Lower Mokelumne River Project

FERC Project No. 2916

Technical Work Group (TWG) Meetings
Water Resources
June 25, 2025

EBMUD

Kleinschmidt

AGENDA

- **Welcome and Introductions**
- **Brief Project Overview**
- **Identify Potential Studies**
- **Q&A and Feedback**
- **Action Items, Schedule and Next Steps**

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Welcome & Introductions

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Lower Mokelumne Relicensing Team

Project Management Team

Priya Jain

Brad Ledesma

Joe Tam

Sabrina Cheng

Karen Donovan

Resource Leads

Ana Ulloa
Ben Bray
Casey Del Real
Casey Leblanc
Chandra Johannesson
Chris Potter
Deirdre Mena
Eric Toth
Ginger Chen
Jason Zhou
Sami Harper
Thom Hardie

Consultant Team

Kleinschmidt
Shannon Luoma

Fatima Oswald

Olivia Smith

Vanessa Martinez

Facilitator
Marie Rainwater

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Meeting Purpose and Objectives

- Ensure EBMUD is aware of relicensing participants interests and objectives as they prepare their draft study plans for inclusion in the PAD

- Receive feedback on potential study plans, including:
  - Goals & objectives
  - Project nexus
  - Study area
  - Methodology

Lower Mokelumne River (FERC Project No. 2916) Project Overview

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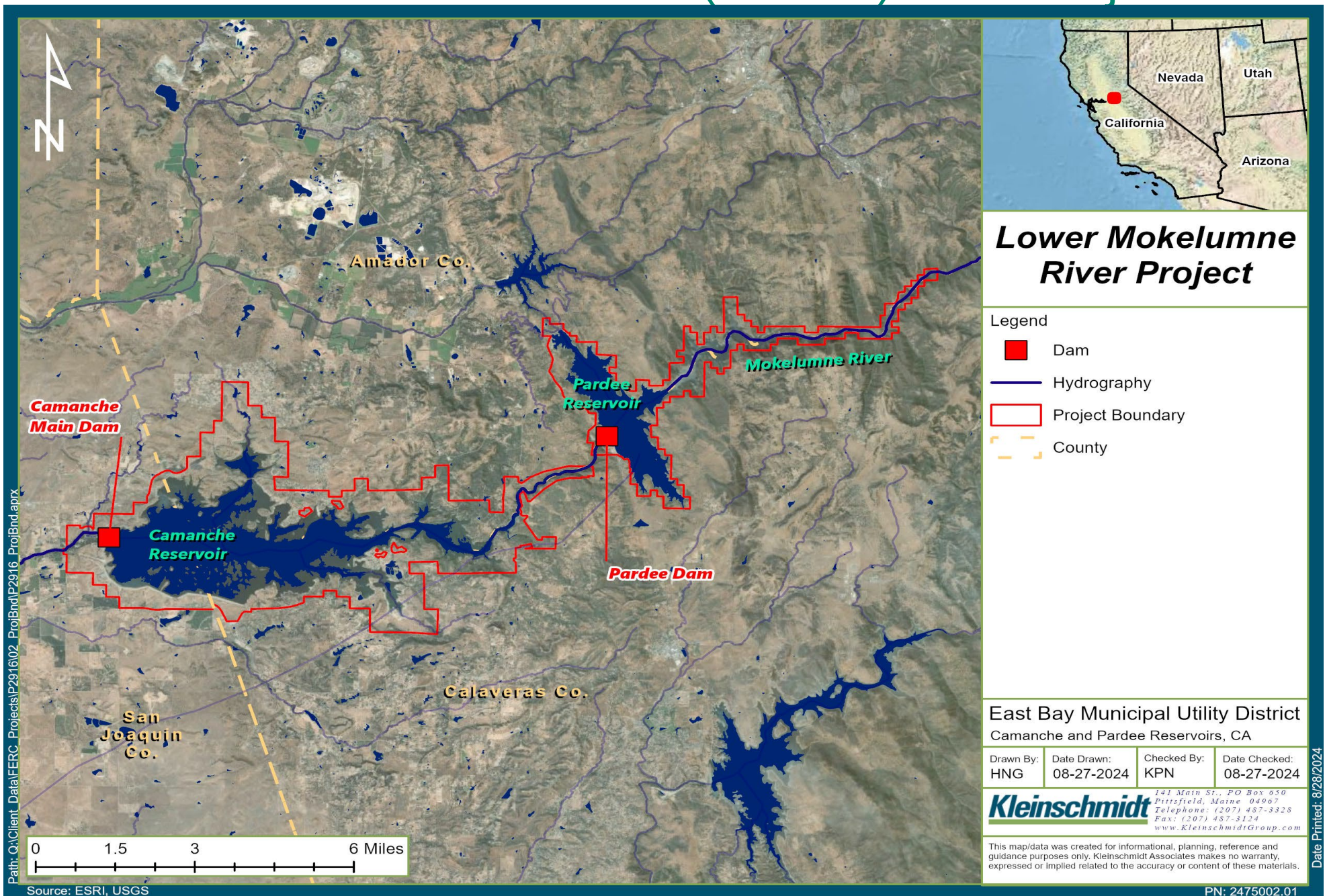
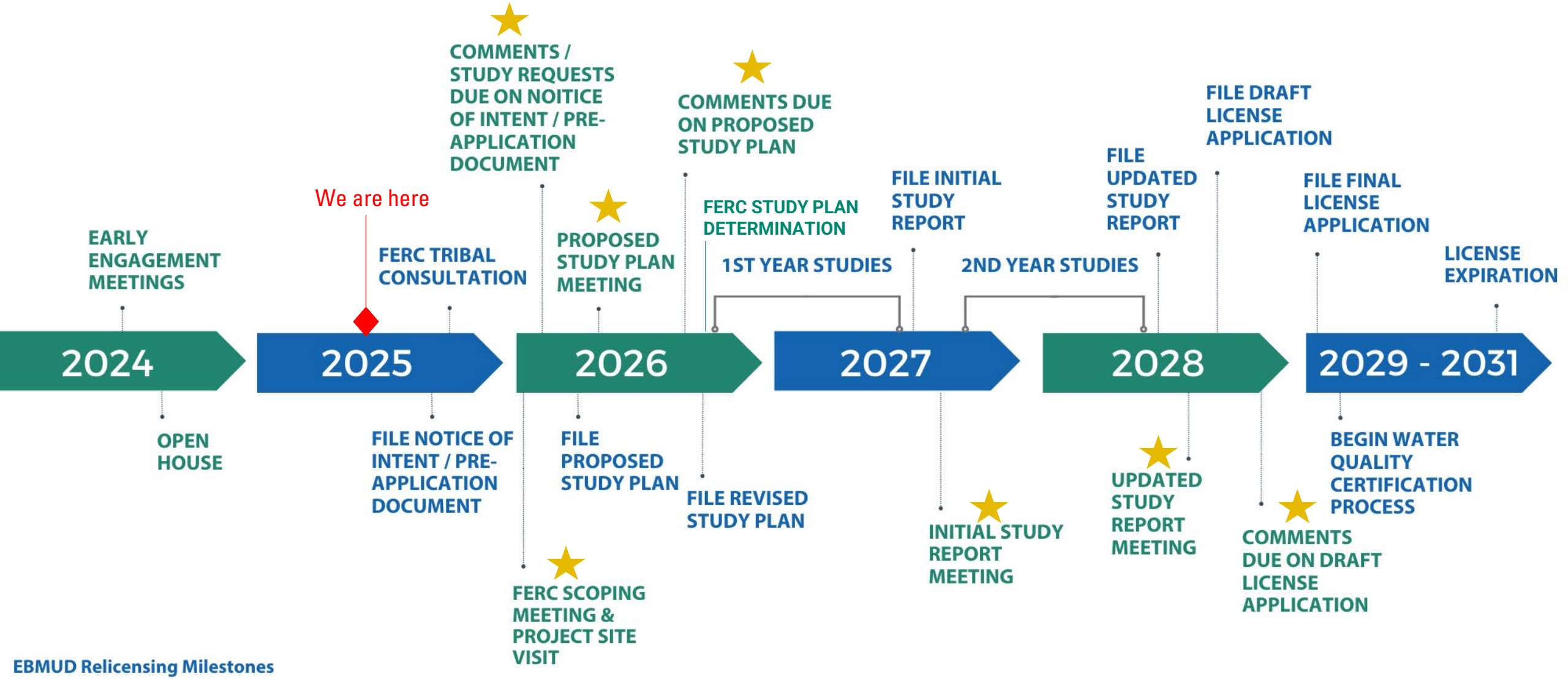
Lower Mokelumne River (P-2916) River Project



RELICENSING SCHEDULE

Lower Mokelumne River Project, FERC No. 2916



EBMUD Relicensing Milestones

Interested Parties Involvement Opportunities

★ Comment Opportunities (not all are shown)

Why Conduct Studies?

- The Proposed Study Plan (PSP) is a FERC requirement under the ILP
- Provide FERC the necessary information to conduct their analysis
- Identify pertinent & preliminary Project issues
- Lay groundwork for future license conditions & PM&Es

18 CFR § 5.11 Potential Applicant's proposed study plan and study plan meetings.

(a) Within 45 days following the deadline for filing of comments on the pre-application document, including information and study requests, the potential applicant must file with the Commission a proposed study plan.

FERC's 7 Study Guide Criteria

1- Goals & Objectives

2&3 - Relevant Resource Management Goals & Public Interest Considerations

4 - Existing Information & Need for Additional Information

5 - Project Nexus

6 - Proposed Methodology

7 - Level of Effort & Costs

Water Resources

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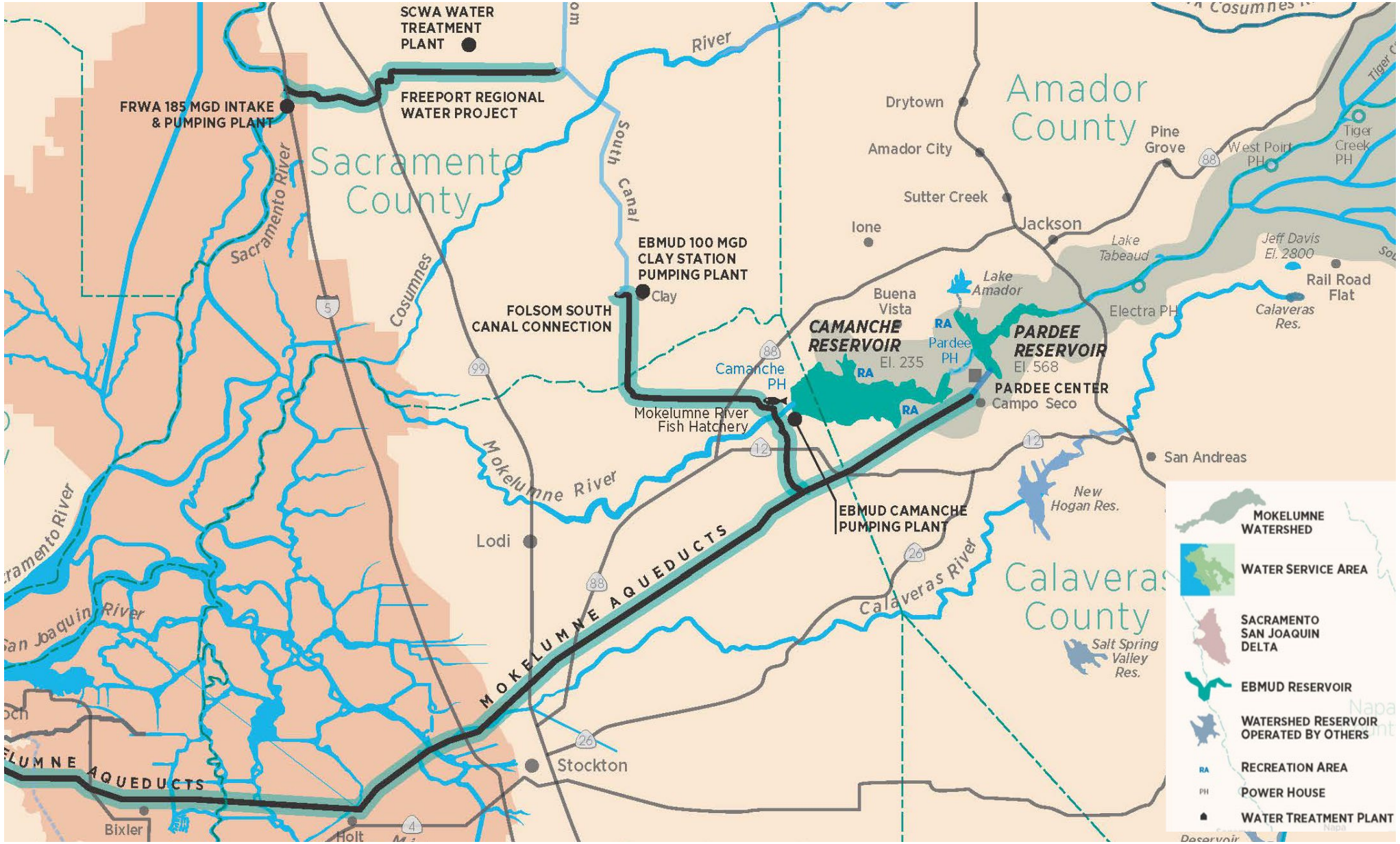
Water Resources – Operations, Hydrology, & Water Quality



Water Resources – Operations, Hydrology, & Water Quality

EBMUD Operating Criteria

- USACE Flood Control Manual
- SWRCB Water Rights Licenses and Permit Terms
- Joint Settlement Agreement
- Agreements with other water rights holders

EBMUD Operational Considerations

Reservoirs are operated in tandem to meet:

- Municipal water supply
- Obligations to downstream diverters
- Fishery requirements
- Water quality (temperature, DO)
- Contribution to Delta inflow/outflow
- Flood control (streamflow regulation)
- Power generation

Water Management Reporting

- USACE Daily Reservoir Report
- USGS Annual Data Validation
- FERC Annual Project Operations Report
- California Data Exchange Center (CDEC)
- SWRCB Water Rights Reporting

Water Quality Monitoring

- Daily and monthly in-situ water temperature data from 1998-2024
- Semi-continuous; daily spring-fall reservoir water temperature data from 2007-2024
- Manual water quality profile data from Pardee and Camanche

Water Resources – Operations and Hydrology

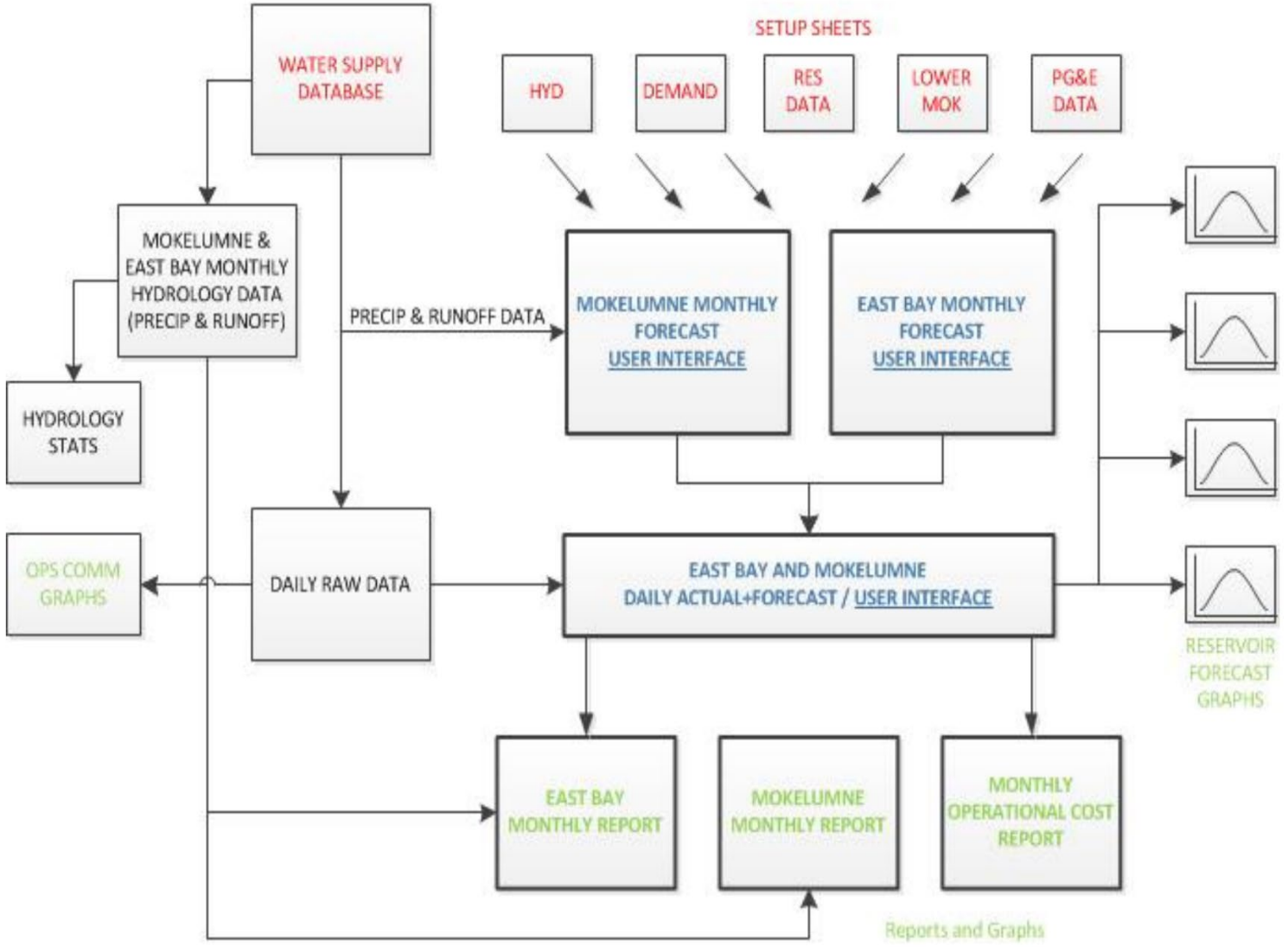
EBMUD Water Supply Operations Model

MS Excel based mass balance accounting tool

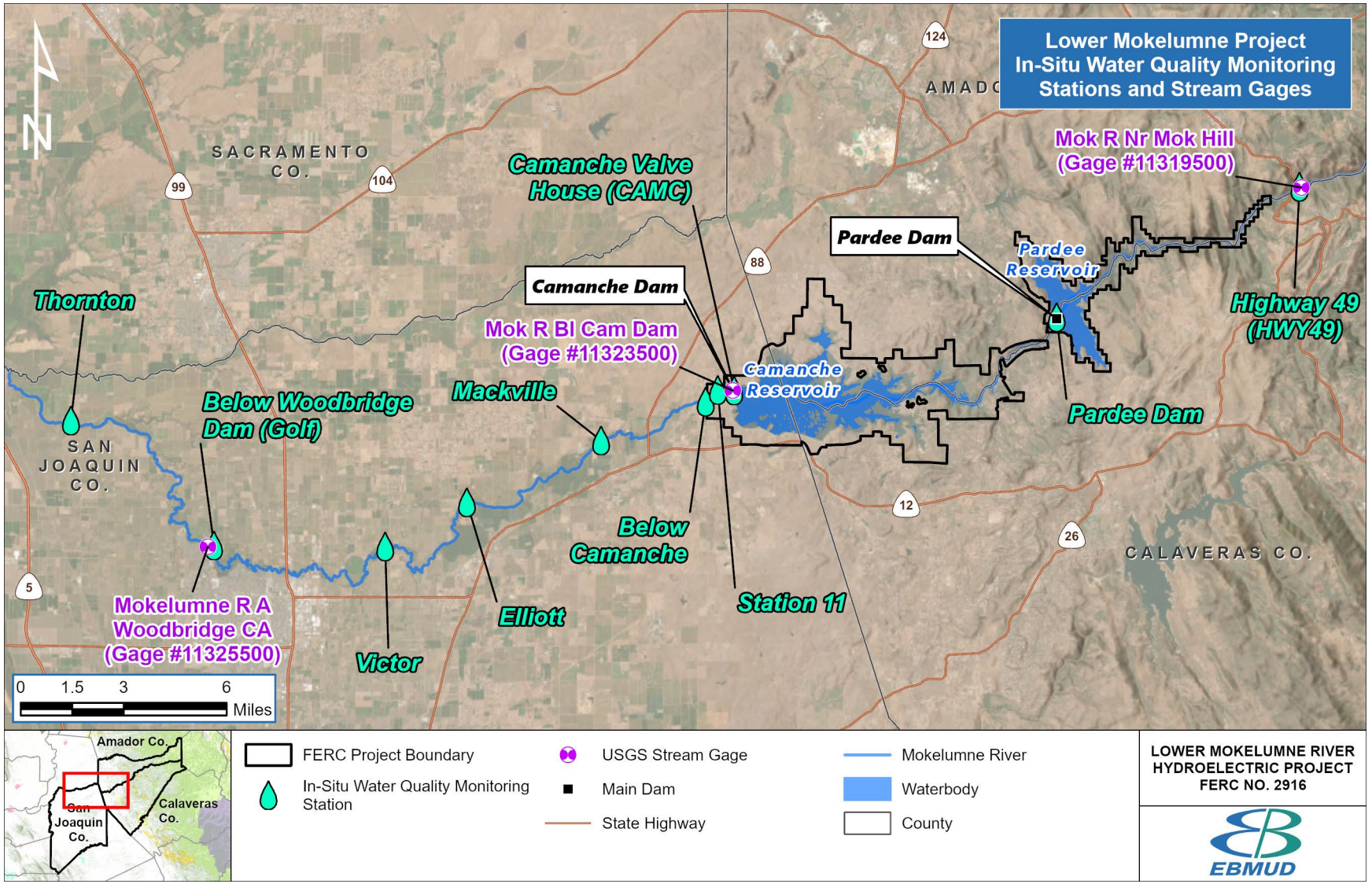
Set up with combination of monthly user inputs and daily time steps

Used to manage water supply reservoir levels for:

- meeting forecasted water treatment plant production needs,
- emergency storage goals,
- flood control,
- water quality limitations,
- In-stream flow requirements
- water rights and agreements,
- power generation goals.



Water Resources – In-Situ Water Quality Monitoring Stations & Stream Gages



Water Resources –Water Quality

Water Temperature Models

CE-QUAL-W2 ver. 4.5

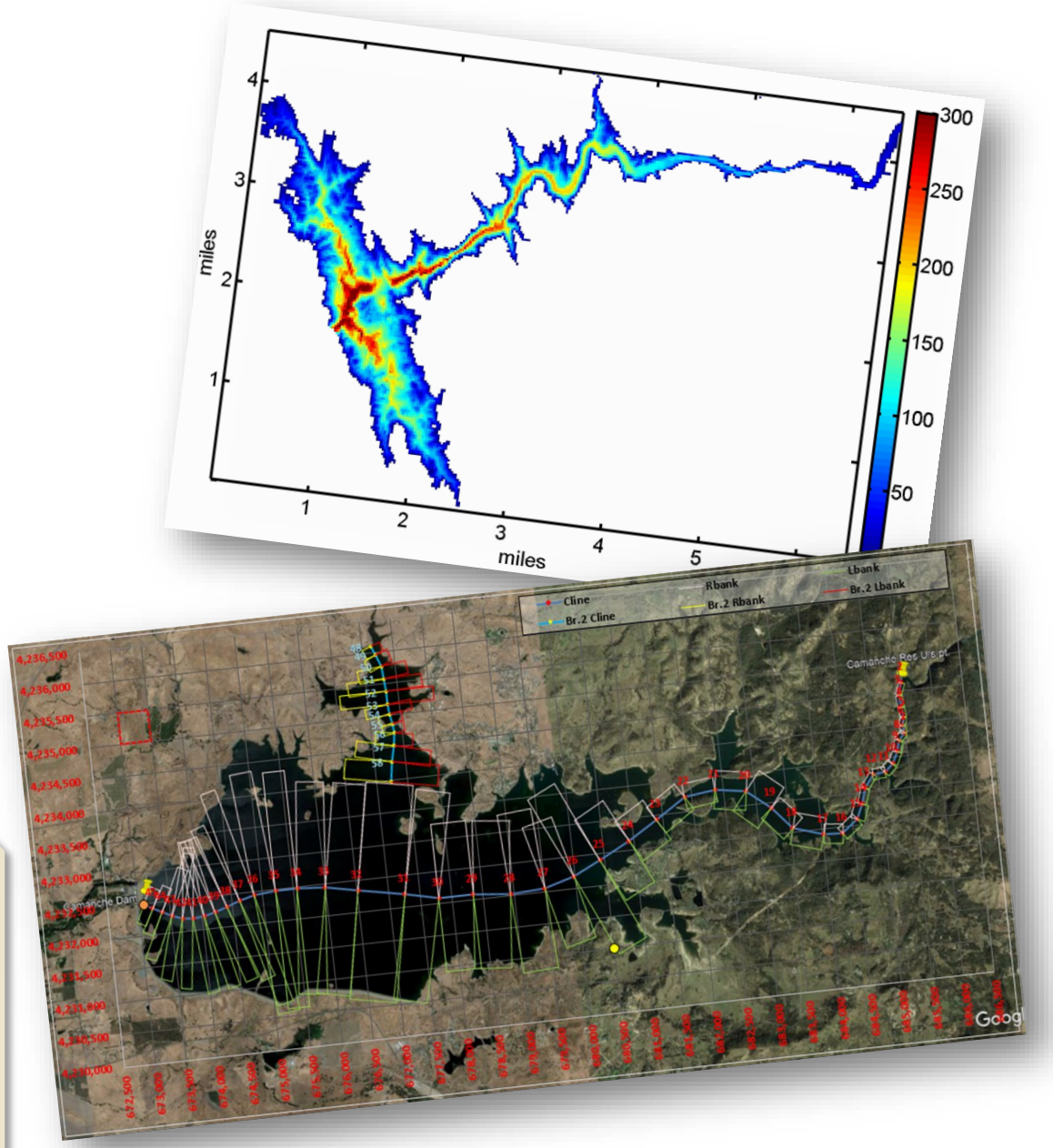
A two-dimensional hydraulic and water temperature model application for both Pardee and Camanche.

SNTEMP/RMS4

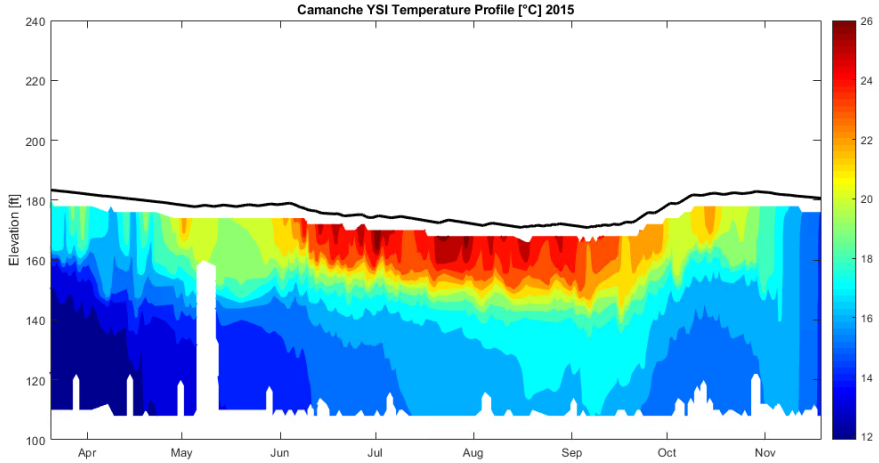
A one-dimensional hydraulic and water temperature model application - RMS4 for hourly timestep resolution and a SNTEMP for daily timestep resolution - for the reach connecting Pardee and Camanche Reservoirs.

SSTEMP

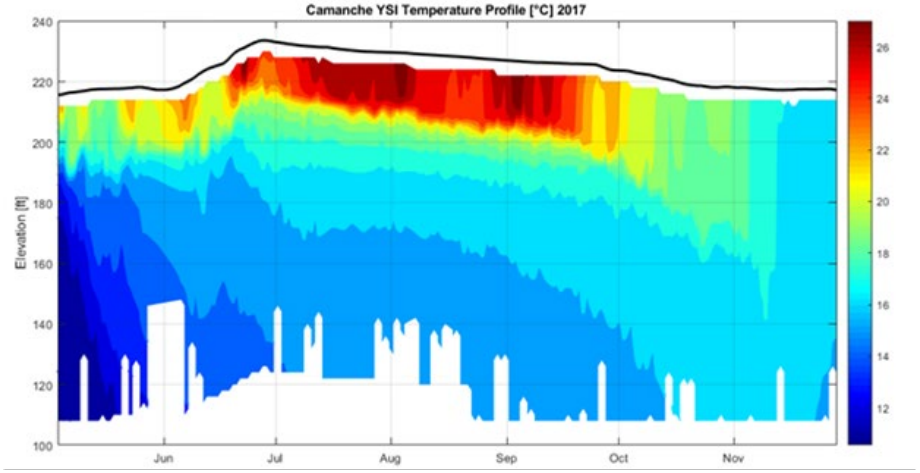
Monthly timestep model with statistical model application that simulates temperatures for the lower Mokelumne river from Camanche Dam to Station Golf below Woodbridge Dam that allow for a prediction of the monthly maximum of the seven-day average daily maximum water temperature given release temperature and flow from Camanche Dam and meteorological inputs.



Water Resources– Water Temperature and Dissolved Oxygen

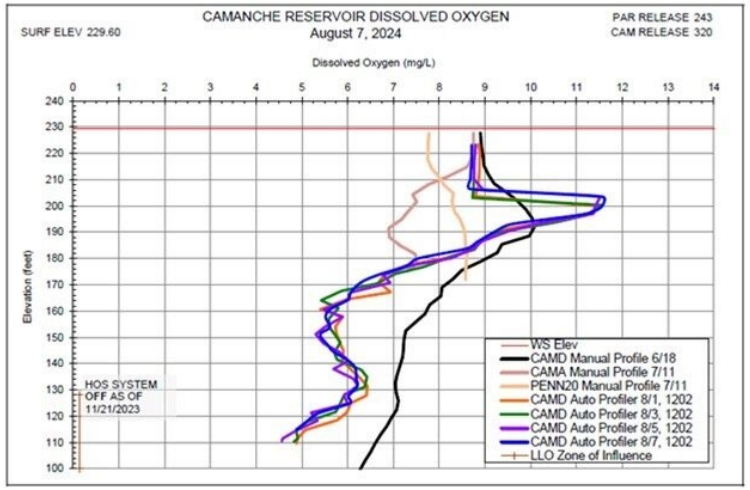


Autoprofiler Temperature (°C) Contour, Station CAMD, 2015 Provisional.

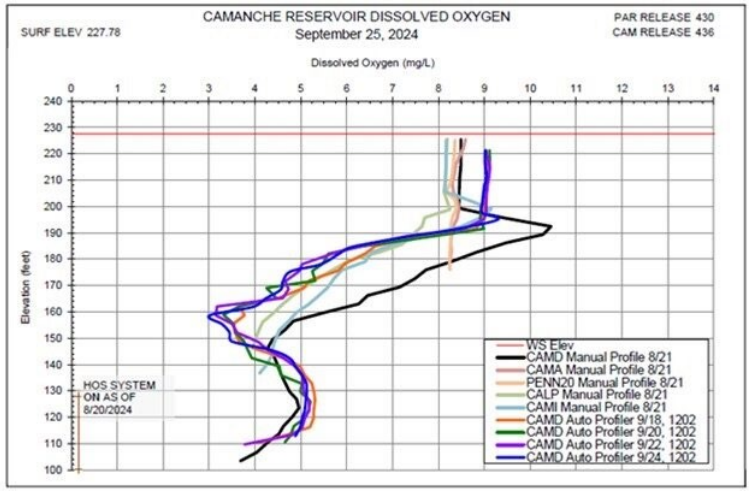


Autoprofiler Temperature (°C) Contour, Station CAMD, 2017 Provisional.

(a) August 7, 2024 before HOS Start-up



(b) September 25, 2024 a month after HOS start-up



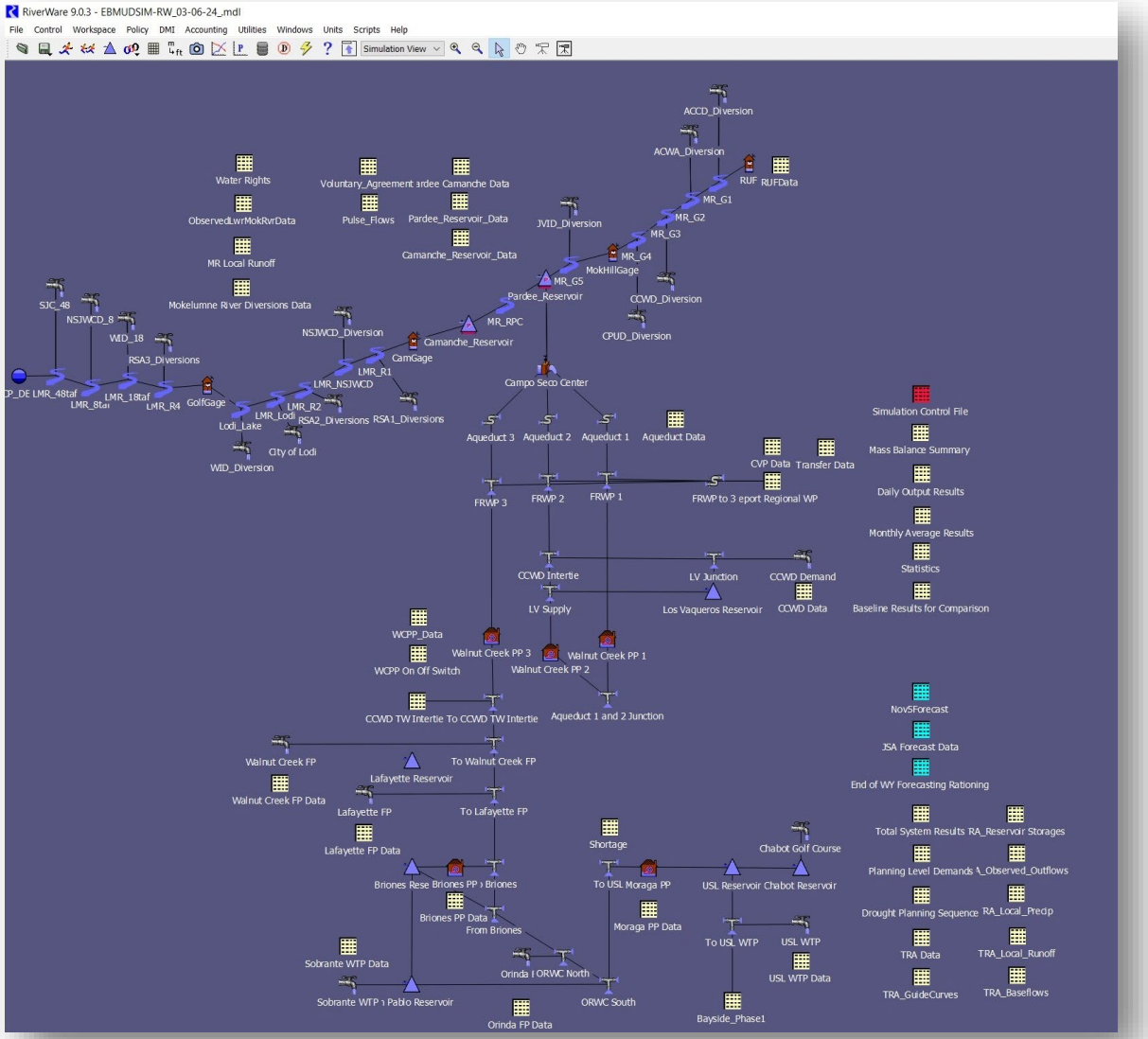
Example of Elevated Dissolved Oxygen within the Camanche Hypolimnion Resulting from the Hypolimnetic Oxygenation System (HOS) Operation.

Water Resources – Operations and Hydrology

Water Supply System Planning Model

EBMUDSIM-Riverware

- Implemented following the fixed level-of-development approach for water supply planning
- Simulate current conditions and future conditions out to 2050 with the past 100 years of hydrology available for the simulation
- Modeling studies typically utilize monthly timestep output, however, daily timestep data are available for more refined analysis or to use as boundary conditions to drive water temperature model applications



Water Resources– Basin Plan Existing Beneficial Uses

(CVRWQCB, 2019)

Water Body	Municipal and Domestic supply	Irrigation	Stock Watering	Power	Contact (Recreation)	Canoeing and Rafting	Warm Water Habitat	Cold Water Habitat	Warm Water Migration	Cold Water Migration	Warm Water Spawning	Cold Water Spawning	Wildlife Habitat
Inflows to Pardee	x			x	x	x	x		x	x			x
Pardee Reservoir	x			x	x		x	x			x	x	x
Camanche Reservoir	x	x	x		x		x	x	x		x	x	x
Camanche to Delta		x	x		x	x	x	x	x	x	x	x	x

Potential Study – Water Quality Study

Goals & Objectives:

- Characterize existing project water quality of Project reservoirs and Project-affected stream reaches
  - Collect water quality data to supplement existing information as needed
- Assess consistency with water quality objectives in the Sacramento River Basin and San Joaquin River Basin Water Quality Control Plan (Basin Plan)
- Assess mercury concentration in game fish tissue

Potential Methodology:

- Collect *in situ* data and grab samples spring and fall (high and low flow) in the Project affected area
- Profiles of DO, pH, specific conductivity, and turbidity will be measured and analyzed at the Project during spring, summer, and fall
- Collect 10 edible sized fish of each species during the fish population study and analyze mercury concentration

Water Resources– Basin Plan Water Quality Objectives

(CVRWQCB, 2019)

Parameter	Analysis Method	Sample Hold Times
Water Quality Monitoring Parameter		
***In-Situ* Measurements**		
Water Temperature	Water Quality Meter	Not Applicable
Dissolved Oxygen	Water Quality Meter	Not Applicable
Secchi Depth	Secchi Disk	Not Applicable
Specific Conductance	Water Quality Meter	Not Applicable
Turbidity	Water Quality Meter	Not Applicable
pH	Water Quality Meter	Not Applicable
Laboratory Analysis Parameter		
General Parameter		
Nitrate-Nitrite (NO_3)	EPA 353.2	48 hrs
Total Ammonia	EPA 350.1	28 days
Total Kjeldahl Nitrogen as N	EPA 351.2	28 days
Total Phosphorous	SM 4500	28 days
Total Dissolved Solids	SM 2540C	7 days
Total Suspended Solids	SM 2540D	7 days
Total Alkalinity	SM 2320B	14 days
Dissolved Orthophosphate	SM 4500-PE	48 hrs
Bacteria		
Total Coliform	EPA SM9223B	24 hrs
Fecal Coliform	EPA SM9223B	24 hrs
E. Coli	EPA SM9223B	24 hrs

Q&A and Feedback

Potential Study – Hydrology and Operations Modeling Study

Goals & Objectives:

- Model the existing Project hydrology using existing EBMUD tools
- Conduct a high flow/flood-frequency analysis for existing Project

Potential Methodology:

- Conduct up to three stakeholder hydrological modeling working group meetings to review and help provide input to the modeling approach
- Model Using
  - USGS / EBMUD gage data
  - 2001 - 2024 period of record (POR) for hydrological modeling.
  - EBMUD's RiverWare model

Q&A and Feedback

Potential Study – Water Temperature Study

Goals & Objectives:

- Characterize existing Project water temperature of Project reservoirs and Project-affected stream reaches from 2001-2024

Potential Methodology:

- Conduct up to three stakeholder water temperature modeling working group meetings to review and help provide input to the modeling approach
- Use the following to model water temperature:
  - Water temperature inflow boundary conditions
  - Reservoir profiles of water temperature
  - MET Data including climate change
  - EBMUD CE-QUAL-W2 and SNTEMP/RSM4 models

Q&A and Feedback

Action Items & Next Steps

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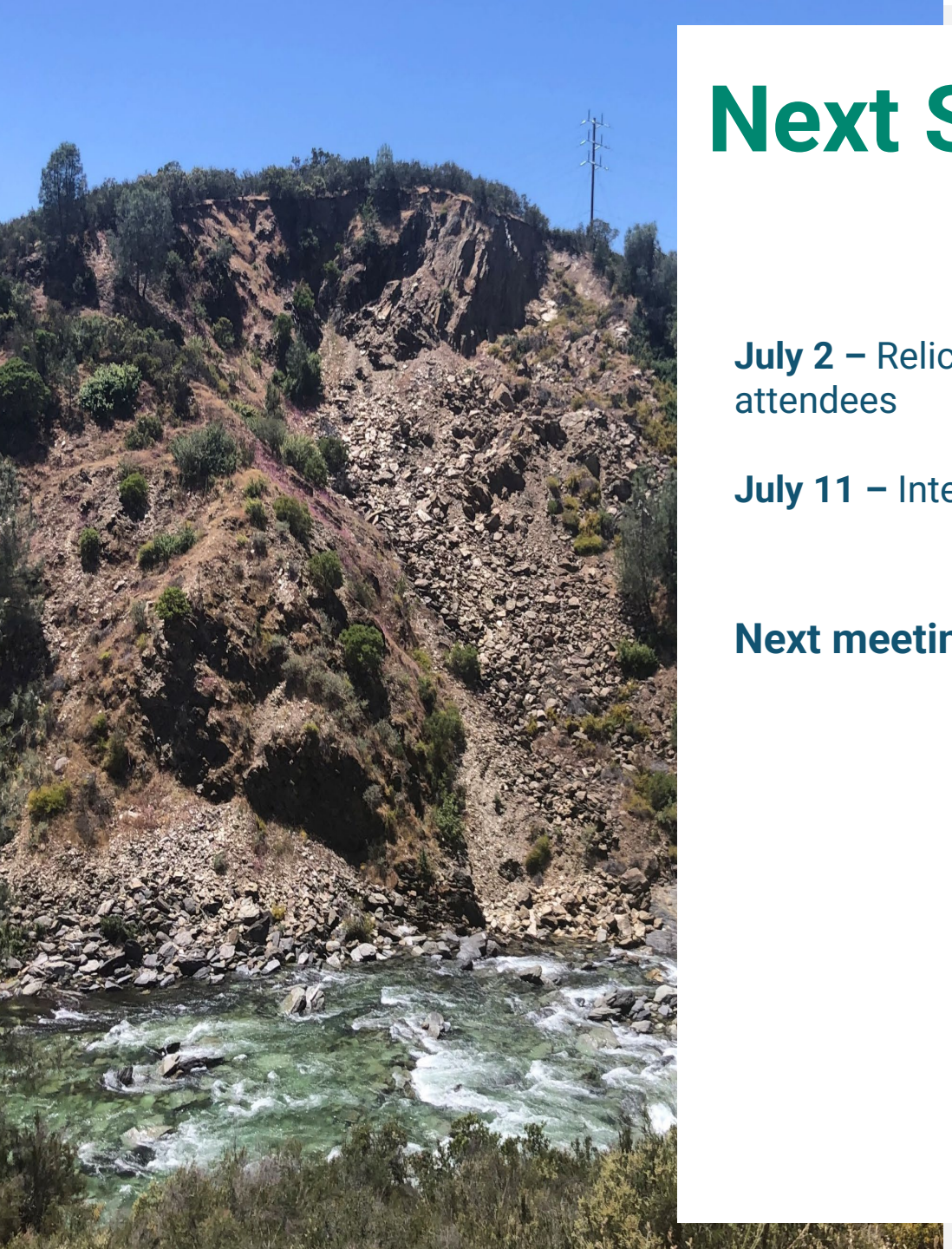

Next Steps

July 2 – Relicensing Team will distribute draft potential study plan outlines to attendees

July 11 – Interested Parties submit feedback on study plans via email

Next meeting: July 30, 1:30-3:30pm

Stay Informed

- Lower Mokelumne Website: EBMUD.com/MokRelicense
- Email: MokRelicense@ebmud.com
- Eric Toth, EBMUD: 510-287-0277
- FERC e-Subscription (docket number “P-2916”) at www.ferc.gov
  - Formal Relicensing begins October 2025 with EBMUD submittal of the Pre-Application Document (PAD)