
GSP Development Update

Merced Irrigation-Urban GSA
Merced Irrigation District
Turner Island Water District GSA
Joint Board of Directors Meeting
December 4, 2018

Image courtesy: Veronica Adrover/UC Merced

Agenda

1. GSP Development Overview
2. Water Budgets
3. Public Outreach Update
4. Next Steps
5. Questions



Image courtesy: Veronica Adrover/UC Merced



GSP Development Overview

Image courtesy: Veronica Adrover/UC Merced

Sustainable Groundwater Management Act Overview

- **Merced Groundwater Subbasin is in a state of critical overdraft**
- **SGMA requires a Groundwater Sustainability Plan** by Jan 1, 2020 for sustainable groundwater management of the basin within a 20-year timeframe

Image courtesy: Veronica Adrover/UC Merced

Sustainable Groundwater Management Act Overview

- **SGMA has two main focus areas:**
 - Halt the overdraft by “balancing the water budget” (basin inputs = basin outputs)
 - Establish thresholds for six sustainability indicators to prevent “undesirable results”



Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply



Significant and unreasonable degraded water quality



Significant and unreasonable reduction of groundwater storage



Significant and unreasonable land subsidence



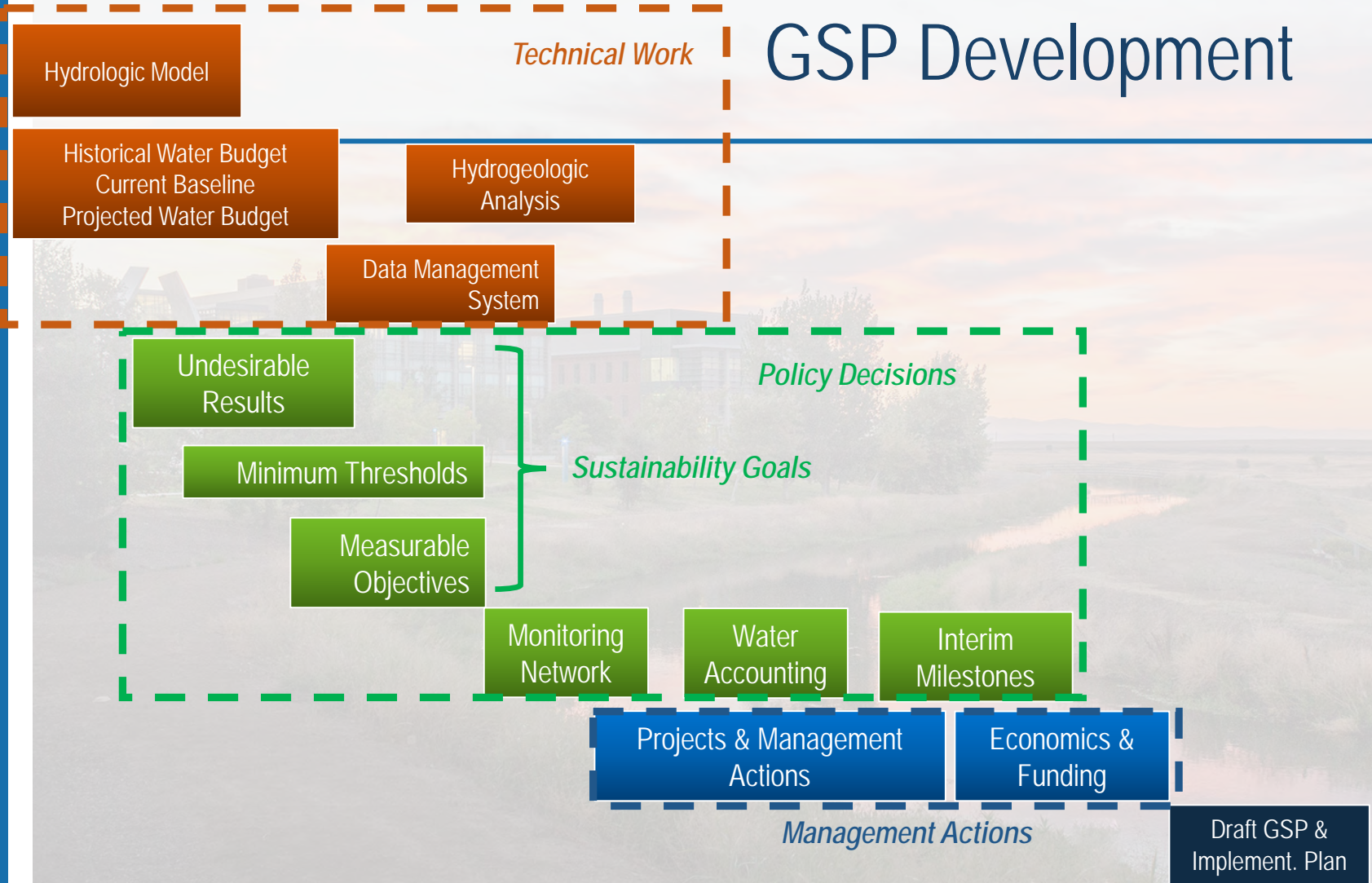
Significant and unreasonable seawater intrusion



Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

Image courtesy: Veronica Adrover/UC Merced

GSP Development



Jun 2018 Jul 2018 Aug 2018 Sep 2018 Oct 2018 Nov 2018 Dec 2018 Jan 2019 Feb 2019 Mar 2019 Apr 2019 May 2019 Jun 2019 Jul 2019

Image courtesy: Veronica Adrover/UC Merced

Characterizing the Challenge

- **SGMA requires determination of “sustainable yield:”** the amount of groundwater that may be extracted from the basin over time without causing undesirable results
- **Sustainable yield “water budget” provides guidance on pumping reductions needed to halt overdraft**
 - Initial estimates: total groundwater pumping from the Subbasin would need to be reduced by about 25% over the next twenty years to achieve sustainable yield by 2040*

**Initial estimates do not reflect changes to flow projections resulting from FERC relicensing, new projects to increase recharge, etc.*

Image courtesy: Veronica Adrover/UC Merced

Path to Sustainability for Merced Subbasin

The challenge: reduce groundwater pumping in the subbasin, while minimizing how much reduction has to be made in total water use

1. Determine how much groundwater can be pumped sustainably

2. Determine available surface water

3. Identify deficit between total demand and (sustainable groundwater pumping + surface water)

4. Identify projects and management actions to “balance the water budget” and meet demands

5. Confirm the approach will not generate “undesirable results”

Image courtesy: Veronica Adrover/UC Merced

Approach to Reaching Sustainability May Result in Changes in Groundwater Elevation by 2040



If changing groundwater conditions between 2020 and 2040 cause undesirable results, the approach to achieving sustainability will need to be changed.

Image courtesy: Veronica Adrover/UC Merced



Water Budgets

Image courtesy: Veronica Adrover/UC Merced

Water Budgets: Defining Timeframes

Historical Water Budget

Uses historical information for hydrology, precipitation, water year type, water supply and demand, and land use going back a minimum of 10 years.

Current Conditions Baseline

Holds constant the most recent or "current" data on population, land use, year type, water supply and demand, and hydrologic conditions.

Projected Water Budget

Uses the future planning horizon to estimate population growth, land use changes, climate change, etc.

Image courtesy: Veronica Adrover/UC Merced

Water Budgets: Merced Integrated Water Resources Model

Key Model Features

- Hydrologic Period: WY 1965-2015
- Detailed Stream Configurations
- Includes Ag Conveyance and Distribution System
- Land Use and Cropping Patterns
- Ag Demand Estimation Verified by Remote Sensing
- Detailed Surface Water Delivery System
- Ag Pumping Data for Ag Districts
- GW Pumping Estimates for private Pumping
- Municipal Well Data

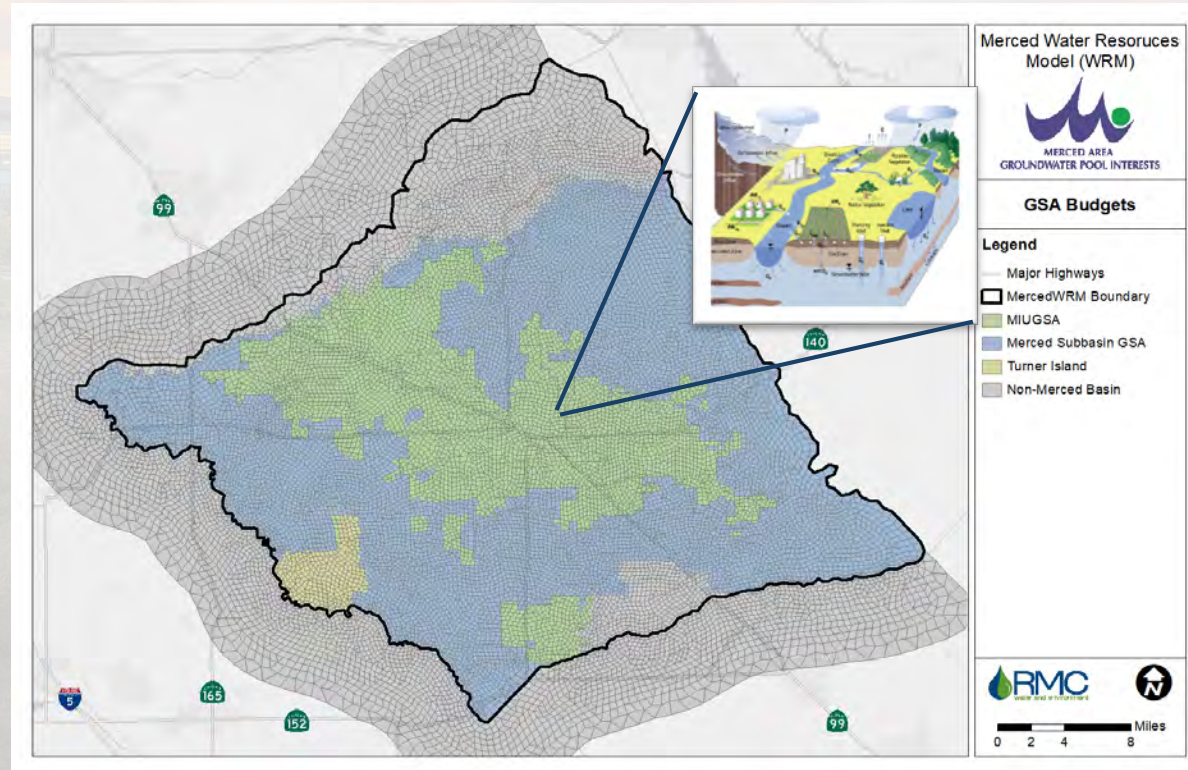


Image courtesy: Veronica Adrover/UC Merced

Land and Water Use Budget

[Historical Simulation]

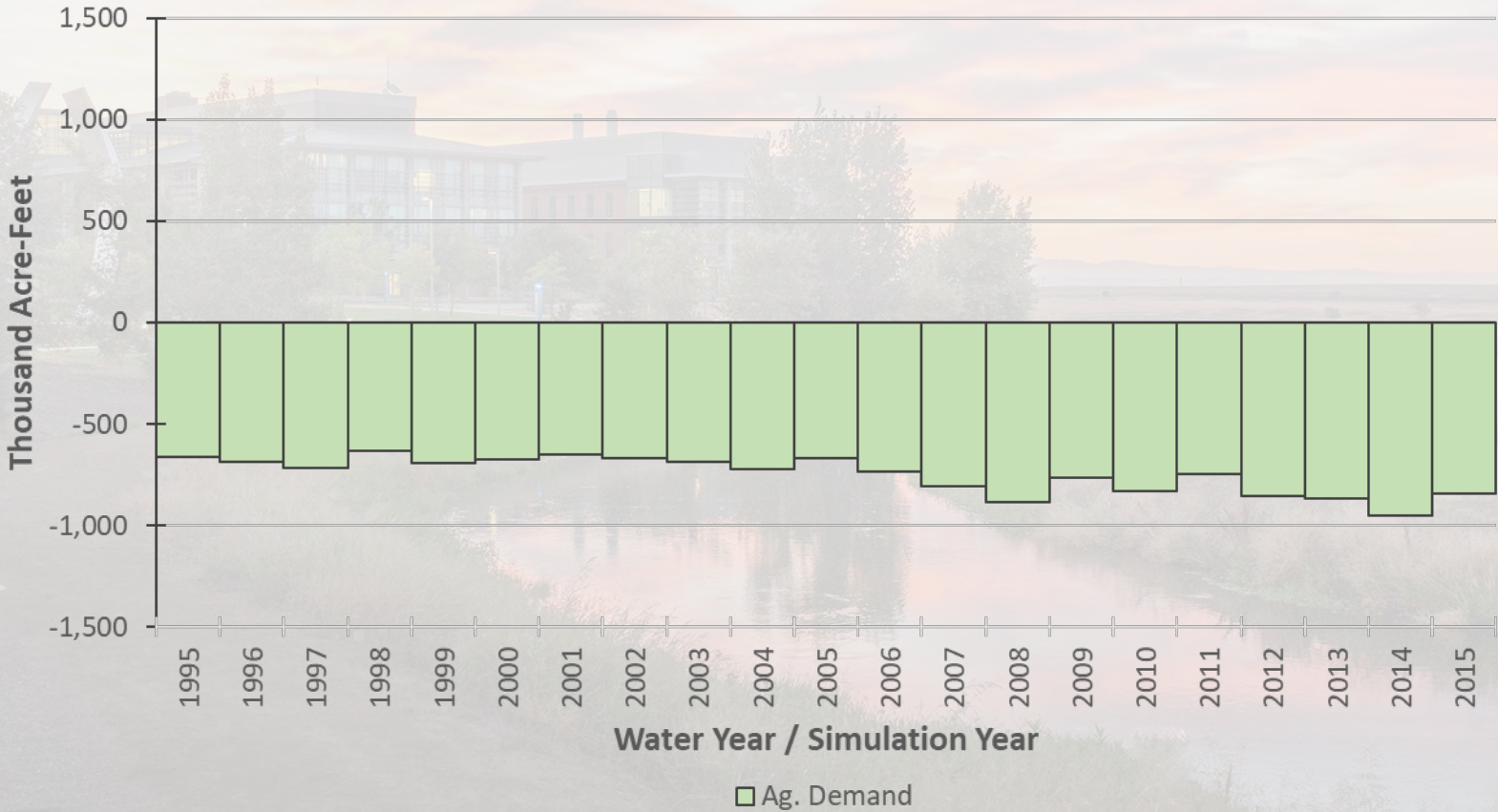


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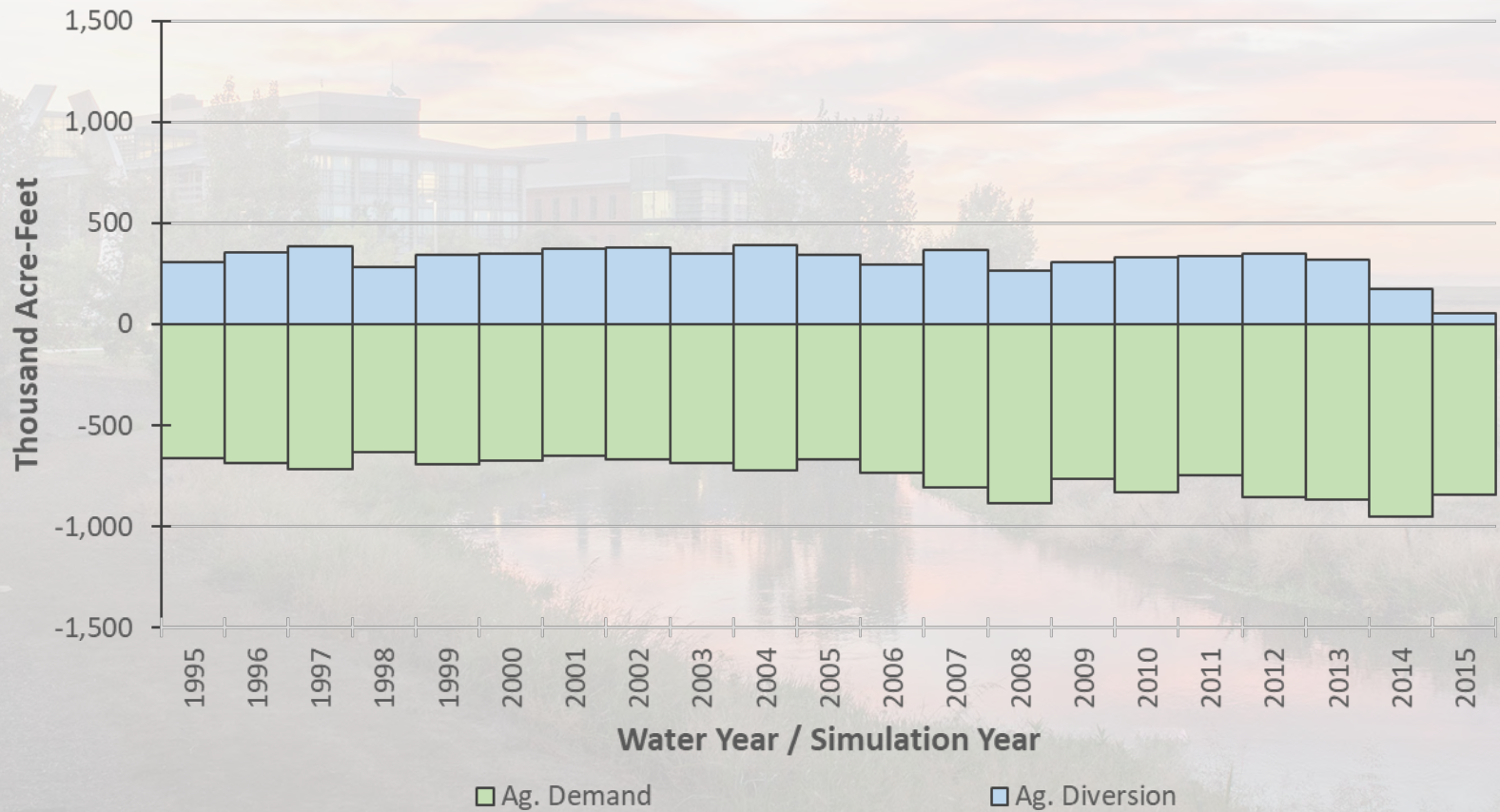


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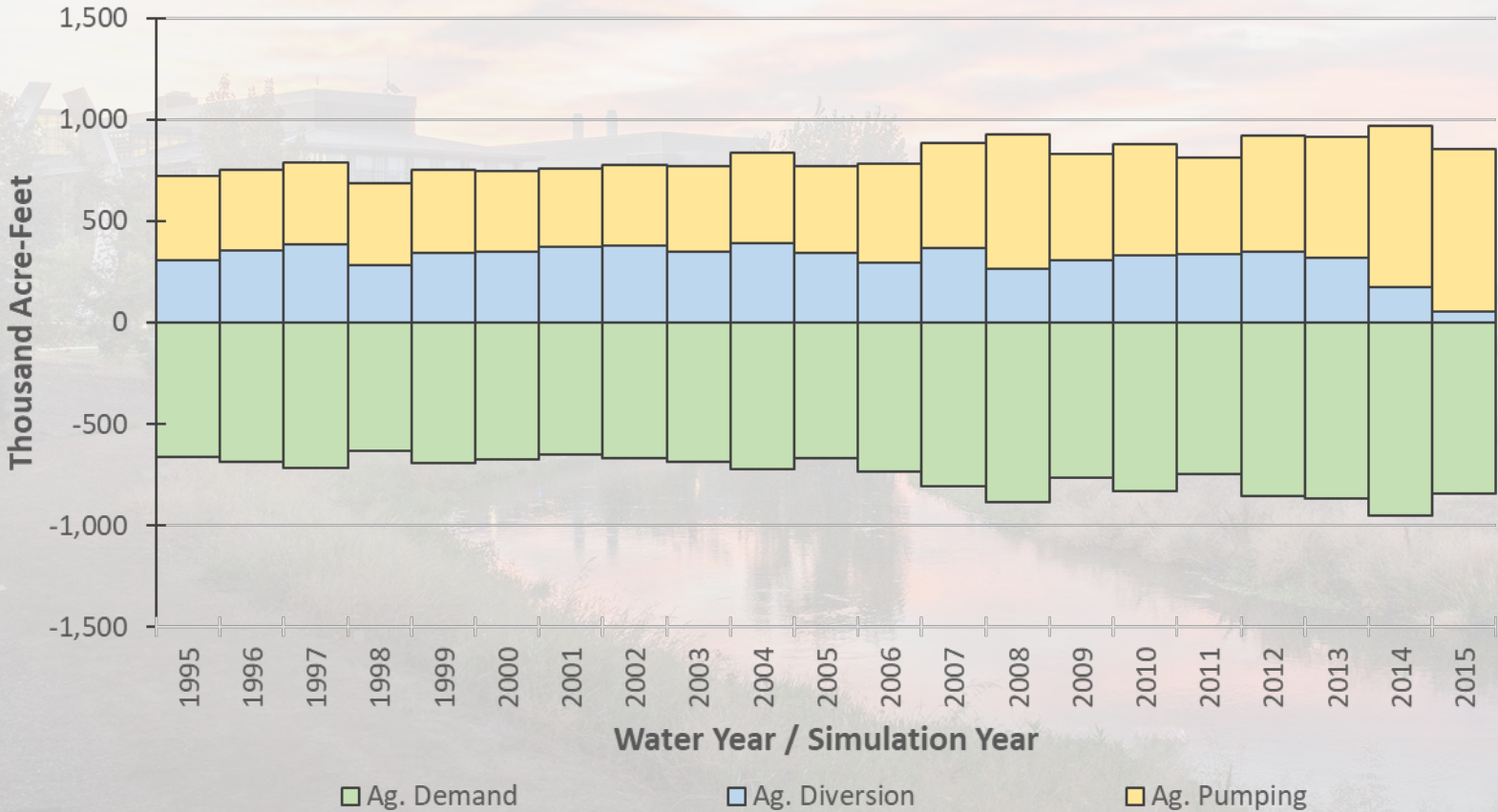


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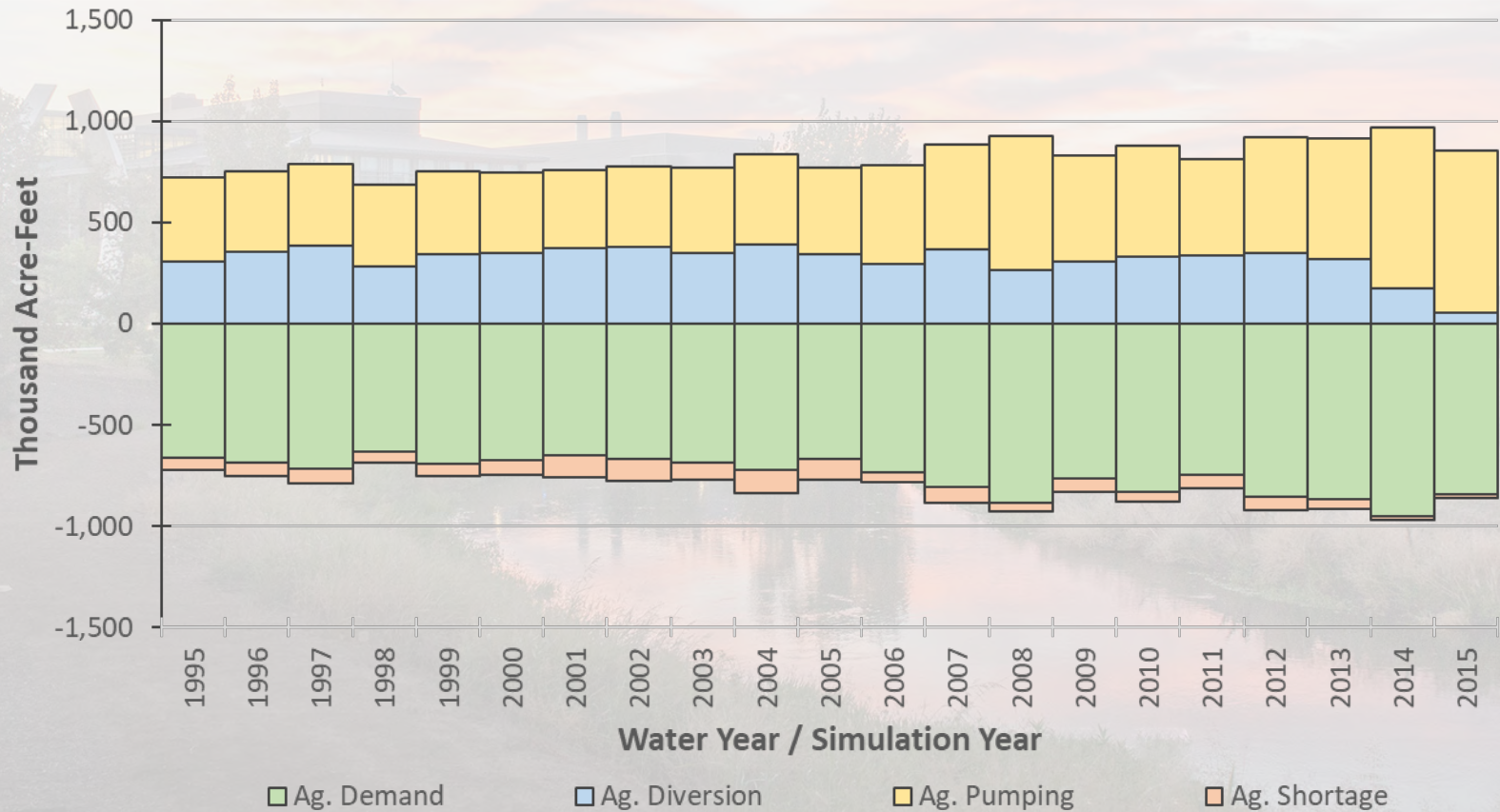


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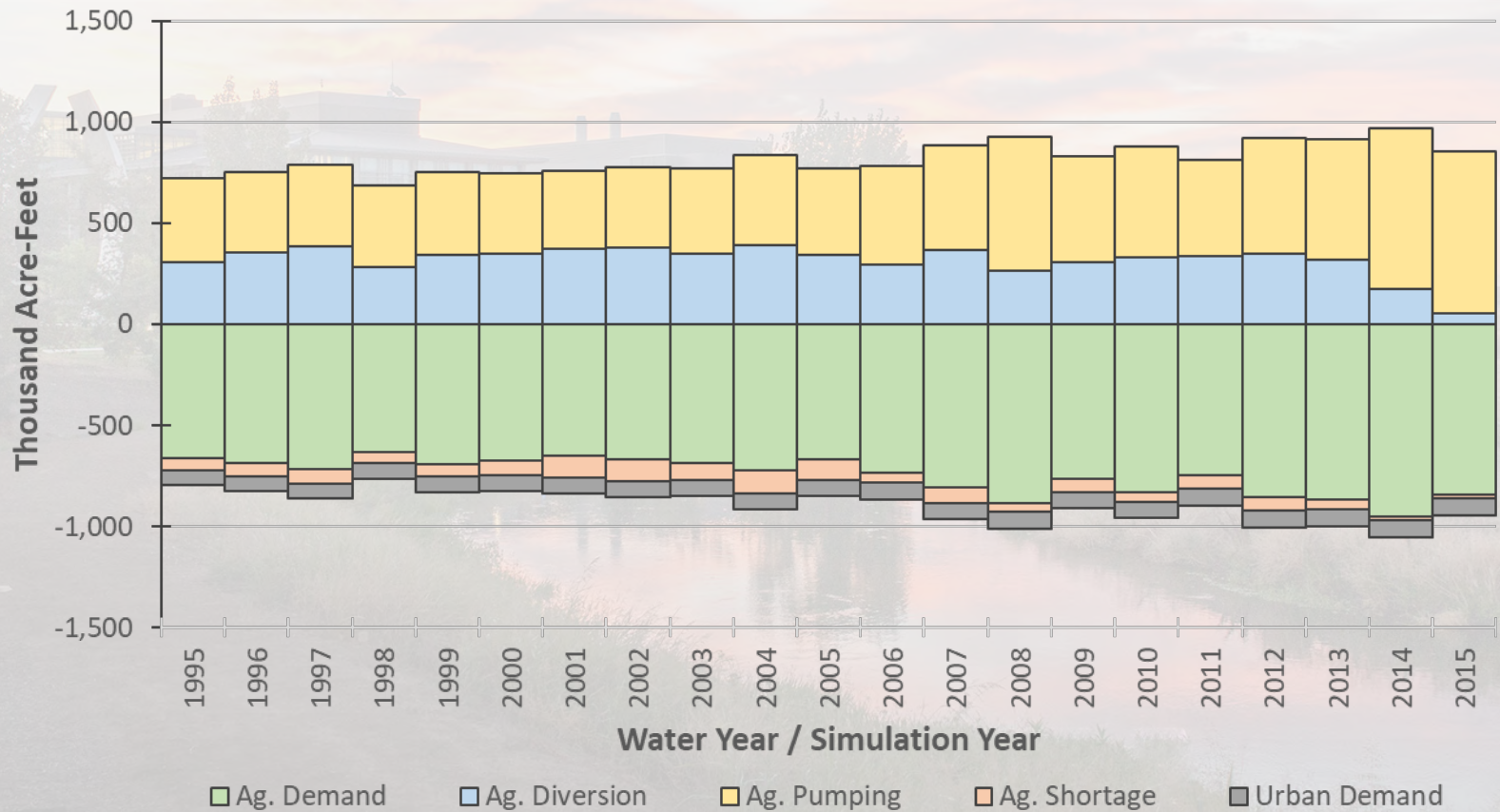


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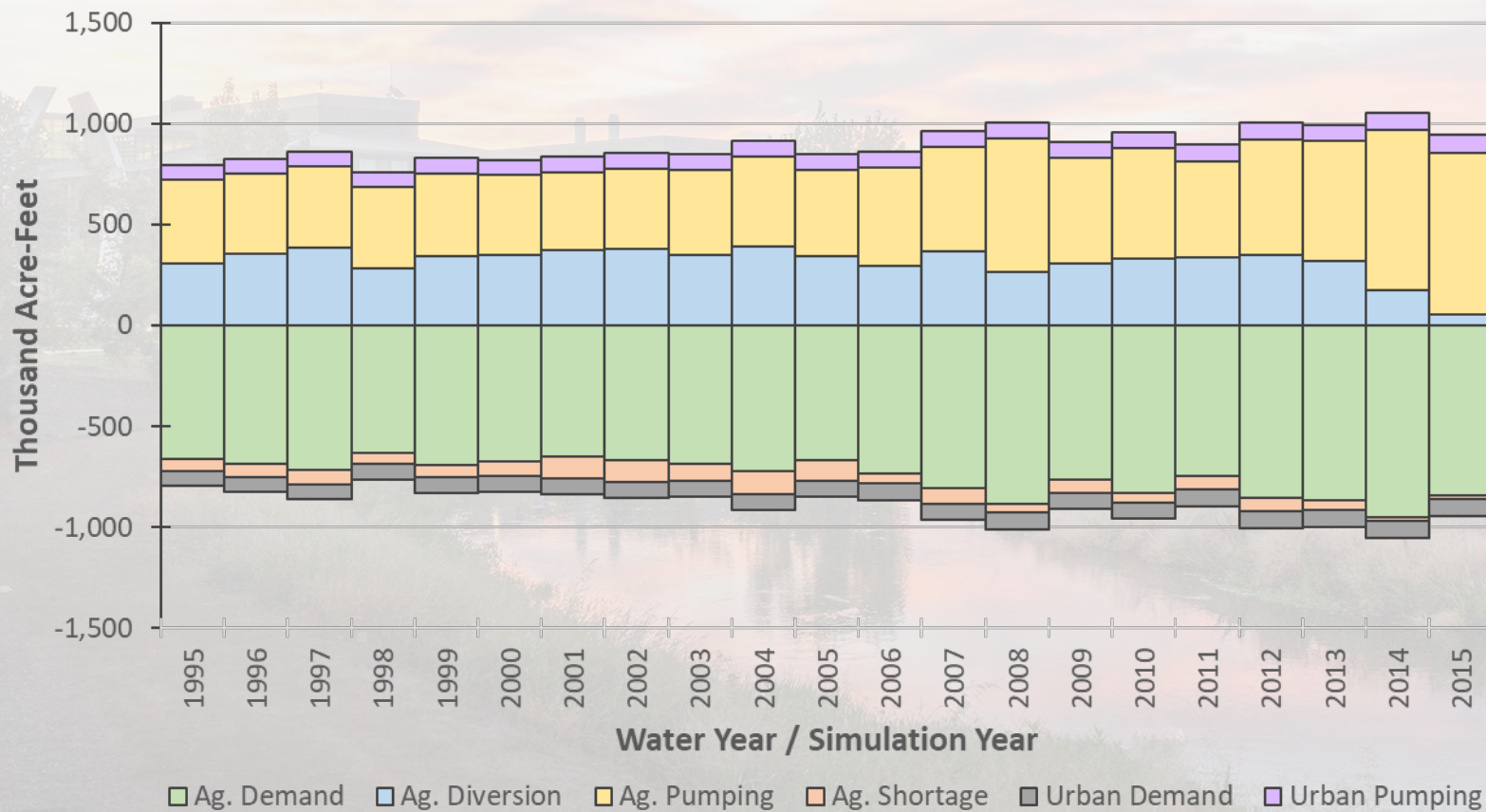


Image courtesy: Veronica Adrover/UC Merced

Groundwater Budget

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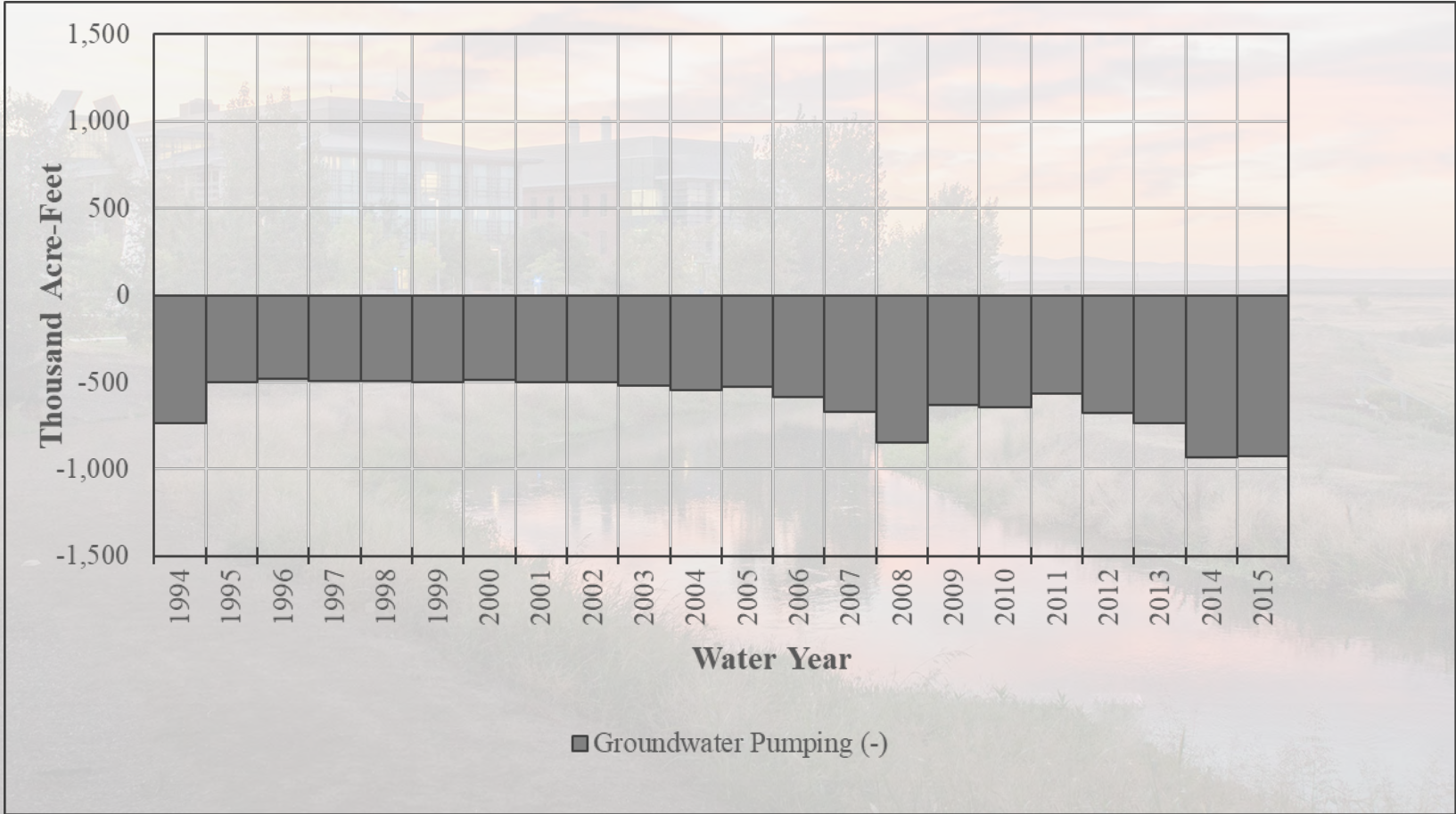


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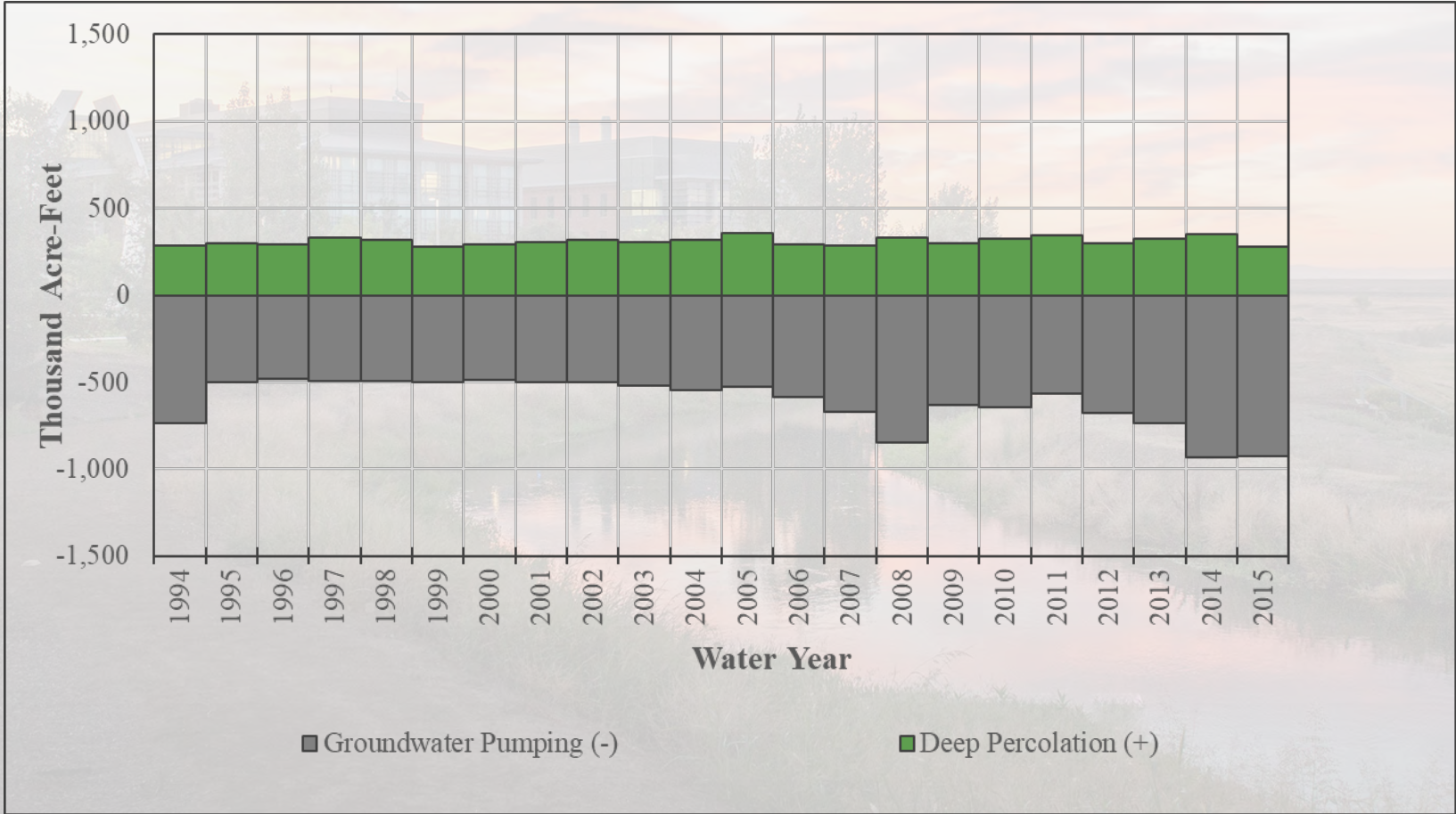


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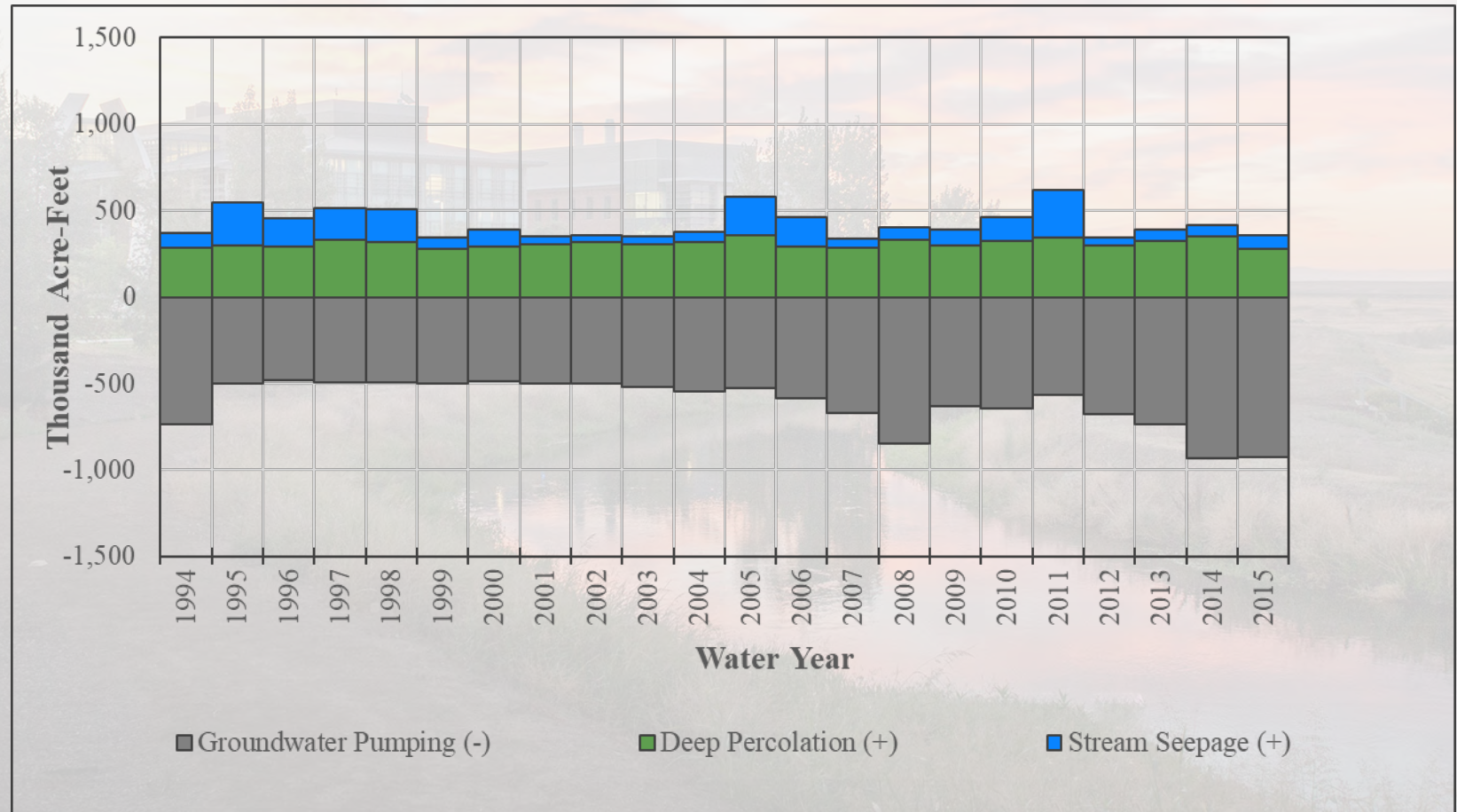


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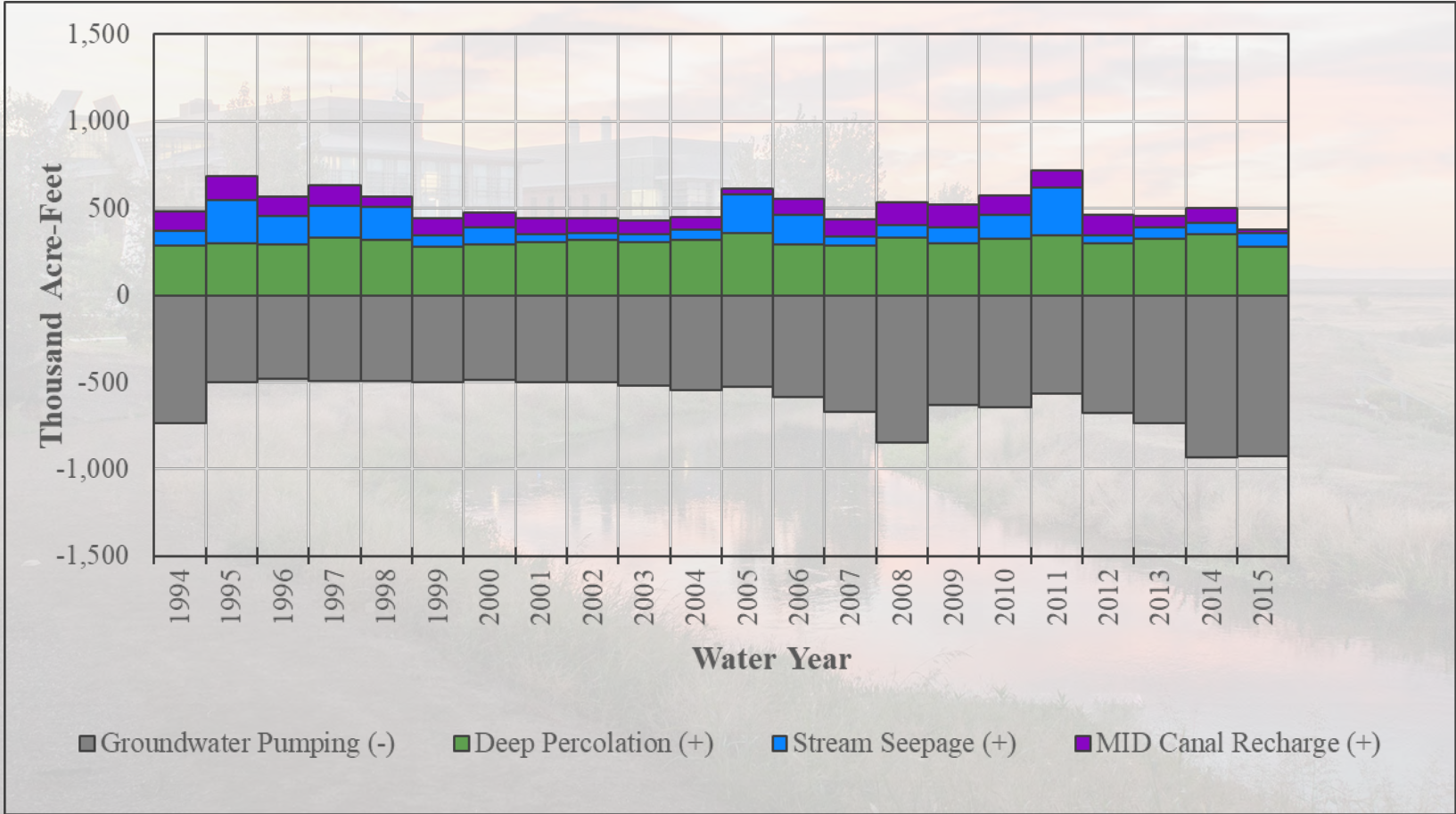


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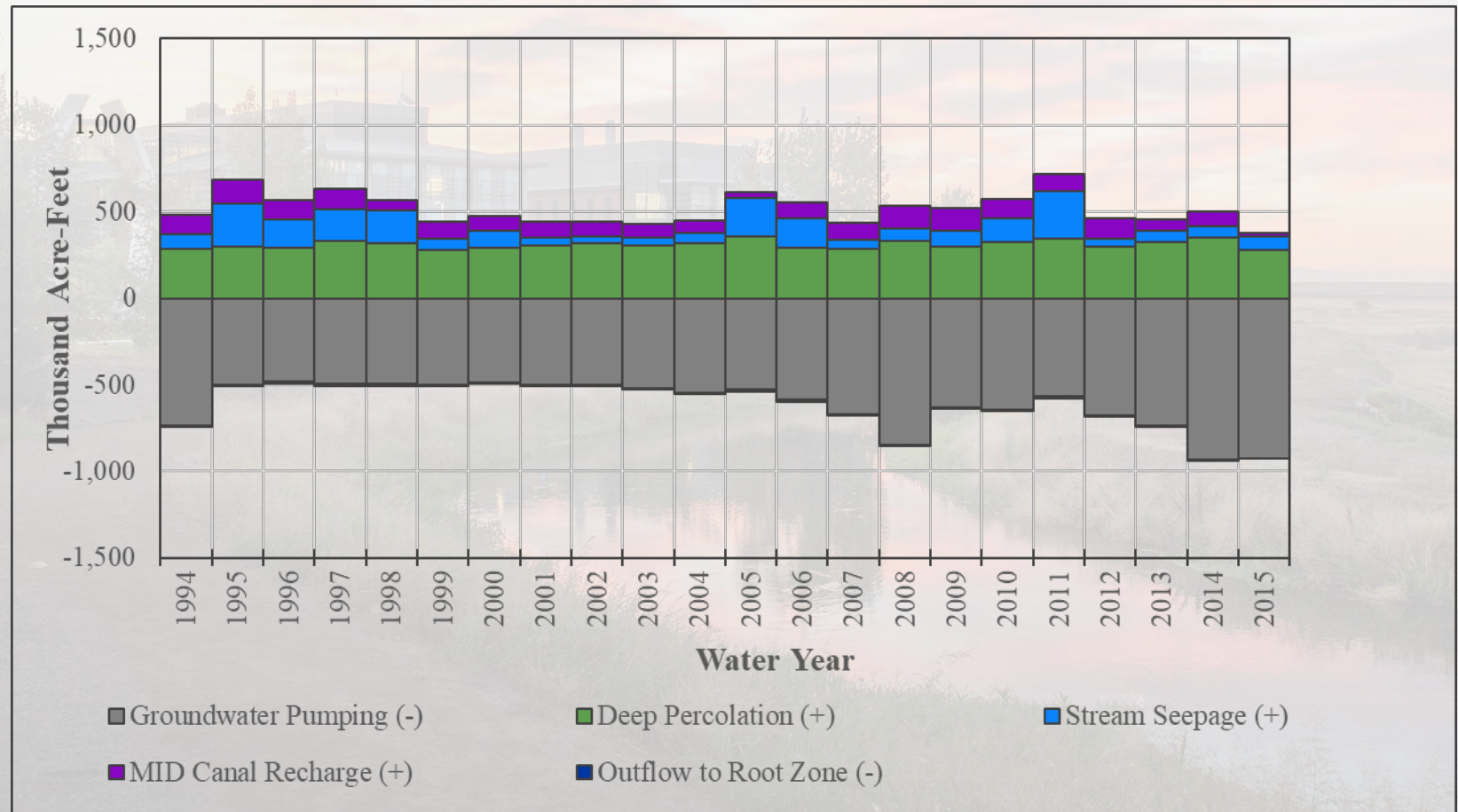


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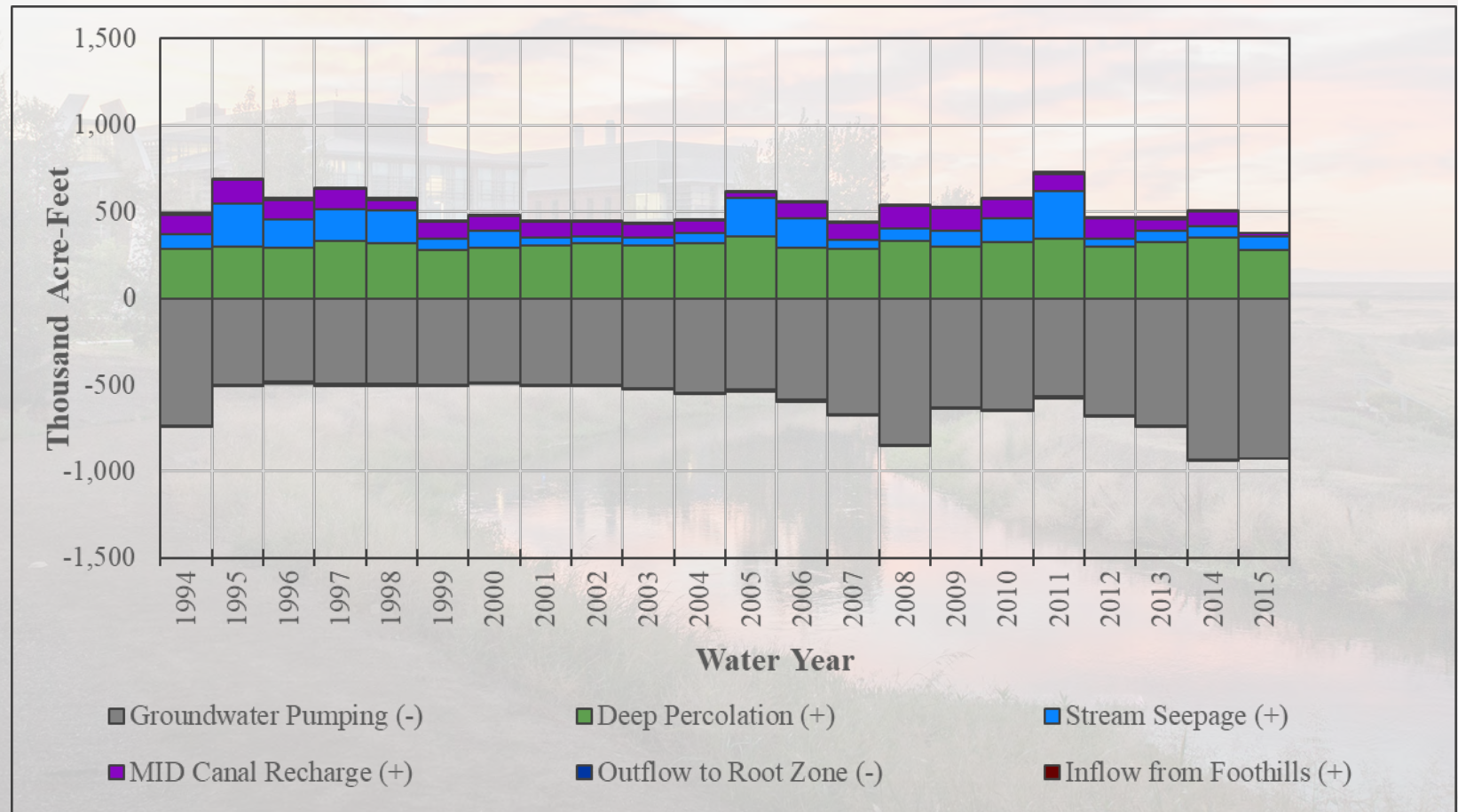


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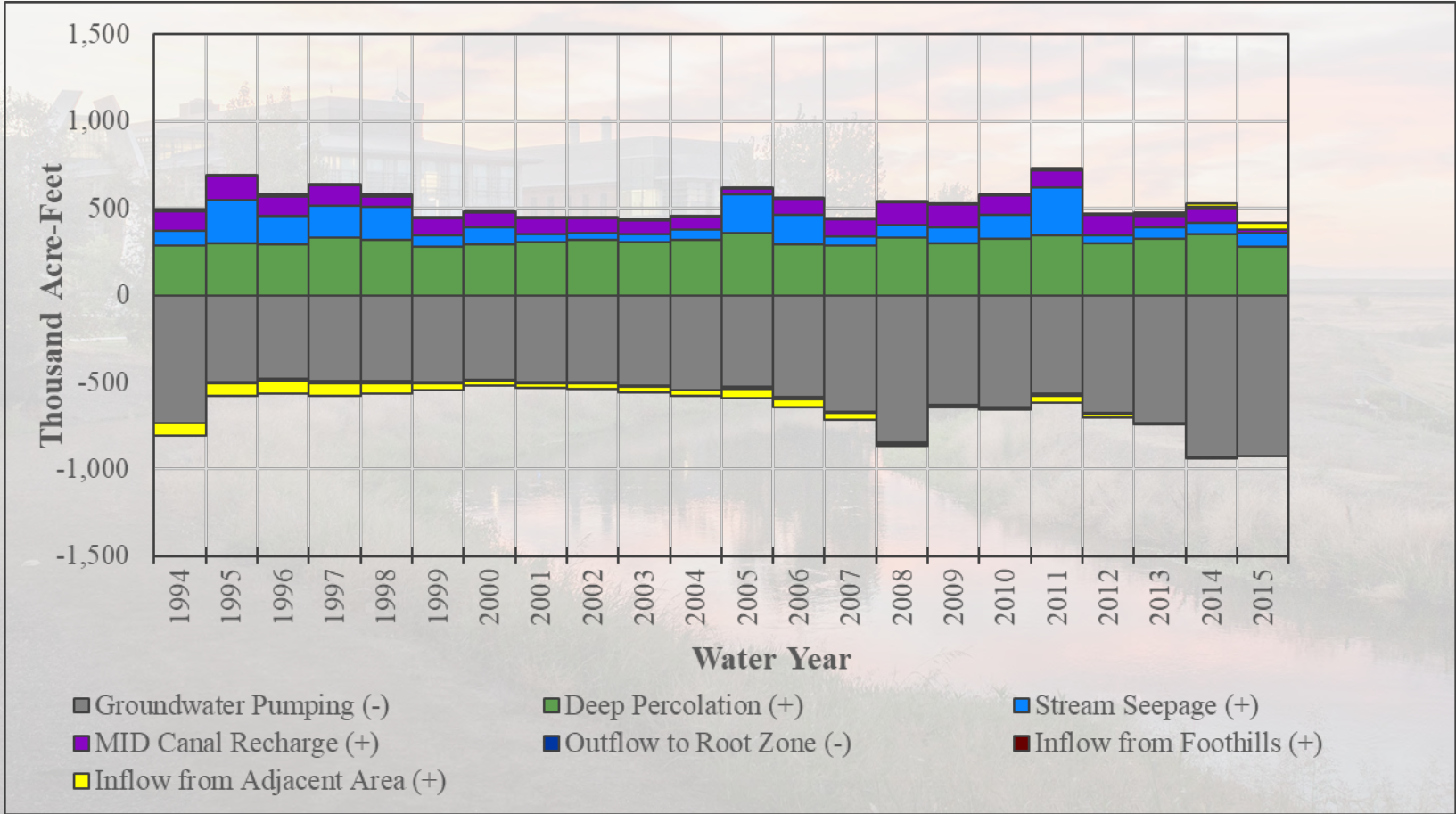


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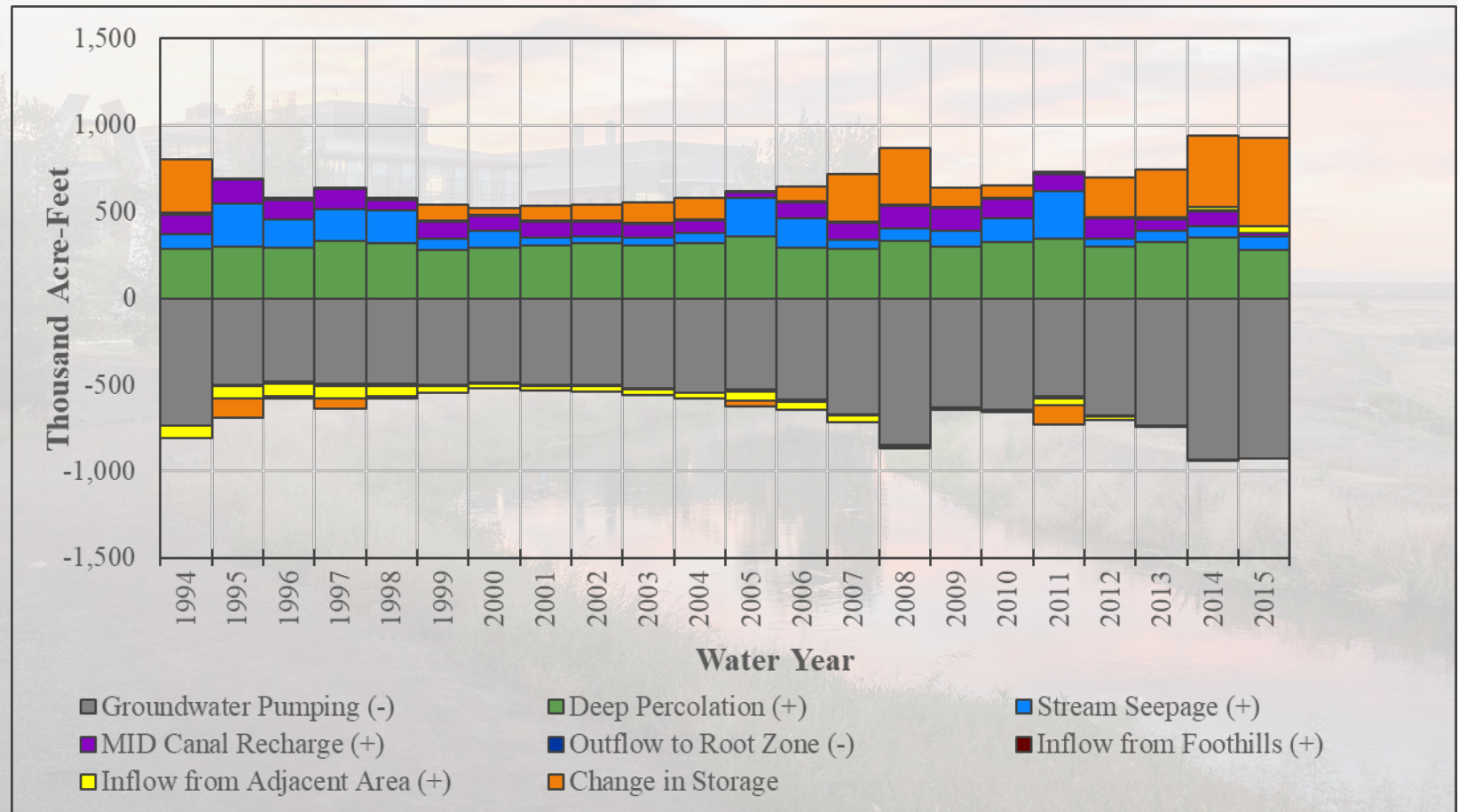


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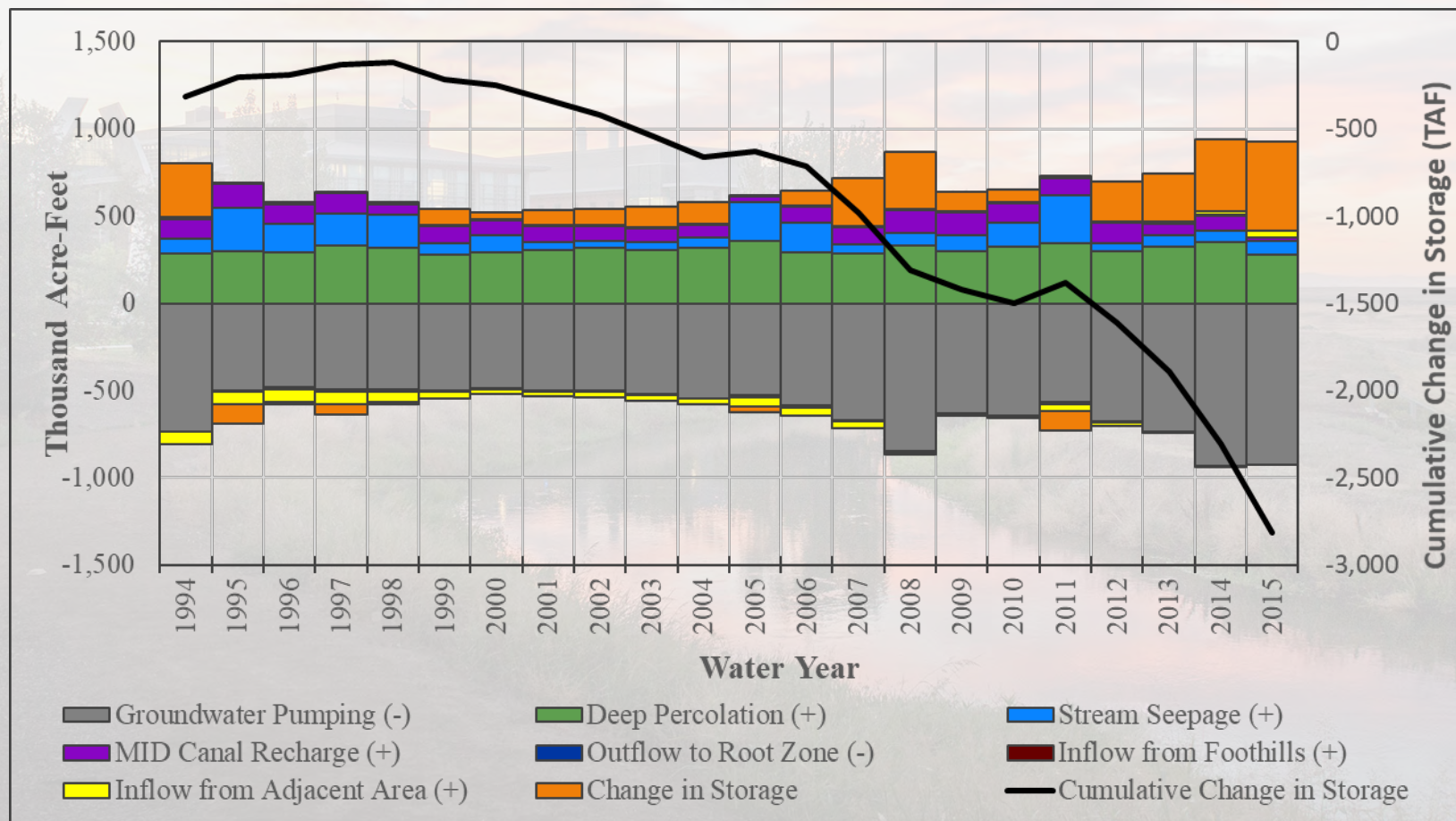


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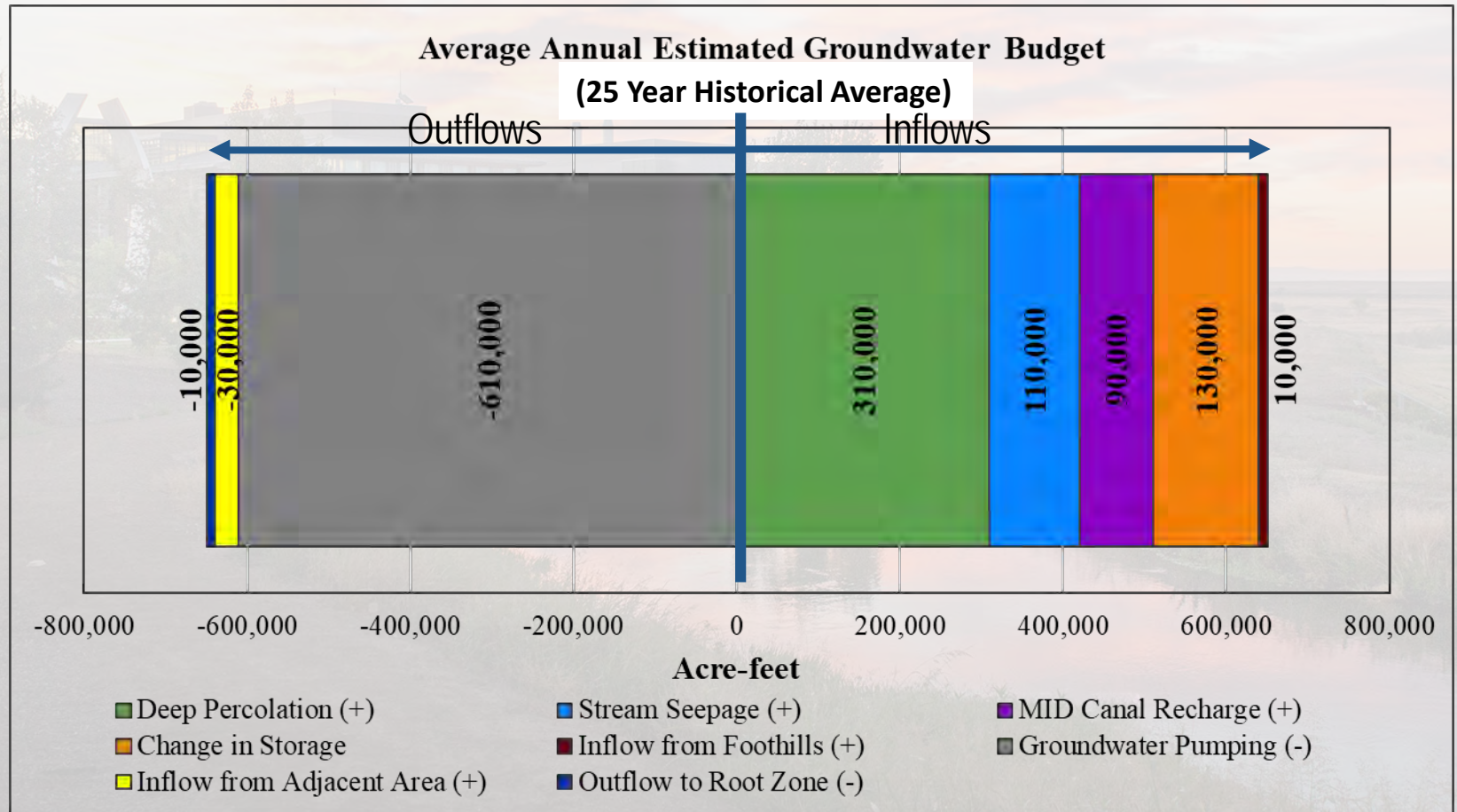


Image courtesy: Veronica Adrover/UC Merced

Projected Water Budget – Modeling Inputs

- Hydrologic Period: Water Years 1969-2018 (50-Year Hydrology)
- River Flows
 - Merced: MercedSIM
 - San Joaquin: CalSim
 - Local Tributaries: Historic Records
- Land Use and Cropping Patterns:
 - 2013 CropScape modified based on discussions with GSAs
- Urban Water Use:
 - General Plan Buildout Conditions
 - Basin Average GPCD: 300
- Surface Water Deliveries provided by local purveyors

Image courtesy: Veronica Adrover/UC Merced

Projected Water Budget Uses 50 Years of Historical Hydrology

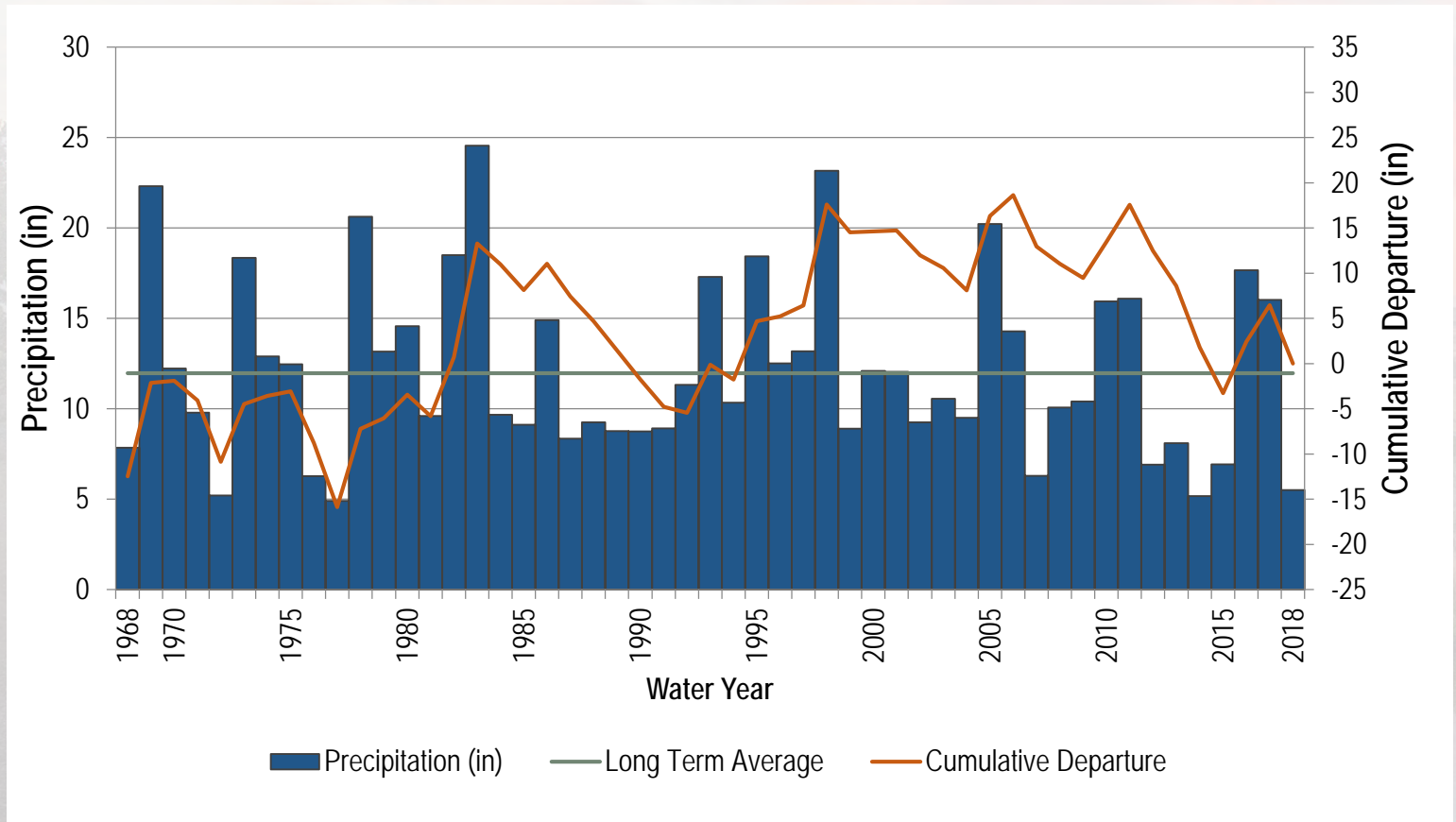


Image courtesy: Veronica Adrover/UC Merced

Land and Water Use Budget

[Projected Conditions Baseline]

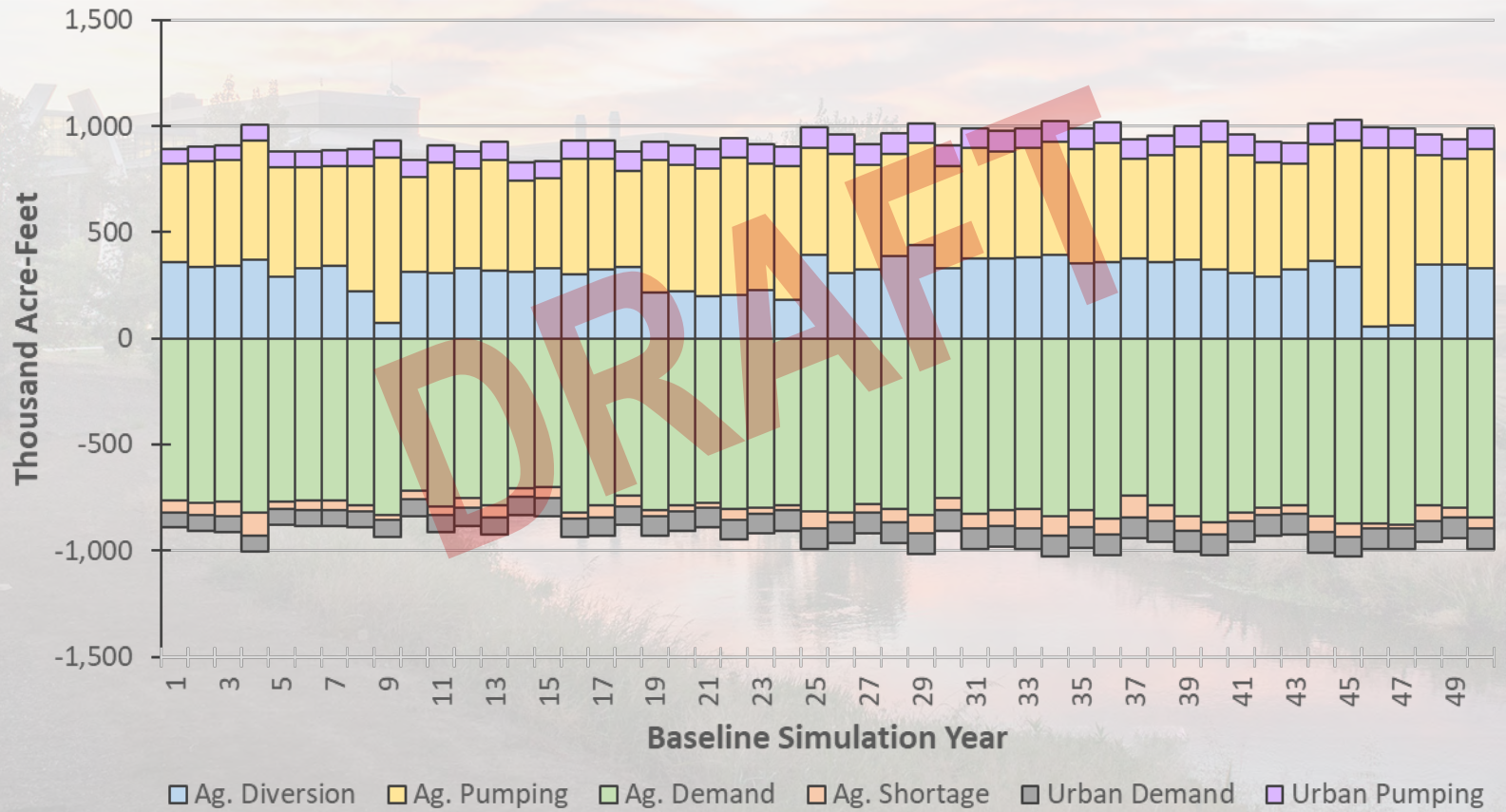


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Groundwater Budget

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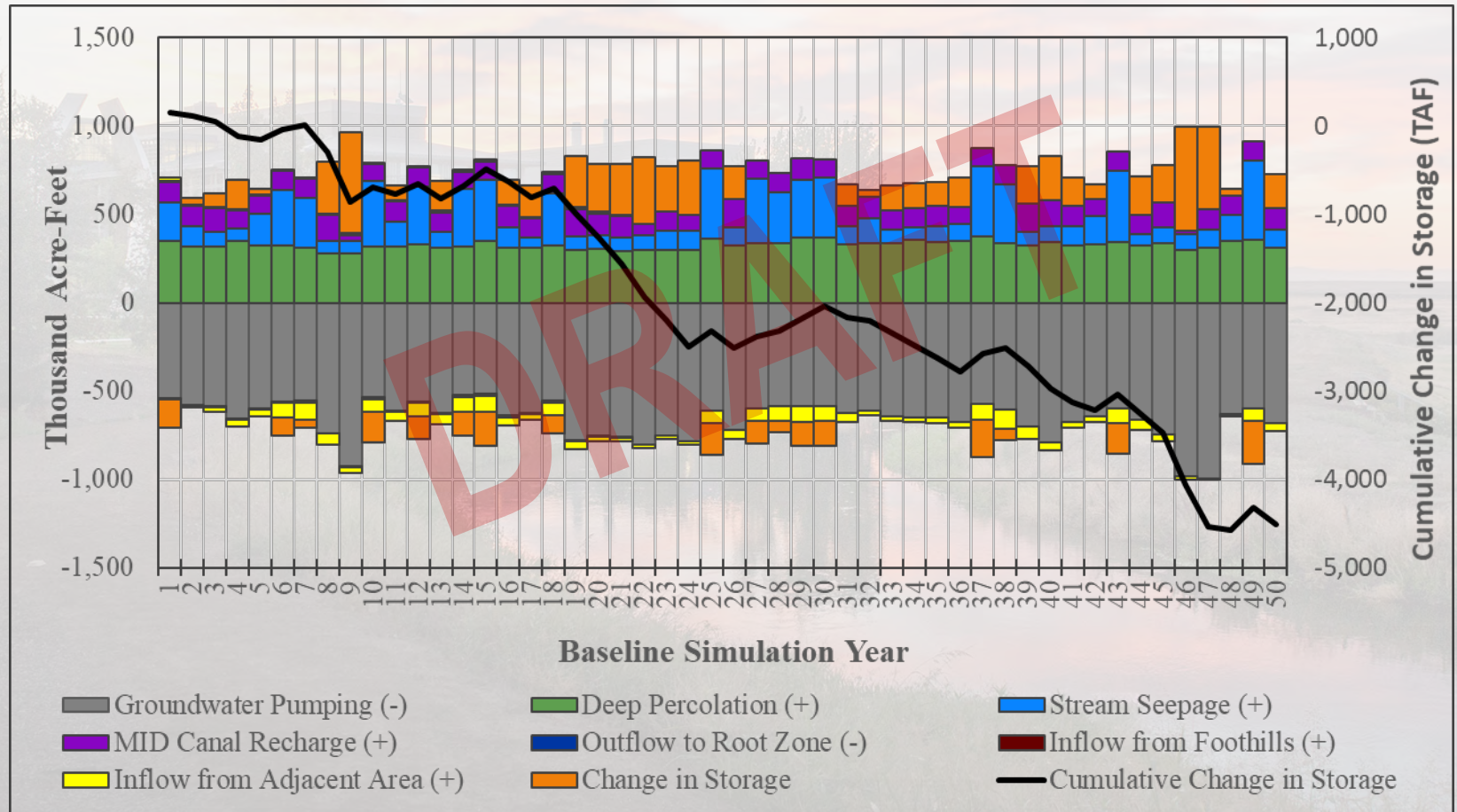


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Groundwater Budget

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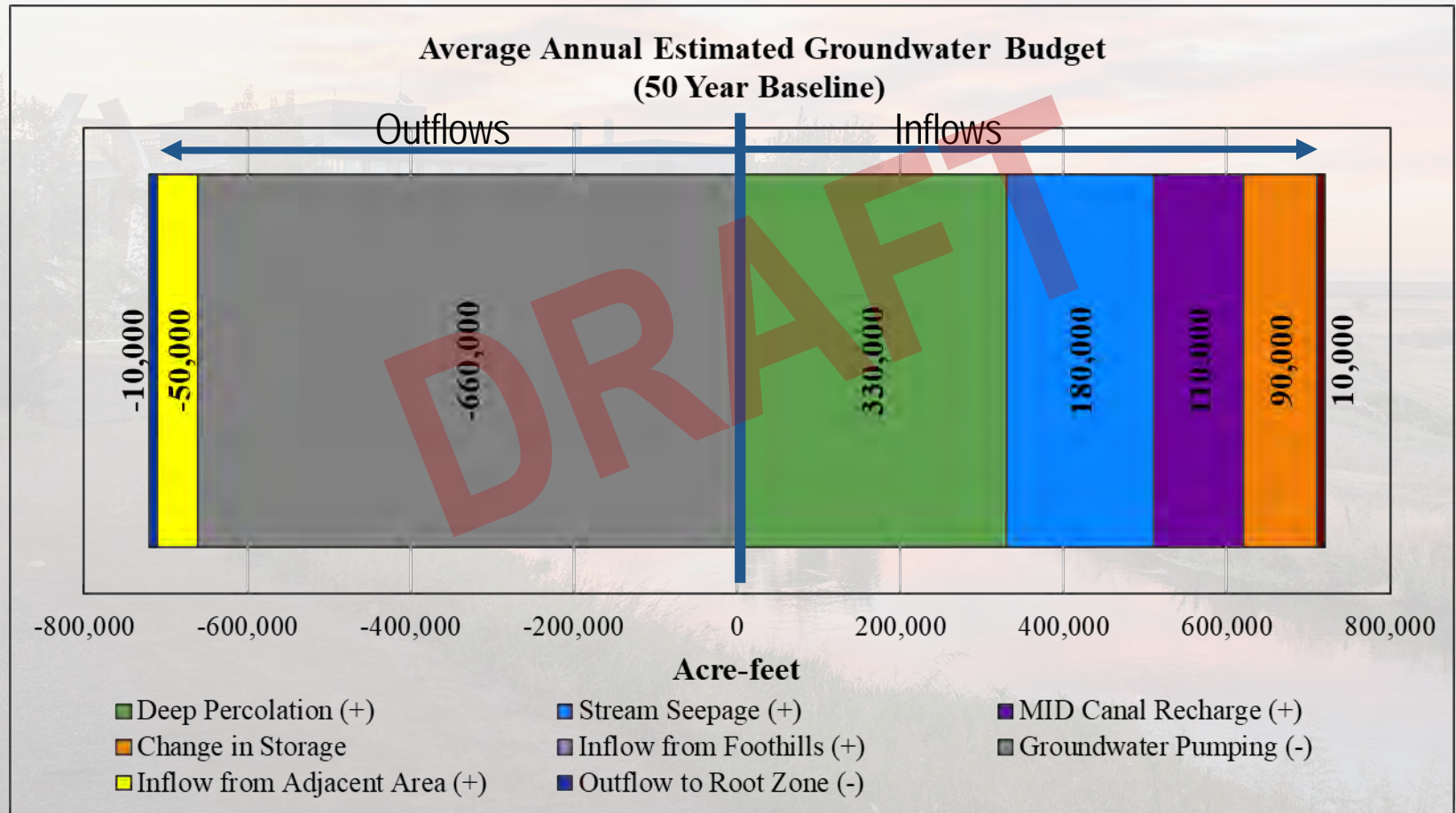


Image courtesy: Veronica Adrover/UC Merced

Going from Water Budgets to Quantifying Sustainable Yield

- What is sustainable yield?
 - “the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result.”
- How do we develop this?
 - Developed through a groundwater model scenario, modifying conditions to balance out the change in stored groundwater over time
- How do we work toward balance?
 - Implement projects and management actions to increase recharge or decrease production

Image courtesy: Veronica Adrover/UC Merced

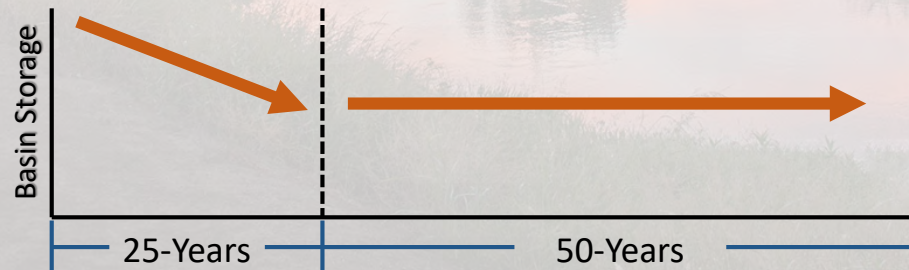
Sustainable Yield – Modeling Analysis

■ Modeling Approach

- Lower groundwater production through reduced agricultural and urban demand across the model domain

■ Assumptions

- 25-Year Implementation Period: operations will remain consistent, and groundwater levels will continue to decline until 2040
- Inter-Subbasin Flows: adjoining subbasins will operate similarly to Merced, whereas subsurface flows will remain similar to long-term average historical conditions



DRAFT Results: Initial simulations only address subbasin yield, analysis is needed to gauge effect on ensure minimum thresholds.

Land and Water Use Budget

[Sustainable Yield Analysis]

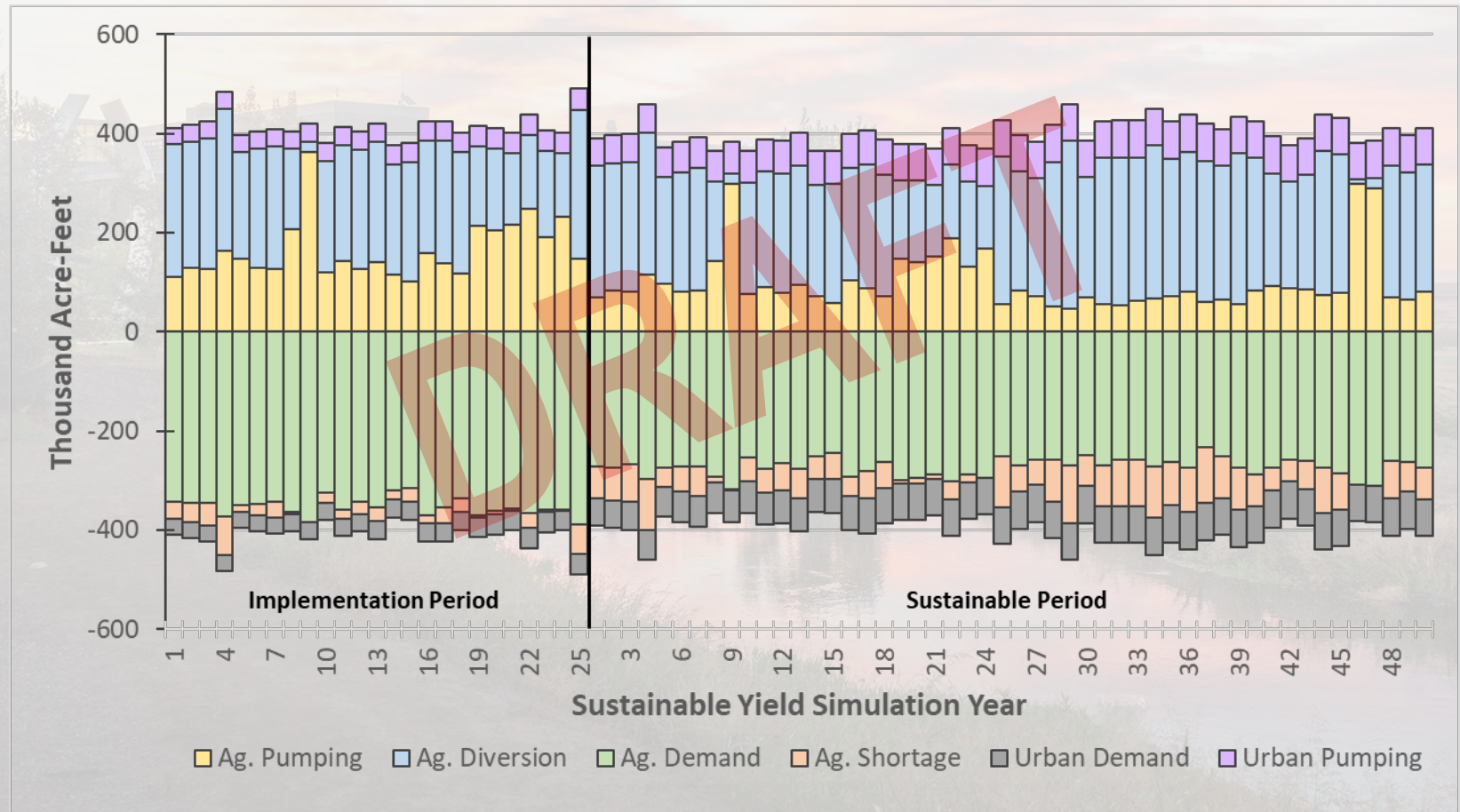


Image courtesy: Veronica Adrover/UC Merced

Groundwater Budget

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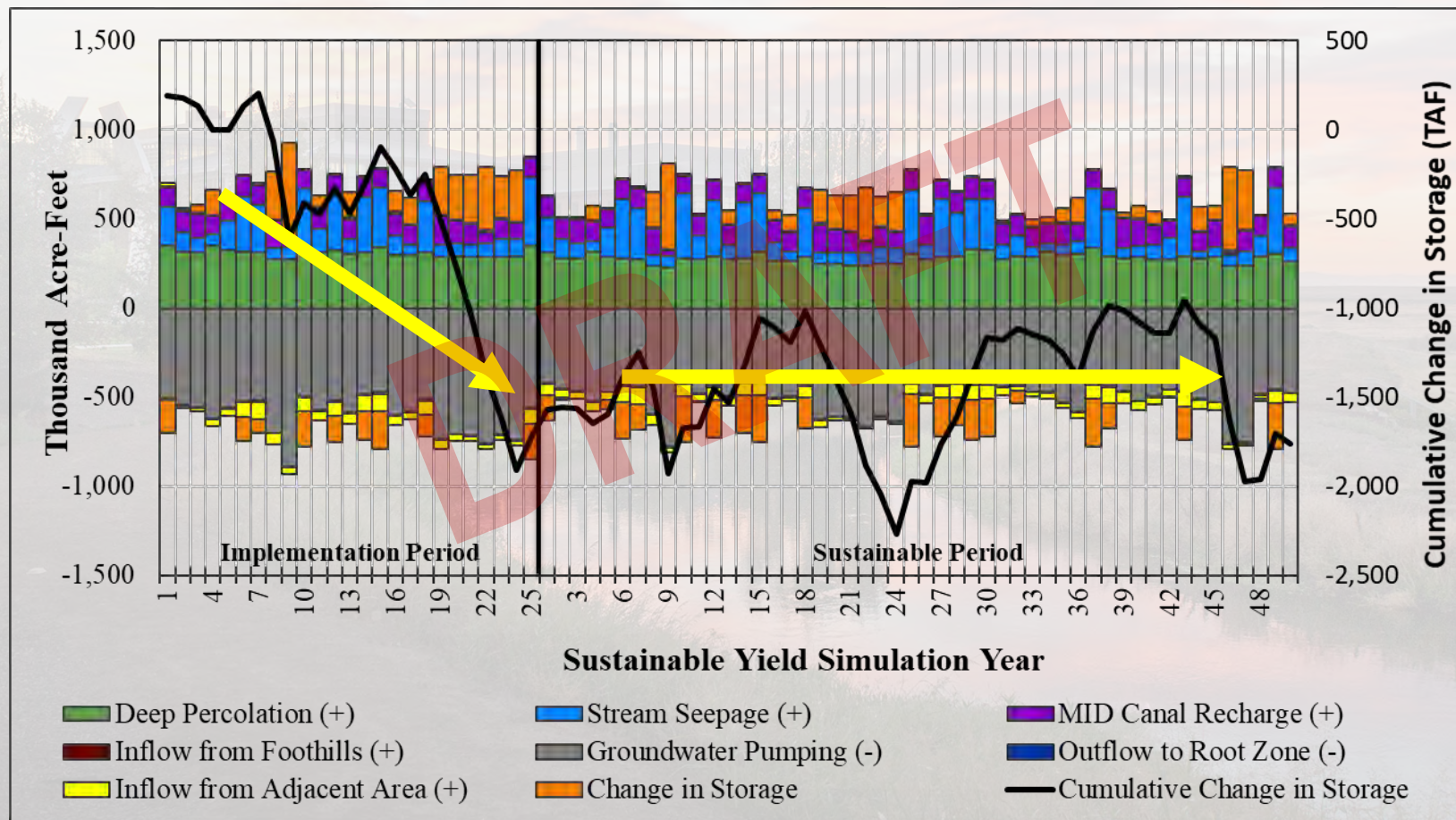


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Groundwater Budget

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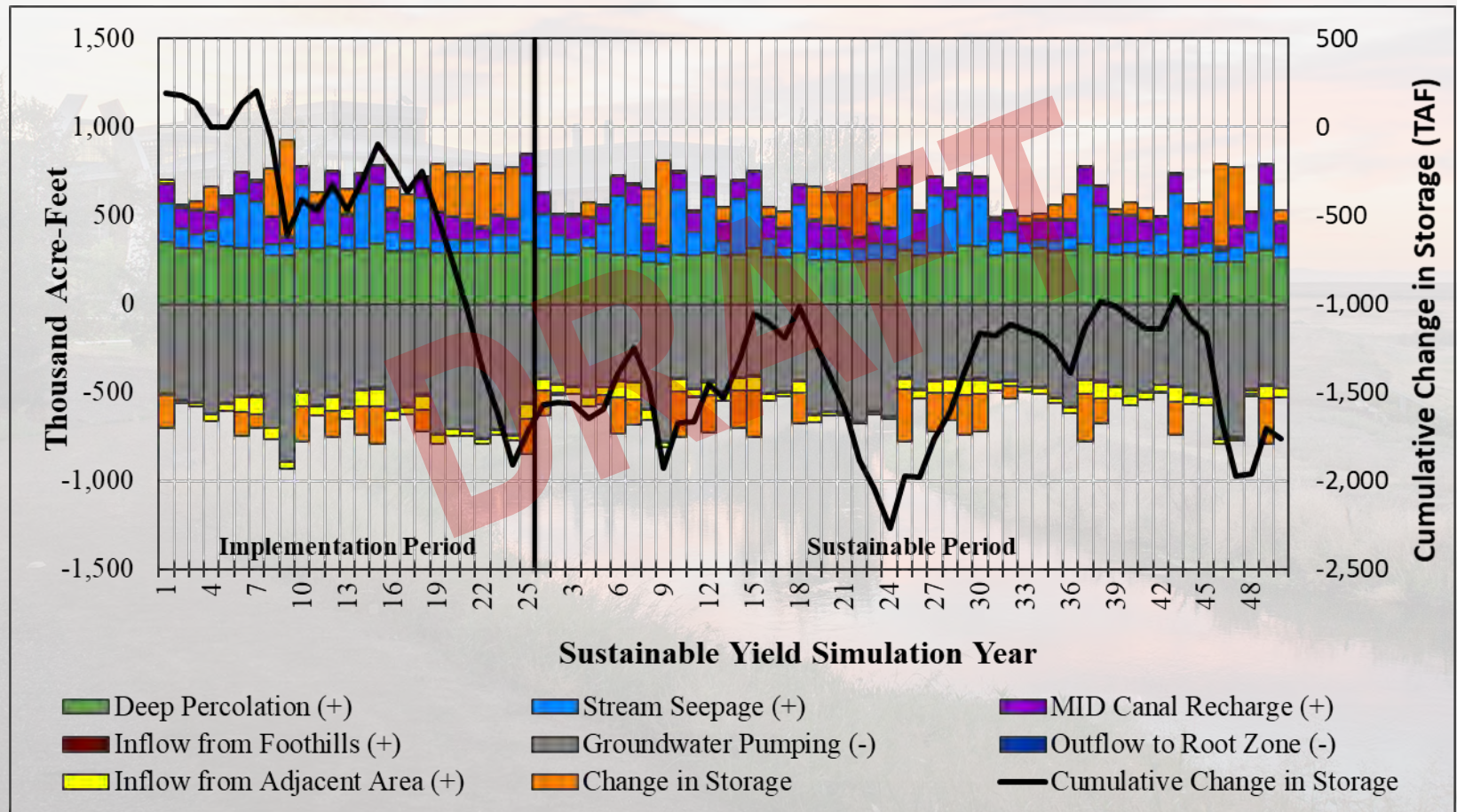


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Groundwater Budget

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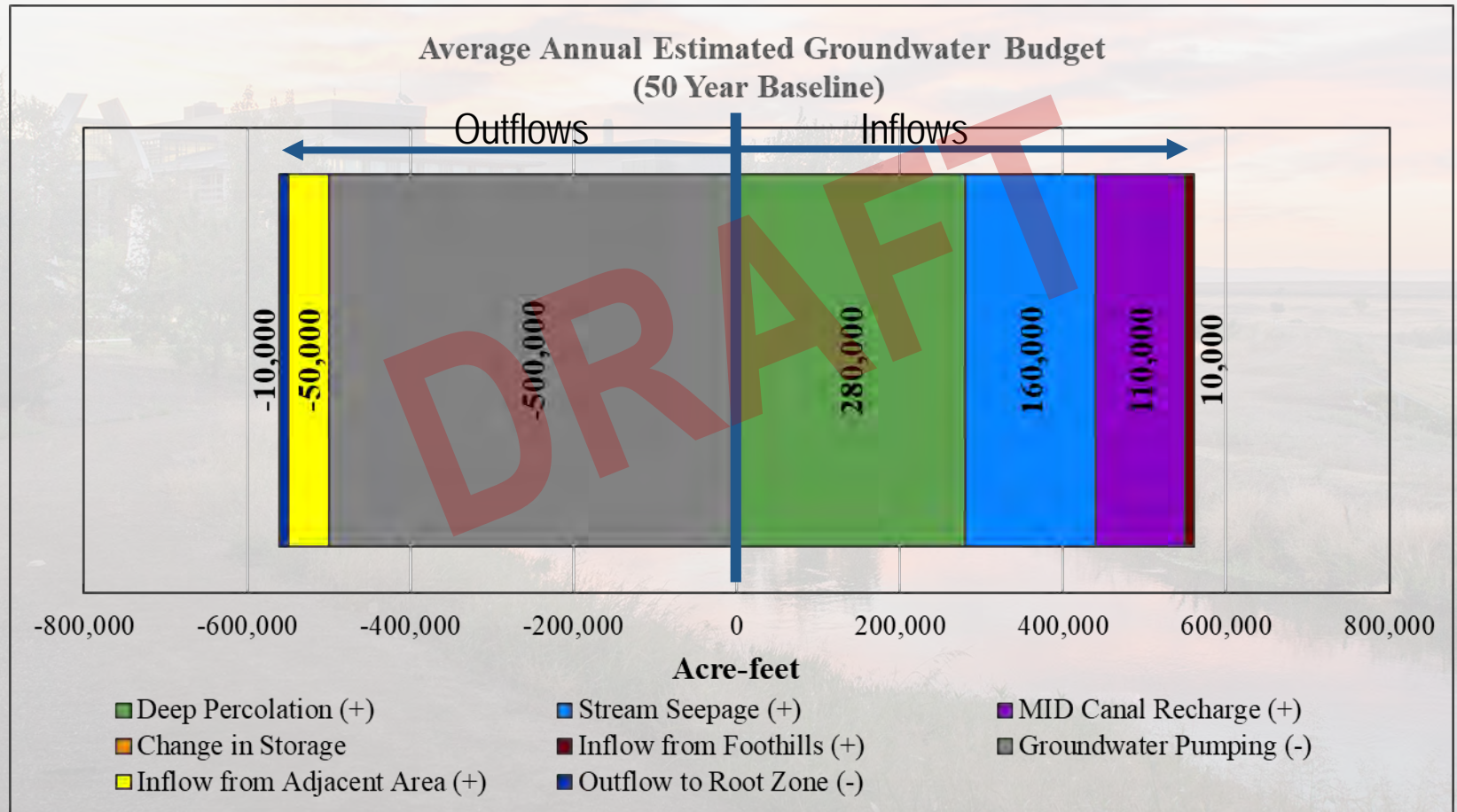
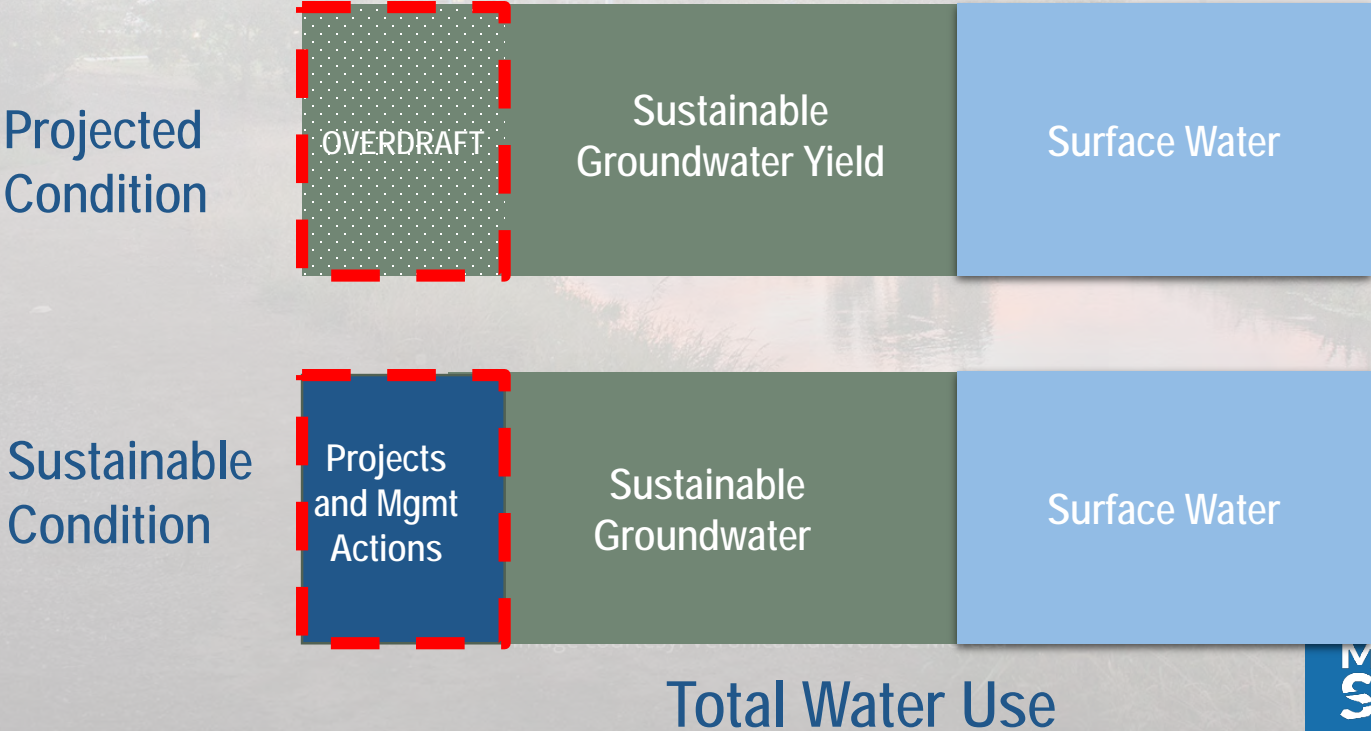


Image courtesy: Veronica Adrover/UC Merced

So What Does This Mean?

- Merced Subbasin will need to reduce groundwater pumping by approximately 25% overall
- In order to meet demands, additional projects and management actions will need to be implemented



Examples of Projects and Management Actions

- Intra-basin transfers
- Non-potable supply projects (expand recycled water use)
- Stormwater capture and recharge
- Conservation incentives
 - Improved water use efficiencies
 - Drought surcharges
 - Fallowing (fallowed land program)
 - Crop changes
- Potential ordinances
- Groundwater markets
- Pumping curtailments/fees

Image courtesy: Veronica Adrover/UC Merced

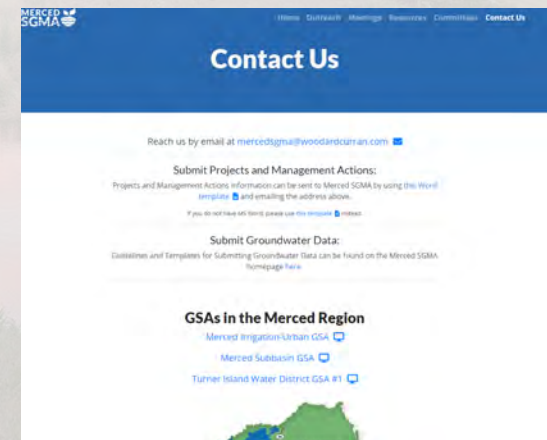
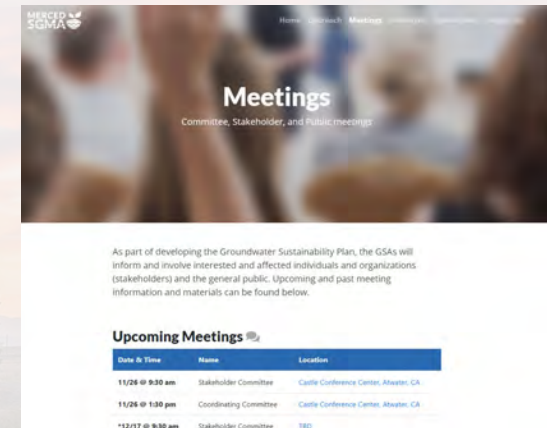


Public Outreach Update

Image courtesy: Veronica Adrover/UC Merced

Public Outreach: Current Progress

- **Total of 8 Coordination Committee and 6 Stakeholder Committee meetings** have been held to date
 - **Materials including agendas, PPTs, and meeting minutes made publicly available** for all of above meetings via Merced SGMA website
- **Stakeholder Communication Workshop held July 23, 2018**
 - Facilitated by UC Merced's Sierra Nevada Research Institute
- **New opportunities for public to provide information:**
 - **Groundwater elevation data** templates and instructions available on the Merced SGMA [Homepage](#)
 - **Projects and management actions information** form available on Merced SGMA [Contact Us](#) page



Public Outreach: Current Progress

- **Public meeting held August 2, 2018**
 - Notices and factsheets provided in English and Spanish
 - Spanish translation made available
 - Approx. 35 attendees, 8 of which were Coordinating or Stakeholder Committee members or staff

- **Contents provided public with an overview of:**
 - SGMA requirements including for developing a GSP and the roles of GSAs
 - Merced Subbasin conditions

- **Discussion and brainstorming activity held on:**
 - What are undesirable effects of groundwater overuse?
 - What does groundwater sustainability mean to people?

- **Methods for publicizing event:**
 - press release, newspaper advertisement in Merced Sun Times, notices distributed by partner organizations & email distribution lists



Public Outreach: Upcoming Events

Community Outreach Workshops

- **Planada Community Center:** Tuesday, December 4, 6:00 to 8:00 p.m., Planada Community Center, Main Hall, 9167 Stanford St., Planada, CA 95365
- **Franklin Elementary School:** Thursday, December 13, 6:00 to 8:00 p.m., Franklin Elementary School, Multipurpose Room, 2736 Franklin Rd, Merced, CA 95348

Focus of outreach workshops:

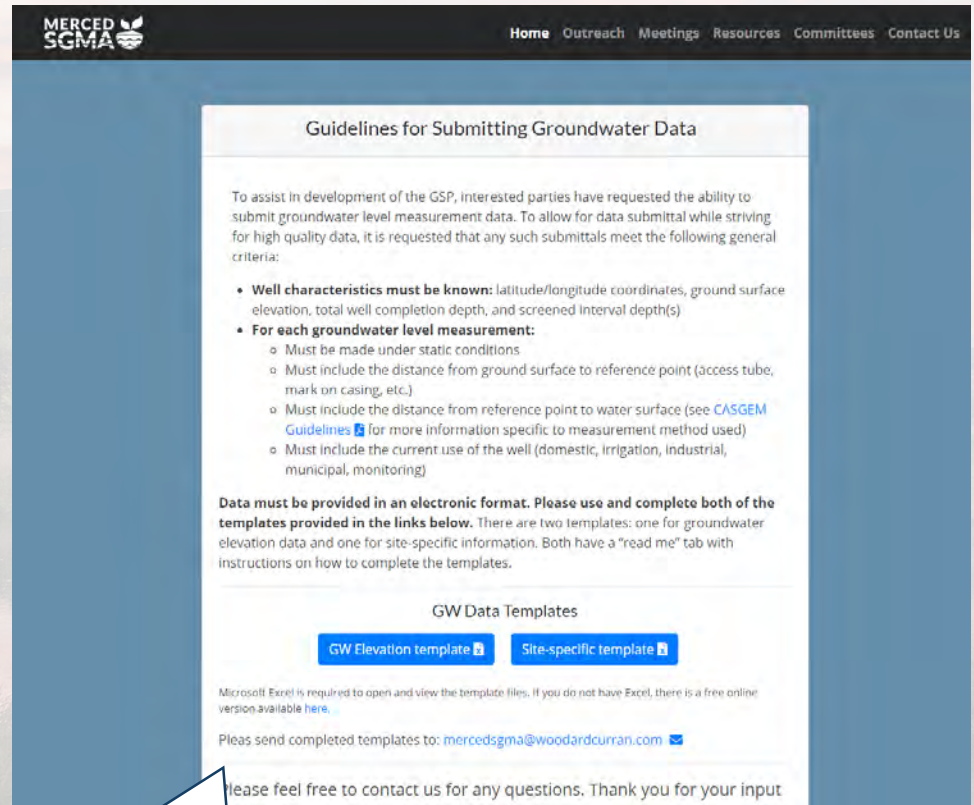
- Where we are in the GSP Process
- What the preliminary water budgets show about groundwater overdraft in the Merced Subbasin
- Possible management actions and projects to offset groundwater deficits

Image courtesy: Veronica Adrover/UC Merced

Submitting Groundwater Well Data

- Templates have been developed for submitting groundwater level measurement data
- Guidelines & templates for submitting groundwater data now on MercedSGMA website
- Templates have been created in connection to ongoing data collection for the **Merced Data Management System (DMS)**

Image courtesy



The screenshot shows the MercedSGMA website with a navigation bar at the top containing links for Home, Outreach, Meetings, Resources, Committees, and Contact Us. The main content area is titled "Guidelines for Submitting Groundwater Data". It includes an introductory paragraph, a list of general criteria, and two buttons for downloading templates: "GW Elevation template" and "Site-specific template". Below the buttons, there is a note about Microsoft Excel and an email address for submitting templates: mercedsgma@woodardcurran.com. A callout box points to the "Site-specific template" button.

MERCED SGMA Home Outreach Meetings Resources Committees Contact Us

Guidelines for Submitting Groundwater Data

To assist in development of the GSP, interested parties have requested the ability to submit groundwater level measurement data. To allow for data submittal while striving for high quality data, it is requested that any such submittals meet the following general criteria:

- **Well characteristics must be known:** latitude/longitude coordinates, ground surface elevation, total well completion depth, and screened interval depth(s)
- **For each groundwater level measurement:**
 - Must be made under static conditions
 - Must include the distance from ground surface to reference point (access tube, mark on casing, etc.)
 - Must include the distance from reference point to water surface (see [CASGEM Guidelines](#) for more information specific to measurement method used)
 - Must include the current use of the well (domestic, irrigation, industrial, municipal, monitoring)

Data must be provided in an electronic format. Please use and complete both of the templates provided in the links below. There are two templates: one for groundwater elevation data and one for site-specific information. Both have a "read me" tab with instructions on how to complete the templates.

GW Data Templates

[GW Elevation template](#) [Site-specific template](#)

Microsoft Excel is required to open and view the template files. If you do not have Excel, there is a free online version available [here](#).

Please send completed templates to: mercedsgma@woodardcurran.com

Please feel free to contact us for any questions. Thank you for your input

Guidelines & templates for submitting data on MercedSGMA [homepage](#)



Next Steps

Image courtesy: Veronica Adrover/UC Merced

Next Steps

- Developing summary of water budget information for formal submittal to GSA Boards for review and approval
- Identifying mechanisms to share available groundwater within sustainable yield
- Identifying projects and management actions to minimize impact to demands resulting from reduced groundwater pumping
- Drafted preliminary threshold approaches to be tested once projects and management actions have been identified
- Confirm projects and management actions and thresholds, along with objectives and interim milestones (implementation plan)
- Develop monitoring and reporting plan



Questions?

Image courtesy: Veronica Adrover/UC Merced