



THE AMERICAN RIVER BASIN STUDY

Climate Change Impacts and Strategies

for addressing the weather extremes that threaten our water supplies,
flood protection and environment

WELCOME!

Congresswoman Doris Matsui

*Representing California's
6th district*



HOUSE KEEPING

- The webinar is being recorded
- “Live Transcript” is available by clicking the “Live Transcript” button at the bottom of your screen
- Feel free to submit questions as we go using the Q&A button on your screen



TODAY'S PROGRAM

About the American River Basin Study

What we learned about climate change impacts

Adaptation strategies included in the study

How collaboration here can benefit California and how you can help

Questions from the audience

THE AMERICAN RIVER BASIN STUDY: Climate Impacts and Adaptation

Andy Fecko, General Manager, Placer County Water Agency



ABOUT THE BASIN STUDY

- One of the most sophisticated evaluations of climate change impacts on water supplies in California to date
- Forecasts potential impacts on water supply, water quality and critical habitat
- Outlines six potential strategies for adapting to the changing climate
- Provides a roadmap to ensure our water reliability into the future

ABOUT THE BASIN STUDY

Study produced in partnership by



— BUREAU OF —
RECLAMATION

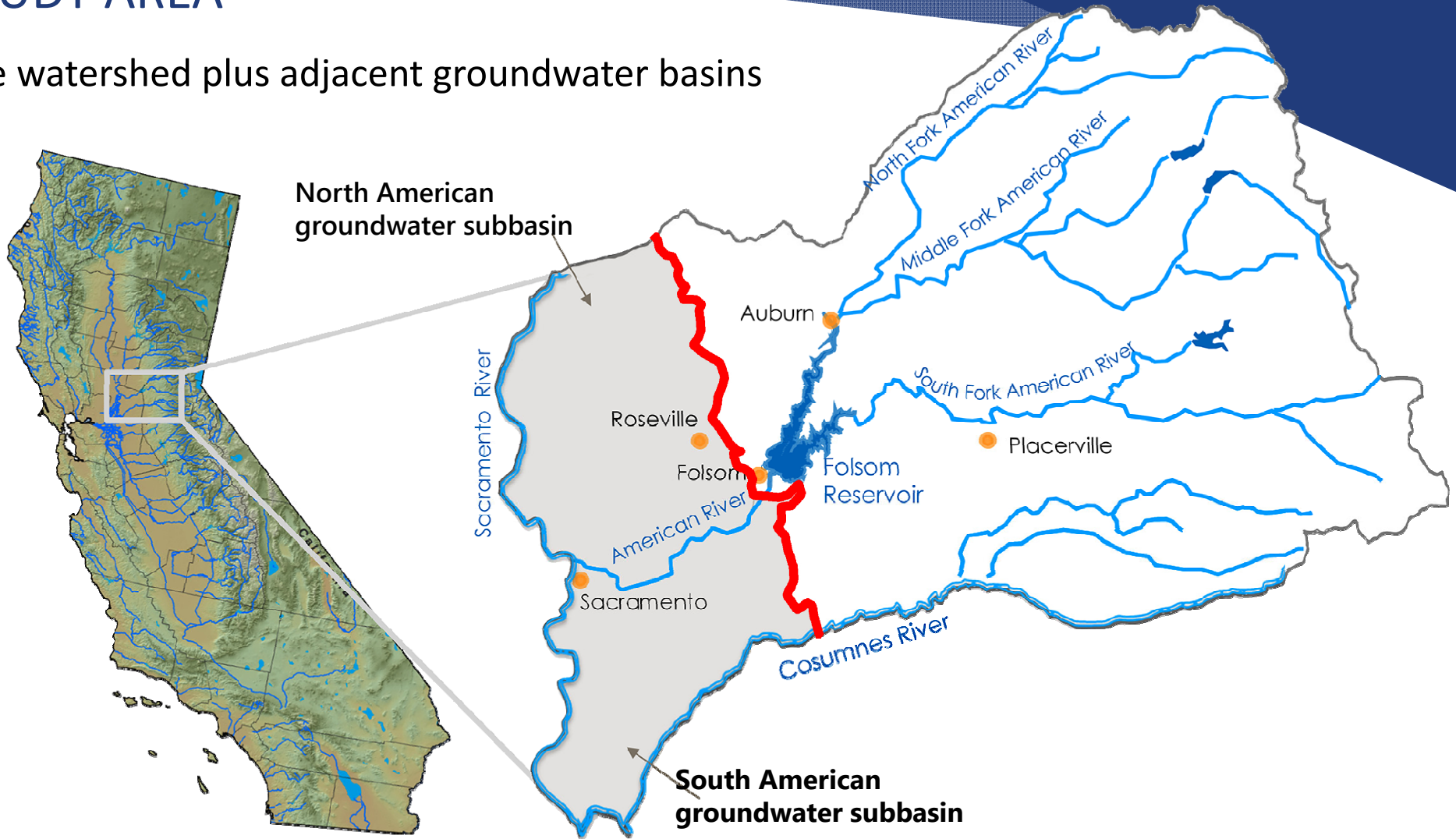


CITY OF
FOLSOM
DISTINCTIVE BY NATURE



STUDY AREA

The watershed plus adjacent groundwater basins



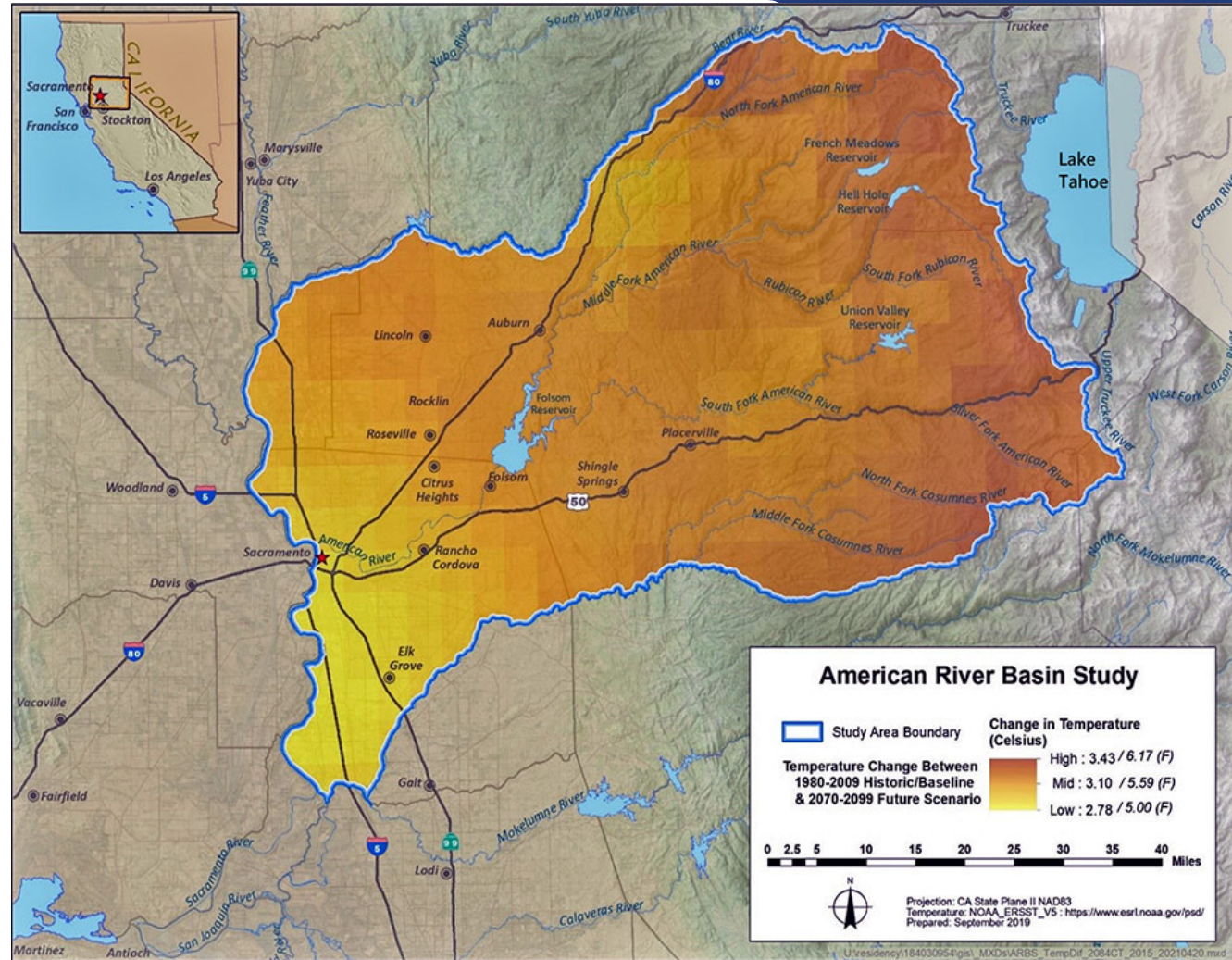
BOTTOM LINE IMPACTS

- Reduced snowpack in the upper watershed, directly impacting water supply reliability, power generation, forest health and recreation for upstream communities
- Increased flood risk in the winter, prompting more flood releases from Folsom Reservoir, and decreased runoff in spring, making the region more vulnerable to shortages
- Increased risks for wildfires from drier soils
- Decreased flows and increased temperatures in the Lower American River in summer and fall, threatening native Chinook salmon

RESULTS

Temperature Increases

- 4-7 °F increase in basin-averaged annual mean temperature by 2085
- Most remarkable change in upper watershed



RESULTS

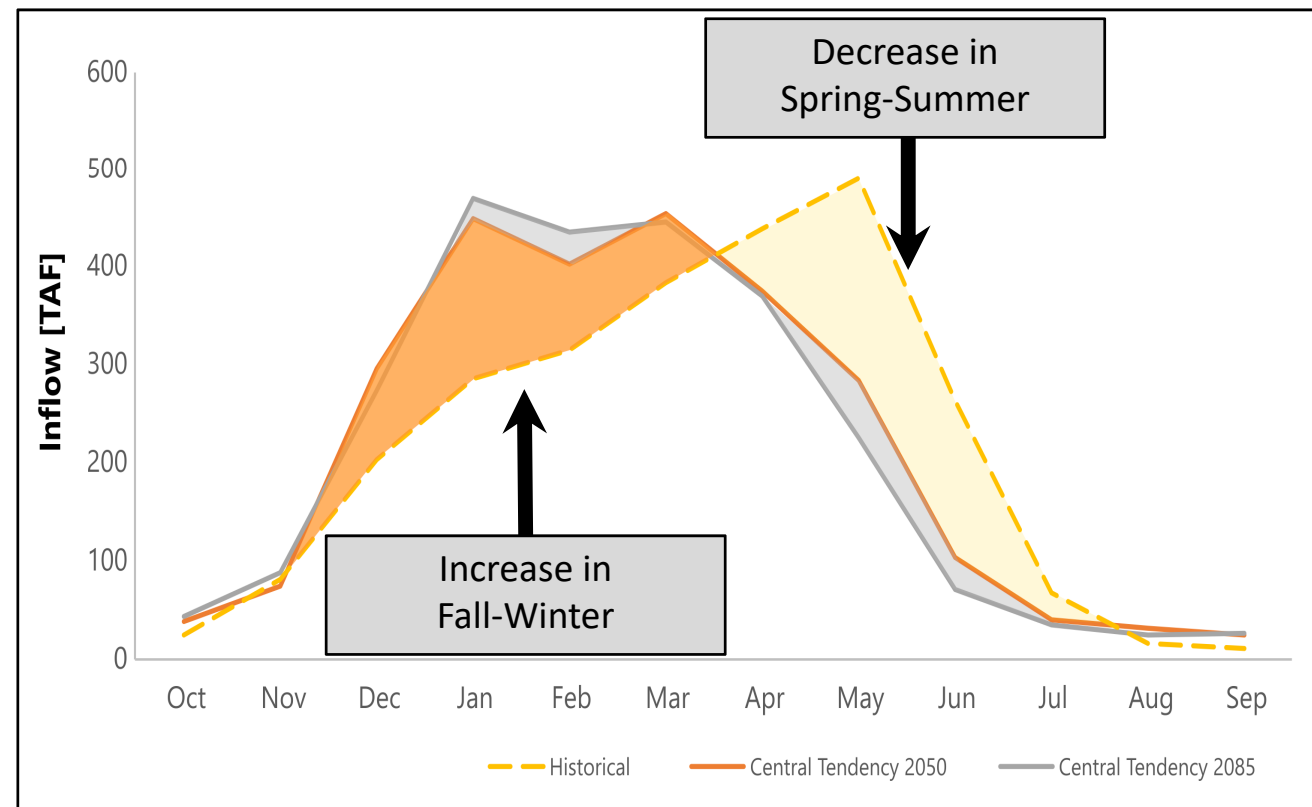
Changes in runoff timing

- Increase in fall-winter
- Decrease in spring-summer

Changes in runoff volume

- Increase under wetter climate scenarios
- Decrease under central tendency and drier climate scenarios

Monthly Mean Runoff

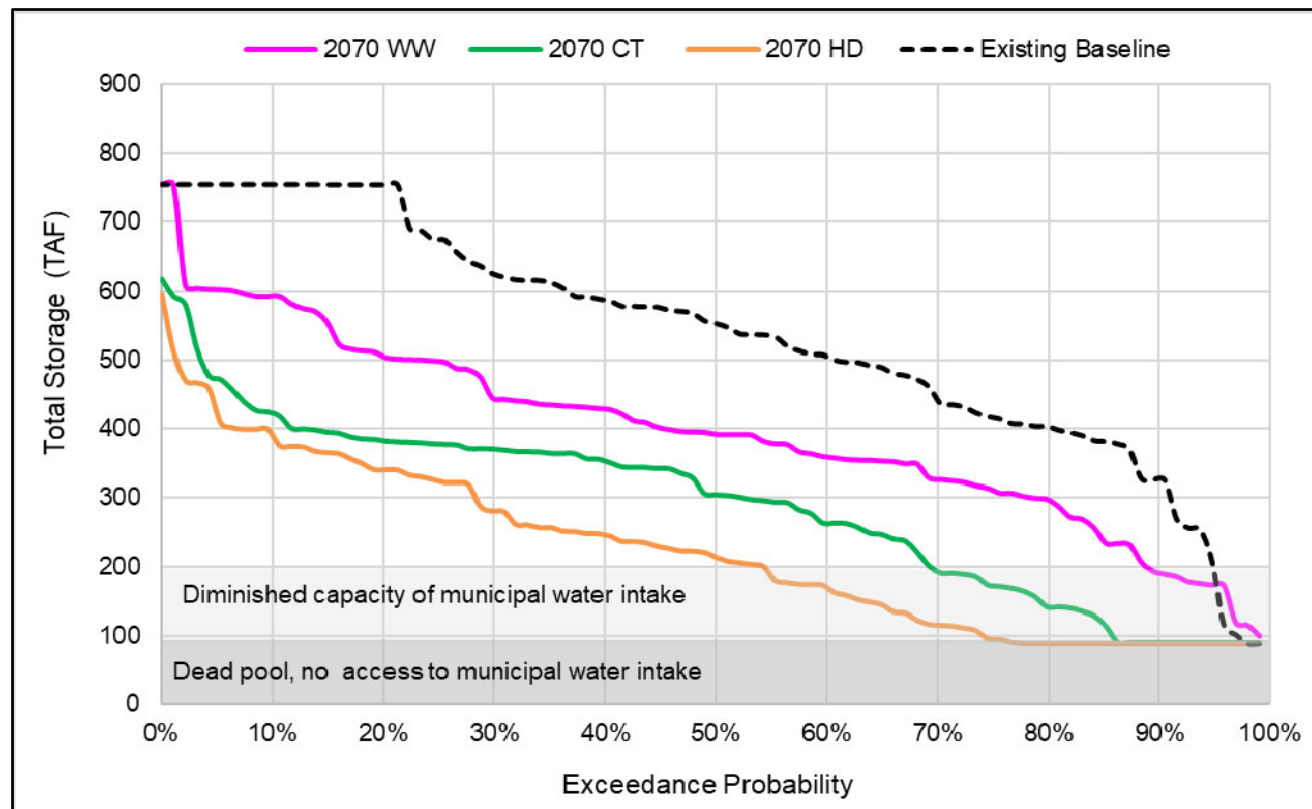


RESULTS

Folsom drops to deadpool nearly half the time

- Baseline: 2% of yrs
- Scenarios: 10-45% of yrs

Projected Impacts to Reservoir Storage: End-of-Year Storage (Without Adaptation)

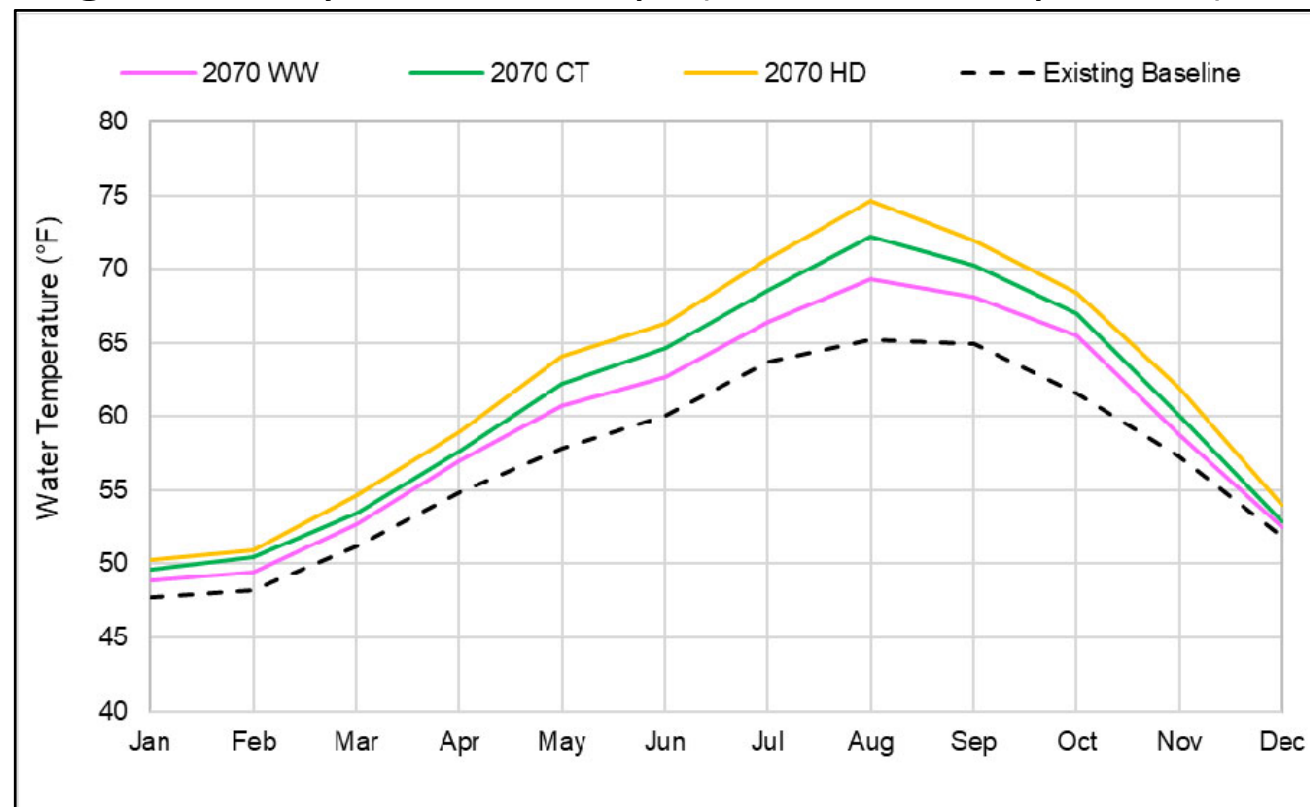


RESULTS

Increased temperatures in the Lower American River

- 4-10 °F increase in average August water temperatures

Projected Impacts to Water Temperatures:
Avg. Monthly Water Temp. (Without Adaptation)



RESULTS

The need for water, even with conservation, will grow by 7 to 8% due to more prolonged and hotter summers

- Valley Floor: 10-30 TAF
- Foothills: 80-120 TAF



WE CAN ADAPT

We must create a 21st-century water system

Six adaptation strategies outlined in the study—discussing three today



Also a word about....

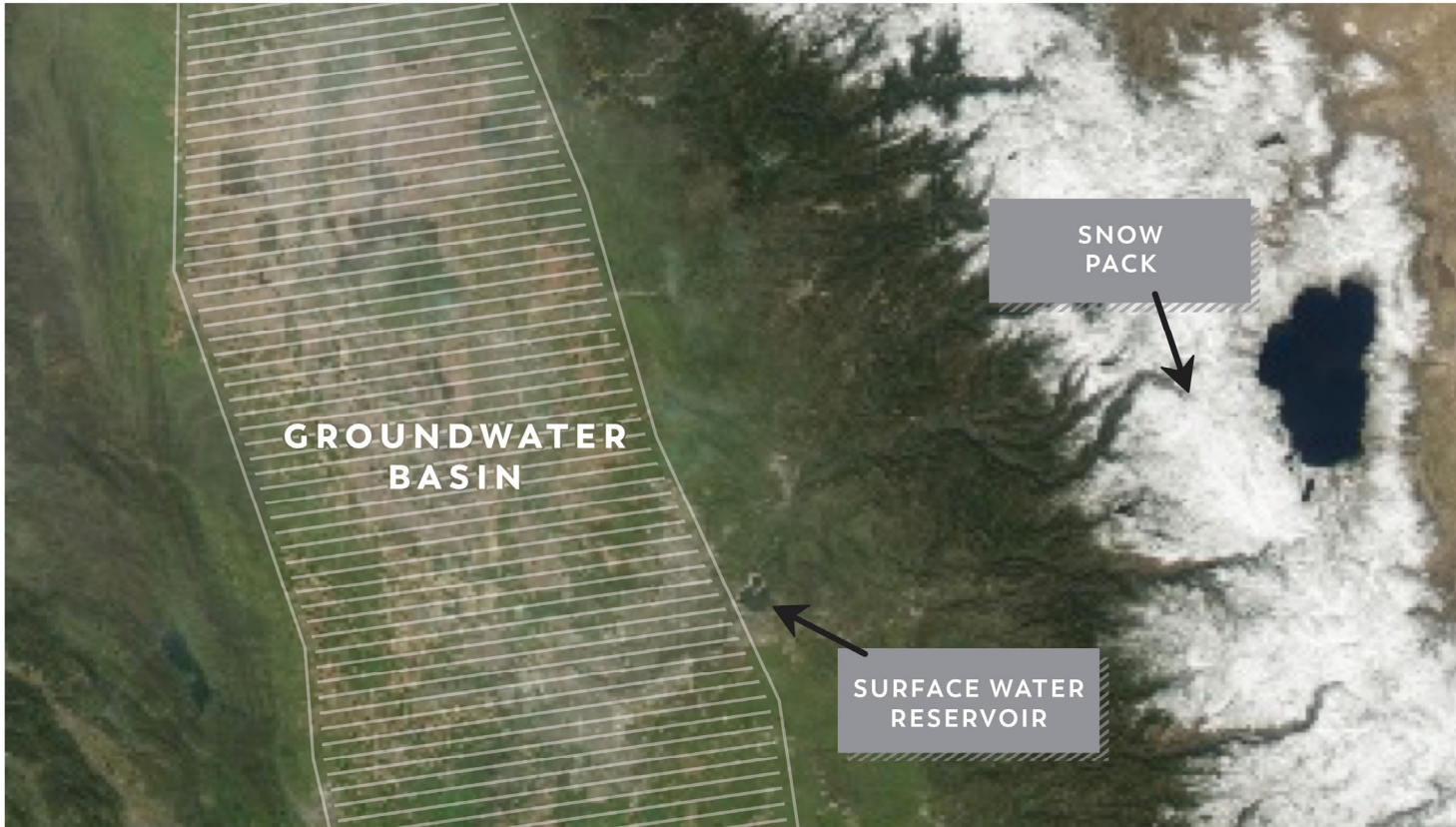
- Watershed health
- If we do nothing

UTILIZING THE RESERVOIR UNDER OUR FEET: Innovative Groundwater Banking for Dry Days

Jim Peifer, Executive Director, Regional Water Authority



SCALE OF THE PROBLEM AND SOLUTION

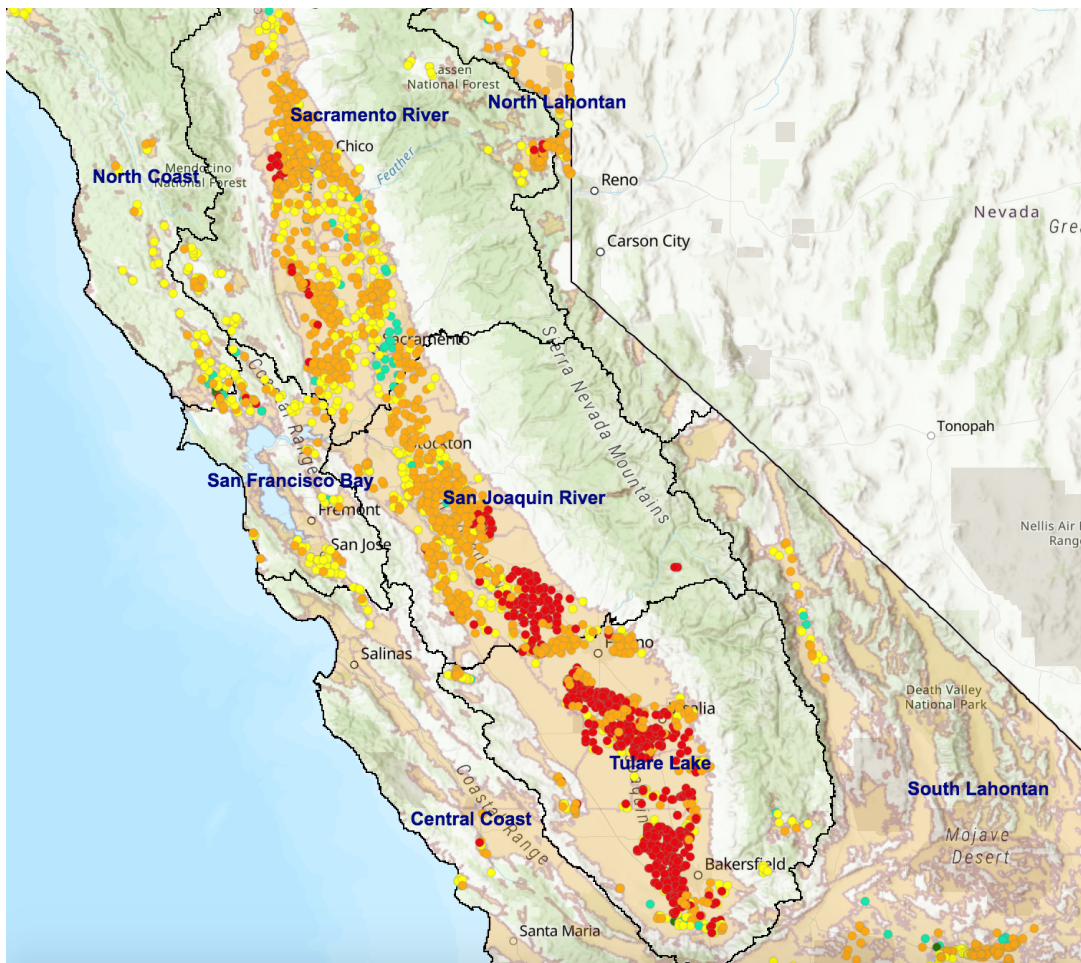


Takeaway:

Groundwater Storage and Recovery needs to be built into California's vision for adapting to Climate Change

GROUNDWATER LEVEL TRENDS

Statewide Groundwater Level Estimated Trends 1998-2018



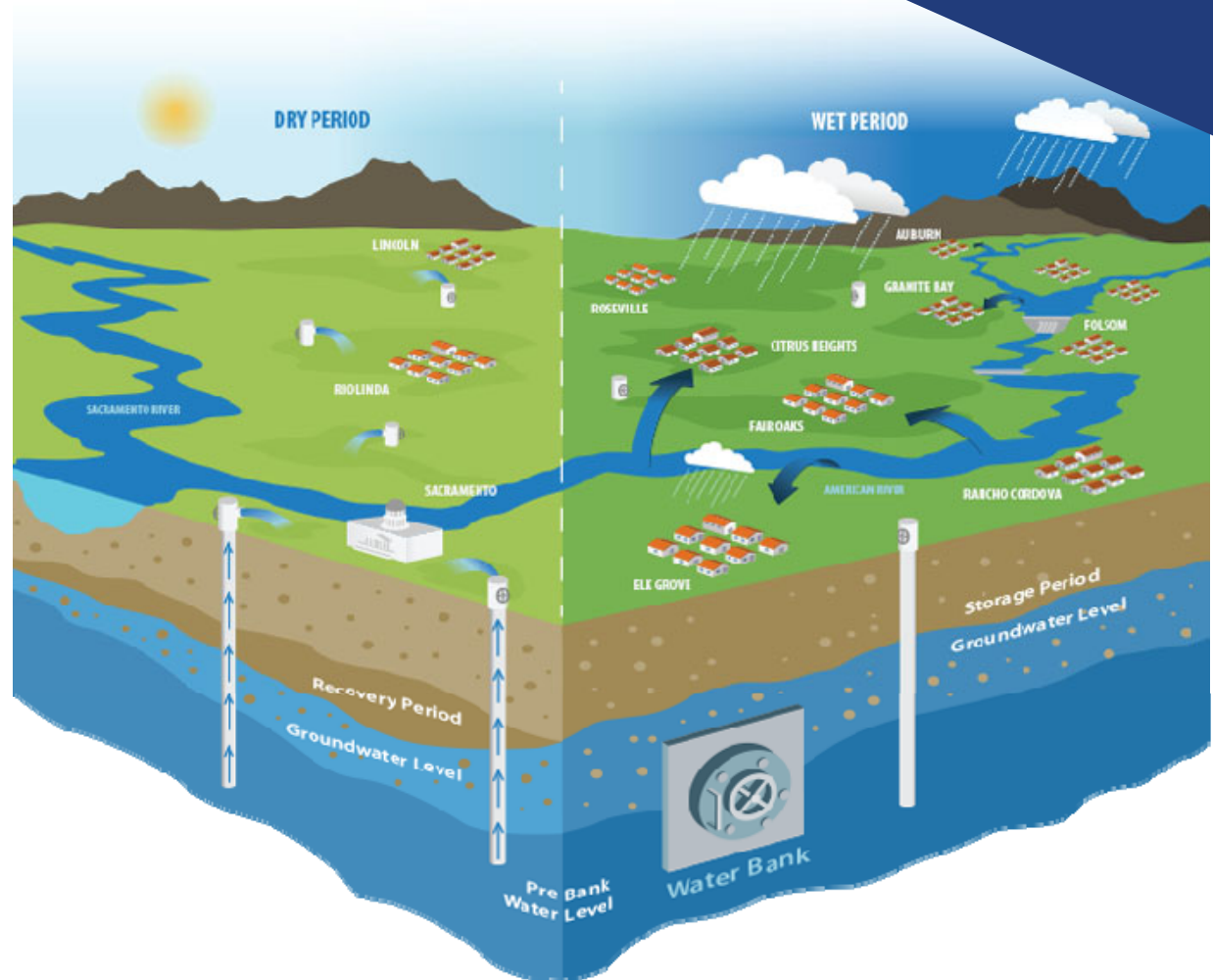
DWR Bulletin 118

Groundwater level estimated trend 1998-2018 (feet/year):

- Green: Increased 0 to 2.5
- Yellow: No significant trend
- Orange: Decreased 0 to 2.5
- Red: Decreased > 2.5

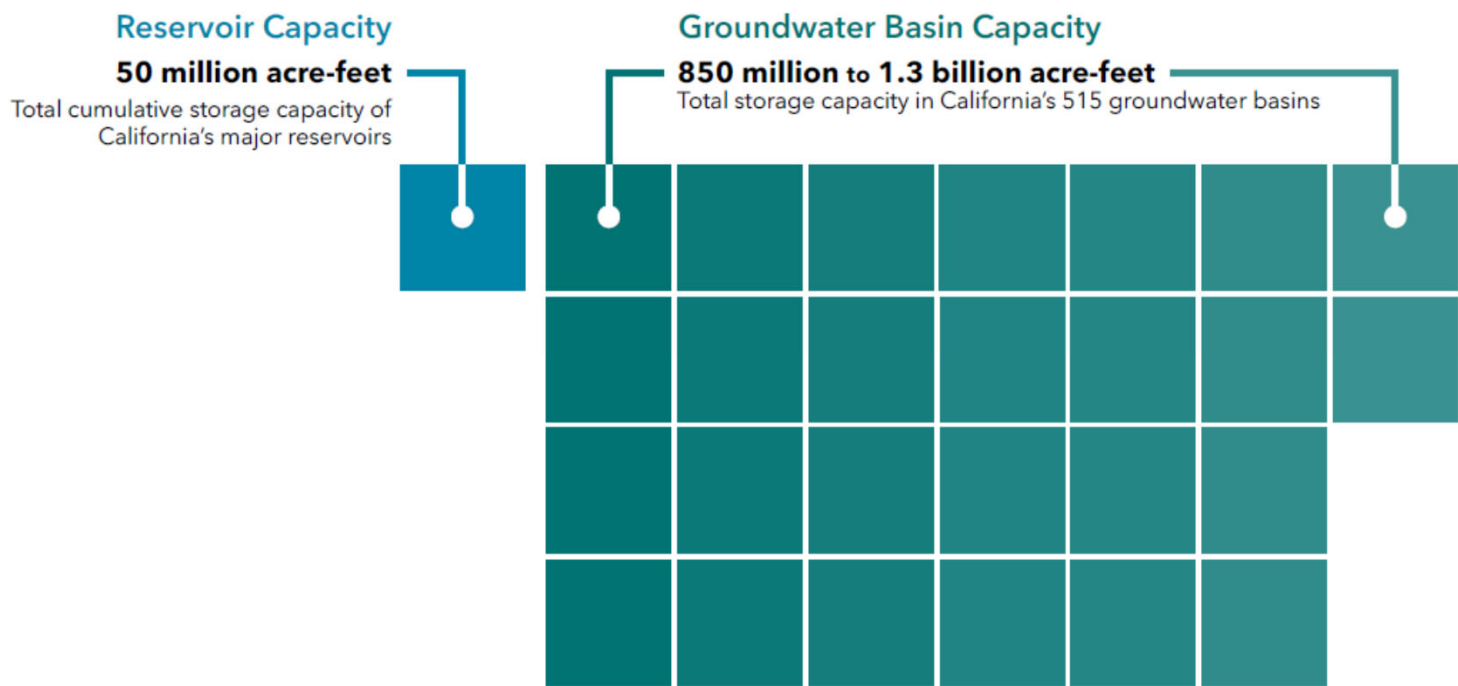
HOW WOULD THE WATER BANK WORK?

- Store water in wet periods by using surface water (turn off groundwater wells) and other recharge methods (injection, flood farm fields)
- Recover water from basin in dry periods, leaving precious surface water in system to meet other needs



POTENTIAL FOR GROUNDWATER STORAGE

Figure 5 Reservoir Capacity vs. Groundwater Basin Capacity

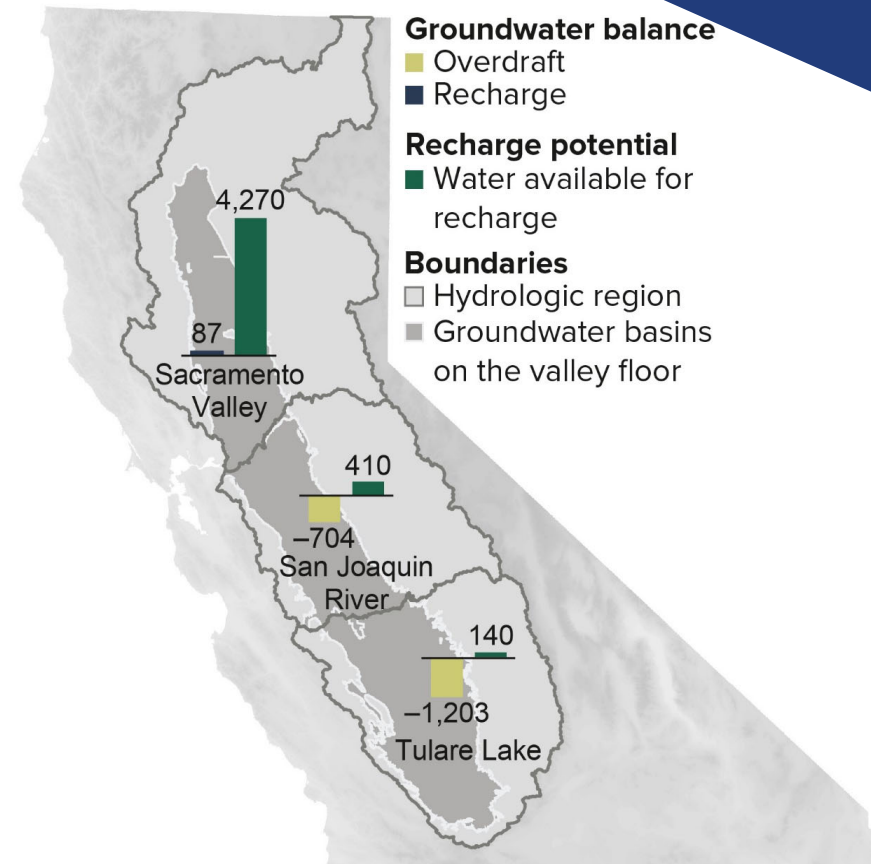


California's 515 groundwater basins can store far more water than the state's reservoirs combined. Overall groundwater storage outstrips surface storage even after taking into account that less than half the groundwater is available for use by people because it is either too deep to be pumped economically or of poor quality.

POTENTIAL FOR STORAGE

“...we recognize that more smart storage is important. By smart storage, certainly we mean underground storage. We know we have a lot of capacity in our underground aquifers. We need to do more to get these winter rains, these winter storms, flows underground...”

Wade Crowfoot,
Ca. Natural Resources
Agency Secretary



Source: Groundwater Recharge (PPIC Factsheet) August 2021, Escrive-Bou, Sencan, Hanak

WE NEED YOUR HELP

- A proven concept
- Help support our solution for adapting to climate change by supporting funding to build the Water Bank
- Bipartisan Infrastructure Law
- State funding opportunities

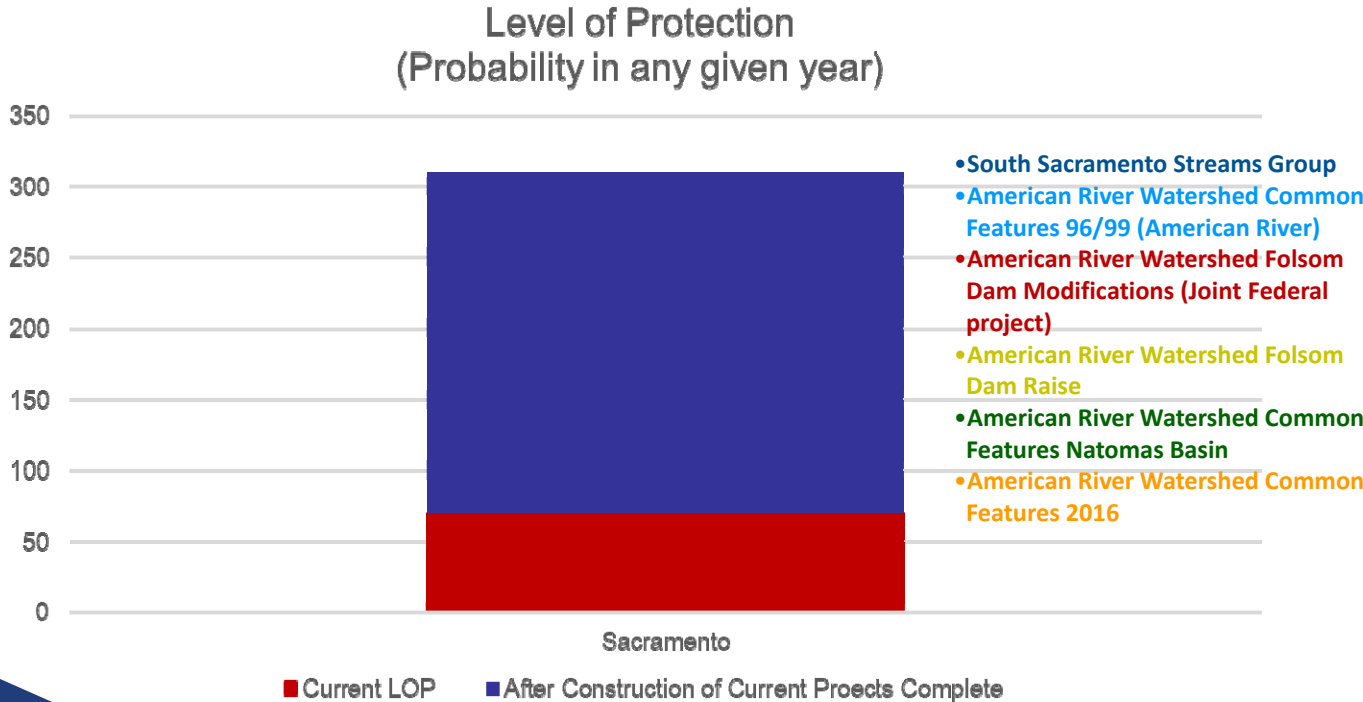


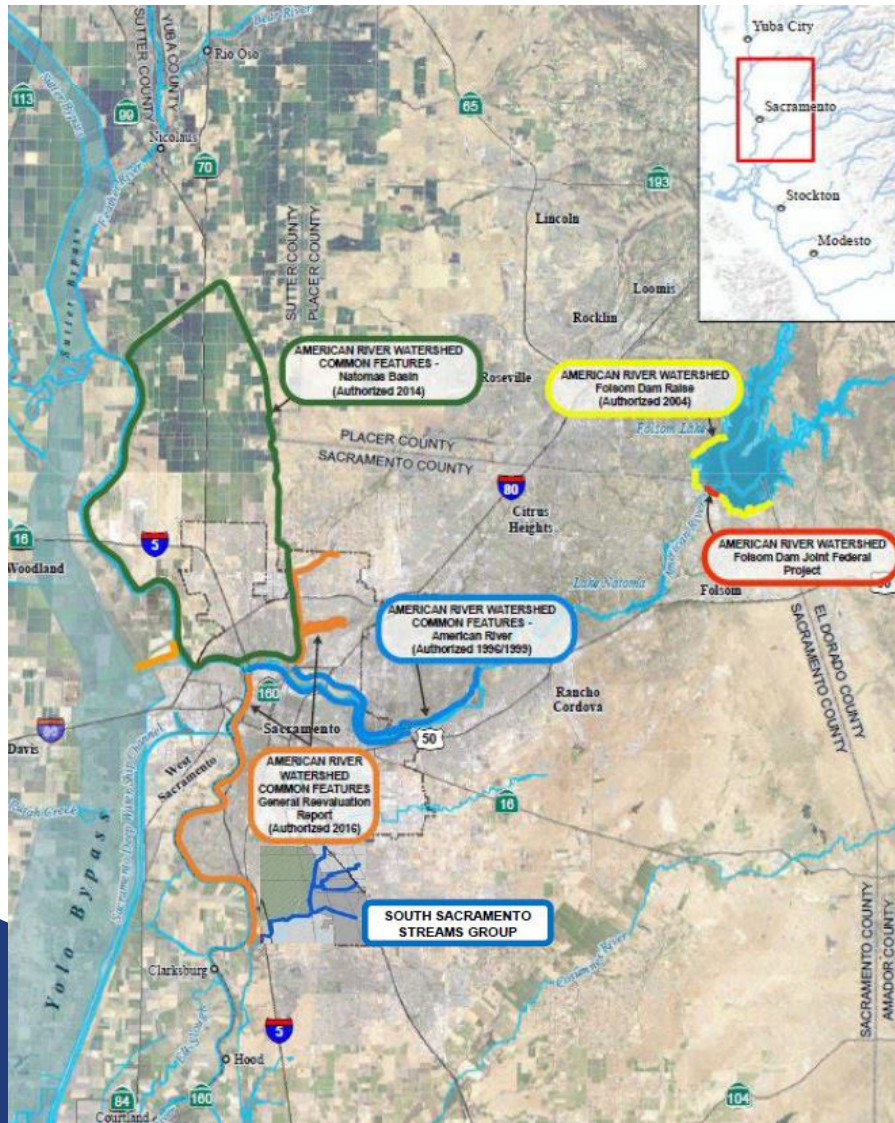
INCREASING FLOOD PROTECTION With Enhanced Weather Forecasting & Reservoir Operation

Gary Bardini, Director of Planning, Sacramento Area Flood Control Agency



LEVEL OF PROTECTION AFTER CONSTRUCTION OF CURRENT AUTHORIZED PROJECTS COMPLETE





All Sacramento Flood Control Features Are Being Upgraded Except for the Yolo Bypass

Six Federally-Authorized Projects to Reconstruct the System

- South Sacramento Streams Group (essentially complete)
- American River Watershed Common Features 96/99 (American River) (essentially complete)
- American River Watershed Folsom Dam Modifications (Joint Federal project) (essentially complete)
- American River Watershed Folsom Dam Raise (under construction)
- American River Watershed Common Features Natomas Basin (under construction)
- American River Watershed Common Features 2016 (under construction)

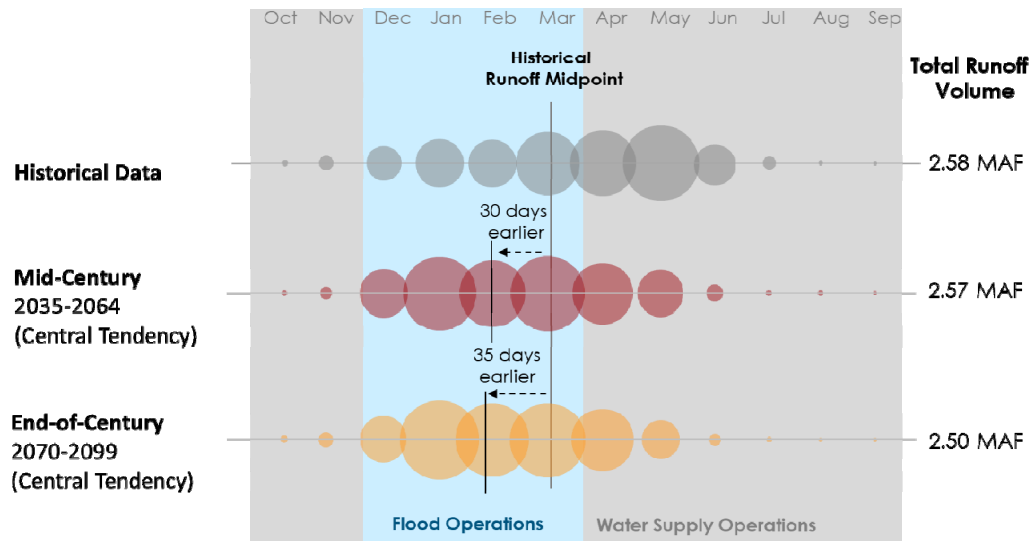
SAFCA'S STRUCTURAL PROGRAM

Phase	Approach
First Steps (1986-1996)	Raise and strengthen area levees to address post-1986 flood deficiencies
	Reoperate Folsom Dam
200-Year Flood Protection (1996- 2025)	Raise and strengthen area levees to address underseepage and other post-1997 flood deficiencies
	Modify Folsom Dam and implement forecast informed reservoir operations (FIRO)
500-Year Flood Protection (2017-2035)	Increase the conveyance capacity of the flood control system downstream of Folsom Dam and 3.5' Raise
	Watershed FIRO with additional reservoir storage space for flood control upstream of Folsom Dam
	Increase conveyance capacity of the Yolo Bypass

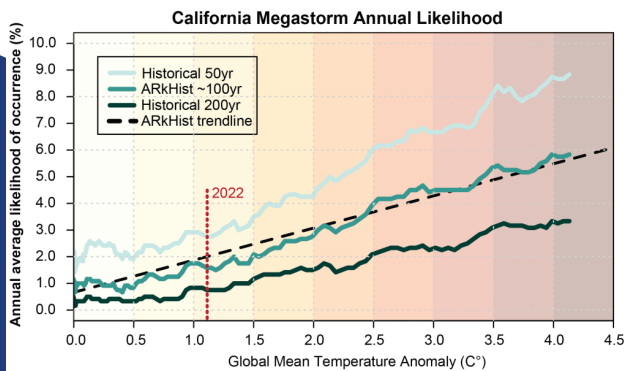
SUMMARY OF AMERICAN RIVER FLOOD BENEFITS

Flood Management Actions	Level of Flood Protection (1 per No. of years)
Folsom Dam Raise & Increased American Channel Capacity With 5-day forecast	250-370
Raise and upstream operations with 7-day forecast and low-level release at Hell Hole	420-440
Raise and upstream operations with 7-day forecast and pre-release of flood water at Hell Hole, Union Valley, and French Meadows	480-520

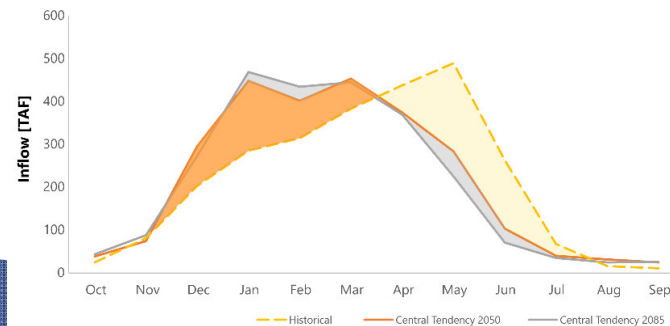
PROJECTED EFFECTS ON TIMING OF INFLOWS TO FOLSOM RESERVOIR WITH FUTURE CLIMATE CHANGE CONDITIONS



Projected Change in Extreme Flood Events ArkStorm 2.0



Projected Change in Water Supply Availability Monthly Average Unimpaired Inflow to Folsom Reservoir – American River Basin Study



ACHIEVING 500-YEAR FLOOD PROTECTION

AMERICAN RIVER UPSTREAM
FORECAST-INFORMED RESERVOIR OPERATIONS
AND MANAGED AQUIFER RECHARGE PROGRAM



WATERSHED FIRO-MAR ALIGNS WITH THE BASIN STUDY

Adaptation Portfolio Evaluation

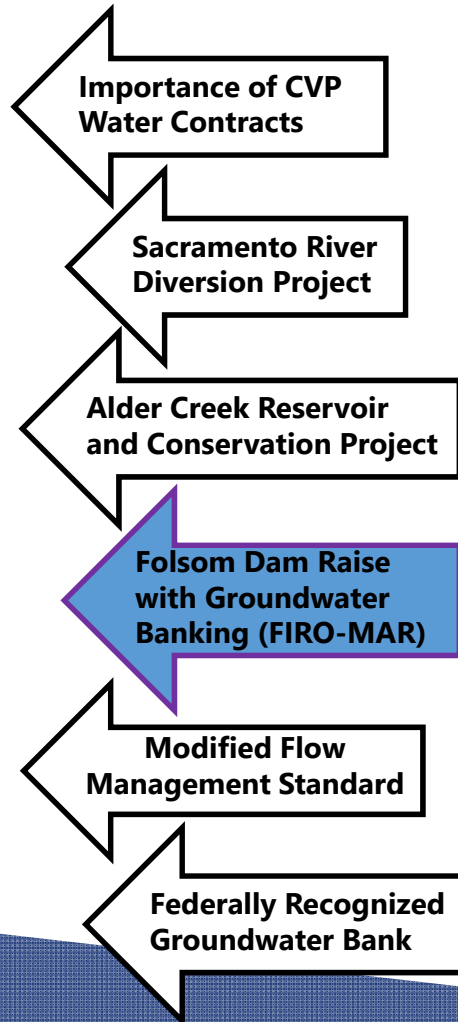
Improve Demand Management

Diversify Water Supplies

Improve Resource Stewardship

Secure Institutional Agreements to Enable Flexibility

Improve Operational Flexibility



Systemwide Multi-Benefit Project

- Resiliency, Public Safety, Ecosystem Features, Improve Operations

IMPLEMENTING A MULTI-OBJECTIVE PROJECT

**CA Dept. of Water Resources
(#): Flood-MAR
Research Theme**

- 1) Hydrology
Observation and
Prediction
 - 2) Reservoir
Operations
 - 3) Infrastructure
Conveyance &
Hydraulics
-
- 4) Crop Suitability
 - 5) Soil Suitability
 - 6) Geologic and Aquifer
Characterization
 - 7) Land Use Management
 - 8) Water Quality
 - 9) Recharge & Extraction
Methods
-
- 10) Environment
 - 11) Social Impacts
 - 12) Economic Analysis
 - 13) Local, State, Federal
Policies & other legal
constraints
-



ALDER CREEK RESERVOIR: Upper Watershed Storage to Improve Water Reliability in the Foothills

Ken Payne, General Manager, El Dorado Water Agency





ALDER CREEK RESERVOIR AND CONSERVATION PROJECT

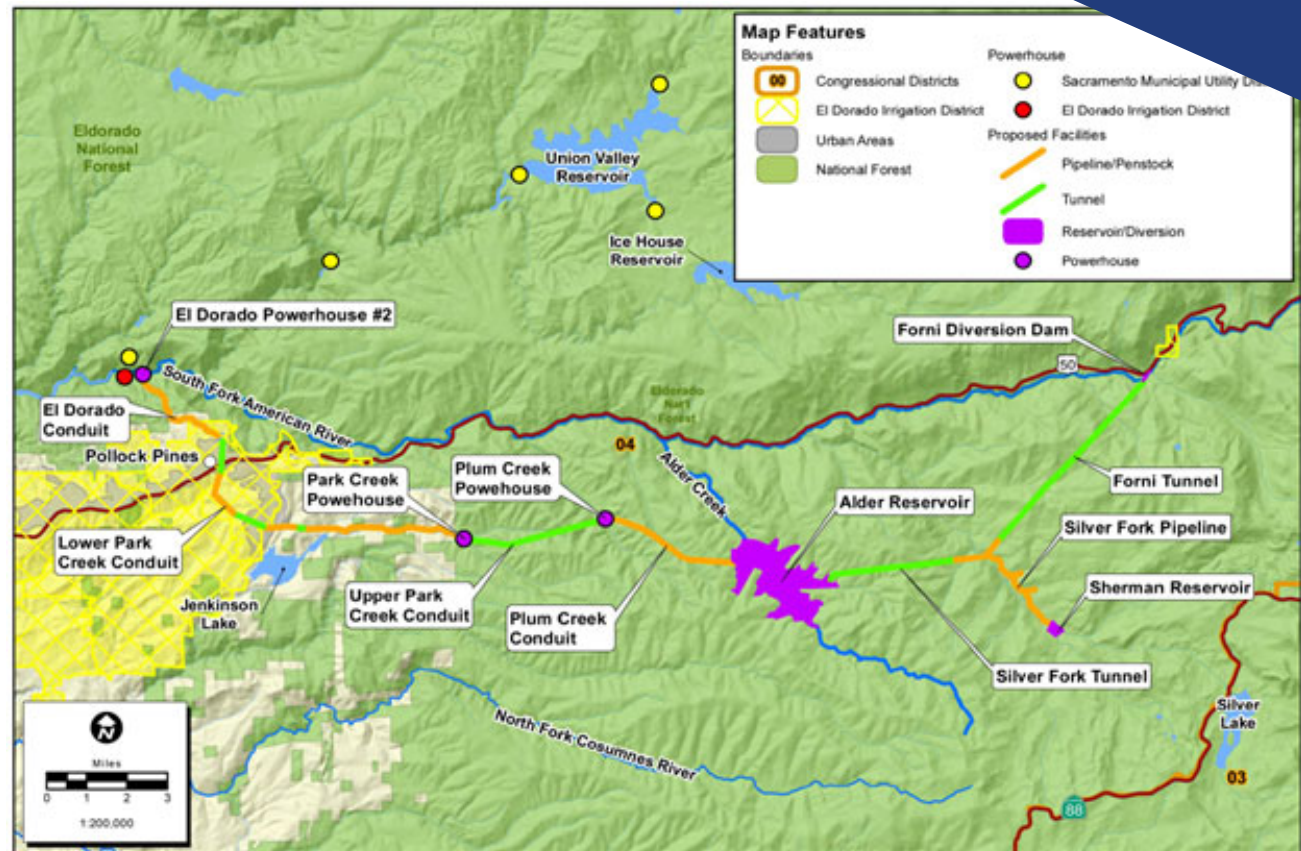
168,000 acre-feet high-elevation, off-stream storage project located in El Dorado County between the Sierra Nevada ridge and Placerville. Would divert water out of the South Fork of the American River into an off-stream surface water storage facility at Alder Creek.

BENEFITS

- Captures winter runoff from lost snowpack storage in the Upper Basin
- Increases watershed storage to 2 million acre-feet
- Improves flexibility through off-stream storage
- Diversifies water supply to the foothills, region, and CVP System
- Increases water supply reliability and drought protection for the foothills

WHY IT'S NEEDED

- **Limited storage in American River Basin**
 - Folsom Reservoir has limited capacity
 - Cannot handle increased runoff that challenges flood control for region
- **No alternative water supply sources in foothills**
 - Foothills have no meaningful groundwater storage
- **California needs additional storage**
 - Governor's Water Resilience Portfolio recognizes the need to develop storage projects





PROJECT BENEFITS

Water Supply Reliability

- Decreases El Dorado County and City of Folsom's reliance on Folsom Reservoir
- Addresses the supply-demand imbalance
- Increases operational flexibility for Reclamation

Flood Risk Management

- Intercepts flood flows upstream of Folsom Dam
 - Reduces peak flows in the Lower American River
- Increases regulating capacity of Folsom Dam
 - Would not impact Reclamation's operations downstream
 - Could store flood flows for use by Reclamation in summer months

PROJECT BENEFITS

Hydropower

- Equipped with three powerhouses (total capacity of 110 megawatts)
- Annual power generation would be up to 470,000 megawatt hours per year

Recreation

- Summer releases would increase Folsom Reservoir storage in the summer and fall
- Spring and late releases for water quality and hydropower generation provide greater flexibility for recreation activities

Fish and Wildlife Habitat Protection

- High elevation and deep storage configuration provides greater flexibility to manage the cold-water pool
- Improves flow and temperature conditions in the Lower American River
- Shifts the timing of releases for fish and wildlife habitat or water supply needs





NEXT STEPS

Initiate Feasibility Study

- Congress has authorized \$3M for the Bureau of Reclamation to conduct a feasibility study to evaluate the proposed project
- Study will model inflows from North and South Forks of American River

Secure state and federal support to begin the evaluation of this climate adaptation portfolio

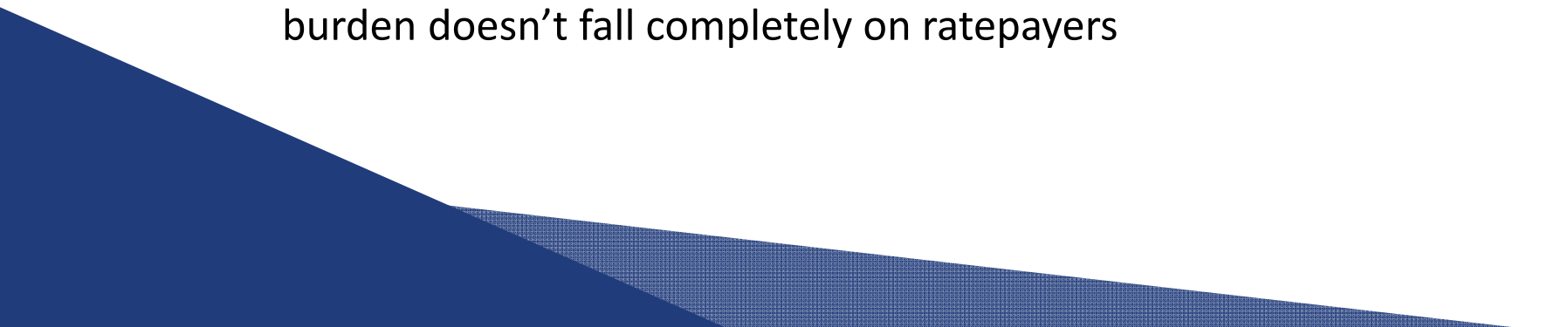
- Establish storage capacity exchange and other operational agreements to ease demands on Folsom Reservoir
- Institute exchanges and operational agreements to augment water supply reliability needs for water purveyors in the Foothills
- Build flexibility to participate in occasional water market participation

REGIONAL COLLABORATION AND CLIMATE RESILIENCY TO BENEFIT CALIFORNIA

Robert Dugan, Director, Placer County Water Agency



THE AMERICAN RIVER REGION IS READY TO ACT

- We have the ideal **geology, hydrology and a history of collaboration** to create the **21st-century water system** needed to adapt to climate change
 - **We have a suite of solutions—not just one “silver bullet”**—up and down the watershed for storage below and above ground, improved flood protection, and forest management
 - As a source watershed, **solutions here will yield broad benefits for California’s water supplies and environment**
 - **We will need your help to compete for our fair share of funding** so that the burden doesn’t fall completely on ratepayers
- 

QUESTIONS





THANK YOU!