GSP Stakeholder Committee

Stakeholder Committee Meeting – September 24, 2018

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Agenda

- Welcome, Introductions, and Agenda Review
- Minimum Thresholds
- Hydrogeologic Conceptual Model
- Projected Water Budget and Sustainable Yield
- Public Outreach Update
- Interbasin Coordination Update
- Substitute Environmental Document (SED) Update
- Public Comment on Items not on the Agenda
- Next Steps and Next Meeting

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Stakeholder Committee Meeting Agreements

Guidelines for successful meetings

- Civility is required.
  - Treat one another with courtesy and respect for the personal integrity, values, motivations, and intentions of each member.
  - Be honest, fair, and as candid as possible.
  - Personal attacks and stereotyping are not acceptable.
- Creativity is encouraged.
  - Think outside the box and welcome new ideas.
  - Build on the ideas of others to improve results.
  - Disagreements are problems to be solved rather than battles to be won.
- Efficiency is important.
  - Participate fully, without distractions.
  - Respect time constraints and be succinct.
  - Let one person speak at a time.
- Constructiveness is essential.
  - Take responsibility for the group as a whole and ask for what you need.
  - Enter commitments honestly, and keep them.
  - Delay will not be employed as a tactic to avoid an undesired result.

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

GSP Development

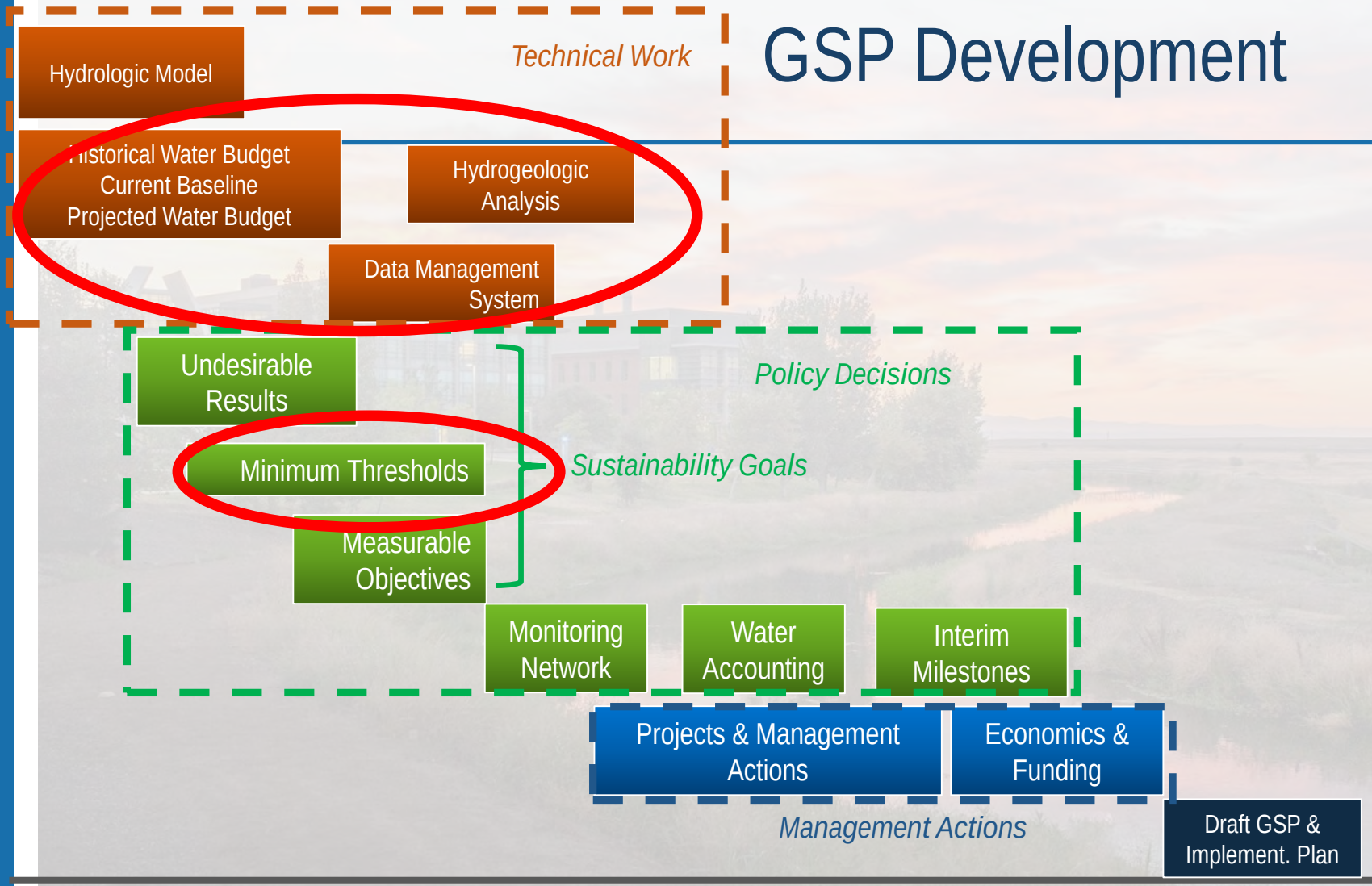


Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Minimum Thresholds

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Developing Minimum Thresholds for Four Sustainability Indicators in Merced Subbasin

- Chronic Lowering of Groundwater Levels
- ~~Reduction in Groundwater Storage~~
- ~~Seawater Intrusion~~
- Degraded Water Quality
- Land Subsidence
- Depletion of Interconnected Surface Water

Storage addressed by bringing budget into balance

Salinity Addressed Under Water Quality

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

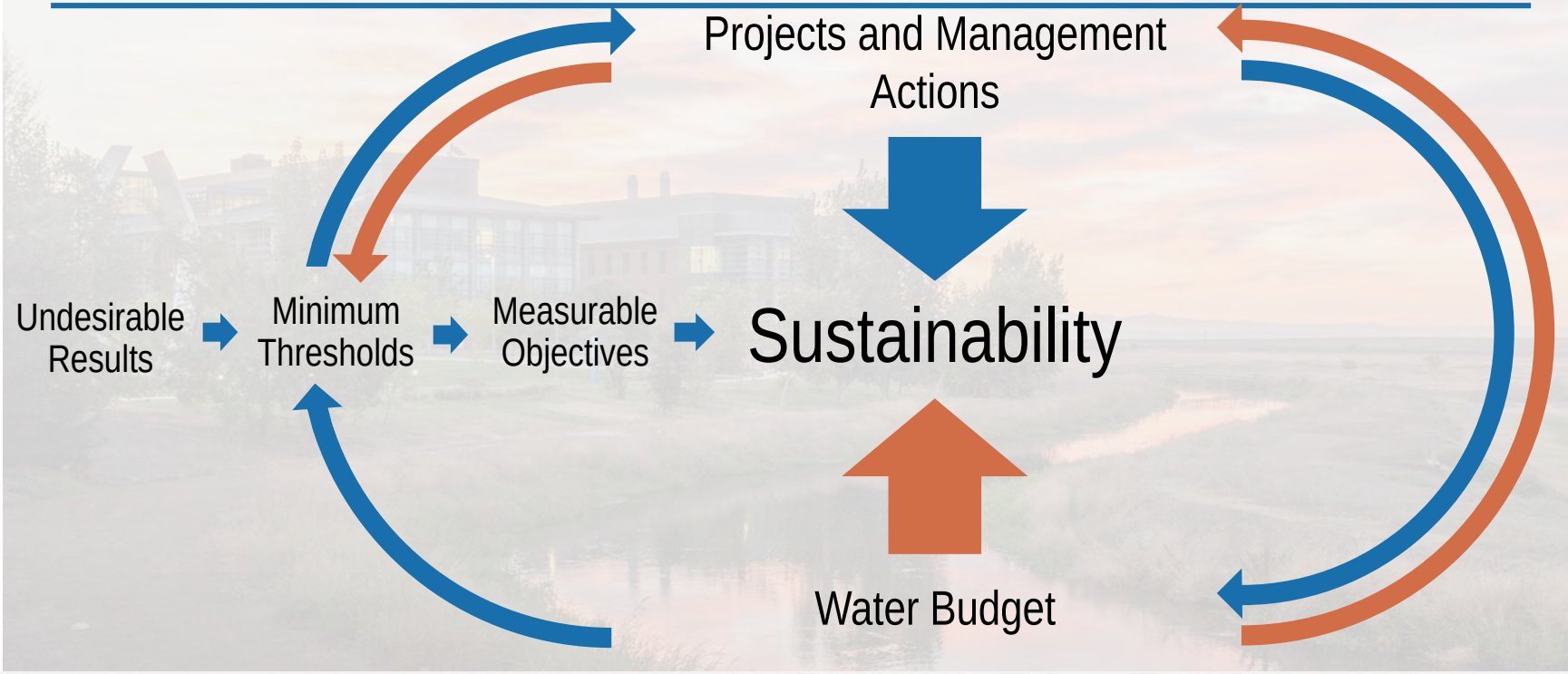
Developing Minimum Thresholds for Four Sustainability Indicators in Merced Subbasin

- Chronic Lowering of Groundwater Levels
- ~~Reduction in Groundwater Storage~~
- ~~Seawater Intrusion~~
- Degraded Water Quality
- Land Subsidence
- Depletion of Interconnected Surface Water

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Developing Minimum Thresholds is an Iterative Process



- Water Budgets *(available water estimates and usage)* influence what kinds of Projects and Management Actions are needed (*actions needed to manage usage and reach sustainability)*
- Projects and Management Actions *(actions we take)* will in turn impact the Water Budget *(available water).* Projects and actions reflect stakeholder input *(what is important for the Subbasin?)*
- Depending on what projects and management actions are implemented and when, groundwater elevations may change *(thresholds and measurable objectives)*
- Additional information feeds into understanding the goals we want to achieve with projects and actions including what are our undesirable results, minimum thresholds and measurable objectives

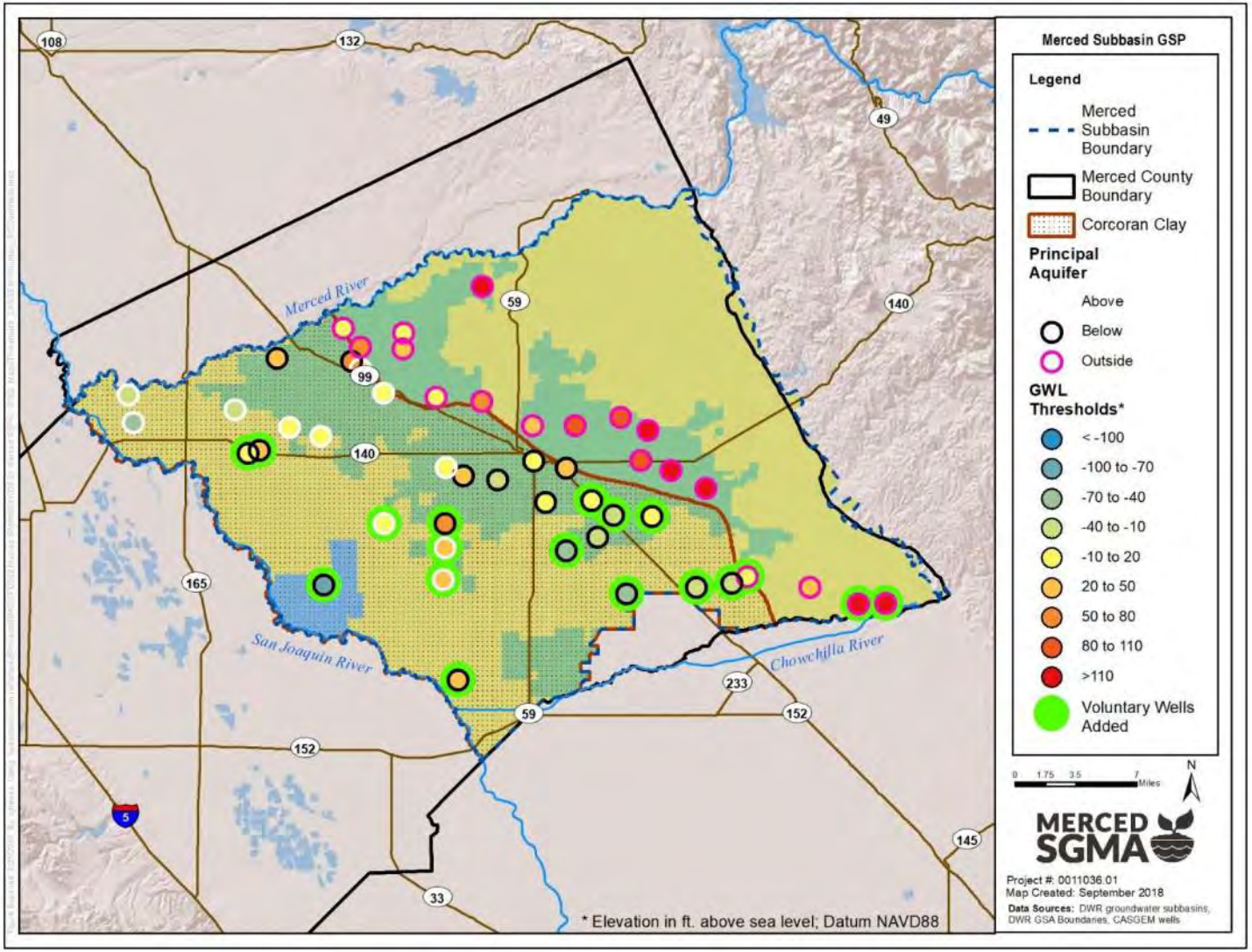
Minimum Thresholds – Updated Approach

- Added 18 monitoring wells for threshold analysis
- Merced County domestic wells database
  - Active wells
  - Omits wells that do not meet County annular seal requirement
  - Filtered for other outliers
- Minimum threshold is defined as the shallowest of either
  - Historical low groundwater elevation at the monitoring well, minus a buffer (range of min & max GWLs from 2008-2018) – this assumes that over the next 20 years, GWE will decline at approximately half the max rate seen over the past 10 years
  - UNLESS this would dewater the **shallowest** nearby domestic well – in this case, threshold was increased to protect nearby wells

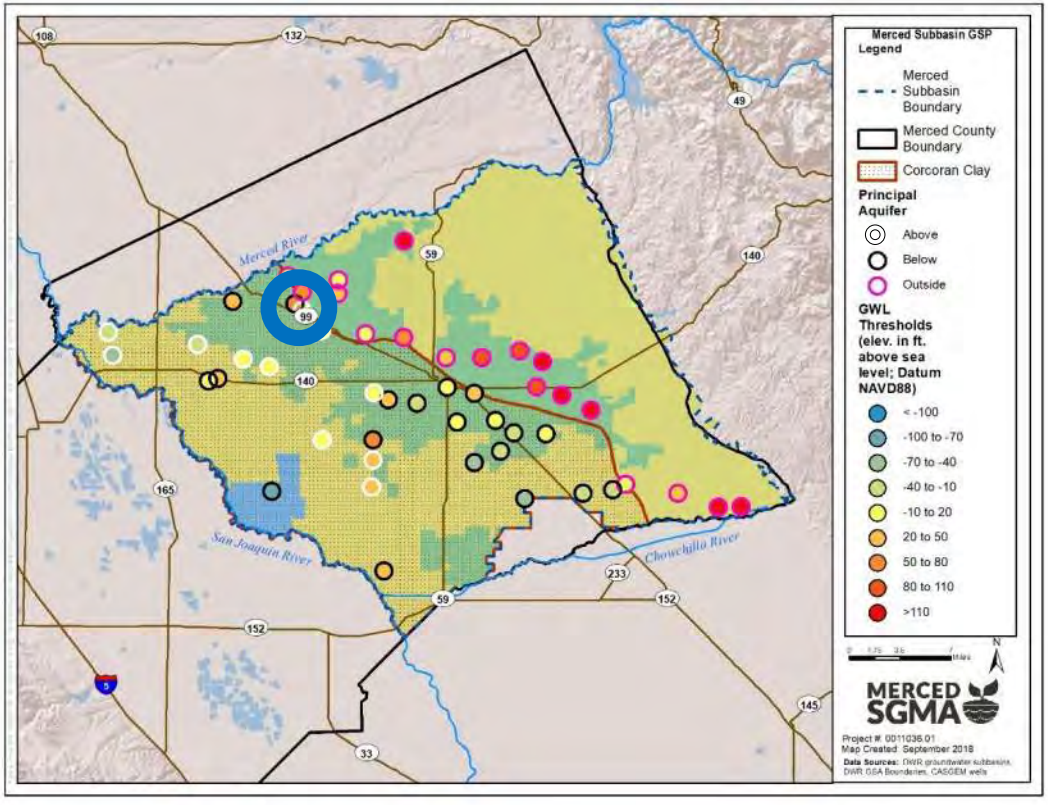
Image courtesy: Veronica Adrover/UC Merced

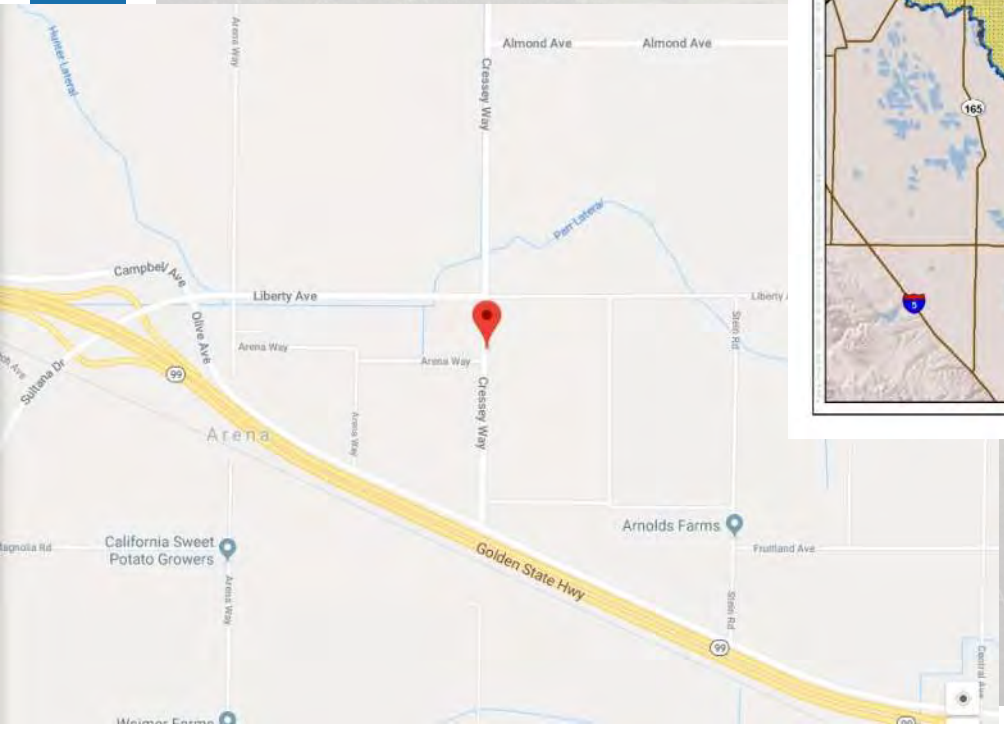
MERCED SGMA

Voluntary Wells Added



Minimum Thresholds Example: Well 31916





MERCED SGMA

Minimum Thresholds Example: Well 31916

Example:

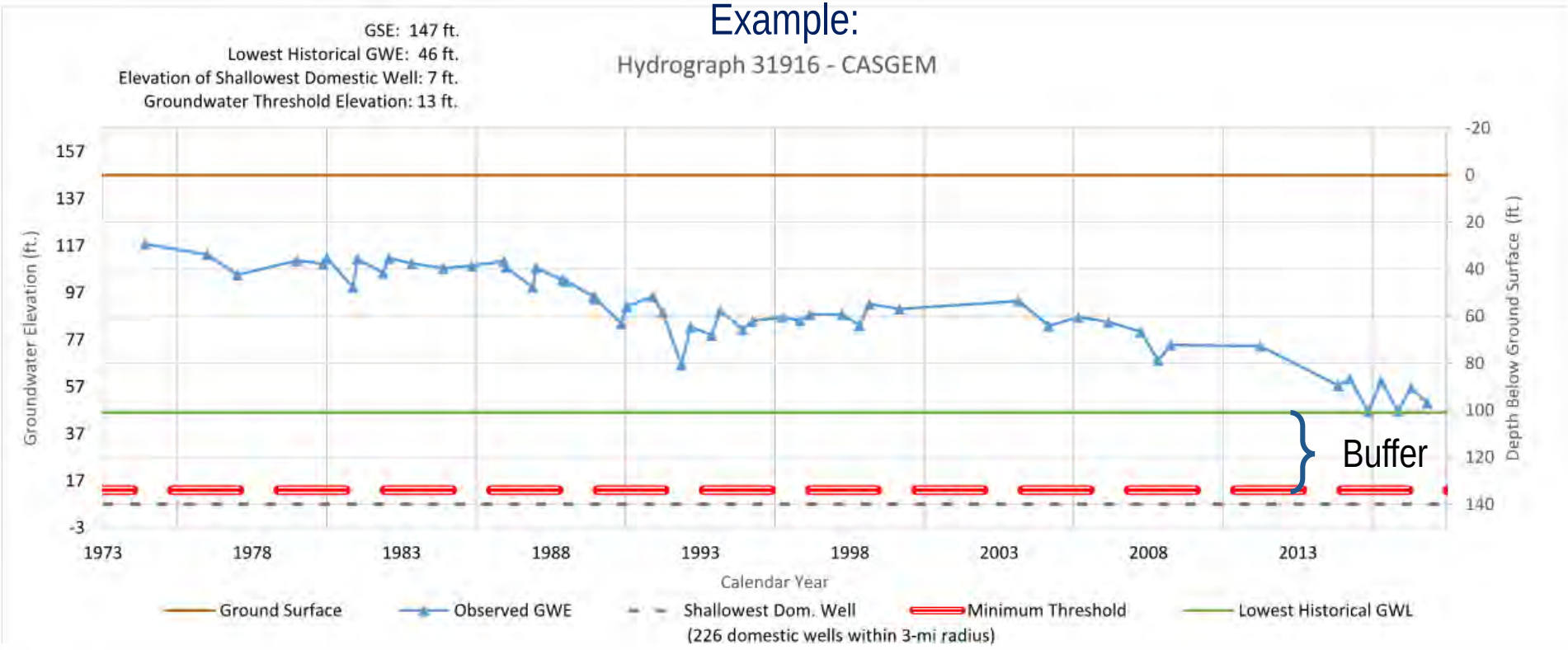
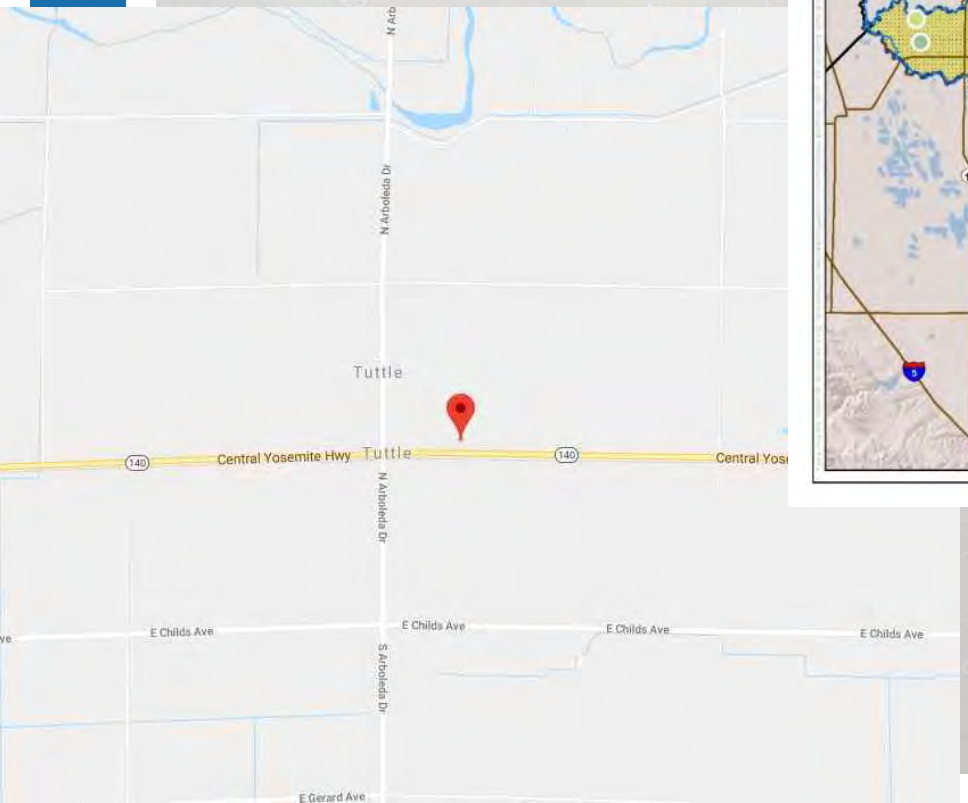
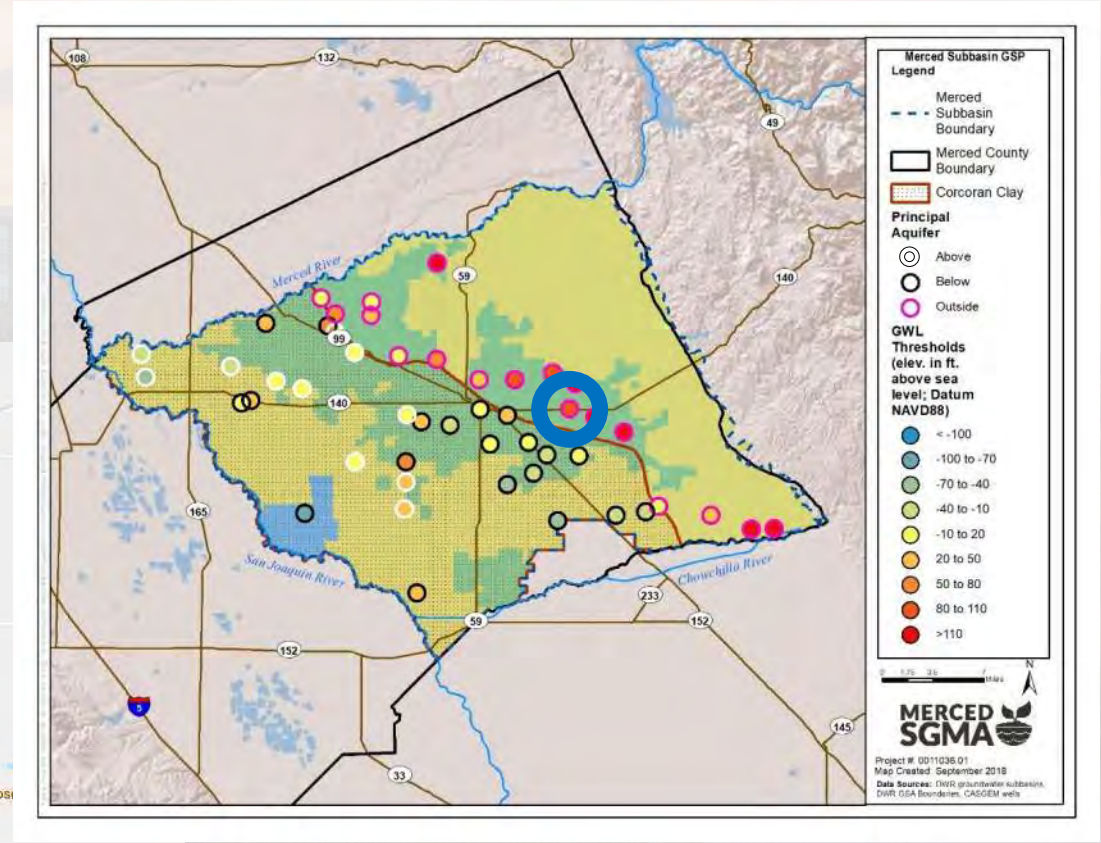


Image courtesy: Veronica Adrover/UC Merced

Minimum Thresholds Example: Well 31742





MERCED SGMA

Minimum Thresholds Example: Well 31742

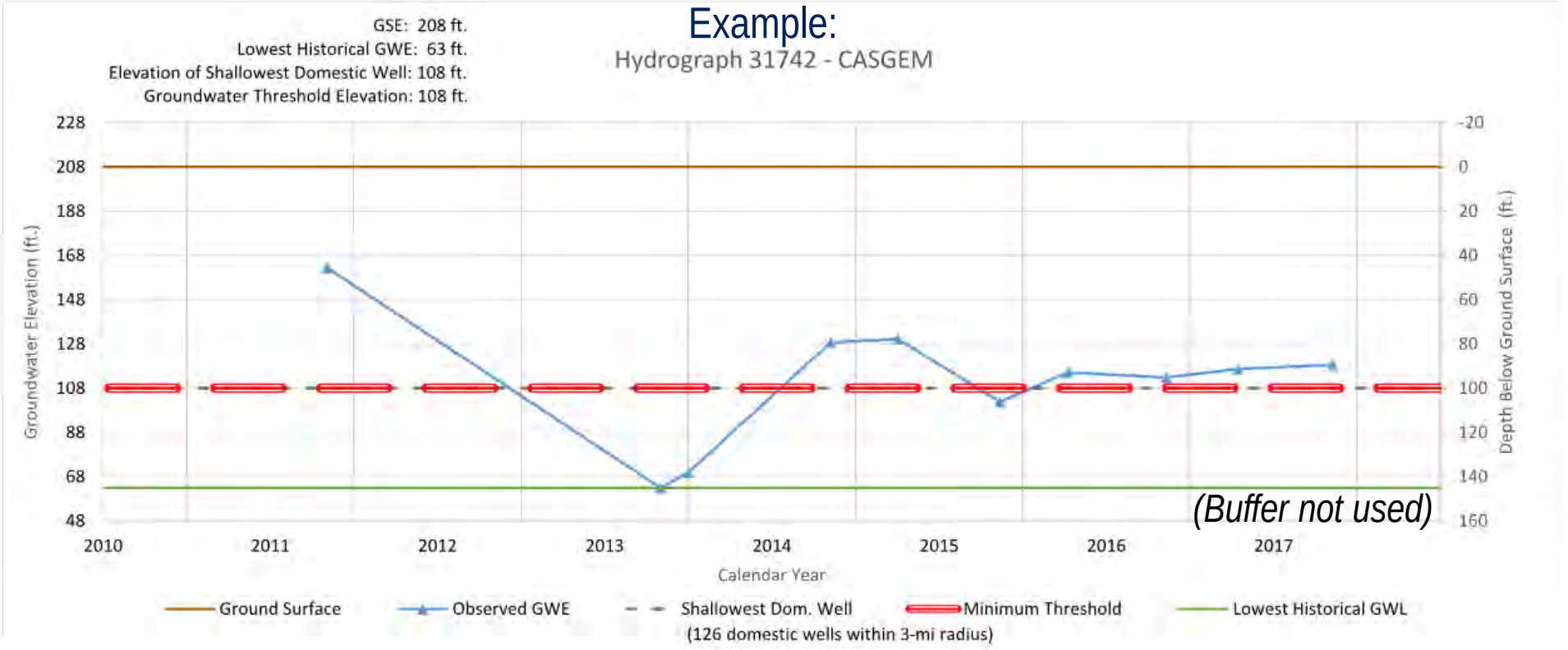
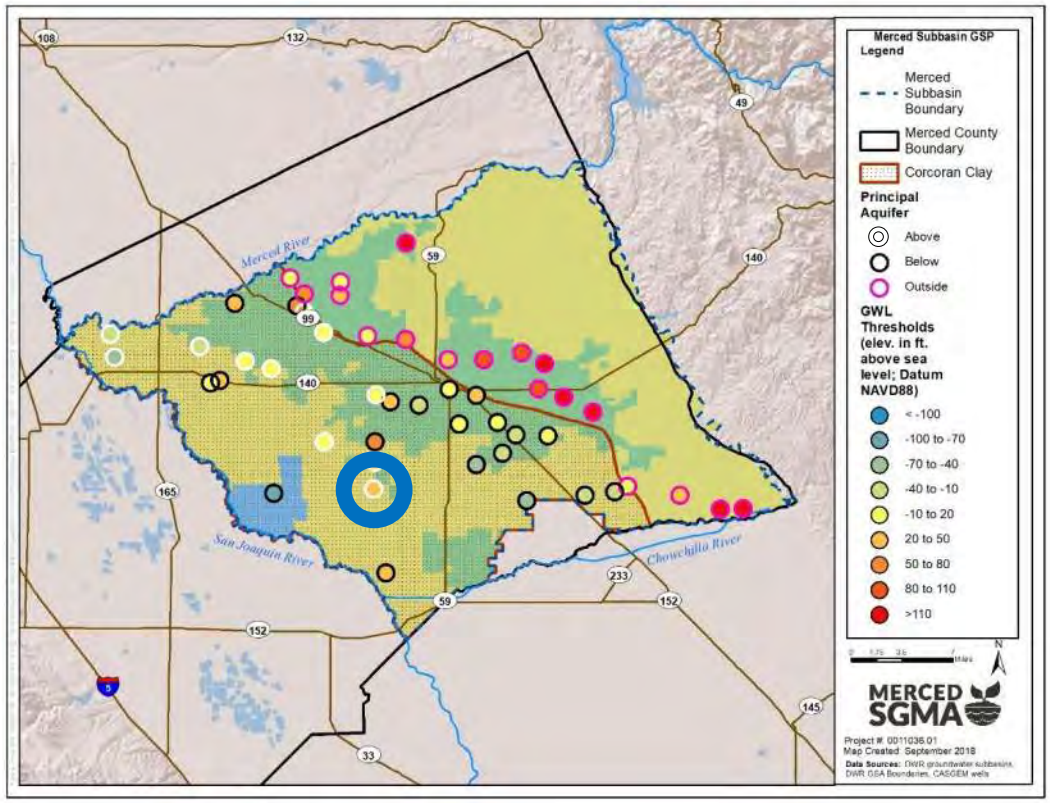
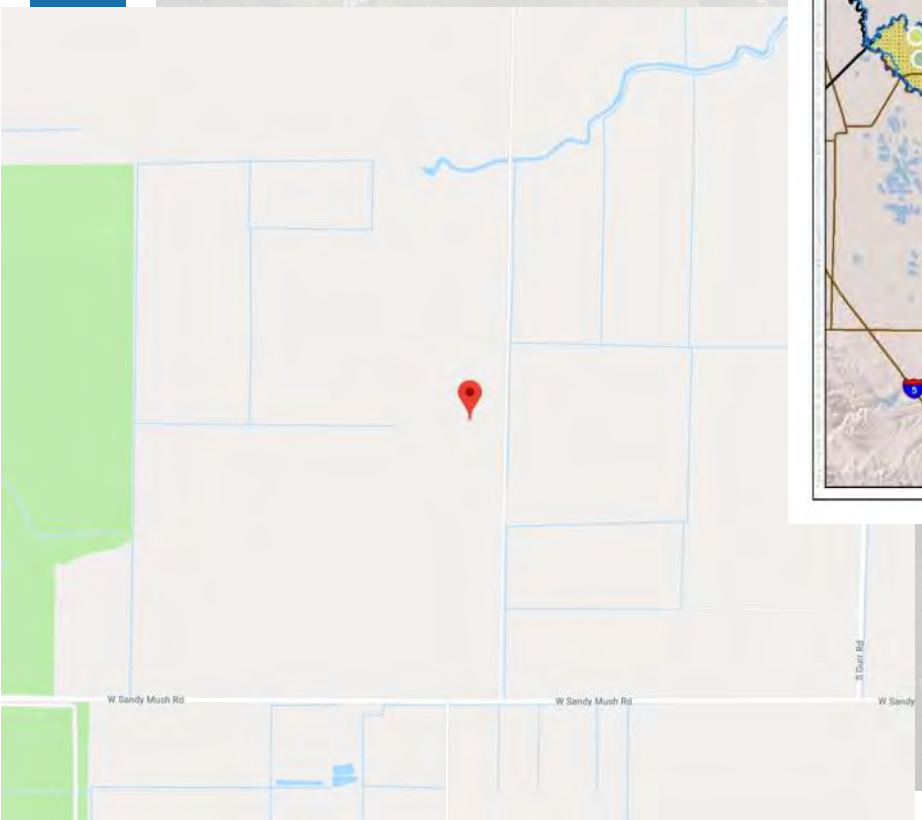


Image courtesy: Veronica Adrover/UC Merced

Minimum Thresholds Example: Well 32342 (new voluntary well)





MERCED SGMA

Minimum Thresholds Example: Well 32342 (new voluntary well)

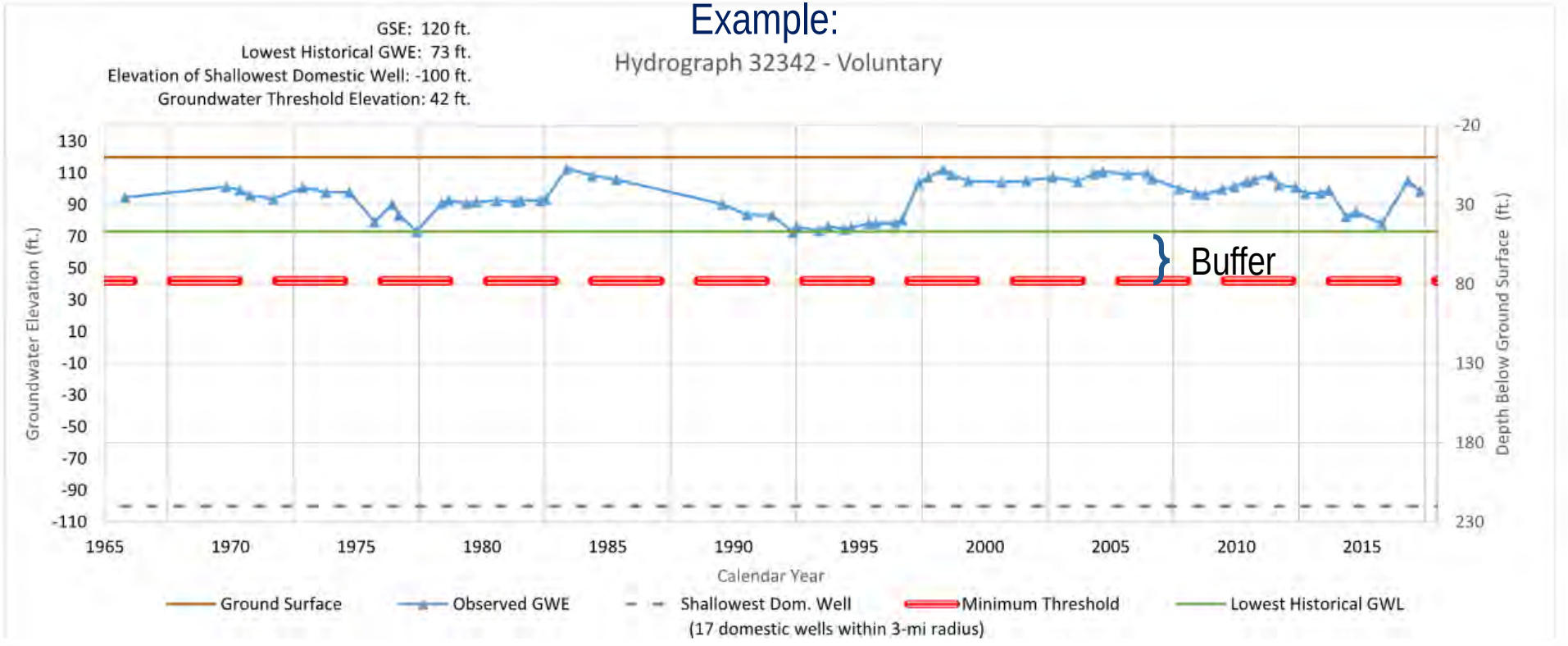
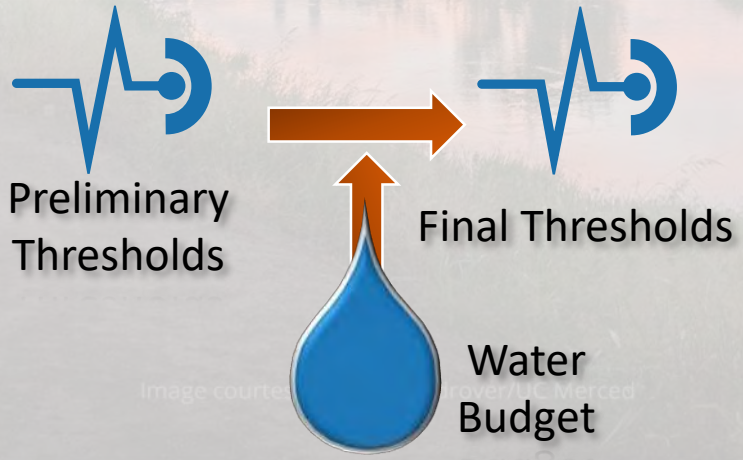


Image courtesy: Veronica Adrover/UC Merced

What Comes Next?

- Projected Water Budget will be used to understand average sustainable pumping rates basin-wide
- Projects and Management Actions need to be identified to include supply and demand-side measures to achieve sustainability
- Depending on rate of project implementation, groundwater elevation thresholds may need to be adjusted



MERCED SGMA

Rate of Plan Implementation May Necessitate Changes in GW Elevation Thresholds

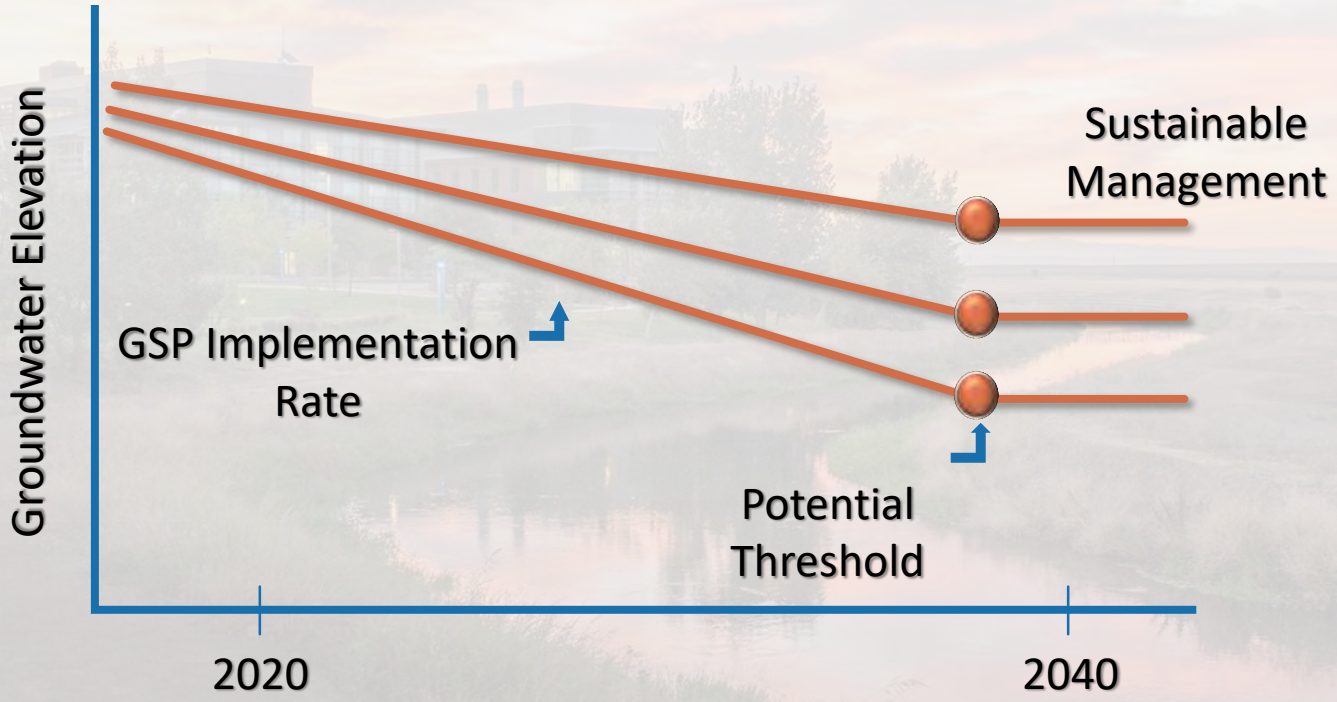


Image courtesy: Veronica Adrover/UC Merced

Discussion & Questions

- Clarifying questions about the Groundwater Elevation Threshold approach.

- Do you have suggested improvements or refinements to the approach?

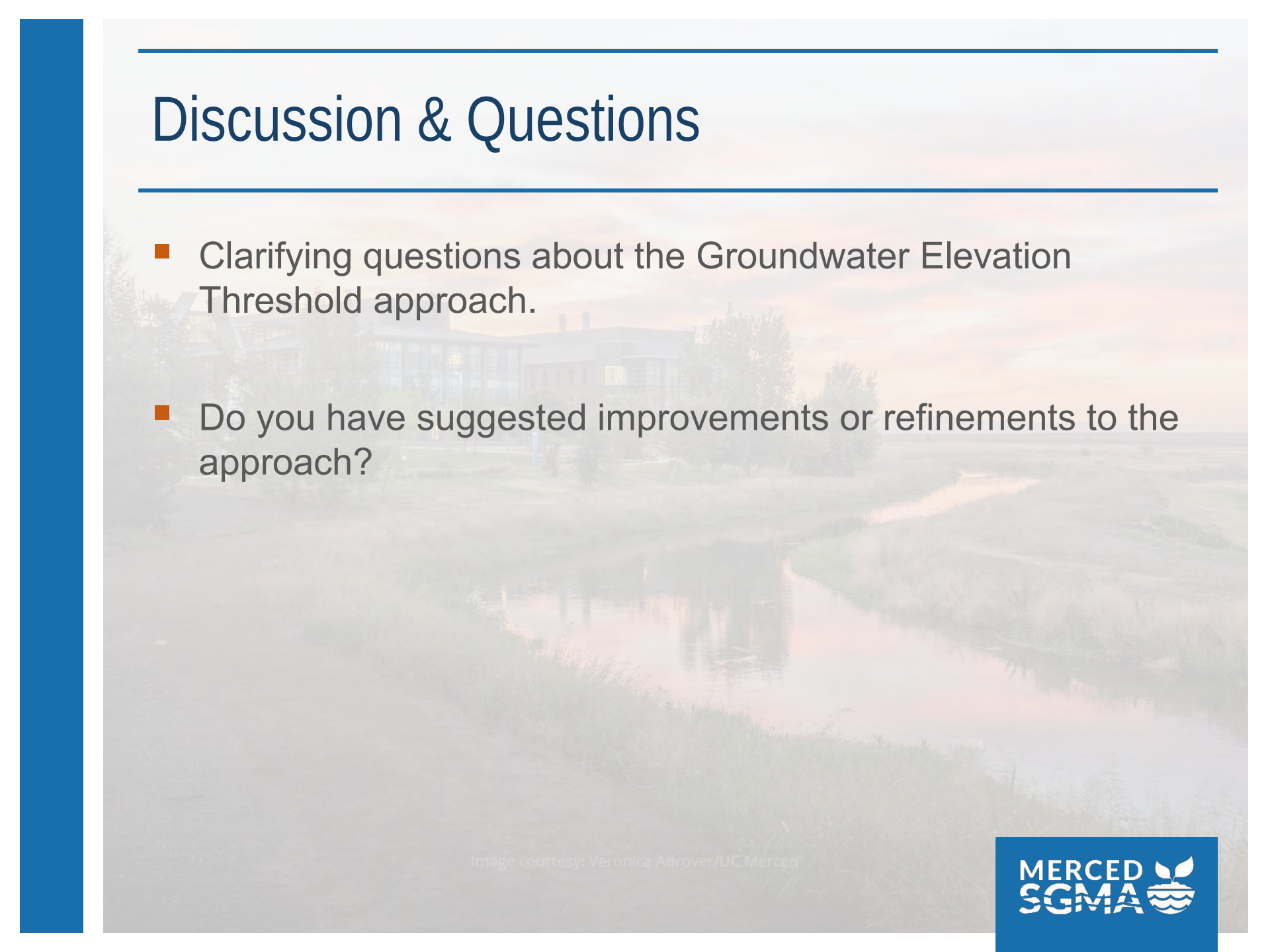


Image courtesy: Veronica Adrover/UC Merced

Hydrogeologic Conceptual Model

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Hydrogeologic Conceptual Model (HCM)

According to DWR regulations, the HCM:

- Provides an understanding of the general physical characteristics related to regional hydrology, land use, geology, geologic structure, water quality, *principal aquifers,* and principal aquitards of the *basin setting*
- Provides the context to develop water budgets, mathematical (analytical or numerical) models, and monitoring networks
- Provides a tool for stakeholder outreach and communication

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Hydrogeologic Conceptual Model (HCM), cont'd

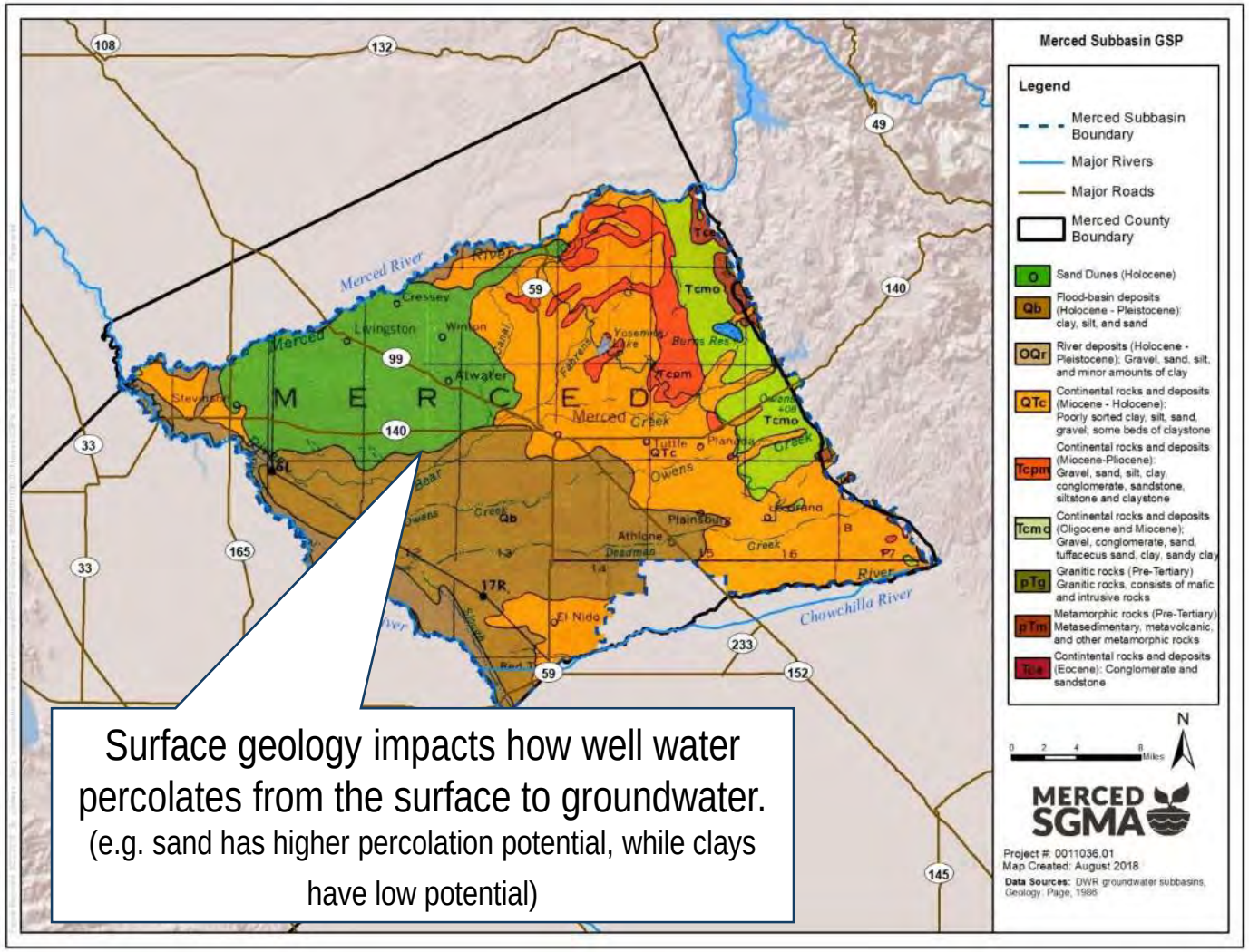
- HCM parameters include:
  - Topographic information, surficial (surface) geology, soil characteristics, delineation of existing recharge areas, surface water bodies, source and point of delivery for local and imported water supplies

- HCM Data gaps:
  - Portions of the basin not well understood
  - Plan to fill data gaps in understanding – currently addressing these gaps

Image courtesy: Veronica Adrover/UC Merced

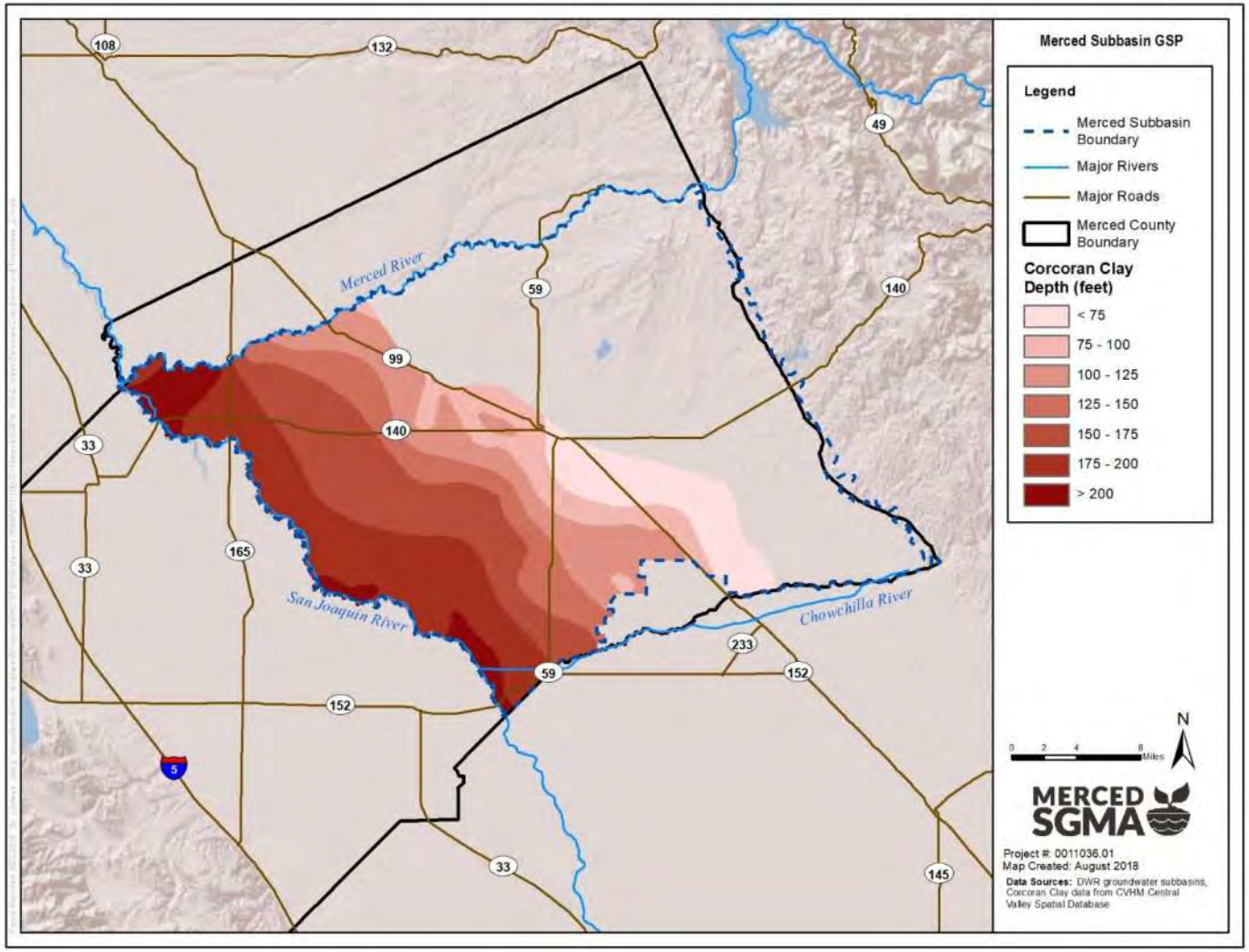
MERCED SGMA

HCM: Surface Geology

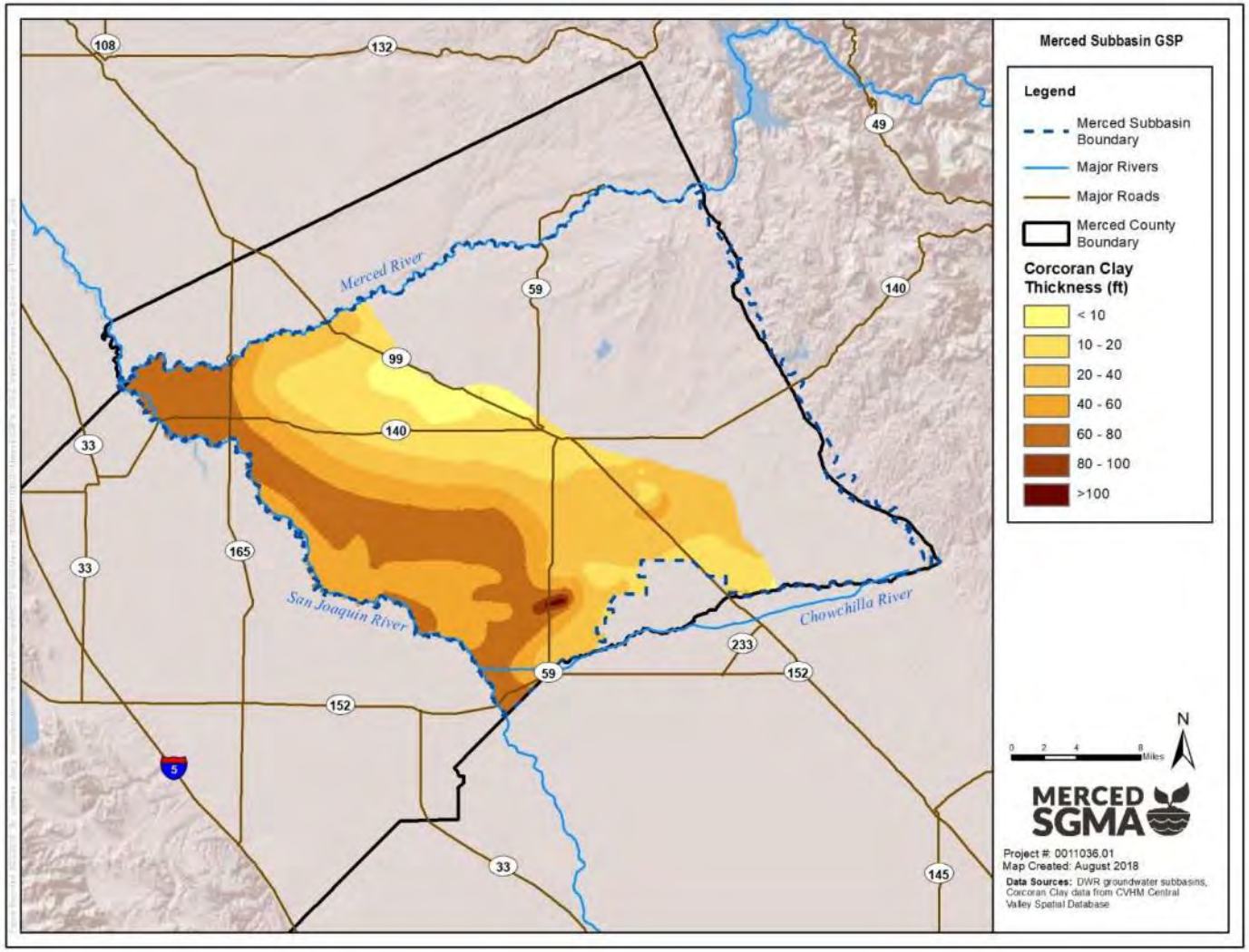


Surface geology impacts how well water percolates from the surface to groundwater.
(e.g. sand has higher percolation potential, while clays have low potential)

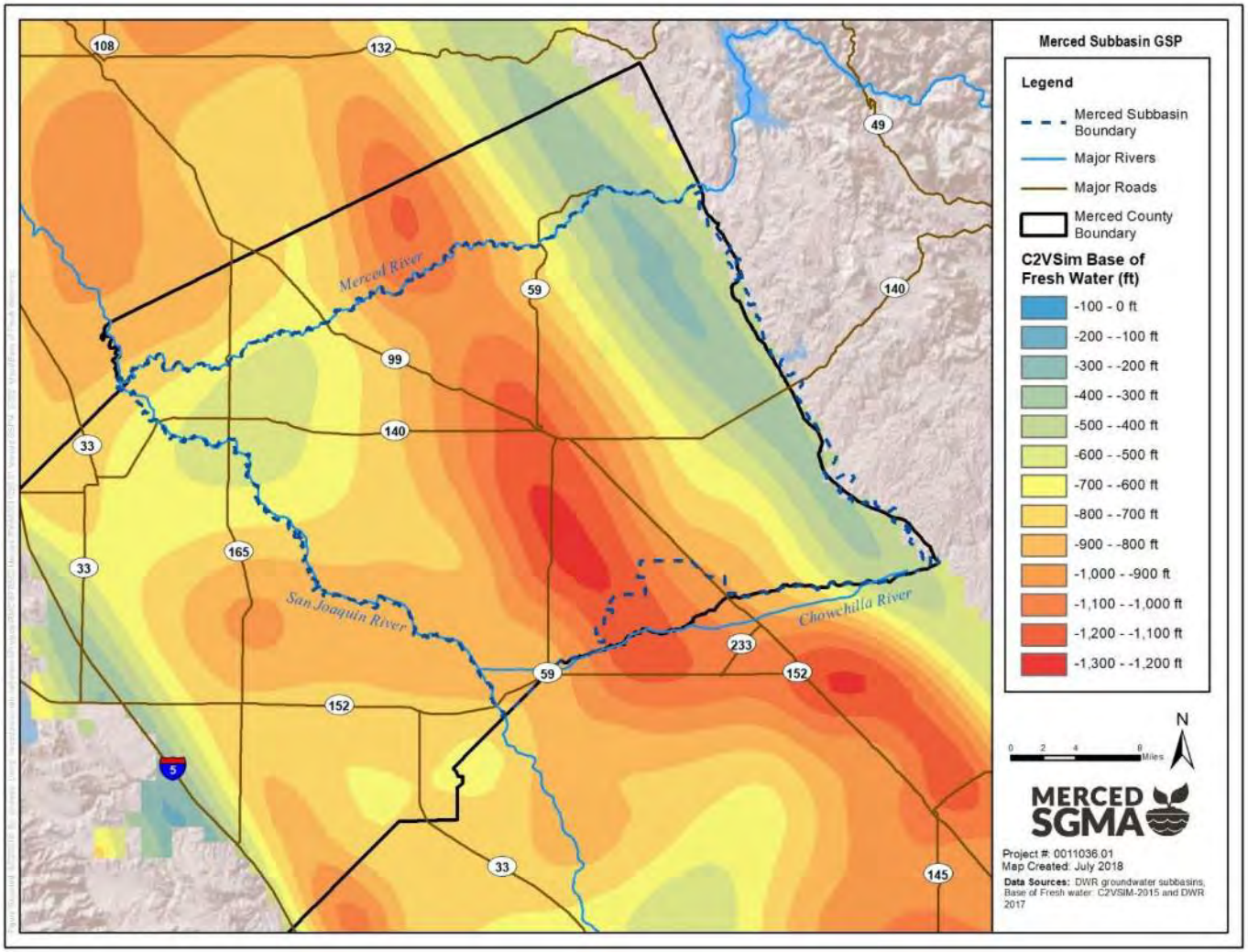
HCM: Corcoran Clay Depth



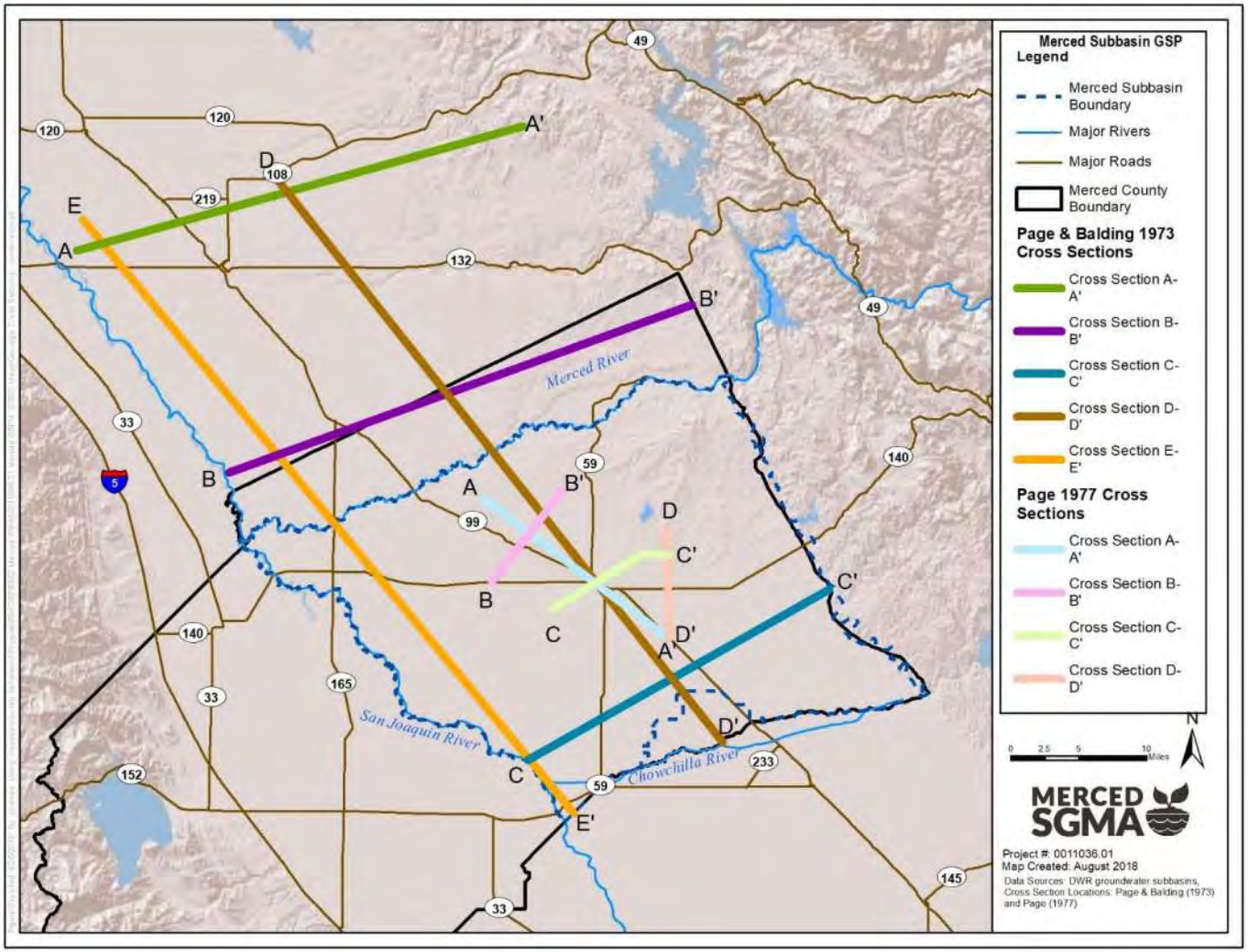
HCM: Corcoran Clay Thickness



HCM: Base of Fresh Water
by elevation above (+) or below (-) sea level



HCM: Geologic Cross Sections



Example Cross Section Detail

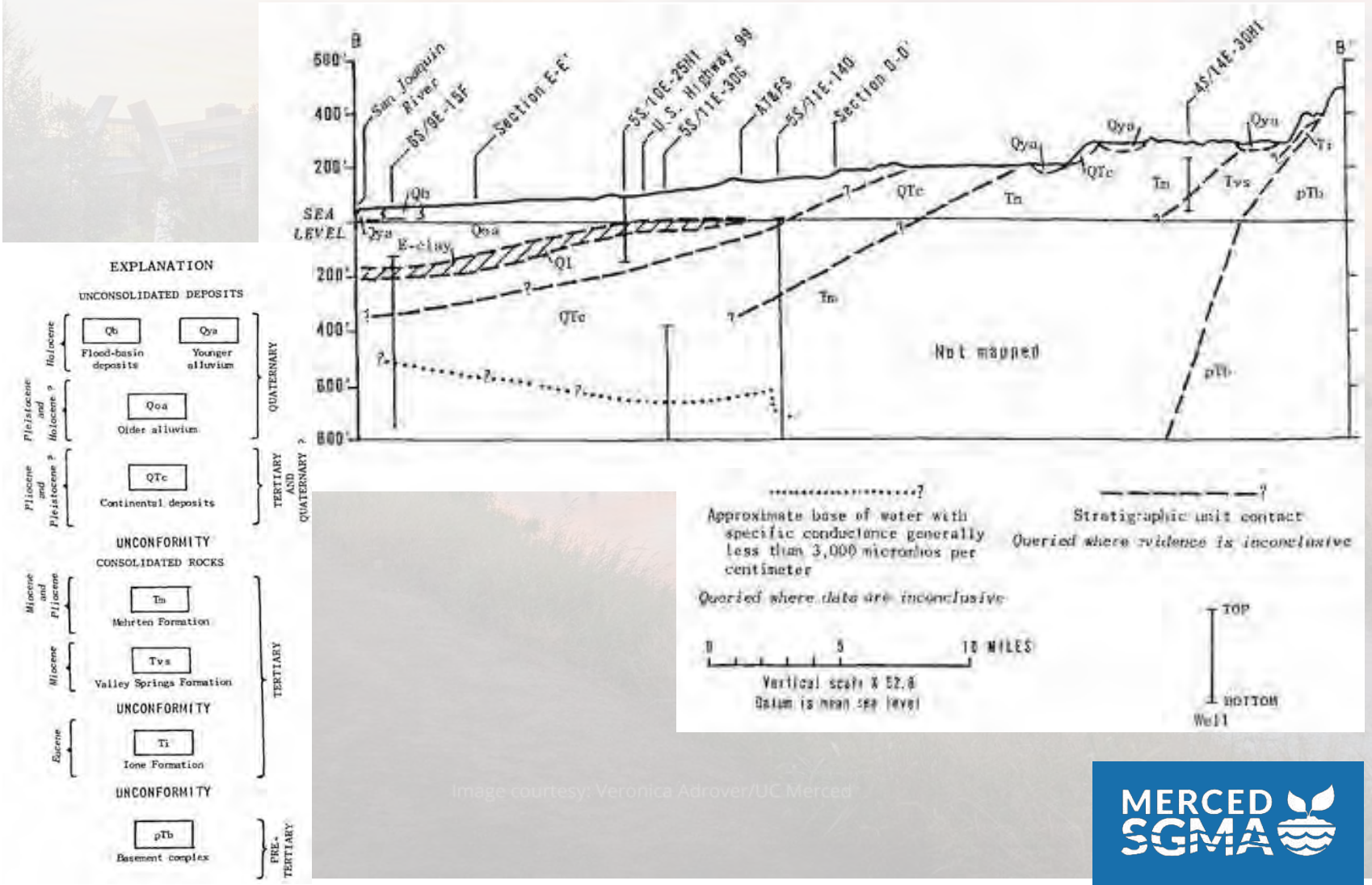
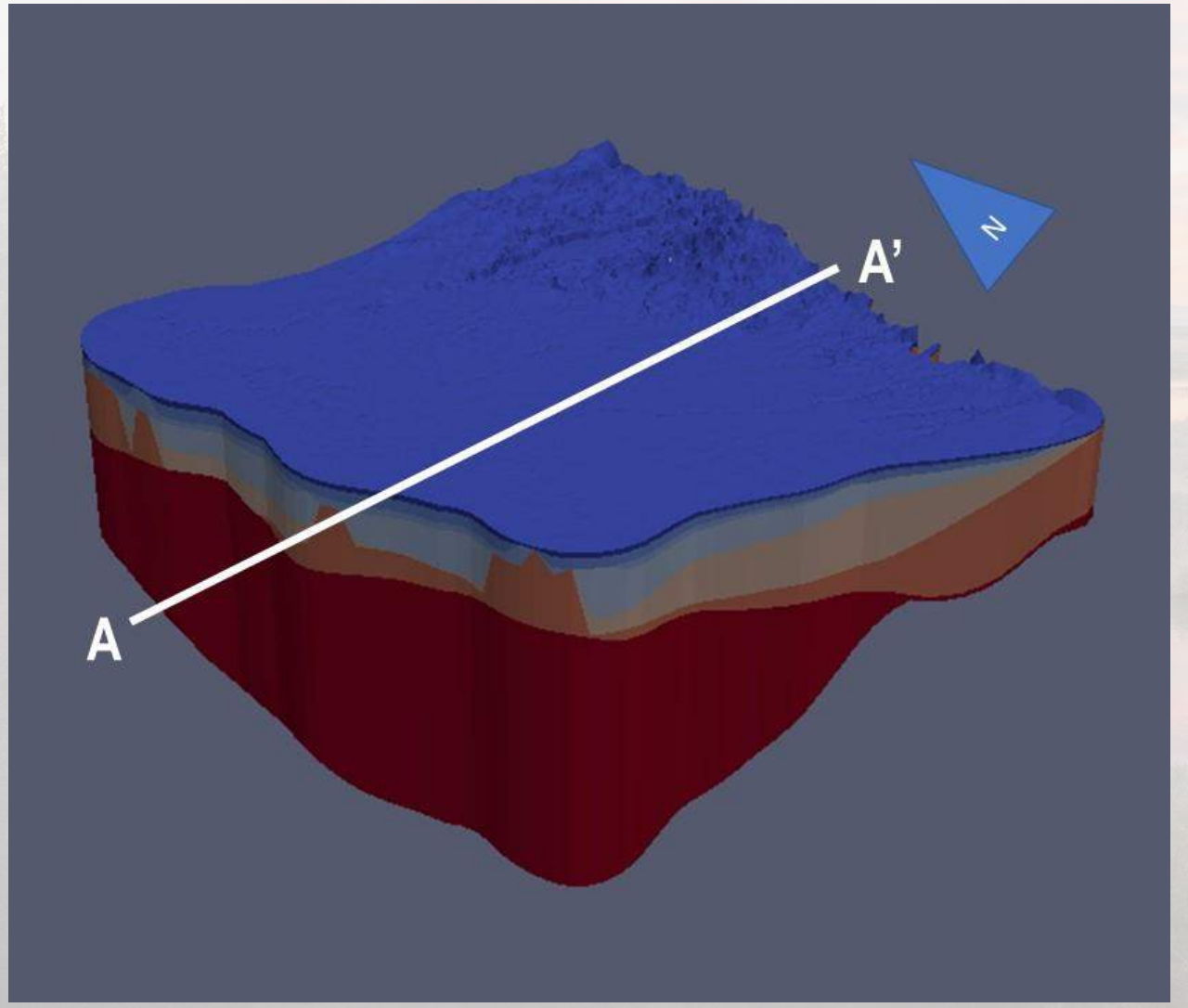


Image courtesy: Veronica Adrover/UC Merced

HCM: 3D Visual



HCM: 3D Visual

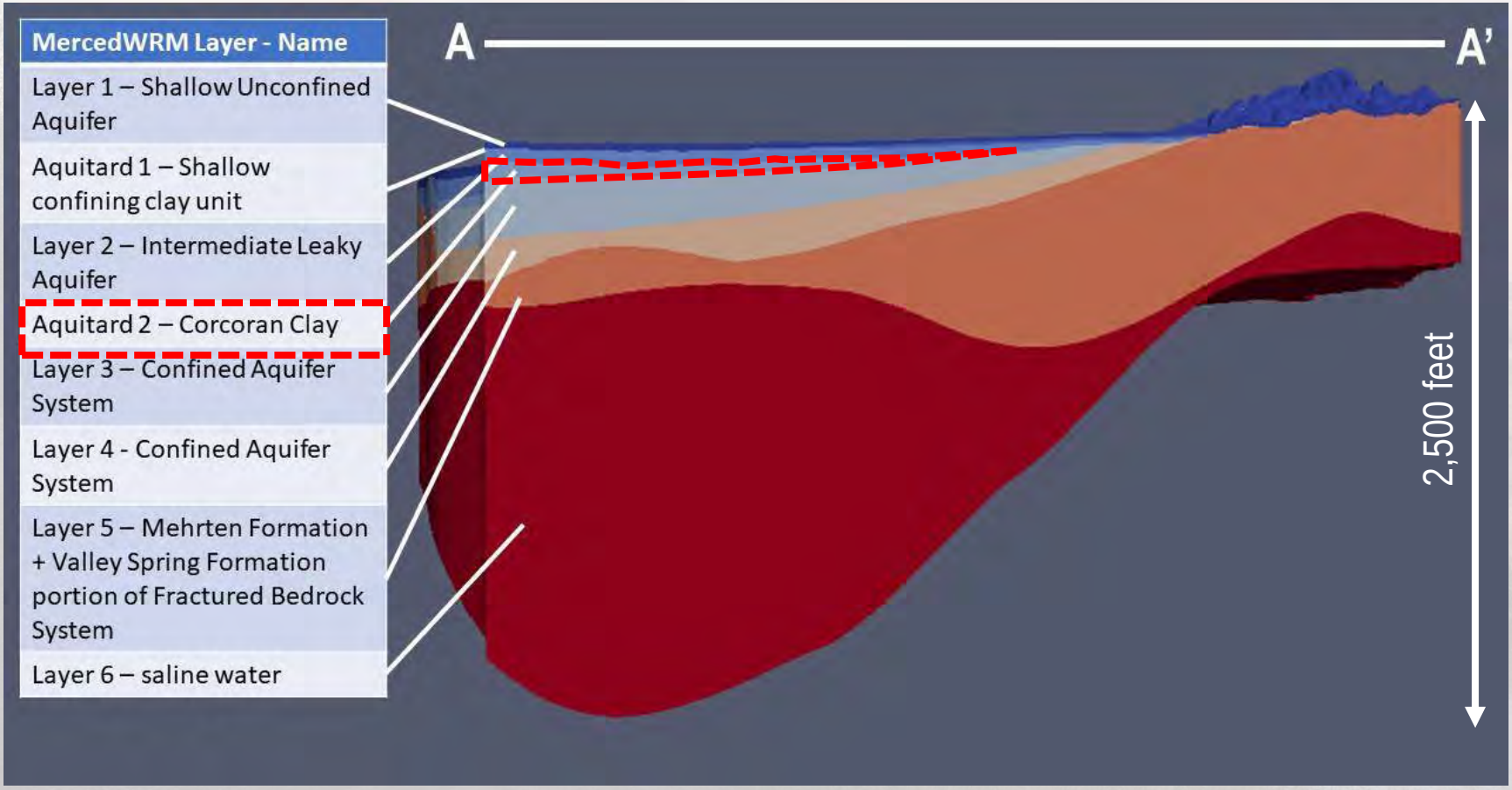


Image courtesy: Veronica Adrover/UC Merced

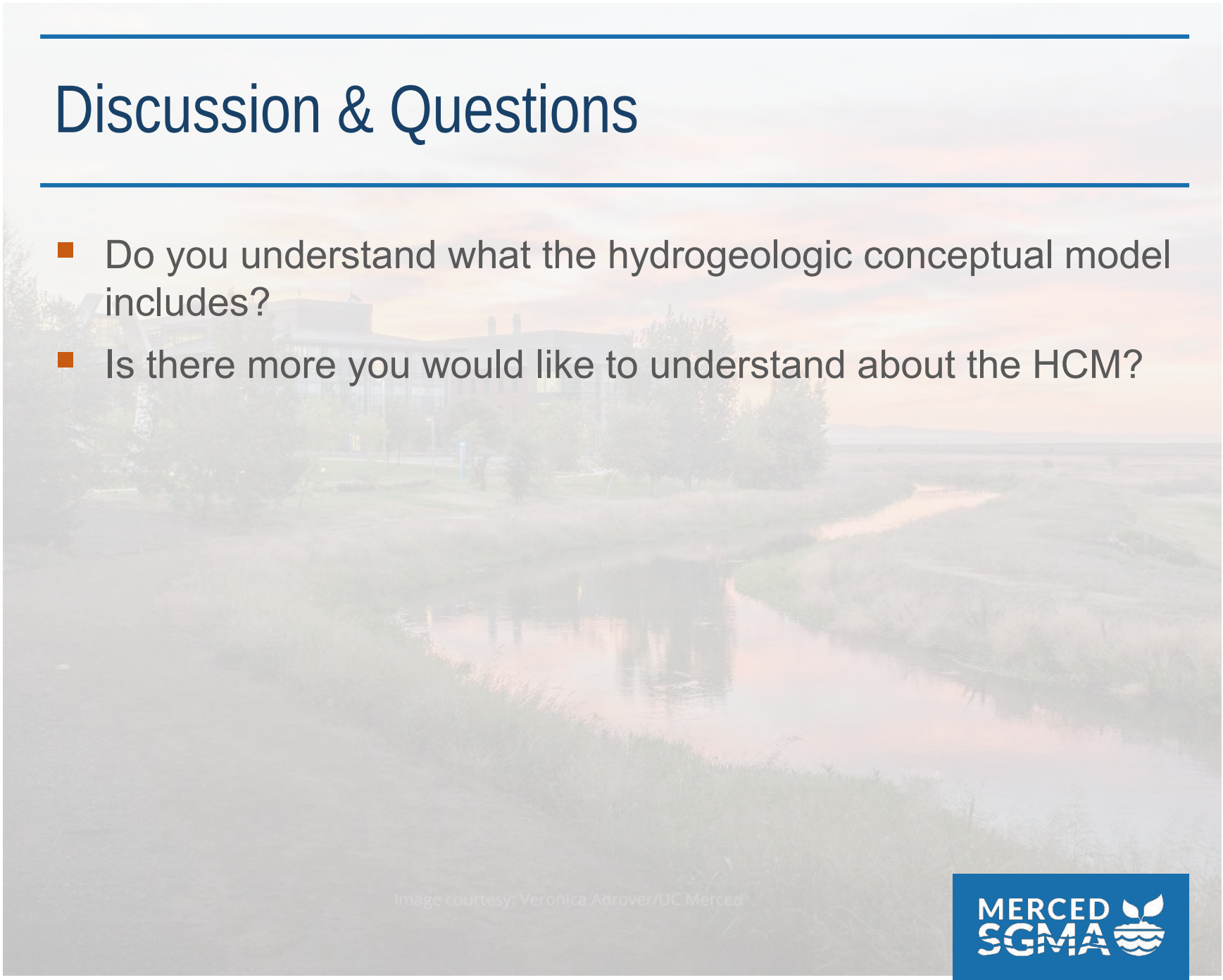
Next Steps

- Continue drafting HCM
  - Water Quality
  - Current Conditions
- Progress on defining data gaps. Current gaps include:
  - Groundwater level data in areas and at depths without existing monitoring
  - Comprehensive groundwater quality data (all constituents of concern, including emerging contaminants), with detail by depth
  - Very shallow groundwater elevation data, to support understanding of GDEs
  - Depth-specific subsidence information
  - Streamflow data on smaller rivers and streams

MERCED SGMA

Discussion & Questions

- Do you understand what the hydrogeologic conceptual model includes?
- Is there more you would like to understand about the HCM?



MERCED SGMA

Projected Water Budget and Sustainable Yield

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

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 Water Budget

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

MERCED SGMA

Projected Water Budget – Modeling Inputs

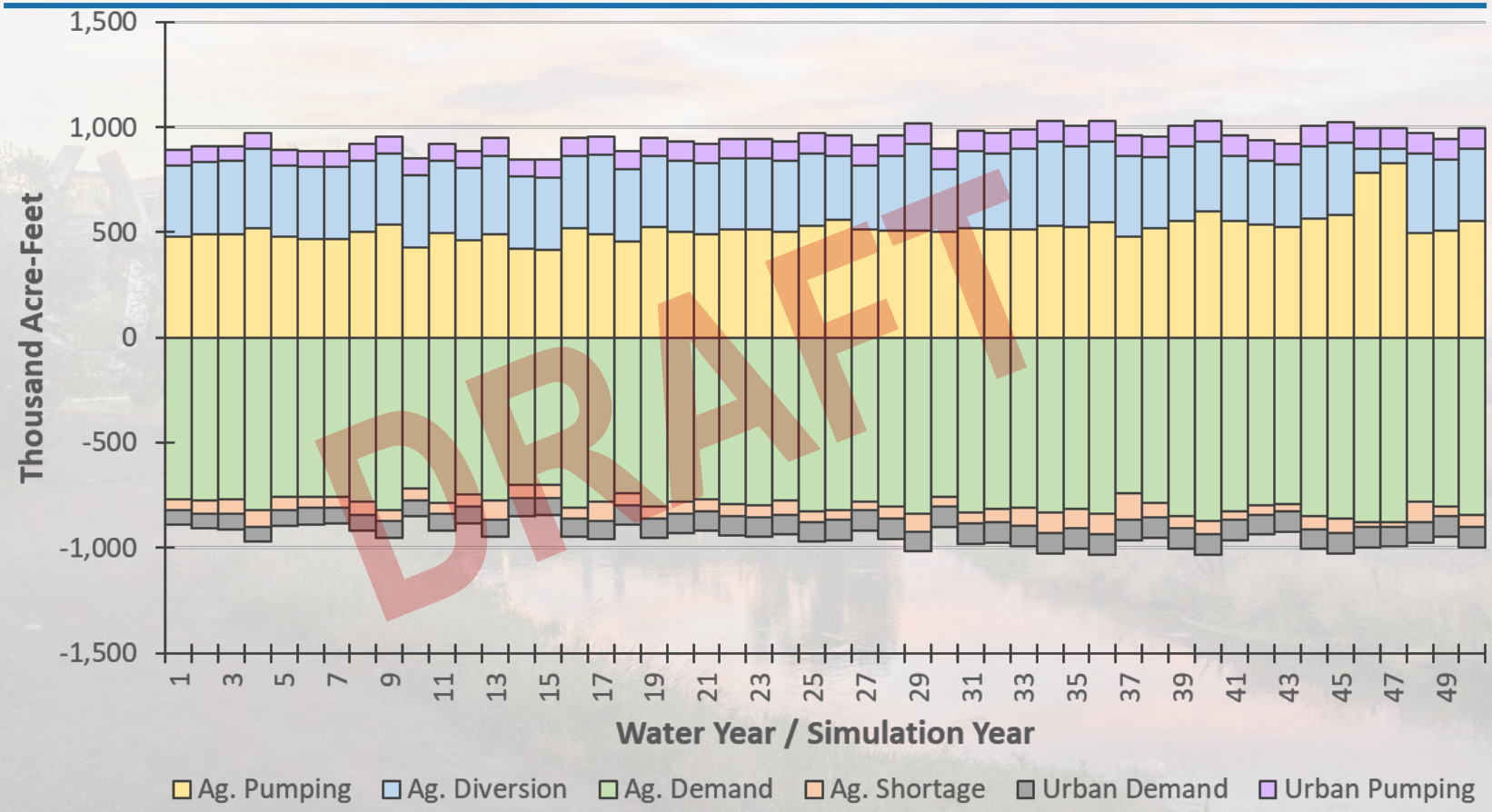
- Hydrologic Period: Water Years 1969-2018 (50-Year Hydrology)
- River Flows
  - Merced: MercedSIM
  - San Joaquin: CalSim
  - Local Tributaries: Historic Records
- Land Use and Cropping Patterns:
  - 2013 CropScape modified based on discussions with GSAs
- Urban Water Use:
  - General Plan Buildout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

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Projected Water Budget by Land Use Type

Merced Groundwater Subbasin

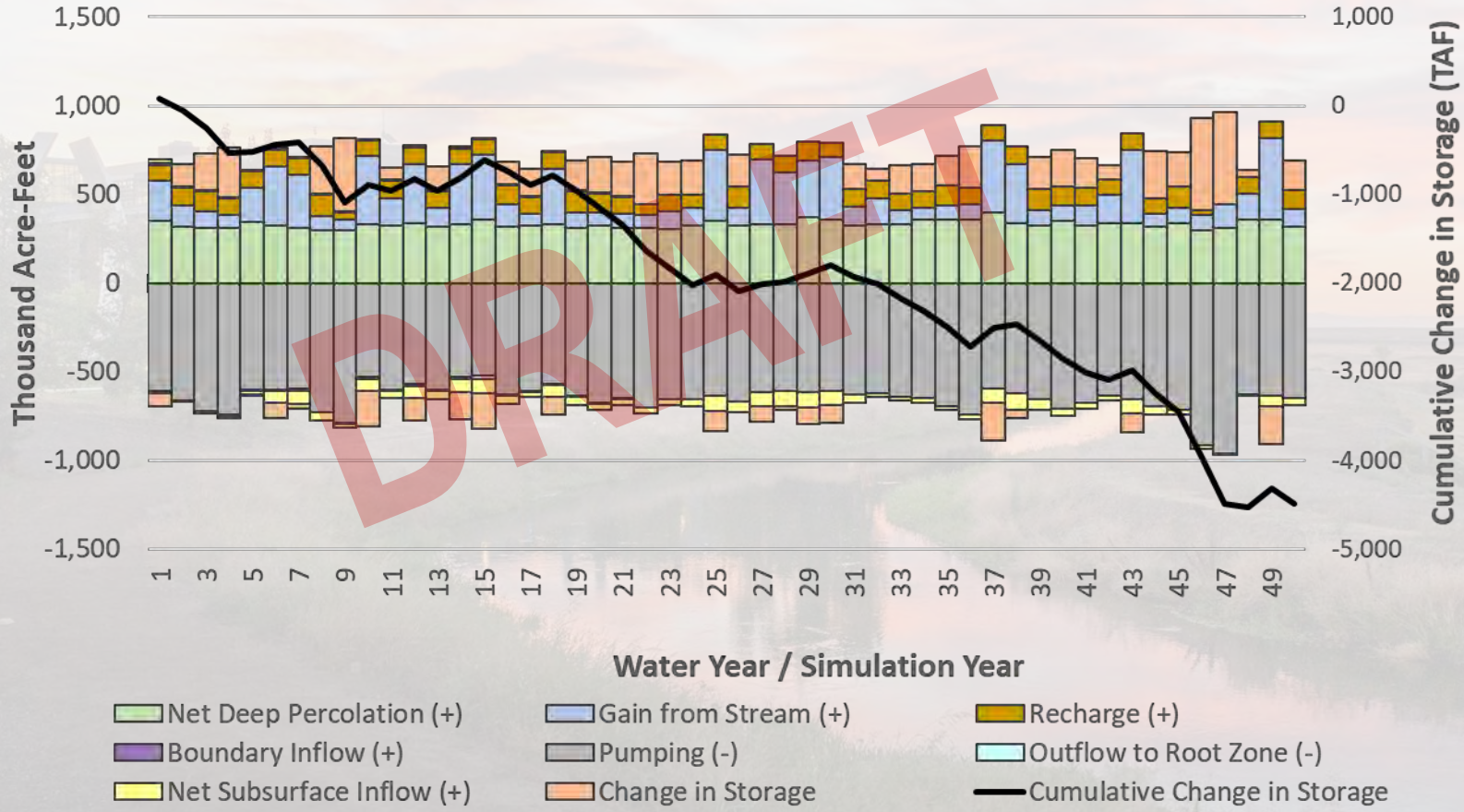


- Below 0 values indicate demand (including agricultural and urban)
- Above 0 values indicate supplies (including pumping and diversion)

MERCED SGMA

Projected Water Budget - Groundwater

Merced Groundwater Subbasin

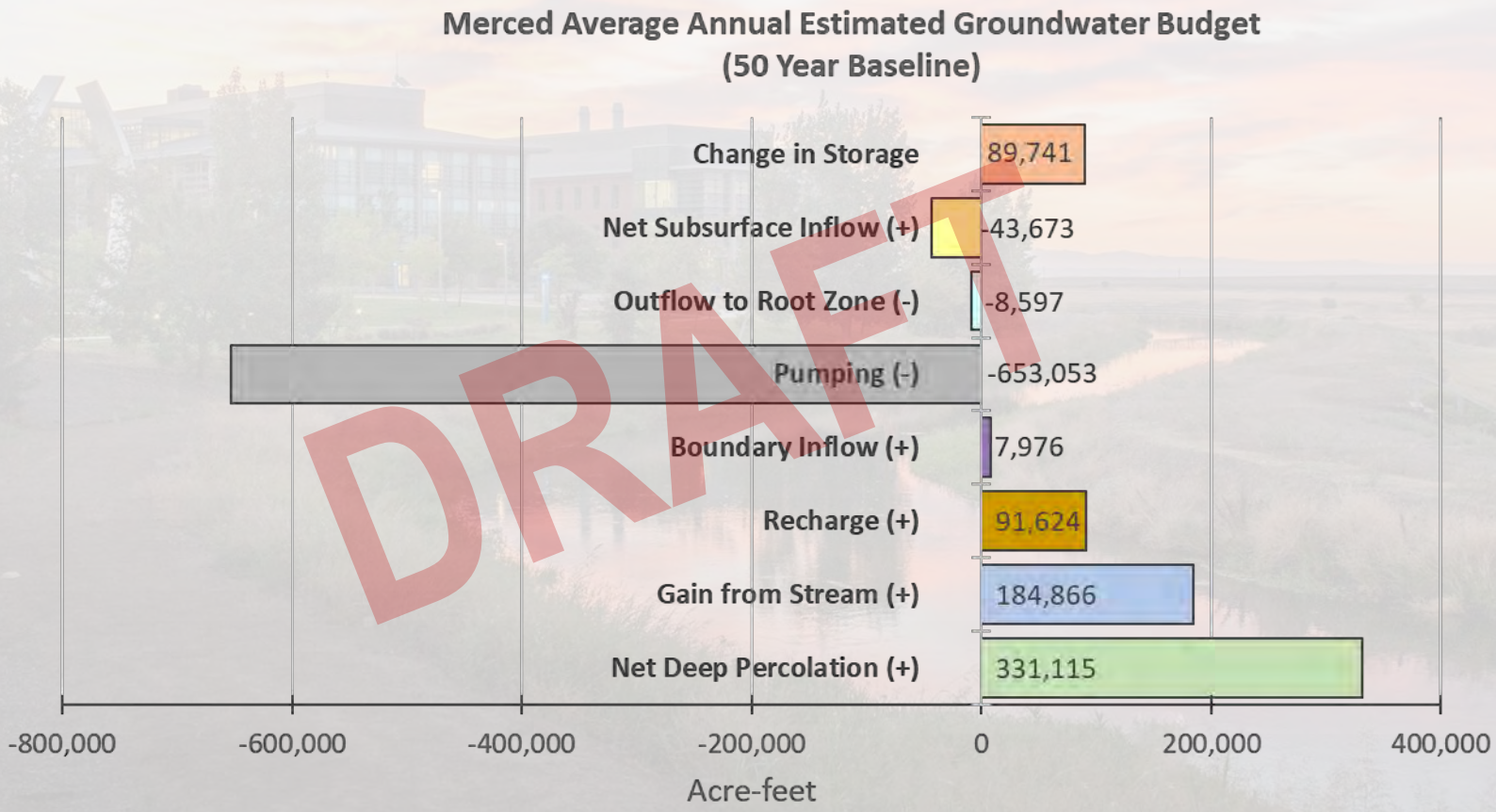


- Positive numbers show flow into aquifer
- Negative numbers show flow out of aquifer
- Line shows overall decline in stored groundwater over time

MERCED SGMA

Projected Water Budget - Groundwater

Merced Groundwater Subbasin



- The graph shows a representation of the inflows (on right) and outflows (on left). Change in Storage is the net amount inflows and outflows (outflows minus inflows).

Discussion & Questions

- Clarifying questions about how the water budget is developed.

- What are your questions and take-aways from the information presented on water budgets?

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

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

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Sustainable Yield – Modeling Analysis

- Modeling Approach
  - Lower groundwater pumping 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

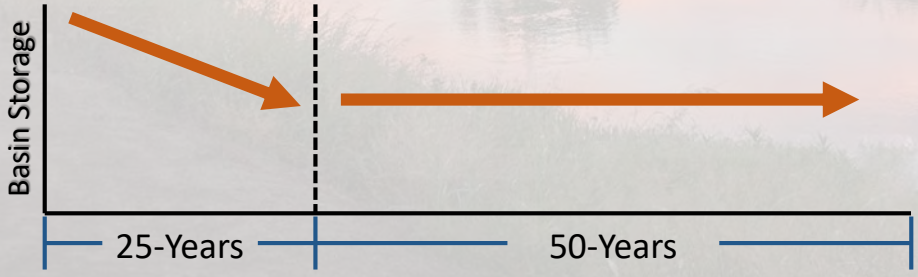


Image courtesy Veronica Ashoori/UC Merced

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

MERCED SGMA

Modeling Assumes "Glidepath" to Sustainability Between 2020 and 2040

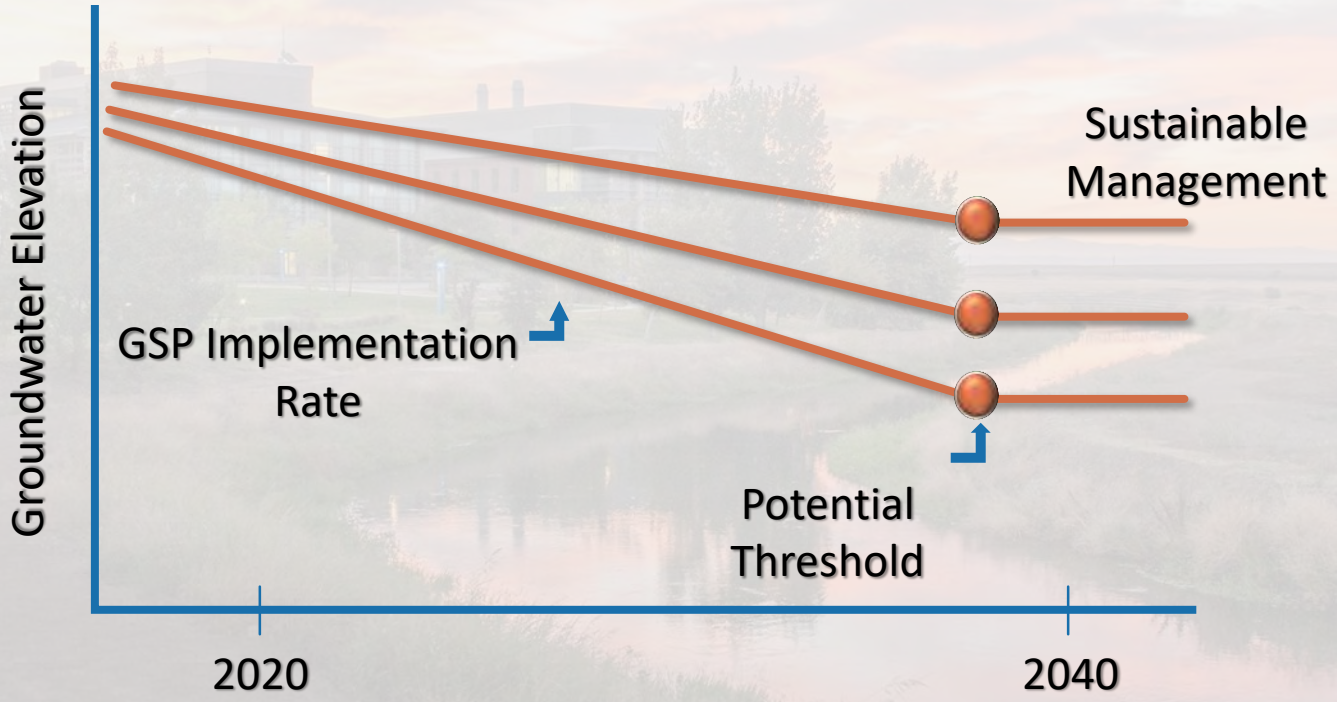


Image courtesy: Veronica Adrover/UC Merced

Sustainable Yield Land and Water Use Budget

Merced Groundwater Subbasin

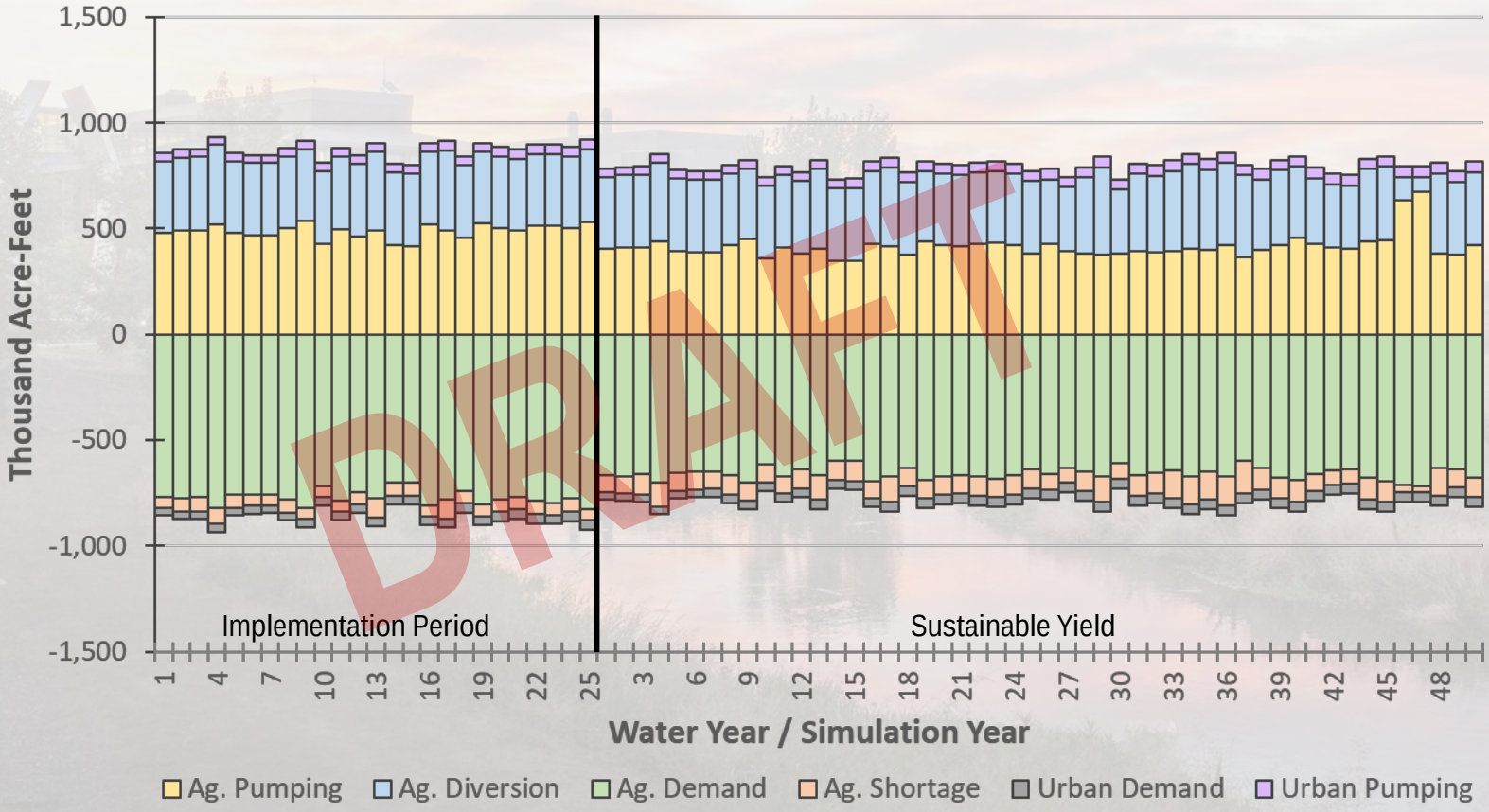


Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Sustainable Yield Groundwater Budget

Merced Groundwater Subbasin

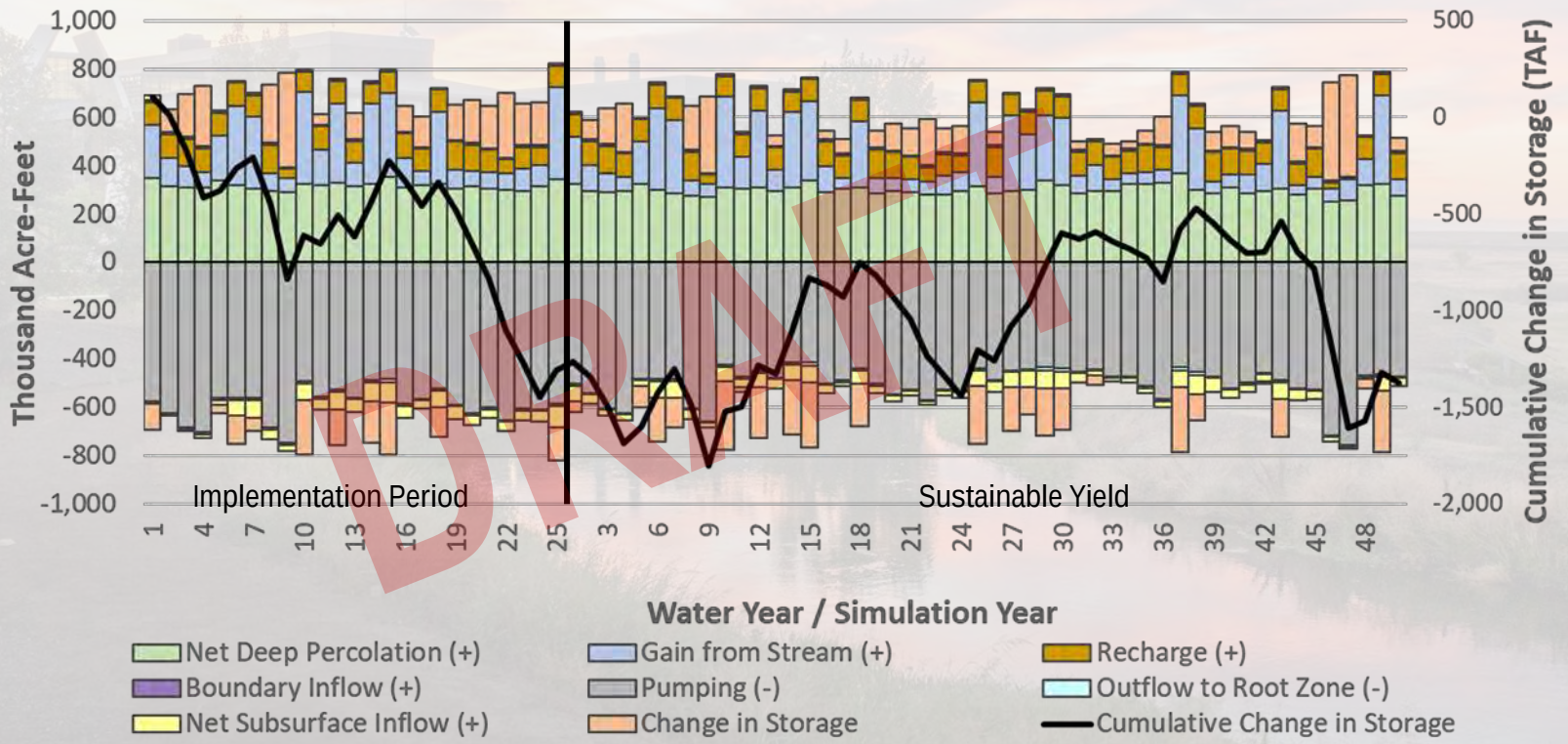


Image courtesy: Veronica Adrover/UC Merced

Sustainable Yield Groundwater Budget

Merced Groundwater Subbasin

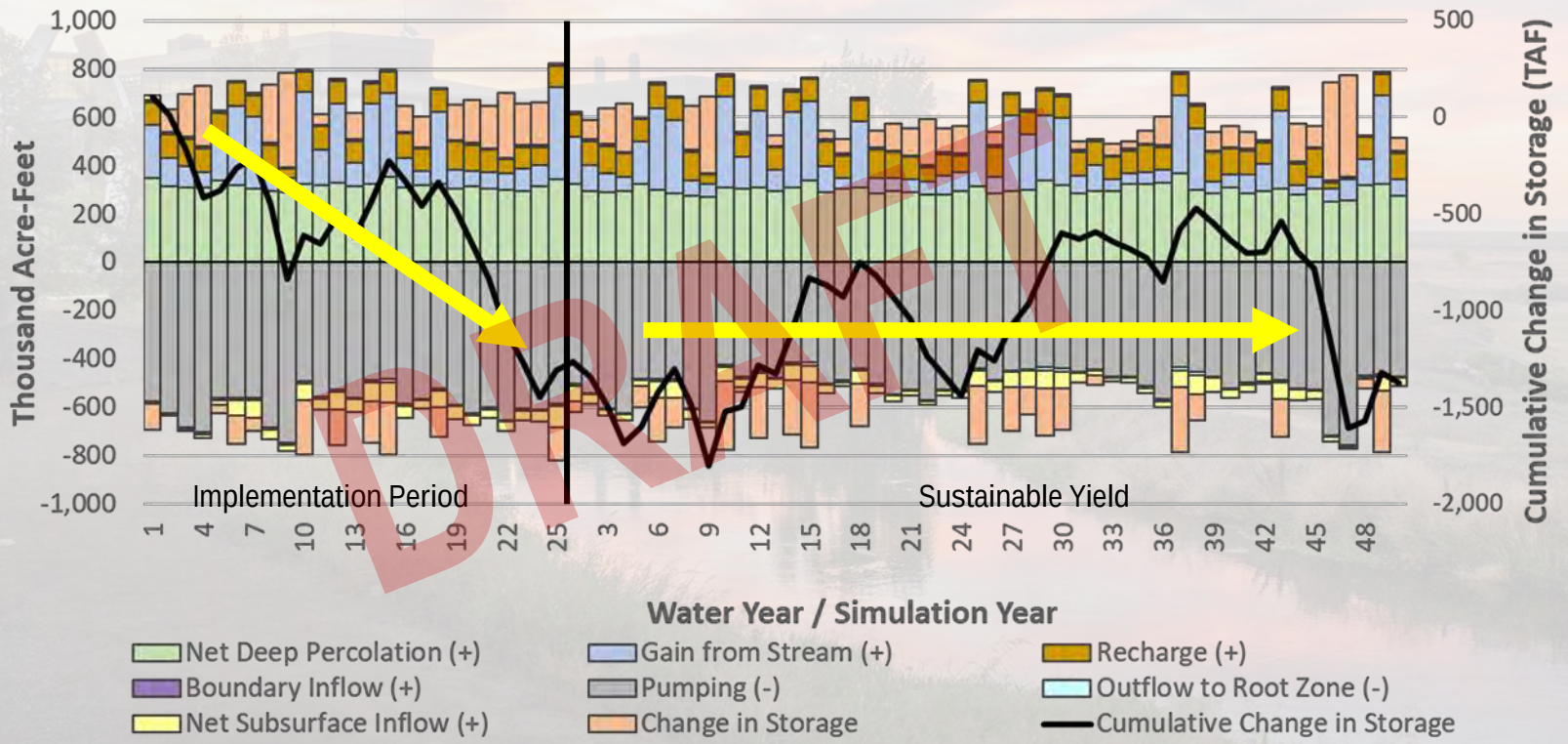


Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Sustainable Yield Groundwater Budget

Merced Groundwater Subbasin

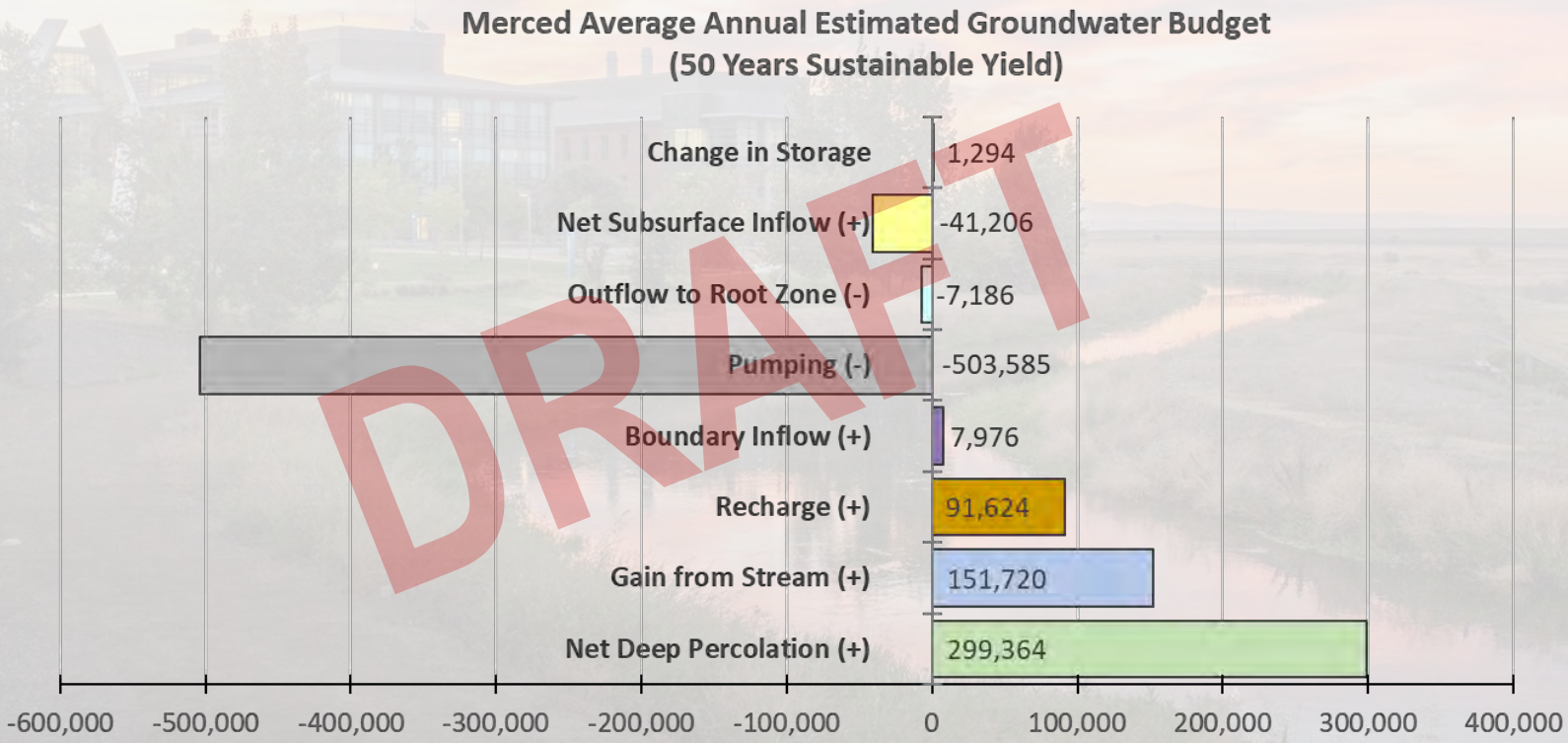


Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Sustainable Yield – Modeling Results

- "Allocations" needed to bring the basin into sustainability by 2040
  - Surface Water Yield 460,000AF ~2.6 AF/Ac*
  - Groundwater Yield 500,000AF ~1.0 AF/Ac**
  - Pumping Reduction 150,000AF ~23%

Notes:

Surface Water Yield: is defined as total surface water supplies divided by the ag acreage within MID, SWD, MCWD, and TIWD

Groundwater Yield: is defined as basin pumping divided by the total acreage of the basin, both developed and undeveloped

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Sustainable Yield - Next Steps

- Identify Projects and Management Actions to Increase Supply Availability and Potentially Reduce Demands
  - Evaluate supply-side options and their effect on yield
  - Evaluate various governance options (water market, etc.)

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Discussion & Questions

- Clarifying questions about the sustainable yield analysis purpose and method.
- What are your suggestions for refining or improving the analysis?
- Any additional questions and take-aways from the information presented on sustainable yield?

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Public Outreach Update

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Public Outreach

- Public Outreach Meetings/Workshop - December
  - Project Update
  - Water Budgets
  - Management Actions and Projects
- Week of December 3
  - Any conflicts?

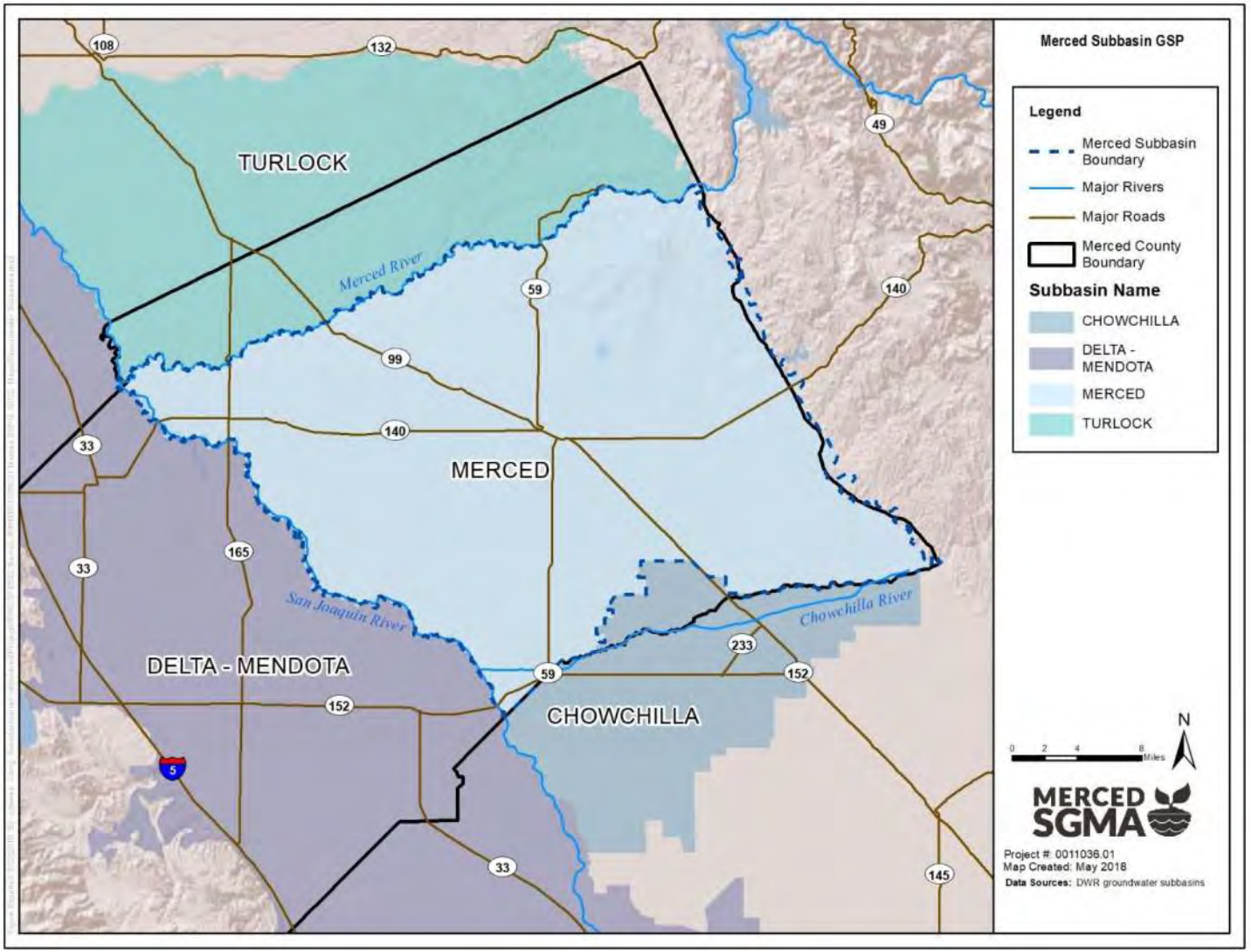
Image courtesy: Veronica Adrover/UC Merced

Interbasin Coordination Update

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Coordination with Neighboring Basins



SED Update

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Questions/Comments from Public

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

Next Steps

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

What's coming up next?

- Next Stakeholder Committee meeting
  - Adjourn to October 22nd @ 9:30 AM, location Castle Airport
  - **Option to adjourn to 9:00 AM to allow time for special topics**

- Next meeting's topics
  - Measurable Objectives and Management Areas
  - Data Management System (DMS)
  - Water Budget & Sustainable Yield
  - Projects and Management Actions

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA

GSP Stakeholder Committee

Stakeholder Committee Meeting – September 24, 2018

Image courtesy: Veronica Adrover/UC Merced

MERCED SGMA