Merced Subbasin Groundwater Sustainability Agency
JOINT MEETING OF THE TECHNICAL AND ADVISORY COMMITTEES

County of Merced Administration Building, Room 310

2222 M Street, Merced, California

May 16, 2019

Special Meeting

2:00PM

AGENDA

Alternate formats of this agenda will be made available upon request by qualified individuals with disabilities. Appropriate interpretive services for this meeting will be provided if feasible upon advance request by qualified individuals with disabilities. Please contact the Secretary at (209) 385-7654 for assistance and allow sufficient time to process and respond to your request. Copies of agendas and minutes will be available at the Merced County Community and Economic Development Department and at www.countyofmerced.com/MercedSubbasinGSA.

1. **INTRODUCTIONS**

2. **PUBLIC COMMENT PERIOD**
   Public opportunity to speak on any matter of public interest within the Agency's jurisdiction including items on the Agency's agenda. Testimony limited to three minutes per person.

3. **MEETING MINUTES**
   April 18, 2019

4. **CLIMATE CHANGE ANALYSIS**

5. **UNDESIRABLE RESULTS & MINIMUM THRESHOLDS**

6. **NEXT MEETING**

7. **ADJOURNMENT**

MERCED SUBBASIN GROUNDWATER SUSTAINABILITY AGENCYJOINT MEETING OF THE TECHNICAL AND ADVISORY COMMITTEES

MINUTES FOR MEETING OF APRIL 18, 2019- SPECIAL MEETING

The special meeting of the Technical and Advisory Committee for the Merced Subbasin Groundwater Sustainability Agency (GSA) was called to order at 10:00 A.m., on April 18, 2019, at the Merced County Administration Building located at 2222 "M" Street, room 310, Third Floor, Merced, California.

I. INTRODUCTIONS

All attendees did roundtable introductions.

II. PUBLIC COMMENT PERIOD

None

III. MEETING MINUTES

Minutes for March 20, 2019, were presented to the committee. Mr. Eric Swenson suggested that the Public Comment Period be split off into two paragraphs discussing management zones and neighboring basins and add that this topic was in response to a question from the public.

IV. WATER ALLOCATION FRAMEWORK UPDATE

Ms. Lacey Kiriakou informed that the Coordination Committee has made a recommendation that includes the three groundwater sustainability agencies and their sustainable yield allocations. Ms. Kiriakou explained what constitutes a sustainable yield and how allocations would be applied. Mr. Ladi Asgill asked for status on the list of projects submitted and Ms. Lacey Kiriakou informed that consultants Woodard and Curran are looking at all aspects of water allocations, budget, minimum thresholds, etc. and they will run the projects through the model for impacts on measurable objectives and other criteria. A priority list of the projects will be developed based on how they score and compare via these criteria. Mr. Asgill commented on DWR Grant money available for projects, and Ms. Kiriakou stated that once they have a list defined, they will apply for any available and applicable grants. Mr. Swenson suggested that agencies that submit projects for consideration should submit these with a cost per acre foot of delivered water analysis in order to help evaluate and decide between projects

V. MERCED SUBBASIN PROPOSITION 218 PROCESS

Ms. Kiriakou informed that the Merced Subbasin GSA Board agreed to look at a 218 per acre charge for equal allocation to grazing landowners and directed staff to work with consultants Provost and Pritchard as well as Woodard and Curran to provide a summary of alternatives. Ms. Kiriakou notified that per the Sustainability Groundwater Agency (SGMA,) if the GSA is not funded, then local agencies risk the State stepping in and imposing their own fees and regulations. Ms. Kiriakou demonstrated a fee comparison for the State based on a 100-acre irrigated parcel with one well to be approximately $14,300 per year. She stated the Prop 218 would allow funding for the functions of the GSA and GSP Development, as well as Staff, monitoring, annual reports and studies. The fee will not be used to fund implementation of projects as a separate 218 process will needed for that. Ms. Kiriakou spoke about how determinations were made for the budget and went over the maximum amount determined that the GSA could collectively charge from the 218 Process fee would be $750,000. Mr. Eric Swenson stated he was concerned this fee might not be high enough to cover GSA costs for the next five years and recommended letting the GSA Board about this concern. Ms. Kiriakou discussed three alternatives options Alternative #1 being an equal charge per acre, Alternative #2 being a fixed minimum plus extra for irrigated Ag land, and Alternative #3 being a sliding scale fee. Mr. Swenson suggested taking a look at the assessed value of irrigated farmland and rangeland from an Assessor's list as that might help the determination of fees based on economics. Ms. Kiriakou also discussed next steps with upcoming meeting schedules and discussed a rate study being put together to present to the GSA Board at a future meeting. Ms. Kiriakou explained that the 218 process allows for the landowners to participate in a protest vote and if 50% +1 of the landowners protest the 218 process, the GSA will not approve this. Ms. Kiriakou stated that if that were to occur, then they would have to go back and revisit a new method to collect fees or run the risk of not funding the GSA.The committee discussed ways to promote news and information about the GSA within the local community including newspapers, radio and other media sources.

V. PROJECT TO MODEL DEMAND REDUCTION

Ms. Kiriakou informed about a model presented to the GSA for the need to demand reduction of the total applied water by 200,000 acre-feet by 2040 and the management actions needed to be able to reach a sustainable yield. Ms. Kiriakou and the committee discussed scenarios of proposed reductions that the GSA will need to review and consider. There was a suggestion made to wait for

5 years and then gradually do a linear reduction. Discussion was had about permanent diversion permits and the application process with the State Board.

V. GSP SECTION REVIEW SCHEDULE

Ms. Kiriakou went over the Groundwater Sustainability Plan (GSP) review schedule and important dates in the GSP process.

VI. NEXT MEETING

May 16, 2019 at 2:00 pm.

VII. ADJOURNMENT

Meeting was adjourned at 11:19 a.m.

Merced Subbasin GSA
Joint Technical and Advisory Committee Meeting
May 16, 2019

Climate Change Analysis

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Climate Change Analysis:
Regulatory Requirements

Section 354.18(d)(3) states:

"(d) The Agency shall utilize the following information provided, as available, by the Department pursuant to Section 353.2, or other data of comparable quality, to develop the water budget:

(1) Historical water budget information for mean annual temperature, mean annual precipitation, water year type, and land use.

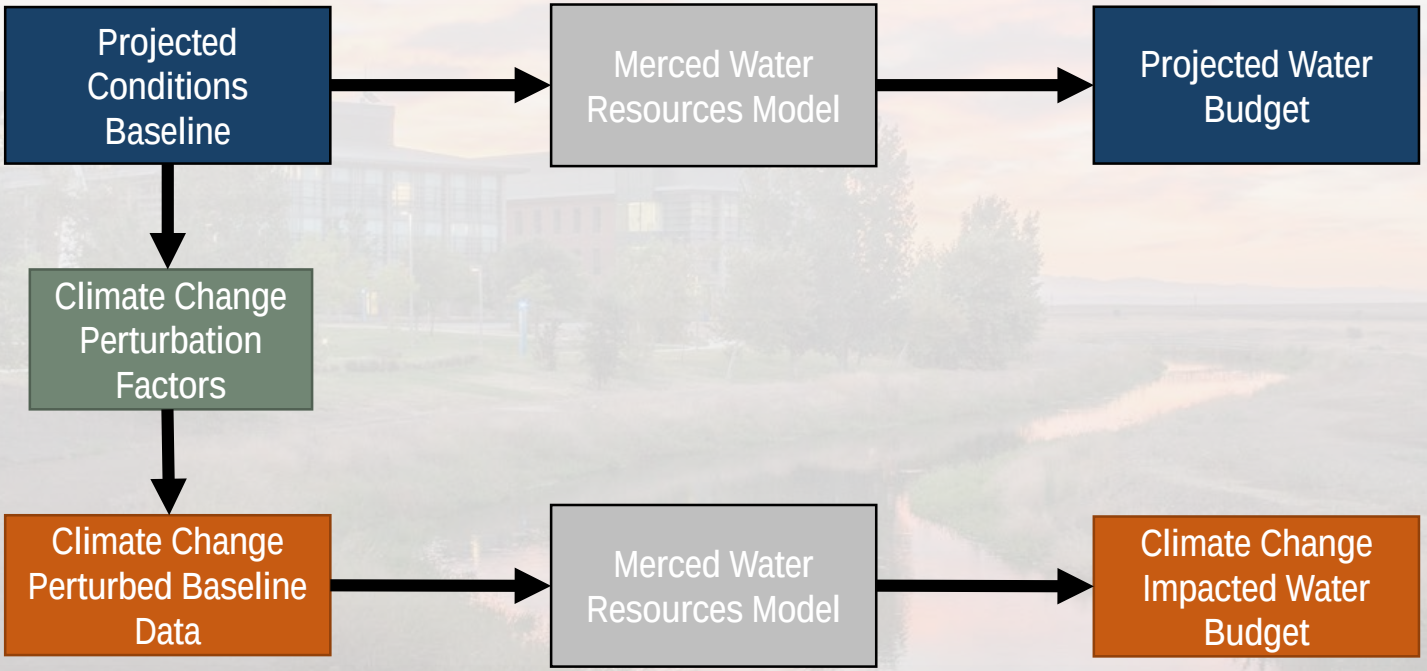
(2) Current water budget information for temperature, water year type, evapotranspiration, and land use.

*(3) Projected water budget information for population, population growth, **climate change**, and sea level rise." (emphasis added)*

Image courtesy: Veronica Adrover/UC Merced

Climate Change Analysis:

Approach for Merced GSP Consistent with DWR Approach



A change factor from DWR is applied to the Projected Data Baseline to simulate the impact of climate change. This creates the Climate Change Baseline, which is put into the Merced model. The output is the Climate Change Water Budget.

Climate Change Analysis:

DWR has provided Climate Change Data and Guidance

Perturbed Variable
Unregulated Streamflow
Regulated Streamflow
Precipitation
Reference ET

The analysis considered impacts on the individual water resource system elements that directly link to groundwater, including: precipitation, streamflow, and evapotranspiration.

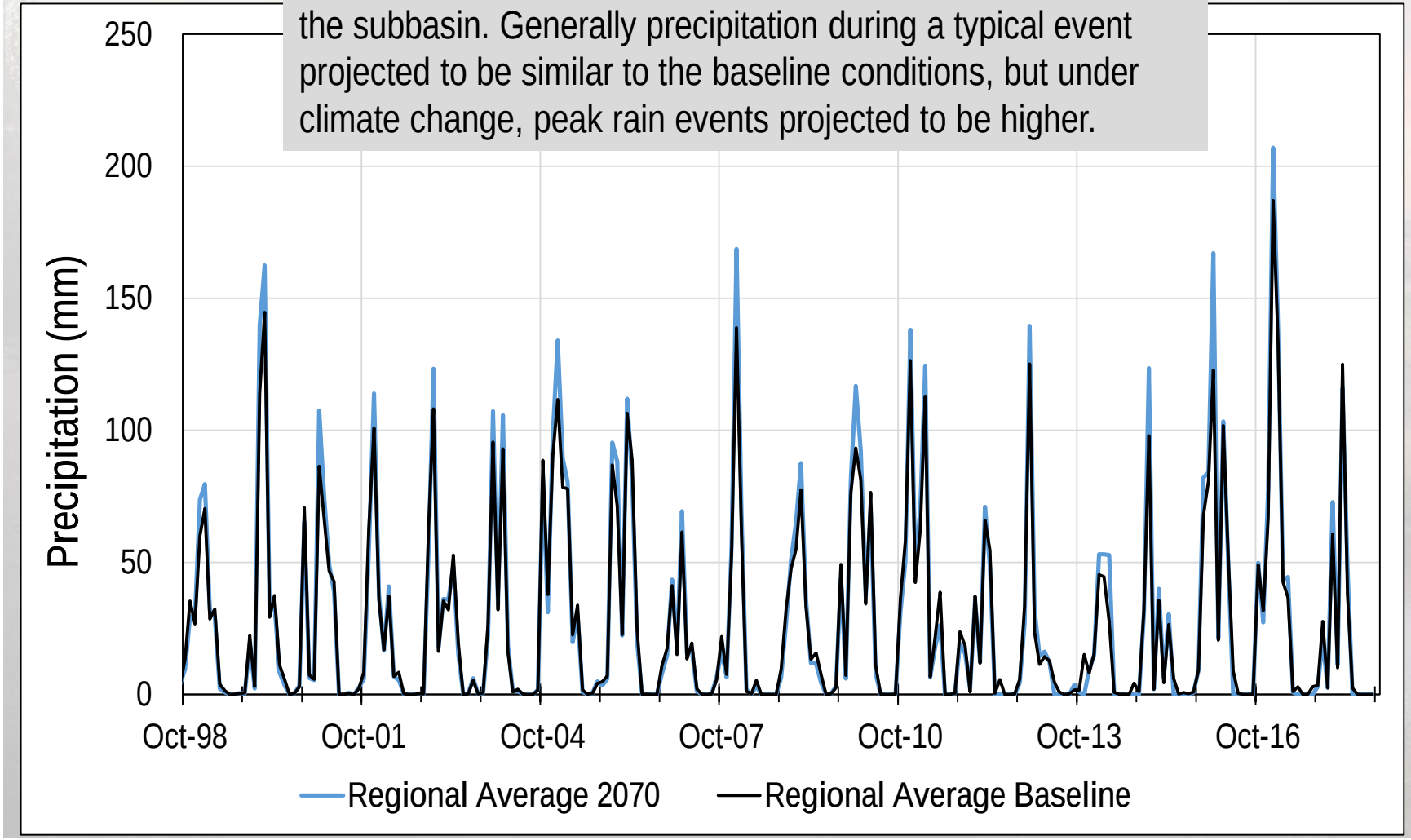
Image courtesy: Veronica Ardoveri/UC Merced

Climate Change Analysis:
Overview of Merced GSP Approach

Projected Baseline and Sustainability Analysis *without* Climate Change Analysis*	Projected Baseline *with* Climate Change Analysis
Includes variability in: • Long-term and seasonal hydrology • Agricultural land use and level of development • Population, urban growth, and urban water use conditions • Water Supply conditions and availability *Above presented in the Water Budget Memo	Additionally includes: • Modified Precipitation • Modified Crop ETa • Modified Streamflows

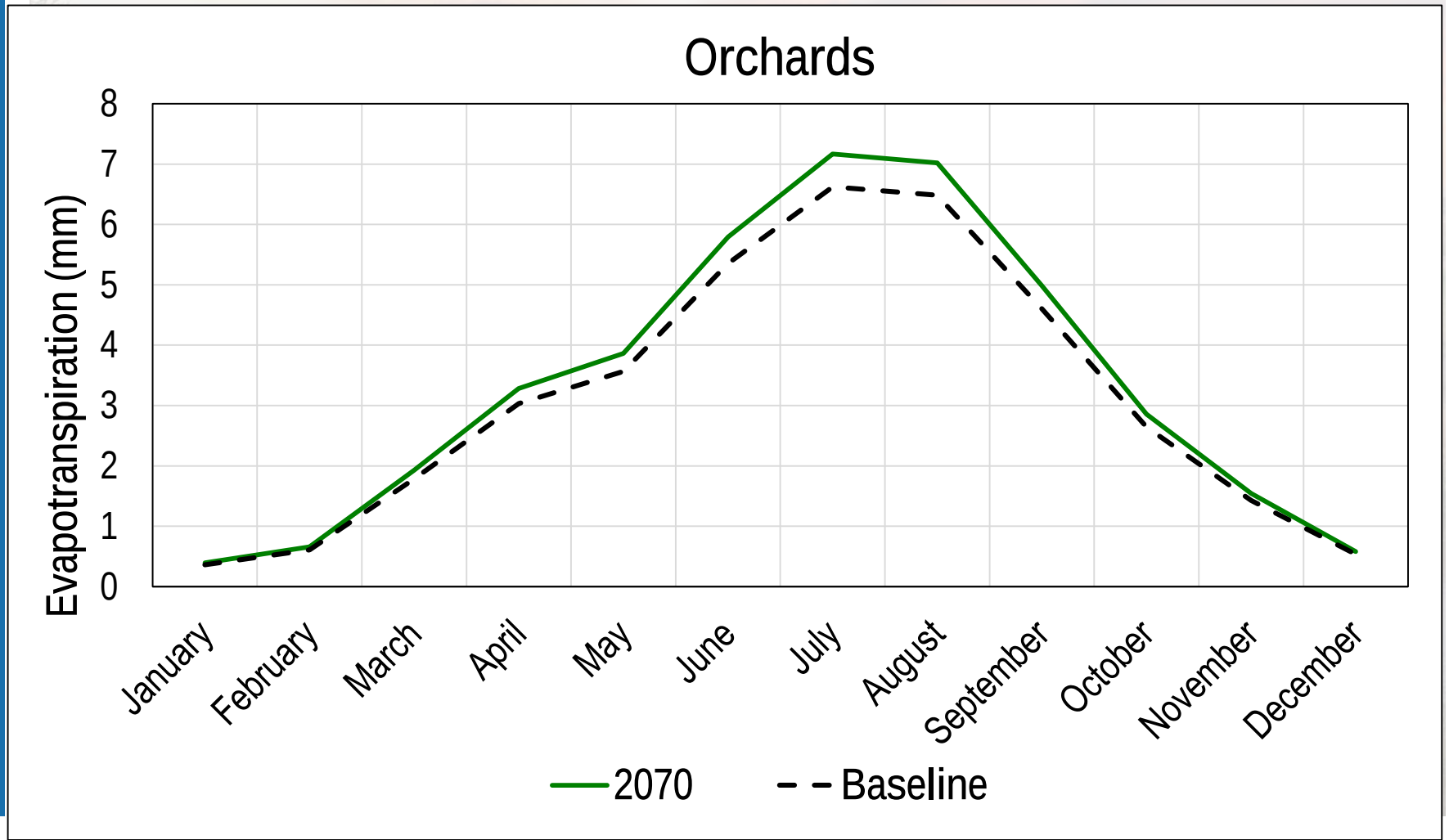
Climate Change Analysis: Precipitation

Baseline and Climate Change scenarios are averaged over the subbasin. Generally precipitation during a typical event projected to be similar to the baseline conditions, but under climate change, peak rain events projected to be higher.



Climate Change Analysis: Evapotranspiration

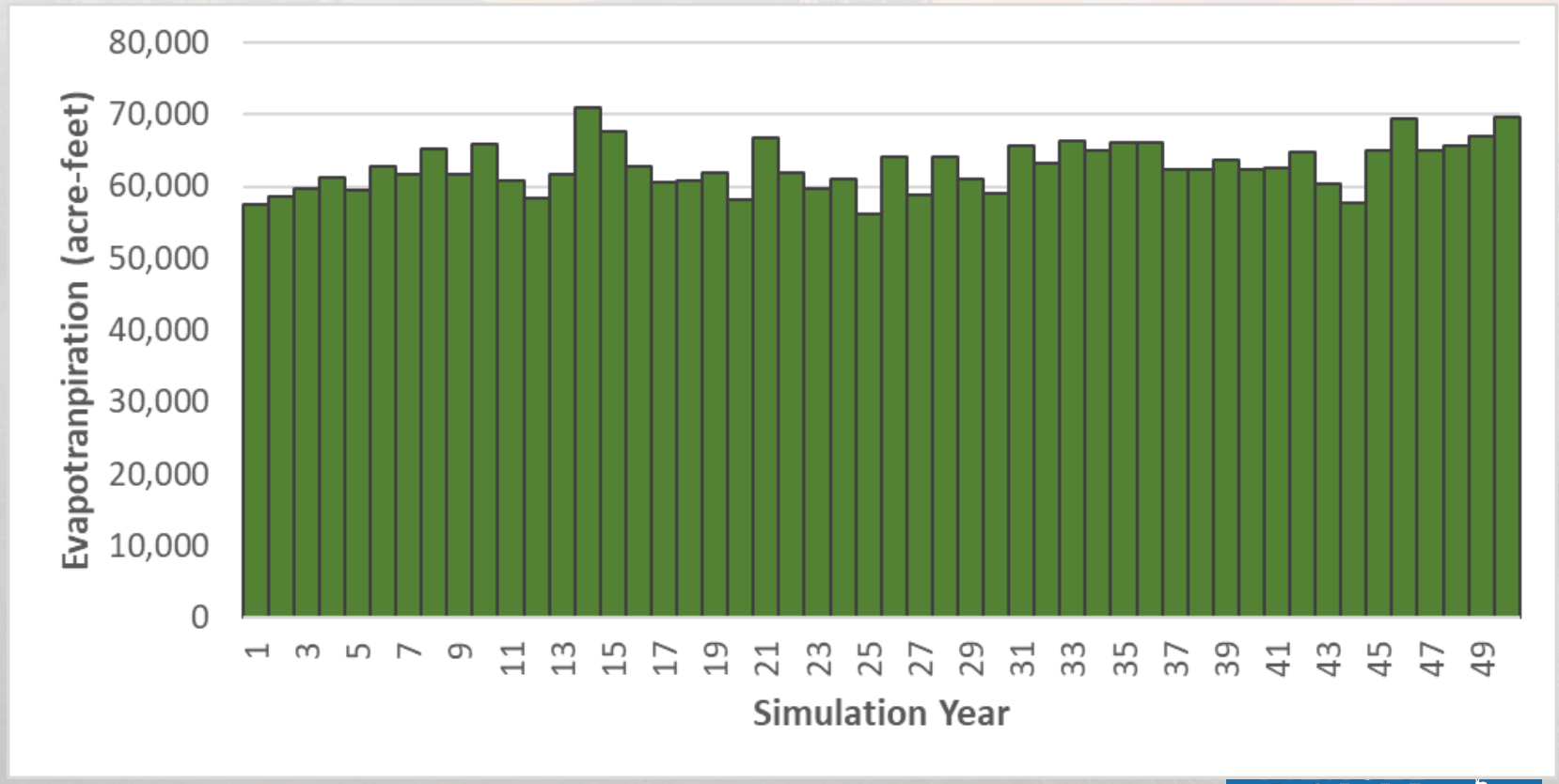
- Under climate change scenario, ET was forecasted to increase 8%



Climate Change Uncertainty Analysis:

Average increase in ET basin-wide is 63,000 AFY

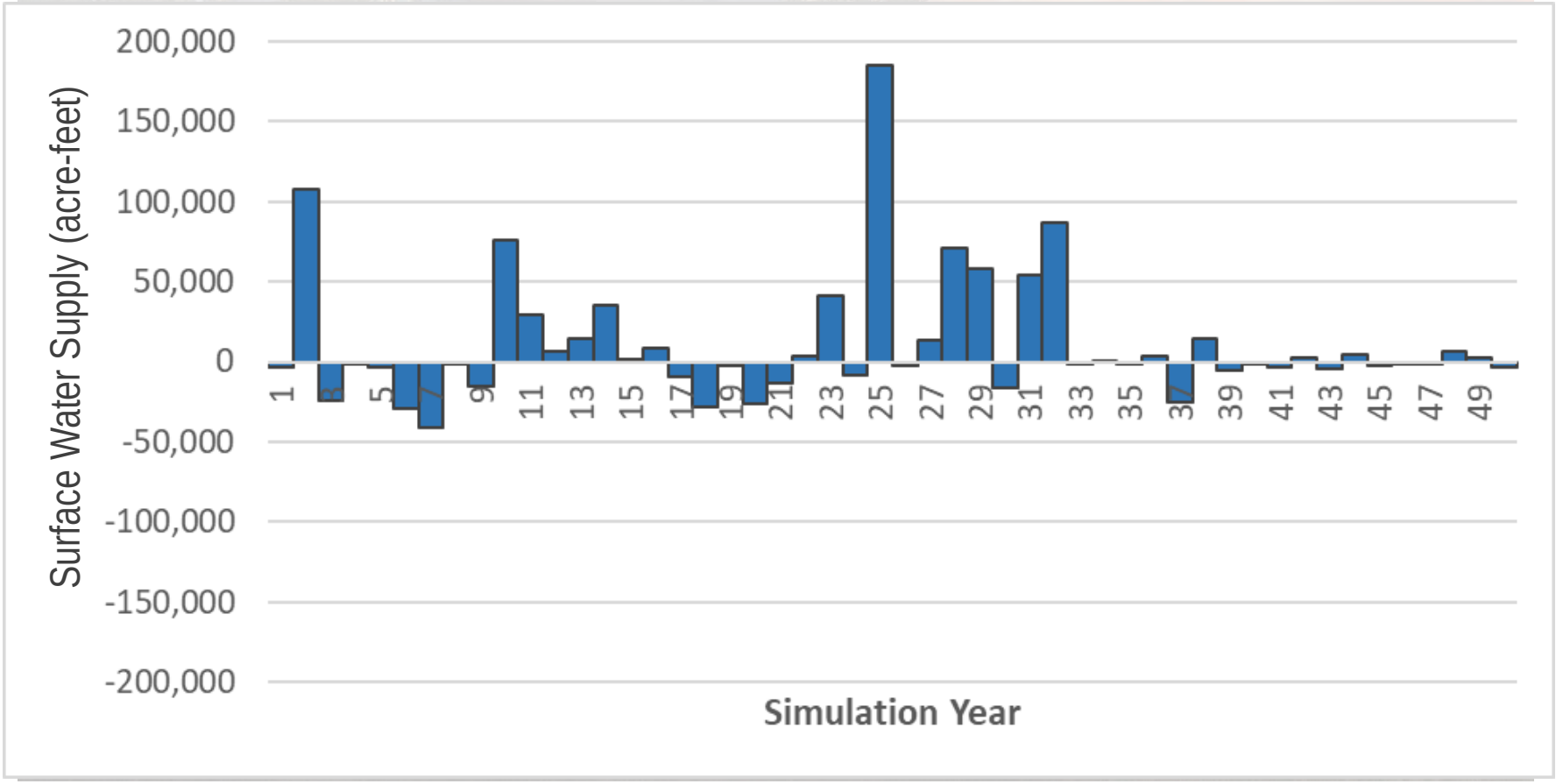
- Changes in ET due to Climate Change (CC Scenario minus Baseline)



Climate Change Uncertainty Analysis:

Findings from Projected Climate Change Budget Run

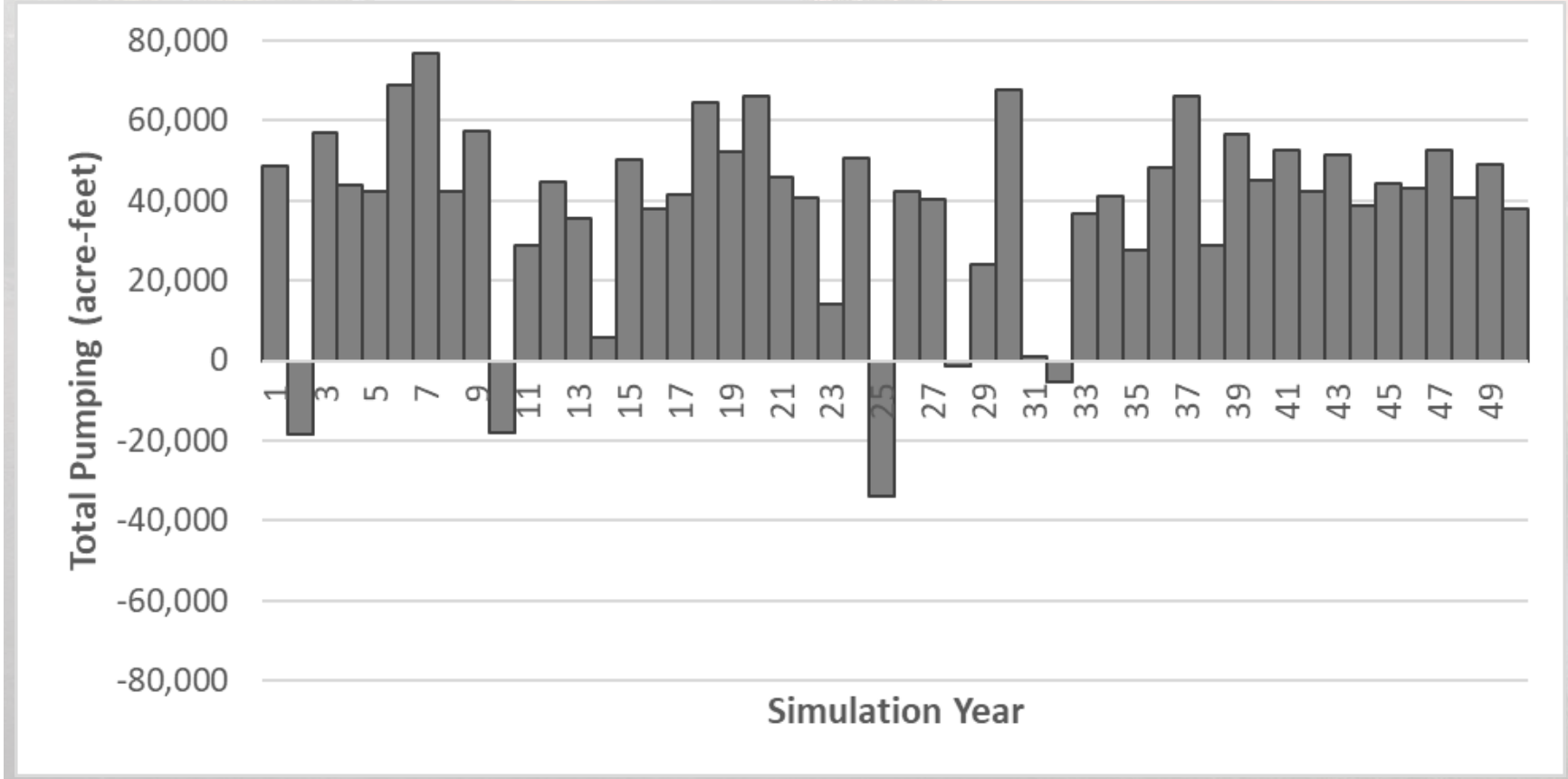
- Changes in Surface Water Supplies due to Climate Change (CC Scenario minus Baseline)



Climate Change Uncertainty Analysis:

Groundwater Pumping Increases under Climate Change Scenario

- Changes in Groundwater Production due to Climate Change (CC Scenario minus Baseline)



Climate Change Uncertainty Analysis:
Summary of Findings

- Analysis was based on the projected conditions baseline with climate change perturbed inputs for streamflow, precipitation, and ET
- Under CC scenario, evapotranspiration forecasted to increase 8%
- Private groundwater pumping simulated to increase 7% from 536,000 AFY to 565,000 AFY
- Depletion in aquifer storage project to increase from 82,000 AFY to 130,000 AFY
- Analysis based on regional model – recommended future refinement to use MIDH2O to better simulate local operations response to changes in water demands

Image courtesy: Veronica Adrover/UC Merced

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Undesirable Results & Minimum Thresholds

Image courtesy: Veronica Adrover/UC Merced

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Undesirable Results Definition

- "Significant and Unreasonable" negative impacts that can occur for each Sustainability Indicator
- Conditions that we do not want to occur
- Used to guide and justify GSP components
  - Monitoring Network
  - Minimum Threshold
  - Projects and Management Actions

Merced GSP Sustainability Goal

The sustainability goal for the Merced Subbasin is *to achieve sustainable groundwater management on a long-term average basis by increasing recharge and/or reducing groundwater pumping, while avoiding undesirable results.*

Image courtesy: Veronica Adrover/UC Merced

Sustainable Management Criteria Definitions

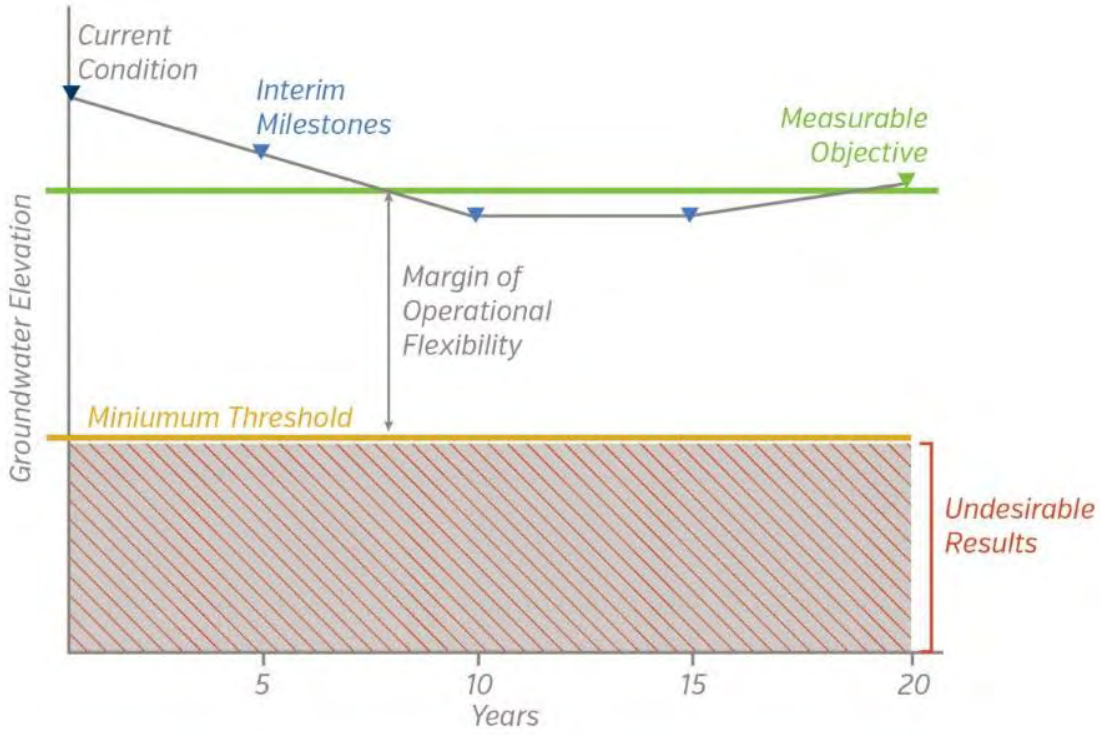

Image courtesy: Veronica Adrover/UC Merced

Chronic Lowering of Groundwater Levels: Undesirable Results

- Undesirable Results qualitatively described in previous CC meetings
  - Unusable and stranded groundwater extraction infrastructure
  - Reduced groundwater production
  - Increased pumping costs due to greater lift and deeper installation or construction of new wells
  - Shallow domestic wells going dry
- Need to define quantitatively

Image courtesy: Veronica Adrover/UC Merced

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Chronic Lowering of Groundwater Levels: Minimum Thresholds

Methods used:

- Representative monitoring wells: 30 CASGEM wells (above, below, & outside the Corcoran Clay)
- Minimum threshold is placed at depth of shallowest domestic well:
  - Merced County electronic database with wells permitted 1990s or later
  - Wells less than 50 feet deep not considered (50 ft annular seal requirement)
  - Outliers were removed via interquartile range analysis
  - Used shallowest well within a 2-mile buffer of each CASGEM representative monitoring well
- Then: Compare proposed minimum threshold against modeled groundwater elevations during implementation and sustainable yield periods (2015-2090)

Image courtesy: Veronica Adrover/UC Merced

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Example Hydrograph

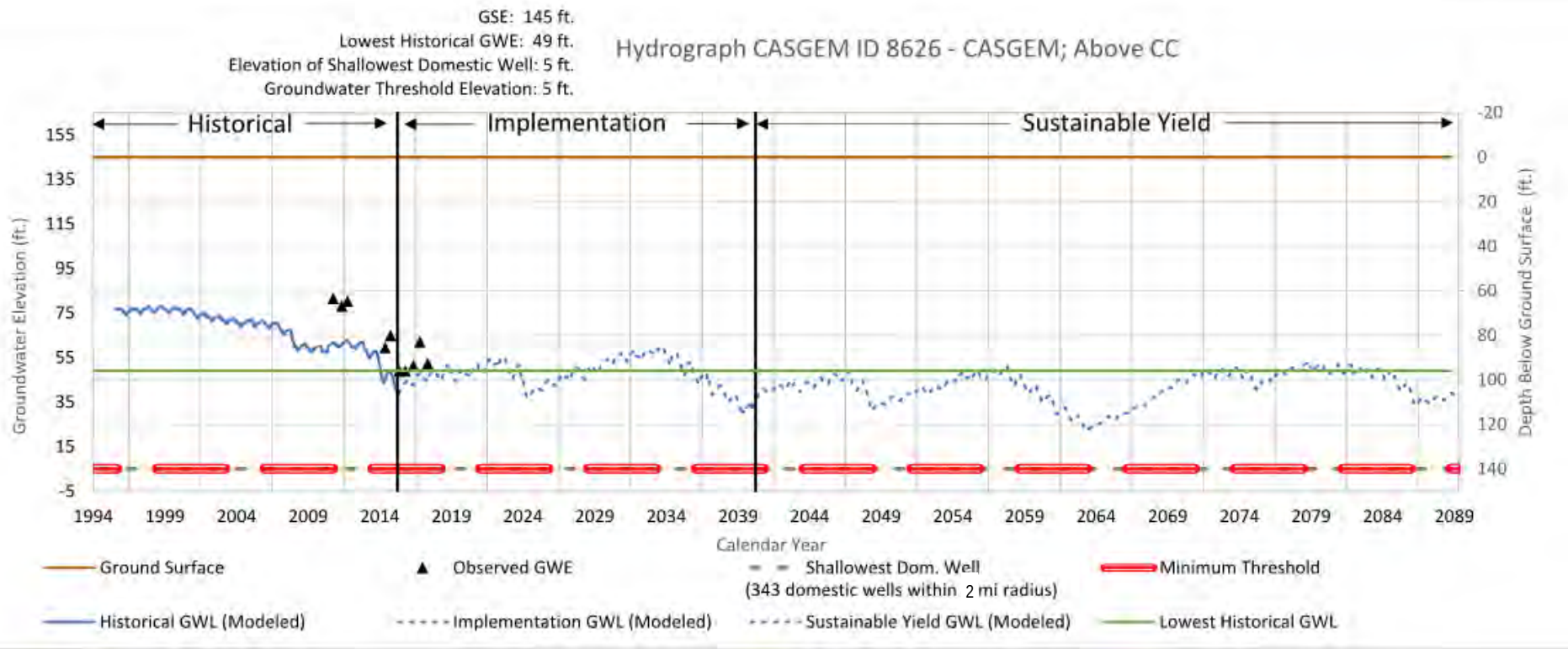
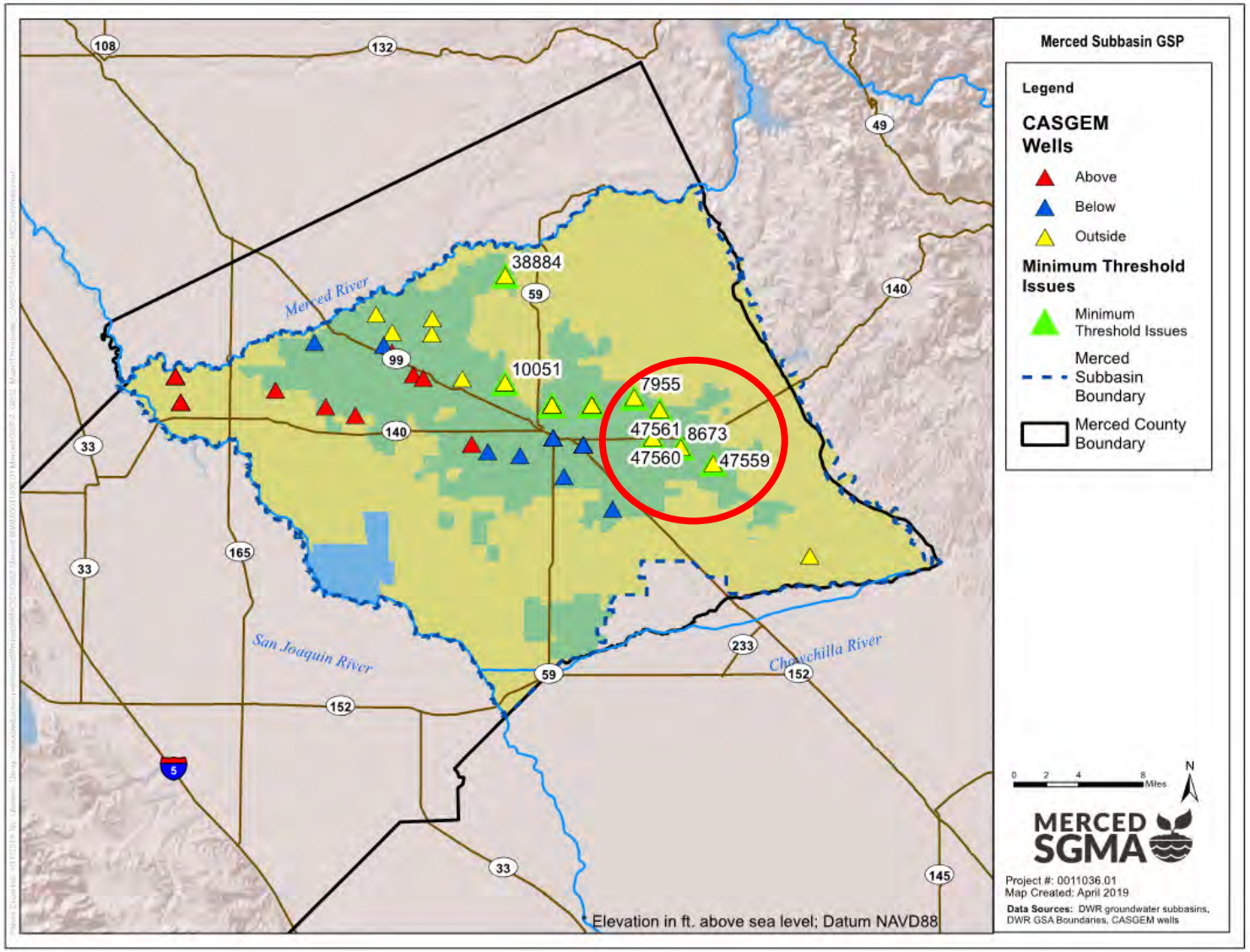


Image courtesy: Veronica Adrover/UC Merced

Minimum Threshold Conflict Area



Example Location with Min. Threshold Conflict

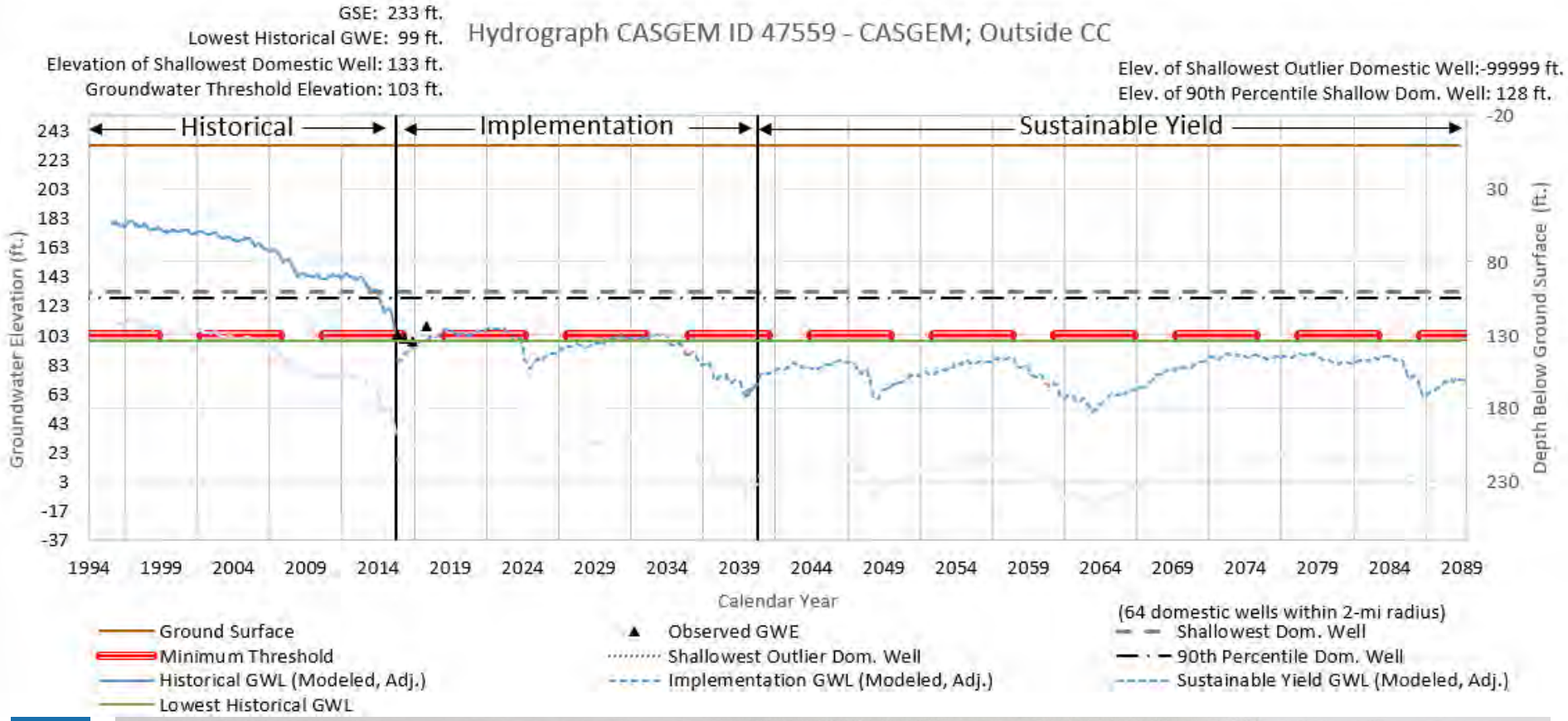
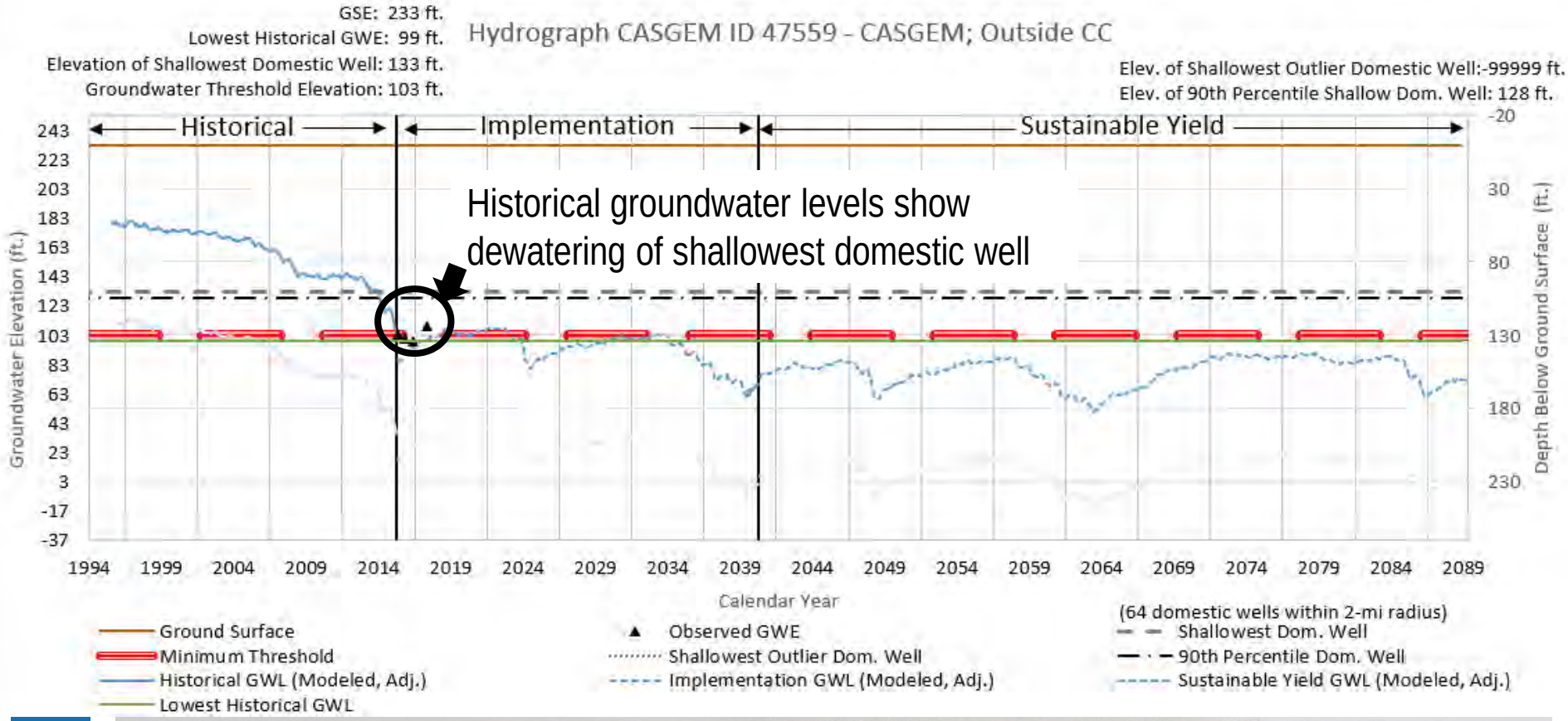


Image courtesy: Veronica Adrover/UC Merced

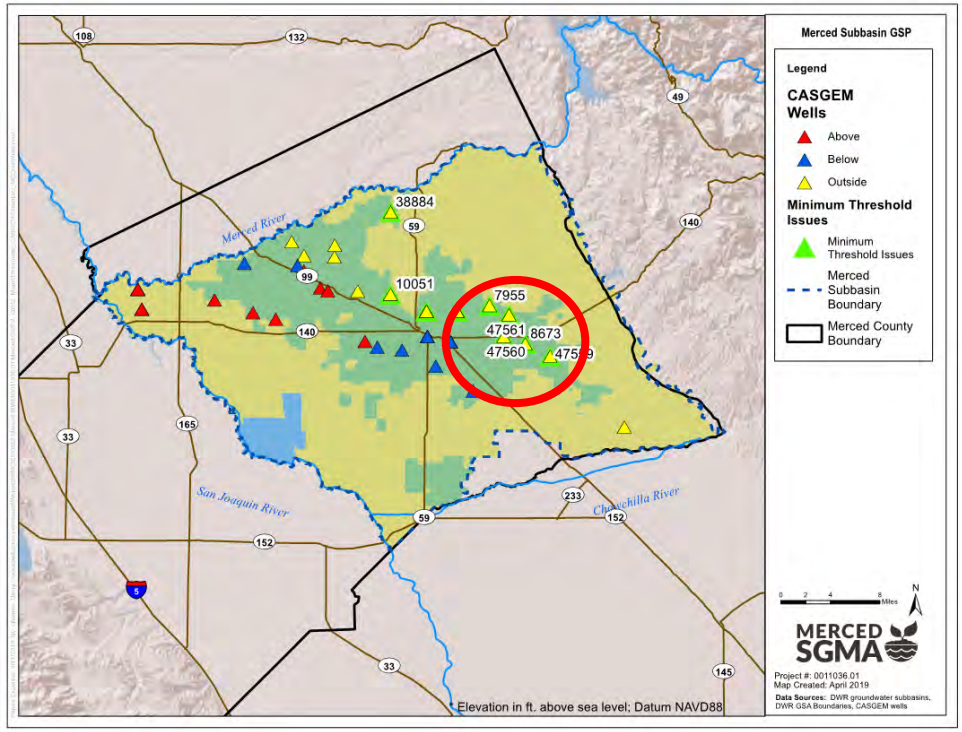
Example Location with Min. Threshold Conflict



- Conflict identifies potential data gap to address for limited number of wells.

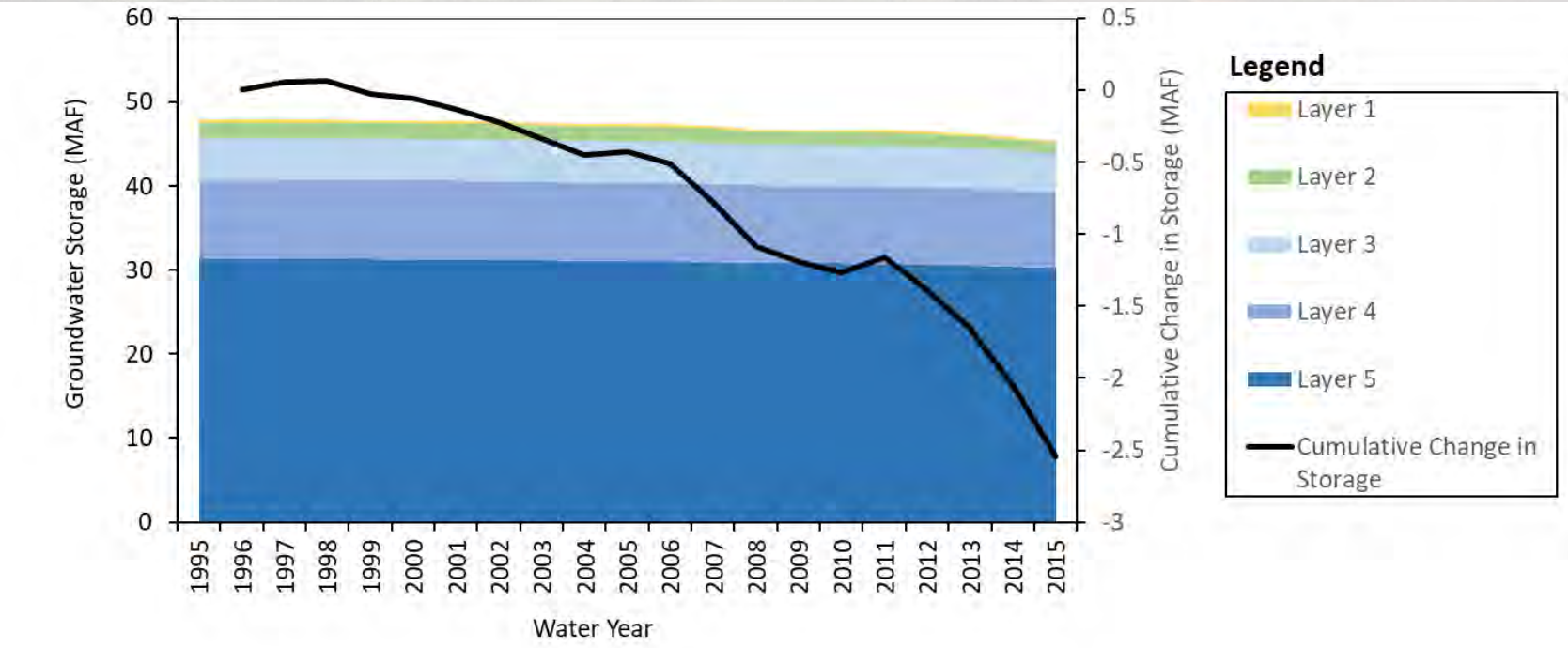
Image courtesy: Veronica Adrover/UC Merced

Distribution of Domestic Well Depths



Reduction of Groundwater Storage

- Will not set Minimum Threshold for storage in Merced GSP
  - Undesirable Results not present and not likely to occur
  - Cumulative change in storage currently is ~0.3% per year (1995-2015); not reasonable to expect available groundwater storage would be exhausted to a significant and unreasonable extent within any foreseeable time period.



Seawater Intrusion: Undesirable Results

- Seawater intrusion – not applicable
  - Not present and not likely to occur (salinity being addressed as a minimum threshold under “degraded water quality”)

Image courtesy: Veronica Adrover/UC Merced

Degraded Water Quality: Undesirable Results

- Undesirable result
  - Significant and unreasonable reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses
  - Set minimum thresholds for constituents where groundwater extractions effect groundwater quality (causal nexus)
  - For contaminants regulated under existing programs, establish communication and coordination to prevent migration of existing plumes through recharge and other activities
  - Basin Contaminants
    - Nitrates – CV-SALTS/ILRP
    - Arsenic – Cal/Federal EPA (naturally occurring)
    - Point Source Contamination – Regional Board
    - Toxics – DTSC
    - **Salinity**

Image courtesy: Veronica Adrover/UC Merced

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Degraded Water Quality: Minimum Thresholds

- **Proposed Minimum Threshold: 1,000 mg/L Total Dissolved Solids (TDS, measurement of salinity)**
- Based on:
  - 1,000 mg/L TDS upper limit Secondary Maximum Contaminant Level (SMCL) from SWRCB
  - Salt tolerances range from 640 - 1,100 mg/L TDS

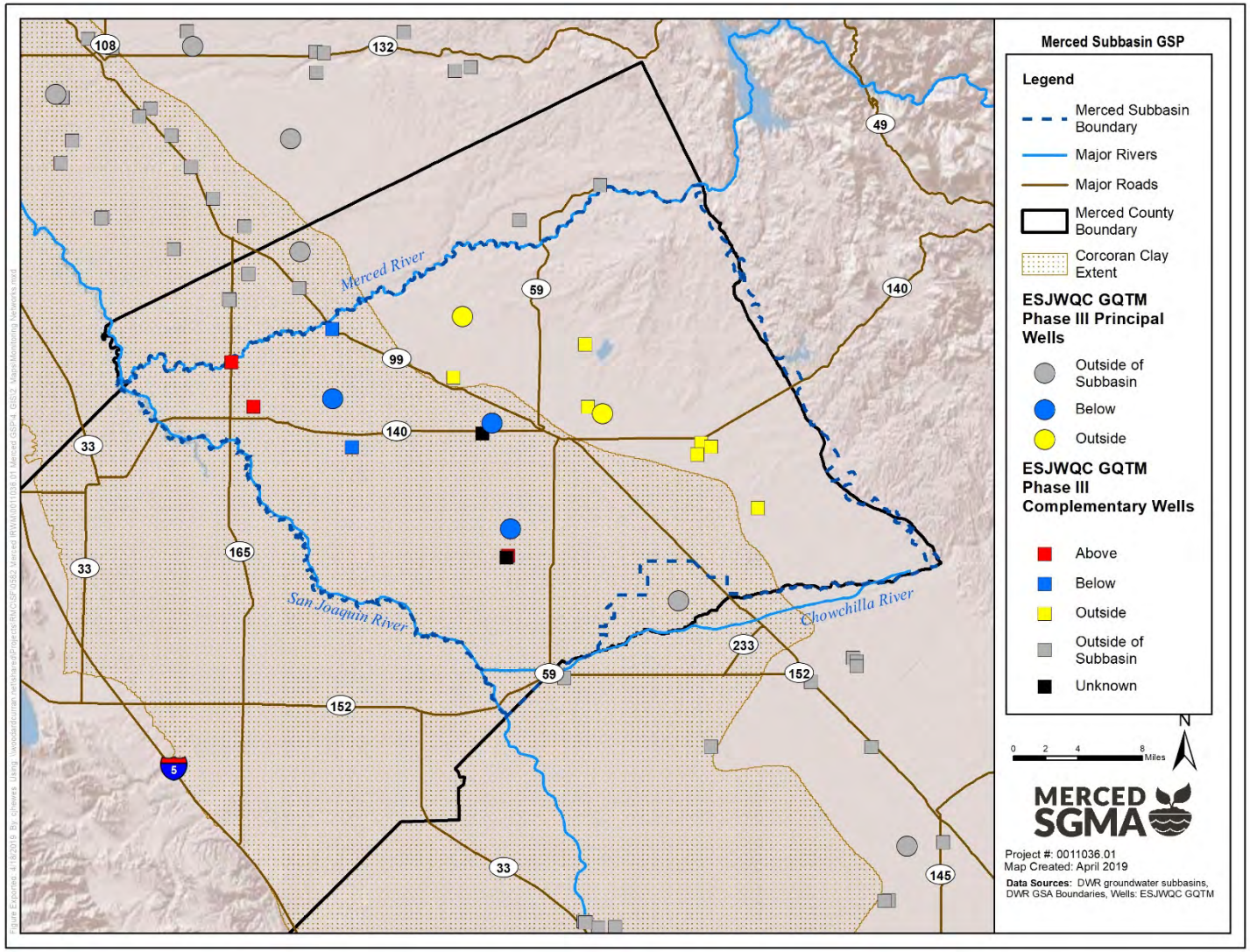
Image courtesy: Veronica Adrover/UC Merced

Degraded Water Quality: Minimum Thresholds (Monitoring)

- Eastern San Joaquin Water Quality Coalition (ESJWQC) Groundwater Quality Trend Monitoring Workplan, Phase III document targeted domestic wells for GWQ monitoring network
  - Includes 5 wells in Merced Subbasin that meet requirements of Waste Discharge Orders
- 15 additional complementary wells with historical data but don't meet criteria for Principal Wells (similar to CASGEM Voluntary)
  - Public Water Systems (PWS) which monitored separately on a regular basis in accordance with SWRCB DDW protocols

Image courtesy: Veronica Adrover/UC Merced

Degraded Water Quality – Monitoring Network



Land Subsidence: Undesirable Results

- Undesirable Results
  - Reduction in the viability of the use of infrastructure (e.g., roads and highways, flood control, canals, pipelines, utilities, public buildings, residential and commercial structures)
- Propose to use groundwater levels as proxy
- In communication with DWR about approach

Image courtesy: Veronica Adrover/UC Merced

Depletion of Interconnected Surface Water: Undesirable Results

- Undesirable Results
  - Effects on operations of upstream reservoirs and/or reduction in the viability of agricultural, fishery, riparian habitat or recreational uses
  - Reduction in the viability of the use of infrastructure (e.g., roads and highways, flood control, canals, pipelines, utilities, public buildings, residential and commercial structures)
  - Minimum threshold:
    - Undesirable results may occur if the 5-year average stream losses exceed the historical simulation maximum losses plus range (using critical, dry, below normal, and above normal water years)

Image courtesy: Veronica Adrover/UC Merced

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Next Meeting