Merced Groundwater Sustainability Plan (GSP) Public Workshop

August 26, 2024

Meeting will begin at 6:30pm or a few minutes after – thank you for joining us!

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

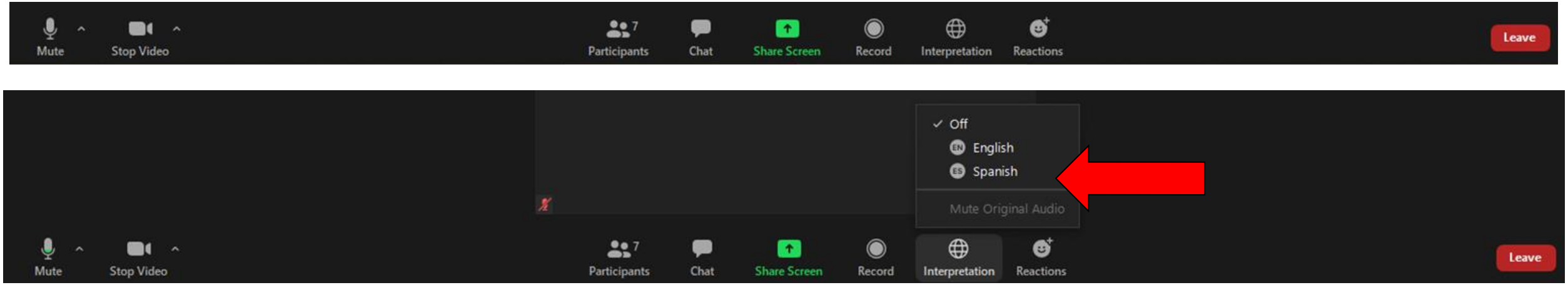
Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

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.

ZOOM Protocols & Meeting Guidelines

1. Online participants will be put on Mute to reduce background sounds. The meeting host will unmute you when it is your turn to speak.
2. During Presentations
   - The team will organize and moderate clarifying questions about presentation content.
   - Online participants: Use the Chat to Panelists feature to ask clarifying questions.
   - If you have questions or comments, please hold them until the discussion periods.
3. Discussion/Public Comment
   - We will take questions and comments from in-person participants first.
   - Online Participants: Use Raise Hand and we will call on you.
4. Meeting Guidelines
   - Please be concise, this is a challenging format for discussion
   - Be honest and constructive, build on the ideas of others

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Agenda

1. Welcome
2. SGMA Overview & Merced GSP History
3. Topic 1: Projects proposed to augment groundwater supplies
4. Topic 2: Methods proposed to reduce groundwater use
5. Topic 3: Use of Merced Water Resources Model to quantify the benefits of collective actions
6. Next steps

Image courtesy: Veronica Adrover/UC Merced

SGMA Overview & Merced GSP History

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Sustainable Groundwater Management Act (SGMA) and Groundwater Sustainability Plan (GSP)

SGMA was passed in 2014 and required the following:

- Groundwater Sustainability Agencies (GSAs) must be formed
- GSP must be prepared and submitted by January 2020 for critically overdrafted basins
- GSPs must include measurable objectives and milestones in five-year increments to achieve sustainability within 20 years of GSP adoption
- GSPs must be evaluated every 5 years
- GSP development must be open and transparent, with stakeholder and public input

Merced Subbasin: 3 GSAs, 1 GSP

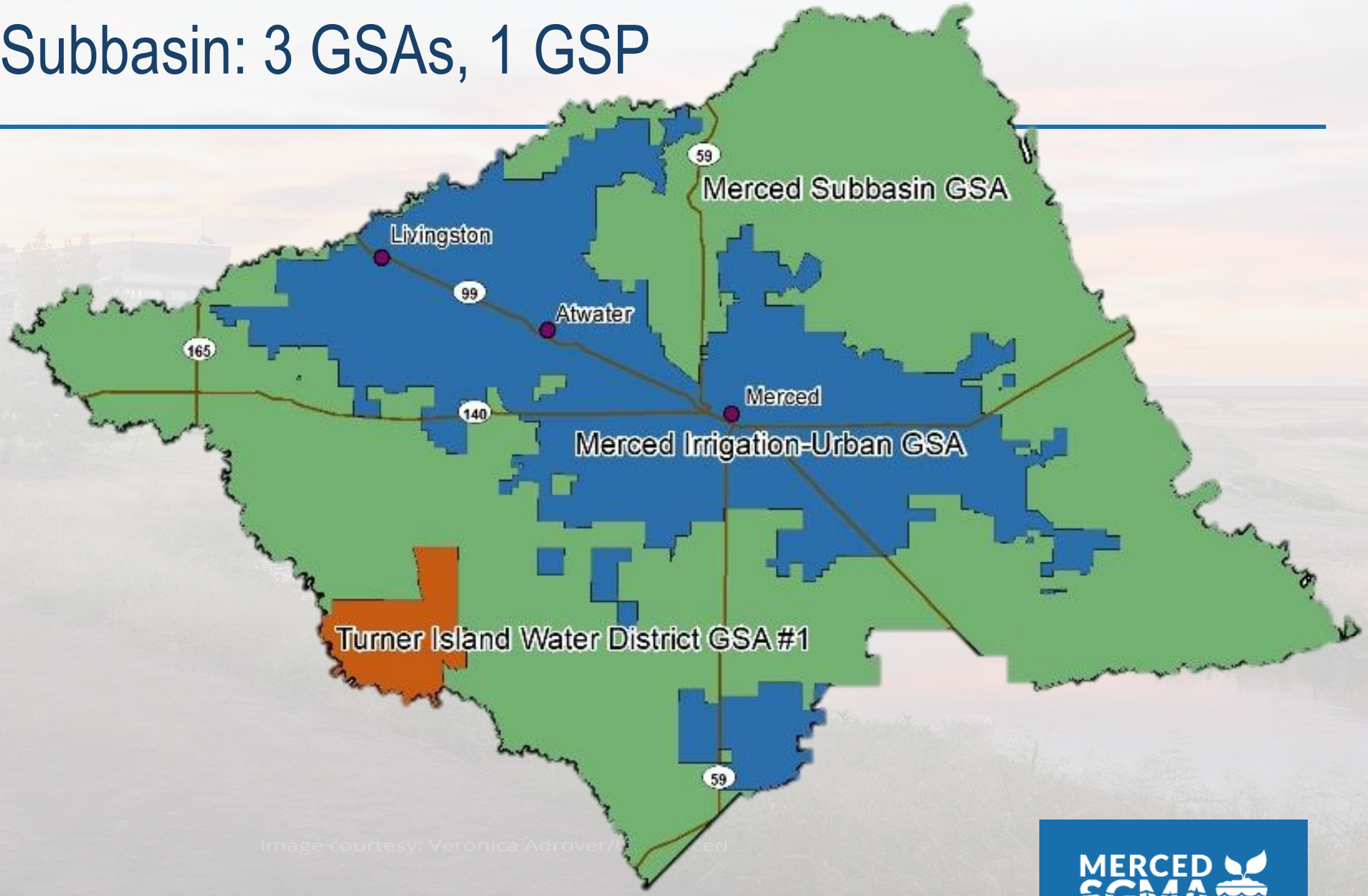


Image courtesy: Veronica Adrover/[illegible]ced

Merced GSP Timeline

2018-2019	2020-2021	1/28/2022	Feb – Jul 2022	Aug 2022 – Mar 2023	Mar 2023 – Aug 2023	Oct 2023 – Jan 2025
• Initial GSP Development	• DWR Review of Initial GSP	• DWR Released "Incomplete" determination	• GSPs had 180 days to address deficiencies	• Public Comment and DWR review of revised GSP	• DWR announces Approval (Mar) and prepares and releases detailed letter (Aug)	• GSP 5-Year Update

You are here

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

SGMA Focuses on Halting Overdraft While Protecting Basin Health

SGMA has 2 main focus areas:

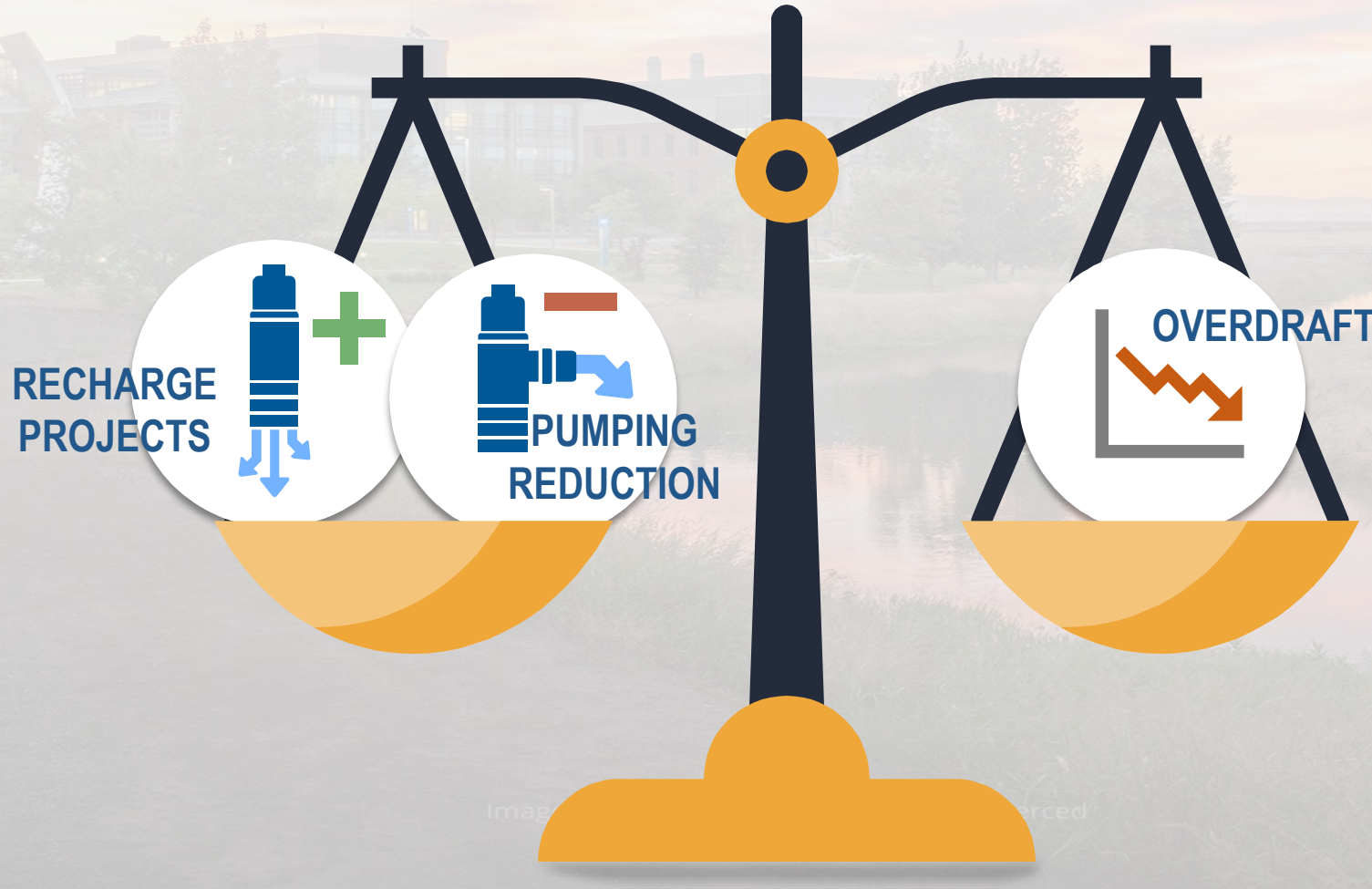
- Halt the overdraft by “balancing the water budget” (basin inputs = basin outputs)
- Establish objectives for six “sustainability indicators”:

Topic 1: Projects proposed to augment groundwater supplies

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

The GSAs have two tools to help balance out the rate of overdraft (long-term decline in groundwater levels and storage):



Projects (1 of 6)

AFY = acre-feet per year

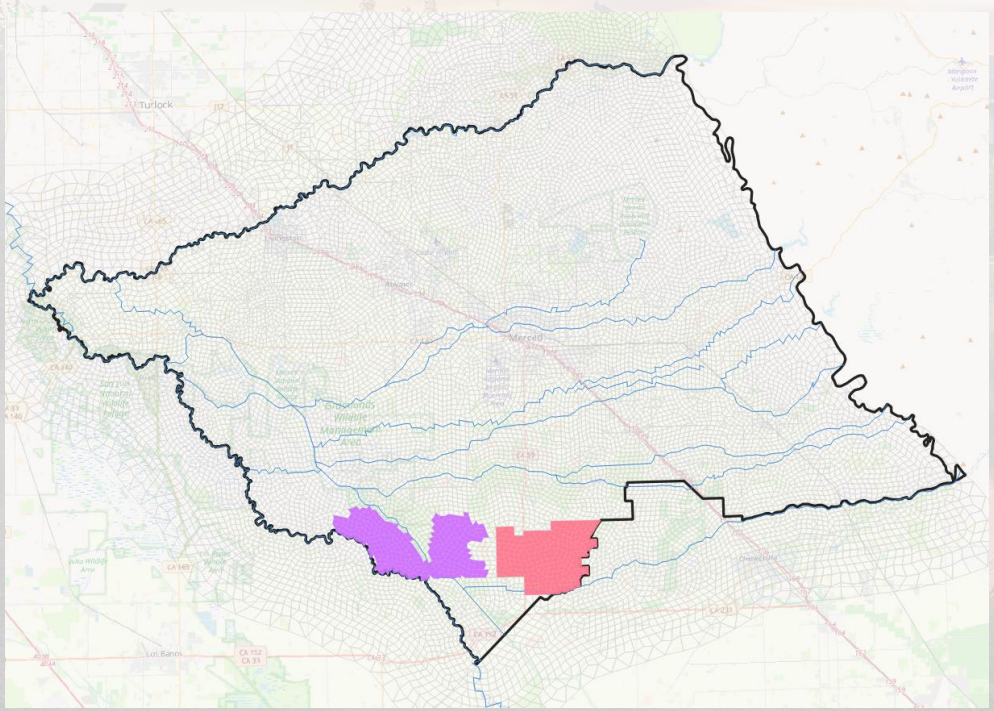


Image courtesy: Veronica Adrover/UC Merced

MID to Lone Tree MWC Conveyance Canal

- In-Lieu Recharge until 2035 (12 years)
- Averages 4,700 AFY (1,000 – 8,000 AFY depending on water year type)

El Nido Conveyance System

- Direct Recharge
- Averages 2,300 AFY (0 – 5,400 AFY depending on water year type)

MERCED SGMA

Projects (2 of 6)

AFY = acre-feet per year

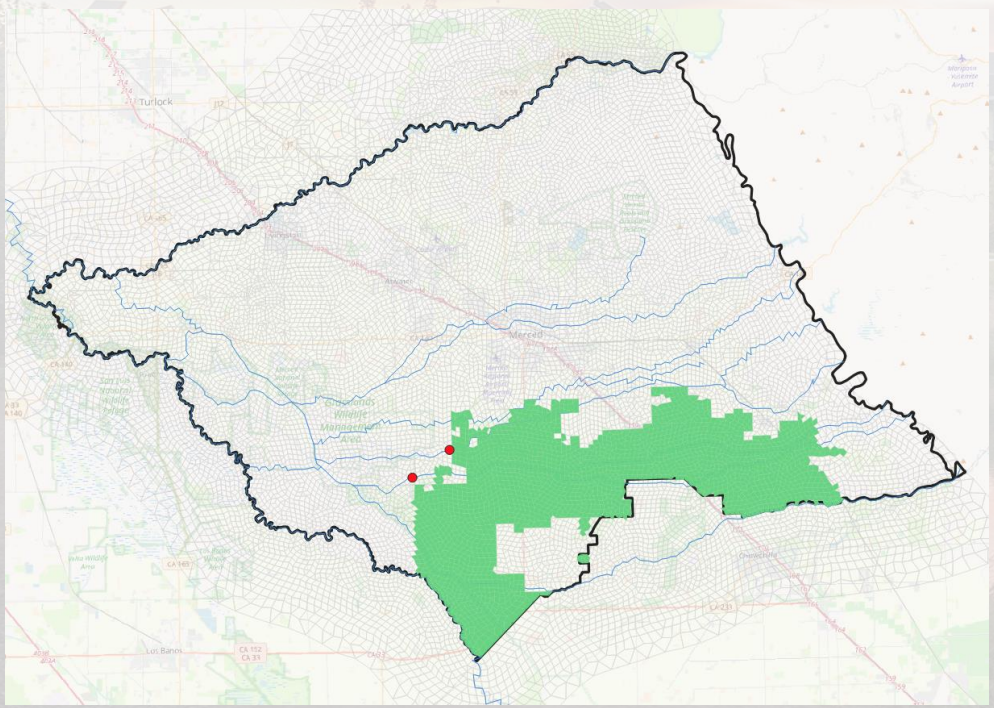


Image courtesy: Veronica Adrover/UC Merced

LeGrand-Athlone Intertie Canal

In-Lieu Recharge (until 2035 – 12 years)

- Averages 3,500 AFY (760 – 6,000 AFY depending on water year type)

Direct Recharge

- From Mariposa Creek and Deadman's Creek
- Averages 3,400 AFY

Projects (3 of 6)

AFY = acre-feet per year

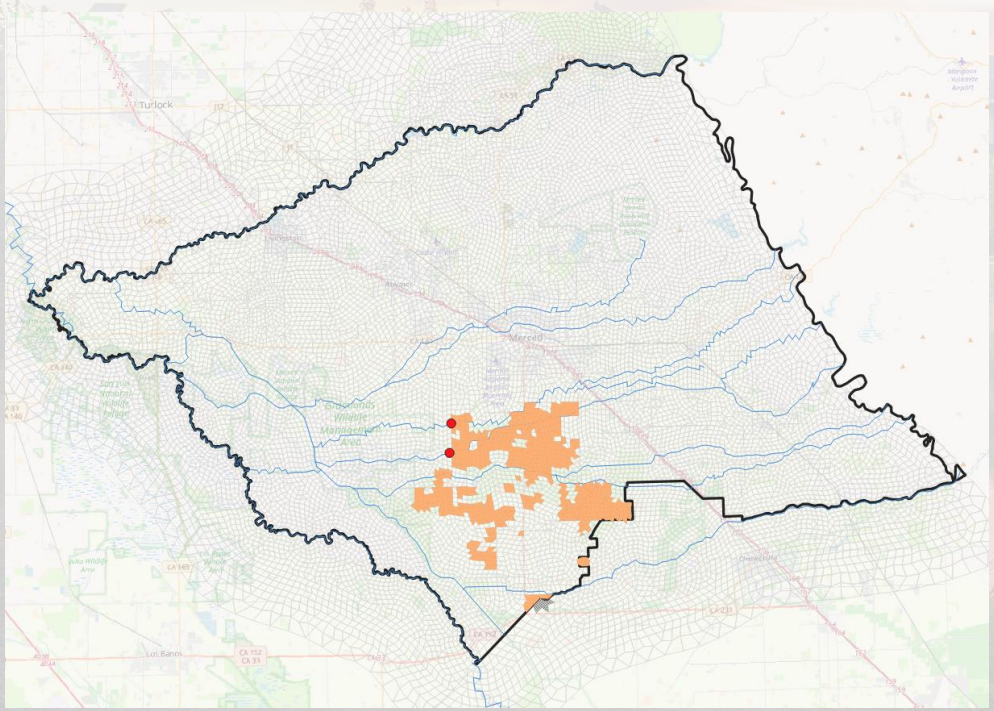


Image courtesy: Veronica Adrover/UC Merced

Vander Dussen Flood-MAR

- Direct Recharge
- Averages 2,200 AFY

Vander Woude Storage Reservoir

- In-Lieu Recharge
- From Owens and Mariposa Creeks
- Averages 750 AFY
- Includes reduction of 30 ac. of irrigated land
  - ~ 80 AFY of yield

Projects (4 of 6)

AFY = acre-feet per year

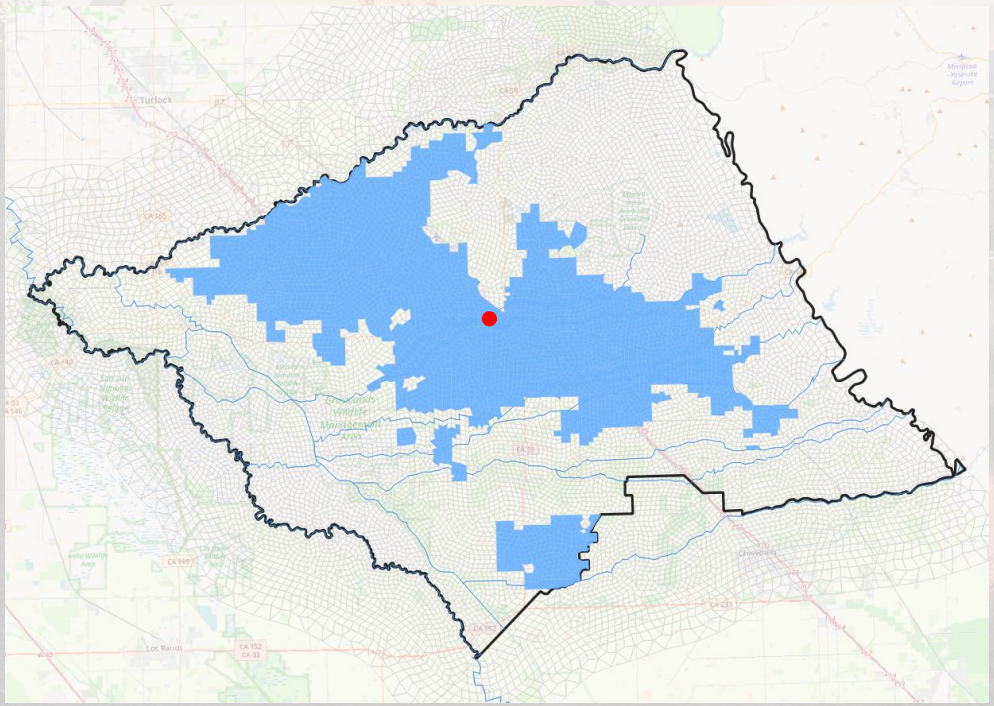


Image courtesy: Veronica Adrover/UC Merced

Crocker Dam Modification

Benefits MID's service area

In-Lieu Recharge

- Averages 5,760 AFY (12,000 AFY in wetter years)

Direct Recharge

- Averages 9,920 AFY (20,000 AFY in wetter years)

Projects (5 of 6)

AFY = acre-feet per year

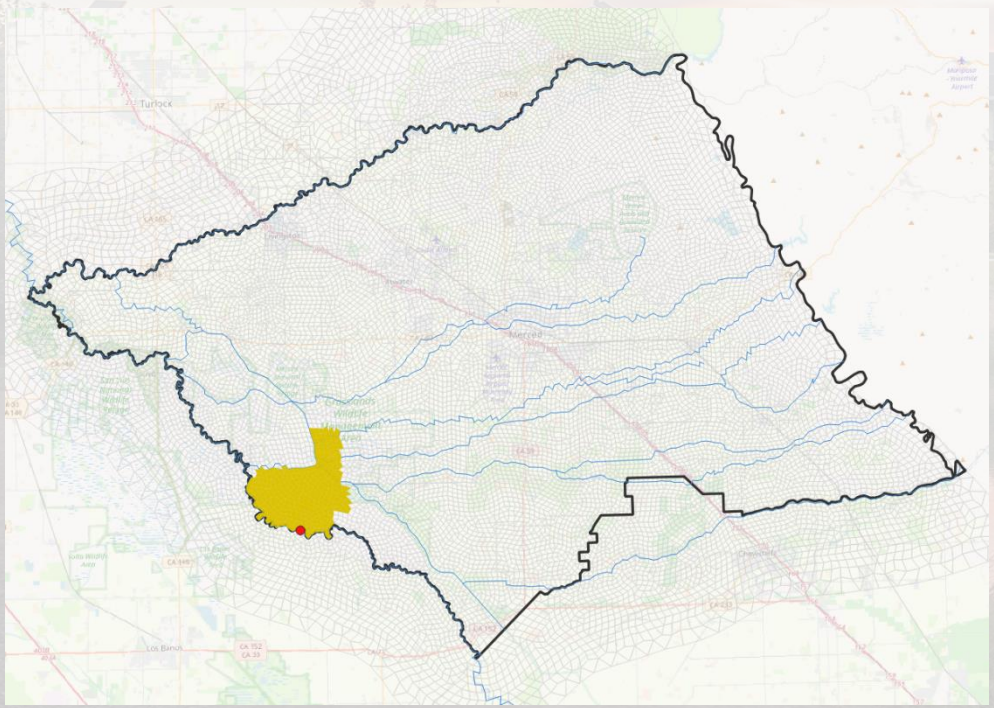


Image courtesy: Veronica Adrover/UC Merced

TIWD Water Conservation

- In-Lieu Recharge from San Joaquin River
- Averages 1,840 AFY (1,500 – 2,500 AFY depending on water year type)

TIWD Shallow Well Drilling

- Modeled by modifying the screen depth for some wells to pump at shallower depths – above the Corcoran Clay
- Average of 1,500 AFY

Projects (6 of 6)

AFY = acre-feet per year

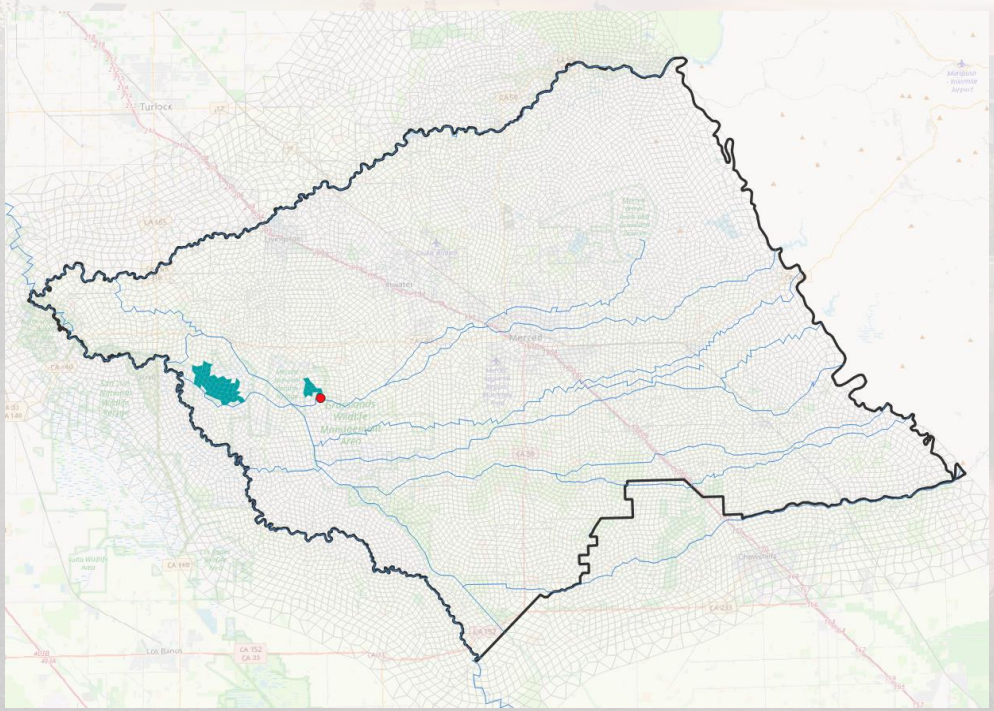


Image courtesy: Veronica Adrover/UC Merced

La Paloma MWC G Ranch Recharge Project

- Direct Recharge
- From Bear Creek **1,800 AFY** all years
- Reduction of 169 ac. of irrigated land
  - ~ 450 AFY of yield

Projects - Summary

All values in AFY = acre-feet per year

Project	In-Lieu Recharge	Direct Recharge	Land Reduction*	Total Yield
MID to LTMWC	1,300	0	0	**1,300**
El Nido Conveyance Improvements	0	2,300	0	**2,300**
LeGrand-Athlone Intertie Canal	1,000	3,400	0	**4,400**
Vander Dussen Flood-MAR	0	2,200	0	**2,200**
Vander Woude Storage Reservoir	700	0	100	**800**
Crocker Dam Modification	5,800	9,900	0	**15,700**
TIWD Water Conservation	1,800	0	0	**1,800**
La Paloma Mutual Water Company Project	0	1,800	500	**2,300**
MID out of district	4,400	0	0	**4,400**
Total	**15,000**	**19,700**	**600**	**35,200**

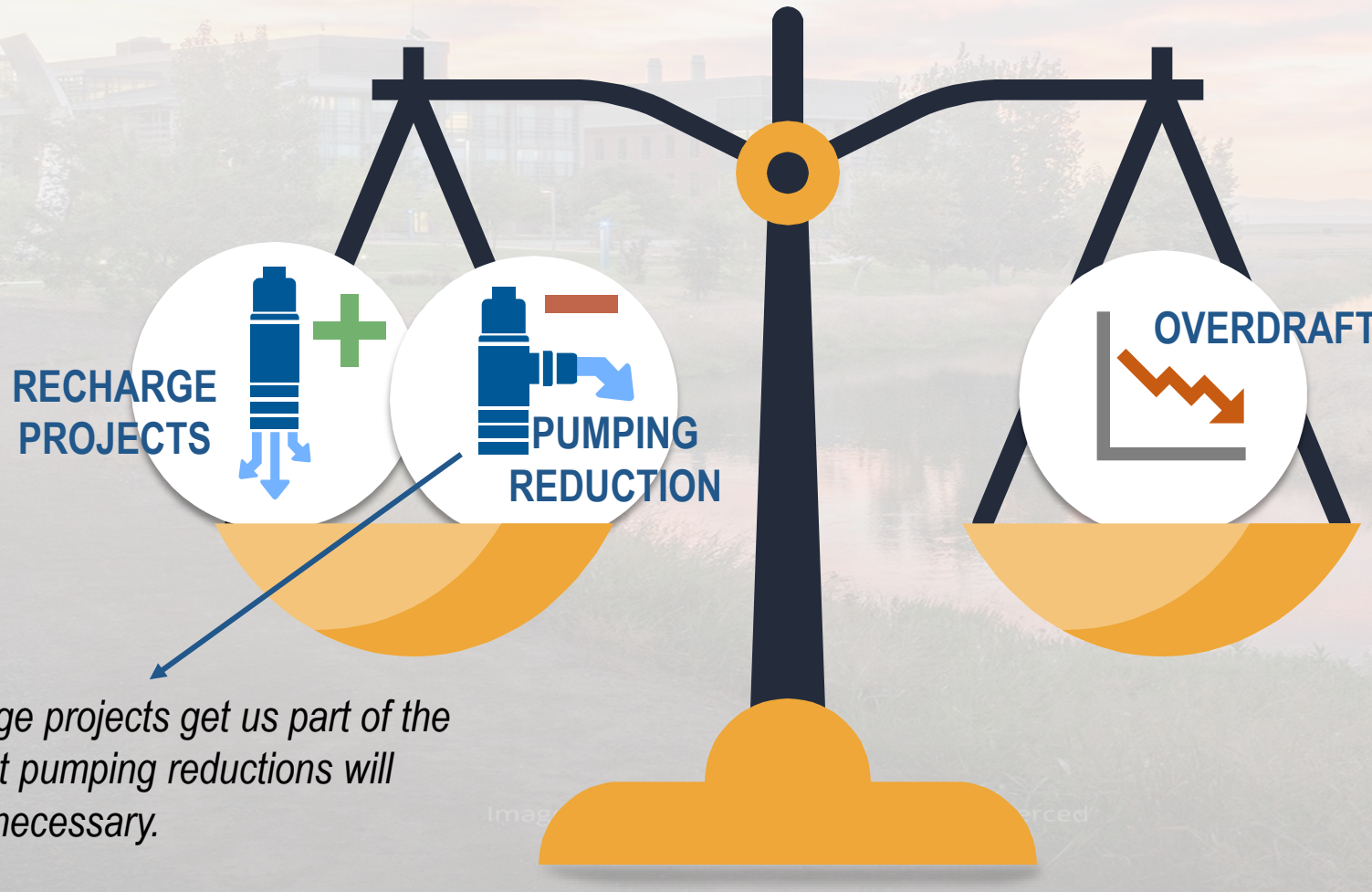
Projected rate of overdraft is 83,000 AFY.

Image courtesy: Veronica Adrover/UC Merced

* Assume 2.7 ft / acre of yield

MERCED SGMA

The GSAs have two tools to help balance out the rate of overdraft (long-term decline in groundwater levels and storage):



Recharge projects get us part of the way, but pumping reductions will still be necessary.

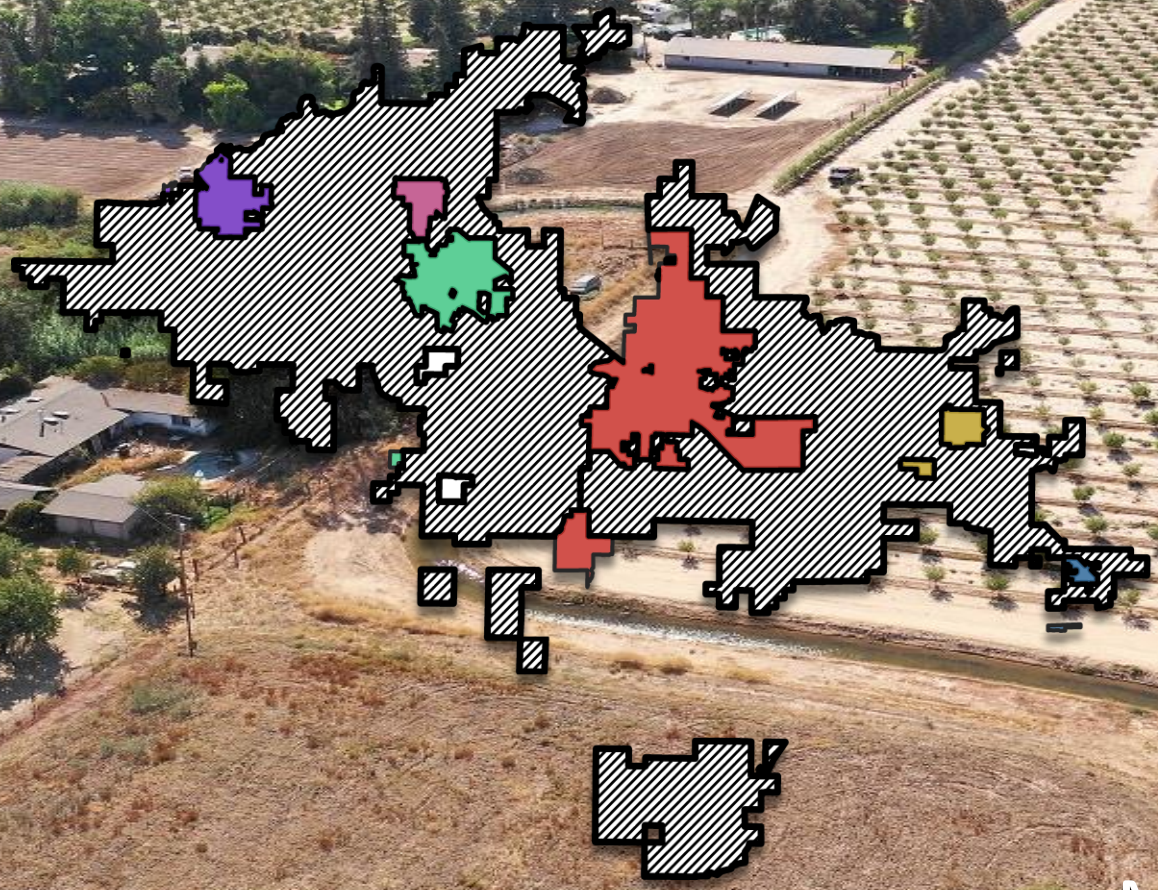
Questions, Comments, & Discussion

Methods proposed to reduce groundwater use

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Merced Irrigation-Urban Groundwater Sustainability Agency



Merced GSP Workshop

August 26, 2024

MERCED IRRIGATION-URBAN GSA

MIUGSA – Milestone Implementation Actions

- June 2022 – MIUGSA Set Allocation at 3.3/AF/AC Over April 1, 2023-December 31, 2025 (1.1 AF/AC Per Year on Average)
- October 2022 – MIUGSA Adopted Well Registration Policy
- October 2023 – MIUGSA Adopted Rules and Regulations and GMIP
  - Provide framework for implementing the GSP within MIUGSA. Includes components for monitoring and enforcement, as well as opportunities for landowners to manage their available groundwater.
  - https://www.miugsa.org/documents
- June 2024 – MIUGSA Set Non-Agricultural Allocations
- August 2024 – Distributed Groundwater Account Statements to Groundwater Only Accounts

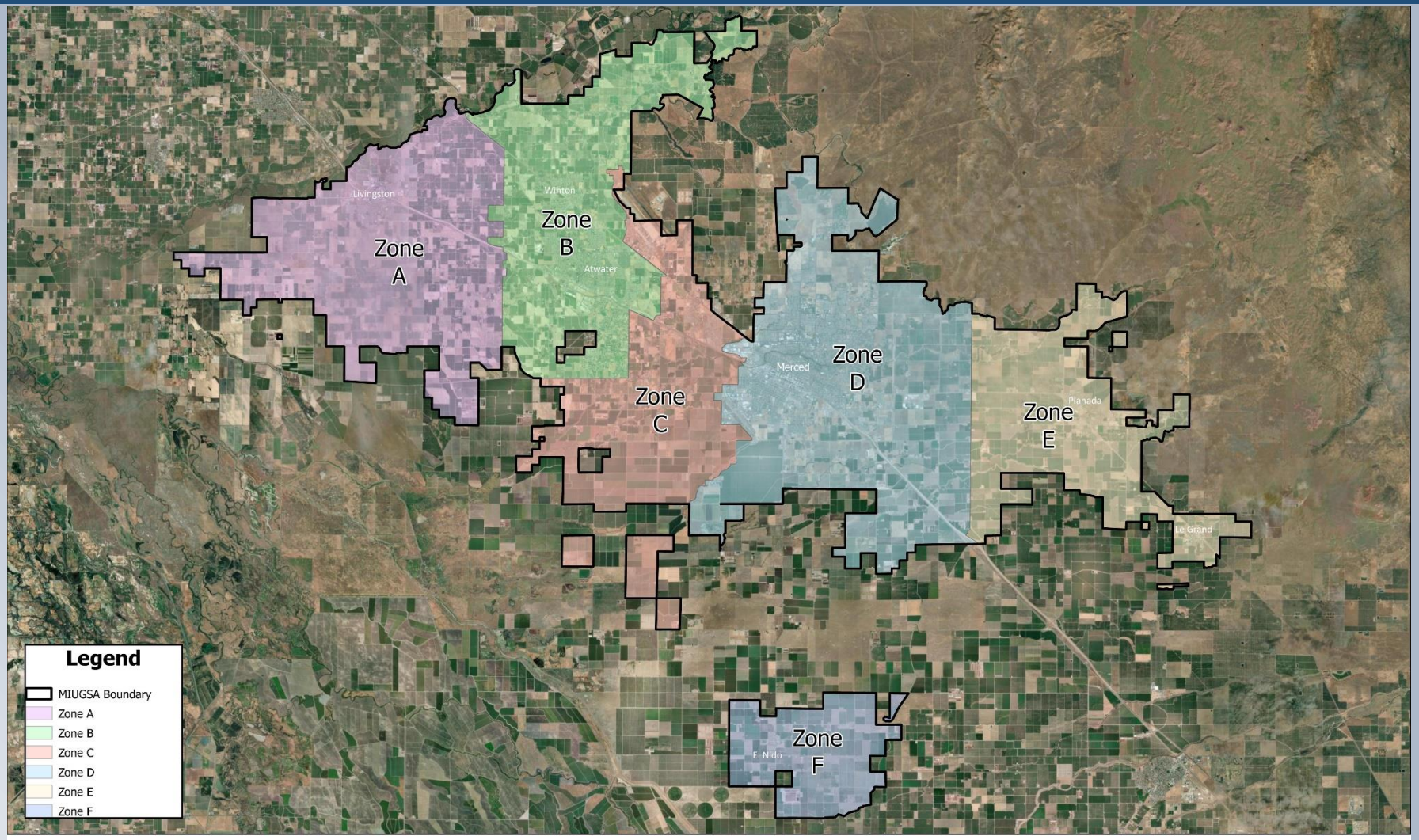
MERCED IRRIGATION-URBAN GSA

MIUGSA – Rules and Regs Key Items

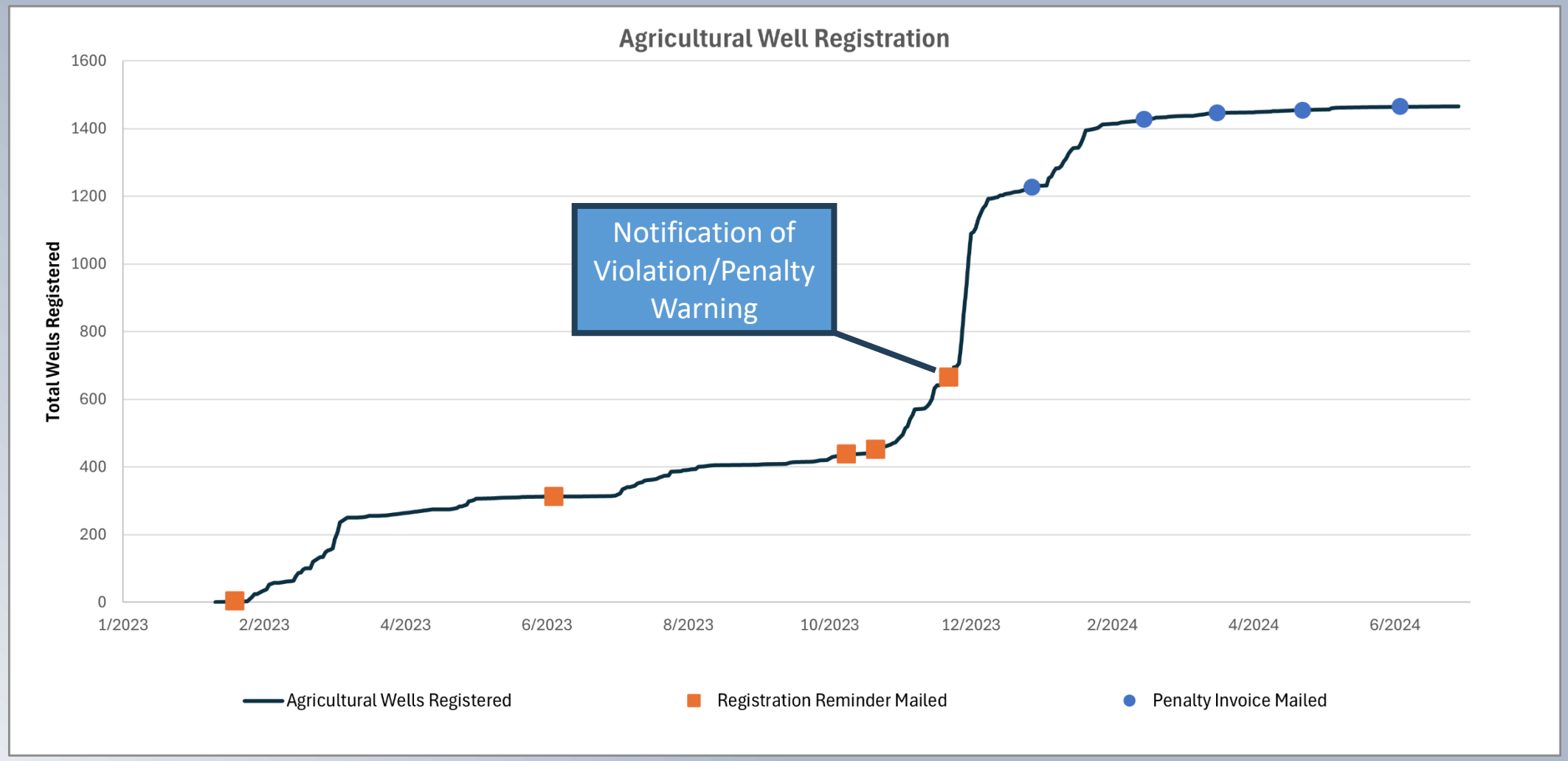
- Groundwater Allocation and Allocation Period
- Pooling and Reallocations
  - Establishment of Groundwater Accounts
  - Opportunities and Limitations for Reallocating
    - Pooling Zones
- Intentional Recharge Credits
- Well Registration, Place of Use, Flow Meters
- Water Accounting System
  - Determination of Groundwater Extracted
- Penalties and Enforcement
  - Process (Notice and Order, Red Tag)
  - Penalty Amounts

MERCED IRRIGATION-URBAN GSA

MIUGSA - Pooling Zones



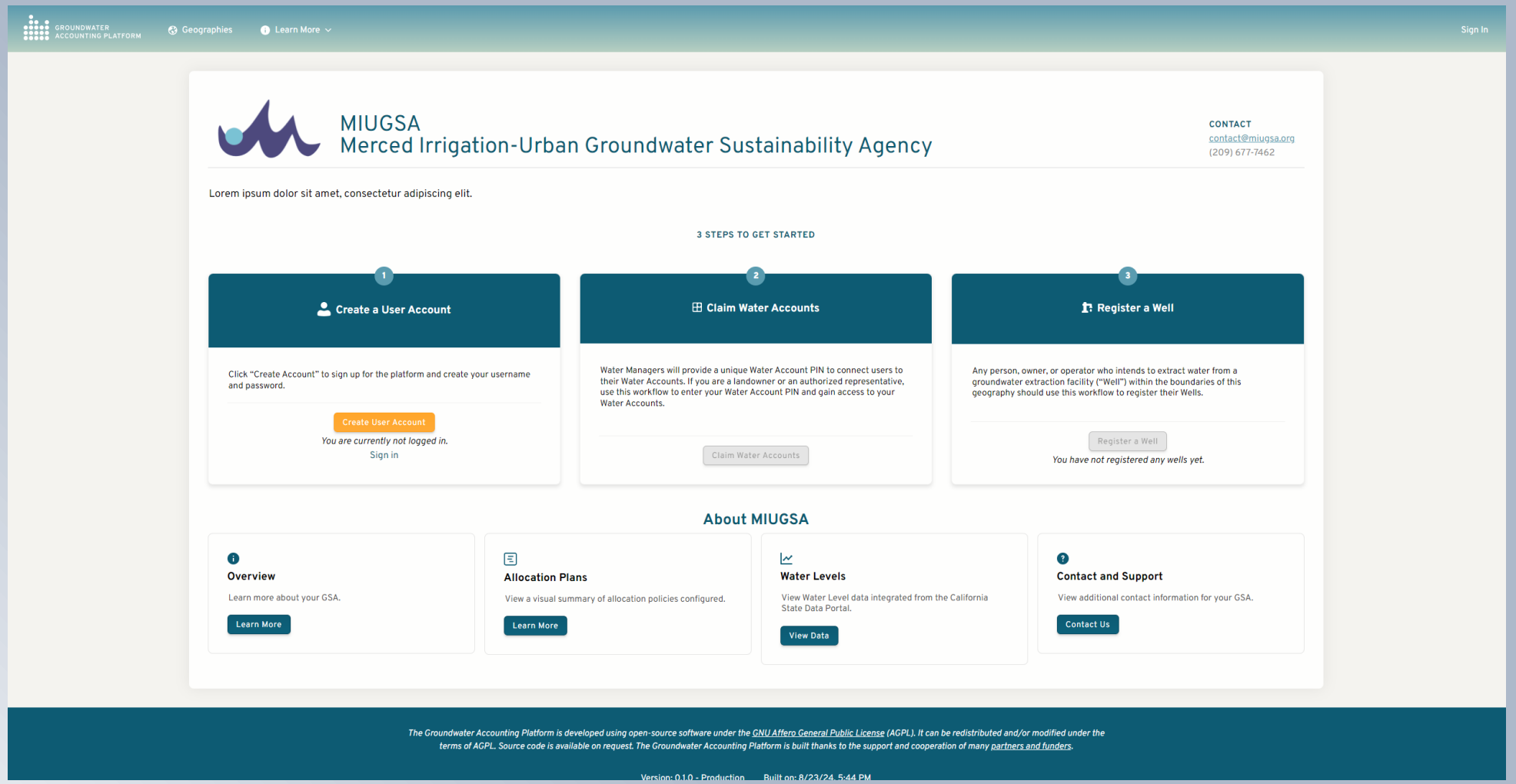
Well Registration Policy Implementation



MERCED IRRIGATION-URBAN GSA

MIUGSA – Groundwater Account Creation

Groundwater Accounting Platform

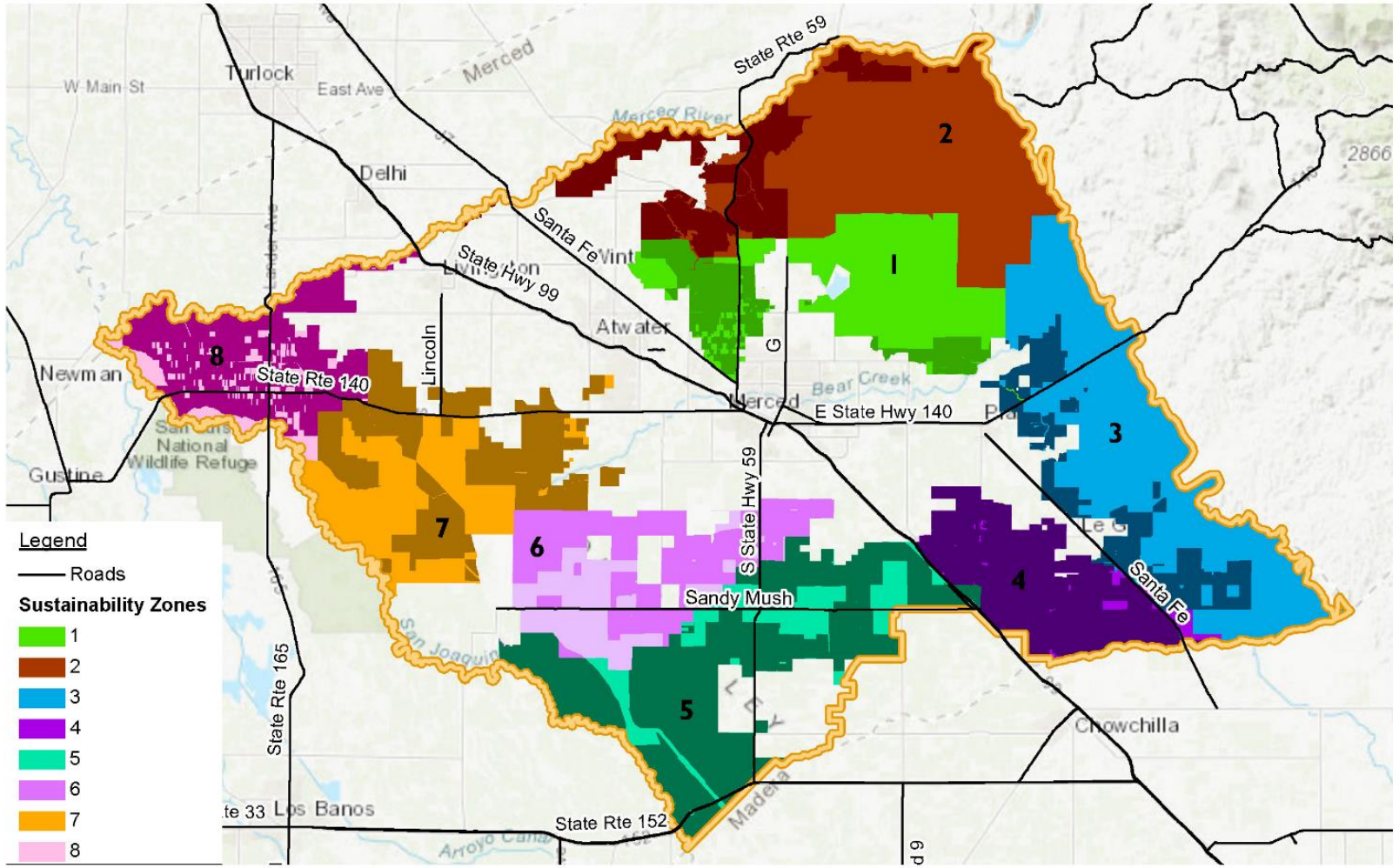


Upcoming Activities

- Outreach and Messaging
- Continue Implementation of Existing Policies
- Further Develop Flow Meter Policies, including:
  - Installation specifications and schedule
  - Deferment process - If well not in use
  - Inspection, maintenance and calibration details
    - Stakeholder recommendation: Owner cost/obligation to install and maintain
- Further Develop Intentional Recharge Credits Policies
- Install new monitoring wells to fill data gaps identified in the Merced GSP

Questions?

Merced Subbasin GSA and Sustainability Zones



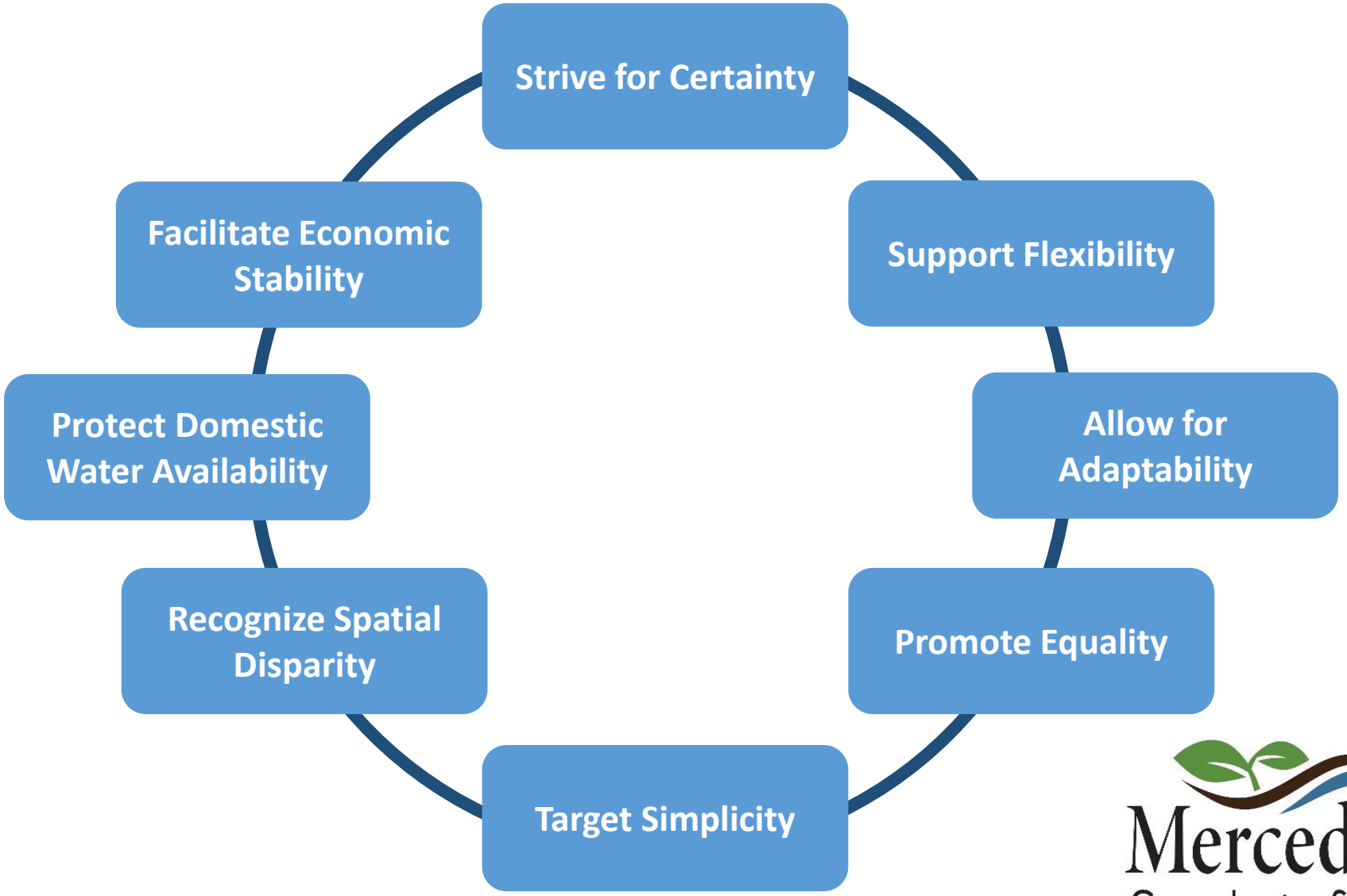
Notes:

1. Darker colored areas in each zone are classified as irrigated land uses (subject to Prop 218 fee).

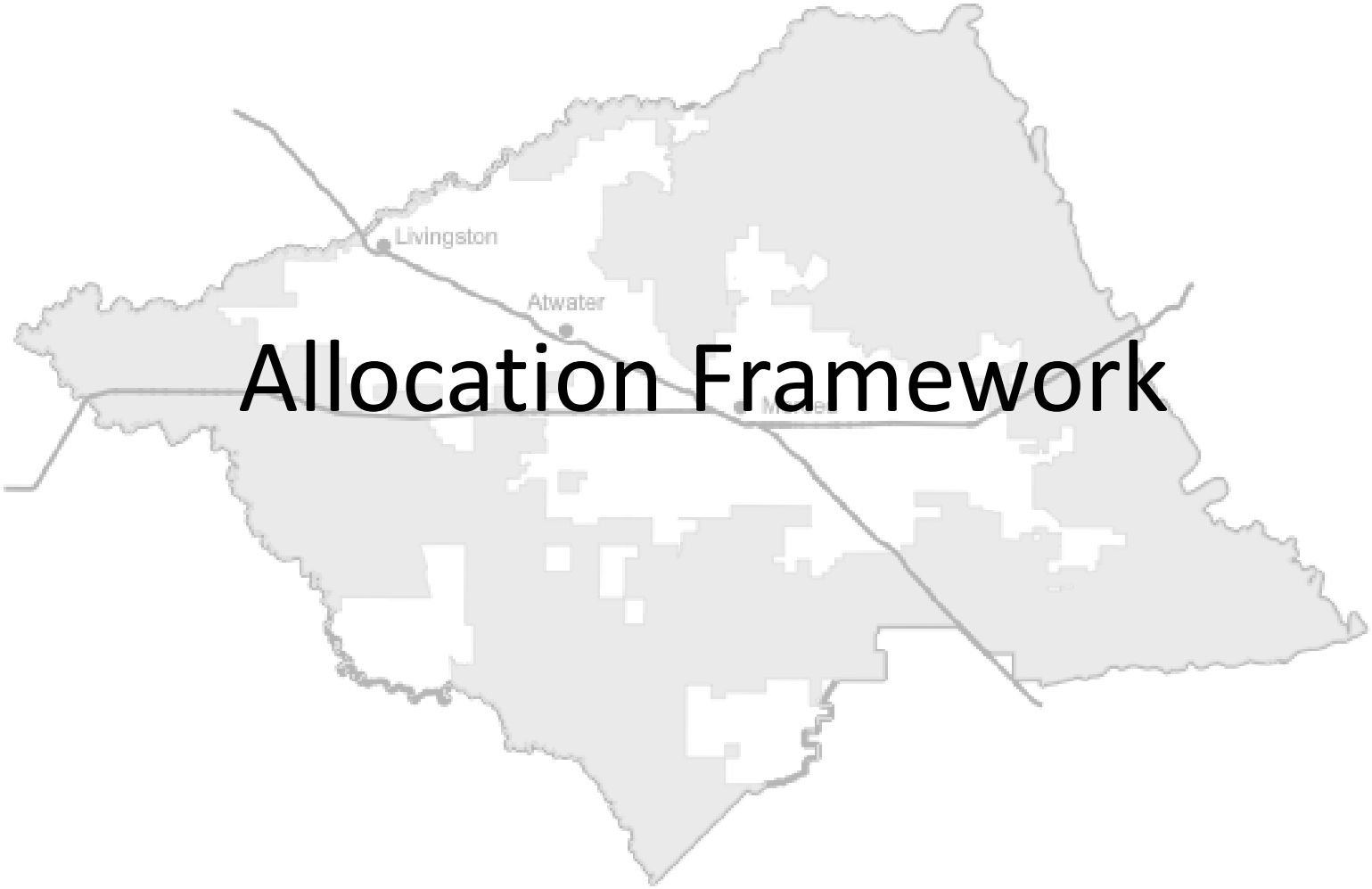
Merced Subbasin
Groundwater Sustainability Agency

MSGSA's Guiding Principles

Adopted October 2022 for Allocations and Recharge



Merced Subbasin
Groundwater Sustainability Agency



Allocation Framework

Merced Subbasin
Groundwater Sustainability Agency

Allocation Framework Recommendations
(as of February 8, 2024)

- Current Focus: Agricultural lands only
- Three Agricultural land use categories*
  1) Irrigated lands (irrigated between 2015 and Jan 1, 2023)
  2) Irrigated lands managed as wetlands
  3) Non-irrigated lands designated as *Grazing*
- Two tier allocation – per-acre quantity of:
  - Sustainable Yield of native groundwater (SY)
  - Additional Pumping Allowance (APA)
    - decrease to zero by 2035 for most Sustainability Zones**
- **5-Year Rolling Bucket of Allocation** - Provide flexibility to growers to manage change across time

* *Appeal process for special circumstances*

** *APA may stabilize before reaching zero if groundwater conditions and other GSP objectives are being satisfied.*

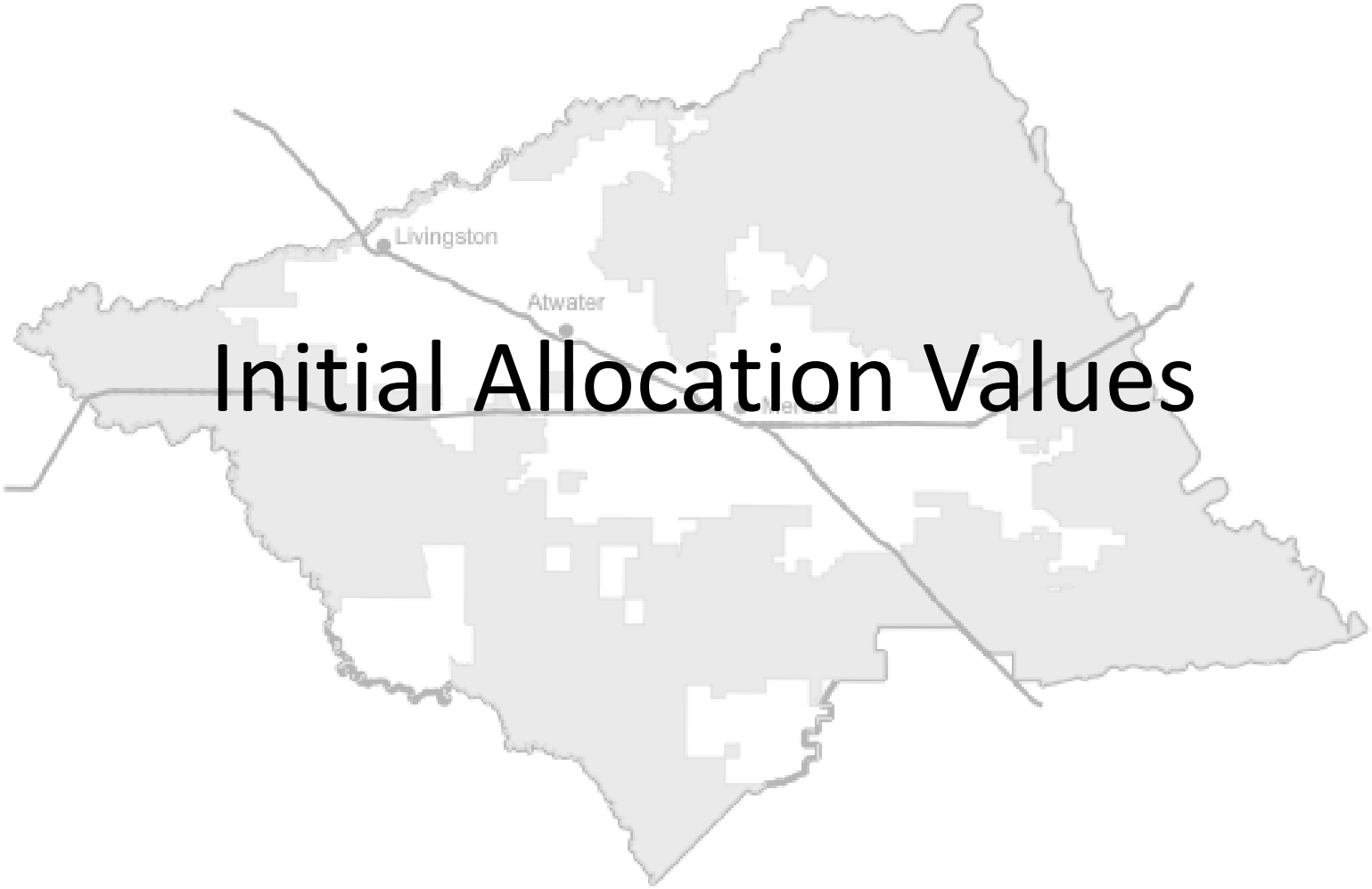
Merced Subbasin
Groundwater Sustainability Agency

Allocation Framework – Cont.
(as of February 8, 2024)

- Additional limitations to pumping any tier of the allocation above and below the Corcoran Clay layer may be required based upon technical evaluation of conditions in the Sustainability Zone to achieve the adopted GSP's groundwater subsidence objectives.

- APA and Sustainable Yield will be revised in future years, consistent with GSP 5-year updates, to reflect data gathered during implementation.

Merced Subbasin
Groundwater Sustainability Agency



Initial Allocation Values

Merced Subbasin
Groundwater Sustainability Agency

Initial Allocation Values

(reflect consumptive use of applied groundwater – **not pumping**)

- Sustainable Yield of Native Groundwater (SY)
  - ✓ 13 inches/acre
  - ✓ Planned consistent into future
  - ✓ Data may cause some adjustment by Zone
- Additional Pumping Allowance (APA)
  - ✓ 11 inches/acre
  - ✓ Decreases to zero in 10 years (~1 inch/year)
  - ✓ Unless GSP groundwater levels are achieved

Merced Subbasin
Groundwater Sustainability Agency

Initial Allocation Values

(reflect consumptive use of applied groundwater – not pumping)

- Other sources of water that is not groundwater pumping (i.e. surface water, seepage agreements, etc.) **do not** contribute to the 5-year rolling allocation bucket.
  - The allocation bucket is only for groundwater pumping.
  - Alternate sources of water will be credited as **separate** water sources that may be used *besides* groundwater, saving allocation in the 5-year bucket.

Merced Subbasin
Groundwater Sustainability Agency

Initial Allocation Values - Example

(reflect consumptive use of applied groundwater – not pumping)

- Example parcel is 10 acres. In 2026, the parcel has a 5-year rolling bucket of 110 inches/acre (or 1,100 inches of allocation).

	2026 (Year 1)	2027 (Year 2)	2028 (Year 3)	2029 (Year 4)	2030 (Year 5)
SY (in/ac)	13	13	13	13	13
APA (in/ac)	11	10	09	08	07
Total Bucket (in/ac) for **2026**	= 110				

Merced Subbasin
Groundwater Sustainability Agency

Initial Allocation Values - Example

(reflect consumptive use of applied groundwater – not pumping)

- Example parcel is 10 acres. In 2026, the parcel has a 5-year rolling bucket of 110 inches/acre (or 1,100 inches of allocation).

- End of 2026: the parcel had 30 in/ac of consumptive use of applied groundwater (300 in of total consumptive use).
  - 80 in/ac (800 total inches of allocation) of the 5-year rolling bucket was not used in 2026.

- **Going into 2027**, the parcel will roll over the remaining 80 in/ac.

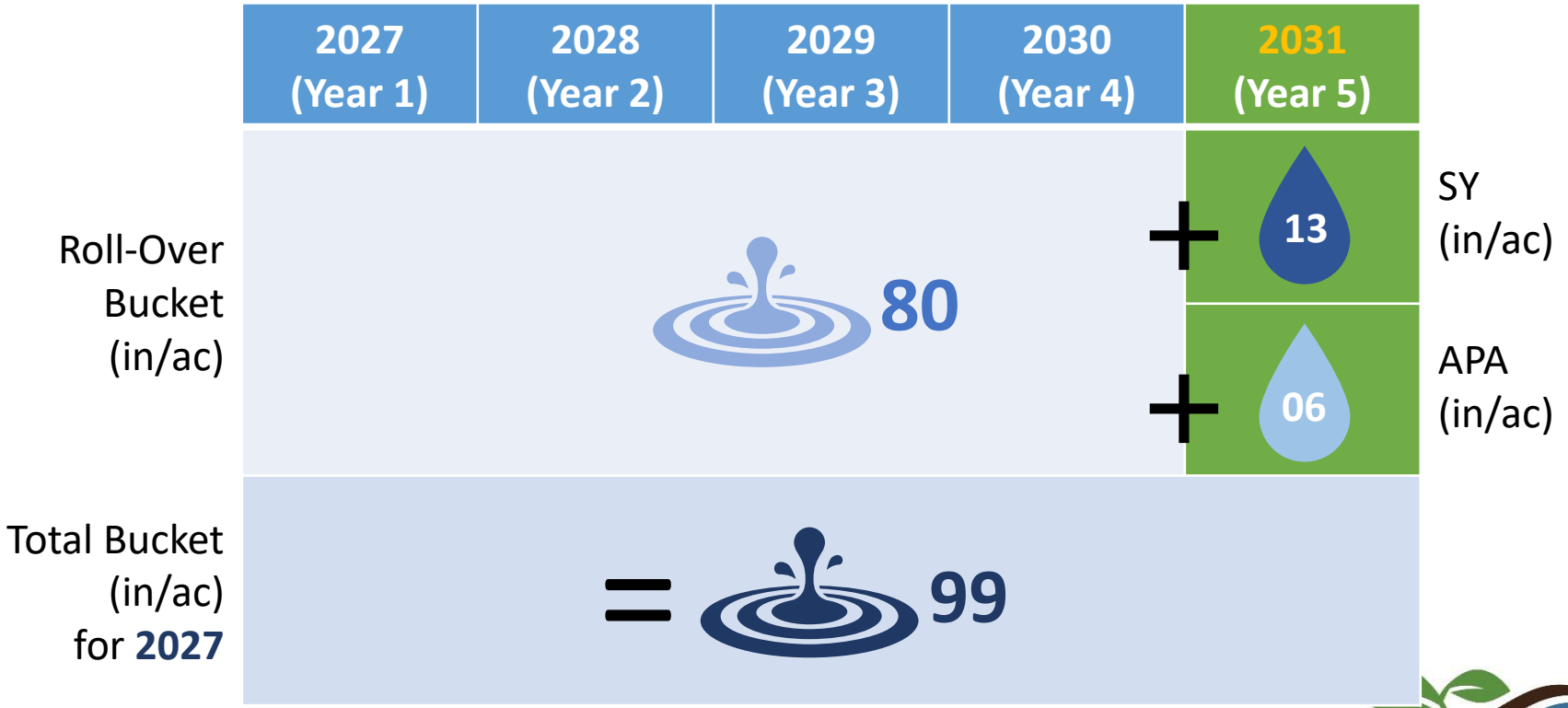
Rolling Bucket (in/ac) =  80

Merced Subbasin
Groundwater Sustainability Agency

Initial Allocation Values - Example

(reflect consumptive use of applied groundwater – not pumping)

- Now, in **2027**, the parcel has a 5-year rolling bucket with a new total of 99 inches/acre (or 990 inches of allocation).



Merced Subbasin
Groundwater Sustainability Agency

Groundwater Accounting

Merced Subbasin
Groundwater Sustainability Agency

Groundwater Allocation Accounting

- Irrigated parcels should be signed up on the Groundwater Accounting Platform for the MSGSA.
  - Letters sent June 7, 2024 with PINs for property owners to claim their parcels.
  - Platform utilizes OpenET to collect Evapotransporation (ET) reports, which will be used to calculate consumptive use of applied groundwater.
  - Alternate water supplies can be added to users' accounts upon submittal of supporting documents (i.e. receipts, etc.).

Merced Subbasin
Groundwater Sustainability Agency

What's next…

- Allocation Rule Adoption in September 2024
- Second Round of Groundwater Accounting Platform Invitations late 2024/early 2025
- Implementation of Allocation Rule:
  - Testing during CY 2025
  - Fully functional in CY 2026

Merced Subbasin
Groundwater Sustainability Agency

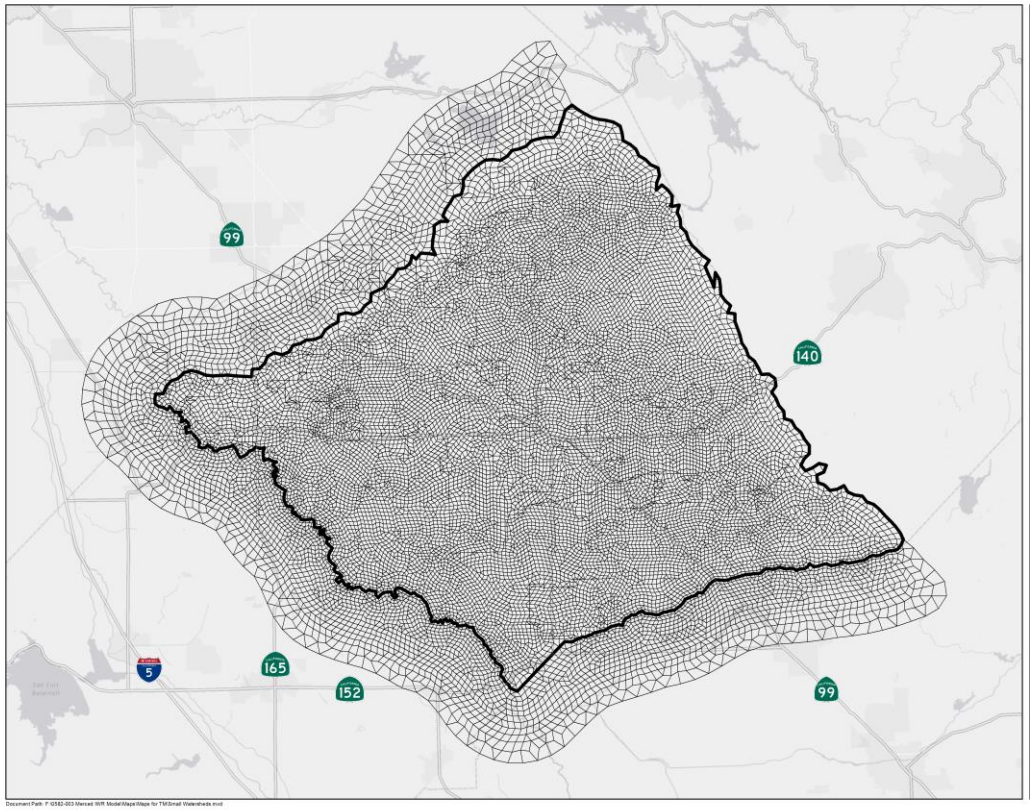
Questions, Comments, & Discussion

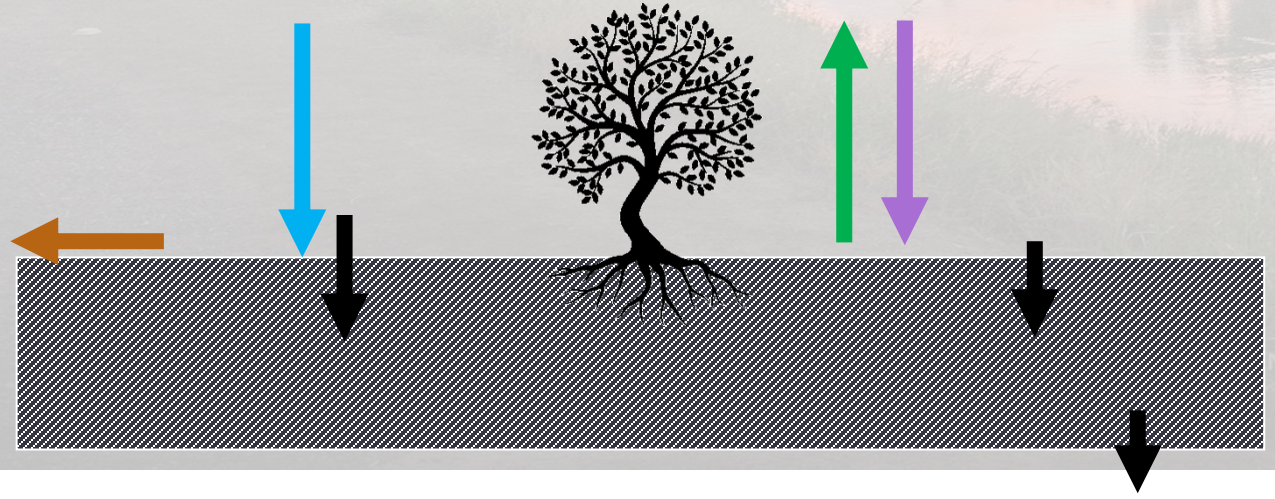
Topic 3: Use of Merced Water Resources Model to quantify the benefits of collective actions

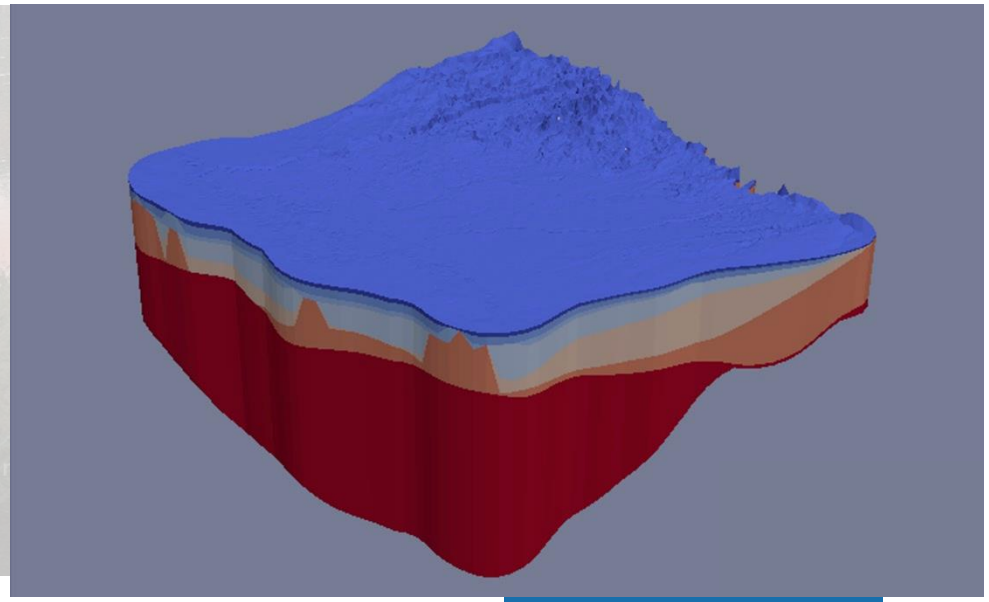
Image courtesy: Veronica Adrover/UC Merced

Merced Water Resources Model (MercedWRM)

- Developed through local & DWR funding
- Over 19,000 “elements” in the model grid
- Models 5 freshwater aquifer layers in three dimensions
- Tracks inputs to the land surface system and root zone
- Calibrated to historical data

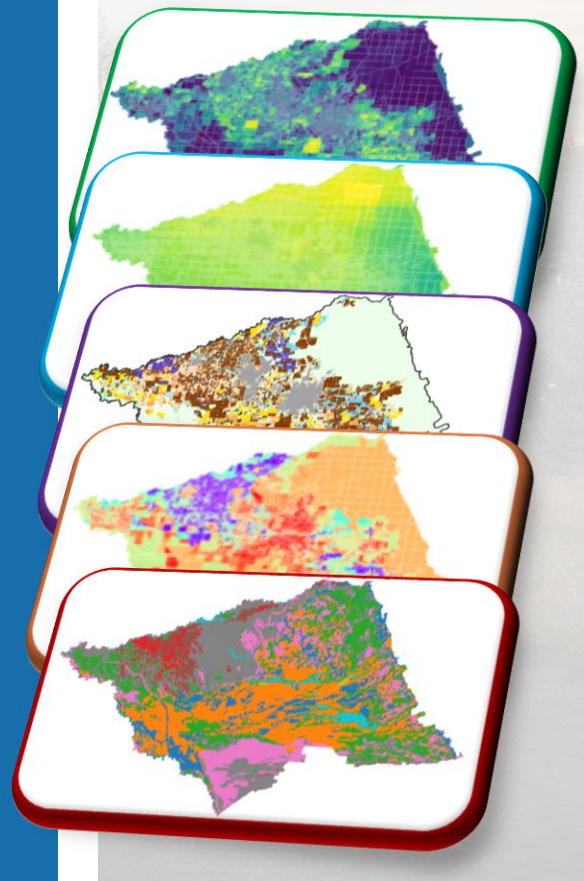






Key Inputs

Key Outputs



Evapotranspiration

Precipitation

Land Use

Runoff

Soil Parameters

Pumping

Surface Water Deliveries

MercedWRM

Water budget

Change in storage

Groundwater elevations

Streamflow

Image courtesy Veronica Adrover/UC Merced

Management Actions – Pumping Allocation Programs

Step 1
Model projects as described earlier

Step 2
Calculate consumptive use of groundwater* within each GSA area

** "Consumptive use of groundwater" means removing the impact of any surface water deliveries*

MIUGSA
0.88 AF/ac

MSGSA
1.95 AF/ac

TIWD GSA-#1
0.97 AF/ac

- Allocation program of 1.1 AF/ac per year means no adjustments needed in model
- **Projected consumptive use is higher than allocation program design, will need to model demand reductions (more on next slides)**
- Based on projected use, model assumes no changes to pumping

MERCED SGMA

Management Actions – MSGSA Allocation Program

Problem: Model doesn't have a "groundwater allocation" button – have to use the tools available.

- Land Reduction is the tool used to model water allocation
- Estimated consumptive use of groundwater (CU) for each sustainability zone
- Long term avg. CU of each zone was compared against the allocation
- Land reduction by ##% until CU matches the allocation

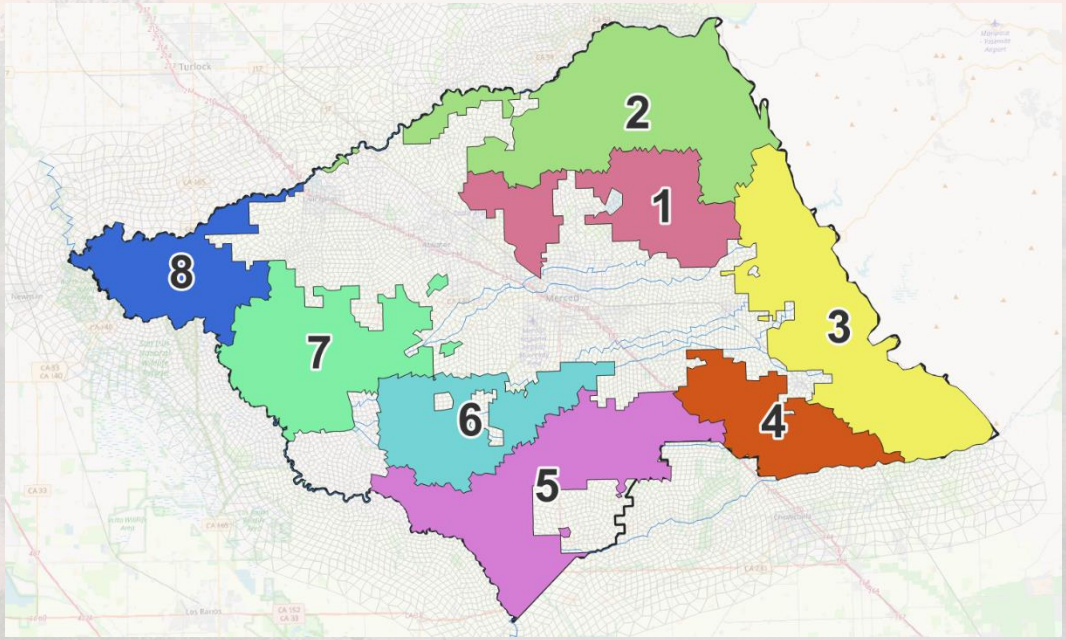


Image courtesy: Veronica Adrover/UC Merced

Management Actions – MSGSA Allocation Program

Example

- Avg CU: 28.42 in
- WY 2024
  - Allocation: 24 in
  - Land Reduction = 1 – 24/28.42 = 16%
- WY 2025
  - Allocation: 23 in
  - Land Reduction = 1 – 23/28.42 = 19%
- WY 2035
  - Allocation: 13 in
  - Land Reduction = 1 – 13/28.42 = 54%

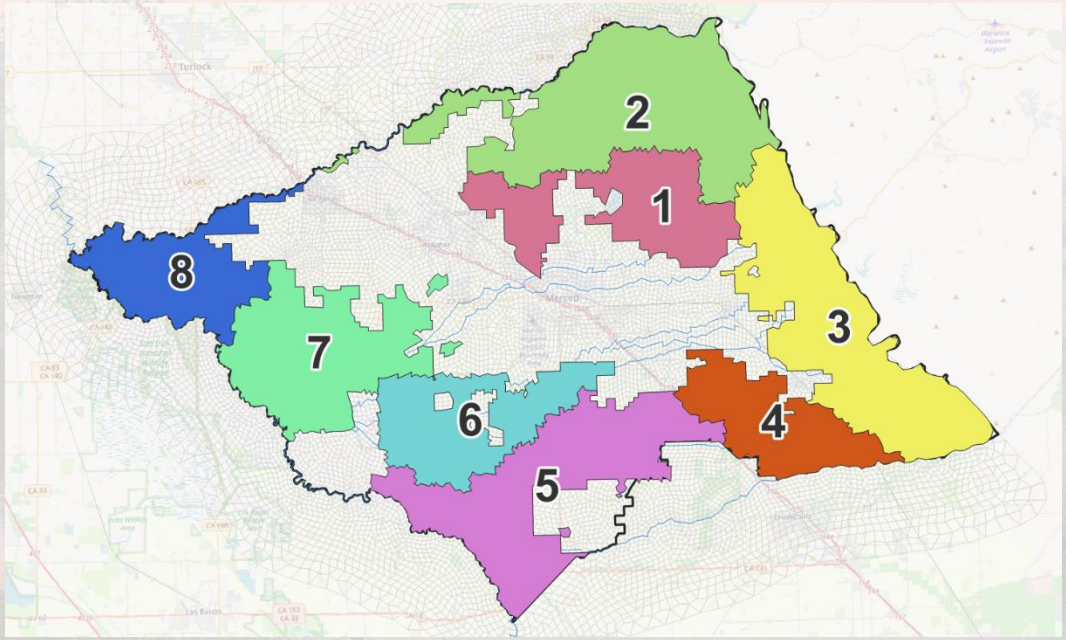
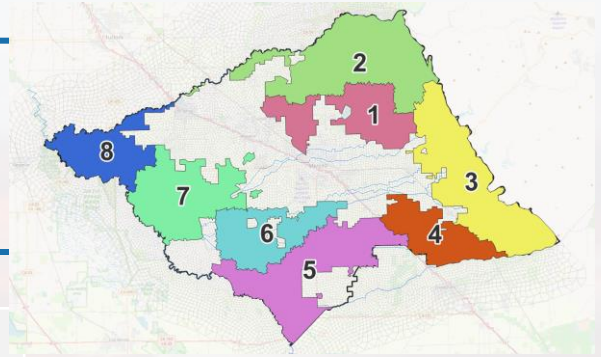


Image courtesy: Veronica Addyor/UC Merced

$$Land\ Reduction_{WY} = 1 - \frac{Allocation_{WY}}{Avg\ CU}$$

Management Actions – MSGSA Allocation Program



	Sustainability Zones – Land Reduction								
WY	Allocation (inches)	1	2	3	4	5	6	7	8
Base CU (inches)		28.2	29.4	24.3	28.4	24.6	20.1	20.8	16.4
2024	24	15%	18%	1%	16%	2%	0%	0%	0%
2025	23	18%	22%	5%	19%	6%	0%	0%	0%
2026	22	22%	25%	9%	23%	10%	0%	0%	0%
2027	21	25%	29%	14%	26%	14%	0%	0%	0%
2028	20	29%	32%	18%	30%	19%	0%	4%	0%
2029	19	33%	35%	22%	33%	23%	5%	9%	0%
2030	18	36%	39%	26%	37%	27%	10%	14%	0%
2031	17	40%	42%	30%	40%	31%	15%	18%	0%
2032	16	43%	46%	34%	44%	35%	20%	23%	3%
2033	15	47%	49%	38%	47%	39%	25%	28%	9%
2034	14	50%	52%	42%	51%	43%	30%	33%	15%
2035 - 2073	13	54%	56%	46%	54%	47%	35%	38%	21%

MERCED SGMA

Cumulative Change in Storage over 50-year simulation

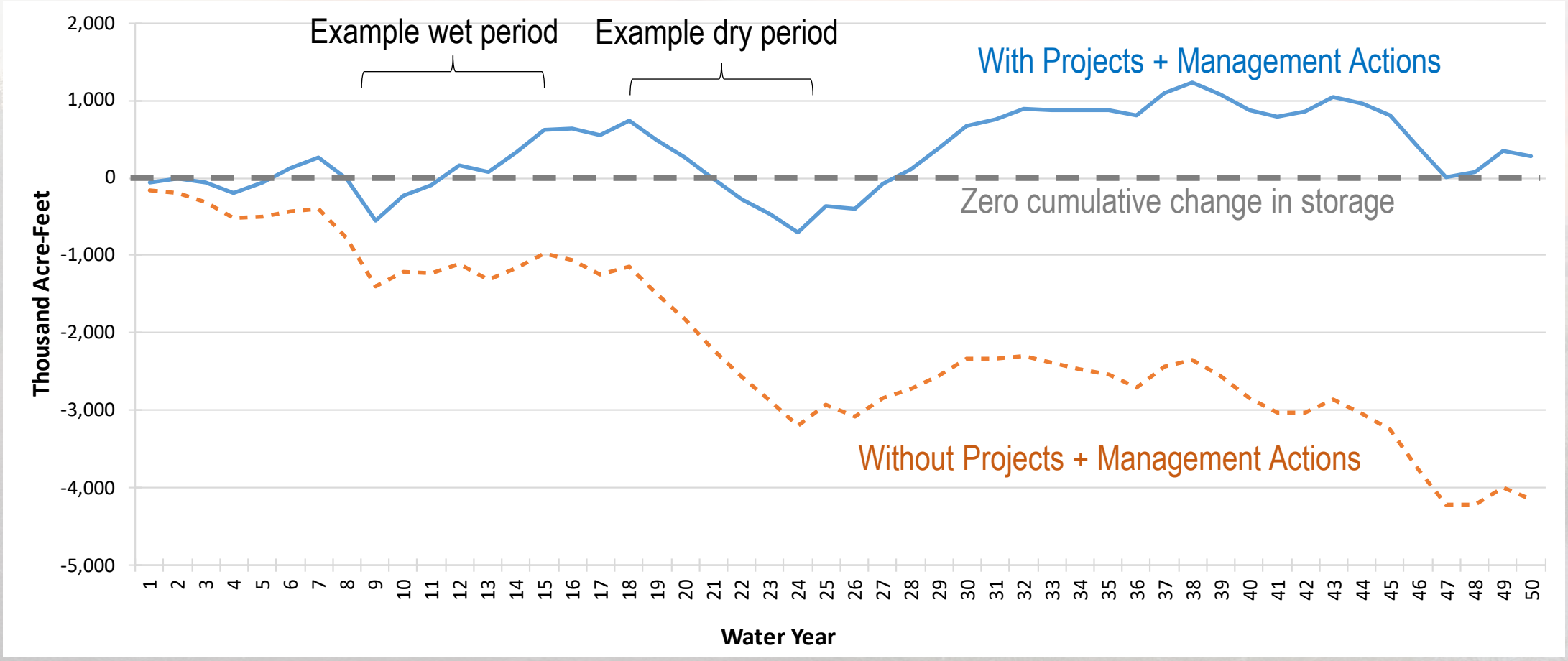


Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Impacts of Management from Neighboring Subbasins

- The model is sensitive to management of groundwater levels in neighboring basins
- Significant uncertainty on how the neighboring basins are going to be operated
- Assumed that neighboring basins manage groundwater levels similarly to Merced
- Highlights importance of ongoing coordination with neighbors

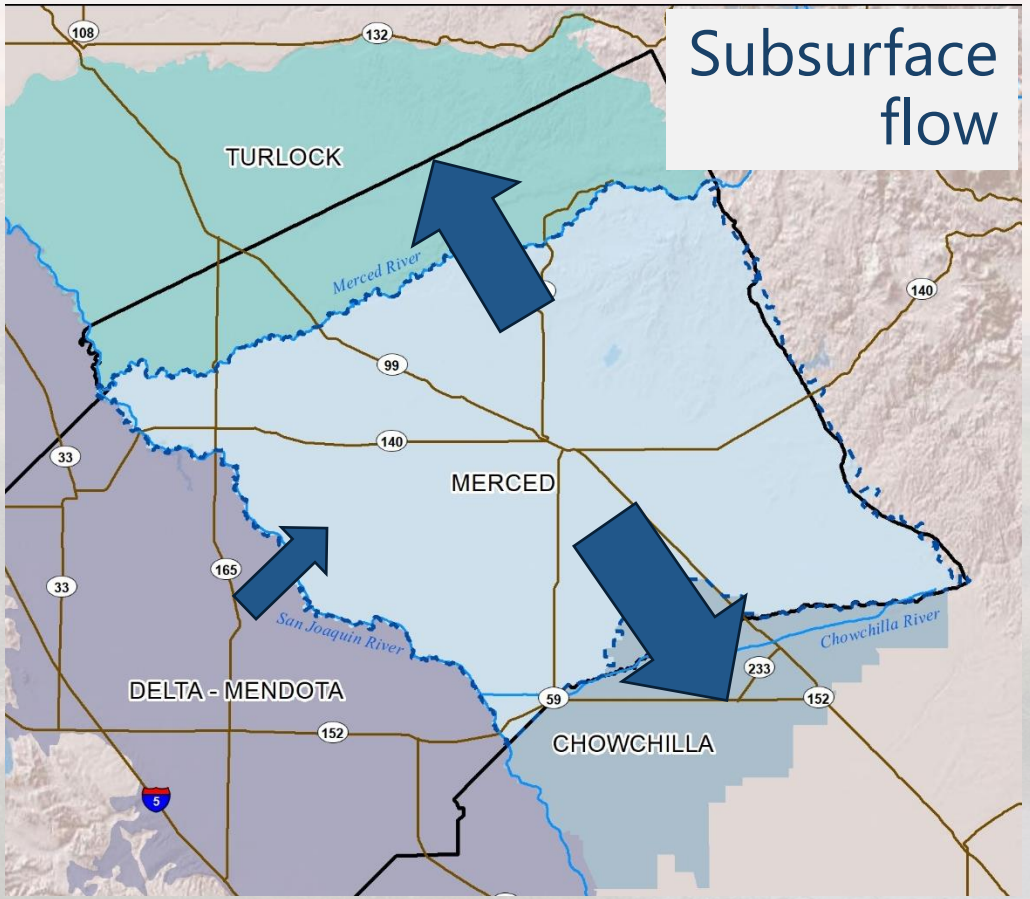


Image courtesy: Veronica Adrover/UC Merced

Questions, Comments, & Discussion

Next Steps

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

GSP Update Schedule

Bolded items indicate where you can get involved!

- October 3 – November 17 (approximate) – **Public review and comment period on draft GSP update**
- October 16 - **Coordination Committee and Stakeholder Advisory Committee Meeting to review draft GSP edits**
- December 2024 – Adoption of the GSP by GSAs
- January 2025 – Submit adopted GSP to Department of Water Resources

Image courtesy: Veronica Adrover/UC Merced

Merced GSP
Public Workshop

August 26, 2024

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

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA