



Follow-Up Dam Safety Program

Planning for Extreme Precipitation Events

Planning Committee

March 12, 2024

EBMUD's Dam Safety Program

- Policy 9.07 Dam Safety Program
- Proactive management of dams
 - Meet State and Federal requirements
 - Safe for continued operation
- Regular periodic evaluation
 - Seismic and hydrologic extremes
- All District dams and spillways are considered safe to operate



Annual FERC Inspection at Camanche Dam in 2023



Seminar/Tabletop/Functional Exercise of Emergency Action Plan in 2023 at Pardee Center

Probable Maximum Precipitation (PMP)

The maximum amount of rainfall that could theoretically occur within a specific geographic area during an extreme weather event.

- Required by FERC & DSOD
- Prescribed by NOAA's HMR-59
- Provides 72-hour winter storm and resulting runoff

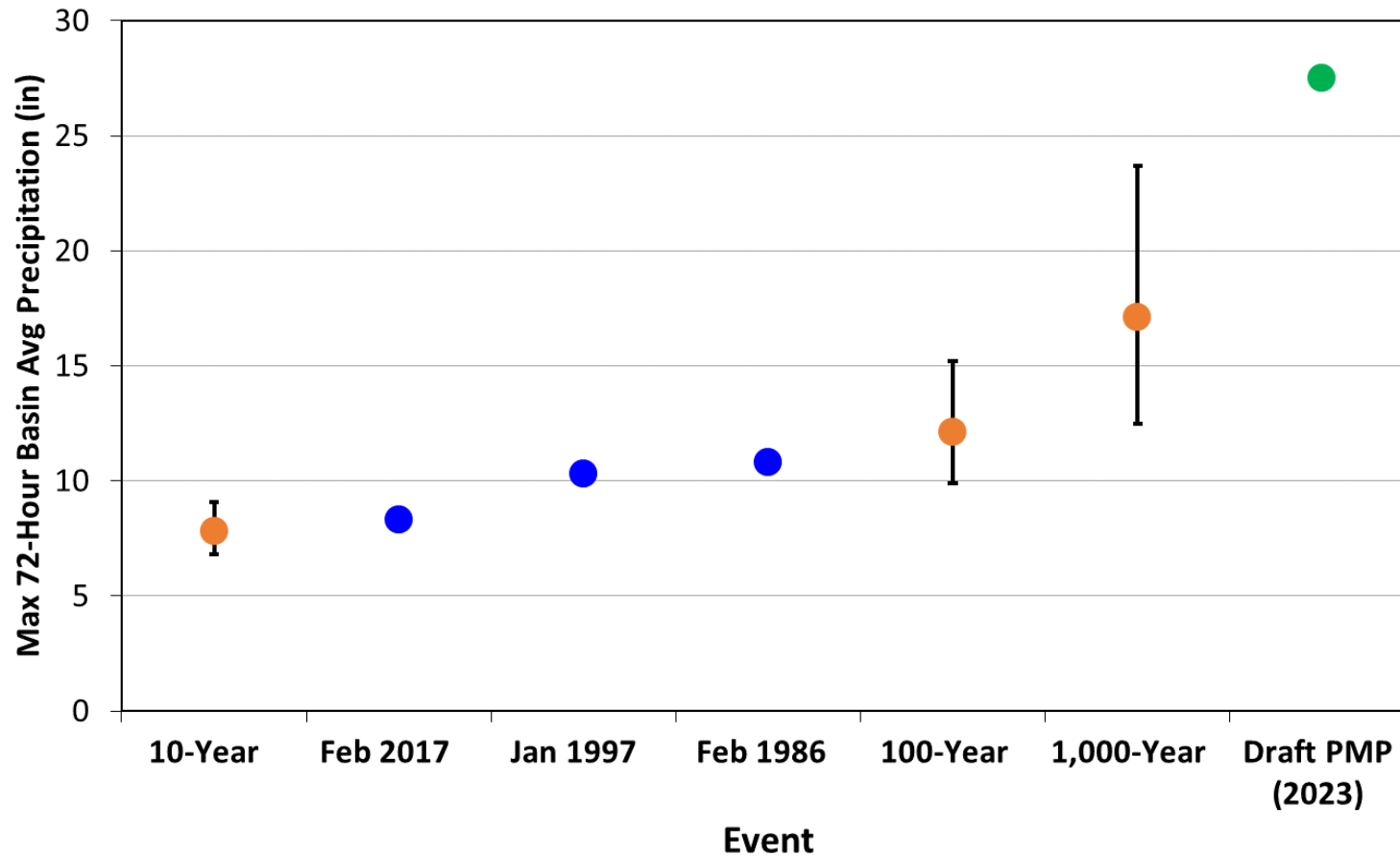


Pardee Spillway in March 2023

*FERC: Federal Energy Regulatory Commission
DSOD: Division of Safety of Dams
HMR: Hydrometeorological Report*

Probable Maximum Precipitation (PMP)

Maximum 72-Hour Basin Average Precipitation in the Mokelumne River Watershed



The PMP is a very large extreme event larger than anything the basin has experienced.

Other Extreme Hydrologic Events

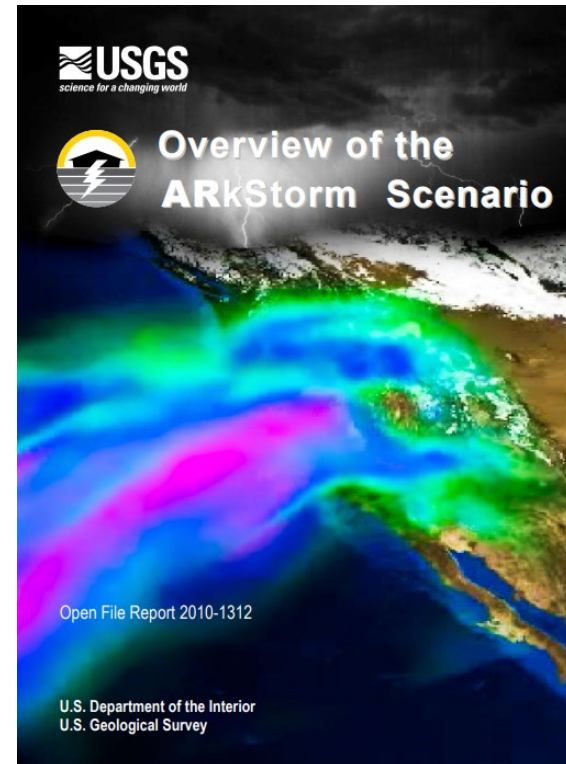
The Great Flood of 1862: The biggest flood in modern history that began with upwards of 15 feet of snow falling in the Sierras followed by a series of atmospheric rivers that brought warm rain and high winds.



**K Street, Sacramento, looking east
1861-1862**

Source of Pictures: USGS Open File Report 2010-1312

ARkStorm 2.0: A hypothetical storm based on the Great Flood of 1862 initially developed by the United States Geologic Survey for emergency planning purposes, and subsequently modified by academic institutions to include climate change.



- Based on 1861-1862 storm pattern
- Incorporates a warmer future climate
- Developed to aid in emergency planning
- Not a regulatory requirement

Probable Maximum Flood (PMF)

Resulting flood associated with the PMP

- Required by FERC & DSOD
- Prescribed by FEMA Guidelines



Selecting and Accommodating Inflow Design Floods for Dams

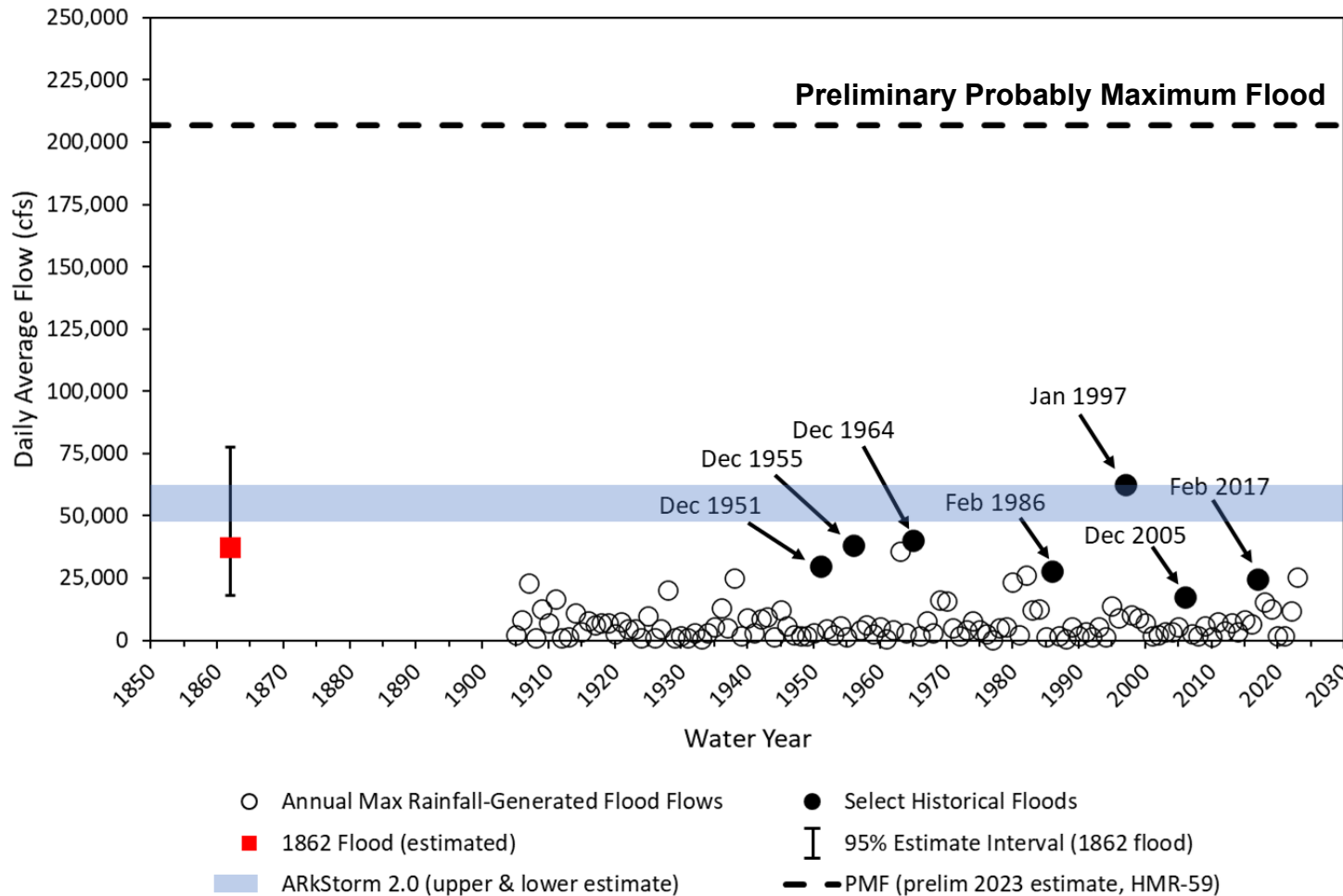
FEMA P-94 / August 2013

*FERC: Federal Energy Regulatory Commission
DSOD: Division of Safety of Dams
FEMA: Federal Emergency Management Agency*



Probable Maximum Flood (PMF)

Comparison of PMF and Other Events to the Unregulated Annual Maximum Daily Flows on the Mokelumne River at Highway 49



The preliminary PMF is much greater than the District's estimates of flows during the Great Flood of 1862, ARkStorm 2.0, and historical large storm events.

This theoretical flood event would overwhelm our required flood reservation in a single day and would far exceed the maximum allowable release and downstream channel capacity.

Anticipated Improvements to Regulatory Requirements

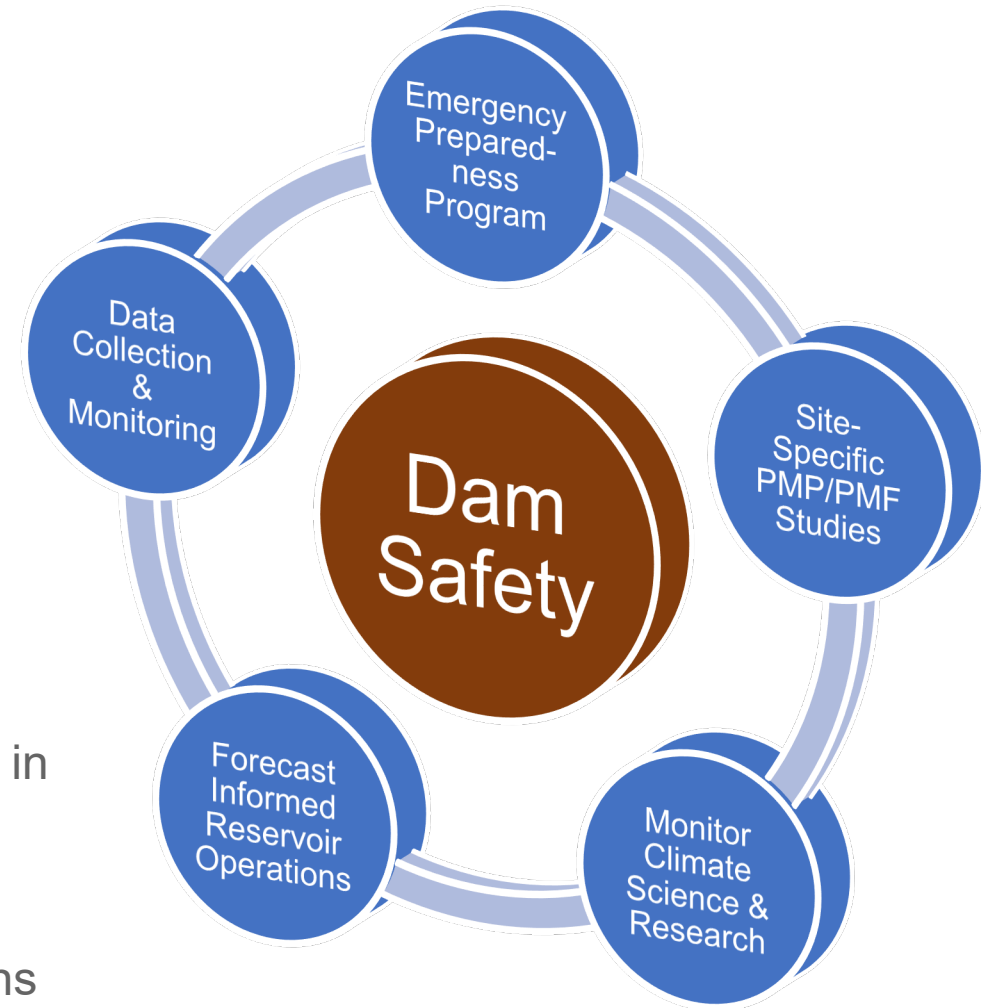
- Integrating climate change and risk analysis into PMP/PMF methodology
 - **Federal:**
 - PRECIP Act
 - Updated FERC Regulations
 - **State:**
 - Updated DSOD guidelines



PRECIP: Providing Research and Estimates of Changes in Precipitation Act
FERC: Federal Energy Regulatory Commission
DSOD: Division of Safety of Dams

EBMUD's Plan for Extreme Precipitation Events

- **Emergency Preparedness Program**
 - Continue to engage with emergency management agencies
 - Educate public
 - Review, update, exercise annually
- **Site Specific PMP/PMF Studies**
 - Partnership with PG&E on Mokelumne River
 - Incorporate climate change
- **Monitor Climate Science & Research**
 - Participate in technical conferences
- **Data Collection & Monitoring**
 - Pursue opportunities to install and maintain instruments to fill in data gaps
- **Forecast Informed Reservoir Operations (FIRO)**
 - Evaluate feasibility of adaptively managed reservoir operations





Questions?



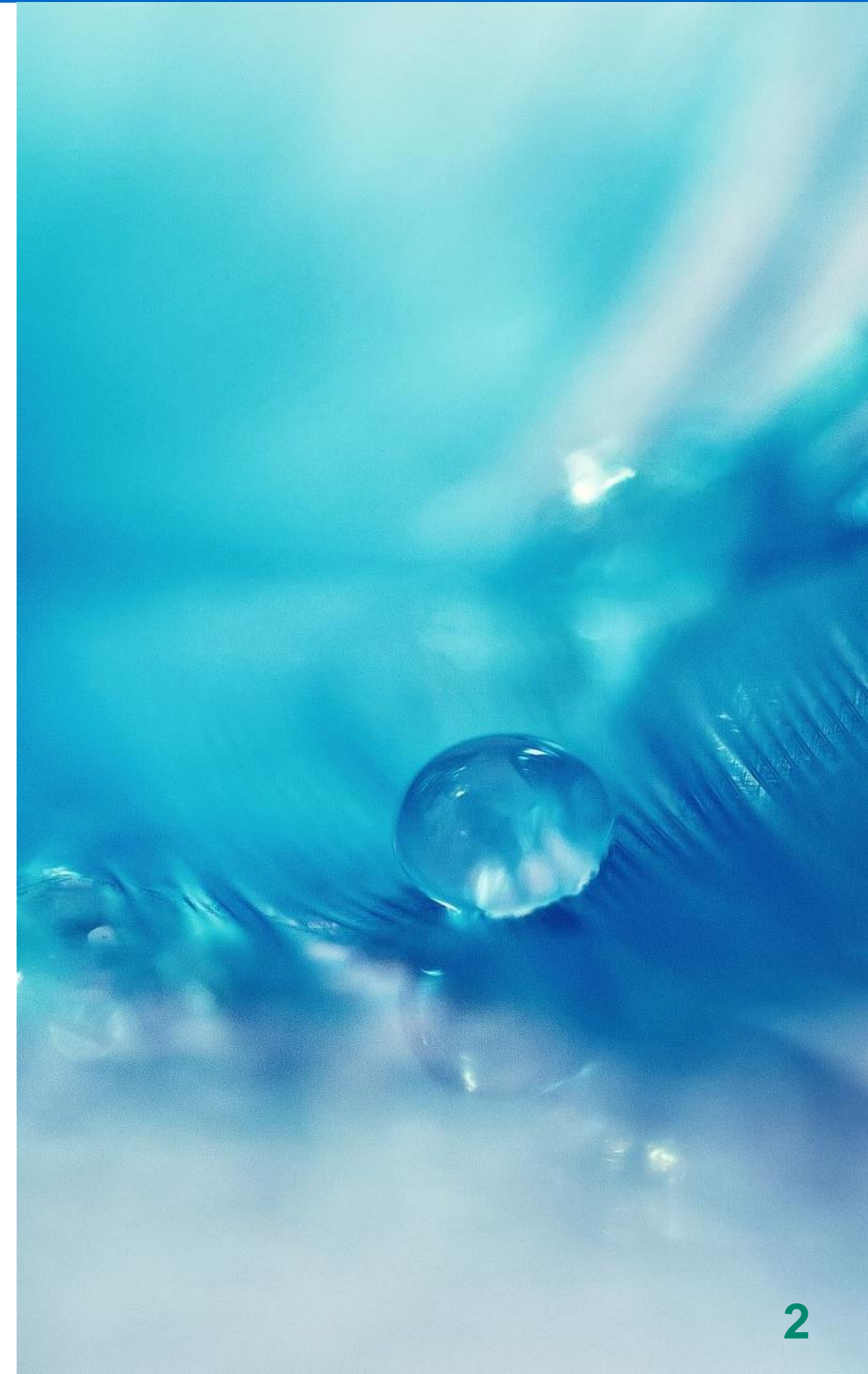
Water Quality Program Annual Update

Planning Committee

March 12, 2024

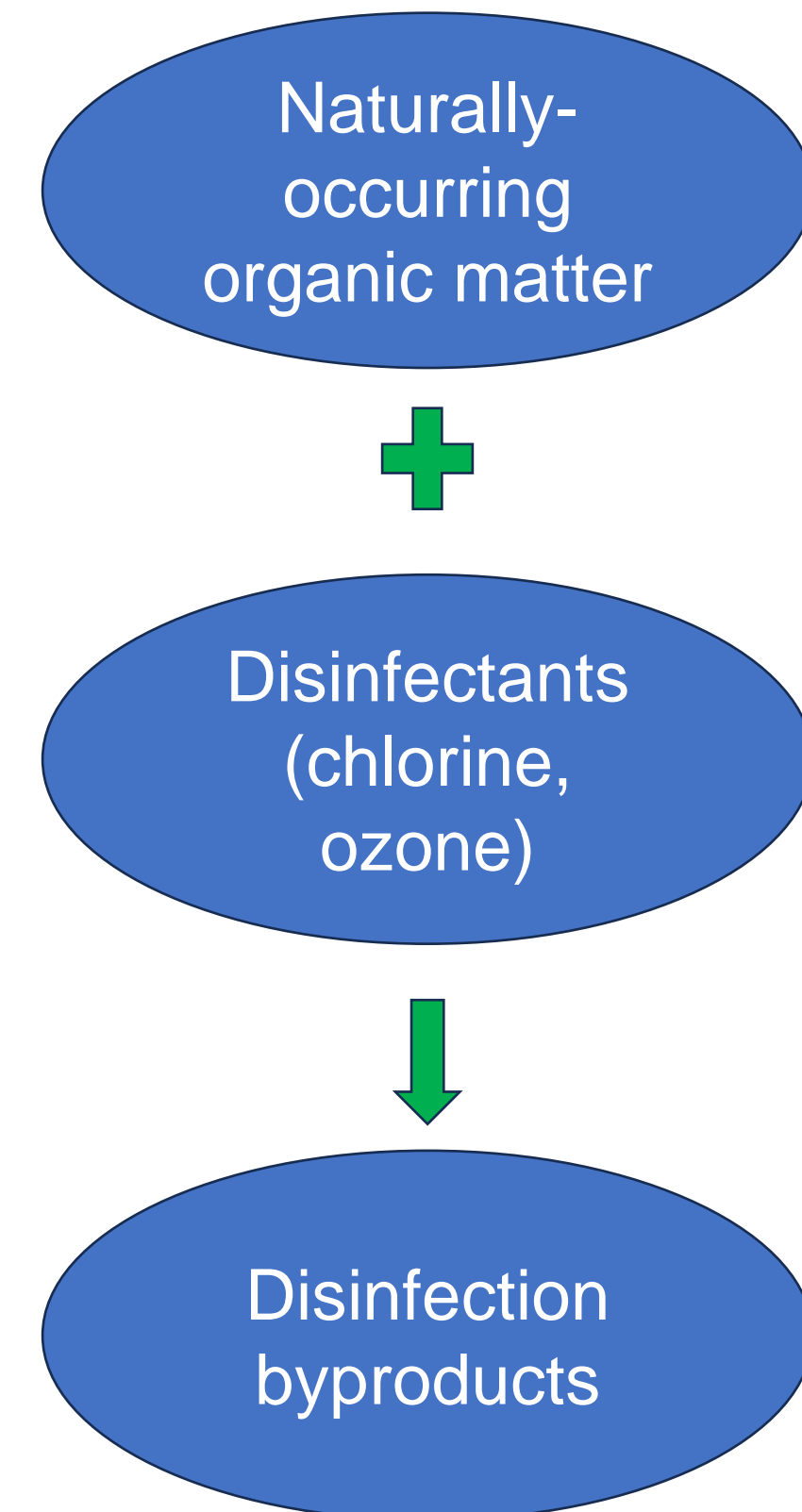
Water Quality Update

- Calendar year 2023
- Met all state and federal drinking water regulations
- Met 94% of internal water quality goals
 - Significantly more stringent than regulatory requirements
 - 119 of 126 internal goals were met
 - Unmet goals associated with disinfection byproducts and operational guidelines

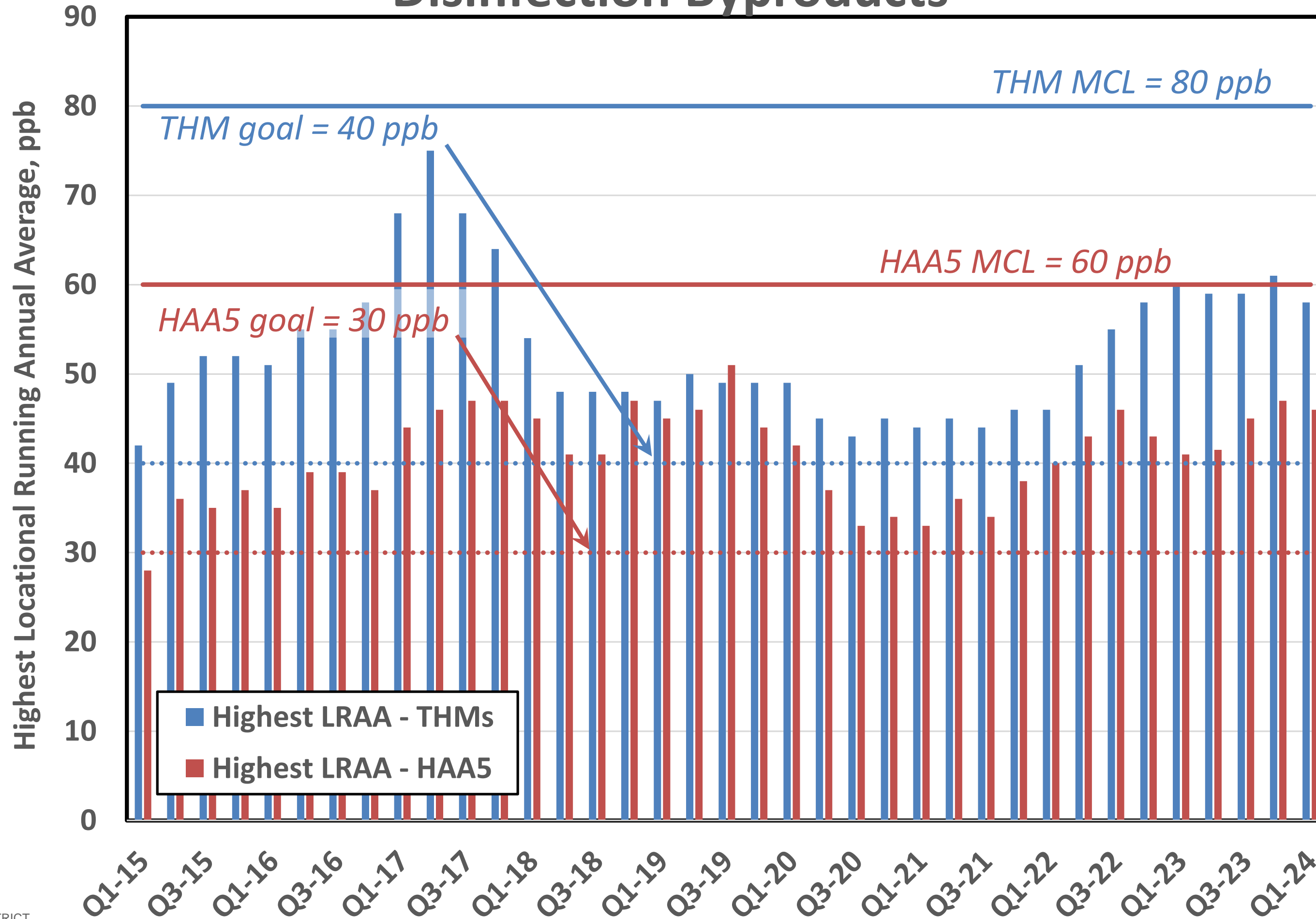


Disinfection Byproducts

- Trihalomethanes (THMs)
 - 83 of 96 samples exceeded goal
- Haloacetic Acids (HAAs)
 - 82 of 96 samples exceeded goal
- N-Nitrosodimethylamine (NDMA)
 - 7 of 20 samples exceeded goal



Disinfection Byproducts

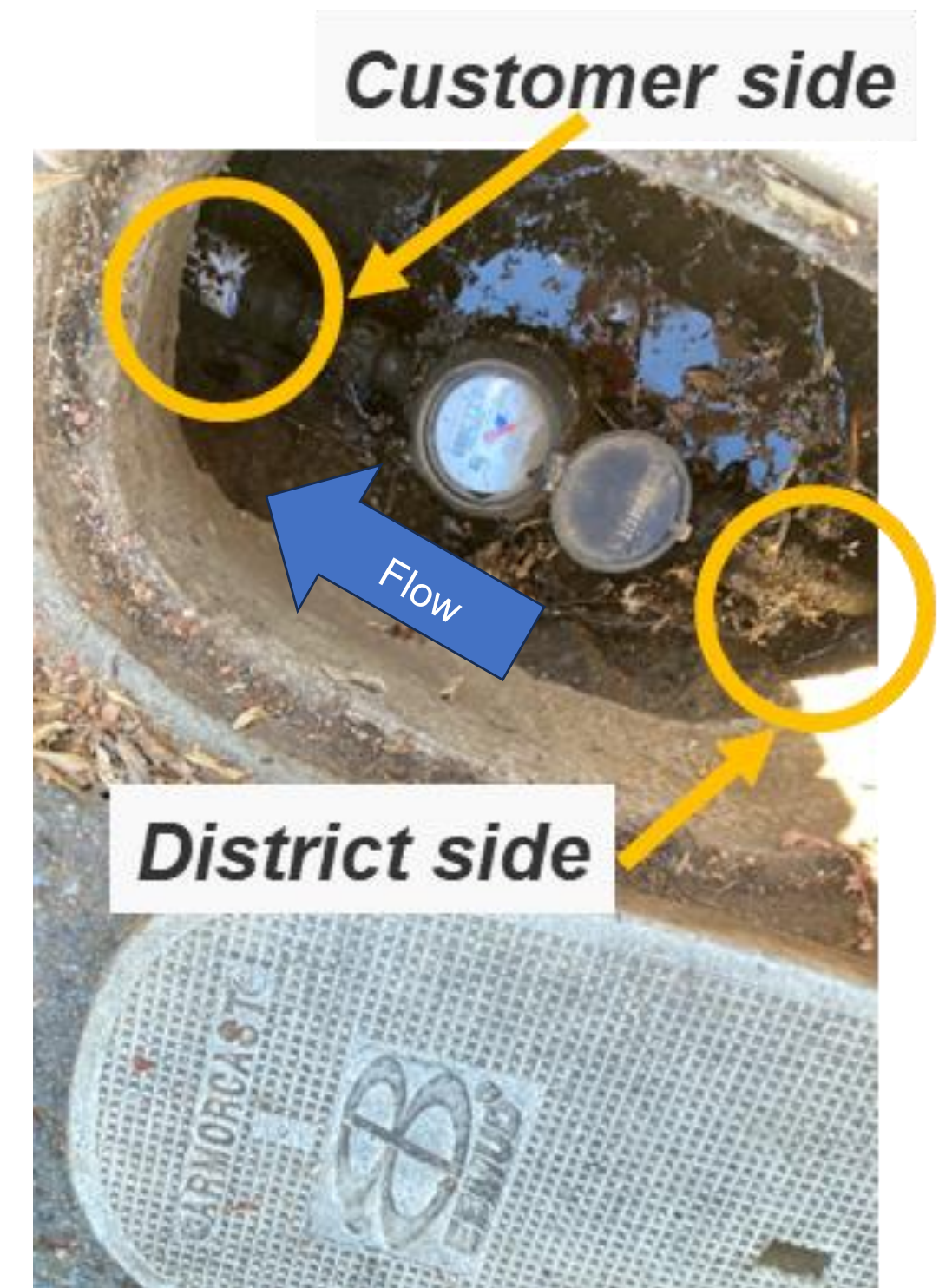


Additional Goals not met in 2023

Parameter	District Goal	2023 Performance
Chlorine residual in distribution system	95% of samples >0.5 mg/L each month	3 of 12 months did not meet goal
Corrosion control index	Between -0.5 and 0.75	3 of 12 months did not meet goal
Total coliform bacteria	Less than 0.5% of all samples positive each month	0.57% in one month

Lead Programs – Federal Requirements

- Expand inventory to include customer-side
 - Identify galvanized service lines formerly connected to District-side lead service lines
- Contractor started in April 2023, expected completion by October 2024
- Outreach efforts to cities, counties, and local groups
- Inspecting approximately 10,000 services (70% completed)
- About 40% of customer-side laterals are galvanized
 - 150 – 250 letters per week are sent to notify consumers
- Additional regulatory changes expected in late 2024



Meter box

Lead Programs – District and State Efforts

- Continue to removed galvanized services with lead fittings
 - State requirement: 125 per year
 - Approximately 616 remaining
 - Completion by 2030, well ahead of 2040 deadline
- Pre-compliance study
 - Test new sampling protocols, determine expected impact to District compliance



District staff replacing a service line

Lead Sampling Results in District Service Area are Consistently Low

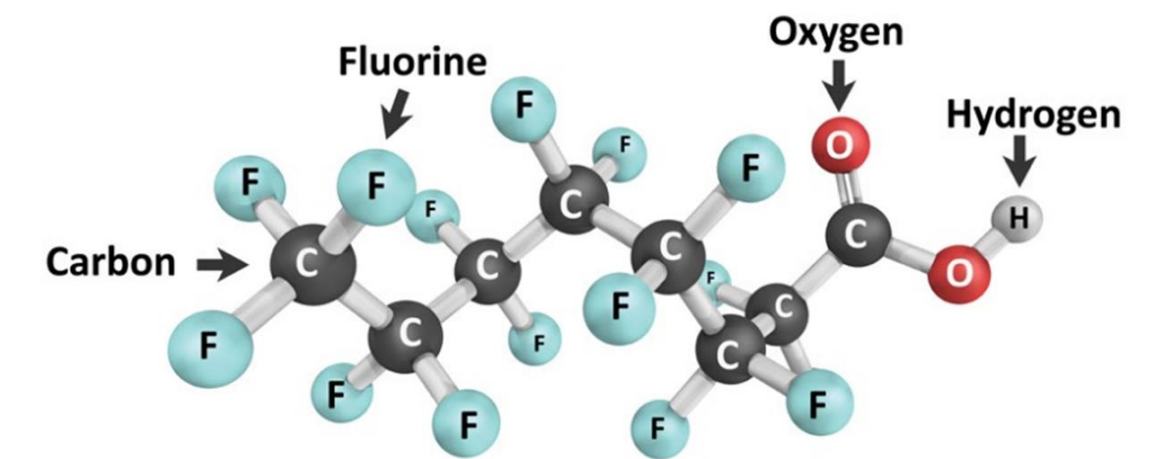
- Lead and Copper Rule (current regulation) sampling: 90% <5 ppb
- Galvanized Requiring Replacement sampling (future regulation): 90% <1 ppb
- Lead pigtails sampling (future regulation): 90% <1 ppb
- Over 3,700 customers have requested sample vouchers
 - 90% of results are less than 1 ppb
 - Number of requests is trending upward



District customer collecting a tap sample for lead

Per- and Polyfluoroalkyl Substances (PFAS)

- Federally required monitoring is underway
 - All treatment plants, quarterly, 2023 – 2025
 - Nearly all results are below federal reporting levels
- Mokelumne River and Freepoint have not had significant detections
- Focused survey monitoring of local watersheds
 - Higher concentrations detected in stormwater supplying local reservoirs
 - San Pablo Creek (from Orinda) and Moraga Creek (from Moraga)



Courtesy of US Department of Energy

EPA Proposed Regulation - March 2023

- Six PFAS to be regulated
- Two Maximum Contaminant Levels
 - PFOA
 - PFOS
- Four PFAS to be regulated by a Hazard Index
 - PFNA, HFPO-DA, PFHxS, PFBS
 - Intended to account for combined effects of co-occurring PFAS
- Running Annual Average of quarterly samples
- Effective treatment technologies are available, if needed
 - Activated carbon, ion exchange, high-pressure membranes
- Compliance within three years, likely 2026 or 2027

Individual PFAS names:

PFOA: Perfluorooctanoic acid

PFOS: Perfluorooctane sulfonic acid

PFNA: Perfluorononanoic acid

HFPO-DA: Hexafluoropropylene oxide and its dimer acid

PFHxS: Perfluorohexane sulfonic acid

PFBS: Perfluorobutane sulfonic acid

Next Steps for PFAS

- Additional monitoring, particularly in East Bay reservoirs
- Exploring potential treatment options but not planning on capital upgrades at this time
- Continue following regulatory developments
- Continue following court cases

Backflow Prevention

- State issued Cross-Connection Control Policy Handbook in 2023 (replaces Title 17)
- Two potential impacts to the District
 - Increased non-residential site surveys
 - New backflow device requirements for residential properties
 - Residential fire sprinklers and swimming pools
 - At present, residential devices are the District's responsibility
- May require amendment to District water service regulations
- District will work with other water utilities to provide input to State on new regulations
 - Goal would be to provide the same level of public health protection with less impact on water utilities



Backflow Protection Assembly (BPA)

Questions?



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Regulatory Compliance Semi-Annual Report

July through December 2023

Planning Committee

March 12, 2024

Agenda

- Environmental Compliance
 - Orinda Water Treatment Plant (WTP) Filter Backwash Toxicity Exceedance
 - Grout Release into San Pablo Creek
 - Sanitary Sewer Overflows
 - Air Quality Notice of Violation Settlements
- Workplace Health and Safety

Orinda WTP Filter Backwash Toxicity Exceedance

- Beginning 2022 to present, multiple failed toxicity testing
- Quarterly fish bioassay lab test on effluent discharge
- No impacts to receiving water observed
- Collaborated with State Water Board to determine cause (no obvious malfunction in treatment process)
- Latest finds indicate the source of toxicity may be associated with the sampling apparatus (and not waste discharge from the plant)

Orinda Water Treatment Plant Grout Release

- Grout released into San Pablo Creek September 19, 2023 and subsequent releases have occurred
- Associated with pressure injection for tiebacks to support retaining wall
- Excavation was temporarily suspended
- Discussions with regulatory agencies ongoing



Excavation site at Orinda WTP

Orinda Water Treatment Plant Grout Release

- Cleanup and restoration of creek was completed last September following the release
- No observed impacts to aquatic life or wildlife
- Biologist actively monitoring the creek during grouting along with other modified work practices



Grout release into San Pablo Creek

Sanitary Sewer Overflow

- July 16, 2023, at Camanche South Shore Recreation Area RV Park
- Estimated volume of 290 gallons, mostly absorbed in the ground
- Clean up of the area was conducted including disinfection of the impacted area
- Foreign debris found in sewer line
- Sewer was inspected via video and cleaned out

Sanitary Sewer Overflow

- October 9, 2023, at Camanche North Shore Recreation Area Mobile Home Park
- Estimated volume of 725 gallons discharged through manhole, mostly absorbed in the ground
- Clean up of the area was conducted including disinfection of the impacted area
- Caused by a build-up of fats, oil and grease in the line
- Manhole re-located to reduce future impacts to residents

Air Quality Violation Settlements

- Settlement of \$20,000 with the Bay Area Air Quality Management District for previous violations
 - May 18, 2021 – Digester gas release; \$12,000
 - April 2, 2023 – Digester gas release; \$8,000
- Corrective actions for both releases reported and discussed previously

Workplace Health and Safety

Lost Time Injury Rate (LTIR)

	LTIR
Strategic Plan Key Performance Indicator	≤ 3.0
LTIR as of December 31, 2023	2.43
If work-related COVID, cases are included	3.21

COVID-19 Pandemic

- Two Cal/OSHA defined outbreaks at District facilities
- Total of 229 cases reported; 10 determined to be work-related
- Provisions of SB 1159 – worker’s compensation presumption expired on December 31, 2023
- Cal/OSHA COVID-19 regulation remains in place until February 2025
- COVID-19 Hotline remained active to manage positive cases

Questions?



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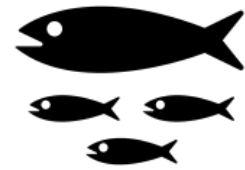


2023 Mokelumne River Salmon Return Update

Planning Committee

March 12, 2024

Agenda



2023 Salmon Returns

- River and Hatchery Returns
- Straying
- Steelhead
- Media Coverage
- Incubation and juveniles



Next Steps

- Meet Voluntary Agreement non-flow requirements
- Supported by \$8 million in State and Federal Grants
- Floodplain/spawning/diversion screening

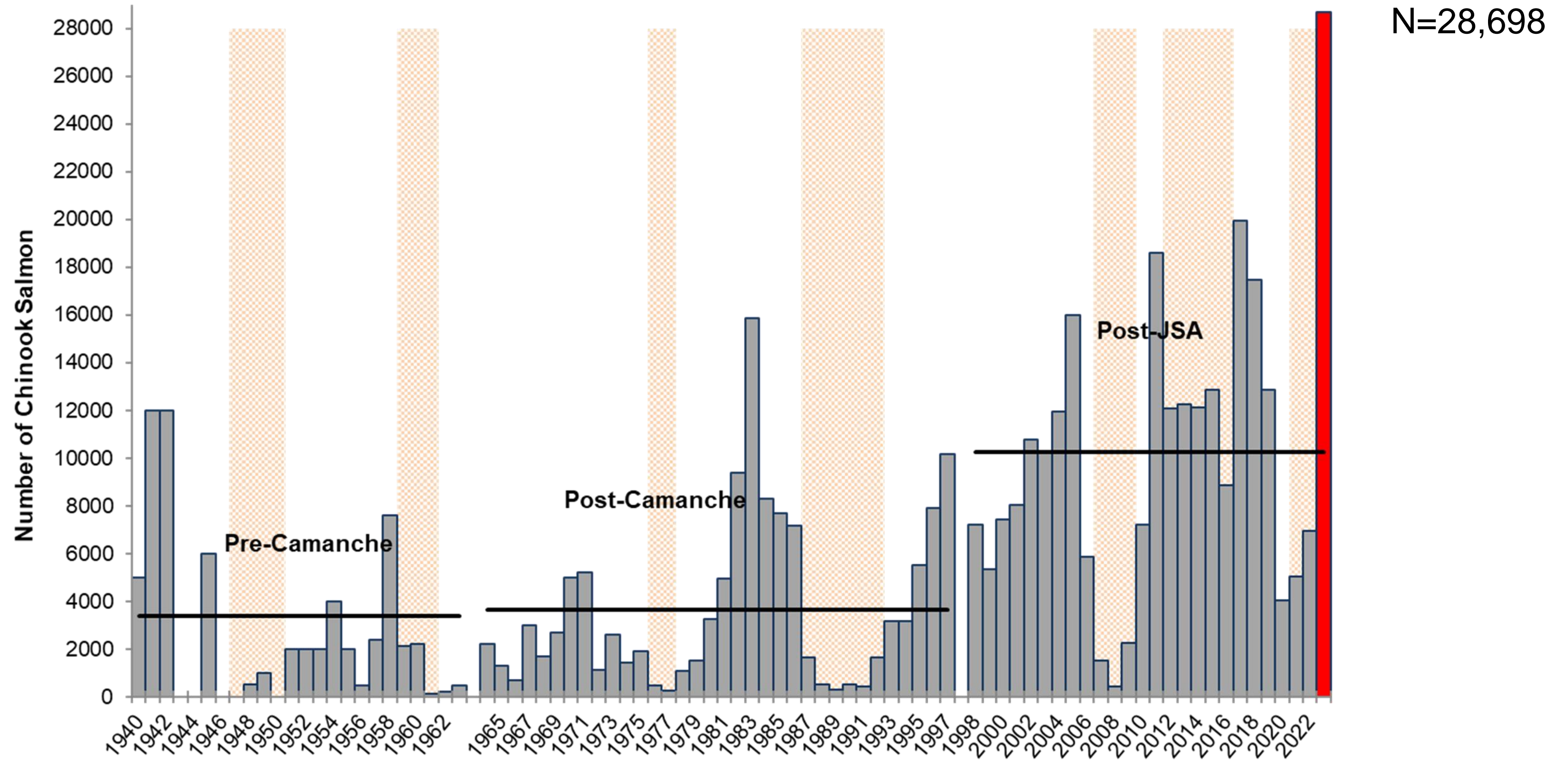


Photo credit: @KingmondYoung



Photo credit: EBMUD staff photo

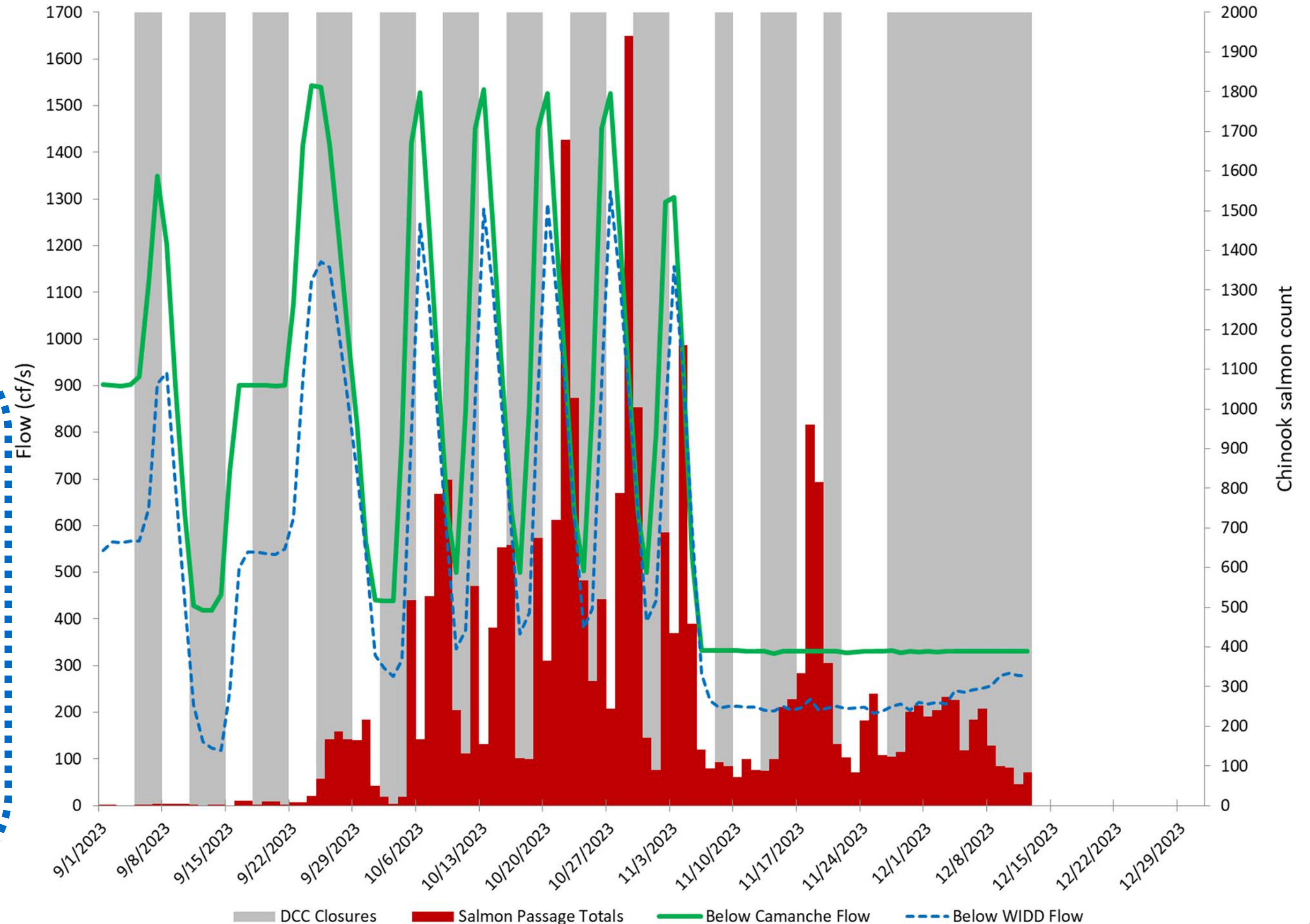
Historical Salmon Count 1940-2023



Fall Pulse Flows and Delta Cross Channel Closures

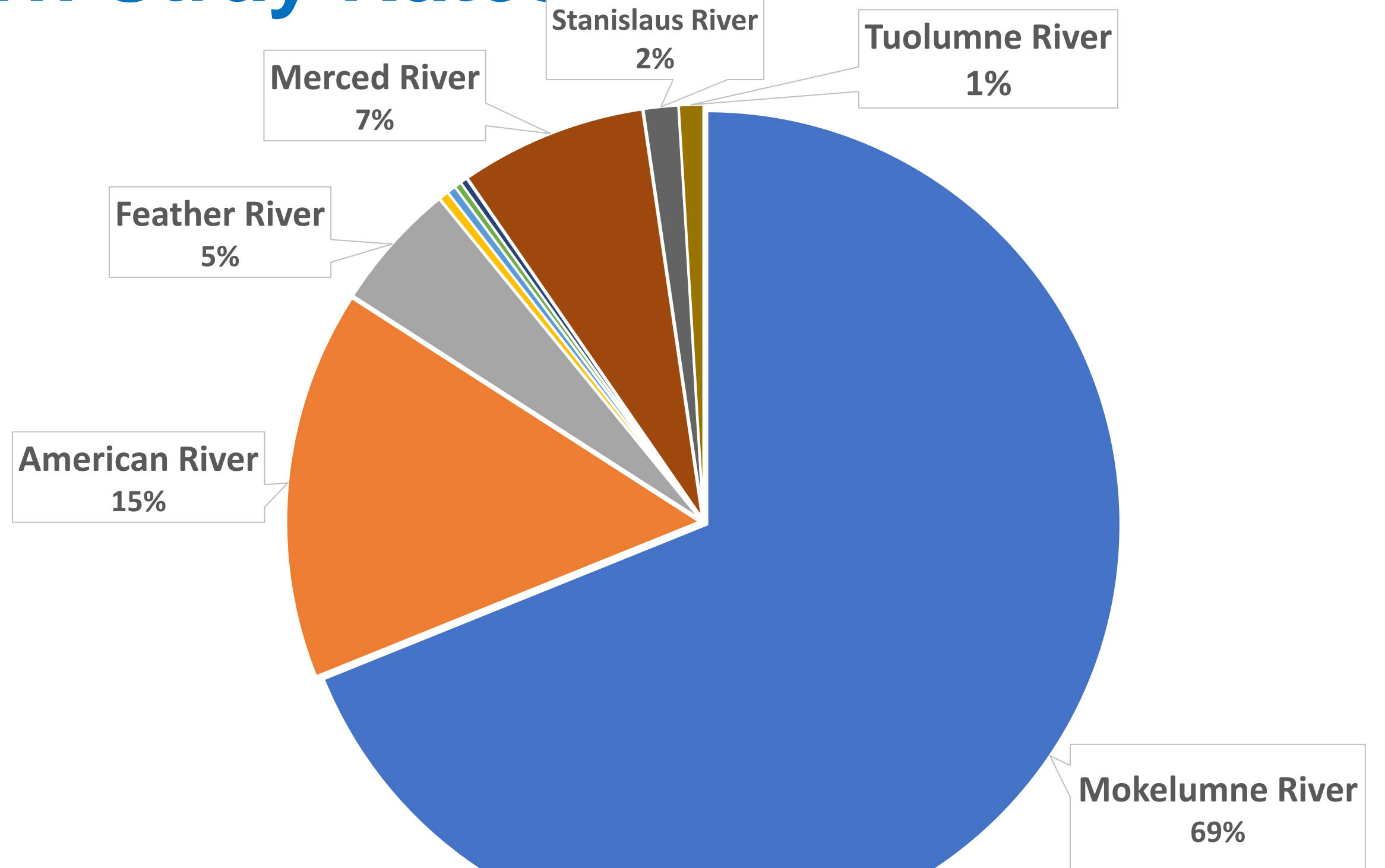
Key Takeaway:

- Six planned pulses in October plus associated Delta Cross Channel Closure equated to more Mokolumne salmon returning than straying to other watersheds



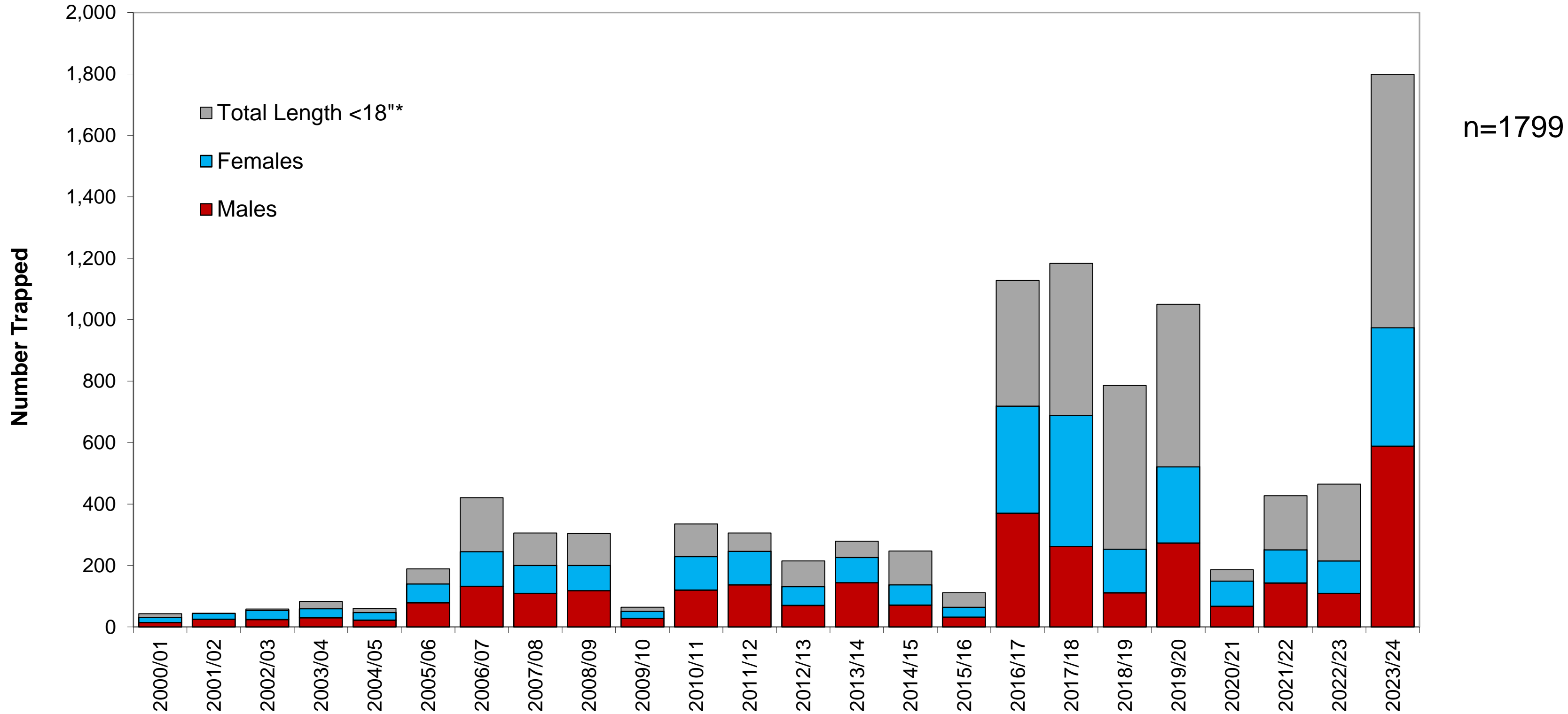
2023 Mokelumne Return Stray Rates

Watershed	2022 Straying	2023 Straying
Sacramento River	42%	21%
San Joaquin River	11%	9%



- Mokelumne River
- American River
- Feather River
- Upper Sacramento River
- Yuba River
- Clear Creek
- Putah Creek
- Merced River
- Stanislaus River
- Tuolumne River

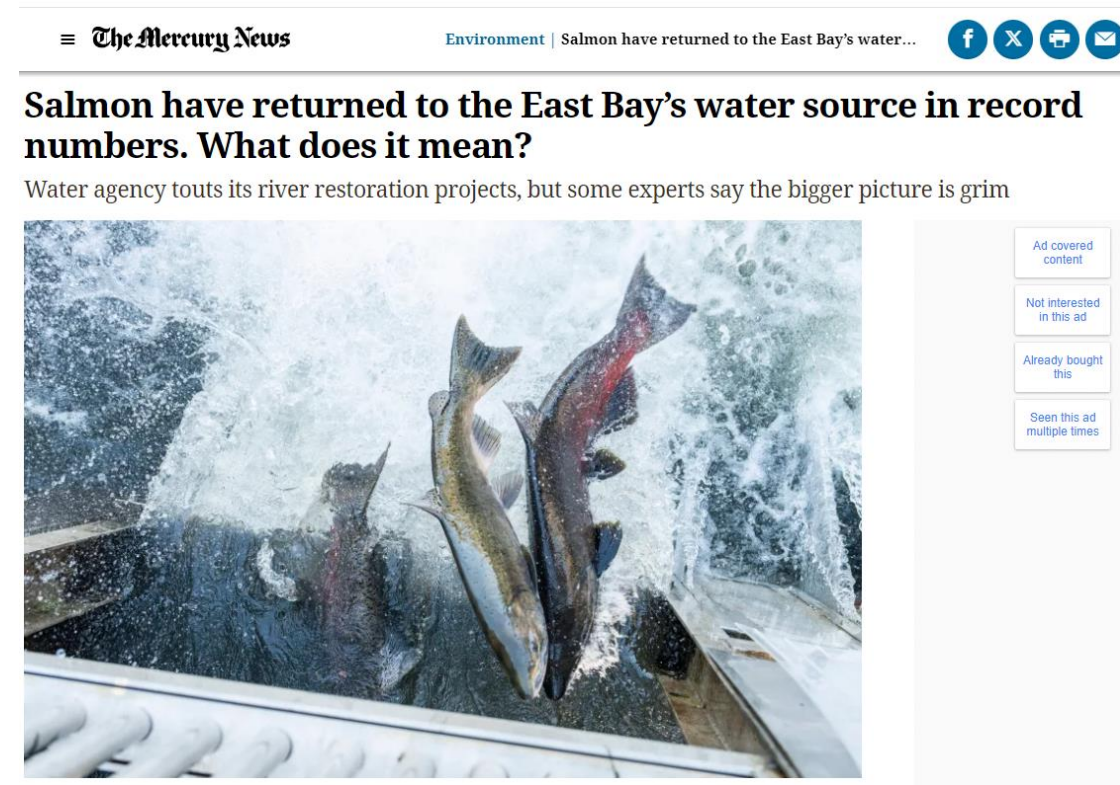
Steelhead Annual Hatchery Trapping Summary



* Adults less than 18" enter the hatchery but are not considered adults, and are therefore not spawned

Media Outreach on Mokelumne Salmon Success

Story picked up by Print, Radio and TV outlets



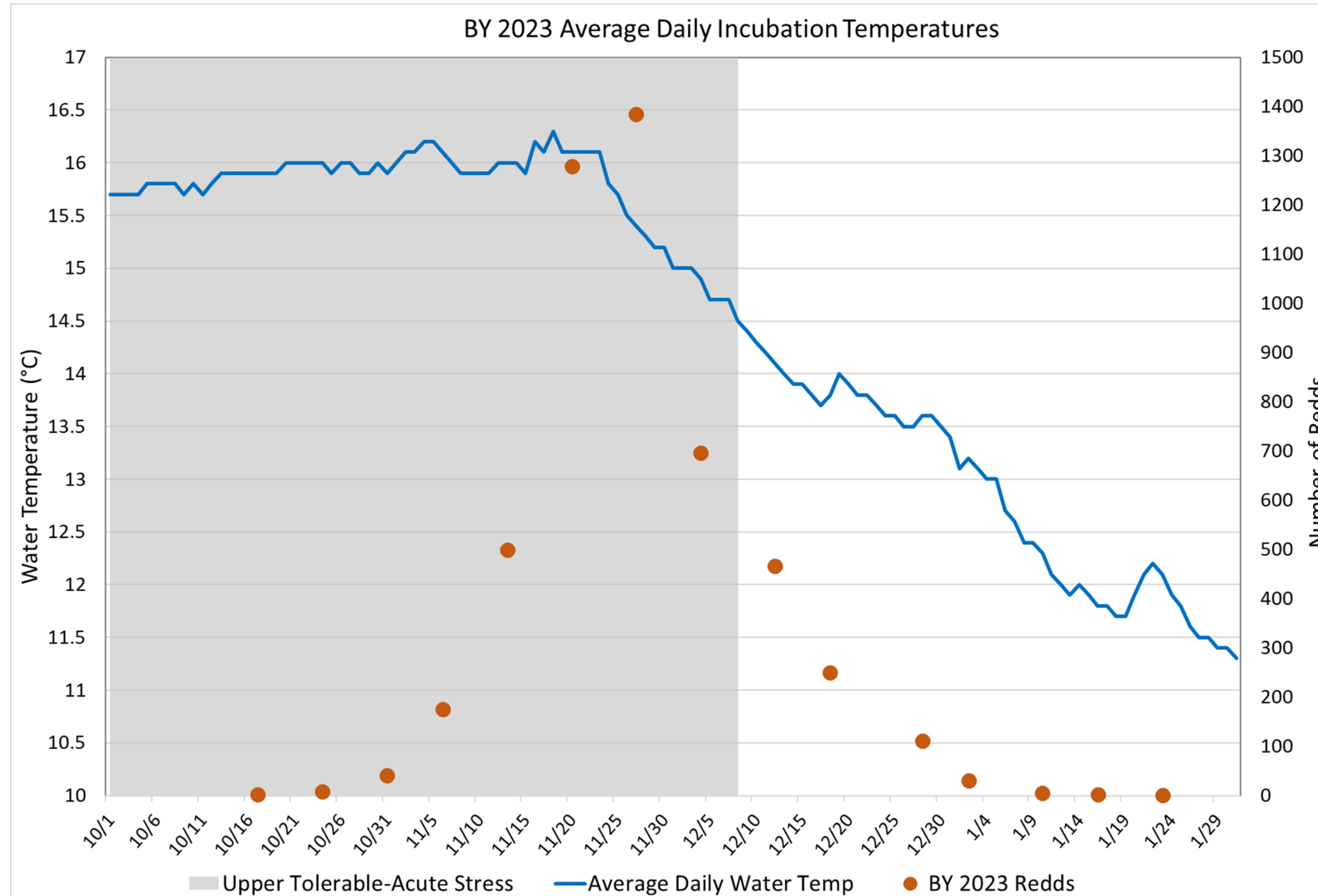
This year, over 20,000 salmon have returned to spawn in the Mokelumne river, a figure not seen in 80 years of record keeping. Over the past few decades, EBMUD has undertaken a series of restoration projects and other measures to try to boost the number of salmon spawning in the river. (EBMUD)



Key Takeaways:

- High returns attributed to Closure of the Ocean Fisher, significant pulse volume, long term river management
- Multiple DCC closures kept most Mokelumne River Fish home and brought in some American River Fish
- Significant media interest

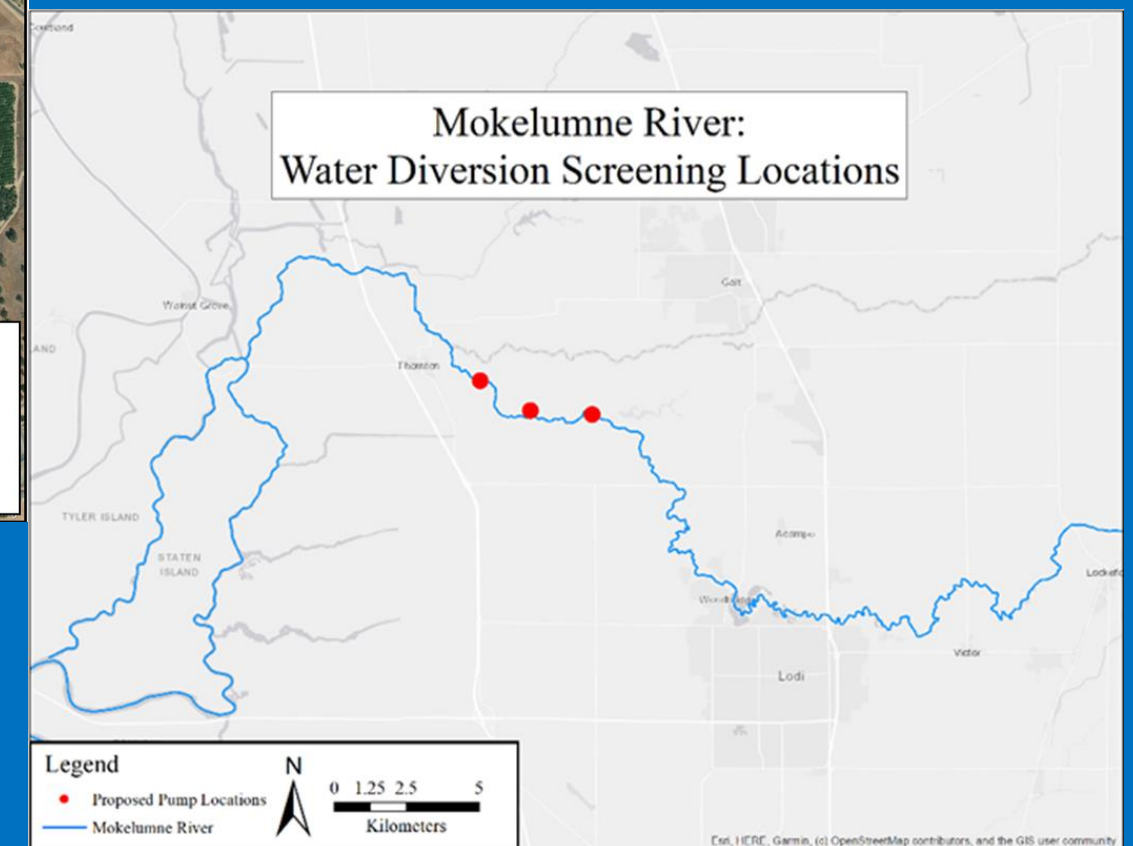
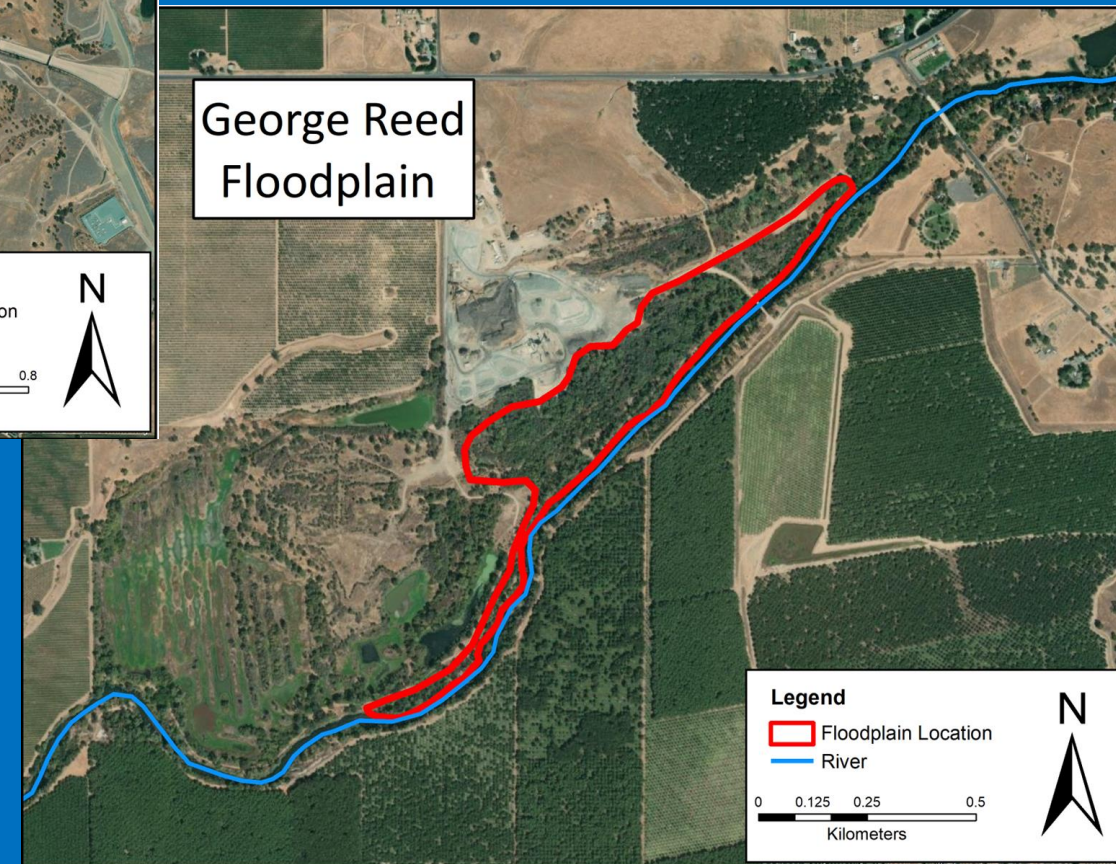
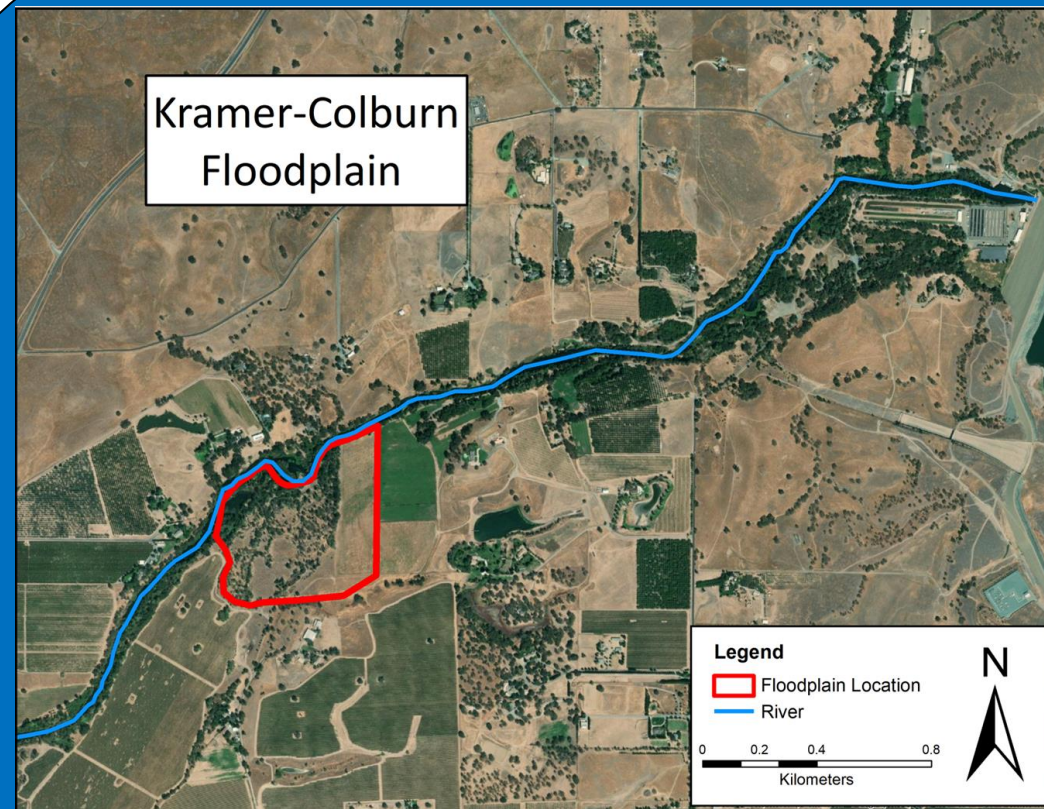
Juvenile Survival Projections



Key Takeaway:

- Egg incubation temperature is limiting and coordination of operations and fisheries continues to help improve conditions
- Water Quality Control Plan Update – Unimpaired flow scenario could make incubation temperatures even worse
- Voluntary Agreement flow proposal protects our cold water pool and allows for more adaptive management of releases to improve temperatures
- Investigating a Temperature Control Device (TCD) at Camanche

VA Non-Flow Measures -Habitat Restoration



Key Takeaway:

- DWR Funding Agreement – \$7.5 million for habitat restoration and monitoring
- USBR Grant - \$650,000 – planning/design of habitat restoration
- Landowner participation is key to future success

Conclusions

Key Takeaways

- 28,698 Chinook Salmon
- Lower stray rates
- Strong media interest
- Record Steelhead return
- Funding for Habitat Restoration
- Temperature is key
- Feasibility of a TCD



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Los Vaqueros Reservoir Expansion Project Updates

Planning Committee

March 12, 2024

Agenda

- Background
- Updated Schedule
- Project agreements
- Next steps



Los Vaqueros Reservoir

Background

Los Vaqueros Reservoir Expansion Project:
Increase capacity from 160 TAF to 275 TAF

Project Benefits

WATER FOR REFUGES



WATER FOR PARTNERS



REGIONAL INTEGRATION



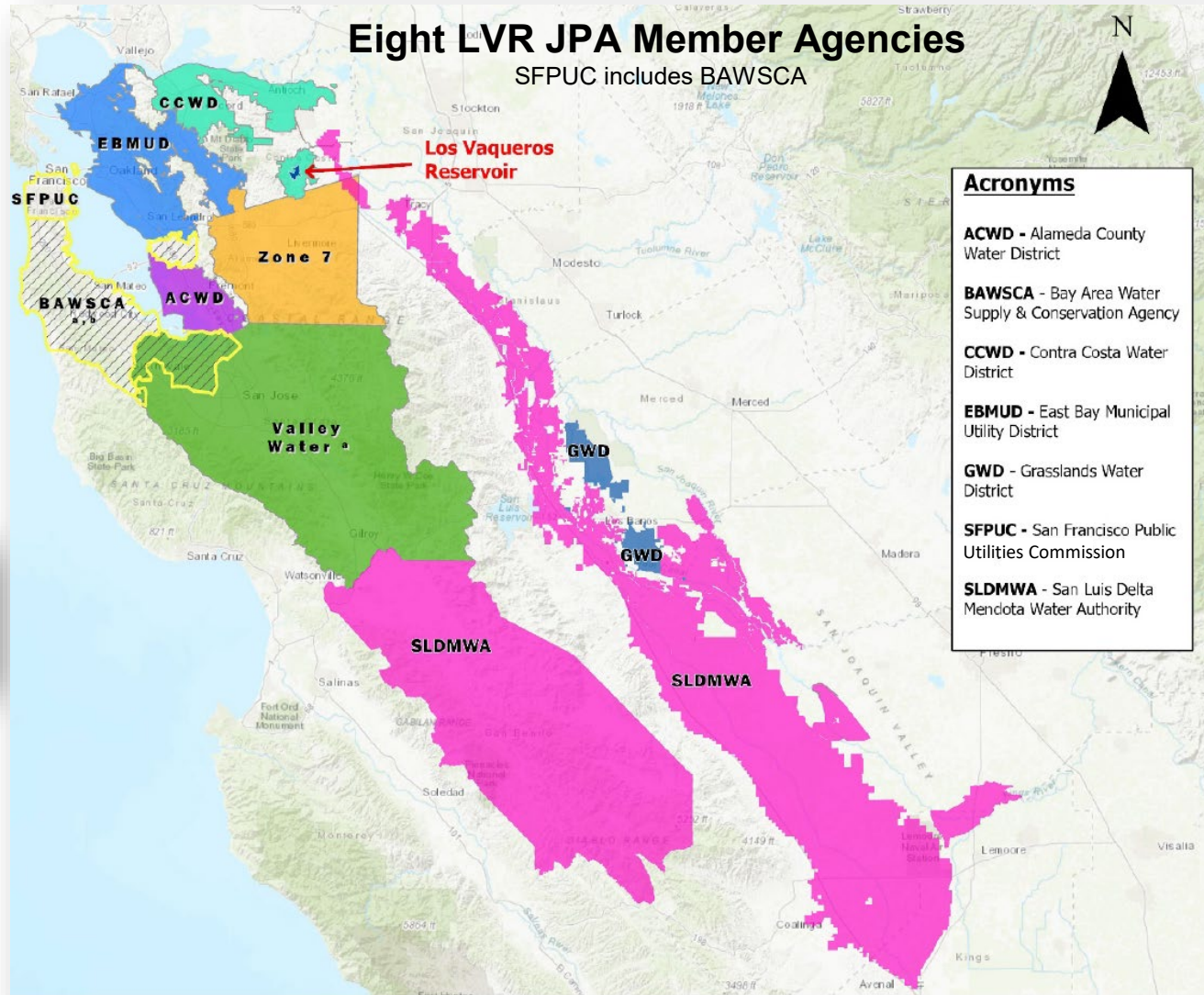
WATER QUALITY



RECREATION



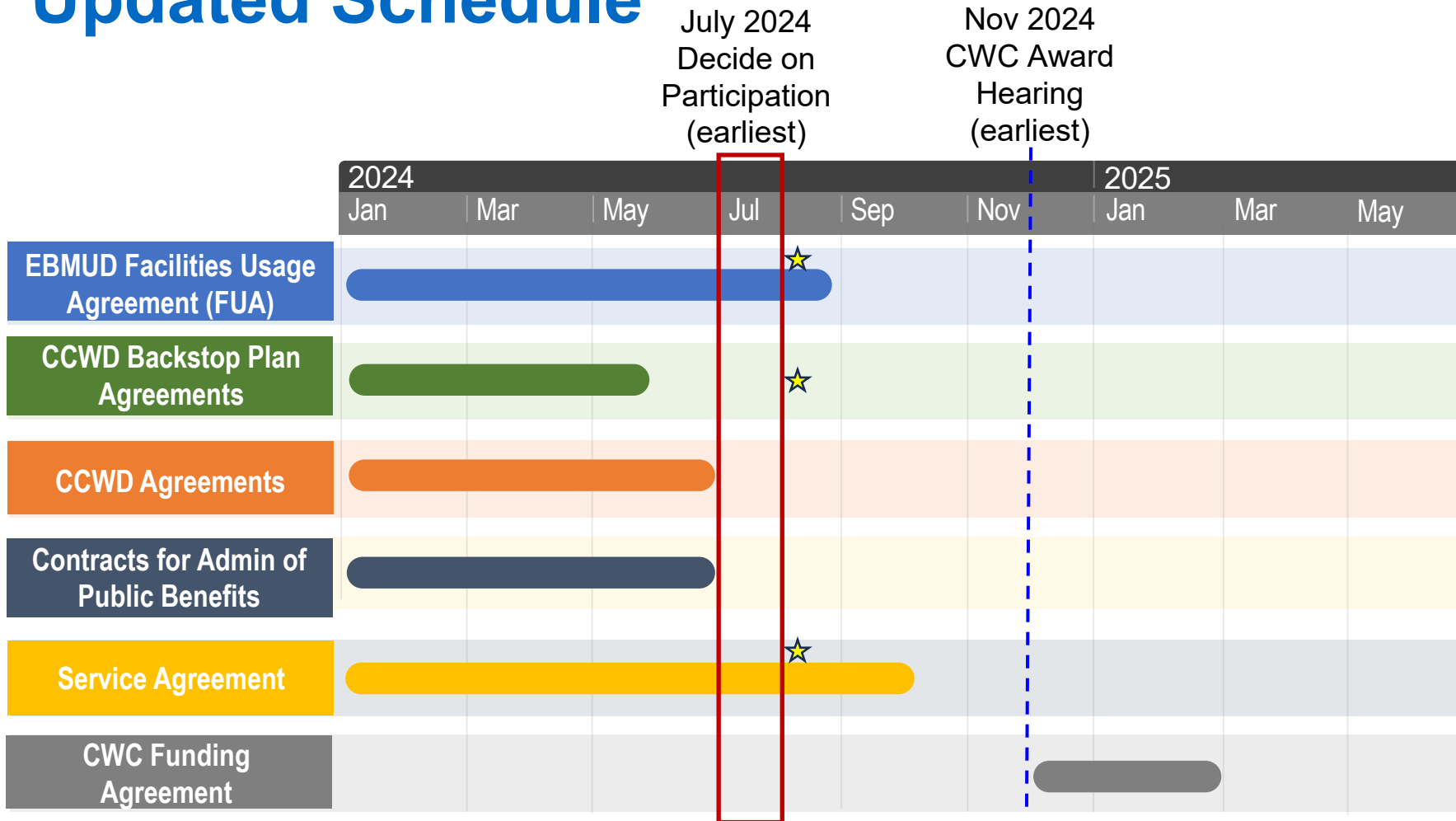
JPA: Joint Powers Authority
LVR: Los Vaqueros Reservoir
TAF: thousand acre-feet



Potential Project Benefits for EBMUD

- 30 TAF dedicated storage west of Delta
- Supply for droughts and emergencies
- \$24 million grant for facility upgrade
- Partial recovery of Freeport sunk costs
- Regional water supply benefits

Updated Schedule



CCWD: Contra Costa Water District
 CWC: California Water Commission

★ EBMUD Board consideration of EBMUD FUA, CCWD-EBMUD Backstop Water Conveyance Agreement, and Service Agreement

Multi-Party Agreement Amendment No. 5 (MPA 5) Status

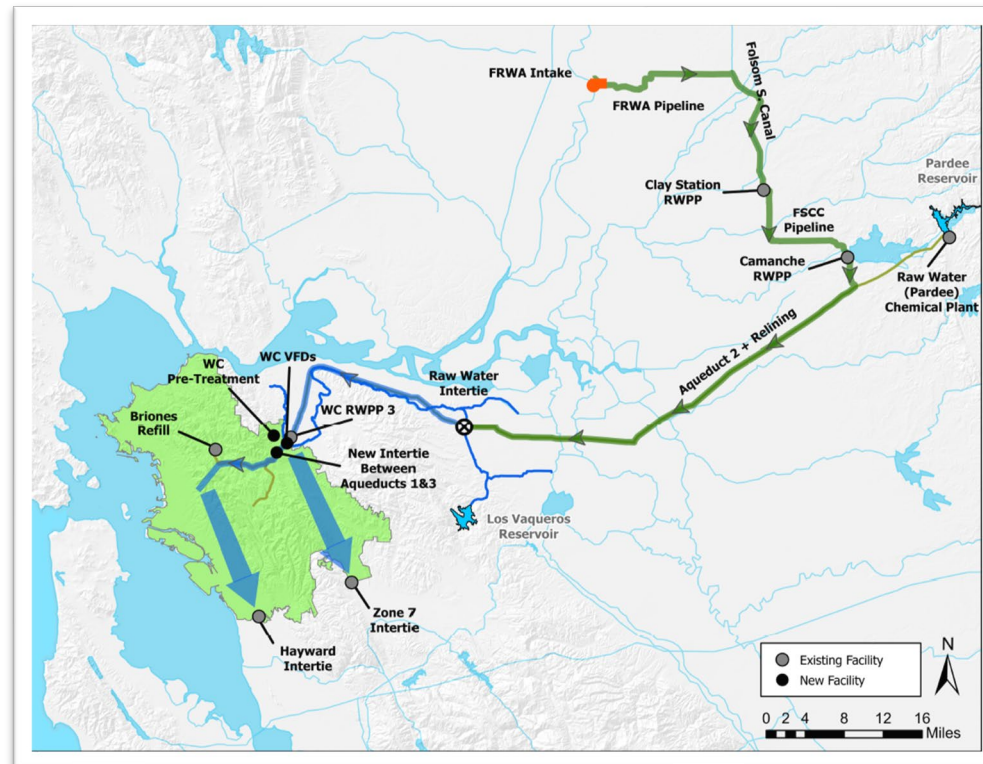
- Term ends on June 30, 2024
- JPA developed a plan to extend existing MPA 5 funds from June 2024 to June 2025
- MPA 6 to be a no cost time extension with term from July 2024 through June 2025

EBMUD Facilities Usage Agreement (FUA)

Purpose	Status	Key Issues
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- | | | |
|--|--|---|
| <ul style="list-style-type: none"> Conditions under which JPA can use EBMUD’s facilities and associated usage fees. | <ul style="list-style-type: none"> EBMUD responded to JPA comments on the draft termsheet. JPA is re-evaluating potential use of the Freeport facilities. | <ul style="list-style-type: none"> EBMUD FUA cannot commit to Freeport conveyance during drought years. Original project concept was use of Freeport during non-drought years. |
|--|--|---|

Potential Conveyance Routes and Facilities



- Use of Freeport Project to convey water for partners
- \$23.7 million for EBMUD for facility upgrades using CWC funding

FSCC: Folsom South Canal Connection
 RWPP: Raw Water Pumping Plant
 WC: Walnut Creek
 VFDs: Variable Frequency Drives

CCWD Backstop Plan Agreements

Purpose	Status	Key Issues
<ul style="list-style-type: none">• Agreements CCWD has with other agencies to provide continued service to CCWD customers.	<ul style="list-style-type: none">• Draft CCWD-EBMUD Backstop Water Conveyance Agreement is under negotiations.• CCWD is negotiating agreements for water supply including securing water transfers.• CCWD evaluating significant treatment and pumping improvements to meet water supply needs during the outage	<ul style="list-style-type: none">• EBMUD must ensure that its water sources are protected if CCWD pursues water transfers as a source for backstop water conveyance.• Changes to CCWD's water quality and water supply reliability during dam construction weighed against cost of facility upgrades

CCWD Design & Construction Agreement (DCA)

Purpose	Status	Key Issues
<ul style="list-style-type: none">• Defines the services provided by CCWD for design and construction of new and modified facilities and the JPA's payment obligations.	<ul style="list-style-type: none">• Discussion of key unresolved issues being discussed by the JPA DCA Ad Hoc Committee.• JPA prepared a risk reduction strategy.• Since CCWD will not accept dam construction risks, each partner will need to consider overall project risk against potential benefit in deciding whether and how to participate in the project.	<ul style="list-style-type: none">• Construction risk sharing and management. CCWD wants overall authority on decisions impacting construction and costs while the JPA member agencies take on the financial risk.

CCWD Facilities Usage Agreement

• Purpose	• Status	Key Issues
<ul style="list-style-type: none">• Conditions under which the JPA can use CCWD's facilities and associated usage fees.	<ul style="list-style-type: none">• CCWD and the JPA are discussing the JPA's December 2023 response to the CCWD FUA termsheet.	<ul style="list-style-type: none">• CCWD usage fees methodology is still under discussion and the JPA desires the following:<ul style="list-style-type: none">• Guaranteed minimum annual delivery quantity with a reduction in future CCWD payments if the minimum deliveries are not met.• Modification of CCWD's water quality criteria for filling the reservoir.• First priority for conveyance and storage capacity after CCWD's needs are met.

Service Agreement

Purpose	Status	Key Issues
<ul style="list-style-type: none"> JPA provides storage, conveyance, public benefits, design, construction, and other services to the members who make payments for the services. 	<ul style="list-style-type: none"> Draft agreement completed fall 2023. Subgroup facilitated by the JPA is meeting to discuss operational priorities, storage and conveyance allocations, and potential impacts of the CDFW permit on CCWD diversion capacity. 	<ul style="list-style-type: none"> Storage capacity allocations. Storage is currently oversubscribed by 50 TAF. EBMUD has consistently requested 30 TAF of storage. Operational priorities among member agencies. Potential for reduced benefits due to operational permit constraints. Public benefits terms to be negotiated, including operational priority of the refuges. For release of stored water, the priority of an exchange between CCWD and EBMUD. Cost and usage rights allocations.

Contracts for Administration of Public Benefits (CAPBs)

Purpose	Status	Key Issues
<ul style="list-style-type: none"> Ensures project public benefits will meet State funding requirements. 	<ul style="list-style-type: none"> JPA developed draft Ecosystem and Recreation and Emergency CAPBs and have shared them with the member agencies, CDFW, and DWR. JPA will be negotiating with CDFW and DWR in spring 2024. 	<ul style="list-style-type: none"> Terms to be negotiated with CDFW and DWR and then incorporated into the Service Agreement. Terms need to be acceptable to JPA member agencies.

Next Steps

- Update EBMUD unit cost evaluation with 2023 project cost estimates
- Continue to negotiate Project agreements and resolve key issues necessary to determine participation
- Continue to advance discussions with SMUD and Reclamation on SMUD CVP Assignment as one source of water supply
- Advance recycled water credits as another source of water supply.
- Updates to the Committee and Board over next 4 months prior to deciding on participation

Questions?

