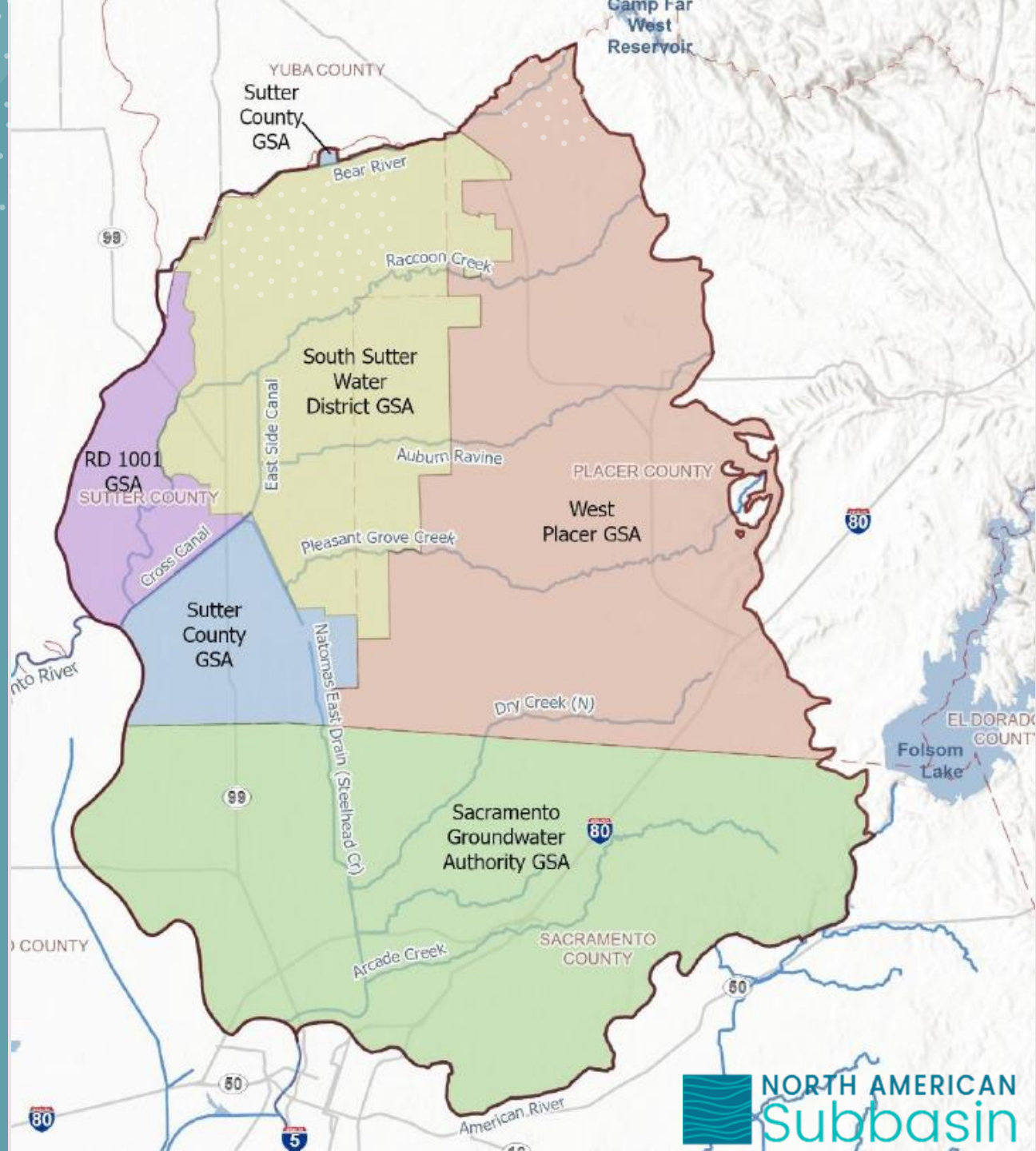
North American Subbasin (NASb) DWR SGM Grant Round II 2026 Post Public Meeting (Virtual)

March 24, 2026, starting at 6PM

Acknowledgement of State Funding

Funding for this project has been provided in part from The California Drought, Water, Parks, Climate, Coastal Protection, and Outdoor Access For All Act of 2018 and through an agreement with the State Department of Water Resources.



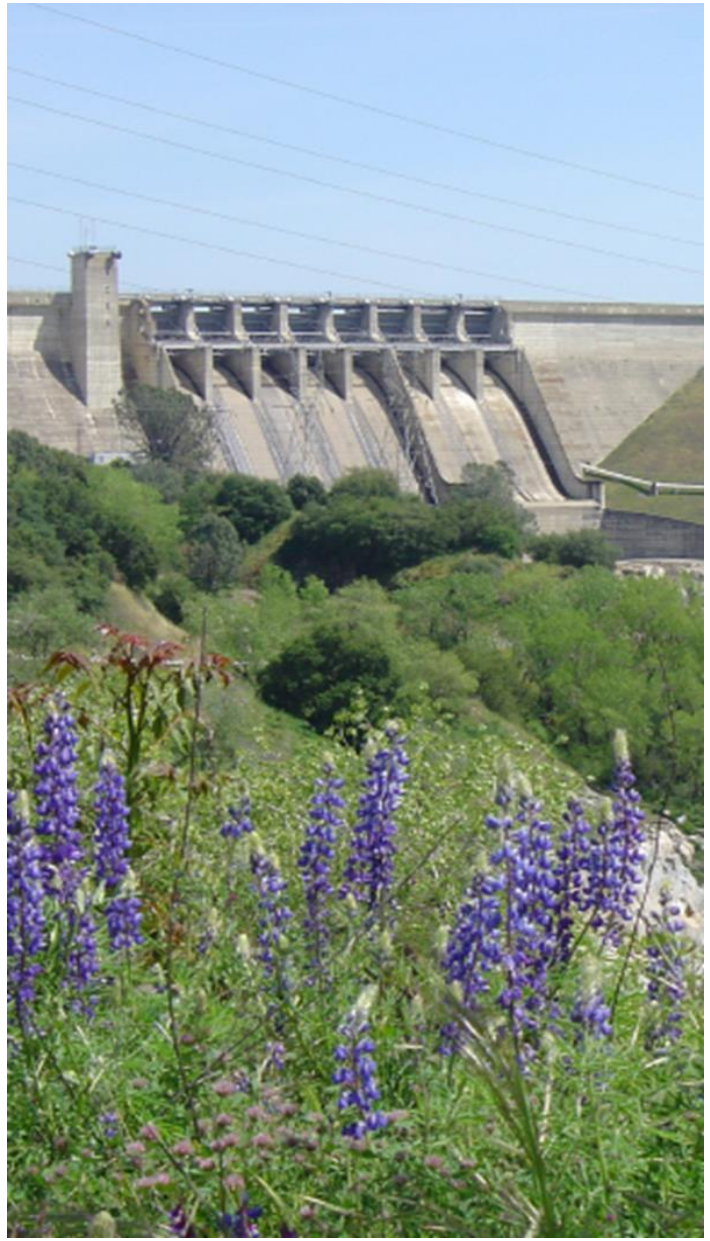
Agenda

I. Welcome and Meeting Purpose

II. The North American Subbasin (NASb) and SGMA Introduction

III. The DWR SGM Grant Round II Program and Post Component Updates

IV. Questions/Comments



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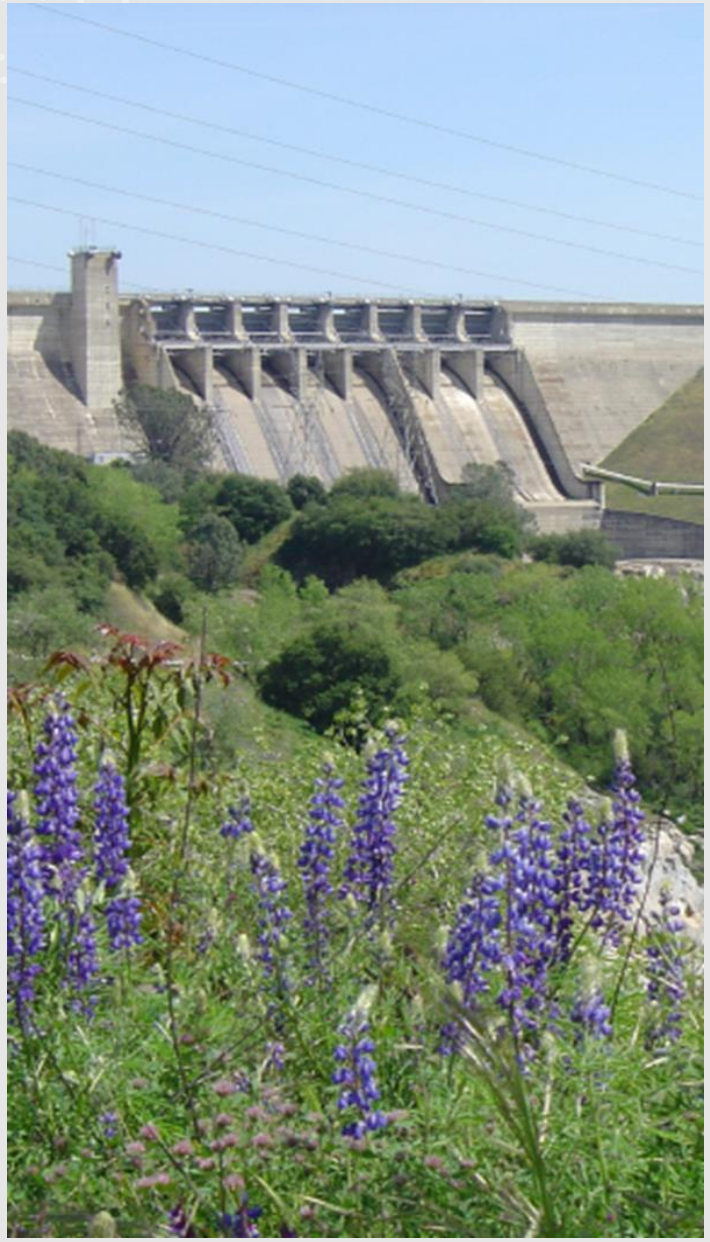
Welcome and Meeting Purpose



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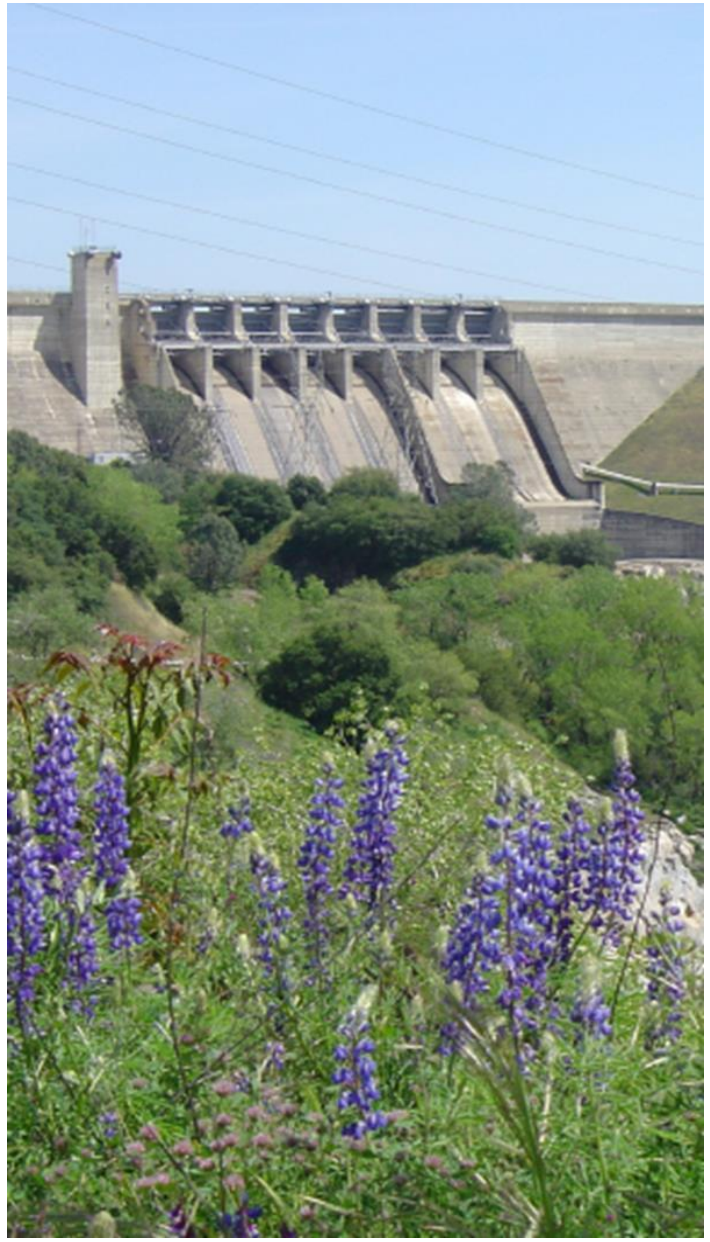
Meeting Purpose

The purpose of todays meeting is to:

- Provide an update of the DWRs SGM Grant Round II awarded to the Subbasin in September 2023 and concludes end of March 2026
- Present and review findings and outcomes of completed Components
- Respond to questions and discuss completion of Components

How to Engage During the Meeting

- **On Zoom**:
  - "Raise hand" function to speak or
  - Type question in comment box
- **Via telephone**:
  - *9 to "Raise Hand"
  - *6 to unmute when called on



This meeting is being recorded, and meeting materials will be uploaded after the event to https://nasbgroundwater.org/

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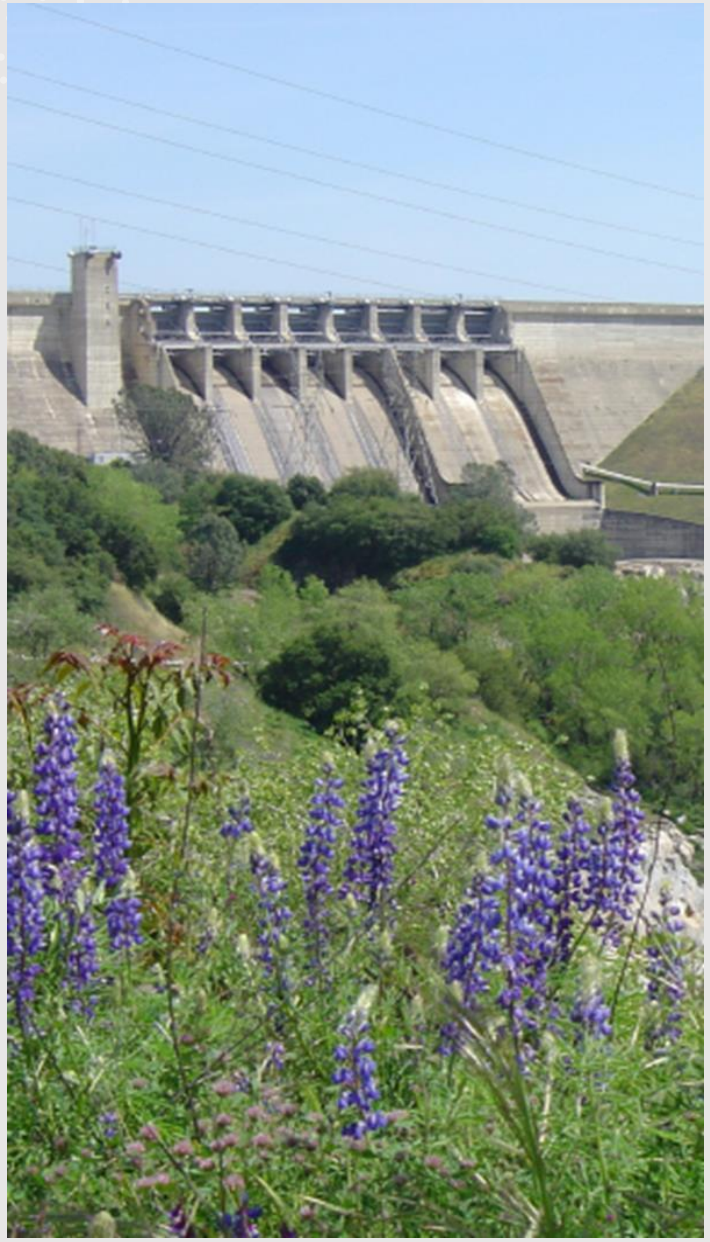
The North American Subbasin (NASb) and Sustainable Groundwater Management Act (SGMA) Introduction



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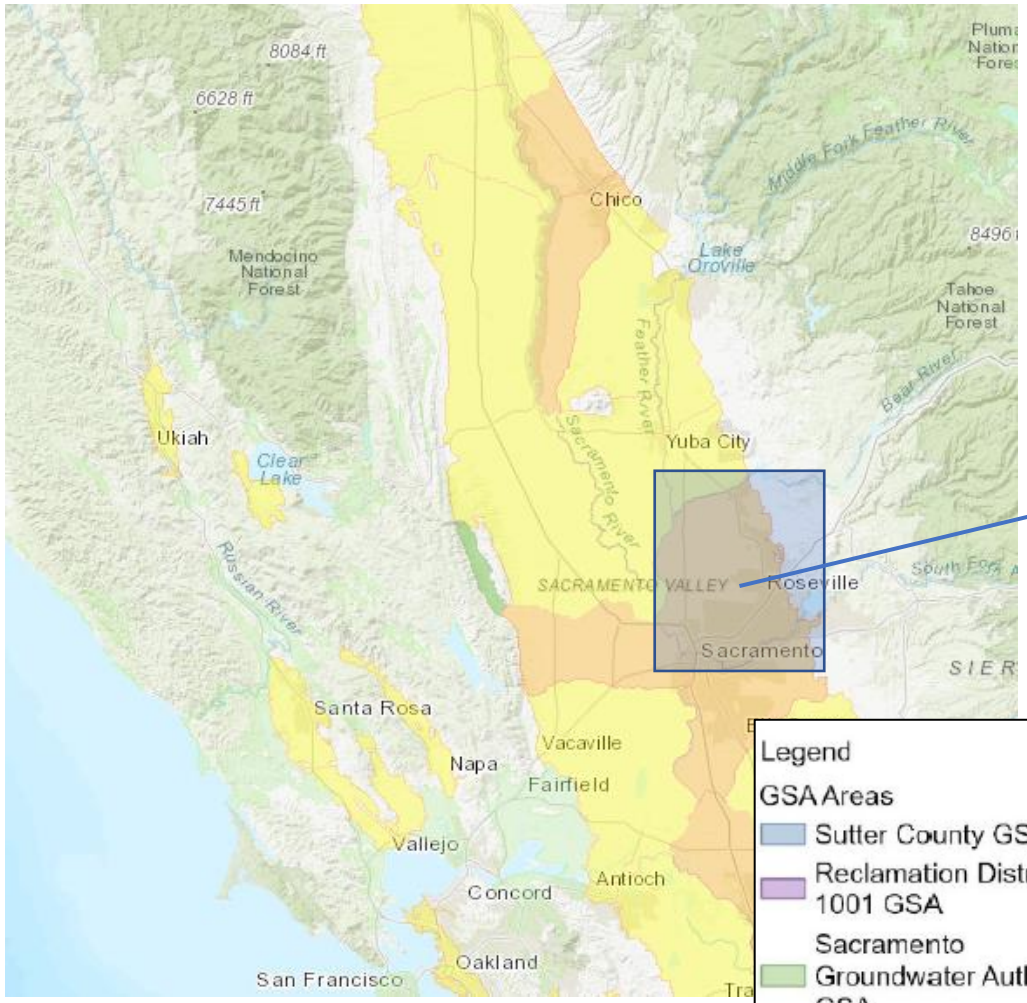
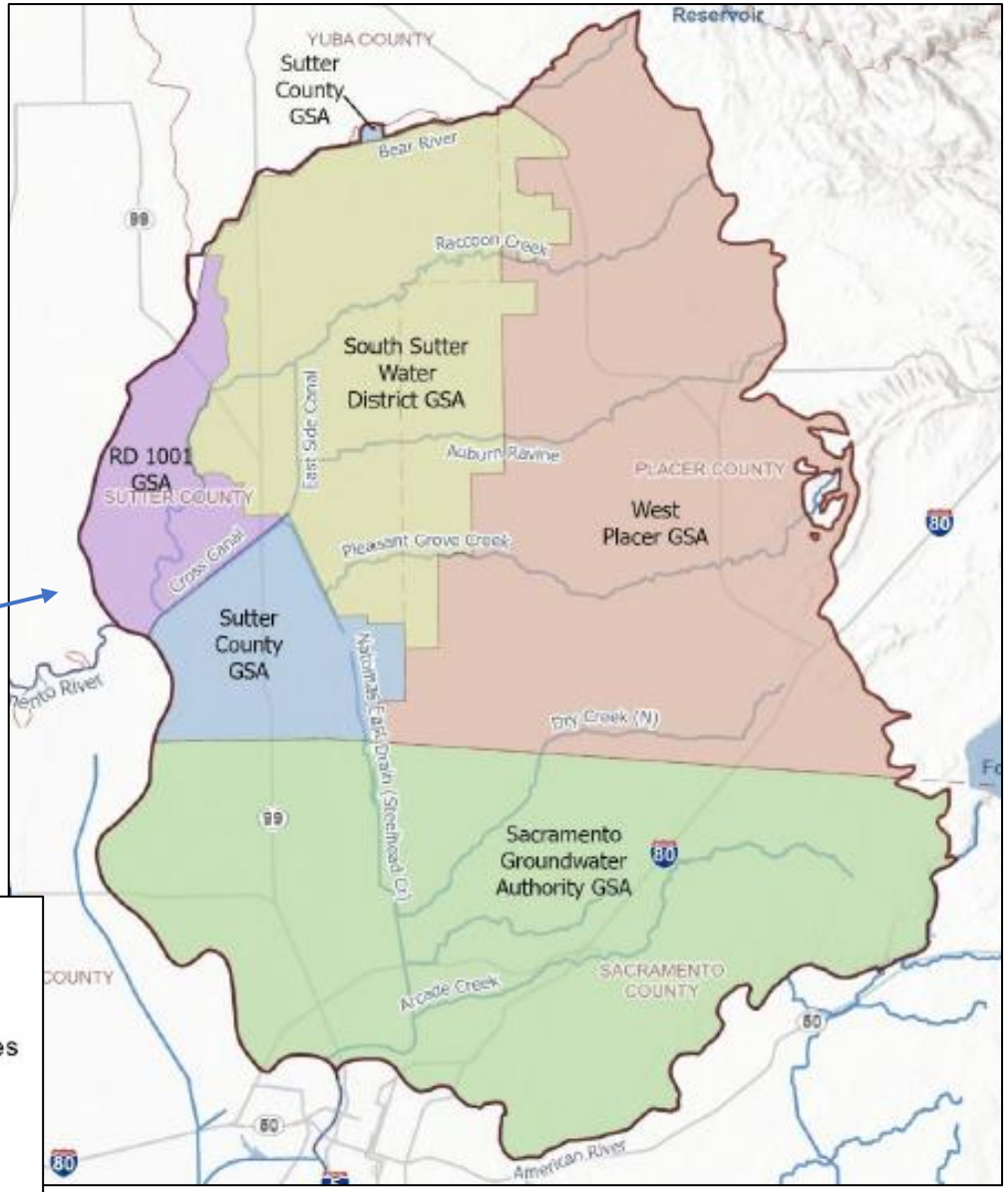
NASb Overview & GSA Introduction





Legend

GSA Areas

- Sutter County GSA
- Reclamation District No. 1001 GSA
- Sacramento Groundwater Authority GSA
- South Sutter Water District GSA
- West Placer GSA

- North American Subbasin
- County Boundaries

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NASb GSAs

Reclamation District 1001 (RD 1001 GSA)

Kimberly Reese | Reclamation District 1001
1959 Cornelius Ave | Rio Oso, CA 95674
530-656-2318 | kreese@rd1001.org

Sacramento Groundwater Authority GSA (SGA GSA)

Trevor Joseph | Manager of Technical Services | Sacramento Groundwater Authority
2295 Gateway Oaks Drive, Suite 100| Sacramento, CA 95833
(916) 967-7692 | tjoseph@rwah2o.org

South Sutter Water District GSA (SSWD GSA)

Hayden Cronwell| General Manager | South Sutter Water District
2464 Pacific Avenue | Trowbridge, CA 95659
530-656-2242 |hcornwell@soutsutterwd.com

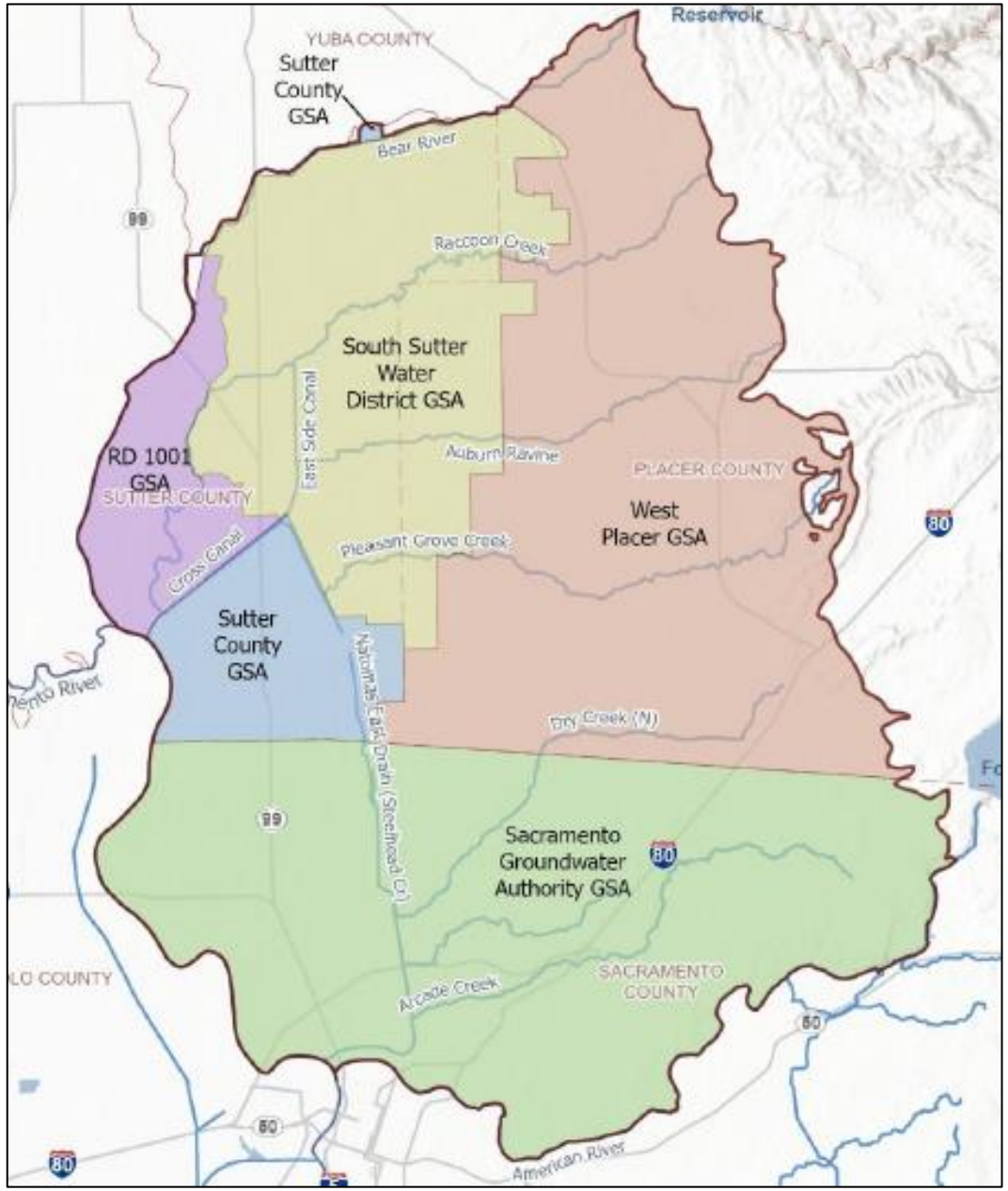
Sutter County GSA (Sutter GSA)

Guadalupe Rivera | Principal Engineer | Sutter County
1130 Civic Center Blvd. | Yuba City, CA 95993
530-822-7400 | grivera@co.sutter.ca.us

West Placer GSA (WPGSA)

Christina Hanson | Public Works Manager| Placer County
3091 County Center Drive, Suite 170 | Auburn, CA 95603
530-886-4965 | chanson@placer.ca.gov

NASb Website: https://nasbgroundwater.org/



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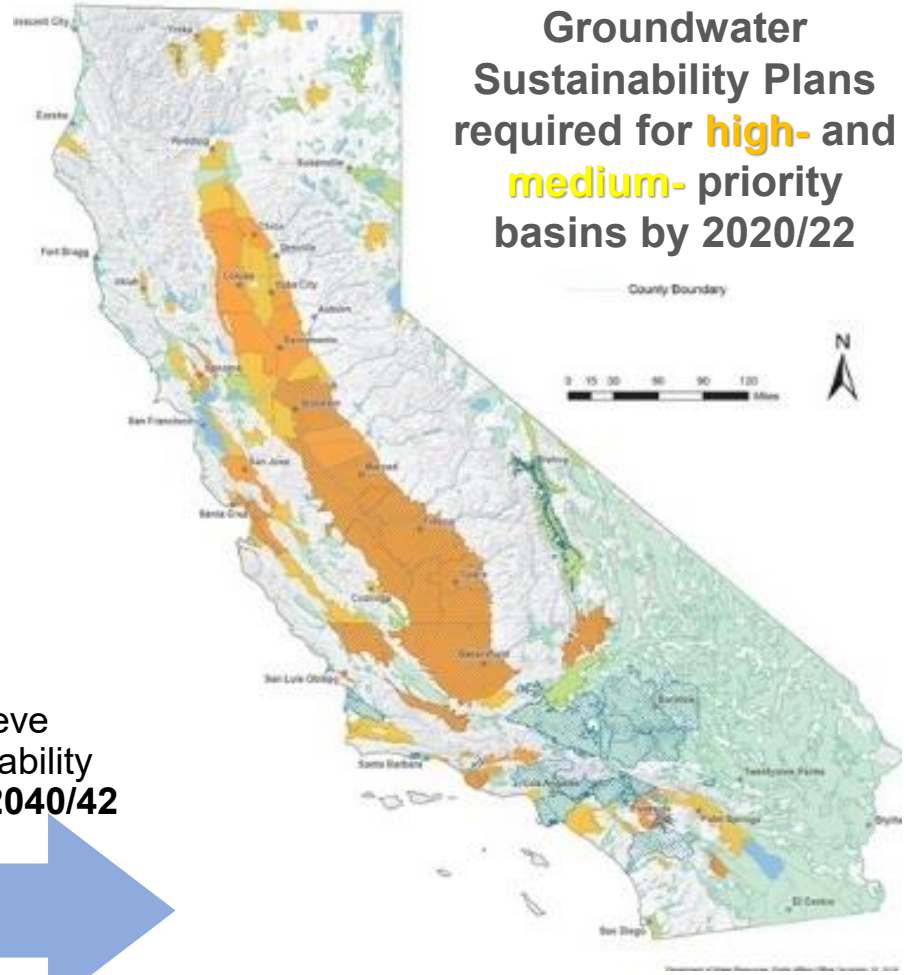
Sustainable Groundwater Management Act (SGMA)

Local Control

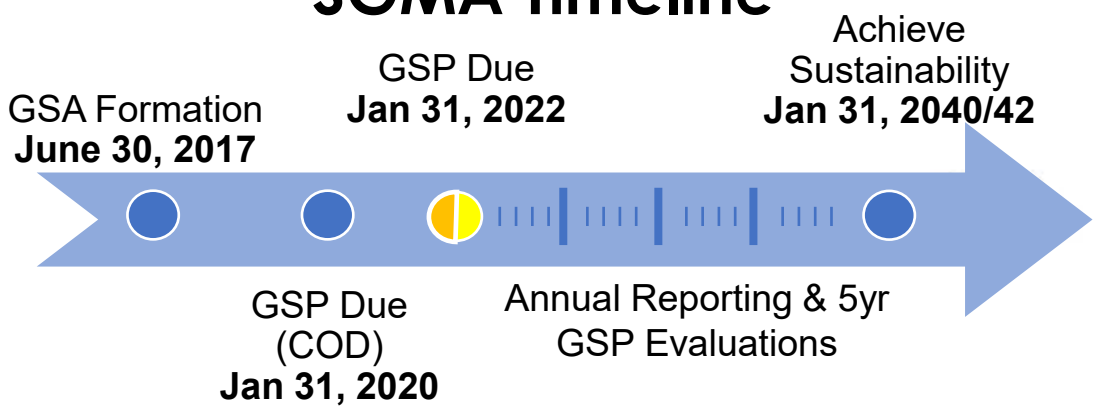
"A central feature of these bills is the recognition that groundwater management in California is best accomplished locally."
Governor Jerry Brown, September 2014

Roles

Groundwater Basins



SGMA Timeline



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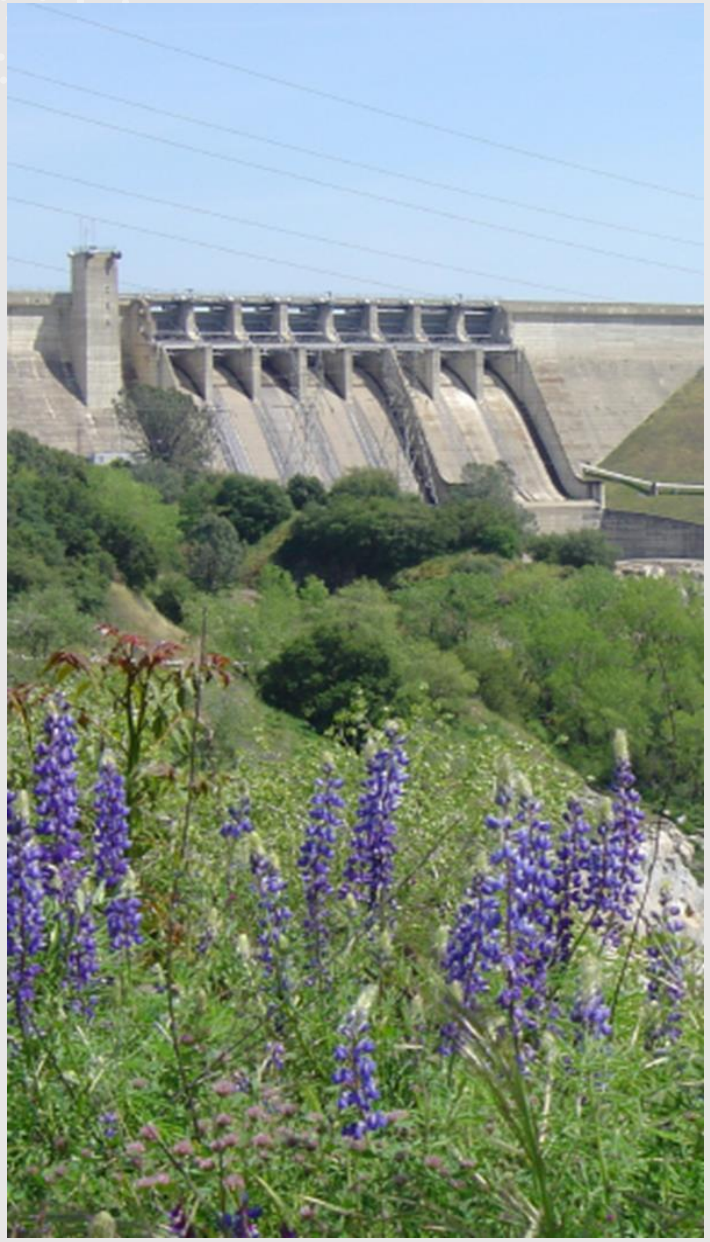
The Department of Water Resources (DWR) SGM Grant Round II – Post Component Updates



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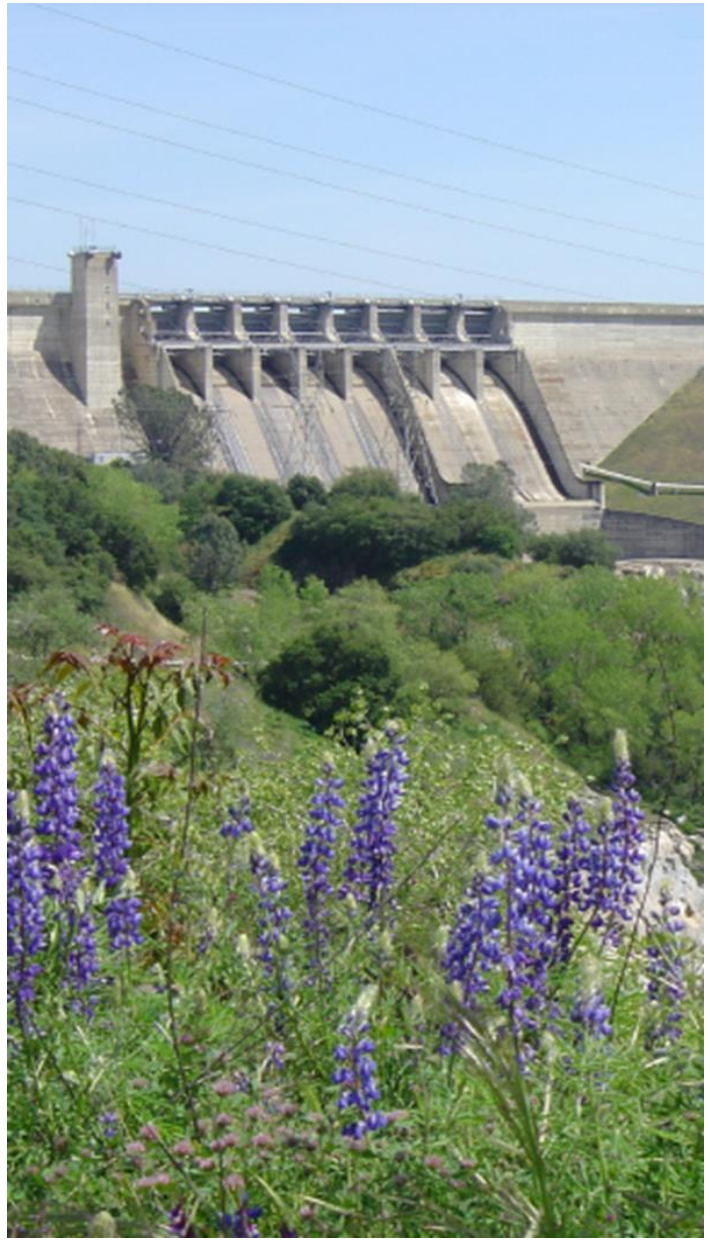
DWR SGM Grant Overview

- DWR administers the SGM Grant Program
- Round 2 Solicitation Opened: October 4, 2022 Deadline: December 16, 2022
  - High, Medium, & Critically Overdrafted basins eligible, approximately $231 million available
- **Round 2 Draft Funding Recommendations Announced May 19, 2023**
  - Recommended 31 applications receive a total award of $187.3M
  - Final award announced September 13, 2023
  - Signed DWR Grant Agreement January 2024
- **DWR awarded NASb the full requested grant amount of $3,560,500 for Advancing NASb Sustainable Groundwater Management**



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NASb Grant Components

Advancing NASb SGM Component Status Update

1. Grant Administration
2. Groundwater Recharge Feasibility Study
3. Groundwater Quality Degradation Study
4. Groundwater Monitoring Wells Construction
    - Groundwater Dependent Ecosystems (GDE) (3)
    - Chronic Lower of Groundwater Levels (CLGWL) (2)
    - Surface Water Depletion (SWD) (1)
5. Groundwater Monitoring Well
6. GSP Update and Annual Reporting
7. CoSANA Model Upgrade and Enhancements

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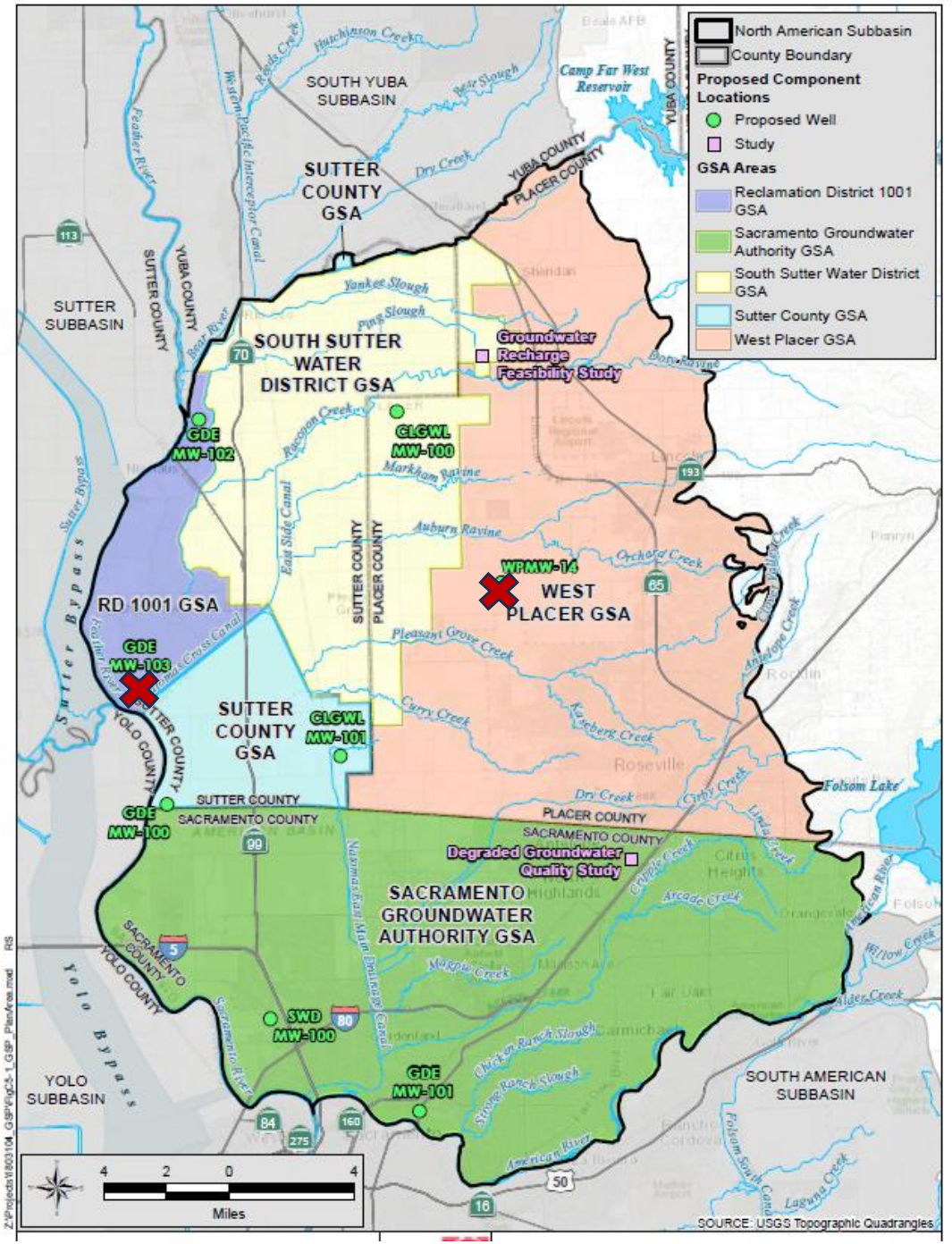
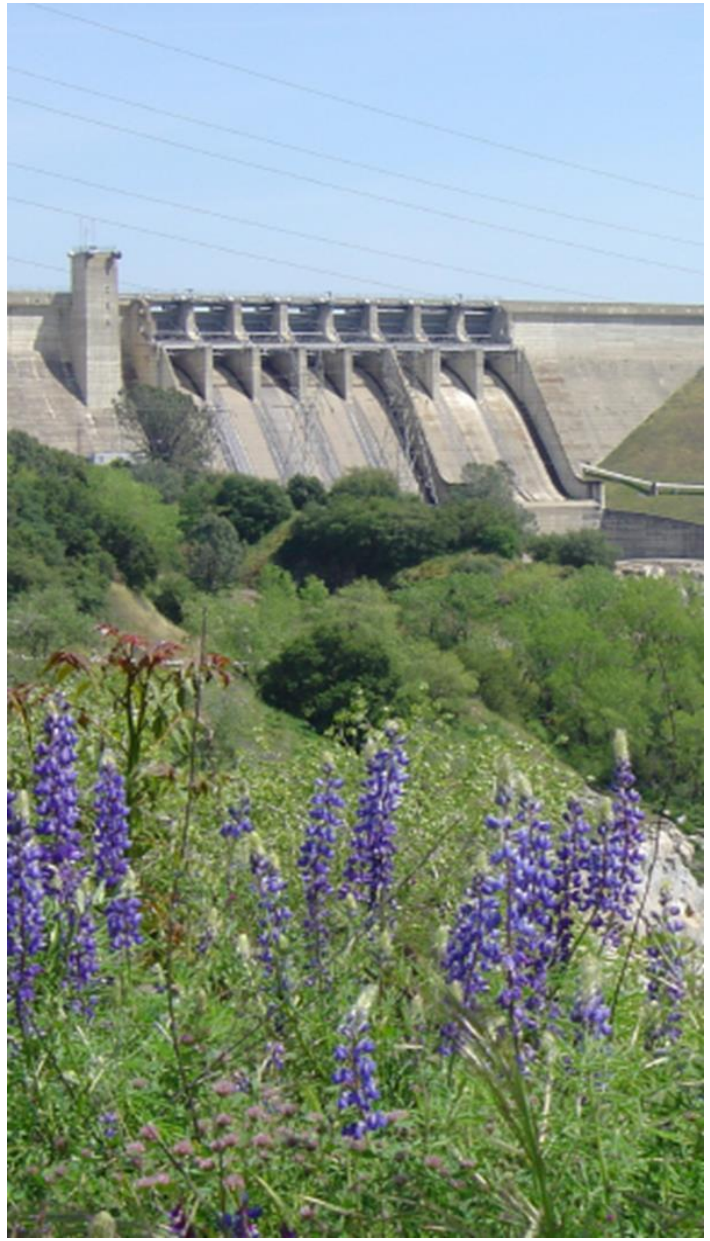


Exact locations of proposed components may vary

Component 2: Groundwater Recharge Feasibility Study

Presentation by West Yost and WPGSA



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Summary of DWR Component 2 Recharge Feasibility Study

March 24, 2026

Groundwater Recharge Feasibility Project Goals and Team

- **Team developed to build sustainability and long-term partnership**
  - Project Management Expertise
  - Regional Technical leadership
  - Willing Conservation Landowners
- **Region/Team is ideal for recharge in the Sacramento area**
  - WPGSA leading direct recharge development
  - Geologic conditions & recharge flow is beneficial for multiple stakeholders
  - Multiple water source potential
- **First of many direct recharge projects for WPGSA**
  - Ten viable sites documented

Proposed Study: Raccoon Creek Recharge Feasibility

Recharge Basin Investigation Planning

Recharge Basin Investigation

Water Conveyance Assessment

Preliminary Design (30%) Drawings

- Conduct planning and investigative activities associated with the recharge basin subsurface investigation.
- Perform electromagnetic surveys, drilling of eight hollow stem auger boreholes, and permeability testing.
- Technical Memorandum documenting permeability testing and estimates of the amount of water that could be recharged.

Project Management and Coordination

Temporary Diversion Permit Application

Stakeholder Engagement and Community Outreach

- Project and contractor management, budgets, coordination, and reports.
- Prepare a draft Temporary Diversion Permit Application
- Engage interested parties and stakeholders and share the findings of the investigation in public meetings.
- Provide stakeholder notifications via website updates, social media, and/or direct mail as appropriate.

Work Performed:

Early Results dictated change in process and eventual stoppage

Towed Transient Electromagnetic (tTEM)

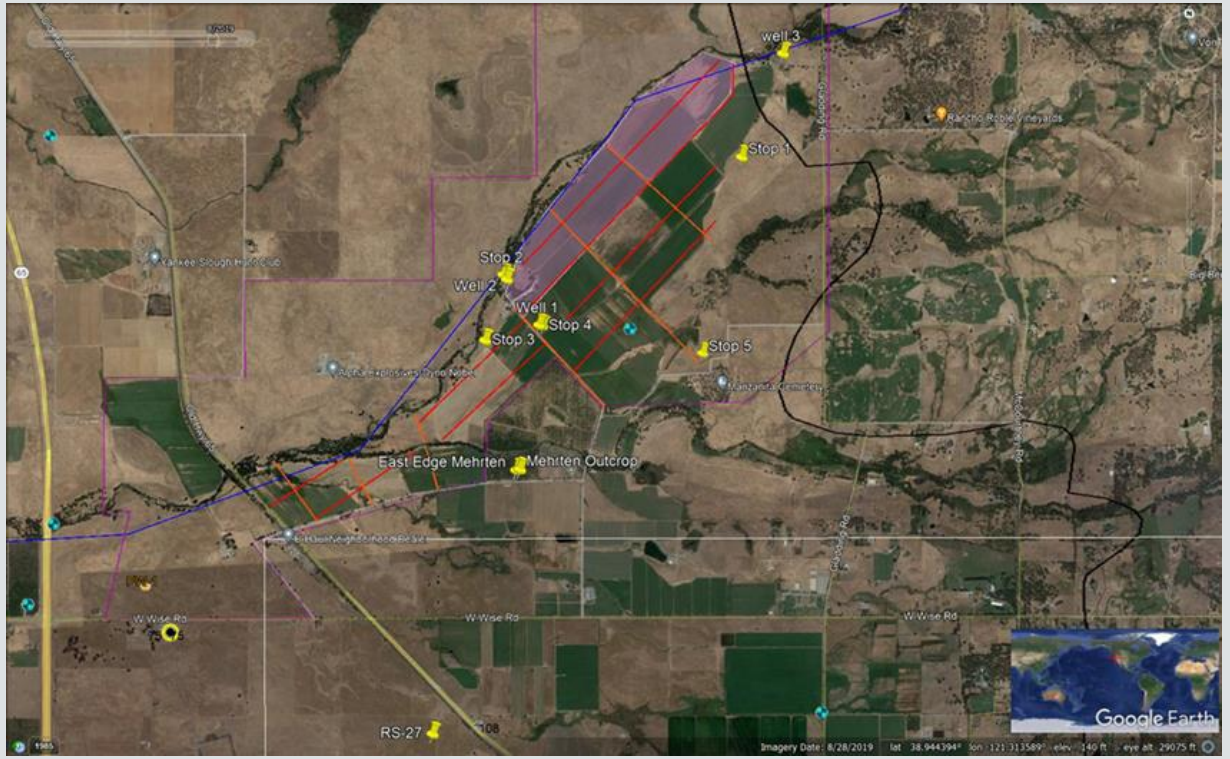
- Conducted a geophysical survey of the subsurface using tTEM. Uses electromagnetics to detect variations in the electric resistivity of the subsurface to be used to understand the ability of the aquifer to convey and store water.

Drilling/Hand Auguring

- Drilled approximately 160 linear feet in 6 boreholes with a hollow-stem auger to confirm the results of the tTEM survey.
- Hand-augering was completed at 20 locations across the Site, collecting soil samples
- Ground-truthing revealed results different than the tTEM data.

Cost/Benefit Analyses

- Due to the geologic information on the site a decision to evaluate three alternatives for groundwater recharge on the site was performed



Conclusions & Next Steps

Results

- **Geophysical survey indicated geology that is favorable for recharge.**
- **Borehole drilling and hand-augering revealed conditions that contradicted the findings near the surface.**
- **The Site was deemed unsuitable for recharge**
  - shallow clays,
  - shallow water table
  - land use restrictions prohibiting the removal of the clay soils

Lessons Learned

- **Develop greater geologic assessment early**
- **Integrate early, low-cost subsurface investigations**
- **Optimize tTEM application**
- **Prioritize shallow-surface borings**
- **Assess conservation lands' compatibility for MAR**

Moving Forward

- **Developing an improved Process**
- **Performing long-term permitting alterations to SWB process**
- **Planning next Feasibility Study**
  - **10 possible sites identified**
- **Seeking grant funding for next project**

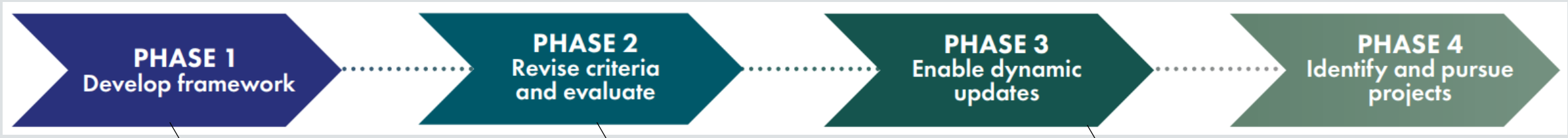
WPGSA New Recharge Framework

Moving from scattered opportunities to a structured, defensible, and adaptable recharge planning framework

Build on past efforts to add:

- Earlier screening of fatal flaws (less risk of sunk costs)
- Clearer pathways to action
- Grant readiness for 2027 Opportunities
- Defensible, repeatable decision-making

Four-Phase Approach



Define goals, constraints, recharge pathways, screening domains, and a stepwise process from idea to implementation.

Deliver a framework + checklist tool

Apply and refine screening criteria. Update rankings based on practical feasibility, cost, and readiness.

Turn static evaluations into a living **dashboard** that adapts as data, partnerships, and funding evolve

Placer County has available project funding, once a feasibility study has been successful

Questions/Comments?

How to Engage During the Meeting

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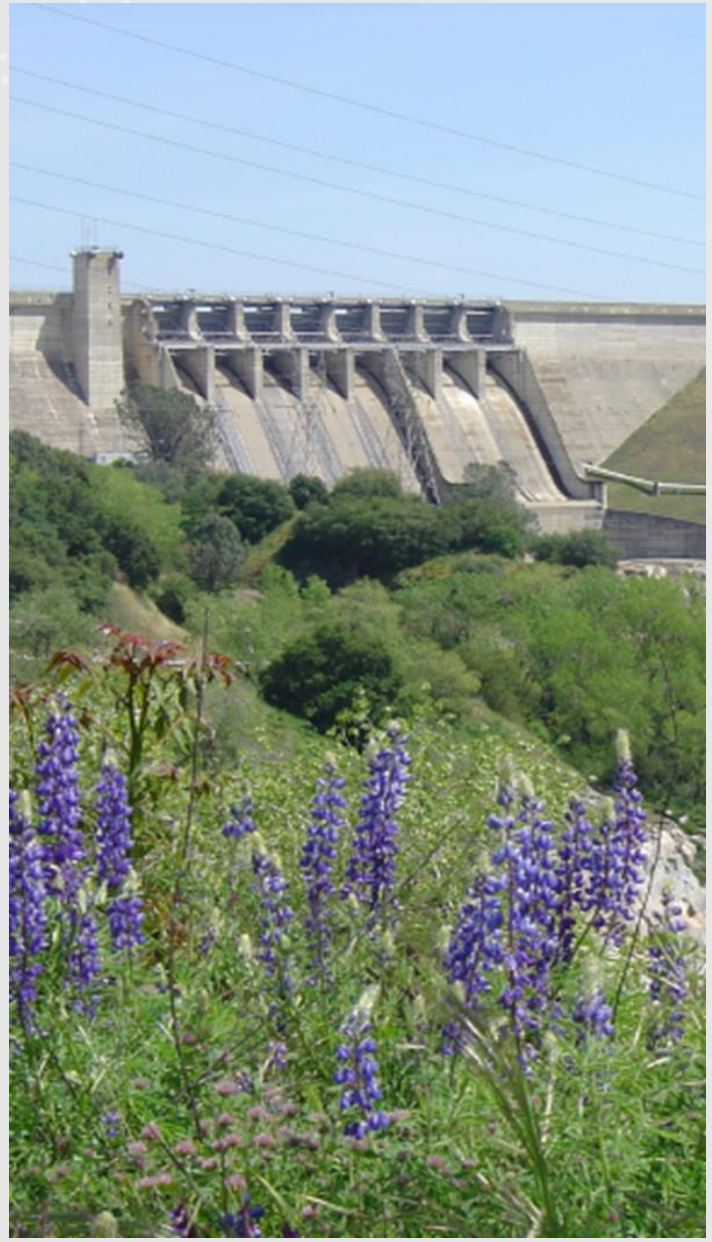

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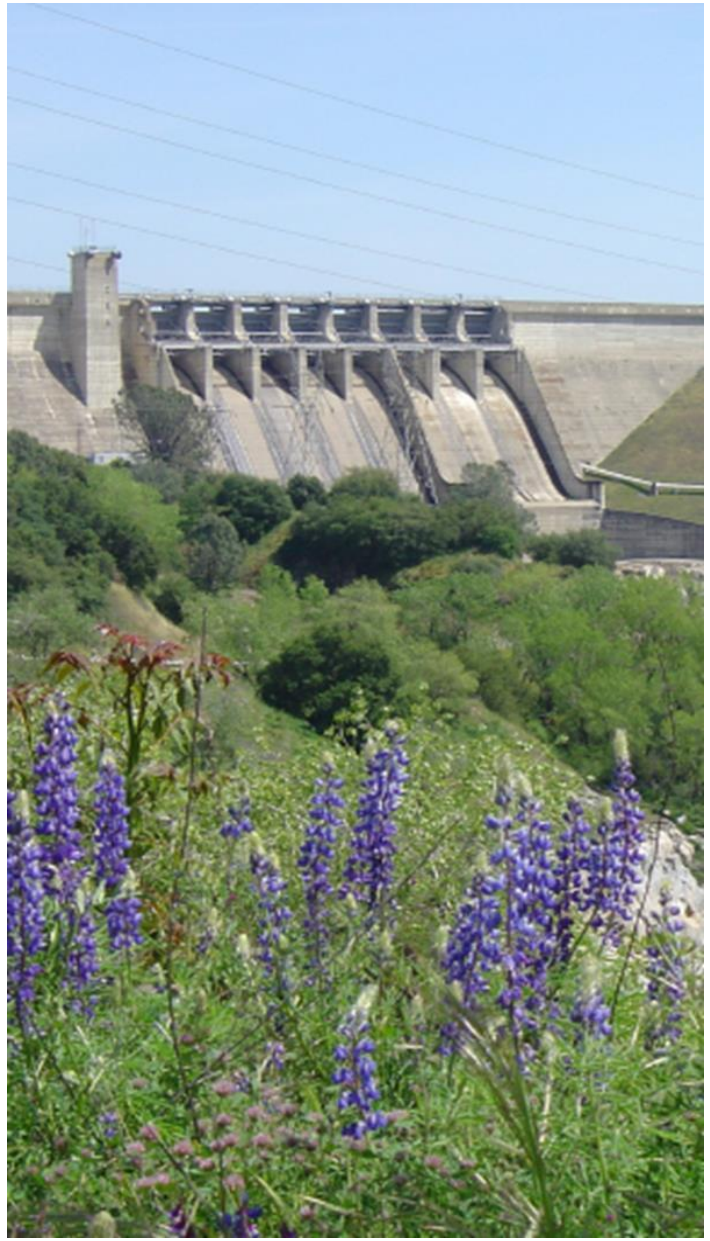
Component 3: Water Quality Degradation Study

Presentation by West Yost and SGA



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Groundwater Quality Degradation Study

Component 3 of DWR Grant Agreement 4600015622

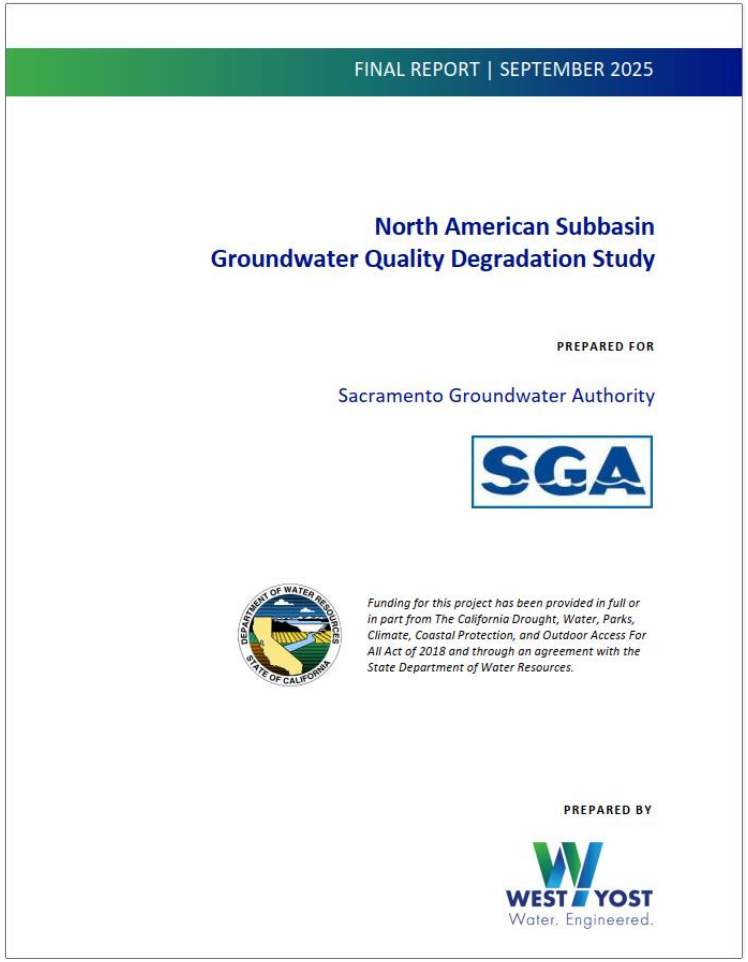
Executed January 18, 2024

Presented By **Ken Loy**, West Yost

March 24, 2026

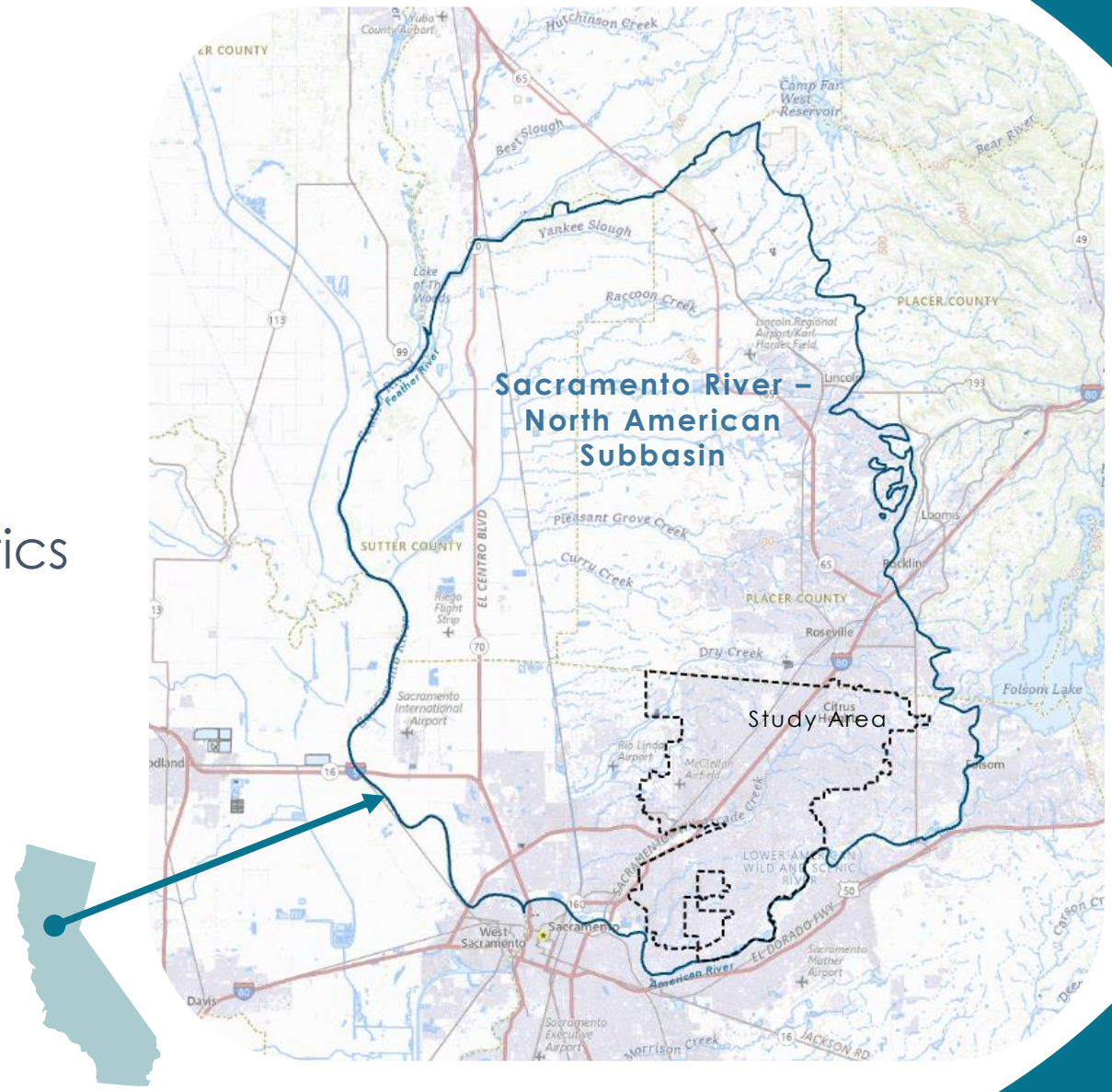
Component 3 Objectives from the DWR-SGA Grant Agreement

- Evaluate the vertical and horizontal extent of tetrachloroethylene (PCE)
  - Added hexavalent chromium, manganese, and perchlorate
- Identify areas that could be affected by PCE in the future
- Identify the potential need for wellhead treatment
- Identify areas favorable for new wells
- Evaluate the potential effects of conjunctive use on the migration of PCE



Agenda

- Introduction
- Physical Setting
- Contaminant Characteristics
- Threat Assessment
- Conclusions



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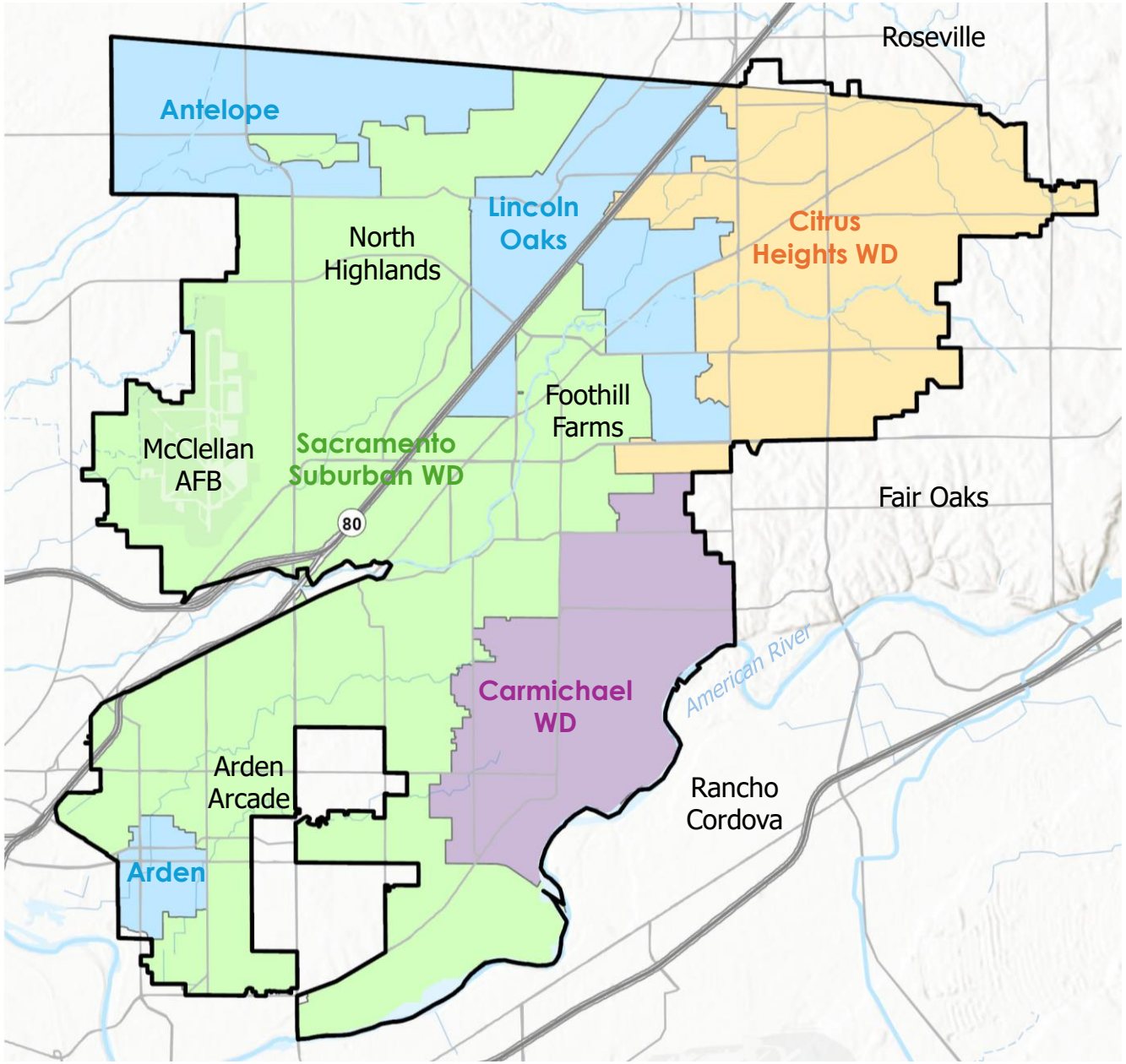
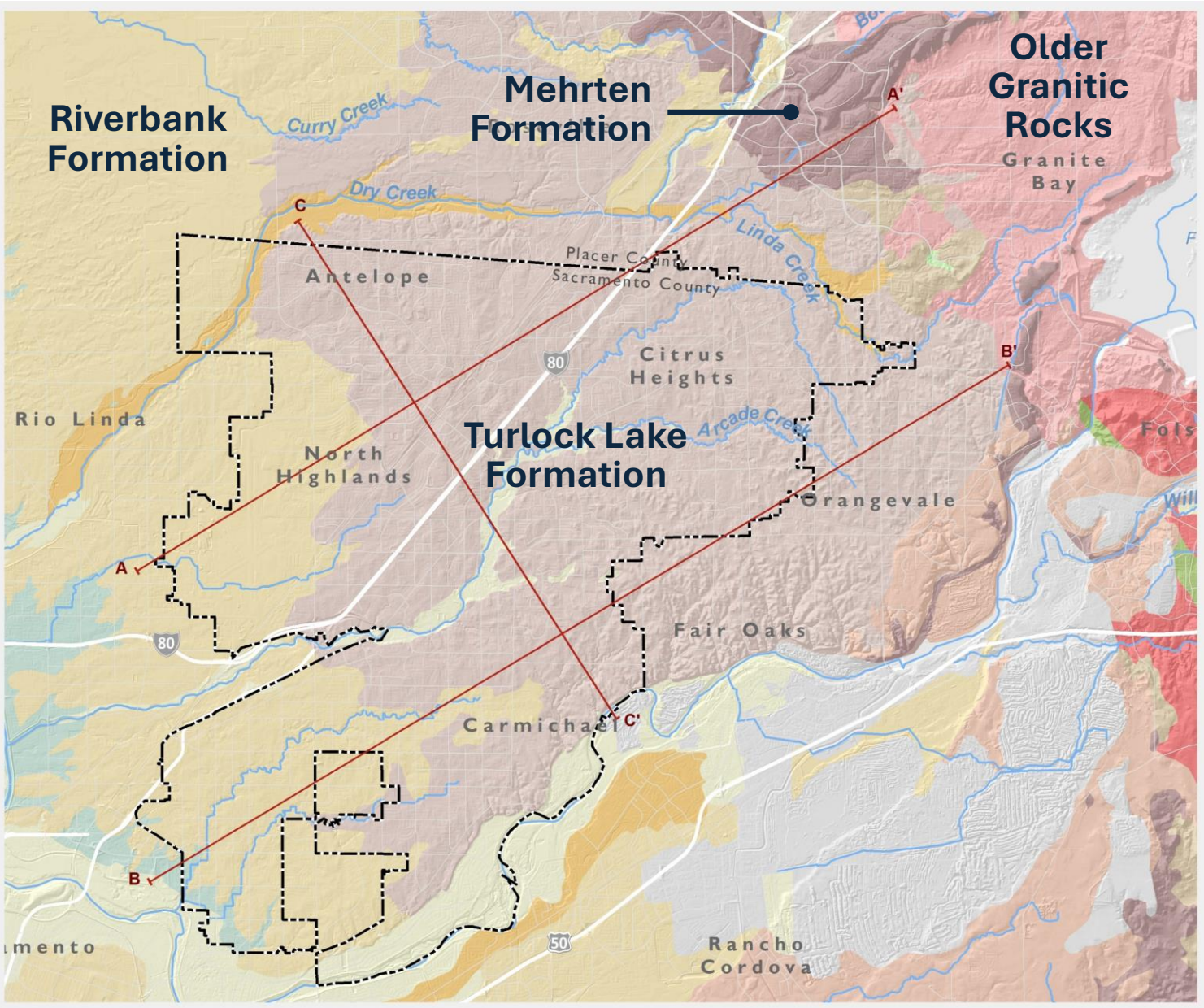
Study Area & Participating Agencies

Participating Agencies:

- California American Water (CAW)
  - Antelope
  - Lincoln Oaks
  - Arden
- Carmichael Water District (CWD)
- Citrus Heights Water District (CHWD)
- Sacramento Suburban Water District (SSWD)



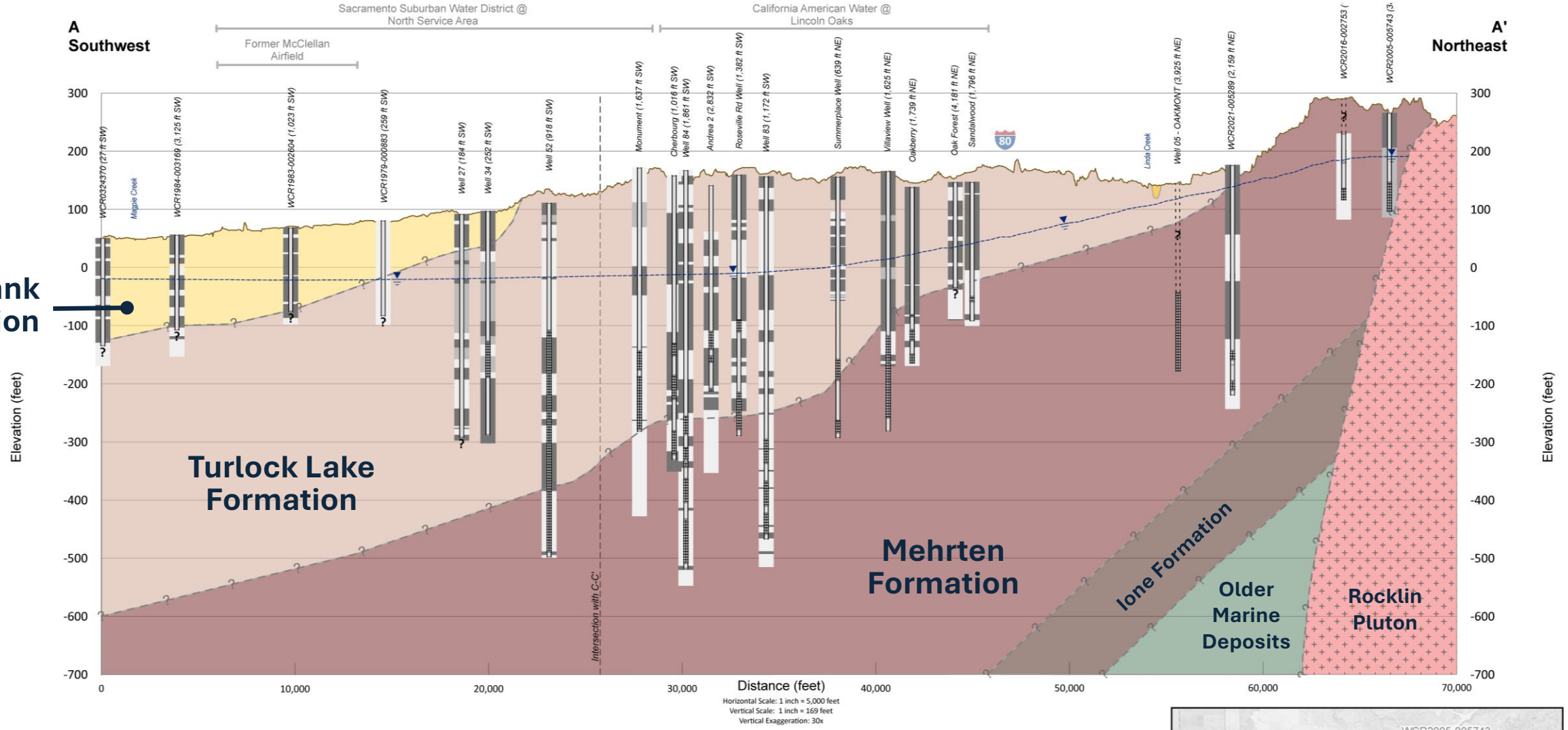
Cross Section Locations



Cross Section

Surface Geology

- Tailings
- Alluvium (Quaternary)
- Modesto Formation (Pleistocene)
- Riverbank Formation (Pleistocene)
- Turlock Lake Formation (Pleistocene)
- Laguna Formation (Pliocene)
- Mehrten Formation (Pliocene-Miocene)
- Ione Formation (Eocene)
- Chico Formation (Cretaceous)
- Salt Springs Slate (Jurassic)
- Copper Hill and Gopher Ridge Volcanics (Jurassic)
- Plutonic Rocks (Mesozoic)



CROSS SECTION FEATURES

Geologic Unit

- Riverbank Formation
- Modesto Formation
- Turlock Lake Formation
- Mehrten Formation
- Ione Formation
- Older Marine Deposits
- Rocklin Pluton

Borehole Lithology

- Fine Material
- Mixed Material
- Coarse Material

- Groundwater Elevation Fall 2019

Well Construction

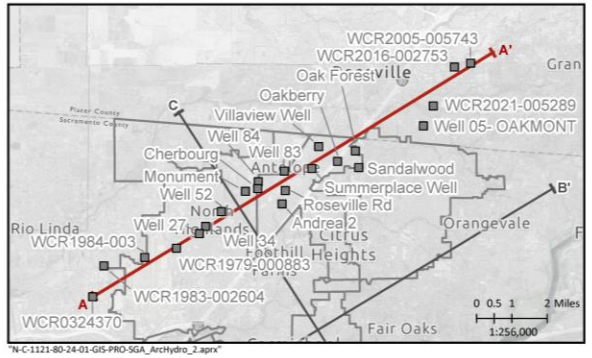
- Blank Casing
- Screen
- Unknown

Notes:

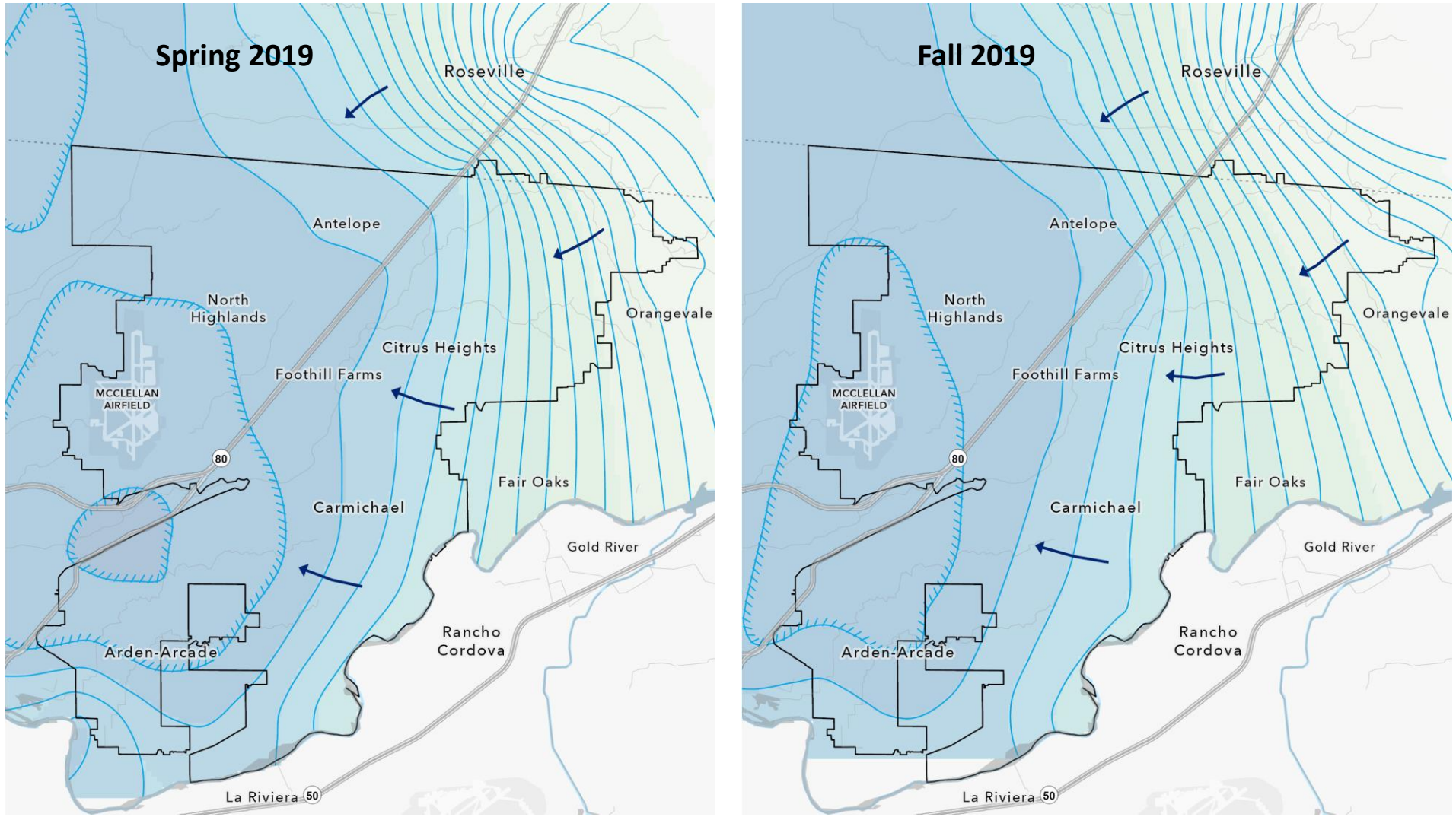
1. Groundwater elevation is from the North American Subbasin Groundwater Sustainability Plan, December 2021.
2. Lithology data is not shown for wells with NA intervals, as this information is unavailable.
3. The boundaries between geologic units are conceptual or inferred in areas without well data, based on available geologic reports, mapping, and local knowledge.

INSET MAP FEATURES

- Wells Shown on Cross Section
- Cross Section Shown on This Figure
- Other Cross Sections
- Participating Agencies



Groundwater Gradients



Arrows show groundwater flow directions

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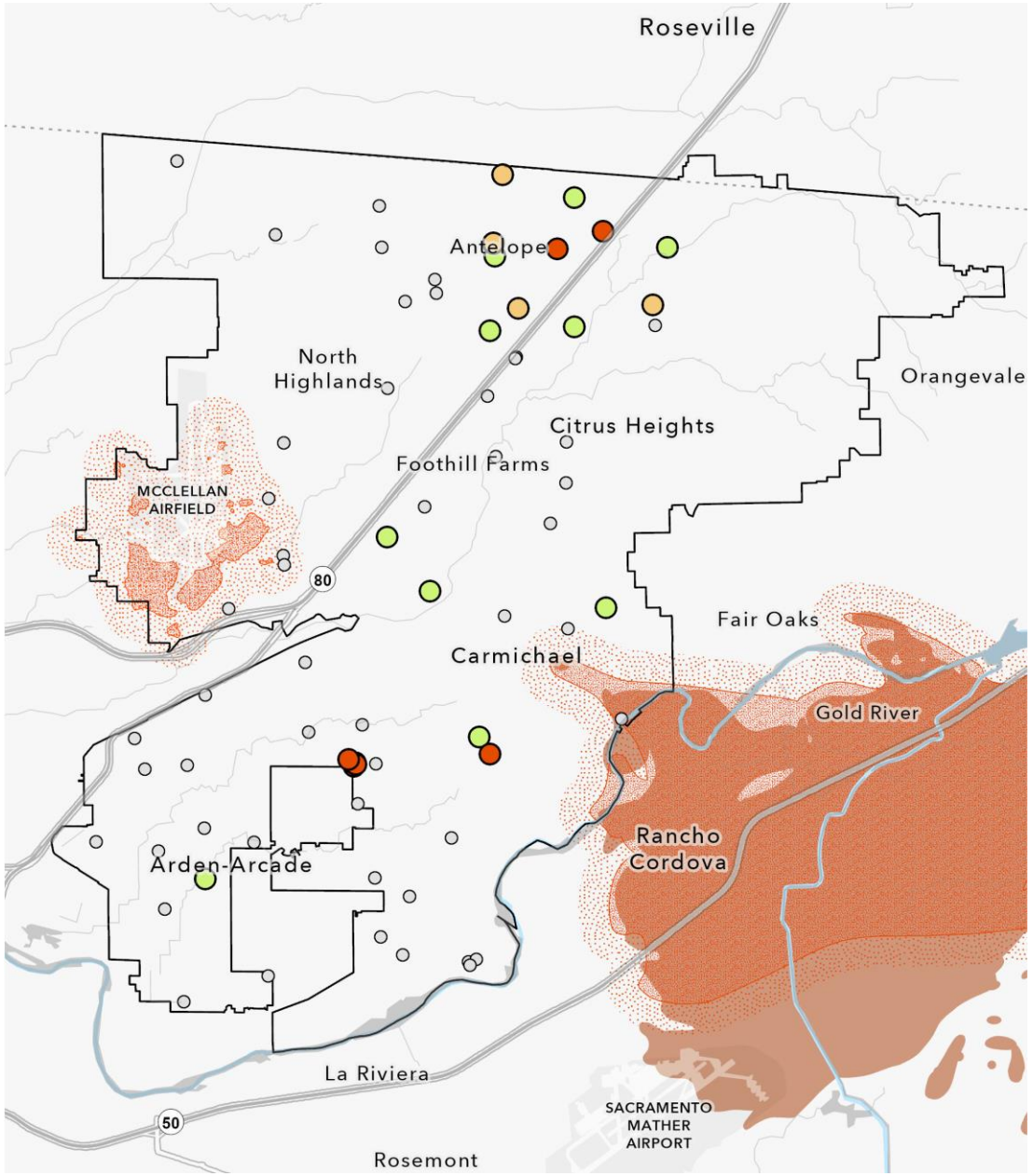
Contaminant Characteristics

Property	Tetrachloroethylene (PCE)	Hexavalent Chromium	Manganese	Perchlorate
Regulatory Water Quality Standards for Drinking Water				
Regulatory Water Quality Level for Drinking Water	5 µg/L	10 µg/L	50 µg/L	6 µg/L
Regulatory Source	Primary CA MCL	Primary CA MCL	Secondary CA MCL	Primary CA MCL
Physicochemical Properties				
Mobility	Moderate - High	High	Controlled by redox conditions	High
Solubility	150 mg/L (Low)	High	Controlled by redox conditions	High
Soil Sorption Coefficient	2.4 (Low)	Low - Moderate	Not Applicable	Not Applicable
Octanol/Water Partition Coefficient	2.5	Not Applicable	Not Applicable	Not Applicable
Degradation Half-Life	1 - 2 years	Not Applicable	Not Applicable	Not Applicable

Source: State Water Resources Control Board (SWRCB). 2017. Groundwater Information Sheets, Assorted Chemicals. California State Water Resources Control Board, Division of Water Quality, GAMA Program. Revised November 2017.



PCE Concentrations 2023

Concentration (µg/L)

- Not Detected
- <2.5
- 2.5 to <5.0
- ≥5.0
- Composite Plume (2022)
- Contamination Zone (2014-2015)
- Consultation Zone (2014-2015)

PCE by Depth

Depth Spacing

Shallow: 0 to <150 ft

—158 wells

—Cleanup, monitoring, domestic, and small water supply wells

Intermediate: 150 to <350 ft

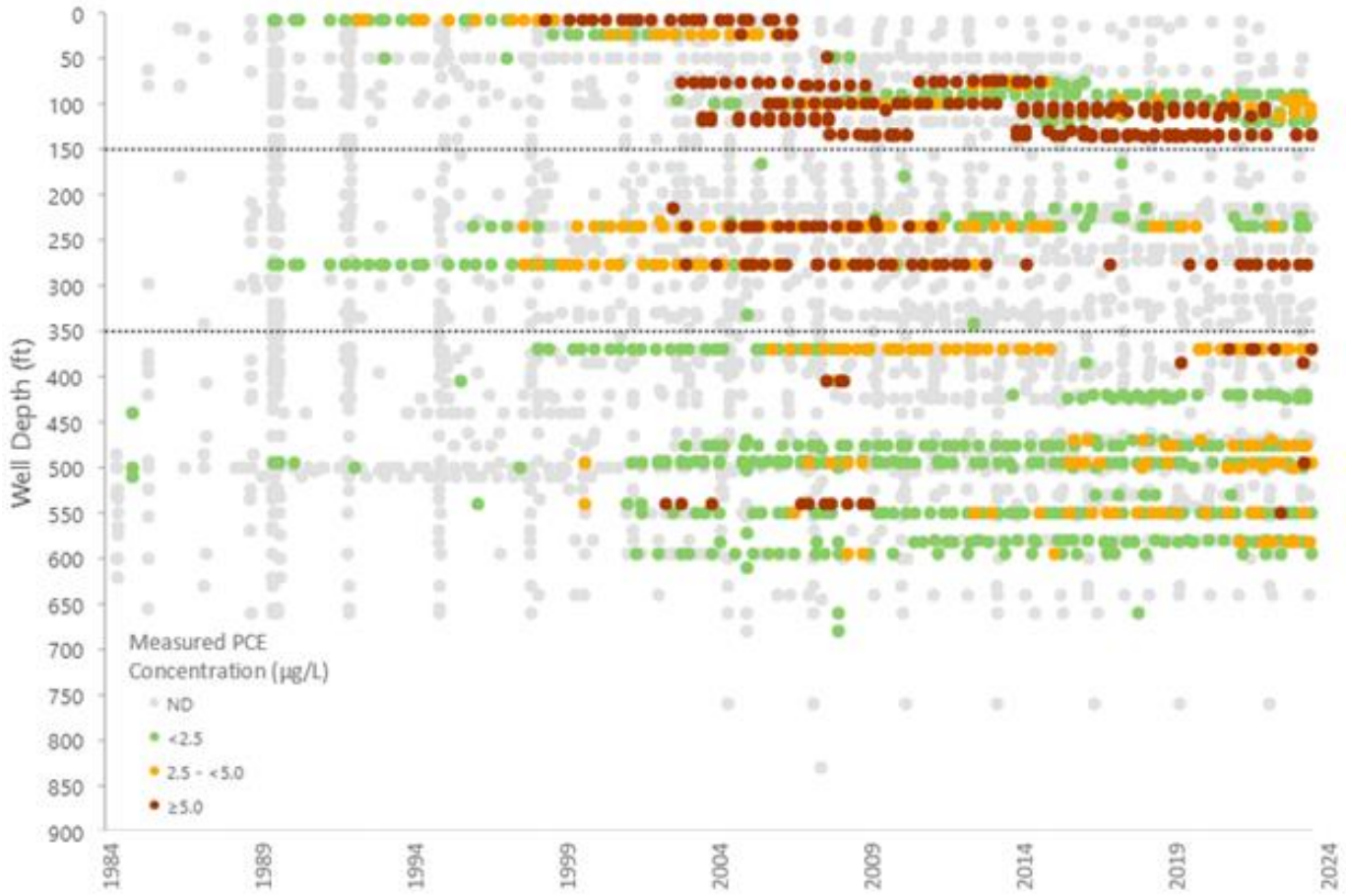
—79 wells

—Monitoring, domestic, and water supply wells

Deep: ≥350 ft

—173 wells (of which 152 wells are municipal supply)

—Monitoring and water supply wells



Threat Assessment Approach

Numerical Scoring and Ranking based on Threat Criteria

- Pumping Intensity
- Aquifer Permeability
- PCE Occurrence & Trends
- Other Contaminant Trends (Hexavalent Chromium, Manganese, Perchlorate)

Scoring is based on heat maps covering the study area.

Scoring Criteria

Scoring Criteria Point Allocation System

Scoring Criteria	Point Allocation				
	0	1	2	3	4
Intensity of Groundwater Pumping	No groundwater contribution to municipal pumping	Groundwater contribution to one municipal well	Groundwater contribution to two to four municipal wells	Groundwater contribution to five to nine municipal wells	Groundwater contribution to 10 or more municipal wells
Specific Capacity (Used as a Proxy for Aquifer Permeability)[a]	--[b]	Less than 50 gpm/ft	50 to less than 75 gpm/ft	75 to less than 150 gpm/ft	150 gpm/ft or higher
PCE Release Sites and/or Mapped Plume Extents	Not near a PCE release site and not within a mapped plume	--	Near a closed PCE site	Within the mapped consultation zone of a plume	Near an active/open PCE release site or within the mapped contamination zone of a plume
PCE 3-Year Average Concentration	Not Detected	Less Than 25 percent of the MCL	25 to 50 percent of the MCL	50 to 100 percent of the MCL	Above the MCL
PCE Trends	Stable with No Detections	--	Decreasing Trend	Stable with Detections	Increasing Trend
Hexavalent Chromium Trends	Stable with No Detections	--	Decreasing Trend	Stable with Detections	Increasing Trend
Manganese Trends	Stable with No Detections	--	Decreasing Trend	Stable with Detections	Increasing Trend
Perchlorate Trends	Stable with No Detections	--	Decreasing Trend	Stable with Detections	Increasing Trend

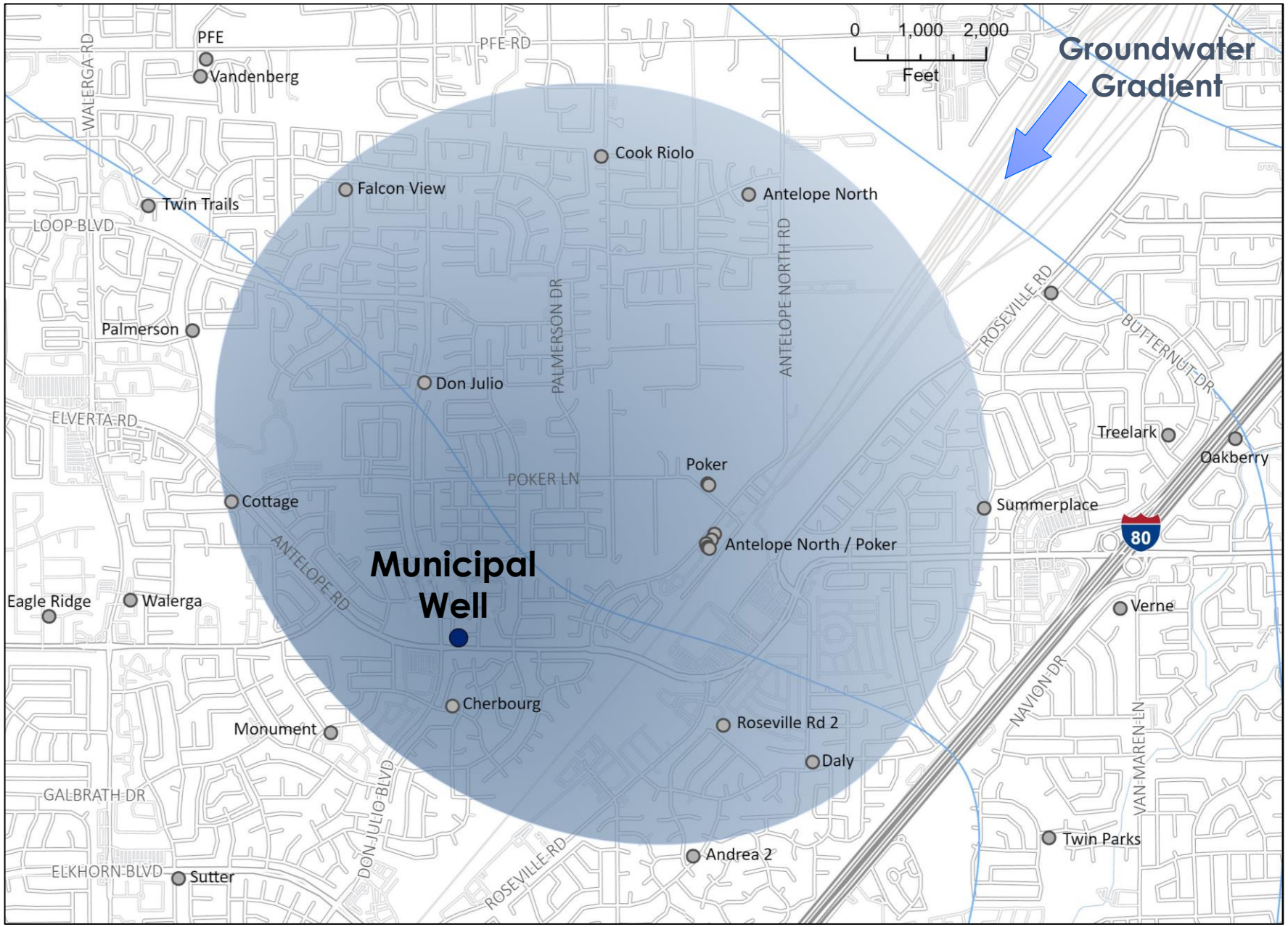
(a) Specific capacity, calculated as a unit of flow per foot of drawdown, is used to assess the performance of a pumping well. Well performance is influenced by the physical condition of the well and the hydraulic properties of the aquifer. Aquifer hydraulic properties (transmissivity and hydraulic conductivity) can be estimated using specific capacity measured in a pumping well.

(b) "--" denotes no condition for the point allocation. For example, there are only three possible scores a grid cell can be assigned based on perchlorate trends: 0 points (no trend and no detections), 2 points (decreasing trend), 3 points (no trend but detectable concentrations), and 4 points (increasing trend).

10-year Groundwater Contribution Zone

Municipal Well

Flow Rate: 3,000 gpm

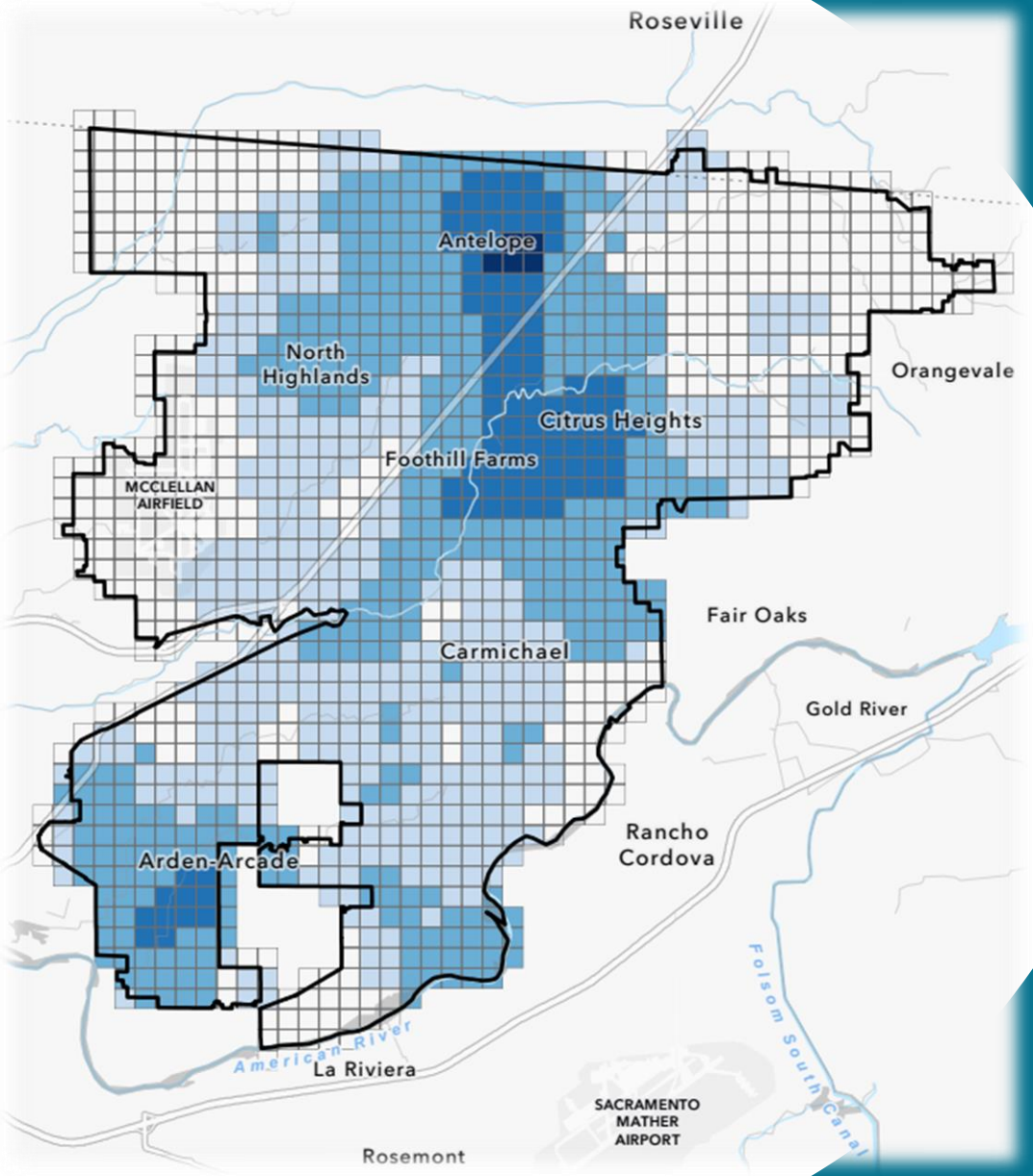


Groundwater Pumping Intensity

- Scaled 10-year groundwater contribution zones for all municipal wells

Intensity of Municipal Groundwater Pumping

- No Groundwater Contribution to Municipal Pumping (0 pts)
- One Municipal Well (1 pt)
- Two to Four Municipal Wells (2 pts)
- Five to Nine Municipal Wells (3 pts)
- Ten or More Municipal Wells (4 pts)

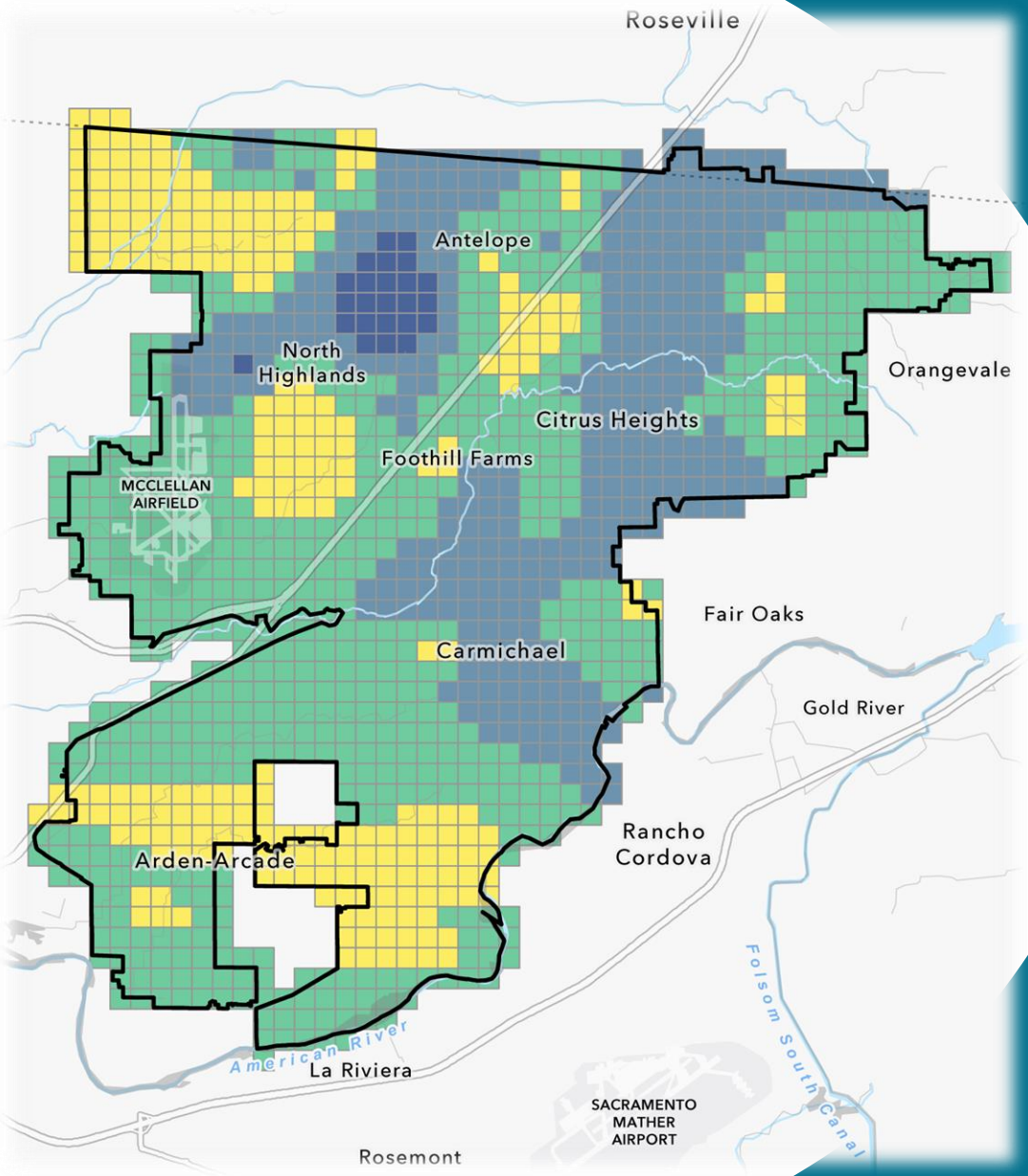


Specific Capacity

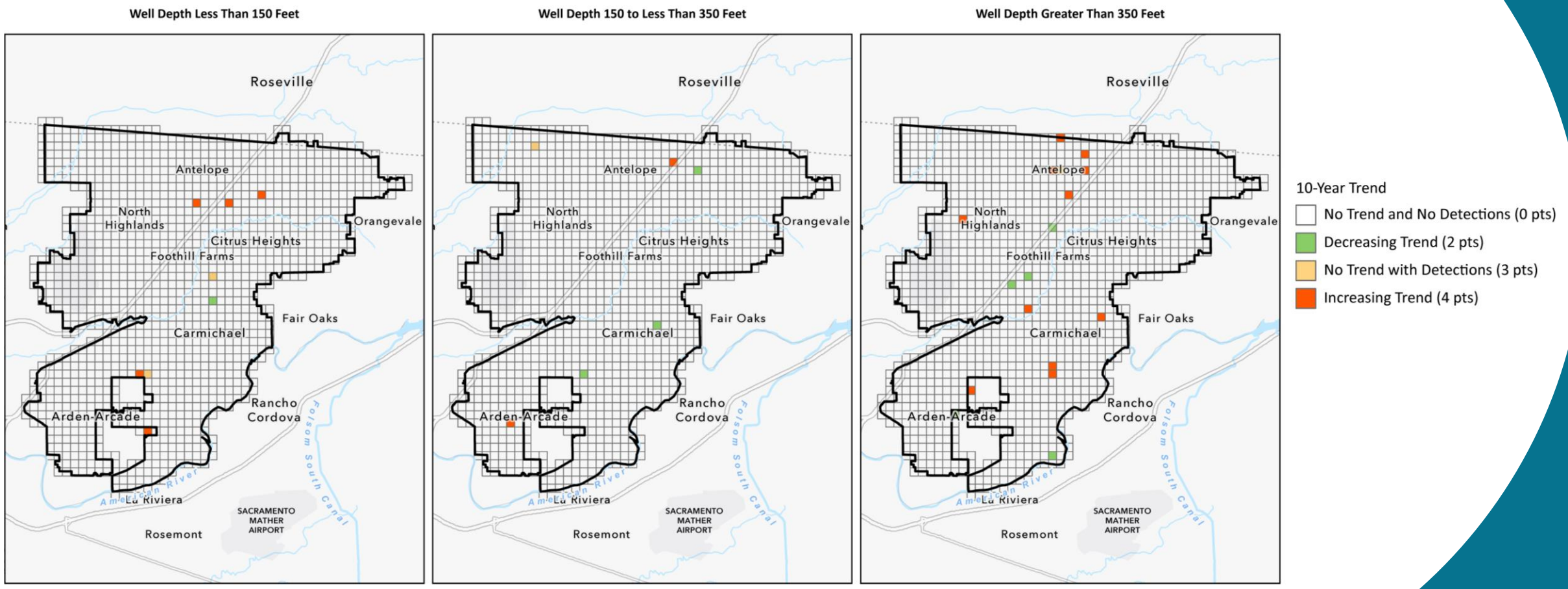
- Used as a proxy for aquifer permeability
- Calculated using all available pump test data

Specific Capacity (gpm/ft)

- < 50 (1 pt)
- 50 to <75 (2 pts)
- 75 to <150 (3 pts)
- ≥150 (4 pts)



PCE 10-Year Concentration Trends

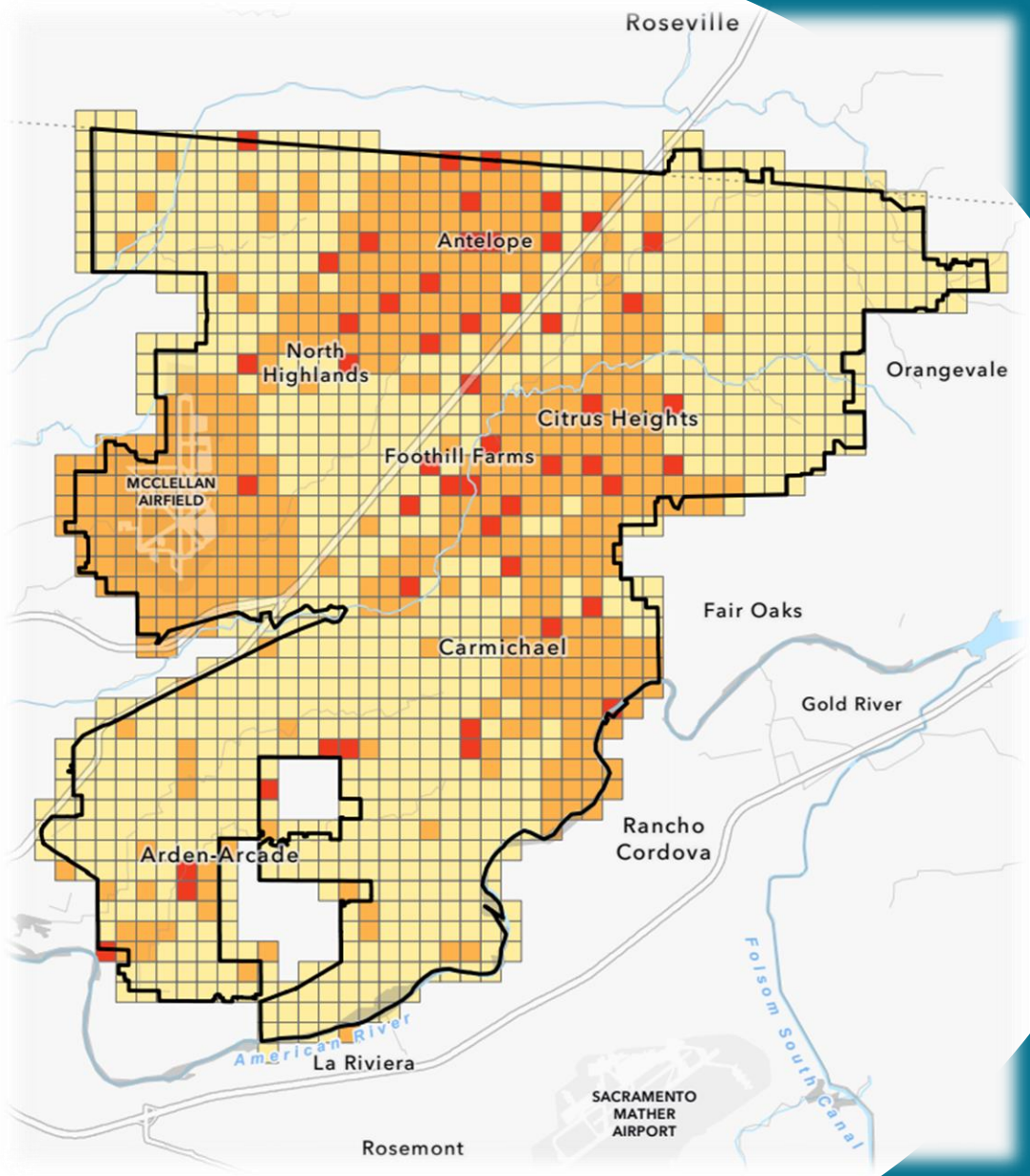


CALIFORNIA DEPARTMENT OF WATER RESOURCES
NORTH AMERICAN Subbasin
35 YEARS Of Excellence WEST YOST
SGA

Total Score

Score Range	Percent of Study Area in Score Range	Number of Municipal Wells in Score Range
1 – 4	63	98
5 – 8	33	74
9 – 23	4	49

- Score of 1 to 4: Areas considered favorable for municipal wells
- Score of 5 to 8: Areas considered to present potential threats to existing and future wells
- Scores 9 to 23: Areas under threat of contamination from one or more of the constituents of concern



Conclusions

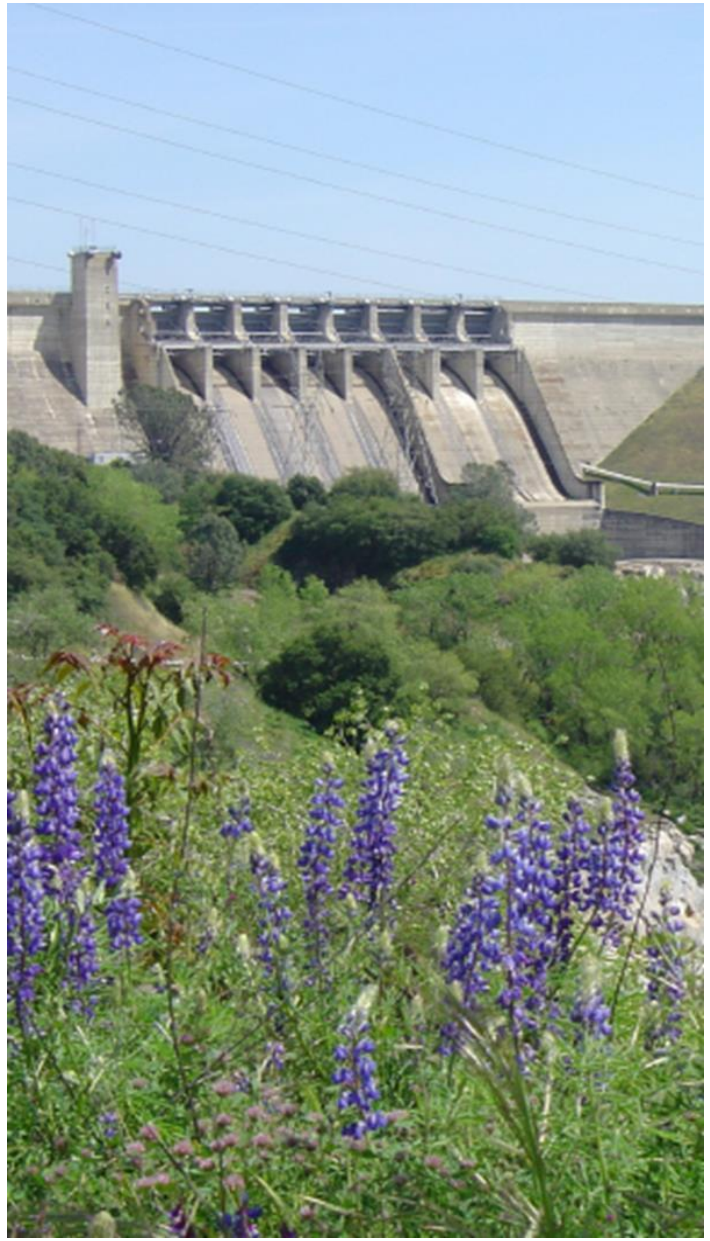
- Threats to supply wells are relatively low in most of the Study Area (96 percent of total area).
  - Low threat scores: 63 percent of area
  - Moderate threat scores: 33 percent of area
- Wellhead treatment is more likely to be needed in the remaining four percent of the Study Area.
- Threats attributable to:
  - High permeability aquifer zones acting as conduits for contamination sources located both within and upgradient of the areas.
  - Intensive groundwater pumping, which induces flow towards the pumping wells
- Ongoing conjunctive use management practices are expected to maintain stable groundwater conditions.

Questions

THANK YOU!

Components 4 and 5: Groundwater Monitoring Wells Construction

Presentation by GEI and SGA



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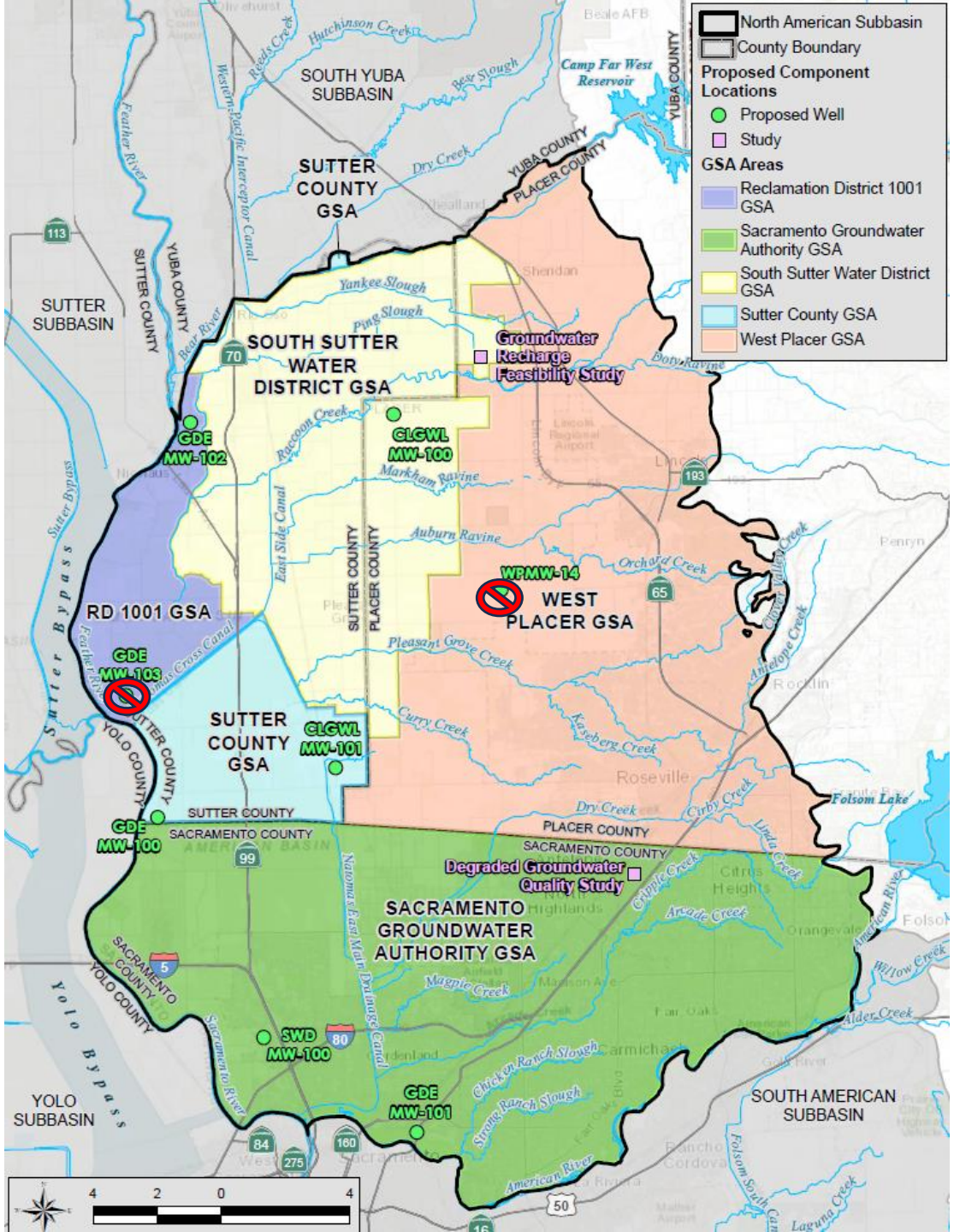
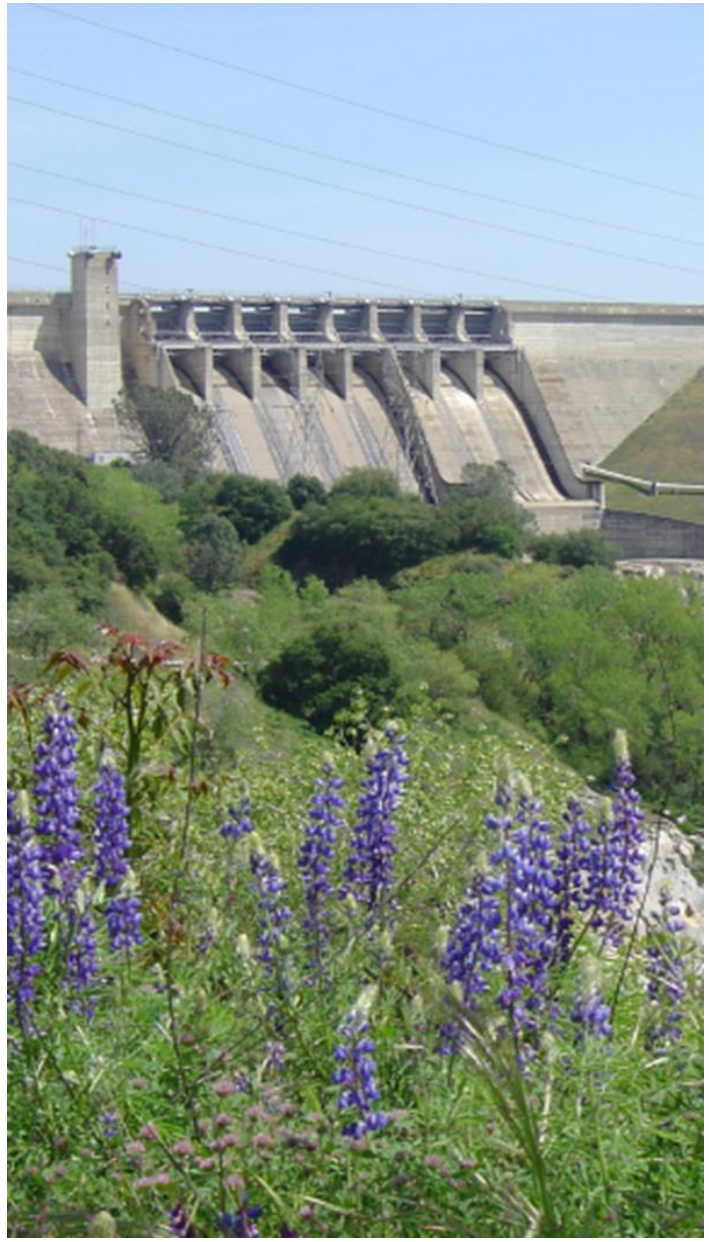
C4 and C5 - Proposed Well Locations





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DWR SGM Grant Updates

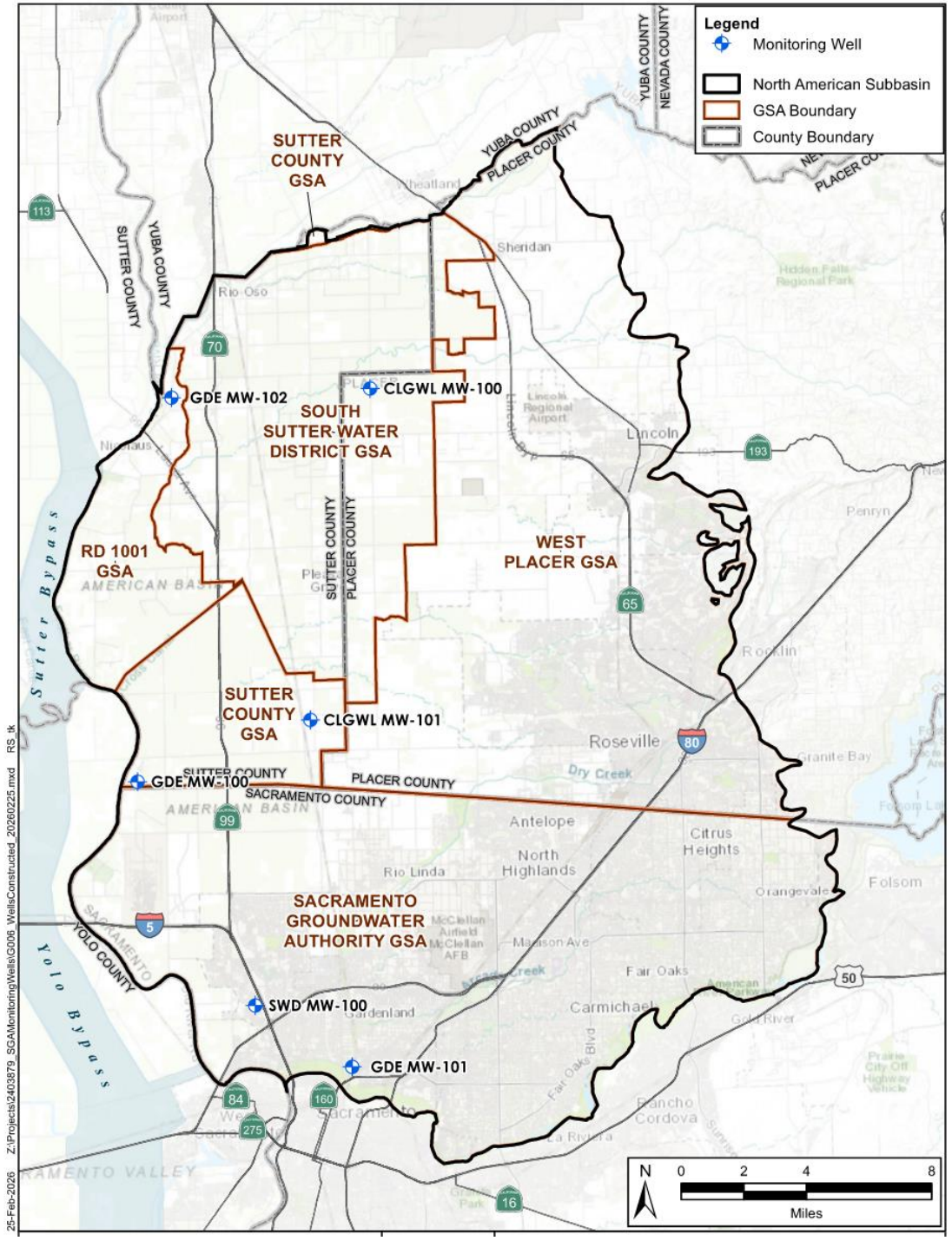
Component 4: Monitoring Wells

Status:

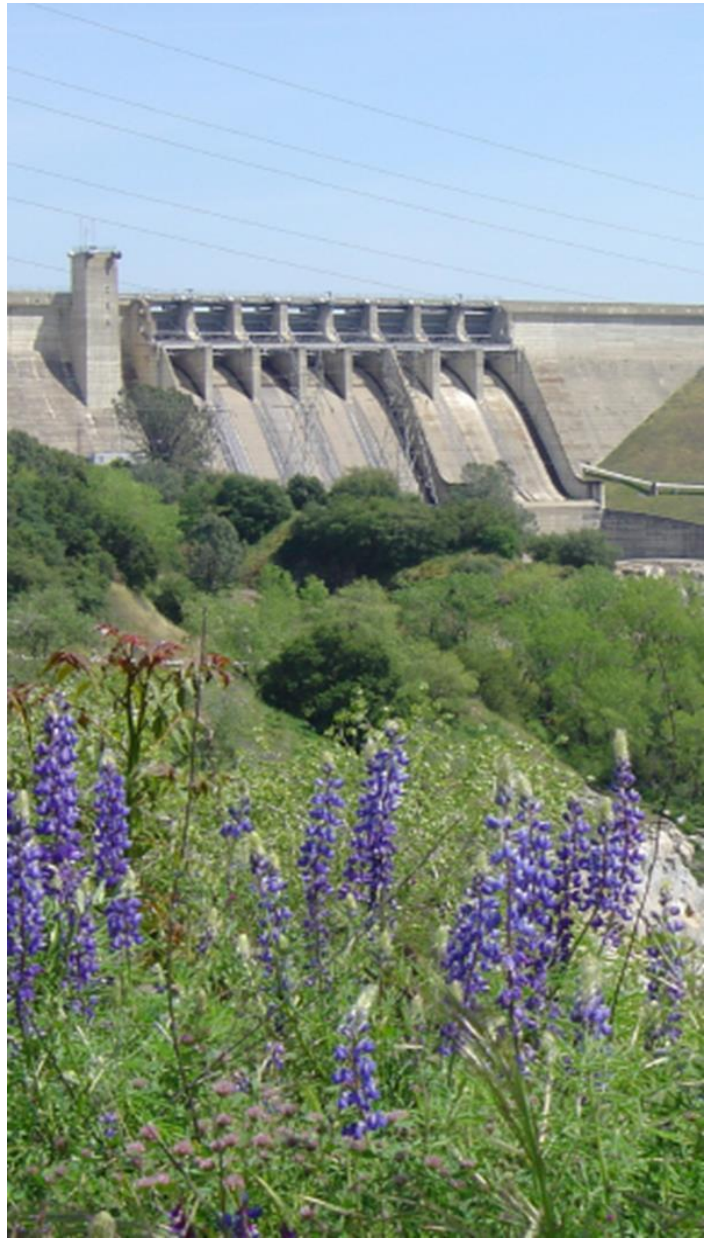
- Three Reverse Mud-Rotary wells completed as of December 2025
  - ✓ GDE MW-100, CLGWL MW-100, CLGWL MW-101
- Three Hollow Stem Auger wells completed as of January 2026
  - ✓ GDE MW-101, GDE MW-102, SWD MW-100

Wells Overview:

- Well depths range from 30 feet to 400 feet below ground surface
- Two wells are “nested” multi-completion
- Four wells are single completion
- All wells have been sampled for water quality
- All wells Well Completion Reports (WCRs) have been filed with the DWRs Online System for Well Completion Reports (OSWCR - https://water.ca.gov/Programs/Groundwater-Management/Wells/Well-Completion-Reports)



DWR SGM Grant Updates



Component 4: Monitoring Wells

Project Timeline Overview:

- Kick-off Meeting and Site Visits held on May 5, 2025, and May 6, 2025
- Construction occurred between October 28, 2025, and January 27, 2026
- Water Quality sampling occurred between December 14, 2025, and February 02, 2026
- All Grant activities completed by March 31, 2026

Challenges:

- GDE MW-103 removed from effort
- Well Permitting and CEQA approval caused delay in drilling schedule
- Wet season drilling (October 15 – April 15) created construction challenges

Future:

- Groundwater levels will be collected as part of the NASb SGMA implementation

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Questions/Comments?

How to Engage During the Meeting

- **On Zoom**:
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- **Via telephone**:
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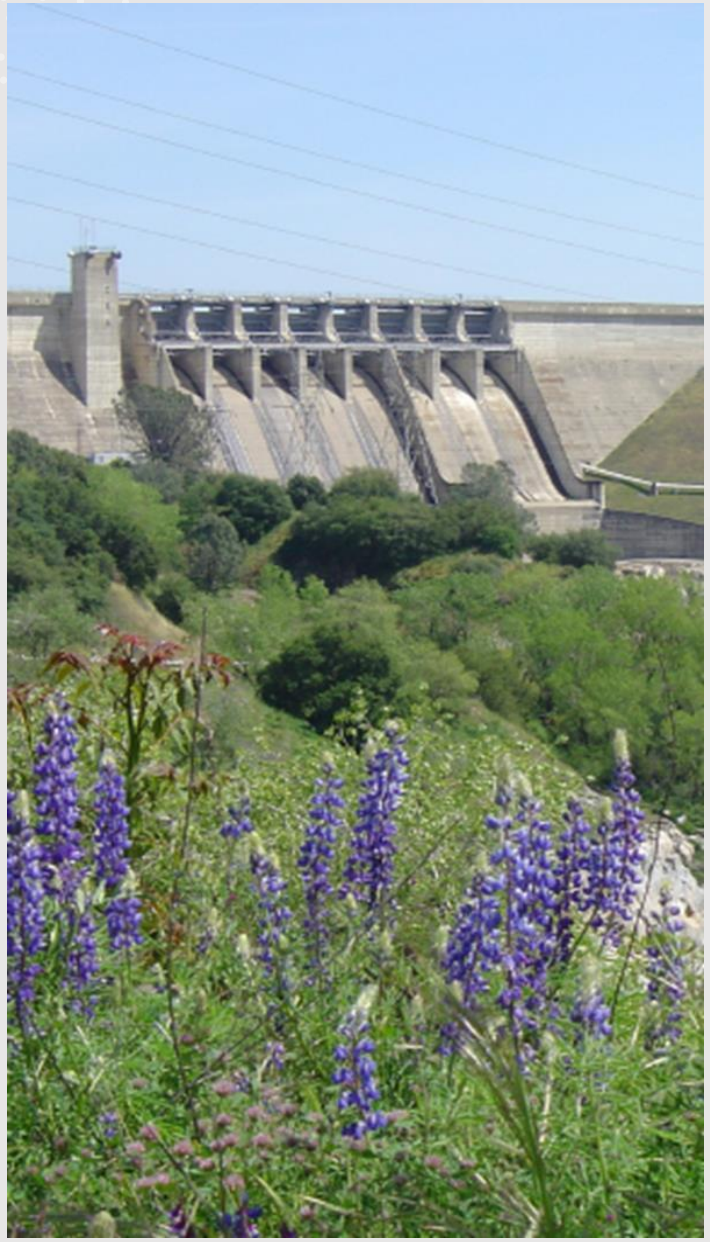
  - *6 to unmute when called on



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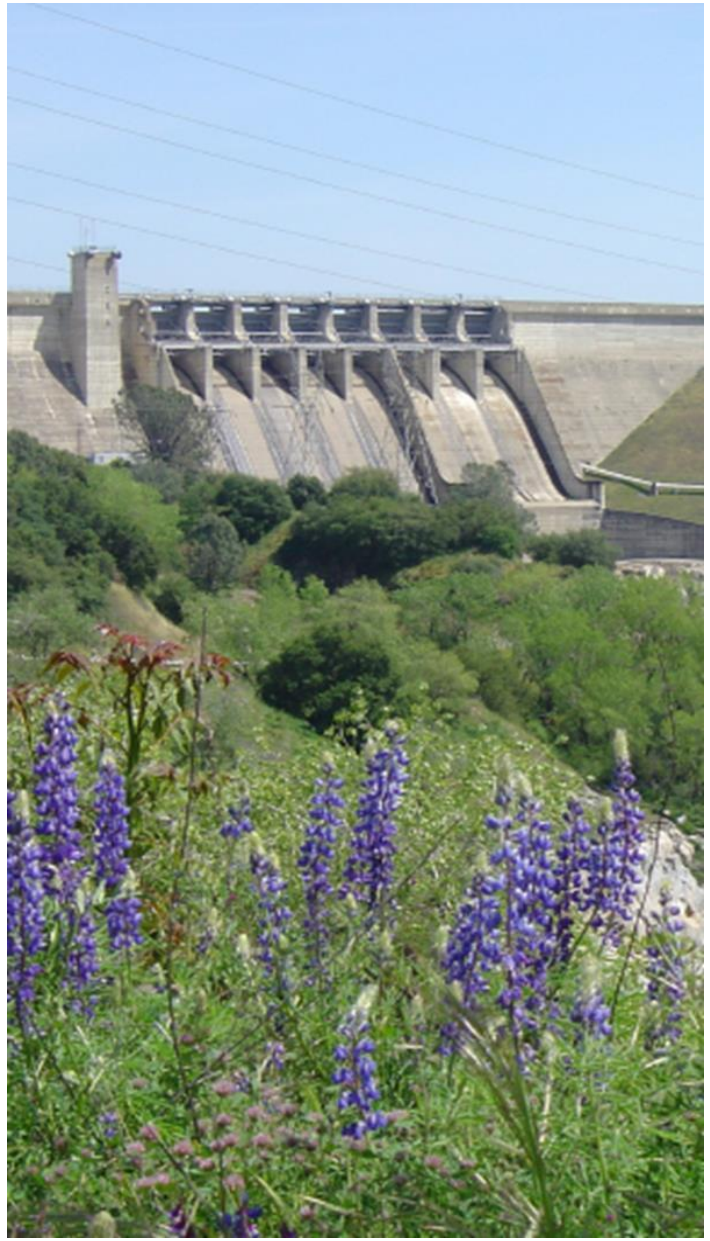
Component 6: GSP Update and Annual Report

Presentation by SGA and Woodard & Curran



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Component 6: GSP Update and Annual Report

Associated Tasks and Deliverables:

- Task 1: DMS Maintenance
- Task 2: Groundwater Levels and Quality Monitoring
  - 2022
  - 2023 **(WY 2023 WQ)**
  - 2024
  - 2025 **(WY 2025 WQ)**
- Task 3: Prepare Annual Reports
  - WY 2022
  - WY 2023
  - WY 2024
  - WY 2025 **In Progress, submitting to DWR by required April 1st deadline**
    - *A public meeting to review the data submitted in WY 2025 Annual Report is anticipated to be held in June 2026*
- Task 4: Develop and Implement Well Permit/Construction Practices
- Task 5: Domestic/Shallow Well Data Collection and Communication
- Task 6: Groundwater Dependent Ecosystem (GDE) Assessment Program
- Task 7: Prepare GSP Update
- Task 8: Monitoring Well Map Book
- Task 9: Transducer Purchase and Installation
- Category E: Task 1: Public Meetings
- Category E: Task 2: Supporting Engagement Strategies

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Questions/Comments?

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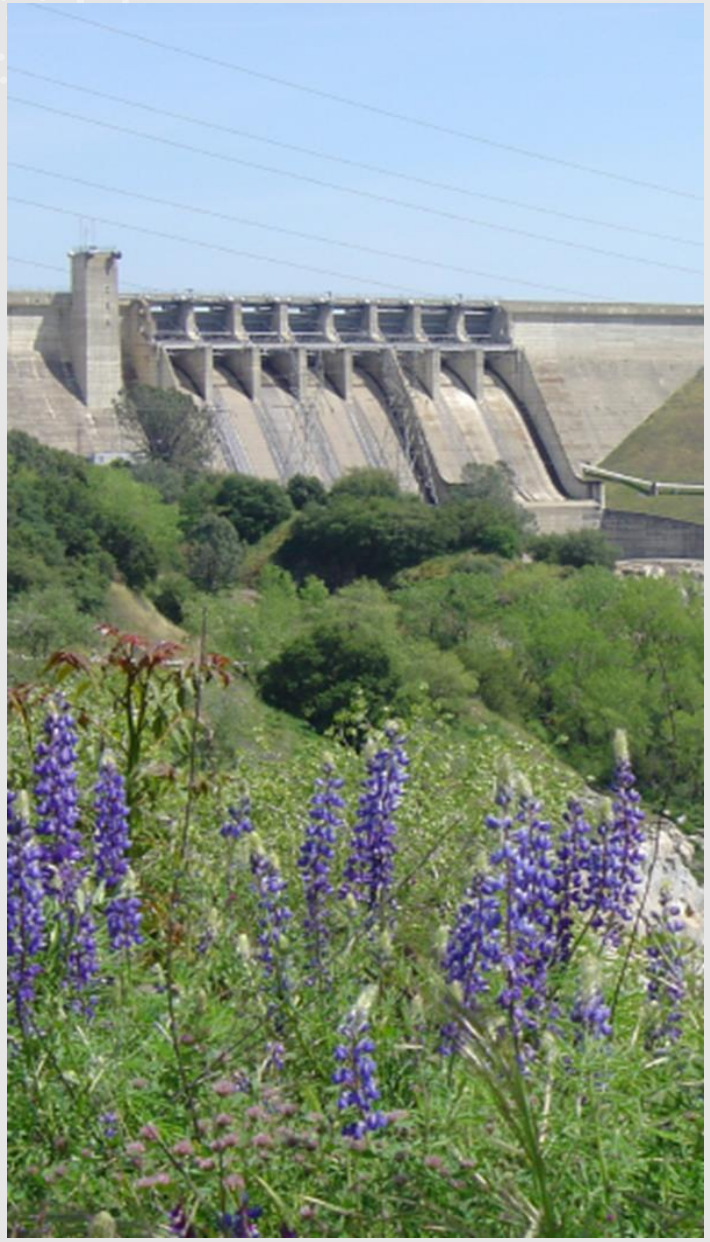

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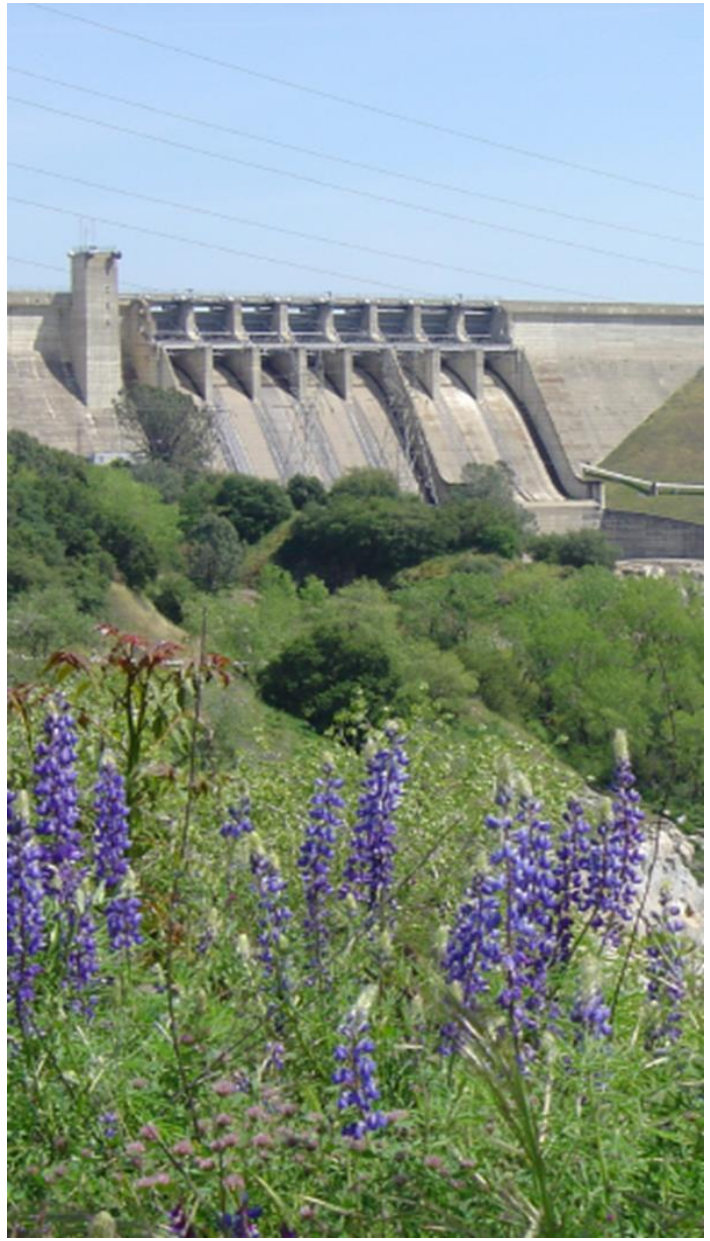
Component 7: CoSANA Model Upgrade and Enhancements

Presentation by Woodard & Curran



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North American Subbasin – Post Public Meeting
March 24th, 2026

Cosumnes - South American - North American (CoSANA) Integrated Water Resources Model Upgrade Status

Presented by: Jingnan Zhou & Ali Taghavi (Woodard & Curran)

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Agenda

- CoSANA Model Upgraded Features, Recalibration Results
- CoSANA Baselines and Climate Scenarios
- Summary and Findings

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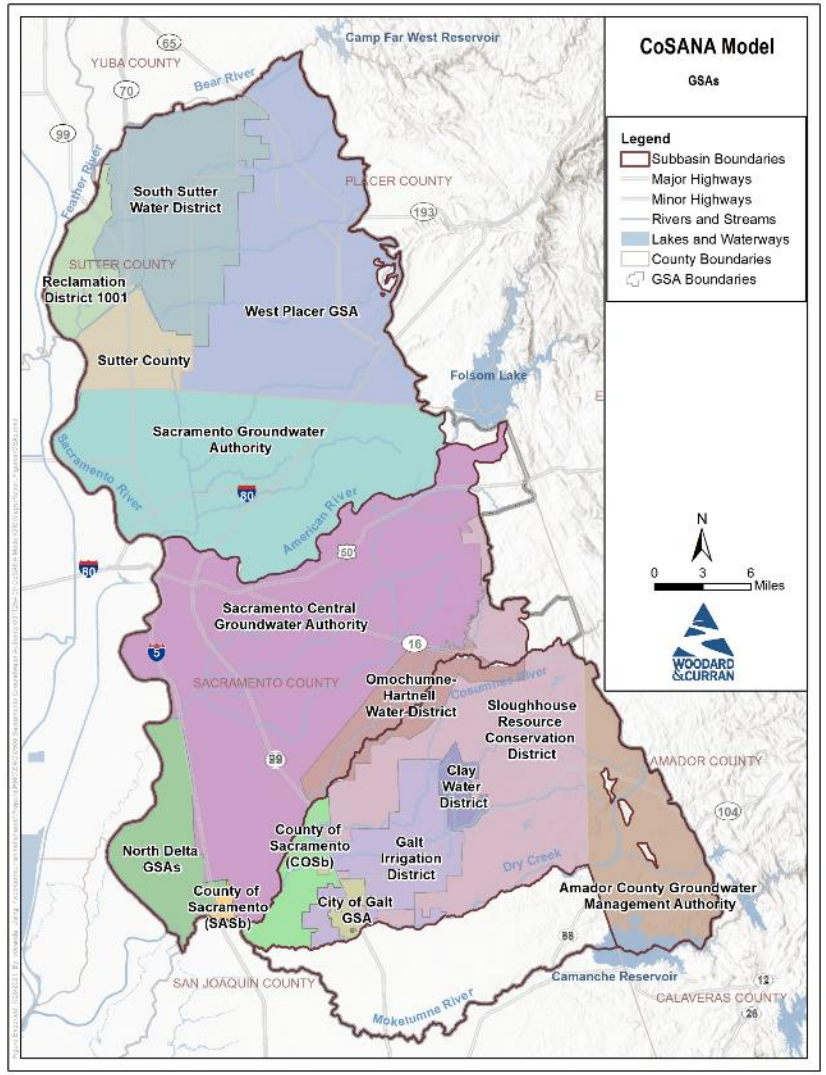
CoSANA Model Upgrade Recap

- **Purpose:**
  - Upgrade specific model features in the NASb Subbasin to better support sustainable water management in the Subbasin
- **Data & Technical Updates**:
  - Data gaps, hydrology/period of record, hydrogeology, land use & cropping, stream geometry
- **Water System Characterization**:
  - Water demands and supplies, groundwater infrastructure, remediation activities
- **Model Refinements**:
  - Updated inputs and recalibrated model
- **Baseline and Scenarios:**
  - Updated current and projected baseline conditions, and developed climate change scenarios
- **Reporting & Coordination**:
  - WY 2025 Annual Report and coordination with SGA
  - Model Report to be published in March 2026
- **Next Steps:**
  - Support the GSP Periodic Evaluation



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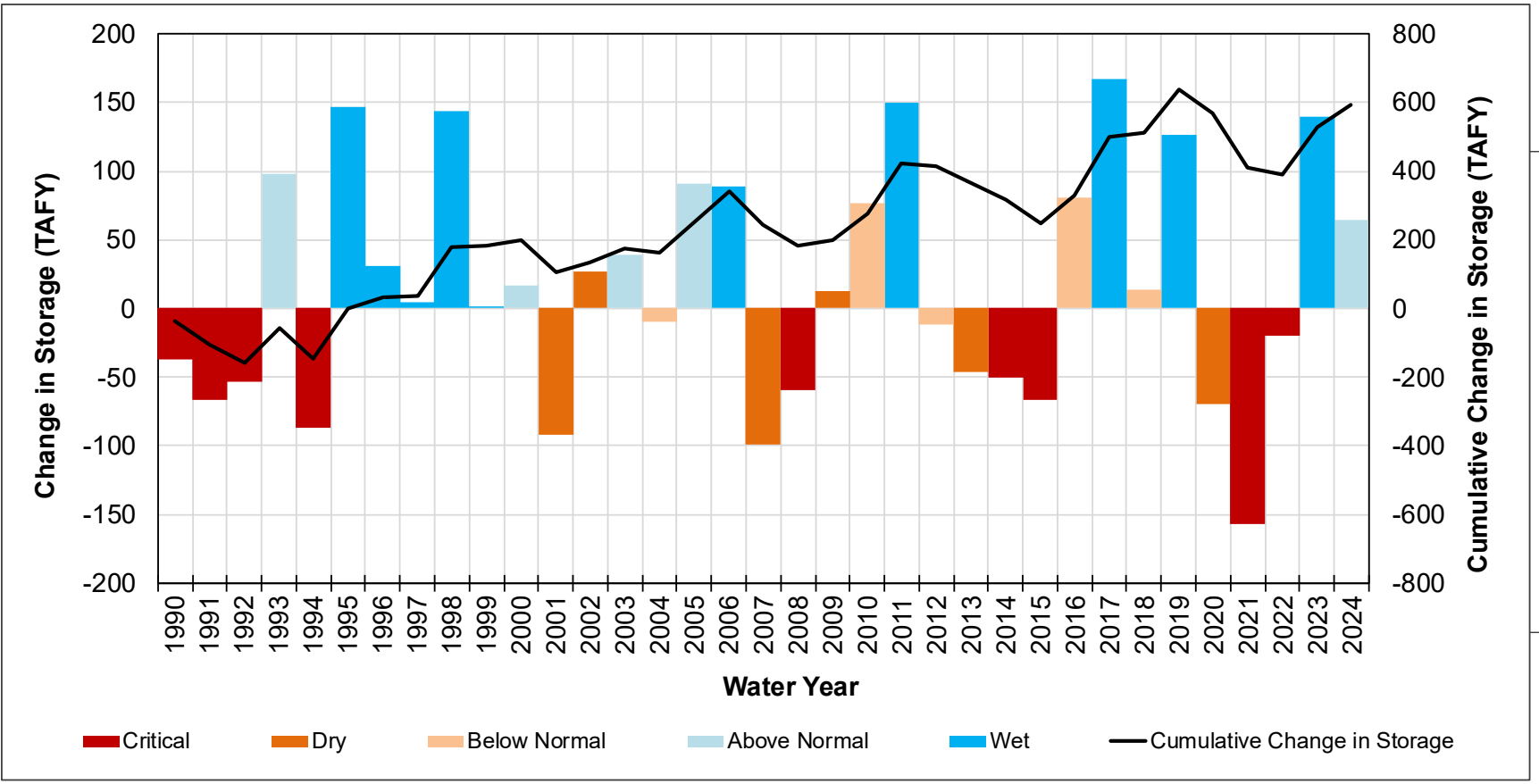
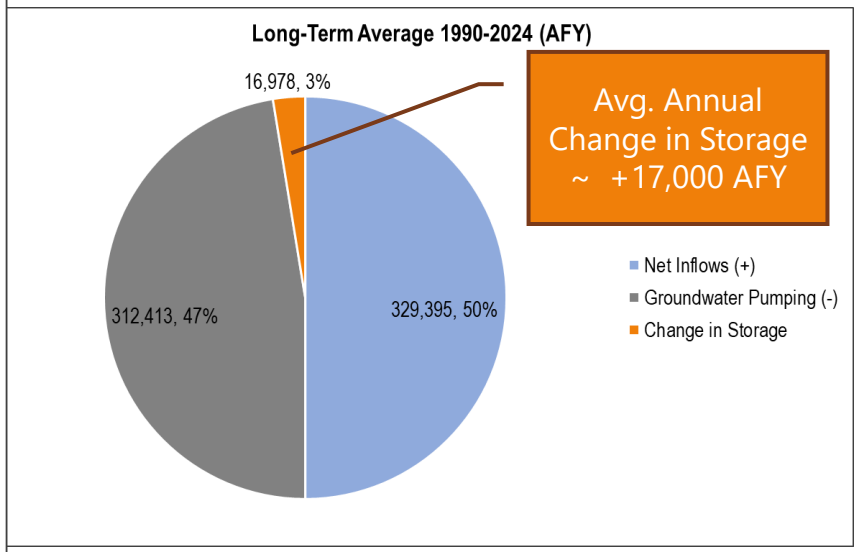
Historical Water Budget

Groundwater Budget





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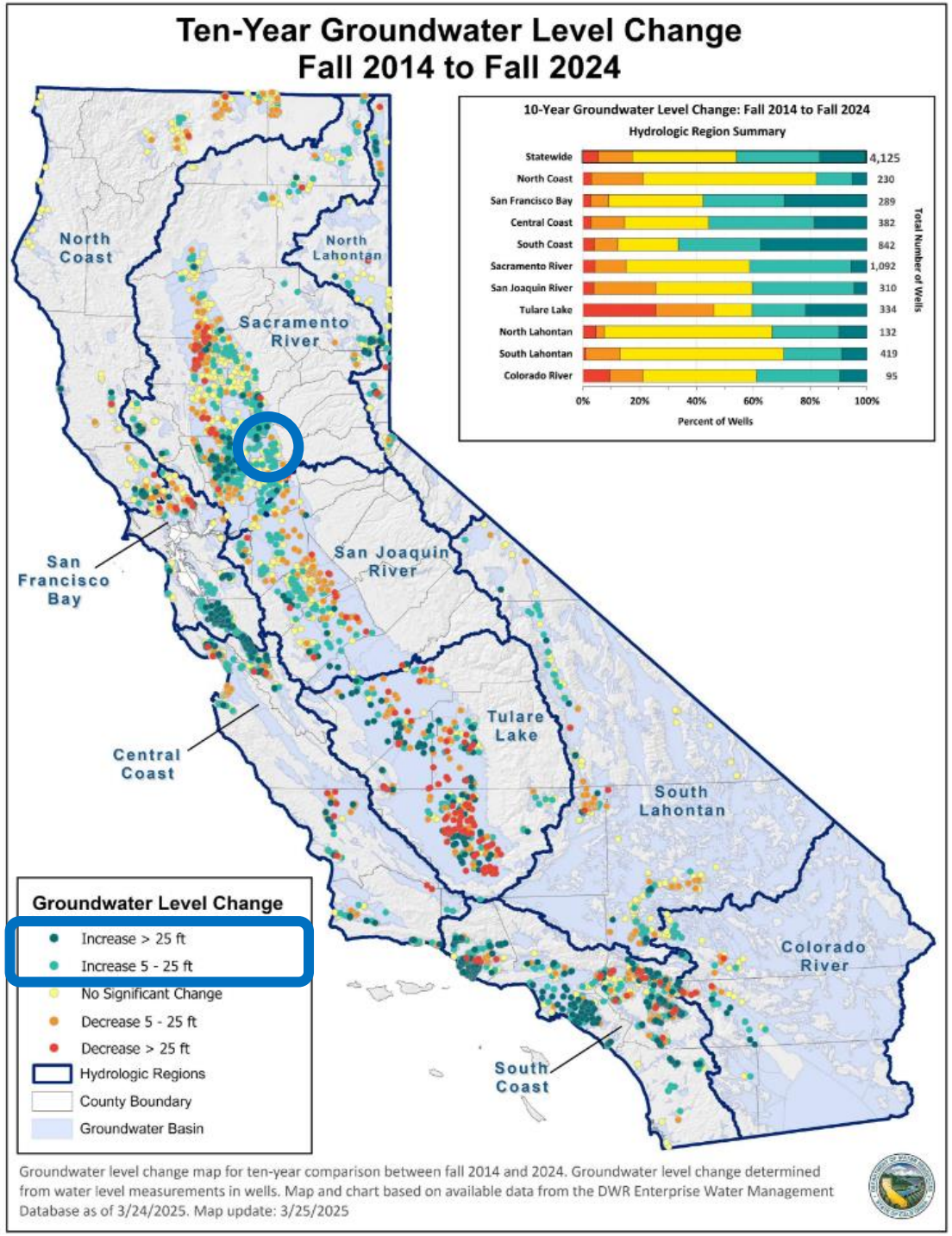
California's Groundwater Conditions:

Semi-Annual Update (May 2025)

- Statewide and hydrologic region groundwater level trend analysis map for WYs 2014-2024
- Reflect generally positive early impacts of local and regional groundwater management efforts



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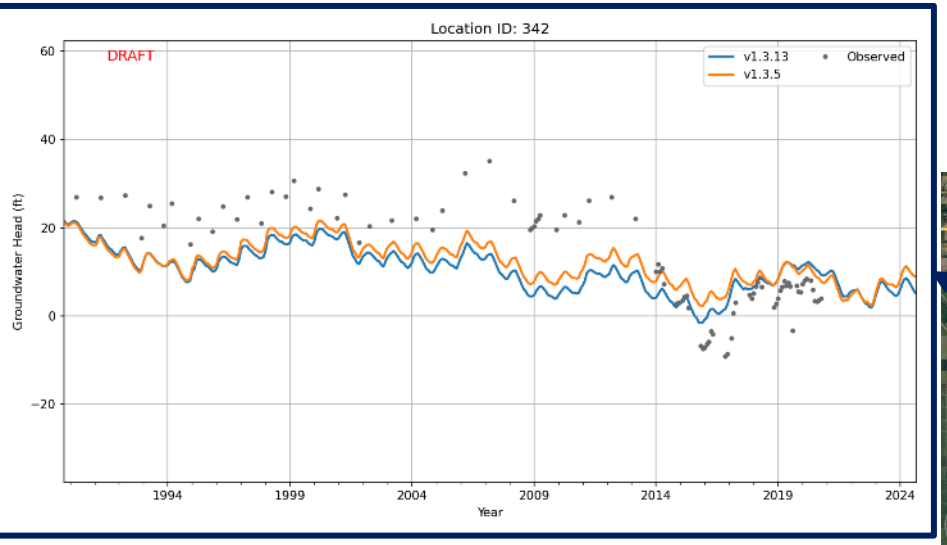
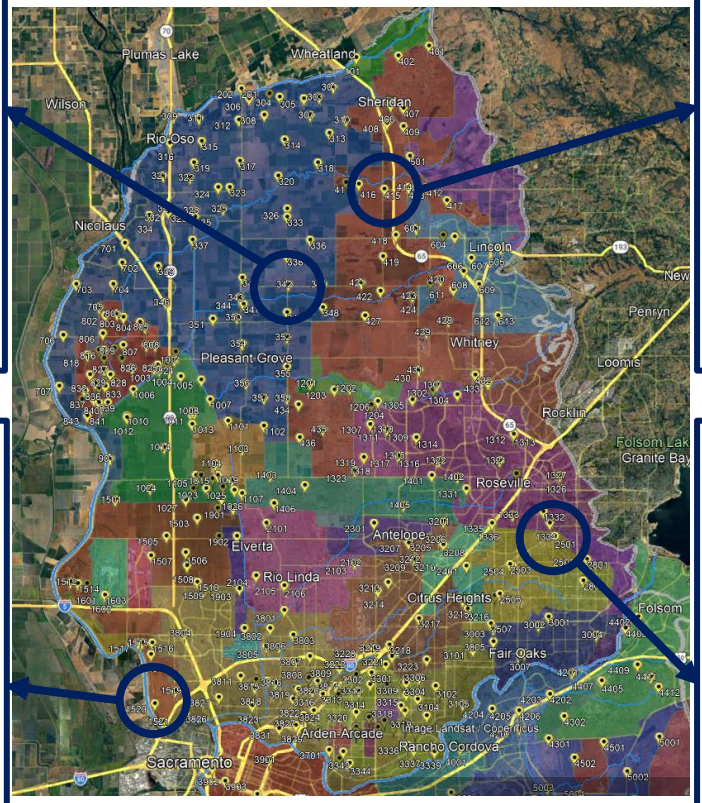
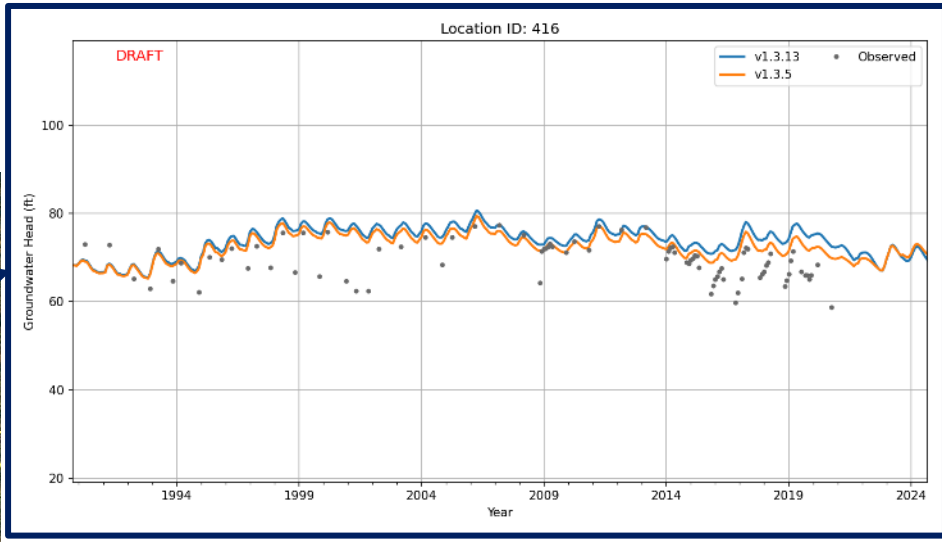
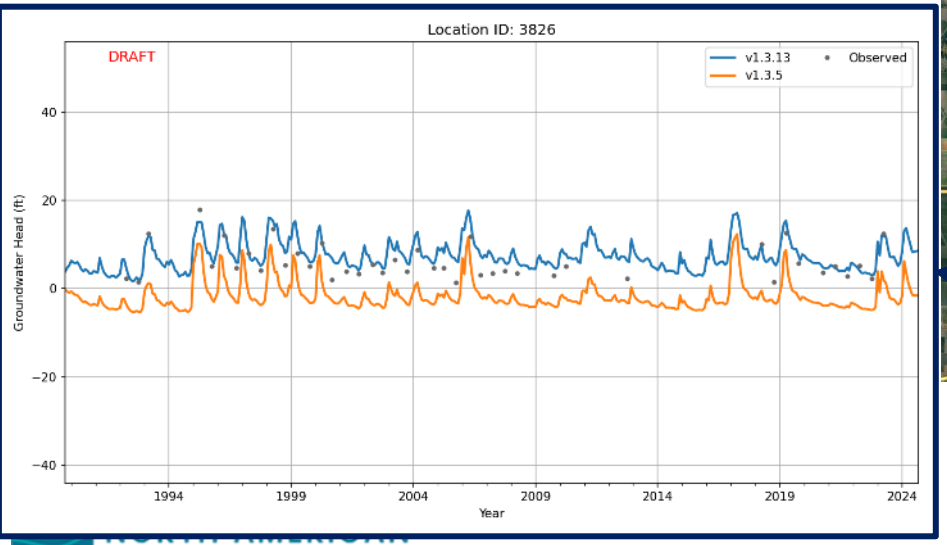
Historical Model Calibration

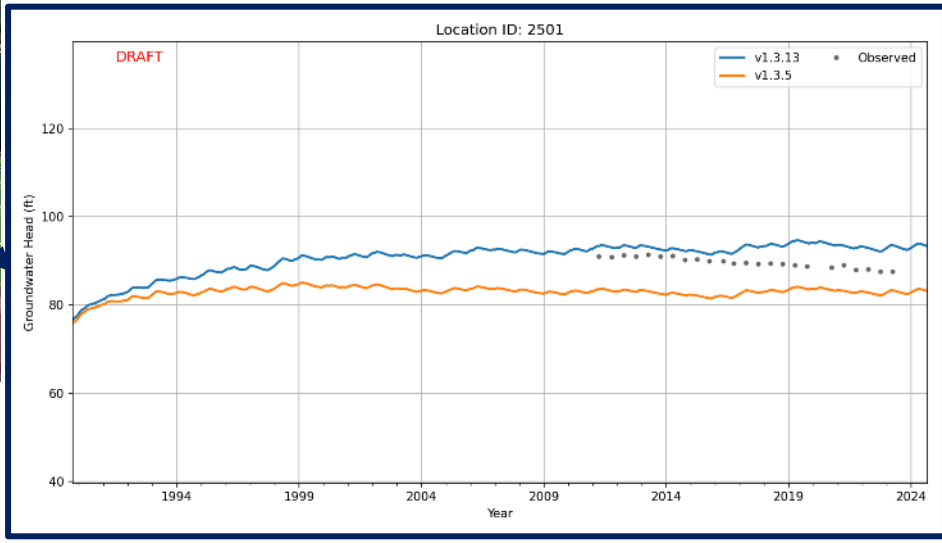
Groundwater Levels











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Baseline Conditions

Assumptions and Approaches

- Period of Analysis: WY 1970-2024
- **Current Condition Baseline (CCBL)**
  - Water Demand & Supply: 2020 conditions from 2020 UWMPs
  - City of Sacramento: Groundwater Master Plan ECBL assumptions
  - Land Use: Current Conditions based on the original GSP
  - Facilities: 2024 Conditions
- **Projected Condition Baseline (PCBL)**
  - Water Demand & Supply: 2040 conditions from 2020 UWMPs
  - City of Sacramento: Groundwater Master Plan FCBL assumptions
  - Land Use: Projected Conditions based on the original GSP
  - Facilities: Projected based on UWMP
- **Projected Condition with Climate Change Scenarios (PCBL-CC)**
  - Scenarios
    - 2070 Central-Tendency
    - 2070 Hot and Dry
  - Approaches
    - Based on American River Basin Study (ARBS) from 2022 GSP

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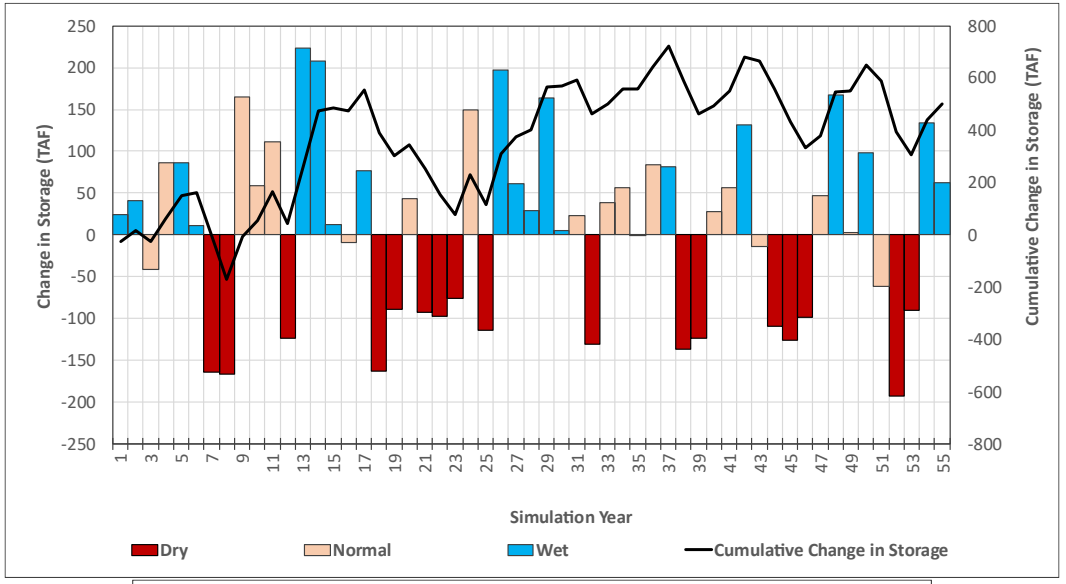
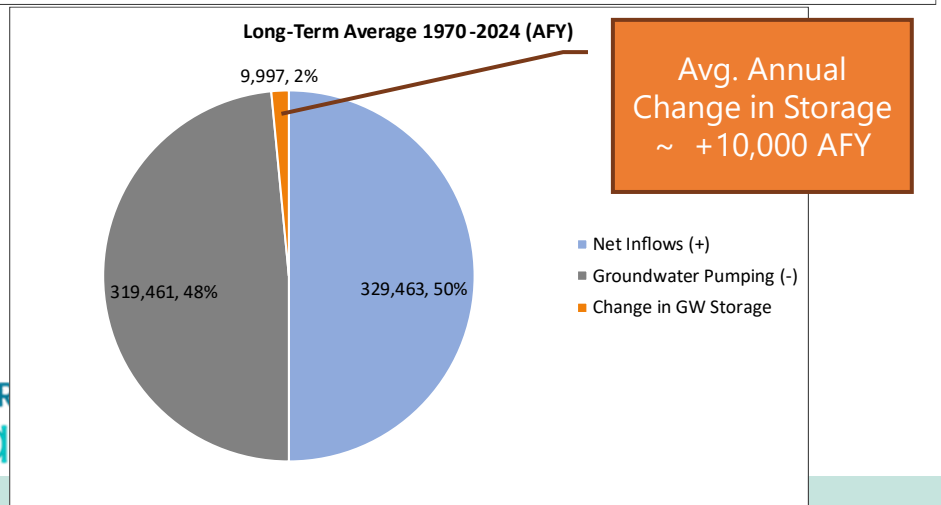
Baseline Water Budget

Groundwater Budget

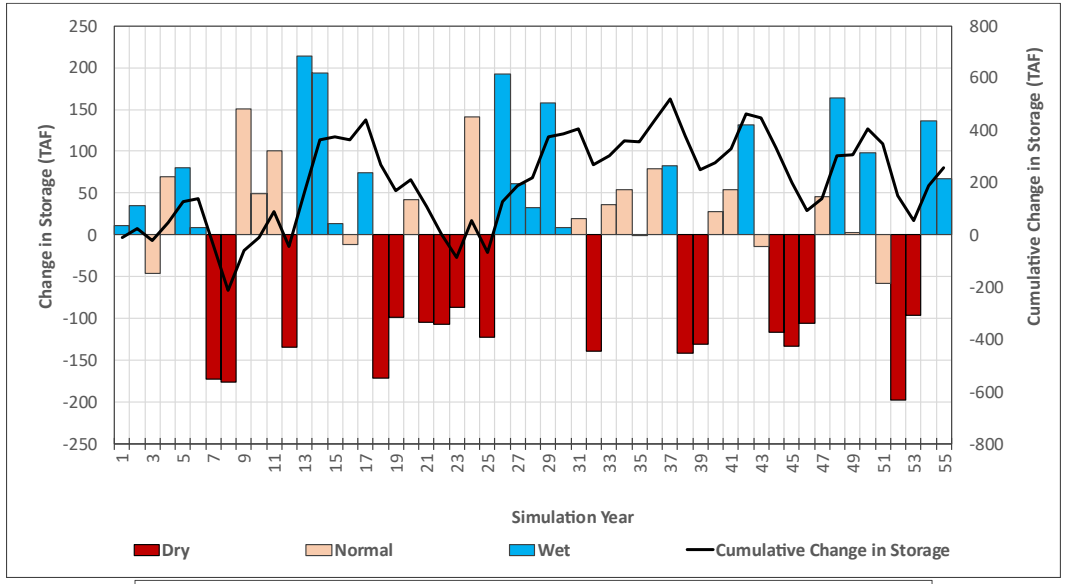
Current Conditions Baseline

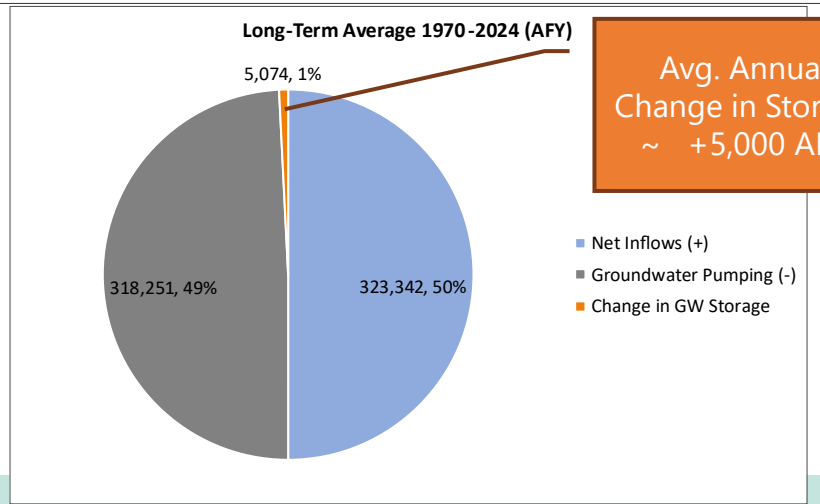




Avg. Annual Change in Storage ~ +10,000 AFY

Projected Conditions Baseline





Avg. Annual Change in Storage ~ +5,000 AFY

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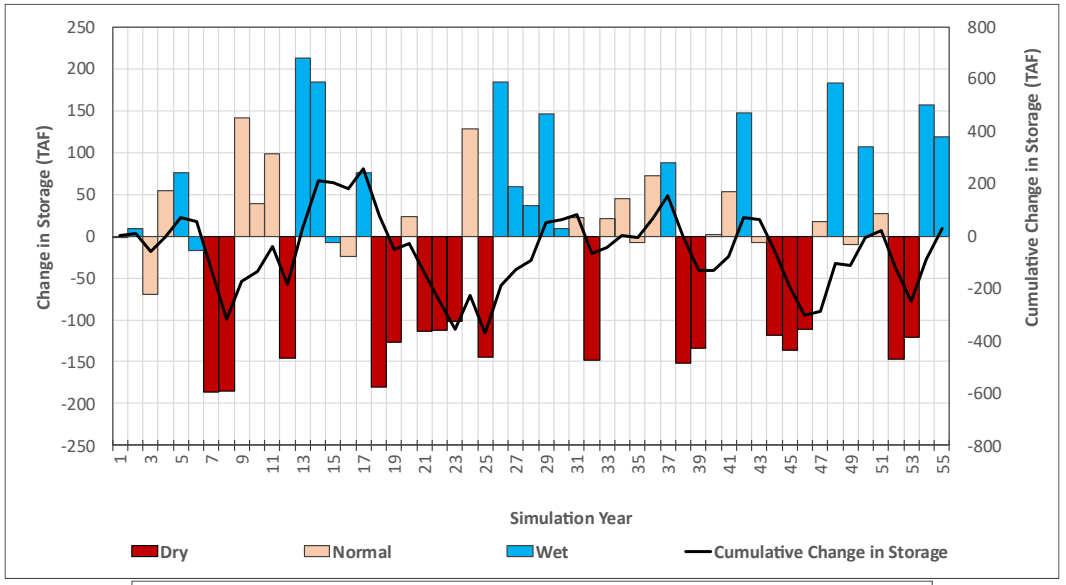
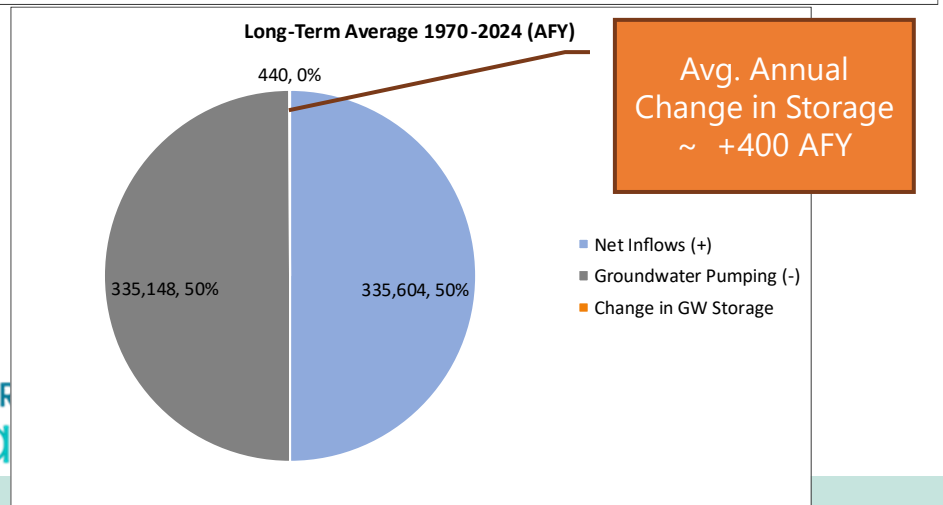
Climate Change Scenario Water Budget

Groundwater Budget

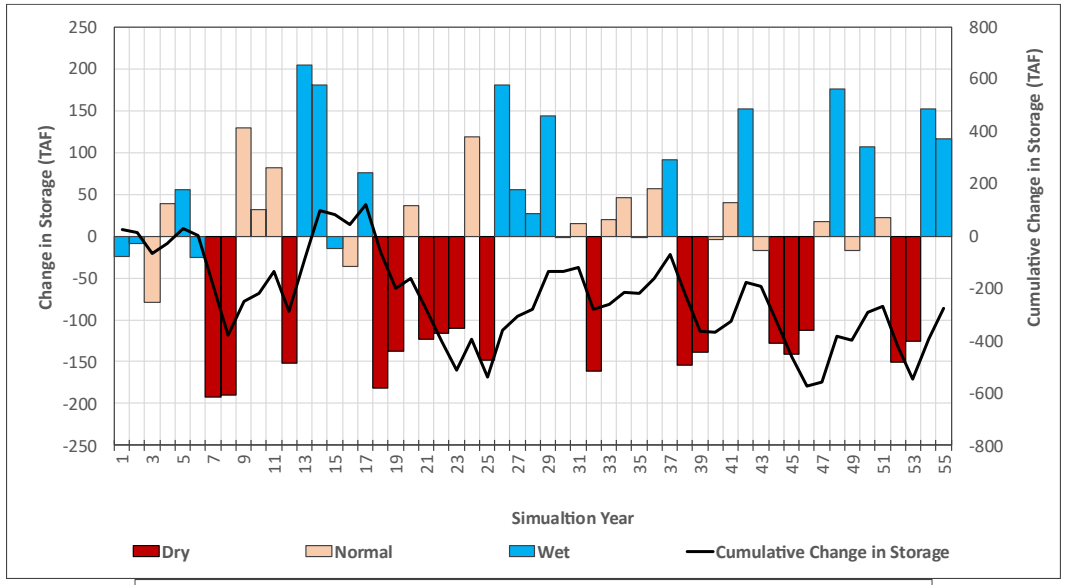
PCBL 2070 Central-Tendency

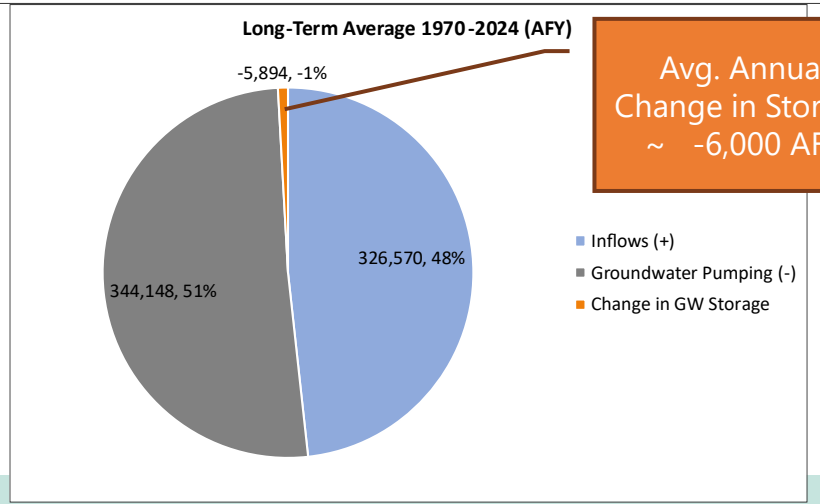




Avg. Annual Change in Storage ~ +400 AFY

PCBL 2070 Hot and Dry





Avg. Annual Change in Storage ~ -6,000 AFY

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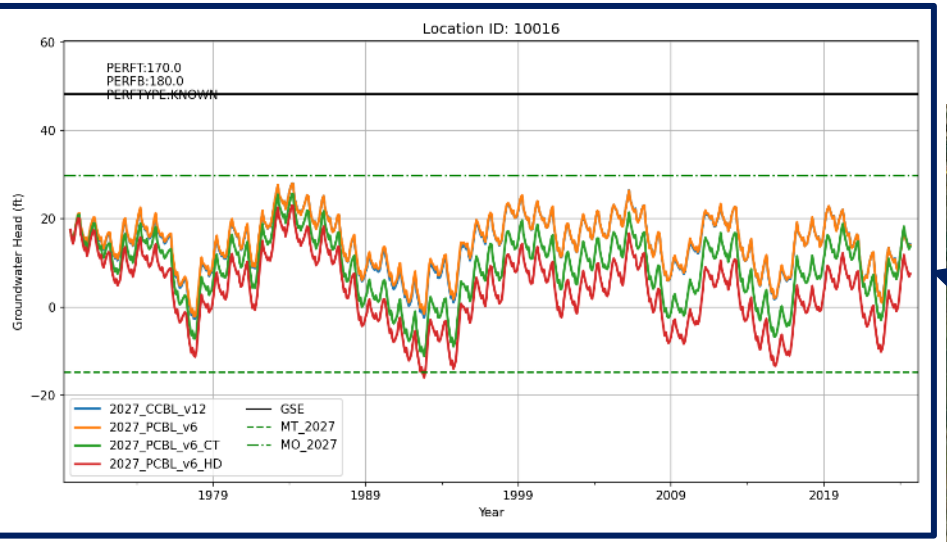
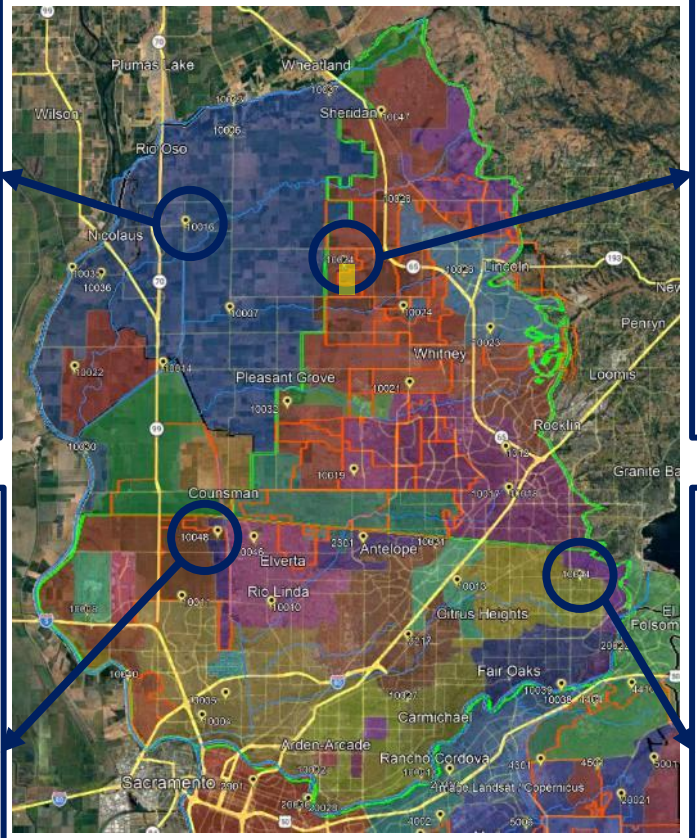
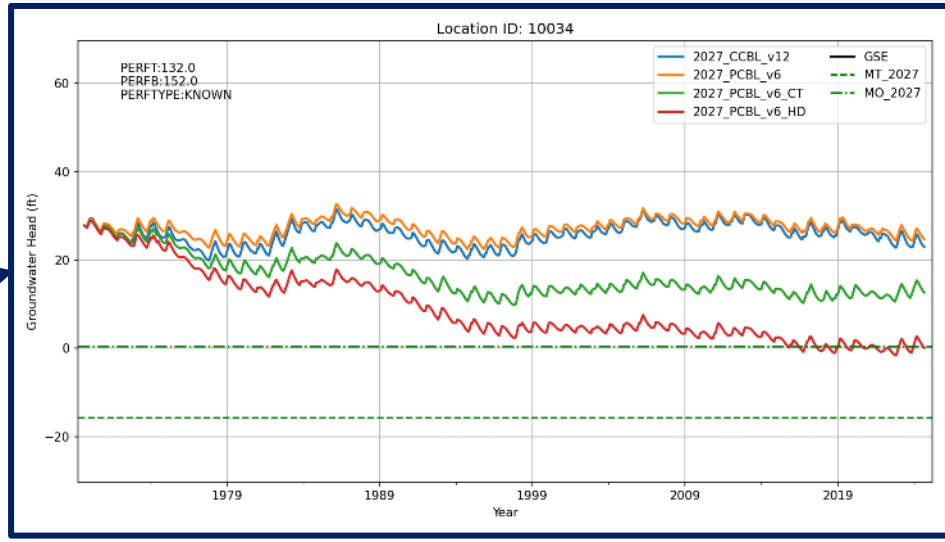
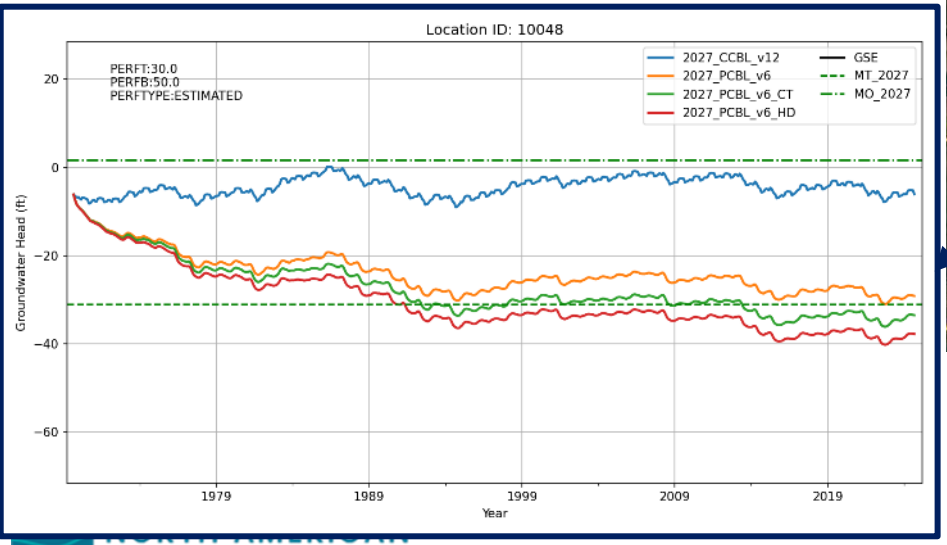
Baseline and Climate Scenario Results

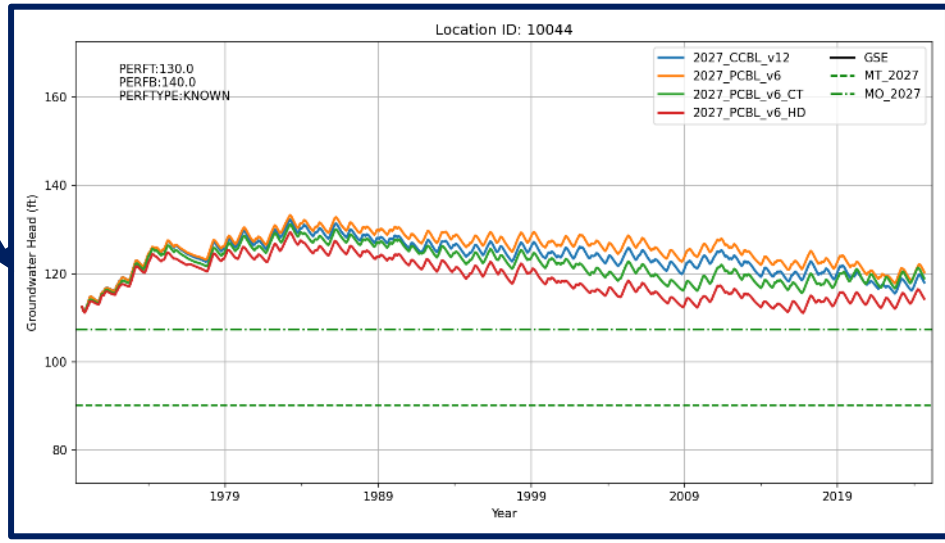
Groundwater Levels











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Summary and Findings

- Model upgrades and enhancements are applied to:
  - CoSANA Historical Model
  - CoSANA Baselines and Scenarios
    - Current Conditions BL
    - Projected Conditions BL
    - Projected Conditions BL with Climate Change Scenarios
      - PCBL 2070 Central-Tendency
      - PCBL 2070 Hot and Dry
- The resulting model is a much more improved numerical tool meets the needs of regional and local programs and projects:
  - GSP Periodic Evaluation
  - GSP Projects and Management Actions
  - Sacramento Regional Water Bank

Questions/Comments?

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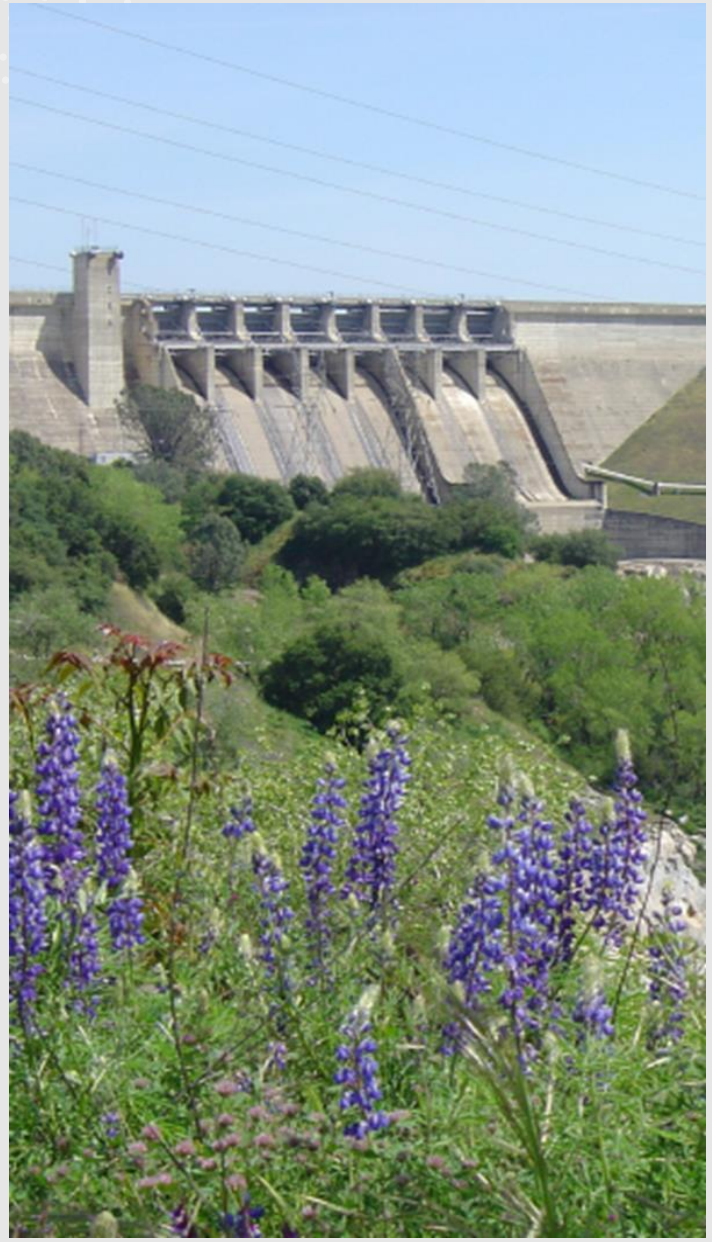

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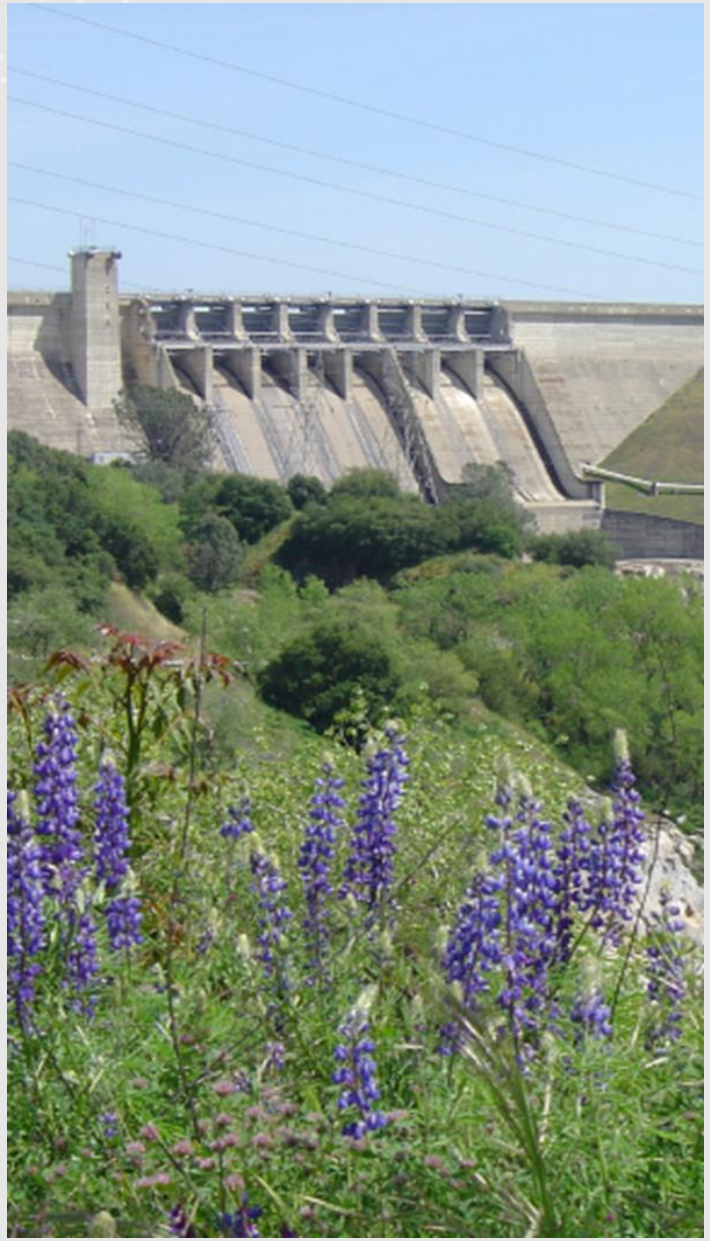
Thank you!



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