA | liquid | mixture | 300 gal | 150 gal | abvgrnd tank |
| 74-98-6 | propane | 1075 | liquid | pure | 1,400 gal | 750 gal | abvgrnd tanks |
| 7681-52-9 | sodium hypochlorite solution | 1791 | liquid | mixture | 150 gal | 60 gal | plastic carboy |
| 8006-61-9 | unleaded gasoline | 1203 | liquid | mixture | 1,983 gal | 1,400 gal | abvgrnd tank |
| 74-86-2 | acetylene | 1001 | gas | pure | 300 CF | 150 CF | Cylinder |
| 8006-61-9 | two-cycle lube oil & unleaded gas | 1993 | liquid | mixture | 983 gal | 940 gal | abvgrnd tank |
| 7782-44-7 | oxygen | 1072 | gas | pure | 300 CF | 150 CF | cylinder |
| 87-90-1 | trichloro-s-triazinetrione | 2468 | solid | pure | 200 lbs | 50 lbs | plastic cans |
| 497-19-8 | sodium carbonate | NA | solid | pure | 200 lbs | 50 lbs | bags |
| 7664-93-9 | sulfuric acid | 2796 | liquid | mixture | 460 gals | 150 gals | abvgrnd tanks |
| 7727-37-9 | nitrogen | 1066 | gas | pure | 1800 CF | 600 CF | cylinder |

## Appendix 5-2 Hazardous Materials Inventory -Pardee Center, Environmental Emergency Response and Release Prevention Plan, Hazardous Materials Inventory August 2007

Hazardous materials stored and/or handled at Pardee Center in quantities above the Federal SARA Title III and California Hazardous Materials Release Response and Inventory Program specified quantities are identified below.

| CAS # | Chemical Name | DOT# | Form | Type | Max Qty | Ave Qty | Container |
|---|---|---|---|---|---|---|---|
| 7778-54-3 | calcium hypochlorite | 2880 | powder | mixture | 250 lbs | 175 lbs | plastic bucket |
| 7681-52-9 | sodium hypochlorite | 1791 | liquid | mixture | 15,100 gal | 10,000 gal | abvgrnd tank |
| 1305-78-8 | lime | 1910 | powder | mixture | 20,000 gal | 10,000 gal | abvgrnd tank |
| 8006-61-9 | unleaded gasoline | 1202 | liquid | mixture | 2,000 gal | 1,250 gal | abvgrnd tank |
| 74-98-6 | propane | 1978 | gas | pure | 700 gal | 400 gal | abvgrnd tank |
| 8002-05-9 | diesel fuel | 1993 | liquid | mixture | 500 gal | 350 gal | abvgrnd tank |
| N/A | compressed air | 1002 | gas | pure | 620 CF | 620 CF | cylinder |
| 353-59-3 | bromochlorodifluro-methane | 1974 | gas | pure | 244 lbs | 244 lbs | cylinder |
| 7440-37-1 | argon | 1006 | gas | pure | 520 CF | 520 CF | cylinder |
| 124-38-9 | carbon dioxide | 1013 | gas | pure | 1,042 CF | 1,042 CF | cylinder |
| 74-86-2 | acetylene | 1001 | gas | pure | 500 CF | 415 CF | cylinder |
| 7782-44-7 | oxygen | 1072 | gas | pure | 830 CF | 830 CF | cylinder |
| 7727-37-9 | nitrogen | 1066 | gas | pure | 1,800 CF | 1,200 CF | cylinder |
| N/A | gear lube SAE 80-90 | 1270 | solid | mixture | 120 lbs | 70 lbs | steel drum |
| N/A | poly grease | 1270 | solid | mixture | 150 lbs | 100 lbs | steel drum |
| 68476-30-2 | 30W motor oil | 1270 | liquid | mixture | 120 gal | 80 gal | steel drum |
| Various | caustic soda solution | 1824 | liquid | mixture | 100 gal | 100 gal | abvgrnd tank |

*Note: In addition to the materials identified above, there are other hazardous materials stored or handled onsite (e.g., cleaners, oils, spray paints), but these are stored or handled in quantities that are less than the reporting quantities. Also, portions of the chemical building (e.g., the interior heater walls, chlorine storage room, and chlorinator room) have been identified as containing asbestos.*

## Appendix 5-2 Hazardous Materials Inventory -Camanche North Shore Recreation Area, Environmental Emergency Response and Release Prevention Plan, Hazardous Materials Inventory January 2010

Hazardous materials stored and/or handled at Camanche North Shore Recreation Area in quantities above the California Hazardous Materials Release Response and Inventory Program specified quantities are identified below.

| CAS # | Chemical Name | DOT# | Form | Type | Max Daily Qty | Ave Daily Qty | Container |
|---|---|---|---|---|---|---|---|
| 68334-30-5 | diesel fuel | 1993 | liquid | mixture | 658 gal | 450 gal | aboveground tank |
| 8006-61-9 | unleaded gasoline | 1203 | liquid | mixture | 4,500 gal | 3,250 gal | aboveground tank |
| 74-98-6 | propane | 1075 | liquid | pure | 19,140, gal | 9,446 gal | aboveground tanks |
| 772-64-7 | potassium permanganate, potassium salt | 1490 | solid | pure | 120 lbs | 60 lbs | cans |
| 772-64-7 | potassium permanganate solution | 1490 | liquid | mixture | 200 gal | 140 gal | aboveground tank |
| 74-86-2 | acetylene | 1001 | gas | pure | 126 CF | 126 CF | cylinder |
| 7782-44-7 | oxygen | 1072 | gas | pure | 564 CF | 282 CF | cylinder |
| 7681-52-9 | sodium hypochlorite | 1791 | liquid | mixture | 475 gal | 238 gal | ½ gallon plastic bottle |
| 64742-65-0 | lubricating oil | 1993 | liquid | mixture | 250 gal | 200 gal | 1 quart container |

## Appendix 5-2 Hazardous Materials Inventory -Camanche South Shore Recreation Area, Environmental Emergency Response and Release Prevention Plan, Hazardous Materials Inventory February 2008

Hazardous materials stored and/or handled at Camanche South Shore Recreation Area in quantities above the California Hazardous Materials Release Response and Inventory Program specified quantities are identified below.

| CAS # | Chemical Name | DOT# | Form | Type | Max Qty | Ave Qty | Container |
|---|---|---|---|---|---|---|---|
| 74-86-2 | acetylene | 1001 | gas | pure | 504 CF | 378 CF | cylinder |
| 68476-34-6 | diesel fuel | 1993 | liquid | mixture | 733 gal | 300 gal | aboveground tank |
| 7782-44-7 | oxygen | 1072 | gas | pure | 896 CF | 614 CF | cylinder |
| 74-98-6 | propane | 1075 | liquid | pure | 17,486 gal | 7,750 gal | aboveground tanks |
| 8006-61-9 | unleaded gasoline | 1203 | liquid | mixture | 10,600 gal | 5,500 gal | aboveground tank |
| 8006-61-9 | unleaded gasoline & diesel #2 mix | | liquid | mixture | 55 gal | 40 gal | drum |
| 7681-52-9 | calcium hypoclorite | | solid | mixture | 100 Lbs | 50 Lbs | plastic bucket |
| NA | Polymer | | Liquid | Mixture | 55 gal | 55 gal | drum |
| 64742-65-0 | lubricating oil | 1993 | liquid | mixture | 250 gal | 200 gal | 1 quart container |
| WC221 | Waste oil | | liquid | Mixture | 55 gal | 20 gal | Steel drum |

**Appendix 5-3**
**Pardee Recreation Area Wastewater Treatment Plant**
**Summary of Monitoring Requirements**
**Waste Discharge Requirements Order No. R5-01-270**

| Influent Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Flow | Gpd | Continuous Meter | Continuous | Monthly | Average Dry Weather flow of 11,500 gpd |
| $BOD_5$ | mg/L | Grab | Quarterly | Quarterly | -- |

| Effluent Monitoring[1] | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Total Coliform Organisms[2] | MPN/100 ml | Grab | Weekly | Monthly | Daily Max: 240 / Monthly Median: 23 |
| Total Settleable Solids | ml/L | Grab | Weekly | Monthly | Daily Max: 0.5 / Monthly Avg: 0.2 |
| pH | Standard | Grab | Monthly | Monthly | Not < 6.5 or > 8.5 |
| $BOD_5$[2] | mg/L | Grab | Monthly | Monthly | Daily Max: 40 / Monthly Avg: 20 |
| Total Dissolved Solids | mg/L | Grab | Monthly | Monthly | -- |
| Nitrate as Nitrogen | mg/L | Grab | Monthly | Monthly | -- |
| Total Kjeldahl Nitrogen | mg/L | Grab | Monthly | Monthly | -- |
| Formaldehyde | mg/L | Grab | Monthly, May-September | Monthly, May-September | -- |
| Zinc | mg/L | Grab | Monthly, May-September | Monthly, May-September | -- |
| Phenol | mg/L | Grab | Monthly, May-September | Monthly, May-September | |
| Standard Minerals[3] | mg/L | Grab | Annually | Annually | -- |

[1] Effluent Monitoring required only when effluent will be discharged to the spray field. Spraying prohibited from October 1 through April 1.
[2] Limit applies when effluent is discharged to the spray disposal field.

[3] Standard Minerals shall include, at a minimum, barium, calcium, magnesium, sodium, postassium, chloride, sulfate, total alkalinity (including alkalinity series), and hardness.

| Lagoon Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Dissolved Oxygen | mg/L | Grab | Weekly | Monthly | Not < 1.0 mg/L |
| pH | Standard | Grab | Weekly | Monthly | Not < 6.5 or > 9.0 |
| Freeboard | 0.25 feet | Measurement | Weekly | Monthly | Not < 2 feet |
| Odors | -- | Observation | Weekly | Monthly | -- |

| Land Application Area Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Flow | Gallons | Continuous | Daily | Monthly | -- |
| Rainfall | Inches | Measurement | Daily | Monthly | -- |
| Acreage Applied (identify the fields) | Acreage | Calcluated | Daily | Monthly | -- |
| Application Rate for each disposal field | Gal/acre-day | Calculated | Daily | Monthly | -- |
| BOD Loading | Lbs/acre-day | Calculated | Monthly | Monthly | -- |
| Total Nitrogen loading rate for each field | Lbs/ac/month | Calculated | Monthly | Monthly | -- |
| Total Dissolved Solids loading rate for each field | Lbs/ac/month | Calculated | Monthly | Monthly | -- |
| Field observations | -- | Observation | Each day spraying occurs | Monthly | -- |

| Lysimeter Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Presence of water in lysimeters | -- | Observation | Quarterly | Quarterly | -- |
| pH | Standard | Grab | Quarterly | Quarterly | -- |
| Total Dissolved Solids | mg/L | Grab | Quarterly | Quarterly | -- |
| Nitrate as Nitrogen | mg/L | Grab | Quarterly | Quarterly | -- |
| Standard Minerals | mg/L | Grab | Annually | Annually | -- |

| Groundwater Monitoring[1] | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Background Quality Value |
| Depth to Groundwater | 0.01 feet | Measurement | Quarterly | Quarterly | -- |
| Groundwater Elevation | 0.01 feet | Calculated | Quarterly | Quarterly | -- |
| Gradient | feet/feet | Calculated | Quarterly | Quarterly | -- |
| Gradient Direction | degrees | Calculated | Quarterly | Quarterly | -- |
| Total Coliform Organisms | MPN/ 100 mL | Grab | Quarterly | Quarterly | -- |
| Total Dissolved Solids | mg/L | Grab | Quarterly | Quarterly | 450 |
| Total Kjeldahl Nitrogen | mg/L | Grab | Quarterly | Quarterly | -- |
| pH | Standard | Grab | Quarterly | Quarterly | Not < 6.5 or > 8.5 |
| Total Phenols | mg/l | Grab | Quarterly | Quarterly | -- |
| Formaldehyde | mg/l | Grab | Quarterly | Quarterly | -- |
| Trihalomethanes[2] | µg/L | Grab | Quarterly | Quarterly | Bromoform: 4 / Bromodichloromethane: 0.27 / Chloroform: 1.1 / Dibromochloromethane: 0.37 |
| Boron | mg/L | Grab | Quarterly | Quarterly | 0.7 |
| Chloride | mg/L | Grab | Quarterly | Quarterly | 106 |
| Iron | mg/L | Grab | Quarterly | Quarterly | 0.3 |
| Manganese | mg/L | Grab | Quarterly | Quarterly | 0.05 |
| Sodium | mg/L | Grab | Quarterly | Quarterly | 69 |
| Standard Minerals | mg/L | Grab | Annually | Annually | -- |

| Water Supply Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| TDS | mg/L | Grab | Annually | Annually | -- |
| pH | Standard | Grab | Annually | Annually | -- |
| Standard Minerals | mg/L | Grab | Annually | Annually | -- |

**Solid Waste and Sludge Monitoring**

A log shall be kept of solid waste and sludge quantities generated and of handling and disposal activities, and shall be submitted as part of the annual report.

**Discharge Prohibitions**

- Discharge of wastes to surface waters or surface water drainage courses is prohibited.
- Bypass or overflow of untreated or partially treated waste is prohibited.
- Discharge of sewage from sanitary sewer system at any point upstream of the WWTP is prohibited. Discharge of treated wastewater downstream of the treatment plant, other than at the spray disposal field, is prohibited.
- Discharge of hazardous waste is prohibited.
- Surfacing of wastewater outside or downgradient of the evaporation/percolation pond is prohibited.
- Use of the land application area as grazing pasture is prohibited.

**Discharge Specifications**

- No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations.
- Neither the treatment no the discharge shall cause a nuisance or condition of pollution.
- Objectionable odor originating at the facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas.
- Public contact with wastewater shall be precluded or controlled through such means as fences and signs, or acceptable alternatives.
- The WWTP shall be operated to maximize treatment of wastewater and optimize the quality of the discharge.
- The wastewater treatment, storage, and disposal system shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
- The facility shall have sufficient treatment, storage, and disposal capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary infiltration and inflow during the winter months. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.
- The wastewater pond shall be managed to prevent the breeding of mosquitoes.

**Reporting Requirements**

- Monthly report is due by the 1st day of the second month following the end of the reporting period.
- Quarterly report is due by the 1st day of the second month after the quarter.
- Reports are signed by the Manager of Water Supply.
- For monthly reports, submit monitoring results, without the lab reports, and an instrument calibration log, and explain whether wastewater was discharged to the spray disposal field during that month or any of the limitations were violated.
- For quarterly reports, submit monitoring results, report groundwater elevations, calculate groundwater flow gradient, compare monitoring results to applicable limitations, and generate a groundwater elevation contour map.
- Annual report to be submitted by February 1st that provides summary of monitoring data obtained the previous year, and any discussion of corrective actions taken or planned to keep discharge in compliance.

**Term of Permit**

No permit expiration date.

**Appendix 5-3**
**Pardee Center Wastewater Treatment Plant**
**Summary of Monitoring Requirements**
**Waste Discharge Requirements Order No. R5-2003-0119**

| Influent Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Flow | gpd | Continuous Meter | Daily | Monthly | Monthly average of 2,000 gpd |
| $BOD_5$ | mg/L | Grab | Monthly | Monthly | -- |

| Effluent Monitoring[3] | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Total Coliform Organisms[1] | MPN/100 ml | Grab | Weekly | Monthly | Daily Max: 240 / Monthly Median: 23 |
| pH | Standard | Grab | Monthly | Monthly | Not < 6.5 or > 8.5 |
| $BOD_5$ | mg/L | Grab | Monthly | Monthly | Daily Max: 40 / Monthly Avg: 20 |
| Total Dissolved Solids | mg/L | Grab | Quarterly | Quarterly | -- |
| Sodium | mg/L | Grab | Quarterly | Quarterly | -- |
| Chloride | mg/L | Grab | Quarterly | Quarterly | -- |
| Nitrate as Nitrogen | mg/L | Grab | Quarterly | Quarterly | -- |
| Total Kjeldahl Nitrogen | mg/L | Grab | Quarterly | Quarterly | -- |
| Standard Minerals[2] | mg/L | Grab | Annually | Annually | -- |

[1] Applies when effluent is discharged to the spray disposal field. Currently, the spray disposal is NOT occurring.
[2] Standard Minerals shall include, at a minimum, boron, calcium, magnesium, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.
[3] Although not monitored for, limitations for Total Settleable Solids do exist. Daily Max: 1.0 mg/L / Monthly Avg: 0.5 mg/L.

| Evaporation/Percolation Pond Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Dissolved Oxygen | mg/L | Grab | Weekly | Monthly | Not < 1.0 mg/L in the upper zone (1 foot) |

| Evaporation/Percolation Pond Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Freeboard | 0.1 feet | Measurement | Weekly | Monthly | Not < 2 feet |
| Odors | -- | Observation | Weekly | Monthly | -- |
| Levee condition | -- | Observation | Weekly | Monthly | -- |

| Groundwater Monitoring[1] | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Depth to Groundwater | 0.01 feet | Measurement | Quarterly | Quarterly | -- |
| Groundwater Elevation | 0.01 feet | Calculated | Quarterly | Quarterly | -- |
| Gradient | feet/feet | Calculated | Quarterly | Quarterly | -- |
| Gradient Direction | degrees | Calculated | Quarterly | Quarterly | -- |
| Total Dissolved Solids | mg/L | Grab | Quarterly | Quarterly | 450 |
| Nitrate as Nitrogen | mg/L | Grab | Quarterly | Quarterly | 10 |
| Total Kjeldahl Nitrogen | mg/L | Grab | Quarterly | Quarterly | -- |
| pH | Standard | Grab | Quarterly | Quarterly | Not < 6.5 or > 8.5 |
| Trihalomethanes[2] | µg/L | Grab | Quarterly | Quarterly | Bromoform: 4 / Bromodichloromethane: 0.27 / Chloroform: 1.1 / Dibromochloromethane: 0.37 |
| Boron | mg/L | Grab | Quarterly | Quarterly | 0.7 |
| Chloride | mg/L | Grab | Quarterly | Quarterly | 106 |
| Iron | mg/L | Grab | Quarterly | Quarterly | 0.3 |
| Manganese | mg/L | Grab | Quarterly | Quarterly | 0.05 |
| Sodium | mg/L | Grab | Quarterly | Quarterly | 69 |
| Standard Minerals | mg/L | Grab | Annually | Annually | -- |

[1] Other constituents with groundwater standards but not required as part of the monitoring program include: Total Coliform Organisms (nondetect); Total Nitrogen (10 mg/L); Nitrite as Nitrogen (1 mg/L); and Ammonia (0.5 mg/L).

[2] Samples shall be collected only from spray disposal field wells. Since no spraying is occurring, no sampling is required.

| Water Supply Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| TDS | mg/L | Grab | Annually | Annually | -- |
| pH | Standard | Grab | Annually | Annually | -- |
| Standard Minerals | mg/L | Grab | Annually | Annually | -- |

**Spray Disposal Area Monitoring**
None required unless spray disposal occurs.

**Solid Waste and Sludge Monitoring**
A log shall be kept of solid waste and sludge quantities generated and of handling and disposal activities, and shall be submitted as part of the monthly monitoring reports.

**Discharge Prohibitions**

- Discharge of wastes to surface waters or surface water drainage courses is prohibited.
- Bypass or overflow of untreated or partially treated waste is prohibited.
- Discharge of sewage from sanitary sewer system at any point upstream of the WWTP is prohibited. Discharge of treated wastewater downstream of the treatment plant, other than at the approved evaporation percolation pond or spray disposal field, is prohibited.
- Discharge of effluent to the spray disposal field is prohibited until the Executive Officer of the RWQCB approves the report required by Provision No. G.1.e of the Order.
- Discharge of hazardous waste is prohibited.
- Surfacing of wastewater outside or downgradient of the evaporation/percolation pond is prohibited.
- The discharge of any wastewater other than that from domestic sources or domestic equivalent is prohibited.

**Discharge Specifications**

- No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations.
- Neither the treatment no the discharge shall cause a nuisance or condition of pollution.
- Objectionable odor originating at the facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas.
- Public contact with wastewater shall be precluded or controlled through such means as fences and signs, or acceptable alternatives.
- The WWTP shall be operated to maximize treatment of wastewater and optimize the quality of the discharge.
- The wastewater treatment, storage, and disposal system shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
- The facility shall have sufficient treatment, storage, and disposal capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary infiltration and inflow during the winter months. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.
- The wastewater pond shall be managed to prevent the breeding of mosquitoes.

**Reporting Requirements**

- Monthly report is due by the 1st day of the second month following the end of the reporting period.
- Quarterly report is due by the 1st day of the second month after the quarter.
- Reports are signed by Pat Lydon.
- For monthly reports, submit monitoring results, without the lab reports, and an instrument calibration log, and explain whether wastewater was discharged to the spray disposal field during that month or any of the limitations were violated.
- For quarterly reports, submit monitoring results, report groundwater elevations, calculate groundwater flow gradient, compare monitoring results to applicable limitations, and generate a groundwater elevation contour map.
- Annual report to be submitted by February 1st that provides summary of monitoring data obtained the previous year, and any discussion of corrective actions taken or planned to keep discharge in compliance.

**Term of Permit**

The permit expires in July 2008. As of December 2010, no action by RWQCB.

**Appendix 5-3**
**Camanche South Shore Wastewater Treatment Plant**
**Summary of Monitoring Requirements**
**Waste Discharge Requirements Order No. R5-2002-0070**

| Influent Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Total Flow | Gpd | Meter | Continuously | Monthly | -- |
| $BOD_5$ | mg/L | Grab | Quarterly | Quarterly | -- |

| Pond Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Dissolved Oxygen | mg/L | Grab | Weekly | Monthly | Not < 1.0 mg/L |
| pH | Standard | Grab | Weekly | Monthly | Not < 6.5 or > 9.0 |
| Freeboard | 0.25 feet | Measurement | Weekly | Monthly | Not < 2 feet |
| Berm Seepage | -- | Observation | Weekly | Monthly | -- |
| Odors | -- | Observation | Weekly | Monthly | -- |

| Effluent Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| $BOD_5$ | mg/L | Grab | Monthly | Monthly | Daily Max: 80 / Monthly Avg: 40 |
| Total Coliform Organisms | MPN/100 ml | Grab | Monthly | 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 | -- |
| Formaldehyde | mg/L | Grab | Monthly | Monthly | -- |
| Zinc | mg/L | Grab | Monthly | Monthly | -- |
| Phenol | mg/L | Grab | Monthly | Monthly | -- |
| Standard Minerals[1] | mg/L | Grab | Annually | Annually | -- |

[1] Standard Minerals shall include, at a minimum, Barium, Calcium, Magnesium, Sodium, Potassium, Chloride, Sulfate, Total Alkalinity (including alkalinity series), and Hardness.

| Groundwater Monitoring[1] | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Depth to Groundwater | 0.01 feet | Measurement | Quarterly | Quarterly | -- |
| Groundwater Elevation | 0.01 feet | Measurement | Quarterly | Quarterly | -- |
| Gradient | feet/feet | Calculated | Quarterly | Quarterly | -- |
| Gradient Direction | degrees | Calculated | Quarterly | Quarterly | -- |
| Total Coliform Organisms | MPN/100 ml | Grab | Quarterly | Quarterly | Nondetect |
| Total Dissolved Solids | mg/L | Grab | Quarterly | Quarterly | 450 |
| Nitrate as Nitrogen | mg/L | Grab | Quarterly | Quarterly | 10 |
| Total Kjeldahl Nitrogen | mg/L | Grab | Quarterly | Quarterly | -- |
| pH | Standard | Grab | Quarterly | Quarterly | Not < 6.5 or > 8.5 |
| Boron | mg/L | Grab | Quarterly | Quarterly | 0.6 |
| Chloride | mg/L | Grab | Quarterly | Quarterly | 106 |
| Iron | mg/L | Grab | Quarterly | Quarterly | 0.3 |
| Manganese | mg/L | Grab | Quarterly | Quarterly | 0.05 |
| Sodium | mg/L | Grab | Quarterly | Quarterly | 69 |
| Zinc | mg/L | Grab | Quarterly | Quarterly | -- |
| Total Phenols | mg/L | Grab | Quarterly | Quarterly | -- |
| Formaldehyde | mg/L | Grab | Quarterly | Quarterly | -- |
| Standard Minerals | mg/L | Grab | Annually | Annually | -- |

[1] Other constituents with groundwater standards but not required as part of the monitoring program include: Total Nitrogen (10 mg/L); Nitrite as Nitrogen (1 mg/L); and Ammonia (0.5 mg/L).

| Water Supply Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Electrical Conductivity | µmhos/cm | Grab | Annually | Annually | -- |
| pH | Standard | Grab | Annually | Annually | -- |
| Standard Minerals | mg/L | Grab | Annually | Annually | -- |

**Surface Water Monitoring**

Monthly monitoring of the freshwater recreation ponds shall be conducted according to a submitted workplan approved by the RWQCB. The results are submitted along with the quarterly groundwater reports.

**Sludge Monitoring**
A composite sample of sludge shall be collected when removed from the treatment and storage/disposal ponds, and tested for: Cadmium, Copper, Nickel, Chromium, Lead, and 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.

**Discharge Prohibitions**

- Discharge of wastes to surface waters or surface water drainage courses is prohibited.
- Bypass or overflow of untreated or partially treated waste is prohibited.
- Discharge of sewage from sanitary sewer system at any point upstream of the WWTP is prohibited.
- Discharge of hazardous waste is prohibited.
- Surfacing of wastewater outside or downgradient of the ponds is prohibited.
- The discharge of any wastewater other than that from domestic sources or domestic equivalent is prohibited.

**Discharge Specifications**

- No waste constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations.
- Neither the treatment no the discharge shall cause a nuisance or condition of pollution.
- Objectionable odor originating at the facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas.
- Public contact with wastewater shall be precluded or controlled through such means as fences and signs, or acceptable alternatives.
- The WWTP shall be operated to maximize treatment of wastewater and optimize the quality of the discharge.
- The wastewater treatment, storage, and disposal system shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.
- The facility shall have sufficient treatment, storage, and disposal capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary infiltration and inflow during the winter months. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.
- The freeboard in all three wastewater ponds shall never be less than two feet.
- The wastewaters pond shall be managed to prevent the breeding of mosquitoes.

**Reporting Requirements**

- Monthly report is due by the 1$^{st}$ day of the second month following the end of the reporting period.
- Quarterly report is due by the 1$^{st}$ day of the second month after the quarter.
- Reports are signed by Pat Lydon.

- For monthly reports, submit monitoring results, without the lab reports, and an instrument calibration log, and explain whether wastewater was discharged to the spray disposal field during that month or any of the limitations were violated.
- For quarterly reports, submit monitoring results, report groundwater elevations, calculate groundwater flow gradient, compare monitoring results to applicable limitations, and generate a groundwater elevation contour map.
- Annual report to be submitted by February 1st that provides summary of monitoring data obtained the previous year, and any discussion of corrective actions taken or planned to keep discharge in compliance.

**Term of Permit**

The permit expires in April 2007. As of December 2010, no action by RWQCB.

**Appendix 5-3**
**Camanche North Shore Wastewater Treatment Plant**
**Summary of Monitoring Requirements**
**Waste Discharge Requirements Order No. R5-95-175**

| Influent Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Total Flow | gpd | Meter | Continuously | Monthly | -- |
| $BOD_5$ | mg/L | Grab | Quarterly | Quarterly | -- |

| Pond Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Dissolved Oxygen | mg/L | Grab | Weekly | Monthly | Not < 1.0 mg/L |
| pH | Standard | Grab | Weekly | Monthly | Not < 6.5 or > 9.0 |
| Freeboard | 0.1 feet | Measurement | Weekly | Monthly | Not < 2 feet |
| Levee condition | -- | Observation | Weekly | Monthly | -- |
| Odors | -- | Observation | Weekly | Monthly | -- |

| Effluent Monitoring (Pond 6) | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| $BOD_5$ | mg/L | Grab | Monthly | Monthly | Daily Max: 80 / Monthly Avg: 40 |
| Total Coliform Organisms | MPN/100 ml | Grab | Weekly | Monthly | -- |
| Settleable Solids | ml/L | Grab | Monthly | Monthly | Daily Max: 0.5 / Monthly Avg: 0.2 |
| Total Suspended Solids | ml/L | Grab | Monthly | Monthly | Daily Max: 80 / Monthly Avg: 40 |
| Total Dissolved Solids | mg/L | Grab | Quarterly | Quarterly | -- |
| Nitrate as Nitrogen | mg/L | Grab | Quarterly | Quarterly | -- |
| Total Kjeldahl Nitrogen | mg/L | Grab | Quarterly | Quarterly | -- |
| Sodium | mg/L | Grab | Quarterly | Quarterly | -- |
| Chloride | mg/L | Grab | Quarterly | Quarterly | -- |
| Standard Minerals[1] | mg/L | Grab | Annually | Annually | -- |

[1] Standard Minerals shall include, at a minimum, boron, calcium, magnesium, sodium, potassium, sulfate, total alkalinity (including alkalinity series), and hardness.

| **Spray Disposal Area Monitoring** | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Flow | Gallons | Continuous | Daily | Monthly | -- |
| Rainfall | Inches | Measurement | Daily | Monthly | -- |
| Acreage Applied (identify the fields) | Acreage | Calcluated | Daily | Monthly | -- |
| Application Rate for each disposal field | Gal/acre-day | Calculated | Daily | Monthly | -- |
| Sprayfield | Observation | Observation | Weekly when spraying | Monthly | -- |

| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency |
|---|---|---|---|---|
| Depth to Groundwater | 0.01 feet | Measurement | Quarterly | Quarterly |
| Groundwater Elevation | 0.01 feet | Measurement | Quarterly | Quarterly |
| Gradient | feet/feet | Calculated | Quarterly | Quarterly |
| Gradient Direction | degrees | Calculated | Quarterly | Quarterly |
| Total Dissolved Solids | mg/L | Grab | Quarterly | Quarterly |
| Nitrate as Nitrogen | mg/L | Grab | Quarterly | Quarterly |
| Total Kjeldahl Nitrogen | mg/L | Grab | Quarterly | Quarterly |
| pH | Standard | Grab | Quarterly | Quarterly |
| Boron | mg/L | Grab | Quarterly | Quarterly |
| Chloride | mg/L | Grab | Quarterly | Quarterly |
| Iron | mg/L | Grab | Quarterly | Quarterly |
| Manganese | mg/L | Grab | Quarterly | Quarterly |
| Sodium | mg/L | Grab | Quarterly | Quarterly |
| Standard Minerals | mg/L | Grab | Annually | Annually |

| Water Supply Monitoring | | | | | |
|---|---|---|---|---|---|
| Constituent | Units | Type of Sample | Sampling Frequency | Reporting Frequency | Limit |
| Electrical Conductivity | µmhos/cm | Grab | Annually | Annually | -- |
| pH | Standard | Grab | Annually | Annually | -- |
| Standard Minerals | mg/L | Grab | Annually | Annually | -- |

**Sludge Monitoring**
Notifiy RWQCB of sludge disposal at least 90 days in advance.

**Discharge Prohibitions**

- Discharge of wastes to surface waters or surface water drainage courses is prohibited.
- Bypass or overflow of untreated or partially treated waste is prohibited.
- Discharge of sewage from sanitary sewer system at any point upstream of the WWTP is prohibited.
- Discharge of hazardous waste is prohibited.
- Surfacing of wastewater outside or downgradient of the ponds is prohibited.
- The discharge of any wastewater other than that from domestic sources or domestic equivalent is prohibited.

**Discharge Specifications**

- No standing water in disposal area 24 hours after spraying.
- No spraying during periods of precipitation and at least 24 hours after cessation of precipitation, or when winds exceed 30 mph.
- Neither the treatment no the discharge shall cause a nuisance or condition of pollution.
- Objectionable odor originating at the facility shall not be perceivable beyond the limits of the wastewater treatment and disposal areas.
- Public contact with wastewater shall be precluded or controlled through such means as fences and signs, or acceptable alternatives.
- The WWTP shall be operated to maximize treatment of wastewater and optimize the quality of the discharge.
- The wastewater treatment, storage, and disposal system shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 25-year return frequency.
- The freeboard in all three wastewater ponds shall never be less than two feet.
- The wastewaters pond shall be managed to prevent the breeding of mosquitoes.

**Reporting Requirements**

- Monthly report is due by the 1$^{st}$ day of the second month following the end of the reporting period.
- Quarterly report is due by the 1$^{st}$ day of the second month after the quarter.

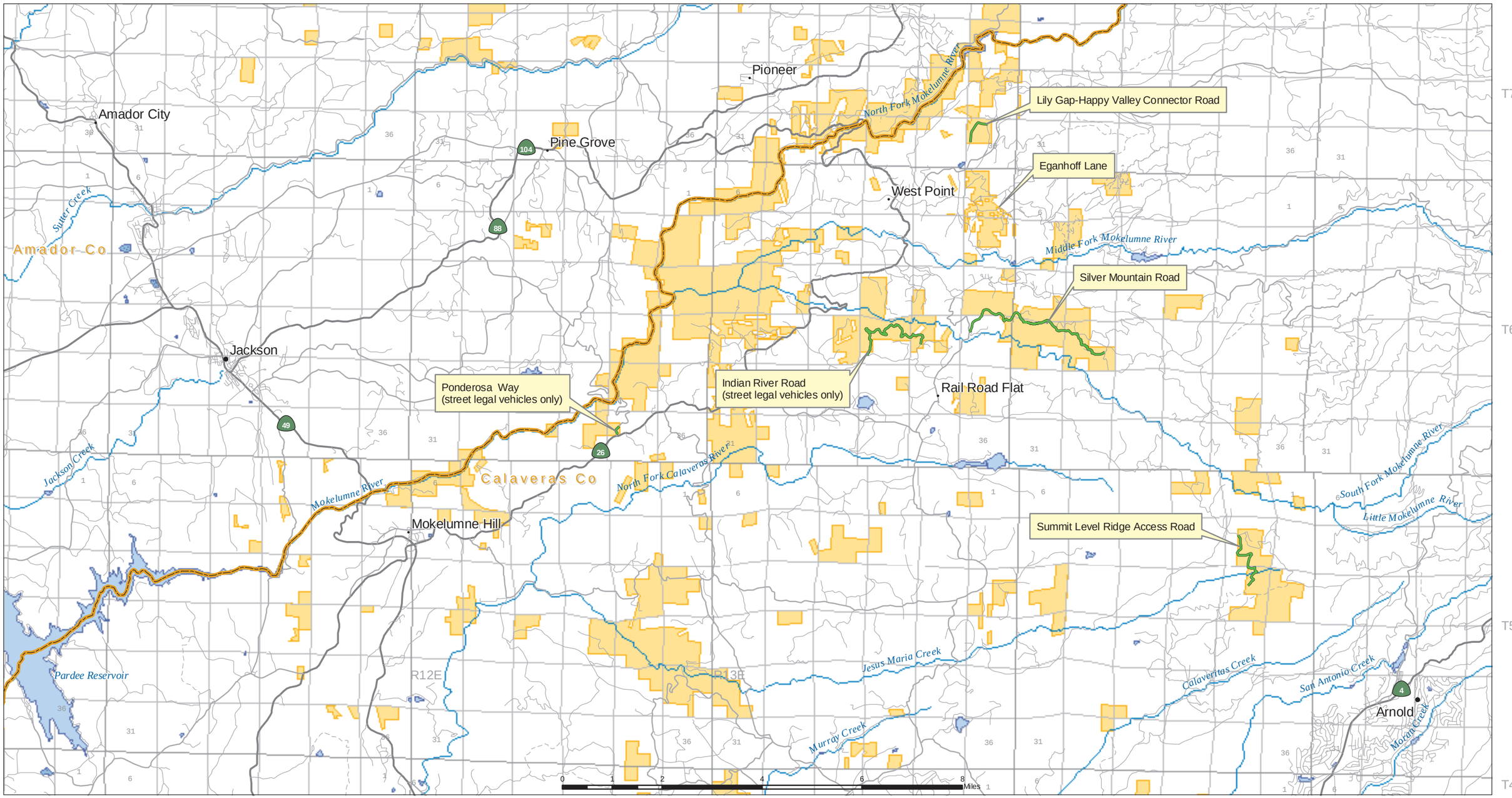
- Reports are signed by Manager of Water Supply.
- For monthly reports, submit monitoring results, without the lab reports, and an instrument calibration log, and explain whether wastewater was discharged to the spray disposal field during that month or any of the limitations were violated.
- For quarterly reports, submit monitoring results, report groundwater elevations, calculate groundwater flow gradient, compare monitoring results to applicable limitations, and generate a groundwater elevation contour map.
- Annual report to be submitted by February 1st that provides summary of monitoring data obtained the previous year, and any discussion of corrective actions taken or planned to keep discharge in compliance.

**Term of Permit**
No permit expiration date.

ELDORADO
NATIONAL
FOREST
To Carson Pass
MOKELUMNE
WILDERNESS
To Markleeville
Ebbetts Pass
TOIYABE
NATIONAL
FOREST
395
Lake Alpine
Salt Springs Res
Bear Valley
Tamarack
88
River
Mokelumne
STANISLAUS
CARSON-ICEBERG
WILDERNESS
Spicer Res
To Jackson
Camp Connell
4
Donnell Res
NATIONAL
Kennedy Meadow
Sonora Pass
To Lee Vining
Dorrington
108
FOREST
Arnold
Strawberry
Calaveras Big Trees S.P.
Beardsley Res
Pinecrest
Hathaway Pines
EMIGRANT
Pinecrest Lake
WILDERNESS
Murphys
Stanislaus River
49
Clavey River
Long Barn
YOSEMITE
4
Columbia
Mi-Wuk Village
NATIONAL
Cherry Lake
Sonora
Lake Eleanor
To Stockton
New Melones Lake
Jamestown
PARK
Twolumne
Hetch Hetchy Res
Tuolumne River
To Twolumne Meadows
108
Chinese Camp
Big Oak Flat
120
Groveland
120
To Modesto and Manteca
Yosemite Village
49
Don Pedro Reservoir
Coulterville
El Portal
To Modesto
132
Merced River
SIERRA
NATIONAL
Lake McClure
Wawona
59
140
FOREST
41
Mariposa
To Merced
To Merced
To Oakhurst
To Oakhurst

R10E R11E R12E R13E R14E R15E

T7N T6N T5N T4N




R10E R11E R14E R15E

Bureau of Land Management
Designated Interim Route
Designated Open Route

**Sierra Resource Management Plan**

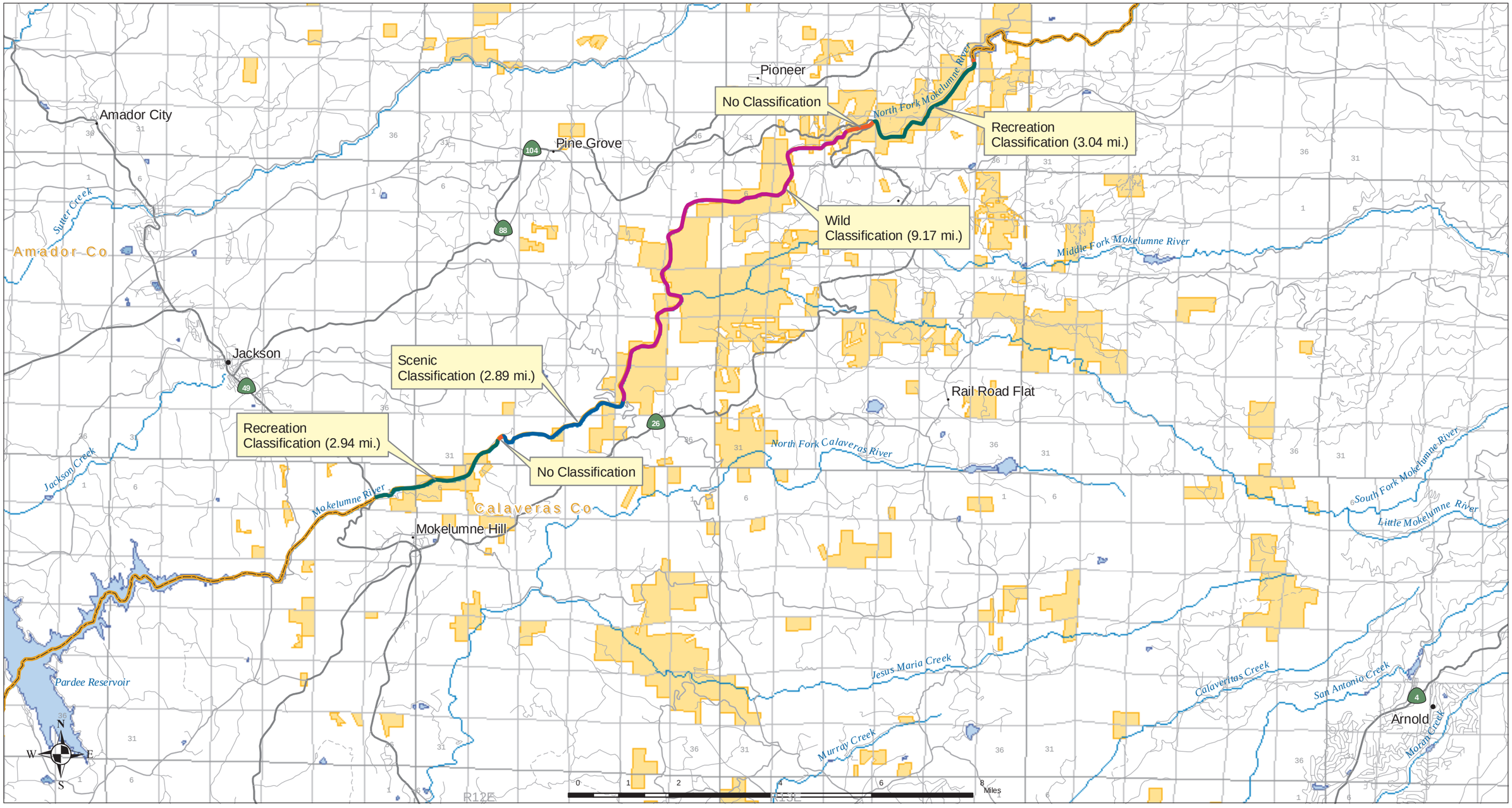
Motorized Vehicle Route Designations

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




R11E 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**

**Table UM-2 Objectives to Preserve and/or Enhance – Recommended Concept**

| Planning Unit Objective: Preserve and enhance biological and cultural resources, enhance public access, recreation opportunities, and sustainable forestry management, and evaluate the potential for grazing opportunities. | | |
|---|---|---|
| **Beneficial Public Value** | **Objective** | **Potential Measures to Preserve and/or Enhance BPVs – Not Requirements*** |
| Protection of the Natural Habitat of Fish, Wildlife, and Plants | **Preserve and enhance habitat in order to protect special biological resources and wilderness values.** | • Conduct surveys of lands outside the FERC boundary to identify biological resources and enable their protection.<br>• Develop a wildlife and habitat management plan for the planning unit.<br>• Develop a noxious weed management plan for areas not included in the FERC-mandated Noxious Weed Plan.<br>• Support future Upper Mokelumne River Watershed Authority efforts to preserve water quality and identify protection and improvement projects that are most critical.<br>• Manage Cole Creek parcels to complement surrounding Mokelumne Wilderness values.**<br>• Formalize or close unauthorized OHV trails to protect biological resources.** |
| Preservation of Open Space | **Preserve open space in order to protect natural and cultural resources, viewsheds, and the recreation setting.** | • Apply permanent conservation easements to ensure a higher level of open space protection. |
| Outdoor Recreation by the General Public | **Enhance recreational facilities in order to provide additional public access, and education and recreation opportunities.** | • Add new day use/fishing access by the dam at Lower Bear River Reservoir.**<br>• Assess the potential for youth program opportunities.<br>• Enhance public recreation access at the LDS camp.**<br>• Review allowed uses on the premises at the Bear River Resort for BPV enhancement possibilities.** |
| Sustainable Forestry | **Develop and implement forestry practices in order to contribute to a sustainable forest, preserve and enhance habitat, enhance surrounding wilderness values, as well as to ensure appropriate fuel load and fire management.** | • Evaluate existing timber inventory data and supplement as appropriate.<br>• Develop a forest management plan for the planning unit to promote natural forest development and structural and physical diversity in forests for long-term ecological, economic, social, and cultural benefits.<br>• Develop a fuels management plan to ensure long-term forest health and reduce fuel loading and fire hazard throughout the planning unit.<br>• Develop a fire management and response plan for the planning unit to ensure fire preparedness. |
| Agricultural Uses | **Identify potential grazing opportunities in order to enhance agricultural resources and related economic benefits.** | • Evaluate the potential for grazing opportunities within the planning unit, in coordination with adjacent USFS grazing allotments. |
| Preservation of Historic Values | **Identify and manage cultural resources in order to ensure their protection.** | • Conduct surveys outside the FERC Project APE to identify cultural resources and enable their protection.<br>• Develop a cultural resources management plan for areas not already included in the FERC-mandated HRMP.<br>• Coordinate with Native American entities when conducting cultural resource measures.<br>• Formalize or close unauthorized OHV trails to protect cultural resources.** |

** This is a set of recommended possibilities for the preservation and enhancement of BPV's, and is not intended to be a set of requirements for future land management.*

*** Denotes site specific measure.*

# Lower Bear Area Planning Unit
## Recommended Concept

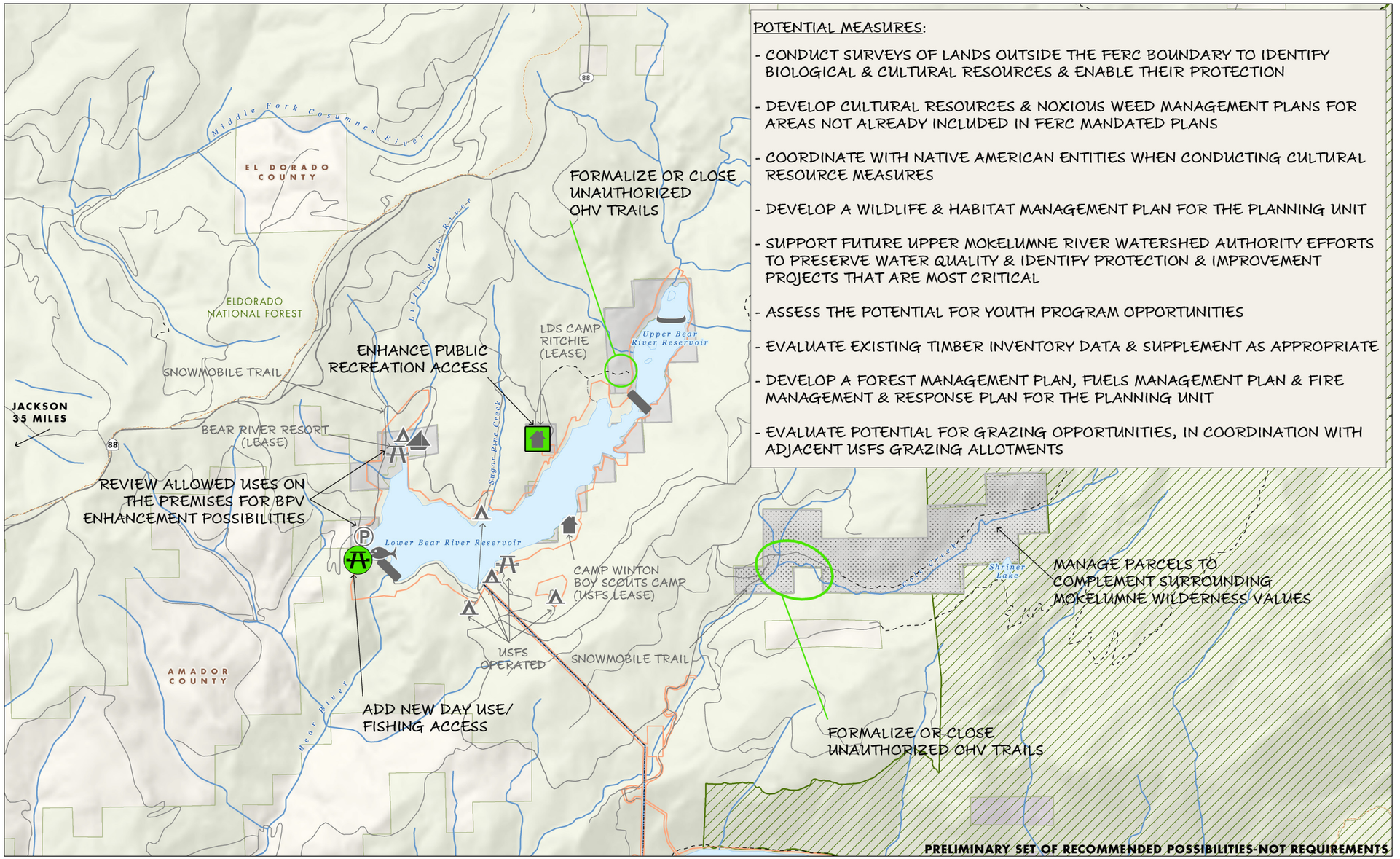



Figure UM-4

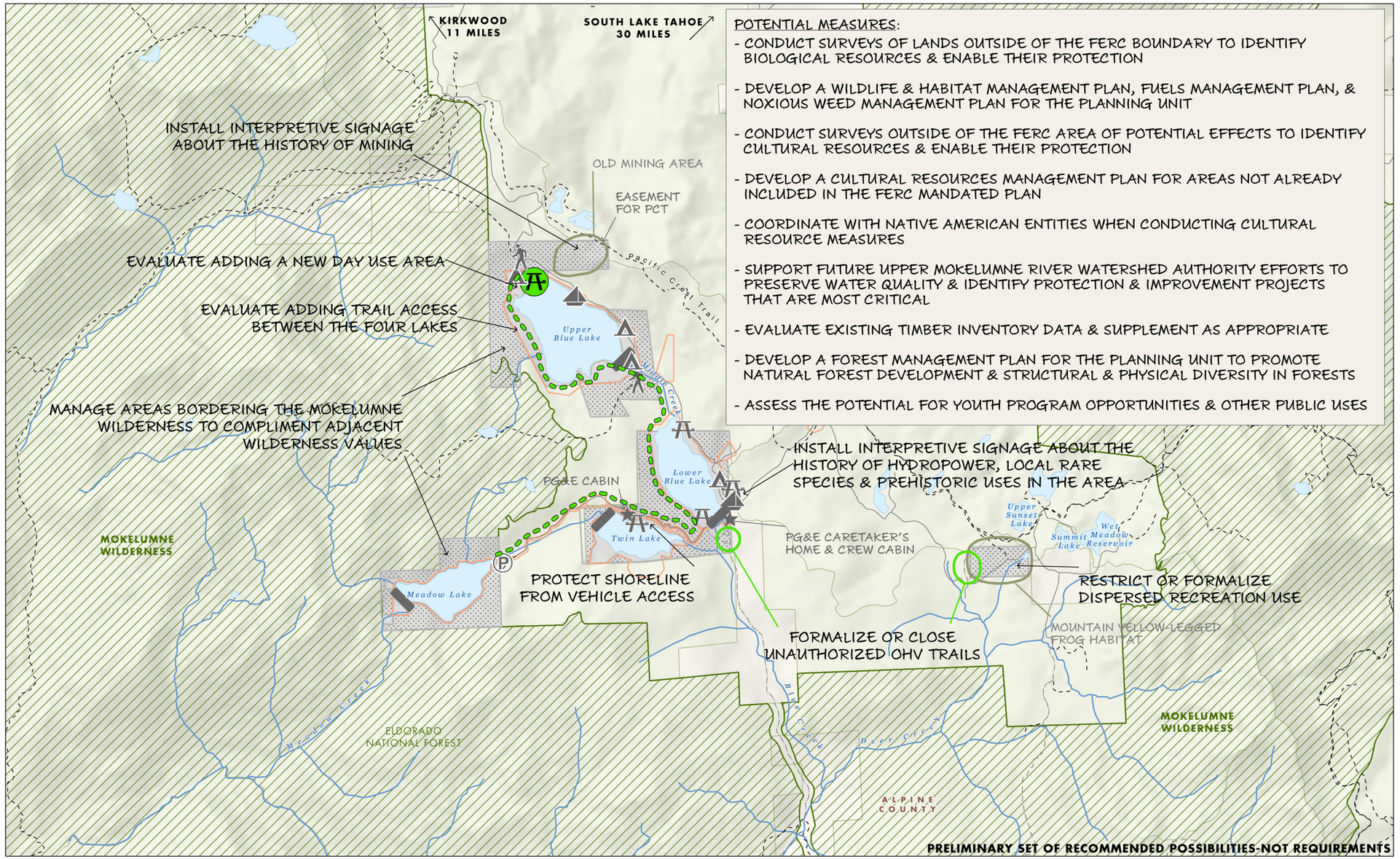
**Table UM-1 Objectives to Preserve and/or Enhance – Recommended Concept**

| Planning Unit Objective: Preserve and enhance biological and cultural resources, and enhance recreation opportunities and sustainable forestry management. | | |
|---|---|---|
| **Beneficial Public Value** | **Objective** | **Potential Measures to Preserve and/or Enhance BPVs – Not Requirements*** |
| Protection of the Natural Habitat of Fish, Wildlife, and Plants | **Preserve and enhance habitat in order to protect special biological resources.** | • Conduct surveys of lands outside the FERC boundary to identify biological resources and enable their protection.<br>• Develop a wildlife and habitat management plan for the planning unit.<br>• Develop a noxious weed management plan for areas not included in the FERC-mandated Noxious Weed Plan.<br>• Support future Upper Mokelumne River Watershed Authority efforts to preserve water quality and identify protection and improvement projects that are most critical.<br>• Restrict or formalize dispersed recreation use on the parcel by Deer Creek to protect valuable habitat.**<br>• Formalize or close unauthorized OHV trails to protect biological resources.**<br>• Protect Twin Lake shoreline from vehicle access.**<br>• Manage areas bordering the Mokelumne Wilderness to complement adjacent wilderness values.** |
| Preservation of Open Space | **Preserve open space in order to protect natural and cultural resources, viewsheds, the recreation setting, and the adjacent wilderness character.** | • Apply permanent conservation easements to ensure a higher level of open space protection. |
| Outdoor Recreation by the General Public | **Enhance recreational facilities in order to provide additional education and recreation opportunities consistent with the carrying capacity of the area.** | • Evaluate adding a new day use area at Upper Blue Lake.**<br>• Evaluate adding trail access between the four lakes.**<br>• Install interpretive signage about the history of hydropower, mining, local rare species, and prehistoric uses in the area.**<br>• Assess the potential for youth program opportunities. |
| Sustainable Forestry | **Develop and implement forestry practices in order to contribute to a sustainable forest, preserve and enhance habitat, as well as to ensure appropriate fuel load management.** | • Evaluate existing timber inventory data and supplement as appropriate.<br>• Develop a forest management plan for the planning unit to promote natural forest development and structural and physical diversity in forests for long-term ecological, economic, social, and cultural benefits.<br>• Develop a fuels management plan to ensure long-term forest health and reduce fuel loading and fire hazard throughout the planning unit. |
| Agricultural Uses | | None proposed. |
| Preservation of Historic Values | **Identify and manage cultural resources in order to ensure their protection.** | • Conduct surveys outside the FERC Project APE to identify cultural resources and enable their protection.<br>• Develop a cultural resources management plan for areas not already included in the FERC-mandated Heritage Resources Management Plan.<br>• Coordinate with Native American entities when conducting cultural resource measures.<br>• Formalize or close unauthorized OHV trails to protect cultural resources.**<br>• Restrict or formalize dispersed recreation use on the parcel by Deer Creek to protect cultural resources.** |

** This is a set of recommended possibilities for the preservation and enhancement of BPV's, and is not intended to be a set of requirements for future land management.*

*** Denotes site specific measure.*

# Blue Lakes Planning Unit
## Recommended Concept

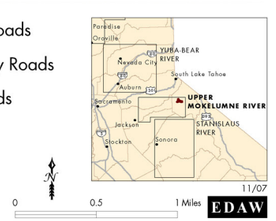



PG&E Lands Preliminarily Designated for Retention
PG&E Lands Preliminarily Designated for Disposition
BIA
BLM
BOR
DOD
NPS
Other/NGO
State
USFS
Federal Wilderness

Concept Features
Modify Existing Feature
New Feature
Trail

Existing Features
Boat Launch
Campground
Dam
Day Use
Feature of Importance
Fishing
Fish Barrier Dam
Gate
Lodging
Non-Motorized Boating
Parking
Powerhouse
Private Camp
Ranch
Trailhead
Whitewater Put-In/Take-Out

FERC Boundary
Stream / River
Canal / Ditch
Pipeline
Primary Roads
Secondary Roads
OHV Roads
Trail




Stewardship Council

Figure UM-2

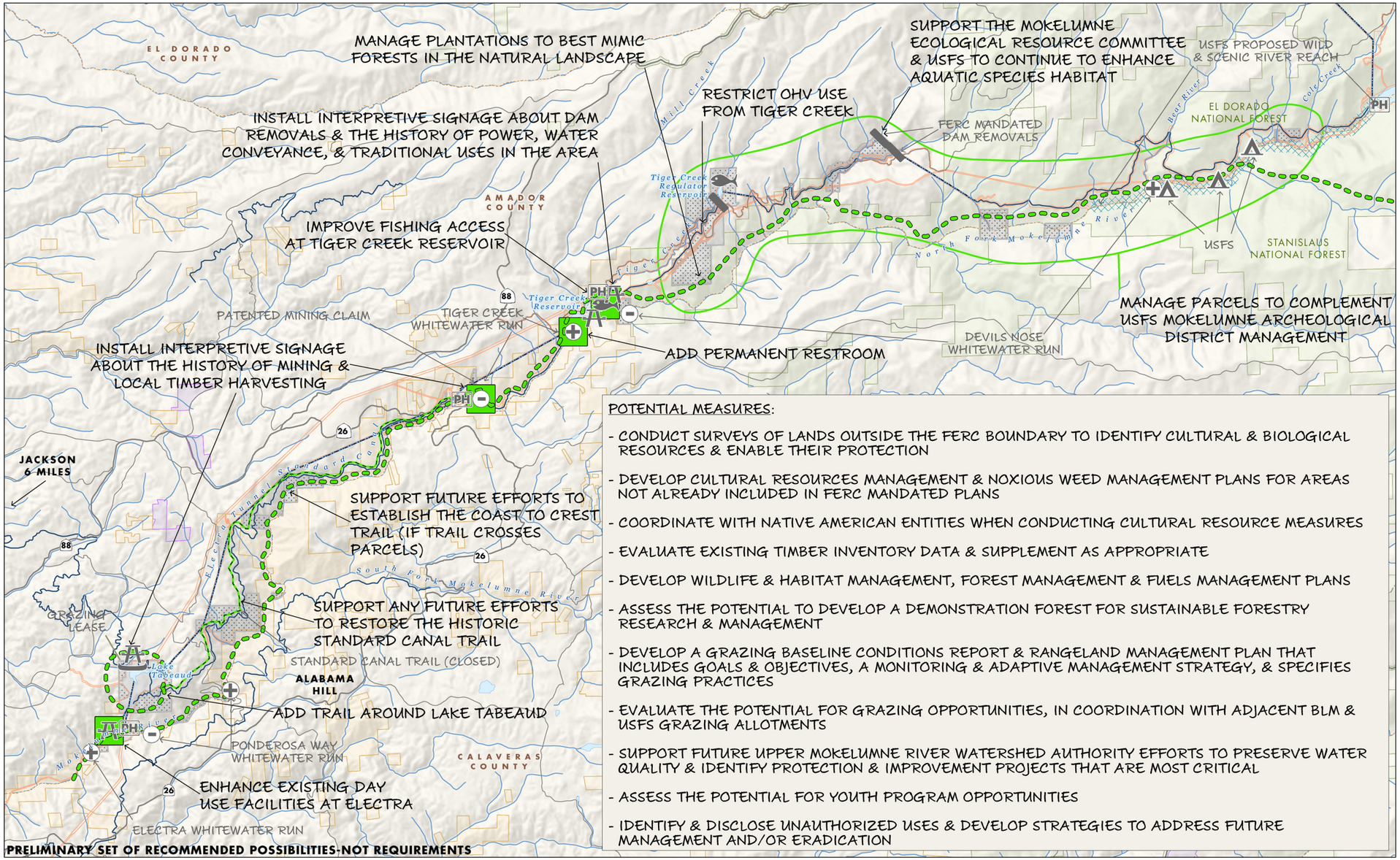
**Table UM-3 Objectives to Preserve and/or Enhance – Recommended Concept**

| Planning Unit Objective: Preserve and enhance biological, cultural, and agricultural resources while enhancing public access, the recreation experience, and sustainable forestry management. | | |
|---|---|---|
| **Beneficial Public Value** | **Objective** | **Potential Measures to Preserve and/or Enhance BPVs – Not Requirements*** |
| Protection of the Natural Habitat of Fish, Wildlife, and Plants | **Preserve and enhance habitat in order to protect special biological resources.** | • Conduct surveys of lands outside the FERC boundary to identify biological resources and enable their protection.<br>• Develop a wildlife and habitat management plan for the planning unit.<br>• Develop a noxious weed management plan for areas not included in the FERC-mandated Noxious Weed Plan.<br>• Support the Mokelumne Ecological Resource Committee and Eldorado National Forest to continue to enhance aquatic habitat in East and West Panther Creeks.**<br>• Restrict OHV use from Tiger Creek.**<br>• Support future Upper Mokelumne River Watershed Authority efforts to preserve water quality and identify protection and improvement projects that are most critical. |
| Preservation of Open Space | **Preserve open space in order to protect natural and cultural resources, viewsheds, and agricultural land uses.** | • Apply permanent conservation easements to ensure a higher level of open space protection. |
| Outdoor Recreation by the General Public | **Enhance recreational facilities in order to provide additional public access, education, and enhance the recreation experience.** | • Identify and disclose unauthorized uses and develop strategies to address future management and/or eradication.<br>• Enhance existing day use facilities at Electra.**<br>• Install interpretive signage about dam removals, the history of power, mining, timber harvesting, water conveyance, and traditional uses in the area.**<br>• Add a permanent restroom at the Tiger Creek whitewater put-in.**<br>• Support any future efforts to restore the historic Standard Canal Trail.**<br>• Add a trail around Lake Tabeaud.**<br>• Support future efforts to establish the Coast to Crest Trail if the trail crosses planning unit lands.**<br>• Improve fishing access at Tiger Creek Reservoir.**<br>• Assess the potential for youth program opportunities. |
| Sustainable Forestry | **Develop and implement forestry practices in order to contribute to and promote a sustainable forest, preserve and enhance habitat, as well as to ensure appropriate fuel load management.** | • Evaluate existing timber inventory data and supplement as appropriate.<br>• Develop a forest management plan for the planning unit to promote natural forest development and structural and physical diversity in forests for long-term ecological, economic, social, and cultural benefits.<br>• Manage plantations to best mimic forests in the natural landscape.**<br>• Develop a fuels management plan to ensure long-term forest health and reduce fuel loading and fire hazard throughout the planning unit.<br>• Assess the potential to develop a demonstration forest for sustainable forestry research and management. |
| Agricultural Uses | **Preserve and enhance grazing in order to support associated economic benefits, as well as to protect open space and habitat resources.** | • Develop a baseline conditions report that describes current agricultural, physical, and overall biological conditions of the area, including current uses and state of improvement.<br>• Develop a rangeland management plan for grazing use that includes goals and objectives and a monitoring and adaptive management strategy, as well as specifies grazing practices that address soil and water conservation, erosion control, pest management, nutrient management, vegetation management, habitat protection, and cultural resources management.<br>• Evaluate the potential for grazing opportunities within the planning unit, in coordination with adjacent BLM and USFS grazing allotments. |
| Preservation of Historic Values | **IIdentify and manage cultural resources in order to ensure their protection, as well as to support opportunities for public education.** | • Conduct surveys outside the FERC Project APE to identify cultural resources and enable their protection.<br>• Develop a cultural resources management plan for areas not already included in the FERC mandated Heritage Resources Management Plan (HRMP).<br>• Coordinate with Native American entities when conducting cultural resource measures.<br>• Manage adjacent parcels to complement USFS Mokelumne Archeological District management.** |

** This is a set of recommended possibilities for the preservation and enhancement of BPV's, and is not intended to be a set of requirements for future land management.*

*** Denotes site specific measure.*

# North Fork Mokelumne River
## Recommended Concept




POTENTIAL MEASURES:

- CONDUCT SURVEYS OF LANDS OUTSIDE THE FERC BOUNDARY TO IDENTIFY CULTURAL & BIOLOGICAL RESOURCES & ENABLE THEIR PROTECTION
- DEVELOP CULTURAL RESOURCES MANAGEMENT & NOXIOUS WEED MANAGEMENT PLANS FOR AREAS NOT ALREADY INCLUDED IN FERC MANDATED PLANS
- COORDINATE WITH NATIVE AMERICAN ENTITIES WHEN CONDUCTING CULTURAL RESOURCE MEASURES
- EVALUATE EXISTING TIMBER INVENTORY DATA & SUPPLEMENT AS APPROPRIATE
- DEVELOP WILDLIFE & HABITAT MANAGEMENT, FOREST MANAGEMENT & FUELS MANAGEMENT PLANS
- ASSESS THE POTENTIAL TO DEVELOP A DEMONSTRATION FOREST FOR SUSTAINABLE FORESTRY RESEARCH & MANAGEMENT
- DEVELOP A GRAZING BASELINE CONDITIONS REPORT & RANGELAND MANAGEMENT PLAN THAT INCLUDES GOALS & OBJECTIVES, A MONITORING & ADAPTIVE MANAGEMENT STRATEGY, & SPECIFIES GRAZING PRACTICES
- EVALUATE THE POTENTIAL FOR GRAZING OPPORTUNITIES, IN COORDINATION WITH ADJACENT BLM & USFS GRAZING ALLOTMENTS
- SUPPORT FUTURE UPPER MOKELUMNE RIVER WATERSHED AUTHORITY EFFORTS TO PRESERVE WATER QUALITY & IDENTIFY PROTECTION & IMPROVEMENT PROJECTS THAT ARE MOST CRITICAL
- ASSESS THE POTENTIAL FOR YOUTH PROGRAM OPPORTUNITIES
- IDENTIFY & DISCLOSE UNAUTHORIZED USES & DEVELOP STRATEGIES TO ADDRESS FUTURE MANAGEMENT AND/OR ERADICATION

**PRELIMINARY SET OF RECOMMENDED POSSIBILITIES-NOT REQUIREMENTS**

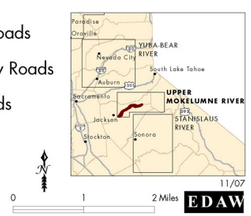
PG&E Lands Preliminarily Designated for Retention
PG&E Lands Preliminarily Designated for Disposition
BIA · DOD · State
BLM · NPS · USFS
BOR · Other/NGO · Federal Wilderness

Concept Features: Modify Existing Feature · New Feature · Trail

Existing Features: Boat Launch · Campground · Dam · Day Use · Feature of Importance · Fishing · Fish Barrier Dam · Gate · Lodging · Non-Motorized Boating · Parking · Powerhouse · Private Camp · Ranch · Trailhead · Whitewater Put-In/Take-Out

FERC Boundary · Stream / River · Canal / Ditch · Pipeline · Highly Valued Stream
Primary Roads · Secondary Roads · OHV Roads · Trail

All symbols may not appear on the map




Stewardship Council

Figure UM-6

## Appendix 6-4  Signs & EBMUD Trail Permit Requirements

Signs Posted Along Public Road in 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.

**Recreation Management Plan, January 2010, excerpt:**

Potential management actions to achieve water quality targets may include the following:

- Informing boaters about the recycling programs on site for used oil, antifreeze, batteries and lamps.
- Informing boaters what hazardous wastes are and how they are handled at the marina.
- Prohibiting topping-off.
- Requiring clean and dry boat bilges prior to launching.
- Never applying wood preservatives or paint to decks or docks while they are in or over the water.
- Using naturally resistant wood (cedar, tamarack, redwood), metal, or plastic instead of treated wood.
- Educating boaters on damages caused by excessive wake and informing them of no-wake zones in the area.
- Prohibiting over watering of lawns to limit surface runoff.
- Prohibiting excessive fertilizer use.
- Requiring collection and proper disposal of pet waste.
- Eliminating sales of lead-based fishing tackle.
- Encouraging the use of non-lead fishing tackle.
- Sweeping parking lots regularly.
- Requiring boaters and employees to stay with a boat that is being fueled.
- Posting safe fueling instructions for boaters.
- Prohibiting discharge of untreated bilge water in the marina basin.
- Monitoring fuel tanks excessive losses that would indicate a leak.
- Posting signs about safe oil and fuel spill response and removal.
- Posting signs advising users not to drain their bilges until the boat is off the ramp. Consider providing an alternate inclined surface where bilge oil can be contained or channeled to an acceptable receiving location.
- Offering oil-absorbent bilge socks for sale to boaters.
- Giving boaters oil-absorbent pads with the fuel nozzle so they can capture drips, vent-line overflow and backwash.
- Providing pamphlets to boaters about the effects of fuel spills and safe fueling of boats.
- Providing boaters with trash bags so that they can bring back their trash.
- Having a spill response plan in place and practice it regularly with all employees.
- Training employees to contain a spill.
- Keeping storm drains properly maintained and cleaned.
- Making sure infants wear swim diapers and rubber pants.
- Establishing and enforcing additional no-wake zones in areas subject to shoreline and substrate erosion.

- Providing for the convenient disposal of hazardous wastes.
- Recycling solvents, used batteries, and used antifreeze and keep them stored with caps closed and on an impervious sheltered surface.
- Relocating docks to allow free flow of water beneath them to prevent erosion and sedimentation along the shore.
- Composting organic waste.
- Installing and operating additional floating restrooms on Camanche reservoir.
- Providing an impervious area for filling fuel cans so any overflow can be easily captured.
- Dispensing nozzles used at marine service stations should be of the automatic-closing type without a latch-open device.
- Installing fuel spill equipment in a waterproof, easily identifiable locker or storage area near boat ramps and fueling stations. The storage area should include enough spill response equipment to contain the greatest potential spill, including a boom large enough to encircle the largest vessel at your facility based on three times the length of the vessel.
- Eliminating paths to the waterfront that cut directly up and down slopes or over bluffs because they decrease stability of the shoreline and increase erosion; replace with stairways when necessary.
- Increasing population control of Canada geese in recreation areas.
- Planting native vegetation along the edges of parking lots.
- Installing wave attenuators at marinas to minimize erosion and allow for flushing of the marina basin.
- Minimizing impervious surfaces.
- Installing bioengineered shoreline erosion control structures in areas of significant shoreline erosion.
- Installing infiltration trenches or basins to infiltrate and percolate runoff from impervious surfaces (since runoff from parking lots and other paved surfaces may contain pollutants, site specific conditions such as soil characteristics and depth to ground water must be considered to prevent shallow ground water contamination).

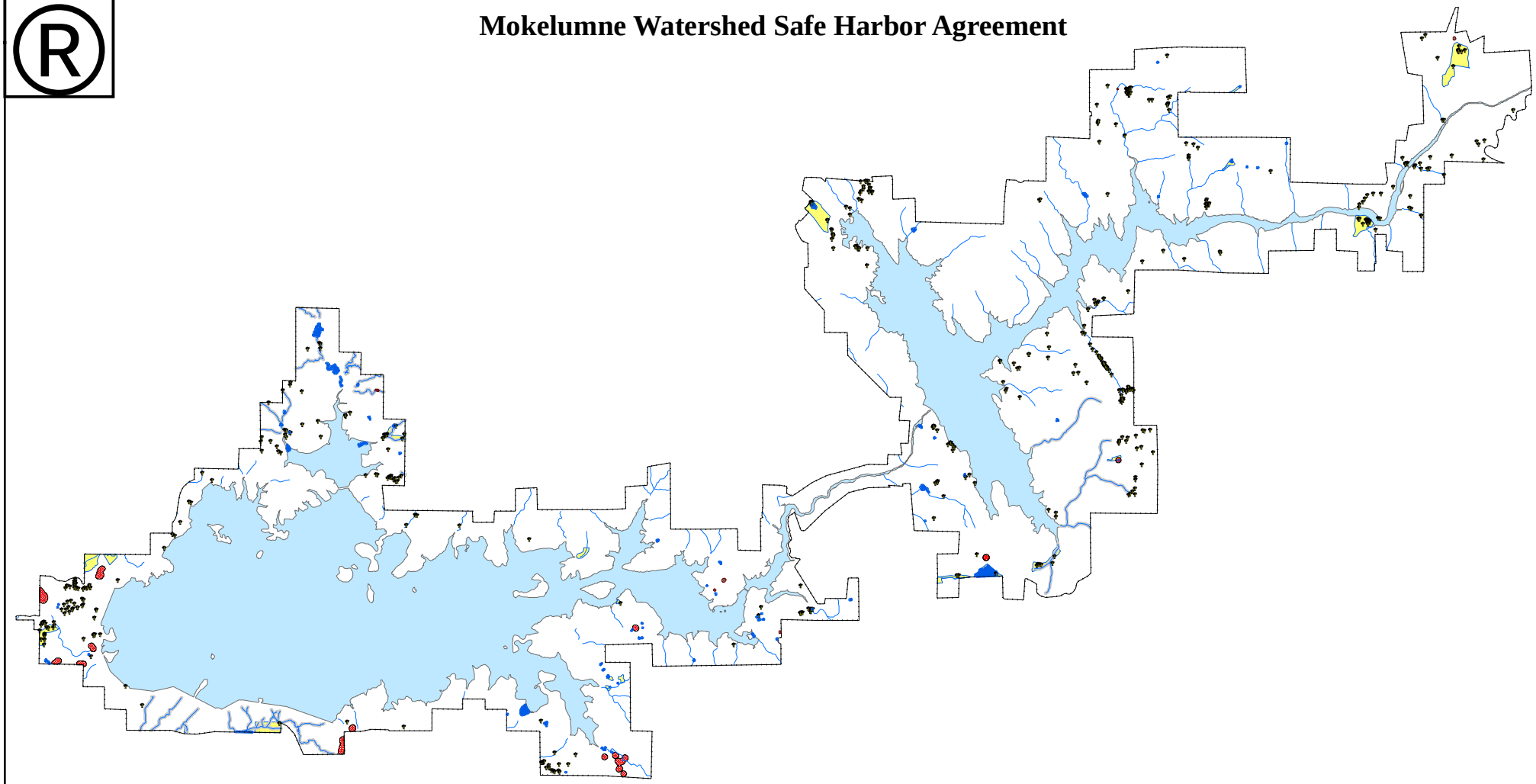
Incorporate the Best Management Practices (BMPs) for limiting impacts of recreational activities to ecological health in the management of recreation areas.

- Prohibiting shore boat access in specific areas to avoid disturbing wildlife and wetlands.
- Using buoyant foams in docks and marinas that have been coated or encapsulated in plastic or wood to prevent buoyant debris, which may be mistaken for food by birds or fish.
- Limiting access to important amphibian and reptile habitats (e.g., shoreline areas, denning and basking sites).
- Design new recreation area trail systems to encourage people to stay on designated trails via board walks, fencing and plantings, and offering

viewing positions from a distance, such as viewing platforms. In addition, buffers can be placed around critical habitats, to deter human access.

- Entry into areas can be limited at certain times of the year via trail closures during the breeding season and juvenile dispersal.
- Limiting access of free-roaming pets into parks and reserves.
- Imposing strict garbage control so that feral animals and opportunistic predators are not inadvertently fed or attracted to natural/critical areas.
- Prohibiting fishing and fish stocking in amphibian habitats consistent with the Safe Harbor Agreement.

# Mokelumne Watershed Safe Harbor Agreement



## Conservation Management Activities

- Pond Restoration/Maintence
- Other Breeding Habitat Restoration
- Elderberry Habitat
- Shallow Water Habitat Development
- Camanche & Pardee Reservoirs

0 0.5 1 2 3 4 5 Miles

## Baseline Habitat 2008 (Dry Year)

- Enrolled Property Boundary
- Observed Elderberry Bushes (Estimated # = 893)
- Streams, Creeks, and Springs
- Vernal Pool Complexes
- Potential Breeding Ponds (#68)

Appendix 6-7

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
Phone (916) 464-3291 • FAX (916) 464-4645
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

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
Phone (916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

**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 9733

**NOTICE OF APPLICABILITY (NOA); LIMITED THREAT GENERAL WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2008-0082; EAST BAY MUNICIPAL UTILITY DISTRICT (EBMUD), CALAVERAS COUNTY**

Our office received application forms on 19 November 2008 from the EBMUD for the Camanche South Shore Recreation Area Water Treatment Plant (CSWTP) 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. R5-2008-0082-009 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 CSWTP treats raw water drawn from Camanche Reservoir and provides potable water to permanent residents of a mobile home park, and to public camping and recreation facilities.

This NOA provides regulatory coverage for the discharge of backwash water from the CSWTP. The receiving surface water is an unnamed creek. The backwash water is plumbed to a below-ground equalization tank where it is mixed with excess unused raw water and then discharged to an unnamed creek. The unnamed creek flows into three fishing ponds and overflow from the last pond enters Camanche Reservoir. The CSWTP has been in operation since 1973 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, R5-2008-0082-009, 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

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
Phone (916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

**Arnold Schwarzenegger**
*Governor*

ECS - Received
APR 30 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

**EAST BAY MUNICIPAL UTILITY DISTRICT**

# BEST MANAGEMENT PRACTICES

# WATER TREATMENT PLANT
# CAMANCHE SOUTH SHORE RECREATION AREA

July 2009

Prepared by:

Water Supply Division
and
Environmental Compliance Section
Operations and Maintenance Department

TABLE OF CONTENTS

**Section** **Page**

**1.0 FACILITY OPERATION** ..... 1

**2.0 POTENTIAL POLLUTANTS** ..... 3

2.1 Chemical Use At The Facility ..... 4
2.2 Discharge Associated With Operation And Maintenance Of Equipment ..... 4

**3.0 POLLUTION CONTROL AND EFFLUENT TREATMENT METHODS** ..... 4

**4.0 CALCIUM HYPOCHLORITE MANAGEMENT** ..... 5

**5.0 RESPONSIBILITY AND TRAINING** ..... 6

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, issued General Order No. R5-2008-0082-009, 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 April 28, 2009. 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) Camanche South Shore (CASS) 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 | 11700 Wade Lane, Burson, CA |
| Raw water source | Camanche Reservoir |
| Treatment capacity, average (maximum) | 230 gpm (480 gpm) |
| Treatment processes | Prechlorination, flocculation, filtration, disinfection |
| Number of available filters (type) | Eight (8) in-line gravity, anthracite and sand |
| Backwash water treatment method | Dechlorination, discharged to plant effluent |
| Types of discharges | Routine and Non-Routine (unplanned or emergency) |
| Receiving Water | Camanche Reservoir |

Detailed operational procedures are documented in the current WTP's Operations and Maintenance Manual (July 2008) 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 manned during daily working hours to start the raw water pumps and during backwash operations.

***Raw Water Source.*** Raw water is pumped from Camanche Reservoir. The reservoir collects surface water drainage and flows from the middle Mokelumne River and Pardee Reservior. Pardee Reservoir stores water from 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 prechlorination, flocculation, filtration, and disinfection contact. Pre-chlorination and flocculation are used to cause fine particles to coagulate and aid in the filtering and removal of organic and particulate materials that may affect the potability and the taste and odor of the finished water.

Under typical water quality conditions (i.e. turbidity <5 NTU and low algae/organic content), raw water will be filtered and the product water delivered to the finished water storage tanks. However, during poor water quality conditions, the plant controls are alarmed to shut down the raw water pumps and the treatment plant.

Calcium hypochlorite is the disinfecting agent to maintain a minimum target free chlorine residual of 0.60 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 Pacific Gas & Electric with back up generation from a diesel powered standby generator.

***Filter Backwashing.*** Filters are backwashed with produced treated water from the distribution storage tanks. Calcium hypochlorite is added to the finished water at a target dose of 1.2 mg/L or greater to sufficiently maintain a 0.7 mg/L residual in the stored water. Backwash water is combined with the bypass intake of raw surface water and instrument analyzer water (see Figure 2) and discharged into an equalizer box. The equalizer box is dechorinated with sodium sulfite tablets prior to overland flow in the creek and into the fish pond.

***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 40 pound containers of dry calcium hypochlorite tablets from the Pardee Center Chemical Plant to the WTP as the chemicals become depleted. The process chemicals are stored separated from incompatible chemicals, in secondary containment, fire safety rated storage room. 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.

The diesel for the emergency backup generator is self contained within the generator with a built-in secondary containment. The tank is operated, maintained, and tested in accordance with the applicable manufacturer's specifications.

***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 and downgradient areas. The nearest sanitary sewer system is the mobile home park, upgradient and within one-half mile of the WTP. Thus, pollutants having a reasonable potential to be present in storm water discharges include: sanitary sewer overflow, 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. Calcium 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** |
|---|---|
| Dry calcium hypochlorite tablets | 40 pound pail |
| Dry sodium sulfite tablets | 40 gallon pail |
| Liquid cationic polymer | 8 gallon bins, 55 gallon drums |

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 creek 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 CALCIUM HYPOCHLORITE MANAGEMENT

***Storage and Transportation.*** Calcium hypochlorite tablets are used as the disinfecting agent. Calcium hypochlorite is stored indoors in 40 pound pails. Off-loading of the containers 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 would flow into the backwash water discharge lines. 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

The automatic dechlorination for the backwash discharge would mitigate potential overflows or process upset. These releases are infrequent and of an emergency nature. 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

# 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 6-8
# Hazardous Material Business Plan
# Example: Camanche North Shore

# HAZARDOUS MATERIALS BUSINESS PLAN ANNUAL INVENTORY CERTIFICATION FORM

*Health and Safety Code Section 25503.3(c) and 19 CCR Section 2729.4(b)*

To: Amador County Environmental Health Department
810 Court Street
Jackson, CA 95642
(209) 223-6439

**Pursuant to Section 25503.3(c) of California Health and Safety Code (HSC), the Hazardous Materials Business Plan (HMBP) certification described below is hereby submitted for the following facility:**

Facility Name: EBMUD Camanche North Shore

Facility Street Address: 7000 Camanche Rd. City: Ione

Date of Current HMBP: 2010

I hereby certify that: *(Check the appropriate box)*

☐ I am complying with the annual inventory reporting requirement of Health & Safety Code Section 25503.3(c) by submitting the following certification statement:

- The information contained in the annual inventory form most recently submitted is complete, accurate, and up-to date; and
- There has been no change in the quantity of any hazardous material as reported on the most recently submitted Hazardous Materials Inventory forms; and
- The facility has not begun handling any hazardous material in a HMBP reportable quantity that is not currently listed in the Hazardous Materials Inventory; and
- The most recently submitted annual inventory form contains the information required by Section 11022 of Title 42 of the United States Code.

**OR**

☒ There have been changes in the annual hazardous materials or hazardous waste inventory handled at this facility and revisions to the Hazardous Materials Inventory are necessary. The annual inventory forms as revised will be submitted to the Amador County Environmental Health Department on or before March 1.

**OWNER/OPERATOR CERTIFICATION: I hereby certify under penalty of law that, based on my inquiry of those individuals responsible for obtaining the information reported above, I believe that the submitted information is true, accurate, and complete. I understand that this certification must be returned to the Amador County Environmental Health Department by March 1 or a revised HMBP must be submitted to said Department within 30 days of any change in this facility's storage or handling of hazardous materials that would require updating of the HMBP.**

Name of Owner/Operator *(Print)*: Kent Lambert Title: Manager, MWRD

Phone: 209-772-8203 Signature [signature] Date: 2/23/10

***Please contact the Amador County Environmental Health Department if you have any questions or need forms to complete updates or revisions.**

UNIFIED PROGRAM CONSOLIDATED FORM
AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT — Facility Information

# BUSINESS OWNER/OPERATOR IDENTIFICATION



## I. IDENTIFICATION

| FACILITY ID# | BEGINNING DATE 100 | ENDING DATE 101 |
|---|---|---|
| 1 | 01/01/2010 | 12/31/2010 |

| BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3 | BUSINESS PHONE 102 |
|---|---|
| East Bay Municipal Utility District – Camanche North Shore Recreation Area | (209) 763-5121 |

BUSINESS SITE ADDRESS 103: 2000 Camanche Road

| CITY 104 | | ZIP CODE 105 |
|---|---|---|
| Ione | CA | 95640 |

| DUN & BRADSTREET 106 | SIC CODE (4 digit #) 107 |
|---|---|
| 827073883 | 7999 |

COUNTY 108: Amador

| BUSINESS OPERATOR NAME 109 | BUSINESS OPERATOR PHONE 110 |
|---|---|
| Chris Cantwell | (209) 763-5121 |

## II. BUSINESS OWNER

| OWNER NAME 111 | OWNER PHONE 112 |
|---|---|
| East Bay Municipal Utility District | (510) 835-3000 |

OWNER MAILING ADDRESS 113: P.O. Box 24055 MS#704

| CITY 114 | STATE 115 | ZIP CODE 116 |
|---|---|---|
| Oakland | CA | 94623-1055 |

## III. ENVIRONMENTAL CONTACT

| CONTACT NAME 117 | CONTACT PHONE 118 |
|---|---|
| John Walter, Environmental Health & Safety Specialist | (510) 986-7524 |

CONTACT MAILING ADDRESS 119: MS #704, P.O. Box 24055

| CITY 120 | STATE 121 | ZIP CODE 122 |
|---|---|---|
| Oakland | CA | 94623-1055 |

## IV. EMERGENCY CONTACTS

| -PRIMARY- | -SECONDARY- |
|---|---|
| NAME 123: Chris Cantwell | NAME 128: EBMUD Pardee Area Control Center |
| TITLE 124: Concessionaire | TITLE 129: Operator On Duty |
| BUSINESS PHONE 125: (209) 763-5121 | BUSINESS PHONE 130: (209) 722-8208 |
| 24-HOUR PHONE 126: None | 24-HOUR PHONE 131: (209) 722-8202 |
| PAGER # 127: None | PAGER # 132: None |

ADDITIONAL LOCALLY COLLECTED INFORMATION 133: The facility is a recreation area owned by EBMUD and leased to the Camanche Recreation Company that operates the concession. The facility includes a café, camping and recreation areas, marina, and two mobile home parks. EBMUD owns and operates a water treatment plant and a wastewater treatment facility.

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.

| SIGNATURE OF OWNER/OPERATOR OR DESIGNATED REPRESENTATIVE | DATE 134 | NAME OF DOCUMENT PREPARER 135 |
|---|---|---|
| | 2/25/10 | John Walter |
| NAME OF SIGNER (print) 136 | TITLE OF SIGNER 137 | |
| Kent Lambert | Manager, Mokelumne Watershed & Recreation Division | |

**UNIFIED PROGRAM CONSOLIDATED FORM**
**AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT 500 Argonaut Lane, Jackson, CA 95642**

# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area)

☐ADD ☐DELETE ☐REVISE 200 | Page __1_ of __9_

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
**East Bay Municipal Utility District – Camanche North Shore Recreation Area**

CHEMICAL LOCATION 201
**Shop (Area B)**

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203
**#2; #3**

GRID# (optional) 204
**G2; D-1&3**

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
**Acetylene**

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
**Acetylene**

EHS* ☐ Yes ☒ No 208

CAS# 209
**74-86-2**

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) ☒ a. PURE ☐ b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes ☒ No 212

CURIES **NA** 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID ☐ b. LIQUID ☒ c. GAS 214

LARGEST CONTAINER **126** 215

FED HAZARD CATEGORIES (Check all that apply) 216
☐ a. FIRE ☐ b. REACTIVE ☒ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| **126** | **126** | **0** | **NA** |

UNITS* (Check one item only) 221
☐ a. GALLONS ☒ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
**365**

STORAGE CONTAINER 223
☐ a. ABOVE GROUND TANK ☐ e. PLASTIC/NONMETALLIC DRUM ☐ i. FIBER DRUM ☐ m. GLASS BOTTLE ☐ q. RAIL CAR
☐ b. UNDERGROUND TANK ☐ f. CAN ☐ j. BAG ☐ n. PLASTIC BOTTLE ☐ r. OTHER
☐ c. TANK INSIDE BUILDING ☐ g. CARBOY ☐ k. BOX ☐ o. TOTE BIN
☐ d. STEEL DRUM ☐ h. SILO ☒ l. CYLINDER ☐ p. TANK WAGON

STORAGE PRESSURE 224
☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225
☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|
| 1 226 **100** | **Acetylene** 227 | ☐ Yes ☒ No 228 | **74-86-2** 229 |
| 2 230 | 231 | ☐ Yes ☐ No 232 | 233 |
| 3 234 | 235 | ☐ Yes ☐ No 236 | 237 |
| 4 238 | 239 | ☐ Yes ☐ No 240 | 241 |
| 5 242 | 243 | ☐ Yes ☐ No 244 | 245 |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
**Maximum Daily Amount converted to pounds = 9 lbs.**

If EPCRA, Please Sign Here

**UNIFIED PROGRAM CONSOLIDATED FORM**
**AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT 500 Argonaut Lane, Jackson, CA 95642**
# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION
(one page per material per building or area)

☐ ADD ☐ DELETE ☐ REVISE 200 | Page _2__ of _9__

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
**East Bay Municipal Utility District – Camanche North Shore Recreation Area**

CHEMICAL LOCATION 201
**Shop (Area B)**

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203: **#2; #3**

GRID# (optional) 204: **G2; D-1&3**

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
**Oxygen**

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
**Oxygen, Compressed**

EHS* ☐ Yes ☒ No 208

CAS# 209
**7782-44-7**

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☒ a. PURE ☐ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ☒ No 212

CURIES 213: **NA**

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ☐ b. LIQUID ☒ c. GAS

LARGEST CONTAINER 215: **282**

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ☐ b. REACTIVE ☒ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| **282** | **564** | **0** | **NA** |

UNITS* (Check one item only) 221: ☐ a. GALLONS ☒ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222: **365**

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM ☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO ☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ☒ l. CYLINDER ☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON ☐ q. RAIL CAR ☐ r. OTHER

STORAGE PRESSURE 224: ☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| | %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|---|
| 1 | **100** 226 | **Oxygen** 227 | ☐ Yes ☒ No 228 | **7782-44-7** 229 |
| 2 | 230 | 231 | ☐ Yes ☐ No 232 | 233 |
| 3 | 234 | 235 | ☐ Yes ☐ No 236 | 237 |
| 4 | 238 | 239 | ☐ Yes ☐ No 240 | 241 |
| 5 | 242 | 243 | ☐ Yes ☐ No 244 | 245 |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
**Maximum Daily Amount converted to pounds = 38 lbs.**

If EPCRA, Please Sign Here

**UNIFIED PROGRAM CONSOLIDATED FORM**
**AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT 500 Argonaut Lane, Jackson, CA 95642**

# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area)

☐ ADD ☐ DELETE ☐ REVISE 200 | Page __3_ of _9__

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
**East Bay Municipal Utility District – Camanche North Shore Recreation Area**

CHEMICAL LOCATION 201
**Storage Yard, South of Building B1**

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203: **#2; #3**

GRID# (optional) 204: **G2; G3 & I5**

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
**Diesel, Petroleum Fuel**

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
**Diesel Fuel #2**

EHS* ☐ Yes ☒ No 208

CAS# 209
**68476-34-6**

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) ☐ a. PURE ☒ b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes ☒ No 212

CURIES **NA** 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID ☒ b. LIQUID ☐ c. GAS 214

LARGEST CONTAINER **500** 215

FED HAZARD CATEGORIES (Check all that apply) 216
☒ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☒ d. ACUTE HEALTH ☒ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| **300** | **500** | **0** | **NA** |

UNITS* (Check one item only) 221
☒ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
**365**

STORAGE CONTAINER 223
☒ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM ☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO ☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ☐ l. CYLINDER ☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON ☐ q. RAIL CAR ☐ r. OTHER

STORAGE PRESSURE 224
☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225
☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| | %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|---|
| 1 | 226 **100** | 227 **Blend of Petroleum Hydrocarbons** | 228 ☐ Yes ☒ No | 229 **68476-34-6** |
| 2 | 230 | 231 | 232 ☐ Yes ☐ No | 233 |
| 3 | 234 | 235 | 236 ☐ Yes ☐ No | 237 |
| 4 | 238 | 239 | 240 ☐ Yes ☐ No | 241 |
| 5 | 242 | 243 | 244 ☐ Yes ☐ No | 245 |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
**Maximum Daily Amount converted to pounds = 400 lbs.**

If EPCRA, Please Sign Here

**UNIFIED PROGRAM CONSOLIDATED FORM**
**AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT 500 Argonaut Lane, Jackson, CA 95642**
# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION
(one page per material per building or area)

☐ADD ☐DELETE ☐REVISE 200 | Page _4__ of _9__

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
**East Bay Municipal Utility District – Camanche North Shore Recreation Area**

CHEMICAL LOCATION 201
**Shop Area B; Buildings C & D; Mobile Park #1**

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203
**2, 3, 4, 5, 7 & 8**

GRID# (optional) 204
**Throughout Rec Area**

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
**Propane**

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
**Liquid Petroleum Gas**

EHS* ☐ Yes ☒ No 208

CAS# 209
**74-98-6**

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) ☒ a. PURE ☐ b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes ☒ No 212

CURIES **NA** 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID ☐ b. LIQUID ☒ c. GAS 214

LARGEST CONTAINER **500** 215

FED HAZARD CATEGORIES (Check all that apply) 216
☒ a. FIRE ☐ b. REACTIVE ☒ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| **9,446** | **19,140** | **0** | **NA** |

UNITS* (Check one item only) 221
☒ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222

STORAGE CONTAINER 223
☒ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM ☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO ☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ☐ l. CYLINDER ☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON ☐ q. RAIL CAR ☐ r. OTHER

STORAGE PRESSURE 224
☐ a. AMBIENT ☒ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225
☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| | %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|---|
| 1 | **100** 226 | **Propane** 227 | ☐ Yes ☒ No 228 | **74-98-6** 229 |
| 2 | 230 | 231 | ☐ Yes ☐ No 232 | 233 |
| 3 | 234 | 235 | ☐ Yes ☐ No 236 | 237 |
| 5 | 242 | 243 | ☐ Yes ☐ No 244 | 245 |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
**Maximum Daily Amount converted to pounds @ 4.2 lbs/gal = 80,388 lbs.**
**Mobile Park #1 = 17,200 gal at individual homes; Area B = 595 gal tank; Building C = 250 & 500 gal tanks; Building D = 595 gal tank**

If EPCRA, Please Sign Here

**UNIFIED PROGRAM CONSOLIDATED FORM**
**AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT 500 Argonaut Lane, Jackson, CA 95642**

# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area)

☐ ADD ☐ DELETE ☒ REVISE 200 | Page _5__ of _9__

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
**East Bay Municipal Utility District – Camanche North Shore Recreation Area**

CHEMICAL LOCATION 201
**Office, Store and Shop**

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203: **#2 and 6**

GRID# (optional) 204: **E3 and C6**

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
**Sodium Hypochlorite**

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
**12.5% Sodium Hypochlorite Solution**

EHS* ☐ Yes ☒ No 208

CAS# 209
**7681-52-9**

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ☒ b. MIXTURE ☐ c. WASTE

RADIOACTIVE 212: ☐ Yes ☒ No

CURIES 213: **NA**

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ☒ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: **475**

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ☒ b. REACTIVE ☐ c. PRESSURE RELEASE ☒ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| **238** | **475** | **0** | **NA** |

UNITS* (Check one item only) 221: ☒ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☒ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM ☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO ☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ☐ l. CYLINDER ☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON ☐ q. RAIL CAR ☐ r. OTHER

STORAGE PRESSURE 224: ☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| | %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|---|
| 1 | **12.5%** 226 | **Sodium Hypochlorite** 227 | ☐ Yes ☒ No 228 | **7681-52-9** 229 |
| 2 | 230 | 231 | ☐ Yes ☐ No | 233 |
| 3 | 234 | 235 | ☐ Yes ☐ No 236 | 237 |
| 5 | 242 | 243 | ☐ Yes ☐ No 244 | 245 |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
**Maximum Daily Amount converted to pounds = 475 gallons x 10 lbs. per gallon = 4750 lbs.**

If EPCRA, Please Sign Here

**UNIFIED PROGRAM CONSOLIDATED FORM**
**AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT 500 Argonaut Lane, Jackson, CA 95642**

# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area)

☐ ADD ☐ DELETE ☐ REVISE 200 | Page __6_ of _9__

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
**East Bay Municipal Utility District – Camanche North Shore Recreation Area**

CHEMICAL LOCATION 201
**On east side of Building C, in fenced area**

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203: **#3 : #4**

GRID# (optional) 204: **I-5 : D3**

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
**Petroleum Lubricating Oil**

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
**Two-Cycle Lube Oil**

EHS* ☐ Yes ☒ No 208

CAS# 209
**64742-65-0**

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) ☐ a. PURE ☒ b. MIXTURE ☐ c. WASTE 211

RADIOACTIVE ☐ Yes ☒ No 212

CURIES **NA** 213

PHYSICAL STATE (Check one item only) ☐ a. SOLID ☒ b. LIQUID ☐ c. GAS 214

LARGEST CONTAINER **0.5** 215

FED HAZARD CATEGORIES (Check all that apply) 216
☒ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| **200** | **250** | **0** | **NA** |

UNITS* (Check one item only) 221
☒ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222
**365**

STORAGE CONTAINER 223
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM ☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO ☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ☐ l. CYLINDER ☐ m. GLASS BOTTLE ☒ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON ☐ q. RAIL CAR ☐ r. OTHER

STORAGE PRESSURE 224
☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225
☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| | %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|---|
| 1 | **55-70** 226 | **Mineral Oil, Petrol Distill, Solv-Dewaxed Hvy Paraffinic** 227 | ☐ Yes ☒ No 228 | **64742-65-0** 229 |
| 2 | **10-30** 230 | **Kerosene** 231 | ☐ Yes ☒ No 232 | **8008-20-6** 233 |
| 3 | **10** 234 | **Proprietary Additives** 235 | ☐ Yes ☒ No 236 | **NA** 237 |
| 4 | 238 | 239 | ☐ Yes ☐ No 240 | 241 |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
**Maximum Daily Amount converted to pounds = 219 lbs.**

If EPCRA, Please Sign Here

**UNIFIED PROGRAM CONSOLIDATED FORM**
**AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT 500 Argonaut Lane, Jackson, CA 95642**

# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area)

☐ ADD ☐ DELETE ☐ REVISE 200 | Page _7__ of _9__

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
**East Bay Municipal Utility District – Camanche North Shore Recreation Area**

CHEMICAL LOCATION 201
**Shop (Area B) and Store (Building C)**

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203: **#3 & #4**

GRID# (optional) 204: **G3 & I-1&2**

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
**Unleaded Gasoline**

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
**Unleaded Gasoline**

EHS* ☐ Yes ☒ No 208

CAS# 209
**Mixture, See Below**

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ☒ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ☒ No 212

CURIES 213: **NA**

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ☒ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: **2,000**

FED HAZARD CATEGORIES (Check all that apply) 216: ☒ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☒ d. ACUTE HEALTH ☒ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| **3,250** | **4,500** | **0** | **NA** |

UNITS* (Check one item only) 221: ☒ a. GALLONS ☐ b. CUBIC FEET ☐ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222: **365**

STORAGE CONTAINER 223:
☒ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☐ c. TANK INSIDE BUILDING ☐ d. STEEL DRUM ☐ e. PLASTIC/NONMETALLIC DRUM ☐ f. CAN ☐ g. CARBOY ☐ h. SILO ☐ i. FIBER DRUM ☐ j. BAG ☐ k. BOX ☐ l. CYLINDER ☐ m. GLASS BOTTLE ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ p. TANK WAGON ☐ q. RAIL CAR ☐ r. OTHER

STORAGE PRESSURE 224: ☐ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ☐ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|
| 1 **<4.9;>1.0** 226 | **Benzene; Ethyl Benzene; Xylenes (P-M-O); Toluene** 227 | ☐ Yes ☒ No 228 | **71-43-2; 100-41-4; 106-42-3; 108-38-3; 95-47-6; 108-88-3** 229 |
| 2 **>1.0; >1.0** 230 | **Hexane; Cyclohexane** 231 | ☐ Yes ☒ No 232 | **110-54-3; 110-82-7** 233 |
| 3 **<15; <18** 234 | **Methyl Tert-Butyl Ether (MTBE); Ethyl Tert-Butyl Ether (ETBE)** 235 | ☐ Yes ☒ No 236 | **1634-04-4; 637-92-3** 237 |
| 4 **<17** 238 | **Tert-Amyl Methyl Ether (TAME)** 239 | ☐ Yes ☒ No 240 | **994-05-8** 241 |
| 5 **<10** 242 | **Ethyl Alcohol (Ethanol)** 243 | ☐ Yes ☒ No 244 | **64-17-5** 245 |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
**Maximum Daily Amount converted to pounds = 3,600 lbs.**

If EPCRA, Please Sign Here

**UNIFIED PROGRAM CONSOLIDATED FORM**
**AMADOR COUNTY ENVIRONMENTAL HEALTH DEPARTMENT 500 Argonaut Lane, Jackson, CA 95642**

# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION

(one page per material per building or area)

☐ ADD ☐ DELETE ☐ REVISE 200 | Page _8__ of __9_

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
**East Bay Municipal Utility District – Camanche North Shore Recreation Area**

CHEMICAL LOCATION 201
**Water Treatment Plant (Building E)**

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203: **#6**

GRID# (optional) 204: **D5 &6**

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
**Permanganic Acid ($KMn0_4$)**

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
**Potassium Permanganate, Potassium Salt**

EHS* ☐ Yes ☒ No 208

CAS# 209
**7722-64-7**

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☒ a. PURE ☐ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ☒ No 212

CURIES 213: **NA**

PHYSICAL STATE (Check one item only) 214: ☒ a. SOLID ☐ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: **60**

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ☒ b. REACTIVE ☐ c. PRESSURE RELEASE ☒ d. ACUTE HEALTH ☒ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| **60** | **120** | **0** | **NA** |

UNITS* (Check one item only) 221: ☐ a. GALLONS ☐ b. CUBIC FEET ☒ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222: **365**

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK ☐ b. UNDERGROUND TANK ☒ f. CAN ☐ c. TANK INSIDE BUILDING ☐ g. CARBOY ☐ d. STEEL DRUM ☐ h. SILO ☐ e. PLASTIC/NONMETALLIC DRUM ☐ j. BAG ☐ k. BOX ☐ l. CYLINDER ☐ i. FIBER DRUM ☐ n. PLASTIC BOTTLE ☐ o. TOTE BIN ☐ m. GLASS BOTTLE ☐ p. TANK WAGON ☐ q. RAIL CAR ☐ r. OTHER

STORAGE PRESSURE 224: ☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| | %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|---|
| 1 | **100** 226 | **Potassium Permanganate** 227 | ☐ Yes ☒ No 228 | **7722-64-7** 229 |
| 2 | 230 | 231 | ☐ Yes ☐ No 232 | 233 |
| 3 | 234 | 235 | ☐ Yes ☐ No 236 | 237 |
| 4 | 238 | 239 | ☐ Yes ☐ No 240 | 241 |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246
**Maximum Daily Amount converted to pounds = 120 lbs.**

If EPCRA, Please Sign Here

**UNIFIED PROGRAM CONSOLIDATED FORM**
**CALAVERAS COUNTY ENVIRONMENTAL HEALTH DEPARTMENT**
# HAZARDOUS MATERIALS INVENTORY – CHEMICAL DESCRIPTION
(one page per material per building or area)

☒ ADD ☐ DELETE ☐ REVISE 200 | Page _17__ of _19__

## I. FACILITY INFORMATION

BUSINESS NAME (Same as FACILITY NAME or DBA – Doing Business As) 3
EBMUD- Pardee Center

CHEMICAL LOCATION 201
Water Treatment Plant

CHEMICAL LOCATION CONFIDENTIAL EPCRA 202
☐ YES ☒ NO

FACILITY ID # 1

MAP# (optional) 203: 6

GRID# (optional) 204: F5

## II. CHEMICAL INFORMATION

CHEMICAL NAME 205
Calcium Hypochlorite

TRADE SECRET ☐ Yes ☒ No 206
If Subject to EPCRA, refer to instructions

COMMON NAME 207
Accu-Tab

EHS* ☐ Yes ☒ No 208

CAS# 209
7778-54-3

*If EHS is "Yes", all amounts below must be in lbs.

FIRE CODE HAZARD CLASSES (Complete if required by CUPA) 210

HAZARDOUS MATERIAL TYPE (Check one item only) 211: ☐ a. PURE ☒ b. MIXTURE ☐ c. WASTE

RADIOACTIVE ☐ Yes ☒ No 212

CURIES 213

PHYSICAL STATE (Check one item only) 214: ☐ a. SOLID ☐ b. LIQUID ☐ c. GAS

LARGEST CONTAINER 215: 50 Lbs

FED HAZARD CATEGORIES (Check all that apply) 216: ☐ a. FIRE ☐ b. REACTIVE ☐ c. PRESSURE RELEASE ☐ d. ACUTE HEALTH ☐ e. CHRONIC HEALTH

| AVERAGE DAILY AMOUNT 217 | MAXIMUM DAILY AMOUNT 218 | ANNUAL WASTE AMOUNT 219 | STATE WASTE CODE 220 |
|---|---|---|---|
| 700 | 1,400 | 0 | |

UNITS* (Check one item only) 221: ☐ a. GALLONS ☐ b. CUBIC FEET ☒ c. POUNDS ☐ d. TONS
* If EHS, amount must be in pounds.

DAYS ON SITE: 222: 365

STORAGE CONTAINER 223:
☐ a. ABOVE GROUND TANK ☒ e. PLASTIC/NONMETALLIC DRUM ☐ i. FIBER DRUM ☐ m. GLASS BOTTLE ☐ q. RAIL CAR
☐ b. UNDERGROUND TANK ☐ f. CAN ☐ j. BAG ☐ n. PLASTIC BOTTLE ☐ r. OTHER
☐ c. TANK INSIDE BUILDING ☐ g. CARBOY ☐ k. BOX ☐ o. TOTE BIN
☐ d. STEEL DRUM ☐ h. SILO ☐ l. CYLINDER ☐ p. TANK WAGON

STORAGE PRESSURE 224: ☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT

STORAGE TEMPERATURE 225: ☒ a. AMBIENT ☐ b. ABOVE AMBIENT ☐ c. BELOW AMBIENT ☐ d. CRYOGENIC

| | %WT | HAZARDOUS COMPONENT (For mixture or waste only) | EHS | CAS # |
|---|---|---|---|---|
| 1 | 65 (226) | Calcium Hypochlorite (227) | ☐ Yes ☒ No (228) | 7778-54-3 (229) |
| 2 | (230) | (231) | ☐ Yes ☐ No (232) | (233) |
| 3 | (234) | (235) | ☐ Yes ☐ No (236) | (237) |
| 4 | (238) | (239) | ☐ Yes ☐ No (240) | (241) |
| 5 | (242) | (243) | ☐ Yes ☐ No (244) | (245) |

**If more hazardous components are present at greater than 1% by weight if non-carcinogenic, or 0.1% by weight if carcinogenic, attach additional sheets of paper capturing the required information.**

ADDITIONAL LOCALLY COLLECTED INFORMATION 246

If EPCRA, Please Sign Here

**East Bay Municipal Utility District**
**Camanche North Shore Recreation Area**

## LIST OF AREA MAPS AND FACILITY DIAGRAMS

**Area Maps:**


**No. 1** **Vicinity Map**

**No. 2** **Site Map**


**Facility Diagrams:**


**No. 3** **North Shore Shop (Area B)**

**No. 4** **North Shore Store (Building C)**

**No. 5** **North Shore Office (Building D)**

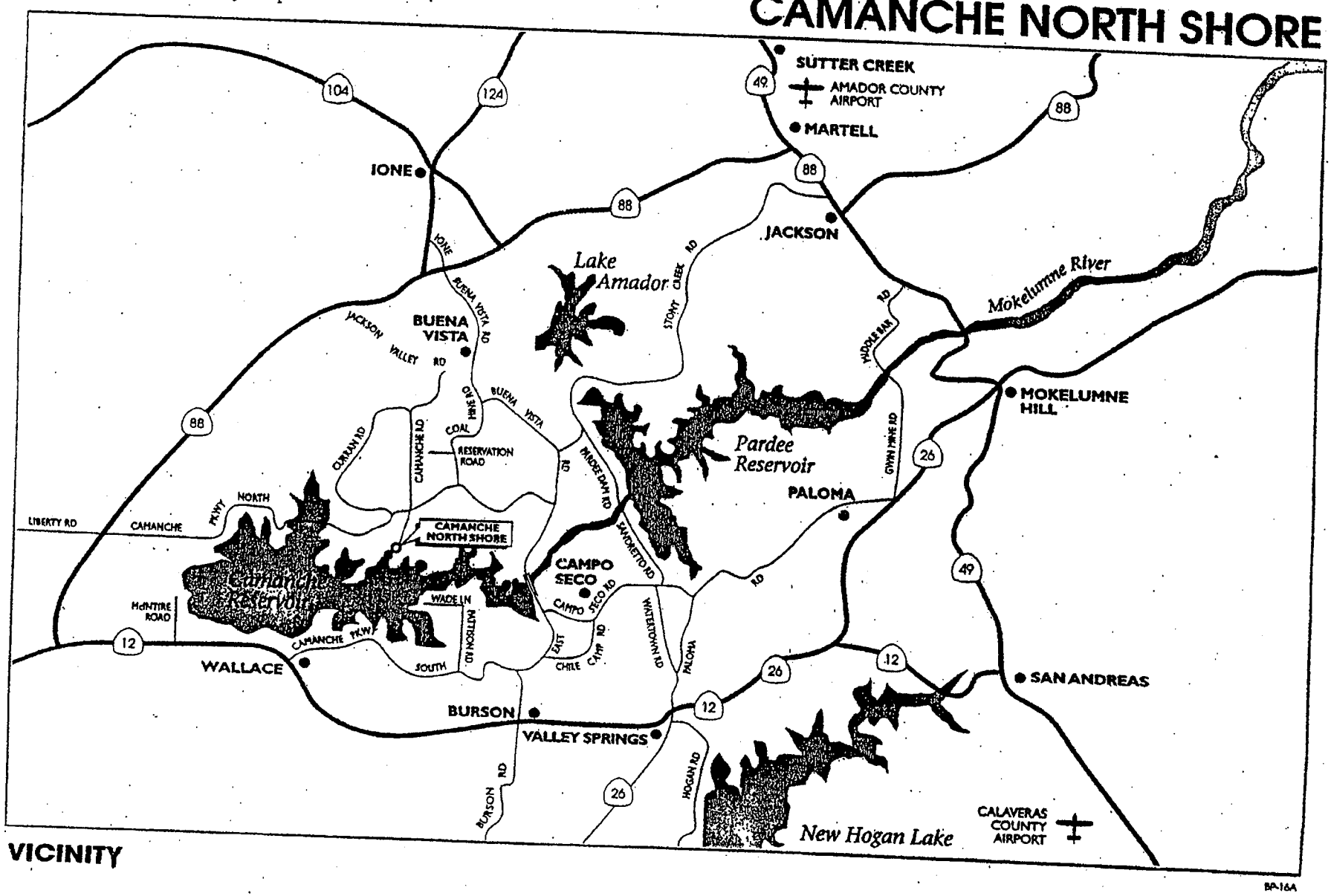
**No. 6** **North Shore Water Treatment Plant (Building E)**

**No. 7** **North Shore Mobile Home Park #1**

**No. 8** **North Shore Mobile Home Park #2**

**No. 9** **North Shore Rental Dock/Berth**

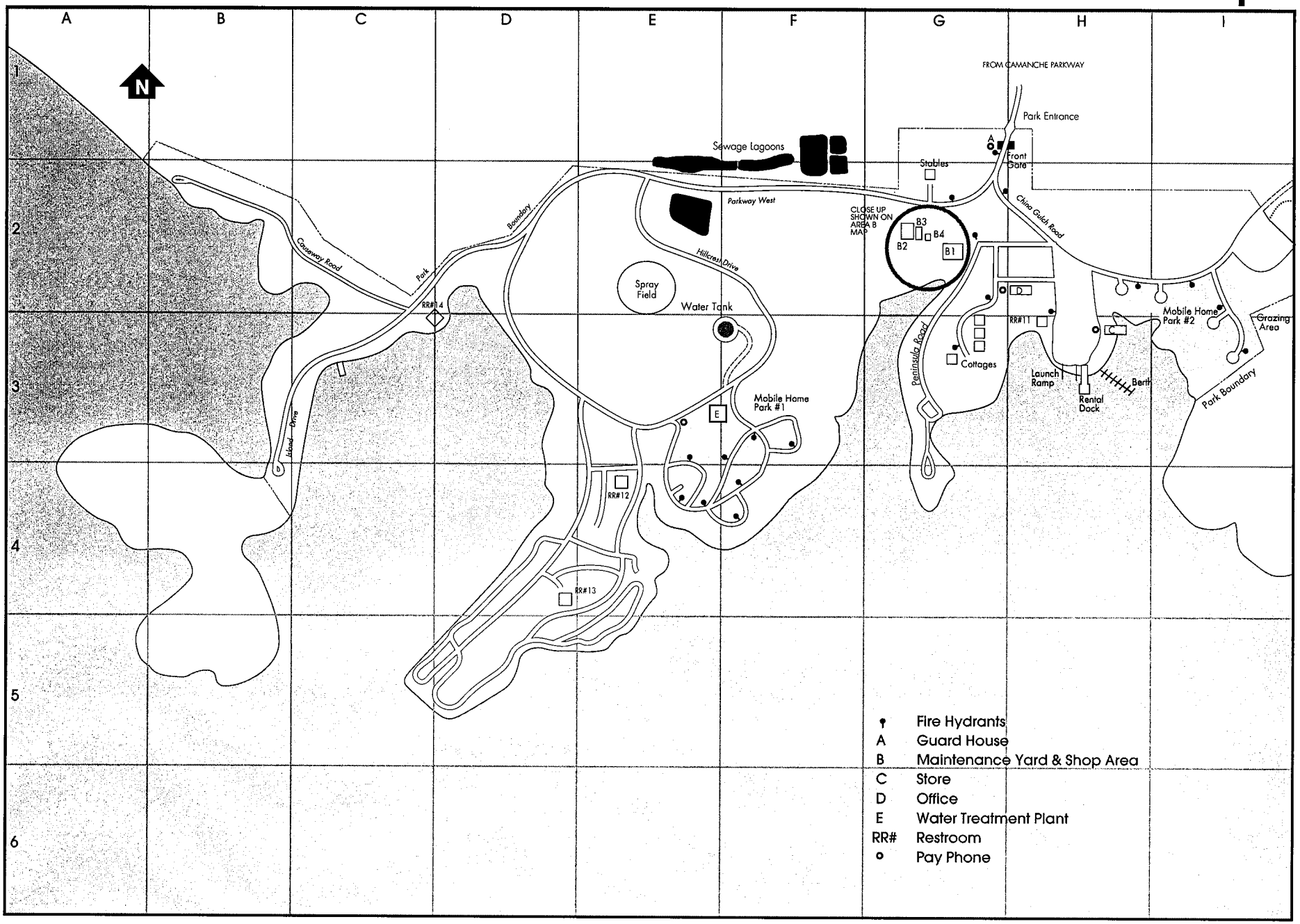
No. 1 - Vicinity Map



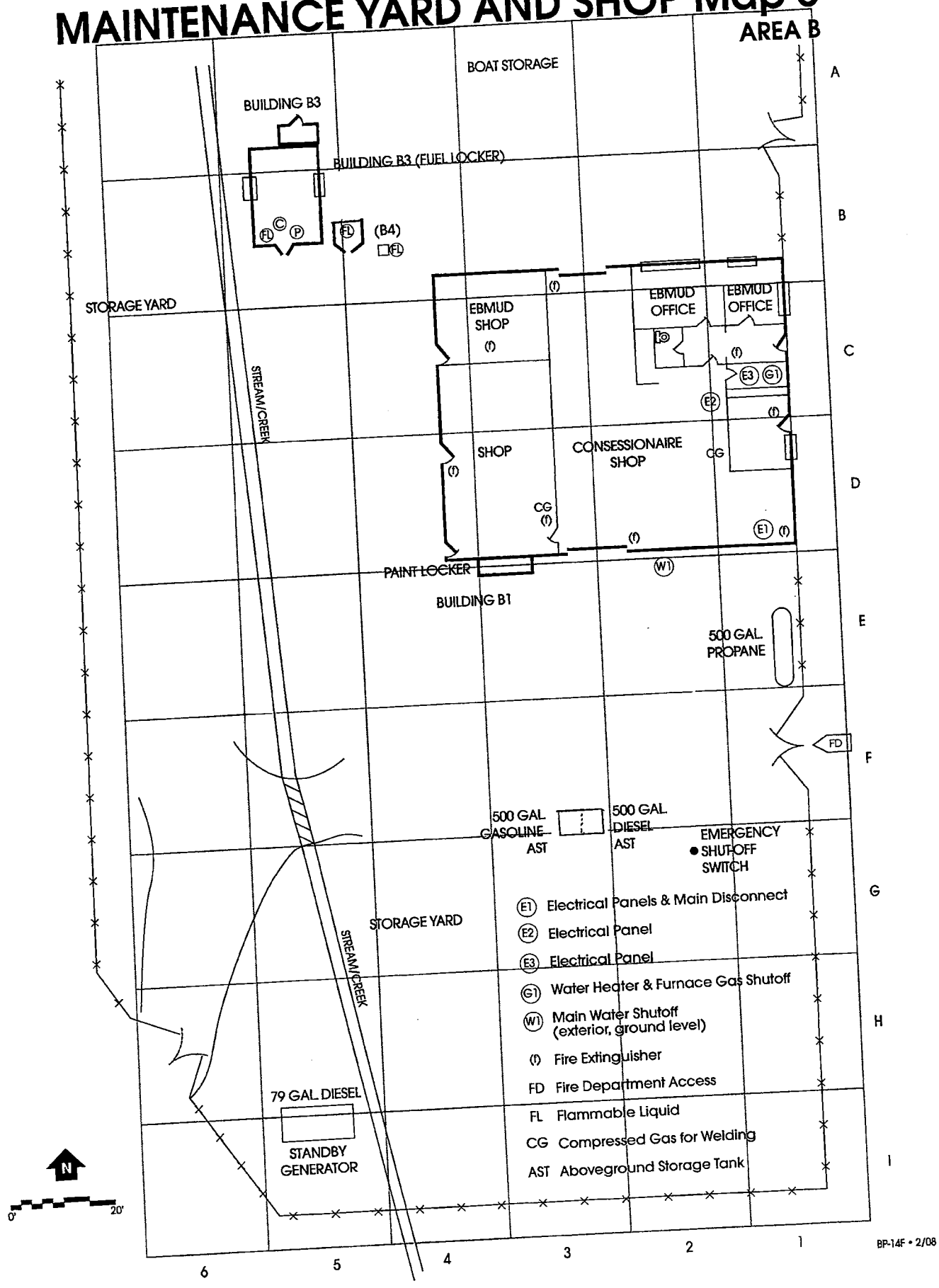

VICINITY

BA-16A

# CAMANCHE NORTH SHORE - Map 2



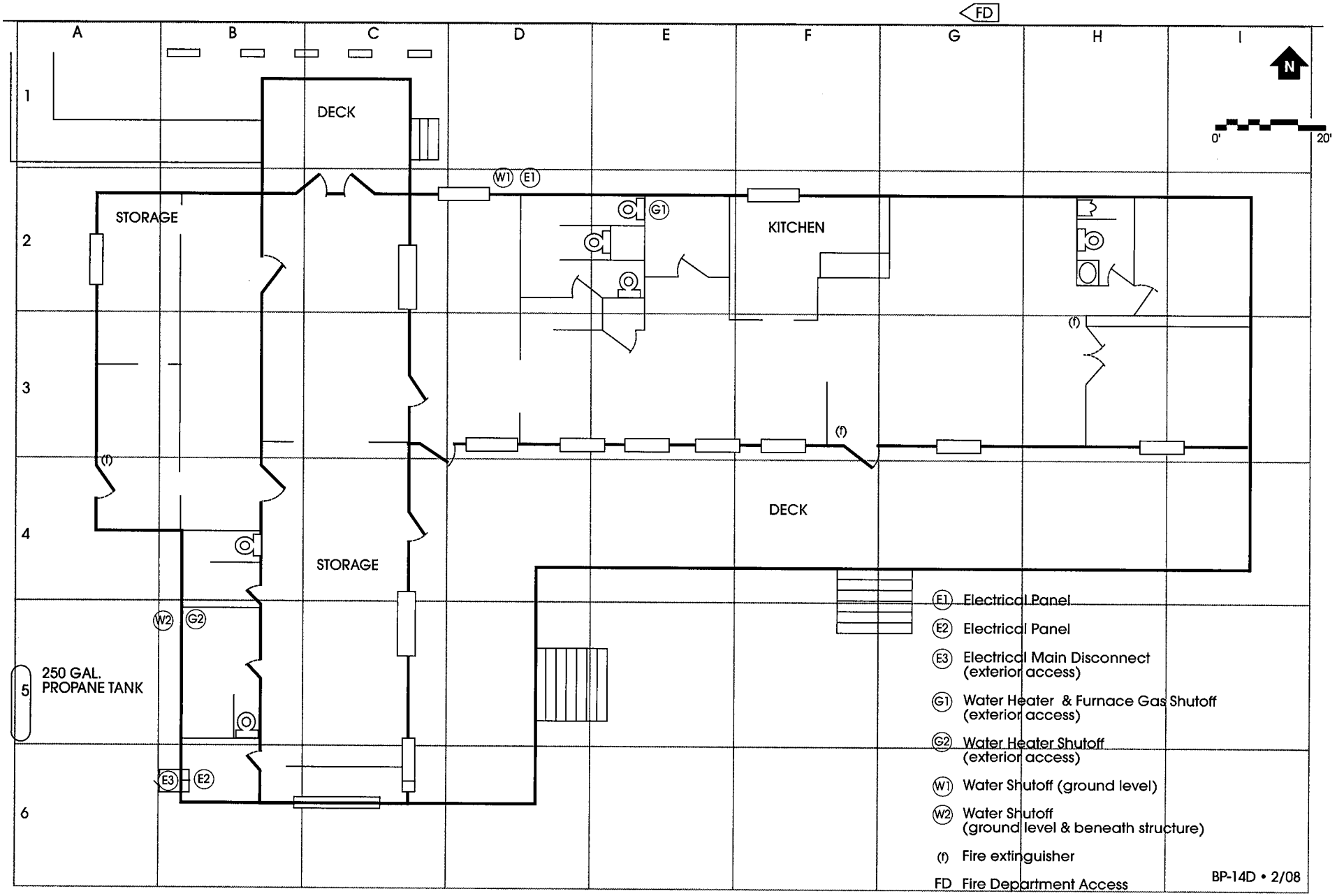
# CAMANCHE NORTH SHORE MAINTENANCE YARD AND SHOP Map 3




BP-14F • 2/08

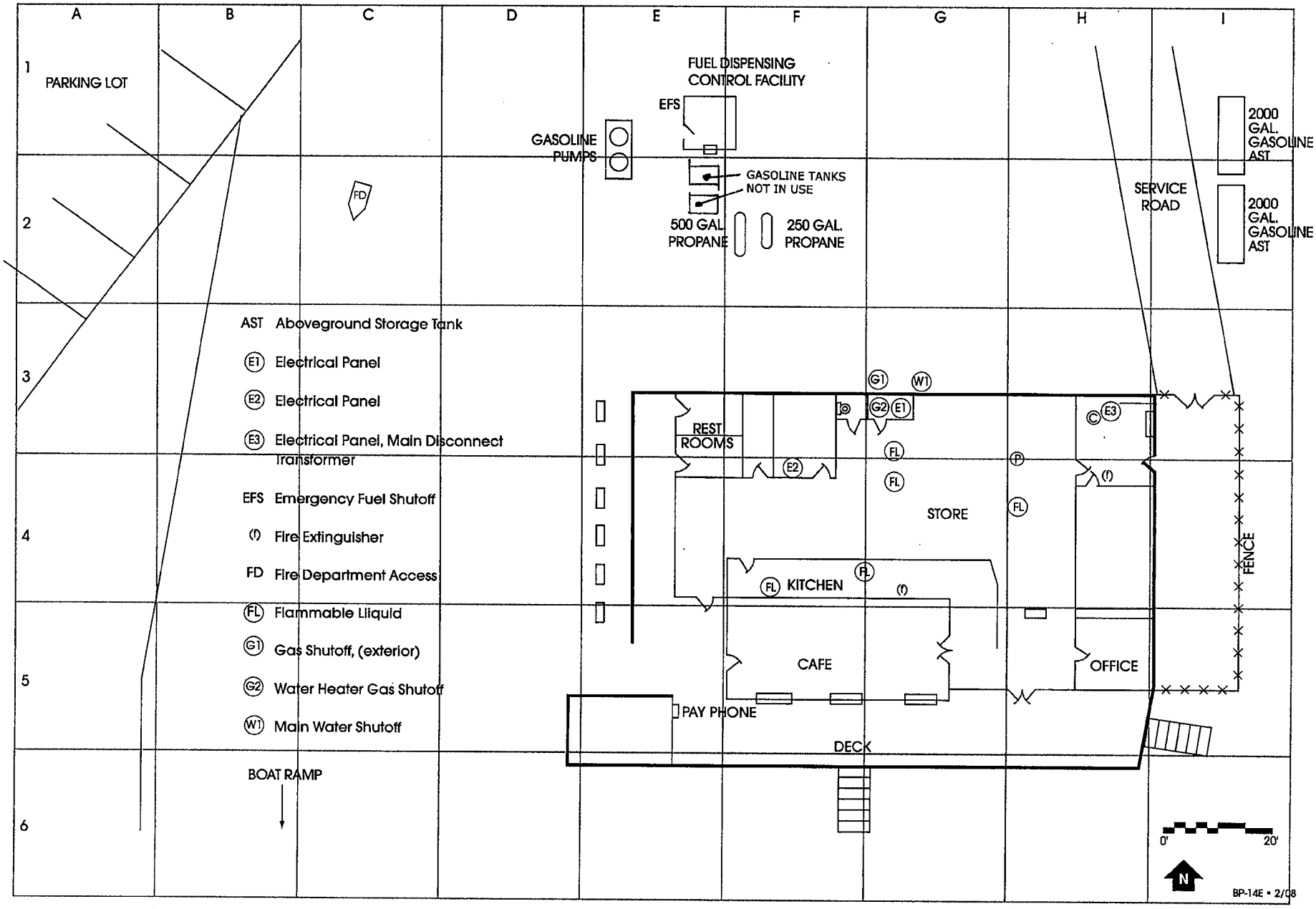
# CAMANCHE NORTH SHORE OFFICE - Map 5

## BUILDING D



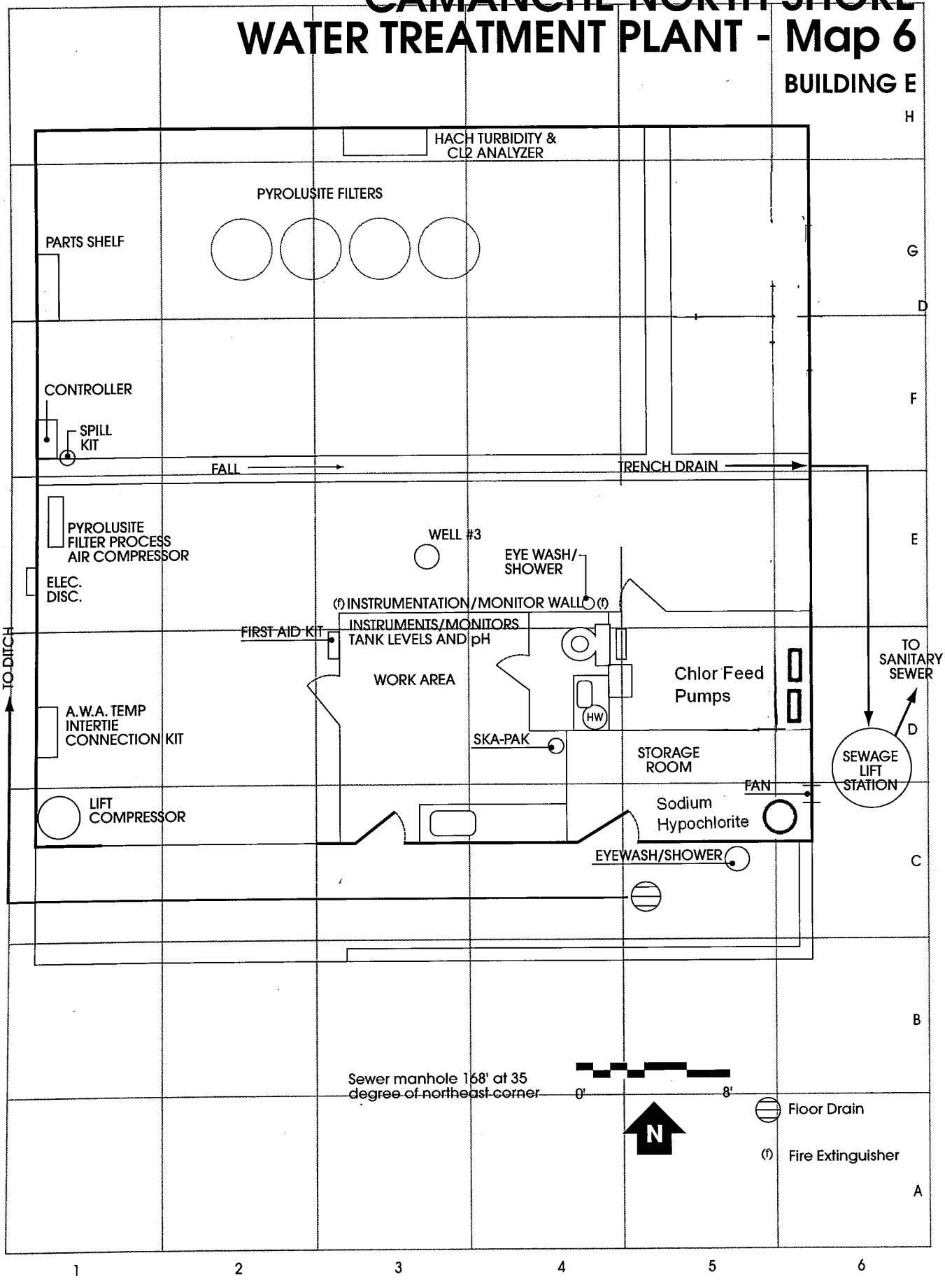
# CAMANCHE NORTH SHORE STORE - Map 4

## BUILDING C



# CAMANCHE NORTH SHORE WATER TREATMENT PLANT - Map 6

## BUILDING E

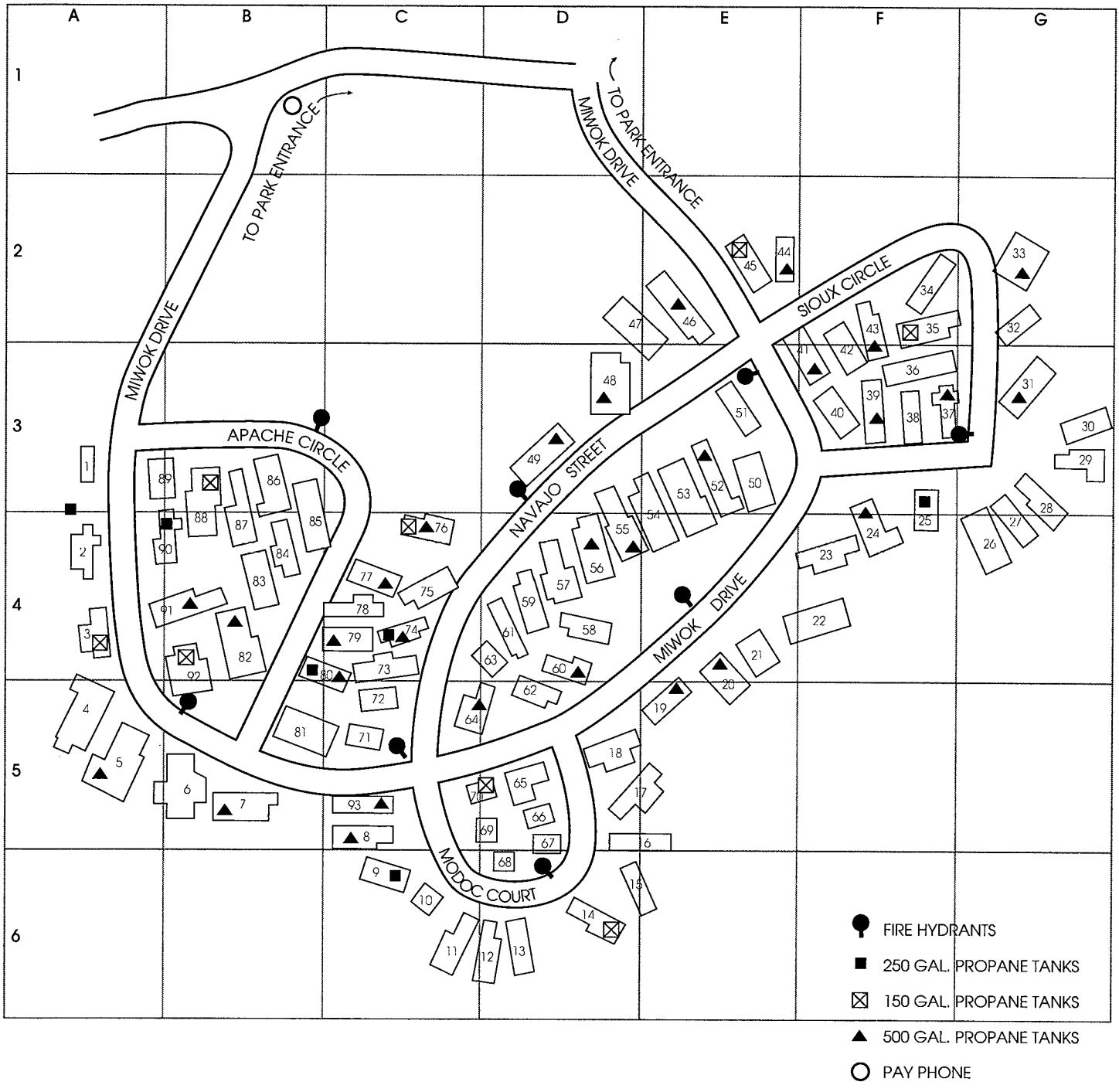



BP-14G•2/08

# CAMANCHE NORTH SHORE MOBILE HOME PARK #1 - Map 7

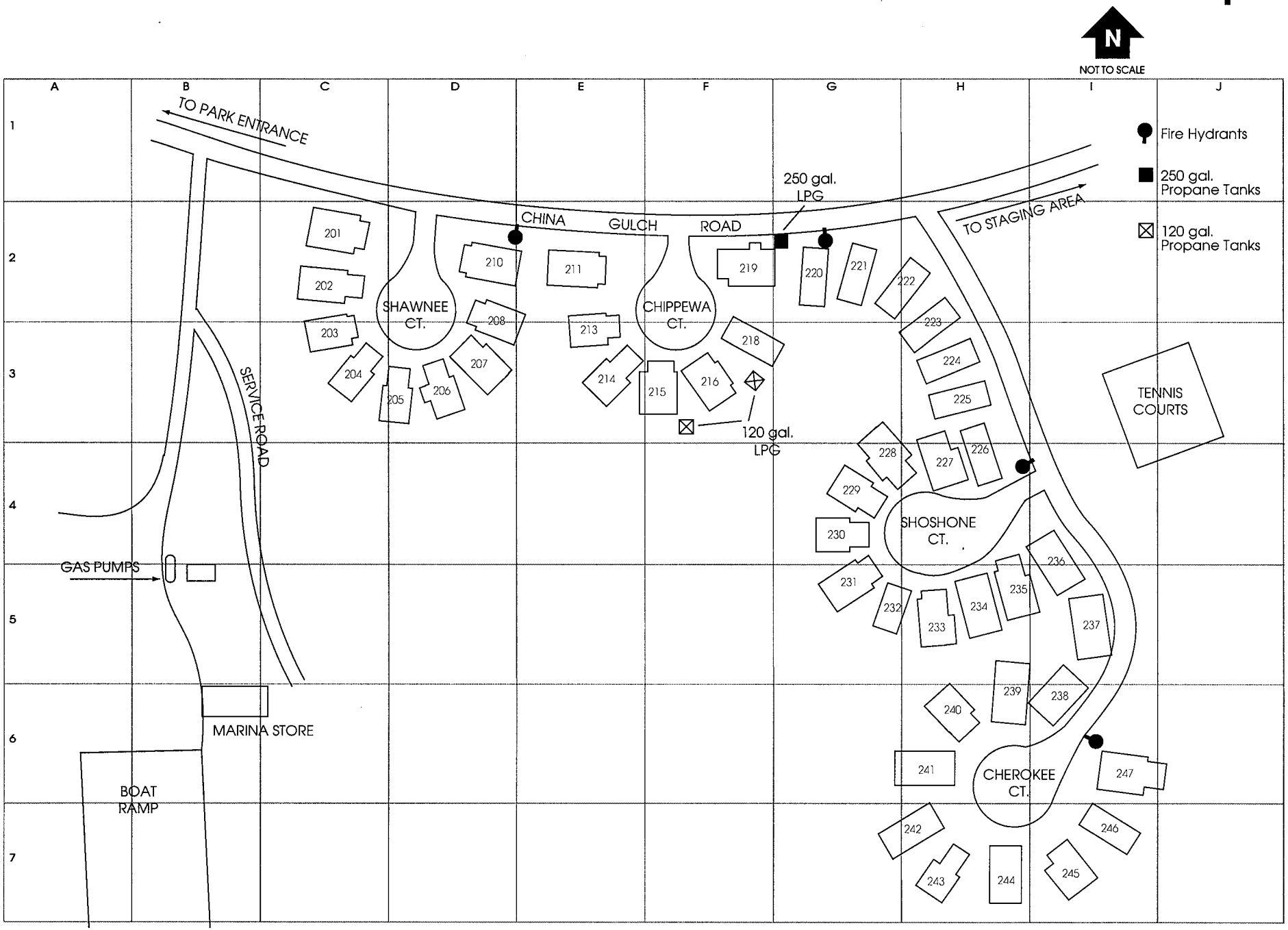
N

NOT TO SCALE



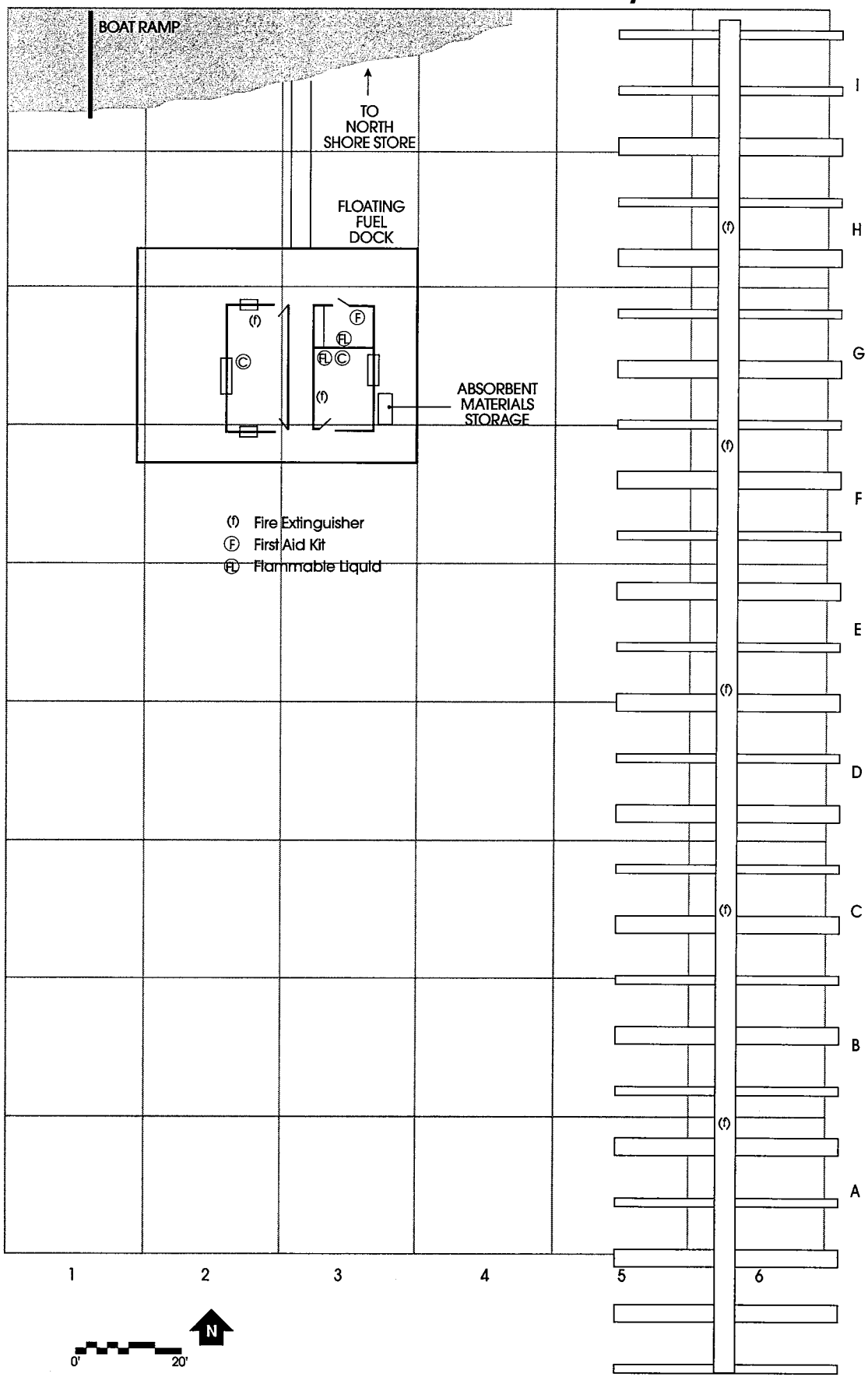

BP-14A

# CAMANCHE NORTH SHORE MOBILE HOME PARK #2 - Map 8




BP-14B

# CAMANCHE NORTH SHORE
# RENTAL DOCK/BERTH - Map 9




BP-14C•2/08