

Merced GSP Stakeholder Advisory Committee Meeting

May 22, 2024

Meeting will begin at 10:00am or a few minutes after – thank you for joining us!

Merced Irrigation-Urban GSA
Merced Subbasin GSA
Turner Island Water District GSA-1

Image courtesy: Veronica Adrover/UC Merced

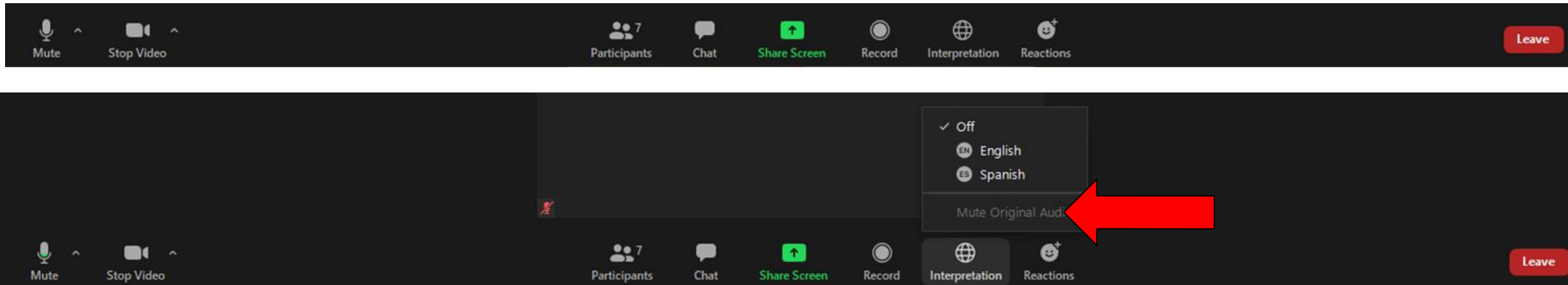


Welcome, Instructions for Zoom

Bienvenidos, Instrucciones para Zoom

We have two language audio channels available. English only speakers, please select English.

Si solamente habla español, debe seleccionar un canal de idioma



The meeting will have simultaneous interpreting, so you are welcome to comment in your native language.
La junta será interpretada simultáneamente, así que le invitamos a que haga comentarios en su lenguaje nativo.

Agenda

1. Call to Order and Welcome
2. Roll Call
3. Public Comment
4. Reports
5. Updates on Basin Conditions and Sustainable Management Criteria for GSP Update
6. MercedWRM Modeling Scenarios Overview and Initial Draft Outputs
7. Next Steps
8. Adjourn

Image courtesy: Veronica Adrover/UC Merced

Stakeholder Advisory Committee Members

Committee Member	Interest/Affiliation	Alternate	Interest/Affiliation
Alvaro Arias	UC Merced	Phillip Woods	UC Merced
Arlan Thomas	MIDAC member	Ben Migliazzo	Live Oak Farms
Bill Eisenstein	River Partners		
Bob Kelley	Stevinson Representative	Blake Nervino	Stevinson/Merquin
Breanne Vandenberg	MCFB		
Caitie Diemel	ESJWQC		
Craig Arnold	Arnold Farms		
Daniel Melendrez	City of Merced		
Danielle Serrano	Serrano Farms - Le Grand		
David Belt	Foster Farms		
Eddie Rojas	E&J Gallo Winery		
Emma Reyes	Martin Reyes Farm/Land Leveling		
Jean Okuye	E Merced RCD		
Joe Sansoni	Sansoni Farms/MCFB		
Joe Scoto	Scoto Brothers/McSwain School Dist.		
Lisa Baker	Clayton Water District	Scott Menefee	Clayton Water District
Lisa Kayser-Grant	Sierra Club		
Maxwell Norton	Unincorporated area		
Nav Athwal	TriNut Farms		
Simon Vander Woude	Sandy Mush MWC		
Susan Walsh	City of Merced	Bill Spriggs	Resident City of Merced
Thomas Dinwoodie	Master Gardener/McSwain		
Trevor Hutton	Valley Land Alliance		
Wes Myers	Merced Grassland Coalition	Lou Myers	Benjamin Land LP
Zachary Hamman	Cal Am Water		



Questions/Comments from Public:

For remote attendees, If you would like to make a comment, please type the comment in the chat or raise your hand to request to be taken off mute

Image courtesy: Veronica Adrover/UC Merced



Reports

Image courtesy: Veronica Adrover/UC Merced

GSA Reports

- Updates from each GSA on activities within their own jurisdiction:
 - Merced Subbasin GSA
 - Merced Irrigation-Urban GSA
 - Turner Island Water District GSA #1

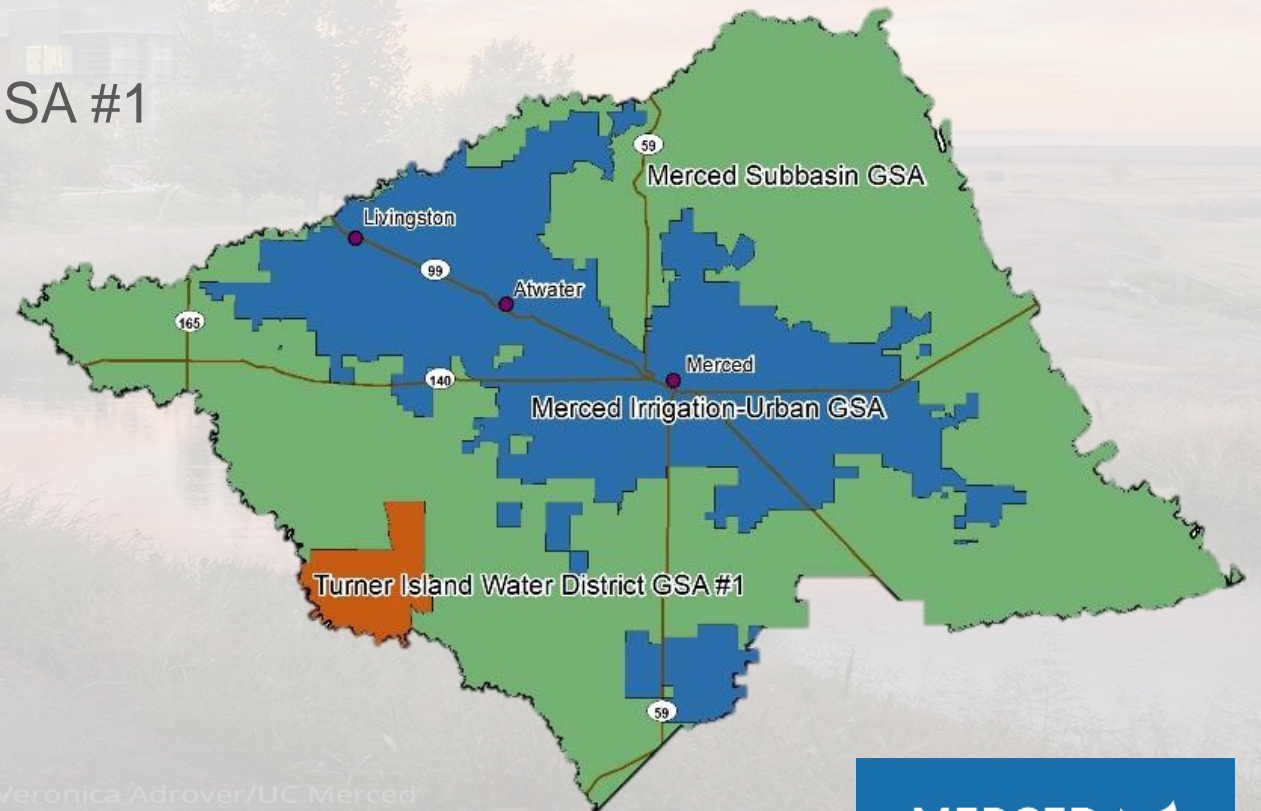


Image courtesy: Veronica Adrover/UC Merced

Merced Subbasin GSA Updates

- Allocation Framework Values Update
- Groundwater Accounting Platform Update
- Update of Stevinson/Merquin Water District New GSA Request
- Land Repurposing Program Update
 - Applications for Year 3 will open June 15 – July 31.
- Multibenefit Land Repurposing Program Update

Merced Irrigation-Urban GSA Updates

- Implementation of adopted Rules and Regulations
 - Well Registration
 - Groundwater Accounting
- Development of Additional Rules and Regulations
 - Urban Allocations
- CIMIS (see separate item)
- Grant Administration
 - Sustainable Groundwater Planning Grant - Completed in April 2024.
 - 2017 Prop 1 Grant and 2019 Prop 68 Grant
 - Sustainable Groundwater Management Grant – Ongoing
 - SGMA Implementation Grant (Rounds 1 & 2)



Other Reports

- CIMIS Station Report
- Current Groundwater Conditions
- Questions & Discussion

Image courtesy: Veronica Adrover/UC Merced

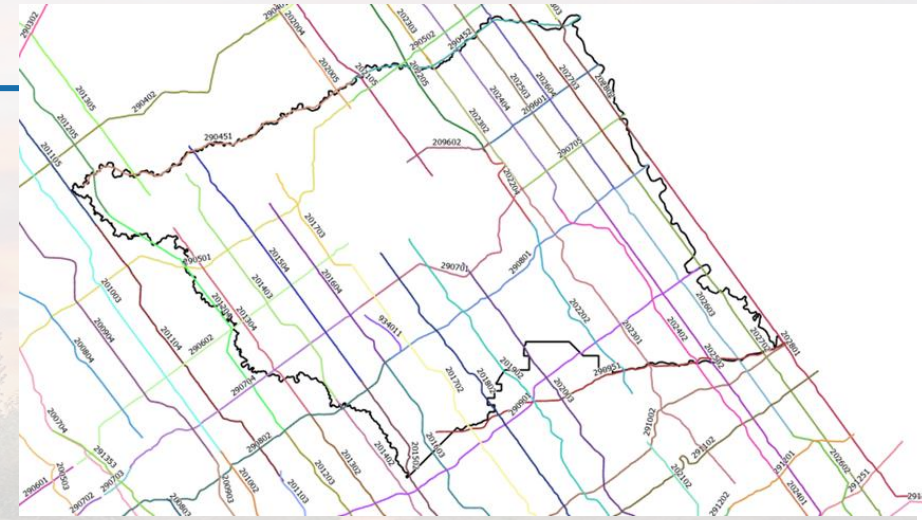


Updates on Basin Conditions and Sustainable Management Criteria for GSP Update

Image courtesy: Veronica Adrover/UC Merced

AEM

- Airborne electromagnetic (AEM) surveying is a geophysical technique that measures electrical properties of subsurface materials to characterize different geological strata
- AEM surveys were conducted in Merced between March and April 2022; results were published by DWR in April 2023
- Data was refined to generate cross-sections which will be used to update the Subbasin's Hydrogeological Conceptual Model



AEM Survey Flight Lines in Merced Subbasin
DWR Data Report for Survey Area 5

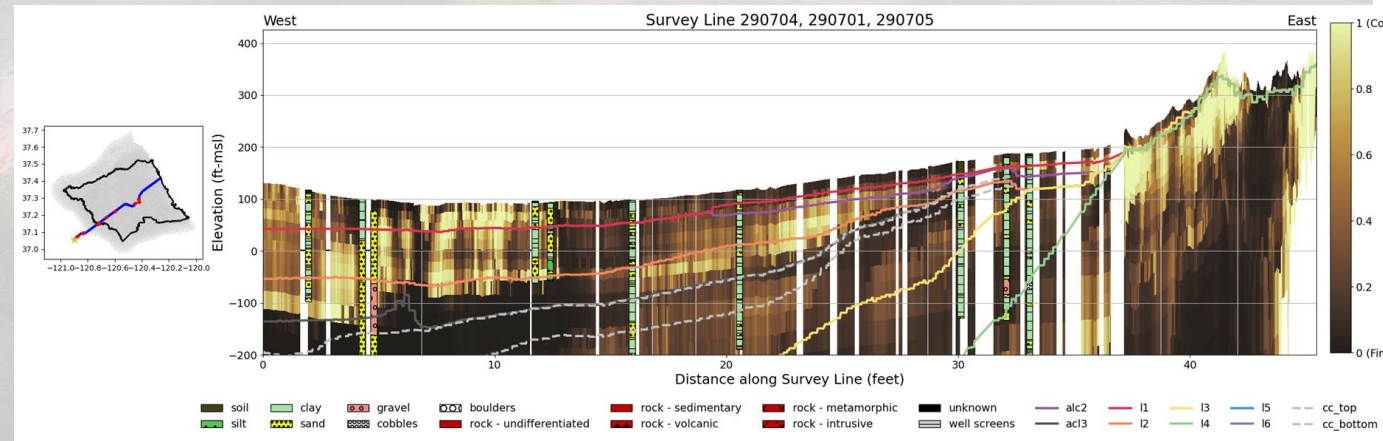


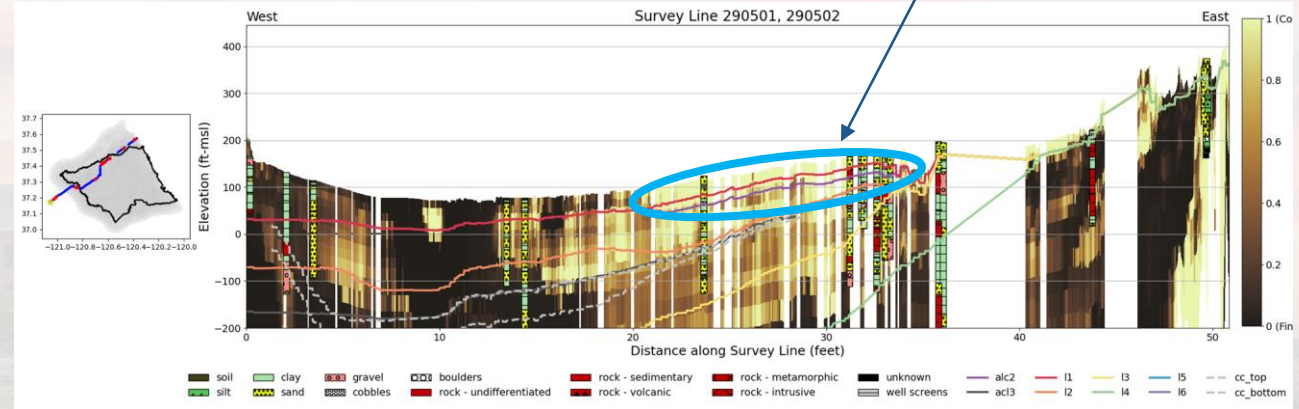
Image courtesy

Geologic cross-section generated from AEM data

AEM (cont.)

- Initially, the MercedWRM estimated shallow clays extended north through the Subbasin
- Following the AEM data analysis, these clays may not be present and the lithology is likely coarser grained material
- Potential implications are increased recharge potential in this area

MercedWRM's shallow clays,
beneath coarse deposit



Updated MercedWRM

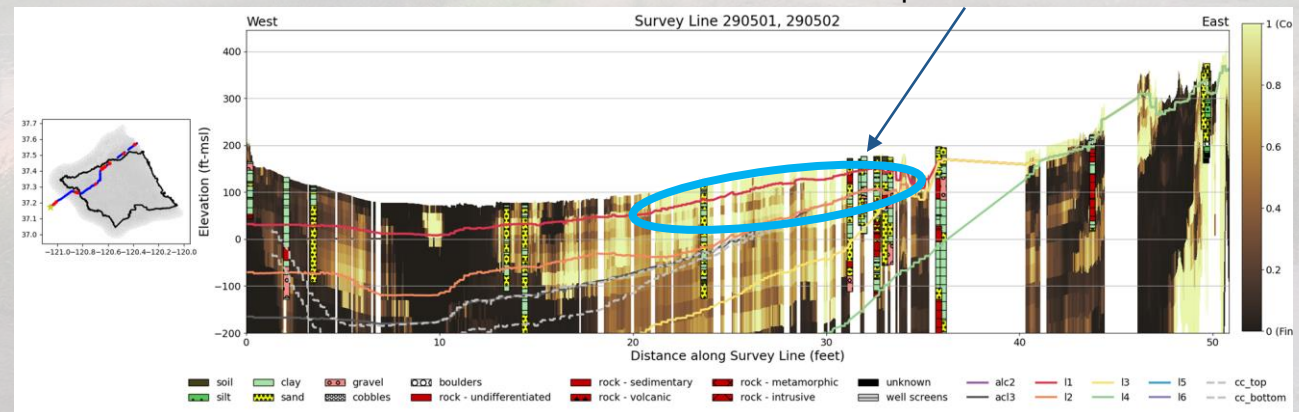


Image courtesy: Veronica Adrover/UC Merced

Water Quality + Groundwater Level Trends

- Corrective action 6(a): *The GSAs should provide additional justification and explanation for how water quality constituents of concern, other than TDS, will be managed and monitored, and how impacts to beneficial uses and users will be addressed should there be degradation of water quality during plan implementation when the Subbasin expects to lower groundwater elevations. The GSAs should consider developing sustainable management criteria for additional water quality constituents.*
- Performed statistical analysis that calculates trends in groundwater quality measurements between two periods of time:
 - 2012-2016: consistent decreases in groundwater levels
 - 2016-2020: groundwater levels were more stable, on average

Image courtesy: Veronica Adrover/UC Merced

Data Sources & Analysis Methodology

Pull all water quality data from GAMA

Remove data from regulated,
contaminated sites

Exclude wells with <8 measurements
of a particular constituent

Run Mann-Kendall Trend Test

- Statistical test
- Identifies positive or negative trends over time

Data sources used:

- DDW
- DPR
- DWR
- GAMA_DOM
- GAMA_USGS
- USGS_NWIS
- WB_ILRP

Summarize results as:

- % wells with positive trend
- % wells with negative trend
- % wells with no trend



Image courtesy: Veronica Adrover/UC Merced

Water Quality + Groundwater Level Trends

- Historical data analysis does not show that lower groundwater levels results in higher concentrations.
- Monitoring will continue and SMCs can be reassessed over time if conditions change.

Image courtesy: Veronica Adrover/UC Merced

Results

Constituent	2012-2016 (decreasing groundwater levels)				2016-2020 (more stable groundwater levels)			
	Increasing	Decreasing	No Trend	Count of Wells	Increasing	Decreasing	No Trend	Count of Wells
Nitrate	2.9%	2.9%	94.3%	35	2.5%	0.0%	97.5%	40
Total Dissolved Solids				0				0
Chlorine				0				0
Arsenic	0.0%	0.0%	100.0%	13	0.0%	0.0%	100.0%	13
Iron				0	0.0%	0.0%	100.0%	1
Manganese	0.0%	0.0%	100.0%	1	0.0%	0.0%	100.0%	2
Chromium-6				0				0
Benzene	0.0%	0.0%	100.0%	12	0.0%	0.0%	100.0%	11
123 TCP	7.7%	15.4%*	76.9%	13	0.0%	2.0%	98.0%	50
DBCP	0.0%	0.0%	100.0%	10	0.0%	7.1%	92.9%	14
MTBE	0.0%	0.0%	100.0%	12	0.0%	0.0%	100.0%	12
111 TCA	0.0%	0.0%	100.0%	12	0.0%	0.0%	100.0%	11
PCE	8.3%	0.0%	91.7%	12	0.0%	0.0%	100.0%	11
TCE	0.0%	0.0%	100.0%	12	0.0%	0.0%	100.0%	11
Boron				0				0
Sodium				0				0
Specific Conductivity	100.0%	0.0%	0.0%	1				0
EDB	0.0%	0.0%	100.0%	2	0.0%	0.0%	100.0%	3

*Likely not a real trend; influenced by reduction in the detection limit (e.g. could be better lab technology through time)

Subsidence Sustainable Management Criteria (SMC)

SMC remains the same, but responds to 2 corrective actions (discussed in previous meeting).

The GSAs should identify the **total cumulative subsidence tolerable by critical infrastructure**.

Reiterate previous outreach to Reclamation. Reach out to Reclamation and other flood managers and transportation managers for comment.

The Plan should also include additional details describing measures that consider and disclose the current and potentially lasting impacts of subsidence on land uses and groundwater beneficial uses and users.

Include additional information on the observed impacts of subsidence on the Eastside Bypass (and El Nido, if information is available). Discuss potential future subsidence impacts.

Provide further discussion on how groundwater level SMC will reduce long-term subsidence.

Subsidence SMC

SMC remains the same, but responds to 2 corrective actions (discussed in previous meeting).

The GSAs should **revise its application of the level of uncertainty** as it relates to subsidence measurements according to standard professional practices. Establishment of sustainable management criteria should not allow for subsidence in perpetuity.

Provide additional information on the Plan's rationale for establishing the measurement uncertainty as 0.16 ft/yr

Include examples in amended Plan demonstrating how the uncertainty is incorporated into the minimum threshold

Change in Storage SMC

- Approach: establish SMC for reduction of groundwater storage using groundwater levels as a proxy (most common method used in other GSPs)
- Will involve demonstration in text that significant correlation exists between levels and storage

Image courtesy: Veronica Adrover/UC Merced



MercedWRM Modeling Scenarios Overview and Initial Draft Outputs

Image courtesy: Veronica Adrover/UC Merced

MercedWRM Modeling Approach

Inputs

Model upgrade:

- Refined layering
- Delayed subsidence package
- Evapotranspiration
- & more...

- Surface water operations model update
- New land use projections
- Active projects

Defined assumptions about:

- Supply-side Projects (e.g., recharge basins)
- Specific demand reduction Projects (e.g., land repurposing)
- Targeted demand reduction by region
- Management Actions

Model Scenario

Historical Conditions

Projected Conditions

Projects & Management Actions

Sustainable Yield

Outputs

Calibration to make sure the updated model works well

Tells us what a “no additional action” scenario looks like in the future.

What kind of impact do the known projects and management actions have?

See next slide

Upcoming MercedWRM Modeling Approach (continued)

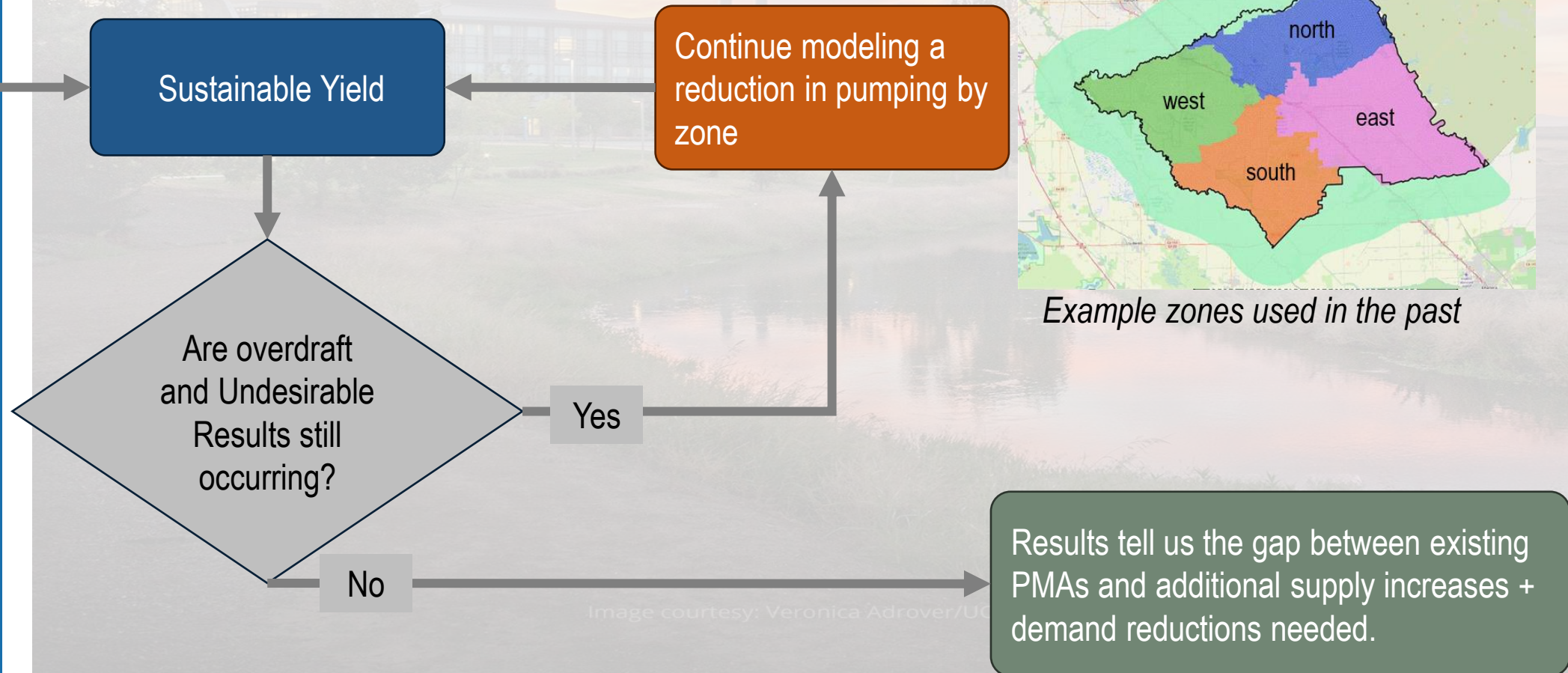


Image courtesy: Veronica Adrover/UC



MercedWRM Enhancement Overview

Image courtesy: Veronica Adrover/UC Merced

MercedWRM has two “System” components that have been updated

Land Surface System

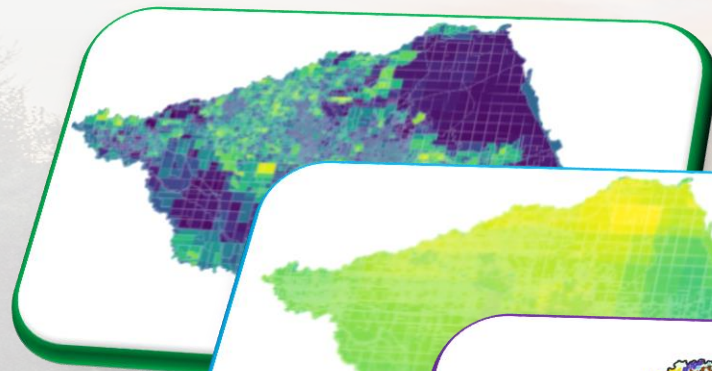
- Land Use
- Evapotranspiration
- Irrigation parameters
- Soil Texture Classifications

Groundwater System

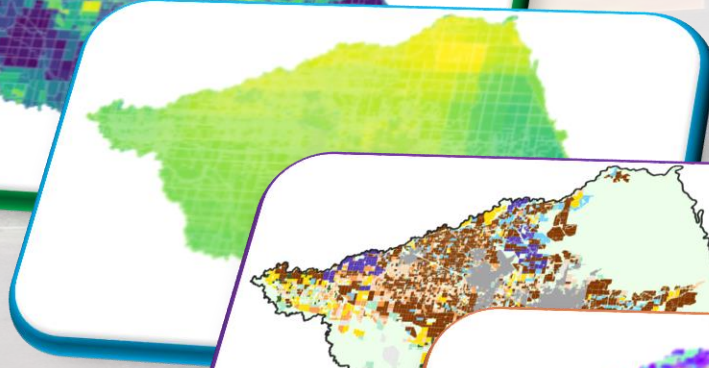
- Model Layering
- Aquifer Parameters

Image courtesy: Veronica Adrover/UC Merced

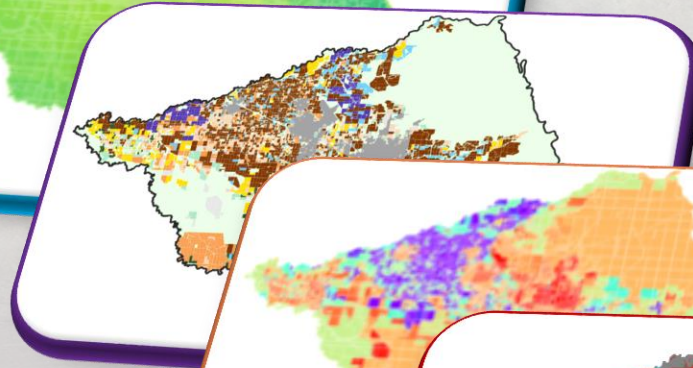
Land Surface System Overview



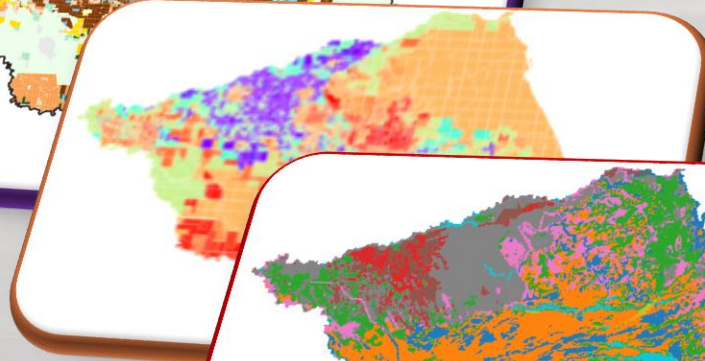
Evapotranspiration (OpenET) *Updated



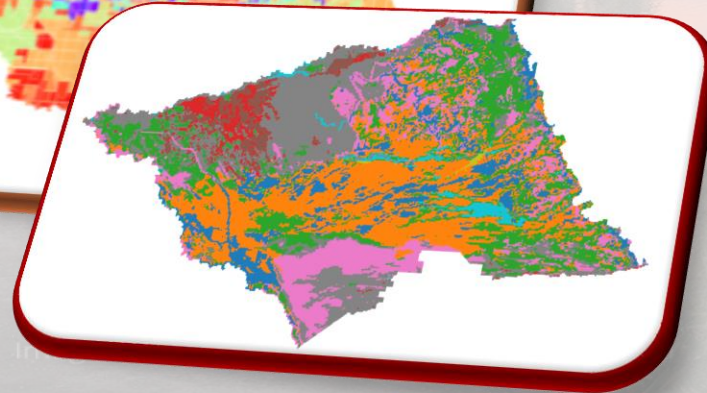
Precipitation (PRISM)



Land Use (DWR) *Updated



Runoff/Curve Number (USDA) *Updated



Soil Parameters (SSURGO) *Updated

Land Surface System Overview



Land Surface System Overview

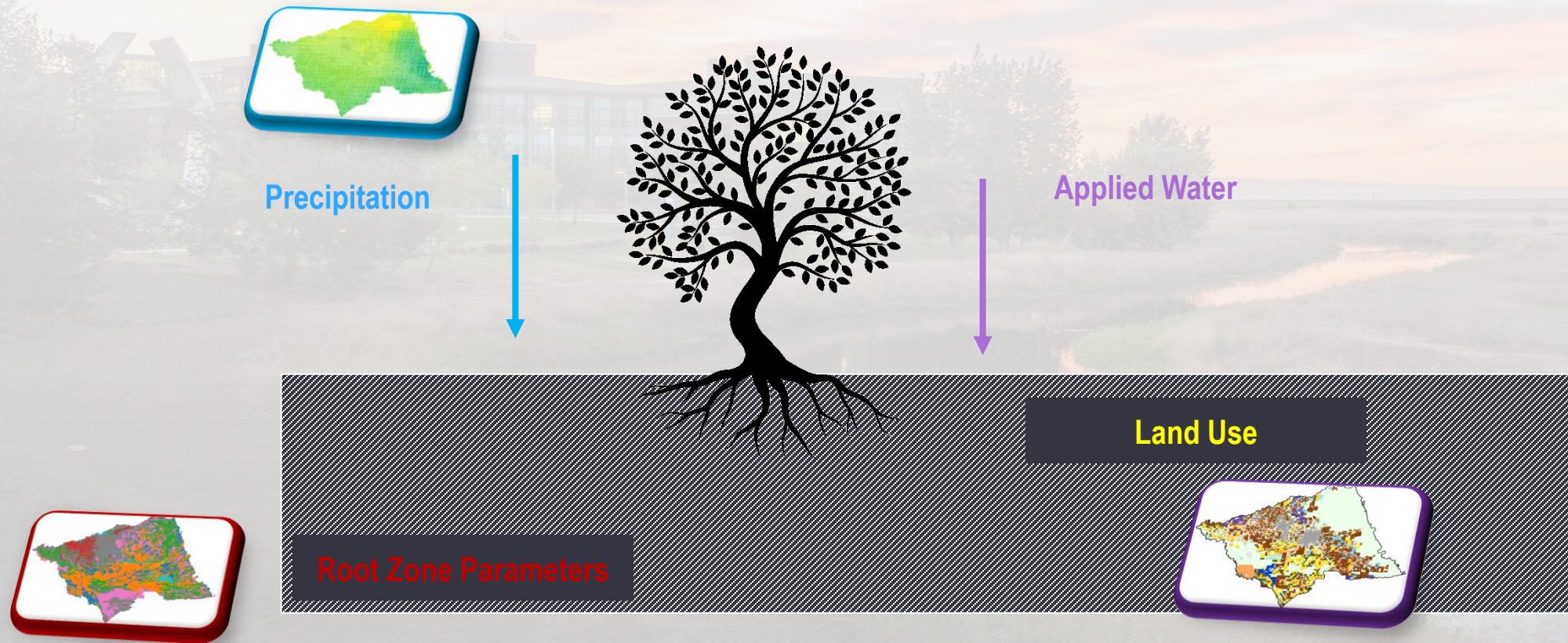


Image courtesy: Veronica Adrover/UC Merced

Land Surface System Overview

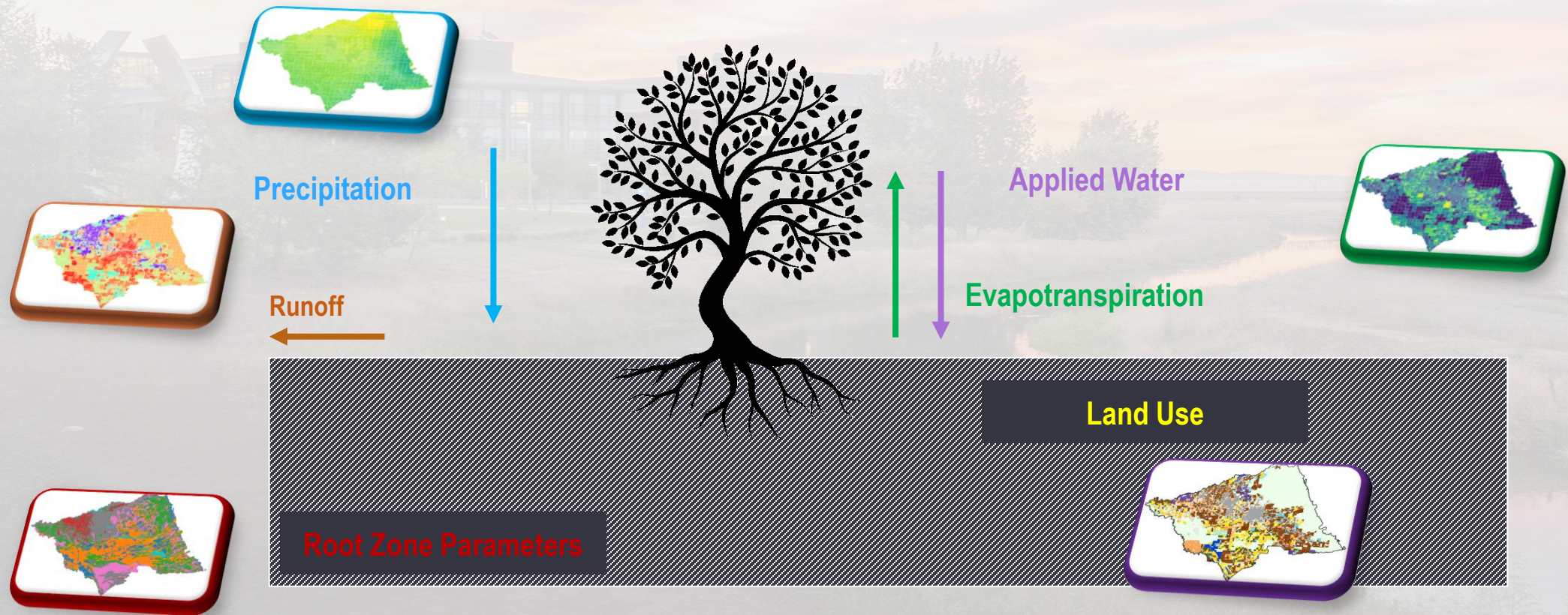


Image courtesy: Veronica Adrover/UC Merced

Land Surface System Overview

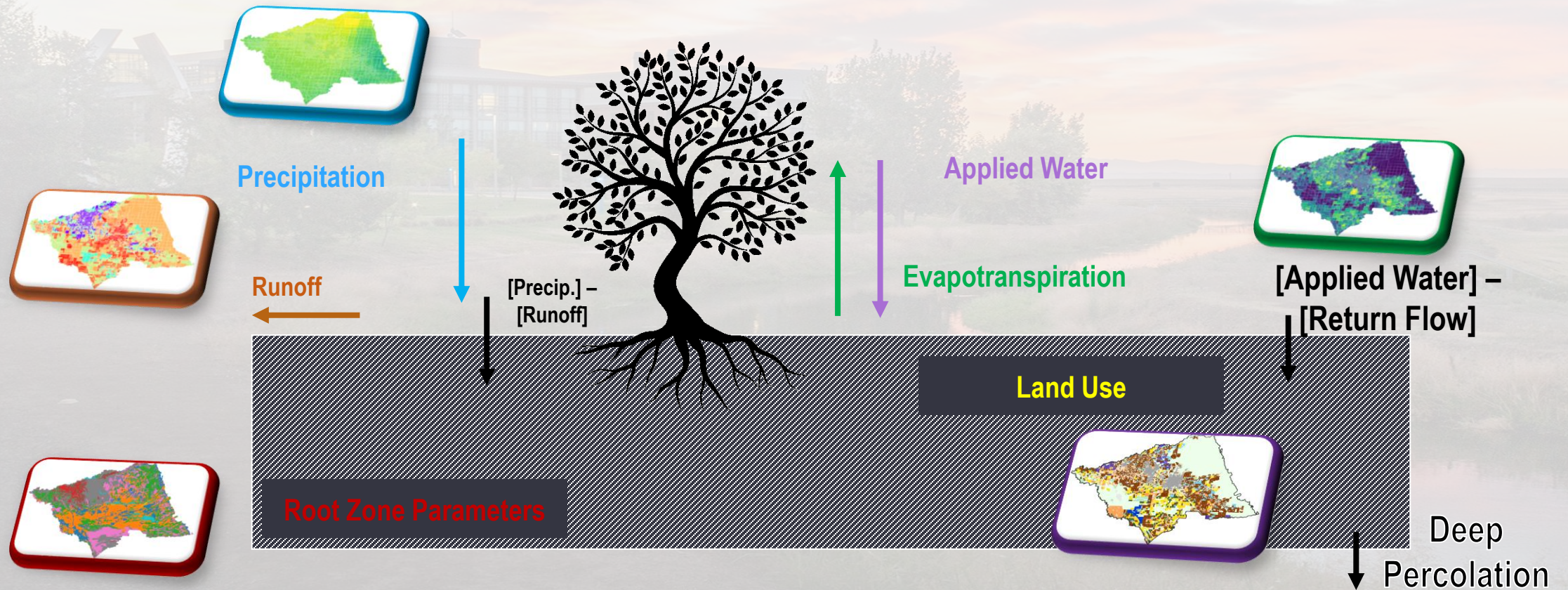
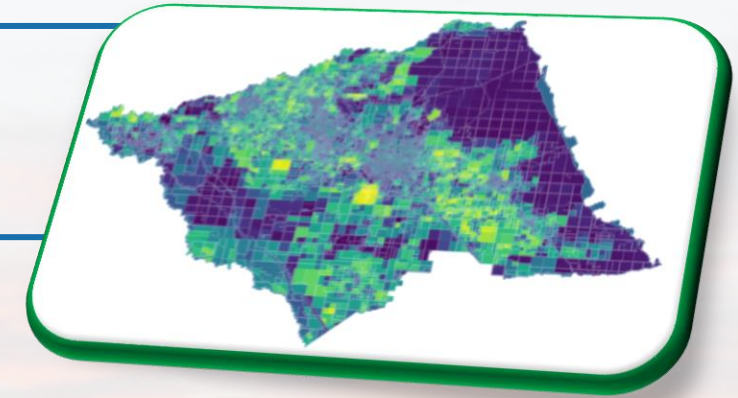


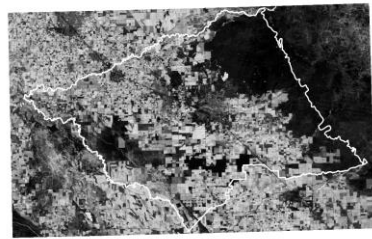
Image courtesy: Veronica Adrover/UC Merced

Evapotranspiration (OpenET)

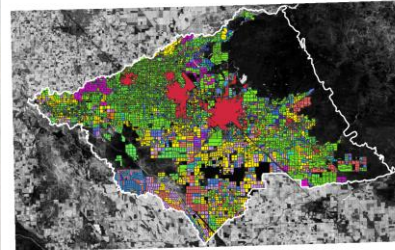
- Using new available datasets that can combine with land use and improve estimates of evapotranspiration



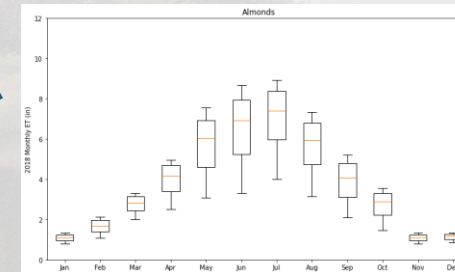
Open ET



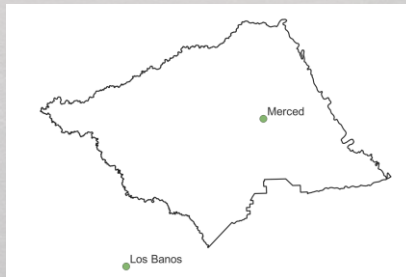
Land Use



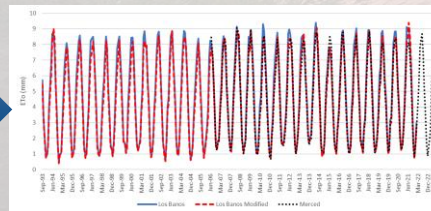
Actual ET by Crop



CIMIS Stations



ET_0



Kc and Potential ET

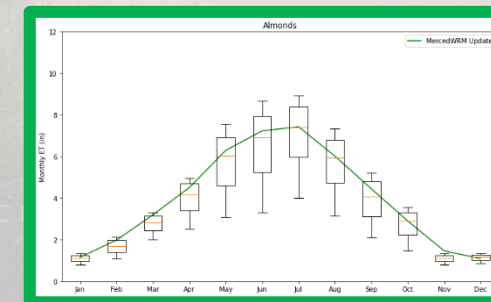


Image courtesy: Veronica Adrover/UC

Land Use Data (DWR)

Statewide Crop Mapping 2022

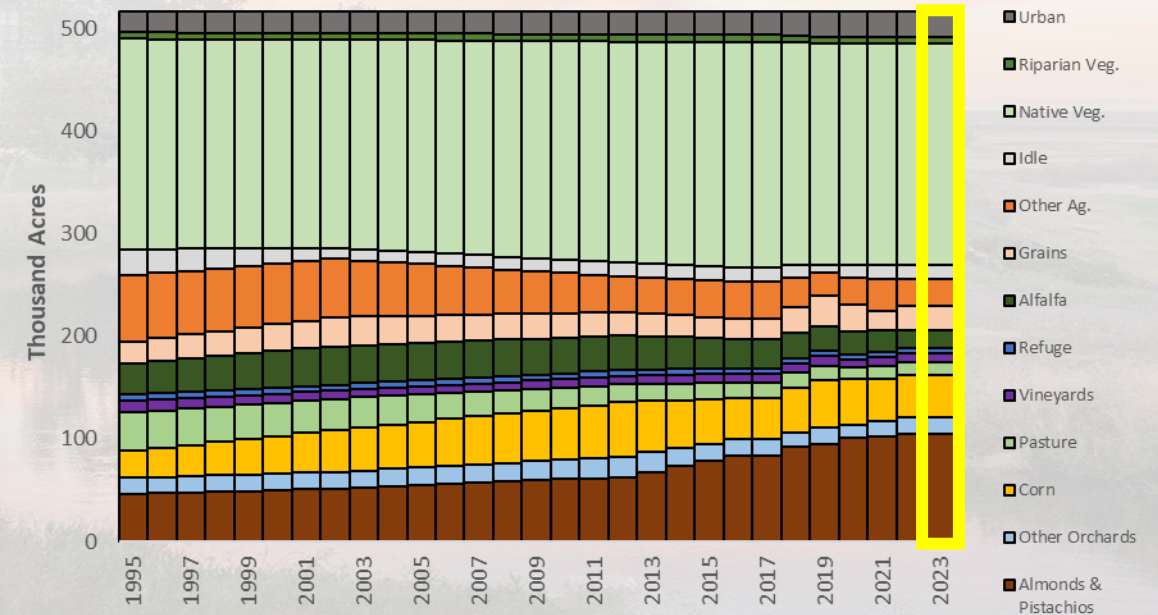
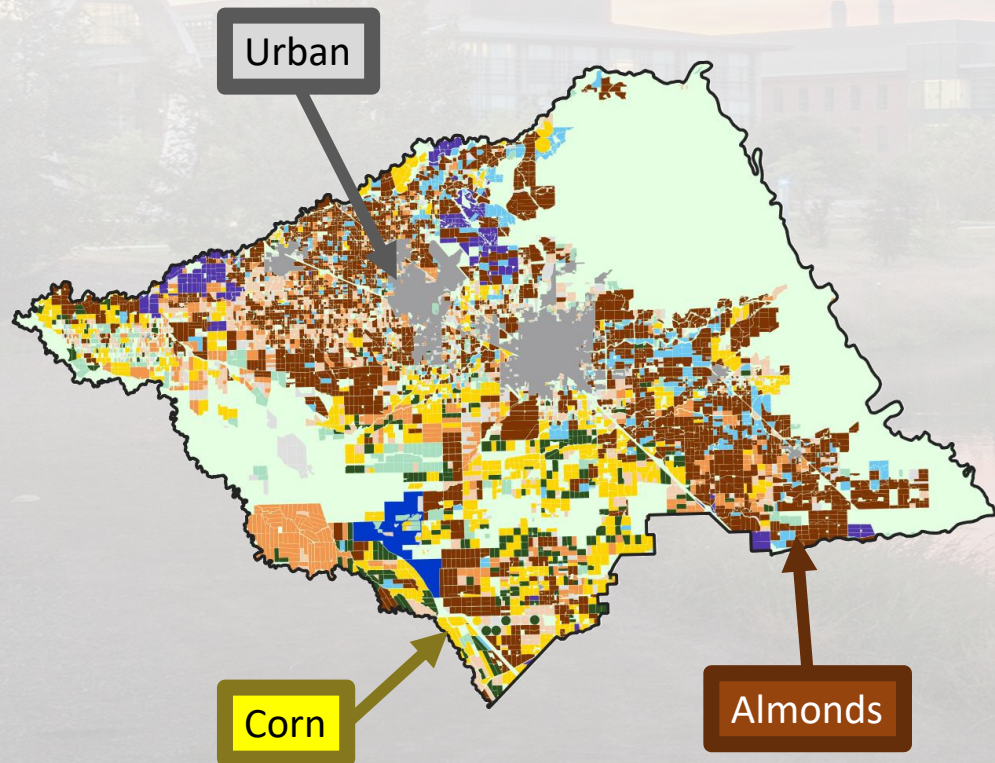
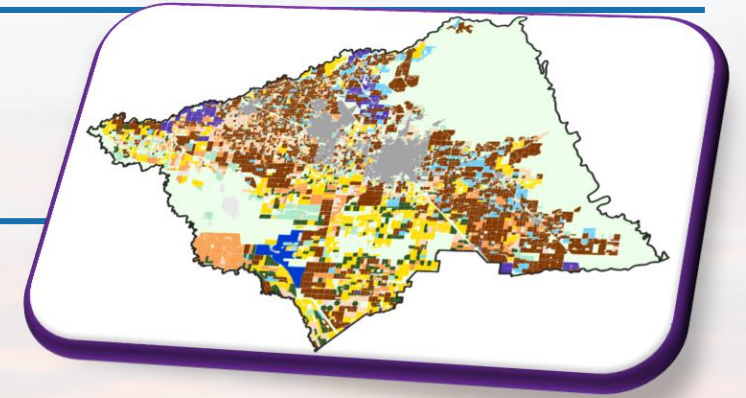
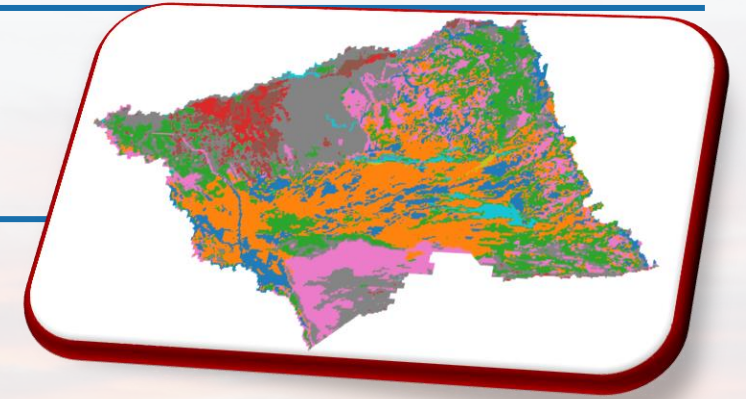


Image courtesy: Veronica Adrover/UC Merced

Soil Parameters - Soil Survey Geographic Database (SSURGO)



- New source: Soil Survey Geographic Database (SSURGO)
 - 12 soil classifications combined with 4 hydrologic soil groups used to define soil texture
- Added improved source of data for soil parameters like:
 - Field Capacity & Wilting Point
 - Pore Size Distribution Index
 - Hydraulic Conductivity
 - Soil Porosity

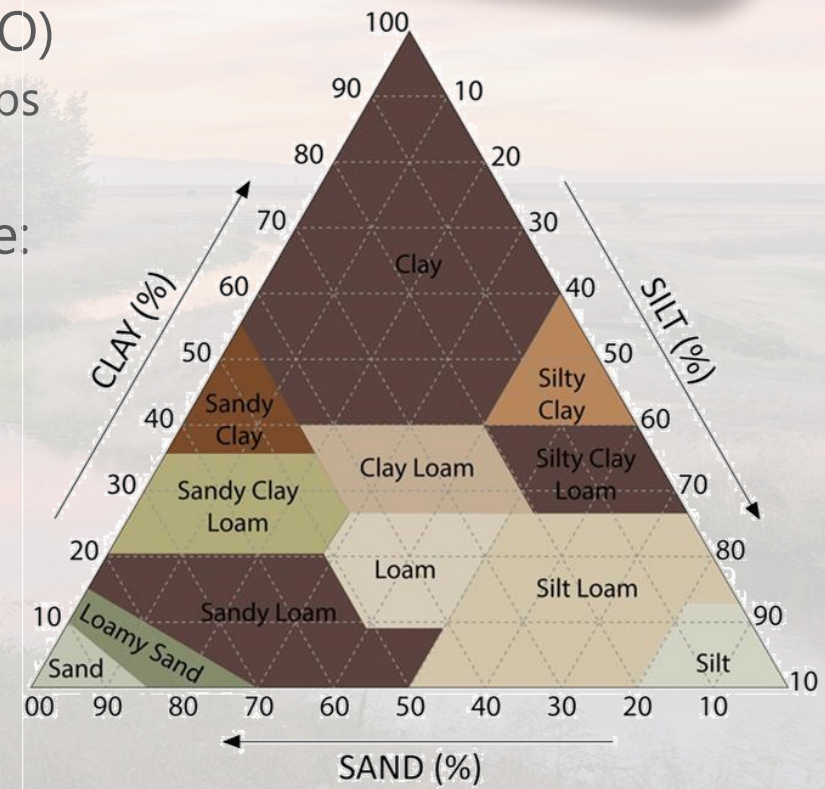
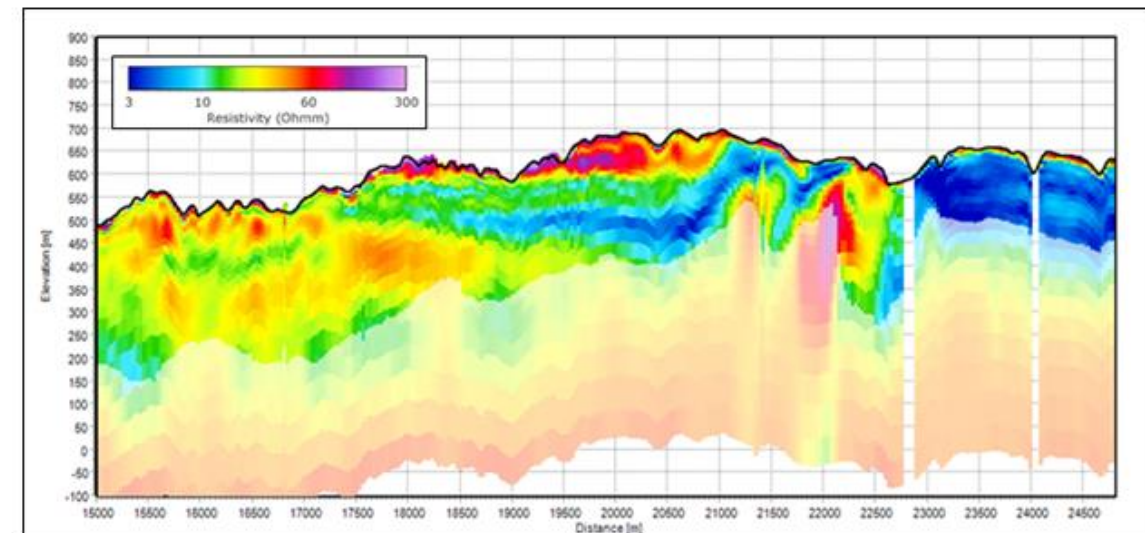


Image courtesy: Veronica Adrover/UC Merced

Groundwater System

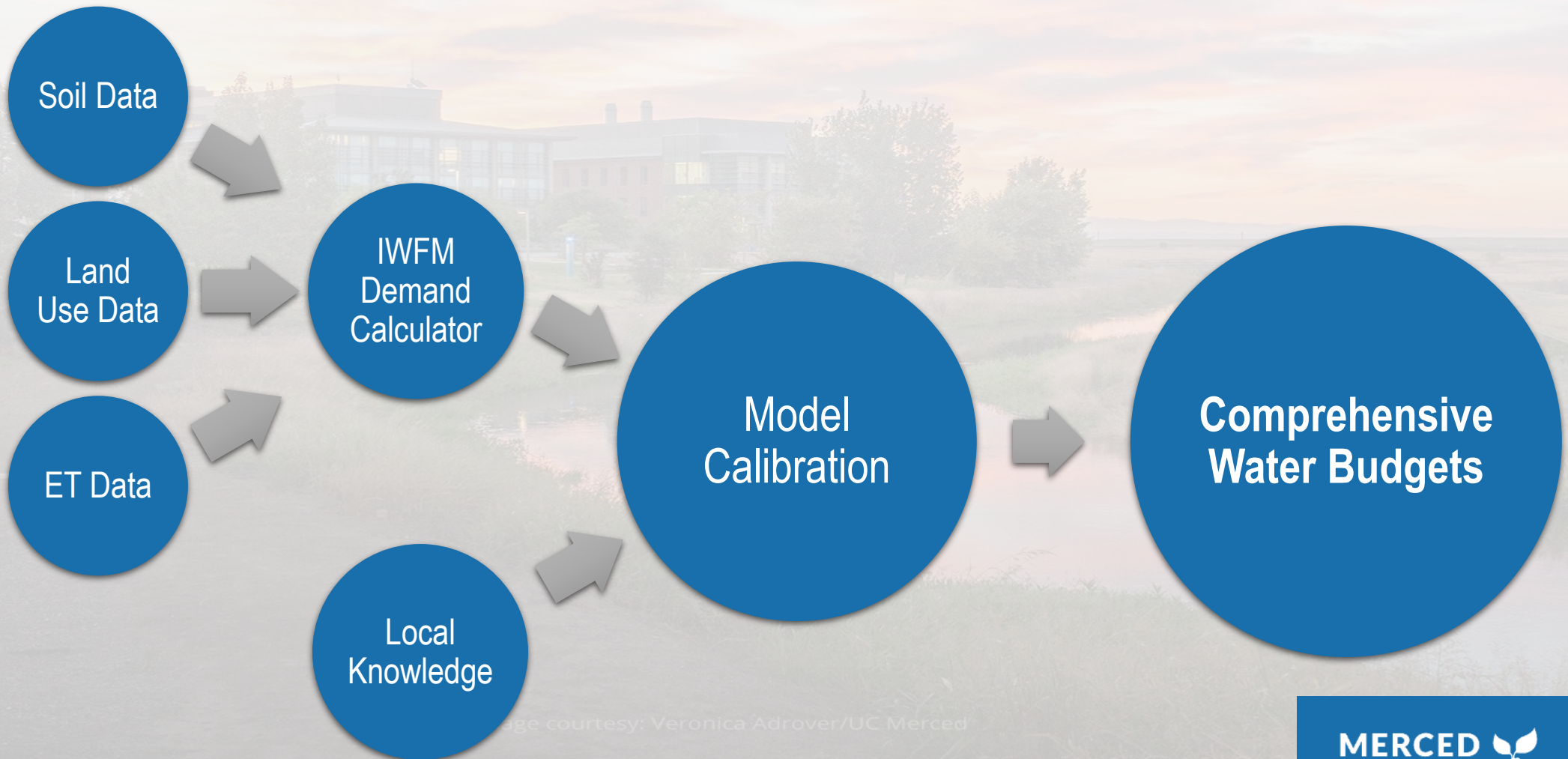
- Compiled and analyzed publicly available data to define the spatial properties and parameters of the existing model layers using:
 - Formations Regional geologic maps, large-scale quadrangles
 - Materials DWR's Airborne Electromagnetic (AEM) Surveys
Well-specific elogs and local lithology information
 - Parameters Transmissivity and storativity
- Features of Consideration
 - Extent, depth, and thickness of clays
 - Slope of hydrogeological layers
 - Shallow alluvium (Layer 1)
- Special Consideration
 - Stream-aquifer representation
 - Shallow clays (Western Subbasin)

Image courtesy: Veronica Ad



Example AEM data cross section showing the distribution of electrical resistivity values with depth

Estimation of Agricultural Water Demand





Model Results

Image courtesy: Veronica Adrover/UC Merced

Model Calibration: Groundwater Levels

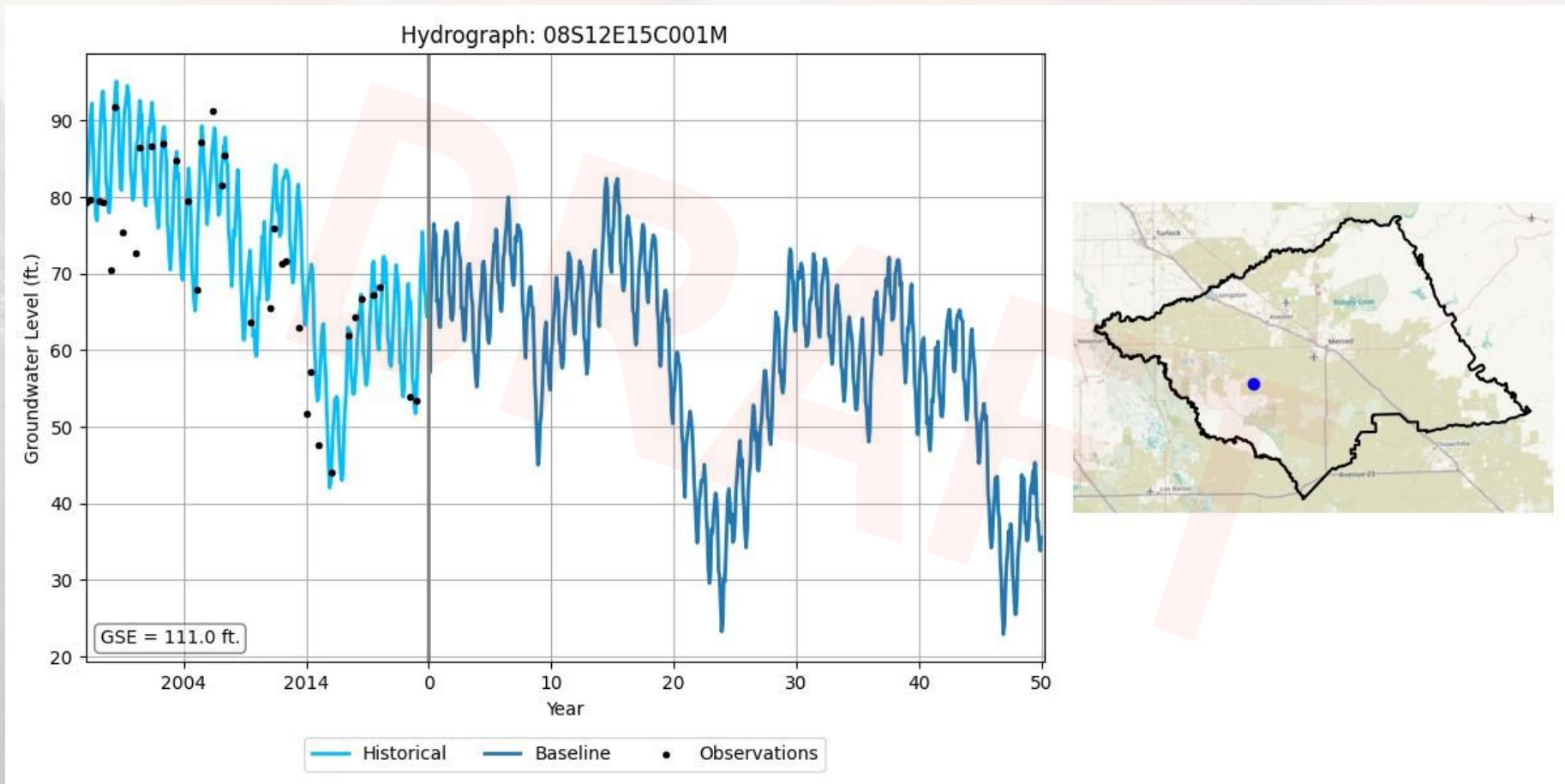


Image courtesy: Veronica Adrover/UC Merced

Model Calibration: Groundwater Levels

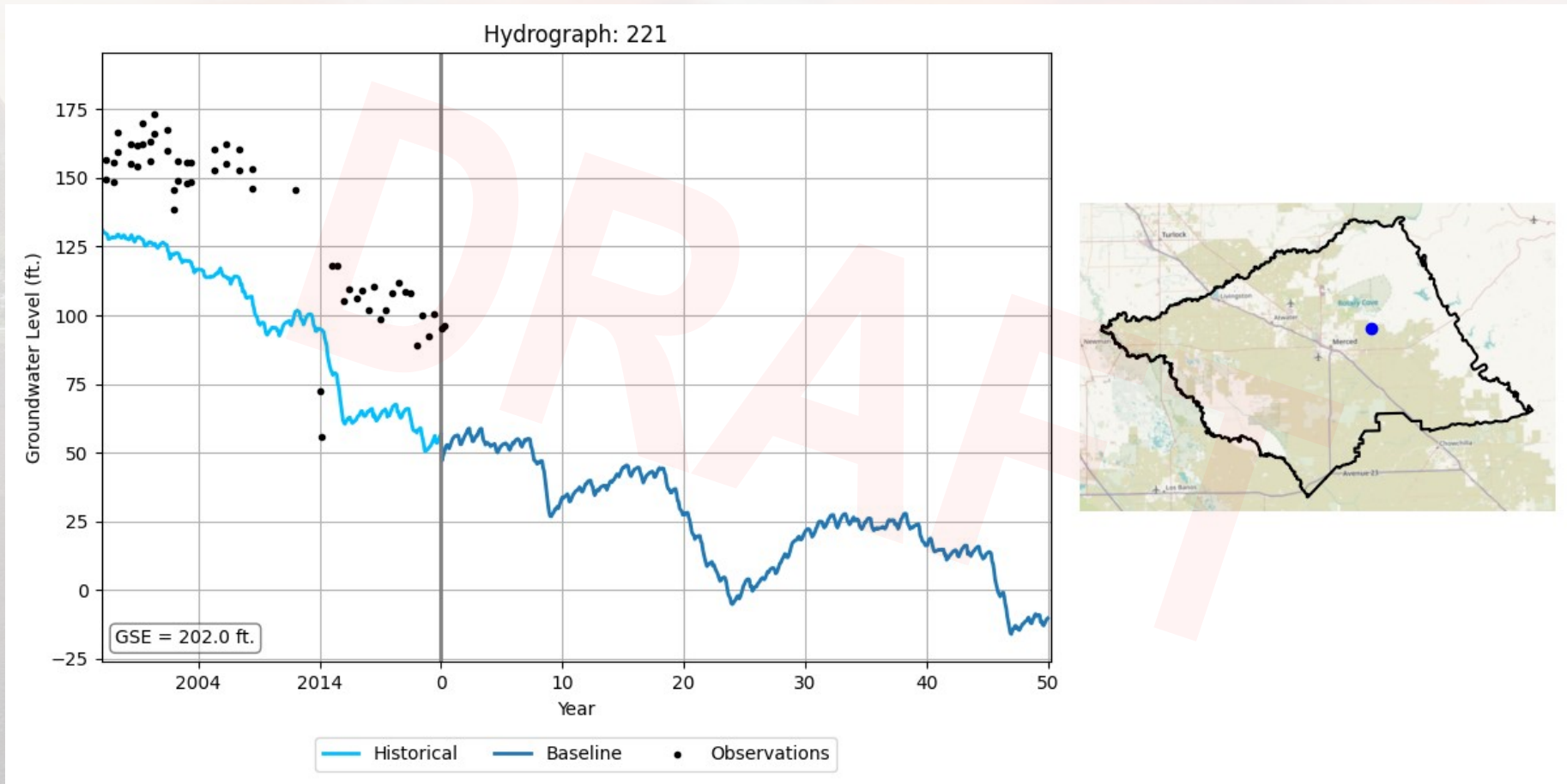


Image courtesy: Veronica Adrover/UC Merced

Stream Hydrograph

Merced River at Stevinson

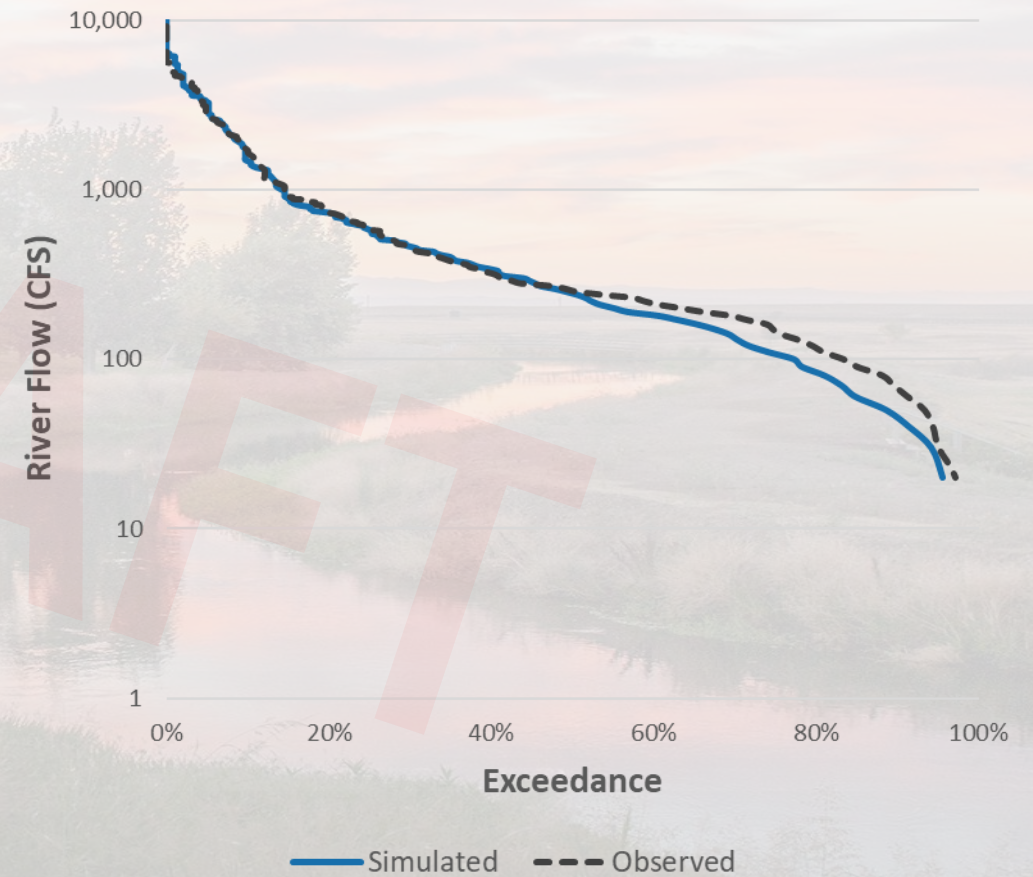
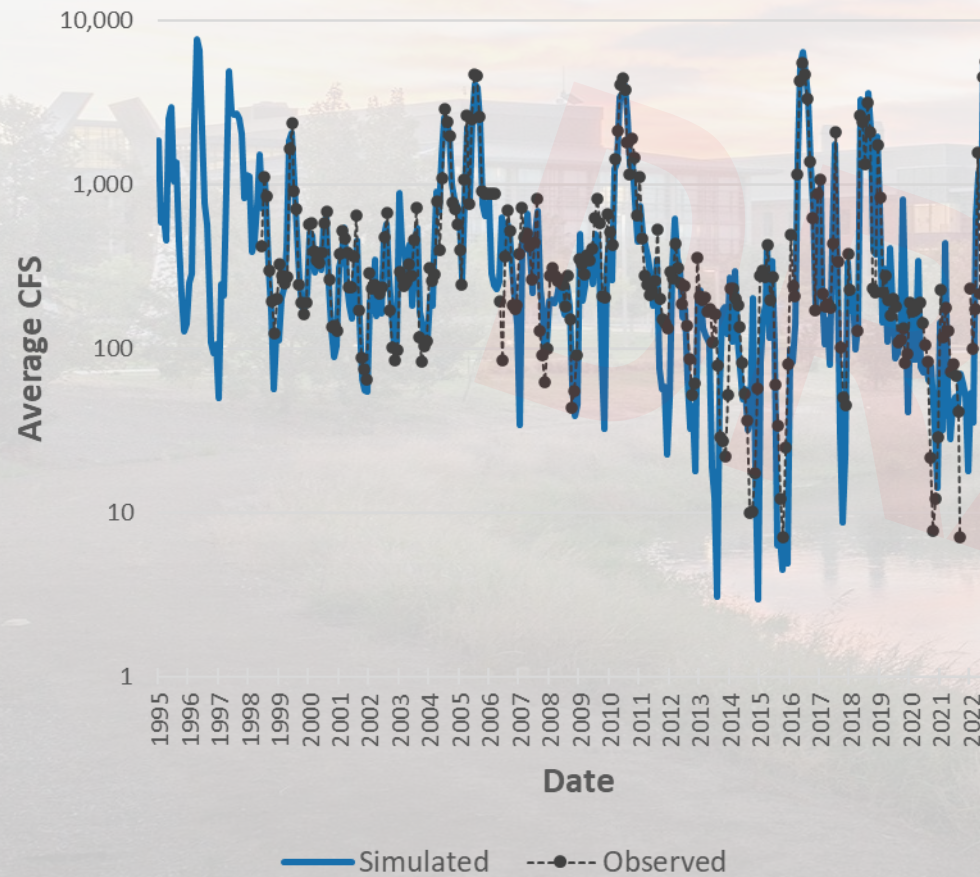


Image courtesy: Veronica Adrover/UC Merced

Groundwater Budget - Historical

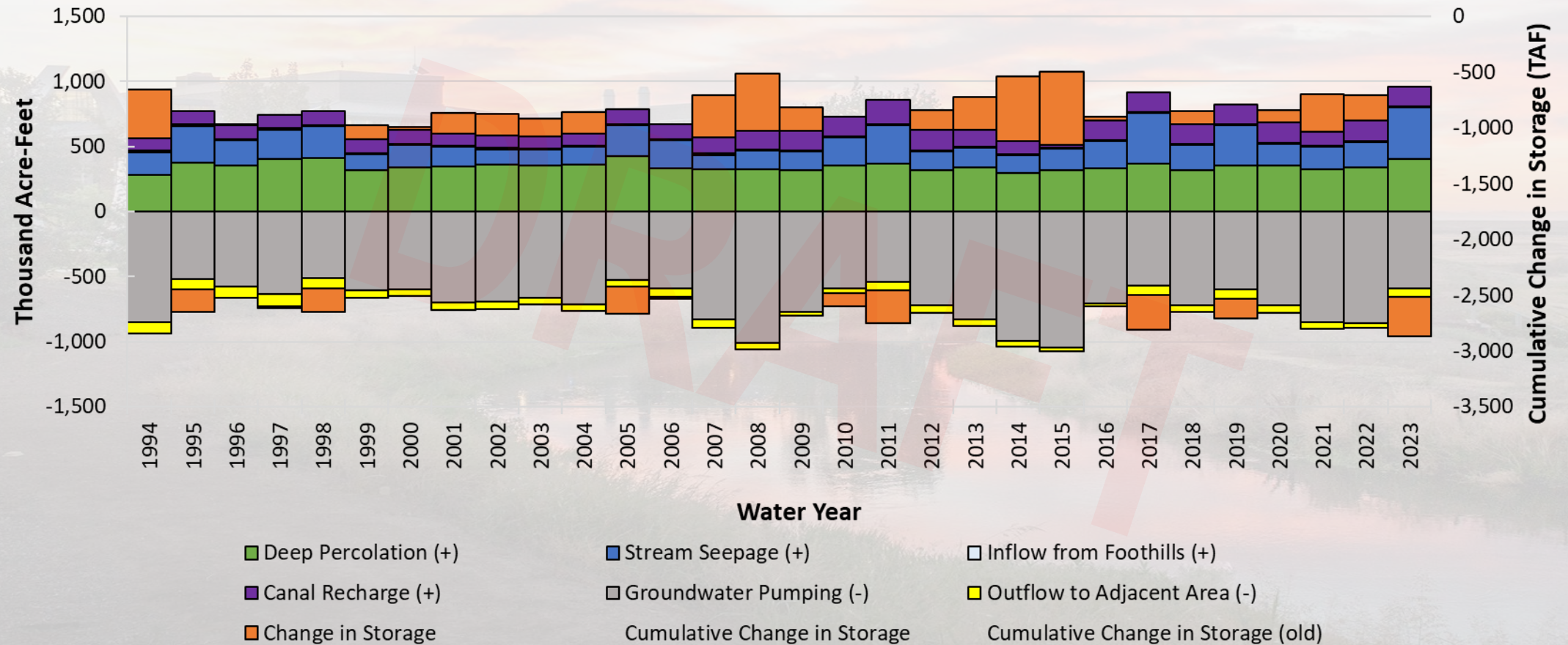


Image courtesy: Veronica Adrover/UC Merced

Groundwater Budget - Historical

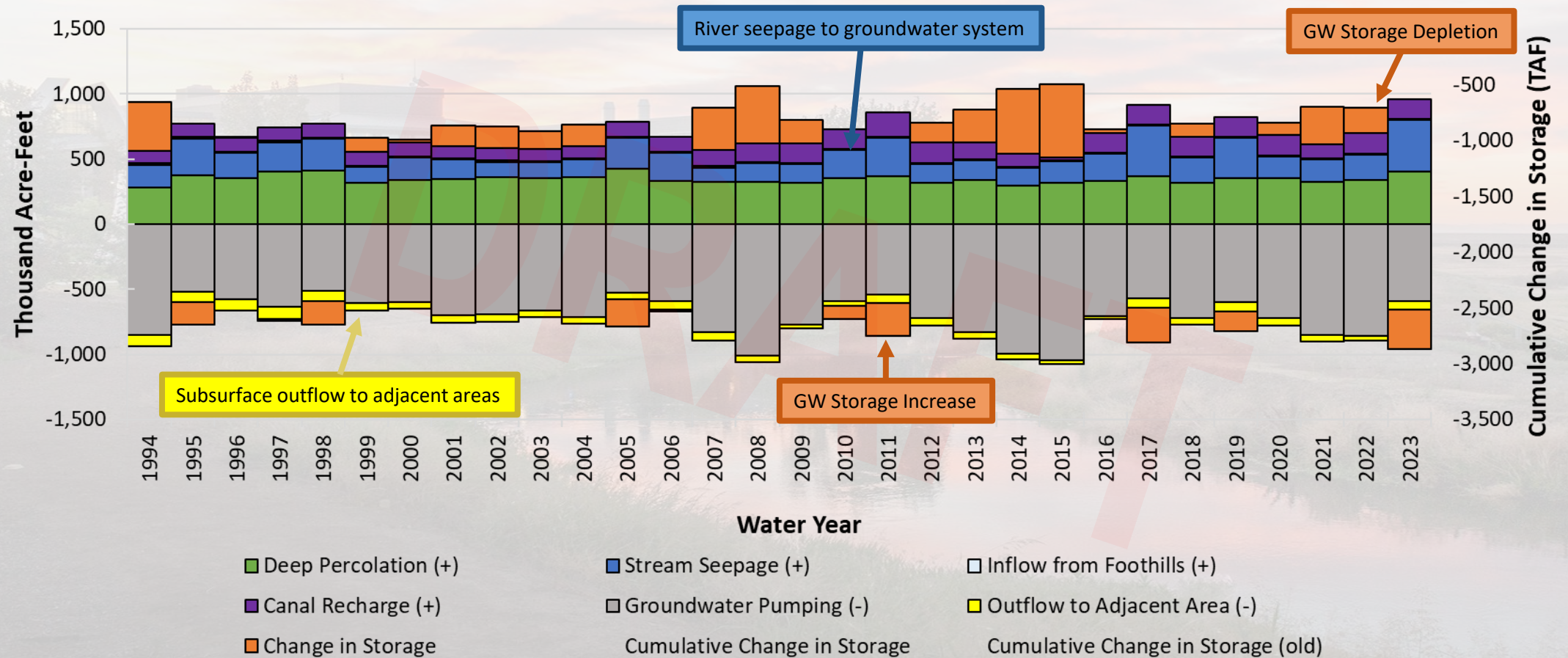


Image courtesy: Veronica Adrover/UC Merced

Groundwater Budget - Historical

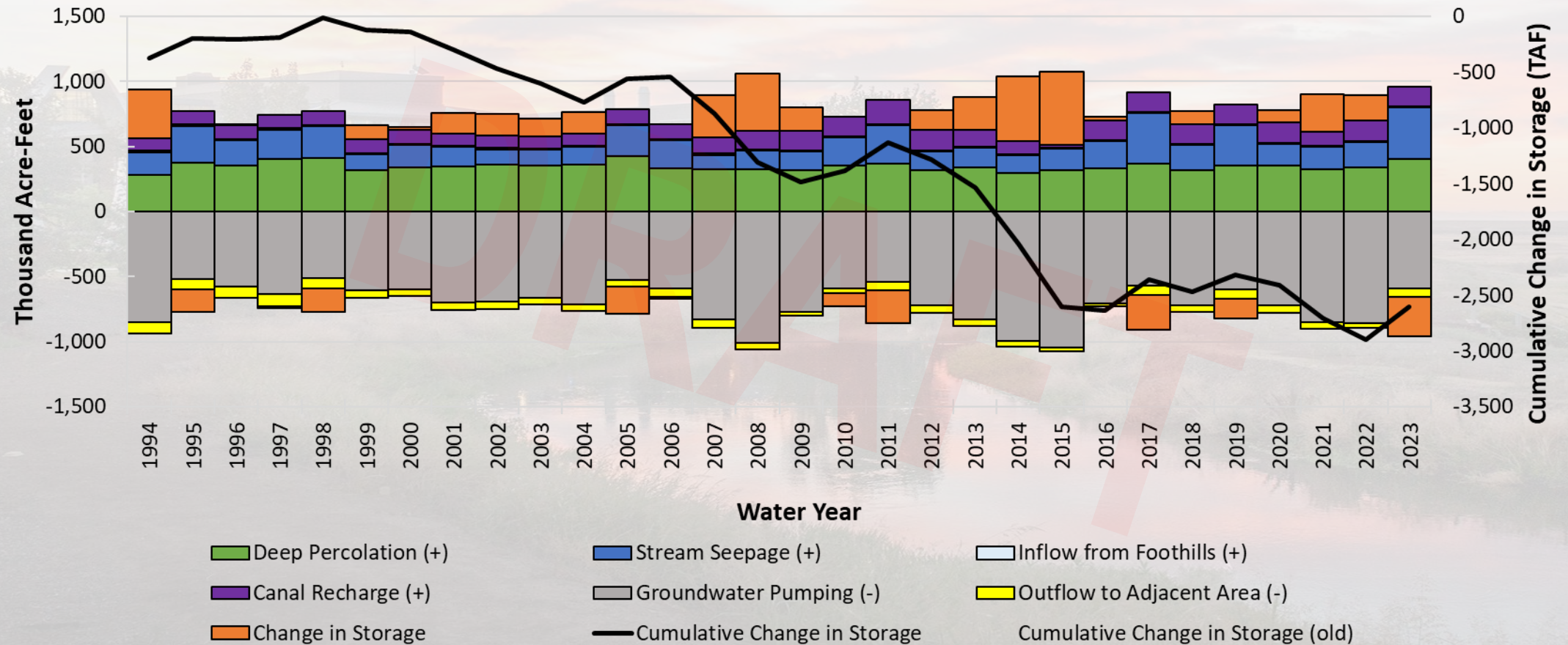


Image courtesy: Veronica Adrover/UC Merced

Groundwater Budget - Historical

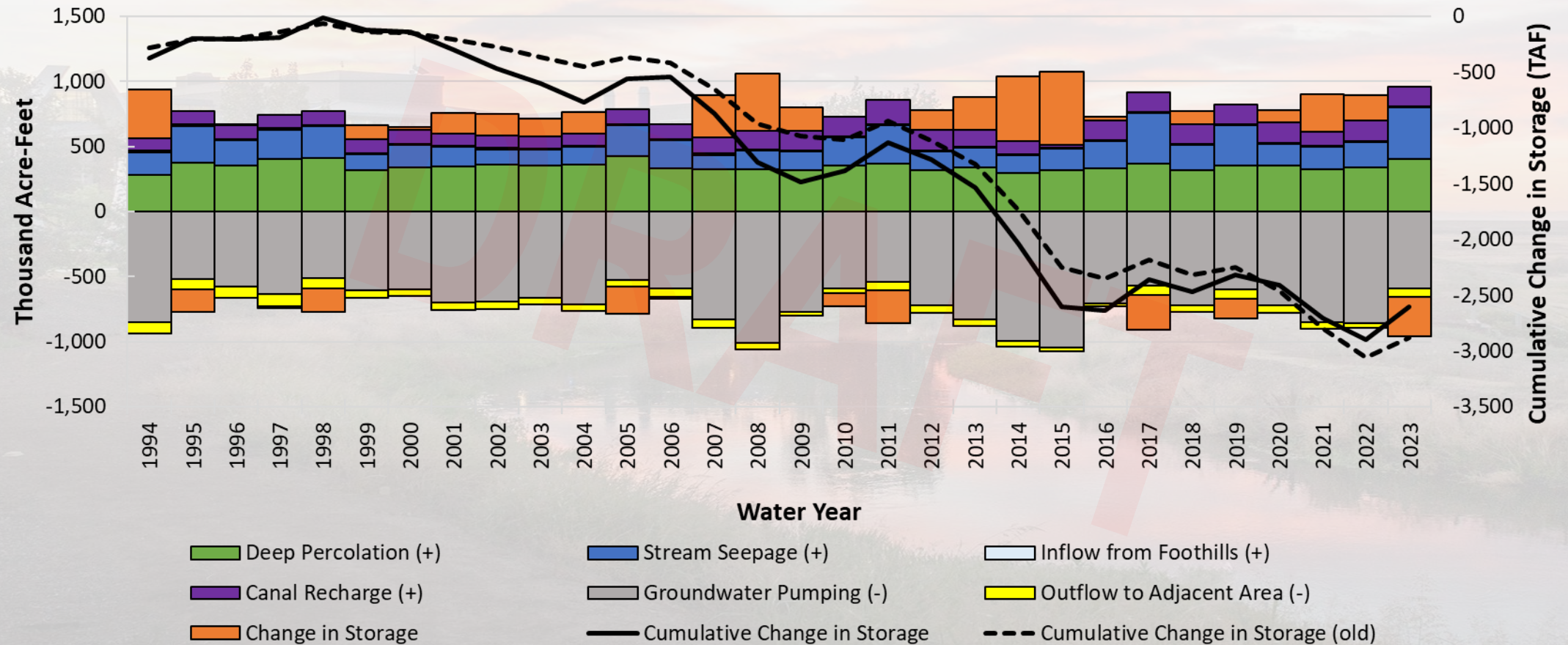


Image courtesy: Veronica Adrover/UC Merced

Conclusions and Next Steps

- MercedWRM shows a good approximation of historical groundwater levels and stream flows
- Refinements support continued improvement of the model
 - Changes in Land Surface inputs align with other tools developed for the subbasin
 - Use of new technology and inputs that give a better characterization and understanding of the basin
- Next Steps
 - Develop new model versions to presented in July:
 - Climate Change
 - Projects & Management Actions
 - Sustainable Yield

Image courtesy: Veronica Adrover/UC Merced



Next Steps

Image courtesy: Veronica Adrover/UC Merced

What's coming up next?

- Public Workshop tonight at 6:30 pm at Sam Pipes Room, Merced Civic Center, 678 West 18th Street, Merced, CA 95340
- Adjourn to next meeting (joint with Coordination Committee), proposed Jul 17, 2024 at 10am
- Anticipated topics:
 - Water budgets for scenarios with projects & management actions + sustainable yield
 - Projects and management actions
 - Review of sustainable management criteria for new groundwater level monitoring wells.

Image courtesy: Veronica Adrover/UC Merced

Merced GSP Stakeholder Advisory Committee Meeting

May 22, 2024

**Merced Irrigation-Urban GSA
Merced Subbasin GSA
Turner Island Water District GSA-1**

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