

# Notice and Agenda of a Workshop of the Yucaipa Sustainable Groundwater Management Agency

Wednesday, February 27, 2019 at 10:00 a.m.

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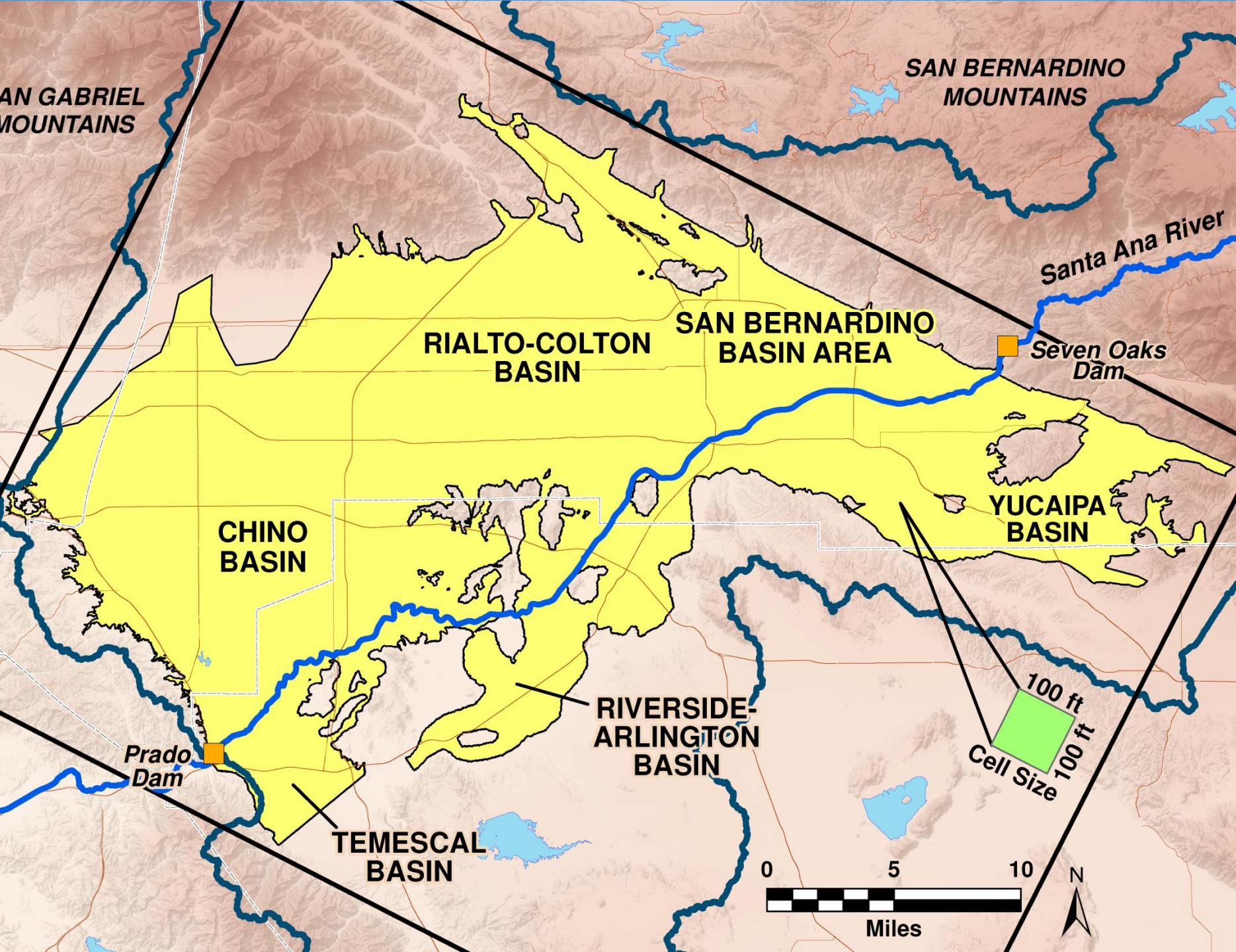
City of Yucaipa, 34272 Yucaipa Boulevard  
Yucaipa, California 92399  
(909) 797-2489 | [www.yucaipasgma.org](http://www.yucaipasgma.org)

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- I. Call to Order**
- II. Roll Call**
- III. Introductions of Board Members and Public Participants**
- IV. Public Comments** At this time, members of the public may address the representatives of the Yucaipa Groundwater Sustainability Agency on matters within its jurisdiction.
- V. Review and Approval of Meeting Minutes**
  - A. Meeting Minutes - January 23, 2019 - Deferred to the next meeting
- VI. Discussion Items**
  - A. Overview and Discussion Regarding the Monthly Progress Report for the Preparation of the Groundwater Sustainability Plan by Dudek - Tim Kellett
  - B. Status Report on the Sustainable Groundwater Management Act Grant Supporting Work by the Yucaipa Sustainable Groundwater Management Agency - Tim Kellett
  - C. Status Report on the Preparation of a Groundwater Sustainability Plan - Dudek / Tim Kellett
  - D. Status Report and Discussion Regarding the Development of the USGS / Geoscience Groundwater Model - Geoscience / Tim Kellett
- VII. Presentation**
  - A. Presentation by the United States Geological Survey Groundwater Flow Model
- VIII. Topics for Future Meetings**
- IX. Comments by Board of Directors**
- X. Announcements - Future Meetings**
  - A. Wednesday, March 27, 2019 at 10:00 am - Workshop
  - B. Wednesday, April 24, 2019 at 10:00 am - Board Meeting
  - C. Wednesday, May 22, 2019 at 10:00 am - Workshop
  - D. Wednesday, June 26, 2019 at 10:00 am - Workshop
  - E. Wednesday, July 24, 2019 at 10:00 am - Board Meeting
  - F. Wednesday, August 28, 2019 at 10:00 am - Workshop
  - G. Wednesday, September 25, 2019 at 10:00 am - Workshop
  - H. Wednesday, October 23, 2019 at 10:00 am - Board Meeting
  - I. Wednesday, January 22, 2020 at 10:00 am - Board Meeting
- XI. Adjournment**

## Roll Call - Board of Directors

Purveyors	Present	Primary Representative	Present	Alternative Representative
South Mesa Water Company		David Armstrong		Adan Ortega
South Mountain Water Company		- -		- -
Western Heights Water Company		Mark Iverson		Tim Green
Yucaipa Valley Water District		Joseph Zoba		Jennifer Ares
<b>Municipals</b>				
City of Calimesa		Lori Askew		Bonnie Johnson
City of Redlands		Cecilia Griego		- -
City of Yucaipa		Ray Casey		Fermin Preciado
<b>Regionals</b>				
San Bernardino Valley MWD		Doug Headrick		Bob Tincher
San Gorgonio Pass Water Agency		Jeff Davis		Tom Todd
<b>Stakeholders</b>				
County of Riverside		Steve Horn		Jeff Johnson
County of San Bernardino		Bob Page		- -
* Quorum requires a total of five Purveyor, Municipal, Regional Members				



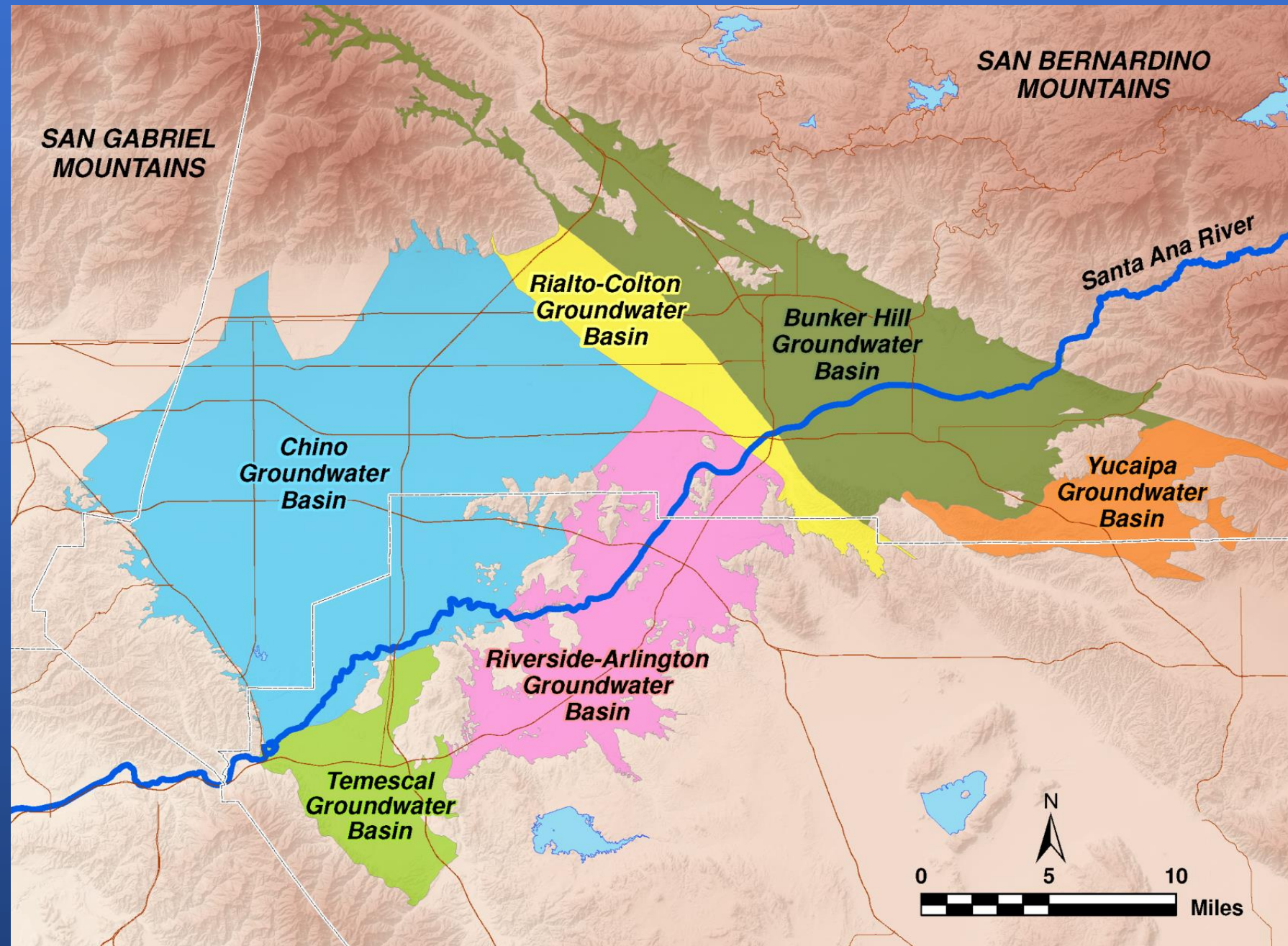
# Upper Santa Ana River Integrated Model

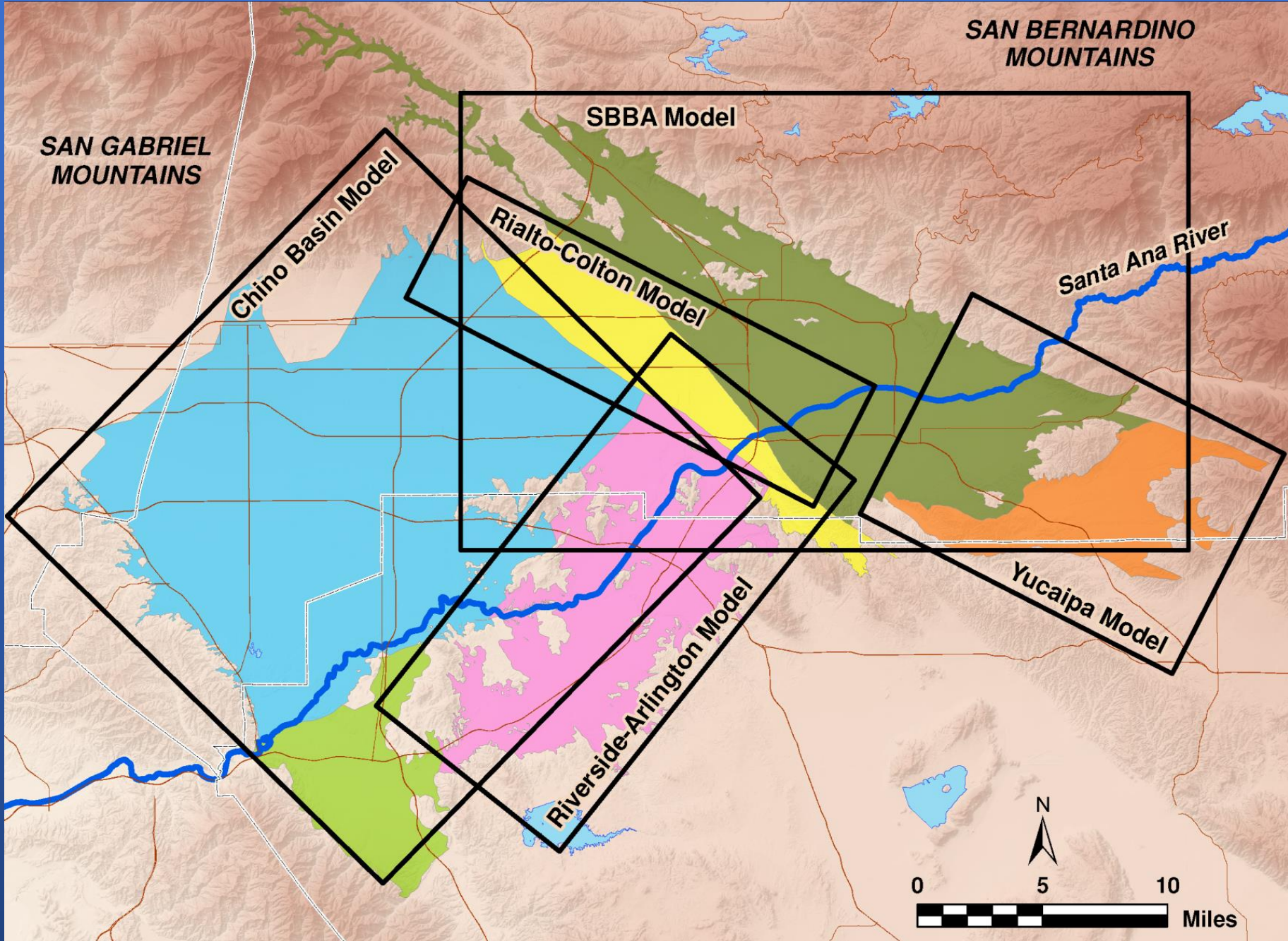
February 27, 2019

**GEOSCIENCE**

# Project Objectives

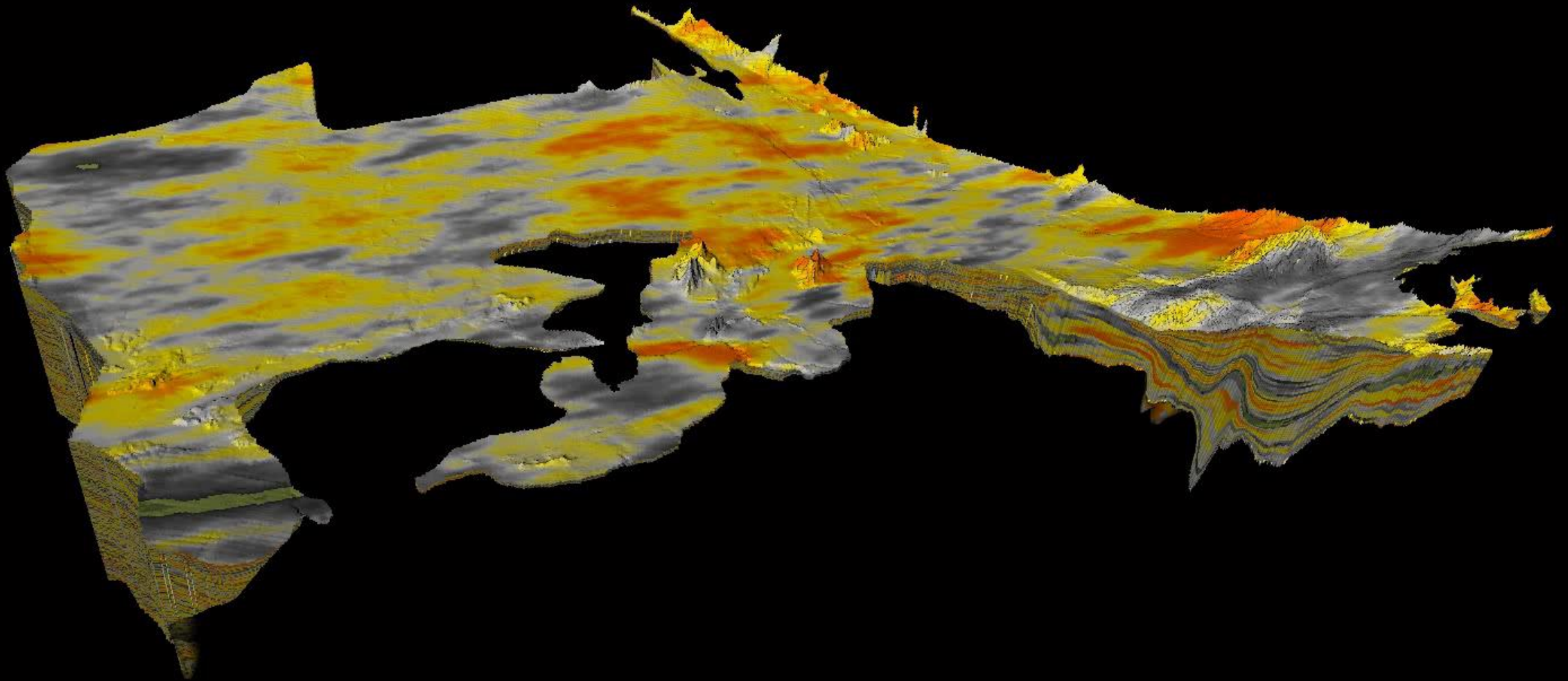
- ✓ Provide a management tool to determine what factors contribute to reduced streamflow in the SAR, and
- ✓ To evaluate potential effects from proposed projects on streamflow and groundwater levels across the basin.





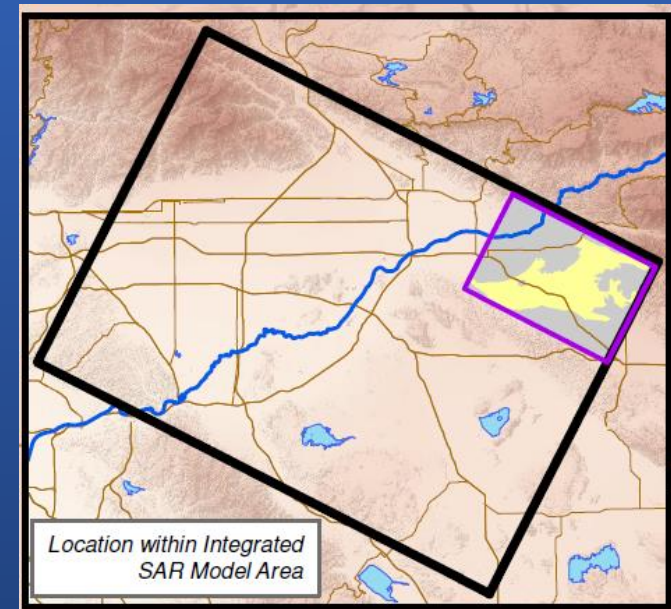
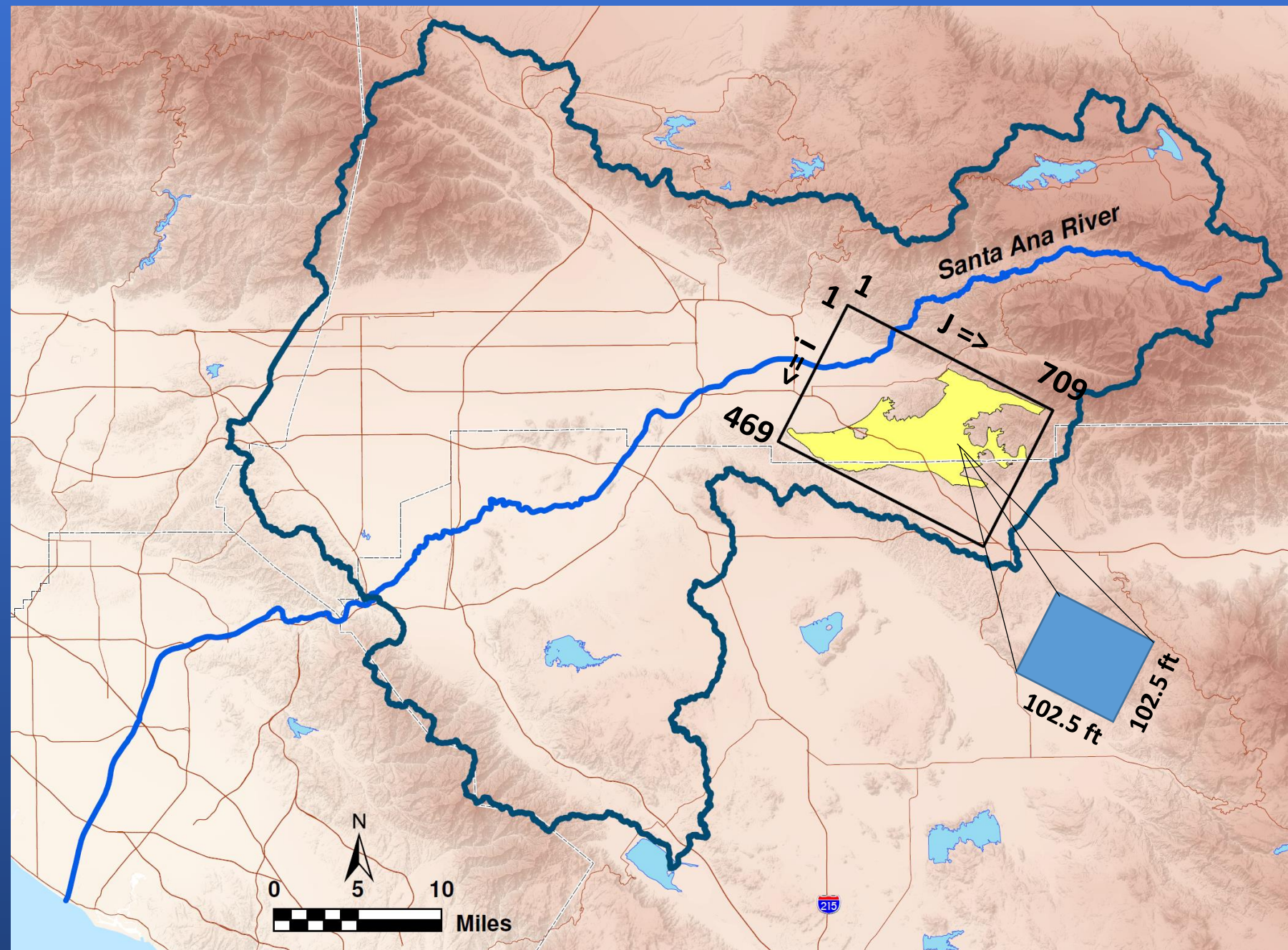
# Approach

- ✓ Integrate the five existing individual groundwater basin models

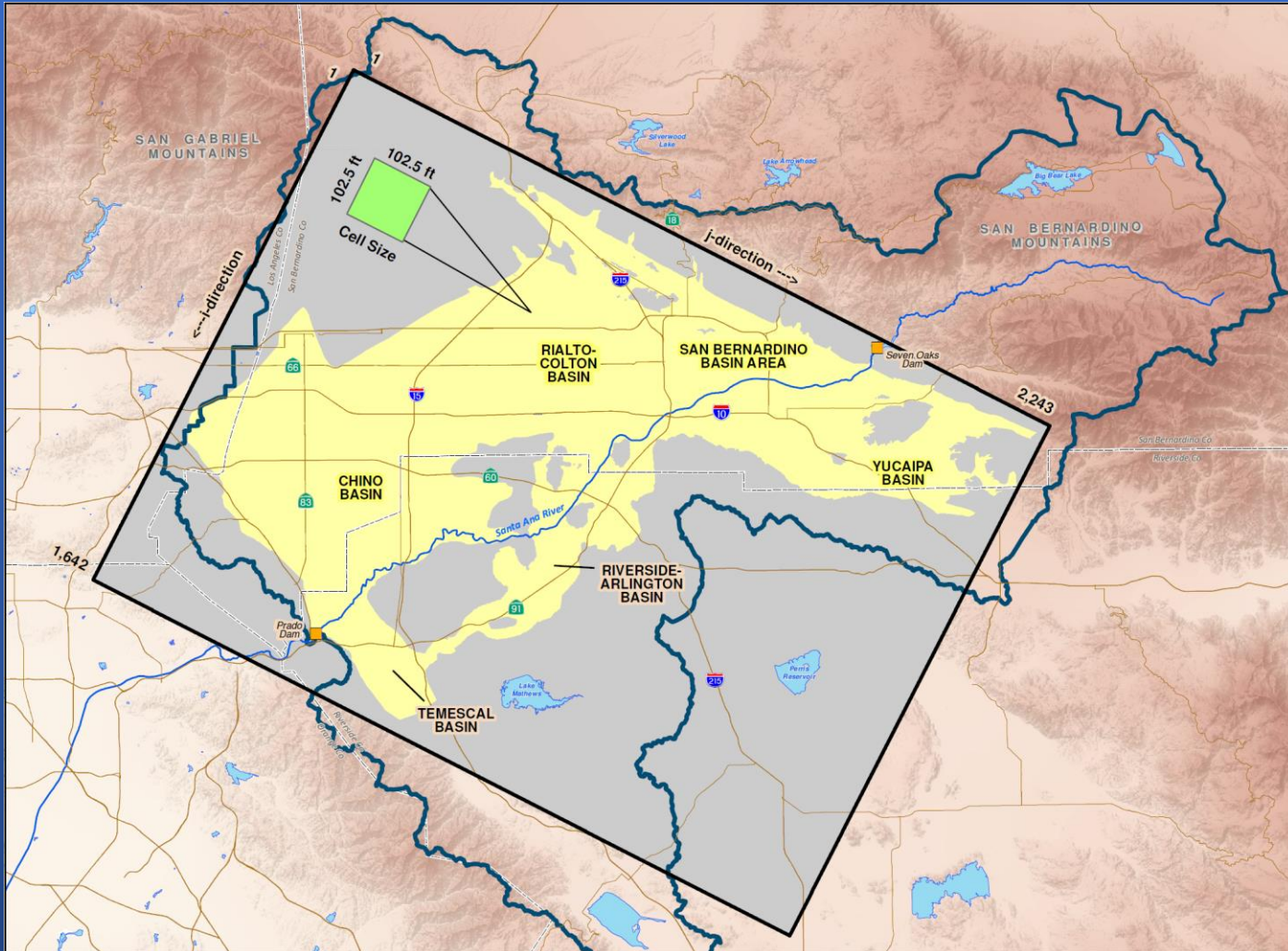


# Update Yucaipa Basin Model

- ✓ Update boundary conditions based on the results from the Integrated SAR Model



# Coordination with USGS



- ✓ Data sharing,
- ✓ Technical Advisory Meetings, and
- ✓ Peer-review meetings to discuss conceptual model, lithologic model and model calibration.



# Conceptual Model for the Yucaipa Basin Model

Yucaipa Basin		
Geologic Unit	Hydrogeologic Unit	Model Layer
Very Young and Young Axial-Channel and Wash Deposits <sup>1</sup> (Holocene)	Axial Channel and Wash Deposits	1
Very Young and Young Alluvial Deposits <sup>2</sup> (Holocene)	Late Quaternary	
Old and Very Old Alluvial Deposits <sup>3</sup> (Pleistocene)		
Live Oak Canyon Deposits (Pleistocene)		2
	Live Oak Canyon Deposits	3
		4
		5
San Timoteo Formation (Plio-Pleistocene)	San Timoteo	6
Mt. Eden (Miocene)	Consolidated	
Granitic Rock	Basement	7



# Hydrogeology and Water Availability of the Yucaipa Subbasin, Yucaipa, California

February 27, 2019  
Yucaipa, California

California Water Science Center, U.S. Geological Survey  
In cooperation with:  
San Bernardino Valley Municipal Water District (SBVMWD)

U.S. Department of the Interior  
U.S. Geological Survey

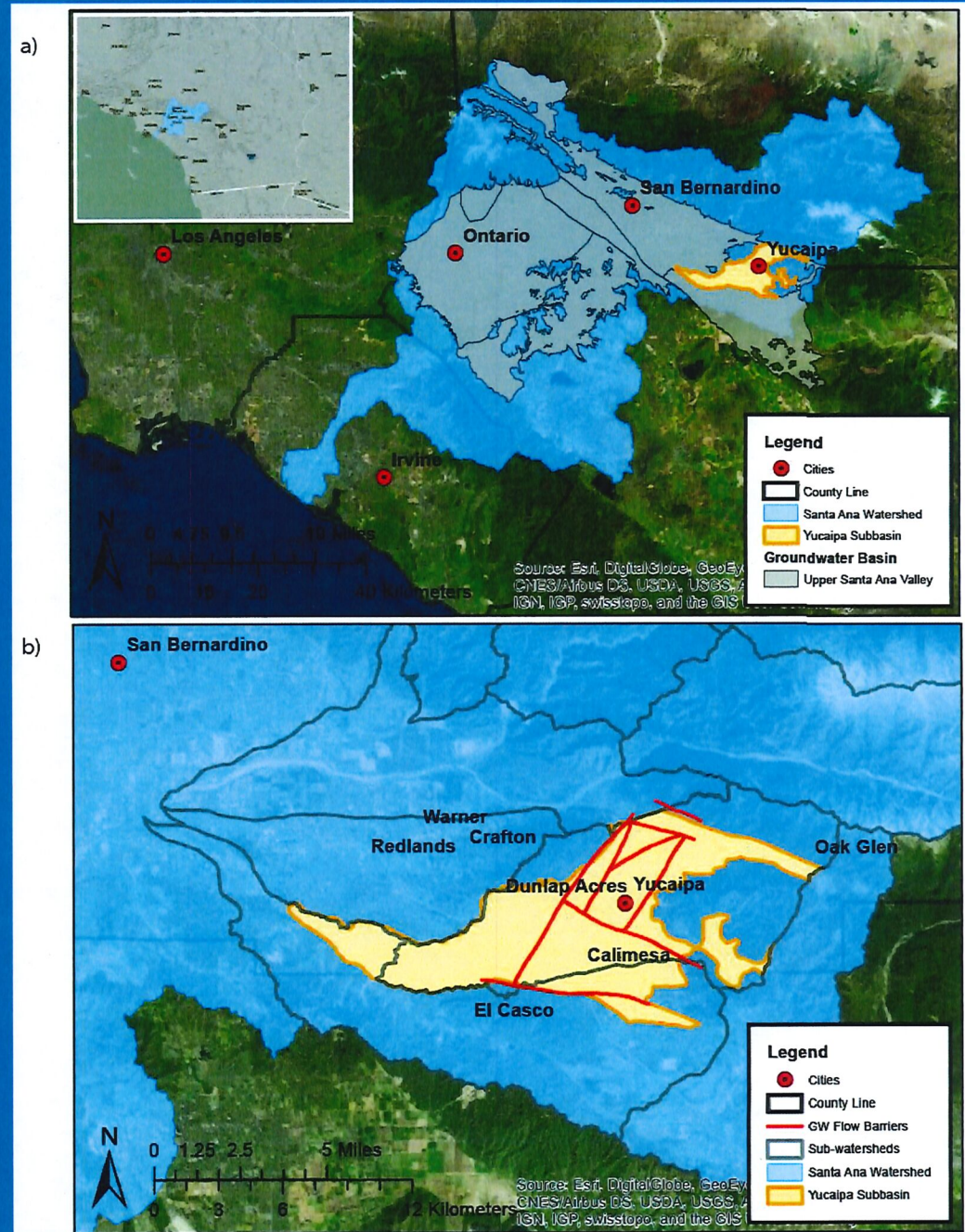
*These data are preliminary or provisional and are subject to revision. They are being provided to meet the need for timely best science. The data have not received final approval by the U.S. Geological Survey (USGS) and are provided on the condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from the authorized or unauthorized use of the data.*

# Presentation Outline

- Project objectives & timeline
- Summary of preliminary integrated groundwater model results
- Questions and discussion

# Project Objectives

1. Define a quantitative hydrogeologic framework of the Yucaipa Subbasin
2. Quantify the hydrologic budget of the subbasin
3. Develop hydrologic modeling tools to aid in evaluating and managing the groundwater resource



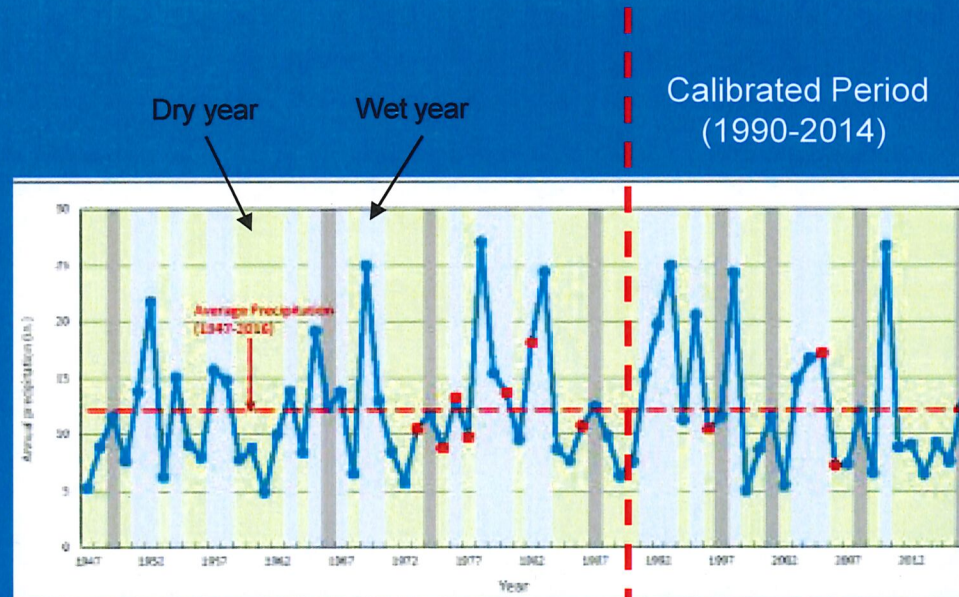
# Timeline

Four year project (2015-2019) – currently in **year four**

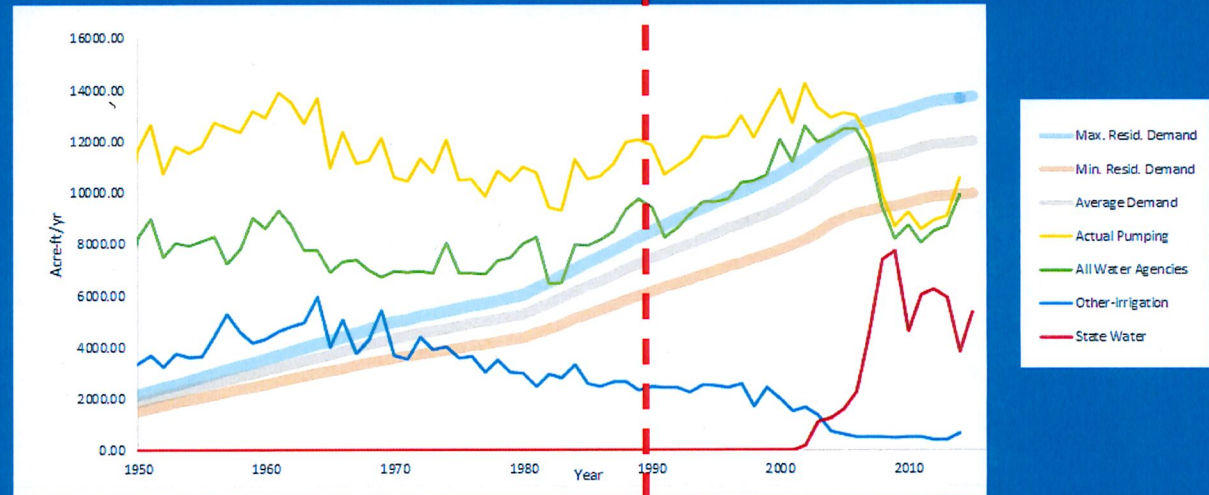
- Preliminary model completed and made available to SBVMWD - 8/22/2018
- Preliminary model and report to USGS and SBVMWD for formal review- **April, 2019**
- Model and report approved and released - **Sept. 30, 2019**

# Background

- Water use shifted from being mainly agricultural to municipal & industrial
- Climatic patterns, and population, affect water use
- Land use increasingly urbanized
- Import of State Water
- Enhanced recharge at Wilson Creek



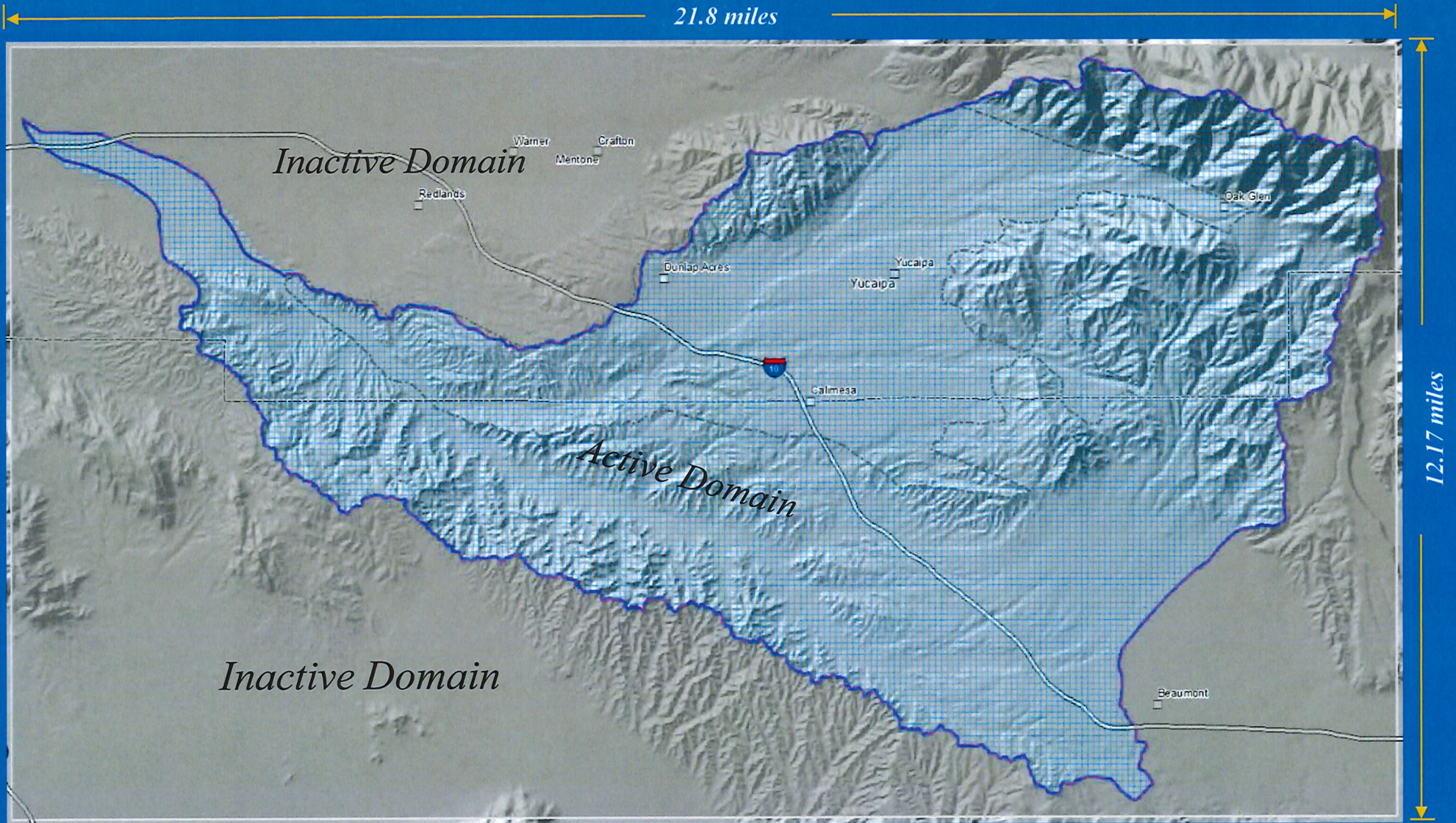
Annual precipitation for the Yucaipa study area



Estimated water budget for the Yucaipa study area

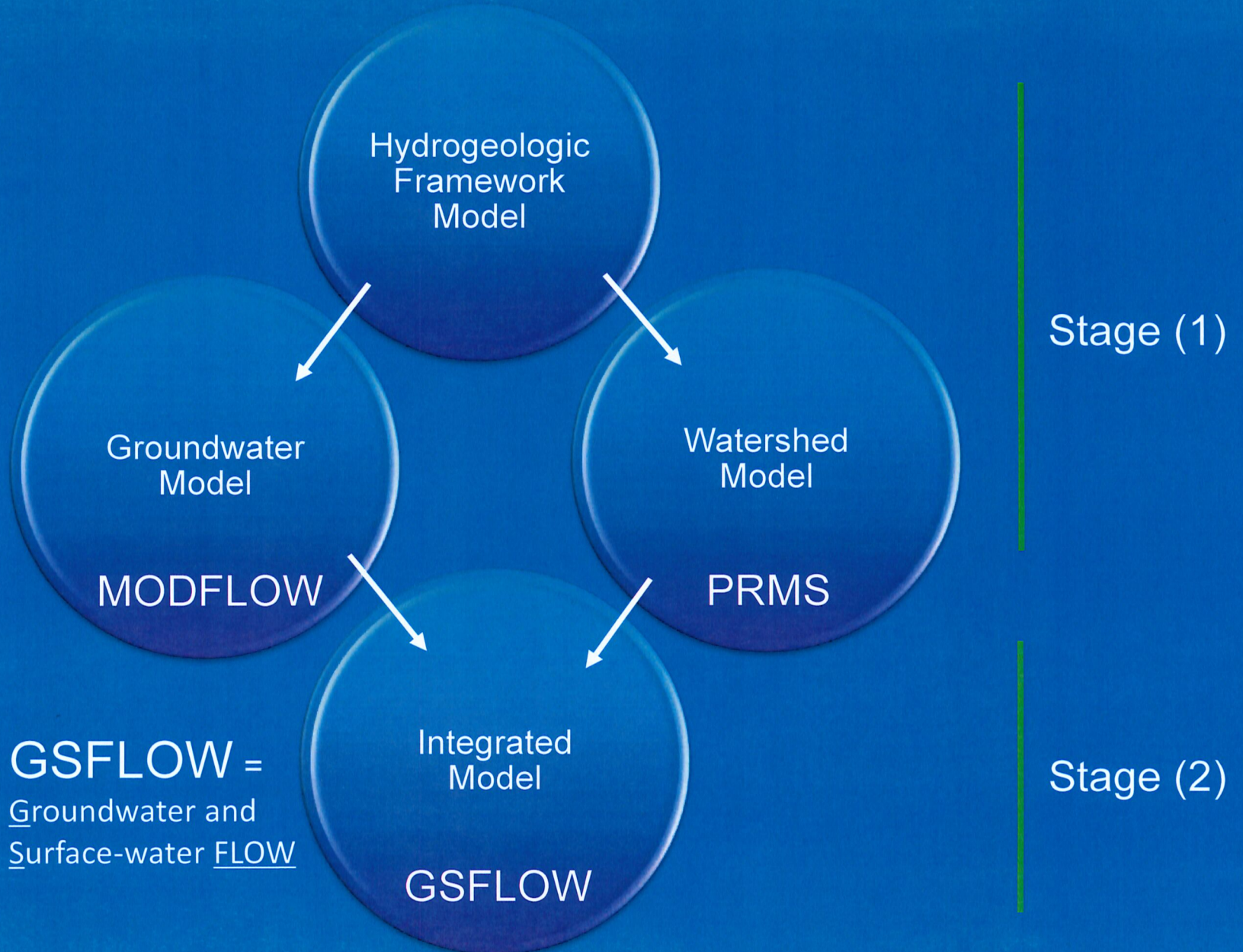


# Grid and Active Domain



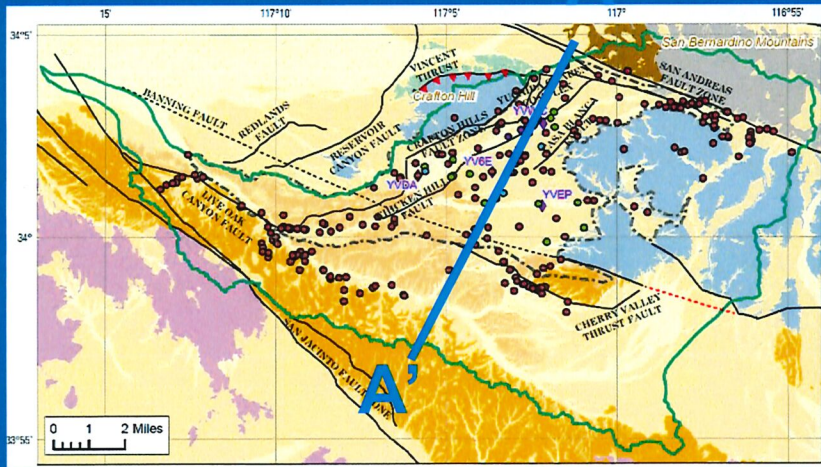
- The grid consists of 134 row and 237 columns, resulting in 31,758 cells per layer.
- 14, 012 cells - (~45% of the domain is active)
- Cell size is 492.13 ft (150 meter)





# Integrated Hydrologic Model

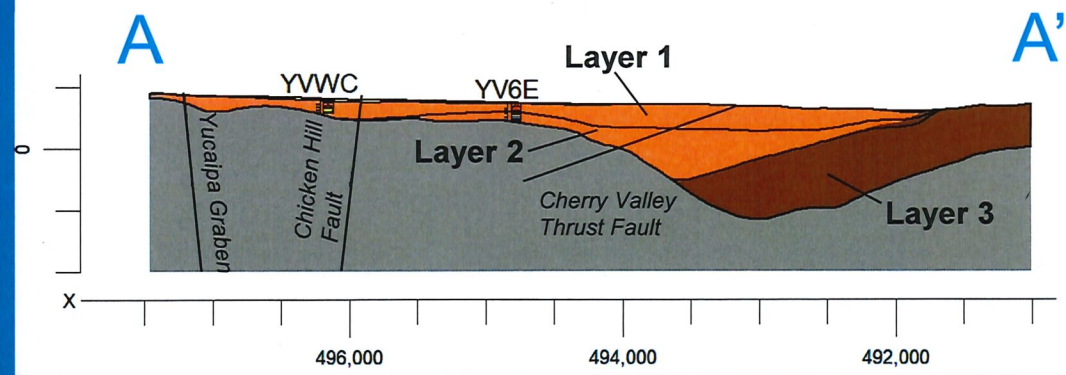
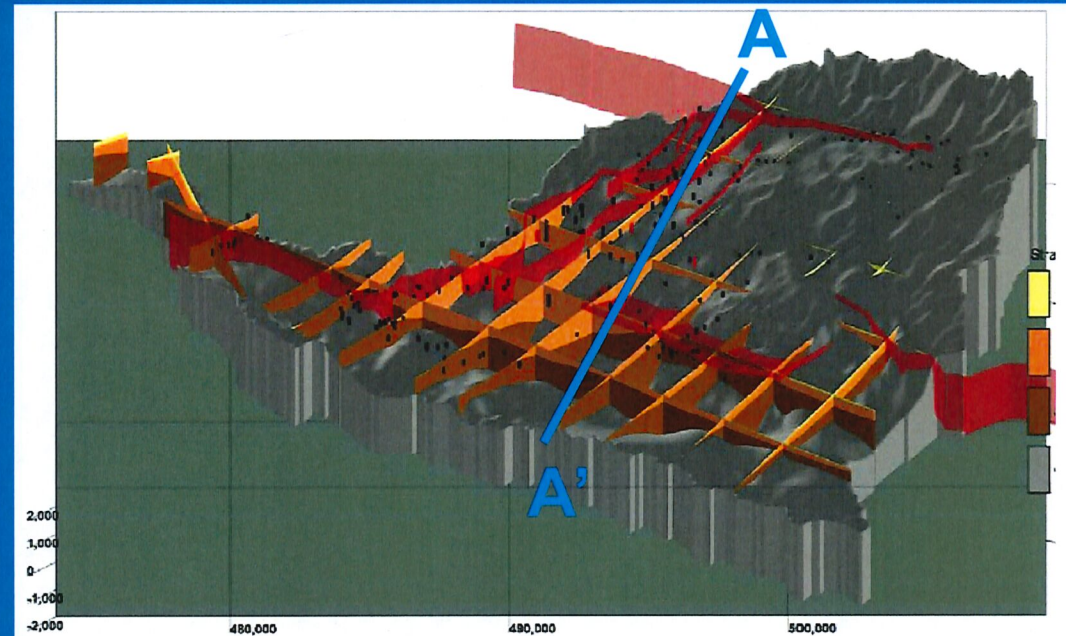




# Hydrogeologic units and groundwater model layers

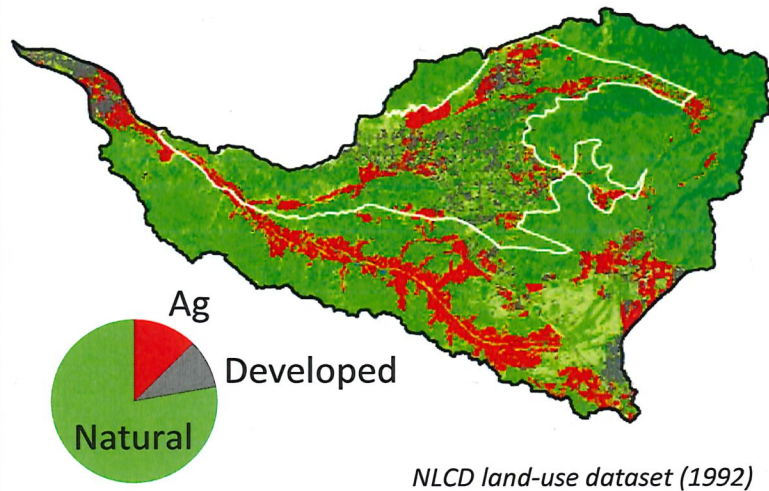


-  Quaternary surficial materials
-  Sedimentary deposits of Live Oak Canyon
-  San Timoteo formation
-  Crystalline Bedrock

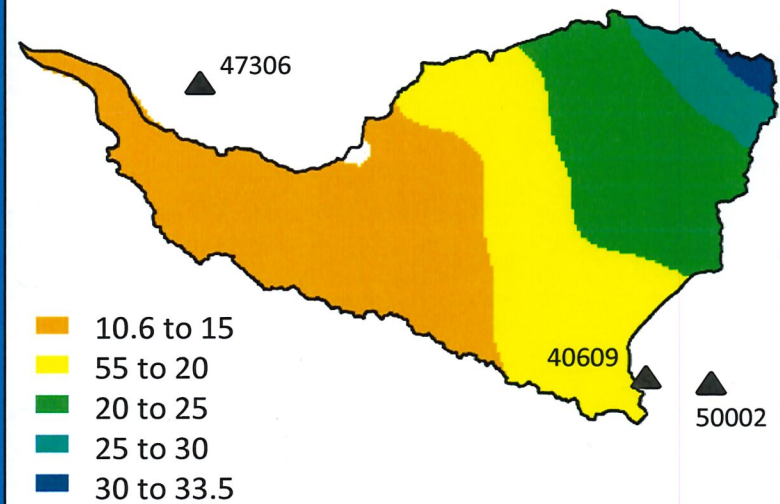


# Watershed Recharge Model Data & Results

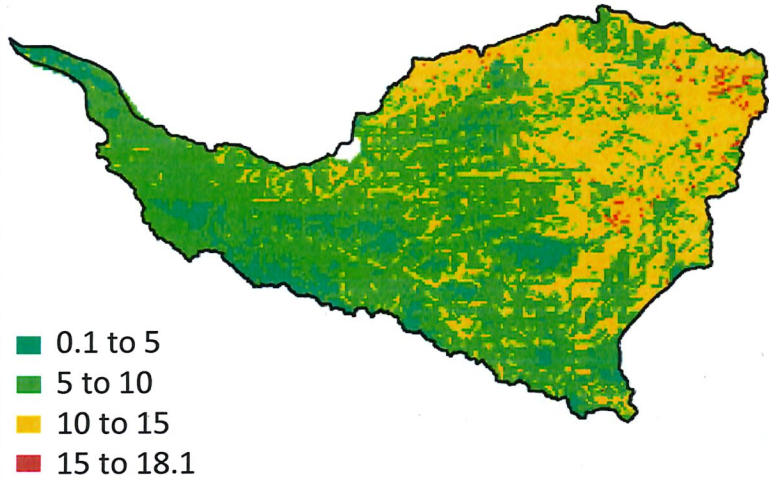
Land Cover: 1982-1995



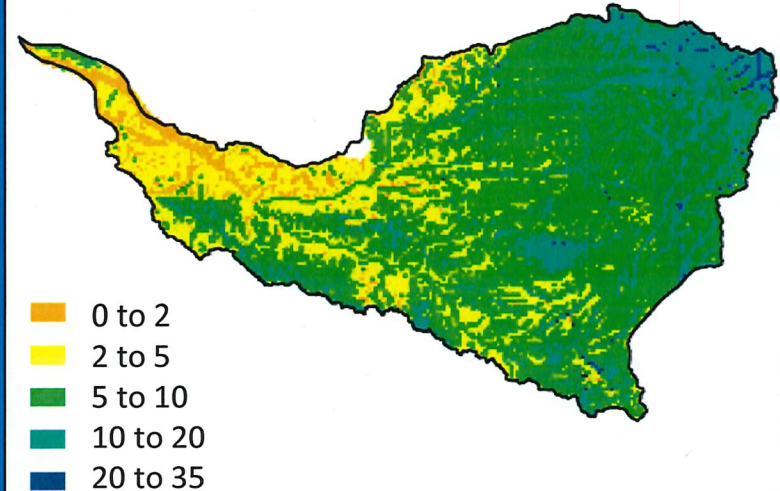
Precipitation (in/yr): 1947-2014



Evapotranspiration (in/yr): 1947-2014



Natural Recharge (in/yr): 1947-2014



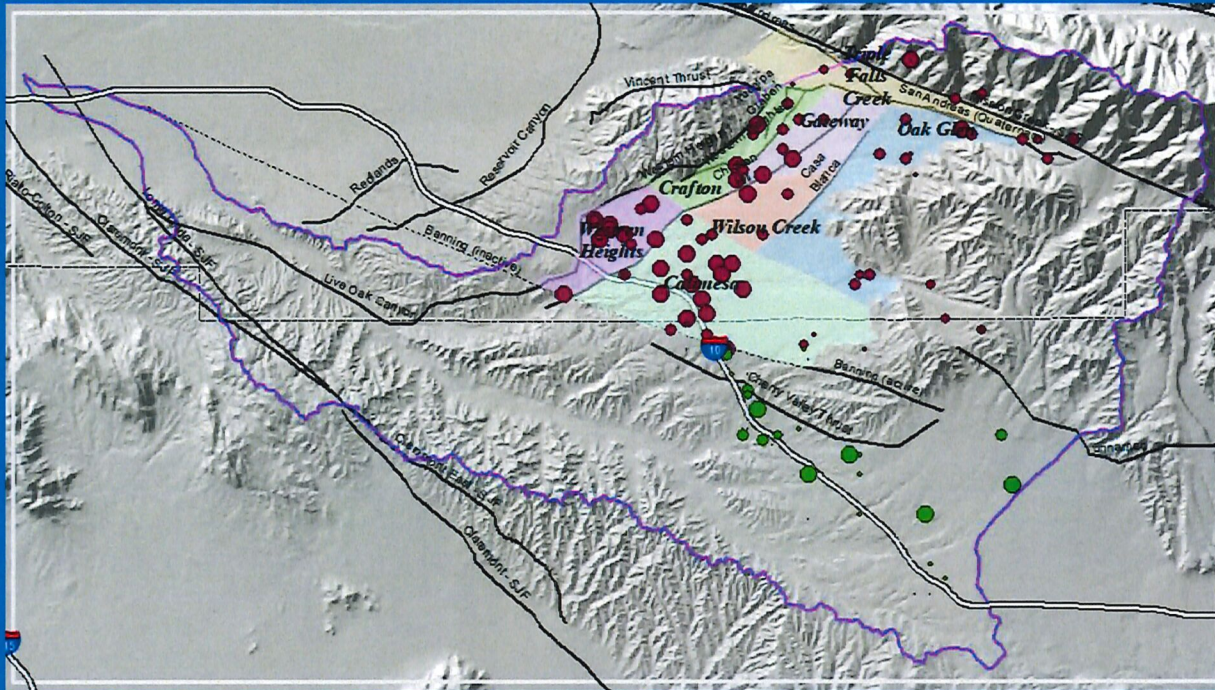
# Integrated Model Period and Timesteps

- Simulated period from Jan 1947 to Dec 2014
  - Spin-up period – 1947 to 1990
  - Calibrated period – 1990 to 2014
- Monthly stress periods used to represent groundwater stresses (e.g. pumping, anthropogenic-induced recharge).
- Daily time-step



# Groundwater Inputs and Outputs

## Groundwater pumping wells



### Average Yucaipa Pumping (acre-ft/day)

- 0.0029 - 0.0083
- 0.0084 - 0.0692
- 0.0693 - 0.1574
- 0.1575 - 0.7443
- 0.7444 - 2.6360

### Average Beaumont Pumping (acre-ft/day)

- 0.0000 - 0.0083
- 0.0084 - 0.0692
- 0.0693 - 0.1574
- 0.1575 - 0.7443
- 0.7444 - 2.6360



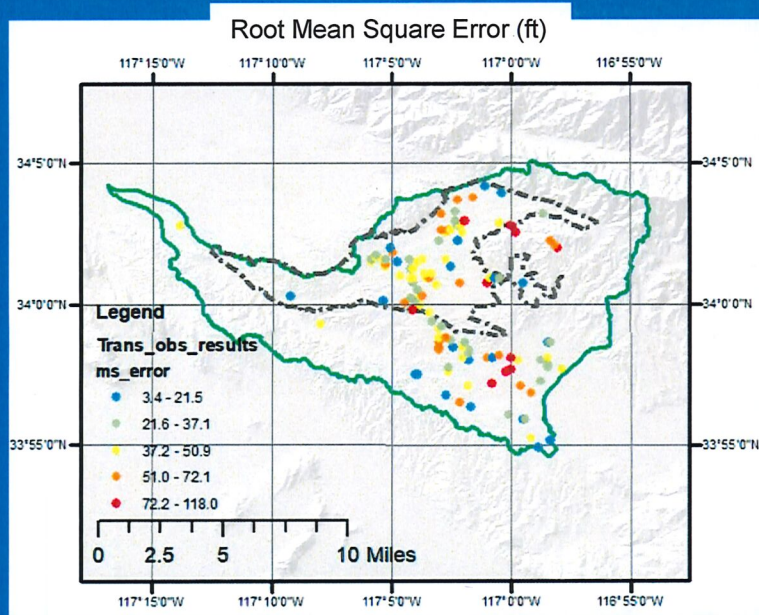
## Inputs:

- Naturally occurring recharge (PRMS)
- Anthropogenic recharge
  - artificial recharge, irrigation return flow, septic tank seepage
- Boundary conditions

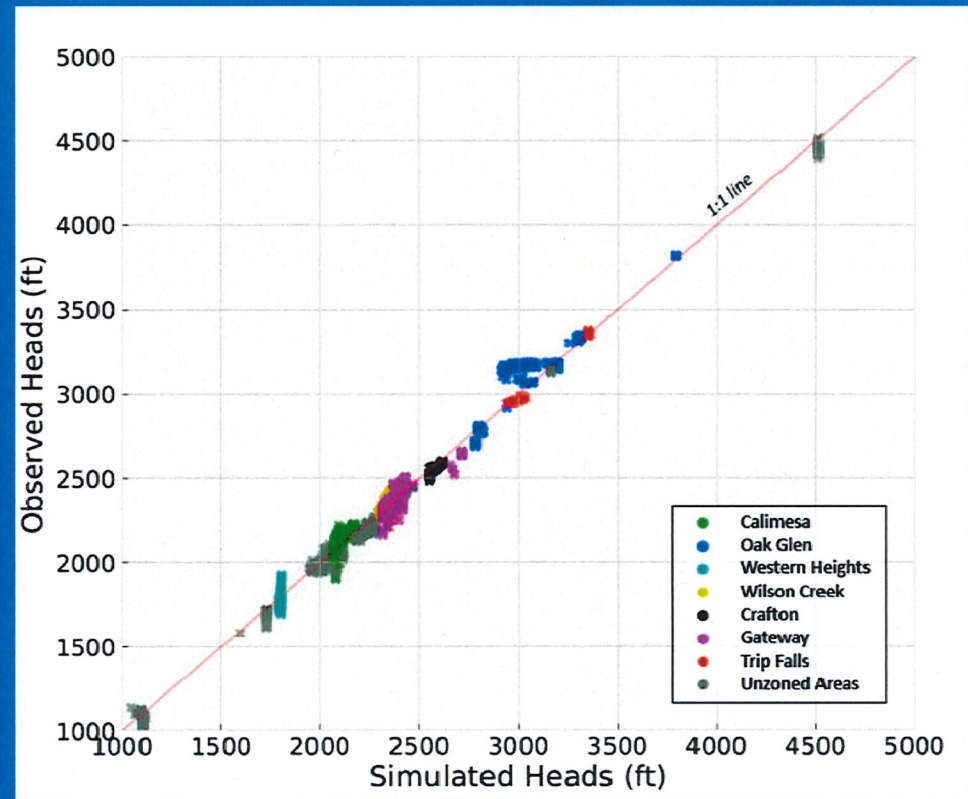
## Outputs:

- Municipal GW pumping
- Agricultural pumping
- Boundary conditions

# Transient Model Calibration



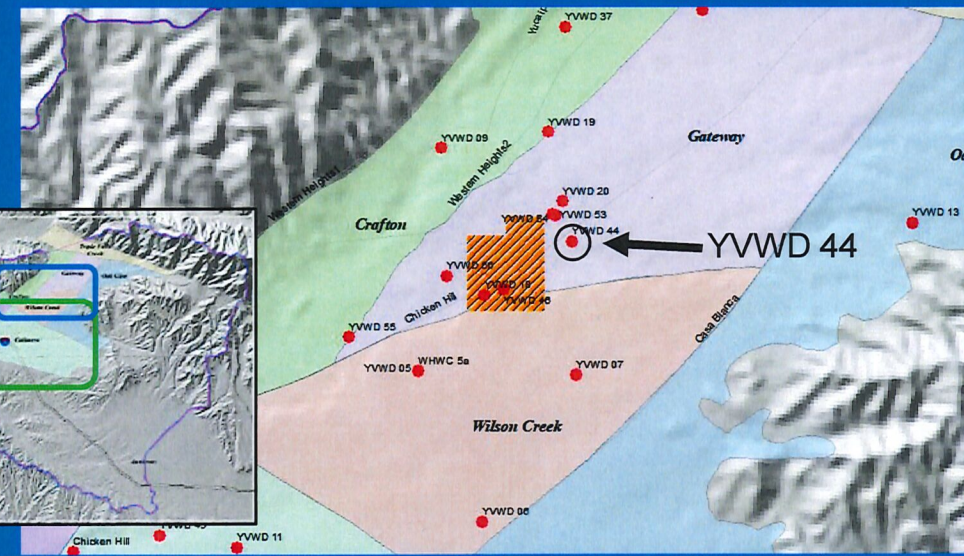
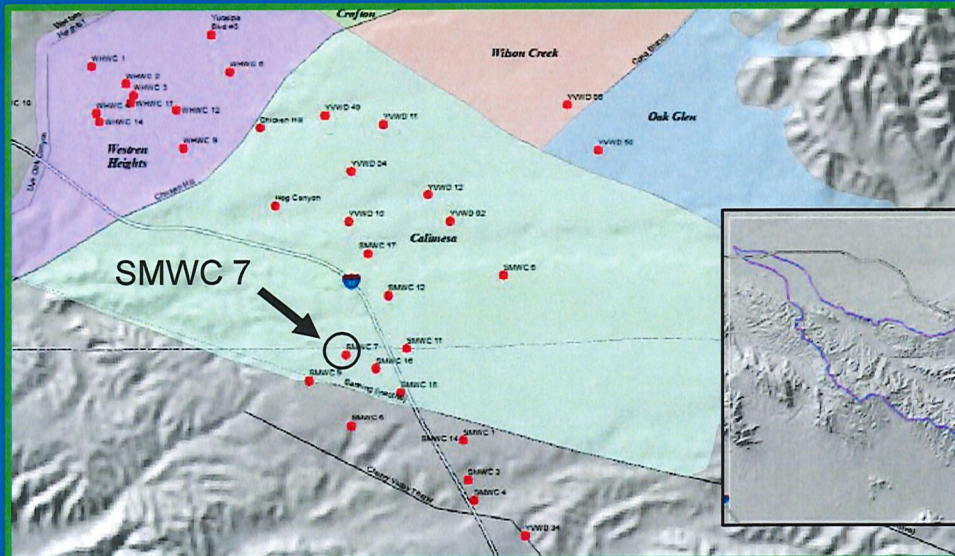
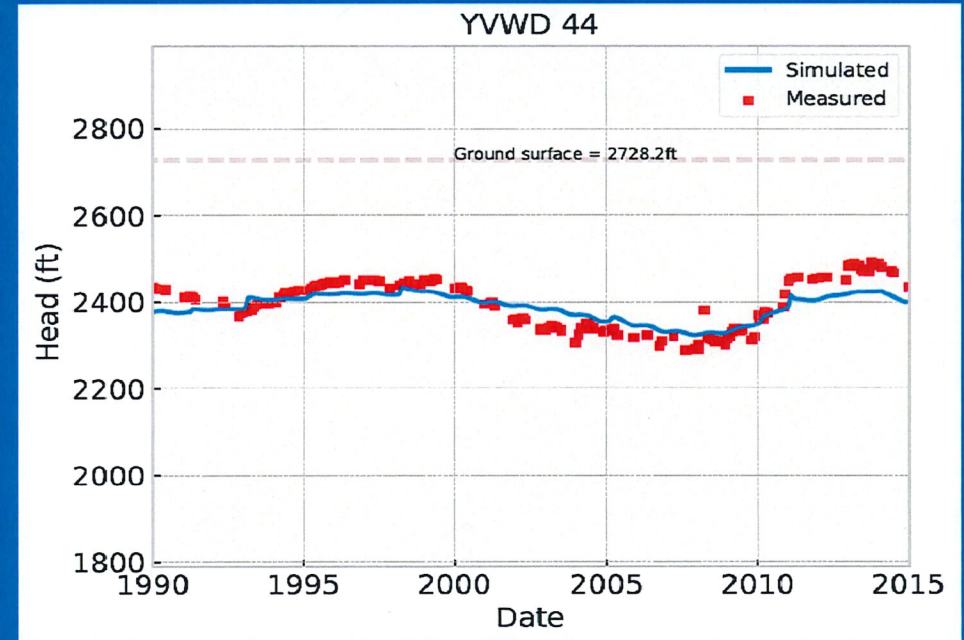
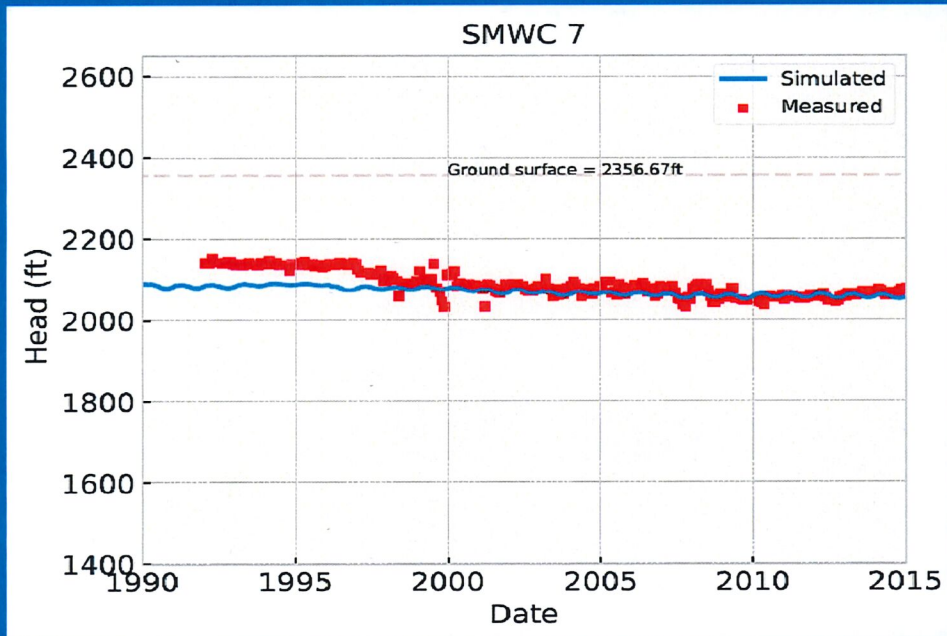
Calibrated to USGS NWIS  
Groundwater Sites



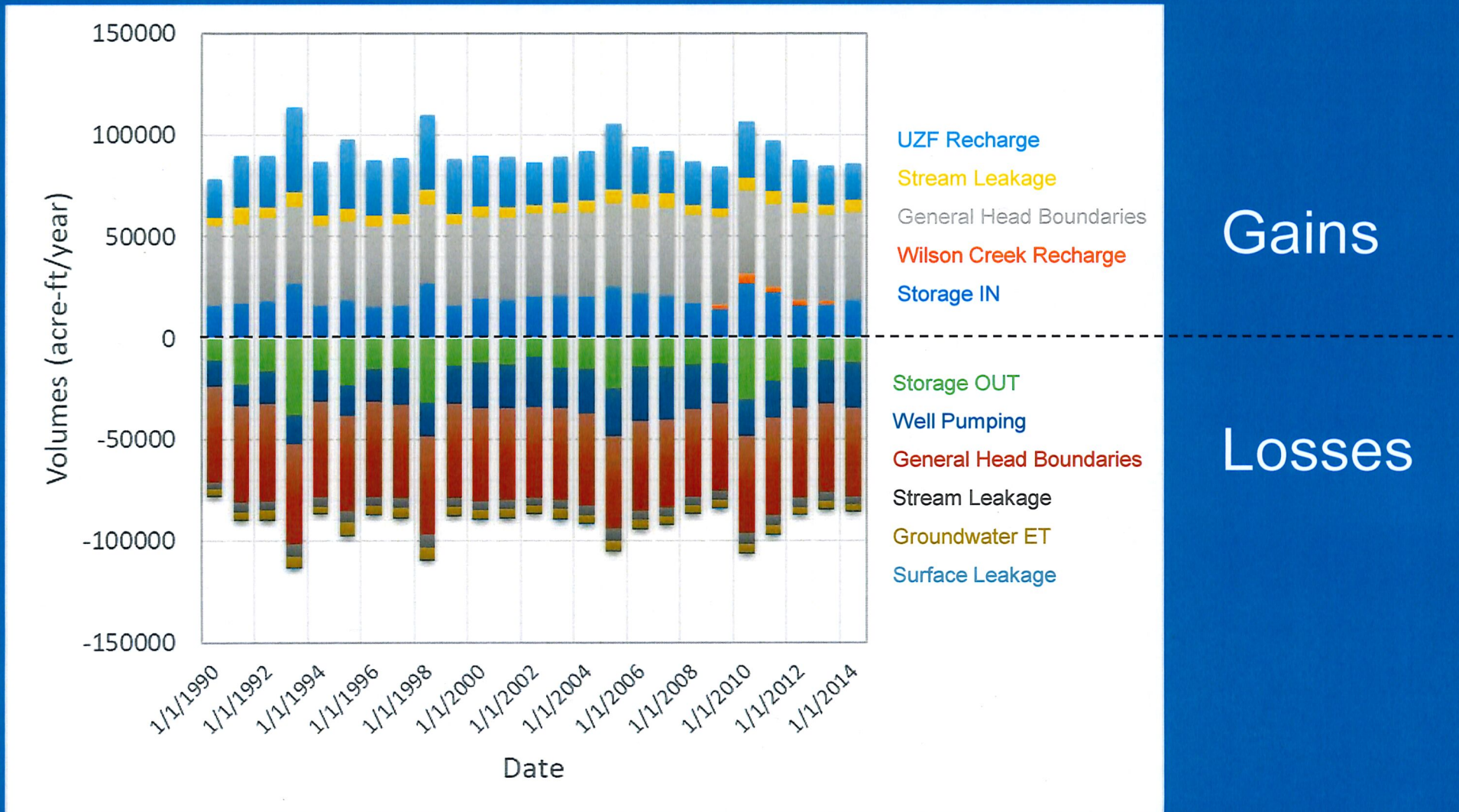
Area Name	Average Error (ft)	Root Mean Squared Error (ft)	Mean Absolute Error (ft)	Number of Wells	Number of Transient Measurements
Entire Study Area	11.79	41.80	37.65	148	12394
Calimesa	-29.06	41.30	37.17	33	4196
Crafton	38.97	45.74	40.33	3	361
Gateway	11.05	48.71	41.28	12	1440
Oak Glen	-1.95	40.01	36.60	9	1137
Triple Falls Creek	-0.95	16.60	14.86	2	57
Western Heights	23.55	39.23	34.84	19	1431
Wilson Creek	11.04	31.29	27.45	6	1181
Unzoned Area	30.62	43.36	39.75	64	2591



# Hydrographs



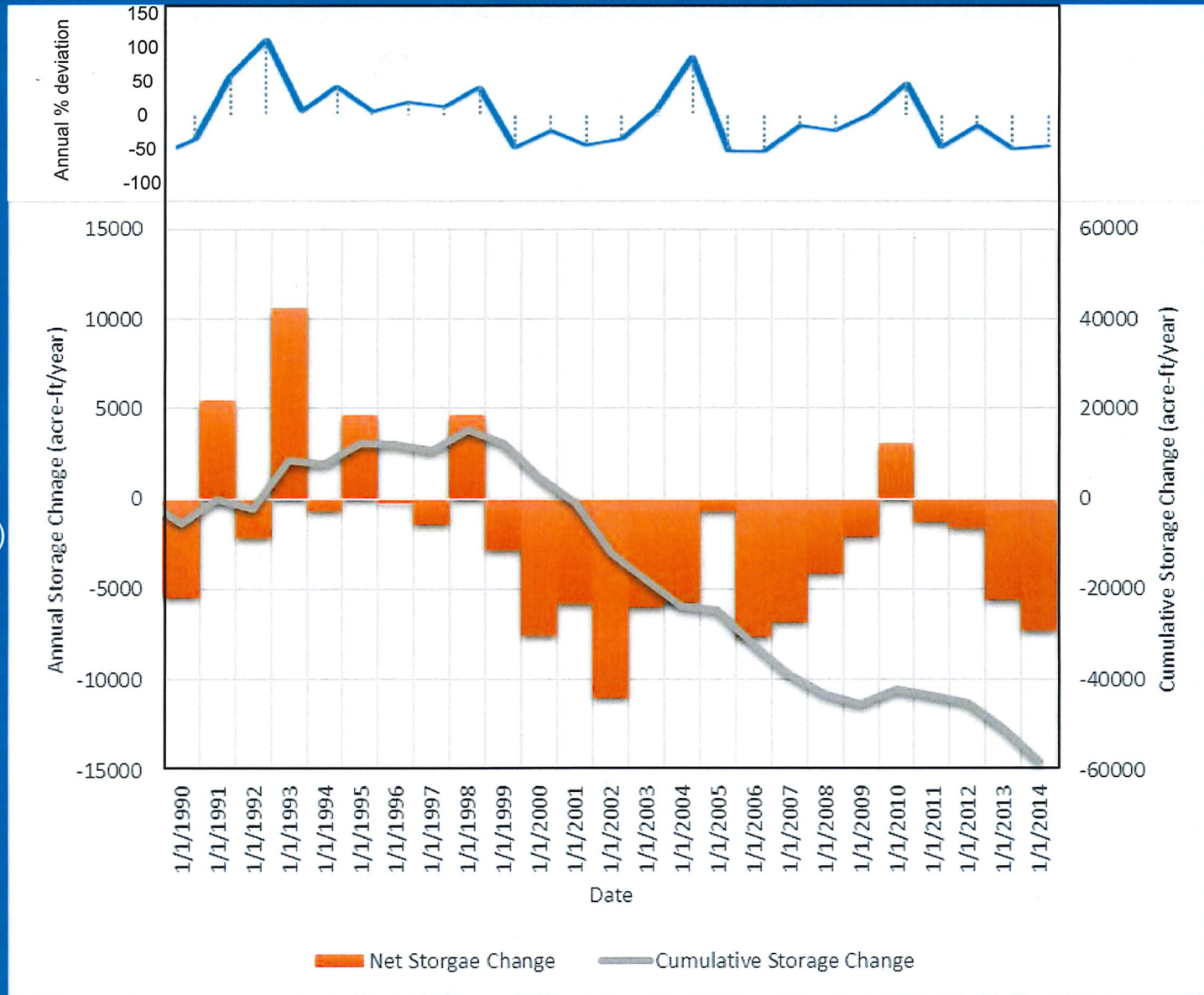
# Groundwater Budget



# Net Storage Changes

**Precipitation:**  
Annual % deviation  
from mean  
(1947-2014)

**Change in Storage:**  
Annual storage  
change (acre-ft/year)





# Summary

- Integrated Hydrologic Model simulates surface water, groundwater, and their interaction
- Accounts for changes in climate, land use, population, and water delivery
- Integrated model is calibrated using water-level and change in water-level data, and loosely to stream-flow
- Simulation results indicate storage gains between 1991-1998 and a general continual loss from 1998 to end of simulation. Coincides with precipitation patterns during this time frame



**Thank You**

