GSP Development Update

Merced Subbasin GSA Meeting – November 1, 2018

Image courtesy: Veronica Adrover/UC Merced

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Agenda

1. GSP Development Overview
2. Water Budgets
3. Public Outreach Update
4. Groundwater Well Data Collection
5. Next Steps
6. Questions

Image courtesy: Veronica Adrover/UC Merced

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GSP Development Overview

Image courtesy: Veronica Adrover/UC Merced

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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

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Sustainable Groundwater Management Act Overview

- **SGMA has two main focus areas:**
  - Halt the overdraft y “balancing the water budget” (basin inputs = basin outputs)
  - Establish thresholds for six sustainability indictors 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

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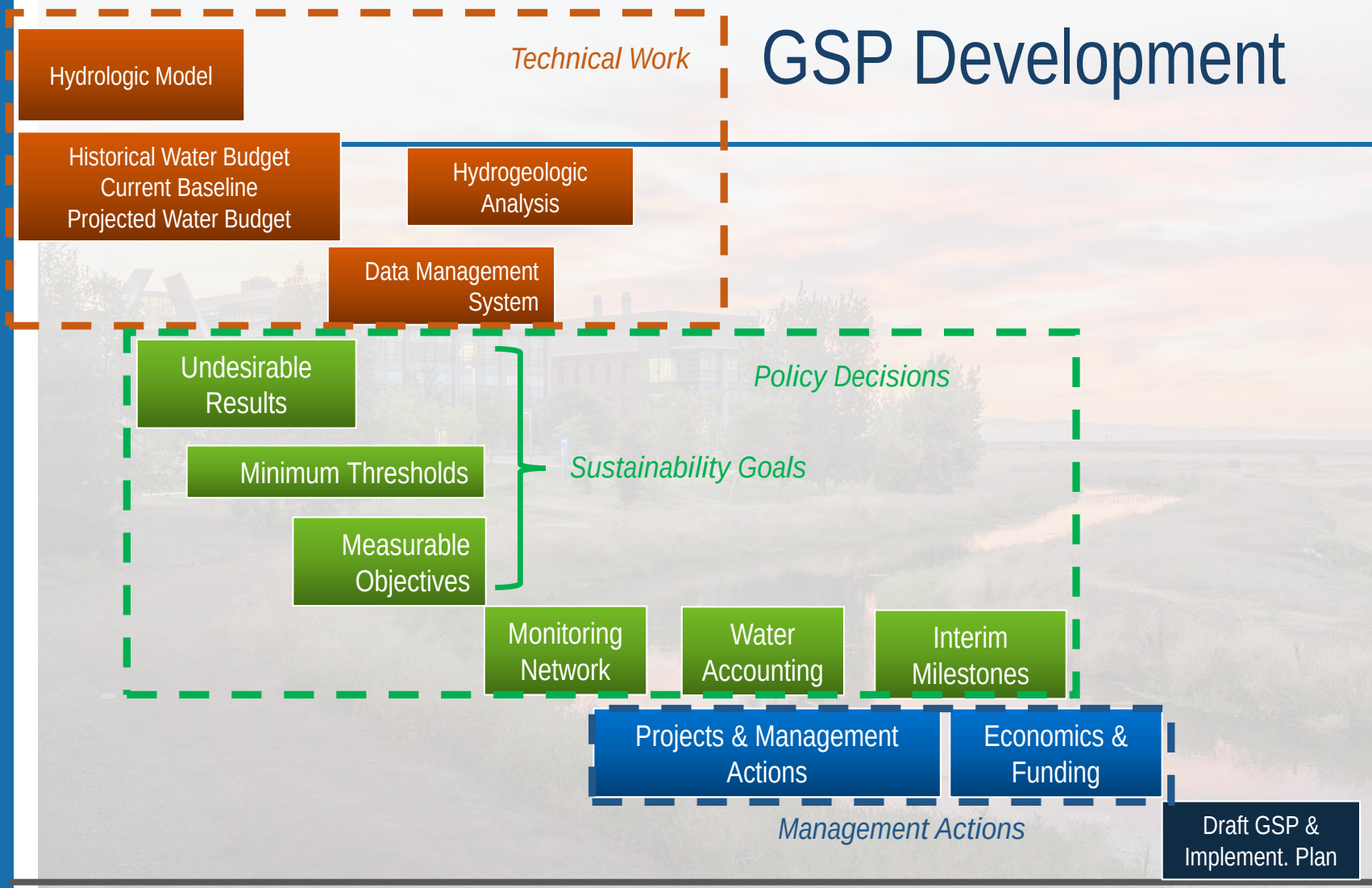
GSP Development



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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

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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

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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.

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Water Budgets

Image courtesy: Veronica Adrover/UC Merced

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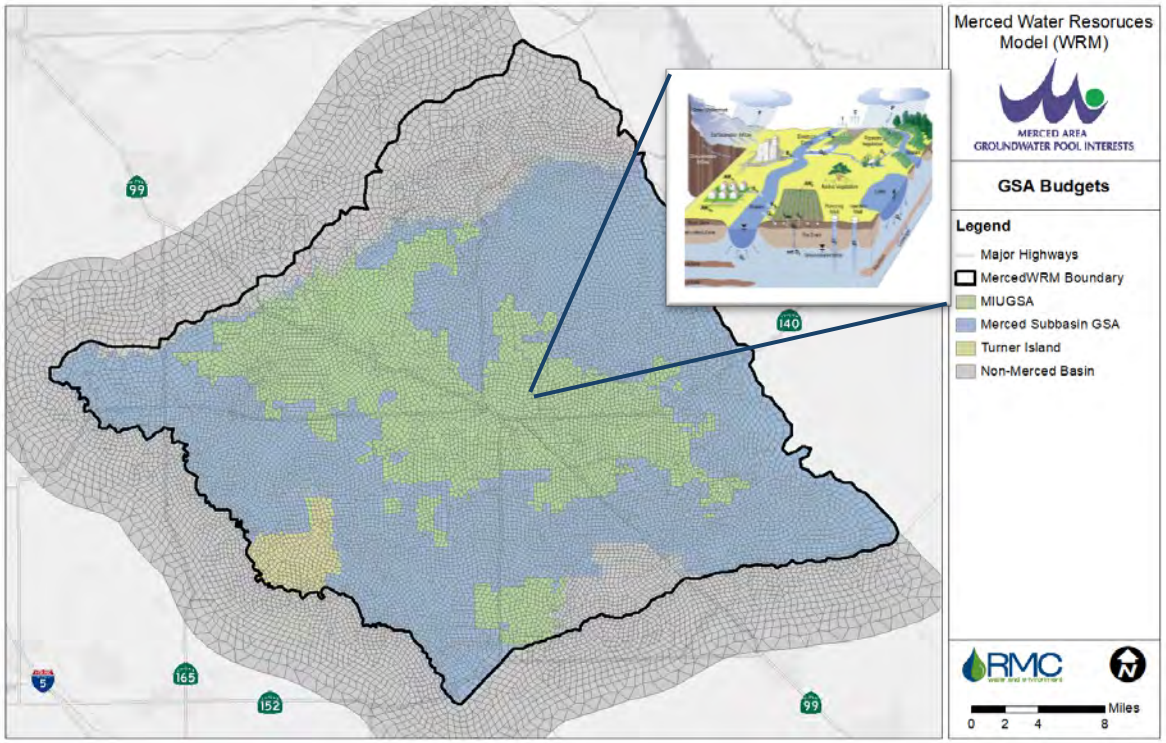
Water Budgets: Merced Integrated Water Resources Model

Key Model Features

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



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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

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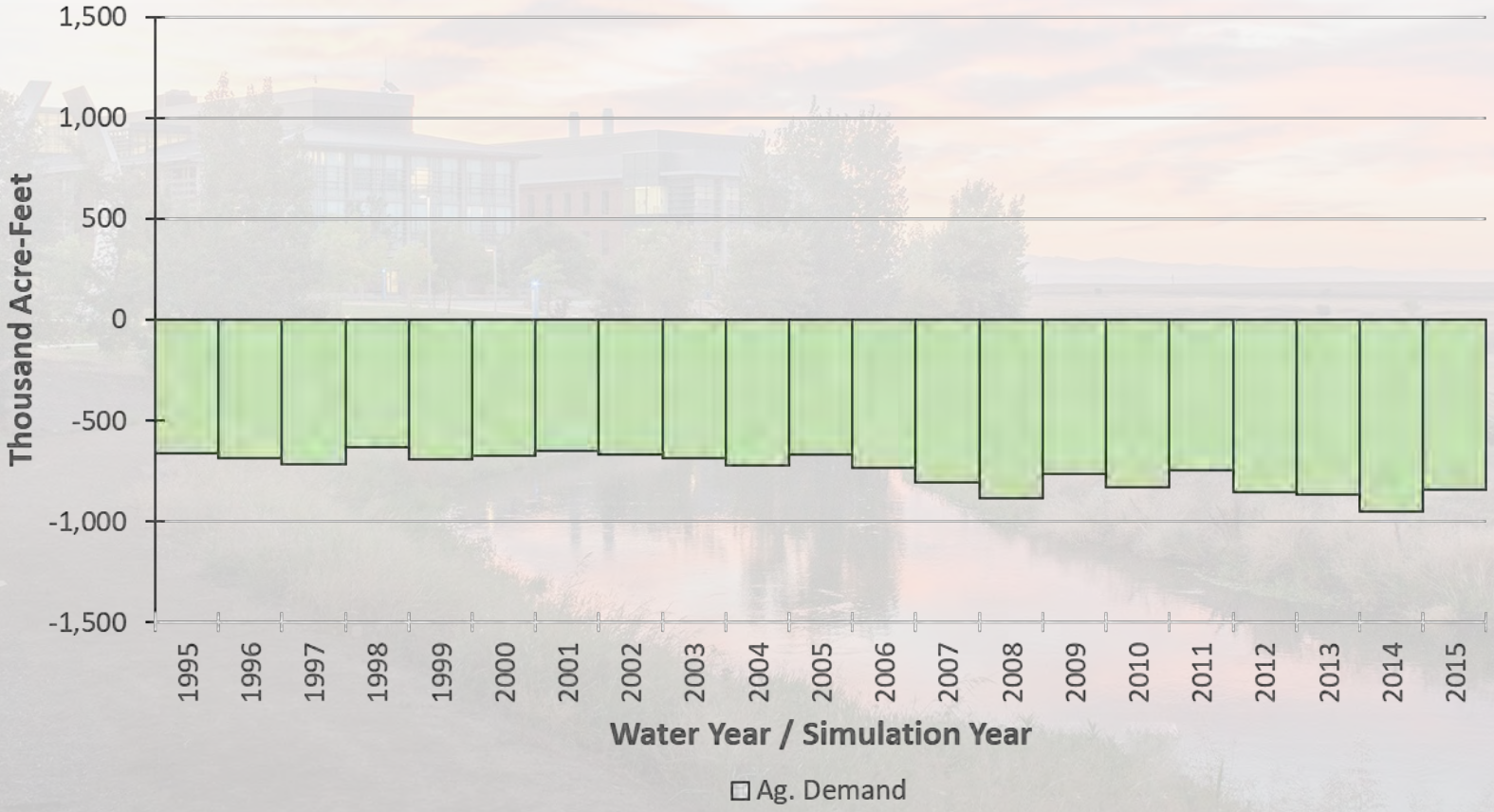
Land and Water Use Budget
[Historical Simulation]



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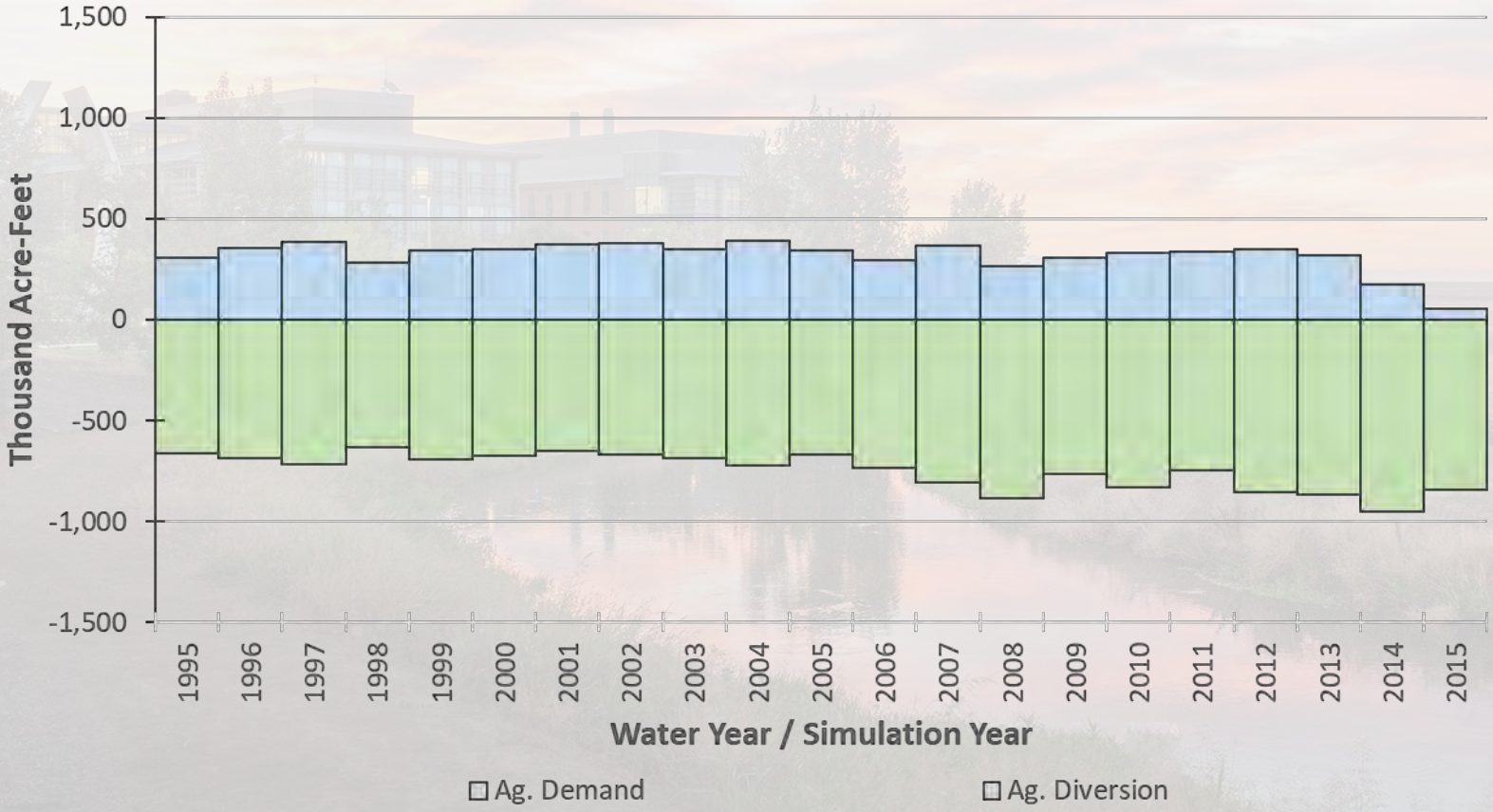

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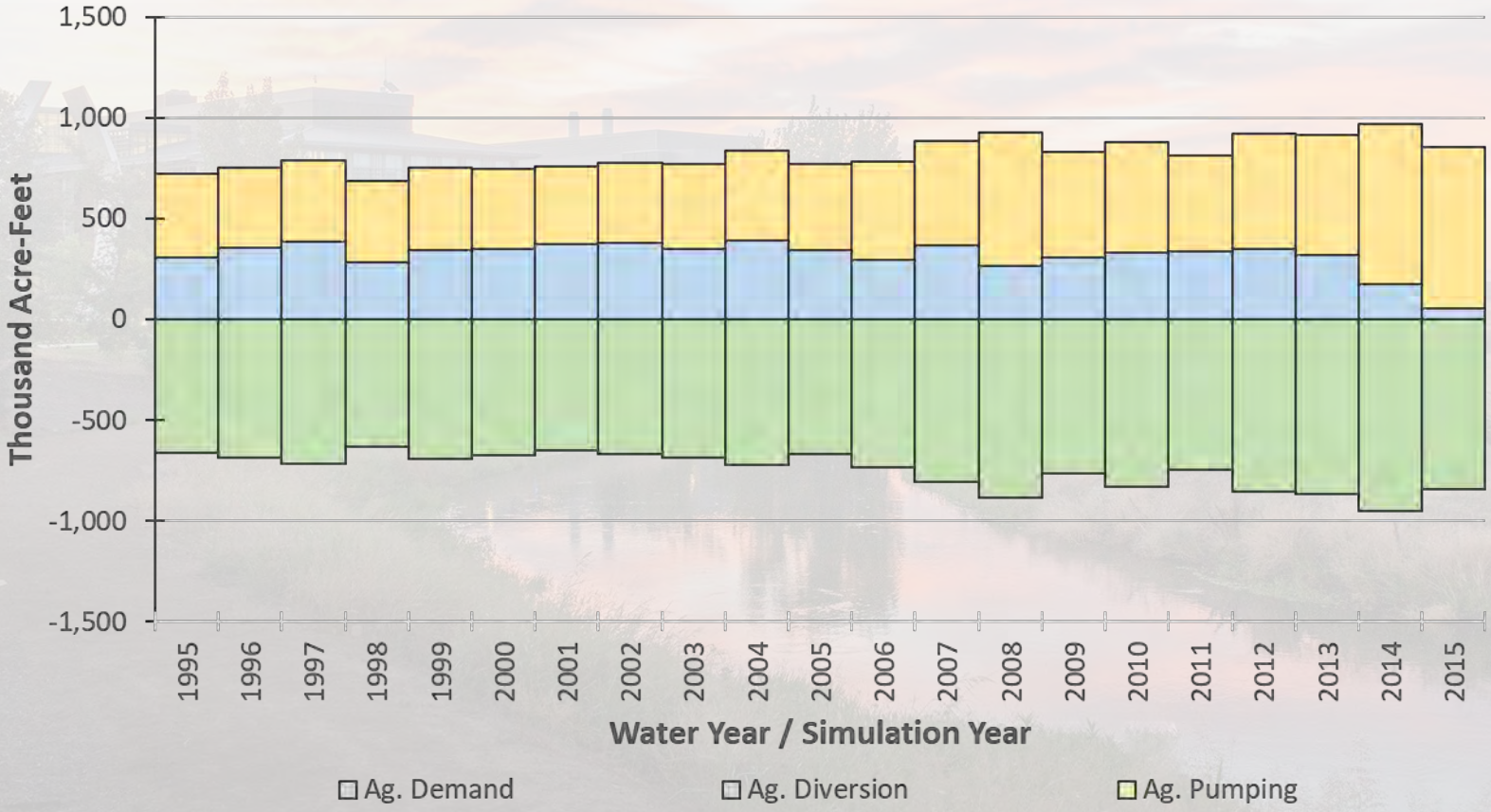

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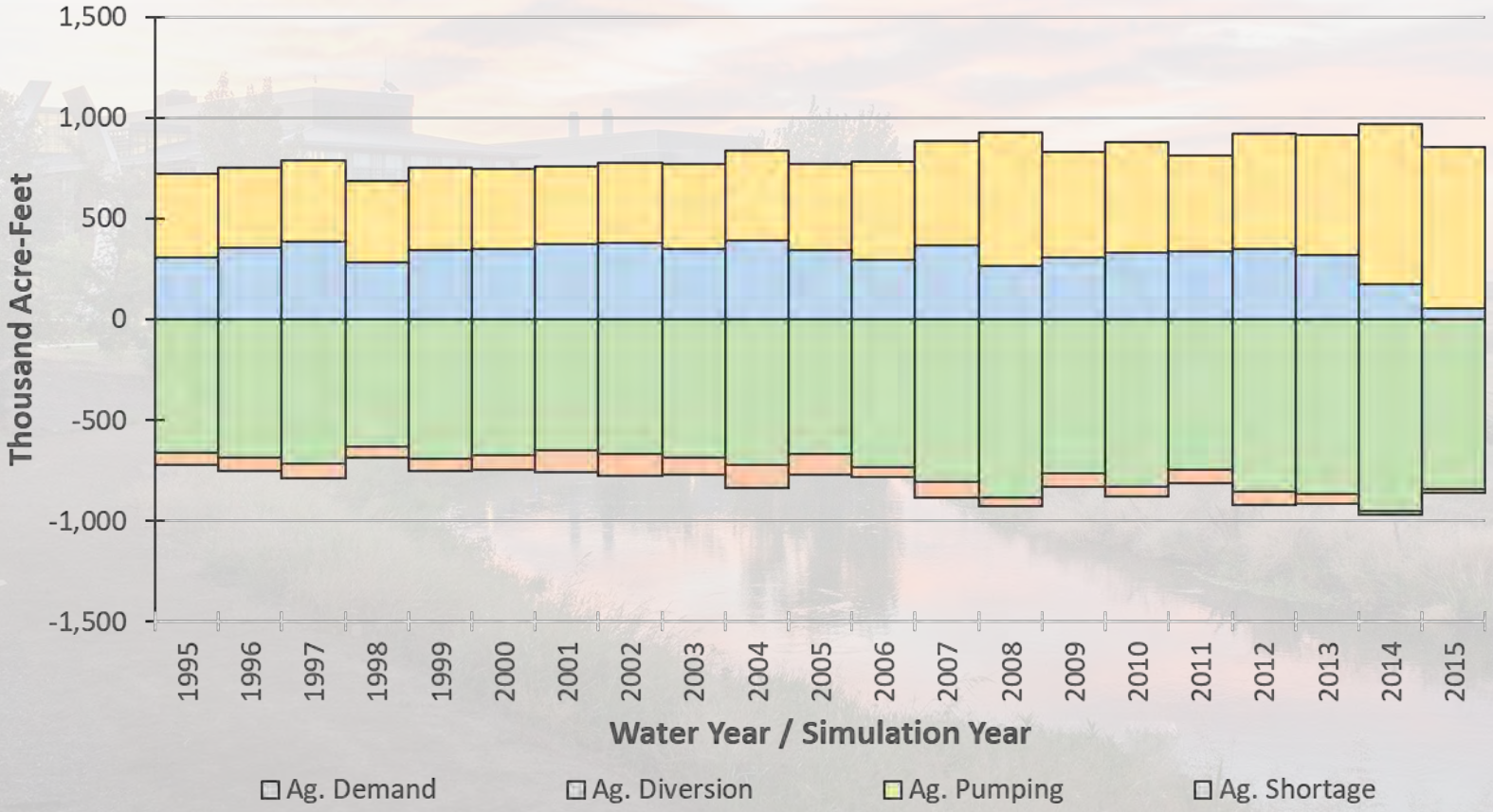

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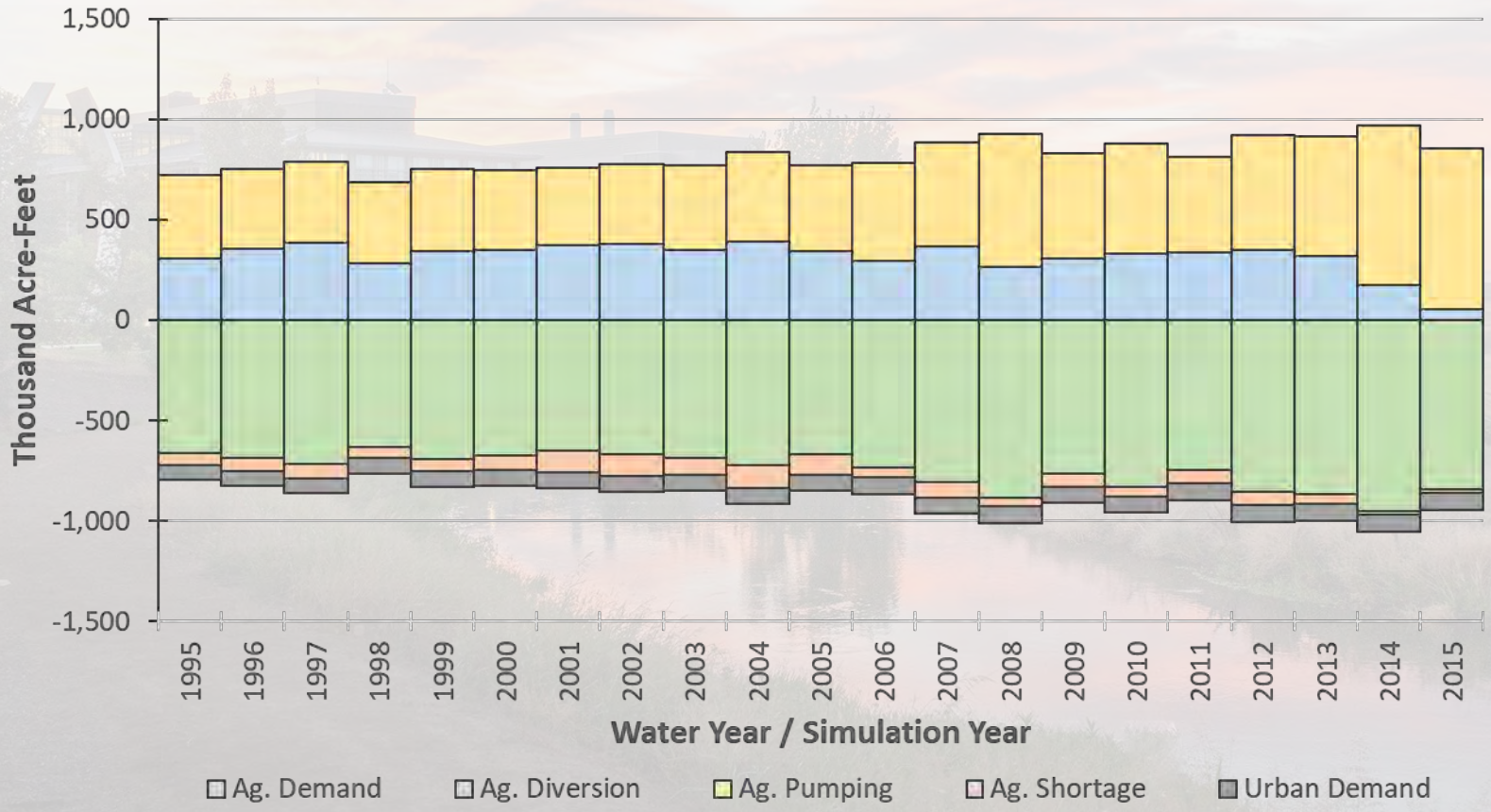

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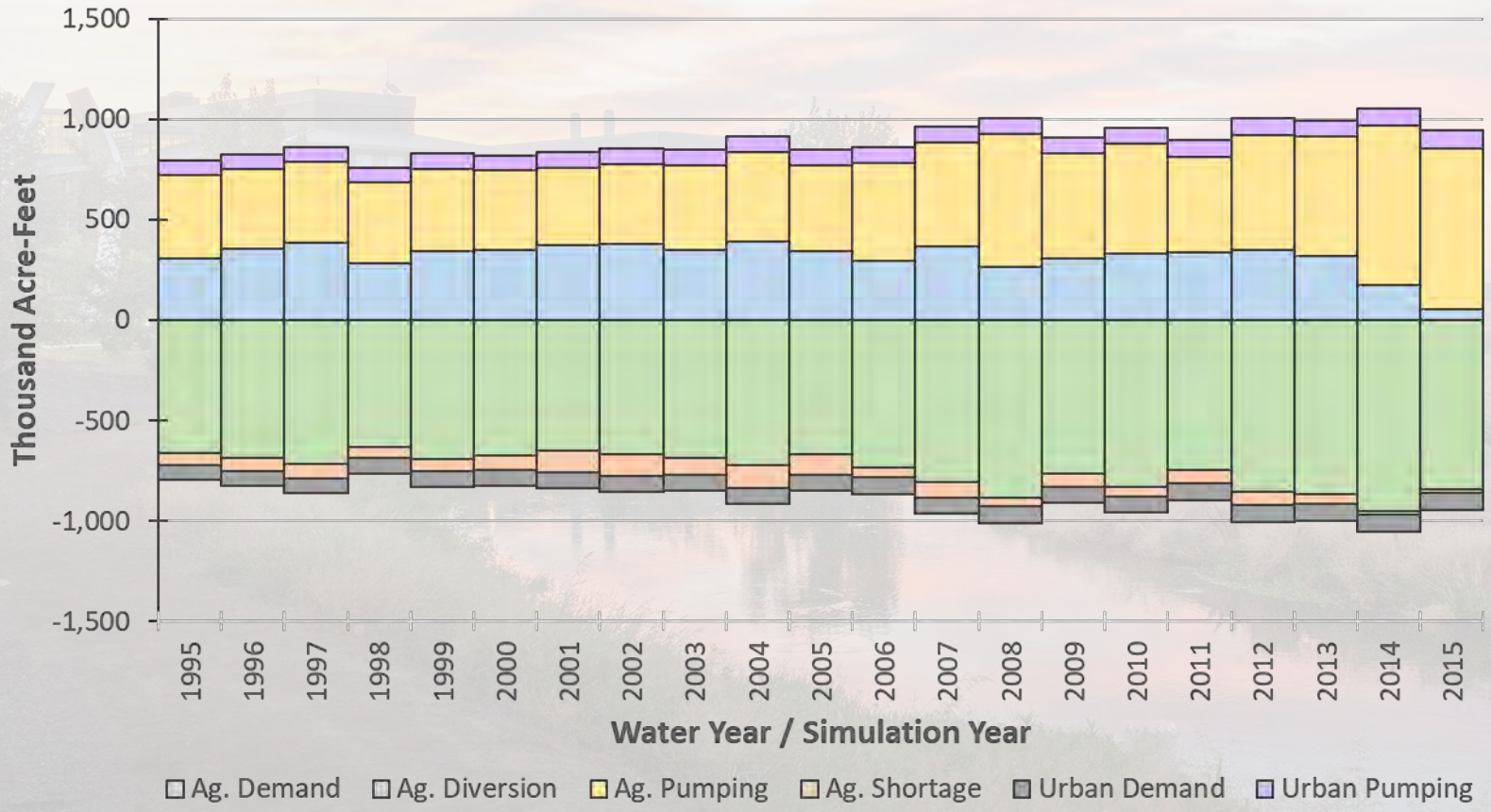

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Groundwater Budget
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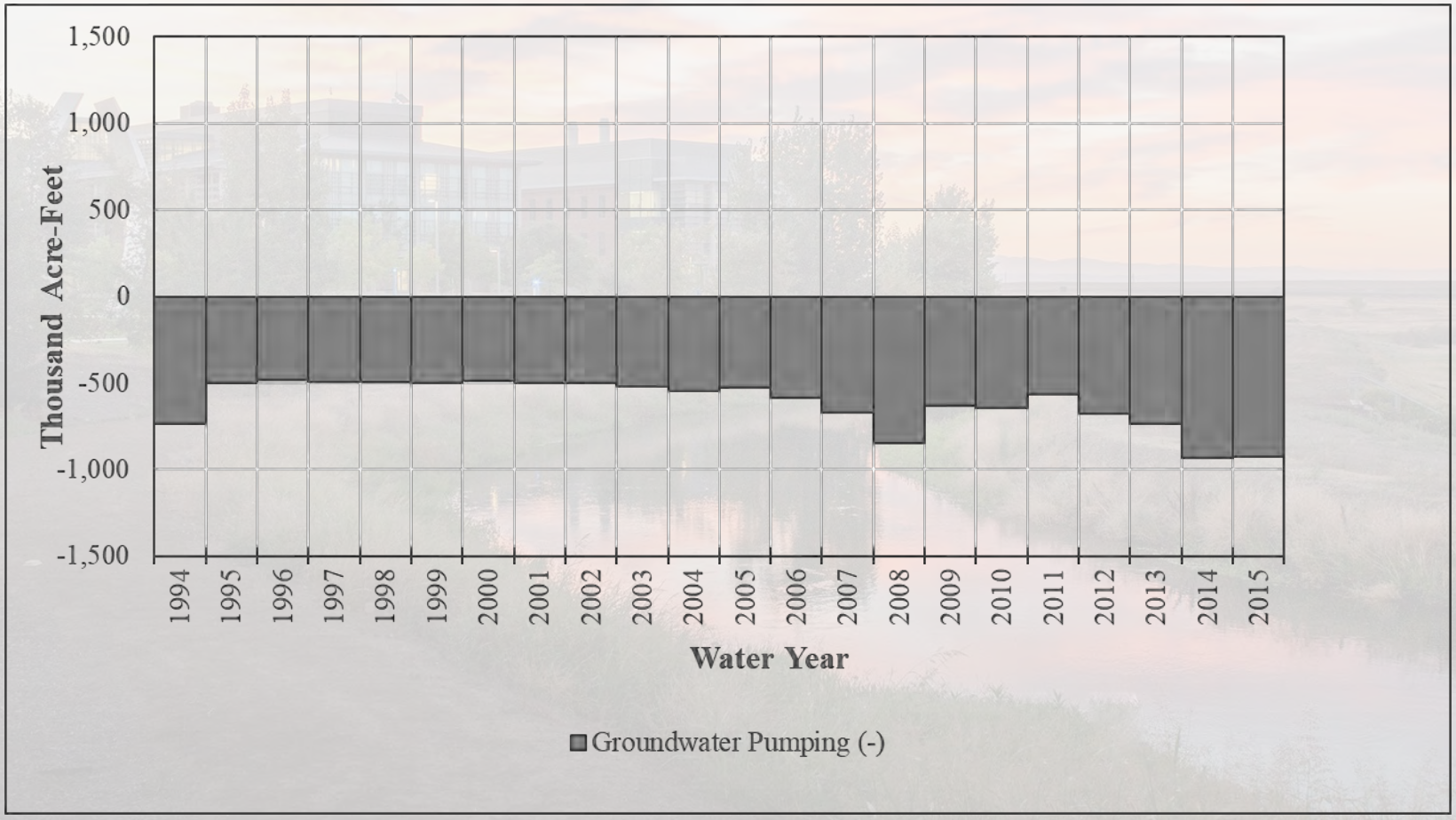

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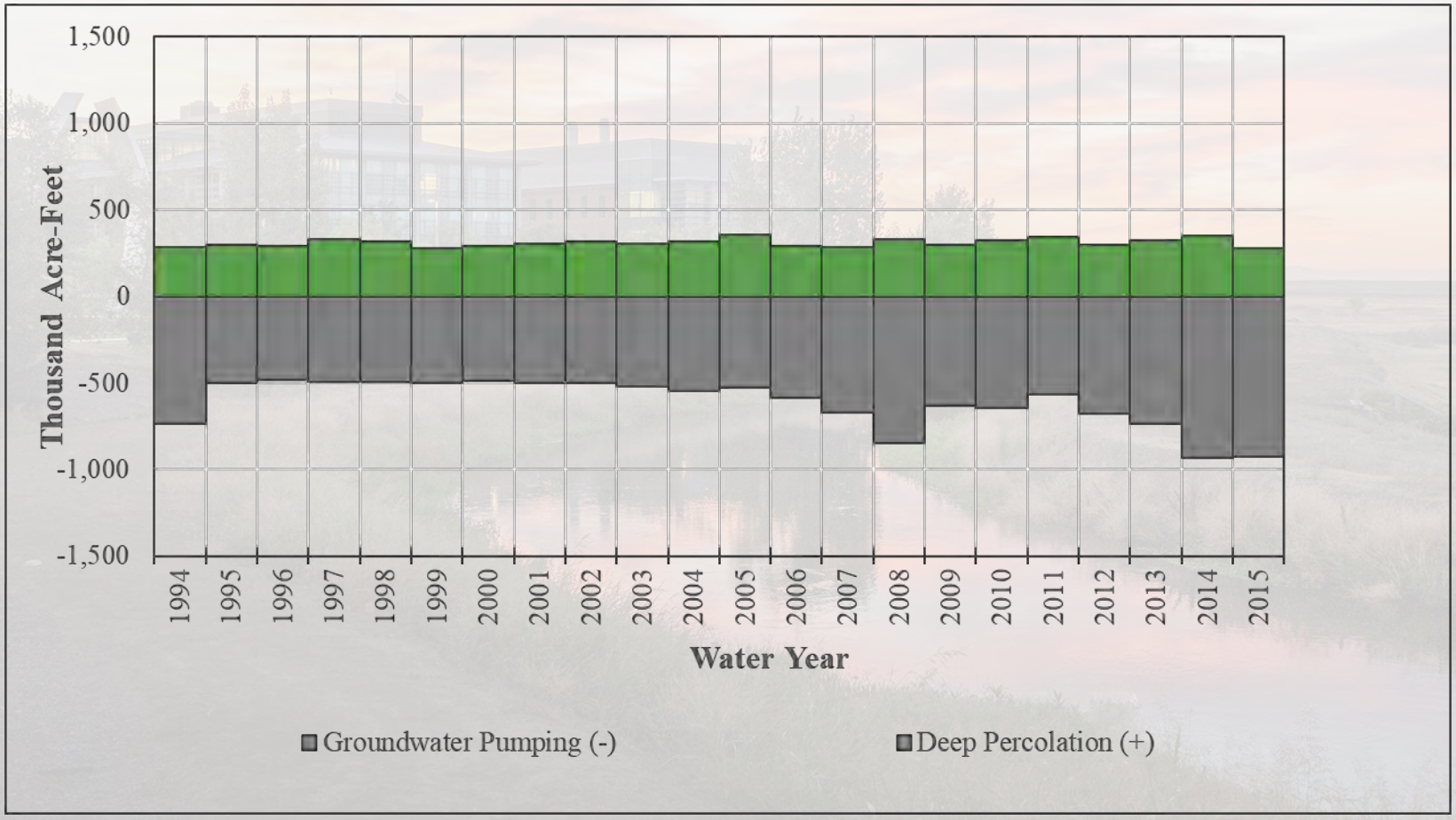

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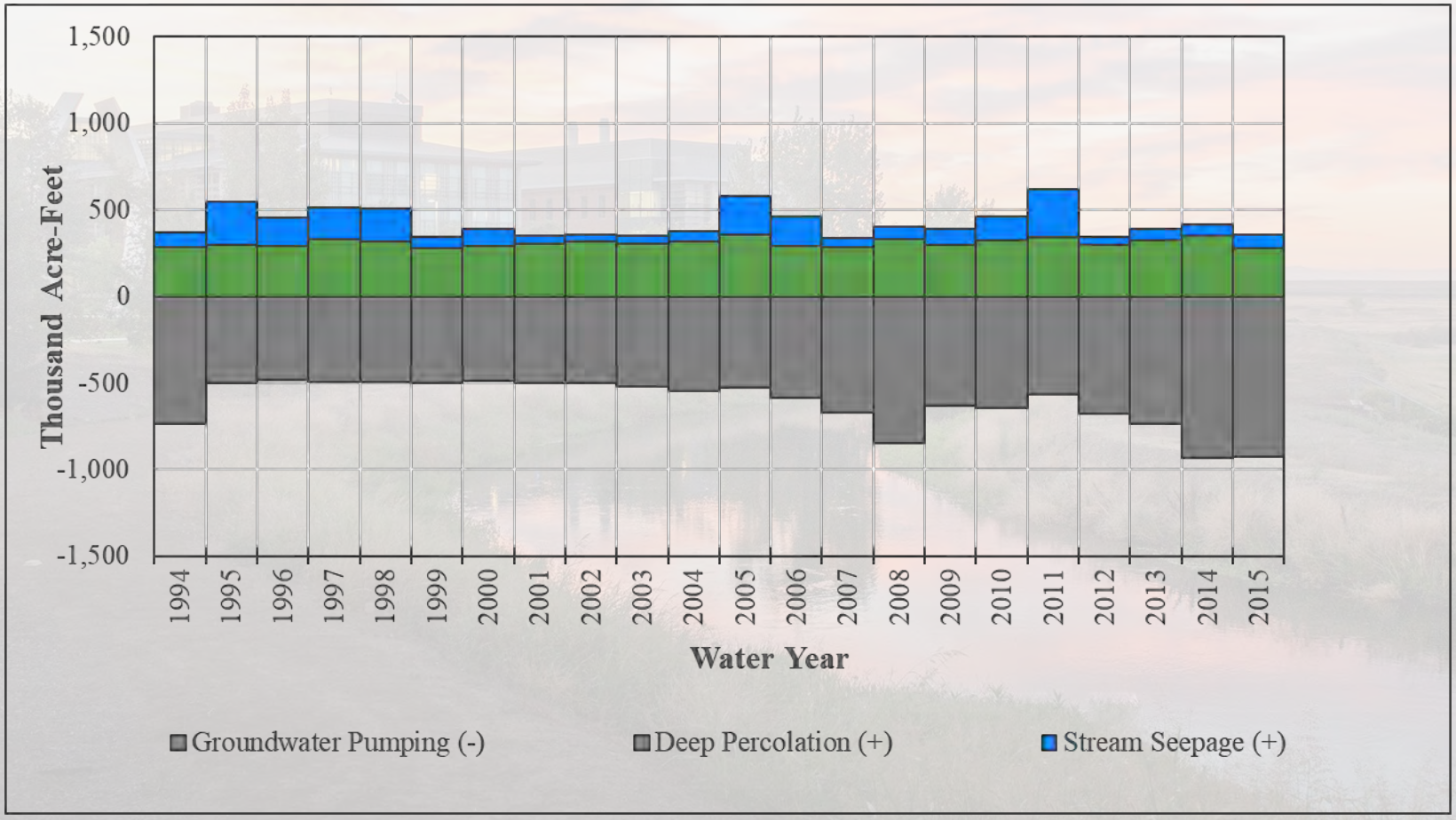

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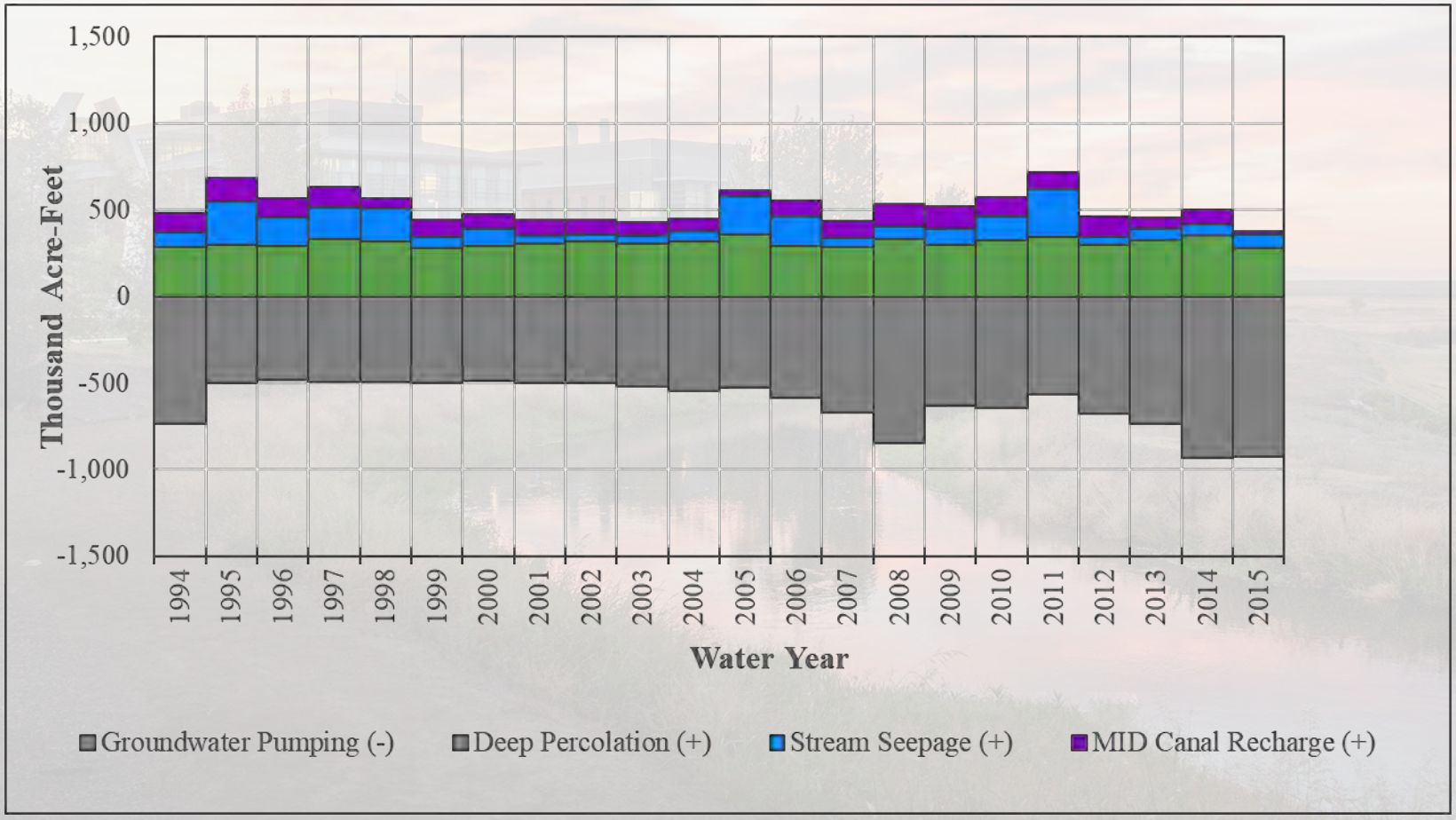

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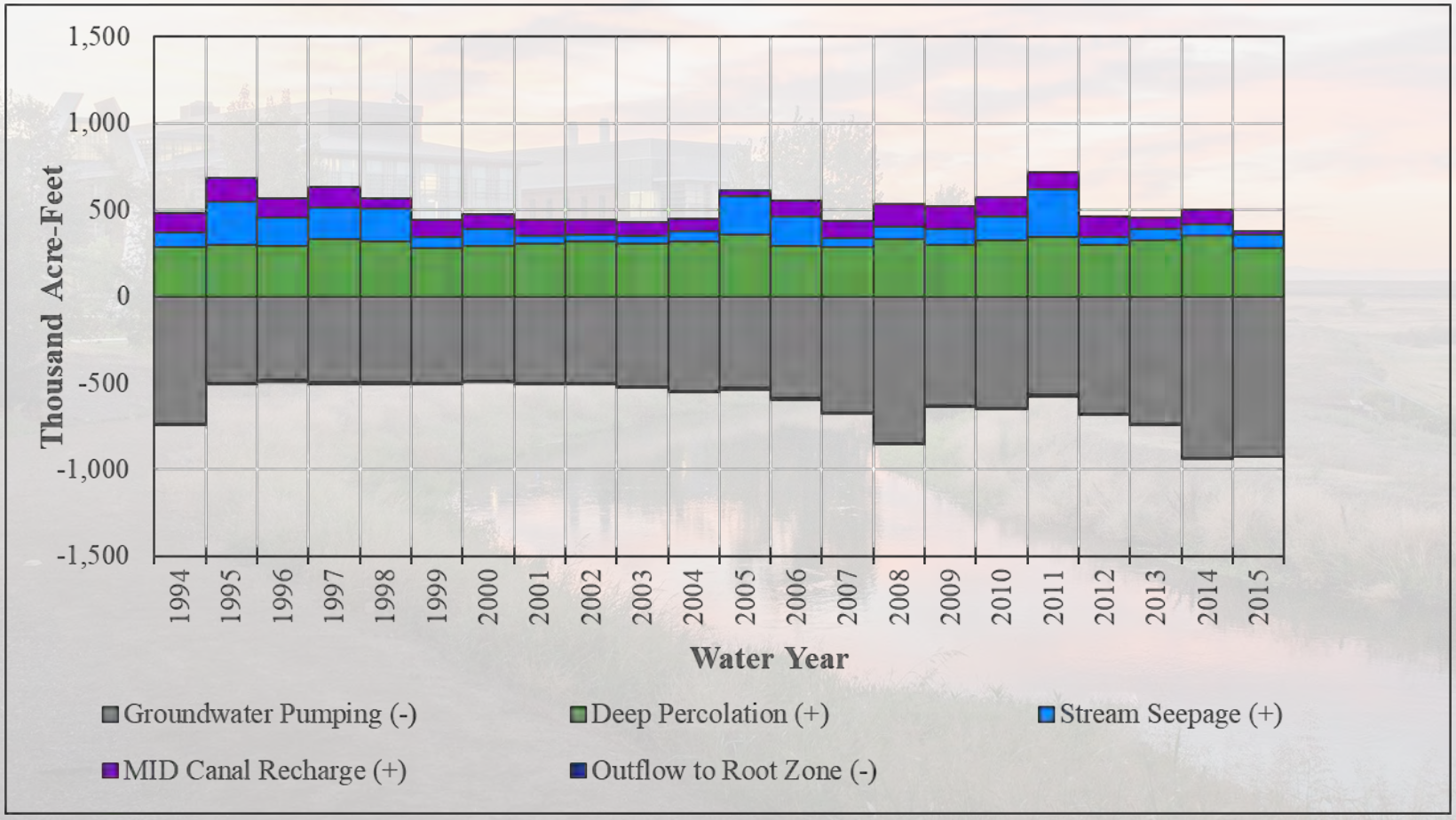

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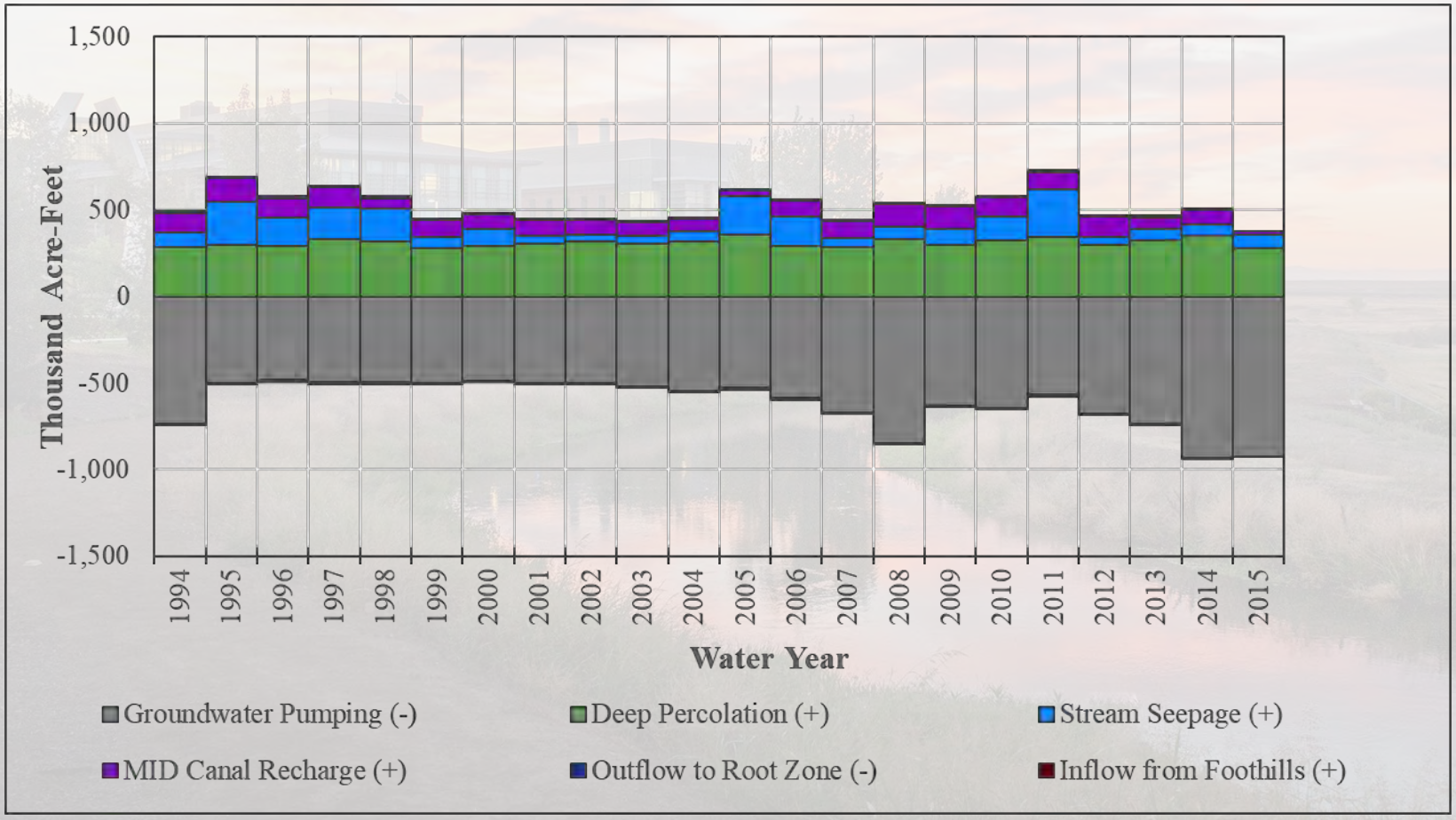

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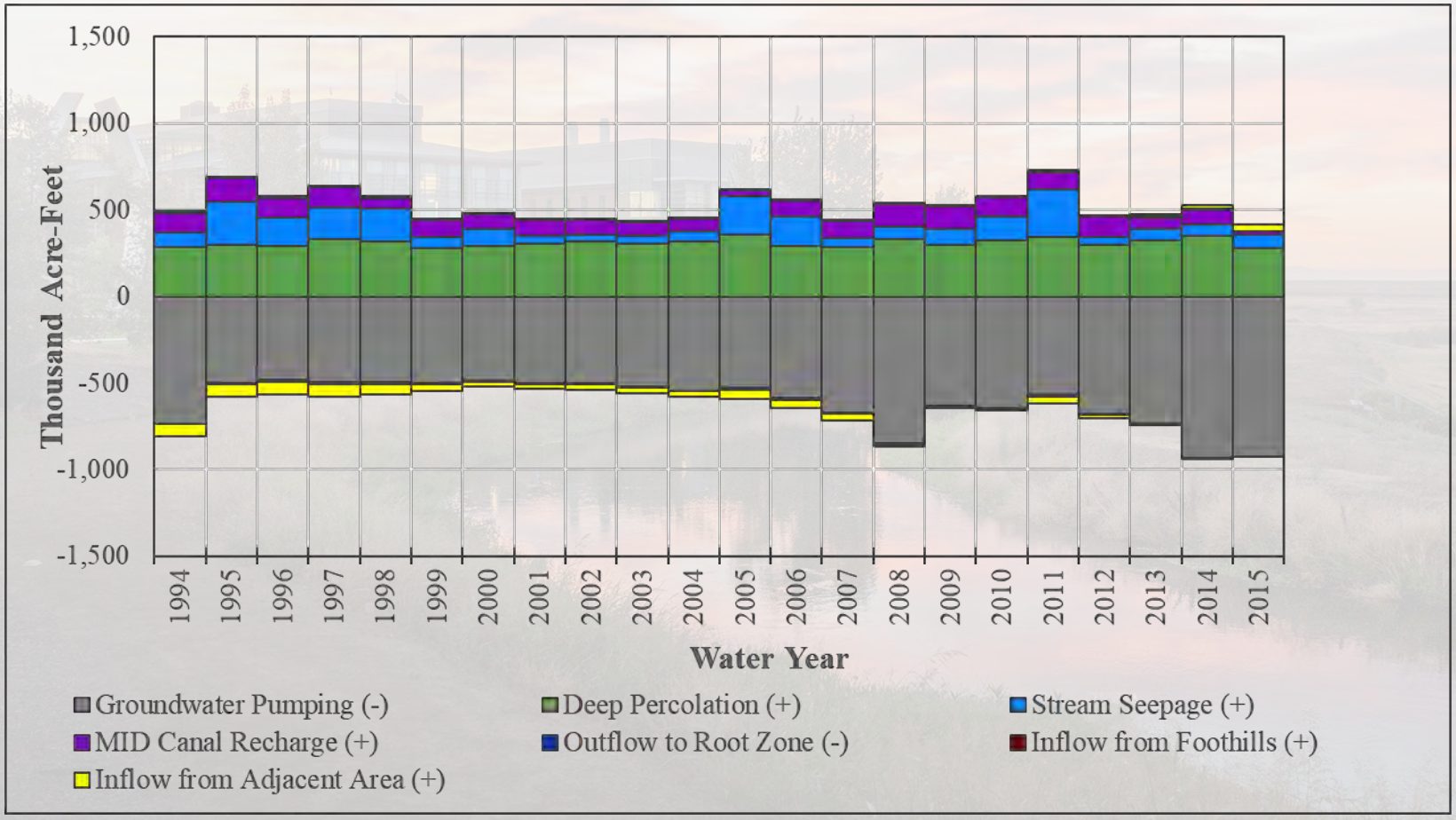

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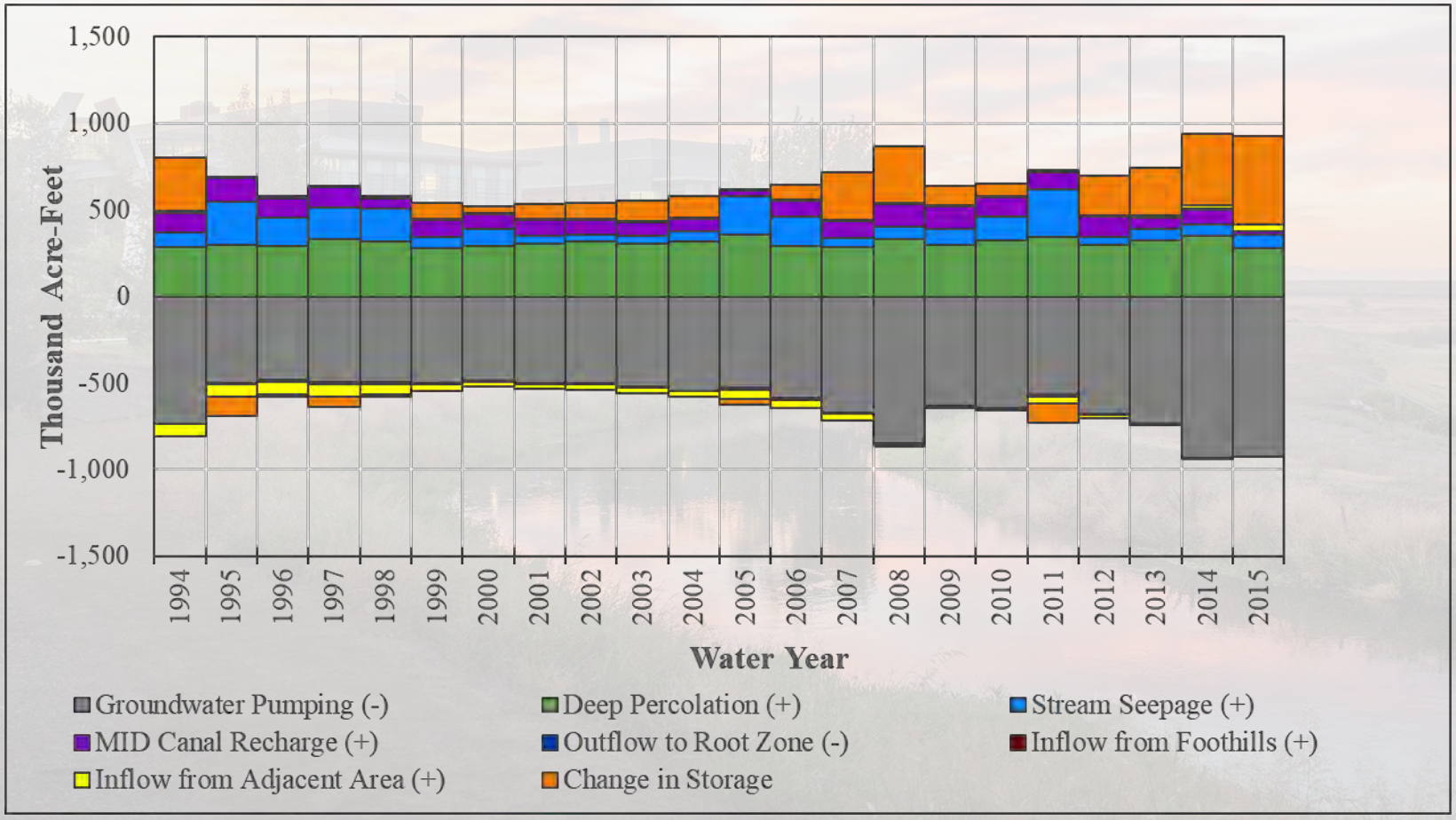

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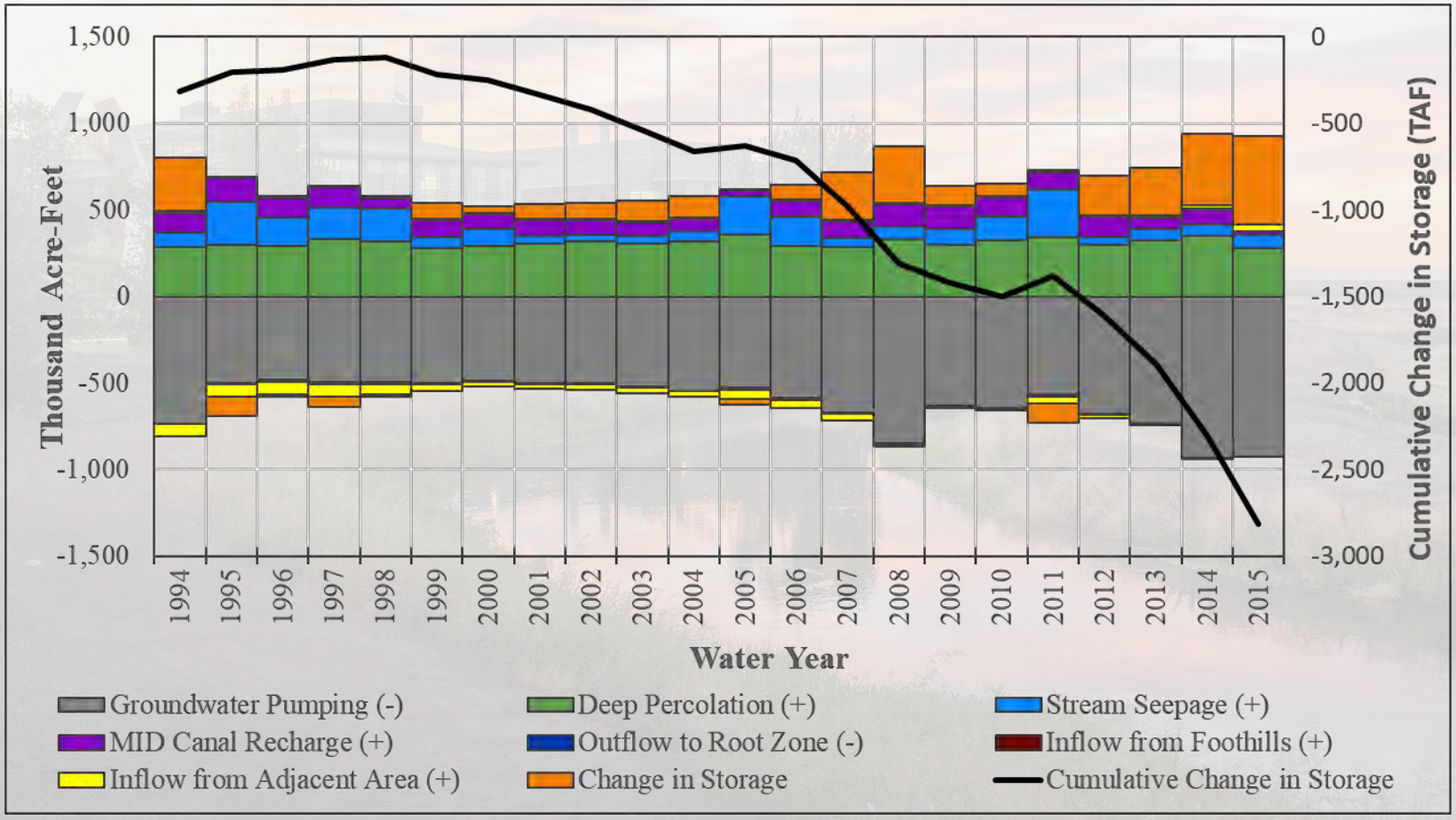

Image courtesy: Veronica Adrover/UC Merced

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Projected Conditions Baseline – 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

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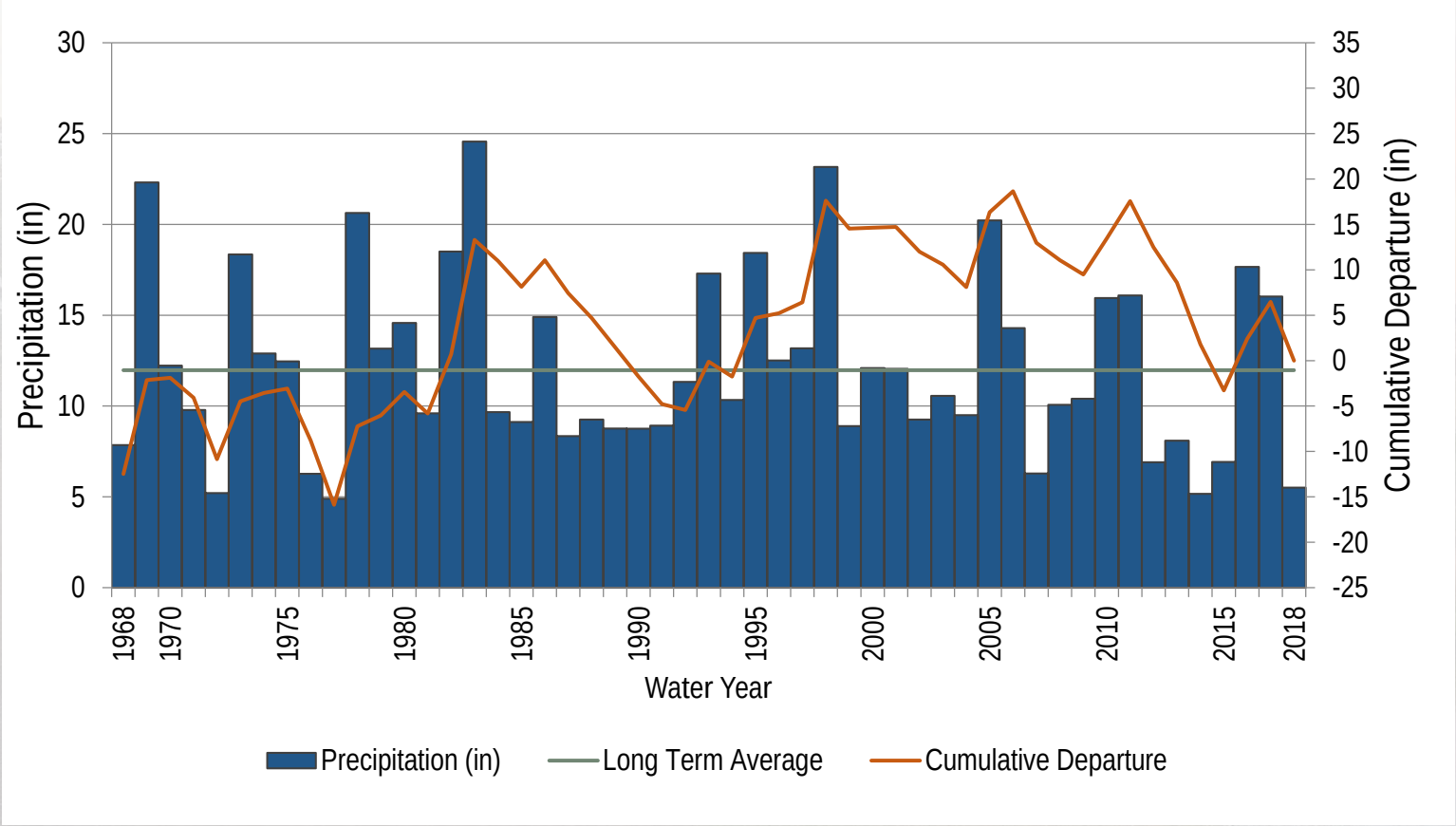
Merced WR Model Historical Hydrology



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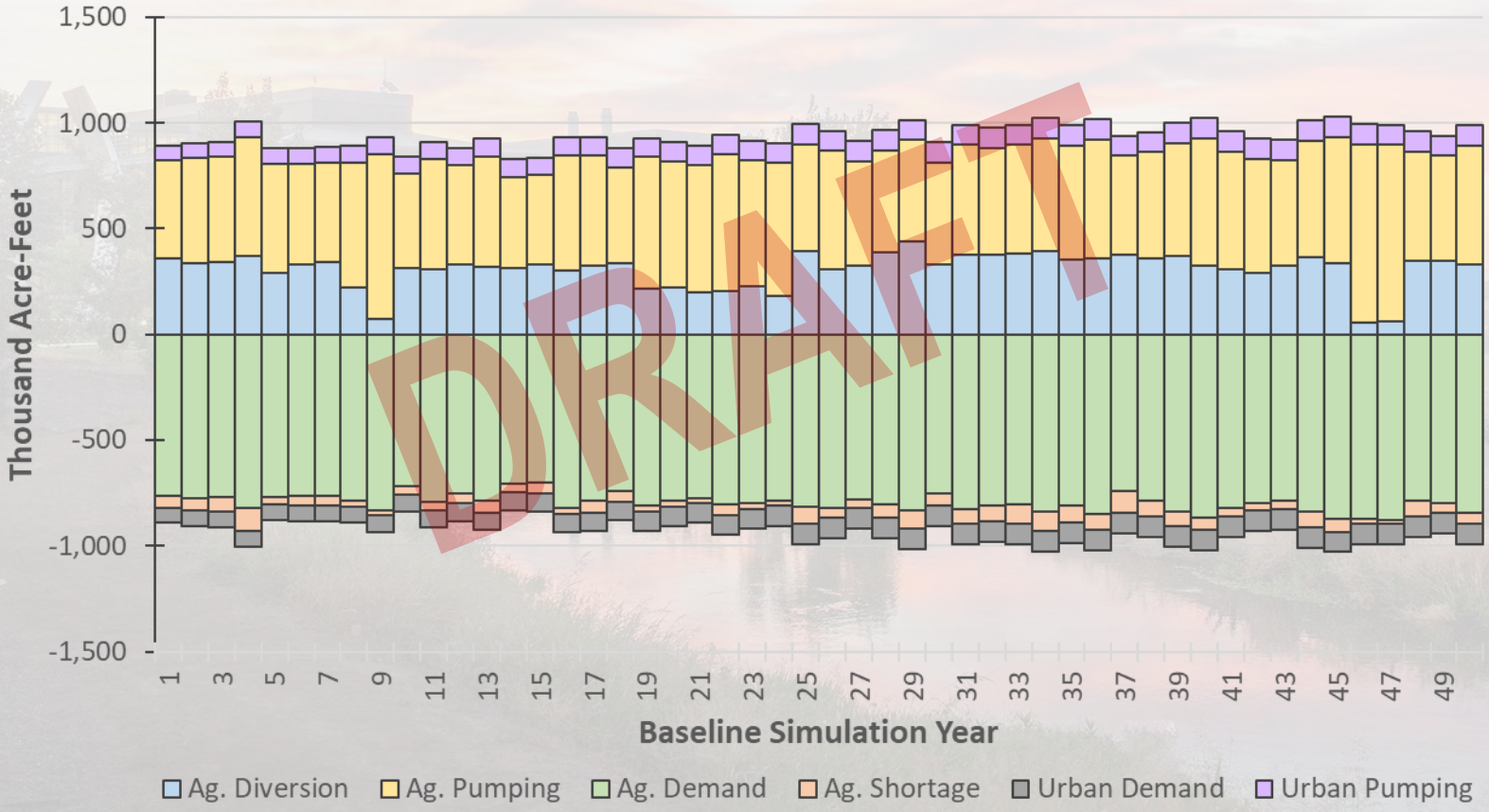
Land and Water Use Budget

[Projected Conditions Baseline]



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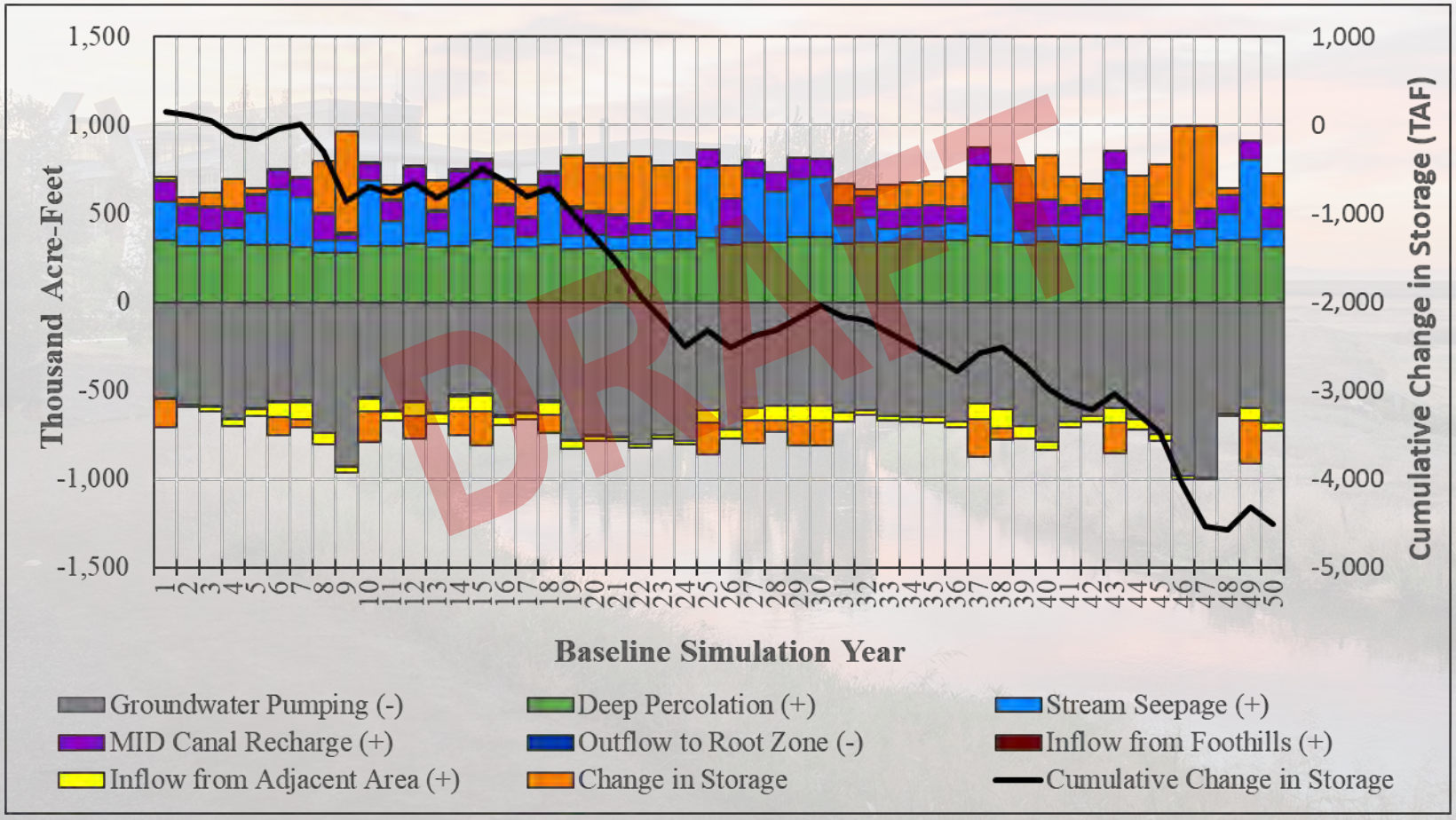

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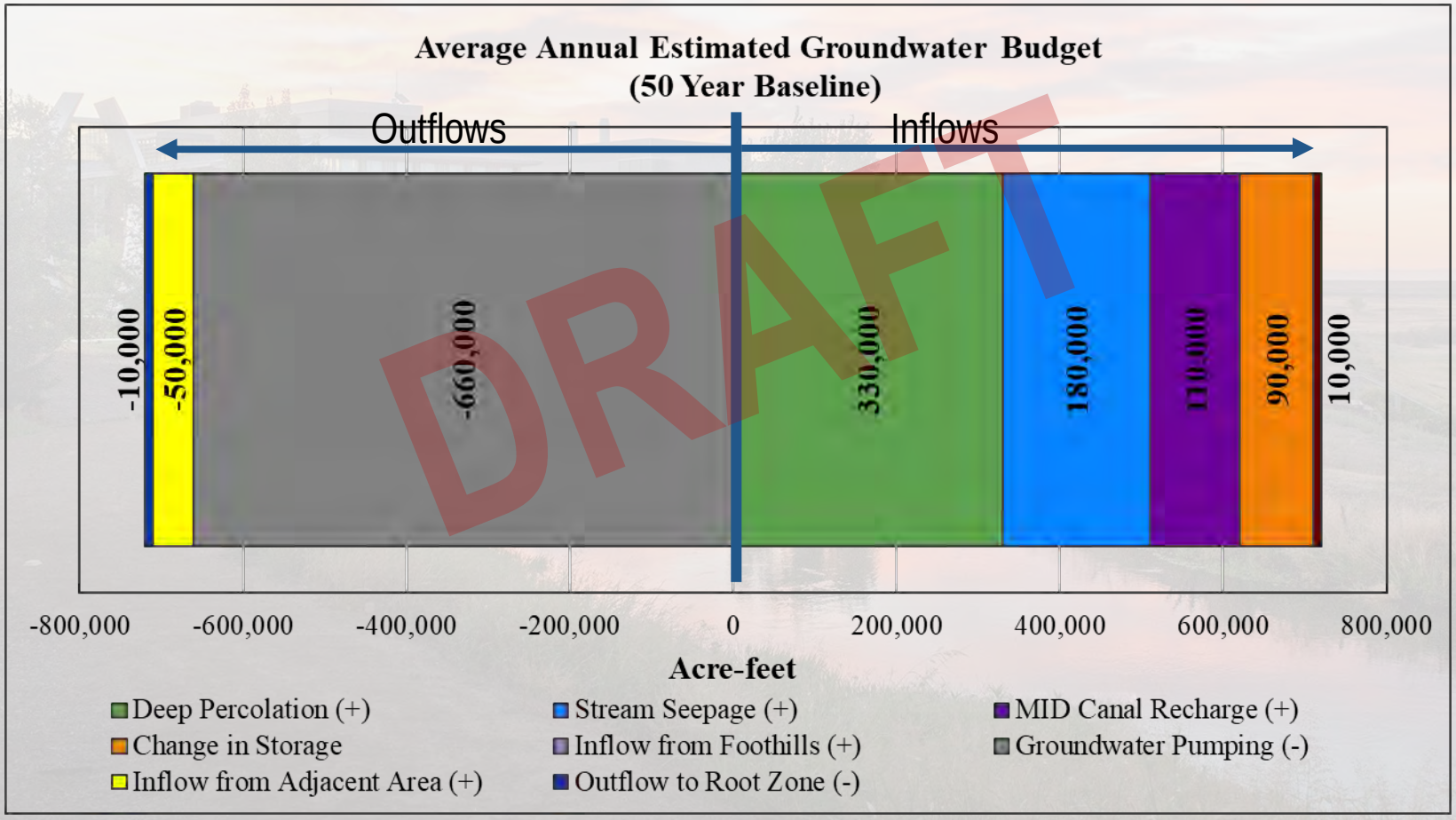

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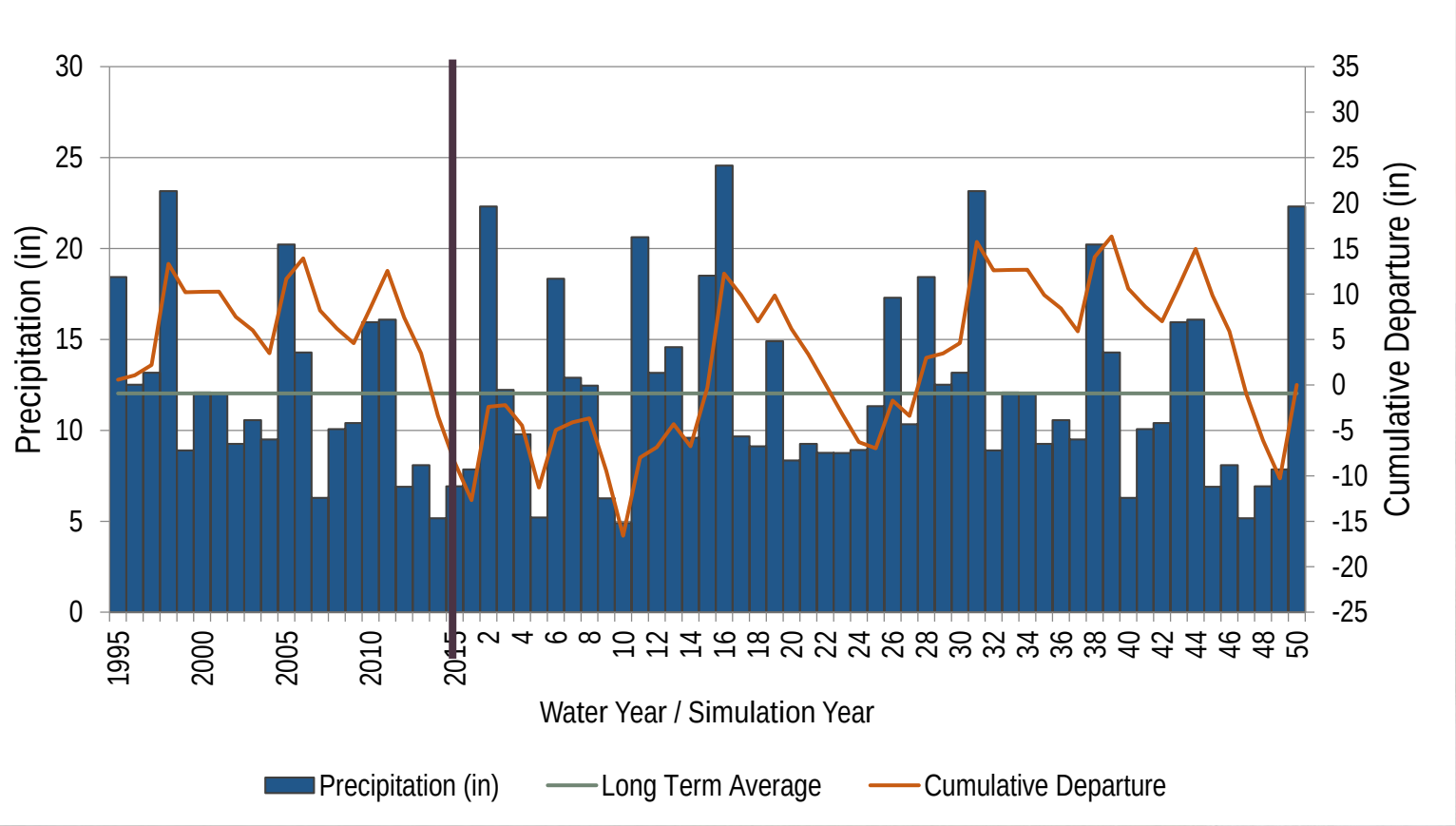
Merced WR Model Baseline Hydrology



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Land and Water Use Budget

[Sustainable Yield Analysis]

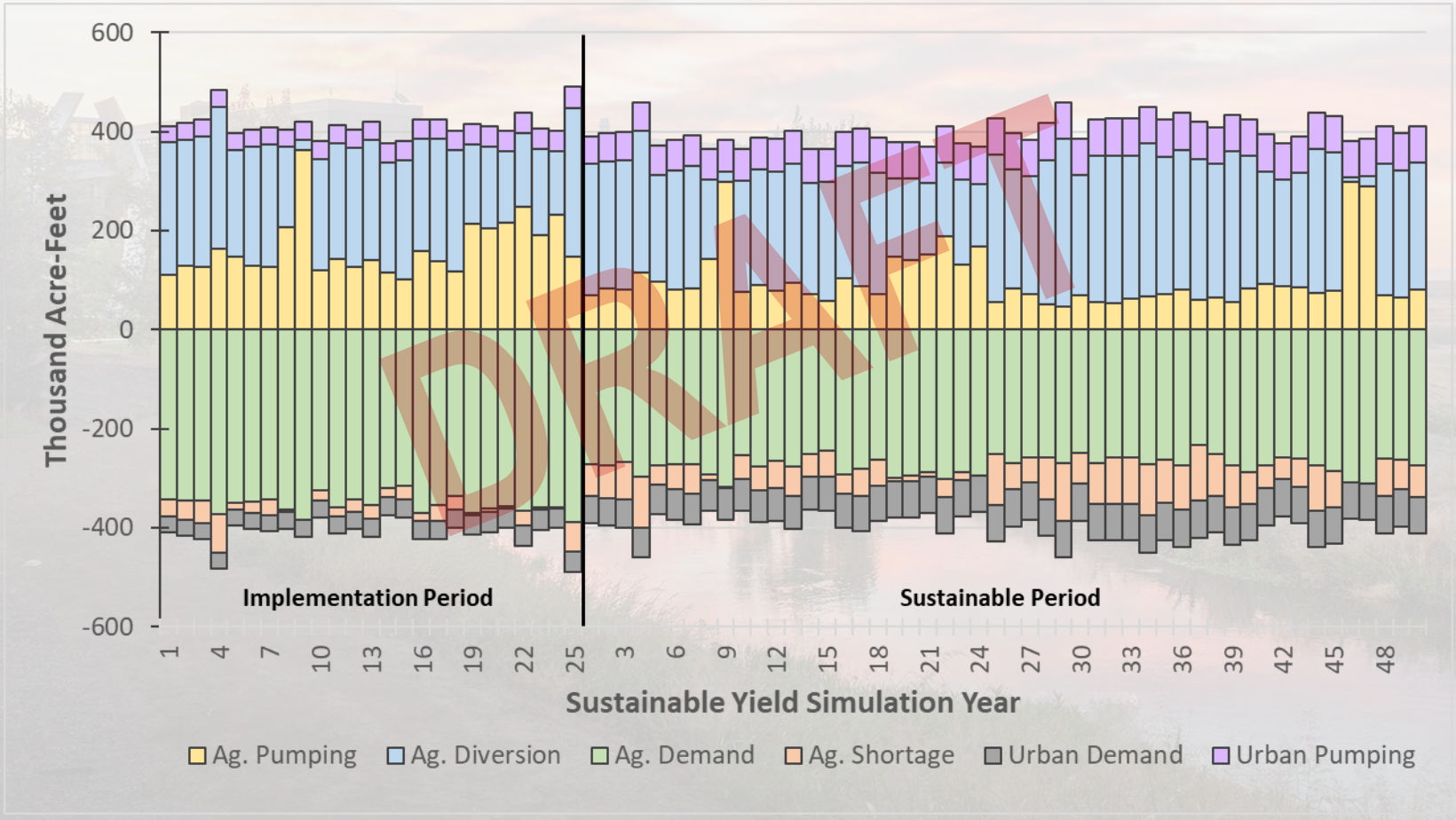

Image courtesy: Veronica Adrover/UC Merced

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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?
  - Can be developed through a groundwater model scenario, modifying conditions to balance out the change in stored groundwater over time
- How do we work toward a balance?
  - Implement projects and management actions to increase recharge or decrease production

Image courtesy: Veronica Adrover/UC Merced

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Modeling Assumes "Glidepath" to Sustainability Between 2020 and 2040

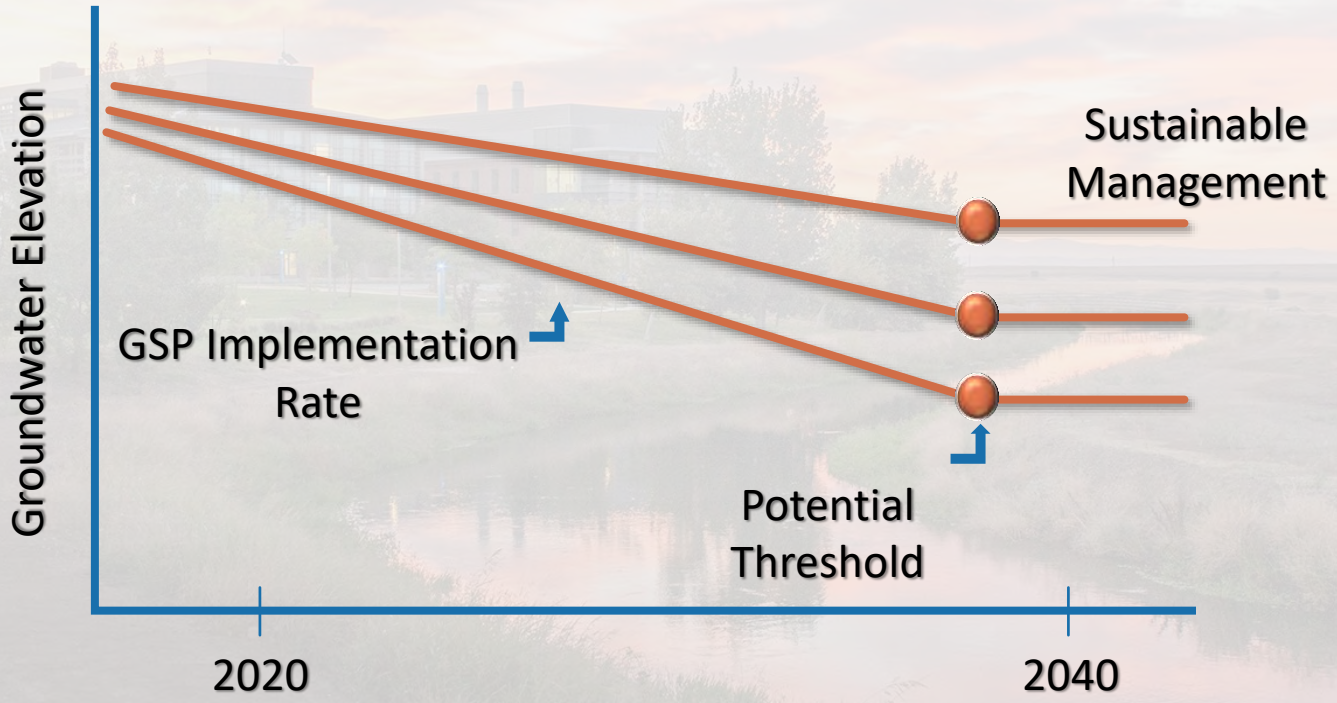


Image courtesy: Veronica Adrover/UC Merced

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

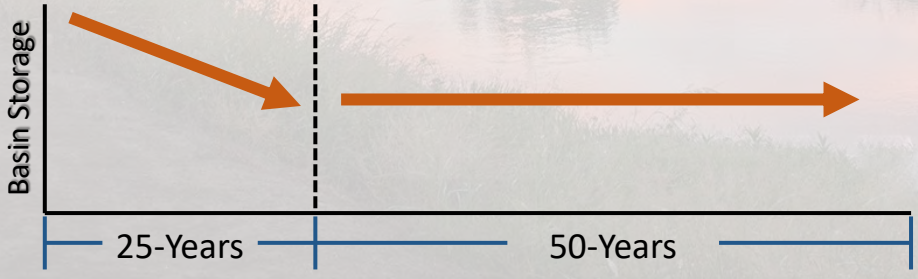
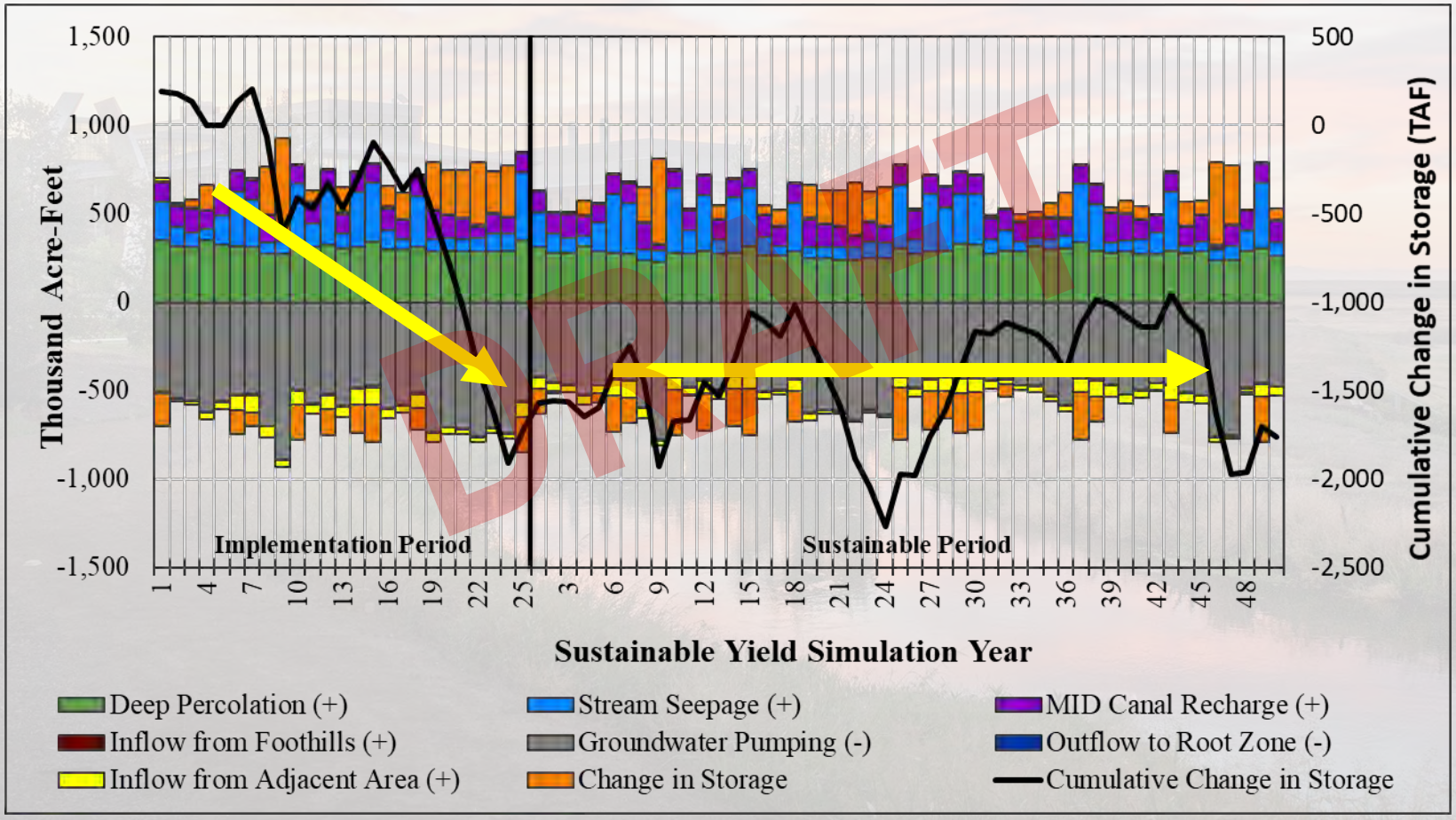


Image courtesy Veronica Addoyer/UC Merced

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

Groundwater Budget
[Sustainable Yield Analysis]



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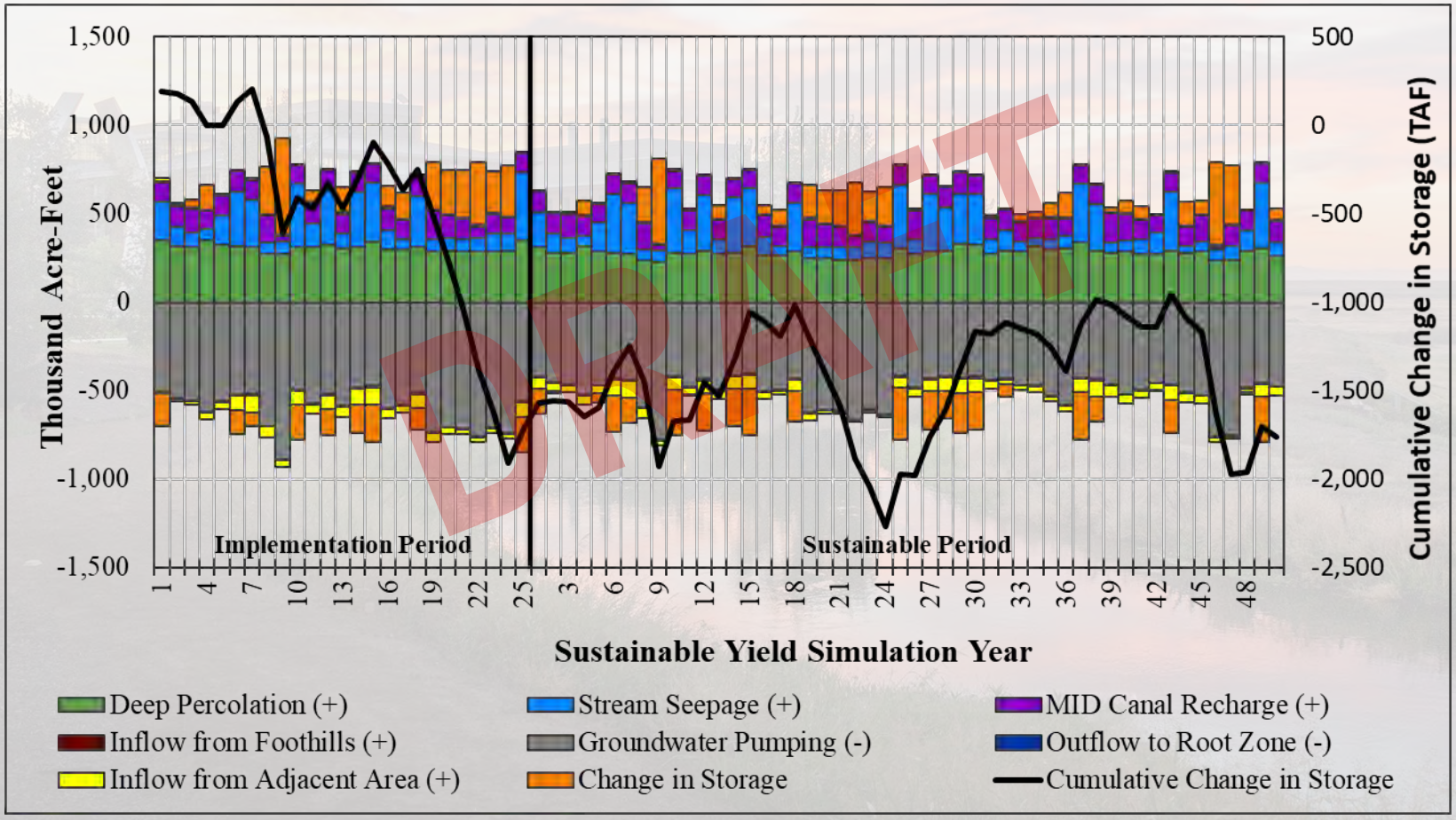

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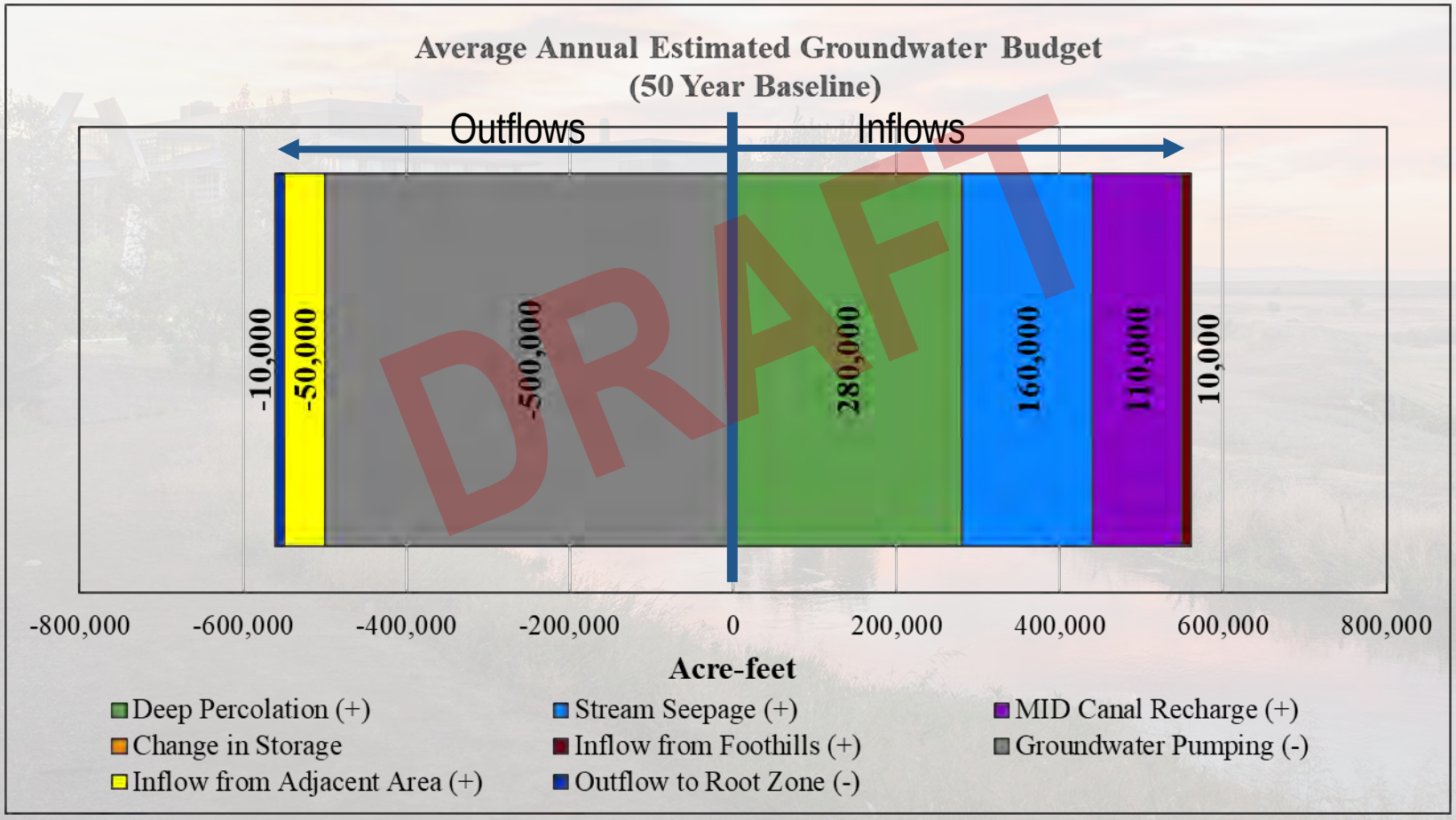
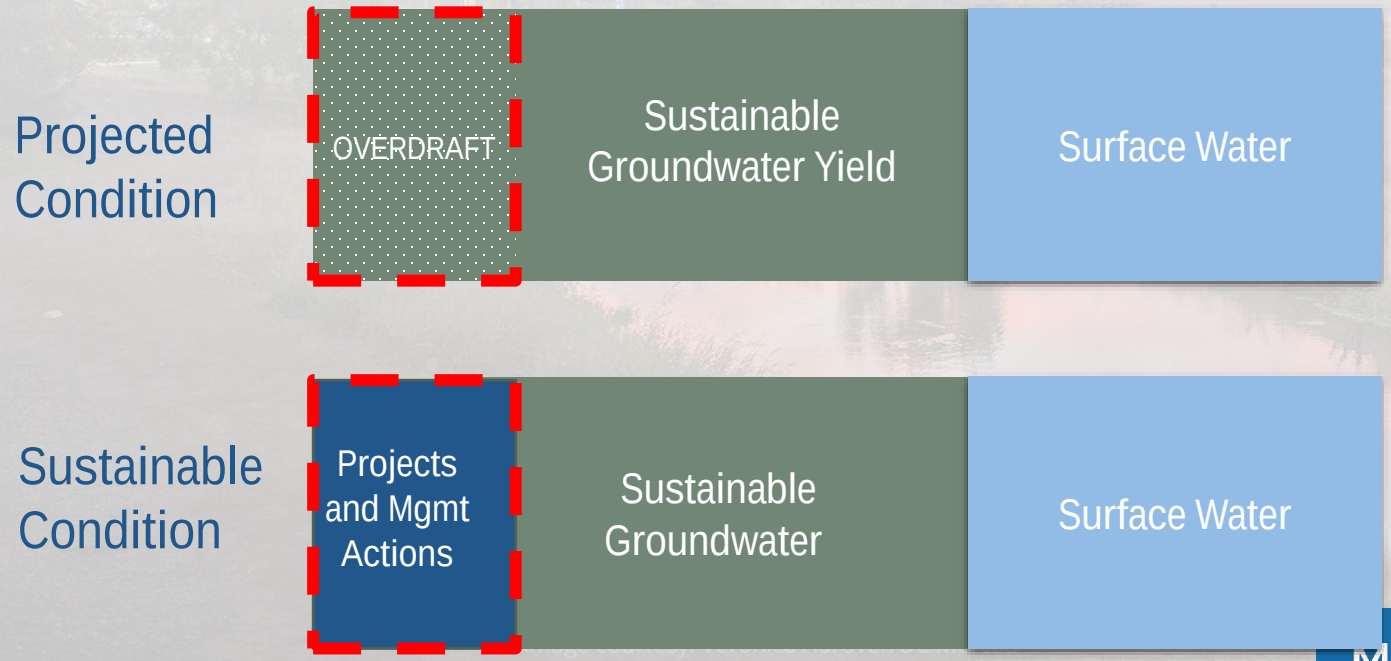


Image courtesy: Veronica Adrover/UC Merced

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

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Public Outreach Update

Image courtesy: Veronica Adrover/UC Merced

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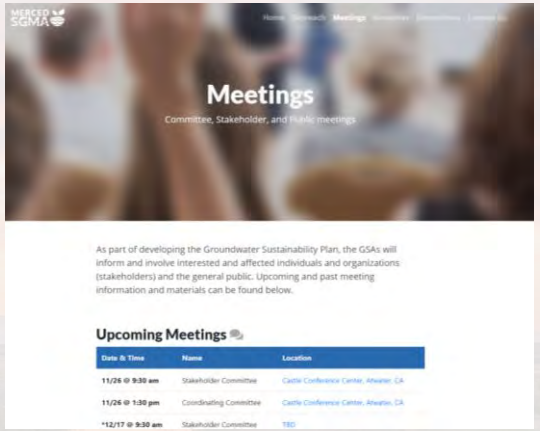
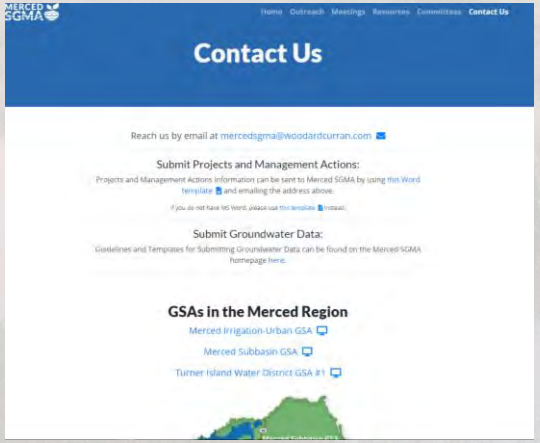
Public Outreach: Current Progress

- **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

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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

Image courtesy Veronica Adrover/UC Merced

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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

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Groundwater Well Data Collection

Image courtesy: Veronica Adrover/UC Merced

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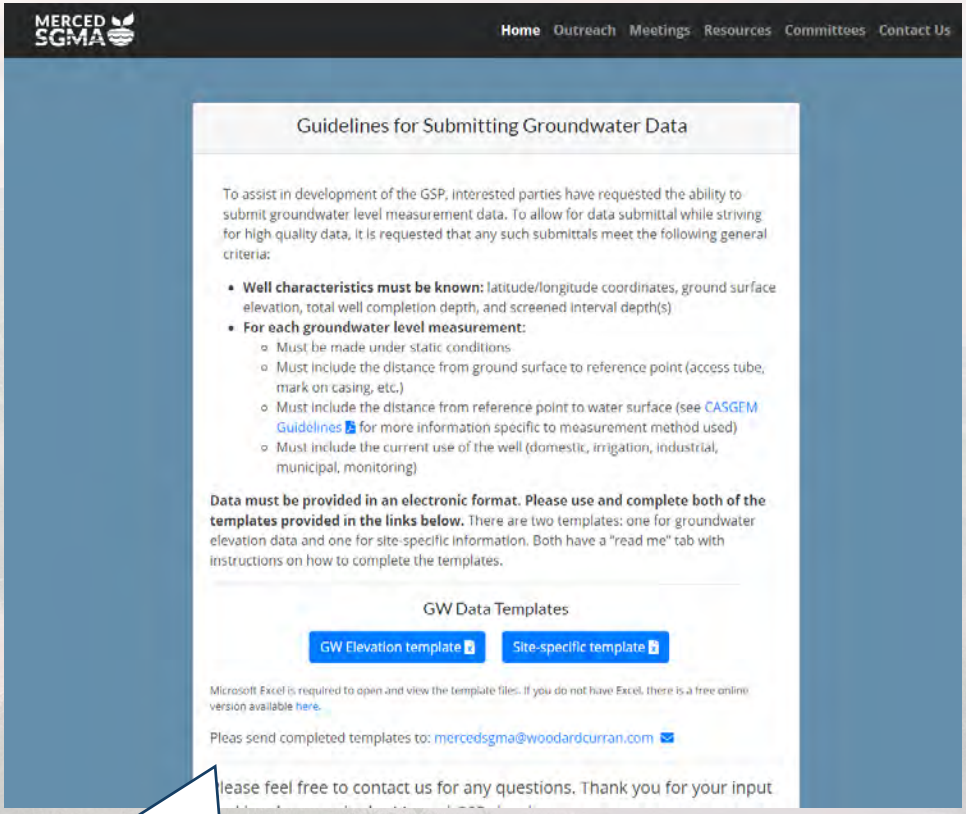
Submitting Groundwater Well Data

- 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)**



Guidelines & templates for submitting data on MercedSGMA homepage

Image courtesy

MERCED SGMA

Submitting Groundwater Well Data

- **In submitting data, certain well characteristics must be known:** latitude/longitude coordinates, ground surface elevation, total well completion depth, and screened interval depth(s)

- **Each groundwater level measurement must:**
  - Be made under **static conditions**
  - Include the **distance from ground surface to reference point** (access tube, mark on casing, etc.)
  - Include the **distance from reference point to water surface**
  - Include the **current use** of the well (domestic, irrigation, industrial, municipal, monitoring)
  - Be provided in **electronic format**

Image courtesy: Veronica Adrover/UC Merced

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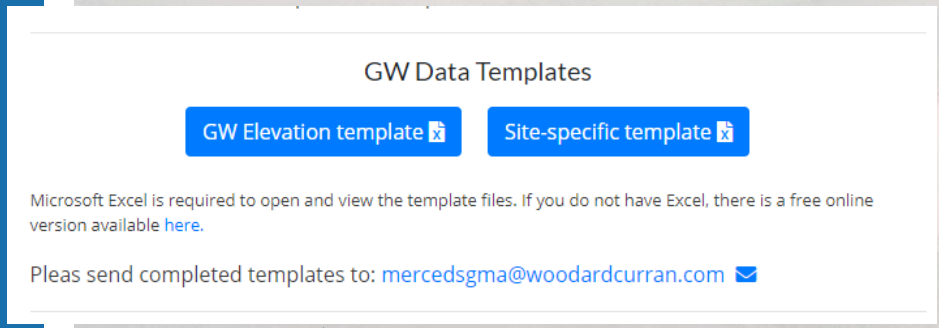
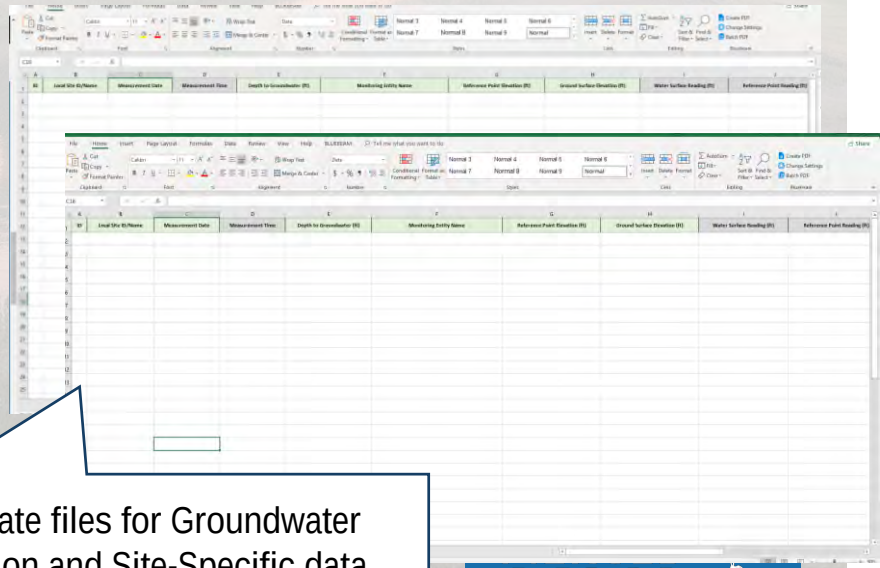
Submitting Groundwater Well Data

- **Please use the two templates provided:**
  - Groundwater elevation template
  - Site-specific information
- **Both have a "read me" tab** with instructions to help you complete the templates.
- **Please send completed templates to** mercedsgma@woodardcurran.com



Location for GW Data Templates



Template files for Groundwater Elevation and Site-Specific data

Next Steps

Image courtesy: Veronica Adrover/UC Merced

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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

Image courtesy: Veronica Adrover/UC Merced

Questions?

Image courtesy: Veronica Adrover/UC Merced

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