# Lower Mokelumne River Project

## FERC Project No. 2916

**Proposed Study Plan (PSP) Meeting**

April 29, 2026

EBMUD

Kleinschmidt

# Welcome & Introductions

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# Lower Mokelumne Relicensing Team

**Project Management Team**

**Priya Jain**
**Brad Ledesma**
**Joe Tam**
**Karen Donovan**
**Michelle Workman**
**Alice Towey**

**Resource Leads**

**Andy Enos**
**Ben Bray**
**Casey Del Real**
**Chuck Beckman**
**Chris Potter**
**Deborah Preciado**
**Eric Toth**
**James Jones**
**James Pearson**
**I-Pei Hsiu**
**Mike Beakes**
**Sami Harper**
**Scott Wiemerslage**
**Jason Zhou**

**Consultant Team**

*Kleinschmidt*
**Shana Wiseman**
**Fatima Oswald**
**Olivia Smith**
**Vanessa Martinez**
**Mike Gagner**
**Blake Hamilton**
**Angela Whelpley**

*Janelle Nolan Associates*
**Janelle Nolan**
**Robyn Smith**

*Rainwater Associates*
**Marie Rainwater (Facilitator)**

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# MEETING AGENDA

- Welcome & Introductions
- Process Review
- Review Proposed Study Plans
  - AM- Terrestrial/Recreation/Cultural and Tribal Resources
  - PM- Water Resources/Fish and Aquatics
- Next Steps & Action Items
- Wrap Up

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# Process Review

- **Early engagement meetings:** Summer 2025
- **PAD FERC-filed:** October 20, 2025
- **Scoping meeting(s):** January 28, 2026
- **Site visit:** January 29, 2026
- **Comments end date:** February 17, 2026
  - 6 Comment Letters
- **FERC's Scoping Doc 2**: April 1, 2026
- **Proposed Study Plan FERC-filed:** April 2, 2026

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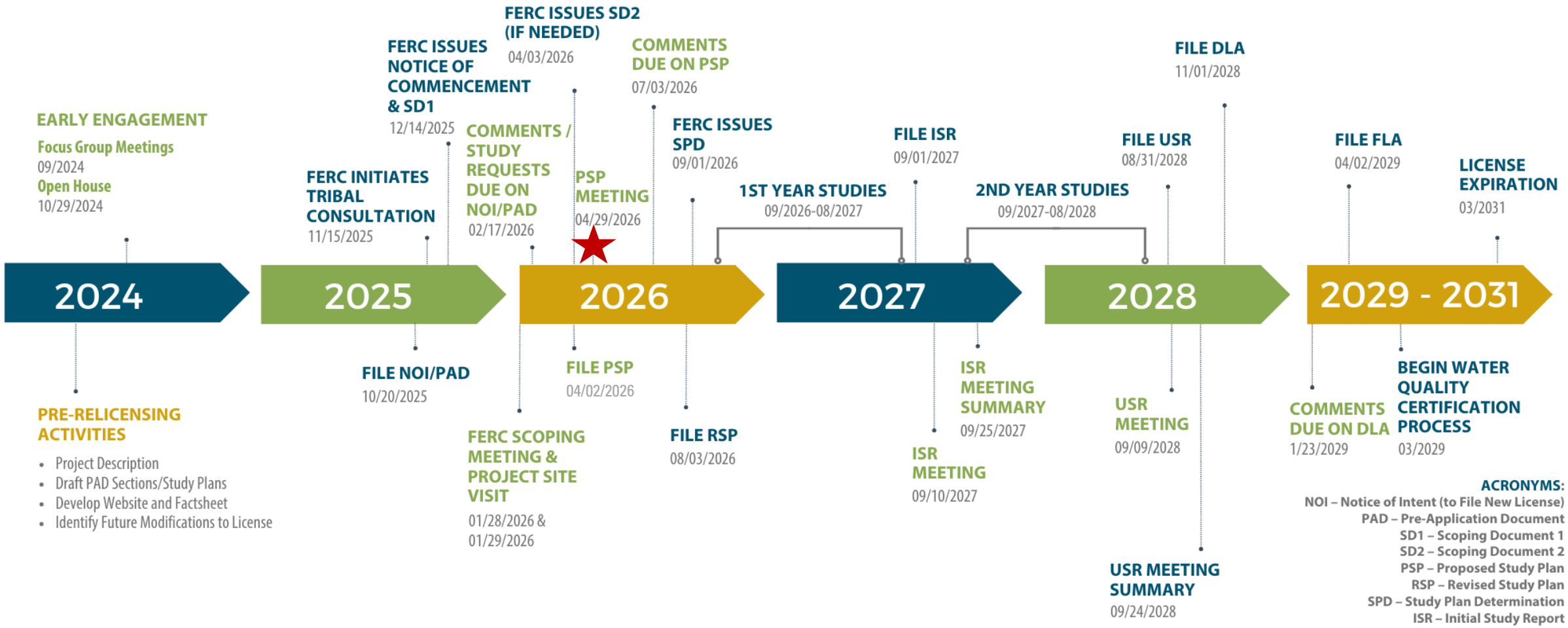
# RELICENSING SCHEDULE

Lower Mokelumne River Project, FERC No. 2916




Pre-Licensing Activities

ILP Relicensing Milestones

Interested Parties Involvement Opportunities

**ACRONYMS:**

NOI – Notice of Intent (to File New License)
PAD – Pre-Application Document
SD1 – Scoping Document 1
SD2 – Scoping Document 2
PSP – Proposed Study Plan
RSP – Revised Study Plan
SPD – Study Plan Determination
ISR – Initial Study Report
USR – Updated Study Report
ILP – Integrated Licensing Process
DLA – Draft License Application
FLA – Final License Application

# FERC's 7 Study Criteria

1- Goals & Objectives
2 - Relevant Resource Management Goals
3 - Public Interest Considerations
4 - Existing Information &
Need for Additional Information
5 - Project Nexus
6 - Proposed Methodology
7 - Level of Effort & Costs

# Proposed Technical Study Plans

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# Botanical, Wildlife, and Rare Threatened Endangered (RTE) Resources Study Plans

- Wildlife Resources Studies (TERR-1)
- Botanical Resources Study (TERR-2)
- Wetlands, Riparian, & Littoral Habitat Survey (TERR-3)

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# Wildlife Resources Study (TERR-1)

## Goals & Objectives:

- Identify special-status wildlife species potentially occurring in California Wildlife Habitat Relationships (CWHR) habitats documented as part of the Botanical Resources Study Plan.
- Map potential habitat for monarch butterfly (Danaus plexippus) (i.e., milkweed) in conjunction with special-status plant surveys completed as part of the Botanical Resources Study Plan.
- Document wintering and nesting bald eagle (Haliaeetus leucocephalus) in the vicinity of Project reservoirs and Project-affected reaches.
- Document bat roosts present on Project facilities and identify bat species present.
- Document wildlife mortality at Project facilities.
- Map deer migration routes and important areas in relation to Project facilities

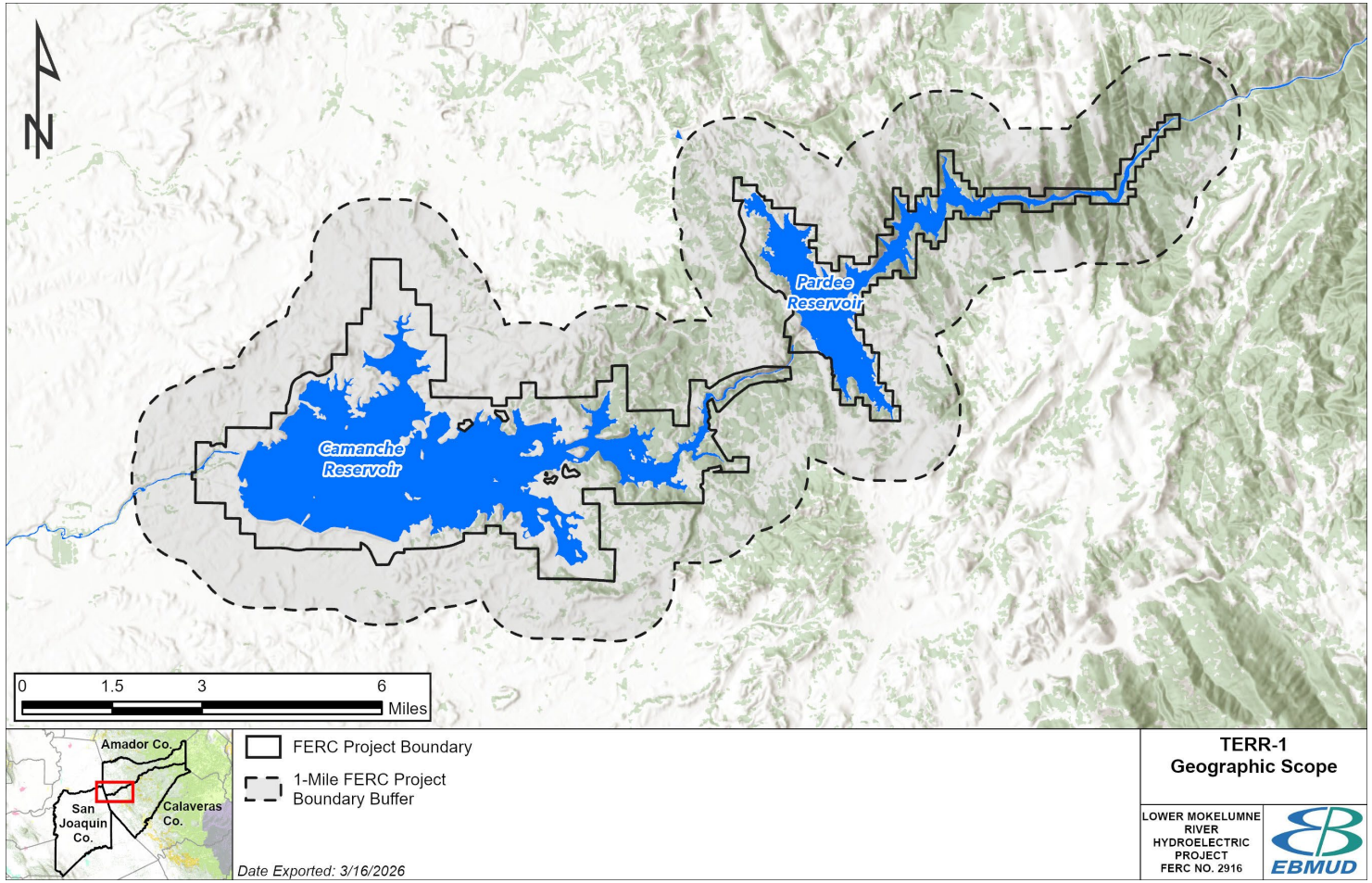
## Methods:

- General Wildlife Surveys
- Monarch Butterfly Habitat Surveys
- Bald Eagle Wintering and Nesting Surveys
- Special-status Bat Roost Surveys
- Wildlife Mortality Reporting
- Deer Migration and Important Areas Mapping

# Wildlife Resources Study (TERR-1)

## Study Area:

- Special-status species potentially occurring in CWHR habitats - FERC Project boundary and 1 mile outside the boundary.
- Wildlife reconnaissance surveys - Area where operations and/or maintenance occurs around Project facilities, plus a protective buffer (Table 5-1).
- Monarch butterfly habitat surveys - Lands within the FERC Project boundary where operations and/or maintenance activities are conducted, plus a protective buffer (Table 5-1).
- Bald eagle wintering and nesting surveys - Project reservoir and Project-affected reaches.
- Special-status bat roost surveys - Project facilities.
- Wildlife mortality Reporting - Project facilities.
- Deer migration routes and important areas - FERC Project boundary and 1 mile outside the boundary.




*CWHR = California Wildlife Habitat Relationships*

# Wildlife Resources Study (TERR-1)

## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments Due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| December 2026 | Initiate Bald Eagle Wintering Survey |
| January 2027 – August 2027 | Conduct Agency Consultation, Desktop Analyses, and Surveys |
| June 2027 – August 2027 | Analyze Data and Prepare Draft Technical Study Report (includes preliminary data) |
| September 2027 | File Initial Study Report (ISR) |
| September 2027 – February 2028 | Analyze Data and Prepare Updated Draft Draft Technical Study Report |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# **Wildlife Resources Study**
# (TERR-1)

## Comments/Updates:

- Added culturally significant wildlife species
    - As part of the TERR-1 study, EBMUD will work with interested Tribes to identify those culturally significant wildlife species within the FERC Project Boundary that may be affected by Project operations.

# Wildlife Resources Study
(TERR-1)

## Questions?

# Botanical Resources Study (TERR-2)

## Goals & Objectives:

- Document California Wildlife Habitat Relationship (CWHR) habitats and sensitive natural communities adjacent to Project facilities.
- Document special-status plant, lichen, and moss populations at Project facilities.
- Document non-native invasive plants adjacent to Project facilities

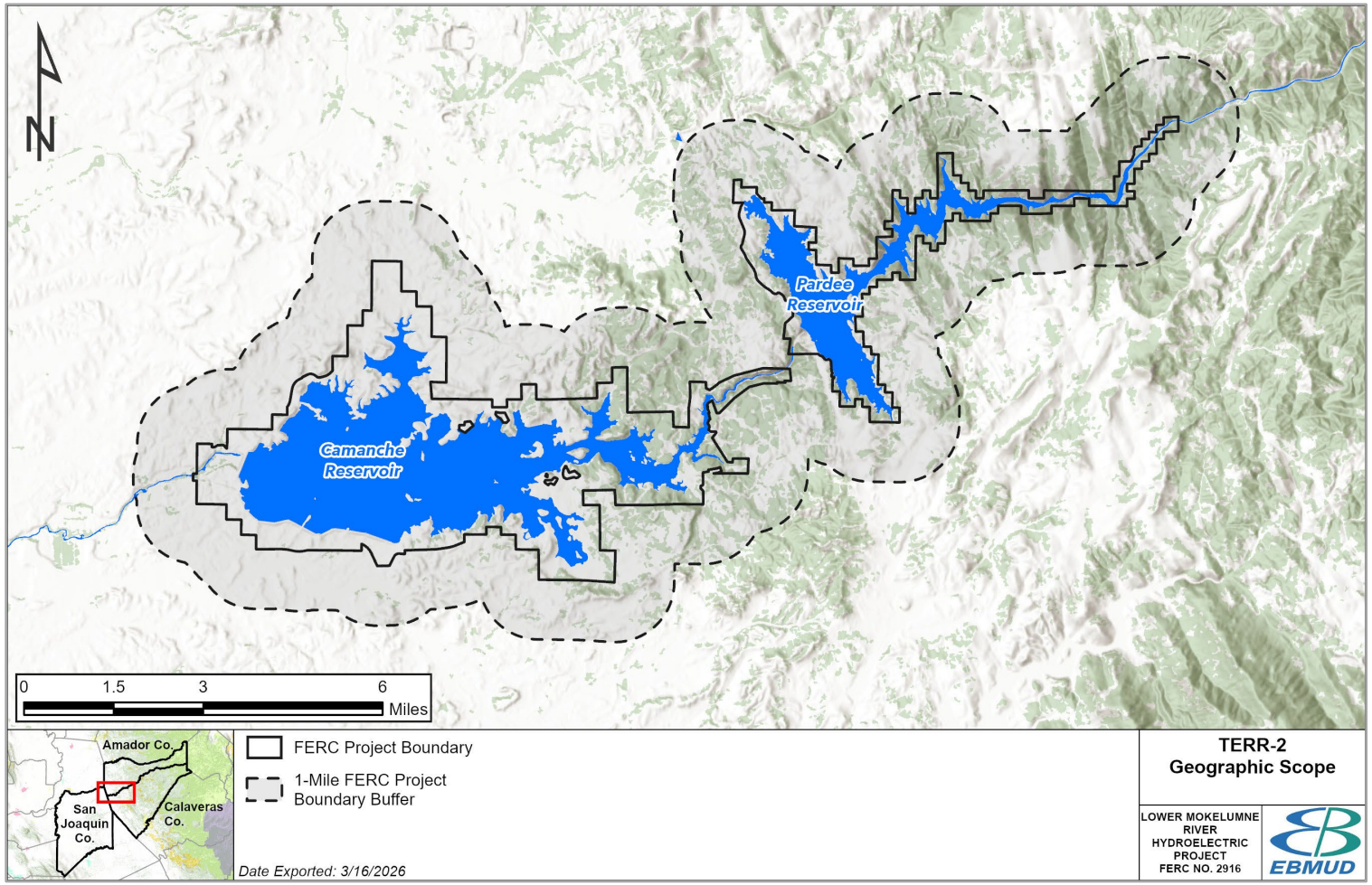
## Methods:

- Map CWHR habitats and sensitive natural communities
- Conduct special-status plants surveys
- Conduct non-native invasive plant (NNIP) surveys

# Botanical Resources Study (TERR-2)

## Study Area:

- CWHR habitats and sensitive natural communities - FERC Project boundary and 1 mile outside.
- Special-status plants and NNIP surveys - lands within the FERC Project boundary where operations and/or maintenance activities are conducted, plus a protective buffer (Table 5-1).



# Botanical Resources Study (TERR-2)

## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments Due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| February 2027 – July 2027 | Conduct Agency Consultation, Reference Population Visits, and Surveys |
| June 2027 – August 2027 | Analyze Data and Prepare Draft Technical Study Report (includes preliminary data) |
| September 2027 | File Initial Study Report (ISR) |
| August 2027 – January 2028 | Analyze Data and Update Draft Technical Study Report |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# Botanical Resources Study (TERR-2)

## Comments/Updates:

- Added culturally significant botanical species
    - As part of the TERR-2 study, EBMUD will work with interested Tribes to identify those culturally significant botanical species within the FERC Project Boundary that may be affected by Project operations.

# Botanical Resources Study
(TERR-2)

## Questions?

# **Wetlands, Riparian, & Littoral Habitat Study** (TERR-3)

## Goals & Objectives:

- Document Waters of the U.S./State and riparian habitats adjacent to Project facilities and reaches affected by the Project.
- Determine the relationship between riparian habitats and flow conditions in Project-affected reaches.

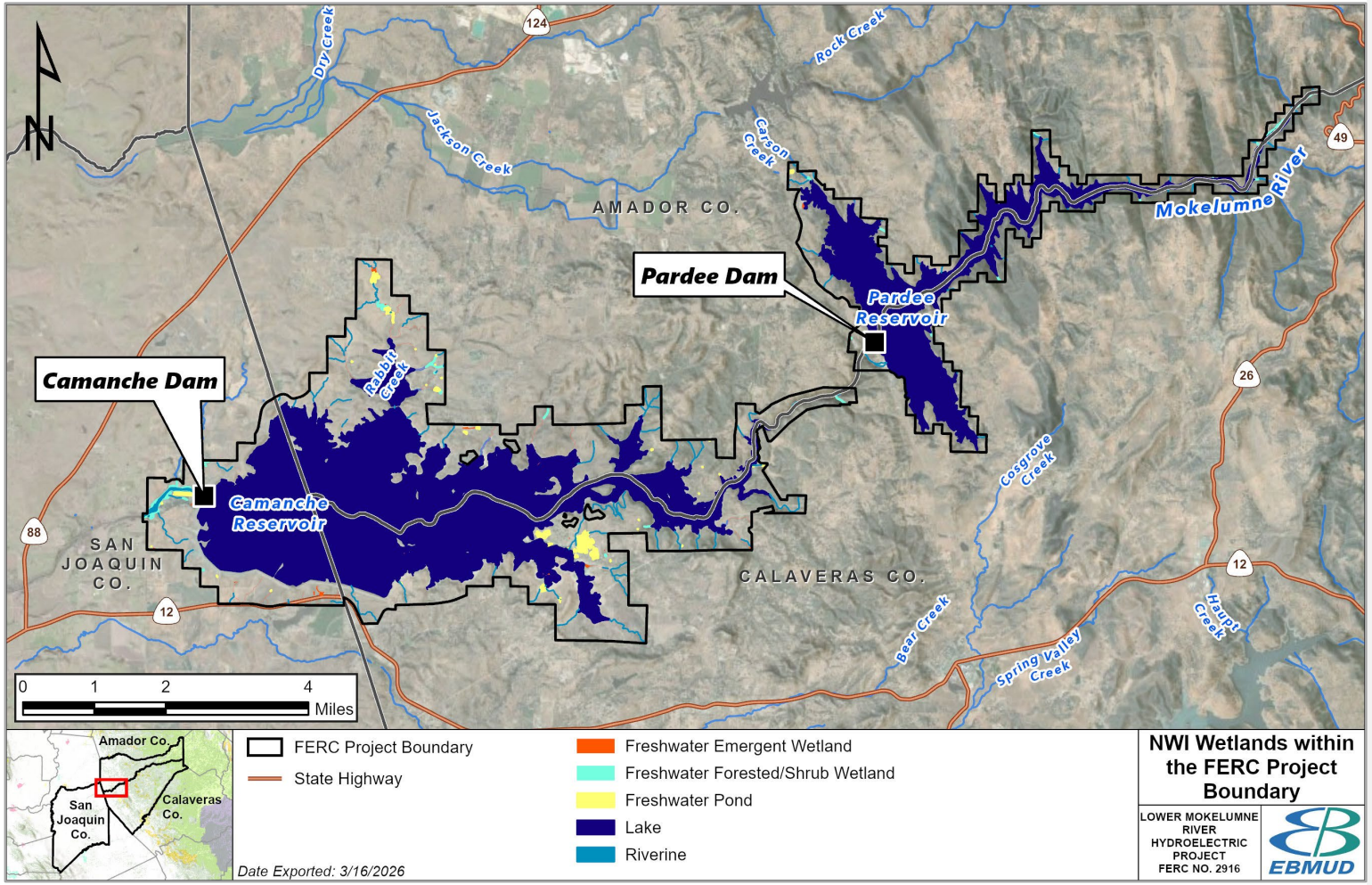
## Methods:

- Conduct Preliminary Mapping Jurisdictional Waters of the U.S/State and Riparian Habitats
- Ground-truthing Field Verification of:
  - Jurisdictional Waters of the U.S/State
  - Riparian Habitats
- Characterize Relationship between Riparian Vegetation and Flow Conditions

# Wetlands, Riparian, & Littoral Habitat Study (TERR-3)

## Study Area:

- Waters of the U.S./State - lands within the FERC Project boundary where operations and/or maintenance activities are conducted, plus a protective buffer (Table 5-1).
- Riparian habitats - Project-affected reaches (Camanche Reservoir to WIDD) and riparian cross-section locations.
- Relationship between riparian habitats and flow conditions - riparian cross-section locations on Project-affected stream reaches.




*WIDDD=Woodbridge Irrigation District Dam*

# Wetlands, Riparian, & Littoral Habitat Study (TERR-3)

## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments Due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| March 2027 – August 2027 | Conduct Surveys, Analyze Data, and Prepare Draft Technical Study Report (includes preliminary data) |
| September 2027 | File Initial Study Report (ISR) |
| September 2027 – March 2028 | Analyze Data and Update Draft Technical Study Report |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# **Wetlands, Riparian, & Littoral Habitat Study** (TERR-3)

## Comments/Updates:

- The TERR-3 study plan has been modified to characterize the relationship between riparian vegetation and flow conditions, with the maximum flow to be analyzed for the stage-discharge relationship at 5,000 cubic feet per second. This is the maximum flow that can be discharged from Camanche Dam (EBMUD 2025).
- The full range of flows for the stage-discharge relationship will be closely coordinated with the FA-2 Instream Flow Study Plan study plan.

# Wetlands, Riparian, & Littoral Habitat Study
(TERR-3)

## Questions?

# Recreation and Environmental Justice Study Plans

- Recreation Facilities Inventory & Condition Assessment Study (REC-1)
- Recreation Use and Needs Study (REC-2)
- Environmental Justice Study (EJ-1)

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# **Recreation Facilities Inventory & Condition Assessment Study** (REC-1)

## Goals & Objectives:

- Inventory FERC-approved recreation sites and the Middle Bar Day Use Area within the Project boundary.
  - Field verify, map, and document recreation facilities and amenities within the Project boundary.
  - Document the general condition of recreation facilities and amenities and describe their maintenance, inspection, and/or management practices.
  - Identify who owns, operates, and maintains each of the FERC-approved recreation sites and the Middle Bar Day Use Area.

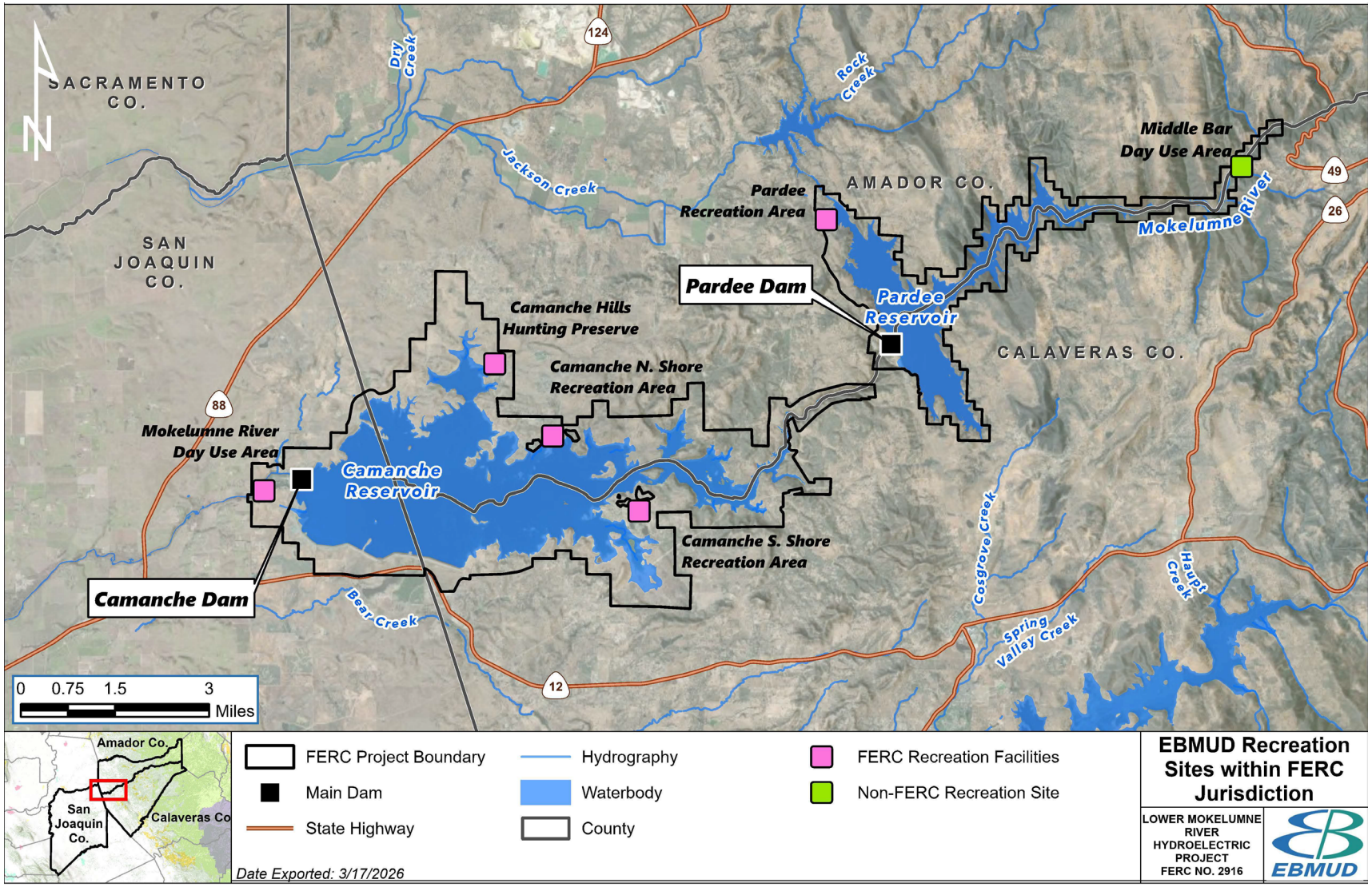
# **Recreation Facilities Inventory & Condition Assessment Study** (REC-1)

## Methods:

- Field Surveys
  - Global positioning system (GPS) location of the facilities;
  - Type, number, and condition of amenities provided at each site;
  - An estimate of parking capacity;
  - Ownership and management;
  - Hours/seasons of operation;
  - Existing safety, security, and informational (signage) measures;
  - Observation of site use and accessibility;
  - Suitability of facilities to provide opportunities for people with disabilities to participate in recreation opportunities; and
  - Site photographs.

# Recreation Facilities Inventory & Condition Assessment Study (REC-1)

## Study Area:




## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| September 2026 – July 2027 | Conduct Study |
| September 2027 | File Initial Study Report (ISR) |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# **Recreation Facilities Inventory & Condition Assessment Study** (REC-1)

## Comments/Updates:

- The main boat ramp at the  Pardee Recreation Area is in service until 535 feet msl, and the low-water ramp can be utilized between 540 feet msl and 495 feet msl.
  Additional and corrected information pertaining to the reservoir levels at Pardee Recreation Area boat launch facility will be included in the Draft License Application.
- Adding Middle Bar Day Use Area.
- No trails are associated with the FERC license. EBMUD's management of the trail segments in the watershed is conducted in accordance with the Mokelumne Watershed Master Plan.

# Recreation Facilities Inventory & Condition Assessment Study
(REC-1)

## Questions?

# Recreation Use and Needs Study
# (REC-2)

## Goals & Objectives:

**Goal 1: Characterize the existing use of FERC-approved recreation sites and the Middle Bar Day Use Area (Study Sites) in the Project boundary.**

Goal 1 Objectives:

1. Estimate recreation use at the Study Sites by day type (i.e., weekday, weekend, peak weekend).
2. Evaluate visitor feedback regarding perception and experience at the Study Sites.
3. Estimate the current recreational fishing effort at all Study Sites.

**Goal 2: Identify current and future needs related to the Study Sites in the Project boundary.**

Goal 2 Objectives:

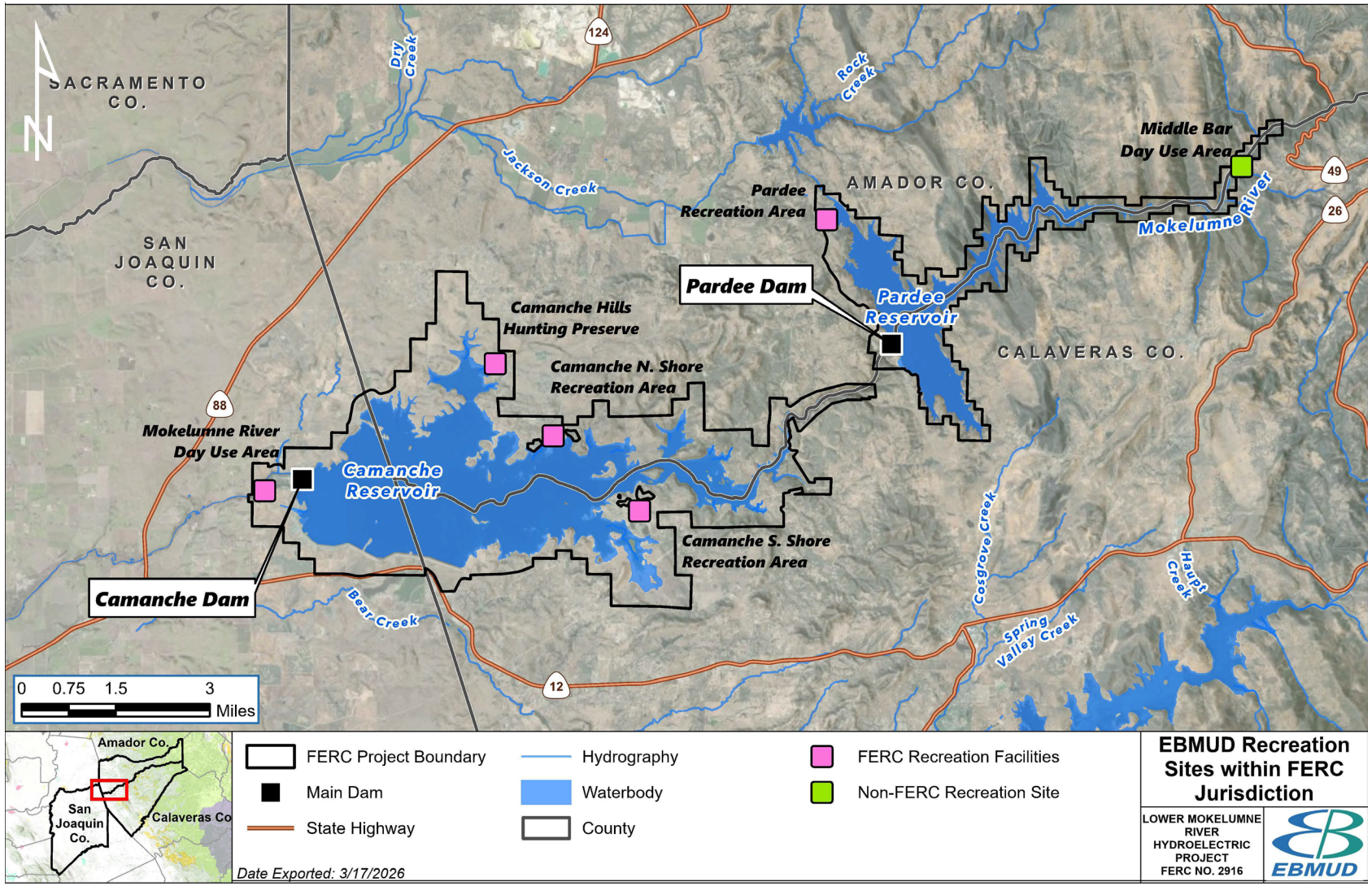
1. Evaluate whether recreation capacity and existing facilities and amenities at the Study Sites meet or exceed current needs.
2. Estimate future recreation use of the Study Sites.
3. Estimate future needs for potential new recreation sites and facilities.

## Methods:

- Spot counts
- Recreation use visitor intercept surveys with branching creel surveys

# Recreation Use and Needs Study (REC-2)

## Study Area:




## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments Due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| May 2027 – September 2027 | Conduct Study |
| September 2027 | File Initial Study Report (ISR) |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# Recreation Use and Needs Study
(REC-2)

## Comments/Updates:

- Fishing access downstream of Mokelumne River Day Use Area is outside of the FERC Project Boundary.
- Pardee Reservoir is currently no body contact and, EBMUD plans to continue no body contact. Ample swimming is provided at the Project via the swimming pool at the Pardee Recreation Area, the Camanche Reservoir, and Mokelumne River Day Use Area.
- Added Middle Bar Day Use Area.
- Will collect demographic data as part of the Visitor Intercept Surveys.
- Tribal interests and historic uses will be discussed in the Cultural Resources Study (CR-1). EBMUD is not proposing to provide public access to the canyon below Pardee Dam.
- No trails are associated with the FERC license. EBMUD's management of the trail segments in the watershed is conducted in accordance with the Mokelumne Watershed Master Plan.

# Recreation Use and Needs Study
(REC-2)

## Questions?

# Environmental Justice Study (EJ-1)

## Goals & Objectives:

- Identify the presence of EJ communities that may be located within the study area.
- Develop strategies to conduct outreach to identified EJ communities to ensure meaningful involvement in the relicensing process is achieved.

## Methods:

- Desktop Data Gathering and Statistics Tables
- Identification of EJ Communities based on U.S. Census Data of Minority Populations
- Identification of EJ Communities base on U.S. Census Data of Low-Income Populations
- Identification of Non-English-Speaking Populations based on U.S. Census Data
- Mapping Efforts

Results will be included in the impacts analysis of the Draft License Application.

# Environmental Justice Study (EJ-1)

## Study Area:

- All census block groups within and intersecting with a 1-mile radius of the Project boundary.

## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| September 2027 | File Initial Study Report (ISR) |
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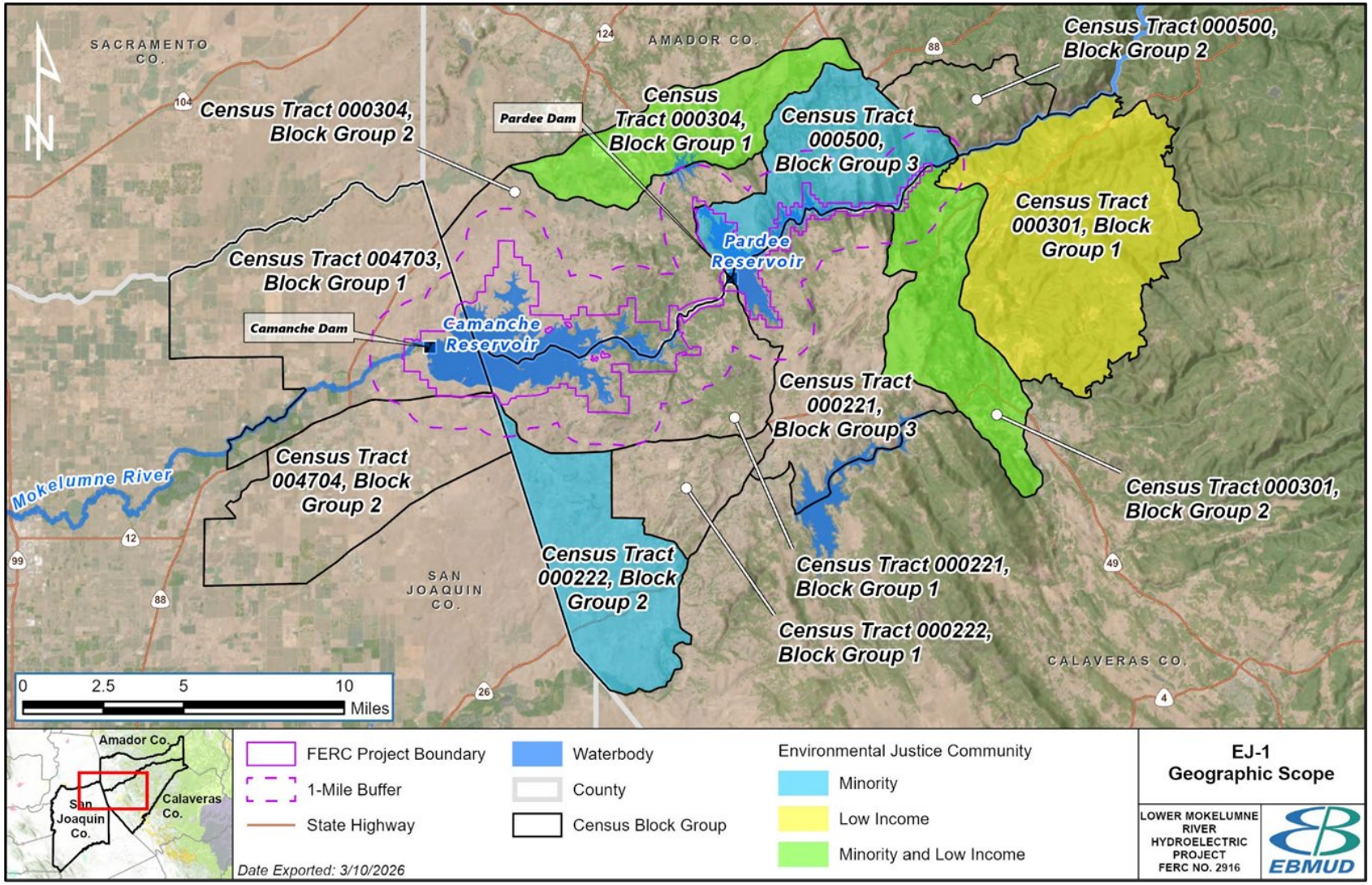

# Environmental Justice Study
(EJ-1)

## Comments/Updates:

- No comments received

## Not currently required for NEPA Analysis

- EJ review has been eliminated from the NEPA review process nationwide. Similarly, FERC no longer requires hydropower applicants to conduct EJ studies.
- Nonetheless, because EMBUD feels the EJ-1 study aligns with their mission and values, they will collect information that is pertinent to the CEQA process.

# Environmental Justice Study
(EJ-1)

## Questions?

# Cultural & Tribal Resources Study Plans

- Cultural Resources (Archaeology & Historic Built Environment) Study (CR-1)
- Tribal Ethnography Study (CR-2)

*Information gathered from these studies will inform a* ***Historic Properties Management Plan (HPMP)***

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# Cultural Resources (Archaeology & Historic Built Environment) Study (CR-1)

## Goals & Objectives:

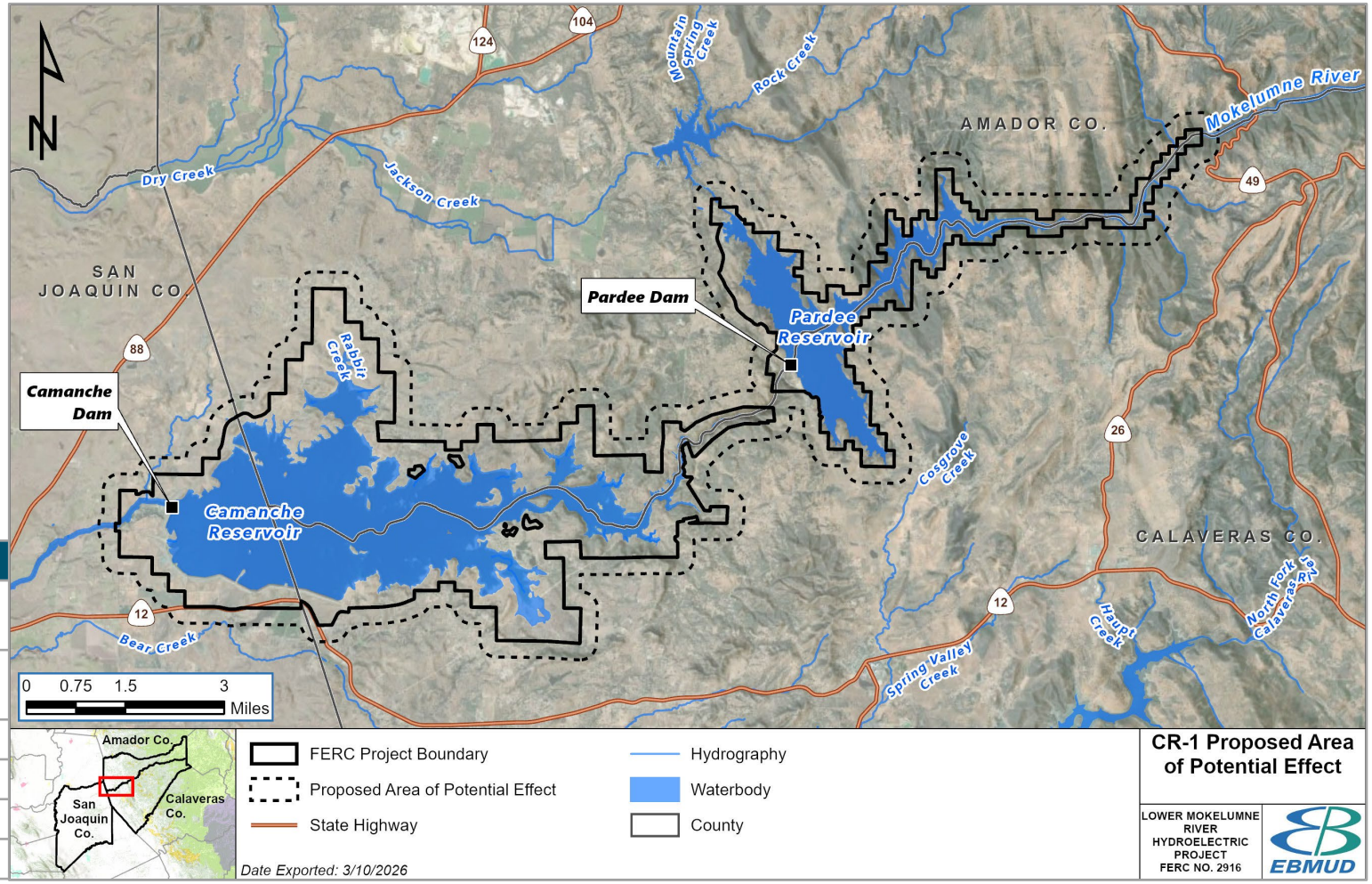
- Meet FERC compliance requirements under Section 106 of the NHPA, by determining if Project-related activities and public access will have an adverse effect on historic properties.
- Identify all archaeological sites and built environment resources within the Area of Potential Effect (APE).
- Determine historic properties and cultural resources.
- Support development of the Historic Properties Management Plan (HPMP).

## Methods:

- Records Search Update and Additional Background Research
- Archaeological Inventory
- Field Survey
- National Register Evaluation

# Cultural Resources (Archaeology & Historic Built Environment) Study (CR-1)

## Study Area: A 0.25-mile buffer around the FERC Project Boundary




## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments Due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| September 2027 | File Initial Study Report (ISR) |
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| April 2029 | File Final License Application (FLA) |

# Cultural Resources (Archaeology & Historic Built Environment) Study
(CR-1)

Comments/Updates:

- There were no comments received on the CR-1 Study.

# Cultural Resources (Archaeology & Historic Built Environment) Study

(CR-1)

## Questions?

# Tribal Ethnography Resources Study (CR-2)

## Goals & Objectives:

- Assist FERC, as its non-federal representative, in meeting its compliance requirements under Section 106 of the National Historic Properties Act (NHPA), by determining if relicensing of the Project will have an adverse effect on historic properties, in this case Tribal resources.

- Identify Tribal resources that may be affected by Project operations & maintenance. Information will be kept confidential.

## Methods:

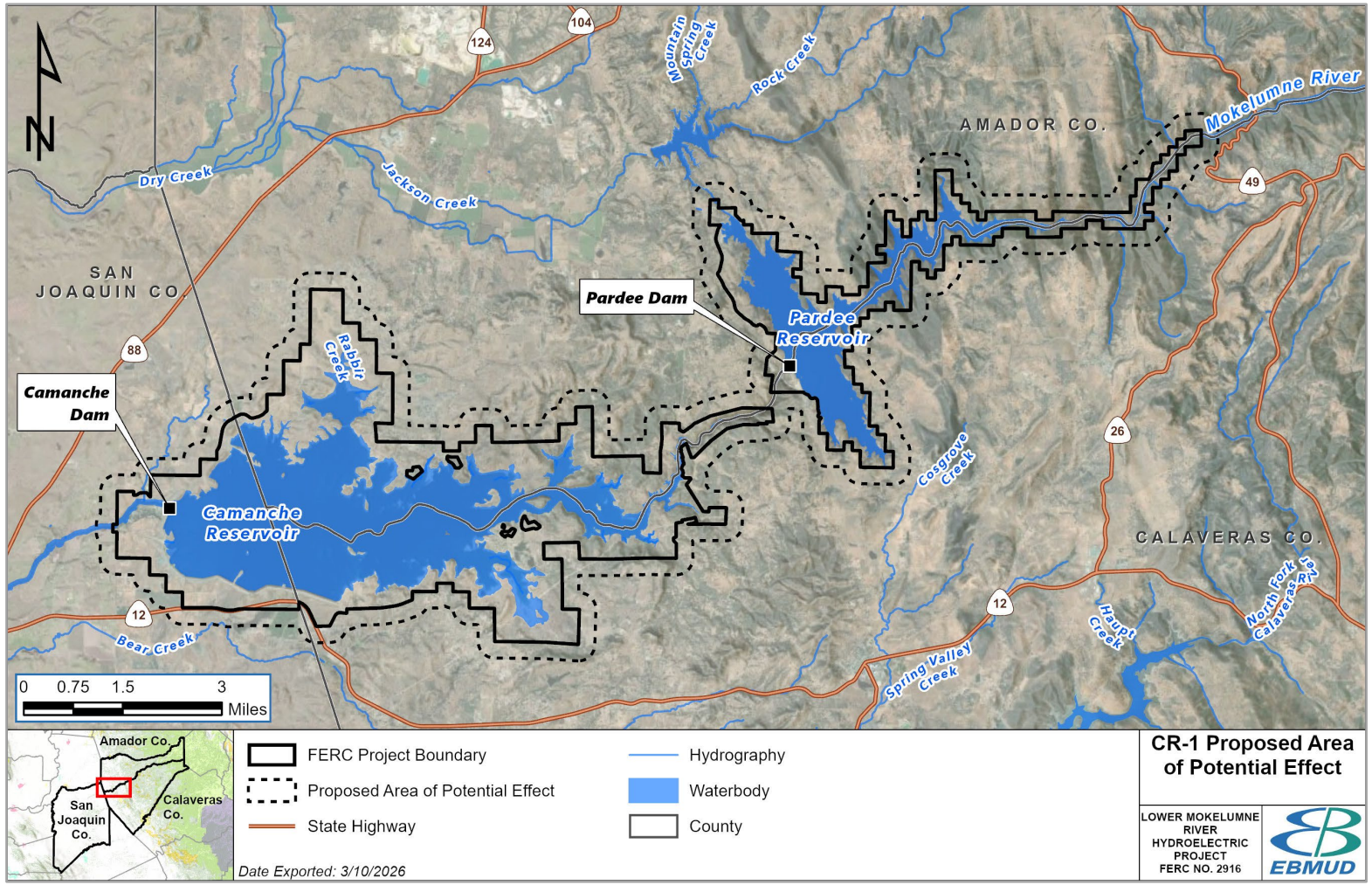
- **Archival Research** will 1) provide primary data to create a background Native American Indian ethnohistory of the Study area; and 2) inform the Tribal resources historic context for the National Register.
- **Meetings with Tribal Governments** Meetings with Tribal governments, administrators or representatives is proposed to provide Project data to Tribal groups, elicit areas of interest, identify appropriate Tribal informants, and establish protocols for conveying information.
- **Interviews** are proposed with Tribal experts to gain an understanding of what is important to them and why.
- **Documentation and Evaluation** Three main categories of Tribal resources are anticipated: 1) Tribal places; 2) TCPs; and 3) Tribal government matters.
- **Coordination with Other Studies** As needed, the Tribal resource expert will assist other resource experts in identifying Tribal resources with connections to their technical study.

# Tribal Ethnography Resources Study (CR-2)

## Study Area: A 0.25-mile buffer Around the FERC Project Boundary

## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments Due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| September 2027 | File Initial Study Report (ISR) |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |



# Tribal Ethnography Resources Study
(CR-2)

Comments/Updates:

- There were no comments received on the CR-2 Study.

# APE Concurrence w/Tribes & SHPO

- After the PAD was filed, FERC initiated consultation with Tribes.
- FERC filed a Notice of Licensing Commencement:
  - Initiating consultation with the State Historic Preservation Officer (SHPO) and designating EBMUD as non-federal Section 106 representative for informal consultation w/Tribes and SHPO.
- **On March 13, 2026 - EBMUD received concurrence on Area of Potential Effects (APE) from the California SHPO**

# Tribal Ethnography Resources Study
(CR-2)

## Questions?

# Water Resources Study Plans

- Water Quality Study (WR-1)
- Water Temperature Study (WR-2)
- Hydrology Operations & Water Systems Models (WR-3)

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# **Water Quality Study**
# (WR-1)

## Goals & Objectives:

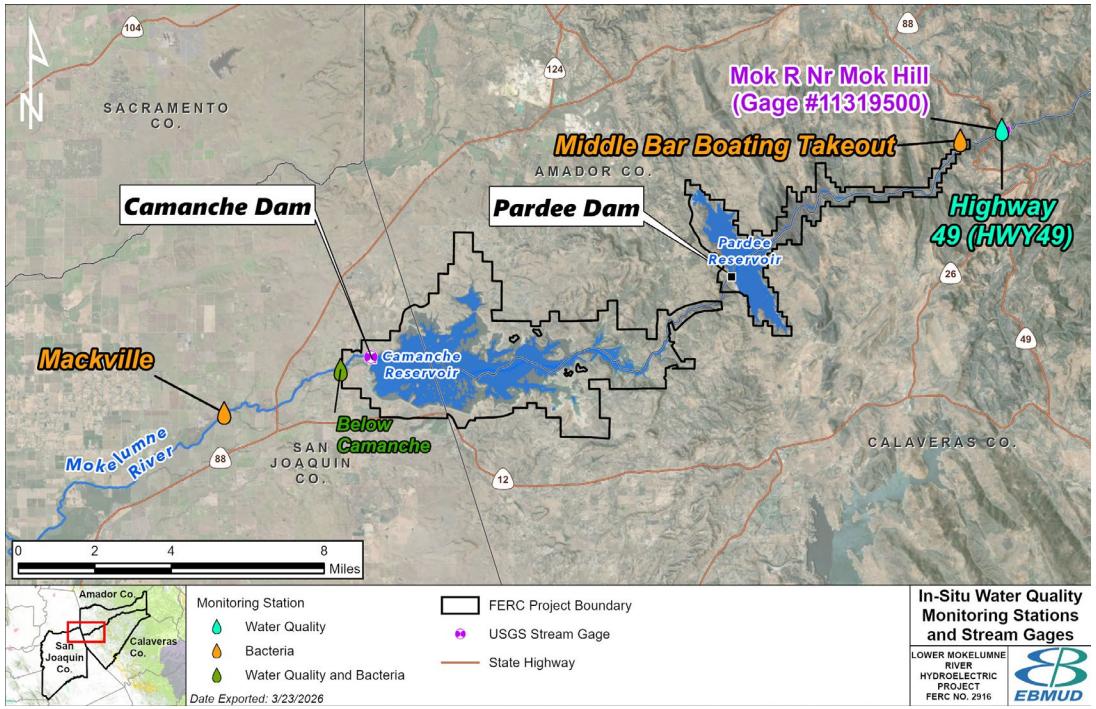
- Characterize existing Project water quality of Project reservoirs and Project-affected river reaches.
- Collect water quality data to supplement existing information.
- Assess water quality conditions in relation to the objectives/criteria of the Central Valley Regional Water Quality Control Board (CRWQCB) Basin Plan (2019) and other water quality standards.

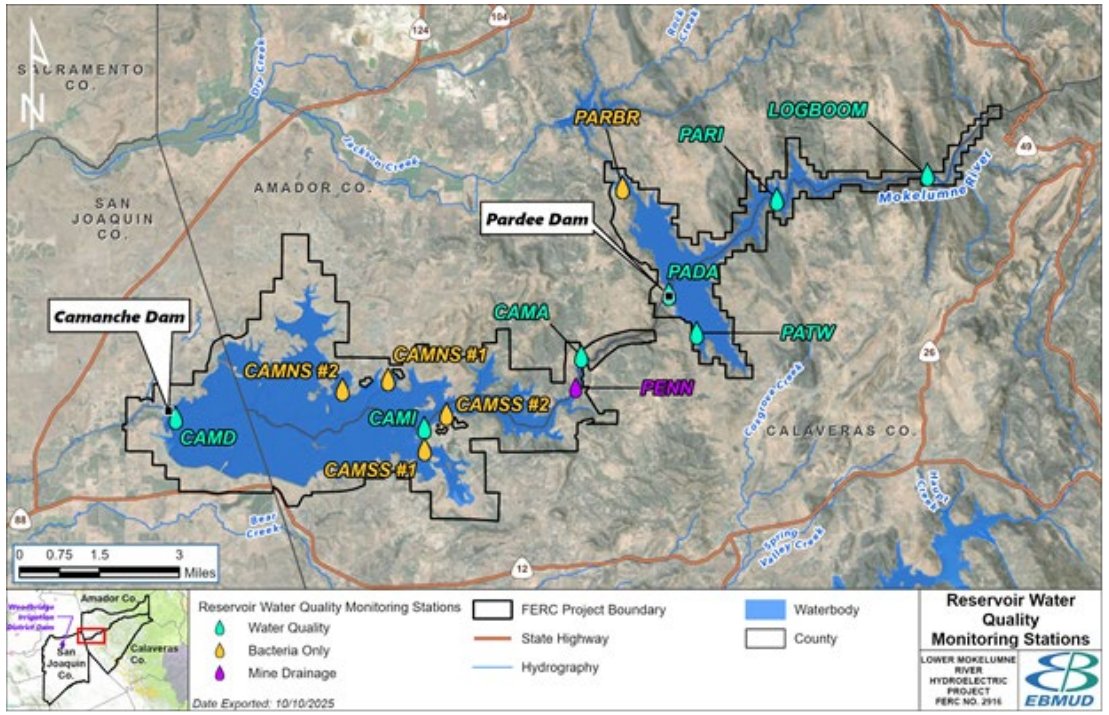
## Methods:

- Seasonal in-situ water quality measurements
- Seasonal water quality grab sampling
- Reservoir/lake profiles, and
- Laboratory analysis and reporting

# Water Quality Study(WR-1)

## Study Area:




## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| April 2027 – March 2028 | Collect Data, Analyze, and Prepare Draft Technical Study Report |
| August 2027 | Provide a Study Progress Update in the Initial Study Report (ISR) |
| August 2027 – July 2028 | If Necessary, Collect Second Year Water Quality Data for Select Parameters and Update Draft Technical Study Report |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# **Water Quality Study**
# (WR-1)

## Comments/Updates:

- In-situ WQ data collected during spring/early summer, and summer/early fall will consist of discrete grab measurements. Seasonal variability is already captured through continuous WQ monitoring at eight sites within the project area. Parameters monitored include water temperature, dissolved oxygen, specific conductivity, pH, turbidity, and chlorophyll. A table has been added to describe the locations and characteristics of these monitoring sites.
- EBMUD will evaluate the feasibility to conduct DO/turbidity monitoring at a well-mixed location downstream of Camanche Dam
- Two additional bacterial testing sites are proposed near North and South Recreation Areas to document any potential recent influences from cattle activity.
- Visual inspections for algal blooms and associated odors will be conducted during peak summer recreation periods.
- EBMUD developed a Cyanotoxin Management Plan in 2016 to monitor for harmful algal blooms (HABs). If HABs are observed, screening will be conducted using field test kits (e.g., “dipstick” tests), followed by laboratory analysis of collected water samples as warranted.
- EBMUD will serve as the lead agency for compliance with CEQA.
- No changes are proposed to the filtration at the Mokelumne River Hatchery as it is managed outside of the FERC project license.

# Water Quality Study
(WR-1)

## Questions?

# Water Temperature Study
# (WR-2)

## Goals & Objectives:

- Review existing water temperature model applications for Pardee and Camanche reservoirs and the Lower Mokelumne River and update if necessary.
- Compile historical water temperature and meteorological data to calibrate and/or validate water temperature models.
- Model water temperature for the existing Project and other potential infrastructure/hydrology operation scenarios under existing climate conditions and future climate change conditions that will be identified prior to study plan implementation.

## Methods:

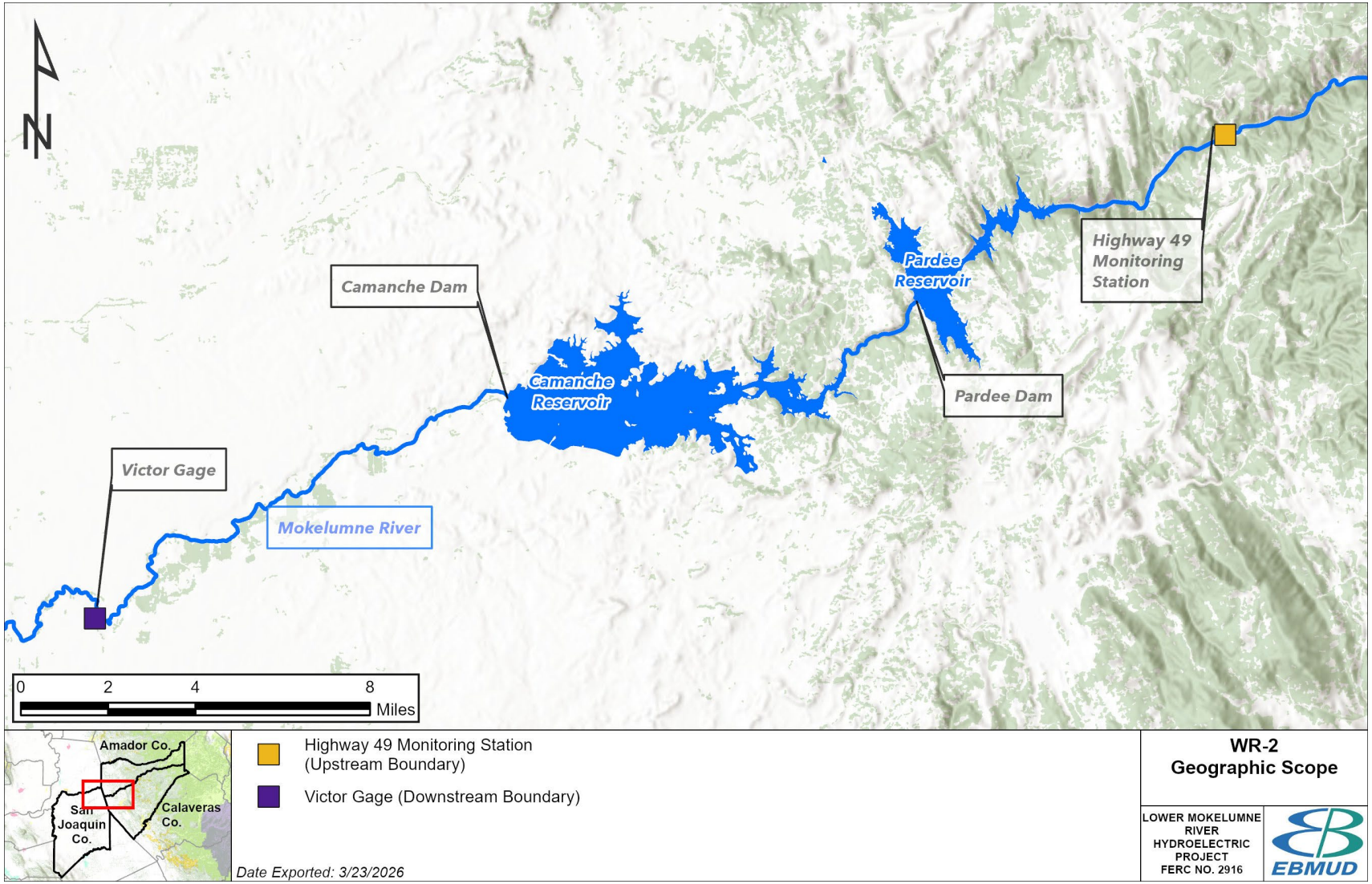
- Water model development
- Data collection and analysis
- Water temperature modeling and analysis
- Reporting

# Water Temperature Study (WR-2)

## Study Area:

## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| October 2026 | Conduct First Year Studies |
| October 2026 – July 2027 | Model Development and Data Collection and Prepare Draft Technical Study Report (for completed study elements) |
| September 2027 | File Initial Study Report (ISR) |
| October 2027 | Conduct Second Year Studies |
| October 2027 – July 2028 | Data Collection, Model the Existing Project and Alternatives, and Update Draft Technical Study Report |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |



# **Water Temperature Study**
# (WR-2)

## Comments/Updates:

- The geographic scope was shifted from Woodbridge Irrigation District Dam (WIDD) to Victor to ensure the study reach is upstream of the Lodi Lake inlet and outside the area influenced by backwater effects
- Studies related to the multi-level outlet works at Camanche Dam are publicly available online at: Document Library :: East Bay Municipal Utility District
- Water temperature conditions upstream of the Electra Powerhouse discharge in the North Fork Mokelumne River are not monitored as part of the Lower Mokelumne River FERC Relicensing process, as this area lies outside of the FERC Project Boundary and lacks a project nexus.

# Water Temperature Study
(WR-2)

## Questions?

# **Hydrology Operations & Water Systems Models Study** (WR-3)

## Goals & Objectives:

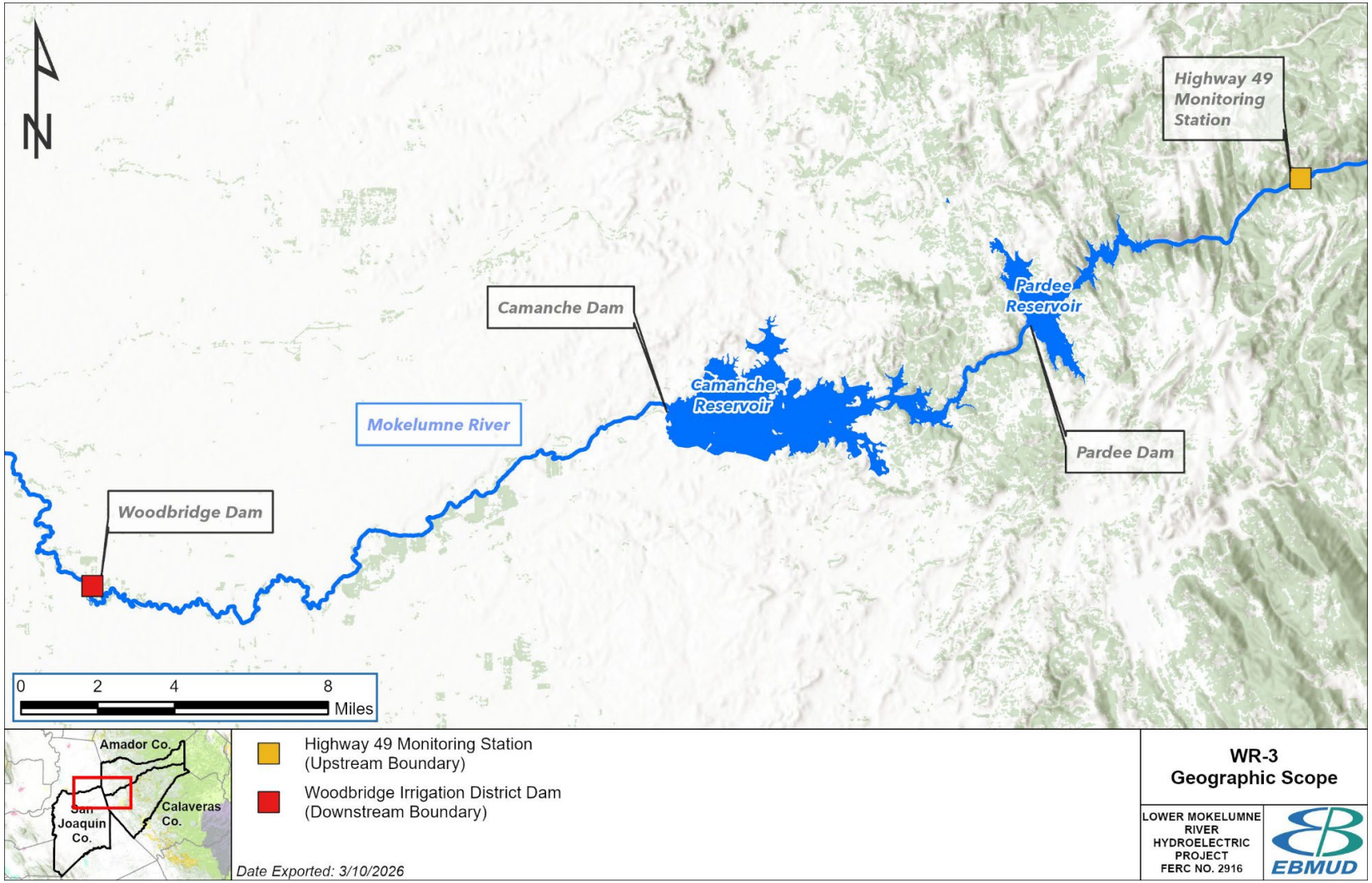
- Model the existing Project physical characteristics, operational criteria, and hydrology
- Model potential hydrology/operational alternatives and evaluate resulting changes from the baseline (existing Project operations) and/or the ability to meet targeted goals, across the range of hydrologic conditions

## Methods:

- Hydrology Model Development
- Hydrologic Alteration Analysis
- Reporting

# Hydrology Operations & Water Systems Models Study (WR-3)

## Study Area:




## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| October 2026 – July 2027 | Model Development and Prepare Draft Technical Study Report (for completed study elements) |
| September 2027 | File Initial Study Report (ISR) |
| September 2027 – July 2028 | Complete Additional Model Alternative Analyses if Needed and Prepare Updated Draft Technical Study Report |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# **Hydrology Operations & Water Systems Models Study** (WR-3)

## Comments/Updates:

- Adjusted study goal of performing a hydrologic alteration analysis to modeling potential hydrological/operational alternatives and evaluating resulting changes from the baseline (existing Project operations)
- No longer conducting a High-Flow Frequency Analysis

# Hydrology Operations & Water Systems Models Study (WR-3)

## Questions?

# Fish & Aquatic Study Plans

- Instream Flow Study (FA-2)
- Reservoir Fish Habitat Study (FA-3)

*15 min break*

- Fish Population Study (FA-1)
- Special Status Amphibians and Aquatic Reptiles Study (FA-4)
- Chinook Egg & Juvenile Mortality Study (FA-5/FA-6)

EBMUD

# Instream Flow Study
(FA-2)

## Goals & Objectives:

- Summarize previous instream flow modeling.
- Identify target species and life stages and habitat suitability criteria
- Use habitat versus flow relationships to develop a time series analysis of aquatic habitat under existing Project hydrology and other potential hydrology/operations scenarios.
- Identify the time periods, flow conditions, and life stages when habitat may be a limiting factor for aquatic resources (fish, benthic macroinvertebrates, other aquatic species, and riparian vegetation) for existing operations and other potential operational or hydrologic scenarios.
- Characterize riparian flow (floodplain/riparian vegetation inundation) and sediment transport conditions related to existing Project operations (below Camanche Dam) in the Lower Mokelumne River.

# Instream Flow Study
(FA-2)

## Methods:

- Review and summarize previous instream flow modeling
- Update or adopt existing habitat suitability criteria
- Use hydrodynamic modeling (HEC-RAS) to develop habitat versus flow relationships for target species
- Use time series and habitat duration analysis to identify critical time periods and habitat bottlenecks
- Coordinate with riparian study to develop stage vs. discharge relationships at 10 assessment sites
- Characterize sediment size and determine sediment transport flow

# Instream Flow Study (FA-2)

## Study Area:


## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| October 2026 | Review and Summarize Previous Hydraulic and Habitat Modeling |
| April 2027 – March 2028 | Collect Data, Analyze, and Prepare Draft Technical Study Report |
| September 2027 | Provide a Study Progress Update in the Initial Study Report (ISR) |
| August 2027 – July 2028 | Complete Modeling and Prepare Updated Draft Technical Study Report |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# **Instream Flow Study**
# (FA-2)

## Comments/Updates:

- There were no comments received on FA-2.

# Instream Flow Study
(FA-2)

## Questions?

# Reservoir Fish Habitat Study
(FA-3)

## Goals & Objectives:

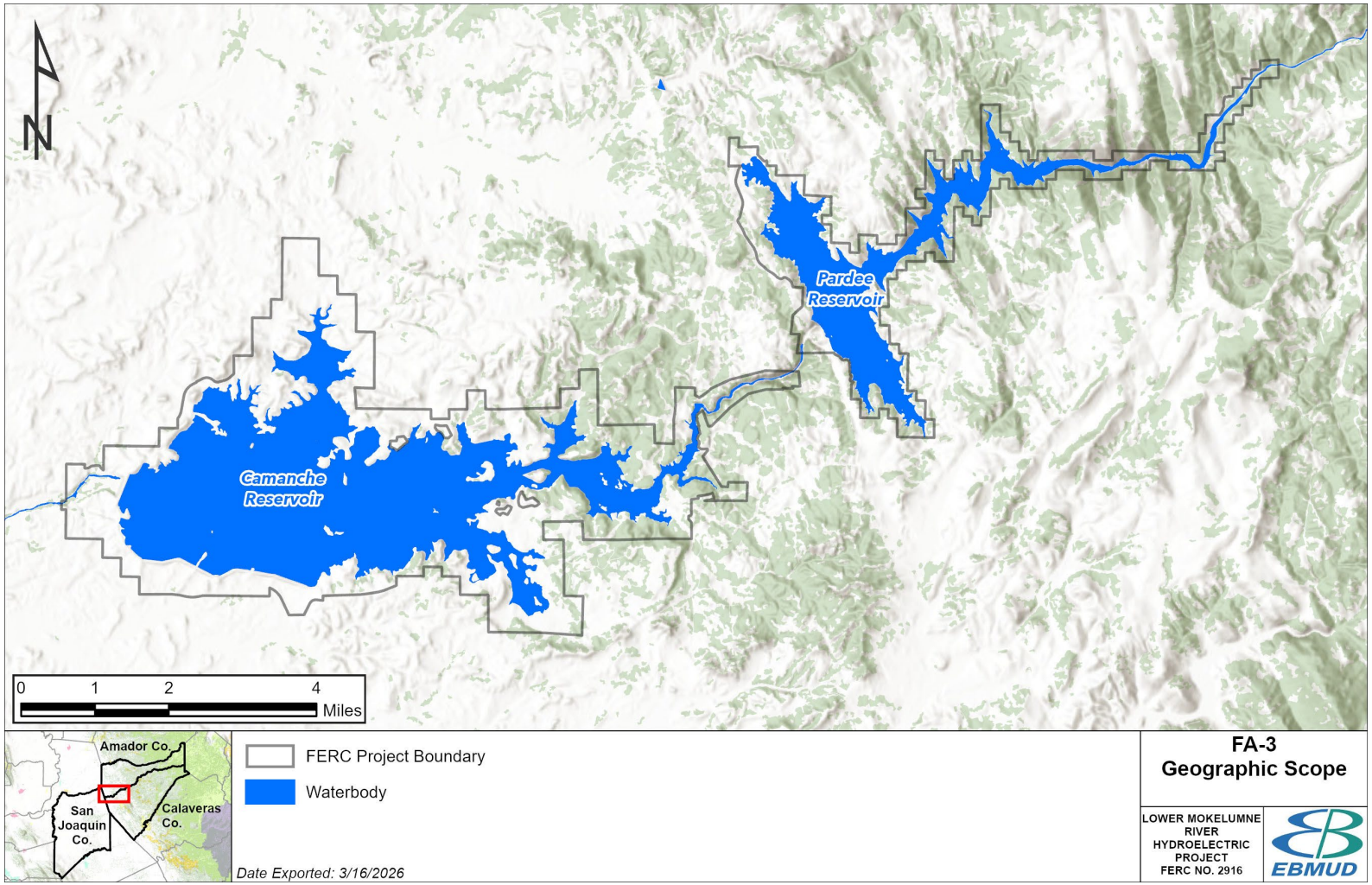
- Characterize existing Project operations daily water surface elevations and pool habitat volumes (cold water, warm water, dissolved oxygen) at each reservoir using the hydrology and water temperature models in the Hydrology and Operations Modeling Study and Water Temperature Study and the historical dissolved oxygen data (1998–2024) .
- Characterize other potential hydrology scenarios for Project daily water surface elevation patterns and pool habitat volumes (cold water, warm water, dissolved oxygen) at each reservoir using the hydrology and water temperature models in the Hydrology and Operations Modeling Study and Water Temperature Study and the historical dissolved oxygen data (1998–2024).

## Methods:

- Summarize fish assemblage in each reservoir
- Habitat modeling (hydrology, temperature, DO, etc.)

# Reservoir Fish Habitat Study (FA-3)

## Study Area:




## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| October 2026 – July 2027 | Model hydrology, water temperature, and dissolved oxygen and Develop a Draft Technical Study Report |
| September 2027 | File Initial Study Report (ISR) |
| August 2027 – July 2028 | Model additional scenarios if needed, develop an Updated Draft TSR |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# Reservoir Fish Habitat Study
(FA-3)

## Comments/Updates:

- EBMUD specified historical DO will be summarized within littoral zone and open water habitats
- CDFW studied habitat suitability and the potential for reintroduction of Chinook to the upper watershed and found the potential introduction of various pathogens to currently established fish populations was too risky. The Upper Mokelumne watershed above Pardee is also not within the FERC Project Boundary nor is it affected by Project operations.
- Boyd 2014 and Brown et al. 2018 are publicly available: https://www.ebmud.com/mokrelicense
- Aquatic habitats in the project areas (e.g., habitat type, plant and animal species, functional values, and integrity) and environmental consequences of the proposed alternatives on these resources will be evaluated by EBMUD in the Draft License Application (DLA), or Final License Application (FLA).
- EBMUD will evaluate impacts to aquatic resources in terms of the areal (acreage for wetlands) or linear extent (for streams) to be impacted and by the functions they perform (e.g. spawning or rearing habitat) in the DLA, or FLA.

# Reservoir Fish Habitat Study
(FA-3)

## Questions?


15-minute break

# Fish Population Study
# (FA-1)

Goals & Objectives:

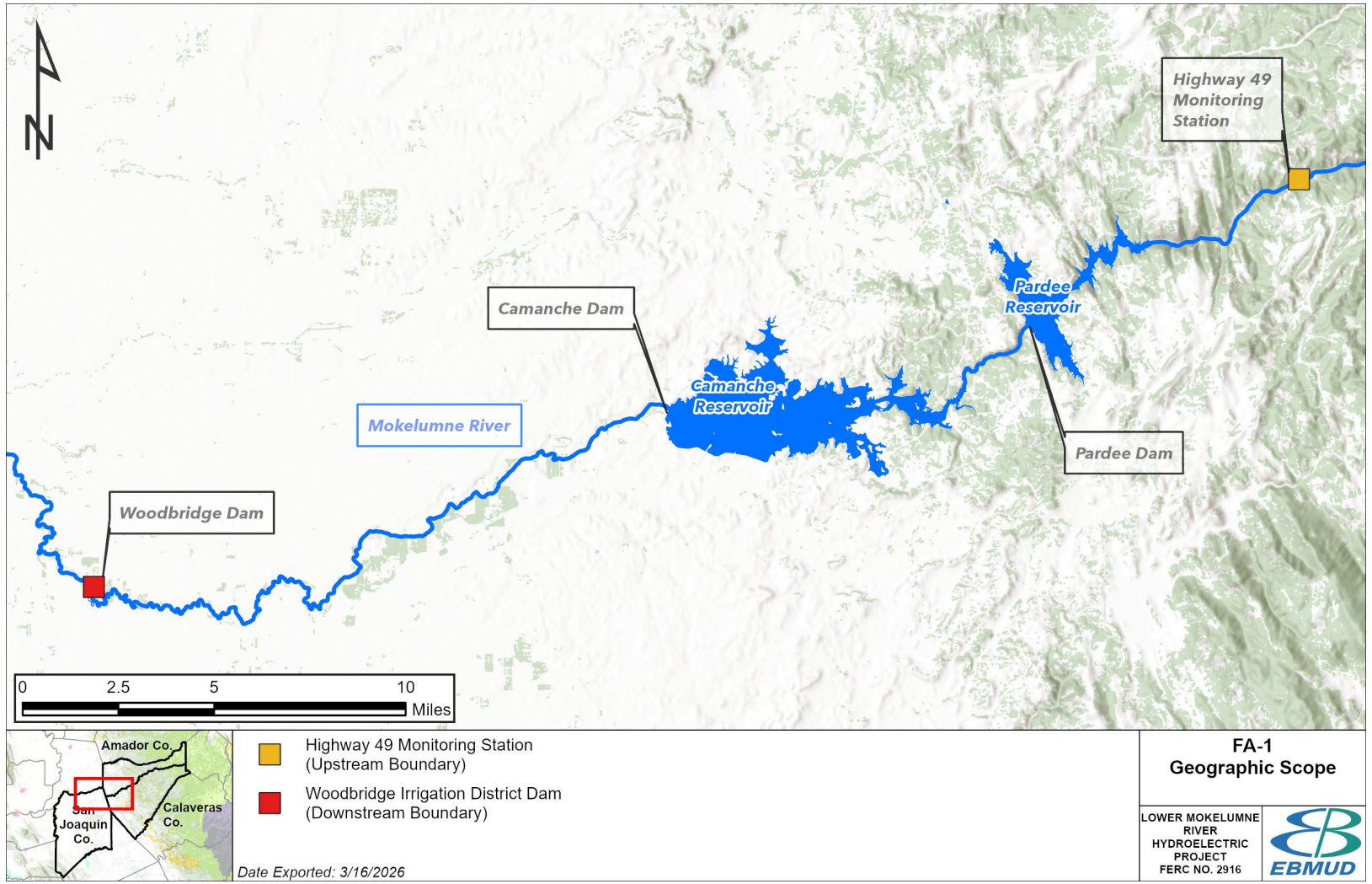
- Document fish species composition, distribution, and abundance in the reservoirs;
- Collect fish from the reservoirs for mercury testing;
- Document fish species composition, distribution, and abundance in the Lower Mokelumne River;
- Characterize fish stocking;
- Characterize fish hatchery operations (e.g., species, production goals, summarize genetics); and
- Analyze the fish data and characterize population trends, condition factor, and population age structure in the reservoirs and river reaches

Methods:

- Reservoir and river sampling
- Fish mercury testing
- Hatchery Operations
- Analysis: CPUE, trends, environmental correlates

# Fish Population Study (FA-1)

## Study Area:




## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| September 2027 | File Initial Study Report (ISR) |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# Fish Population Study
# (FA-1)

## Comments/Updates:

- **Mercury-** Added text referring to Water Quality (WQ-1) Study Plan for mercury testing in Pardee and Camanche Reservoirs. Existing OEHHA 2022 guidelines will apply for the Lower Mokelumne River downstream of Camanche Dam.
- **River Sampling-** Efficiency test frequency between December and June will depend on natural production and hatchery availability. When wild fish readily being caught, up to 50 will be marked and released upstream of the trap weekly. Once wild fish catch diminishes, hatchery fish will be used (depending on availability) for up biweekly tests, or when flow/environmental conditions change such that an efficiency test is needed.
- **Fish Handling-** per EBMUD's current SCP, water temperature in holding containers shall be maintained within 2° C of the ambient water temperature in which the fish were collected and shall not exceed 18° C for electrofishing or 21° C for other methods.

# Fish Population Study
(FA-1)

## Questions?

# Special Status Amphibians and Aquatic Reptiles Study (FA-4)

## Goals & Objectives:

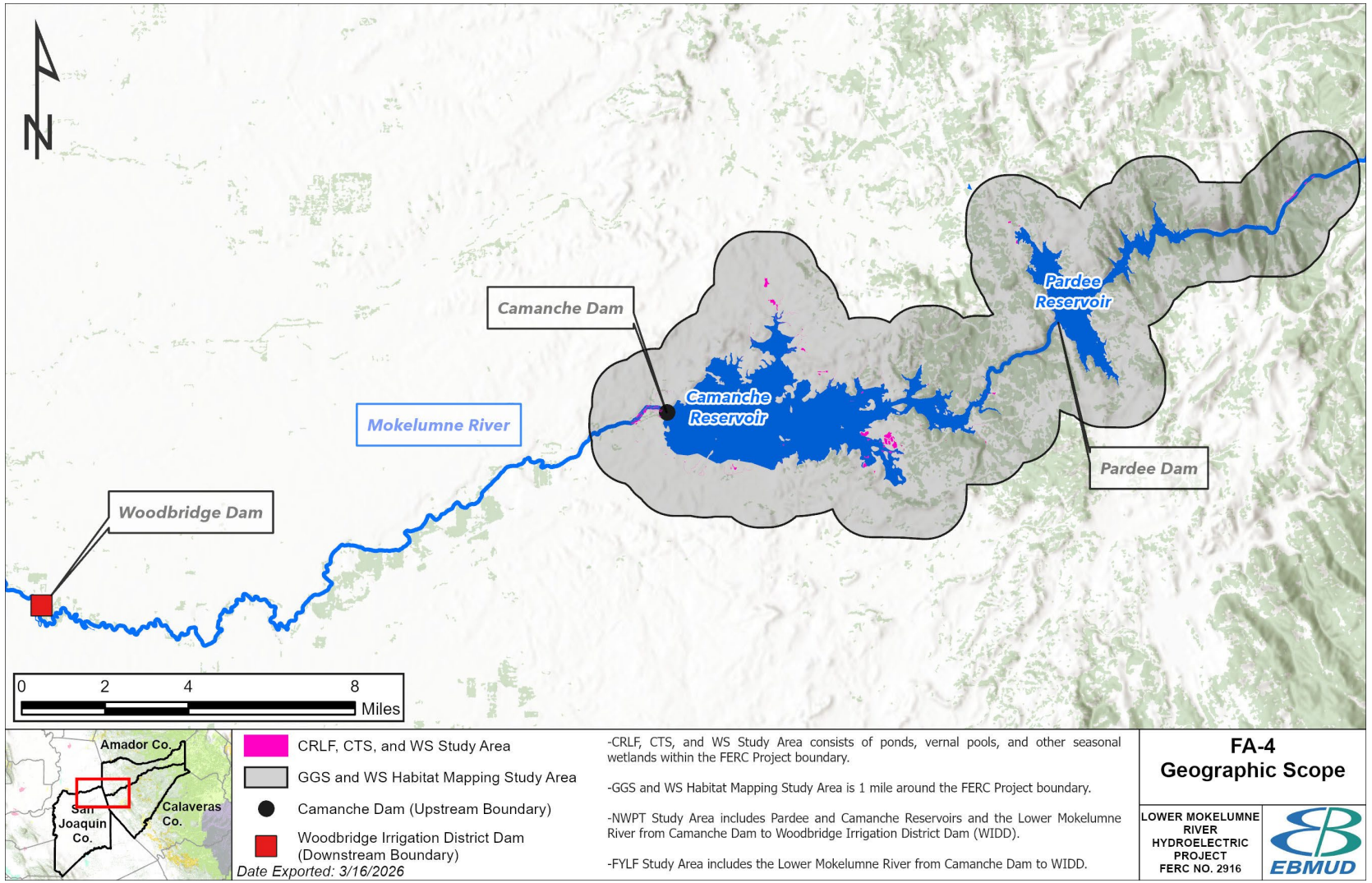
- Document the distribution and abundance of northwestern pond turtle (NWPT) (*Actinemys marmorata*) populations in the study area.
- Document the presence of potential NWPT nesting habitat near Project facilities.
- Conduct breeding habitat assessment and visual encounter surveys for foothill yellow-legged frog (FYLF) (*Rana boylii*) in representative sites in the Lower Mokelumne River below Camanche Dam to WIDD and associated tributaries.
- Continue conducting surveys consistent with the monitoring requirements under the Safe Harbor Agreement (SHA or Agreement) for California red-legged frog (CRLF) (*Rana draytonii*) and California tiger salamander (CTS) (*Ambystoma californiense*). Continue to document the presence of western spadefoot (WS) (*Spea hammondii*) during surveys.
- Characterize habitat for giant garter snake (GGS) (*Thamnophis gigas*) and WS.

## Methods:

- Desktop analysis for habitat characterization
- Visual encounter surveys

# Special Status Amphibians and Aquatic Reptiles Study (FA-4)

## Study Area:

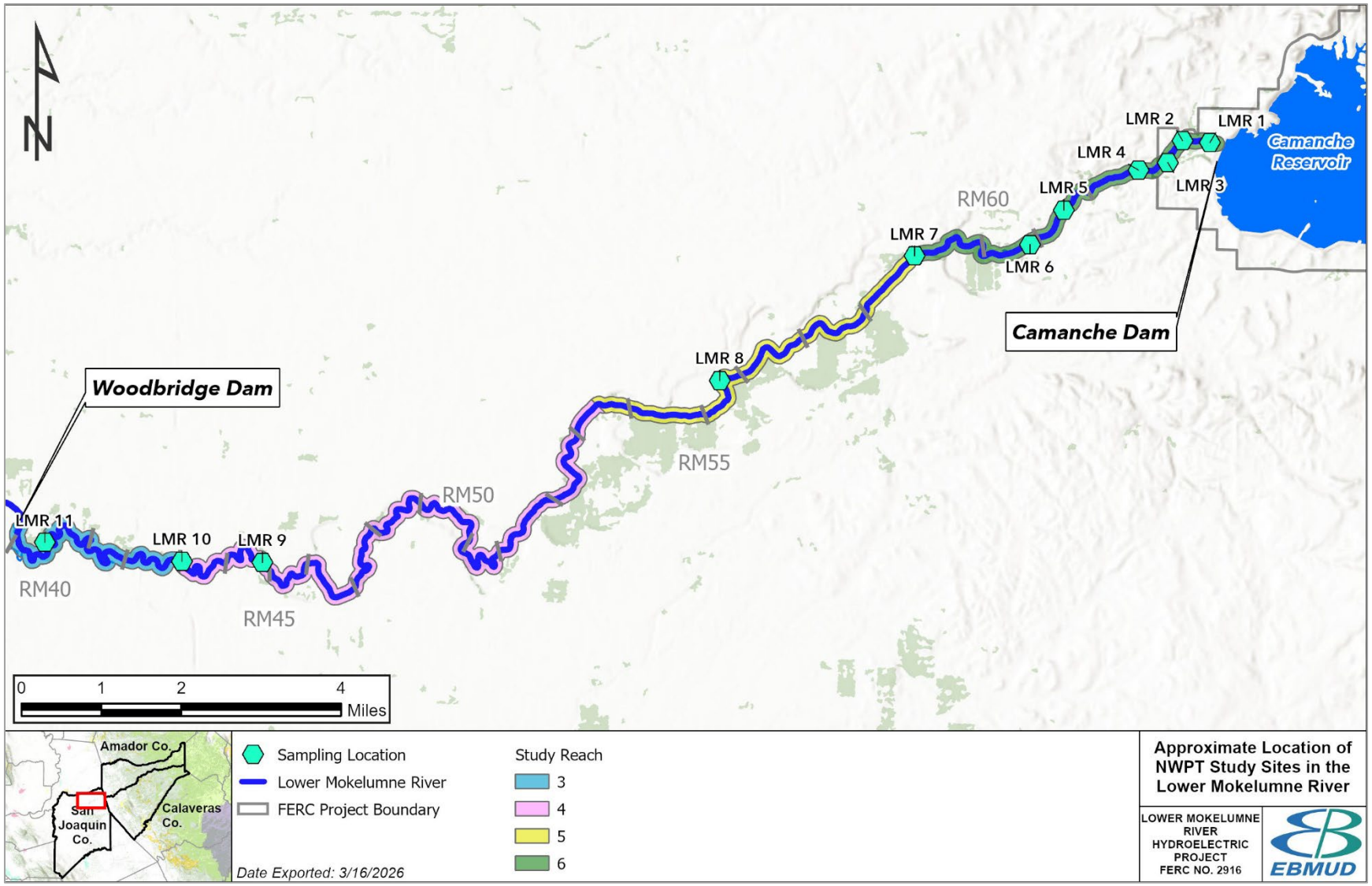



## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| September 2027 | File Initial Study Report (ISR) |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |

# Special Status Amphibians and Aquatic Reptiles Study (FA-4)

## Study Reaches:



# Special Status Amphibians and Aquatic Reptiles Study (FA-4)

## Comments/Updates:

- EBMUD will coordinate with USFWS and CDFW throughout the FERC relicensing process specifically about evaluating Project effects of continued operation and maintenance on special-status plant and wildlife species and their habitats, including state- and federally listed species
- Sampling sites were selected within the vicinity of electrofishing sites in suitable northwestern pond turtle (NWPT) habitat (backwater areas, pools, and slow-moving water that have basking sites and terrestrial and aquatic escape cover). NWPT sites will be selected and adjusted while in the field.
- EBMUD is proposing a select second study site in Reach 3 (in addition to Reach 4, 5, and 6) based on site-specific conditions (*see next slide*).
- Critical habitat for foothill yellow-legged frog (FYLF) occurs outside the FERC Project Boundary at higher elevations, the two nearest known extant populations are approx. 12 miles upstream of Pardee Reservoir. The California Natural Diversity Database (CNDDB) includes two historic records from within the watershed (from 1958 and 1965) but considers these record locations as extirpated. EBMUD staff have not observed FYLF during extensive aquatic surveys throughout the FERC Project Boundary. However, visual encounter surveys (VES) for FYLF has been added to the Proposed Study Plan (PSP) along with a breeding habitat assessment.
- eDNA has been removed for both NWPT and FYLF.

# Special Status Amphibians and Aquatic Reptiles Study (FA-4)

## Questions?

# Chinook Salmon Egg & Juvenile Survival Study (FA-5/FA-6)

## Goals & Objectives:

- **Compile historical data from the Lower Mokelumne River** to evaluate egg and juvenile Chinook salmon survival related to physical, chemical, and biological factors.
- **Develop a mechanistic/empirical model relating egg and juvenile survival** with environmental conditions based on existing data, models, and other pertinent information that can be used to inform flow management strategies.
- **Quantify in-river egg survival rates** by recording survival to emergence of fertilized eggs in artificial redds, monitor potential survival correlates including water temperature, dissolved oxygen, flow, and sediment composition, and evaluate the predictive ability of the model.
- **Identify additional data needs** based on model uncertainty, if present, and develop targeted studies to collect those data.

## Methods:

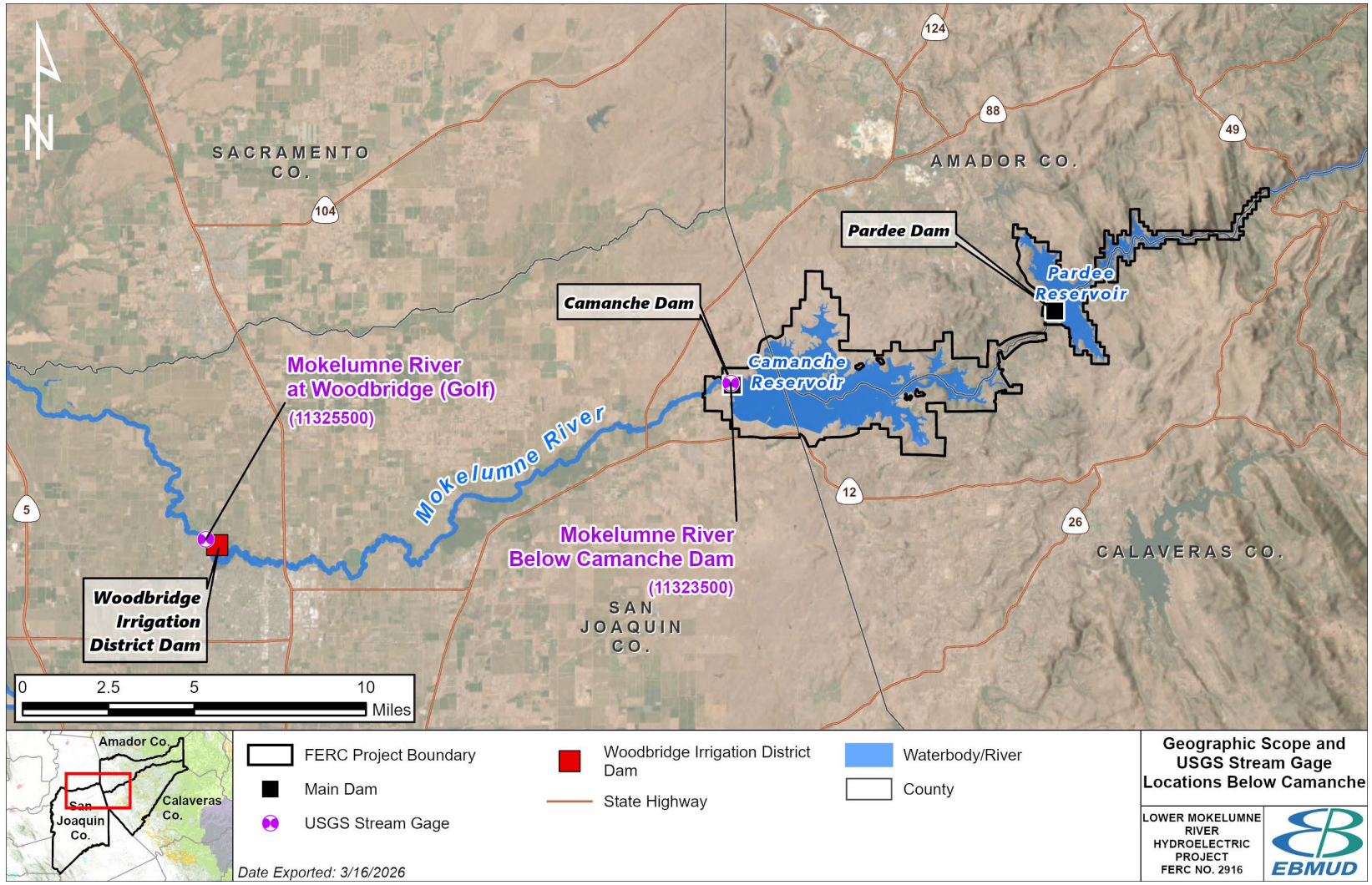
- Compile and analyze historical data
- Develop Integrated Early Life Stage Survival Model
- Field Studies
    - In-river egg survival rates (multiple sites, varied timing, using artificial redds)
    - Reach-scale spawning habitat quality (hyporheic environment, gravel quality, environmental monitoring, reach-scale spawning activity)

# Chinook Salmon Egg & Juvenile Survival Study (FA-5/FA-6)

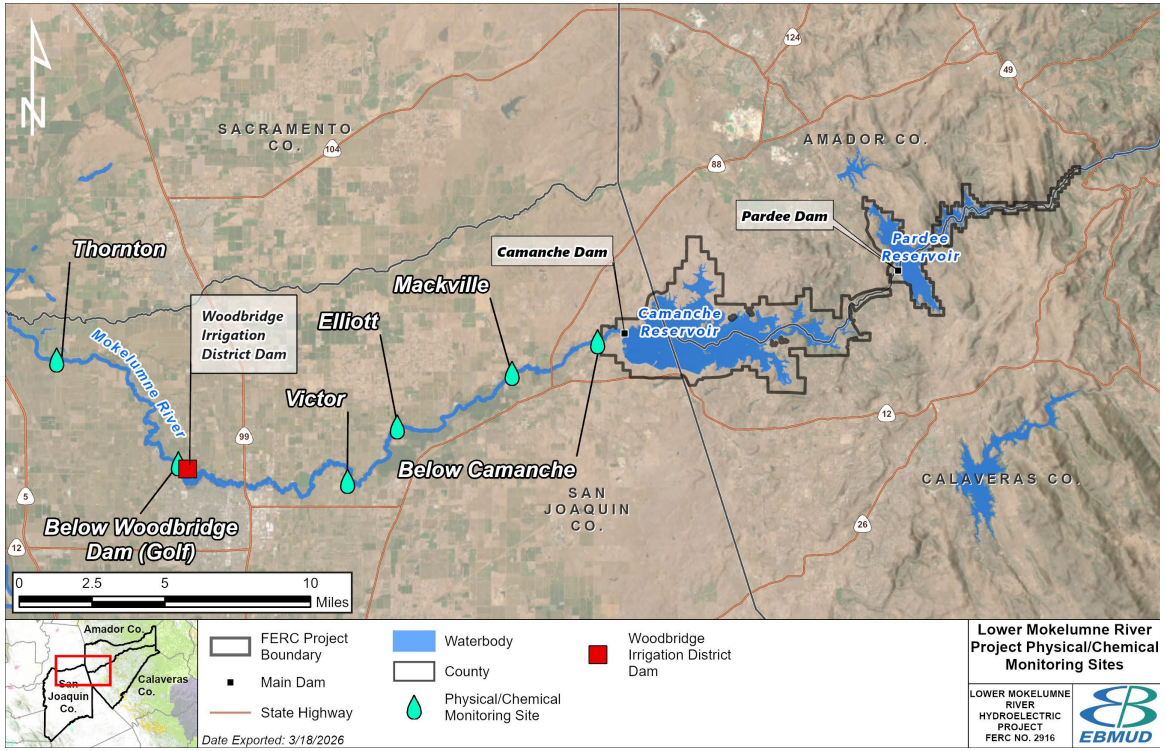
## Study Area:

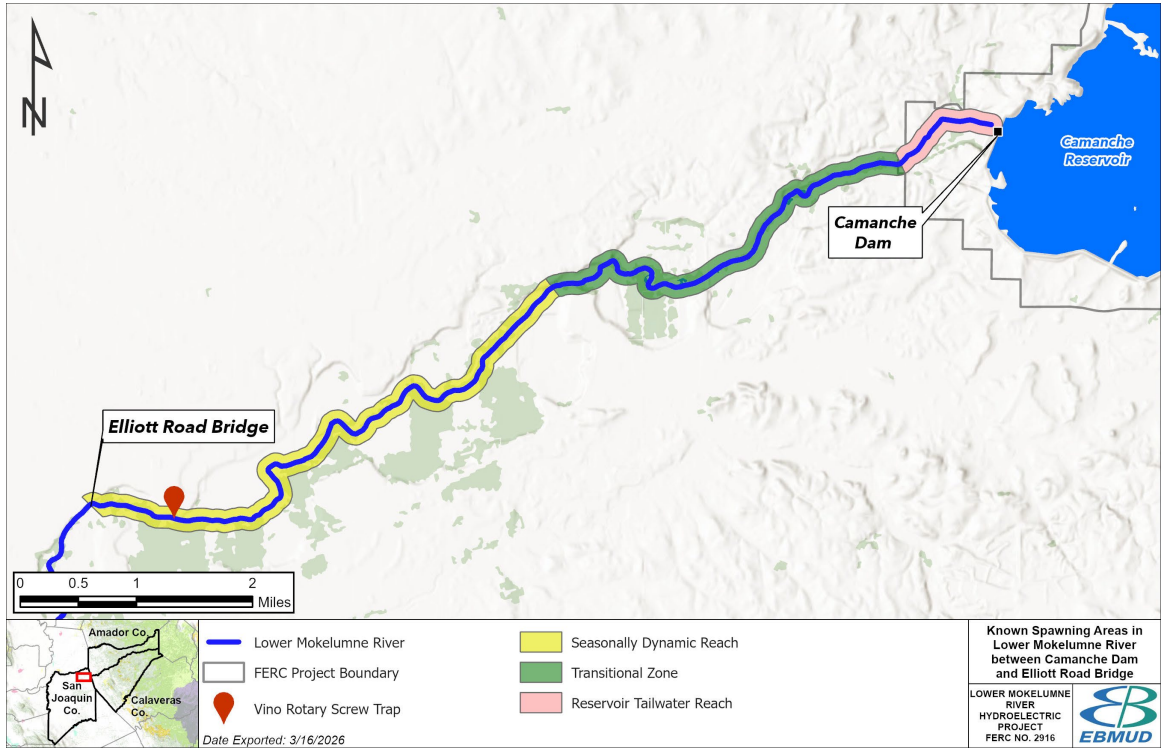
## Schedule:

| Date | Activity |
|---|---|
| July 3, 2026 | Proposed Study Plan (PSP) Comments due to FERC |
| September 2026 | FERC Study Plan Determination (SPD) |
| Pre-study plan determination | Complete Compilation of Historical Data |
| September 2026 – July 2027 | Complete first year study components and develop a Draft Technical Study Report on first year results |
| September 2027 | File Initial Study Report (ISR) |
| September 2027 – July 2028 | Complete second year study components and develop a Draft Technical Study Report on second year results |
| August 2028 | File Updated Study Report (USR) |
| November 2028 | File Draft License Application (DLA) |
| April 2029 | File Final License Application (FLA) |



# Chinook Salmon Egg & Juvenile Survival Study (FA-5/FA-6)



# **Chinook Salmon Egg & Juvenile Survival Study**
# (FA-5/FA-6)

## Comments/Updates:

- Natural redds were removed from the field study component as several previous studies have indicated a high degree of uncertainty and this would complicate accurate estimates of egg-to-fry survival
- Artificial redds will be distributed among three distinct Chinook salmon spawning reaches, with the total number determined by a power analysis that identifies the necessary sample size to refine key model parameters and validate model outputs.
- Temperature and DO Loggers will be deployed for the  FA-5/FA-6 Study to collect continuous data through the extent of egg incubation from Camanche Dam to Elliot Road Bridge. When that study ends as fry are emerging from redds, some of these loggers will be redistributed to cover downstream of Elliot Road Bridge to the WIDD, resulting in full coverage from Camanche Dam to WIDD during juvenile rearing and outmigration.

# Chinook Salmon Egg & Juvenile Survival Study
(FA-5/FA-6)

## Questions?

# What's Next?

April 29 – PSP Meeting

May 13 – EBMUD to distribute PSP meeting materials via relicensing website

**July 3 – PSP comments due to FERC**

August 3 – EBMUD Files Revised Study Plan (RSP)

September 1 – FERC issues Study Plan Determination (SPD)

September – EBMUD Initiate Studies

# How to Stay Involved

- Lower Mokelumne River Project Relicensing Website: EBMUD.com/MokRelicense
- Email: MokRelicense@ebmud.com
- Priyanka Jain, EBMUD: 510-287-1153
- FERC e-Subscription (docket number “P-2916”) at www.ferc.gov

# Questions & Wrap Up

EBMUD