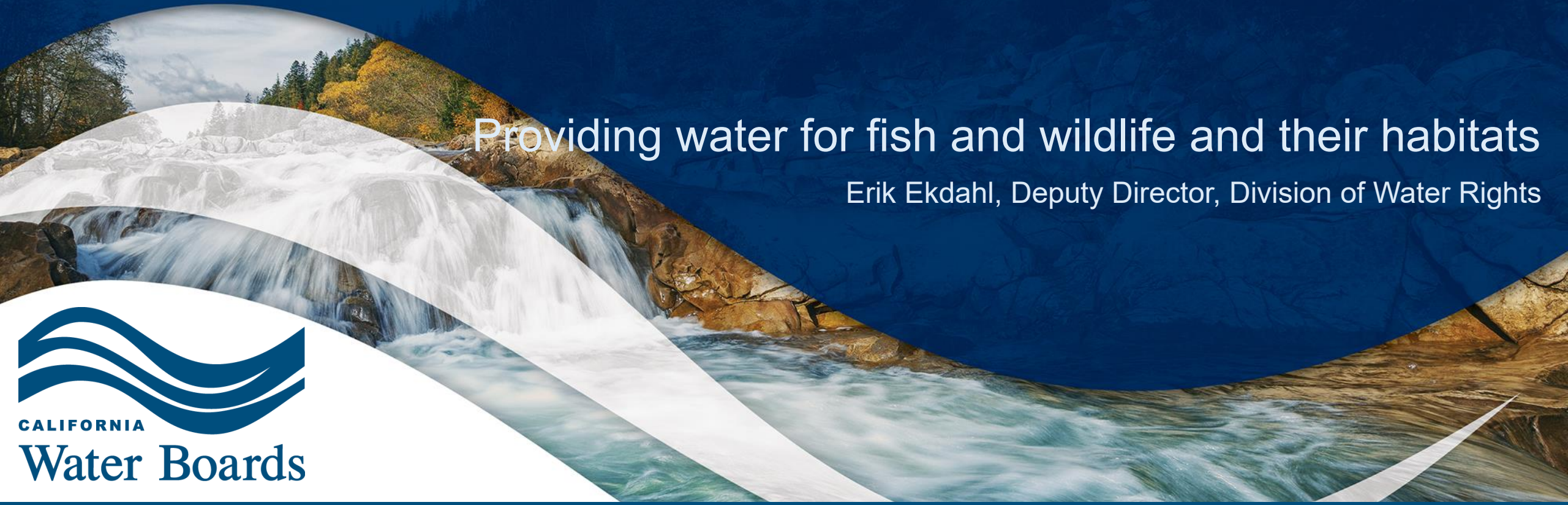
California State Water Resources Control Board



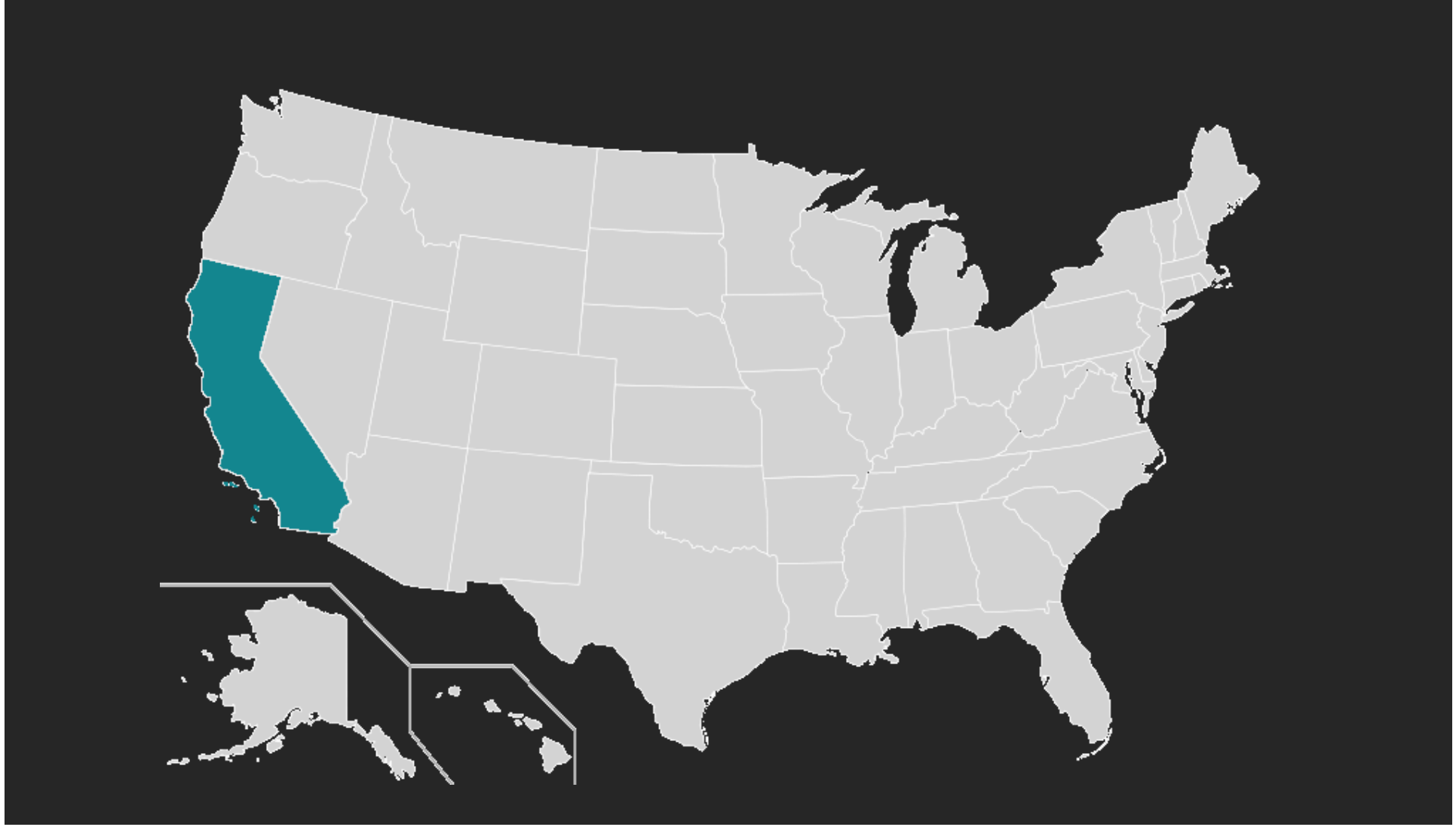
Providing water for fish and wildlife and their habitats

Erik Ekdahl, Deputy Director, Division of Water Rights

CALIFORNIA
Water Boards

Overview

- California's waterscape
- California water rights – background and basics
- 21st century challenges
- Protecting and balancing beneficial uses



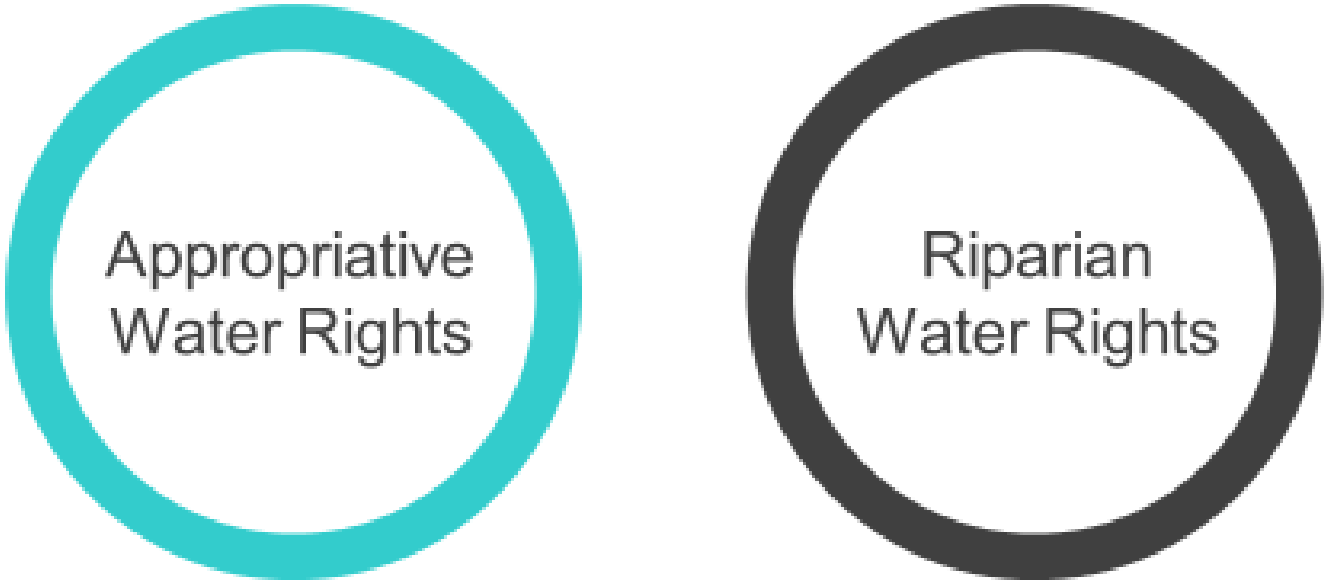
3rd largest state in the US: 158,706 miles^2 (411,046 km^2)

Largest state population: 39+ million residents (12% of US)

California Waterscape

- 3rd largest state by area in the United States
- 39.5 million residents
- 1,100 miles of coastline (1,700 km)
- 211,000 miles of rivers and streams
- 200 million acre feet average precipitation (247 billion cubic meters)
- 46,000 acre feet (56 million cubic meters) of groundwater used per day by Californians, more than any other state in the nation

California's Generalized Surface Water Rights (Dual System)

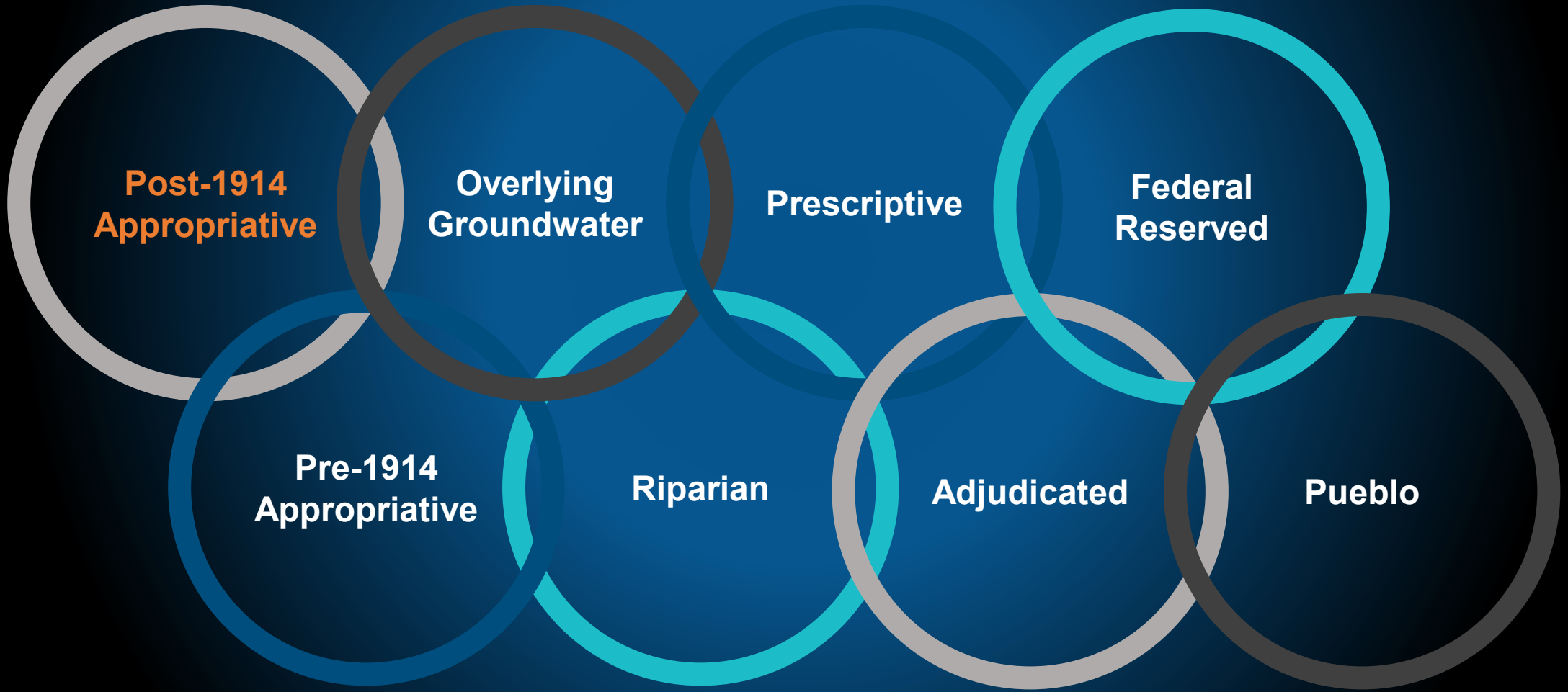


Water right types and California's hybrid system

- Main types of water rights:
  - Pre-1914 appropriative rights
  - Post-1914 appropriative rights
  - Riparian

- Hybrid System: first in time + parcel location
  - Rights established before 1914 are exempt from state permitting
  - Riparian users outside state permitting authority, not priority-based
  - Groundwater not included in state water rights permitting system

Actual California Water Rights are Complicated



Division of Water Rights

Permitting, Licensing, Transfers, & Changes to Existing Rights

Water Quality Certifications

Enforcement & Hearings

Public Trust Evaluations (Flows, Quality, Quantity, more)

Bay Delta Water Quality Control Planning

Data management

- ✓19th Century Water Rights Law
- ✓20th Century Data and Infrastructure
- ✓21st Century Climate

California's Water Dilemma

California's Water Dilemma

California's Water Dilemma

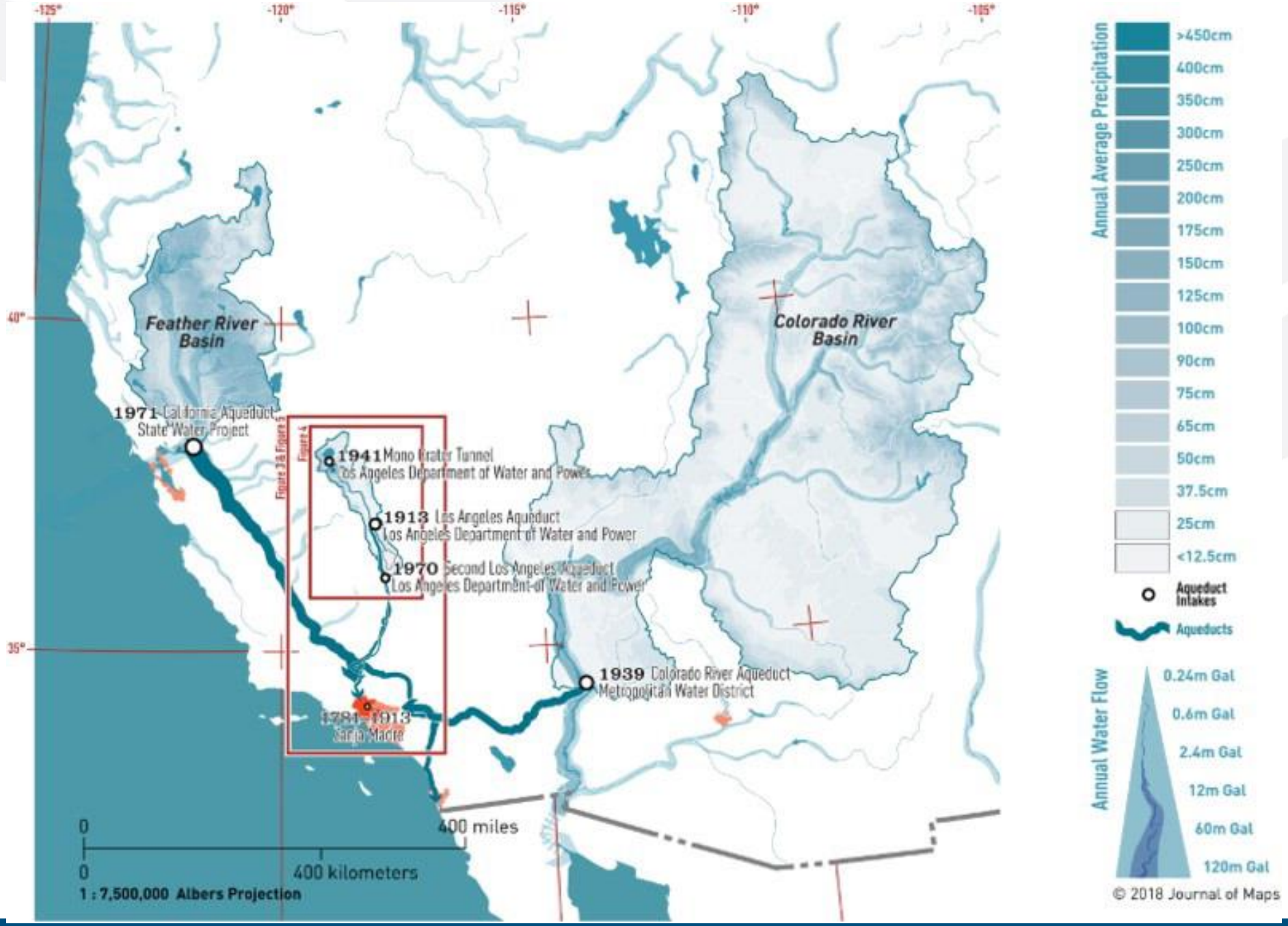
Major Water Projects

Federal – Central Valley Project
(CVP)

State - State Water Project
(SWP)

Local- Many throughout state
(Colorodo River, Hetch Hetchy, EBMUD, Owens Valley)

Source: Water Environment Foundation

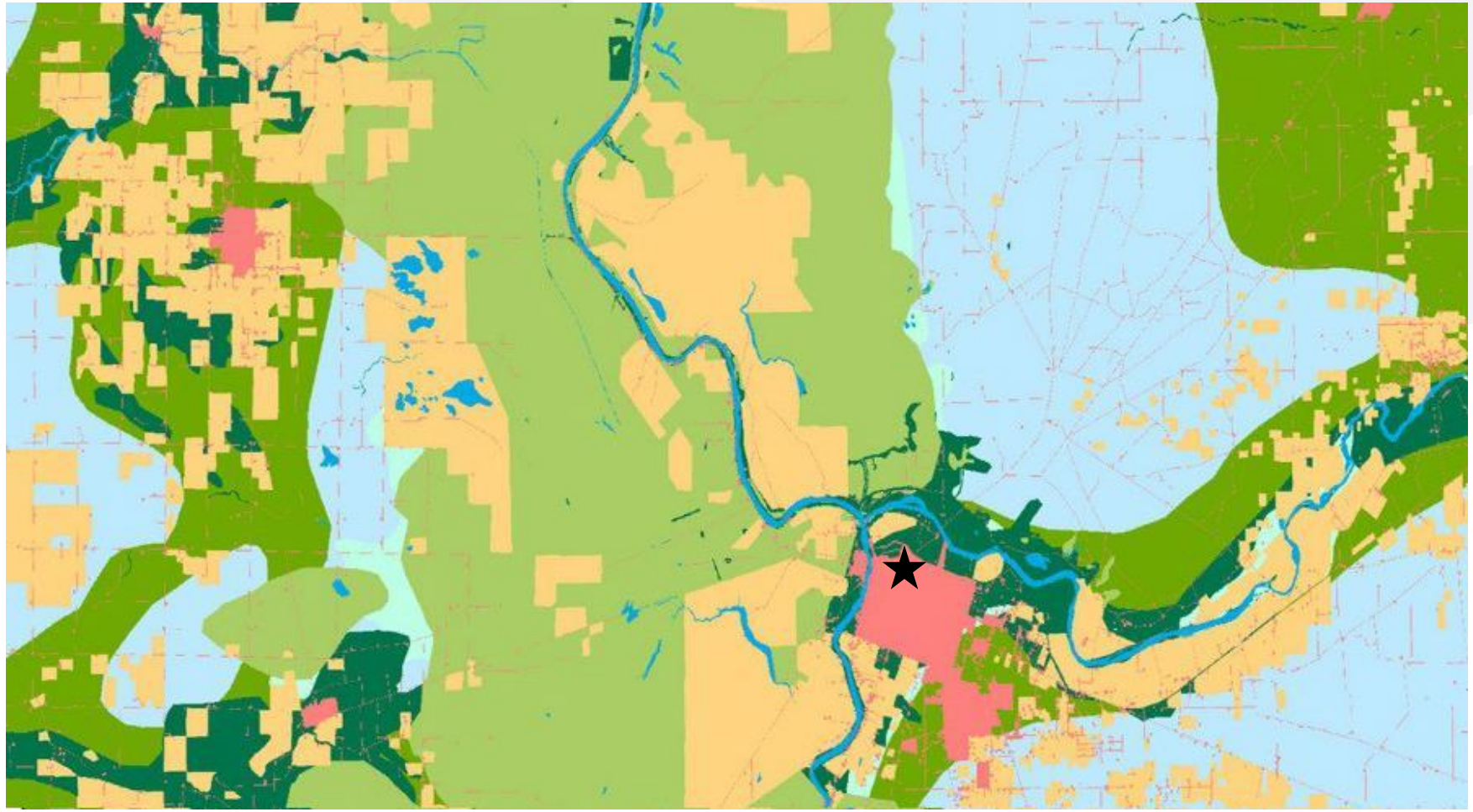

-125°
-120°
-115°
-110°
-105°
40°
35°
Feather River Basin
Colorado River Basin
1971 California Aqueduct State Water Project
1941 Mono Crater Tunnel Los Angeles Department of Water and Power
1913 Los Angeles Aqueduct Los Angeles Department of Water and Power
1970 Second Los Angeles Aqueduct Los Angeles Department of Water and Power
1939 Colorado River Aqueduct Metropolitan Water District
1784–1913 Santa Maria
Figure 3A
Figure 4
Figure 5
0
400 miles
0
400 kilometers
1 : 7,500,000 Albers Projection
Annual Average Precipitation
>450cm
400cm
350cm
300cm
250cm
200cm
175cm
150cm
125cm
100cm
90cm
75cm
65cm
50cm
37.5cm
25cm
<12.5cm
Aqueduct Intakes
Aqueducts
Annual Water Flow
0.24m Gal
0.6m Gal
2.4m Gal
12m Gal
60m Gal
120m Gal
© 2018 Journal of Maps

California population

Source: California Department of Finance estimates

1920

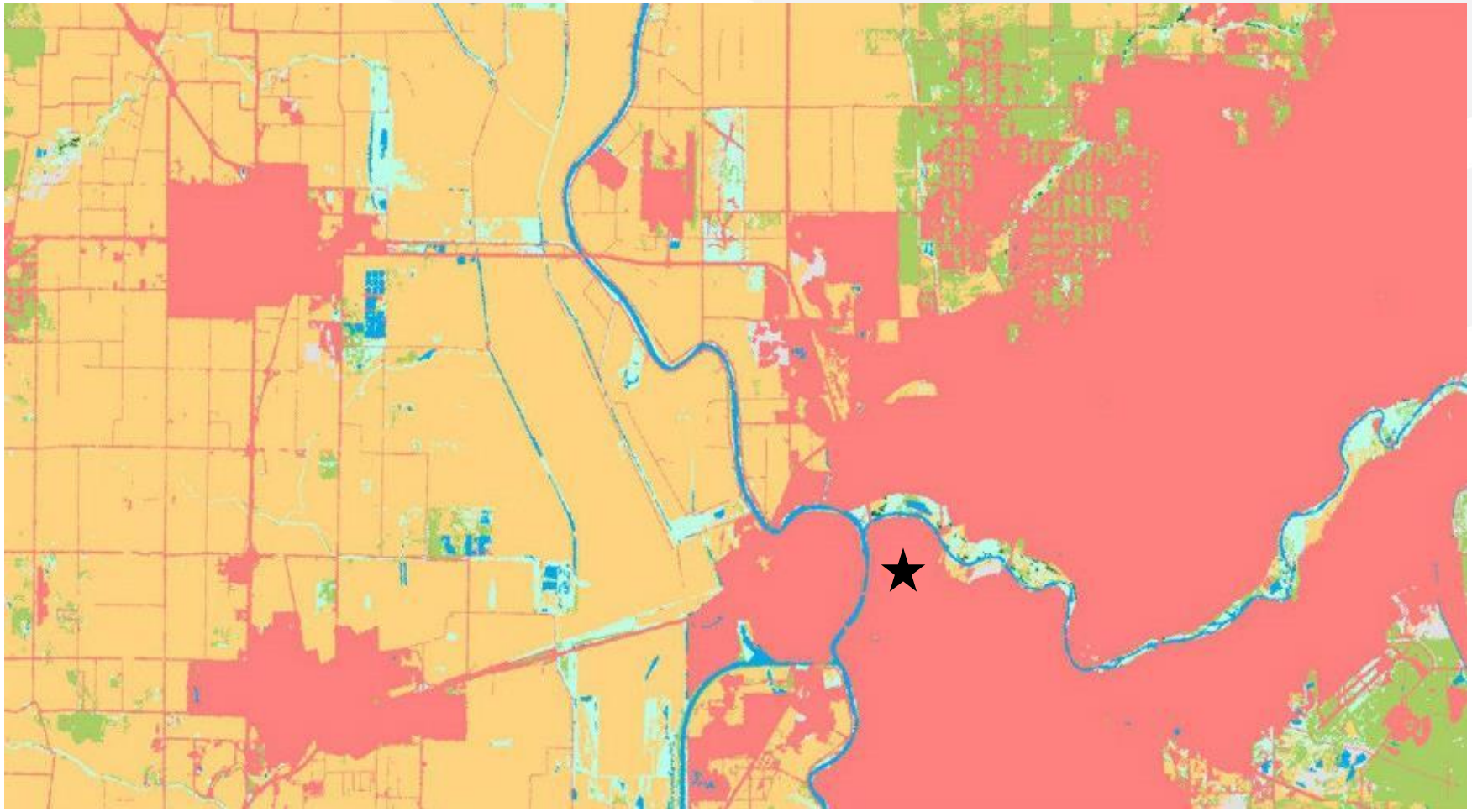
Sacramento LAND USE



Source: The Grinnell Resurvey Project, Museum of Vertebrate Zoology, UC Berkeley

2011

Sacramento LAND USE



Source: The Grinnell Resurvey Project, Museum of Vertebrate Zoology, UC Berkeley

Drought

2011 2012 2013 2014 2015

Slide courtesy Dept. of Water Resources

CALIFORNIA DEPARTMENT OF WATER RESOURCES

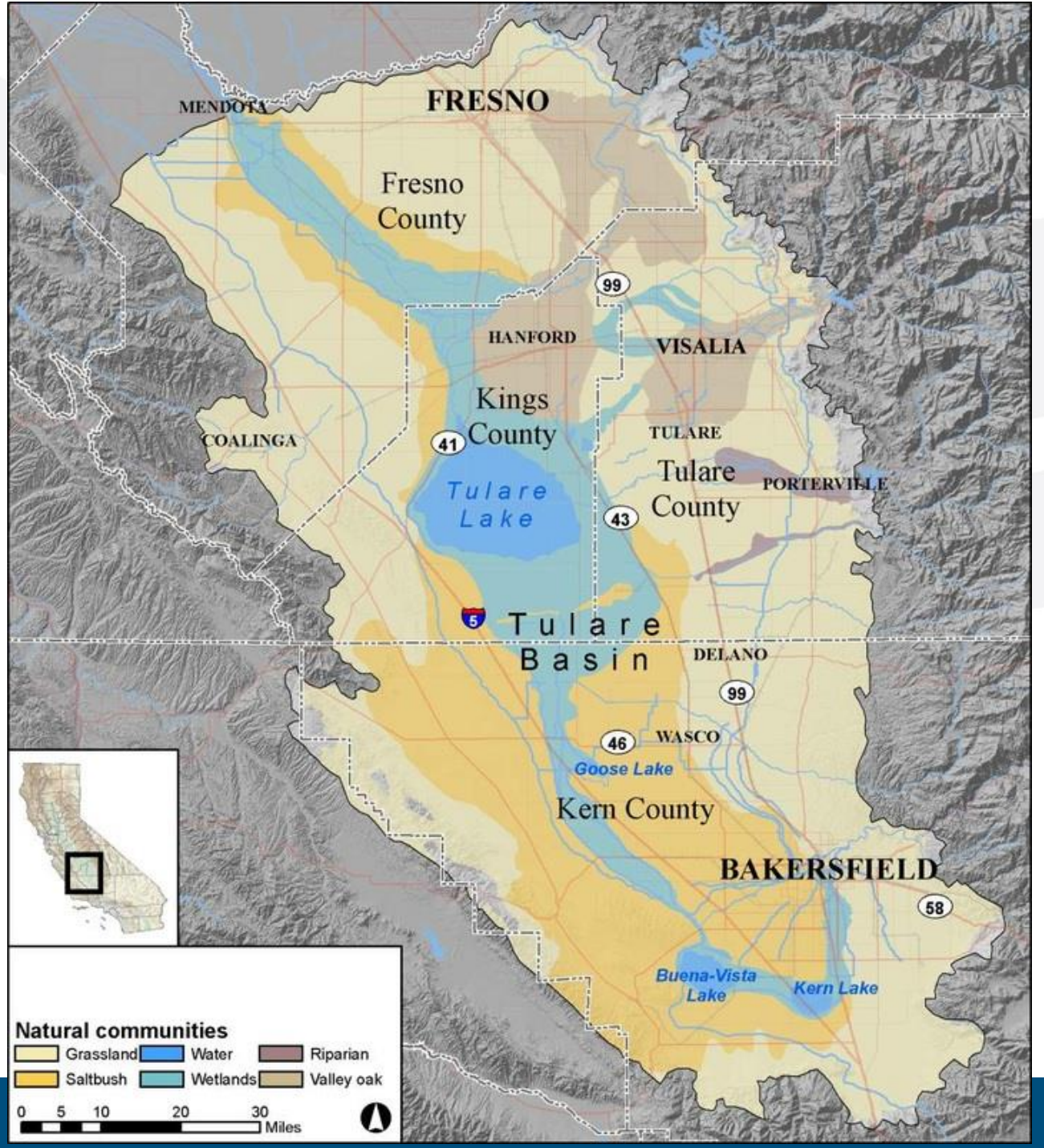
Lake Oroville

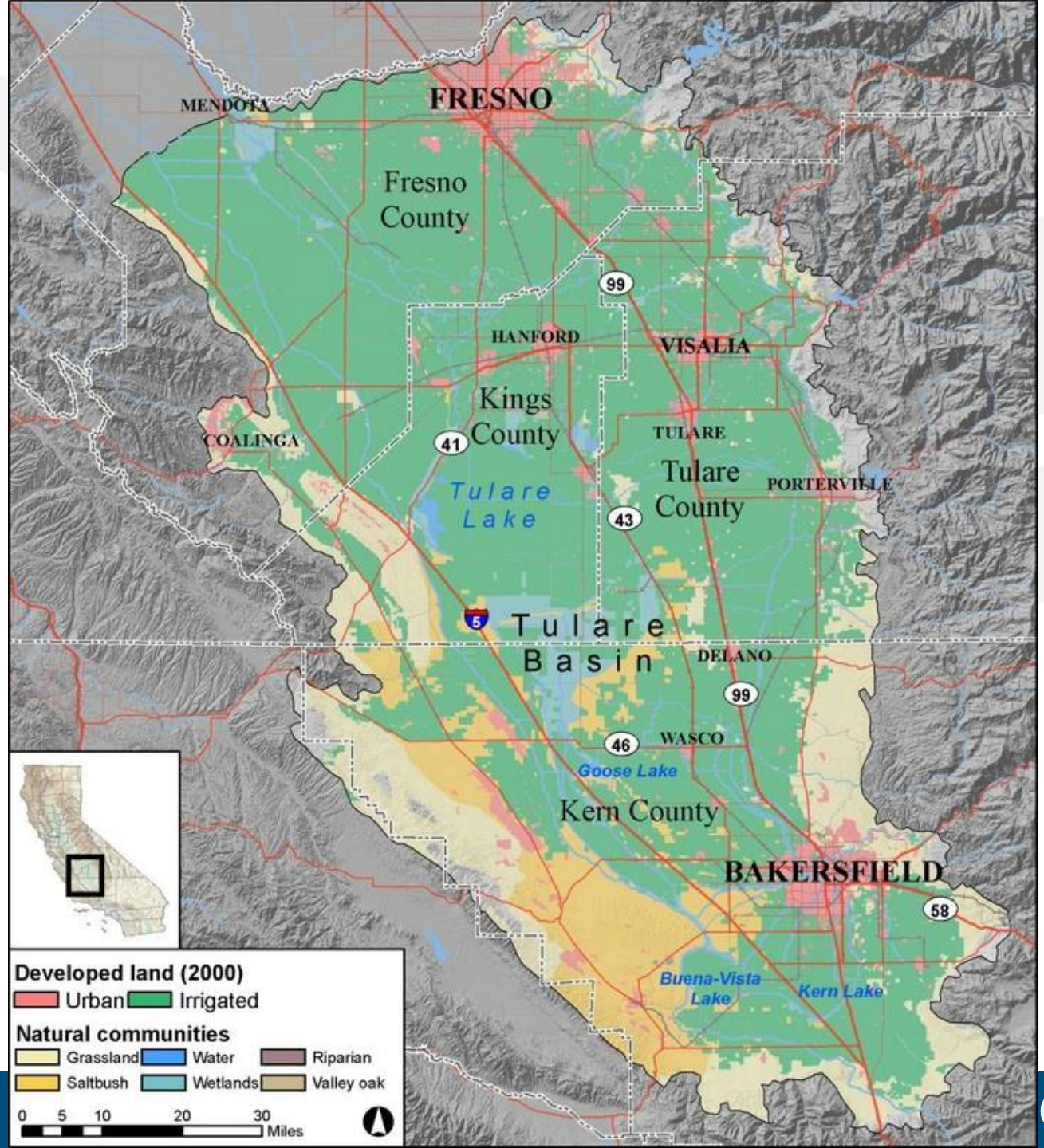
State Water Project's Largest Reservoir

December 21, 2022

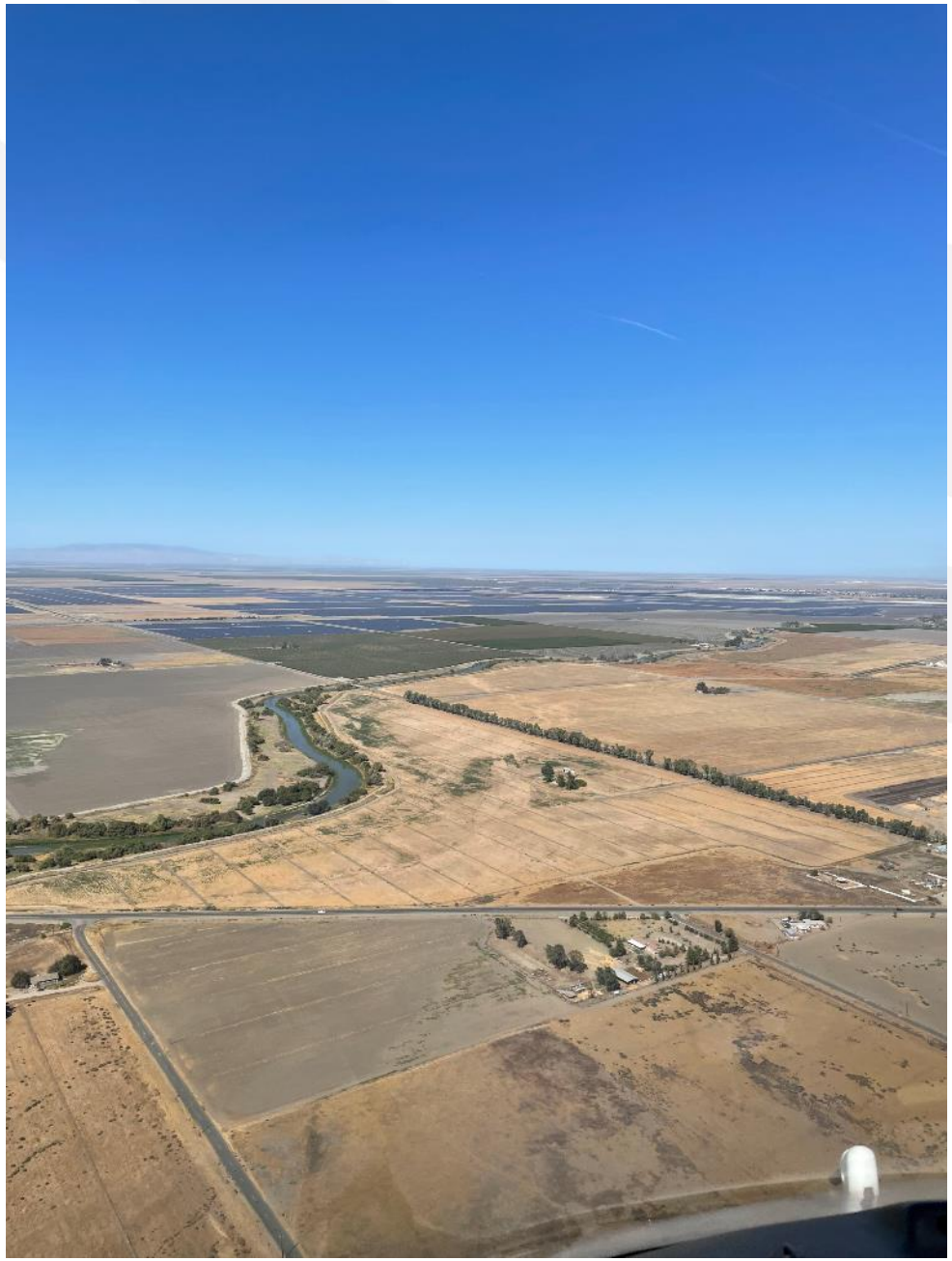
June 12, 2023

Approximately 1860




MENDOTA
FRESNO
Fresno County
99
HANFORD
VISALIA
Kings County
COALINGA
41
TULARE
Tulare Lake
Tulare County
PORTERVILLE
43
5
Tulare Basin
DELANO
99
46
WASCO
Goose Lake
Kern County
BAKERSFIELD
58
Buena-Vista Lake
Kern Lake
Developed land (2000)
Urban
Irrigated
Natural communities
Grassland
Water
Riparian
Saltbush
Wetlands
Valley oak
0 5 10 20 30
Miles

Tulare Lake basin, September 2022



Tulare Lake basin, September 2022

Tulare Lake Basin, March 23, 2023 (Photo: Dept. of Water Resources)

Tulare Lake Basin, March 23, 2023 (Photo: Dept. of Water Resources)

Loss of 10% of average water supply by 2040

Loss of an estimated six to nine million acre-feet per
year. Equivalent of about two full Shasta Reservoirs.

Loss of snowpack, implications for how California's reservoirs are operated.

Aridification

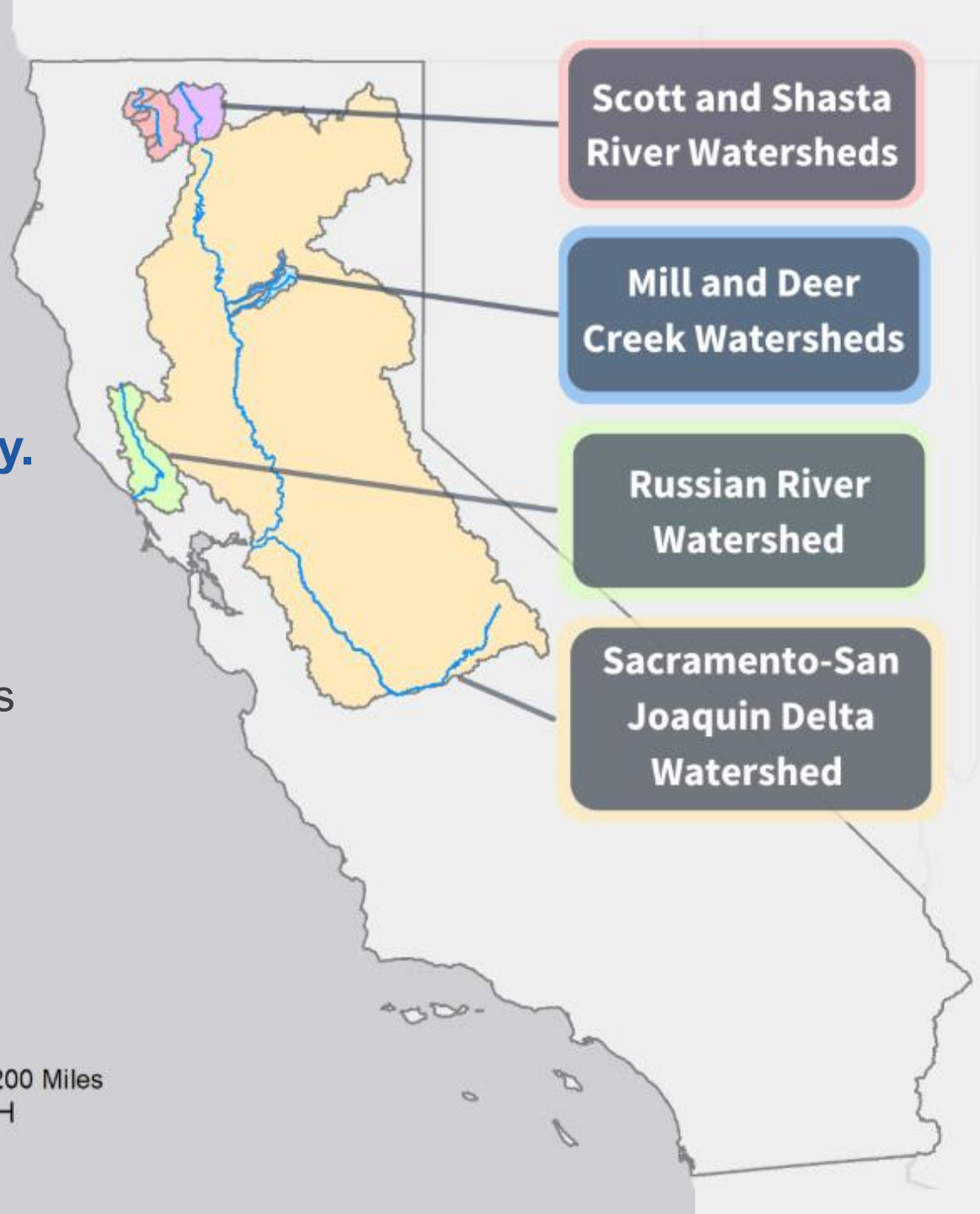
Water Supply Strategy, August 2022

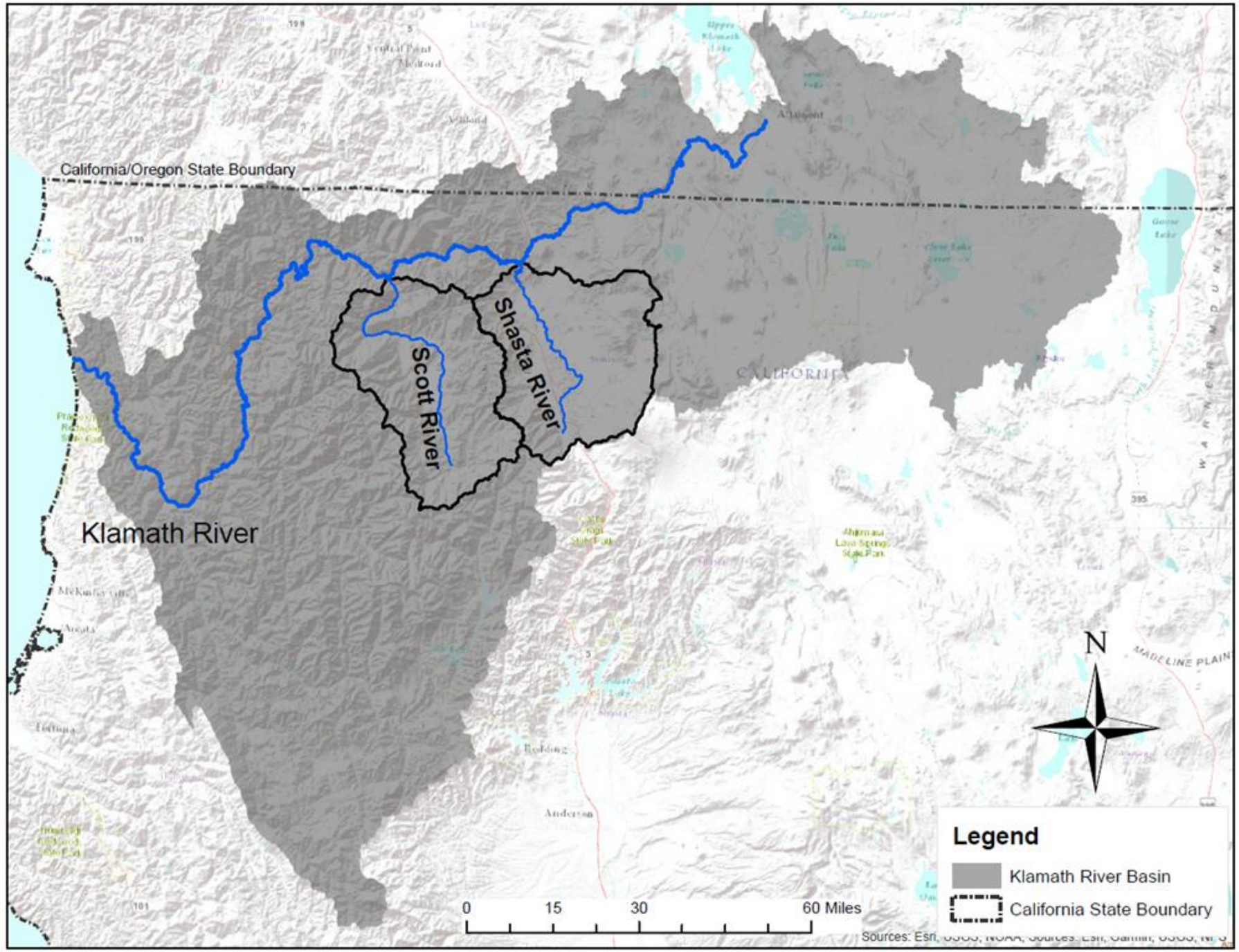
Drought Response

Drought Curtailments

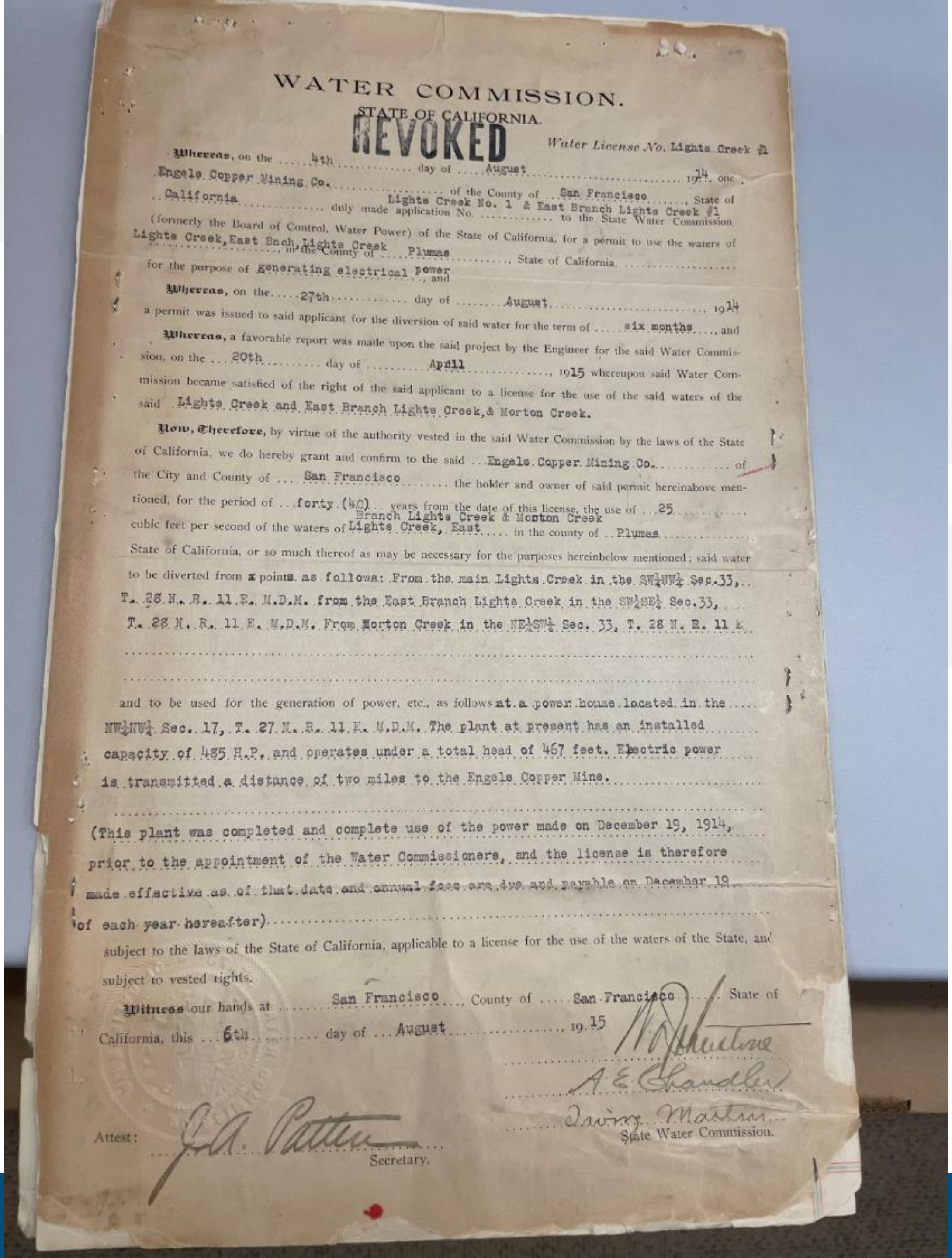
Goal: Implement priority system while protecting fish, wildlife, & human health & safety.

- Authority tied to emergency drought proclamation
- Environmental review (CEQA) suspended
- Curtailment process outlined in emergency regulations
- Emergency regulations good for one year
- Each watershed has its own emergency regulation
- Extensive public engagement




California/Oregon State Boundary
Klamath River
Scott River
Shasta River
CALIFORNIA
N
Legend
Klamath River Basin
California State Boundary
0
15
30
60 Miles

Modernization



WATER COMMISSION.
STATE OF CALIFORNIA.
REVOKED
Water License No. Lights Creek #1

Whereas, on the 4th day of August 1914, one Engels Copper Mining Co. of the County of San Francisco, State of California duly made application No. Lights Creek No. 1 & East Branch Lights Creek #1 to the State Water Commission (formerly the Board of Control, Water Power) of the State of California, for a permit to use the waters of Lights Creek, East Bnch. Lights Creek in the County of Plumas, State of California, for the purpose of generating electrical power and

Whereas, on the 27th day of August 1914 a permit was issued to said applicant for the diversion of said water for the term of six months, and

Whereas, a favorable report was made upon the said project by the Engineer for the said Water Commission, on the 20th day of April 1915 whereupon said Water Commission became satisfied of the right of the said applicant to a license for the use of the said waters of the said Lights Creek and East Branch Lights Creek, & Morton Creek.

Now, Therefore, by virtue of the authority vested in the said Water Commission by the laws of the State of California, we do hereby grant and confirm to the said Engels Copper Mining Co. of the City and County of San Francisco the holder and owner of said permit hereinabove mentioned, for the period of forty (40) years from the date of this license, the use of 25 cubic feet per second of the waters of Lights Creek, East Branch Lights Creek & Morton Creek in the county of Plumas State of California, or so much thereof as may be necessary for the purposes hereinbelow mentioned; said water to be diverted from x points as follows: From the main Lights Creek in the SW¼NW¼ Sec.33, T. 28 N. R. 11 E. M.D.M. from the East Branch Lights Creek in the SW¼SE¼ Sec.33, T. 28 N. R. 11 E. M.D.M. From Morton Creek in the NE¼SW¼ Sec. 33, T. 28 N. R. 11 E.

and to be used for the generation of power, etc., as follows at a power house located in the NW¼NW¼ Sec. 17, T. 27 N. R. 11 E. M.D.M. The plant at present has an installed capacity of 485 H.P. and operates under a total head of 467 feet. Electric power is transmitted a distance of two miles to the Engels Copper Mine.

(This plant was completed and complete use of the power made on December 19, 1914, prior to the appointment of the Water Commissioners, and the license is therefore made effective as of that date and annual fees are due and payable on December 19 of each year hereafter)

subject to the laws of the State of California, applicable to a license for the use of the waters of the State, and subject to vested rights.

Witness our hands at San Francisco County of San Francisco State of California, this 6th day of August 1915

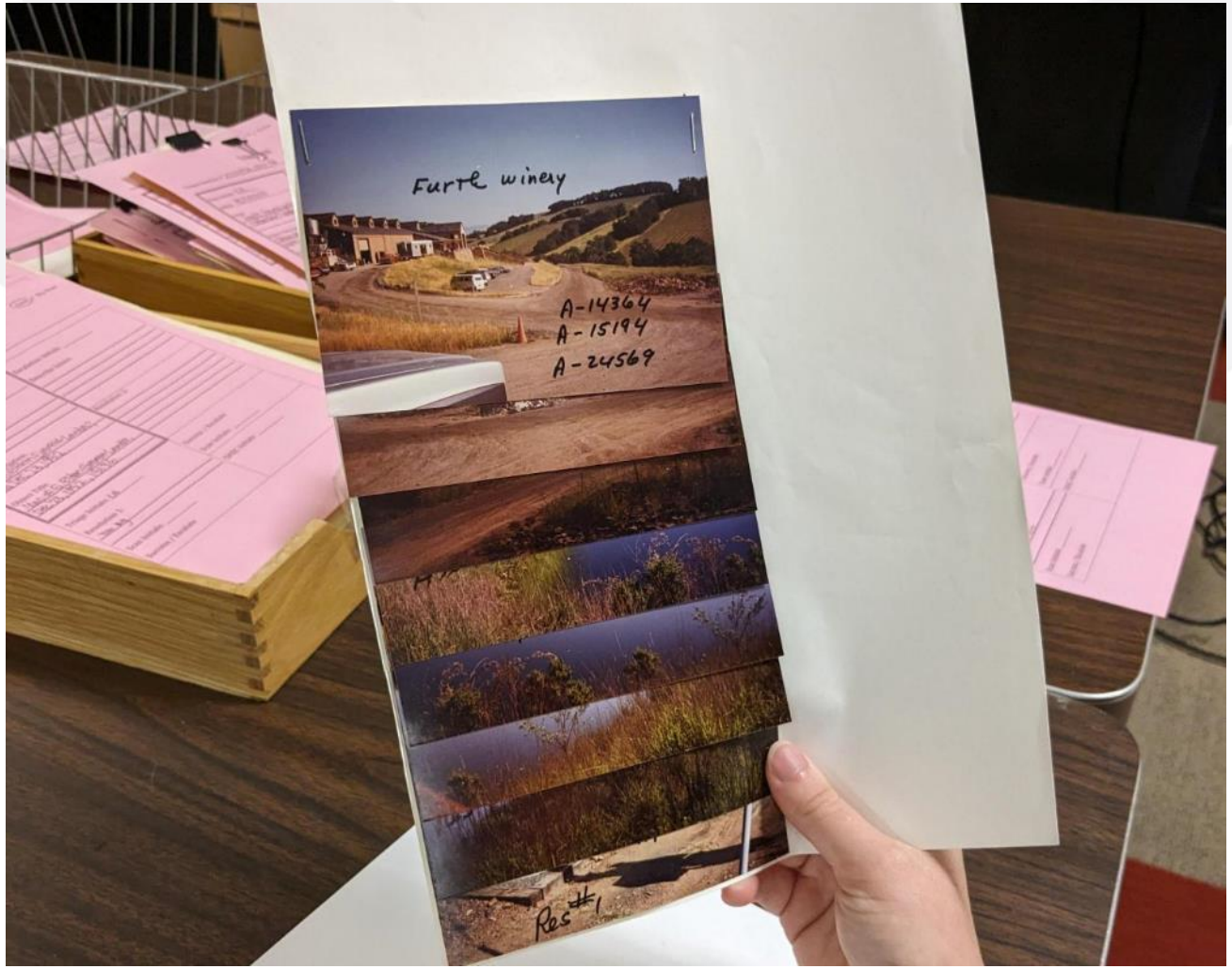
W. Johnstone
A. E. Chandler
Irving Martin
State Water Commission.

Attest: J. A. Patten
Secretary.

Water Right License #1

Changing standards for mapping

Place of use maps are often outdated, and value is sometimes limited.



ds


DELTA – MENDOTA CANAL
COUNTY
SANATORIUM
Pirate Creek
HETCH HETCHY
SIPHON


WATER
TRICT
NSHIP COUNTY
AQUEDUCT
Maguire Peaks
APPERSON
Creek
Water Tank
YABM 2351

What does “Modernization” mean?

- Better data
- Better decisions
- Planning and management tools
- Easier access for everyone
- Innovative local solutions

Modernizing Water Rights Data

- $61.5 million for modernizing Water Rights Data System

- UPWARD- Updating Water Rights Data for CA
  - Replace antiquated data system (eWRIMS → CalWTRS)
  - Digitize millions of paper or physical documents
  - Create Geospatial (map-based) system (CalWTRS)
  - Build capabilities for future – telemetry, meter data, curtailments, map updates

What are we doing now?

- UPWARD- Updating Water Rights Data for CA
  - Go-live: Summer 2025
- Drought Planning
- Supply and Demand Assessment Tools
- Telemetry Research
- Increased Enforcement

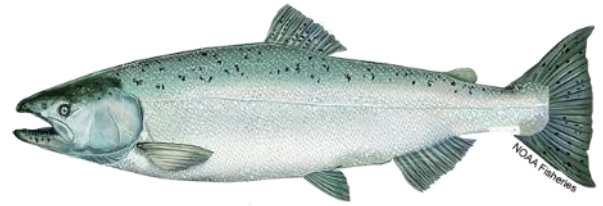
Bay-Delta

San Francisco Bay/ Sacramento-San Joaquin Delta (Bay-Delta) Watershed

Bay-Delta Plan Updates

Purpose of Bay-Delta Plan Updates

- Native species have undergone substantial population declines



- Aquatic ecosystem stressors:
  - Flow alteration
  - Habitat loss
  - Water quality

- Bay-Delta Plan updates are intended to establish flow and related measures to protect native species and other beneficial uses

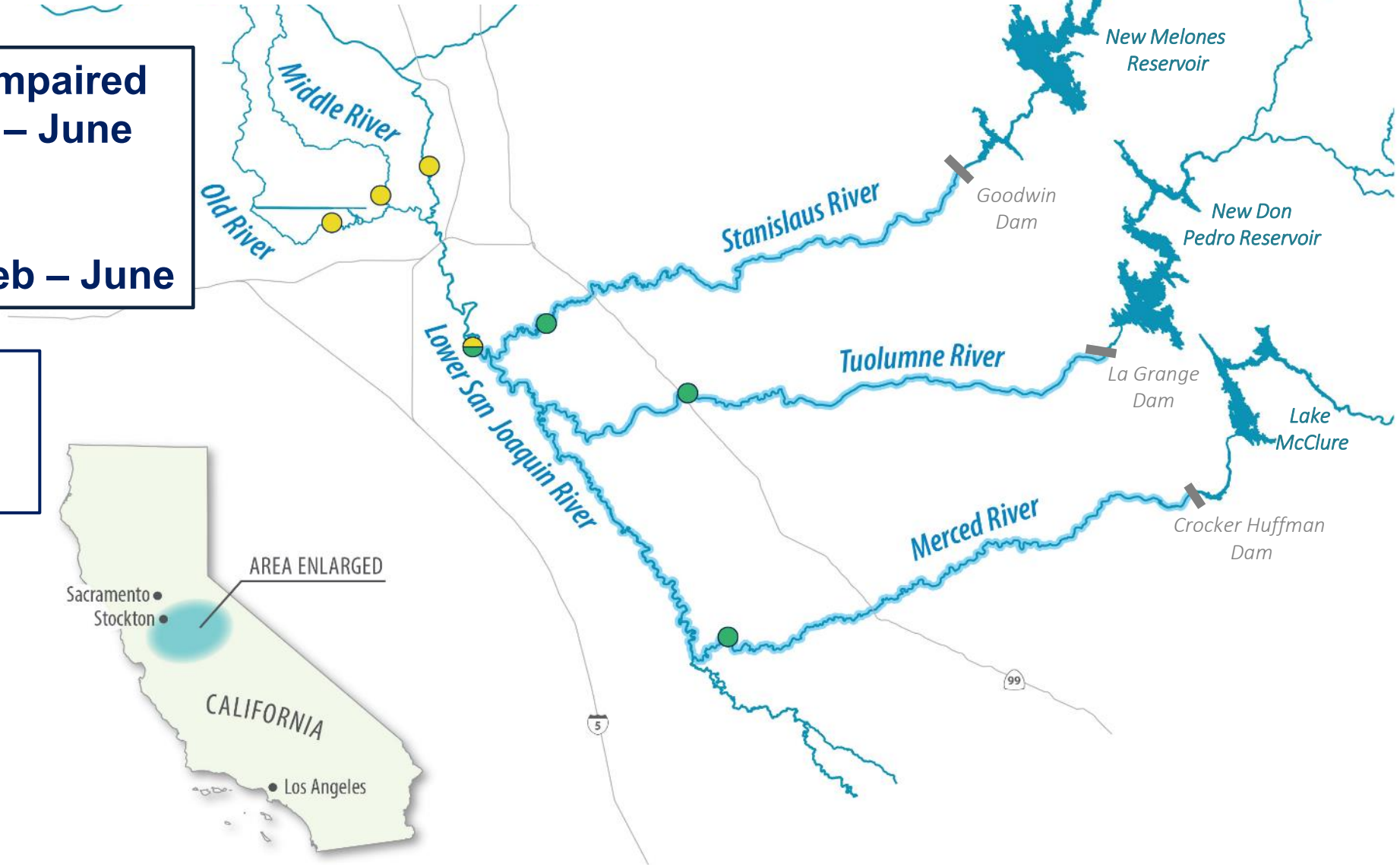
- Those measures are then implemented through subsequent water right/water quality actions

2018 Bay-Delta Plan Update

Tributary Flow: 40% unimpaired flow, 30-50% range, Feb – June

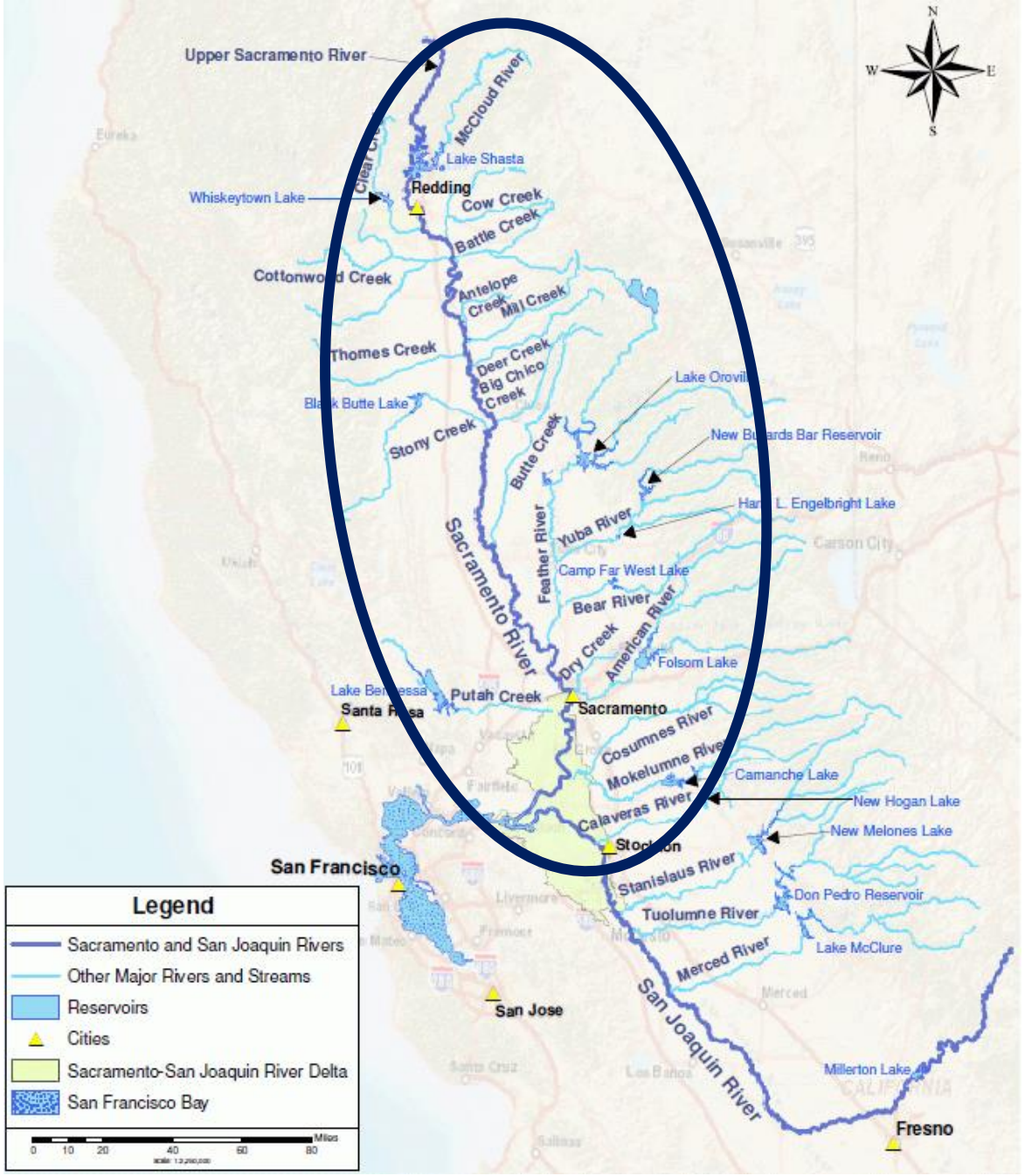
Vernalis Flow: 1,000 cfs, 800 – 1,200 cfs range, Feb – June

Salinity: 1.0 dS/meter Electrical Conductivity Year-round



Bay-Delta Watershed

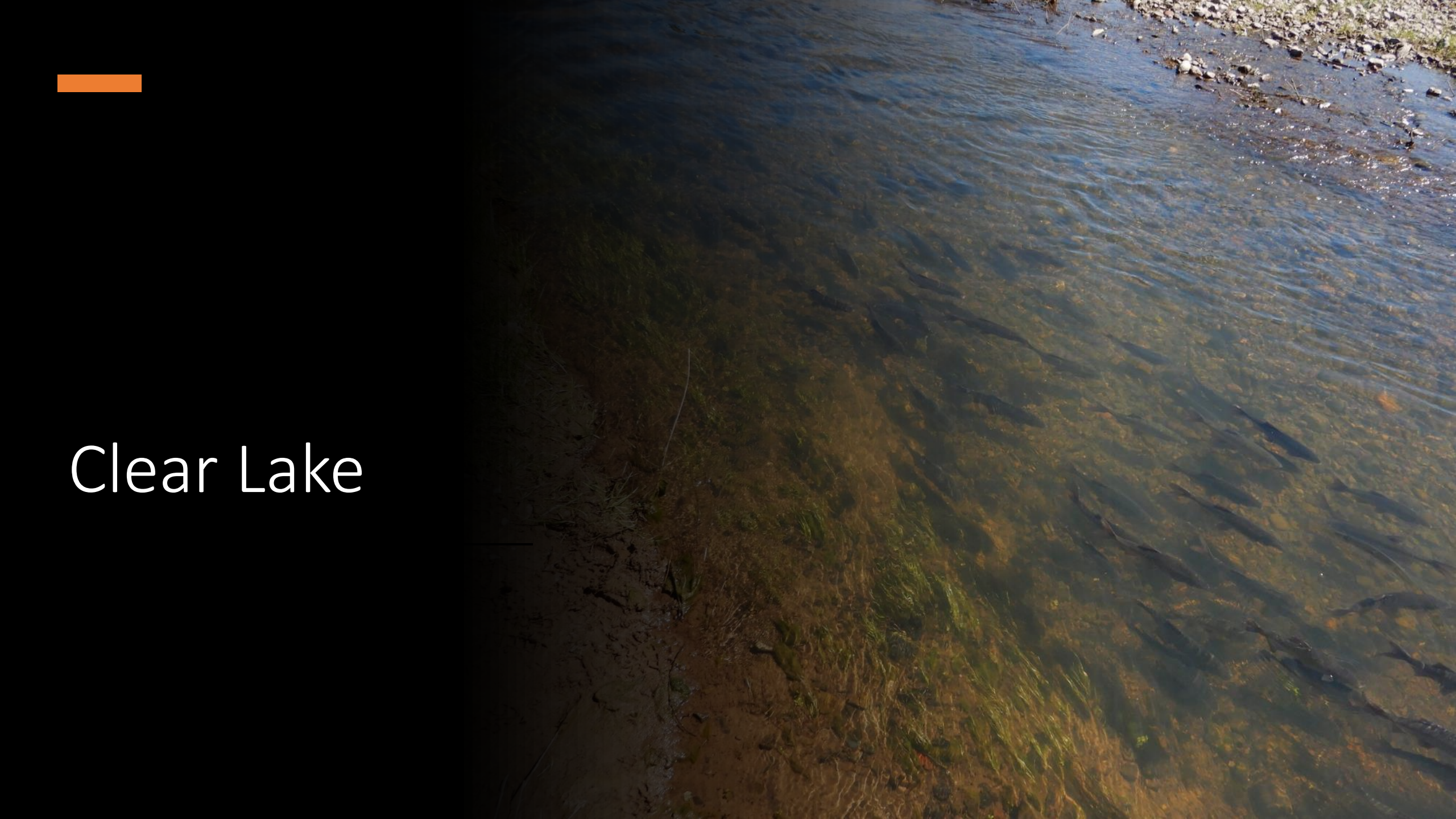
Sacramento/Delta Update to the Bay-Delta Plan

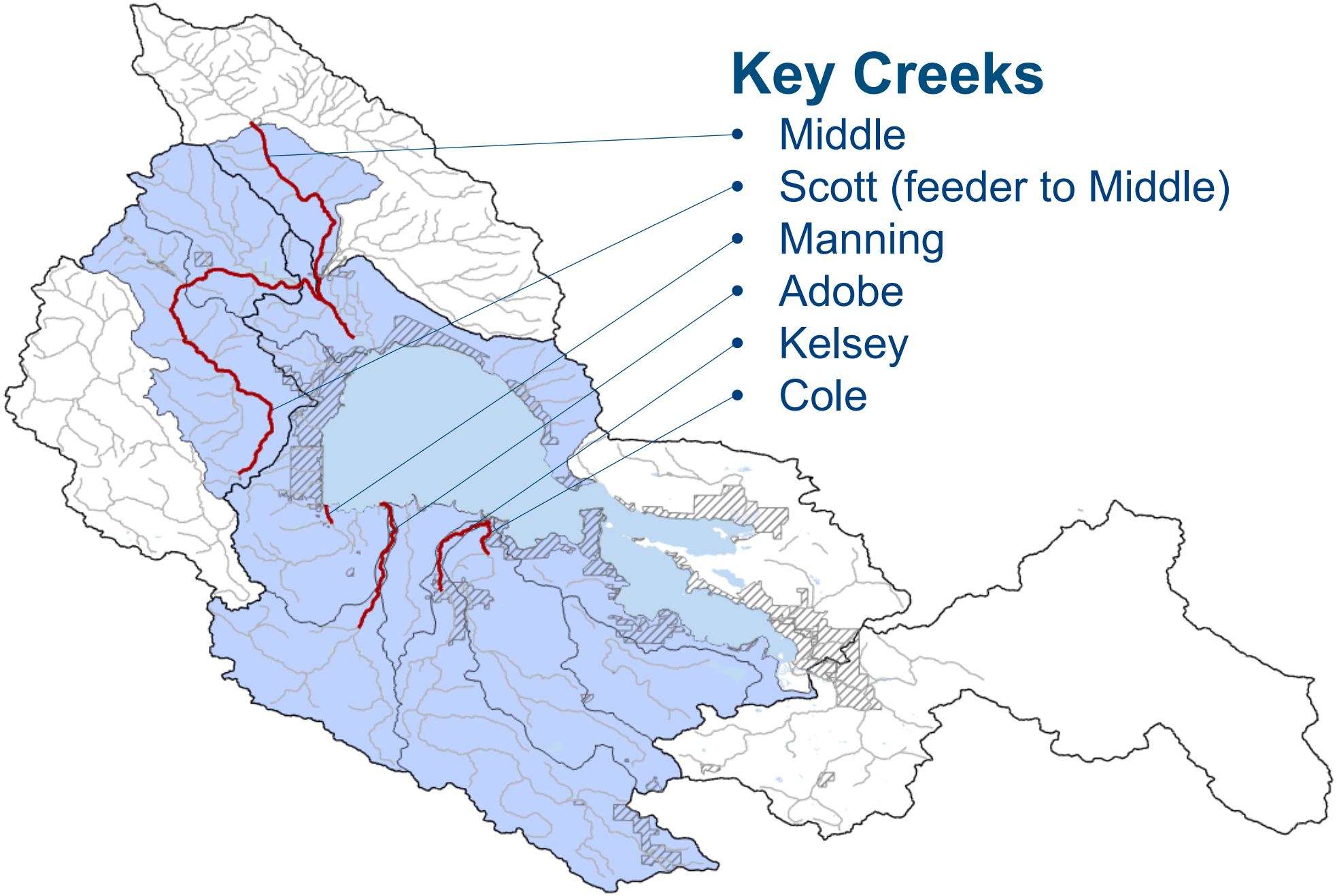


Sacramento/Delta Update to the Bay-Delta Plan

- Draft Staff Report released in September 2023 that evaluates potential benefits and environmental/economic impacts of possible alternatives for updating the Sacramento/Delta components of the Bay-Delta Plan
- Assesses a range of alternatives, including the Regulatory Protection Pathway, and proposed Healthy Rivers and Landscapes agreements
- Identifies proposed incorporation of tribal and subsistence fishing beneficial uses to the Bay-Delta Plan
- Draft Plan released October 2024, 2nd draft July 2025
  - Reviewing public comments

Clear Lake





Key Creeks

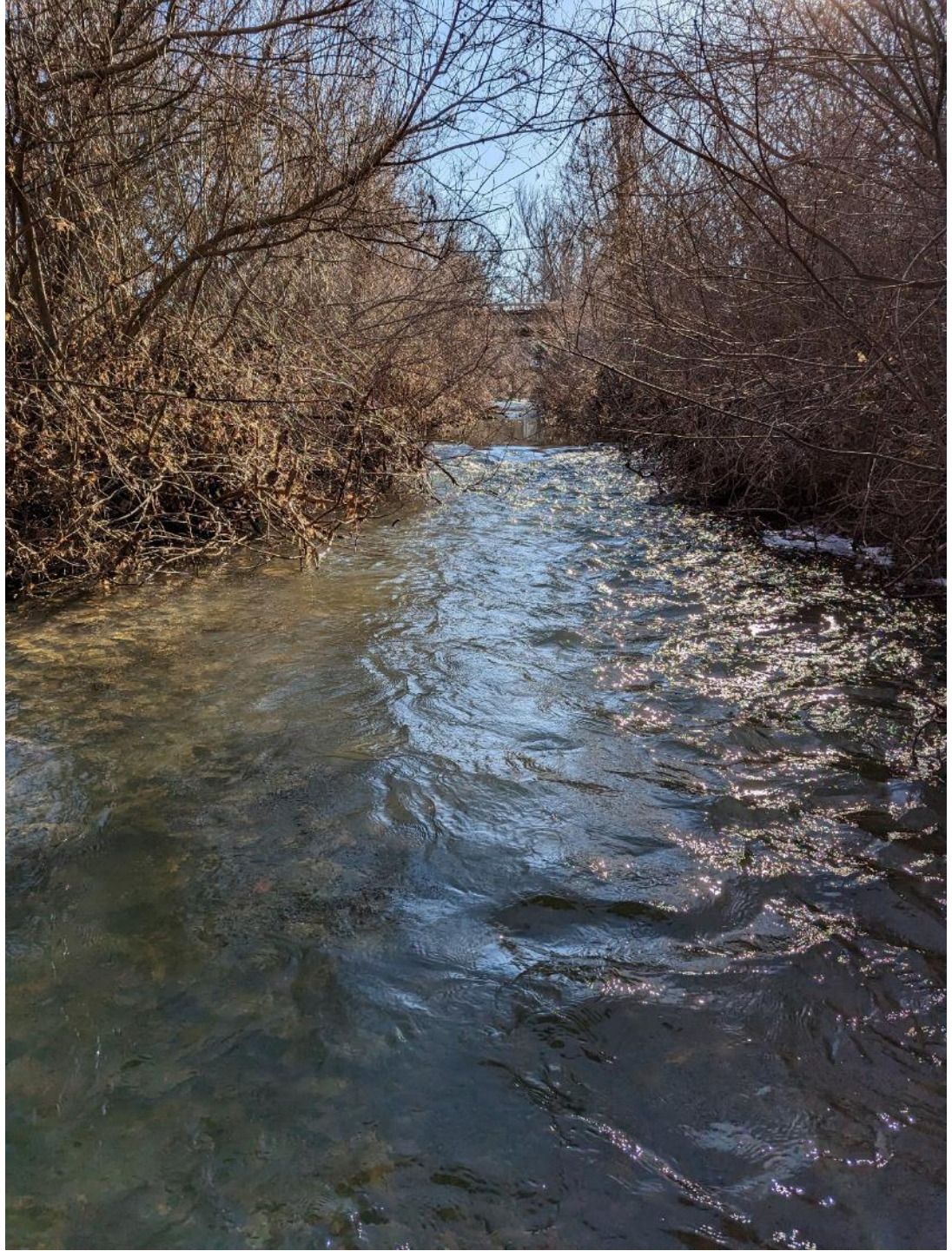
- Middle
- Scott (feeder to Middle)
- Manning
- Adobe
- Kelsey
- Cole

Adobe Creek, March 2022
(Clear Lake)

Photo: Center for Biological Diversity

Kelsey Creek, March 2022
(Clear Lake)

Photo: Center for Biological Diversity



Adobe Creek, February 2023

Photo: Val Zimmer, WaterBoards

Adobe Creek, April 2023

Photo: Val Zimmer, WaterBoards

Current Hitch actions

Information order (ended Jan. 2025) for well location, data
Groundwater-Surface water interaction studies and model
Gauging
Coordination with tribes, county, CDFW, and others
Enforcement: Cannabis, water rights reporting, unauthorized diversions

Summary

- Communication & coordination are key
- Many projects underway
- Flows, habitat, and management are all part of keeping fish and ecosystems in good condition
- Climate change poses significant challenge – can we move quickly enough in response?

Extra Slides

Accounting challenges

Example: Data Quality Issues in Self Reported Diversion Data (Riparian and Pre-1914 Claims)

Watershed	Number of Claims	2018 Reported Diversion (AF) (>5,000 AFY diverters only)	2019 Reported Diversion (AF) (>5,000 AFY diverters only)
SAN JOAQUIN RIVER	2,601	3,751,671 (original) 3,229,774 (corrected) **13% reduction**	4,999,286 (original) 3,742,052 (corrected) **25% reduction**
SACRAMENTO RIVER	3,969	12,455,707 (original) 3,978,399 (corrected) **68% reduction**	29,688,143 (original) 4,063,238 (corrected) **86% reduction**

How Water Is Used In California