California Water and Environmental Modeling Forum

2023 ANNUAL MEETING

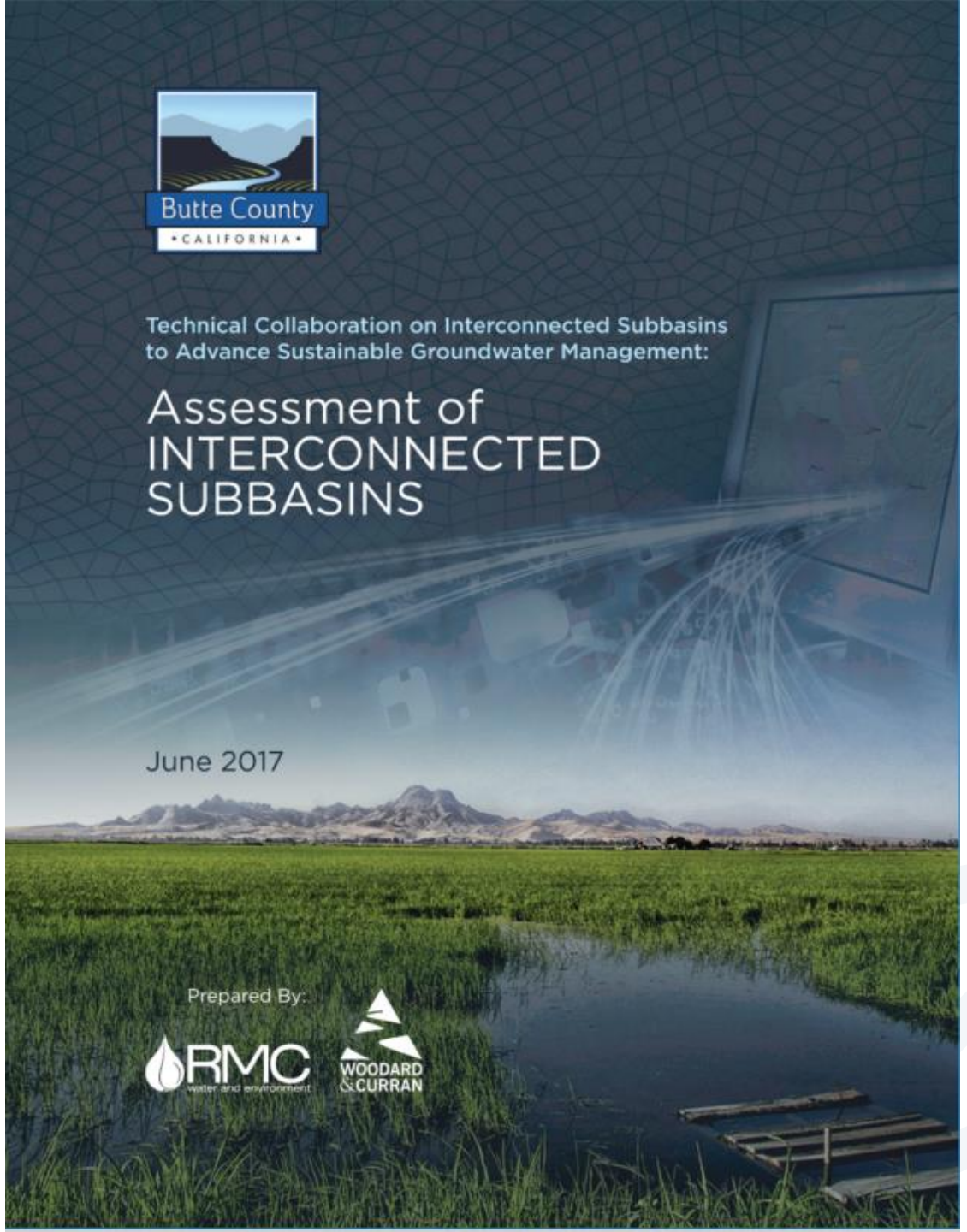
Overview of 2017 Assessment of Interconnected Subbasins Project

Woodard & Curran

Reza Namvar

Woodard & Curran

April 18, 2023



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Project Goal:
Provide recommendations on approaches to account for groundwater flow between interconnected subbasins

- Funded by Water Foundation
- Administered by Butte County
- Project Team
  - Butte County
  - Technical Collaborators
  - Woodard & Curran

Technical Collaborators

Name	Organization	NSVIRWM TAC Member?
Charlie Brush	DWR Bay-Delta Office, Modeling Support Branch	
Christina Buck	Butte County Department of Water and Resource Conservation	
Grant Davids	Davids Engineering, Inc.	
Bill Ehorn	DWR Northern Region Office	✓
Claudia Faunt	United States Geological Survey	
Allan Fulton	University of California, Cooperative Extension	✓
Thomas Harter	University of California, Davis	
Peter Lawson	CH2M	
Steffen Mehl	California State University, Chico	
Vickie Newlin	Butte County Department of Water and Resource Conservation	✓
Ben Pennock	Glenn Colusa Irrigation District (Retired)	✓
Steve Phillips	United States Geological Survey	
Mary Randall	DWR Northern Region Office	
Oscar Serrano	Colusa Indian Community Council	✓
Ali Taghavi	RMC, a Woodard & Curran Company	

Project Motivation & Goal

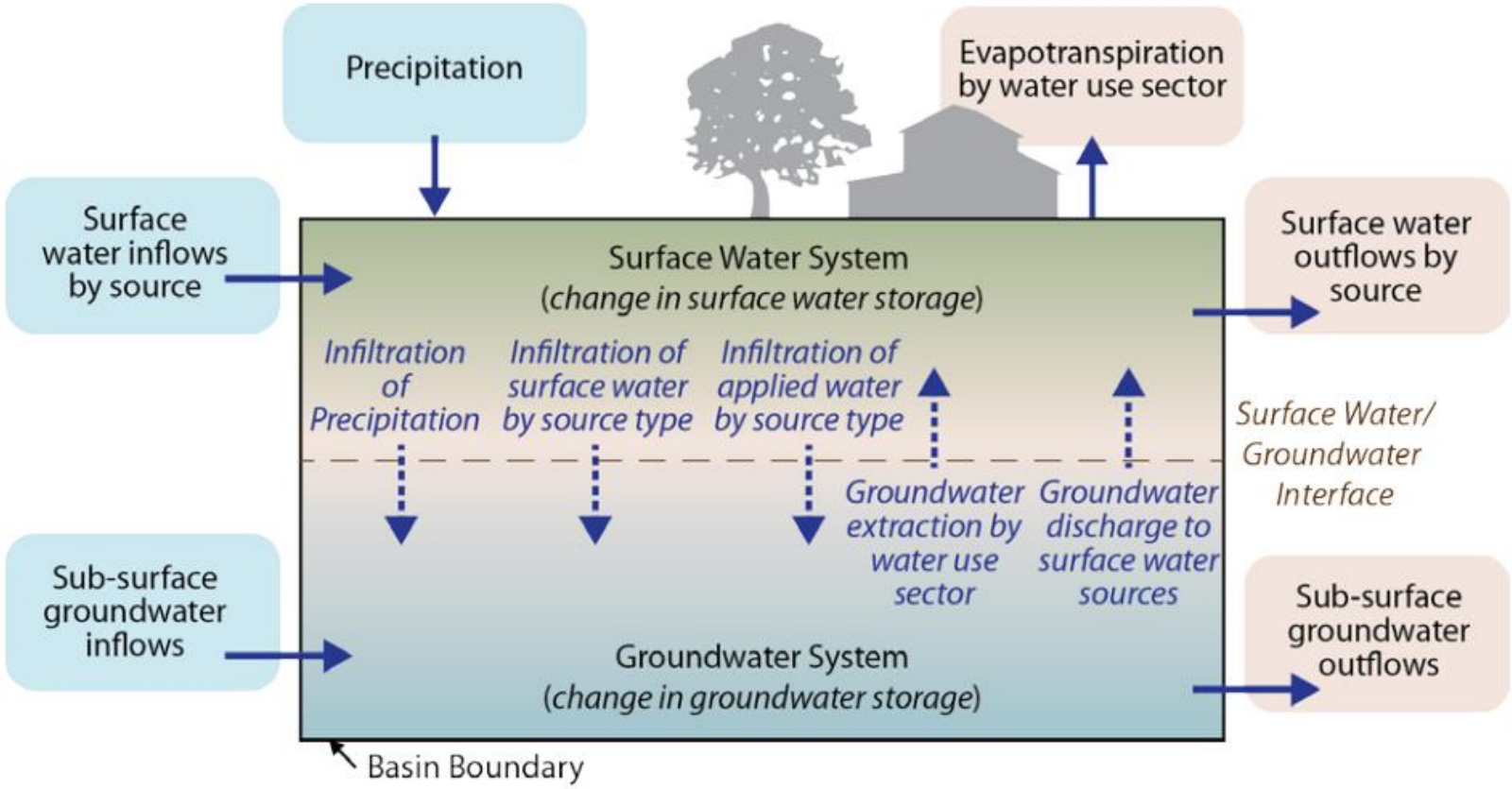

Figure 5 – Required Water Budget Components

From DWR Water Budget BMP

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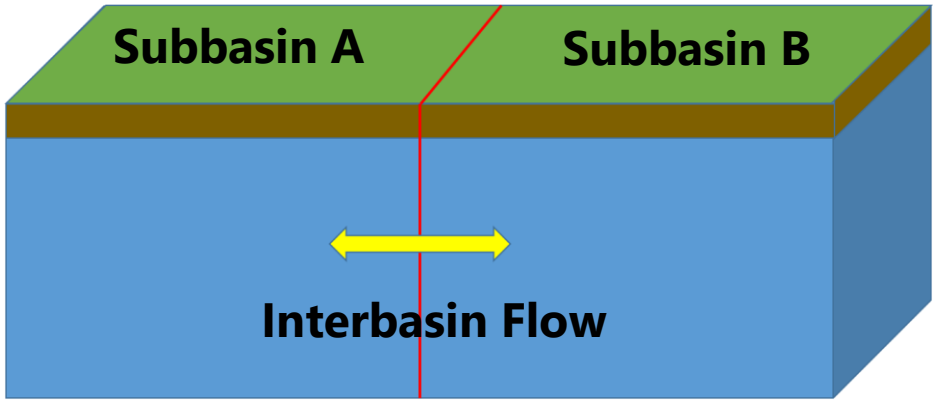
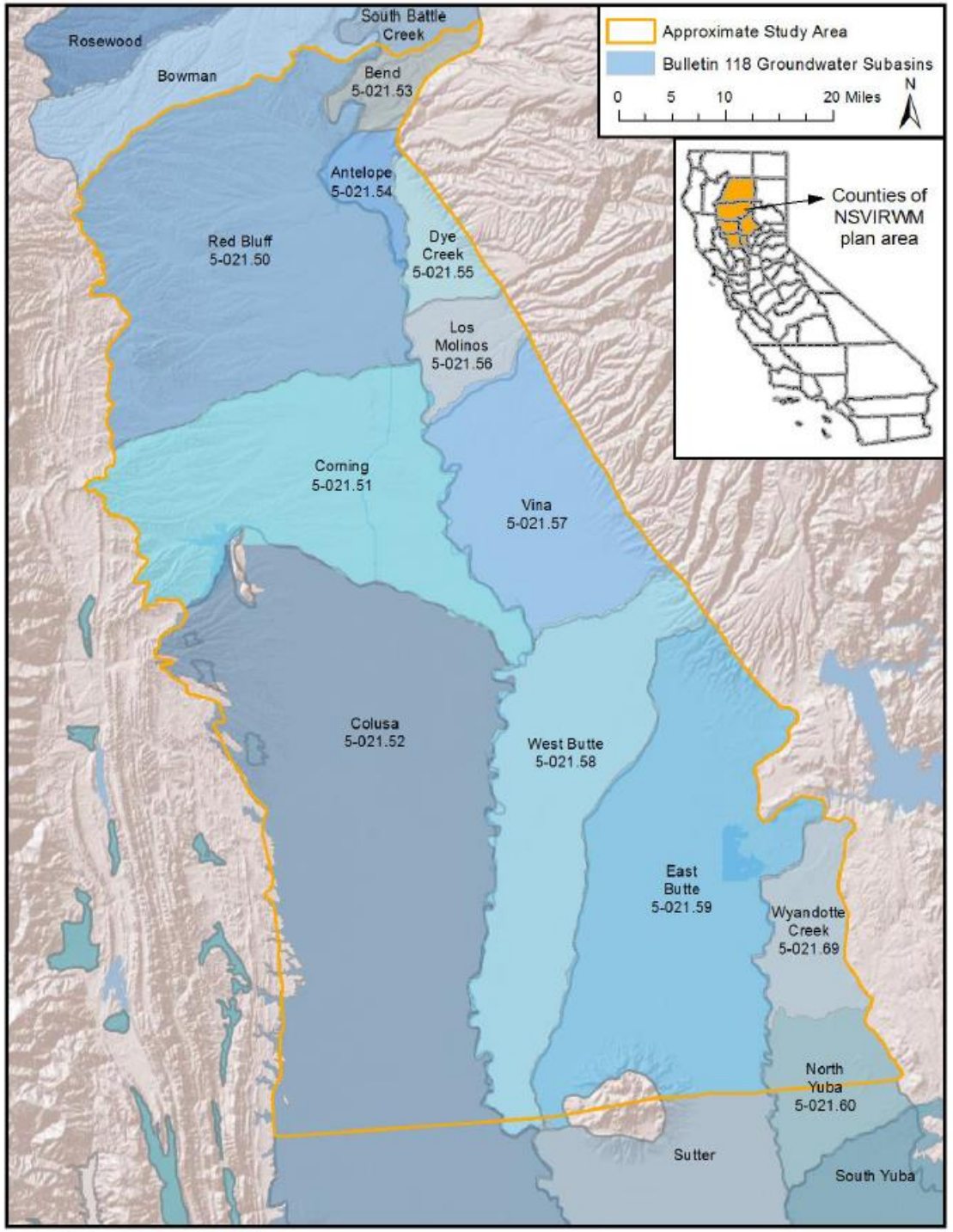
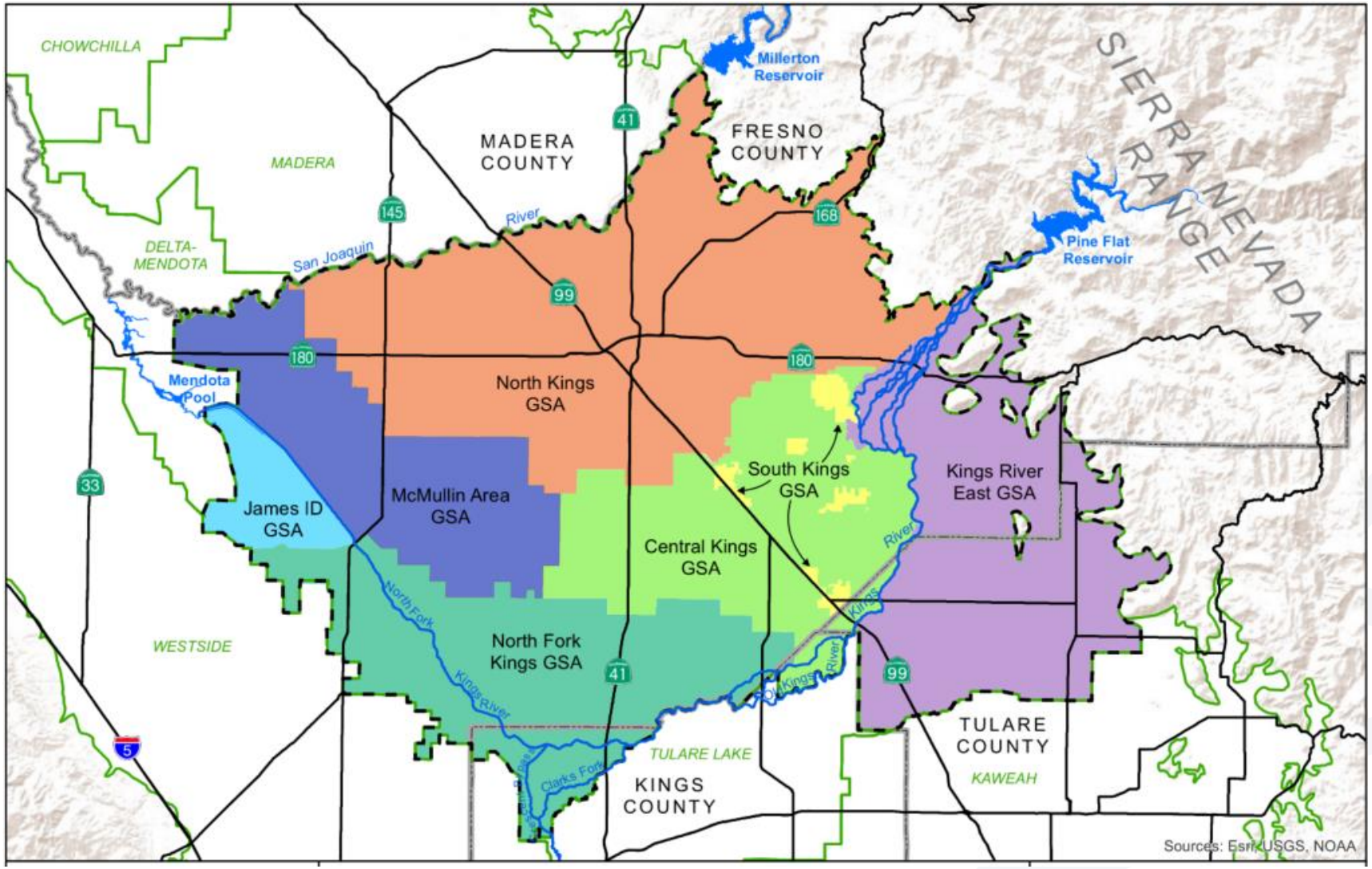
Hydrologically Interconnected Subbasins

- 12 subbasins in Study area
- Relevant to entire Central Valley
- Need to collaborate with neighbors early on





Kings Basin – Groundwater Sustainability Agencies



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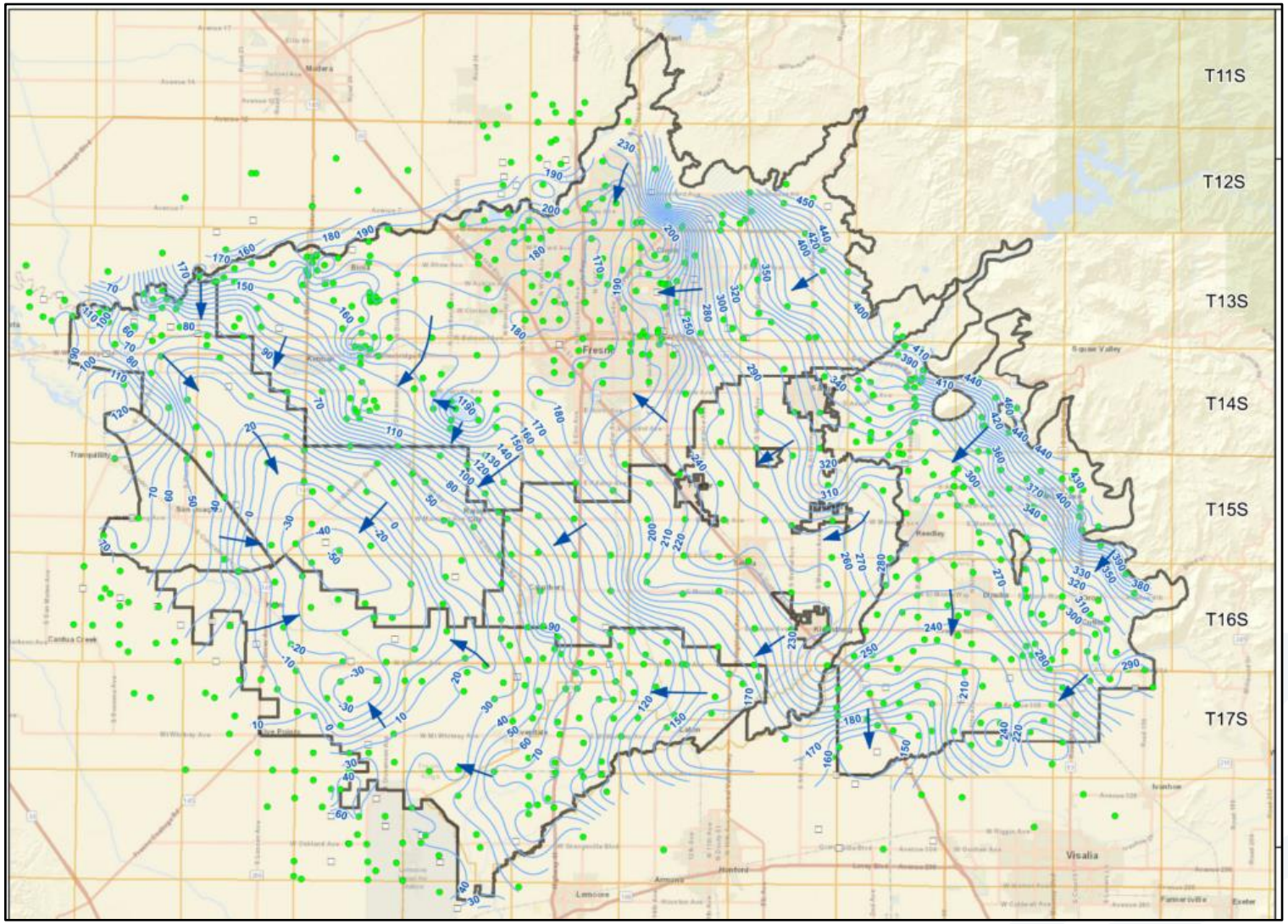
Kings Basin – Fall 2017 Groundwater Elevation Contours



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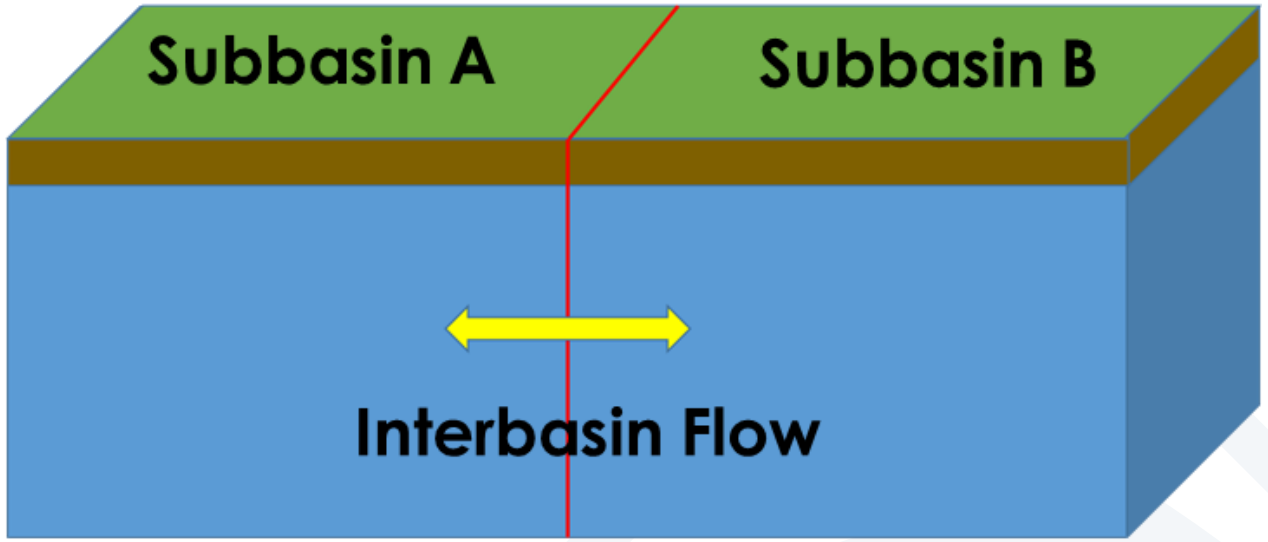
Interbasin Groundwater Flow Characteristics

- Cannot be directly measured
- Vary significantly in space and time
- Depends on dynamics of recharge and discharge from subbasins
- Groundwater models are necessary for quantifying flows



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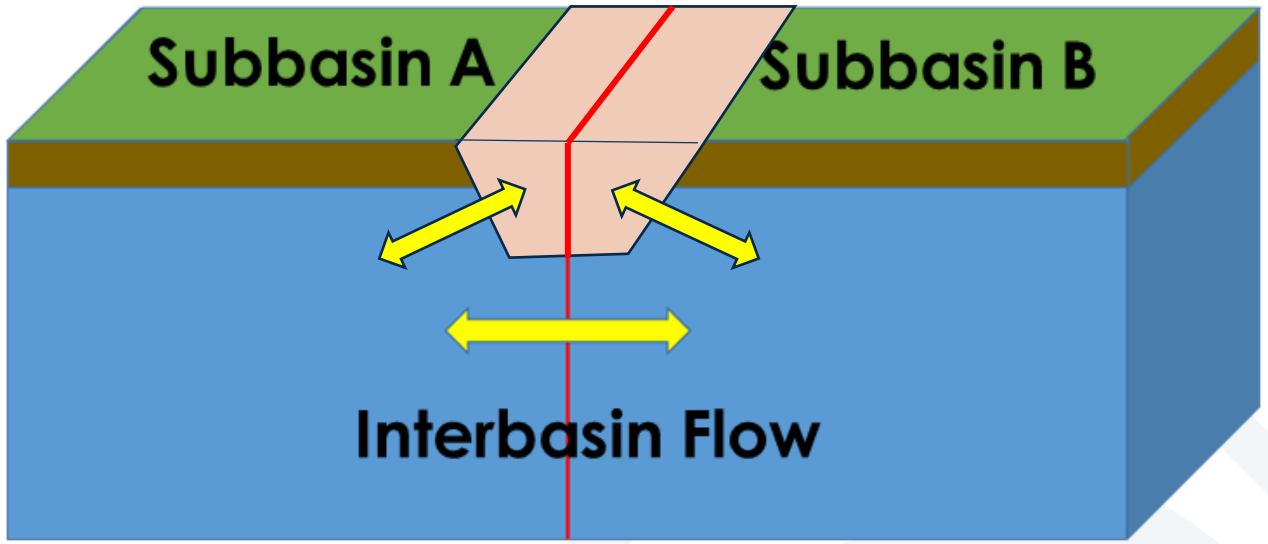
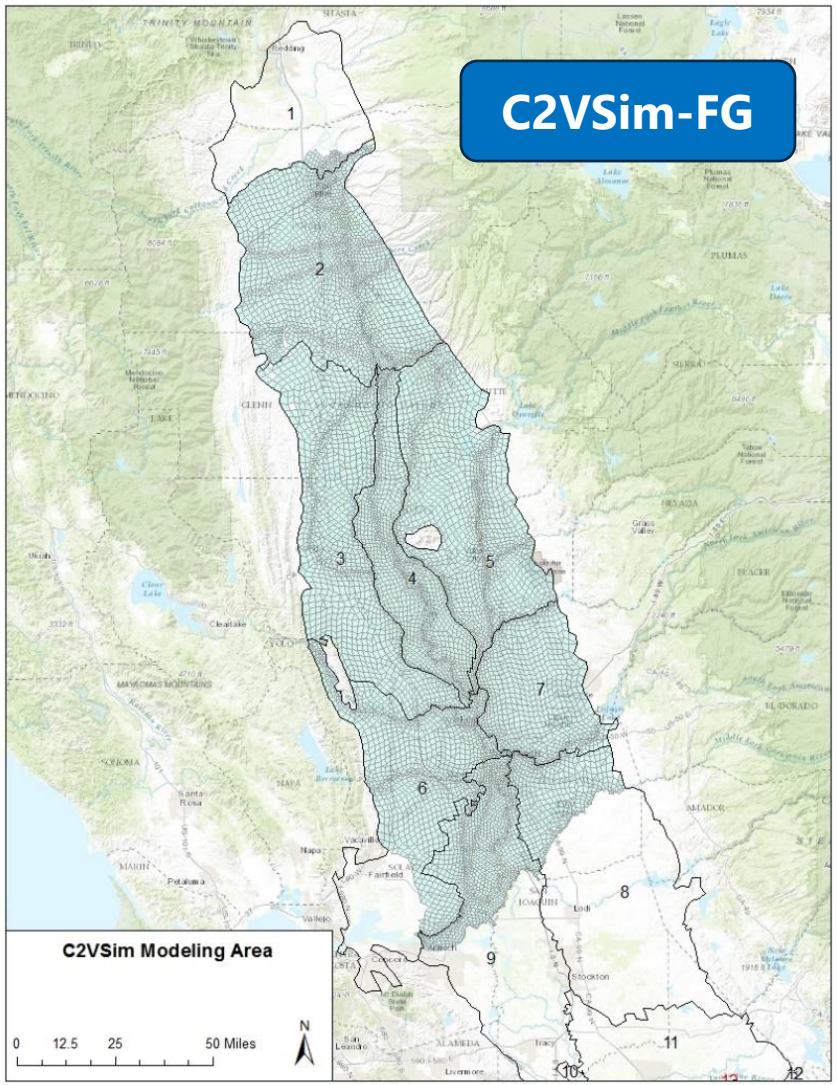
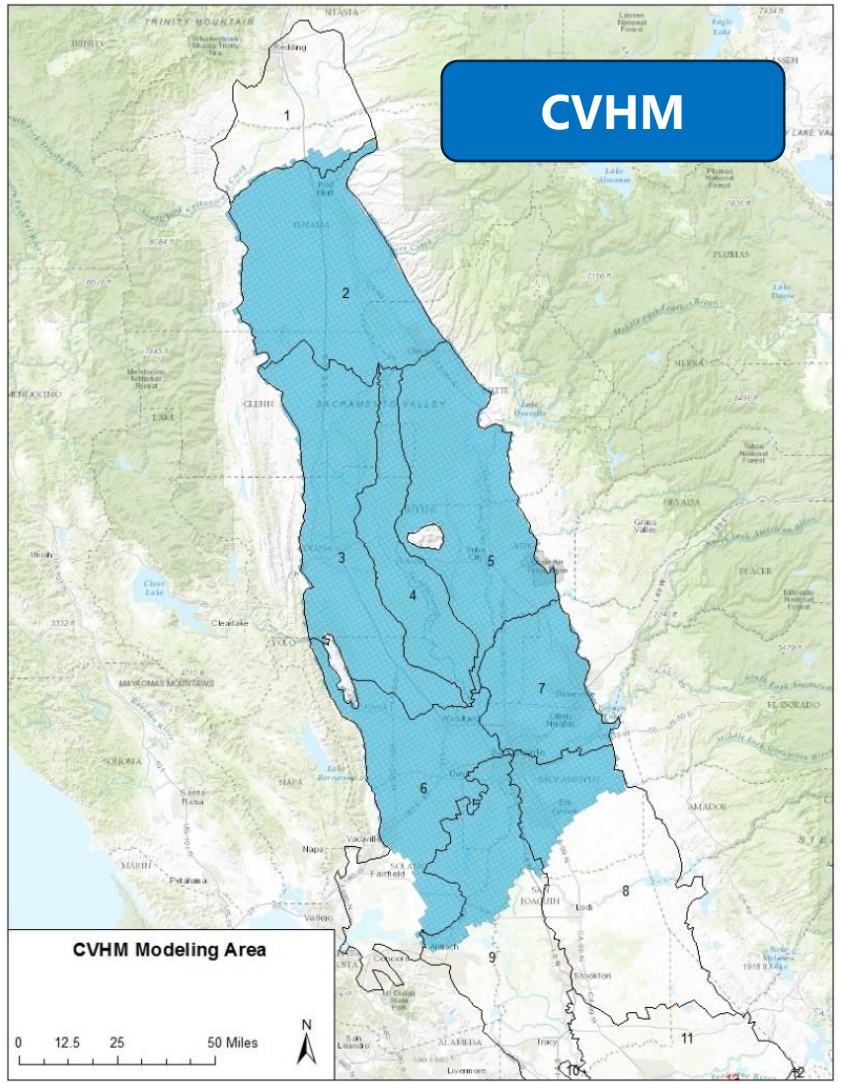
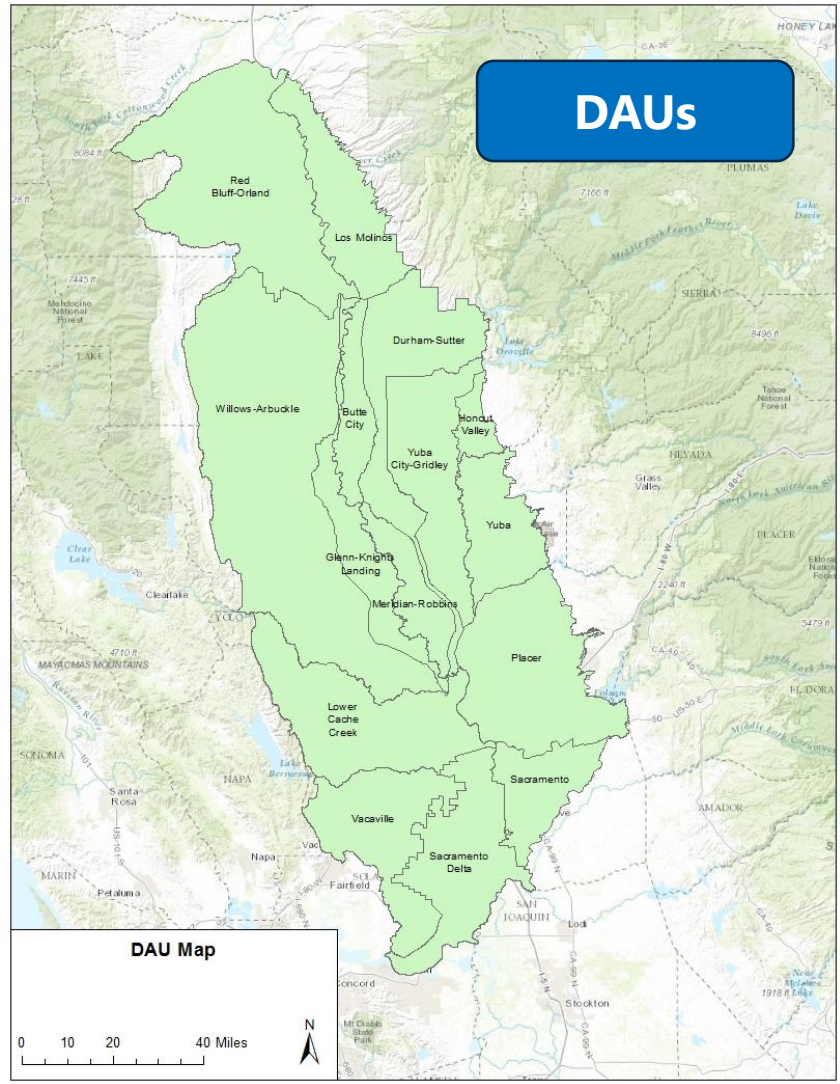


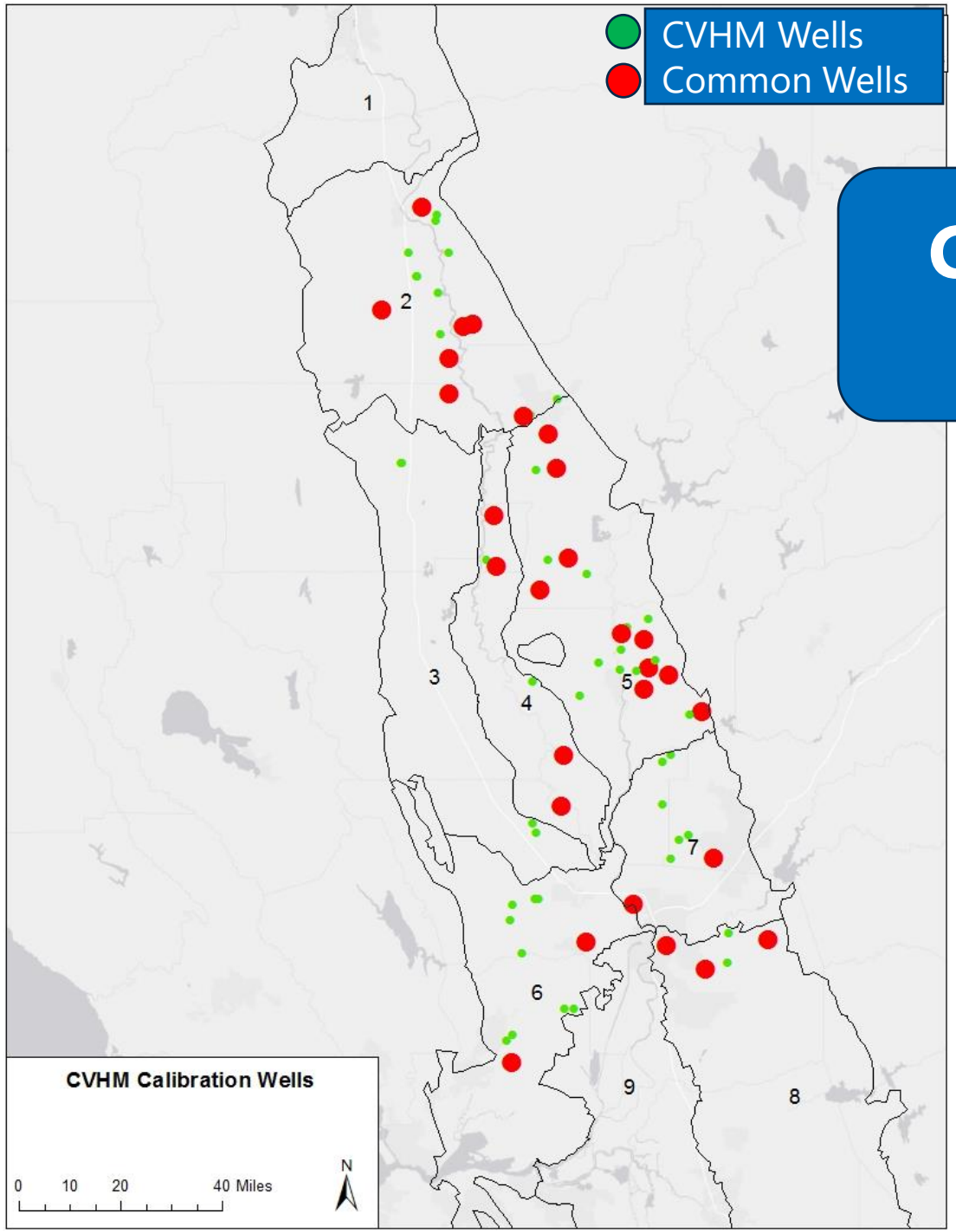
Study Area

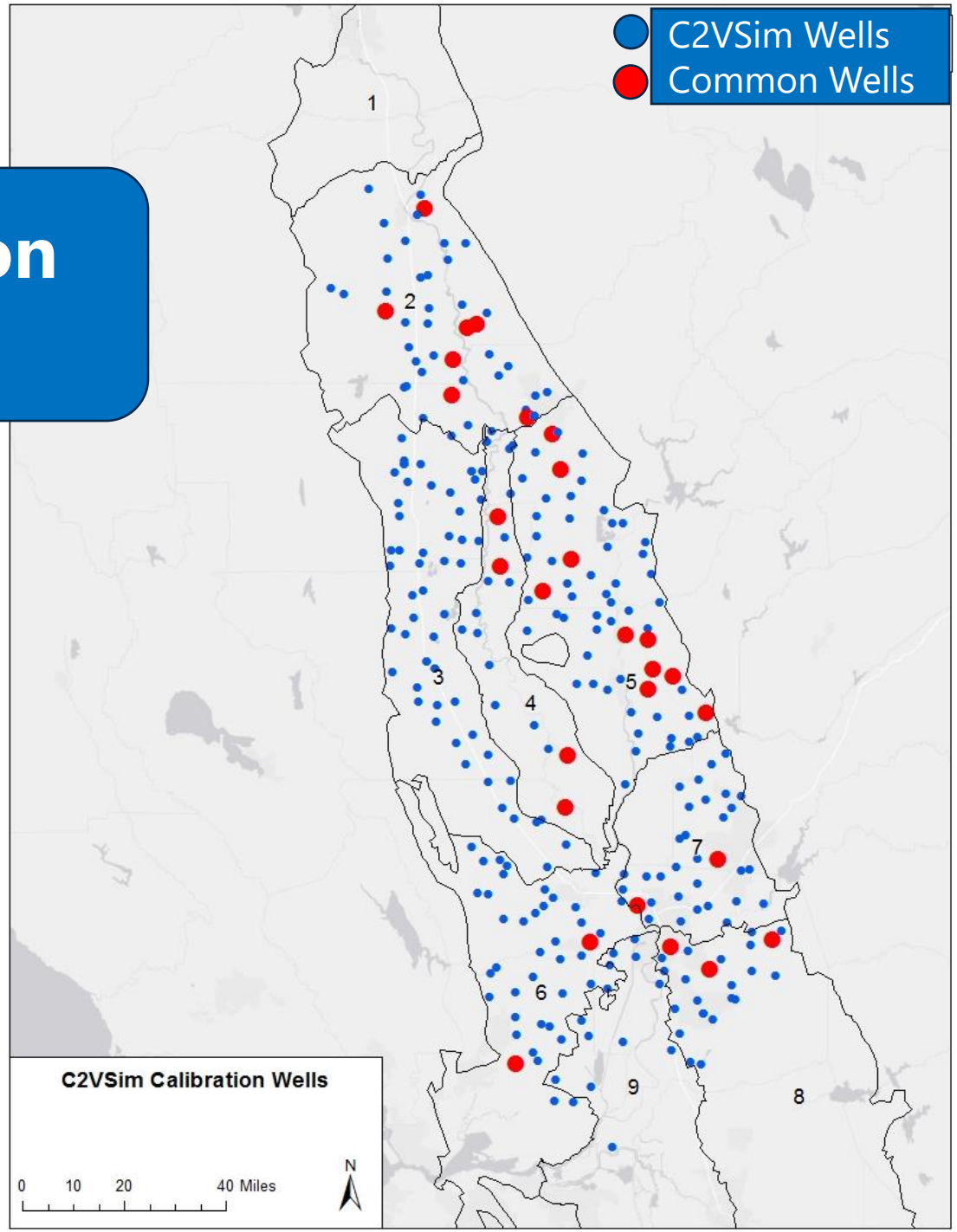

C2VSim-FG
C2VSim Modeling Area
0 12.5 25 50 Miles
N


CVHM
CVHM Modeling Area
0 12.5 25 50 Miles
N


DAUs
Red Bluff-Orland
Los Molinos
Durham-Sutter
Willows-Arbuckle
Butte City
Honcut Valley
Yuba City-Gridley
Yuba
Glenn-Knights Landing
Meridian-Robbins
Placer
Lower Cache Creek
Sacramento
Vacaville
Sacramento Delta
DAU Map
0 10 20 40 Miles
N

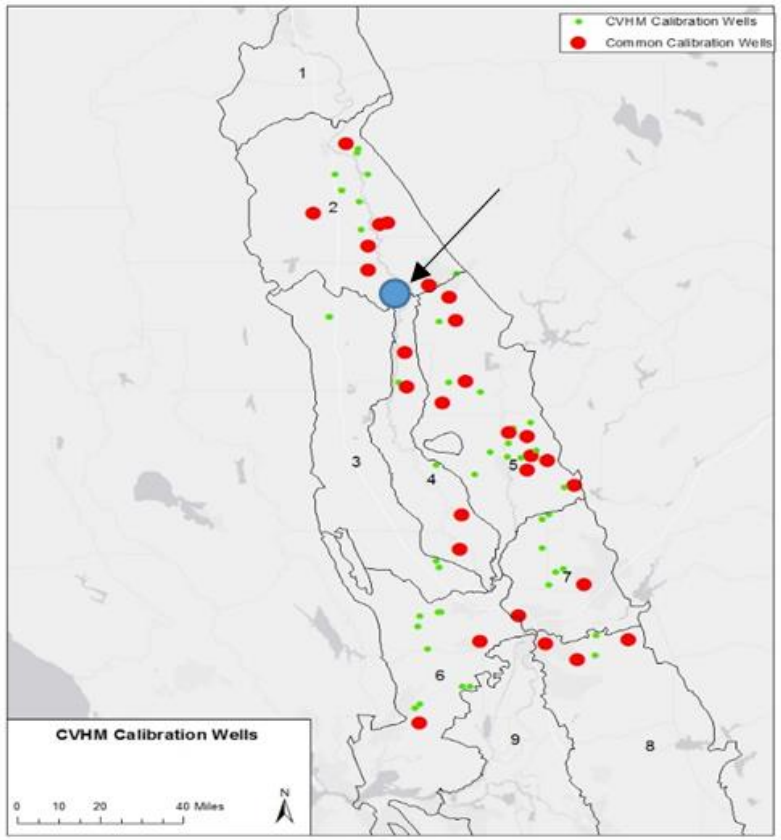
Calibration Wells

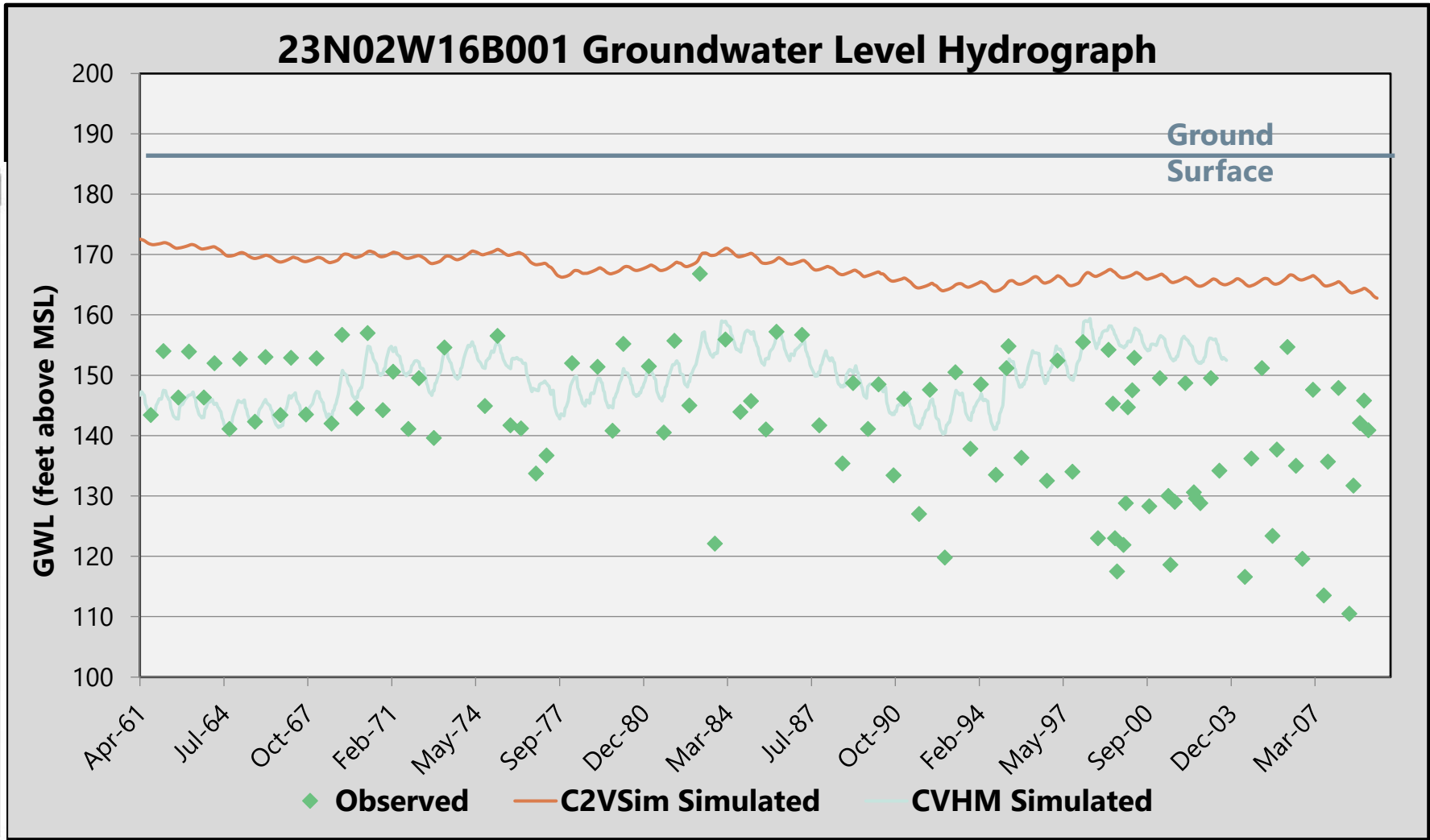




Model Calibration

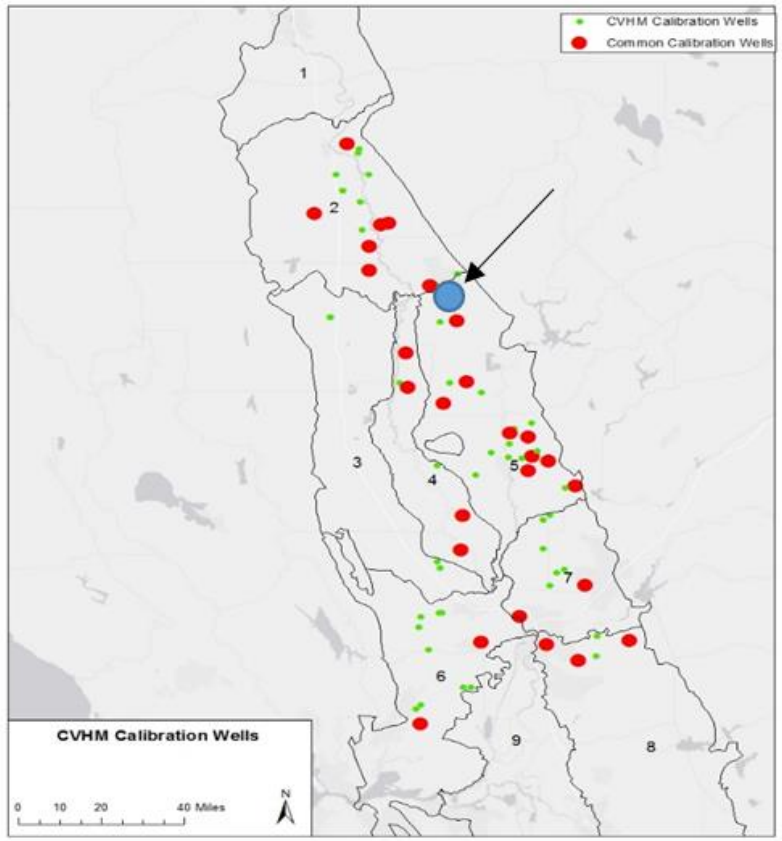
- **Active Irrigation**
- **Shallow (100 – 120 ft)**

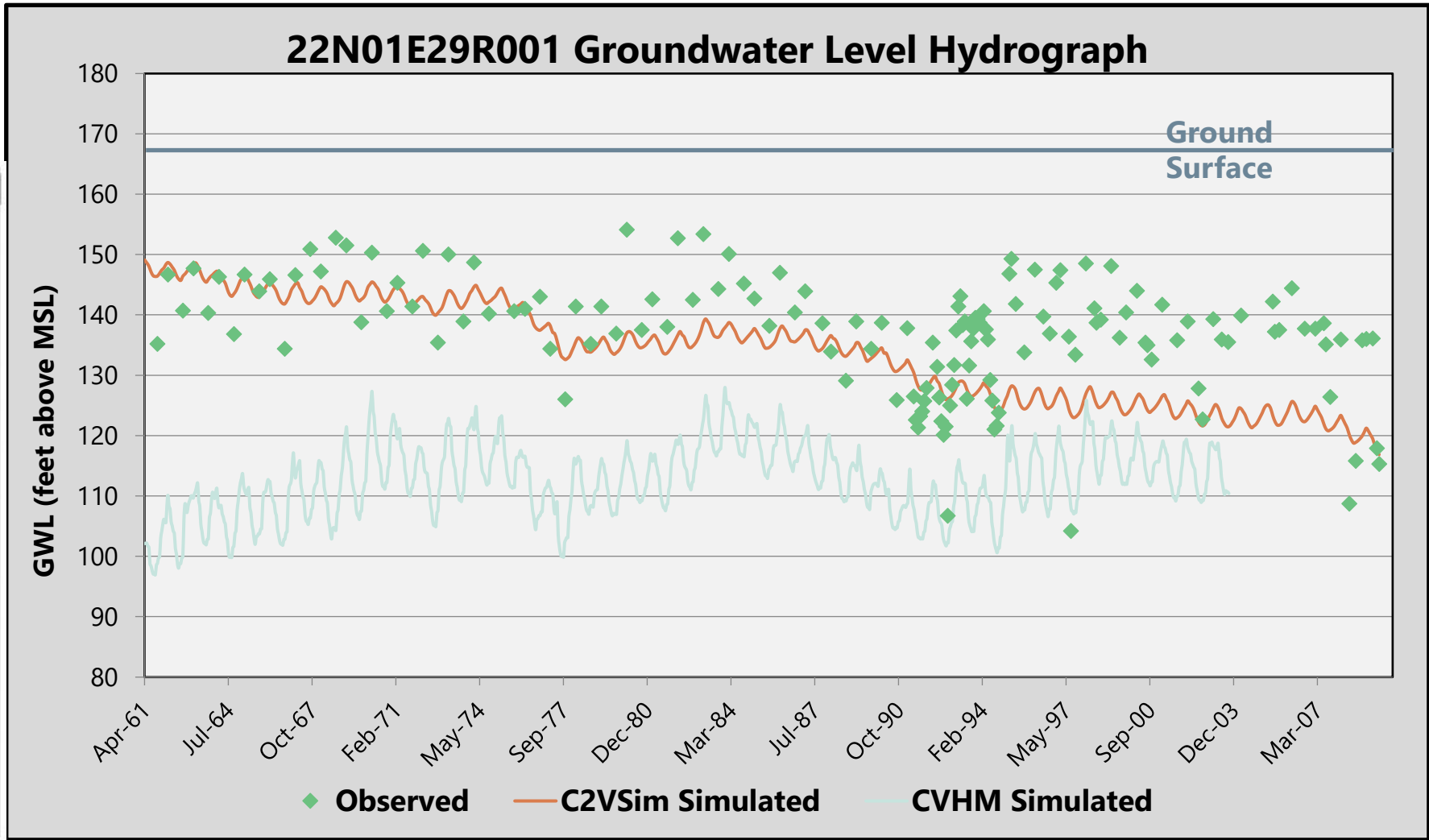




Model Calibration

- **Observation**
- **Intermediate (460 – 559**





Recommendations for GSAs in NSV

- Evaluate most current version of available models at time of GSP development: C2VSim, CVHM, SVSim
- Compare to local surface layer models or water budget data to select model. Do not mix output from gw model with other local water budget sources.
- Over time, work with agencies to incorporate local knowledge/data into the selected regional gw model
- When evaluating a groundwater model, consider representation of:
  - Crop acreage
  - Irrigation practices
  - Surface water supplies and diversions
  - Rivers and streams (does it include ones the GSA considers important?)
  - Subsurface flows from outside the subbasin boundaries (eastern or western foothills)

Recommendations for DWR and USGS

- **Important opportunity to provide specific recommendations for technical assistance to GSAs**
- Develop tools and guidance to **ease comparison of models** (inputs like crop data, and outputs of water budget components)
- Process to **incorporate local data** into regional tools
- Provide guidance on use of these tools to address the six undesirable results defined by SGMA
- Other specific technical assistance needs (e.g. methods for developing water budgets where boundaries are co-located with streams)

Contacts

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