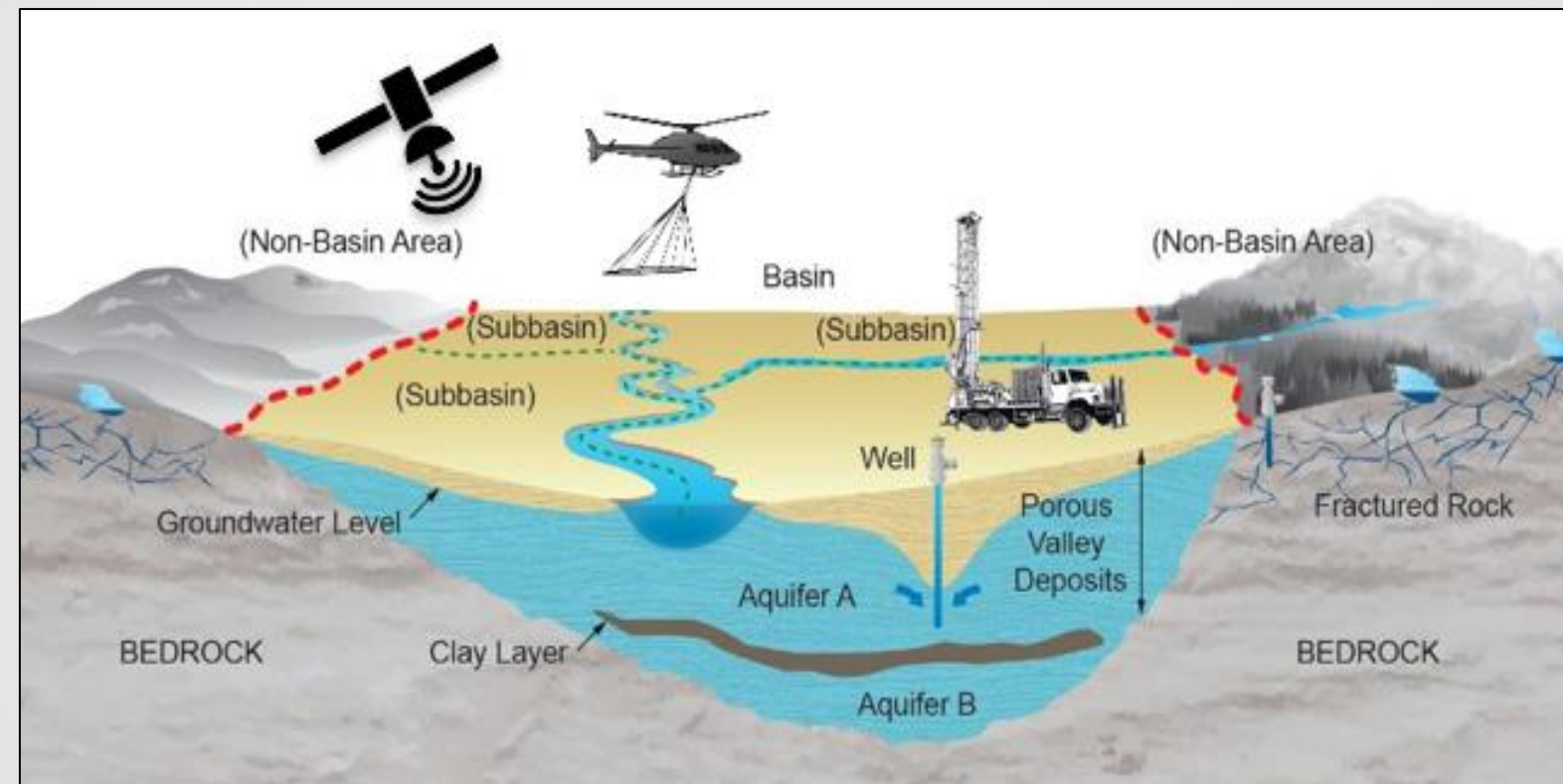




DWR's Basin Characterization Program

CWEMF

September 23, 2024



Steven Springhorn, Katherine Dlubac, Benjamin Brezing, Craig Altare, and Tim Godwin
Sustainable Groundwater Management Office, CA Department of Water Resources



California's Groundwater Connected Activities

Requirements

CA Water Code

10720.1, 10729, 10920, 12924

Focus - SGMA Basins

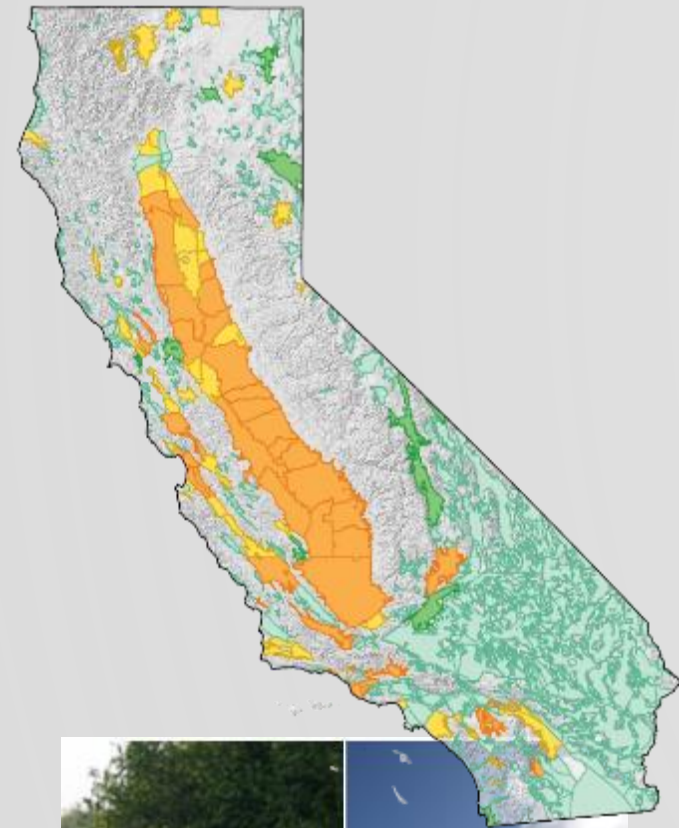
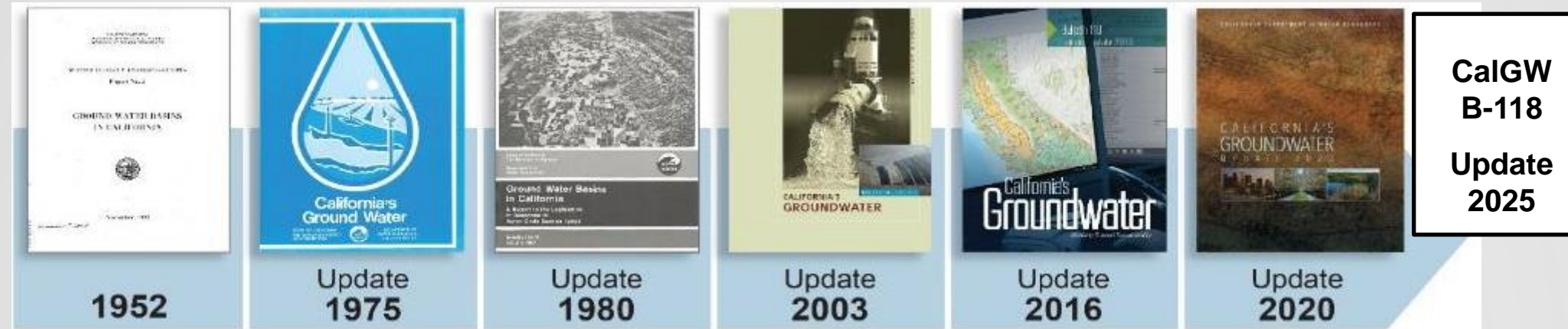
Water Resilience Portfolio,

Water Supply Strategy,

Drought/Flood

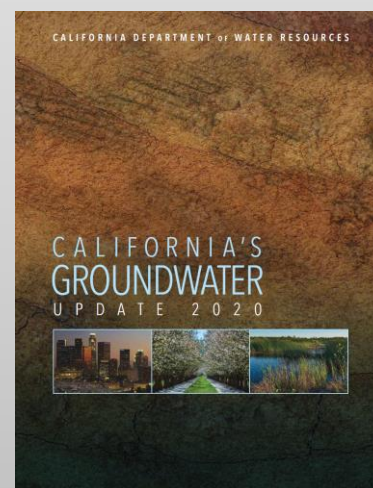
DWR is Required to Publish Bulletin - 118, Characterize Groundwater Basins, and Provide Assistance

CA's Groundwater (B-118) & CA Water Plan (B-160) (Archive & Vision)



California's Groundwater Informational Resources

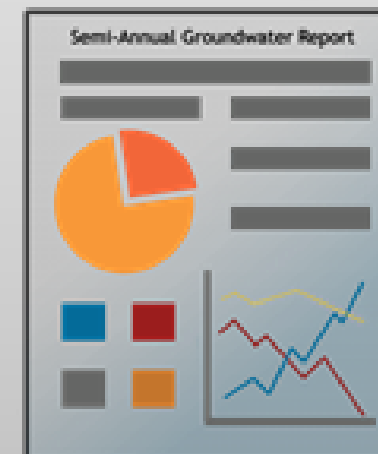
California's Groundwater (Bulletin 118) Updates



Updated every 5 years

- CalGW (B-118) consists of:
 - Highlights (English & Spanish)
 - Statewide Report
- Update 2025 in Development
- Target Release Date, Mid & End of 2025
- More Info: water.ca.gov/calgw

Semi-Annual Conditions Updates



Updated twice a year

California's Groundwater Live



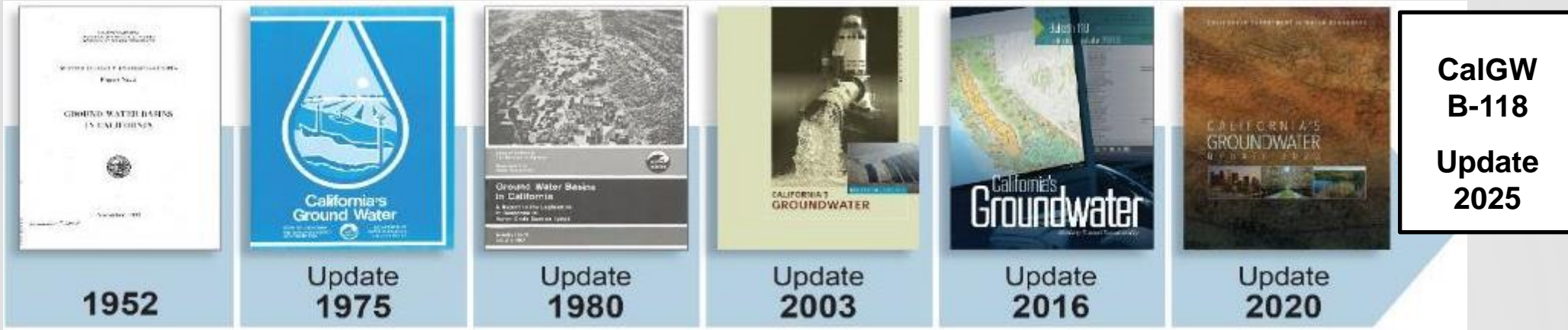
Updated daily

California's Groundwater Connected Activities

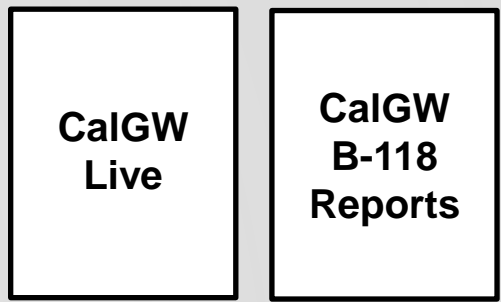
Requirements
 CA Water Code
 10720.1, 10729, 10920, 12924
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DWR is Required to Publish Bulletin - 118, Characterize Groundwater Basins, and Provide Assistance

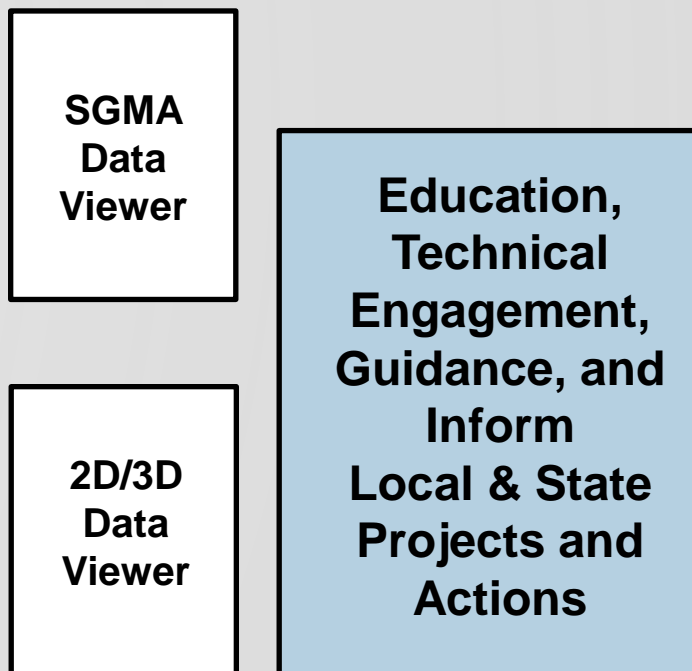
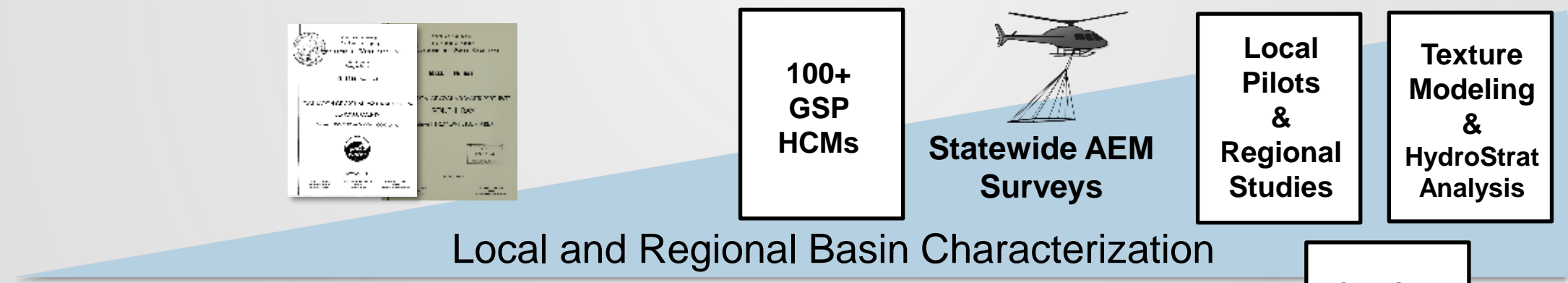
CA's Groundwater (B-118) & CA Water Plan (B-160) (Archive & Vision)



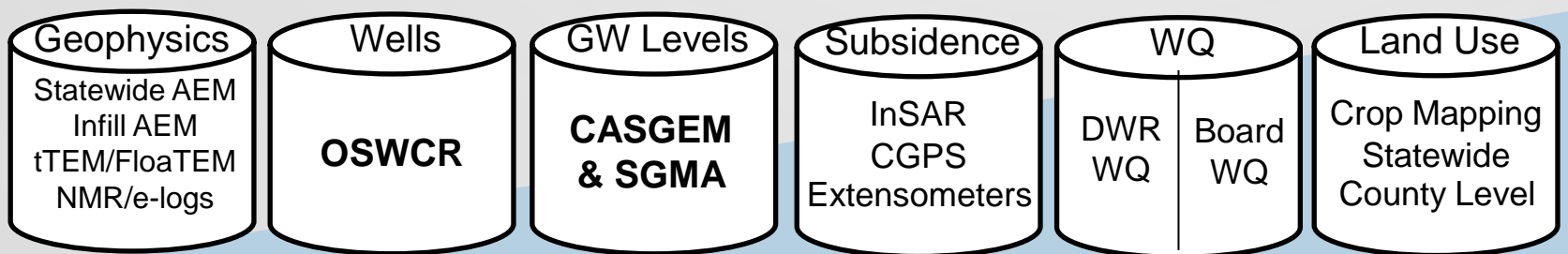
Data Reporting



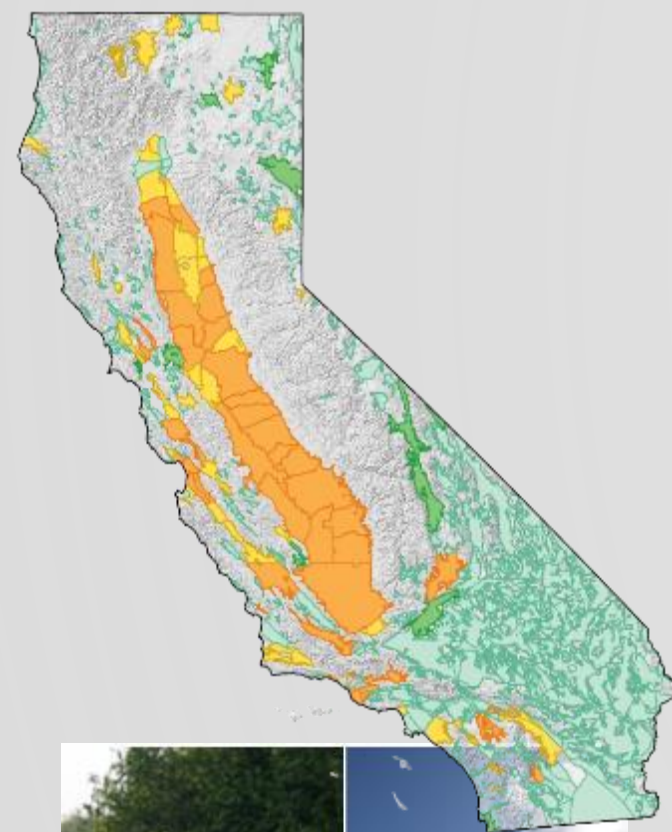
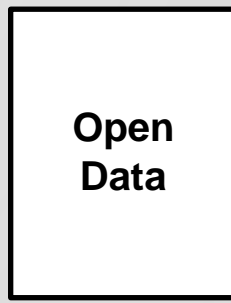
DWR's Groundwater Basin Characterization (Analysis & Tools)



DWR's Data Collection and Stewardship (Access)



New Groundwater Monitoring & Characterization Funding



Public
Audience
Technical

Basin Characterization Program – Overview

DWR is required to provide assistance, characterize groundwater basins, and update California's Groundwater (Bulletin 118).

SGMA, Recharge, & GW Applications

- Primary Aquifers
- Extent of Clays
- Recharge Sites
- Interconnected Surface Water (ISW)
- Subsidence Potential
- Base of Fresh Water
- Vulnerable Domestic Wells
- Salinity Mapping

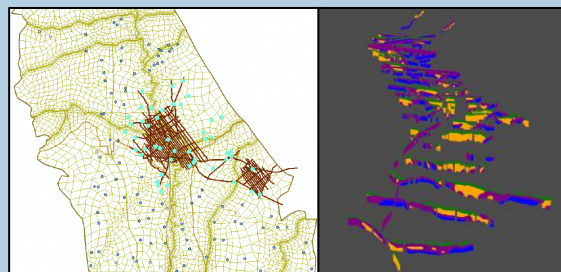
Community of Practice

- Local, State, & Federal Agencies
- NGOs, Academia, & Private Sector
- Basin Characterization Workgroup

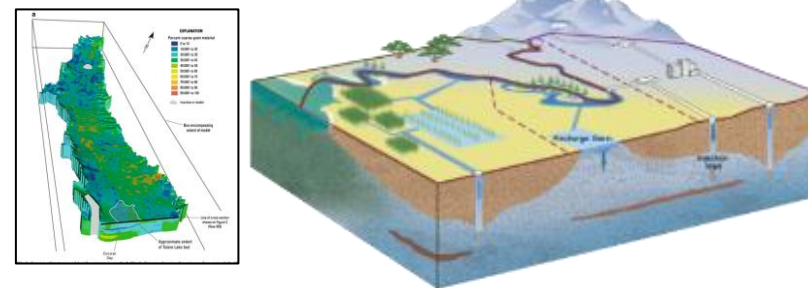
Collect & Compile Data



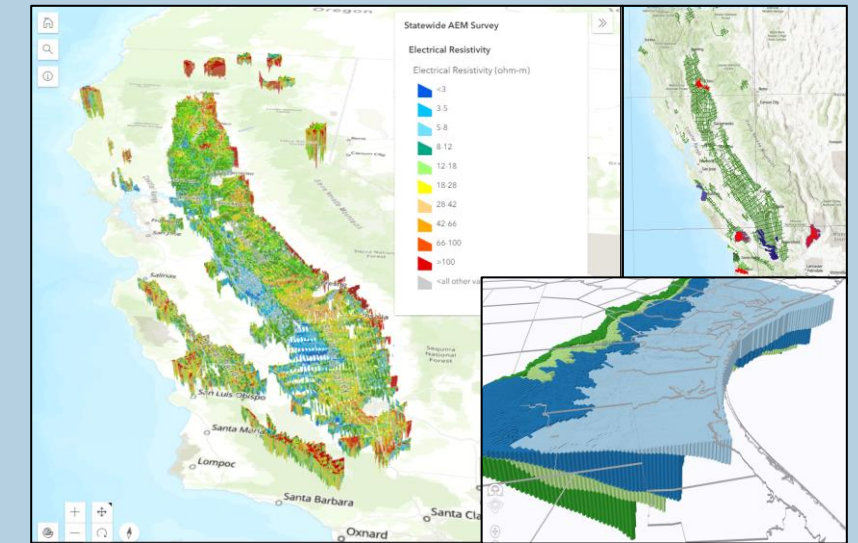
Integrated Analysis of All Subsurface Data



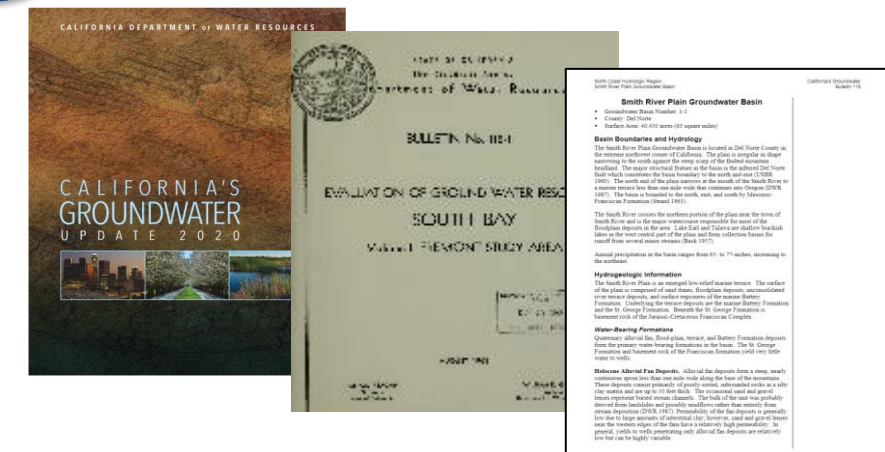
Stewarded Texture & Hydrostratigraphic Models (& Components)



Data Access & Visualization

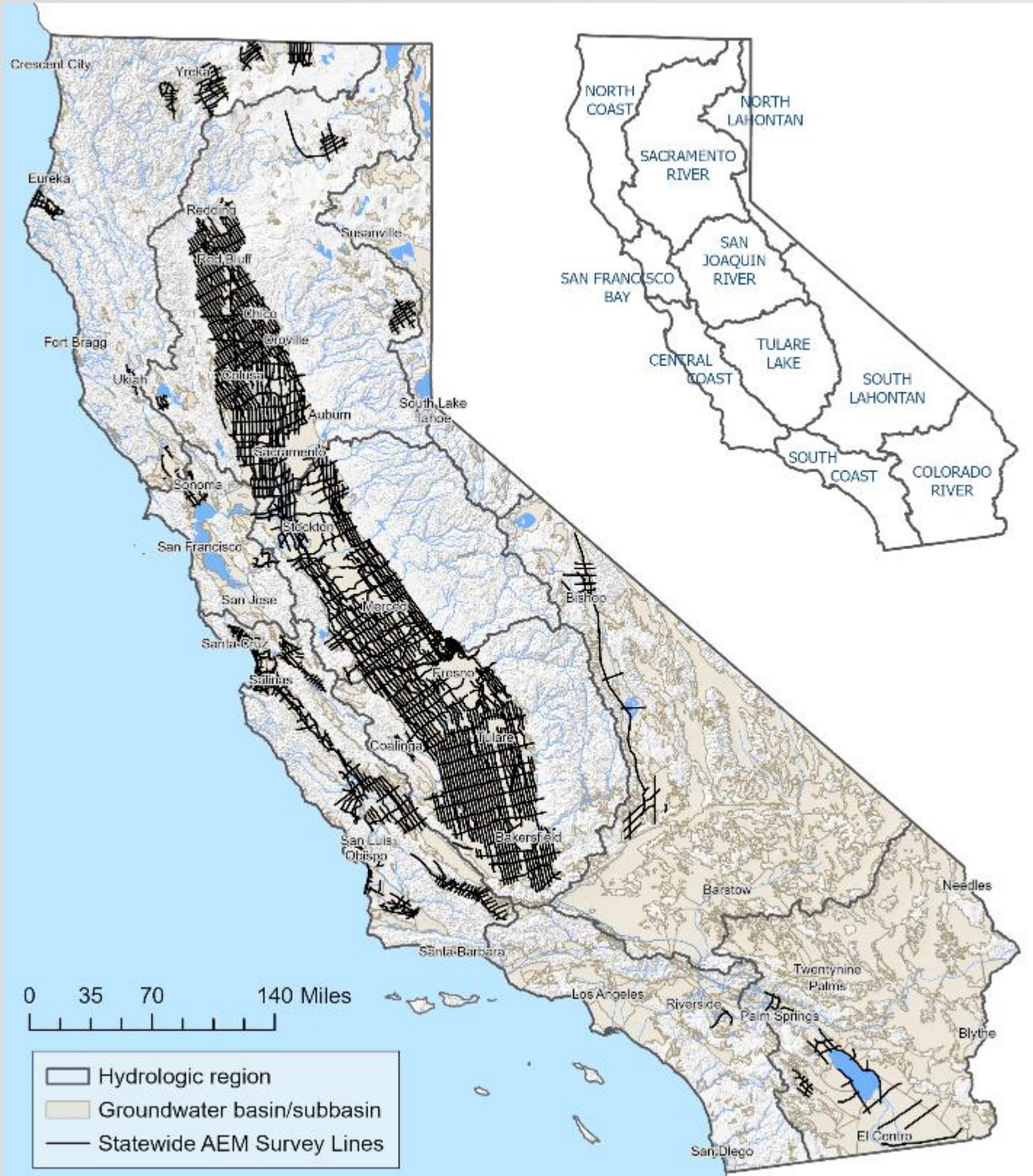


Data Archive California's Groundwater



CALIFORNIA DEPARTMENT OF WATER RESOURCES
SUSTAINABLE GROUNDWATER
MANAGEMENT OFFICE

Statewide AEM Surveys – What we've accomplished



Goal: To improve understanding of large-scale aquifer structure and support implementation of SGMA.

When: Summer 2021 - Fall 2023.

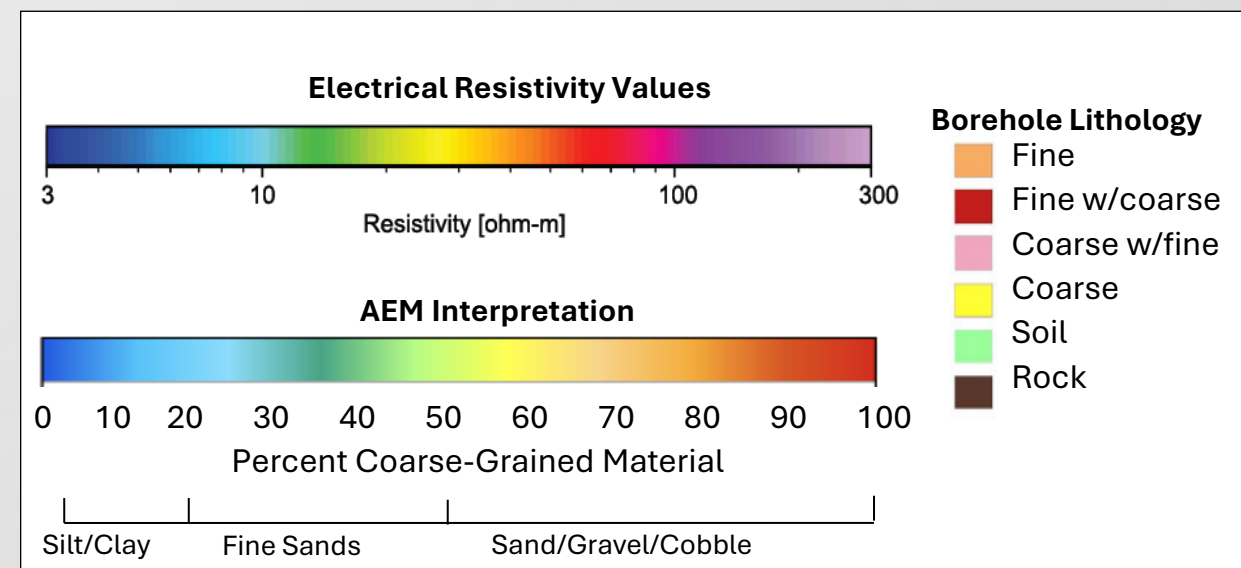
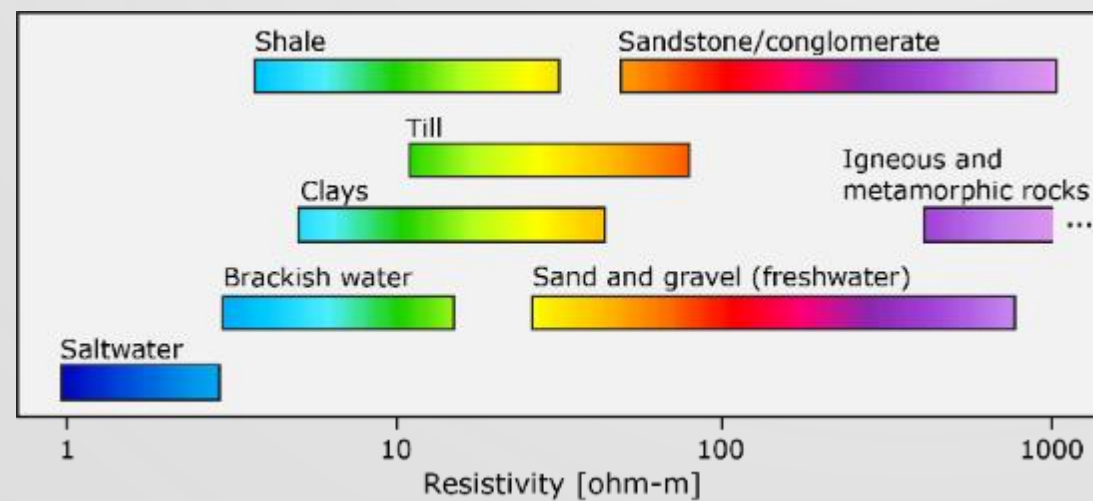
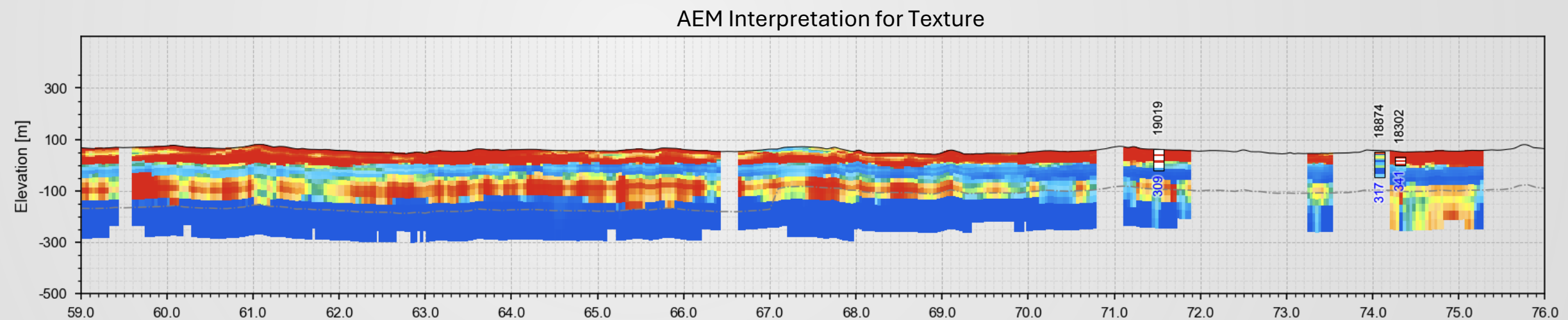
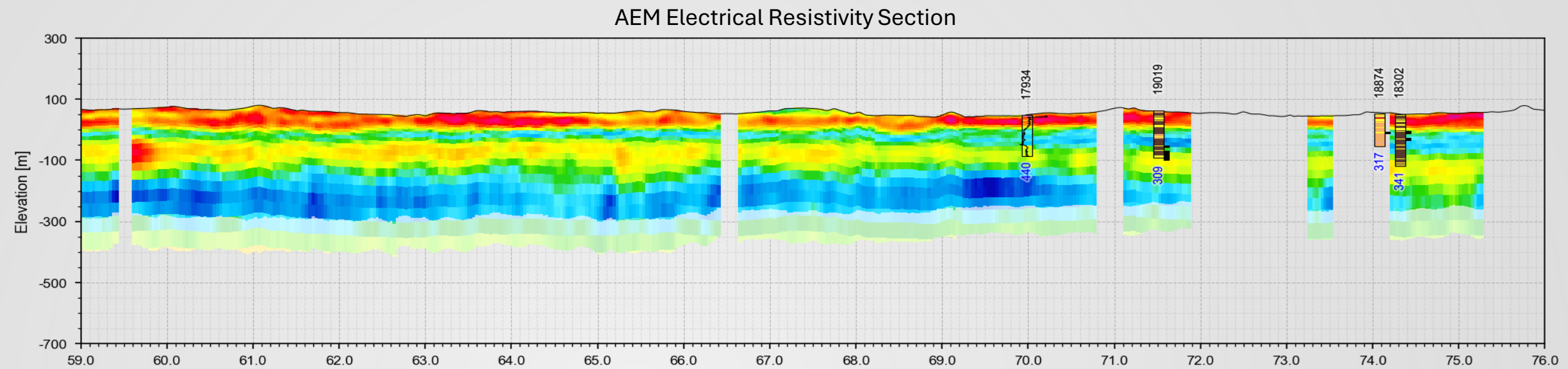
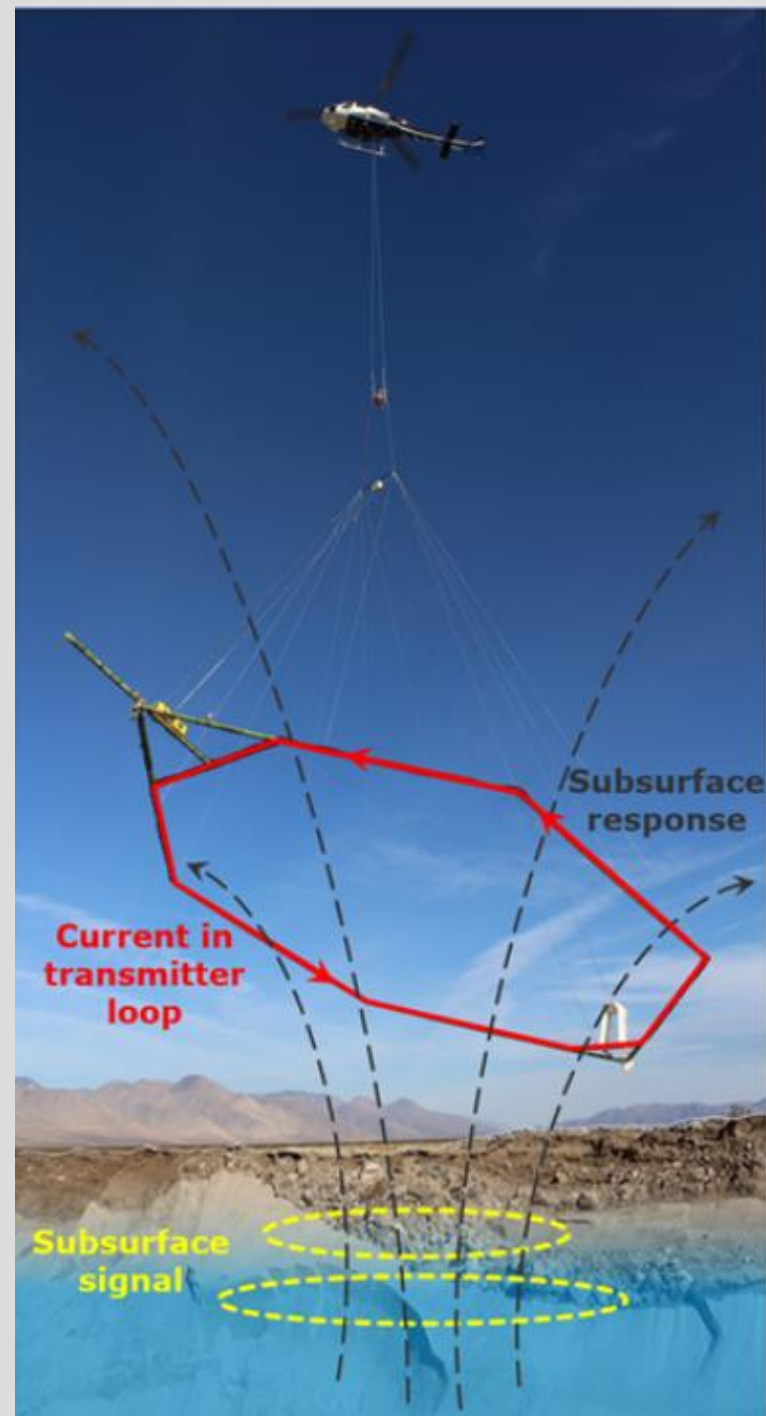
Where: All high- and medium-priority groundwater basins, where data collection was feasible (95 groundwater subbasins partially or fully surveyed).

- What:**
- ~16,000 line-miles of data.
 - Data collected in reconnaissance grid ~3x13 km (~2x8 mile) line spacing line spacing.
 - Coordinated closely with local groundwater managers on areas of interest.



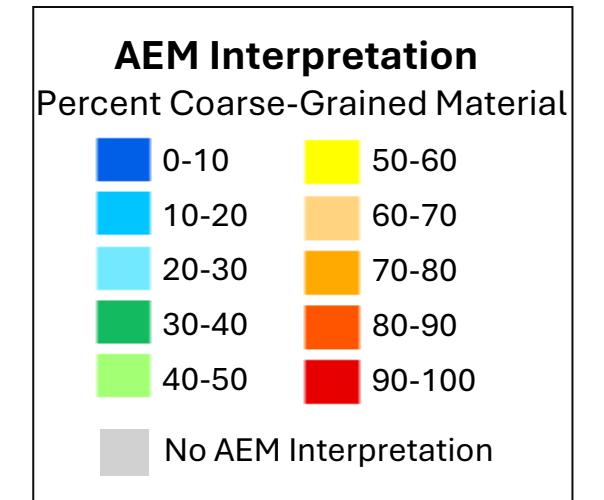
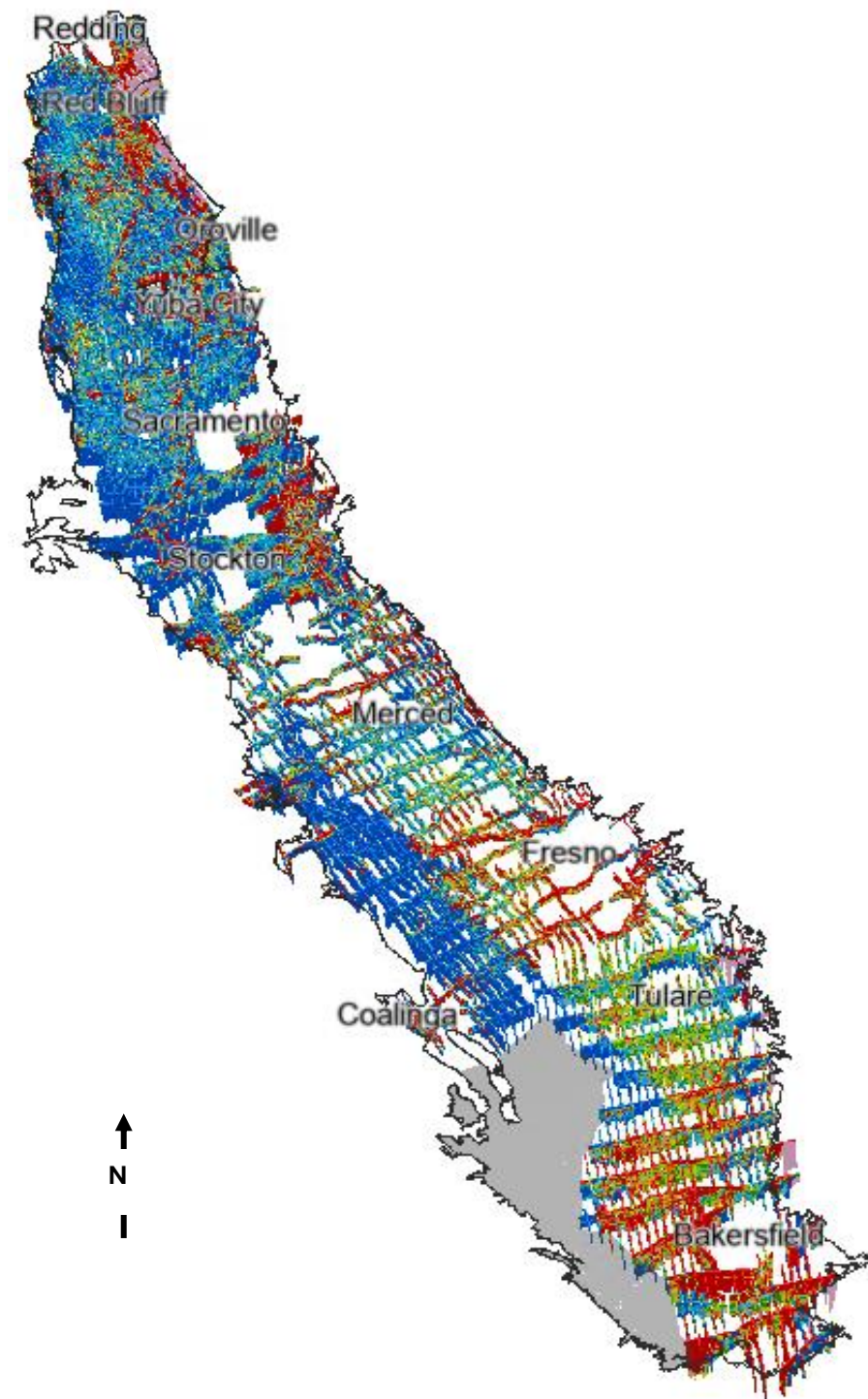
AEM Method and Data

Send signals into earth and the measure the EM response



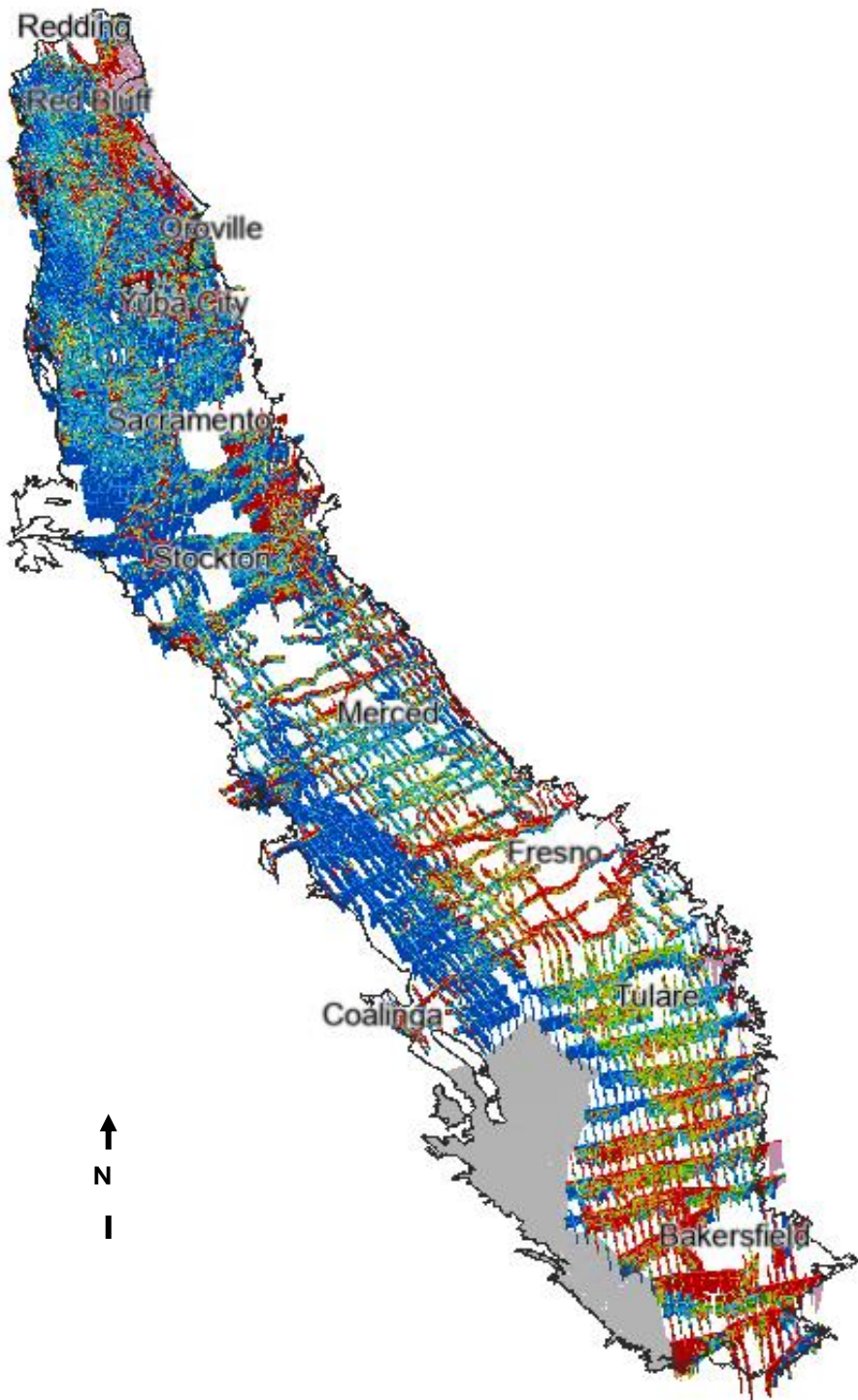
AEM Texture Model for the Central Valley

All interpretations for coarse-grained materials

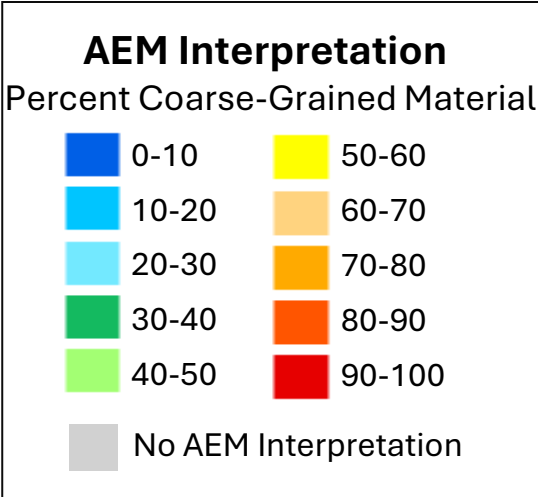
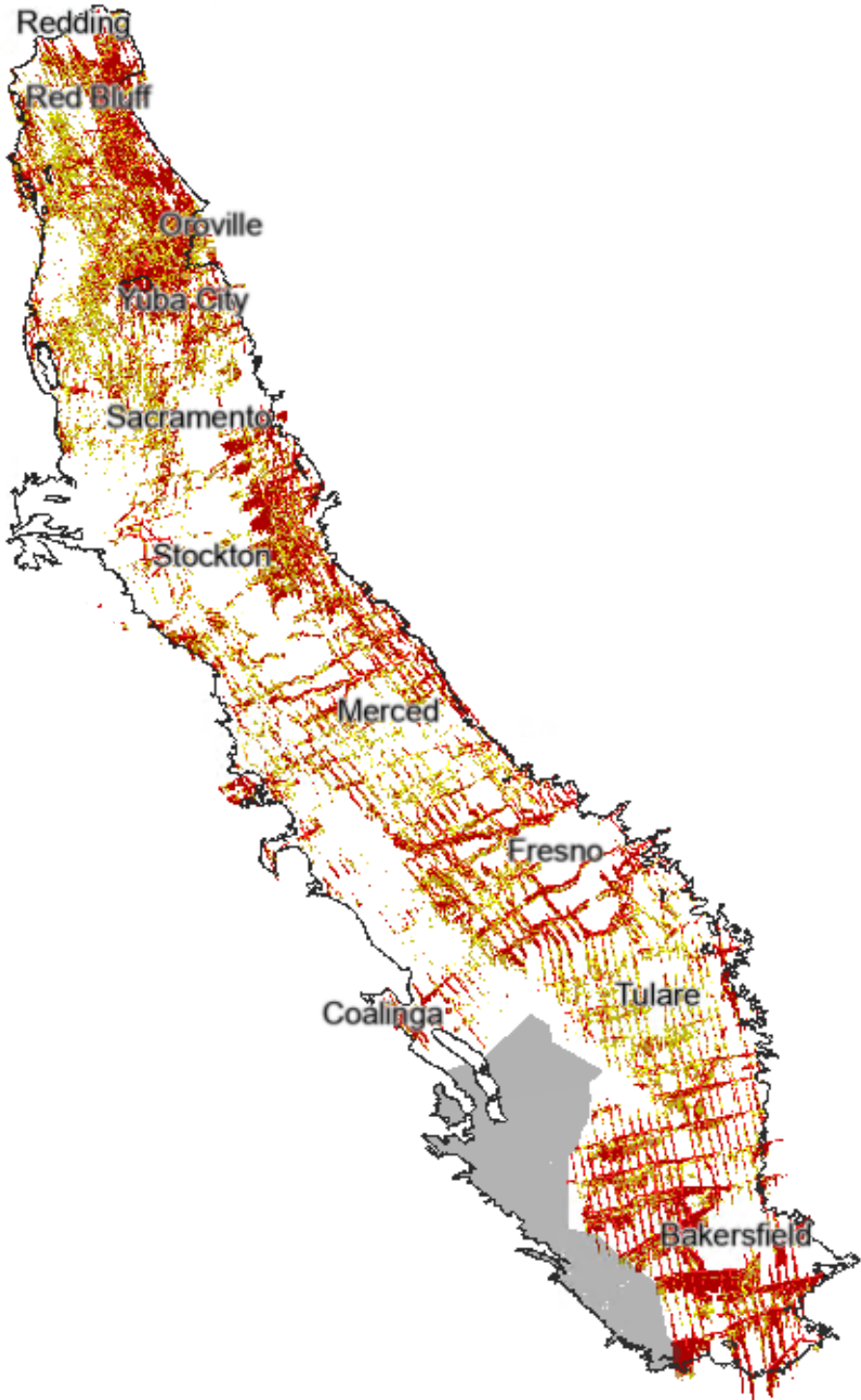


AEM Texture Model for the Central Valley

All interpretations for coarse-grained materials

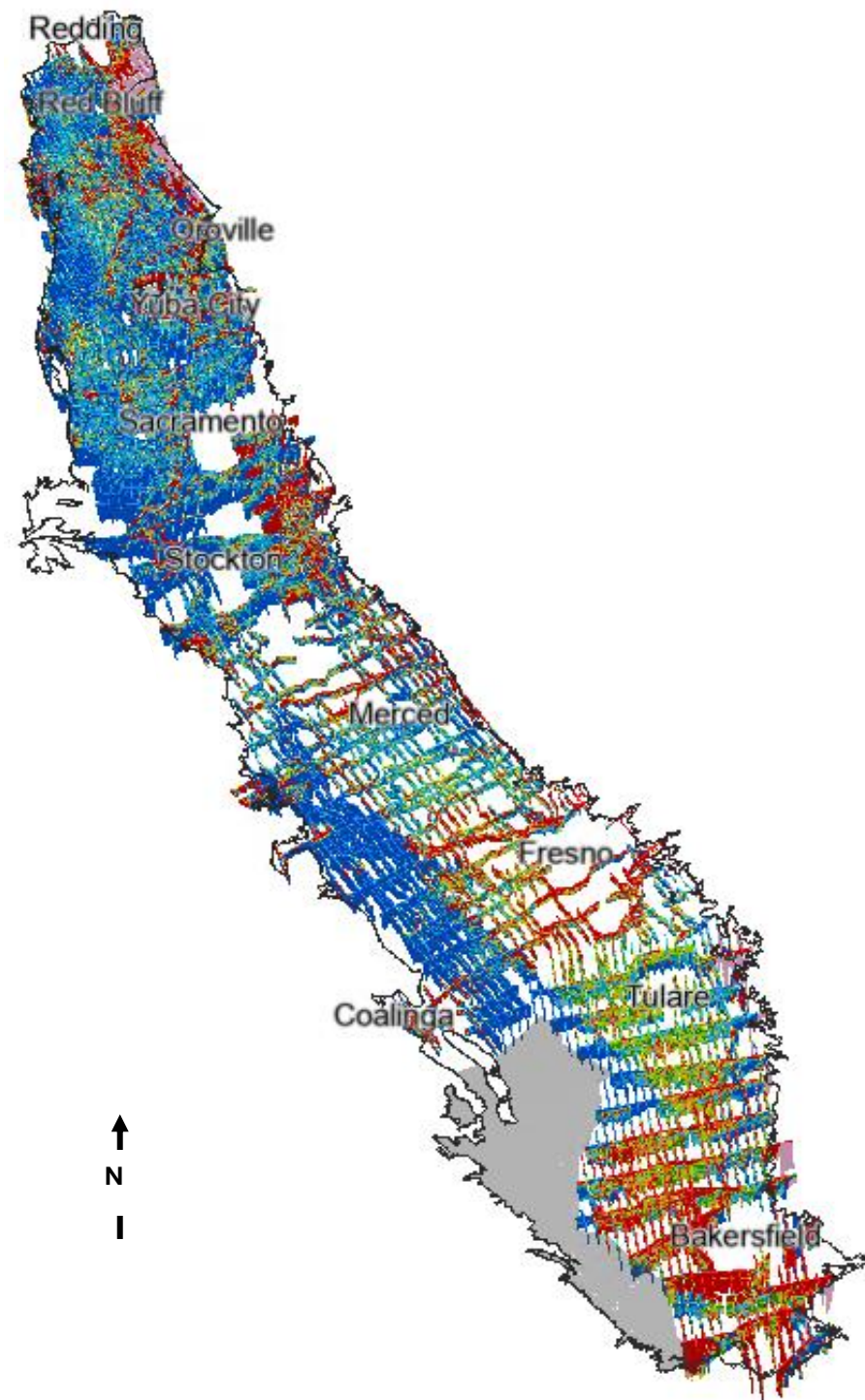


Predominately coarse-grained material

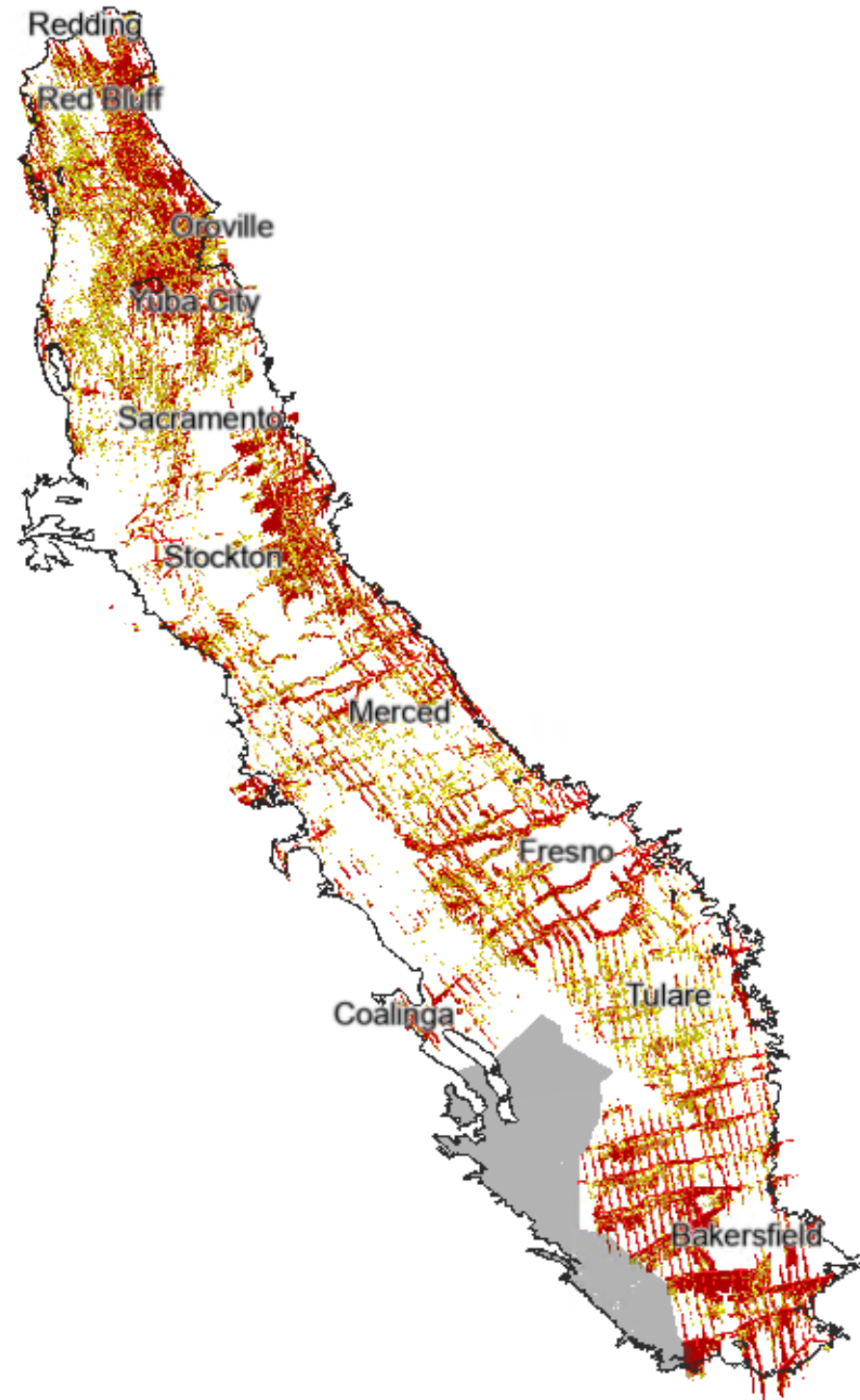


AEM Texture Model for the Central Valley

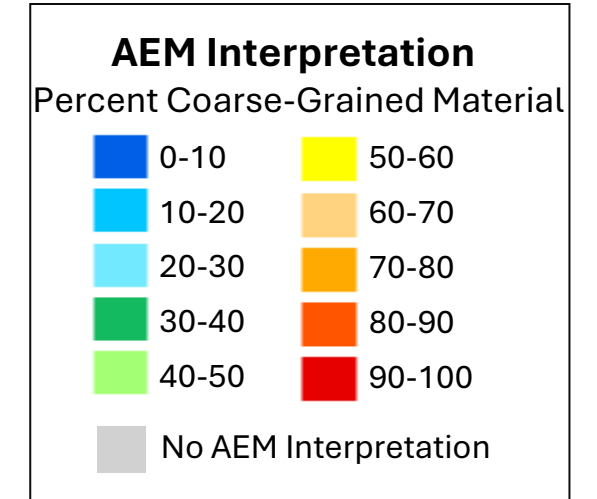
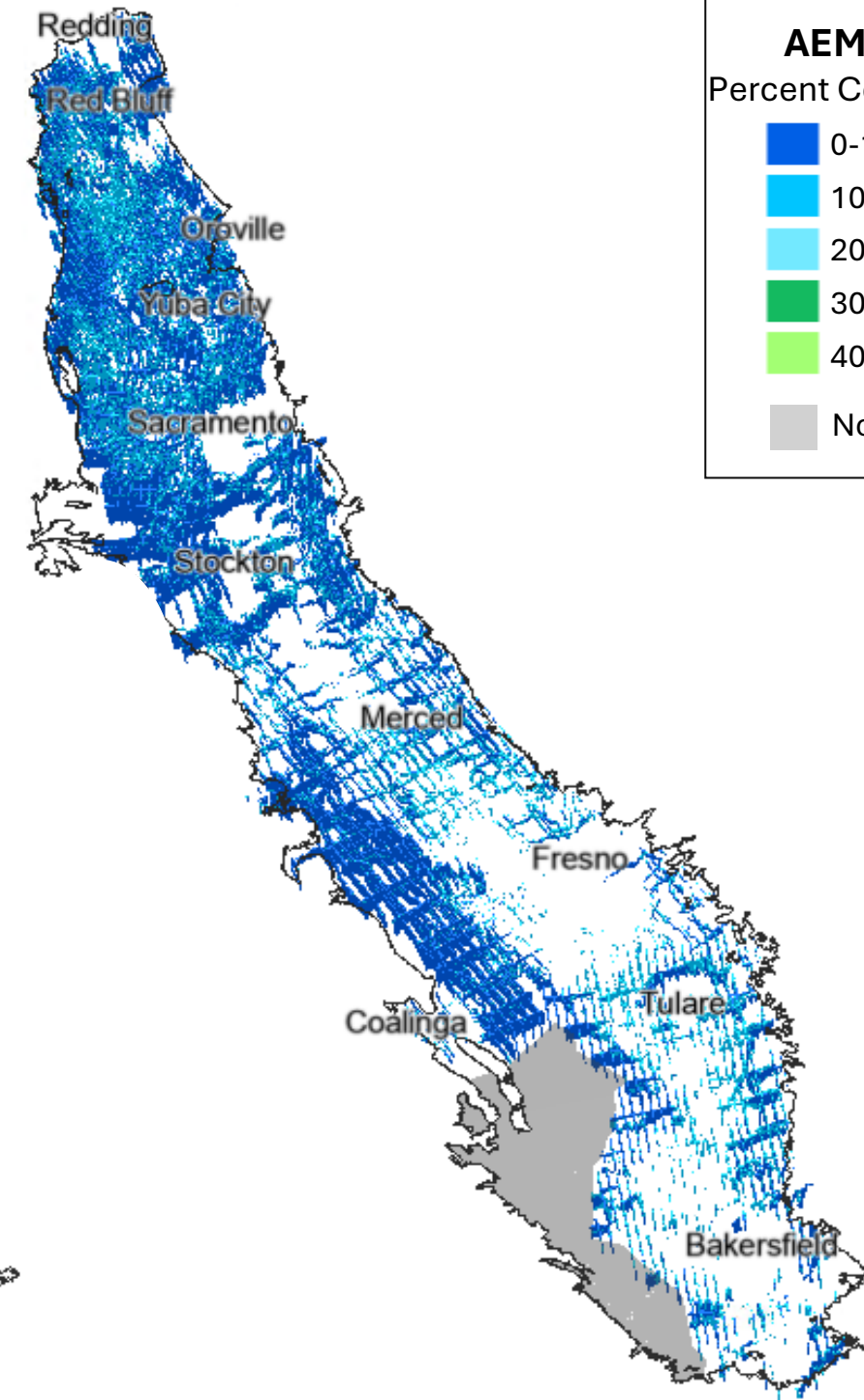
All interpretations for coarse-grained materials



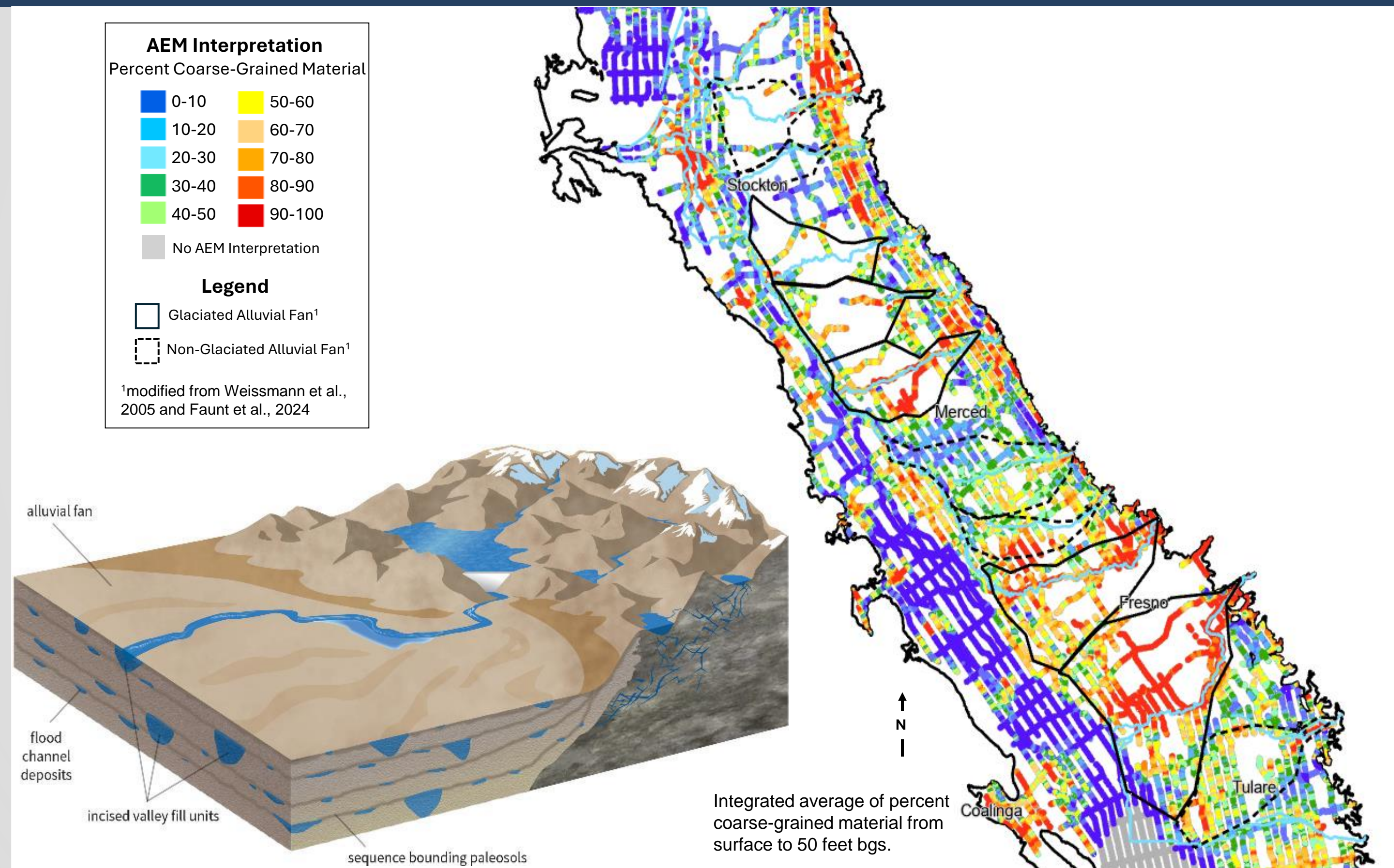
Predominately coarse-grained material



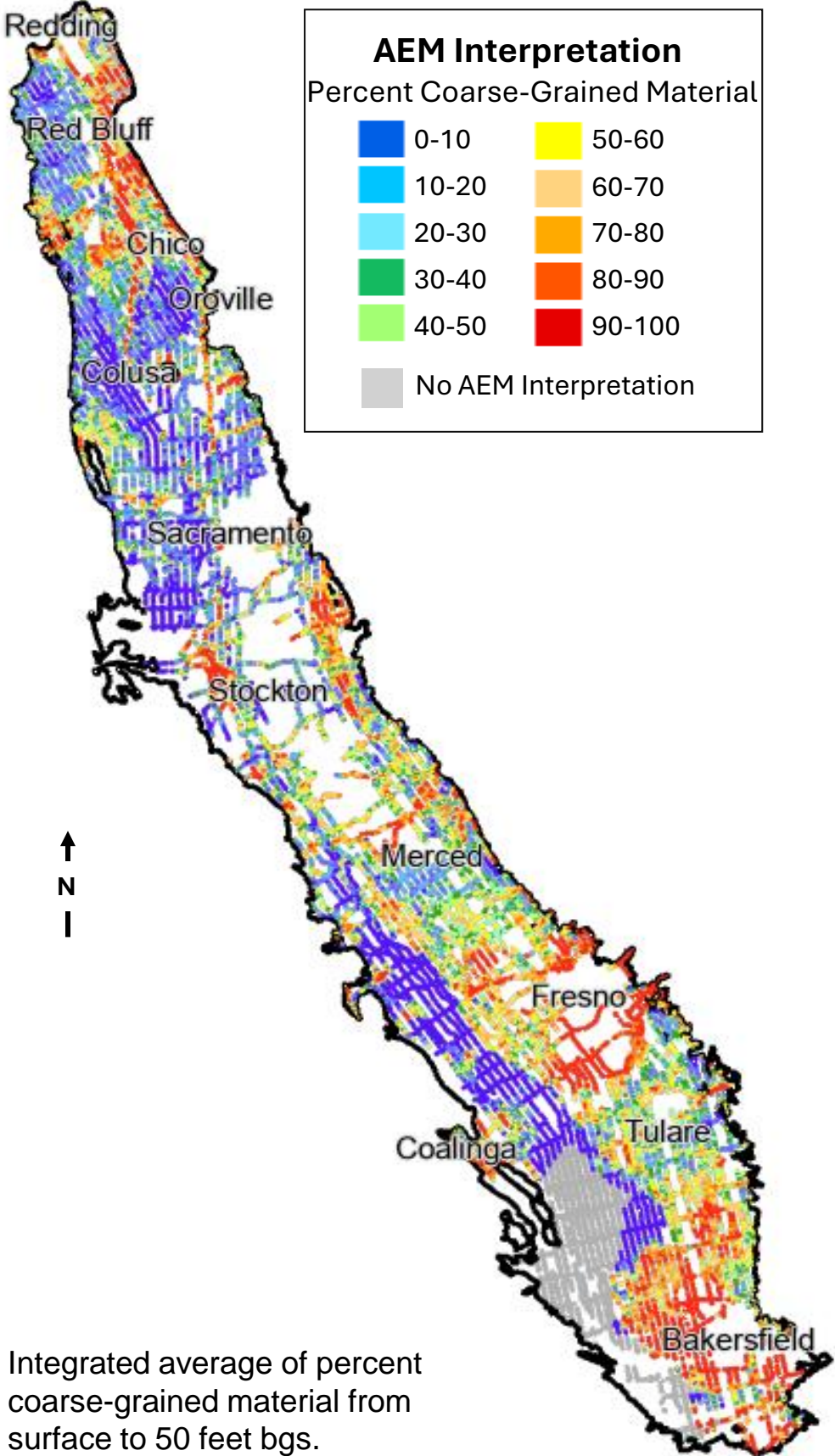
Predominately fine-grained material



Comparison of Shallow Texture to Mapped Alluvial Fans



AEM Surficial Groundwater Recharge Map for the Central Valley



Basin Characterization Program – Overview

DWR is required to provide assistance, characterize groundwater basins, and update California's Groundwater (Bulletin 118).

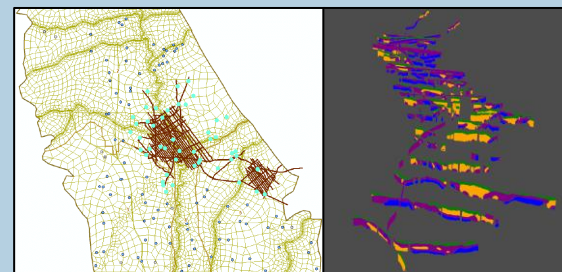
Tim Parker (Ramboll)

Collect & Compile Data

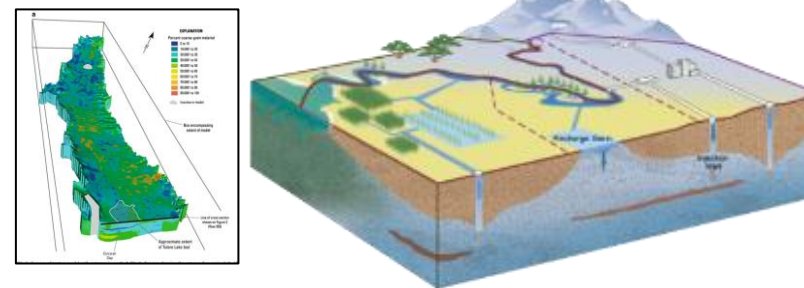


Mesut Cayar (W&C) and Matt Tonkin (SSPA)

Integrated Analysis of All Subsurface Data

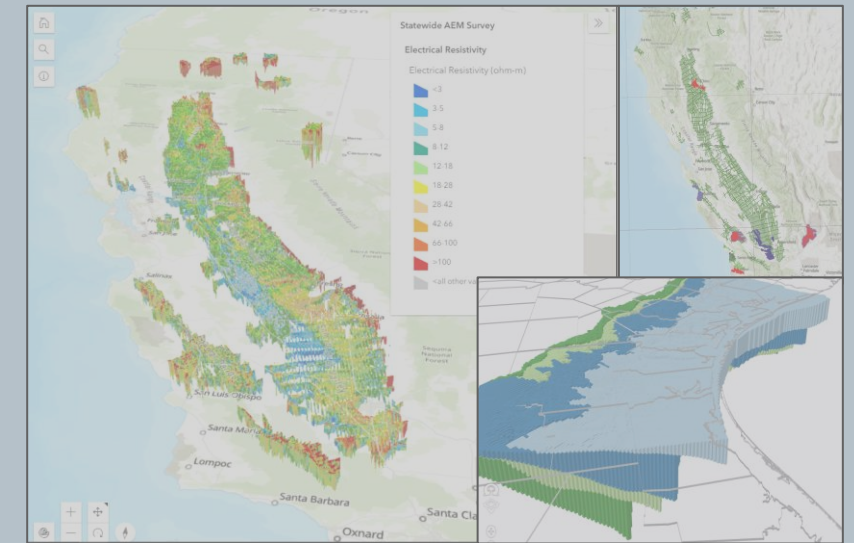


Stewarded Texture & Hydrostratigraphic Models (& Components)

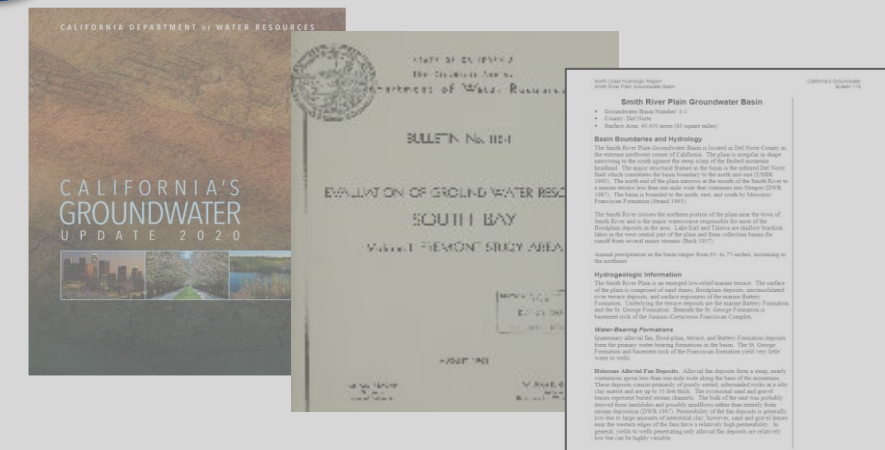


Ben Brezing (DWR)

Data Access & Visualization



Data Archive California's Groundwater



SGMA, Recharge, & GW Applications

- Primary Aquifers
- Extent of Clays
- Recharge Sites
- Interconnected Surface Water (ISW)
- Subsidence Potential
- Base of Fresh Water
- Vulnerable Domestic Wells
- Salinity Mapping

Community of Practice

- Local, State, & Federal Agencies
- NGOs, Academia, & Private Sector
- Basin Characterization Workgroup



CALIFORNIA DEPARTMENT OF WATER RESOURCES
SUSTAINABLE GROUNDWATER
MANAGEMENT OFFICE

Basin Characterization Program – Collect Data through Pilot Studies

Explore methods, techniques, and analyses that address SGMA initiatives and create guidance for groundwater managers.

SGMA Initiatives

- Groundwater Recharge
- Interconnected Surface Water
- Subsidence
- Base of Fresh Water
- Seawater Intrusion
- Vulnerable Domestic Wells

Methodologies

- Infill AEM
- t-TEM
- FloaTEM
- NMR-logs
- E-logs
- Cone Penetrometer
- Monitoring Wells
- Lithology logs
- Well re-activation
- Aquifer tests



Pilot Study 1

SGMA Initiatives: Groundwater recharge, ISW, domestic wells
Where: Upper San Joaquin River/Eastern Madera



Pilot Study 2

SGMA Initiatives: ISW, groundwater recharge, flood mitigation
Where: Pajaro Valley



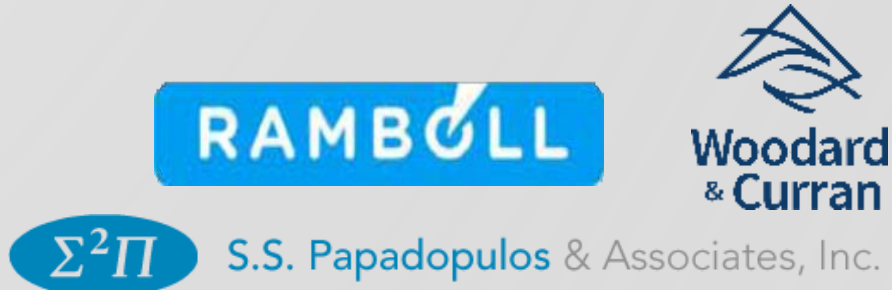
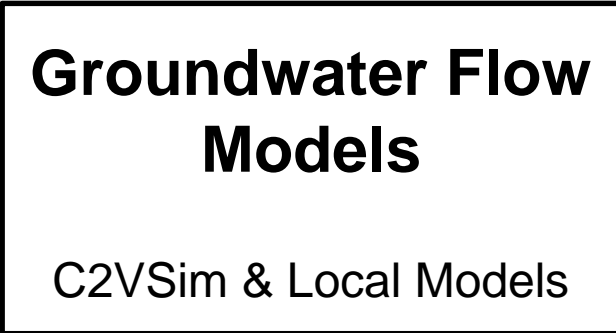
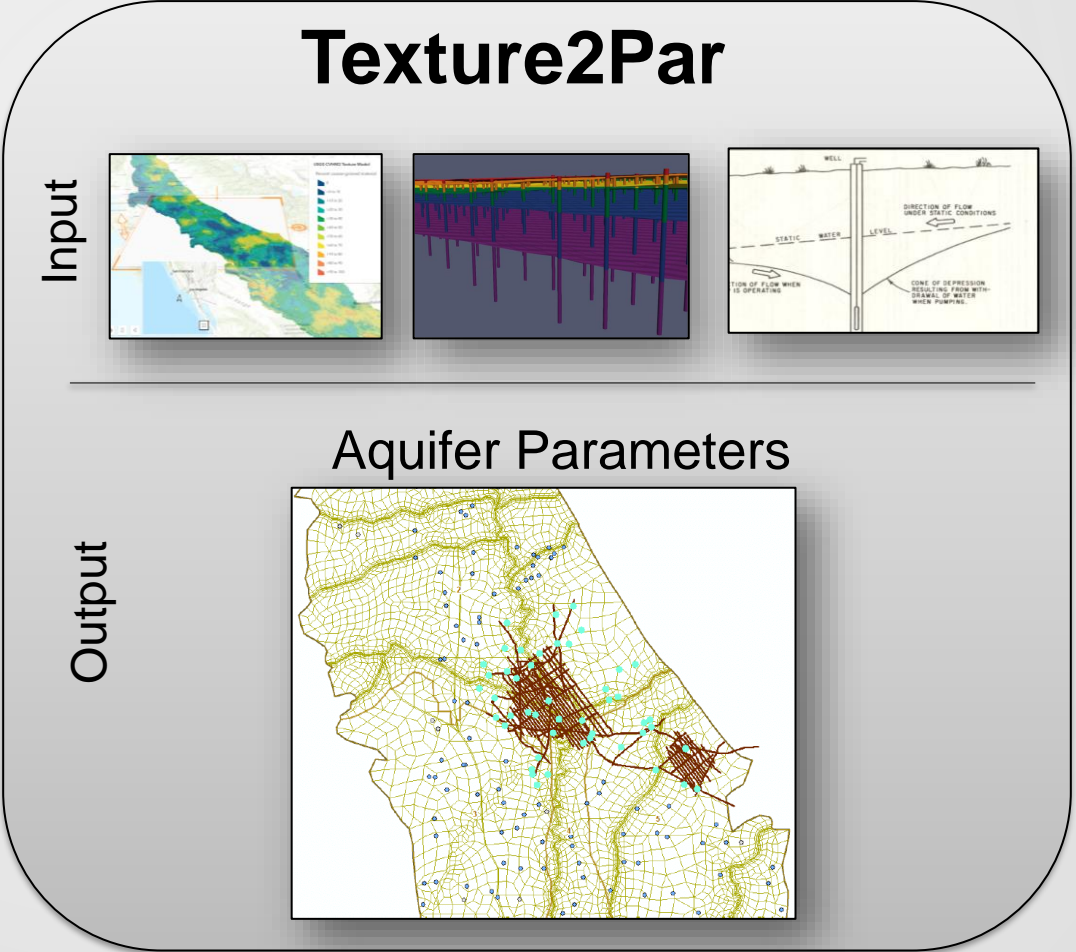
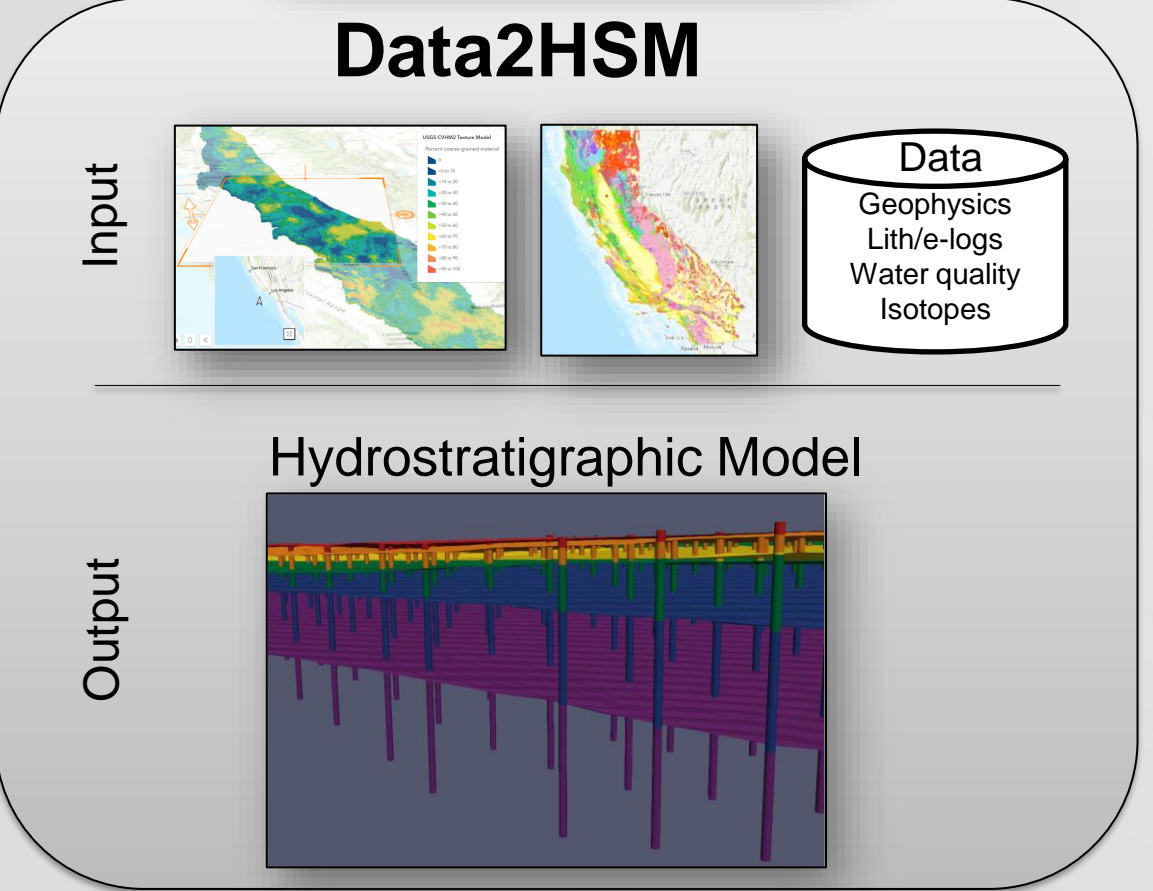
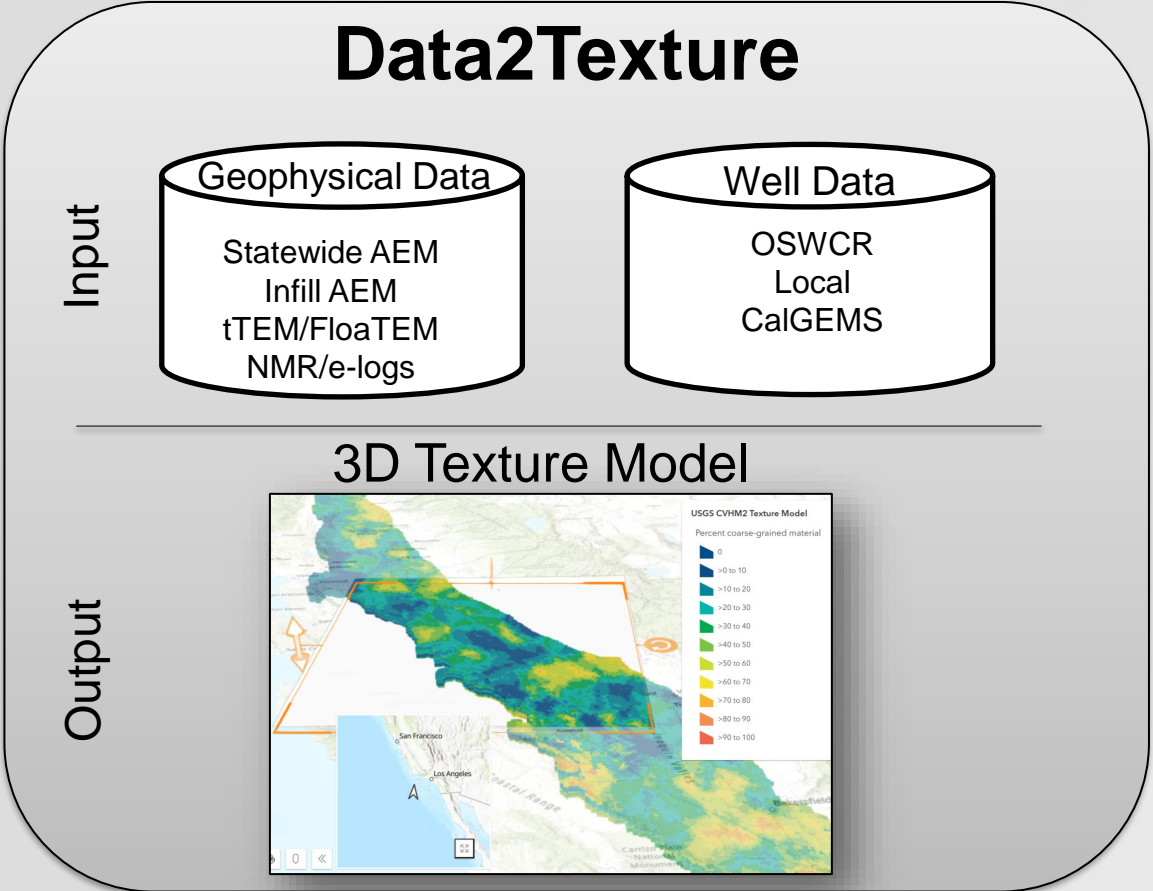
Pilot Study 3

SGMA Initiatives: Subsidence, groundwater recharge
Where: TBD, San Joaquin Valley



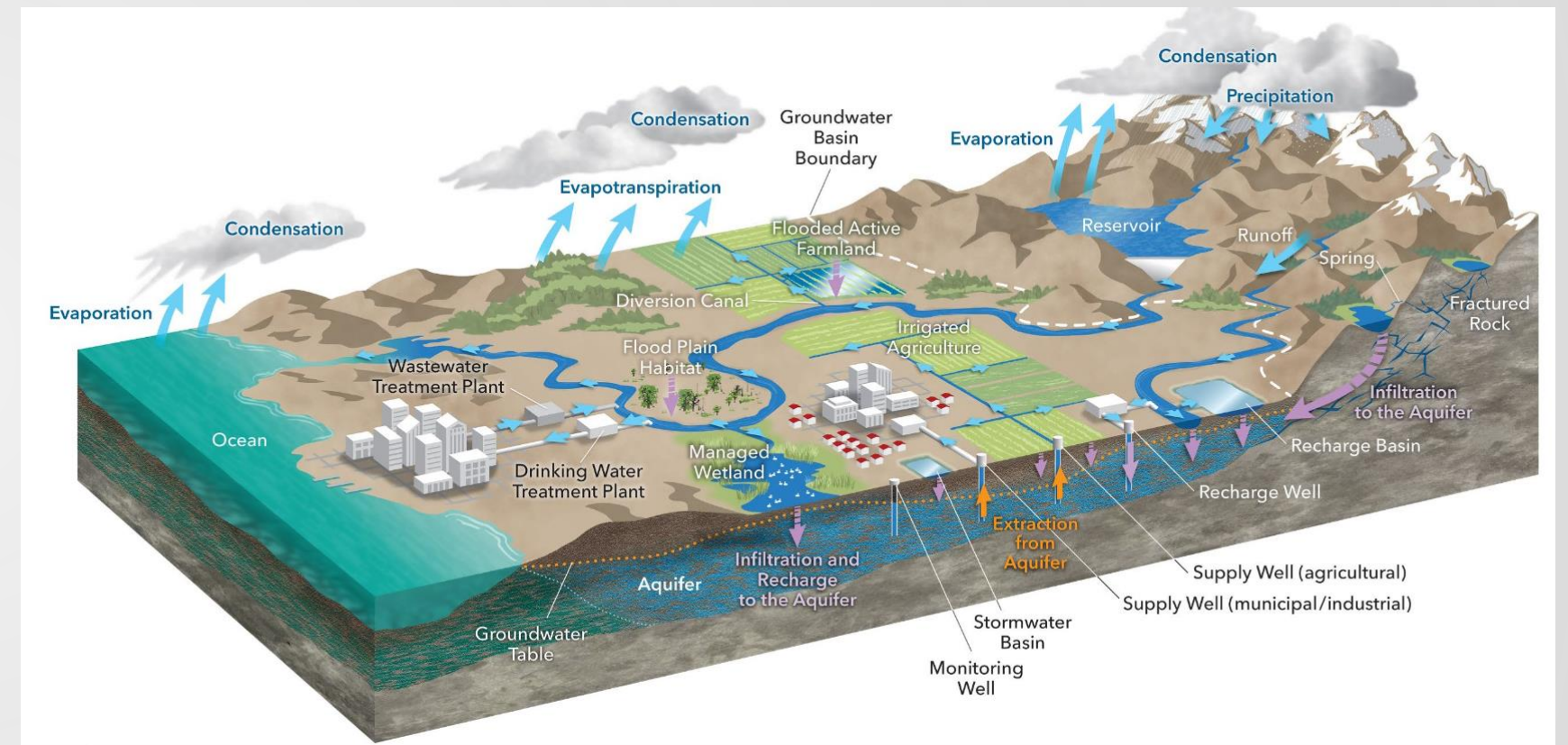
Basin Characterization Program – Analyses Processes

All tools and related guidance will be made available for public use.



Basin Characterization Program – Aquifer Recharge Potential Maps

Aquifer Recharge Potential Map	Recharge Method	Analysis
Surficial Shallow	<ul style="list-style-type: none"> Flood mitigation Surface water spreading FloodMAR 	Conditions in top 50 feet.
Surficial Preferential Pathways	<ul style="list-style-type: none"> Dedicated surface groundwater recharge facilities 	Connections from surface to deeper aquifer
Preferential Pathways	<ul style="list-style-type: none"> Dry Wells 	Connections from below surface to deeper aquifer
Deep Storage	<ul style="list-style-type: none"> ASR Deep injection 	Available storage space in deep aquifer.

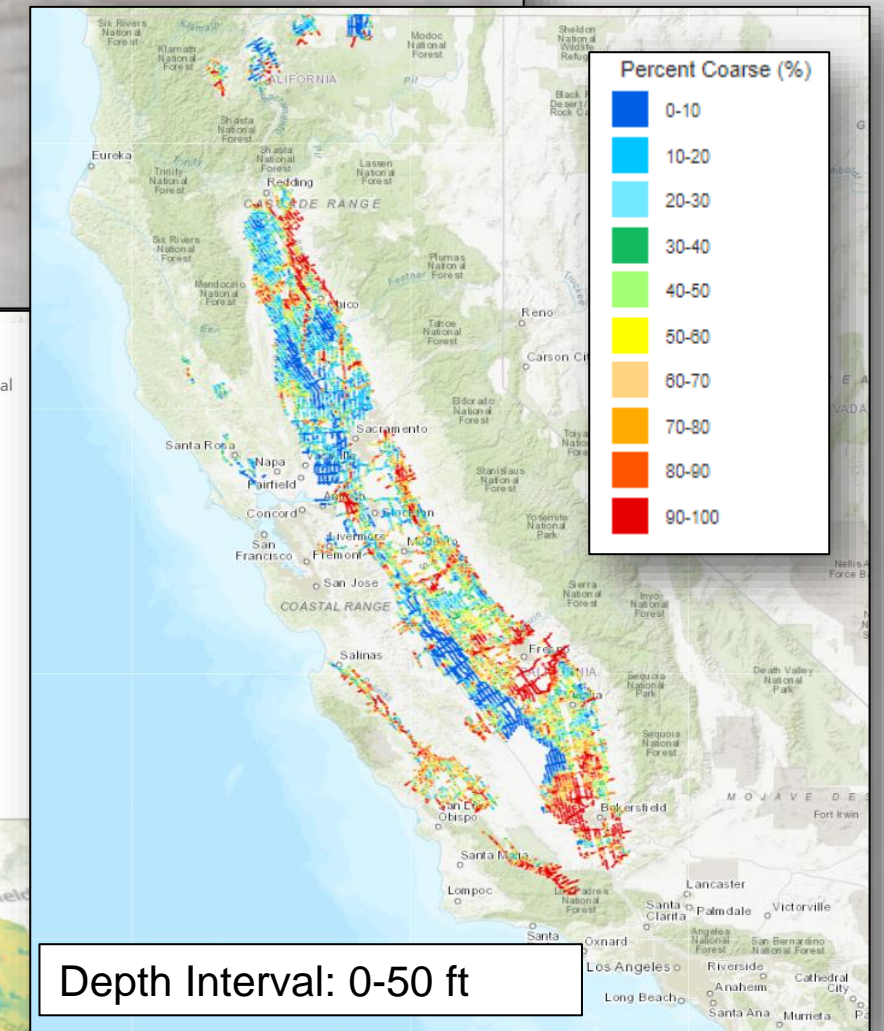
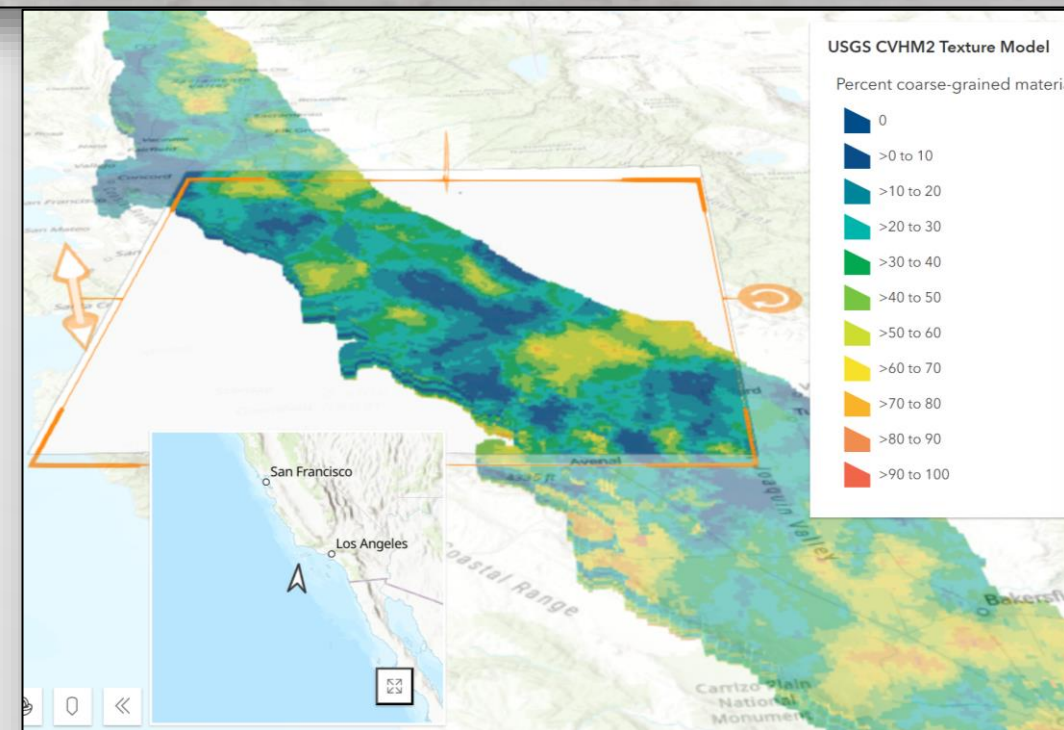
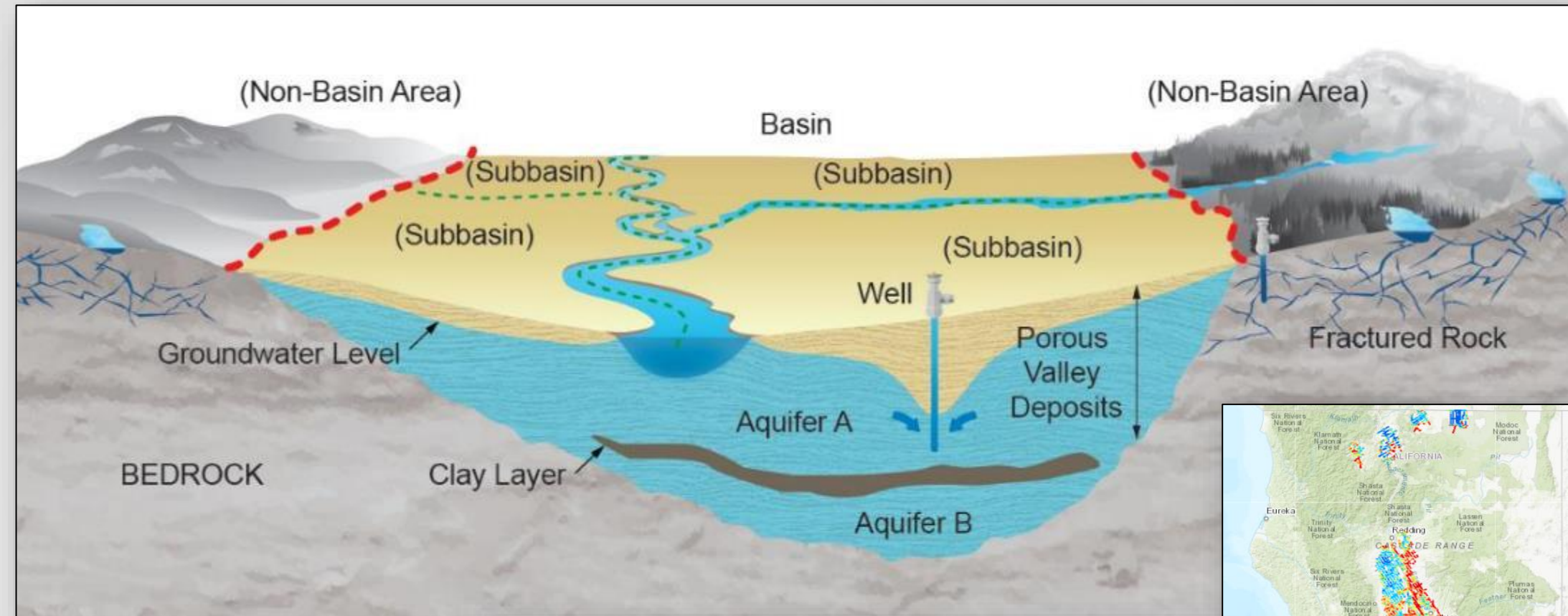


Basin Characterization Program – State-Stewarded Models and Maps

State-stewarded models and maps updated regularly as new data are collected or digitized.

Goals for State-Stewarded Maps and Models

- Aquifer Recharge Potential
- Texture Model
- Aquifer Storage
- Hydrostratigraphic Model
- Important Aquifers
- Extent of Corcoran Clay
- Depth to Basement
- Base of Fresh Water

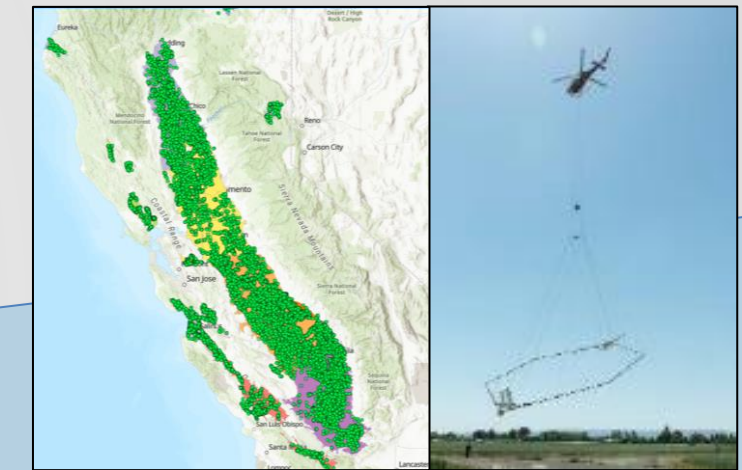


Basin Characterization Program – Integration of Efforts

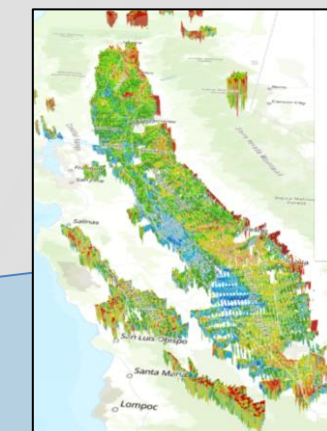
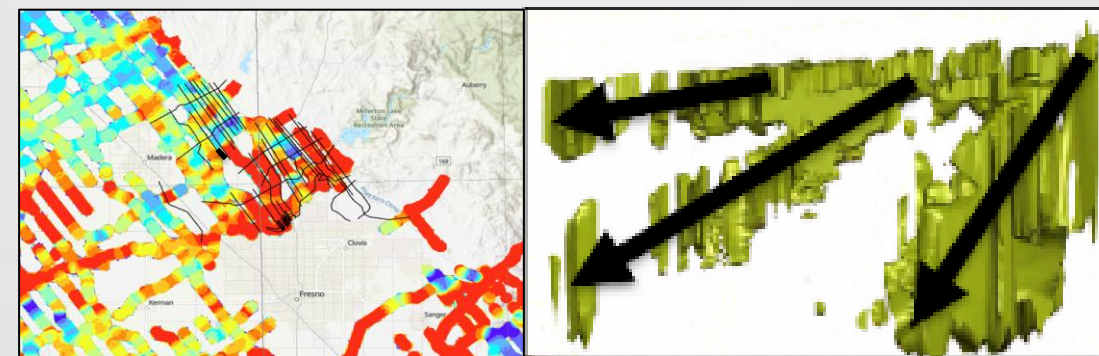
Think globally, act locally. Data collection, tool development and analyses first at local scale, then statewide scale.

Basin Characterization Program

**Data Collection
& Compilation**



**Texture Model
HSM
HCM Components**



Local Scale
(Pilot Studies)

Statewide Scale



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SUSTAINABLE GROUNDWATER
MANAGEMENT OFFICE

Basin Characterization Timeline

Local Scale

Continued Technical Engagement

Pilot study 3

Pilot study 2

Pilot study 1



2024



2025

2026

2027

Statewide Scale

Statewide AEM Surveys

Program Kickoff

Aquifer Recharge Potential Maps

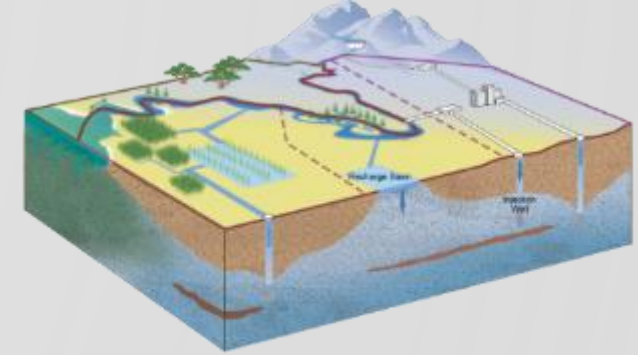
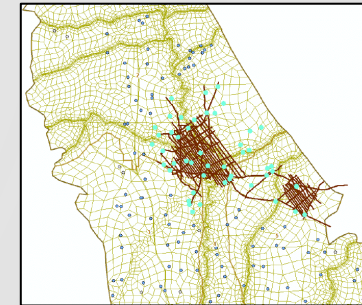
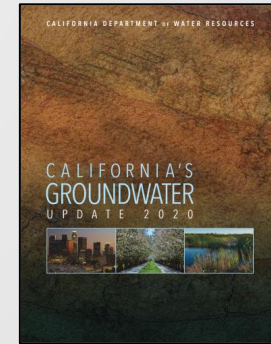
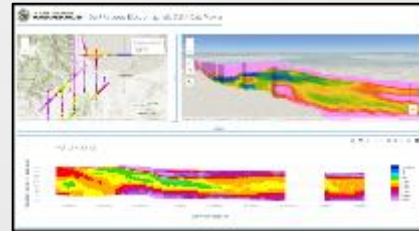
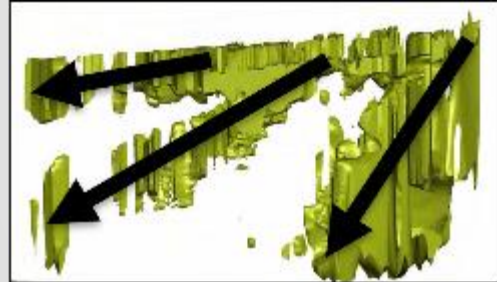
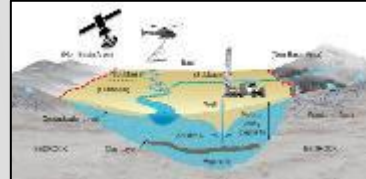
Central Valley Texture Model

Advanced Data Viewer

California's Groundwater

Analysis Tools

Central Valley Hydrogeologic Conceptual Model



Basin Characterization Workgroup



CALIFORNIA DEPARTMENT OF WATER RESOURCES
SUSTAINABLE GROUNDWATER
MANAGEMENT OFFICE

Tentative Timeline & Activities - Subject to Change

Thank you!

Basin Characterization Program Website:

<https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118/Basin-Characterization>

Email: Basin.Characterization@water.ca.gov

