GSP Coordinating Committee

Coordinating Committee Meeting – April 23, 2018

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

Image courtesy: Veronica Adrover/UC Merced

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Agenda

1. Call to Order
2. Approval of Minutes for March 26, 2018
3. Presentation by Woodard & Curran on GSP Development
   - Stakeholder Committee Progress and Update
   - Overview of Work to Date on Basin Conditions
   - Introduction to Terminology and Preliminary Discussion:
     - Sustainability Indicators
     - Undesirable Results
     - Minimum Thresholds
     - Measurable Objectives
     - Interim Milestones

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Agenda Continued

4. Update on DWR's SGMA Technical Support Services
5. Discuss Leadership Counsel Request for Letter of Support
   - Action – authorize letter of support
6. Public comment
7. Next steps and adjourn

Stakeholder Committee

Image courtesy: Veronica Adrover/UC Merced

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Stakeholder Committee Update

Feb & March

- Solicited Applications for Stakeholder Committee
- Received and reviewed 35+ applications

April

- Finalized Stakeholder Committee members list
- Notified members of selection
- Scheduled first Stakeholder Committee Meeting for May 29, 2018

May

- Committee members sign charter
- Hold first meeting (May 29, 2018)

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Basin Conditions – Work to Date

Image courtesy: Veronica Adrover/UC Merced

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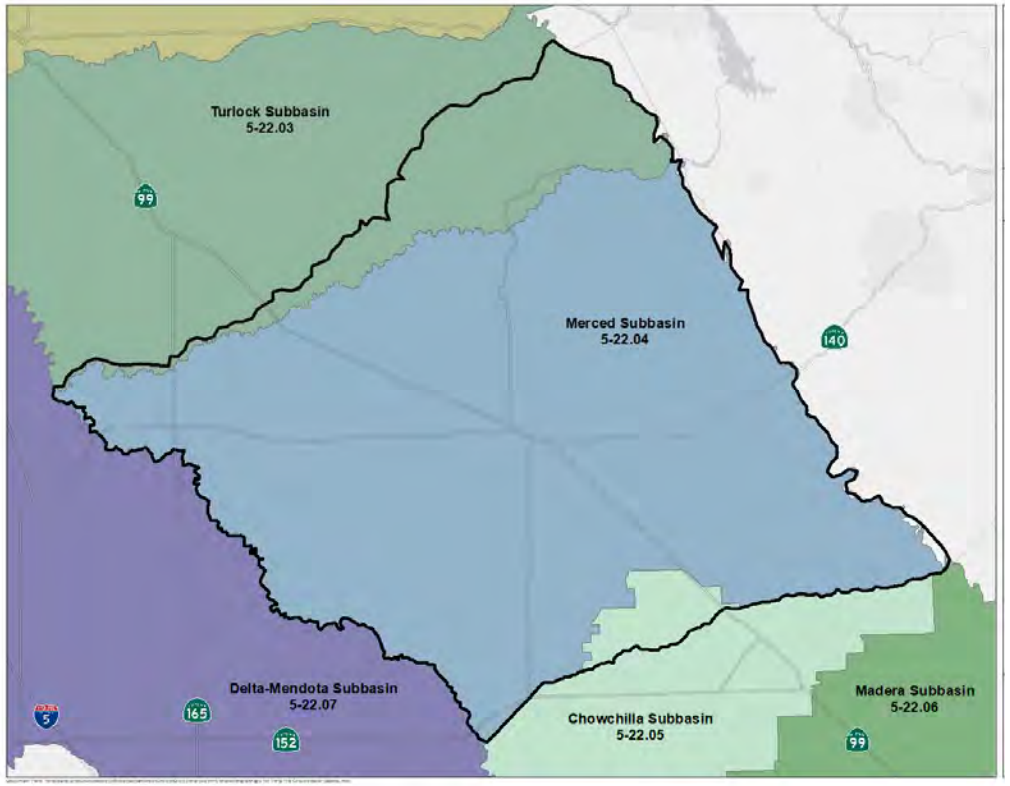
MercedWRM Model Development

- Development through local and DWR funding
- Input data collected and used
- Model calibration efforts completed
- Water quality model efforts in progress (MercedWQM)

MercedWRM Intended Uses

- Basin Characteristics
  - Natural Conditions
  - Stream-Aquifer Interaction
  - Land Subsidence
  - Water Quality
- SGMA Support
  - Groundwater Sustainability
  - Groundwater Banking
  - Water Availability
  - Project Beneficiary Assessment



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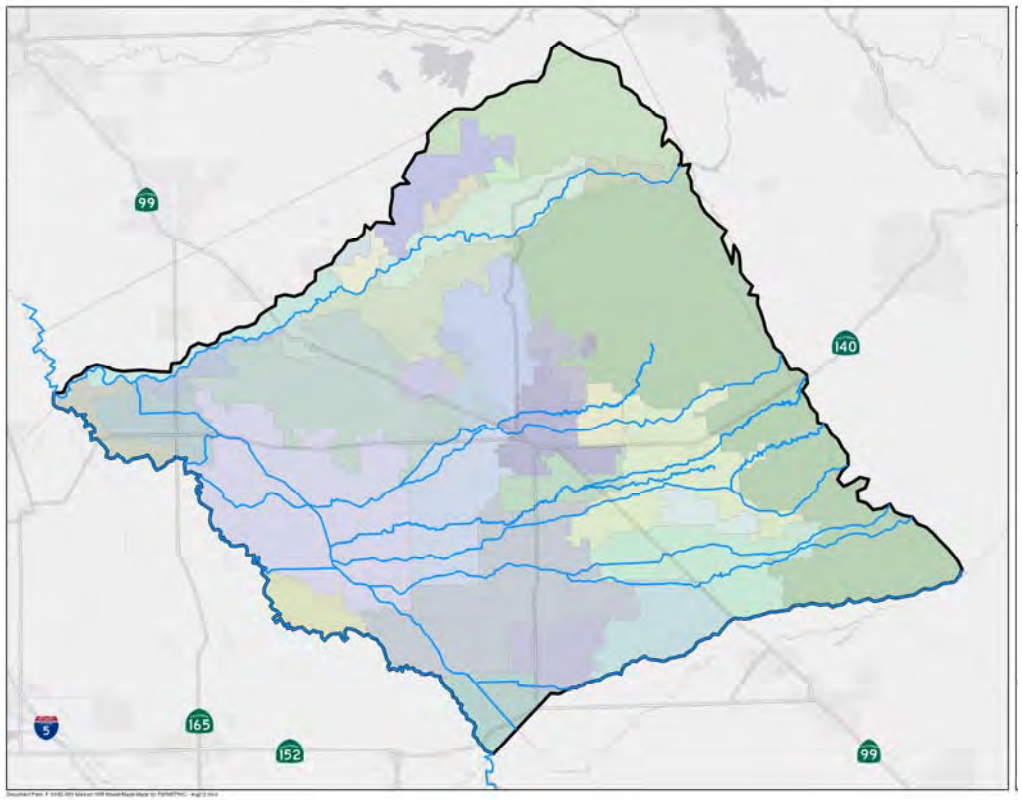
Model Grid

Grid Criteria

- Bulletin 118 (2003) Groundwater Basin Boundaries
- Agency Boundaries
- Stream Flow Operational Boundaries
- Lines
- Major Conveyance Features
- Unincorporated Land Use
- Topography/Drainage
- 5-Mile Boundary Buffer



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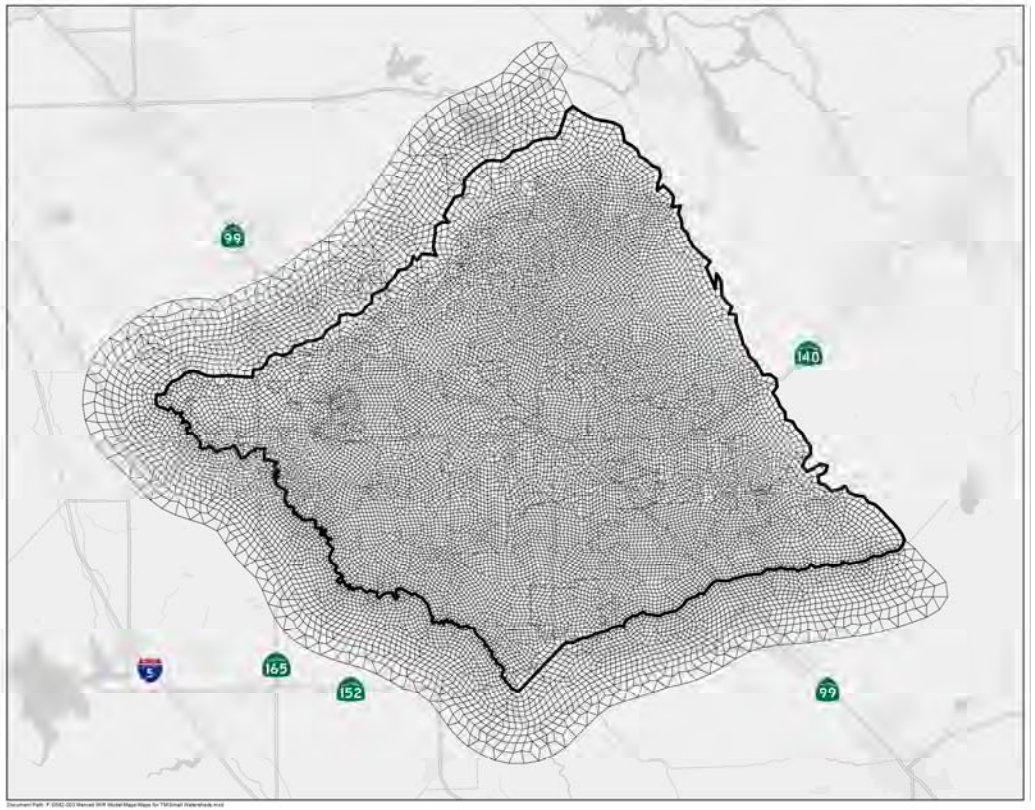
Model Grid

Grid Statistics

- 607,000 Total Acres
- 71 Stream Reaches
- 37 Subregions
- 17,696 Nodes
  - Stream Lines
  - Agency Boundaries
  - ¼ Mile Discretization
- 19,563 Elements
  - Average Size = 24 Acres



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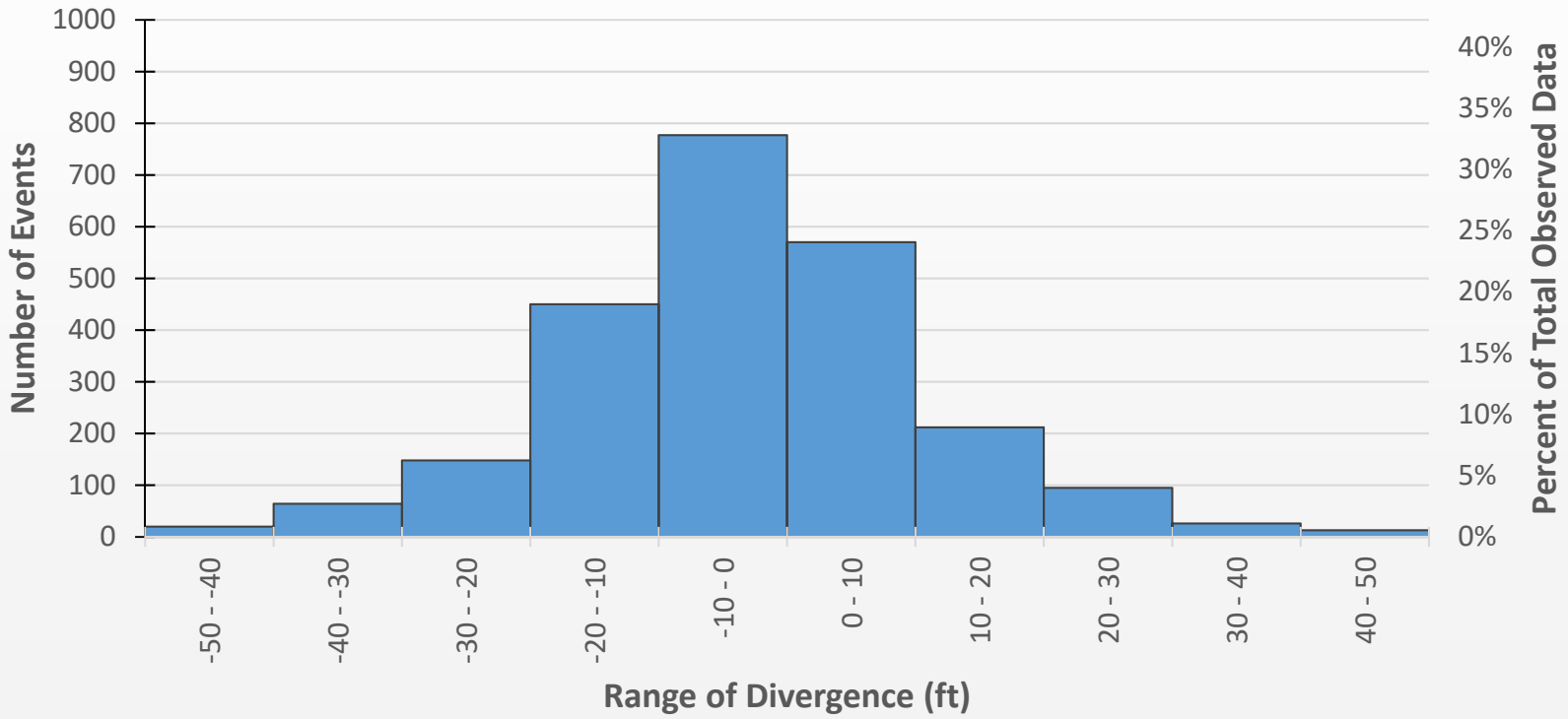
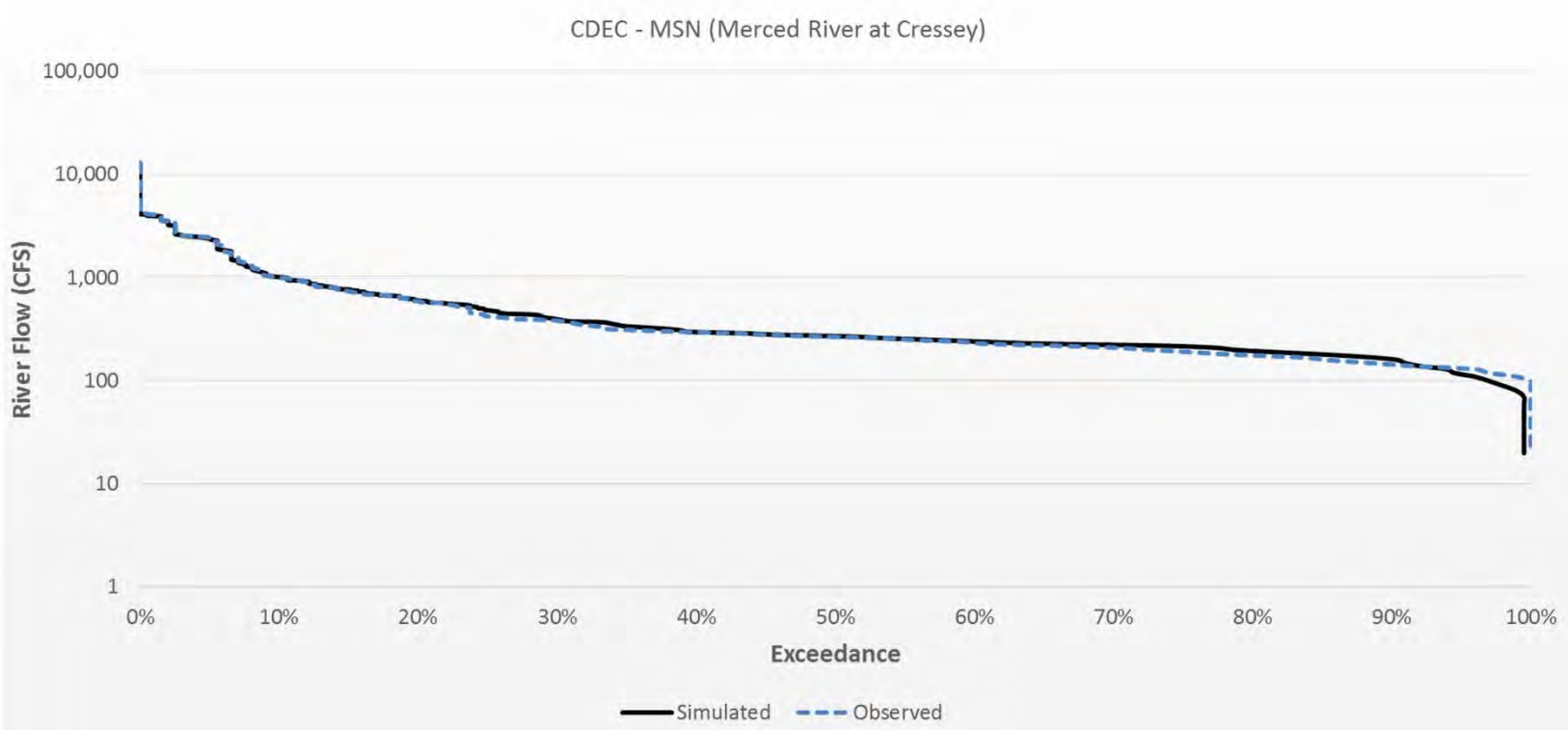
Model Calibration: Statistics



Model Calibration: Streamflow Exceedance Example



Monitoring Plan – Merced County

- Data requests to local, regional, and state agencies
  - Merged local data with statewide databases in Monitoring Tool
- Developed library of monitoring plans and information
- Developed Monitoring Plan document with characterization of existing monitoring of:
  - Groundwater levels
  - Groundwater quality
  - Land subsidence
  - Surface water and diversions
  - Water budgets
- Beneficial Groundwater Level Monitoring Analysis

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Monitoring Plan – Merced County

Existing Merced County Water Monitoring, by the Numbers

4/19/1922 oldest water level record

2,189 unique wells with water level data

72,682 water level measurements

54,799 groundwater quality records

0 extensometers, **2** GPS subsidence stations, and **20** other subsidence control points

19 streamflow gaging stations

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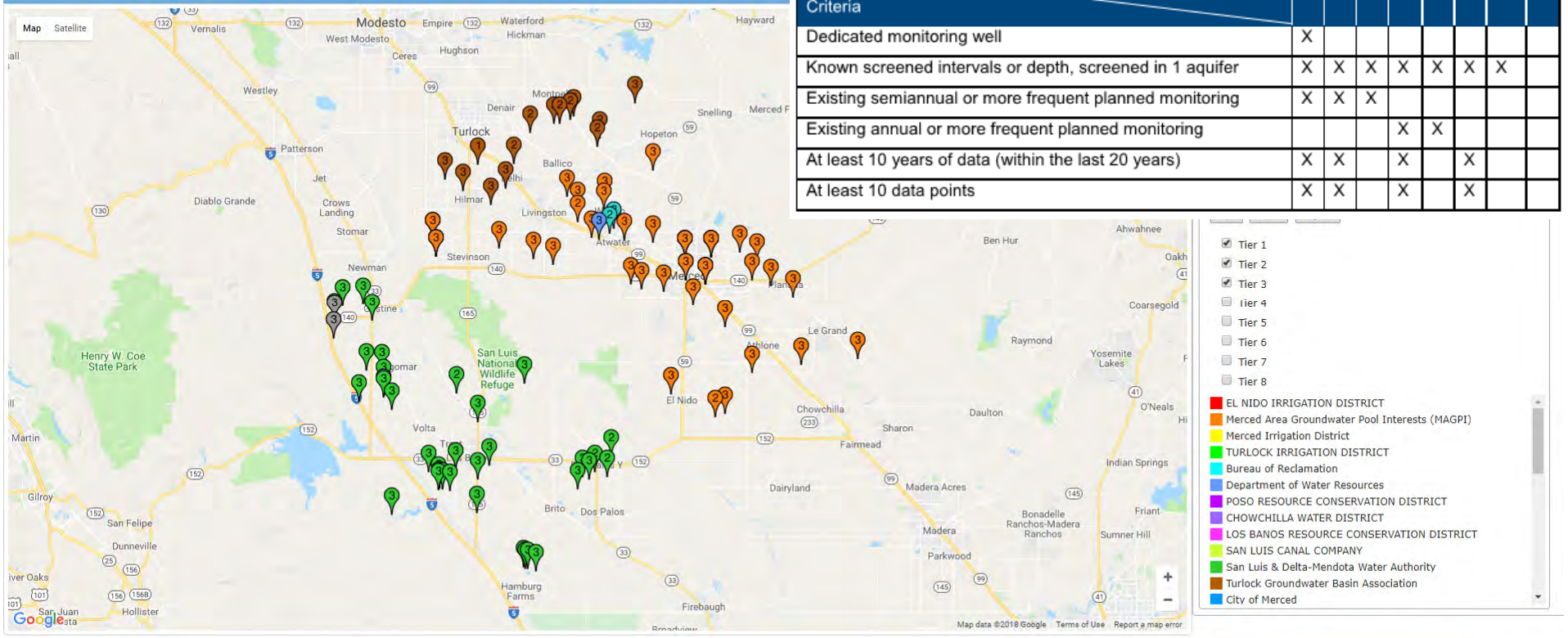
Monitoring Plan Well Monitoring Tool

- Tool to guide development of monitoring networks
- Builds upon existing programs
- Foundational for future use by GSAs
- Compiles multiple characteristics into one interface
  - Known screened intervals or depth
  - Frequency of existing monitoring
  - Period of data record
  - Volume of existing data
- Interface allows flexibility

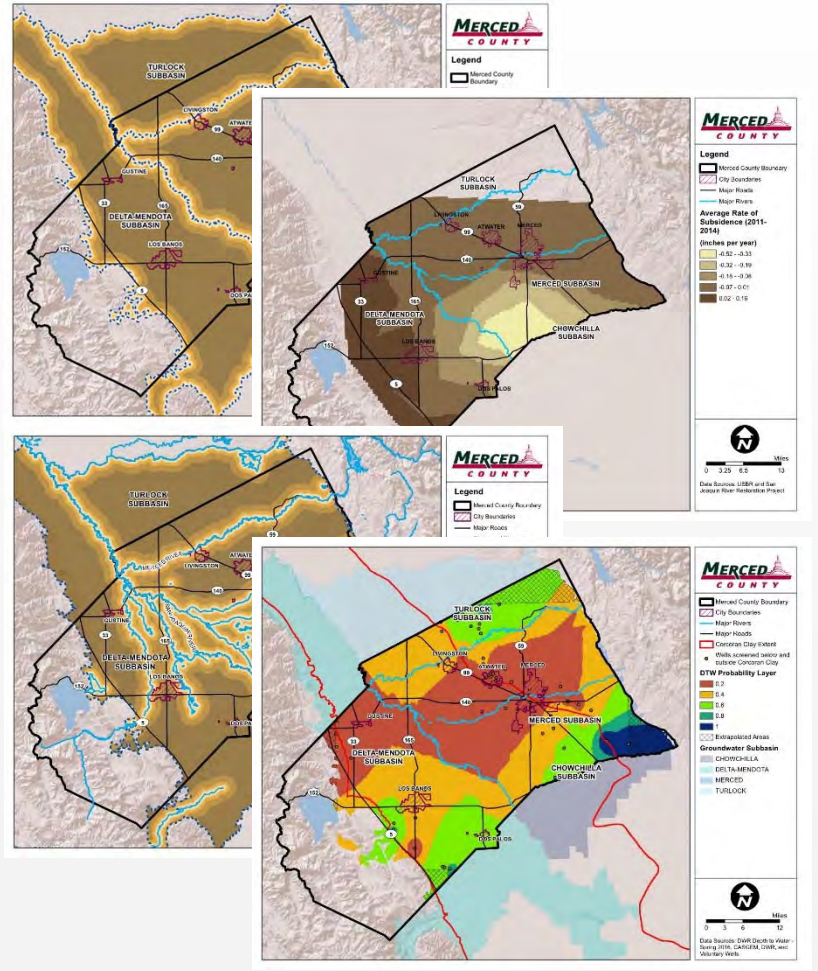
Monitoring Plan Well Monitoring Tool

Criteria \ Well Tier	1	2	3	4	5	6	7	8
Dedicated monitoring well	X							
Known screened intervals or depth, screened in 1 aquifer	X	X	X	X	X	X	X	
Existing semiannual or more frequent planned monitoring	X	X	X					
Existing annual or more frequent planned monitoring				X	X			
At least 10 years of data (within the last 20 years)	X	X		X		X		
At least 10 data points	X	X		X		X		



Beneficial Groundwater Level Monitoring Analysis

- Additional information developed to support GSP development of monitoring networks
  - Depth to water (above, below, outside Corcoran Clay)
  - Land use
  - Surface water supplies
  - Distance to rivers or streams
  - Distance to TDS or nitrate exceedances
  - Rate of subsidence
  - Distance to subbasin boundaries



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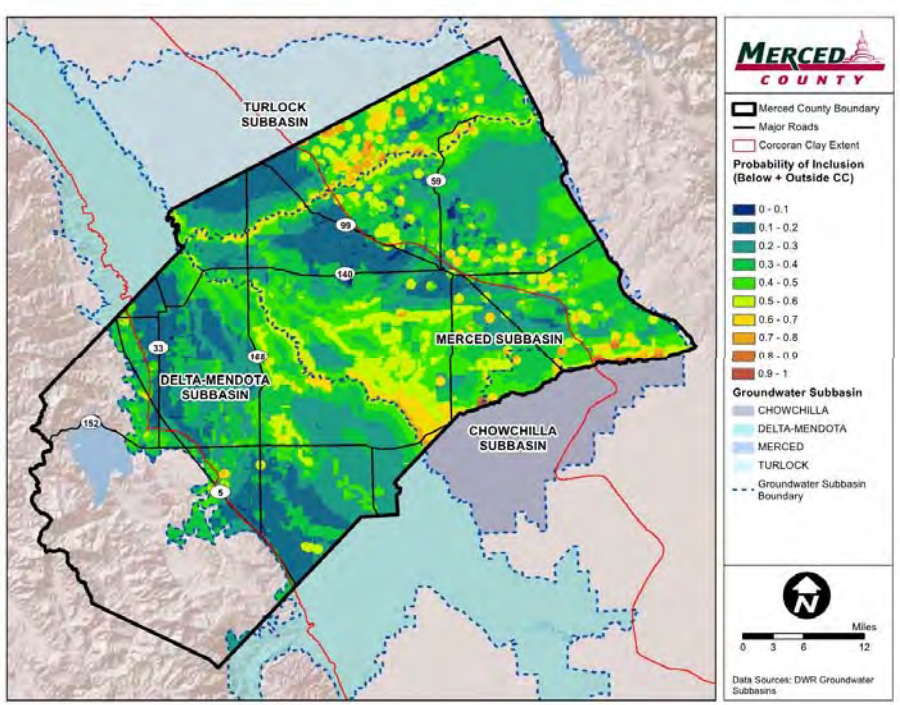
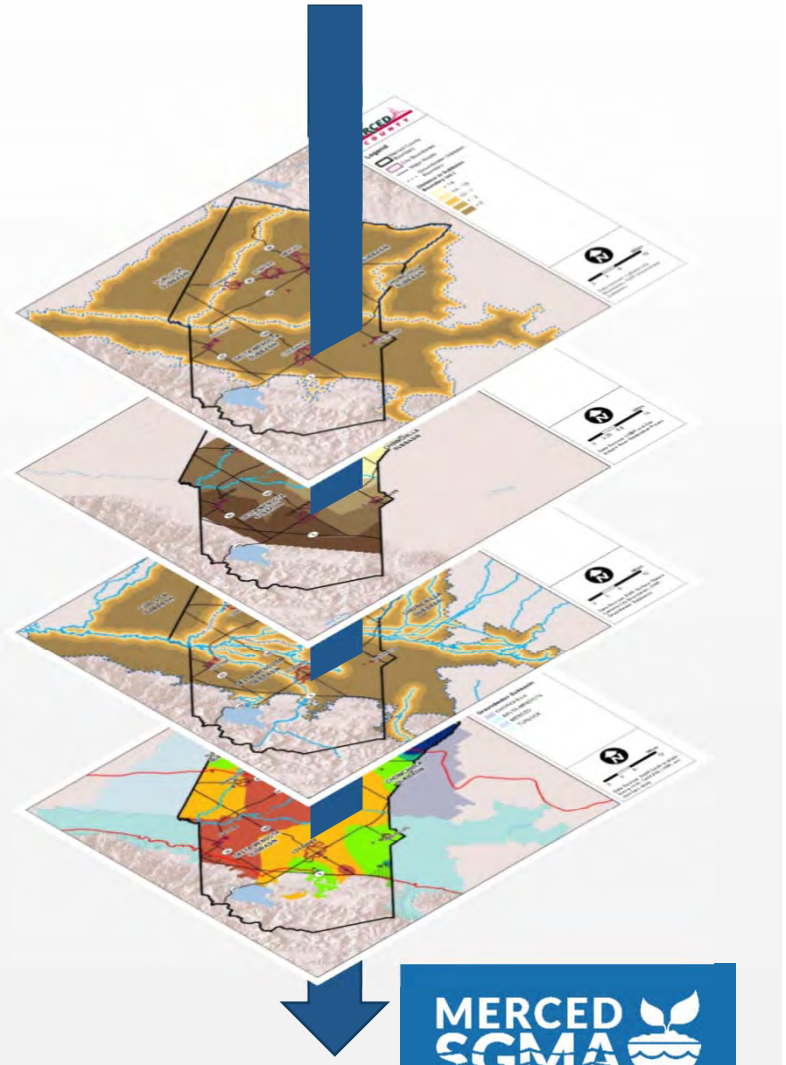
Beneficial Groundwater Level Monitoring Analysis

- Assigned scores and weights to datasets
- Combine datasets and tiered existing monitored wells into 1 map





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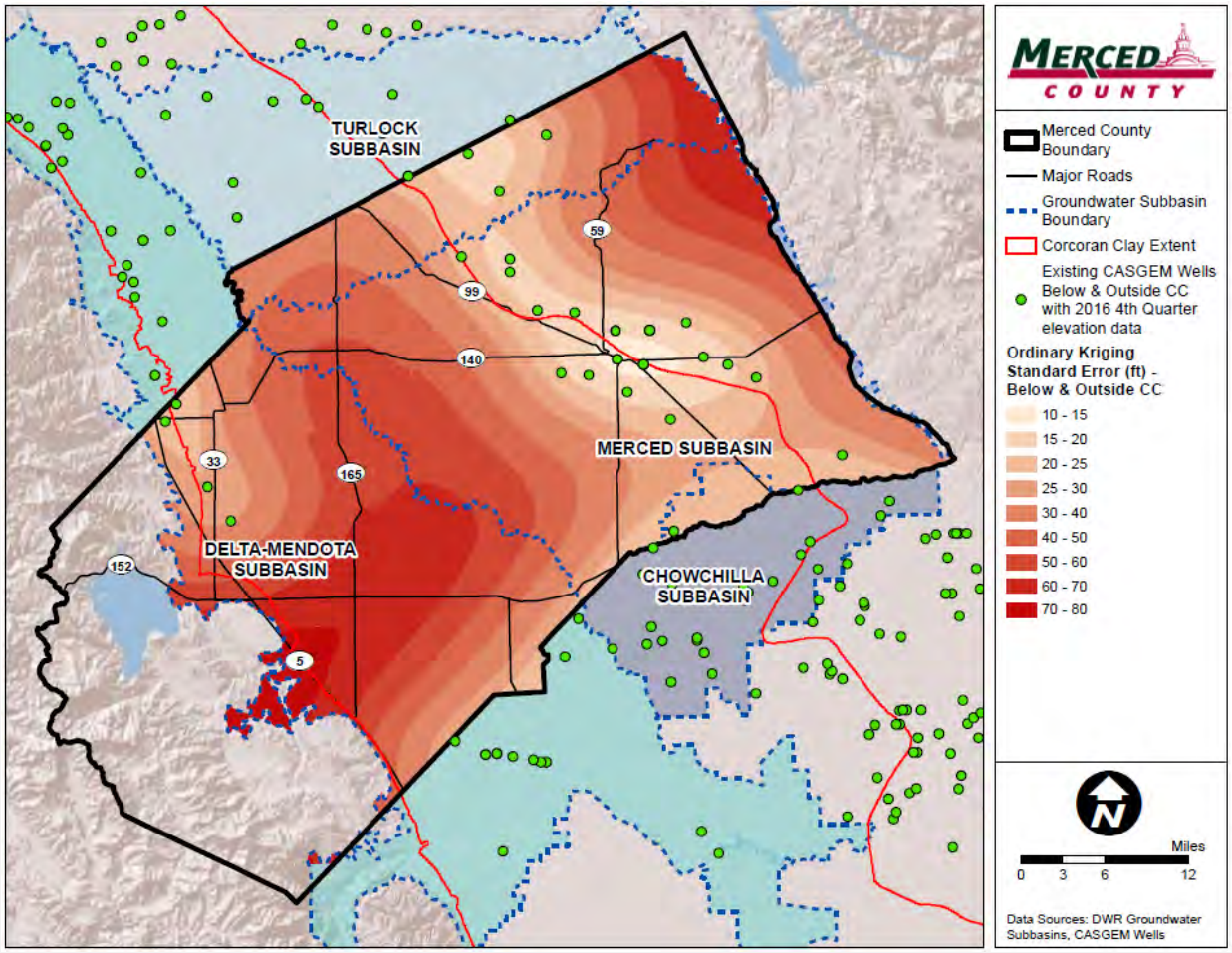
Beneficial Groundwater Level Monitoring Analysis

- Kriging (spatial interpolation) used to identify areas of higher standardized error
- Goal to “fill in gaps” with new wells and reduce error



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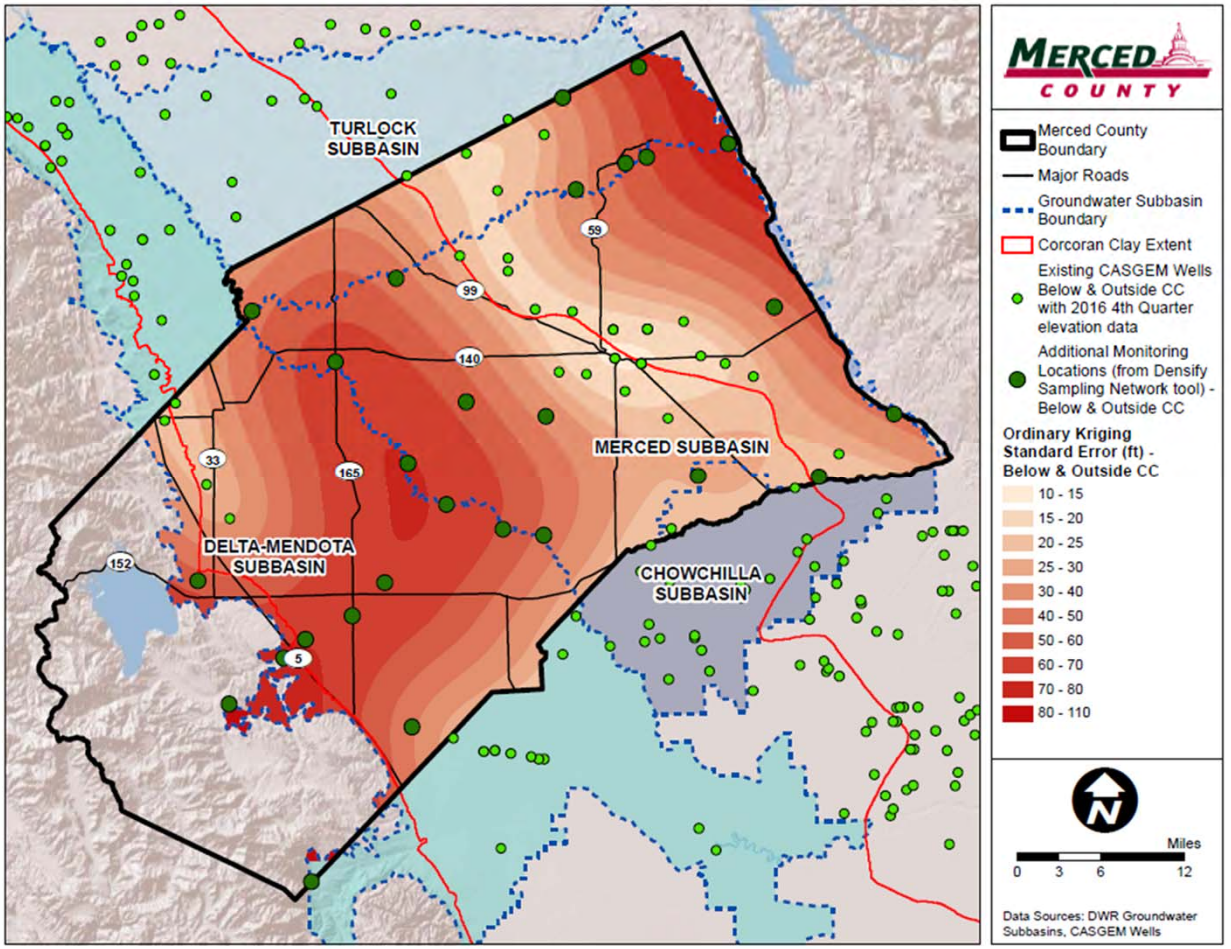
Beneficial Groundwater Level Monitoring Analysis

- Densify Sampling Network Tool
- Kriging output combined with weighted preferential site layer
- Suggests locations for new wells



Next Steps – Monitoring Plan

- Recommend areas for automation and telemetry

Key Terminology

Image courtesy: Veronica Adrover/UC Merced

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So Many Terms, So Little Time

Sustainable Groundwater Management Act

Measurable Objective

Hydrogeologic Conceptual Model

Minimum Threshold

Interim Milestone

Significant and Unreasonable

Groundwater Conditions

Undesirable Results

Basin Settings

Sustainability Indicator

Water Budget

Margin of Operational Flexibility

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GSP Requirements

- Why are terms important?
  - Established by regulation
  - Used by regulators during GSP review
  - Consistency of terms assists SGMA discussion
- Today's focus is the relationship between:
  - Sustainability Indicators
  - Undesirable Results
  - Minimum Thresholds
  - Measurable Objectives
    a. Interim Milestones
    b. Margin of Operational Flexibility
  - Monitoring Network

Six “Sustainability Indicators”

Chronic Lowering of Groundwater Levels

Reduction in Groundwater Storage

Seawater Intrusion

Degraded Water Quality

Land Subsidence

Depletion of Interconnected Surface Water

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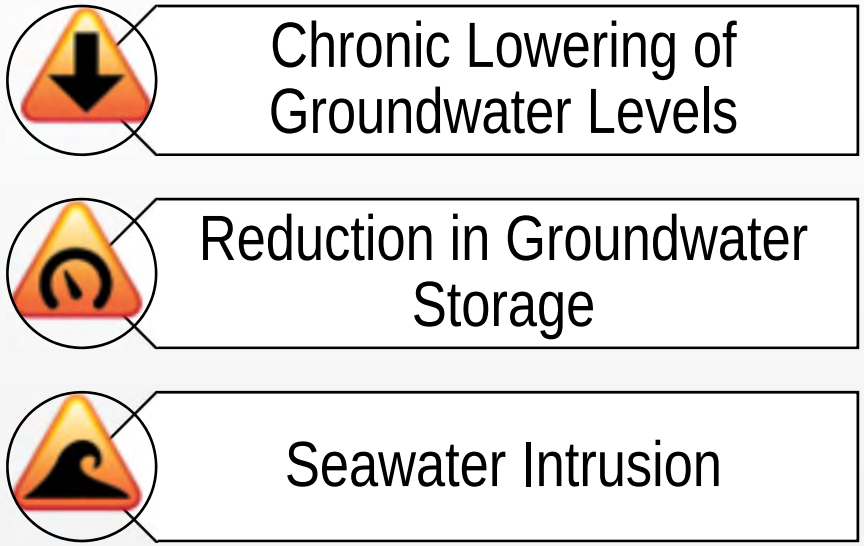
Undesirable Results

- 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

Undesirable Results are Significant and Unreasonable Impacts



- "Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon"
- "Significant and unreasonable reduction in groundwater storage"
- "Significant and unreasonable seawater intrusion"

Undesirable Results are Significant and Unreasonable Impacts

Degraded Water Quality

- "Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies"

Land Subsidence

- "Significant and unreasonable land subsidence that substantially interferes with surface land uses"

Depletion of Interconnected Surface Water

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

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Minimum Thresholds

- Point at which Undesirable Results may begin to occur
  - Example: Lowest GW elevations can go at a monitoring point without something significant and unreasonable happening to groundwater
  - If issues are already occurring, we only need to "go back" to Jan 1, 2015 conditions; if no issues are occurring, can set threshold where they would be anticipated to occur
- Quantitative thresholds

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Measurable Objectives: 2040 Targets Provide Buffer to Prevent Undesirable Results

- Establish the high side of an operating margin that the basin will be managed to in order to prevent undesirable results (above the minimum thresholds)
- Quantitative targets

Interim Milestones are Established to Chart Progress Toward Meeting Objectives

- Interim Milestone
  - Interim Milestones are the 5 year targets for the Measurable Objective
- Margin of Operational Flexibility
  - Margin of Operational Flexibility is the space between the measurable objective and the minimum threshold

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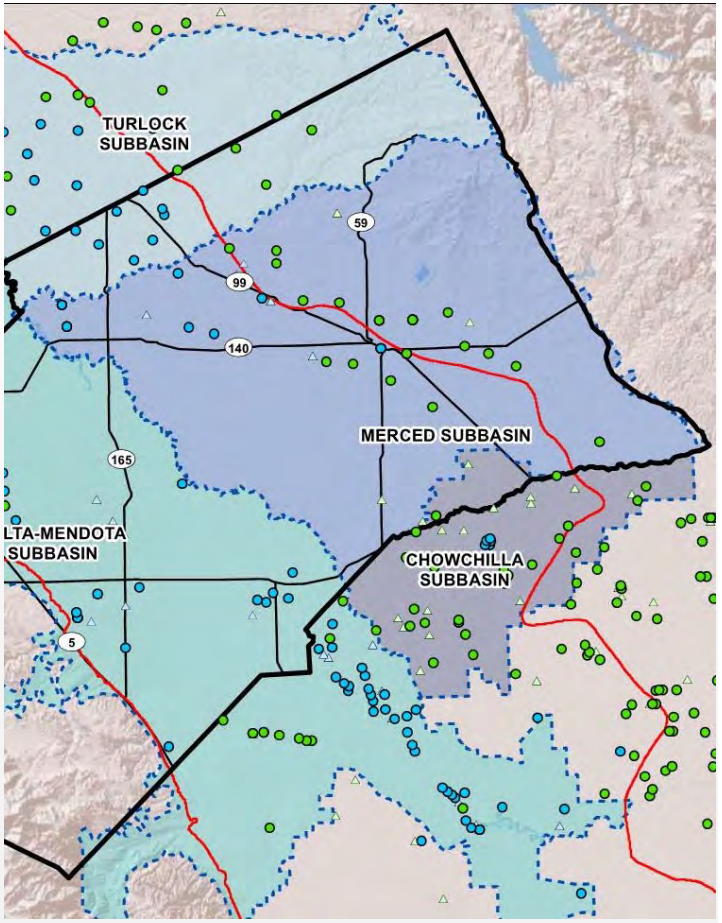
Monitoring Network

- Monitor for conditions that would cause undesirable results
- Address the six sustainability indicators
- Provide adequate spatial and temporal coverage for each primary aquifer
- Establish minimum thresholds and measurable objectives for each monitoring point
- Prioritize subset of existing wells that provide adequate spatial resolution (minimize new monitoring requirements)



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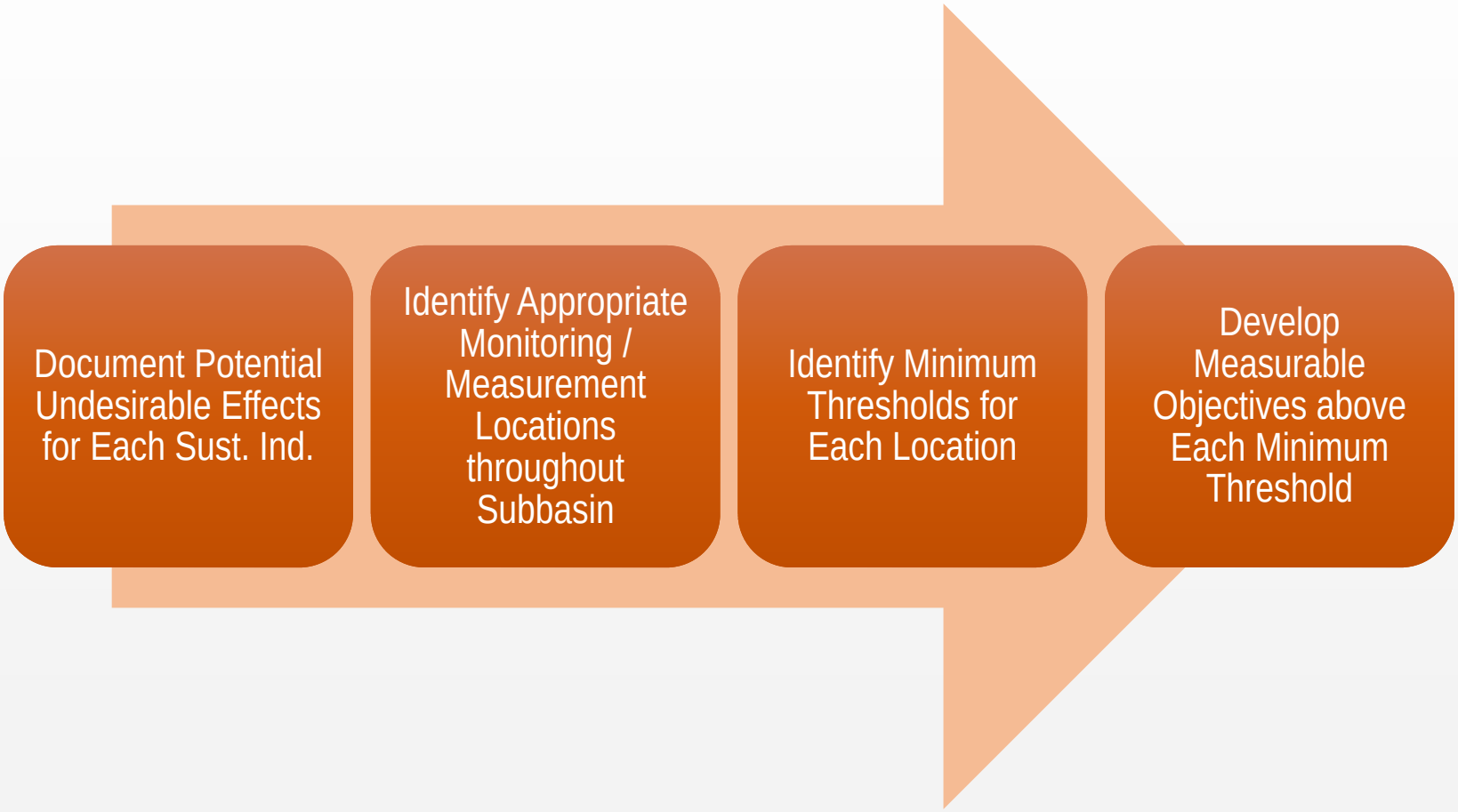
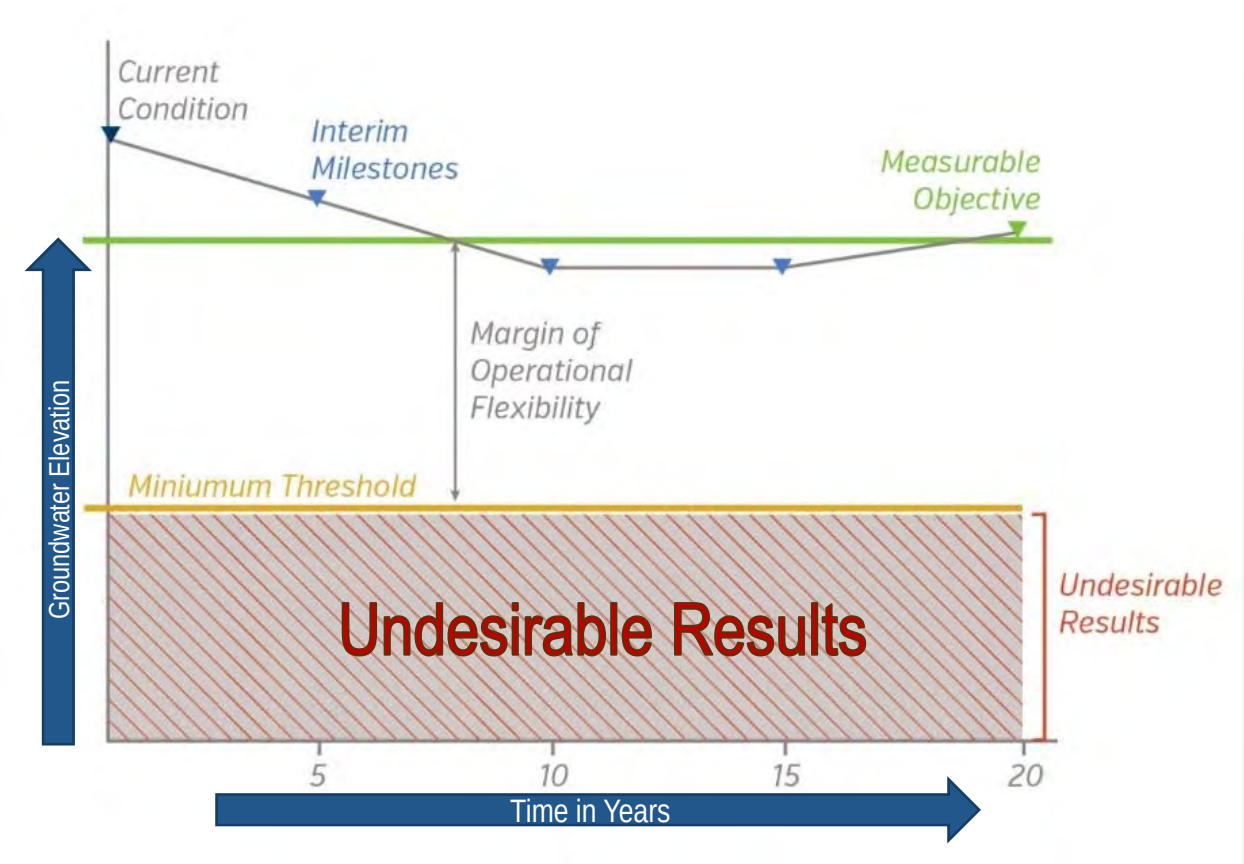
Process for Setting Measurable Objectives



Example: Lowering of Groundwater Levels



Potential Undesirable Results

Image courtesy: Veronica Adrover/UC Merced

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What Are Potential Undesirable Results for Each Sustainability Indicator?

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

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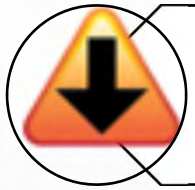
Undesirable Results for Lowering Groundwater Levels



Chronic Lowering of Groundwater Levels

Why is this a concern? What are we trying to avoid?

- Wells going dry
- Reduced production
- Higher pumping costs due to greater lift
- Deeper installation (more, and more expensive, drilling)

Discussion: other potential effects to consider?

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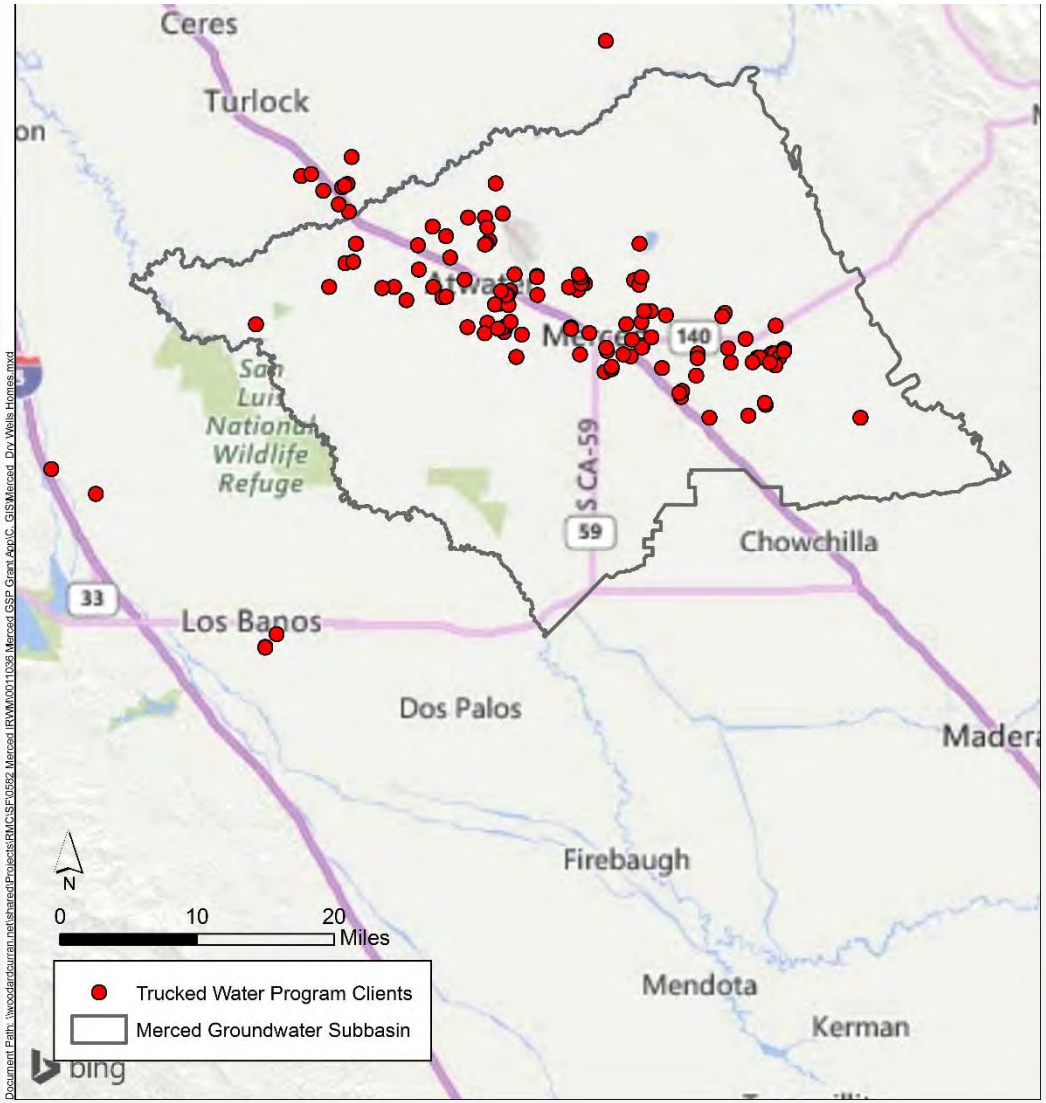
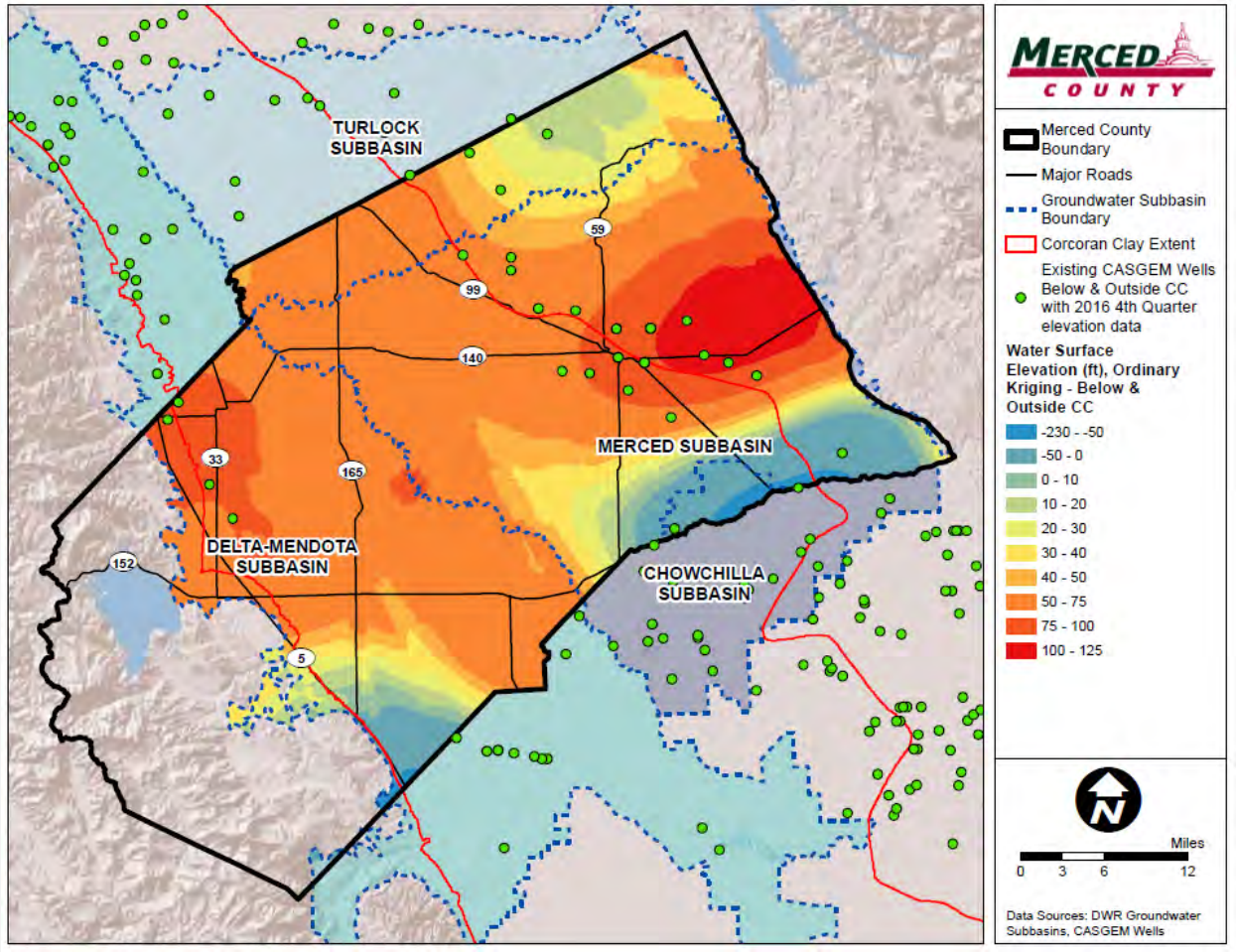
Trucked Water Program During Recent Drought



Current Conditions: Groundwater Elevations Below and Outside Corcoran Clay (example)



Discussion: what impacts are you seeing now?

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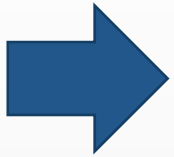
What Are Potential Undesirable Results for Each Sustainability Indicator?



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

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Undesirable Results for Reduction of Storage

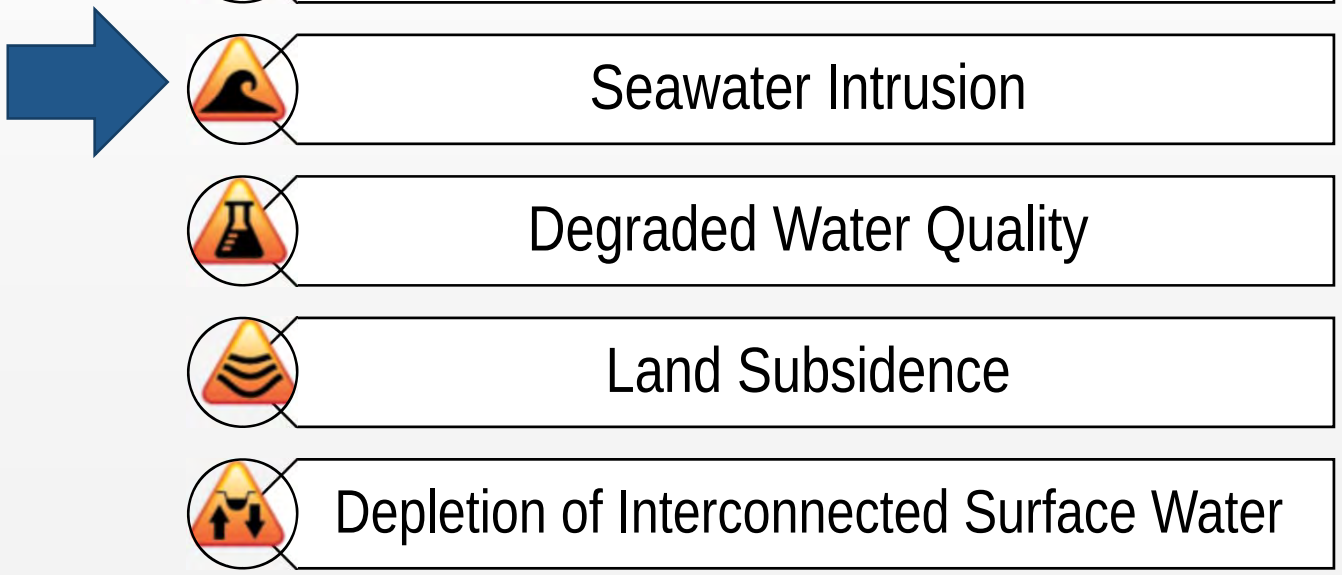
Reduction in Groundwater Storage

Why is this a concern? What are we trying to avoid?

- This is not a major concern
- Large basin storage (up to 50 MAF), no chronic reduction that impacts supply needs
- Undesirable result = running out of sufficient storage to get through drought

****This does not mean we do not need to bring the basin into balance, it only means that groundwater-related impacts will be more sensitive to other indicators, such as groundwater elevations.*

What Are Potential Undesirable Results for Each Sustainability Indicator?



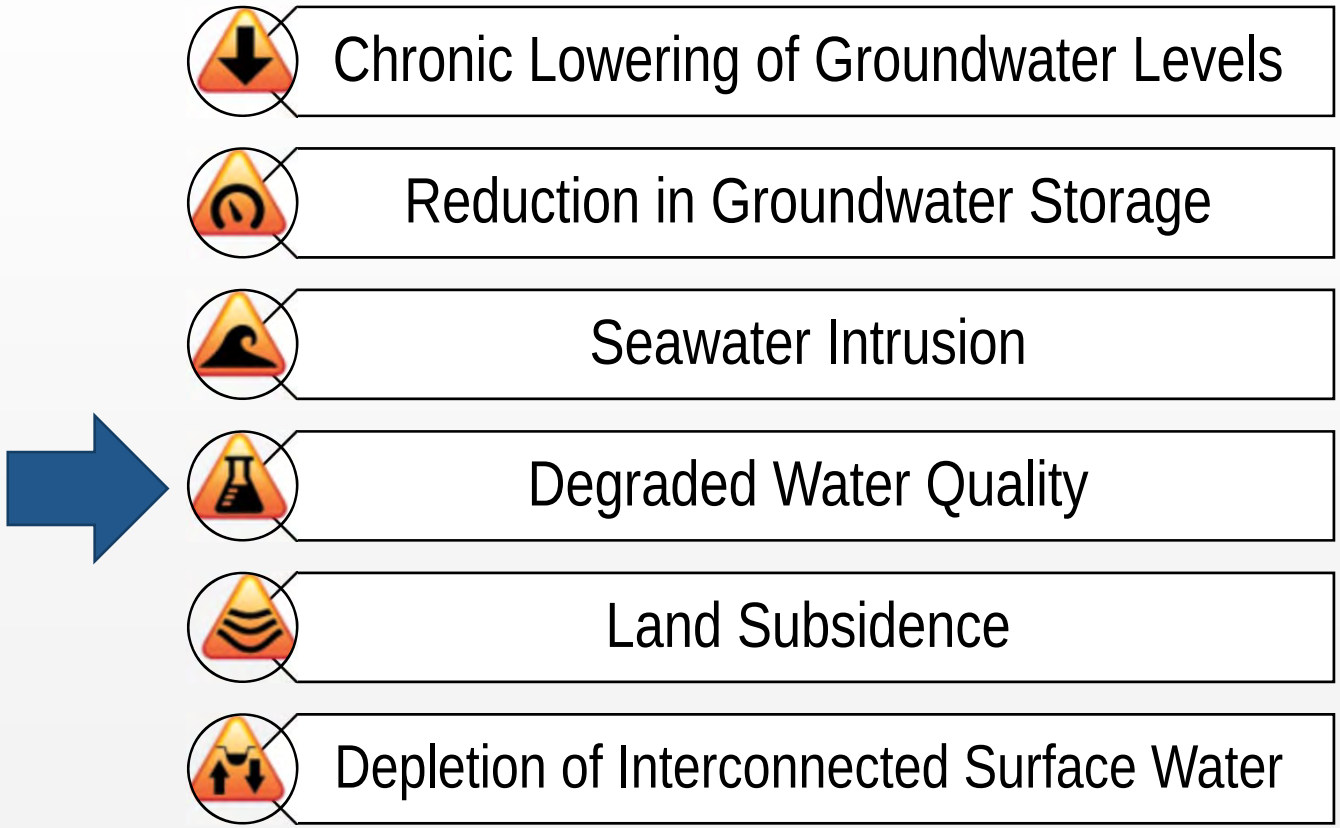
Undesirable Results for Seawater Intrusion

Seawater Intrusion

Why is this a concern? What are we trying to avoid?

- Direct seawater intrusion does not occur in the subbasin and thresholds do not need to be addressed; salinity will be addressed via the Water Quality Sustainability Indicator

What Are Potential Undesirable Results for Each Sustainability Indicator?



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Undesirable Results for Degraded Water Quality

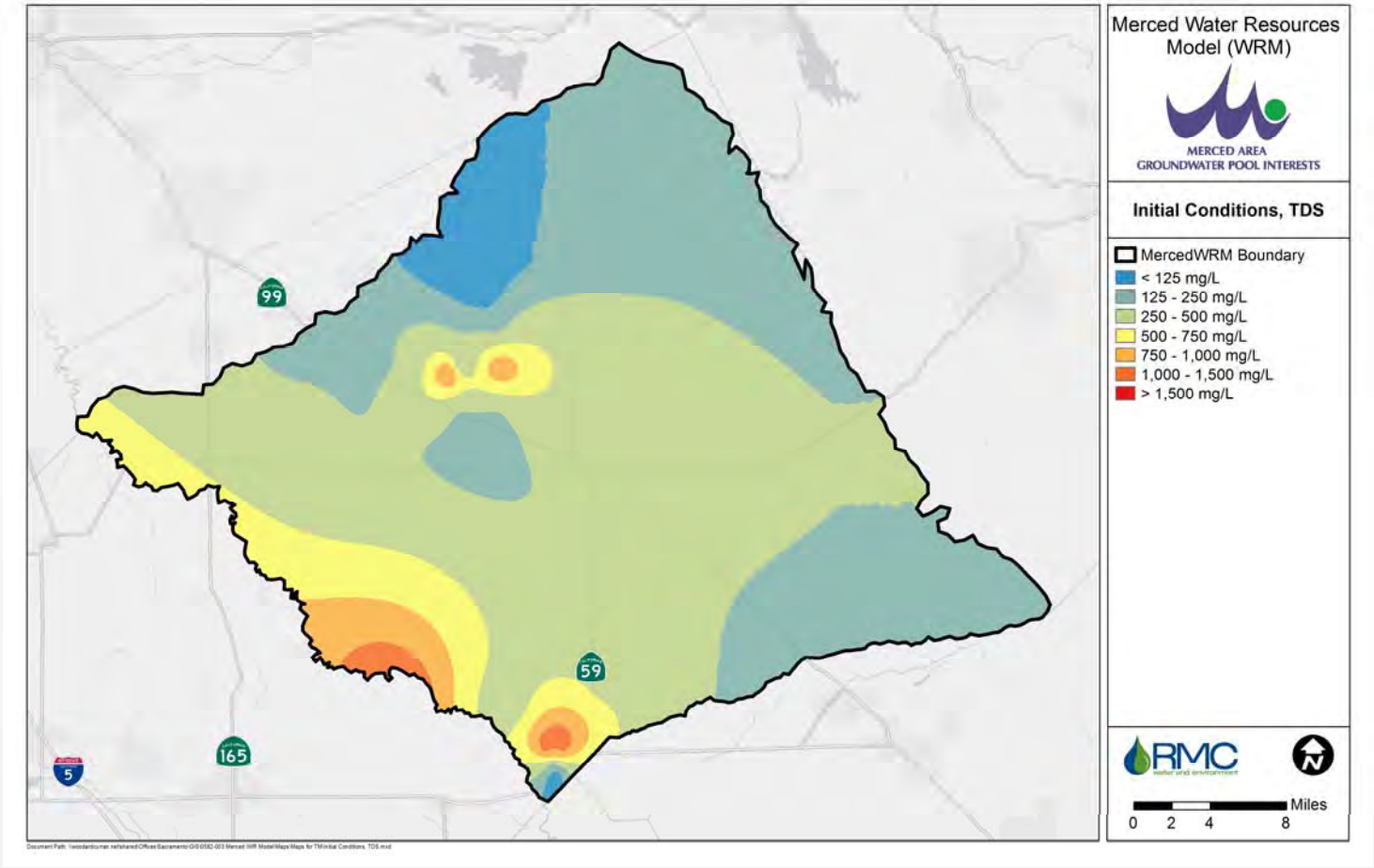
Degraded Water Quality

Why is this a concern? What are we trying to avoid?

- Salinity issues – primarily associated with the west side of the subbasin, potential for migration
- Nitrates – septic and ag historical issues
- Point-sources plumes – need to be considered, per regulations

Discussion: other potential effects to consider?

Current Conditions (example): Salinity (TDS)



Discussion: what impacts are you seeing now?

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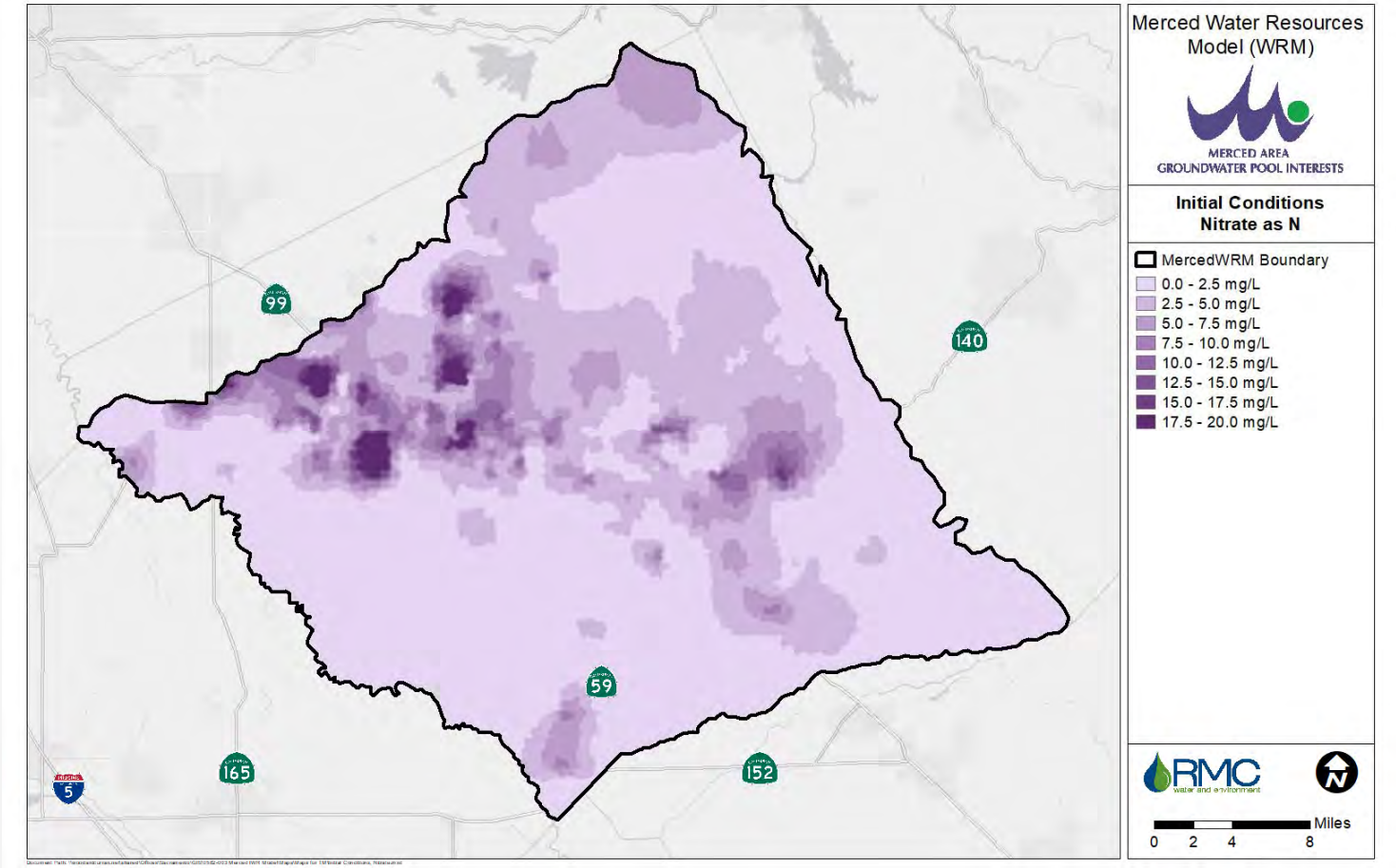
Current Conditions (example): Nitrate (as N)



Discussion: what impacts are you seeing now?

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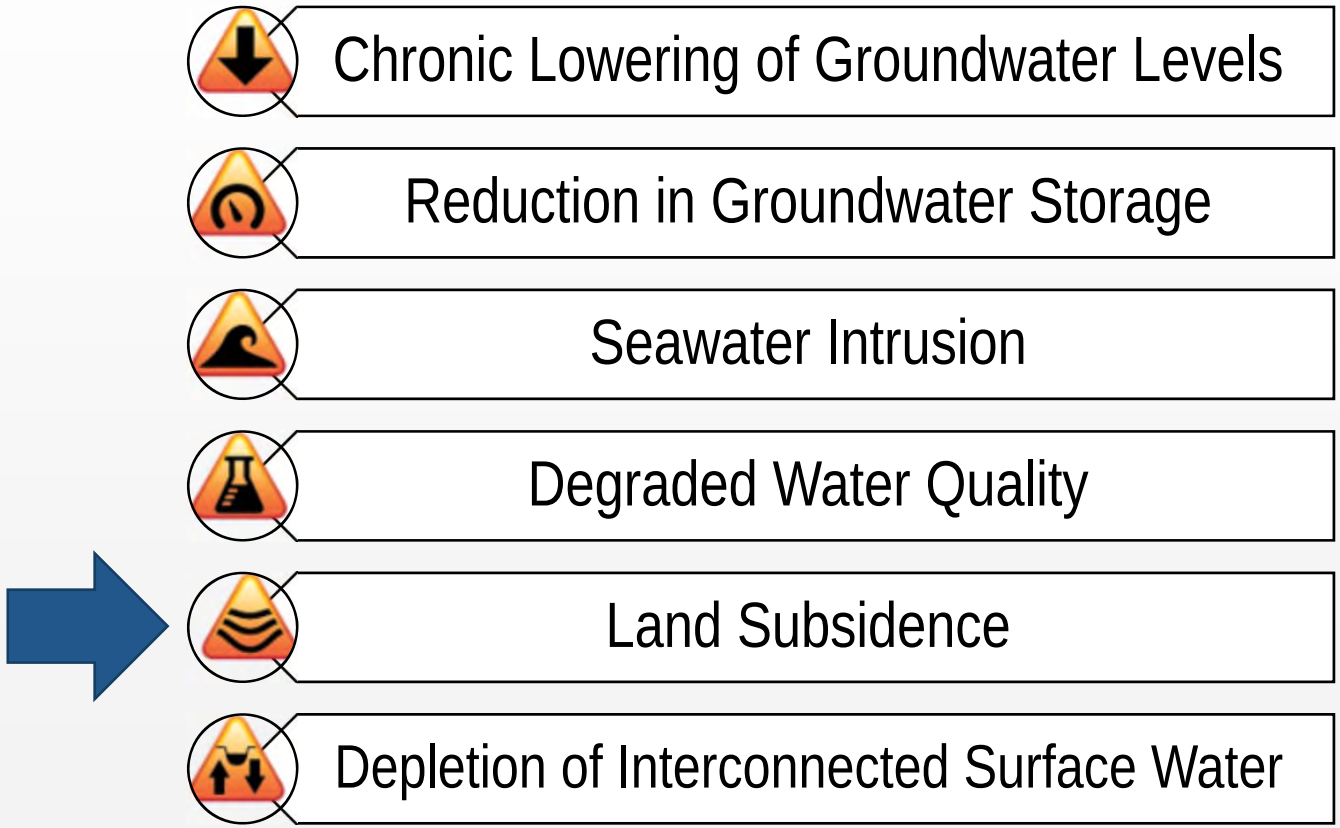
What Are Potential Undesirable Results for Each Sustainability Indicator?



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Undesirable Results for Land Subsidence

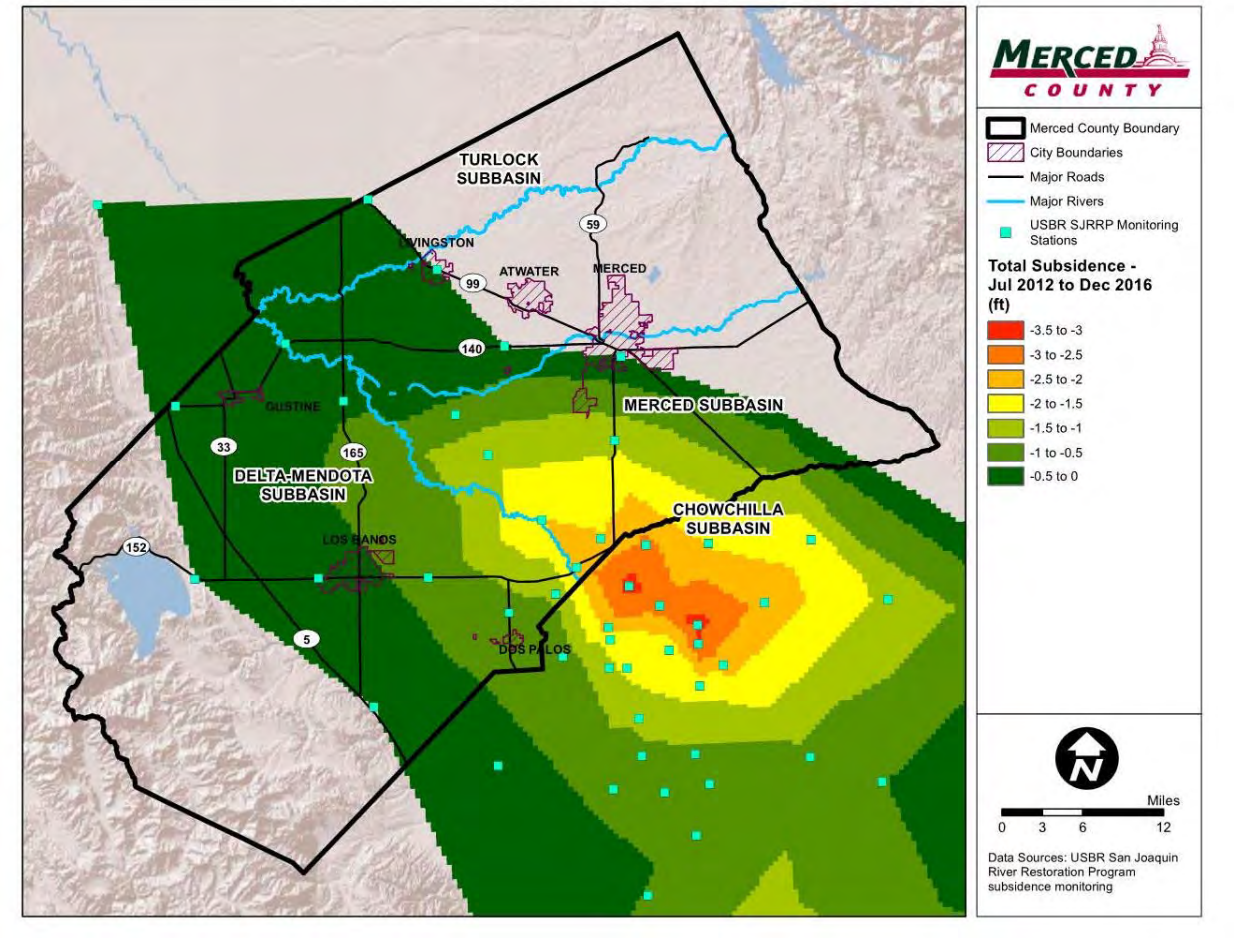
Land Subsidence

Why is this a concern? What are we trying to avoid?

- Impacts to private and public infrastructure
- Flood hazards

Discussion: other potential effects to consider?

Current Conditions: Subsidence



Discussion: what impacts are you seeing now?

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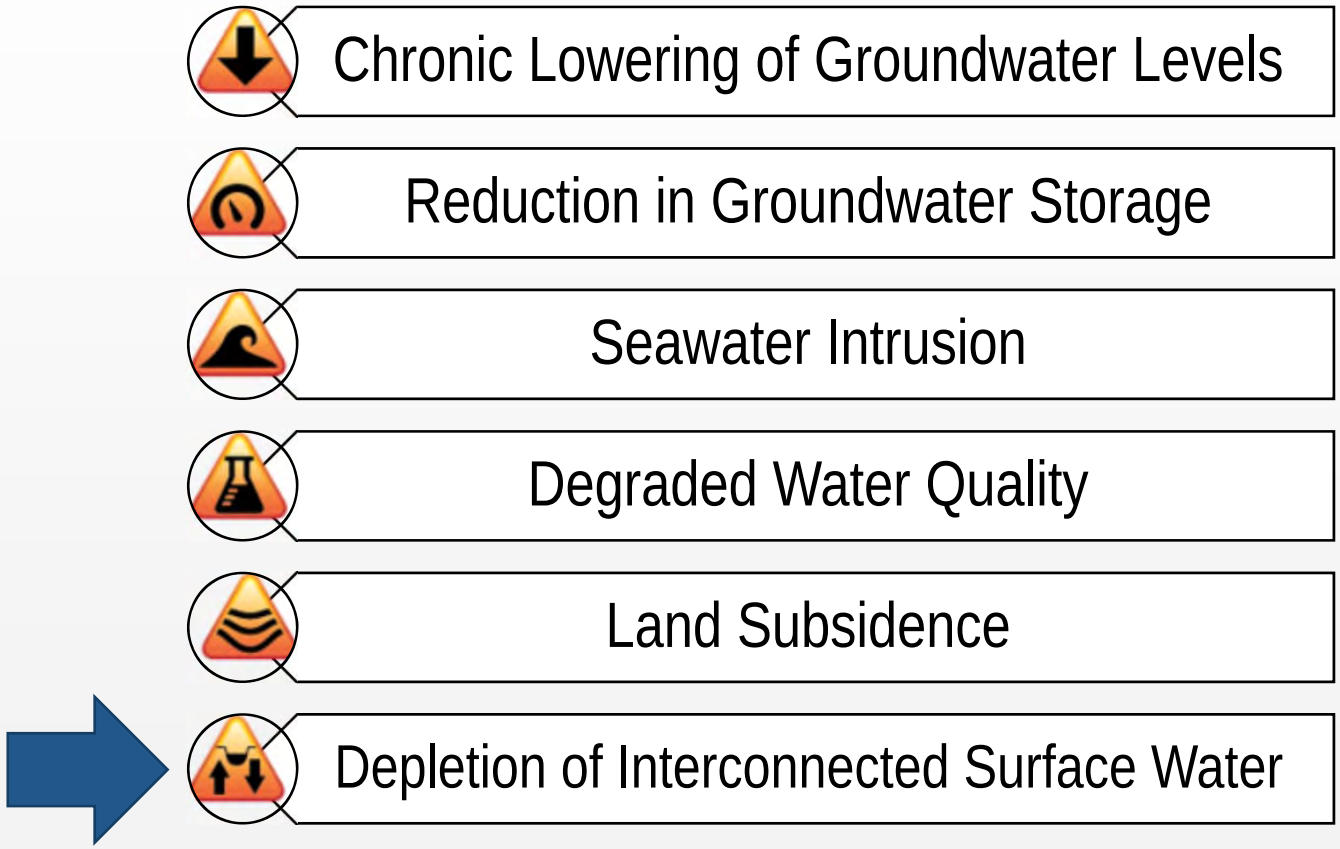
What Are Potential Undesirable Results for Each Sustainability Indicator?



Undesirable Results for Surface Water Depletion

Depletion of Interconnected Surface Water

Why is this a concern? What are we trying to avoid?

- Ability to meet minimum flow requirements
- Recreation impacts
- Fisheries impacts/temperature
- Habitat impacts
- Groundwater Dependent Ecosystems
- Impacts to water supply for reservoirs
- Water rights issues
- Water quality issues

Discussion: other potential effects to consider?

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Current Conditions (example): Instream Flow Requirements

Merced River

- Species of concern:
  Central Valley Fall Chinook Salmon, Central Valley Spring Chinook Salmon*, Central Valley Steelhead Trout, River Lamprey, Pacific Lamprey, Hardhead, California Red-Legged Frog, Western Pond Turtle

San Joaquin

- Species of concern:
  Central Valley Fall Chinook Salmon, Central Valley Spring Chinook Salmon*, Central Valley Steelhead Trout, Kern Brook Lamprey, Pacific Lamprey, Hardhead, California Red-Legged Frog, Western Pond Turtle

Discussion: what impacts are you seeing now?

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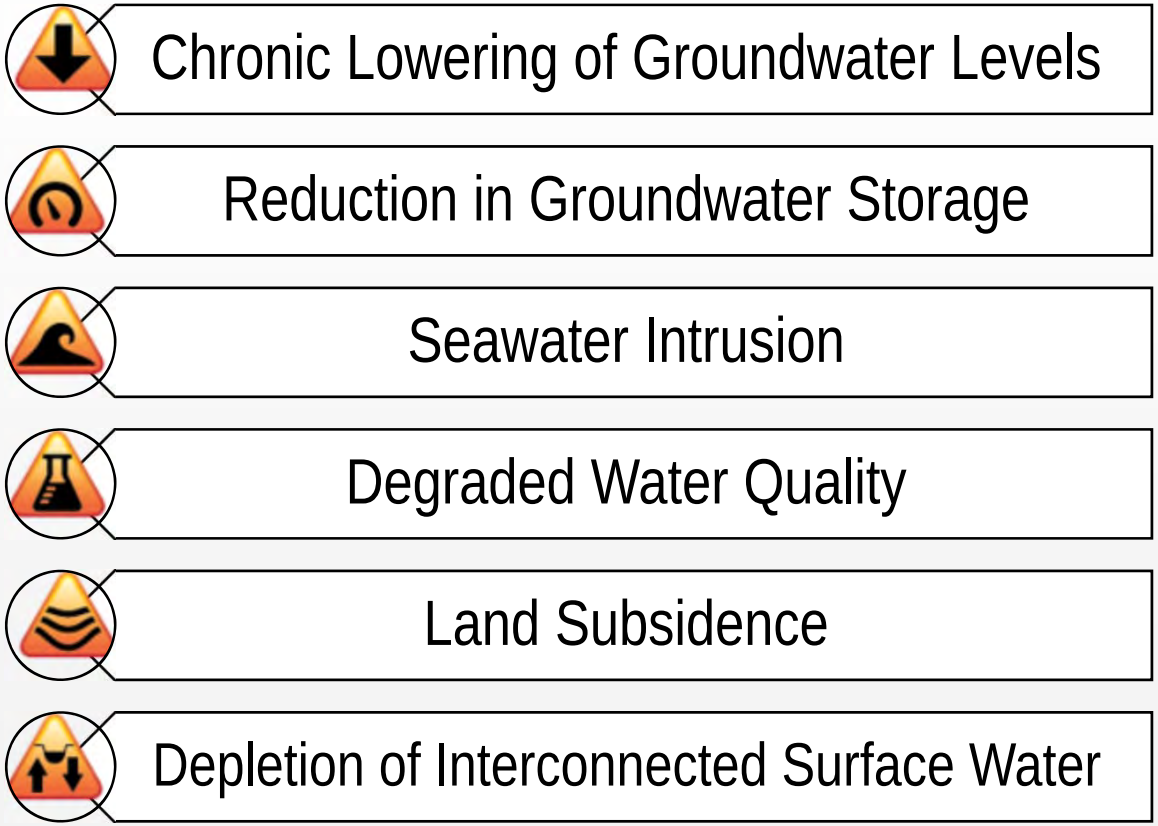
What Are Potential Undesirable Results for Each Sustainability Indicator?



Next Steps

Image courtesy: Veronica Adrover/UC Merced

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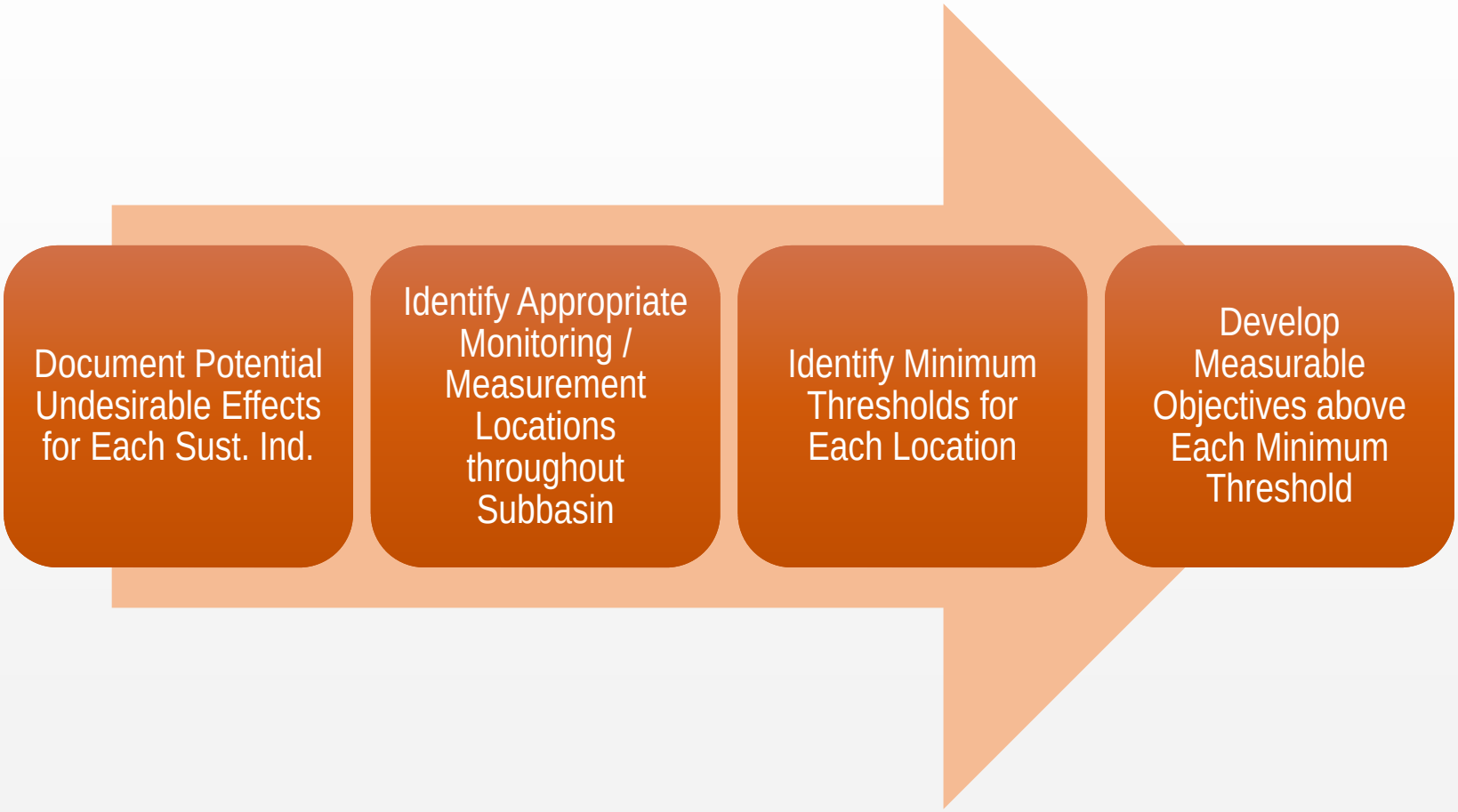
Process for Establishing Measurable Objectives



Minimum Thresholds – Going Back to 2015

- If issues are occurring now, need to set minimum thresholds at Jan 1, 2015 levels (or better)
- If issues are NOT occurring now, need to set minimum thresholds where issues are anticipated to occur (or better)
  - If issues are NOT occurring now, when might they have occurred in the past?
  - Look back to 1987-1992 drought conditions to determine whether issues occurred there
  - Supposition: if issues did not occur in 1992, that may be a reasonable threshold
- Assignment: review conditions in 1992, 2015, and present to understand when there were issues, and what those were

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DWR Technical Support Services Update

Image courtesy: Veronica Adrover/UC Merced

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Technical Support Services Update

- CC approved pursuing TSS services
  - Goal of program: Provide education, data and tools to GSAs
  - Applications for TSS in Spring 2018, evaluated continuously
  - Funding priority for critically overdrafted basins
  - No match – DWR provides direct services
- Held conference call with DWR on Friday April 20, 2018
  - Preference to fund monitoring well installation
  - Wells in “triangle” area coordinated with Delta Mendota and / or Chowchilla Basins to assess subsurface flows seems favorable for funding
  - Anticipate working with Chowchilla to pursue wells in triangle area
  - Need to identify at least two potential well locations

Leadership Counsel Request for Letter of Support

Image courtesy: Veronica Adrover/UC Merced

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Leadership Counsel Request for Letter of Support

- Leadership Counsel has requested SGMA funding for DAC outreach in the San Joaquin Valley, including in Merced
- Similar scope of work being completed in conjunction with Self Help Enterprises, an organization represented on the Merced Stakeholder Committee
- DWR requires Leadership Counsel to obtain support from affected basins prior to finalizing contract
- Leadership Counsel requesting letter of support from Merced GSAs
- Action: Authorize issuance of letter of support for Leadership Counsel funding on behalf of the Merced Subbasin GSAs

Questions/Comments from Public

Image courtesy: Veronica Adrover/UC Merced

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Next Steps

Image courtesy: Veronica Adrover/UC Merced

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Next Steps

- Coordinating Committee work with staff to complete undesirable results assessment and return to Woodard & Curran by Monday, May 7
- Adjourn to next meeting (Tuesday, May 29, 2018 @ 1:30 PM, per CC decision at March meeting)
  - Focus for May meeting : preliminary assessment of minimum thresholds

GSP Coordinating Committee

Coordinating Committee Meeting – April 23, 2018

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

Image courtesy: Veronica Adrover/UC Merced

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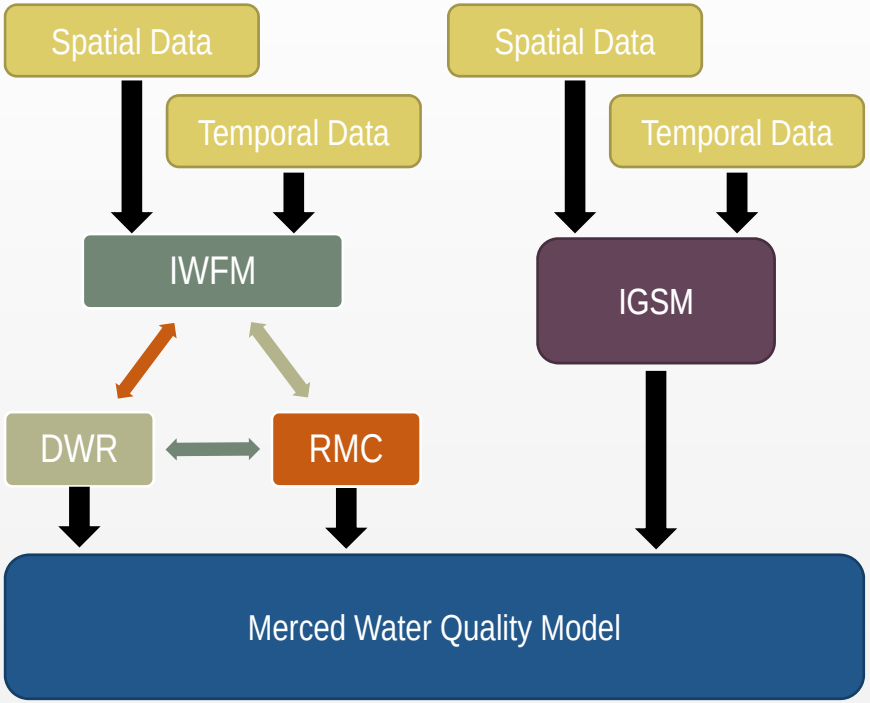
Merced Water Quality Model

Step 1: IGSM Water Quality Update

- Revised script to incorporate IWFM-2015 flow components.
- Hosted extensive coordination with DWR to verify parameters, components, budget definitions to accurately align model output.



Merced Water Quality Model

Step 2: Model Development

- Collection of Available Data
  - Merced IRWMP
  - Observation chemo-graphs
  - UC Davis Cooperative Extension
  - Develop assumptions based on local knowledge
- Model Calibration