BOARD OF DIRECTORS
EAST BAY MUNICIPAL UTILITY DISTRICT

375 - 11th Street, Oakland, CA 94607 Office of the Secretary: (510) 287-0440

Notice of Time Change

PLANNING COMMITTEE MEETING
8:30 a.m.
Tuesday, April 10, 2018

Notice is hereby given that on Tuesday, April 10, 2018 the Planning Committee Meeting of the Board of Directors has been rescheduled from 9:15 a.m. to 8:30 a.m. The meeting will be held in the Training Resource Center of the Administration Building, 375 - 11th Street, Oakland, California.

Dated: April 5, 2018

Rischa S. Cole

Rischa S. Cole
Secretary of the District

W:\Board of Directors - Meeting Related Docs\Notices\Notices 2018\041018_planning_time_change.docx

BOARD OF DIRECTORS
EAST BAY MUNICIPAL UTILITY DISTRICT

375 – 11th Street, Oakland, CA 94607 Office of the Secretary: (510) 287-0440

AGENDA

Planning Committee
Tuesday, April 10, 2018
8:30 a.m.
Training Resource Center

(Committee Members: Directors Mellon {Chair}, Linney and Young)

ROLL CALL:

PUBLIC COMMENT: The Board of Directors is limited by State law to providing a brief response, asking questions for clarification, or referring a matter to staff when responding to items that are not listed on the agenda.

DETERMINATION AND DISCUSSION:

1.	Earthquake Preparedness	(Chan)
2.	Earthquake Preparedness – HayWired Report Update	(X. Irias)
3.	Regulatory Compliance Semi-Annual Report – September 2017 through March 2018	(Chan)
4.	Water Quality Program Semi-Annual Update	(Briggs)
5.	2017 Mokelumne Fall-run Chinook Salmon and Steelhead Returns	(Sykes)
6.	Annual Recreation Report - 2017	(Sykes)

ADJOURNMENT:

Disability Notice

If you require a disability-related modification or accommodation to participate in an EBMUD public meeting please call the Office of the Secretary (510) 287-0404. We will make reasonable arrangements to ensure accessibility. Some special equipment arrangements may require 48 hours advance notice.

Document Availability

Materials related to an item on this Agenda that have been submitted to the EBMUD Board of Directors within 72 hours prior to this meeting are available for public inspection in EBMUD's Office of the Secretary at 375 11th Street, Oakland, California, during normal business hours, and can be viewed on our website at www.ebmud.com.

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: April 5, 2018

MEMO TO: Board of Directors

THROUGH: Alexander R. Coate, General Manager ARC

FROM: Clifford C. Chan, Director of Operations and Maintenance BF for CC

SUBJECT: Earthquake Preparedness

INTRODUCTION

The District maintains an active Emergency Preparedness Program that includes an Emergency Operations Plan (EOP) in accordance with Policy 7.03 – Emergency Preparedness/Business Continuity. The plan guides the District's critical emergency operations to protect people, property, and the environment, and is regularly updated as new information is gathered. In April, Earthquake Preparedness Month, the United States Geological Survey (USGS) will issue a new report focused on the potential impacts of a large 7.0 earthquake on the Hayward fault. An update on District emergency preparedness efforts and the USGS report will be presented at the April 10, 2018 Planning Committee meeting.

DISCUSSION

The District's Strategic Plan includes a strategy to maintain an active emergency preparedness program to manage the District's functions and allow for efficient and effective recovery following an emergency. Key Performance Indicators in the Strategic Plan (KPIs) include updating the EOP every two years, conducting an annual Emergency Operations Team (EOT) exercise, updating Business Continuity Plans (BCPs) every two years, and preparing or updating two to three event-specific emergency communication plans annually. These KPIs will be met in Fiscal Year 2018.

The District continues to harden and improve the resiliency of its infrastructure, develop response plans, and conduct exercises to prepare for future earthquakes. Studies by the District and USGS indicate a large earthquake can cause thousands of main breaks and damage District facilities, which can disrupt water service for months. Given those results, staff engaged cities and counties in the service area to plan for disruption of water service following an earthquake. The goals are to support city and county planning to distribute potable water, provide resources and support as available until state or federal agencies establish mass care systems, and prepare for coordination of water system recovery. This effort will continue in Fiscal Year 2018.

A major event such as an earthquake can require significant resources for response. The event can also reduce the District's resources due to impacts to employee's homes and families. In this case, the District has mutual assistance agreements in place to obtain resources from other water and wastewater utilities. Staff regularly engages mutual assistance partners to ensure those resources will be available when needed. The District, Las Vegas Valley Water District, and Los Angeles Department of Water and Power have a mutual assistance agreement. The agencies conducted an emergency preparedness workshop in Las Vegas on February 1, 2018 and will conduct a more extensive exercise in Los Angeles in August 2018.

CCC:sd

I:Sec\2018 Board Related Items\Info Memos 2018\041018_InfoMemos\ OMD_04_10_18 Earthquake Preparedness.docx

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: April 5, 2018

MEMO TO: Board of Directors

THROUGH: Alexander R. Coate, General Manager

FROM: Xavier J. Irias, Director of Engineering and Construction

SUBJECT: Earthquake Preparedness – HayWired Report Update

INTRODUCTION

The United States Geological Survey (USGS) will publish their HayWired Report (Report) on April 18, 2018, as part of Earthquake Preparedness Month. The Report focuses on multiple impacts to Bay Area infrastructure and businesses, including the water distribution systems of study participants EBMUD and San Jose Water Company, following a hypothetical magnitude 7.0 earthquake on the Hayward Fault. The Planning Committee received a Report update on April 6, 2017. The USGS has since, with the District's assistance, reviewed and completed the portions of the Report pertaining to water distribution systems. Staff will present an overview of the Report at the April 10, 2018 Planning Committee meeting.

DISCUSSION

The USGS undertakes disaster scenario modeling in order to promote discussion, preparedness, and policy change in advance of natural disasters. The Report is an earthquake scenario for a hypothetical, yet scientifically realistic, magnitude 7.0 earthquake on the Hayward Fault, with an epicenter in the City of Oakland. In this scenario, both the northern and southern segments of the Hayward Fault (approximately 52 miles) rupture and strong ground shaking affects the surrounding areas. The quake impacts the greater Bay Area, but the cities of Richmond, Berkeley, Oakland, San Leandro, Hayward, and Fremont experience the most ground shaking and surface fault ruptures. This scenario predicts 800 deaths, 16,000 non-fatal injuries, $30 billion in fire damage, and $82.6 billion in property damage and business losses.

The District provided considerable assistance to the USGS and their academic team to develop the science and predictive model used to estimate damage and repair timeframes for the District's water distribution system following the hypothetical earthquake, associated infrastructure and lifeline disruptions. The model predicts 5,500 breaks and leaks as a result of both the main shock and a series of aftershocks, mostly on older and more brittle cast iron and asbestos cement pipes, and in areas of poor soils and high pipe network density. Given the large scale ground movement and area-wide disruption, including transportation, energy, fuel, and other commodities, the model predicts it would take over six months to restore 100 percent of the damaged water mains.

The scenario predicts the average East Bay resident would be without water service for six weeks, during which time drinking water would be available only at neighborhood distribution centers. The number of breaks and leaks from the main shock event is consistent with the results previously estimated in the District's past studies. The scenario's repair time estimate focuses solely on water main repairs and does not consider destruction of structures, which could reduce the scope of water service restoration needs in the short-term.

The District has always been committed to earthquake preparedness and hazard mitigation. In 1995, the District launched its 10 year, $189 million Seismic Improvement Program (SIP) to retrofit facilities and reduce earthquake impacts on the water system. The program was the first of its kind in the Bay Area, and included seismic upgrades to 13 building structures, 70 storage reservoirs, 130 pumping plants, 5 water treatment plants, and 56 pipeline fault crossings. Several large diameter pipelines were upgraded to improve the resilience of the District's water system, which included critical pipelines in areas of landslides and liquefaction. Specifically, the SIP included the Claremont Tunnel Seismic Upgrade and Southern Loop Pipeline Projects, as well as improving approximately 60 fault crossings to provide resilience and redundancy across the Hayward Fault.

The District continues to improve network resilience and water system reliability after a major earthquake through its Large Diameter Pipeline Replacement and Pipeline Rebuild Programs. As part of these efforts, the District is relocating critical large diameter transmission mains that cross the Hayward Fault, increasing the replacement of the highest-risk small diameter pipes with more earthquake-resilient pipe, and developing programs to further improve the reliability of its service to critical customers and emergency preparedness outreach to cities and counties. The Report provides the District with additional tools to further guide capital programs and risk reduction efforts.

ARC:XJI:rhm

Attachment: Draft USGS HayWired Fact Sheet

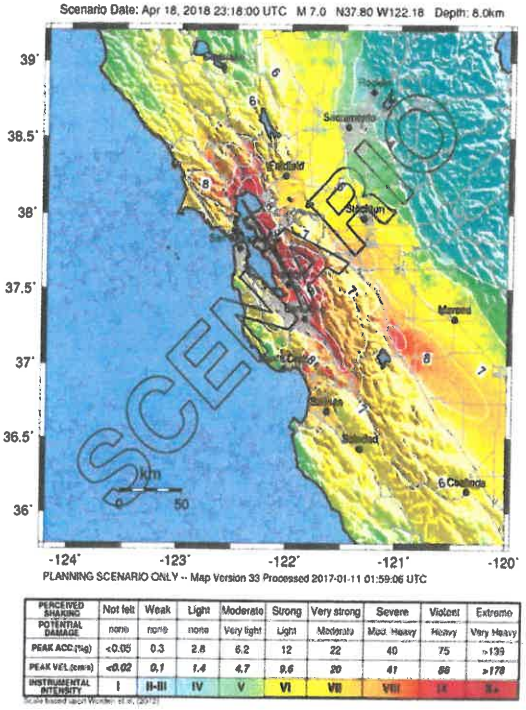
USGS
science for a changing world

HAYWIRED
OUTSMART DISASTER

Outsmart Disaster - The HayWired Earthquake Scenario

The HayWired Scenario is a hypothetical yet scientifically realistic depiction of a magnitude (M_w) 7.0 earthquake occurring on April 18, 2018, at 4:18 p.m. on the Hayward Fault in the east bay part of the San Francisco Bay area, California. The earthquake in this scenario has its epicenter in Oakland, and its resulting strong ground shaking causes a wide range of severe impacts throughout the greater Bay Area. The Hayward Fault ruptures along its length for 83 kilometers (about 52 miles). The East Bay cities of Richmond, Berkeley, Oakland, San Leandro, Hayward and Fremont would be hit hardest by shaking, surface fault rupture, aftershocks and fault afterslip, but the impacts would reach throughout the Bay Area and far beyond. The scenario includes an estimated eight hundred deaths and 16,000 non-fatal injuries. Not considering potential for fires following the earthquake, total property damage and business disruption loss is estimated at $82.6 billion. Additional fire damage increases the total losses by $30 billion. Recovery is expected to take two decades, but mitigation measures taken beforehand can reduce damage, shorten recovery and reduce human suffering and losses. With these benefits and a proactive approach in mind, the HayWired Scenario is offered to help guide risk reduction efforts.

The 1868 Hayward Fault (below, right), 1906 San Francisco earthquake and 1989 Loma Prieta earthquake each motivated residents of the San Francisco Bay Area to build counter-measures to earthquakes into the fabric of the region. Since Loma Prieta, Bay Area communities and utilities have invested tens of billions of dollars in seismic upgrades, retrofits and replacements of older buildings and infrastructure. Innovation and state-of-the-art engineering, informed by science, including novel seismic hazard assessments, have been applied to the challenge of increasing seismic resilience throughout the Bay Area. As long as people live and work in seismically vulnerable buildings or rely on seismically vulnerable transportation and utilities, however, more work remains to be done. The HayWired Scenario is the latest in a series of like-minded efforts to bring a special focus onto the impacts when the Hayward Fault again ruptures through the east side of the San Francisco Bay as it last did in 1868. Building on a decades-long series of efforts to reduce earthquake risk in the San Francisco Bay region, this carefully simulated earthquake, and its many cascading impacts and consequences included in the HayWired Scenario, are used to re-examine the well-known earthquake hazard of the Hayward Fault, with a focus on business & lifeline vulnerabilities. Together, we can Outsmart Disaster.



U.S. Geological Survey ShakeMap of the San Francisco Bay region, California, showing instrumental intensity (estimated Modified Mercalli Intensity) for the hypothetical magnitude-7.0 mainshock of the HayWired earthquake scenario on the Hayward Fault (Modified from Aagaard, Boatwright, and others; modified from U.S. Geological Survey, 2014).

The Hayward Fault threatens more than 7 million people, approximately two million buildings, the region's and the Nation's economies, and dozens of major infrastructure lifelines including freeways and tunnels, pipelines, aqueducts, electric substations, electric-transmission and distribution lines, phone lines and fiber-optic routes, and rail lines. The surface trace of the Hayward Fault runs beneath the foundations of more than 300 buildings, including the University of California in Berkeley's football stadium, which has been extensively seismically retrofitted. Preparing for the next large, damaging earthquake in the Bay Area is not an insurmountable task, and governments, critical infrastructure managers and providers, businesses, and residents have already taken enormous strides toward that goal.

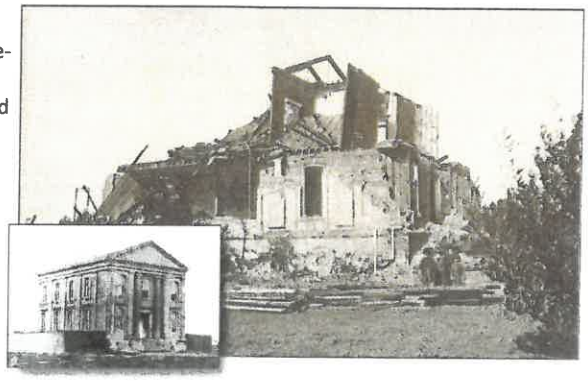


Figure 3. Photograph showing shaking damage from the 1868 magnitude-6.8 Hayward Fault earthquake, which caused collapse of the Alameda County Courthouse in San Leandro, California (photograph courtesy of the Bancroft Library, University of California, Berkeley). Inset shows the same building before the earthquake (photograph courtesy of courtesy of San Leandro Public Library).

Fact Sheet 2018-XXXX
April 2018

Objectives of the HayWired scenario are to:

(1) improve the communication and use of earthquake-hazard science in decision-making,
(2) advance basic knowledge of earthquake risks and to inform actions to reduce earthquake risks, and
(3) help build community capacity to respond to and recover from earthquakes.

The HayWired scenario may be especially informative to young people in the San Francisco Bay region, many of whom were not yet born or have no memory of the Loma Prieta earthquake, as well as newcomers to the region. It is hoped that the HayWired scenario will energize new efforts and a next generation of proponents and champions acting along a line of purposeful, thoughtful, and responsible action, similar to earlier efforts, to help the bay region prepare for its next large earthquake.

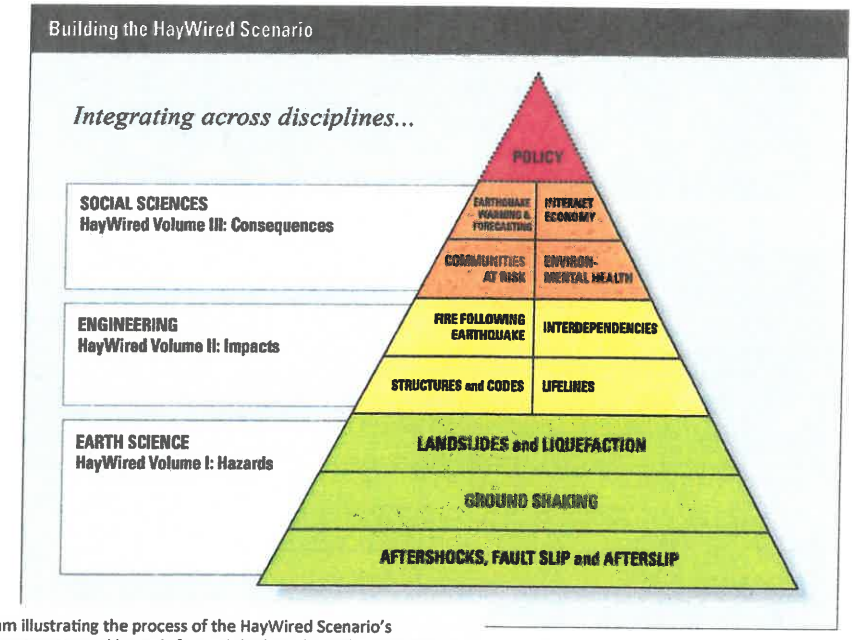


Diagram illustrating the process of the HayWired Scenario's construction. Natural hazards formed the base (green), engineering impacts the middle (yellow), and economic and social consequences the upper portion (orange). These parts are intended to then ultimately and collectively support better-informed policy development (red).

With scenarios, we provide a highly detailed and scientifically plausible picture of what will happen before it happens. The more the community engages in this process, the more detailed and accurate the scenario becomes. The community is able to see their interconnections, interdependencies, and vulnerabilities and make better decisions on how to address them. Similar to previous U.S. Geological Survey (USGS) Science Application for Risk Reduction project (SAFRR) led scenarios, the HayWired Scenario earthquake is a natural-hazards incident, with additional cascading hazards of fault rupture, aftershocks (subsequent earthquakes), afterslip (subsequent movement on a fault), landslides, liquefaction (soils becoming liquid-like during shaking), and fire following earthquake (potentially widespread fires triggered by an earthquake) that can be as destructive and disruptive as powerful ground shaking in the mainshock. For the earthquake scenario, damages are calculated using engineering best practices combined with new basic research into building-code performance objectives, urban search and rescue, interactions between lifelines, self-protective actions, and other topics.

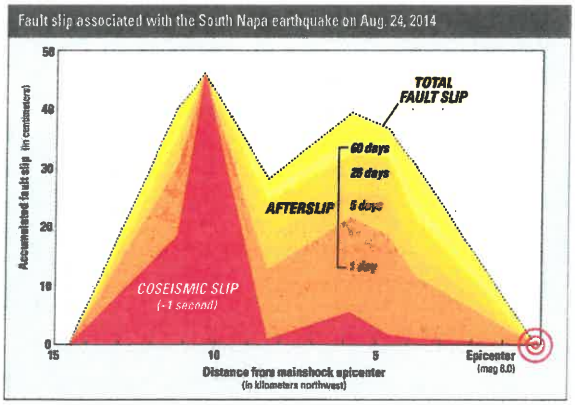
The HayWired Scenario is being done at a time when the economy of the San Francisco Bay region is healthy & thriving. Strong economic growth comes with strains on infrastructure, affordable housing shortages, and more pronounced income disparities. Although the strength of the bay region's economy is an asset in building more resilient infrastructure and communities, emerging issues increase the region's vulnerability to an earthquake, and these issues need attention. It is time to update earthquake scenarios for the San Francisco Bay region to leverage new knowledge, capabilities, and developments. Some new key themes extend previous scenario analyses to enhance collaborations with traditional audiences and to target new audiences to help increase the region's resilience in a natural disaster. The HayWired Coalition has completed more than one year of intensive partner engagement through workshops, meetings and exercises to formulate input to the scenario as well.

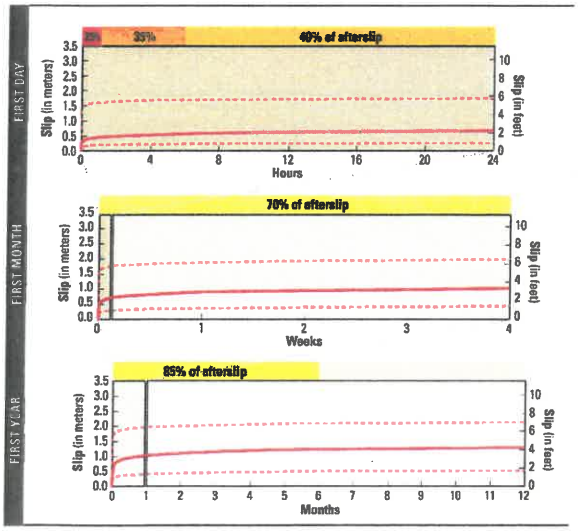
HayWired Coalition Partners

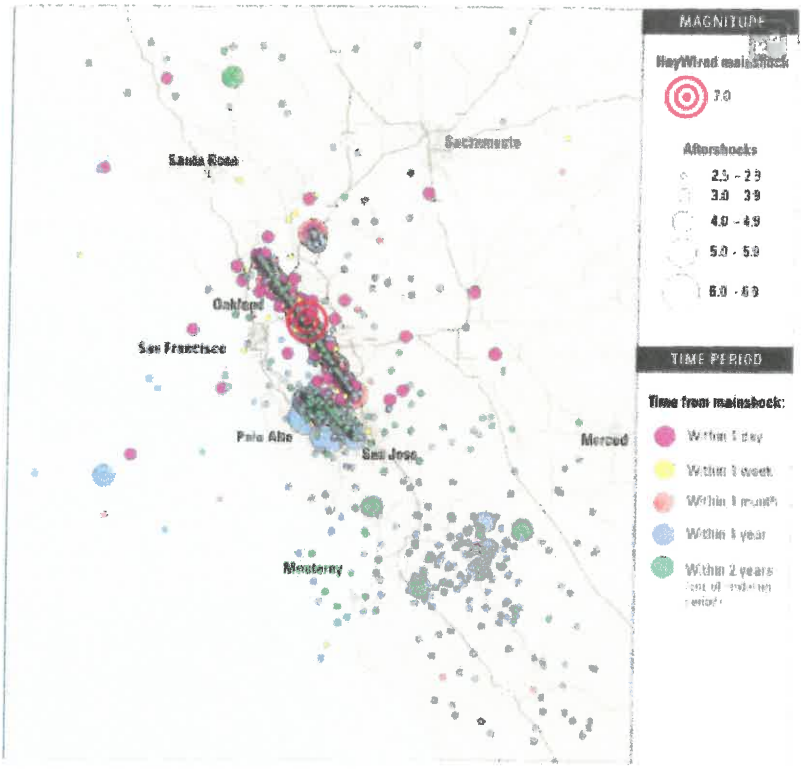
ARUP—Design and Engineering Consultants
Association of Bay Area Governments
Aurecon
Bay Area Center for Regional Disaster Resilience
Bay Area Rapid Transit Authority
Boston University
California Department of Public Health
California Department of Transportation
California Earthquake Authority
California Earthquake Clearinghouse
California Geological Survey
California Governor's Office of Business and Economic Development
California Governor's Office of Emergency Services
California Public Utilities Commission
California Resiliency Alliance
California Seismic Safety Commission
Carnegie Melon University Silicon Valley
City of Berkeley
City of Oakland
City of San Francisco, Department of Emergency Management
City of Walnut Creek
Earthquake Country Alliance
Earthquake Engineering Research Institute
East Bay Municipal Utilities District
Federal Emergency Management Agency
Joint Venture Silicon Valley
Laurie Johnson Consulting
MMI Engineering
Pacific Earthquake Engineering Research Center
Pacific Gas and Electric
Red Cross
Rockefeller Foundation—100 Resilient Cities
San Jose Water Company
Southern California Earthquake Center
SPA Risk LLC
San Francisco Bay Area Planning and Urban Research Association
Strategic Economics
Structural Engineers Association of Northern California
University of California Berkeley Seismological Laboratory
University of Colorado Boulder
University of Southern California
U.S. Geological Survey

Scientists have documented a series of prehistoric earthquakes on the Hayward Fault, and are confident that the threat of a future earthquake as depicted in the HayWired Scenario is real and could happen at any time. The team assembled to examine this scenario has brought innovative new approaches to examining the natural hazards, impacts and consequences of such an event. The earthquake would be accompanied, as well, by widespread liquefaction and landslides, which are treated in greater detail than ever before. The team also considers how the now-prototype ShakeAlert earthquake early warning system could provide useful public alerts, for example by slowing the BART trains that carry about 360,000 passengers per day before strong shaking arrives.

Scientific Investigations Report 2017-5013 and accompanying data releases are products led by the U.S. Geological Survey (USGS), but this body of work was created through the efforts of a large team including partners who have come together to form the HayWired Coalition. More than a full year of intensive partner engagement, beginning in April 2017, is being directed toward producing the most in-depth look ever at the impacts and consequences of such an event. With the HayWired Scenario, our hope is to encourage and support the active ongoing engagement of the entire Bay Area community by providing the scientific, engineering, economic and social science inputs for use in exercises and planning well into the future by the HayWired Coalition partners.





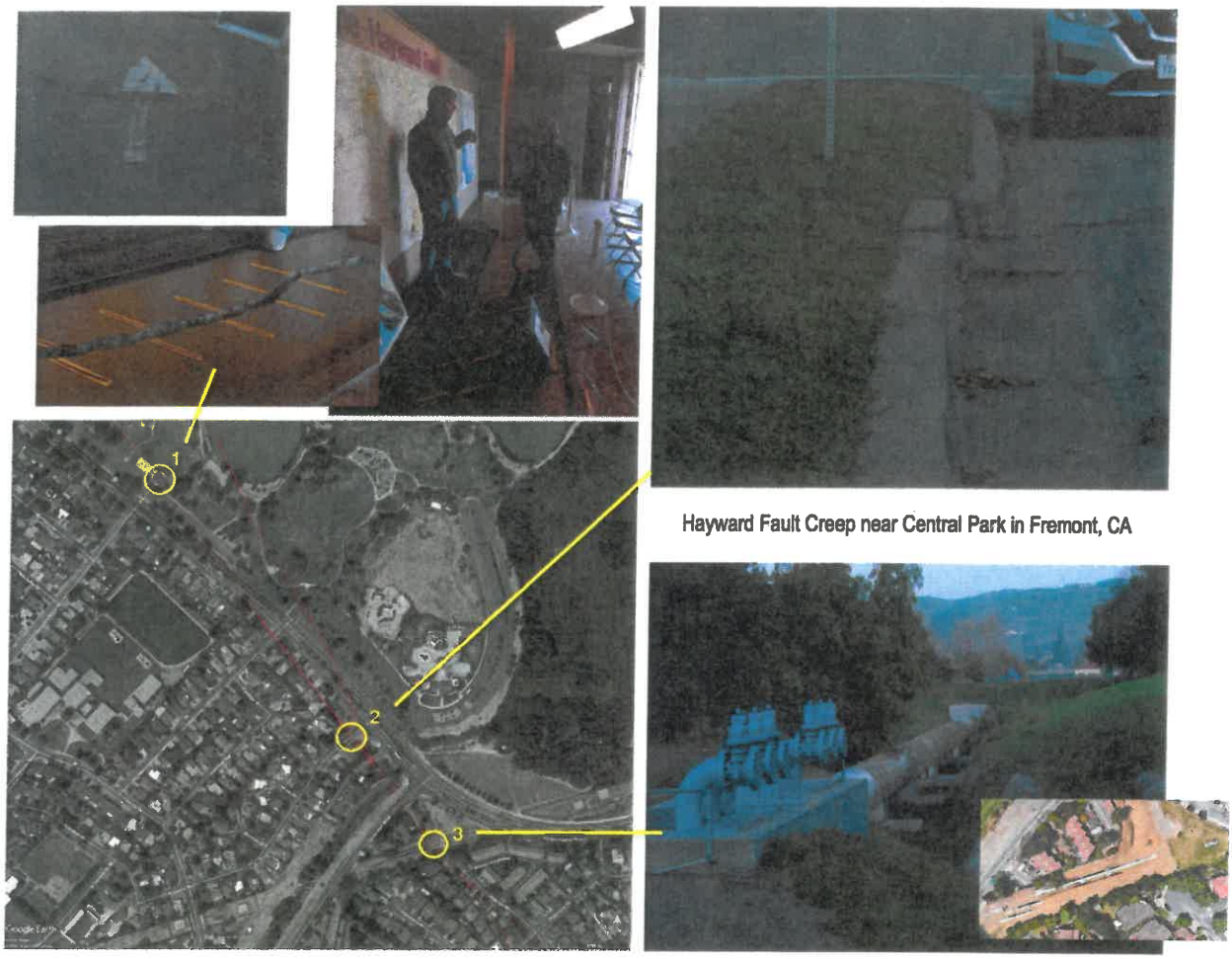


Map showing aftershocks simulated to occur as part of the HayWired Scenario. Although most aftershocks occur on the Hayward Fault, some are off-fault, for example two large late aftershocks that would produce damage in Silicon Valley near San Jose and Palo Alto.

Fault slip and afterslip associated with the South Napa earthquake (upper panel) from J. Lienkaemper, USGS. At the time of the earthquake, slip shown in red occurred. Later, afterslip shown in orange to yellow increased the slip along the fault, rapidly over the next several days, and slowing down over the next several months to years. During a future Hayward Fault earthquake, it is expected that fault slip will occur immediately, and that then afterslip will occur, increasing the offset of building foundations, lifelines, and other infrastructure over the hours, weeks and months after the earthquake (lower three panels). Red in both the upper and lower panel shows that within the first few hours, about 25% of the total slip occurs. Within the next several hours, 35% of the total slip occurs (dark orange), and 40% within the first day. Over the next 4 weeks, fault slip would reach about 70% of the total (yellow), and finally over the first 6 months about 85% of the total slip can be expected to accumulate. Afterslip prolongs disruption, and if not taken into account, afterslip can require repeated repairs. Afterslip can be forecasted, as done for the South Napa earthquake, which helped homeowners decide when to make their repairs.

Why the Name HayWired?—Internet and Interconnectedness

The scenario's name, HayWired, refers to the rupture of the Hayward Fault and speaks to the potential disruption to our wired and wireless world. California has not experienced a large earthquake in an urban environment since our society, culture, and economy have become intertwined with the Internet. Experience in recent Japan (2011 magnitude-9.1 Tohoku) and New Zealand (2011 magnitude-6.2 Christchurch) earthquakes suggest that Internet service outages tend to be localized and coinciding in duration with the loss of power service. Although designed to be robust because of its redundancy, the Internet is not immune to performance problems. More generally, "wired" represents interconnectedness at many levels—the interconnectedness of seismicity evidenced by afterslip and aftershocks, interdependencies of lifelines, social connectivity through technology (including earthquake early warning), and ripple effects of damages and disruption throughout an economy, encompassing especially the modern digital economy. The HayWired theme is particularly appropriate for the San Francisco Bay region, which is home to Silicon Valley and to world leaders in technology and digital communications.



Hayward Fault Creep near Central Park in Fremont, CA

The Hayward Fault is among the most urban, active and dangerous faults in America. Because it passes underneath housing developments and critical lifeline infrastructure crossings, seismic retrofits have been required to reduce risk and ensure seismic safety. Near Central Park in Fremont, California, several examples are shown of active motion on the fault and earthquake counter-measures, that is, actions that have already been taken to reduce disruption from a future earthquake like the one depicted in the HayWired Scenario. Above, in the satellite image (lower left), three locations are indicated for photos clockwise from upper left; 1) fault creep has offset the head of the painted arrow to the right from its shaft (cracks in the asphalt mark the fault, which passes from left to right), and the floor of a building has also been offset by creep at a rate of about 5 millimeters per year at this site, 2) at Rockett Drive, near its intersection with Paseo Padre Parkway, this street curb has been offset to the right by ongoing fault creep, and 3) where a water main operated by San Francisco Public Utilities Commission crosses the Hayward Fault, it has been retrofitted with sliders to accommodate fault motion, and shut off valves to allow for rapid repairs in case of sudden, large fault slip or shaking damage. This water pipeline is only one of many such examples along the Hayward Fault. The Claremont Tunnel has similarly already been fixed by the East Bay Municipal Utility District to accommodate fault slip without disrupting water supply. Despite these improvements to strengthen water supply transmission lines, other aspects of the existing water system, such as the distribution lines, remain vulnerable to earthquake shaking. In the HayWired Scenario report, this has been assessed and damage to water systems are also important for fire following earthquake, a topic also analyzed in the report; both are in volume two.

Extraordinary Investment in Earthquake Resilience Already Accomplished

Earthquake scenarios and seismic-resilience efforts are not new to the San Francisco Bay region (see the appendix for background on previous initiatives and accomplishments). All told, the bay region has invested at least $25 billion (Association of Bay Area Governments, 2014a), and reportedly as much as $50 billion (KQED, 2014), in earthquake countermeasures since the 1989 magnitude-6.9 Loma Prieta earthquake, strengthening potential points of failure in buildings and infrastructure. Concurrently, local and regional organizations have started to confront many of the complex, interrelated societal issues that can limit resilience. An extraordinary amount has already been done in the San Francisco Bay region to reduce the earthquake risk to communities and critical facilities and lifelines and to increase societal resilience in response to natural hazards.

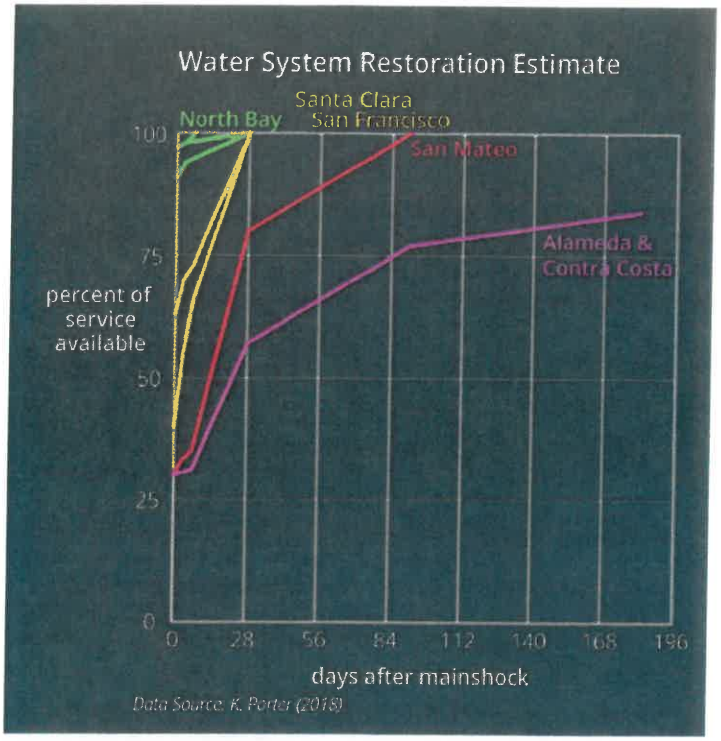
However, the HayWired earthquake scenario shows that much more needs to be done. Many reasonable mitigation options can take decades to complete, such as the costly replacement of brittle pipelines. Time is of the essence if decision makers wish to complete these actions before the next large earthquake actually occurs in the bay region. Society has a strong interest in continuing to strengthen infrastructure to reduce damage and better sustain us during response and recovery from a natural disaster. It also has a strong interest in planning and preparedness activities, not only engineering approaches, to improve community resilience.

Water-network resilience was modeled in the scenario, taking into account the HayWired mainshock and its aftershocks, lifeline interactions, resource limitations, and service restoration over time. The new water-network resilience model shows that the average east bay resident could lose water service for 6 weeks (some for as long as 6 months).

A study of fire following earthquake shows that the HayWired mainshock would cause about 450 large fires in counties nearest the epicenter, burning a building-floor area equivalent to that for about 80,000 single-family dwellings. These fires would kill hundreds of people and cause property losses approaching $16 billion. A first-ever joint exercise of portable firefighting water-supply systems was also conducted as part of the HayWired Coalition partner engagement activities.

A study of the societal consequences of the International Building Code's seismic-performance objectives for new buildings indicates that the code protects life well but is not robust enough to ensure that hundreds of thousands of buildings are not red-tagged (rendered unsafe to enter or occupy) or yellow-tagged (safe only for limited use). As a consequence, a significant fraction of the San Francisco Bay area's population—perhaps 1 in 4—could be displaced. A more-resilient building stock is achievable for an additional 1-percent construction cost and could allow 95 percent of the population to remain in their homes and workplaces following a powerful earthquake.

The first-ever scholarly survey of public preferences for the tradeoff between cost and building resilience, showing that most people prefer and would be willing to pay for greater resilience of the building stock.

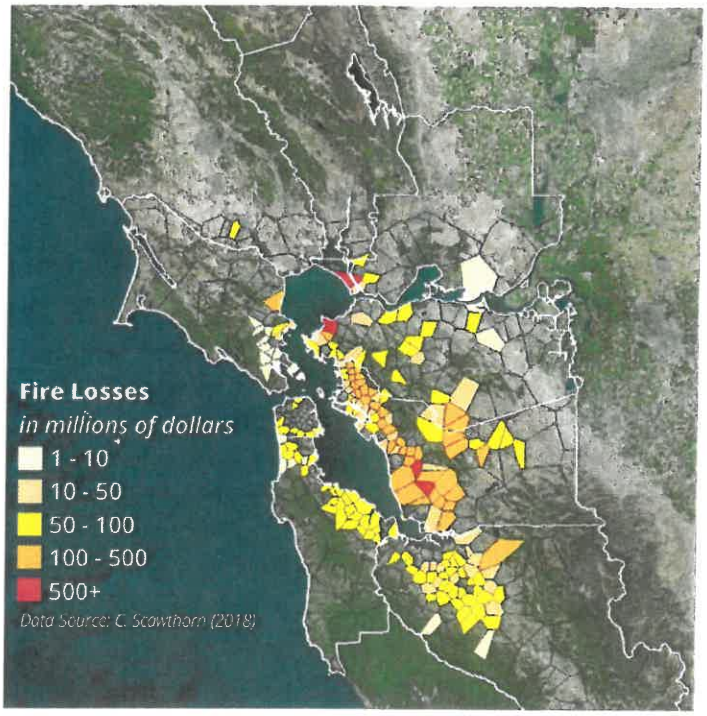


Graph showing EBMUD water-service repair progress; repairs take more than 6 months after the mainshock to complete. Curves are shown for remaining repairs under current, as-is conditions, including total for EBMUD's system and service east and west of the East Bay Hills. Resilience measures could reduce the economic impacts of EBMUD water-supply damage by as much as $8 billion.

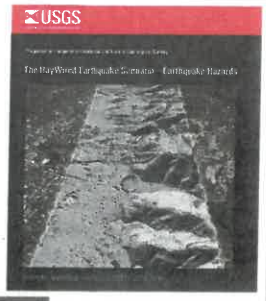
The HayWired Scenario includes the following new or updated developments that were not included (or given as much attention) in previous disaster and earthquake scenarios or studies:

- A comparison of the use of ground-motion-estimation methods.
- An estimate of landslide probability and liquefaction probability.
- Forecasting impacts of fault afterslip and aftershocks.
- Public expectations for the performance of new buildings and potential benefits of enhancing building-code requirements for new buildings.
- New methods to estimate urban search-and-rescue needs in response to building collapse and stalled elevators.
- Expected complications of fire following earthquake and interoperability of portable fire-fighting water- supply systems.
- A new method to estimate water-supply damage and service-restoration time in an earthquake sequence, and quantifying lifeline interdependencies.
- An estimation of communication and infrastructure damage and service restoration time.
- Potential benefits of earthquake early warning.
- Identification of potential long-term recovery challenges for the region's communities.
- Impacts to and resilience of the digital economy and strategies to bolster economic resilience.

This map of California's San Francisco Bay region shows areas burned as a result of fires caused by the hypothetical magnitude-7.0 mainshock of the HayWired earthquake scenario on the Hayward Fault. Warmer colors show areas with greater losses in billions of dollars. Effects are most severe along the Hayward Fault itself.



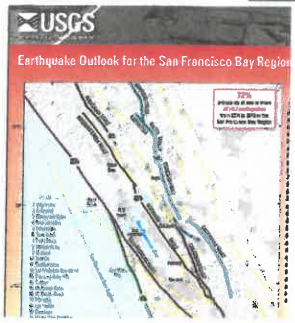
Additional Resources:



USGS HayWired Earthquake Scenario, Scientific Investigations Report, Volumes 1 (2017) and 2 (2018) https://pubs.er.usgs.gov/publication/sir20175013v1 & https://pubs.er.usgs.gov/publication/sir20175013v2

The HayWired Scenario: An Urban Earthquake in a Connected World (geonarrative with interactive content): http://www.usgs.gov/haywiredvol1geonarrative

Outsmart Disaster – Statewide Campaign for Business Resilience http://outsmartdisaster.com for steps to make your business more resilient

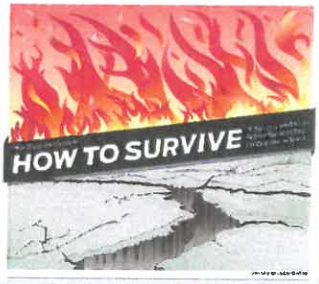


USGS Fact Sheet 2016-3020 and resources listed on pg. 6; Aagaard and others, 2016, Earthquake outlook for the San Francisco Bay region 2014–2043 (ver. 1.1, August 2016): U.S. Geological Survey Fact Sheet 2016–3020, 6 p., http://dx.doi.org/10.3133/fs20163020

150th Anniversary Commemoration of the Oct. 21, 1868 Hayward Fault earthquake https://earthquake.usgs.gov/earthquakes/events/1868calif/

Steven Newton, The most dangerous fault in America, *Earth (2016)* https://www.earthmagazine.org/article/most-dangerous-fault-america

Jeremy Miller, Creep on the Hayward Fault, *The New Yorker (2016)* https://www.newyorker.com/tech/elements/creep-on-the-hayward-fault



San Francisco Chronicle, "How to Survive," pp. W2-W32, published Nov. 19, 2017 https://www.sfchronicle.com/survival/ [free on-line]

Stoffer, P., Where's the Hayward Fault? A green guide to the fault, U.S. Geological Survey, Open-File Report 2008-1135, 88 pp. http://pubs.usgs.gov/of/2008/1135/

Earthquake Country Alliance; Seven Steps to Earthquake Safety; https://www.earthquakecountry.org/sevensteps/

USGS SAFRR has partnered with a number of organizations to form a group named the HayWired Coalition to disseminate and make use of the HayWired Scenario. The HayWired Coalition aims to identify the scenario's potential impacts on their constituents and to align the scenario with the concerns of their respective communities. The coalition began forming in mid-2016 to help with the process of receiving input and organizing the interactions of a broad range of stakeholders. The coalition has assisted the scenario-development team in helping to identify previously unrecognized vulnerabilities of communities, lifelines, infrastructure, and supply chains. In the development of previous disaster scenarios, much of this interaction took place organically after the scenario was finalized and published. Instead, for the HayWired scenario, a deliberate effort has been underway for over one year to engage partners, help them identify mitigation actions, and begin to use the scenario to reduce risk even before full publication of SIR 2017–5013. Volumes one & two of the HayWired Scenario USGS SIR will be released on April 18, 2018, making the detailed natural hazards and impacts portions of the report publicly available.

USGS Scientific Investigations Report (SIR) 2017–5013, describing the HayWired scenario, is planned to be published as three volumes. As HayWired volumes are published, they will be made available at https://doi.org/10.3133/sir20175013. Ideally, the HayWired scenario volumes will help readers collectively improve their own and their community's resilience in future disasters. For example, the ABAG/MTC has been examining housing availability and potential impacts of earthquake scenarios to support regional policy development. Building safety helps maintain livelihoods, neighborhoods, and jobs, as well as enhancing economic and business resilience. The HayWired Scenario and Outsmart Disaster statewide campaign are intended to help everyone reduce risk and improve their safety, security and economic well-being by providing the scientific basis for informed decisions.

"Together, we can Outsmart Disaster" will serve as the call to action for a statewide campaign intended to increase business and lifeline resilience through reducing risk.

Ken Hudnut, Dale Cox, Anne Wein, Keith Porter, Laurie Johnson, Sue Perry, Jen Bruce, Drew LaPointe

Prepared in Cooperation with the California Geological Survey and The HayWired Coalition

Edited by *James Hendley & Carolyn Donlin*

Graphics contributed by *Michael Germeraad, ABAG/MTC, John Blanchard, San Francisco Chronicle*

...
More info
URL's
...

ISSN XXXX-XXXX (print) ISSN XXXX-XXXX (on-line)
http:// ... doi ...

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: April 5, 2018

MEMO TO: Board of Directors

THROUGH: Alexander R. Coate, General Manager ARC

FROM: Michael R. Ambrose, Manager of Regulatory Compliance JRH for MRA

SUBJECT: Regulatory Compliance Semi-Annual Report – September 2017 through March 2018

INTRODUCTION

This memorandum summarizes the key regulatory issues and compliance activities since the last Regulatory Compliance Semi-Annual Report on September 12, 2017. Specific details are contained in the attached report. A presentation updating the status of regulatory compliance issues will be provided at the April 10, 2018 Planning Committee meeting.

SUMMARY

The District's Strategic Plan Water Quality and Environment Protection goal includes a Key Performance Indicator (KPI) for wastewater discharges to have no violations of the National Pollutant Discharge Elimination System (NPDES) and Waste Discharge Requirements (WDR) permits issued by the State Water Resources Control Board (SWRCB) or Regional Water Quality Control Boards (RWQCB). In this reporting period, the District received no violations of NPDES or WDR permits.

On October 23, 2017, the District received a fully executed final settlement agreement from the San Francisco RWQCB and the California Department of Fish and Wildlife (CDFW) related to three water main breaks in late 2015 and early 2016. The total settlement amount was $893,190, and a portion of that amount ($382,095) was suspended and will eventually be dismissed pending successful completion of an Enhanced Compliance Action (ECA). The ECA involves installation of approximately 970 leak detection loggers at 485 locations (the precise number may be adjusted depending on field conditions) and providing quarterly reports to the Regional Board for the next 3 years.

On November 16, 2017, the District accepted a settlement offer of $8,000 from the Bay Area Air Quality Management District (BAAQMD) for two violations where hydrogen sulfide levels in digester gas at the Main Wastewater Treatment Plant (MWWTP) exceeded the permit level of 340 ppm. The initial violations occurred on November 9, 2016 and December 23, 2016 and the

Notices of Violation were originally reported in the March 9, 2017 Regulatory Compliance Semi-Annual Report.

The Strategic Plan Workforce Planning and Development goal includes a KPI for Lost Time Injury Rate (LTIR) to be less than or equal to 3.0. The District's LTIR at the end of March 2018 was 0.63. The LTIR measures the number of work-related injuries or illnesses resulting in days away from work per 100 employees.

On December 14, 2017, the District accepted a settlement agreement with Cal/OSHA for an incident in March 2017 where an employee at the MWWTP suffered a partial finger amputation while working with an ironworker machine. The employee was punching holes in a piece of stainless steel when he inadvertently put his hand into the point of operation resulting in the loss of a fingertip. In August 2017, the District received two citations from Cal/OSHA following their incident investigation. The District appealed one of the citations with an associated fine of $22,500. An appeal meeting was held in November 2017 with the Regional Manager of Enforcement with Cal/OSHA. An agreement was reached with Cal/OSHA and the fine was reduced to $10,800. This case is now closed.

DISCUSSION

An overview of compliance issues during the last reporting period follows. More details on these and other efforts are provided in the attached report.

Environmental Compliance

NPDES Compliance at the Orinda Water Treatment Plant (WTP)

On September 6, 2017, the District reported to the San Francisco (SF) RWQCB an exceedance of the limit for residual chlorine in the filter backwash discharge at the Orinda WTP. Approximately 230,000 gallons of water containing 0.22 mg/L of chlorine or less was discharged to San Pablo Creek. The permit limit is less than 0.1 mg/L total chlorine residual. No environmental impacts to the creek were observed. The District initiated a root cause analysis of the non-compliant discharge which identified short-term and long-term corrective actions to prevent the recurrence of non-compliance. The District met with the SF RWCB on January 26, 2018 to present the findings and corrective actions of the analysis.

Air Quality Compliance at the MWWTP

The District reported exceeding the NOx (oxides of nitrogen) limit for the new enclosed flares at the MWWTP to the BAAQMD on January 11, 2018. The exceedance occurred during the initial commissioning emissions test conducted on November 9, 2017, which was reported in January after receiving the final emissions test report from the test company. At this time the BAAQMD is reviewing the emissions test report and a request from the District to raise the NOx limits. BAAQMD has not taken any enforcement on this event to date.

Workplace Health and Safety

The District continues to make progress in reducing the number of lost time injuries. The LTIR has declined from 3.5 in 2010 to 0.63 as of March 2018. In addition, the number of lost time injuries declined from 67 in 2010 to 17 in 2017. The number of lost time hours that employees were away from work due to an injury or illness has been reduced by 51 percent over the last seven years, from 35,322 hours in 2010 to 17,236 hours in 2017. This is a reduction of 18,086 hours; the equivalent of roughly ten full time employees.

The District continues to focus on preventing injuries by increasing supervisor presence in the field; tracking more leading indicators such as number of local safety committee meetings held, safety training hours completed, and injury investigation reports completed; and presenting lost time injury investigation results at management staff meetings.

The District participated in a Water Research Foundation (WRF) project with six other water utilities to develop an ergonomics guide using a participatory team approach in order to reduce the risk of musculoskeletal injuries. Musculoskeletal injuries (e.g., sprains, strains, etc.) are the most common type of injury for District employees. The goal is to leverage the expertise of workers to identify problems and solutions resulting in a better quality of risk assessment and control. Using this particpatory team approach, five tasks with ergonomic risk were identified. The team was able to come up with workable solutions and implement fixes to three of the five identified tasks; one of the remaining tasks is contingent on a new piece of equipment which is to be purchased in the future; and a solution is still being sought for the final task. A report will ultimatley be written and published on the project by WRF.

Key Upcoming Activities

Orinda WTP Filter Backwash Discharge

Staff will continue making improvements to the monitoring and control systems for the filter backwash settling pond discharge systems at the Orinda WTP. A meeting with the SF RWQCB will be conducted in the summer to provide a progress update.

Statewide Mercury in Reservoirs Program

On January 12, 2018, staff met with SF RWQCB representatives for a second time, at their request, to review some of the high level details of the State's Mercury in Drinking Water Reservoirs Program. This statewide initiative, overseen by the SWRCB and RWQCB sponsors, has been in the works for several years and aims to control the formation of methylmercury in reservoirs which can be taken up by predatory fish and ultimately be consumed by people and/or wildlife. All of the District's raw water reservoirs, upcountry and in the East Bay, have been identified as impaired for mercury in fish tissue. The SWRCB is requesting that reservoir owners across the state, including the District, voluntarily participate in a variety of studies to evaluate different technologies, source control strategies and fisheries management approaches to reduce

methylmercury production. There are many unknowns about participating in such studies (e.g., cost to District, funding from State, overall management and direction, etc.). Another workshop with statewide stakeholders has been proposed for May 2018. Staff will continue to follow this issue for any impacts to District facilities.

Enhanced Compliance Action Quarterly Reports

The District agreed to complete an ECA as part of the final settlement agreement related to three water main breaks in late 2015 and early 2016. The ECA involves installation of leak detection loggers at locations where pipes cross or are installed adjacent to creeks. The ECA requires the District to submit quarterly reports on implementation progress. The first quarterly report including status of the leak detection loggers purchased and deployed as well as a summary of initial data was submitted on December 28, 2017. The second quarterly report was submitted on March 28, 2018. The next quarterly reports are due on June 30 and September 30, 2018.

Proposed Workplace Violence Prevention Regulations

The California Division of Occupational Safety and Health (DOSH) promulgated a workplace violence prevention rule for the healthcare industry in November 2016 which became effective in April 2017. DOSH has also drafted proposed regulations for workplace violence prevention for general industry. The District has maintained a robust workplace violence prevention program consistent with industry standards for many years. District staff presented comments at an advisory meeting regarding the new regulation for general industry on January 25, 2018. Staff participated in a task force conference call on February 22 to provide additional feedback. Another public meeting on the proposed rule is expected in the future. Staff will continue to work with industry groups to shape this emerging regulation.

ARC:MRA:sd

Attachment

REGULATORY COMPLIANCE SEMI-ANNUAL REPORT
September 2017 through March 2018

This report provides the status of the District's efforts to meet the objectives and comply with environmental, health, and safety regulations in accordance with District Policies 7.05 – Sustainability and 7.09 – Workplace Safety and Health.

NPDES AND WATER DISCHARGE REQUIREMENTS PERMIT ISSUES

Main Wastewater Treatment Plant (MWWTP) and Wet Weather Facilities: No compliance incidents occurred in this reporting period.

Orinda Water Treatment Plant (WTP): On September 6, 2017, the District reported to the San Francisco Regional Water Quality Control Board (SF RWQCB) an exceedance of the limit for residual chlorine in the filter backwash discharge at the Orinda WTP. Approximately 230,000 gallons of water containing 0.22 mg/L of chlorine or less was discharged to San Pablo Creek (the permit limit is less than 0.1 mg/L total chlorine residual). The event was identified when staff analyzed a sample of the discharged water which indicated the presence of chlorine. The online instrumentation did not indicate chlorine in the discharge. No environmental impacts to the creek were observed.

The District initiated a root cause analysis of the non-compliant discharge which identified both short-term and long-term corrective actions to prevent the recurrence of non-compliance. The District met with the SF RWQCB on January 26, 2018 to present the findings and corrective actions of the analysis. The corrective actions implemented included:

- The dechlorination agent (sodium bisulfite) dose to the backwash wastewater was increased as much as practical while maintaining pH within the NPDES permitted range.
- Staff was provided updated training on the National Pollutant Discharge Elimination System (NPDES) permit requirements.
- Two new chlorine analyzers were installed and commissioned.
- Hourly readings from the new analyzers are being stored and were provided in the 2017 annual report and will be provided in all future annual reports to the SF RWQCB.
- Staff is enhancing future training materials to add details on specific permit limits and monitoring and reporting requirements.
- An NPDES permit compliance audit program will be implemented in the summer to ensure that all permit requirements are being met.

Staff is working on improvements to the system controls and will meet with the SF RWQCB later this year to provide an update on this work.

Upcountry Wastewater Treatment Plants (WWTPs): The District is operating under expired Waste Discharge Requirements (WDR) at Camanche North Shore (CANS), Camanche South Shore (CASS), Pardee Recreation Area (PARA), and Pardee Center. The State Water Resources Control Board (SWRCB) adopted General Order 2014-0153-DWQ on September 23, 2014, for discharges to land by small domestic wastewater treatment systems. On January 22, 2018, the District received Pardee Center WWTP's Notice of Applicability (NOA) for the General Order.

Coverage is effective once the facility's current WDRs are rescinded at the Central Valley (CV) RWQCB's April 2018 Board meeting. The NOA for PARA WWTP is pending. The District anticipates the CV RWQCB will require a Report of Waste Discharge for CANS WWTP and CASS WWTP in the future which would be the first step in obtaining coverage under the new General Order. In the interim, staff continues to work on a strategy for eventual long-term compliance under the General Order for all four Upcountry WWTPs, including CANS and CASS.

On March 29, 2017, the District submitted a groundwater evaluation technical report including an evaluation of the groundwater monitoring system for the CANS WWTP and CASS WWTP to the CV RWQCB as required by Notices of Violation that were issued to each of the facilities in summer 2016. On February 13, 2018, the CV RWQCB issued a response to the CASS WWTP report requiring additional actions including the submittal of a work plan to determine if all the existing monitoring wells are sampling the groundwater from the same aquifer and a second work plan to install a replacement background well. The District's consultant found the existing well was sufficient to collect groundwater data to establish the background limitations for compliance monitoring. On February 22, 2018, the CV RWQCB issued a response to the CANS WWTP Report approving a previously submitted work plan to install two replacement monitoring wells (one for background data and one for compliance data) in addition to a new compliance well that was recommended in the District's report to facilitate the determination of the groundwater flow. Also quarterly (currently semi-annual) groundwater elevation monitoring is required.

For the 2020 Annual Report, the District is required to submit an inter-well statistical evaluation of the compiled monitoring data and propose background limitations for compliance constituents. The CV RWQCB will then establish the background limitations for compliance.

AIR PERMIT COMPLIANCE

MWWTP – Title V Permit and Permit to Operate: One compliance-related incident occurred in this reporting period at the MWWTP. The District reported an exceedance of the NOx (oxides of nitrogen) limit for the new enclosed flares at the MWWTP to the Bay Area Air Quality Management District (BAAQMD) on January 11, 2018. The exceedance occurred during the initial commissioning emissions test conducted on November 9, 2017 which was reported to BAAQMD in January after receiving the final emission test report from the test company. The flares have not been operated since the test. The District has applied to raise the NOx limit for the flares from 0.06 lb/MMBtu to 0.12 lb/MMBtu. The flares performed at 0.08-0.09 lb/MMBtu during the emissions test. The District has done extensive troubleshooting and work to optimize flare performance but does not believe the 0.06 lb/MMBtu limit can be met, primarily due to ammonia levels in the digester gas that were discovered after the flares were installed. The BAAQMD is reviewing the emissions test report and the District's request to raise the NOx limits and has not taken any enforcement action at this time.

On November 16, 2017, the District accepted a settlement offer of $8,000 from the BAAQMD for two violations in which hydrogen sulfide levels in digester gas at the MWWTP exceeded the permit level of 340 ppm. The initial violations occurred on November 9, 2016 and December 23, 2016. The fine for each violation was $4,000. In March 2017, the MWWTP air permit was

modified to regulate digester gas hydrogen sulfide level as an annual average of 200 ppm instead of an instantaneous limit of 340 ppm. The new permit limit has been met since the change and the District expects to continue to be in compliance.

OTHER ENVIRONMENTAL ISSUES

Richmond Advance Recycled Expansion (RARE) pH Violations: On November 14, 2017, the RARE facility received two Notices of Violation for discharging wastewater to West County Wastewater District (WCWD) outside of the permitted pH range of 6.0-12.0. On September 5 and September 14, 2017, the reported daily average pH was 5.9, which is below the permitted range. The District and WCWD are working together to determine a better approach to permit compliance through process and operational facility changes and daily minimum and maximum reporting. With the changes already implemented the District has been unable to meet the new requirements required by WCWD. The District has informed WCWD of this issue and has requested an exception from the new pH reporting requirement. If WCWD does not grant an exception, the District has proposed the installation of a chemical-based pH neutralization system at RARE. This system would be operational by March 31, 2019. The District is waiting for WCWD to respond to the District's request to either modify the pH limits or establish a compliance schedule through March 31, 2019 to allow continued operation of the facility while improvements are made at RARE.

Glen Echo Creek Cellular Concrete Spill and Restoration Project: In response to the cellular concrete spill into Glen Echo Creek in April 2015, the District voluntarily agreed to perform some minor restoration work in 2016 and to conduct creek monitoring for at least three years. Annual monitoring in 2017 has been completed and the annual monitoring report was submitted on September 26, 2017 to the California Department of Fish and Wildlife (CDFW), SF RWQCB and the City of Oakland. The creek appears to have recovered as of this report. The District has proposed to complete one more year of monitoring at the site and then issuing a final report to support closure of the Streambed Alteration Agreement 1600-2016-0003-R3 issued by CDFW.

District Owned Disposal Sites: The District stockpiles clean trench soil material at three permitted sites in the service area. Staff oversees pre-wet season inspections and reinforcement of existing Best Management Practices (BMPs) to control sediment and erosion. This includes installation of fiber rolls, jute matting, and hydro-seeding on vulnerable slopes prior to October 15th of each year. Staff continues to inspect and maintain the BMPs, as required by the State's Stormwater Construction Permit. One site near Briones Reservoir continues to be challenging to manage given the amount of soils. SF RWQCB staff inspected the site on two occasions last wet season to ensure water quality is protected and is working with the District to ensure stormwater plans and controls are adequate for the site. This year, additional measures were incorporated to provide protection during the wet season. Additionally, all three sites are scheduled to begin offhaul to landfill or beneficial reuse starting in 2018.

Poison Lake: In coordination with the District, the United States Bureau of Land Management (BLM) completed remediation at a former mine tailings pond known as Poison Lake in November 2017. Mine waste from historic mining operations in the Camanche Reservoir area was piped to and accumulated in a series of three hydraulically-connected settling ponds at the site. The site is situated on BLM and District property. Both of the lower two ponds and most of

the upper pond are covered with native and planted grasses and pose no apparent exposure concerns for humans or wildlife. However, a portion of the upper pond approximately 1/3 of an acre in size has exposed mine waste at the surface where the grasses have not taken root and which does pose a potential heavy metals exposure concern for humans and wildlife. The exposed area is situated on both sides of the property line between BLM and District property. The surface contamination will be excavated and impounded to prevent transport of tailings. The Board authorized at the July 11, 2017 Regular Board meeting a cost-share agreement with BLM for the District to contribute a one-half share, not to exceed $300,000, for the remediation project. Under the cost-share agreement, BLM is responsible for constructing the remediation project on BLM and District property, and for future routine inspection, maintenance, and repairs. The District is responsible for ongoing future water quality monitoring and reporting to the CV RWQCB to demonstrate the effectiveness of the remediation.

After BLM completed the planned remediation activities at the site, the CV RWQCB participated in a final site walk with District and BLM representatives present. The CV RWQCB requested that District staff conduct high-flow and low-flow surface water runoff monitoring at the site on an annual basis. The first round of monitoring for the current wet season was conducted in January 2018. On March 2, 2018, CV RWQCB staff submitted their inspection reports from the site walk acknowledging the remediation work that was done and noting their appreciation of the effort.

Lancha Plana Pond: At the end of the 2016/2017 wet season, the District noted that the earthen impoundment dam on one of the many small ponds on District property in the Mokelumne watershed sustained some damage during the winter. The pond is located upstream of the Lancha Plana Bridge crossing of Buena Vista Road on the shore of Camanche Reservoir. Staff has been monitoring the site since the conditions were first noted. Soil and surface water samples have been collected from the site to better understand general site conditions. The sampling and monitoring indicate the pond is situated downstream of and hydrologically connected to an apparent former mine and the surface water that seasonally flows into the pond from the mine has been impacted by low pH water with metals contamination. The District continues to monitor site conditions and will communicate changes to the CV RWQCB and discuss a long-term strategy for the site.

Integrated Pest Management (IPM) Program: IPM is a comprehensive, systems-based pest management process that involves determining appropriate control methods based on the pest and site-specific conditions. IPM focuses on managing pests with minimum impact to human health, the environment, and non-target organisms by requiring a variety of non-pesticide control methods be considered in addition to pesticide controls. In the mid-1990s, the District developed an IPM program to address pest problems within District property while minimizing risks to people and the environment. The District's IPM program addresses a broad range of issues in the District's service area, approximately a hundred miles of rights-of-way, and 56,000 acres of watershed lands in the East Bay and Upcountry.

In this reporting period, the District contracted with an IPM expert to perform a third-party review of the District's IPM program. The results of that review were reported at the January 9, 2018 Sustainability/Energy Committee. Staff has assembled an internal working group of representatives that implement IPM strategies to develop program improvements that address the

items identified in the third party report. In addition, enhanced District training will be provided to staff in April for all employees with pest management responsibilities.

Bixler Fueling Facility: The District is nearing the final formal closure of the former underground storage tank site at the Bixler facility. Following removal of four tanks in 1990, a soil and groundwater investigation was completed. The CV RWQCB requested that all monitoring and extraction wells on the site be destroyed and a well destruction report be presented to complete the closure. The well destruction report was submitted to the CV RWQCB and Contra Costa County. Staff is awaiting the final regulatory closure notification from the CV RWQCB.

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: April 5, 2018

MEMO TO: Board of Directors

THROUGH: Alexander R. Coate, General Manager ARC

FROM: David A. Briggs, Manager of Water Operations BTK for DB

SUBJECT: Water Quality Program Semi-Annual Update

INTRODUCTION

This memo provides an update on the District's water quality and ongoing initiatives to ensure delivery of high quality treated water to customers. Water quality data spans calendar year 2017, in which the District met all federal and state drinking water standards. A presentation on the Water Quality Program will be made at the April 10, 2018 Planning Committee meeting.

SUMMARY

In calendar year 2017, the District met all federal and state drinking water standards and met 94 percent of the District's internal goals (7 of 125 were not met). Levels of total trihalomethanes (TTHMs) exceeded District goals but remained below regulatory levels. Various operational actions last summer and fall, along with improved raw water conditions, helped significantly lower TTHMs. The District's water quality goals for n-nitrosodimethylamine (NDMA) and post-filter turbidity at the treatment plants were also exceeded. Although record-setting runoff elevated turbidity in Pardee and Briones Reservoirs, impacts to customers and major taste and odor events were avoided. The District also addressed two significant cross-connection issues from improperly configured private wells, and initiated a large-scale lead sampling effort for K-12 schools pursuant to State Water Resources Control Board (SWRCB) requirements. By the end of 2017, lead sampling for K-12 schools was 70 percent complete.

DISCUSSION

District Water Quality Goals

The District's internal water quality goals are substantially more stringent than federal or state water quality standards to ensure regulatory compliance and maximize the quality of the District's treated water. In 2017, the District exceeded seven of its water quality goals.

TTHMs and five haloacetic acids (HAA5) are regulated disinfection byproducts (DBPs) that form after chlorine reacts with natural organic matter in the water. For calendar year 2017, the District's goal was exceeded in 60 out of 64 TTHM samples and 46 out of 64 HAA5 samples. These goals are set at half of the regulatory standard. At no point did the District exceed the regulatory standards. Several factors contributed to elevated DBP concentrations during the spring and summer. First, prolonged drought caused organic material to accumulate in the Pardee Reservoir watershed. Intense rainfall last winter and associated runoff then greatly increased organic carbon loading into Pardee Reservoir. Warmer weather and higher organic carbon levels necessitated the use of higher chlorine doses at the treatment plants, which also increased DBP concentrations. Since early 2017, TTHM concentrations have steadily decreased as raw water quality improved and staff implemented DBP monitoring and control measures. Moving forward, the upcoming capital projects planned for the Orinda and Walnut Creek Water Treatment Plants and the improvements within San Pablo Reservoir should result in consistently lower DBP concentrations.

NDMA can also be a disinfection byproduct and is formed when chloramine reacts with precursor materials in the water. NDMA forms very slowly and it is likely that the long residence times in the distribution system contributed to NDMA formation. Quarterly samples were collected from five locations in the distribution system in 2017. The District's water quality goal was exceeded in nine of the 20 samples. There is no regulatory standard for NDMA and no health impacts are expected at this concentration. The District's goal is set at the same level as the Public Health Goal for this compound.

Post-filter turbidity level is a performance indicator of the filtration process. The District has five water quality goals for turbidity; four of them were not met during 2017. One of these five goals pertains to the turbidity in the combined effluent of all of the filters at each plant. Turbidity readings are recorded each minute. Although regulations allow up to 5% of all turbidity measurements to exceed the applicable level, the District's goal is for each to be lower. In 2017, there were 18 individual turbidity readings above the goal among all of the WTPs. Therefore, 0.0008 percent of overall readings exceeded the applicable turbidity level. These exceedances were caused by short-term mechanical and control system issues and chemical dosing irregularities. The additional three turbidity goals that were not met were also very short in duration and were attributed to equipment failures.

Lead

The District continues its efforts to minimize customer exposure to lead in drinking water through a variety of programs.

- Samples from customer taps were collected in 2017 in accordance with the United States Environmental Protection Agency's (USEPA) Lead and Copper Rule. The lead concentration of ninety percent of the samples was 3.4 ppb or less, far lower than the regulatory Action Level of 15 ppb.

- The sampling voucher program has been successful with over 600 customers requesting to participate in 2017. Ninety percent of these samples were less than 1 ppb, and none have been above the Action Level (15 ppb).
- Sampling for lead in schools within the service area was initiated in 2017 and continues in 2018. More than 70 percent of the public schools (including charters schools) and 11 percent of private schools were sampled in 2017. No problems are anticipated in meeting the regulatory deadlines for the remainder of this sampling program. Results from the 2017 school sampling program have been very good, only 12 percent of the samples exceeded 1 ppb and just 0.2 percent (3 out of 1,251 samples) exceeded 15 ppb.
- The Lead Service Line (LSL) inventory will be completed by the regulatory deadline of July 1, 2018. There are no remaining lead services in the District's distribution system based on the District's records. When lead services are incidentally encountered in the field (about 10 each year), the services are immediately replaced. In these circumstances, the District works with each affected customer to collect water samples and provides information on how to reduce exposure to lead. Short connection piping between the service line and meter box are also part of the inventory. Such piping (referred to as "pigtails", "goosenecks", etc.) may exist in thousands of District services and will be replaced over time. Based on the District's properly managed corrosion control program staff is confident that any remaining lead components in the distribution system do not present a significant health risk.

Taste & Odor/Algal Compounds

No major taste and odor incidents occurred in 2017. However, ongoing construction at Sobrante and Upper San Leandro Water Treatment Plants (WTP) in 2017, and continuing in 2018, has rendered ozone unavailable at both plants. Use of ozone is the most effective way to reduce taste and odor causing compounds in treated water. Several efforts are underway to mitigate the potential for a taste and odor (T&O) event in the Sobrante WTP service area, if the plant is needed prior to the completion of the ozone upgrade this spring.

In addition to T&O-causing compounds, algae can produce toxins under certain conditions. The District continues its efforts to monitor algal concentrations in raw water reservoirs, and to collect and analyze samples for toxins as indicated by the algal results.

Backflow Prevention

When an alternate water source exists on a customer's property, such as a well, there is a potential for contamination of the potable supply and a backflow protection device is required. There were several occasions in 2017 when irrigation wells were discovered to be cross connected with potable supplies. When discovered, District staff collected samples, installed backflow protection devices, flushed, and otherwise ensured potable water was safeguarded. Efforts are underway to search records of groundwater wells in the service area and ensure that proper backflow devices are installed when needed. The most significant cross connection in

2017 occurred in the Alameda Point water system. The District supported the investigation and response per agreement with the City of Alameda.

Upcountry Systems

The District owns and operates four separate, small public water systems near Pardee and Camanche Reservoirs. These small systems have similar challenges as the District's primary system in terms of weather-related impacts on water quality and high water age. The District added a granular activated carbon (GAC) to the treatment systems for the Pardee Recreation Area and the Camanche Area South Shore (CASS) in 2017 to maintain DBPs at low levels. A new WTP for CASS was also completed in 2017 (which also includes GAC). Transition from the old to new plant will likely occur this spring.

Nitrification/Chlorine Residuals

Due to the size, complexity and long residence time of the District's water distribution system, maintaining a high disinfectant residual is a continuous challenge. In addition to the health risk from microbiological contamination, loss of disinfectant residual and longer water age contribute to nitrification. Extensive staff effort is devoted to collection and analysis of water samples from pipelines and reservoirs throughout the system, as well as follow-up actions when nitrification and low disinfectant residual are detected. The District goal is 0.5 mg/L, or greater, chlorine residual in at least 95% of monthly samples. This target was met in 11 of 12 months during 2017.

Wherever possible, distribution reservoirs are taken out of service to reduce water age, subject to pressure and fire flow requirements. In the long term, capital projects that involve replacing oversized reservoirs with appropriately sized tanks will help reduce water age and improve water quality. Investigations are ongoing regarding additional sites for reservoir mixing units and chloramine boosting stations.

Looking ahead, staff expects disinfection by products (DBPs) to remain low in 2018. Primary efforts will focus on maintaining high disinfectant residuals in the distribution system, controlling taste and odors and other algal byproducts, aggressively investigating potential cross connections, and continuing to work with stakeholders related to lead sampling in schools.

ARC:DAB:SMT

Attachment

EBMUD Semi-Annual Water Quality Report March 2018

Parameter	Units	MCL	PHG	DLR	SMCL	NL	other	Basis for WQG	District Water Quality Goal (WQG)	Status*
USEPA/State Water Quality Regulations										
Primary (Health Standards)										
Inorganic Chemicals										
Aluminum	ug/L	1000	600	50	200			½SMCL	100	Met
Antimony	ug/L	6	20	6				DLR	6	Met
Arsenic	ug/L	10	0.004	2				DLR	2	Met
Asbestos	MFL	7	7	0.2				½MCL	3.5	Met
Barium	ug/L	1000	2000	100				½MCL	500	Met
Beryllium	ug/L	4	1	1				PHG/DLR	1	Met
Cadmium	ug/L	5	0.04	1				DLR	1	Met
Chromium (total)	ug/L	50		10				½MCL	25	Met
Cyanide	mg/L	0.15	0.15	0.1				DLR	0.1	Met
Fluoride (source water)	mg/L	2	1	0.1				PHG	1	Met
Hexavalent chromium	ug/L	10	0.02	1				DLR	1	Met
Mercury	ug/L	2	1.2	1				DLR	1	Met
Nickel	ug/L	100	12	10				PHG	12	Met
Nitrate + Nitrite Total (as N)	mg/L	10	10	0.4				½MCL	5	Met
Nitrate as N [x4.5 for NO3]	mg/L	10	10	0.4				½MCL	5	Met
Nitrite (as N)	mg/L	1	1	0.4				½MCL	0.5	Met
Perchlorate	ug/L	6	1	4				DLR	4	Met
Selenium	ug/L	50	30	5				½MCL	25	Met
Thallium	ug/L	2	0.1	1				DLR	1	Met
Organic Chemicals										
Volatile Organic Compounds (VOCs)										
1,1,1-Trichloroethane (1,1,1-TCA)	ug/L	200	1000	0.5				½MCL	100	Met
1,1,2,2-Tetrachloroethane	ug/L	1	0.1	0.5				DLR	0.5	Met
1,1,2-Trichloroethane (1,1,2-TCA)	ug/L	5	0.3	0.5				DLR	0.5	Met
1,1-Dichloroethane (1,1-DCA)	ug/L	5	3	0.5				½MCL	2.5	Met
1,1-Dichloroethylene (1,1-DCE)	ug/L	6	10	0.5				½MCL	3	Met

Compounds highlighted in blue appear more than once in this table.
**Status is either "Met or "Not Met". If goal was not met, number shown is the percent of samples not meeting the goal.*

Parameter	Units	MCL	PHG	DLR	SMCL	NL	other	Basis for WQG	District Water Quality Goal (WQG)	Status*
1,2,4-Trichlorobenzene	ug/L	5	5	0.5				½MCL	2.5	Met
1,2-Dichlorobenzene (o-DCB)	ug/L	600	600	0.5				½MCL	300	Met
1,2-Dichloroethane (1,2-DCA)	ug/L	0.5	0.4	0.5				DLR	0.5	Met
1,2-Dichloropropane	ug/L	5	0.5	0.5				DLR	0.5	Met
1,3-Dichloropropene (Total)	ug/L	0.5	0.2	0.5				DLR	0.5	Met
1,4-Dichlorobenzene (p-DCB)	ug/L	5	6	0.5				½MCL	2.5	Met
Benzene	ug/L	1	0.15	0.5				DLR	0.5	Met
Carbon Tetrachloride	ug/L	0.5	0.1	0.5				DLR	0.5	Met
Dichloromethane (Methylene Chloride)	ug/L	5	4	0.5				½MCL	2.5	Met
Ethylbenzene	ug/L	300	300	0.5				½MCL	150	Met
Freon 113 (1,1,2 trichloro 1,2,2 trifluoroethane)	ug/L	1200	4000	10				½MCL	600	Met
Methyl-tert-butyl ether (MTBE)	ug/L	13	13	3	5			DLR	3	Met
Monochlorobenzene (Chlorobenzene)	ug/L	70	200	0.5				½MCL	35	Met
Styrene	ug/L	100	0.5	0.5				PHG	0.5	Met
Tetrachloroethylene	ug/L	5	0.06	0.5				DLR	0.5	Met
Toluene	ug/L	150	150	0.5				½MCL	75	Met
Trichloroethylene (TCE)	ug/L	5	1.7	0.5				PHG	1.7	Met
Trichlorofluoromethane (Freon 11)	ug/L	150	700	5				½MCL	75	Met
Vinyl Chloride (VC)	ug/L	0.5	0.05	0.5				DLR	0.5	Met
Xylenes (Total)	ug/L	1750	1800	1				½MCL	875	Met
cis-1,2-Dichlorethylene (c-1,2-DCE)	ug/L	6	100	0.5				½MCL	3	Met
trans-1,2-Dichloroethylene (t-1,2-DCE)	ug/L	10	60	0.5				½MCL	5	Met
Synthetic Organic Compounds (SOCs)										
1,2-Dibromo-3-chloropropane (DBCP)	ug/L	0.2	0.002	0.01				DLR	0.01	Met
2,3,7,8-TCDD (Dioxin)	pg/L	30	0.05	5				DLR	5	Met

Compounds highlighted in blue appear more than once in this table.
**Status is either "Met or "Not Met". If goal was not met, number shown is the percent of samples not meeting the goal.*

Parameter	Units	MCL	PHG	DLR	SMCL	NL	other	Basis for WQG	District Water Quality Goal (WQG)	Status*
2,4,5-TP (Silvex)	ug/L	50	25	1				PHG	25	Met
2,4-D	ug/L	70	20	10				PHG	20	Met
Alachlor (Alanex)	ug/L	2	4	1				DLR	1	Met
Atrazine (Aatrex)	ug/L	1	0.15	0.5				DLR	0.5	Met
Bentazon (Basagran)	ug/L	18	200	2				½MCL	9	Met
Benzo(a)pyrene	ug/L	0.2	0.007	0.1				DLR	0.1	Met
Bis(2-ethylhexyl)phthalate (DEHP)	ug/L	4	12	3				DLR	3	Met
Carbofuran	ug/L	18	1.7	5				DLR	5	Met
Chlordane	ug/L	0.1	0.03	0.1				DLR	0.1	Met
Dalapon	ug/L	200	790	10				½MCL	100	Met
Di(2-ethylhexyl)adipate	ug/L	400	200	5				½MCL	200	Met
Dinoseb (DNBP)	ug/L	7	14	2				½MCL	3.5	Met
Diquat	ug/L	20	15	4				½MCL	10	Met
Endothall	ug/L	100	580	45				½MCL	50	Met
Endrin	ug/L	2	1.8	0.1				½MCL	1	Met
Ethylene dibromide (EDB)	ug/L	0.05	0.01	0.02				DLR	0.02	Met
Glyphosate	ug/L	700	900	25				½MCL	350	Met
Heptachlor	ug/L	0.01	0.008	0.01				DLR	0.01	Met
Heptachlor Epoxide	ug/L	0.01	0.006	0.01				DLR	0.01	Met
Hexachlorobenzene	ug/L	1	0.03	0.5				DLR	0.5	Met
Hexachlorocyclopentadiene	ug/L	50	50	1				½MCL	25	Met
Lindane (Gamma BHC)	ug/L	0.2	0.032	0.2				DLR	0.2	Met
Methoxychlor	ug/L	30	0.09	10				DLR	10	Met
Molinate	ug/L	20	1	2				DLR	2	Met
Oxamyl (Vydate)	ug/L	50	26	20				½MCL	25	Met
PCB's	ug/L	0.5	0.09	0.5				DLR	0.5	Met
Pentachlorophenol (PCP)	ug/L	1	0.3	0.2				PHG	0.3	Met
Picloram	ug/L	500	500	1				½MCL	250	Met
Simazine	ug/L	4	4	1				½MCL	2	Met
Thiobencarb	ug/L	70	70	1	1			DLR	1	Met
Toxaphene	ug/L	3	0.03	1				DLR	1	Met
Disinfection By-Products (DBPs)										
Bromate	ug/L	10	0.1	1				½MCL	5	Met
Chlorite	ug/L	1000	50	20				PHG	50	Met

Compounds highlighted in blue appear more than once in this table.
**Status is either "Met or "Not Met". If goal was not met, number shown is the percent of samples not meeting the goal.*

Parameter	Units	MCL	PHG	DLR	SMCL	NL	other	Basis for WQG	District Water Quality Goal (WQG)	Status*
Haloacetic Acids (HAA)	ug/L	60		1				½MCL	30	72%
Total Trihalomethanes (TTHM)	ug/L	80		0.5				½MCL	40	94%
Radionuclides										
Alpha	pCi/L	15		3				½MCL	7.5	Met
Beta	pCi/L			4			50	½ other[1]	25	Met
Radium 226 + 228	pCi/L	5	0.019	1				½MCL	2.5	Met
Strontium-90	pCi/L	8	0.35	2				DLR	2	Met
Tritium	pCi/L	20000	400	1000				DLR	1000	Met
Uranium	pCi/L	20	0.43	1				DLR	1	Met
Microbiological										
%Total Coliforms Positive/Mo.	Organisms/100 ml	5%						other[2]	0.5%	Met
Treatment Techniques										
Individual Filter Effluent (IFE) Turbidity	NTU						< 0.10 NTU more than 95% of the time.	Exceed Partnership for Safe Water[5]	< 0.10 NTU more than 99.9% of the time	0.15%
Individual Filter Effluent (IFE) Turbidity	NTU							Exceed Partnership for Safe Water[5]	Max value 0.2 NTU for inline, 0.3 NTU for others	0.00009 %
Filter Startup Turbidity	NTU						Max individual backwash recovery period[3] of 15 minutes.	Partnership for Safe Water	Max individual backwash recovery period[3] of 15 minutes.	Met
Combined Filter Effluent (CFE) Turbidity	NTU							Exceed Partnership for Safe Water[5]	< 0.10 NTU more than 99.9% of the time.	0.13%
Combined Filter Effluent (CFE) Turbidity	NTU						CaSWTR[4]	Exceed Partnership for Safe Water[5]	Max value 0.2 NTU for inline, 0.3 NTU for others	0.0008 %

Compounds highlighted in blue appear more than once in this table.
**Status is either "Met or "Not Met". If goal was not met, number shown is the percent of samples not meeting the goal.*

Parameter	Units	MCL	PHG	DLR	SMCL	NL	other	Basis for WQG	District Water Quality Goal (WQG)	Status*
Fluoride added at WTP Effluent	mg/L							other[6]	0.6-1.2	Met
CT Ratio							1	other[7]	>1	Met
SUVA	L/mg-m						2	other[8]	1.8	Met
Lead 90th percentile	ug/L		0.2	5			15	½ AL[9]	7.5	Met
Copper 90th percentile	ug/L		300	50			1300	½ AL[10]	650	Met
Acrylamide							0.05% monomer by wt. dose not to exceed 1 mg/L	other[11]	0.05% monomer by wt. dose not to exceed 1 mg/L	Met
Secondary (Aesthetic) Standards										
Aluminum	ug/L	1000	600	50	200			½SMCL	100	Met
Chloride	mg/L				250			½SMCL	125	Met
Color	color unit				15			½SMCL	7.5	Met
Copper	ug/L		300	50	1000			PHG	300	Met
Foaming agents (MBAS)	ug/L				500			½SMCL	250	Met
Iron	ug/L				300		100	other[12]	100	Met
Manganese	ug/L				50	500	15	other[13]	15	Met
Methyl tertiary butyl ether (MTBE)	ug/L	13	13	3	5			DLR	3	Met
Odor threshold	TON				3			SMCL	3	Met
Silver	ug/L				100			½SMCL	50	Met
Specific Conductance	uS/cm				900			½SMCL	450	Met
Sulfate	mg/L				250			½SMCL	125	Met
Thiobencarb	ug/L	70	70	1	1			DLR	1	Met
Total Dissolved Solids	mg/L				500			½SMCL	250	Met
Turbidity (distribution)	NTU				5			½SMCL	2.5	Met
Zinc	ug/L				5000			½SMCL	2500	Met
Customer Expectations										
District-caused complaints	Complaints/ month						30	other[14]	30	Met
Emerging Contaminants										
Inorganic Chemicals										

Compounds highlighted in blue appear more than once in this table.
**Status is either "Met or "Not Met". If goal was not met, number shown is the percent of samples not meeting the goal.*

Parameter	Units	MCL	PHG	DLR	SMCL	NL	other	Basis for WQG	District Water Quality Goal (WQG)	Status*
Boron	ug/L			100		1000		½NL	500	Met
Chlorate	ug/L					800		½NL	400	Met
Organic Chemicals										
1,2,4-Trimethylbenzene	ug/L					330		½NL	165	Met
1,3,5-Trimethylbenzene	ug/L					330		½NL	165	Met
N-Nitrosodi-methylamine [NDMA]	ng/L		3			10		PHG	3	45%
N-Nitrosodiethylamine [NDEA]	ng/L					10		½NL	5	Met
Naphthalene	ug/L					17		½NL	8.5	Met

[1] ½ screening level
[2] 1/10th 5% MCL
[3] Backwash recovery period is the time the turbidity is ≥ 0.10 NTU after a filter is placed in operation following a backwash or filtering to waste.
[4] California Surface Water Treatment Rule (SWTR): combined filter effluent turbidity < 0.3 NTU 95% for conventional plants and 0.2 NTU for in-line filtration plants more than 95% of the time.
[5] <0.10 NTU 95 percent of the time.
[6] Optimal Fluoride Dose (0.7 mg/L) per 2015 US Public Health Service recommendation
[7] CT ratio of 1 is the minimum for compliance; goal is be greater than or equal to 1 at all times.
[8] Based on operational experience
[9] ½ Action Level
[10] ½ Action Level; compliance based on in-home samples.
[11] USEPA Treatment Technique
[12] Operational experience
[13] Operational experience
[14] Based on historical data

Compounds highlighted in blue appear more than once in this table.
**Status is either "Met or "Not Met". If goal was not met, number shown is the percent of samples not meeting the goal.*

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: April 5, 2018

MEMO TO: Board of Directors

THROUGH: Alexander R. Coate, General Manager

FROM: Richard G. Sykes, Director of Water and Natural Resources

SUBJECT: 2017 Mokelumne Fall-run Chinook Salmon and Steelhead Returns

INTRODUCTION

The 2017 fall-run Chinook salmon return to the Mokelumne River was an estimated 19,954 fish, including 5,635 fish that spawned in the river and 14,319 that were collected at the hatchery for egg production. The return was the highest ever recorded since 1940 and about 400 percent of the long-term average of 4,905 fish. Salmon returns have exceeded 12,000 fish for six of the last seven years. One indicator EBMUD uses to assess the health of the Mokelumne Fishery is the running 9-year average escapement, which represents three complete, 3-year salmon life cycles. With the addition of the 2017 returns, the 9-year average annual escapement is 11,794 fish or 240 percent of the long-term average. Additionally, the 2017 steelhead trout return to the hatchery exceeded 538 adult fish, which is the second highest return recorded. This memo provides a brief review of the 2017 return and the key factors affecting salmon and steelhead escapement to the Mokelumne River. This information will be presented at the April 10, 2018 Planning Committee meeting.

DISCUSSION

While record precipitation was recorded throughout the Central Valley and Sierra Nevada Mountains in 2017, the impacts of the 2012-2015 drought continue to significantly influence Fall-run Chinook salmon returns throughout the Central Valley. In 2017, the Sacramento River basin experienced one of the worst years on record with a combined return to the Sacramento, Feather and American Rivers of only 70,000 salmon. The 2017 Central Valley return was particularly impacted by low Delta out flows and high water temperatures in the spring of 2014 and 2015.

Salmon returns in the Central Valley are cyclical, typically declining in dry years and years of warmer ocean temperatures, and increasing in wet years and years of cooler ocean temperatures. However, there are many other important factors that influence escapement, particularly on the Mokelumne River, where salmon have to traverse the Delta and are impacted significantly by export pumps, Delta Cross Channel (DCC) operations, and predation. Figure 1 shows salmon escapement to the Mokelumne since records began in 1940.

Although the drought and subsequent flood flows have resulted in challenges, the record 2017 Mokelumne escapement demonstrates that program changes implemented in 2009, and continued through 2017, have improved the sustainability of the Mokelumne salmon population when compared to other systems in the Central Valley. Program changes included moving the release location of the hatchery fish to Jersey Point to balance increased survival and reduced straying, conducting fall pulse flows, and innovative fish release strategies to increase survival of naturally-produced juveniles. One action that significantly improved returns to the Mokelumne River in 2017 was the extended DCC closures of 5 days per week beginning in mid-September. These closures reduced the stray rate of Mokelumne origin salmon to other systems. With all of these actions, the goal is to maximize the number of salmon surviving and returning to the Mokelumne River.

Since 2009, the strategy of releasing pulse flows has been extremely successful in boosting salmon returns to the river. EBMUD coordinated with Woodbridge Irrigation District (WID) on eight pulse flow events in 2017. The pulses were conducted from September through November and all resulted in large increases in daily passage of salmon past Woodbridge Dam. Staff worked with operators on the Stanislaus River to coordinate timing of flow pulses to reduce competing migration cues and thus reduce straying.

The Mokelumne salmon population continues to make up a significant portion of the commercial and recreational catch off the coast of California. Numbers released by the California Department of Fish and Wildlife (CDFW) show that Mokelumne salmon made up approximately 20 percent of the commercial and 35 percent of the recreational catch respectively last year. Considering the size of watershed, average annual runoff, and modest Delta outflow contribution, the Mokelumne's contribution to the salmon industry is significant. Unfortunately, due to the poor Sacramento River Basin returns in 2017, the 2018 commercial and sport fishing season is expected to be severely restricted.

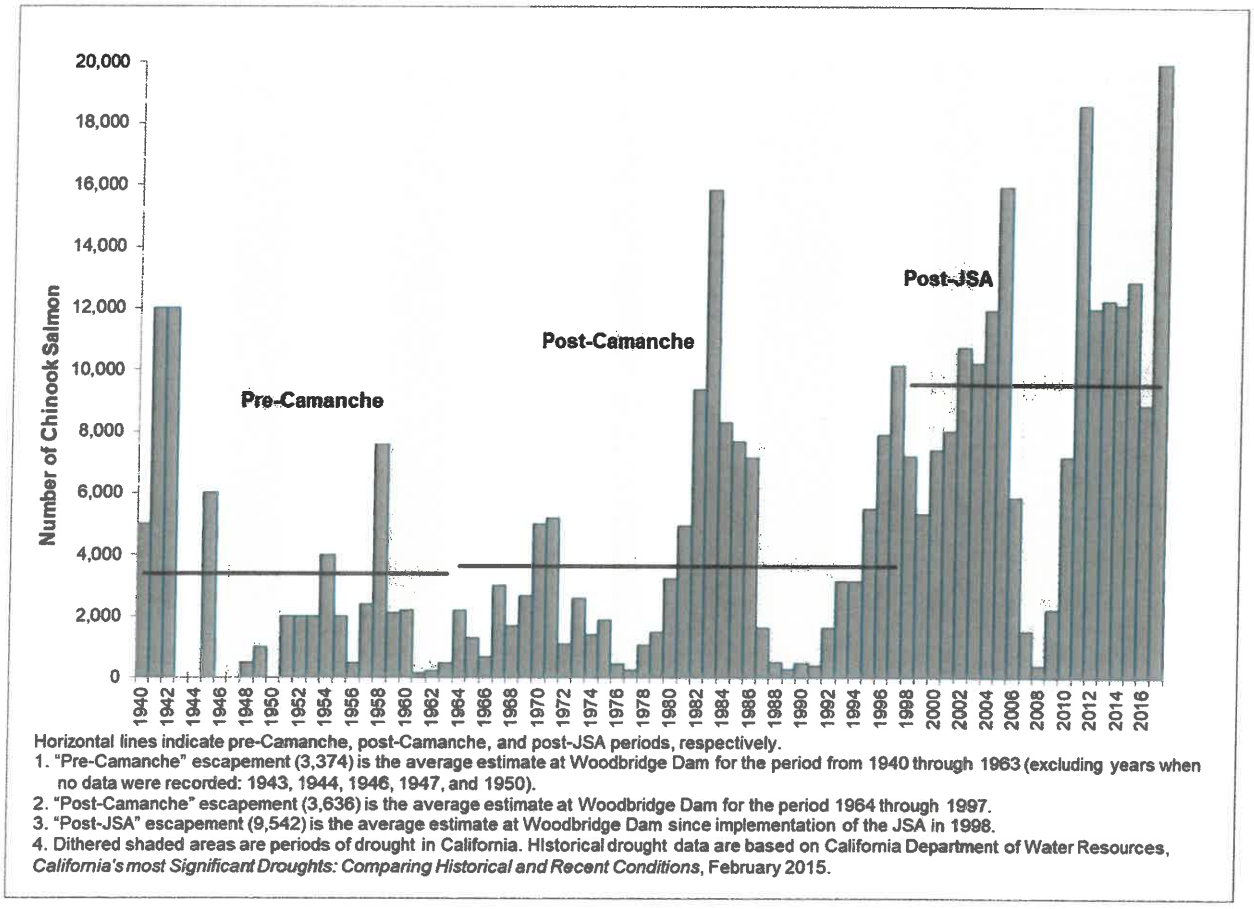
Steelhead trout returns for the Mokelumne River (primarily measured at the hatchery) have never been substantial since records were first kept in 1963. The District and various resource agency partners who comprise the Mokelumne River Hatchery Coordination Team (HCT) have, over the course of the last 10 - 15 years, implemented numerous measures such as, changing release locations, eliminating egg imports, and improving rearing techniques. In 2017, over 500 adult steelhead entered the hatchery and resulted in an egg take of approximately 1 million. As a comparison, the 2015 return was 64 steelhead, resulting in 47,000 eggs being collected. With small population numbers, the HCT is particularly concerned about inbreeding in the Central Valley steelhead population. To address this, the HCT collaborated with the National Marine Fisheries Service Southwest Science Center to implement new spawning strategies including holding over adults in the hatchery for brood stock the following season. Approximately 200 adult females were held from 2016, some succumbed to pre-spawn mortality, but approximately 50 were available to be used to augment the 2017 spawning egg collection, and 50 will be held for 2018. This is the first time the strategy has been used at a Central Valley hatchery and its outcome will be evaluated based on future returns.

NEXT STEPS

Delta conditions continue to challenge juvenile salmon migrating from the Mokelumne River and overcoming these effects will be at the forefront of fisheries management activities. Staff, working with resource agencies, will continue to implement actions to improve the survival of juvenile salmon as they migrate through the central delta. These actions will include barging of a portion of the hatchery production and spring pulse flows. District biologists will continue to be engaged with resource agency staff, advocacy groups and others in key forums, such as the Central Valley Project Improvement Act Science Integration Team, Hatchery Scientific Review Group Statewide Policy Team and Central Valley Hatchery Coordination Team, to help guide the process towards an outcome that will continue the successes of the last eight years. Additionally, EBMUD is actively involved in the Bay Delta Water Quality Control Plan Phase 2 process and will continue work with resource agencies and others to ensure that any outcome is protective of the Mokelumne fishery and that the hatchery continues to support a sustainable fishery in a manner that is compatible with the protection and recovery of listed salmonids in the Central Valley.

ARC:JS:dec

I:\SEC\2018 Board Related Items\Committees 2018\041018_Planning ctte\WNR – Mokelumne Fall Run Chinook Salmon Returns – 2017.docx



Horizontal lines indicate pre-Camanche, post-Camanche, and post-JSA periods, respectively.

1. "Pre-Camanche" escapement (3,374) is the average estimate at Woodbridge Dam for the period from 1940 through 1963 (excluding years when no data were recorded: 1943, 1944, 1946, 1947, and 1950).
2. "Post-Camanche" escapement (3,636) is the average estimate at Woodbridge Dam for the period 1964 through 1997.
3. "Post-JSA" escapement (9,542) is the average estimate at Woodbridge Dam since implementation of the JSA in 1998.
4. Dithered shaded areas are periods of drought in California. Historical drought data are based on California Department of Water Resources, *California's most Significant Droughts: Comparing Historical and Recent Conditions*, February 2015.

Figure 1- Annual Chinook salmon escapement totals to the lower Mokelumne River since 1940 with drought periods delineated.

EAST BAY MUNICIPAL UTILITY DISTRICT

DATE: April 5, 2018

MEMO TO: Board of Directors

THROUGH: Alexander R. Coate, General Manager

FROM: Richard G. Sykes, Director of Water and Natural Resources

SUBJECT: Annual Recreation Report – 2017

INTRODUCTION

This memo provides an update on recreation activities in EBMUD's watersheds during the past year and reports on key performance indicators (KPIs) established for recreation in the Mokelumne and East Bay Watersheds. A presentation on this information will be made to the Planning Committee on April 10, 2018.

SUMMARY

EBMUD's watersheds receive nearly 2 million visitors per year. Visitation is predominantly at the developed recreation areas, with most visitation occurring at Lafayette and Camanche Reservoirs. Overall visitation in 2017 increased. In the East Bay, there was a slight drop from 2016 levels to a total of 1,227,300 visitors. Visitation in the Mokelumne was nearly 663,000 visitors which is a substantial (21%) increase over 2016. Revenues at Mokelumne recreation areas in 2017 reached an all-time high and were a full 20 percent over the prior year. Significant activities in 2017 include:

- Staff worked closely with our San Joaquin County partners to prohibit boat launching due to high flows and hazardous conditions in the river below Camanche from January through June;
- Rocky Mountain Recreation Company began a five-year contract to oversee the operations at Pardee Recreation Area;
- Carr Ranch was added to the watershed and opened for public recreation; and
- Nearing completion of the 2017 East Bay Watershed Master Plan.

Recreation programs and projects help to ensure a safe and enjoyable experience for our recreational guests and support the District's Strategic Plan goals of Long-Term Water Supply, Water Quality and Environmental Protection, and Long-Term Infrastructure Investment.

Mokelumne Watershed Recreation

The Mokelumne Watershed Master Plan and subsequent management plans establish a number of KPIs for evaluating recreational services based on financial performance, public safety and customer satisfaction levels. The attached Tables 1 through 4 show annual visitation for the Mokelumne Area recreation venues and performance results based on the established KPIs.

KPIs were met for eleven of the twelve benchmarks tracked at the Mokelumne Recreation areas. Visitor safety and customer satisfaction KPIs were met at all Mokelumne Recreation areas, and the boating safety KPI held steady at just over the benchmark. The benchmark of less than one boating accident per 10,000 boat launches has only been met in two of the six years this has been tracked. Staff will work with local law enforcement to attempt to more effectively inform the boating public and monitor on-water activities to try and reduce boating accidents.

The improved water levels in the latter part of 2016 and all of 2017 resulted in marked increases in attendance and resulted in the highest overall visitation on record in the Mokelumne. Cost recovery KPIs were met in FY17 at all four recreation areas.

In 2017, a number of significant infrastructure projects and programs were completed or continued:

- The dilapidated 25-year-old open berth dock structure at Camanche North Shore was removed from the water and completely refurbished for visitor use;
- The Camanche South Shore Marina parking lot was repaired, sealed and restriped for parking and Americans with Disabilities Act access;
- Construction was completed on the Moccasin Campground improvements just in time for the Memorial Day crowds at Camanche South Shore; and
- The 2017 season marked the tenth successful season of inspection, monitoring and regulation of incoming boats to prevent infestations of Quagga Mussels, Zebra Mussels and other aquatic invasive species.

Many of these important projects are completed through the Maintenance/Capital Improvement Fund which typically, at Camanche, collects 20 percent of recreation revenue and applies it towards park infrastructure and maintenance needs.

East Bay Watershed Recreation

KPIs are also used in the East Bay Watersheds for evaluating recreational services based on financial performance, public safety and customer satisfaction levels. The attached Tables 5 through 8 show annual visitation for the East Bay Recreation Area venues and performance results based on the KPIs.

Opportunities to explore and enjoy nature continue to attract visitors to the East Bay reservoirs and watershed trails. In 2017, visitation at the Lafayette and San Pablo Recreation facilities declined slightly, 7 percent at Lafayette and 2 percent at San Pablo respectively, while the

watershed trail system showed a significant 21 percent increase. Cost recovery at Lafayette and San Pablo Recreation Areas remain well above target levels. Recreation safety in the East Bay continues to be very good. There were no major accidents or reported public safety related events in the period. Customer satisfaction surveys were 89 percent "Good" or "Excellent" in 2017. During 2017, the District added the 605-acre Carr Ranch to the watershed including opening of new trails on the Ranch which connect to the existing trail network in the Upper San Leandro Watershed.

NEXT STEPS

For 2018 in the Mokelumne Watershed, the focus will be to complete paving renewal in the Camanche Recreation Areas, assist Rocky Mountain Recreation Company to a good start in their first year at Pardee Recreation Area, and to address the challenges at the smaller, unstaffed recreation areas of Middle Bar and the Mokelumne River Day Use Area. In the East Bay, replacement of the aged force sewer main, resurfacing of the paved hiking trail, and upgrading self-contained restrooms facilities at Lafayette Reservoir will continue in 2018. At the San Pablo Recreation Area, resurfacing of paved service roads and hiking trails will continue to be a priority. Finally, pending approval of the updated East Bay Watershed Master Plan, trail improvements are planned to accommodate limited bicycle access on the East Bay watershed.

ARC:RGS:dec

Attachment

Table 1 – Annual Visitation at Mokelumne Recreation Venues (Visitor Days)

Location	CY 2013	CY 2014	CY 2015	CY 2016	CY 2017
Camanche North Shore	193,050	170,525	147,726	192,660	242,036
Camanche South Shore	189,360	168,291	164,264	211,040	254,378
Pardee Recreation Area	71,58	66,769	48,140	57,224	89,926
Mokelumne River Day Use	58,242	60,753	53,520	64,252	55,233
Camanche Hills Hunting Preserve	12,962	13,262	12,768	12,462	12,610
Watershed Trails	7,838	8,462	8,259	9,417	9,519
Total	**533,010**	**487,361**	**434,677**	**547,055**	**663,702**

Table 2 – KPI Performance Results: Percent Cost Recovery for Mokelumne Venues

Location	Goal % Cost Recovery	FY 13	FY 14	FY 15	FY 16	FY 17
Camanche North Shore Recreation Management Area	45%	66%	66%	67%	54%	64%
Camanche South Shore Recreation Management Area	45%	64%	64%	63%	63%	54%
Camanche Hills Hunting Preserve	95%	96%	93%	87%	94%	100%
Pardee Recreation Area	40%	41%	40%	45%	34%	46%

**A change in concession reporting skewed the North Shore/South Shore percentages for FY16.*

Table 3 – KPI Performance Results: Public Safety in the Mokelumne Watershed

KPI	Goal	CY 2013	CY 2014	CY 2015	CY 2016	CY 2017
Boating Accidents (# of documented accidents per boating day)	.01%	.019% 5 accidents 26,713 vessels	.005% 1 accident 20,461 vessels	.000% 0 accidents 18,223 vessels	.011% 3 accidents 28,130 vessels	.011% 4 accidents 36,918 vessels
Visitor Incidents (# of documented visitor incidents per visitor day)	.2%	.12% 634 incidents 533,010 visitors	.06% 294 incidents 487,361 visitors	.06% 273 incidents 434,360 visitors	.04% 207 incidents 547,055 visitors	.04% 243 incidents 663,702 visitors

Table 4 – KPI Performance Results: Visitor Satisfaction Survey for the Mokelumne Venues

Location	Goal	CY 2013	CY 2014	CY 2015	CY 2016	CY 2017
Camanche North Shore	80% "Good" or "Excellent"	89%	83%	95%	97%	95%
Camanche South Shore	80% "Good" or "Excellent"	87%	91%	91%	89%	93%
Camanche Hills Hunting Preserve	80% "Good" or "Excellent"	100%	99%	100%	99%	99%
Pardee Recreation Area	80% "Good" or "Excellent"	87%	93%	97%	98%	96%
Mokelumne River Day Use	80% "Good" or "Excellent"	95%	94%	96%	97%	95%
Watershed Trails	80% "Good" or "Excellent"	95%	98%	99%	98%	98%

Table 5 – Recreation Visitation at East Bay Recreation Venues (Visitor Days)

Location	CY 2012	CY 2013	CY 2014	CY 2015	CY 2016	CY2017
Lafayette Recreation Area	940,960	907,000	1,020,616	1,106,994	1,080,662	1,003,287
San Pablo Recreation Area	127,351	130,941	143,045	153,045	140,638	137,513
East Bay Trails	47,720	52,160	57,133	68,300	71,140	86,500
Total	**1,079,520**	**1,116,031**	**1,220,794**	**1,328,339**	**1,292,700**	**1,227,300**

Table 6 – KPI Performance Results: Percent Cost Recovery for the East Bay Venues

Location	Goal (% Cost Recovery)	FY 2014	FY 2015	FY 2016	FY2017
Lafayette Recreation Area	65%	84%	82%	79%	79%
San Pablo Recreation Area	40%	N/A	54%	57%	55%

Table 7 – KPI Performance Results: Public Safety in the East Bay Watersheds

KPI	Goal	CY 2014	CY 2015	CY 2016	CY2017
Visitor Incidents (# of documented visitor incidents per visitor day)	.2%	.02% 281 incidents 1,220,794 visitors	.03% 403 incidents 1,328,339 visitors	.03% 371 incidents 1,292,700 visitors	.04% 447 incidents 1,227,300 visitors

Table 8 – KPI Performance Results: Visitor Satisfaction Surveys East Bay Venues

Location	Goal	CY 2015	CY 2016	CY2017
All East Bay Recreation Areas	80% "Good" or "Excellent"	94%	92%	89%

East Bay Municipal Utility District

MOKELUMNE AREA RECREATION

2017 ANNUAL REPORT

EBMUD

Presented to the

Camanche Regional Park Advisory Board

at its March 2018 regular meeting.

EBMUD's MOKELUMNE RECREATION AREAS
2017 ANNUAL REPORT

I RECREATION AREA MANAGEMENT

A. East Bay Municipal Utility District (EBMUD)

The Honorable Board of Directors of EBMUD

Alexander R. Coate	General Manager
Richard G. Sykes	Director, Water & Natural Resources Department
Kent Lambert	Manager of Watershed & Recreation, Mokelumne
Mark Bolton	Ranger Supervisor, Pardee-Camanche Recreation Unit
Chris Swann	Ranger Supervisor, Mokelumne Watershed Unit
Tim Cox	Ranger Supervisor, Resource Patrol Unit
Lisa Stuart	Sr. Administrative Clerk and administrative support to CRPAB

B. Concessionaires

Camanche Recreation Areas

John Koeberer	President, Urban Parks Concessionaire
Pam Koeberer	CFO, Urban Parks Concessionaire
Kris Koeberer	Vice-President, Urban Parks Concessionaire
Hismael Guerrero	General Manager, Camanche Recreation Co. (CRC)

Pardee Recreation Area

Richard Cooper	President, Pardee Lake Recreation, Inc.
Kerry Cooper	Vice-President, Pardee Lake Recreation, Inc.

Camanche Hills Hunting Preserve

Larry Skinner	President, Camanche Hills Hunting Preserve, Inc. (CHHP)
L. Marshall Skinner	Vice-President, CHHP

C. County Supervisors for EBMUD's Mokelumne Recreation Areas in 2017

Richard Forster	Supervisor, District 2, Amador County
Gary Tofanelli	Supervisor, District 1, Calaveras County
Jack Garamendi	Supervisor, District 2, Calaveras County
Chuck Winn	Supervisor, District 4, San Joaquin County

D. Camanche Regional Park Advisory Board (CRPAB) - 2017

Rinehart Heinitz	Ione	Amador County
Jim Wishart	Ione	Amador County
Albert Alt	Valley Springs	Calaveras County
Bob Van Bibber	Valley Springs	Calaveras County
Mary Fuhs	Acampo	San Joaquin County
Norm Walker –Chair	Lodi	San Joaquin County

E. CRPAB Regular Meeting in 2017

Two regular business meetings of the Camanche Regional Park Advisory Board were held on:

March 16, 2017 at Mokelumne Watershed Headquarters

November 16, 2017 at Clements Fire Station

Two focus group sessions were held on:

July 20, 2017 at Camanche Recreation Area – Overview of Camanche Recreation Area Programs and Facilities – information provided at this focus group included tours of the facilities at the recreation area including the campgrounds, marina and café.

November 16, 2017 at Clements Fire Station – Mokelumne River Day Use Area (MRDUA) – information provided at this focus group related to the history of the park and EBMUD's current operations there, including a presentation on fish habitat improvements.

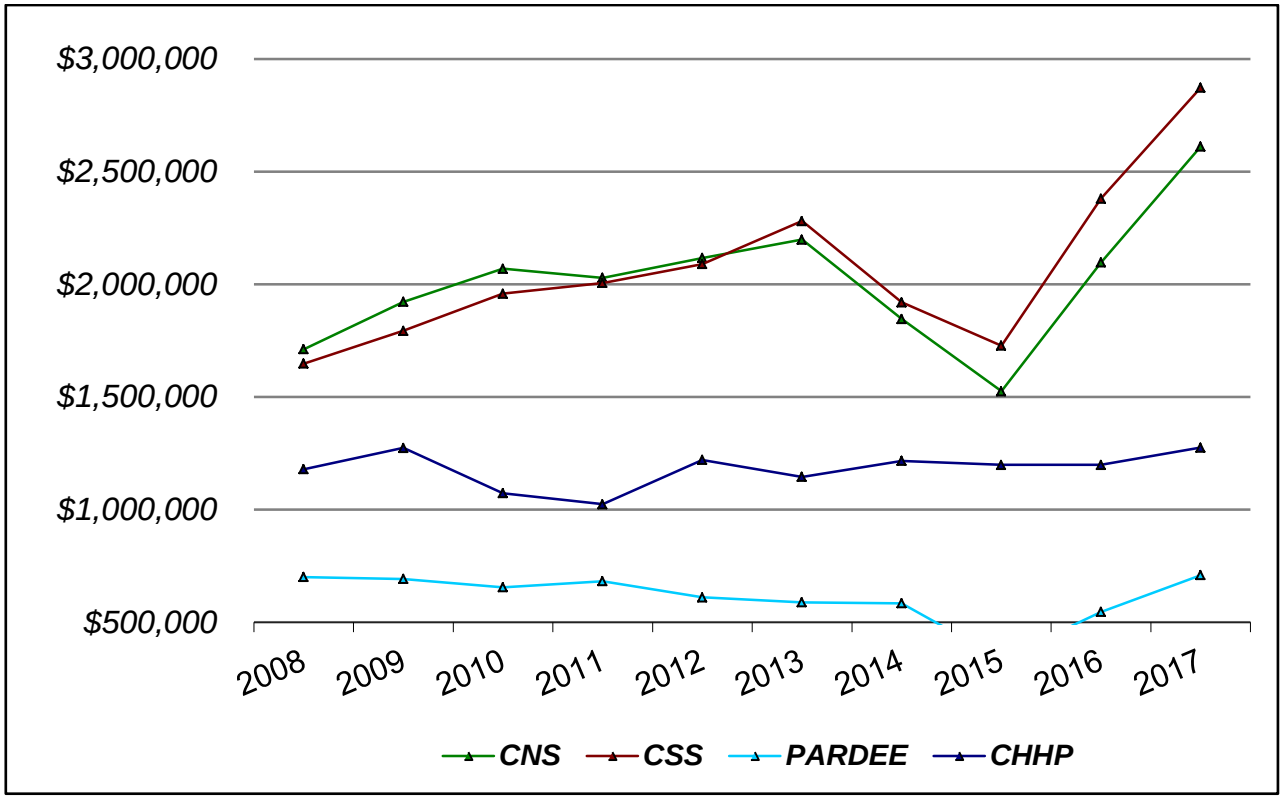
There were no special meetings in 2017.

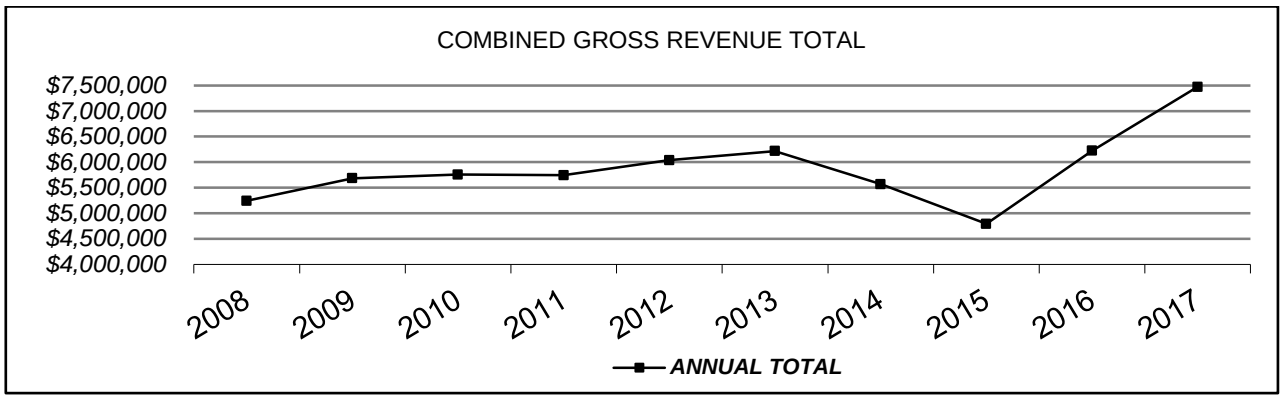
Cover: Pardee Spill, January 2017. Photo by Lisa Stuart

II CONCESSION REVENUE/VISITATION

A. Annual Gross Revenue

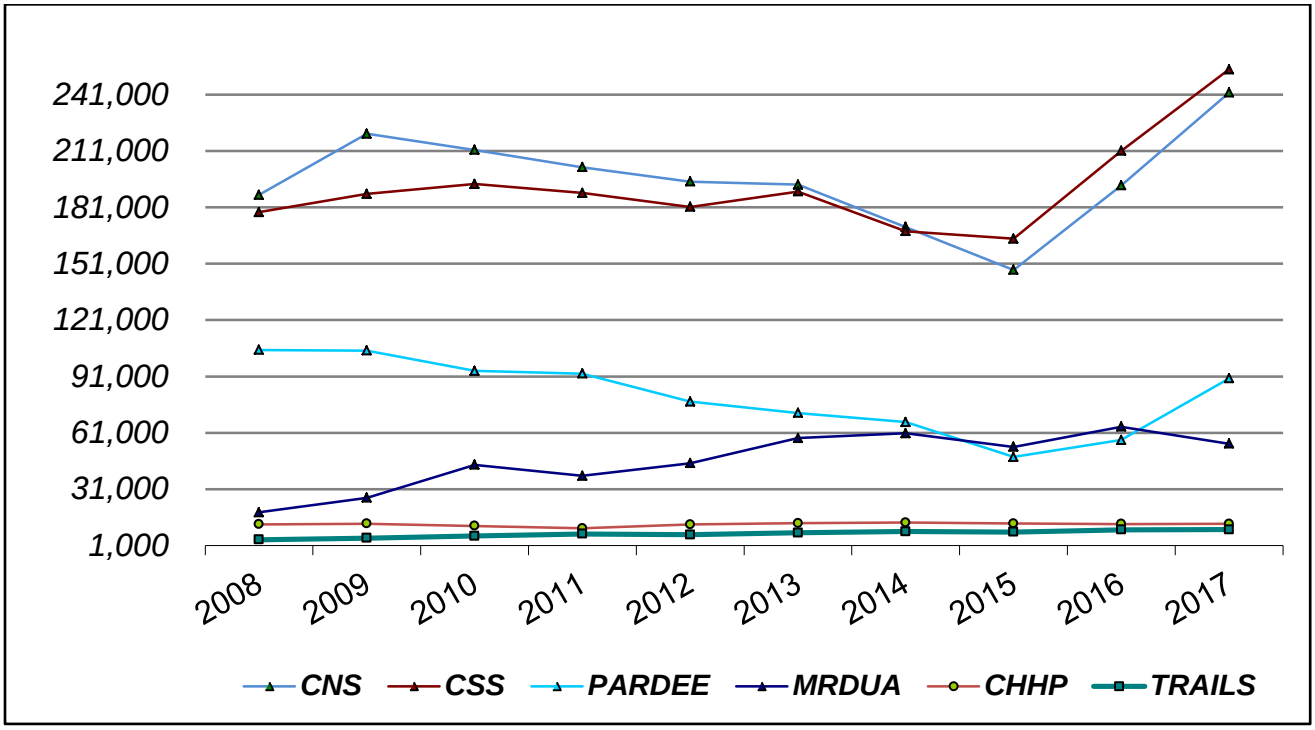
YEAR	CNS	CSS	PARDEE	CHHP	ANNUAL TOTAL
2008	$1,712,584	$1,648,341	$701,456	$1,180,102	$5,242,483
2009	$1,922,607	$1,793,872	$692,848	$1,274,408	$5,683,734
2010	$2,069,369	$1,958,913	$655,608	$1,072,966	$5,756,856
2011	$2,028,986	$2,006,176	$682,877	$1,024,076	$5,742,115
2012	$2,116,962	$2,089,719	$611,305	$1,220,792	$6,038,778
2013	$2,199,044	$2,281,148	$589,226	$1,145,393	$6,214,811
2014	$1,846,493	$1,920,050	$584,765	$1,216,982	$5,568,290
2015	$1,525,651	$1,728,206	$336,981	$1,199,135	$4,789,973
2016	$2,097,412	$2,380,703	$546,621	$1,198,695	$6,223,431
2017	$2,611,701	$2,873,529	$709,772	$1,275,692	$7,470,694

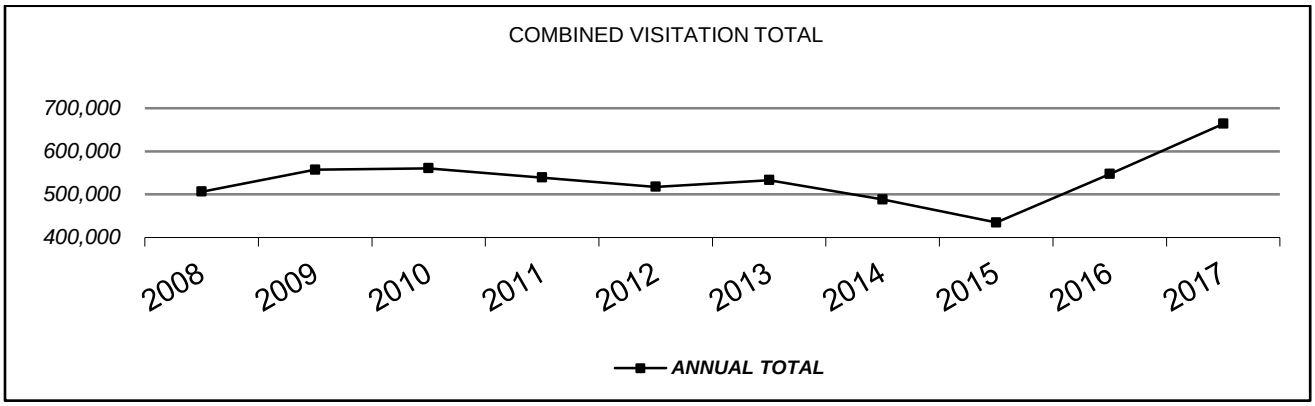




B. Annual Visitation

YEAR	CNS	CSS	PARDEE	MRDUA	CHHP	TRAILS	ANNUAL TOTAL
2008	187,614	178,385	105,109	18,683	12,327	4,178	506,296
2009	220,107	188,146	104,744	26,503	12,684	5,012	557,196
2010	211,541	193,416	93,965	44,023	11,520	6,122	560,587
2011	202,320	188,662	92,501	38,109	10,222	7,205	539,019
2012	194,689	181,250	77,611	44,889	12,252	6,785	517,476
2013	193,050	189,360	71,558	58,242	12,962	7,838	533,010
2014	170,525	168,291	66,769	60,753	13,262	8,462	488,062
2015	147,726	164,264	48,140	53,520	12,768	8,259	434,677
2016	192,660	211,040	57,224	64,252	12,498	9,417	547,091
2017	242,036	254,378	89,926	55,233	12,610	9,519	663,702





III RECREATION KEY PERFORMANCE INDICATORS (KPI's)

Financial KPI - Cost Recovery Through User Fees

This index compares the overall operating costs of providing water, sanitation, facility access and other essential visitor services (capital costs excluded) with the total collected user fees. Distinct financial targets have been developed for each facility based upon the type of recreation provided and published industry standards.

Recreation Management Area and % Cost Recovery Target	FY 2011 Performance	FY 2012 Performance	FY 2013 Performance	FY 2014 Performance	FY 2015 Performance	FY 2016 Performance	FY 2017 Performance
Camanche North Shore 45%	46%	64%	66%	66%	67%	54%*	64%
Camanche South Shore 45%	34%	58%	64%	64%	63%	63%*	54%
Cam. Hills Hunting Preserve 95%	76%	100%	96%	93%	87%	94%	100%
Pardee Recreation Area 40%	33%	26%	41%	40%	45%	34%	46%

*A change in concession reporting skewed the North Shore/South Shore percentages for FY16 only.

Public Safety KPI - Incidents as a Percentage of Visitation

The first of these indices looks at the number of boating accidents resulting in injuries or more than $500 damage compared to the number of boat launches. The second of these indices looks at the number of documented evictions, citations, and arrests compared to the total visitation. Public safety targets were developed based on industry standards.

RMP Goal	2012 Result	2013 Result	2014 Result	2015 Result	2016 Result	2017 Result
Boating Safety **<.01%**	**.015%** 4 Accidents 27,267 Vessels	**.019%** 5 Accidents 26,713 Vessels	**.005%** 1 Accidents 20,461 Vessels	**.00%** 0 Accidents 18,223 Vessels	**.011%** 3 Accidents 28,130 Vessels	**.011%** 4 Accidents 36,918 Vessels
Visitor Incidents **<.2%**	**.07%** 363 Incidents 488,063 Visitors	**.12%** 634 Incidents 523,121 Visitors	**.06%** 294 Incidents 487,361 Visitors	**.06%** 273 Incidents 434,360 Visitors	**.04%** 207 Incidents 547,055 Visitors	**.04%** 243 Incidents 663,702 Visitors

Visitor Satisfaction - Survey results regarding visitor experiences

This index looks at the result of a randomized sample of visitors queried regarding their perception of six performance areas: Courtesy of Staff, Cleanliness of Facilities, Value of Services, Safety and Security of Facilities, Availability of Information, and Overall Satisfaction with their experience. Each category provided an opportunity for the following five responses: Excellent, Good, Fair, Poor, and Not Applicable. Visitor satisfaction targets were developed based upon industry standards and the survey results (excluding the Not Applicable responses) are below.

Location	2014 (Goal=80%) % Ratings of Good or Excellent	2015 (Goal=80%) % Ratings of Good or Excellent	2016 (Goal=80%) % Ratings of Good or Excellent	2017 (Goal=80%) % Ratings of Good or Excellent
Camanche North Shore Rec. Area	443/534=83%	1280/1347=95%	1249/1291=97%	1263/1329=95%
Camanche South Shore Rec. Area	686/751=91%	1080/1193=91%	982/1110=88%	1063/1139=93%
Camanche Hills Hunting Preserve	409/413=99%	348/348=100%	349/357=99%	372/377=99%
Pardee Recreation Area	328/351=93%	837/865=97%	803/818=98%	629/657=96%
Mokelumne River Day Use	409/434=94%	292/304=96%	301/311=97%	324/342=95%
EBMUD Trails	544/555=98%	279/283=99%	250/254=98%	349/357=98%

IV RESERVOIR ELEVATION AND STORAGE

CAMANCHE RESERVOIR

Spill elevation: **235.5 feet above sea level**
Reservoir Capacity: **417,000 acre feet**

	2016		2017	
MONTH	**ELEVATION (Feet)**	**STORAGE (%)**	**ELEVATION (Feet)**	**STORAGE (%)**
January	174.60	21.7	213.92	64.9
February	180.50	26.3	232.6	94.9
March	197.92	43.9	219.13	72.7
April	208.57	57.3	215.97	67.9
May	217.10	69.6	217.25	69.8
June	222.94	78.7	233.25	96.0
July	220.29	74.5	229.62	89.7
August	218.42	71.6	227.04	85.4
September	217.00	69.4	223.69	79.9
October	215.81	67.7	218.16	71.2
November	215.55	67.3	216.91	69.3
December	217.18	69.7	219.15	72.7

PARDEE RESERVOIR

Spill elevation: **567.7 feet**
Reservoir Capacity: **203,795 acre feet***

	2016		2017	
MONTH	**ELEVATION (Feet)**	**STORAGE (%)**	**ELEVATION (Feet)**	**STORAGE (%)**
January	550.97	82.4	567.94	103.3
February	556.71	88.2	567.54	102.8
March	565.64	97.8	562.34	97.1
April	559.25	90.9	565.86	100.9
May	566.78	99.0	568.62	104.1
June	562.52	94.3	568.01	103.4
July	563.57	95.5	565.23	100.2
August	562.51	94.3	562.39	97.1
September	560.61	92.3	560.89	95.5
October	560.77	92.7	560.19	92.0
November	563.06	95.1	566.51	98.8
December	560.35	92.2	562.68	94.7

*Revised in 2016 as a result of bathymetric survey

Elevation readings are taken on the last day of each month.

V EBMUD ACTIVITIES

A. Camanche Recreation Areas – North and South Shores

EBMUD Ranger Supervisor Mark Bolton, with a staff of three Ranger Naturalists and one Senior Ranger under his direction, was responsible for monitoring daily concessionaire operations and managing projects through the Maintenance/Capital Improvement Fund (MCIF) program and EBMUD capital projects outside the scope of the concessionaire agreement.

1. Projects

Enhancing Recreation Area Facilities

In early 2017, heavy precipitation increased the likelihood that Camanche Reservoir could spill. So ranger staff, working with inmates from the Department of Corrections, dismantled the old boat restraining barrier, replaced 18 of the booms and all the hardware and reinstalled the barrier in the reservoir. The 2 ½-day effort makes it safer for boaters in the event that water starts flowing over the spillway.

Ranger staff completed a full renovation of the campground loop in Moccasin Campground at South Shore in time for Memorial Day weekend. The new loop includes 21 refurbished campsites, a paved roadway, and 66 newly-planted trees with irrigation. Approximately 500 bollards were installed to protect the new infrastructure, allowing for the opening just in time for the busy holiday and it was full to capacity for the weekend.

Ranger staff took on the task of manufacturing 400 hazard marker buoys for use on the Mokelumne area reservoirs to protect boaters from submerged obstacles. The project, led by Ranger/Naturalist II Dustin Wyckoff, supplied the District with enough buoys to last about 6 years and saved approximately $95 per buoy (for a total of $38,000).

Working with the District's sign shop, Ranger staff designed a new billboard to replace the old, faded Camanche sign located on State Highway 12 in Wallace. The old sign was demolished and the new aluminum sign with a marine-grade plywood backing was installed in July.

This South Shore Marina parking lot serves boating guests providing 75 parking spaces for vehicles with boat trailers. It was first installed in the early 90's, and had deteriorated to the point of requiring repairs in 2017. Approximately 27,000 square feet of asphalt was removed, the earth below compacted and 4-8" of asphalt installed. Additionally 120,000 of asphalt surface was slurry sealed. The entire area was then restriped to designate regular and ADA parking spaces.

In response to the North Shore Homeowners Association, Park Management has embarked on the creation of a "pocket park" on Modoc Court. This project provides foot access from Miwok Drive down to the park and on to the lower set of stairs accessing the lake shore. It will soon incorporate an ADA parking space, a portable restroom, picnic tables and barbecue, and a turn-around for vehicle traffic at the end of the court.

The North Shore open berth had deteriorated significantly over the past 5 years and needed to be removed or replaced. Due to popular demand, funding for its renovation was set aside for a complete overhaul. The 160' dock was removed from the lake, hauled off-site and rebuilt. The new structure has all new compliant floatation tubs, framework, decking, and electrical lights/outlets.

2. Programs

Children's Fishing Pond

Senior Ranger Naturalist Scott Wiemerslage and Ranger/Naturalist II Andy Lockwood partnered up to host the third annual Kid's Fishing Day at Camanche South Shore Tule Pond. Prior to the event, 450 pounds of rainbow trout were planted. EBMUD's Fisheries and Biologist staff shocked and transported almost 500 additional sunfish and bass from the main body of Lake Camanche to the pond. Volunteers from Camanche South Shore HOA and the Delta Fly Fishers were present to assist with cooking a hot dog lunch and rigging fishing gear. Camanche Recreation Company featured an hourly raffle and offered loaner fishing gear to those who wanted to give fishing a try. EBMUD's Division Manager Kent Lambert hosted the popular fish fry station for the third year in a row.

Integrated Pest Management (IPM)

Under the supervision of EBMUD ranger staff, Camanche Recreation Company performed annual squirrel population control efforts. In 2016, a total of 258 squirrels were taken at Camanche. The purpose of this program is to protect public safety and park assets.

EBMUD ranger staff supervised another successful season of Canada goose management at Camanche Reservoir. For the eighth year in a row, public hunting was allowed on the main body of Camanche under special permit. During the 2017-2018 hunting season, 107 birds were taken on Camanche.

After obtaining a special permit from the Department of Fish and Wildlife (DF&W), District staff set about locating goose eggs on Camanche reservoir shorelines and islands and applying corn oil to the shells. The oil renders the eggs unviable, but the hen continues to sit on them without laying more. Every year there are many hundreds of nests and thousands of Canada goose eggs laid at Camanche. Nine nests containing 38 eggs were treated. This is one prong in the IPM effort to improve reservoir water quality and visitors' experiences by managing the numbers of geese residing on the lake. The goal of the combined hunting and egg depredation efforts is to limit the population of resident geese on Camanche to 2,000, which is the estimated carrying capacity of the reservoir.

In an effort to reduce the aquatic vegetation to enhance the fishing experience in the children's fishing cove of Tule Pond, a biological survey regarding invasive aquatic species was conducted on the pond. Recommendations for controlling the invasive elodea and Egeria included exposing the aquatic vegetation in order to cause a die-off. Permits were obtained from the DF&W to conduct this activity. Ranger staff resurrected an old siphon system in the pond to draw down the pond elevation, leaving the kid's fishing cove high and dry. The goal is to allow the aquatic weeds to die over a couple of months and then refill the pond in time for the 2018 Kid's Fishing Day.

Forestry

The annual Hazard Tree Inspection was completed at Camanche South Shore this year. A total of 457 trees were individually inspected. As a result 28 underwent mitigation work to address issues: 19 were removed, 5 trees underwent crown cleaning, and 4 trees had end weight reduction.

Ranger staff planted a total of 107 fifteen gallon trees in 2017. The new Moccasin campground installation received the bulk of those, while the new Sugarloaf campground installation received 28 trees. A newly enhanced riparian zone, near the amphitheater also received 10 trees.

To address mortality of new plantings in 2016 and earlier, Camanche Recreation Company planted 10 trees at North Shore and 48 trees at South Shore.

Fish Stocking

During 2017, the Fishing Access Fund planted a total of 69,000 pounds of trout in Camanche Reservoir and ponds. Additionally, 500 pounds of trout were provided by California Department of Fish and Wildlife. An additional 5,830 northern-strain largemouth bass fingerlings were planted in Camanche as part of an annual effort to enhance the bass fishery.

3. 2018 Planned Projects

- The electrical system will be re-installed at the South Shore floating marina following the construction of the new ADA ramp
- The South Shore Mobilehome Park entrance gate area will be repaved and a new detection loop for the automatic gate will be installed
- A new covered equipment building will be installed in the North Shore maintenance yard
- Three aged and failing Information Boards will be replaced with new all-steel boards which are powder coated to provide longevity
- Another South Shore rental cottage is scheduled to receive a renovation which will include a relocation of the entry door as well as replacement of windows, flooring, and furniture
- Installation of shade structures is planned for South Shore's Oaks Campground and Marina Grill, and North Shore's MHP #1 basketball courts
- Campground shade enhancements proposed for 2018 include 20 trees planted by rangers and another 90 paid for through the MCIF tree enhancement program planted by Camanche Recreation Company

B. Camanche Hills Hunting Preserve (CHHP)

EBMUD Ranger Supervisor Mark Bolton and Senior Ranger Scott Wiemerslage, with a staff of three Ranger Naturalists under their direction, had the responsibility for monitoring daily concessionaire operations and managing projects through the Maintenance/Capital Improvement Fund program and EBMUD capital projects outside the scope of the concessionaire agreement.

1. Projects

At the beginning of the 2017 hunting season, Ranger staff installed a new information sign at the Camanche Hills Hunting Preserve clubhouse. The new sign has 4 panels that provide clear direction and is an attractive improvement over the previous 9-panel sign, many of which were of different vintages.

Ranger staff purchased and installed a "floating island" on the Willows Pond. The island has been anchored in the middle of the pond and planted with various species of grasses and shrubs that are capable of thriving on the foam-like membrane of the island, receiving sustenance from the available nutrients in the pond. This island will be one additional approach to reducing nutrient levels in the pond, thereby minimizing the blue-green algae bloom that occurred in 2016 in our ponds, causing their closure.

2. Programs

Integrated Pest Management (IPM)
Ranger staff continued the plan to address invasive species at CHHP. District staff treated 16 acres of roadside star thistle using the specialized herbicide prescription. This effort will continue in future years in order to manage various invasive species in the 1,500-acre preserve.

Forestry
Ranger staff revegetated a section of the hunt preserve's Zone H with native species including toyon, redbud, elderberry, coyote brush, buck brush, and deer brush. Twenty-five planting location were selected and prepped with special caging to protect the plants from vole attacks.

3. 2018 Planned Projects

- Replacement of a large area of asphalt in the parking lot near the clubhouse
- Replacement of a 20-year-old utility vehicle
- Sixty-five garbage cans are slated for replacement

C. Mokelumne River Day Use Area (MRDUA)

EBMUD Ranger Supervisor Tim Cox, with a staff of two Ranger Naturalists and one Senior Ranger under his direction, was responsible for the daily operations and maintenance of the MRDUA. Except for services that are contracted out (restroom servicing, weekend security) the MRDUA remains EBMUD's sole recreation facility in

the Mokelumne area that is not maintained by a private concessionaire. This facility remains free to the public.

1. Programs

EBMUD continues to be an active participant in the "KIDS DON'T FLOAT, A Life Jacket Will" program which provides free access to life jackets for river visitors. When established in 2010, EBMUD was one of three agencies working in collaboration to install and maintain containers filled with free, loaner life jackets. River users borrow a life jacket from a bin at MRDUA and drop it off at Stillman Magee County Park (in Clements) in containers installed by San Joaquin County Parks staff. Clements Fire Station personnel retrieve the borrowed vests and return them to the container at MRDUA. EBMUD and Clements Fire continue to work together to maintain adequate supplies of life vests, in part by using the funds generated by the recycling program at MRDUA. Since the program was instituted, there have been no known drowning incidents of users floating downriver from the MRDUA.

EBMUD staff welcomed the assistance of students from San Joaquin County's Lodi Academy that has adopted the MRDUA as "their" park with the intent to keep it looking nice for everyone's enjoyment. On two occasions in 2017, approximately 20 students assisted rangers with litter pick-up and painting projects at several locations throughout the park.

2. Projects

In 2017, the boat launch turn-around commonly referred to Van Assen Loop was redesigned and resurfaced by ranger staff.

3. 2018 Planned Projects

- Installation of an additional portable restroom near Salmon Run
- Kiosk roof replacement
- Installation of a new bench at Cobble Bar
- Replacement of the fishing pier

D. Pardee Recreation Area

EBMUD Ranger Supervisor Mark Bolton, with a staff of three Ranger Naturalists and one Senior Ranger under his direction, was responsible for monitoring daily concessionaire operations and managing projects through the Maintenance/Capital Improvement Fund program and EBMUD capital projects outside the scope of the concessionaire agreement.

The concession contract for Pardee Recreation Area expired on November 30, 2017. Staff completed a Request for Proposal (RFP) early in 2017, posted it on ebmud.com, and mailed letters to concession companies across the country. A site visit at Pardee Recreation Area for prospective bidders was held on May 9 and seven individuals representing three prospective bidders attended. After an extensive selection process, the new contract was awarded to Rocky Mountain Recreation Company, who took over the management of the park effective December 1, 2017.

1. Projects

Manager's Residence Driveway Repairs
Approximately 1,892 square feet of asphalt were removed and replaced with 3" of new asphalt. An additional 4,400 square feet of road surface cracks were filled and then slurry sealed.

2. Programs

Integrated Pest Management (IPM)
Under the supervision of EBMUD ranger staff, Pardee Lake Recreation staff performed annual squirrel population control efforts. In 2017, a total of 68 squirrels were taken at Pardee. The purpose of this IPM program is to protect public safety and park assets.

Fish Stocking
Obtaining private hatchery fish in 2017 continued to be a challenge early in the year. In anticipation of a shortage, EBMUD sought help from the Mokelumne River Fish Hatchery which had extra rearing capacity available in 2016. The Pardee Fishing Access Fund procured 30,000 rainbow trout eggs from a grower in Oregon and had them delivered to the hatchery in early 2016, where the Department of Fish and Wildlife staff raised them to maturity for the 2017 season. Special high-protein fish food was used to speed growth, and the result was amazing. Beginning in February 2017, the hatchery delivered weekly plantings; a total of 65,350 pounds of fish for the season! Fish planted at the beginning of the season weighed about 2 pounds and by May, when the last fish were delivered, they were weighing in at 3 to 4 pounds each. To finish off the remainder of the season, another 17,000 pounds of trout were brought in from Mt. Lassen Trout Farms, and 1,000 pounds were brought in from other DF&W hatcheries.

3. 2018 Planned Projects

- Decking replacement on the marina dock will continue in a phased approach

- Pardee Shoreline Trail realignment will be completed in 2018 (loss of the trail in 2016 due to the severity of the winter storms and high lake levels resulted in its closure for the 2017 season)
- Repair and pave the marina parking lot

E. Watershed Trails Program

EBMUD Ranger Supervisor Chris Swann, with a staff of four Ranger Naturalists and one Senior Ranger under his direction, was responsible for maintaining more than 40 miles of hiking and equestrian trail – most of which is part of the Mokelumne Coast to Crest Trail (MCCT).

More than 9,519 hikers, runners, and equestrians ventured out on EBMUD's Mokelumne area trails in 2017, a new all-time record for trail use.

Heavy rainfall and associated runoff challenged many sections of the trail system. Substantial repairs, like the Jackass Gulch trail crossing, required reconstruction to maintain open access for trail users and emergency vehicles.

Strategic planning and implementation actions continue on the broader Mokelumne Coast to Crest Trail with hopes that, in the not-too-distant future, trail segments to the east and west of EBMUD's Mokelumne watershed will be completed, establishing 290 miles of contiguous Coast to Crest Trail access from the Martinez shoreline to Ebbetts Pass.

F. Middle Bar Take-Out Facility

EBMUD Ranger Supervisor Tim Cox, with a staff of two Ranger Naturalists and one Senior Ranger under his direction, was responsible for maintaining the rafting take-out facility at Middle Bar, on the Amador County side of the river below Highway 49. This remote but popular area sees moderate use by the general public during the year.

1. Projects

<u>Take-out Access Widened</u>
EBMUD ranger staff widened the egress pathway for rafters leaving the water by trimming the willows that parallel the shoreline at the Middle Bar Take-out.

G. Mokelumne Area Programs

Quagga/Zebra Mussel Prevention Program

EBMUD Ranger Supervisor Tim Cox, with a staff of three part-time Recreation Area Attendants under his direction, was responsible for administering EBMUD's Aquatic Invasive Species Prevention Program.

EBMUD continued their long-standing program of surveying or inspecting all incoming vessels for risk from Quagga and Zebra Mussels. A vulnerability study was conducted in 2010 and it was determined that EBMUD's Mokelumne Area reservoirs were at a low risk of sustaining Quagga or Zebra Mussel populations. As a result of those findings, the physical inspection program was reduced to a goal of inspecting 50% of incoming vessels at Camanche and 60% of incoming vessels at Pardee while continuing to survey 100%.

In 2017, a total of 32,056 incoming vessels were surveyed for county of origin and location of recent reservoir use. In addition, 18,159 of these vessels were given a physical inspection to look for signs of the invasive mussels and other invasive species. A total of 280 vessels failed as a result of the survey/inspection process, representing a 0.77% failure rate.

In early 2016, a Watercraft Decontamination Station (WDS) was purchased and installed at Camanche South Shore Recreation Area with grant funds from the California Department of Boating & Waterways. The WDS serves not only EBMUD customers but any vessel owner that wants or needs to have a vessel decontaminated. Of the 280 vessels that failed inspection at Camanche and Pardee Reservoir, 158 elected to be decontaminated (56%) instead of being turned away.

Inspections are currently performed at no charge to the boater. However, vessel owners are charged for the decontamination and fees range from $25.00 to $45.00 per vessel depending on the complexity of the decontamination. No actual Quagga or Zebra Mussels were detected on any inspected vessel or in EBMUD reservoirs in 2017.

H. Public Safety

EBMUD Ranger Supervisor Tim Cox, with a staff of two Ranger Naturalists and one Senior Ranger under his direction, was responsible for responding to visitor concerns and coordinating resource protection and public safety with law enforcement and fire protection agencies.

Fire Prevention and Response

EBMUD ranger staff assisted the California Department of Forestry and Fire Protection (Cal Fire) and local fire departments in the suppression of fires near Pardee and Camanche Reservoirs. A total of five fires occurred inside EBMUD's recreation property boundaries in 2017; two at Camanche North Shore, one at Camanche South Shore, one at Camanche Hills Hunting Preserve and one at Pardee Recreation Area. EBMUD ranger staff responded and the fires were quickly extinguished.

Events/Incidents

EBMUD ranger staff, local agencies, and law enforcement worked cohesively to ensure public safety and emergency response access during the busy Memorial Day, Fourth of July, and Labor Day weekends. Deputy coverage was doubled during the weekend-evening patrol on these holidays resulting in greater compliance from visitors.

EBMUD ranger staff assisted medical first responders at 65 emergency medical incidents. Of these, thirty-one were at Camanche South Shore, seventeen at Camanche North Shore, four on Camanche Reservoir, one at Pardee Lake Recreation Area, one on the trails, one at Mokelumne River Day Use Area, one at the Camanche Hills Hunting Preserve, and nine on the watershed. Included in these medical incidents were four recreation-related fatalities: two drownings and one jet-ski accident that occurred on Camanche Reservoir and one drowning at the Mokelumne River Day Use Area.

I. Mokelumne Area Public Outreach

Mokelumne Volunteer Program

In 2017, volunteers participated in eleven events hosted on EBMUD lands. In total, 28 volunteers contributed 315 hours toward a variety of stewardship, educational, and outreach activities.

Great Sierra River Cleanup

On September 16, 2017, Ranger Naturalist II Lora Sparrowk coordinated the efforts of 106 volunteer participants on stretches of the Mokelumne River and Camanche Reservoir between Middle Bar and Stillman Magee Park in conjunction with the statewide, ninth annual Great Sierra River Cleanup. Over 3,000 pounds of trash and recycling was collected from the river system in just a few hours, followed by a lunch at Camanche South Shore sponsored by Camanche Recreation Company.

This event brings diverse members of the community together as they restore, protect, and enjoy the amazing resource that is the Mokelumne River. This is the 27th year that EBMUD has facilitated a river cleanup event on the Mokelumne.

Recycling

EBMUD ranger staff along with The ARC of Amador and Calaveras (a regional employment opportunity for disabled and challenged adults) continued their efforts to promote recycling within the parks. In 2017, a total of 15,128 pounds of plastic, glass, and aluminum were recycled.

Special Use Permits

A total of 21 special use permits were issued for events in the Mokelumne Area in 2017. These included permits for fire and search and rescue trainings, challenge running events, community support events, and technical/historical data gathering and research.

Ranger-Led Environmental Education Program (RLEEP)

The 2017 RLEEP year was very successful. Since its inception in 2006, rangers have led a maximum of ten programs a year; primarily for schools from Amador and Calaveras Counties. The coordination of the program is a cooperative effort between EBMUD and Stewardship Through Education (STE) which was created through and supported by the Upper Mokelumne River Watershed Authority (UMRWA) in partnership with Central Sierra Resource Conservation and Development.

EBMUD's participation in this program has given the rangers a forum for educating the local youth on water quality issues, inspiring environmental stewardship, and upholding Mr. Richard Louv's ideals whose book *Last Child in the Woods* has inspired the No Child Left Inside Act.

In 2017, rangers provided a total of six programs to local schools. A total of 198 students participated in the programs with titles that included: Anadromous Fish of the Lower Mokelumne, Reforestation, Ornithology, and Habitat Ecology. Most programs include a service learning component such as habitat restoration or litter pick up.

Public Tours

Public tours hosted by EBMUD in 2017 included:

- Bald Eagle Tours (guided public boat tours)
- Longest Mile Wildflower Hike
- Hike and Tour of the Historic Wildermuth House
- Native American Cave Paintings Tour (Camanche Reservoir watershed)

VI CONCESSION MANAGEMENT REPORTS

A. Camanche Recreation Areas

Explore

Lake Camanche's activities and sightseeing adventures allow you to immerse yourself in the wonders of the Resort. Featuring activities for people of all ages and all levels of skill, guests can experience the sights at their own comfort level. From tranquil fishing and programs for young kids to horseback riding and extreme water sports, Lake Camanche Resort offers a wide range of activities and challenges everyone can enjoy.

Fish

Lake Camanche is best known for great bass fishing, though it is also a favorite of trout anglers. Each year, up to 60,000 pounds of trout are stocked between October and June, with each fish weighing at least a pound up to trophy sized 8 pounders. The large Trout Pond and Children's Fishing Pond at South Shore are perfect places to take children fishing.

There is also a unique Florida-strain largemouth bass plant each year. Other species found in Lake Camanche include rainbow trout, large and small mouth bass, spotted bass, catfish, kokanee, crappie, bluegill and sunfish.

Stay

Tent and RV sites are available year-round at both North and South Shores. RV hook-up sites are provided at South Shore only. Self-contained RVs may camp at North Shore. Many sites offer immediate lake access while others are just a short walk away. Ask your reservation agent or check the online maps for which sites provide shade. Campsite amenities include barbecues, tables, water, hot showers, restrooms and laundry facilities.

2017 Major Accomplishments

- North Shore Open Berth Renovated
- Renovated and upgraded 6 rental Patio boats
- Renovated one South Shore Cottage
- Replaced Ice House at NS Marina
- Added one new "Party Barge" to rental fleet ("Gracie")
- New Irrigation system added at SS Cottonwood Campground
- Paving of SS Marina boat launch parking lot
- Continued NS Café menu additions and upgrades
- Completion of NS MHP #1 "Pocket Park"

2018 Planned Projects

- Refurbish and upgrade 9 fishing boats
- Continued renovation of SS Cottages (1)
- Deck replacement and upgrade at South Shore Lakeside Hall
- Add one new 16 foot Bass Boat w/40 HP motor to rental fleet
- Planned purchase of "Road Sweeper" to clear debris from parking lots
- Planned addition of North Shore Maintenance Yard "covered" building
- North Shore Hill Cottages Irrigation system replacement
- South Shore Trout Pond "rail" fencing
- Planned purchase of "portable cinema" to show movies at NS Blue Oaks campground
- Planned addition of South Shore Amphitheatre Dog Park and 9-hole Frisbee golf course

2018 Planned Marketing Efforts & Events

- Sacramento International Sportsmen Show
- Jolly Hooker Fishing Club
- Central Valley Anglers – South Shore
- Kayak Bass Derby – 89 kayakers

- RV Seminar –Monument – Guest speaker – campfire recipes, camping hacks (5 total throughout the year)
- Bass in tubes – 2 day event
- Sacramento Bass Wranglers
- El Dorado Bass
- CA Bass Federation
- St. Patrick's Day - "Social Media Pots of Gold Event"
- CA Bass Federation
- SS 200 Bikes stopping for rest stop – Calaveras Arts Council 9:30-11:00am
- Roaster Tails – 20 boats NS
- Easter Egg Hunt both shores – Employee Hunts
- FPSIE Cottages, Camping, Monument, boat rentals, LSH and derby
- Trade show – Jackson Rancheria
- Float Tube fly fishing seminar at Pond
- Riverbank Bass Anglers
- Central Valley Anglers
- Children's Pond Event
- Angler's Press Bass Derby
- Yak-a-bass for Vets
- Camanche Kids Club
- Fairfield/Suisun Bass Reapers
- CA Bass Federation
- Father's Day Weekend - Lunch Specials
- Elk Grove Bass Club
- Fit Kid Fun Run
- Proposed: 4th of July Lighted Boat Parade, Food concessions on both shores.
- 4th RV Decorating Contest
- Outlaw Bass Club
- Hosting ACCC Mixer NS
- Camanche Cleanup
- Tri Valley Bass Masters - 2 day event
- Bass Busters of Santa Clara – 2 day event
- Bass Anglers of NorCal
- Proposed: Hunted House each weekend through October
- Kerman Bass Club
- Riverbank Bass Anglers – 2 day event
- Hosting CCCC Mixer SS
- Oro Madre Bass Club
- Trunk or Treat Halloween Event, game booths, hayride to Monument
- Manteca Bassin Buddies
- Contra Costa Bass Club
- Lake Camanche Boat in Sutter Creek Parade and CRC MHP Santa drive
- Oro Madre Bass Club
- Sacramento Bass Trackers
- Folsom Bass Team
- Proposed Lighted Boat Parade, Food concession on both shores

2017 Community Service Efforts

- Lodi FAA AG Boosters – Crab Feed Fundraiser
- Jolly Hookers Fishing Club
- Camanche School Readiness Program - Preschool
- Happy Hooker Fishing Club
- Central Valley Anglers
- Ione Elementary – Science Camp
- Project THANK YOU – Fundraiser to assist Military & their families
- Amador SO/CHP Golf Classic Fundraiser- benefiting fallen officer's families
- Sons of the Golden West – Parlor #33 Ione
- Make a Wish Greater Bay Area
- Amador County Eagles – Youth Football
- ENOCH HS Game Night FAA Fundraiser
- Calaveras HS FAA Booster Fundraiser
- I Heart Radio/Fundraiser – Bob Simms
- Purple Heart Anglers Fundraiser
- Operation Care for Military Overseas
- Hosting Amador & Calaveras County Chamber of Commerce Mixer
- Monthly Amador & Calaveras Chamber Mixers
- Kid's Pond – Partnering with EBMUD & SS MHP Residents
- Amador & Calaveras Community Easter Egg Hunts
- Walk for the Troops Ione Veterans Memorial Fundraiser
- Oak View Elementary Parents Club
- Argonaut HS Spring & Fall advertising
- ACRA KAP –Kids Afterschool Program Fundraiser
- Amador County Hospice
- Amador County Behavioral Health Department
- ARC Amador & Calaveras Counties – Recycling program
- Top Cop Challenge & Fundraiser
- Saddle up for St. Jude Trail Ride and Campout
- Resident – Van Bibber – St. Joseph Fundraiser
- 2017 Great Sierra River Clean Up – Partnering with EBMUD
- United Home /Personal Care Fundraiser at the lake & employee volunteers
- Amador County Recreation Agency Triathlon ACRA & fundraiser
- Calaveras HS FAA Boosters - Fall Program
- CRC Camp Out for a Cause Fundraiser Amador County Food Bank
- Employee volunteers Amador County Food Bank
- Trunk or Treat Community Outreach Event
- Veteran's Day – Free park entrance for veterans and active military
- Central Valley Birding Symposium
- 2017 IFMAS Anglers derby and party
- Campout for a Cause – benefitting Calaveras Resource Connection Food Bank & Toys for Tots
- Employee volunteers - Calaveras County food bank & Toys for Tots
- Amador County Sober Grad Program fundraiser

B. Camanche Hills Hunting Preserve

Camanche Hills Hunting Preserve is a first class family membership hunting club that releases thousands of game birds per year. Hundreds of those game birds remain on the preserve to propagate. In addition, CHHP is open to the public for selected upland bird and waterfowl hunts and multiple clay shooting opportunities. This includes thirty (30) sporting clays stations, two (2) Trap Houses, two (2) Five Stands and a new Super Sport Range for a bigger challenge. We have an Archery Range, which opened September 2015. It has seven stations with multiple three dimensional Rhinehart targets indicative of various wildlife species indigenous to North America, with additional targets and landscaping. The preserve is situated on over 1,400 acres of East Bay Municipal Utility District land used for the sole purpose of developing habitat and escape cover.

The sporting clay stations are located on the east side of the preserve where hunting is prohibited. The valley, rolling hills, and shoreline provide visitors and their families with a relaxing atmosphere. There is a spacious clubhouse and large picnicking area for member and public use. The CHHP professional staff and facility have been carefully designed in every facet to ensure a memorable experience for every patron on every visit, including a fully stocked pro shop and restaurant serving American cuisine favorites for breakfast and lunch.

General Information

CHHP is located 45 miles south of Sacramento and 30 miles east of Stockton, in the foothills of the Gold Country of Amador County on the North Shore of Camanche Reservoir near Ione, California on EBMUD property.

CHHP has been licensed since 1962 by the California Department of Fish and Wildlife. This is the only property owned by EBMUD where someone can legally hunt upland game birds and waterfowl.

Visitor statistics for 2017: approximately 12,610 visitors enjoyed hunting upland game birds, waterfowl, sporting clays and other shotgun sports. Many came from California and other states across the USA with some from foreign countries.

The private hunting program has been a great success for many years. The membership design ensures each member quality hunting conditions. Each field is assigned a specific number of hunters providing a safe hunting experience, thus guaranteeing a satisfying and memorable hunt at the end of each day. A volunteer staff provides hunters with highly trained hunting dogs and guide services throughout the season. Bird processing is available to those who wish to have their game cleaned. Hunters may also purchase smoked birds by exchanging their processed bird and paying an additional fee.

Number of Pheasants released in 2017-2018	12,131
Number of Chukar released in 2017-2018	1,539
Number of Ducks released in 2017-2018	5,500
Number of Canada Geese harvested in 2017-2018	142
Number of Quail released in 2017-2018	200

We offer shotgun shooting instruction to beginners and advanced shooter instruction. In addition, we have continued the program that introduces new shooters to sporting clay target shooting. We provide golf cart rentals for our clay shooters and have a variety of shotguns available for rent (gun rentals are to adults only or supervised juveniles). Individuals and non-profit groups have utilized our sporting clay facility to raise funds for scholarships and other special projects. Assistance in organizing these events is offered by our own personnel who provide support during the shoots and catering to make each fund raiser a success.

Overnight self-contained RV parking, with water but no electrical hookup, is available to the public and our members for short stays. This enables the user to extend their visit and leisurely enjoy the various seasonal activities available.

The CHHP Sporting Clays Course and its facilities rank as one of the top ten courses in the nation on Registered Targets thrown. We have shooters that come from all over the USA and from out of the country. Major shoots including the California State Sporting Clay Competition, the Zone 7 shoot and the first Western Regional Competition which encompassed the 12 western states by zone and included all shooters from the United States was hosted at our facility. We are hosting the 2018 California State Sporting Clay Championship in June 14 - 17. Also, Larry Skinner was inducted into the California Sporting Clays Association Hall of Fame in May 2017.

CHHP has a sub-concessionaire contract with Mr. Dale Tate, a gun maker, formerly of Purdey & Son in England. Mr. Tate's expertise enables him to establish a person's exact shotgun measurements and subsequently fit each individual with his/her unique and exact fit. Mr. Tate's expertise includes gun restorations and he is an NSCA Level II instructor. Mr. Tate has been at our facility for over 16 years.

Our clubhouse is a show piece featuring an outstanding restaurant offering hearty home-style breakfast and lunch. The pro shop, located within the clubhouse, is geared to the shotgun enthusiast. The back lawn area, which overlooks the lake and the spacious grounds, has a large adjustable BBQ, several picnic tables and a 26' X 64' covered awning with lights and removable/adjustable curtain sides. A full flushing bathroom facility is within close proximity and is ADA compliant. A public address system is available to accommodate large groups. We have installed a series of on-demand street lights that illuminate the driveway and parking area at the front of the clubhouse for convenience and safety. If you throw in the beautiful sunsets and lake-view setting we are indeed the best place for that memorable wedding or very special occasion.

Major Accomplishments

- MCIF – Road Maintenance/Improvement 24 Truck and Trailer Loads of gravel and grading
- MCIF – New 10' Hydraulic Disc with wheels
- MCIF – Installation of Island on Willow Pond
- New wireless counter system for Sporting Clays
- Promatic Sporting Clay machines

Marketing Efforts

- Sporting Clay Promotions will run beginning April 1, 2018 for lessons and rentals for sporting clays and is currently posted on our website; CHHP shooting challenge events are also included on our website
- Promotional Certificates have been donated to a variety non-profit organizations such as National Wild Turkey Federation, NRA, Ducks Unlimited, California Waterfowl Association and Pheasants Forever many other organizations
- Fishing and Hunting News Advertising
- Stockton Record Advertising
- Sporting Clay Magazine Advertising

Community Service Efforts During 2017

CHHP is active in supporting local businesses and continues to donate to many organizations such as the local Lions Club, local Pheasants Forever and California Waterfowl organizations as well as supporting our local Scholastic youth clay shooting teams: A&A Shooters, Camanche Claybusters, Calaveras Gold Country Shooters and the NorCal Longshots. The Camanche Village Homeowners Association has the use of the Camanche Hills clubhouse if needed free of charge for their meetings. CHHP also provides grounds for dog trails for various groups and training for special law enforcement tracking dogs.

We are very pleased and proud to announce that our Camanche Hills Preserve hunting club members donated 200 pheasants and processing ($6,400.00 value) off their punch cards for 2017-2018. Dog Handlers donated their time and dogs as well ($400 value). The programs funded included the annual youth shoot, Ladies shoot, the disabled shooters and Veterans of the Armed Forces Shoot. Donation total was $6,800.00.

Concession Objectives – 2018

CHHP plays an integral role in managing resident Canada geese populations at the Preserve itself as well as on Camanche Reservoir. During the 2016-2017 hunting season, 142 resident Canada geese were harvested by CHHP. The management of the goose population is important to the health and cleanliness of the lake. Our guides use portable two-man goose blinds, decoys and calls for calling Canada geese into portable blind area for harvesting.

Projects

- New Garbage cans throughout hunting, sporting clays and archery area
- New handicap toilet for C1
- New asphalt for driveway

CHHP is constantly looking for new ideas to improve our facility and introduce new customers to hunting and clay target shooting. Implementing new programs to promote our shooting sport and gun safety is our commitment and our ultimate goal.

C. Pardee Recreation Area

Pardee Recreation Area continues to offer a clean and family friendly day use and camping environment with great fishing and camping opportunities. The marina offers a fully stocked tackle/bait shop and boat rentals, and the Pardee Café serves breakfast and lunch Friday through Sunday.

Major Accomplishments

Pardee still holds the California state record for Smallmouth Bass (2007).

Marketing Efforts for 2018

- Facebook Marketing
- California Sportsman Radio Show
- Ultimate Bass Radio Show
- Fish Sniffer
- Western Outdoor News
- Company Newsletter

RMRC has increased the offerings of the Bait Shop and Marina with regards to retail offerings and boat rentals. Online reservations have been added for customer convenience.