TECHNICAL WORKSHOP
SUSTAINABLE MANAGEMENT CRITERIA

JOINT TECHNICAL ADVISORY COMMITTEES (TACs) SPECIAL MEETING

JUNE 25, 2020

DRAFT

PRESENTATION OUTLINE

- Agenda Item #8: Groundwater Dependent Ecosystems
- Agenda Item #9: Sustainable Management Criteria
  - Update on Projected Water Budget analysis
  - Land Subsidence Sustainability Indicator
  - Water Quality Sustainability Indicator




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GROUNDWATER DEPENDENT ECOSYSTEMS (GDEs) ANALYSIS TO MEET GSP REQUIREMENTS

- A **Groundwater Dependent Ecosystem (GDE) -** ecological communities or species that depend on groundwater emerging from aquifers at or near the ground surface
- GSP is required to **identify GDEs** within the basin *utilizing data available from the Department, … or best available information.*
- Natural Communities Commonly Associated with Groundwater (NCCAG) maps from DWR in cooperation with TNC (almost 2,500 polygons of vegetation or potential wetlands in the Turlock Subbasin)
- Polygons published AFTER the GSP work began; **no current funding to analyze the maps**
- Need a reasonable approach to consider NCCAG in the GSP

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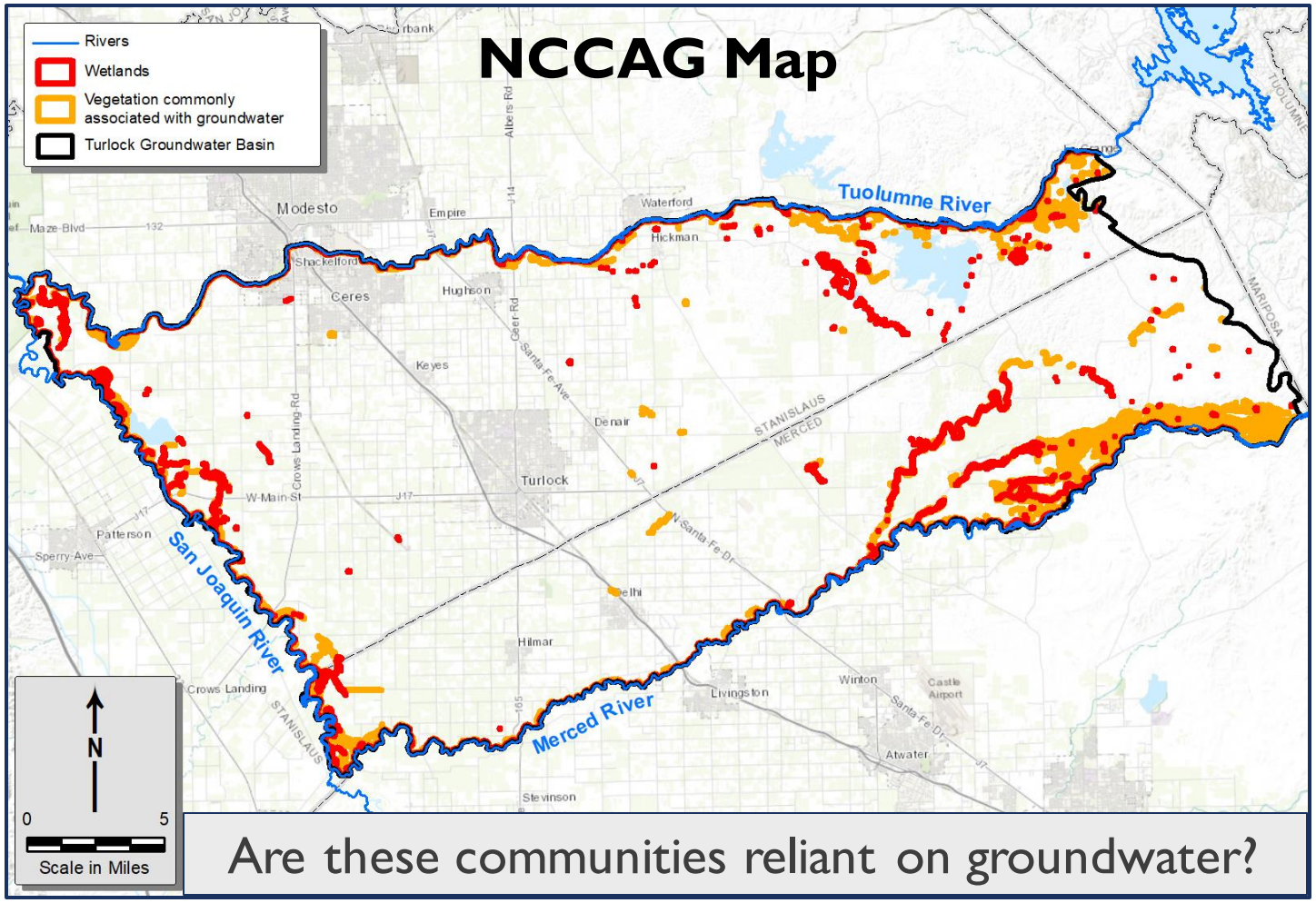
NCCAG POLYGONS VEGETATION AND POTENTIAL WETLANDS



- Almost 2,500 polygons mapped in the Subbasin
  - Vegetation: 1,873 polygons
  - Wetlands: 618 polygons
- Too many polygons to assess individually as requested by TNC
- Maps were preliminary; many polygons are clearly not GDEs
- **<u>Need ground-truthing</u>**

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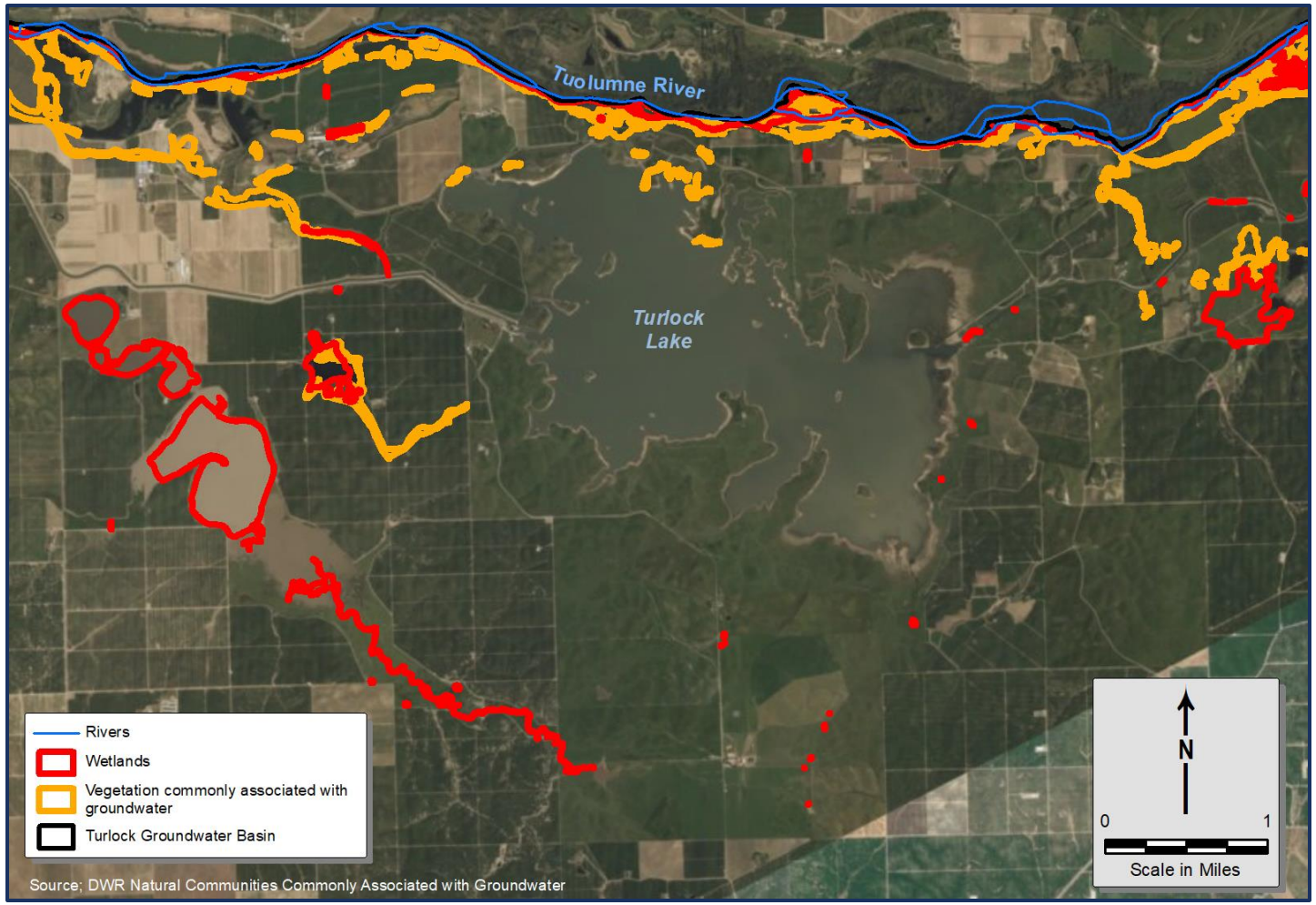
NCCAG POLYGONS NEAR TURLOCK LAKE



- Are they along internal drainageways?
- What is the depth to water?
- Could they be reliant on irrigation water? River water?
- Do they use surface water from diversions? WWTP? Recharge basins?
- Mapping errors?

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NEXT STEPS FOR GDE ANALYSIS

- Need resources, approach, and criteria to review NCCAG maps for GSP
- **Karen Morgan**, Superintendent of Public Works, City of Ceres
  - Accelerated Master's Program in Natural Resources at Oregon State University
  - Expertise in water supply
  - Long-term Central Valley resident with interest in natural communities
  - Assist technical team with GDE analysis

ACTION:

Approve collaboration and coordination between Karen Morgan and Todd Groundwater for GDE analysis

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REGULATORY REQUIREMENTS FOR PROJECTED WATER BUDGETS

- Estimate future baseline conditions of water supply and demand
- Develop baseline covering 50 years of historical precipitation, ET, and streamflow
- Baseline must be based on most recent land use with projected future changes in land use planning, population growth and climate
- Baseline must use most recent water supply information for estimating future surface water supply

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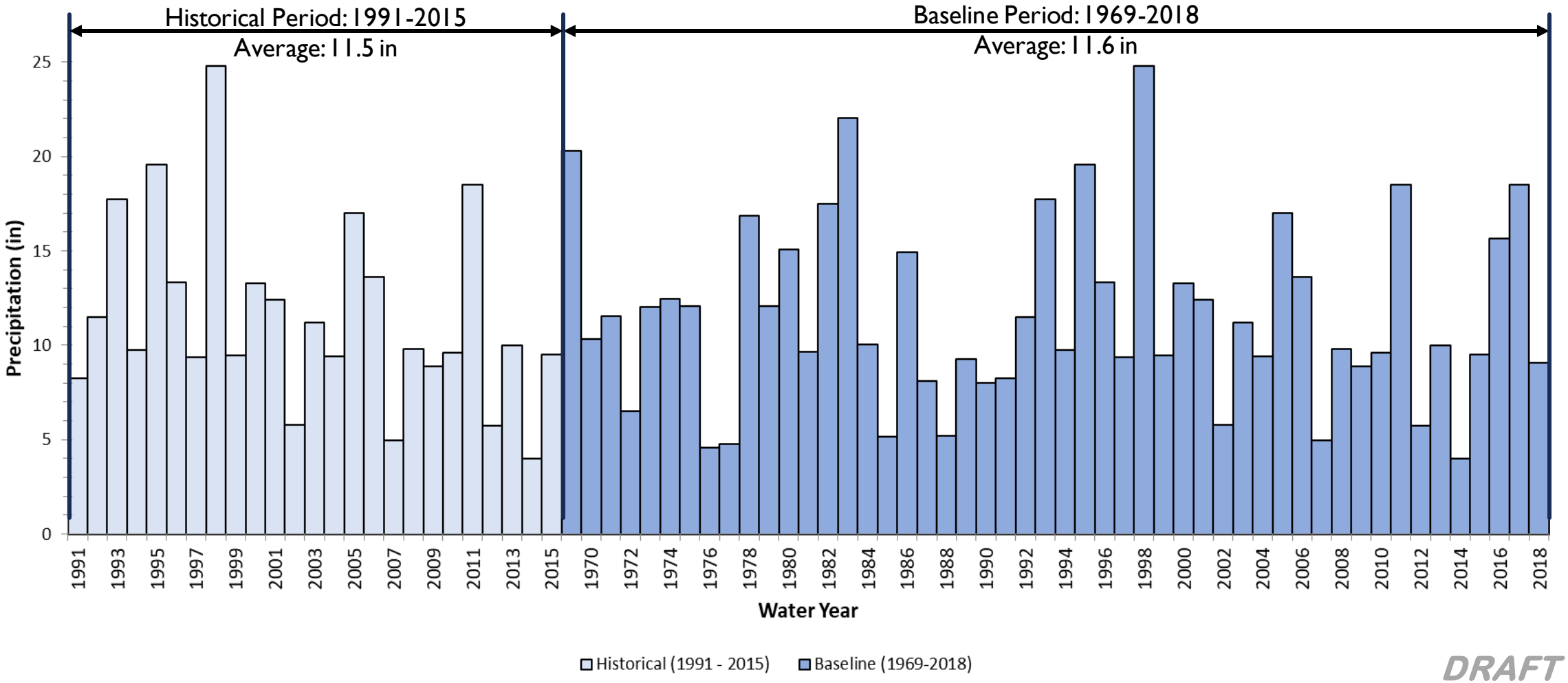
Hydrologic Period Precipitation



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Agricultural Data Update

West Turlock GSA

- TID working with team to provide:
  - Projected reservoir releases
  - Coordination with Modesto ID
  - Projected Turlock Lake operations
  - TID deliveries
- As needed:
  - Land use and cropping patterns
  - Groundwater wells and extractions

East Turlock GSA

- As needed:
  - Land use and cropping patterns
  - Groundwater wells and extractions

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URBAN DATA UPDATES

Municipal Agencies

- Working with City of Turlock to provide:
  - Growth that may result in urbanization of agricultural lands
- Sphere of influence
- Water use and supply based on UWMPs:
  - Ceres
  - Turlock
  - Modesto
  - Hughson (2005)
  - Waterford (2005)
  - If not in UWMPs, need following:
    - Population growth trend
    - Per-capita-water-use
    - Groundwater wells and extractions

Unincorporated / Rural Areas

- As needed:
  - Areas of growth
  - Population growth trend
  - Per-capita-water-use

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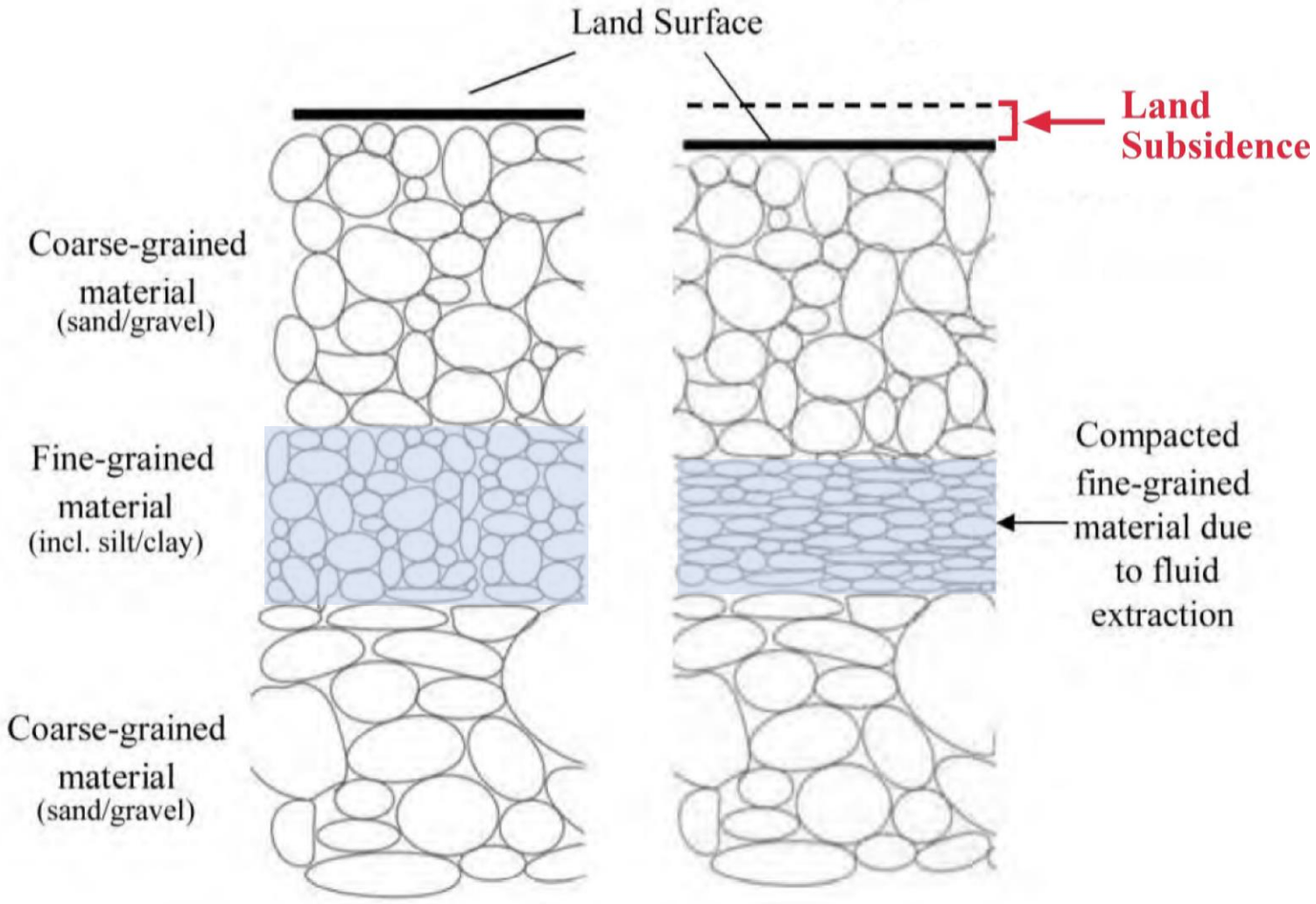
LAND SUBSIDENCE CONCEPTUAL DIAGRAM



- Declining water levels decrease pore pressure
- Can lead to subsurface compaction of fine-grained material, allowing the land surface to sink
- Most of the land subsidence in the Central Valley is associated with the Corcoran Clay

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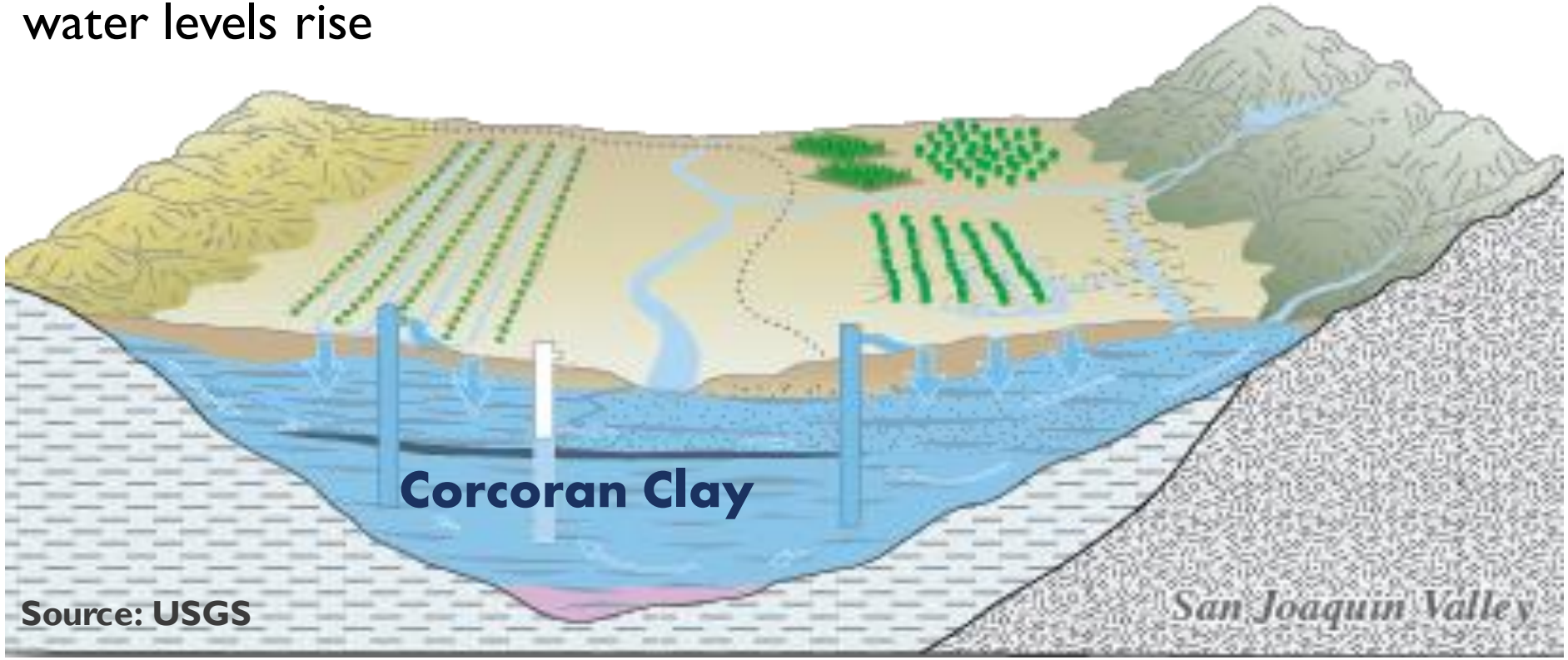
CORCORAN CLAY AND LAND SUBSIDENCE

- Paleo Lake deposits - regional aquitard
- Much of the deformation is below the top of the clay (confined aquifer)
- Clay compaction is very slow and subsidence continues for a long time, even after water levels rise



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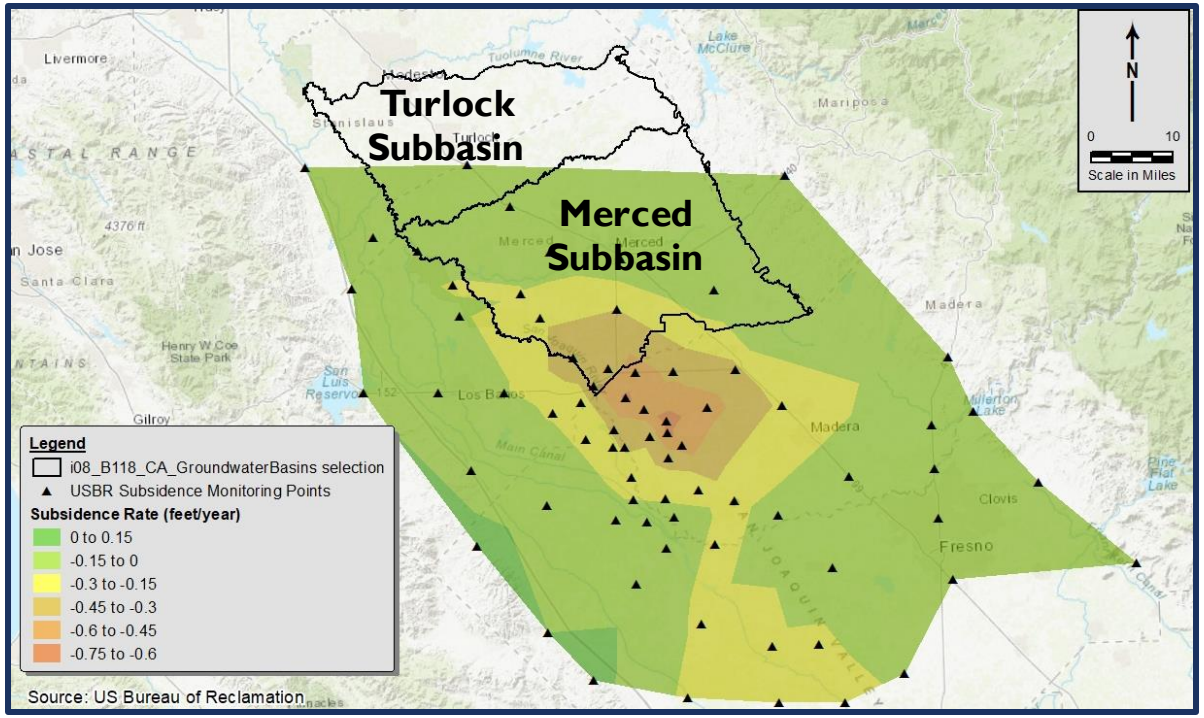
EXAMPLE - MERCED SUBBASIN SUBSIDENCE SUSTAINABLE MANAGEMENT CRITERIA

Undesirable results - definition

- Significant and unreasonable reduction in the viability of the use of infrastructure over the planning and implementation horizon of the GSP.
- Land subsidence that substantially interferes with surface land uses causes damage to public and private infrastructure (e.g., roads and highways, flood control, canals, pipelines, utilities, public buildings, residential and commercial structures).

Undesirable results - identification

- Exceedance of minimum threshold (MT) rates of land subsidence at three or four (of four) monitoring sites for two consecutive years, where both years are categorized as hydrologically below normal, above normal or wet.



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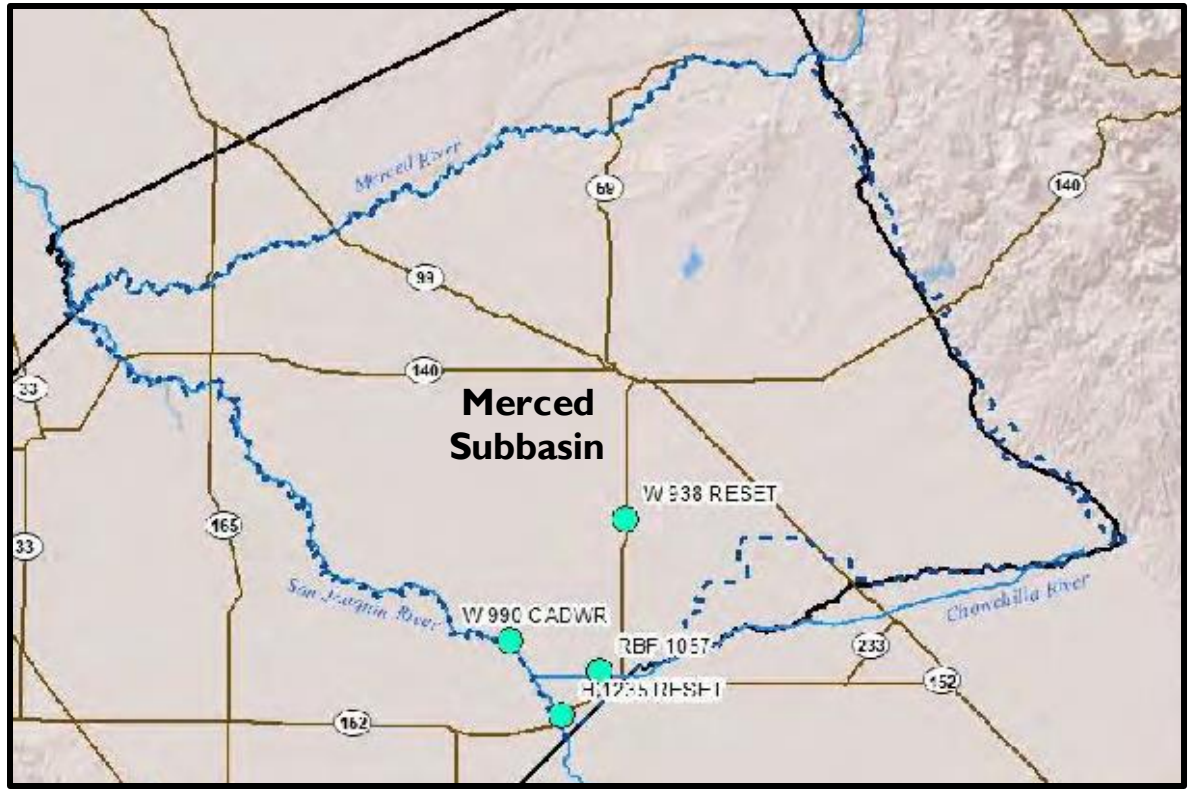
MERCED SUBBASIN SUBSIDENCE SUSTAINABLE MANAGEMENT CRITERIA

Minimum thresholds:

- Defined for 4 USBR monitoring points in the southwestern Merced Subbasin
- Maximum annual subsidence rates from 2011 to 2018 ranged from -0.58 to -0.67 feet per year

  (No undesirable results during this time)
- Minimum threshold set at -0.75 feet per year (more than maximum annual values measured from 2011 to 2018)
- Minimum threshold may be reconsidered if additional information becomes available on the sensitivity of existing infrastructure



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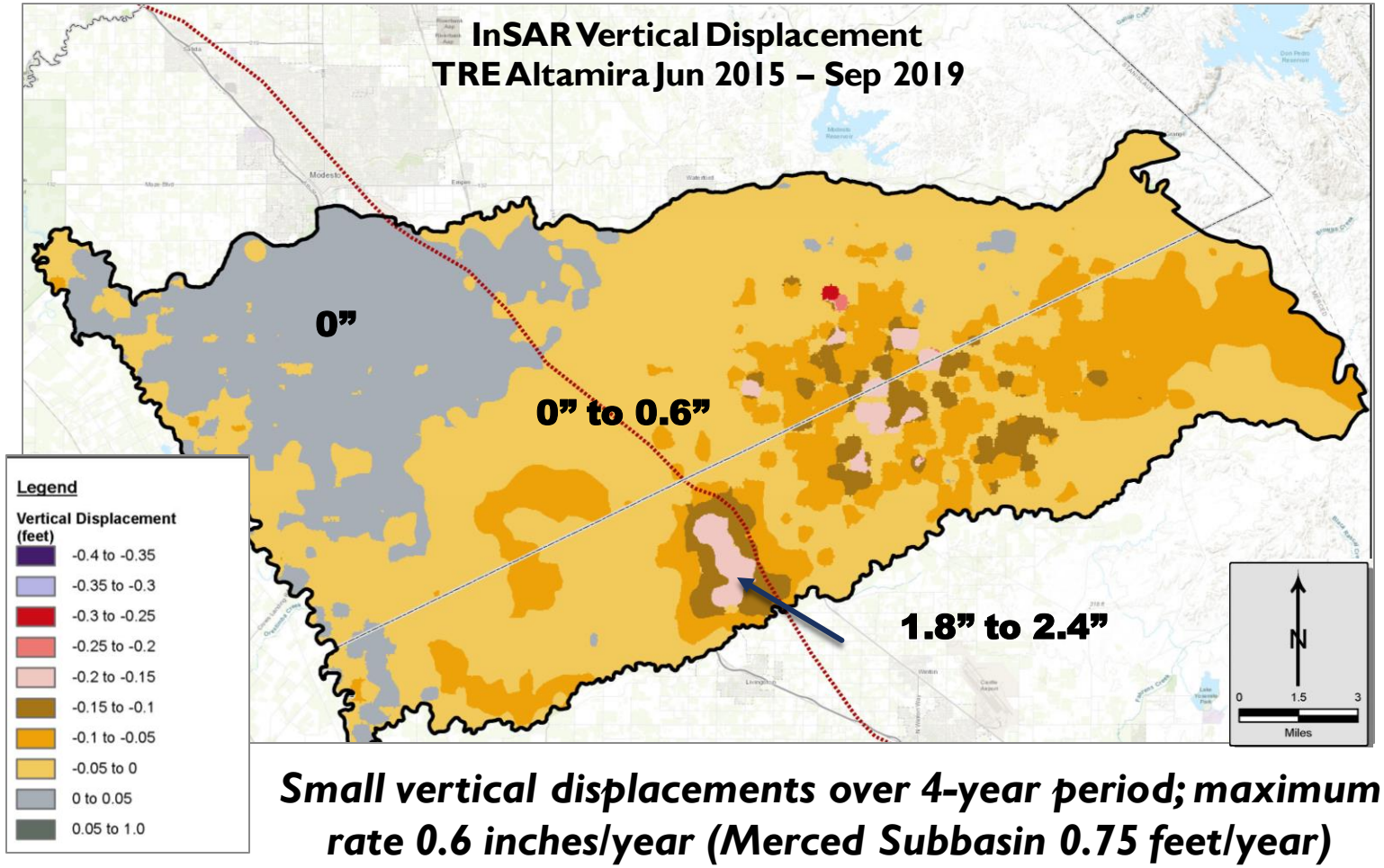
LAND SUBSIDENCE
TURLOCK SUBBASIN



Small vertical displacements over 4-year period; maximum rate 0.6 inches/year (Merced Subbasin 0.75 feet/year)

- Subsidence has not been a significant issue for the Turlock Subbasin
- Corcoran Clay suggests the potential for future subsidence
- Recent DWR InSAR data
- Screening-level data may need “ground-truthing”

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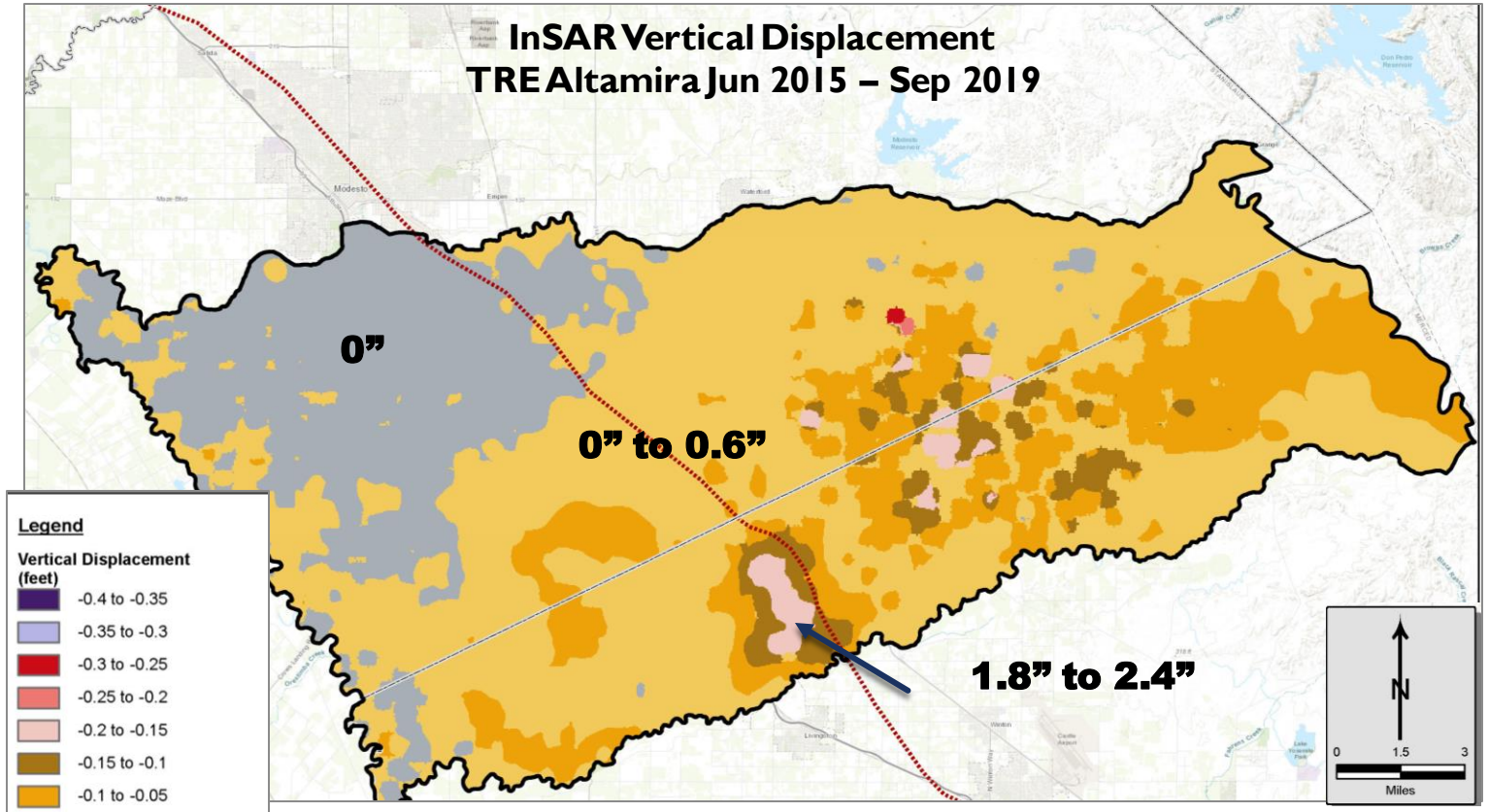
LAND SUBSIDENCE
TURLOCK SUBBASIN



Small vertical displacements over 4-year period; maximum rate 0.6 inches/year (Merced Subbasin 0.75 feet/year)

Merced Subbasin definition of undesirable results appropriate for the Turlock Subbasin?

- Significant and unreasonable reduction in the viability of the use of infrastructure over the planning and implementation horizon of the GSP.
- Land subsidence that substantially interferes with surface land uses causes damage to public and private infrastructure (e.g., roads and highways, flood control, canals, pipelines, utilities, public buildings, residential and commercial structures).

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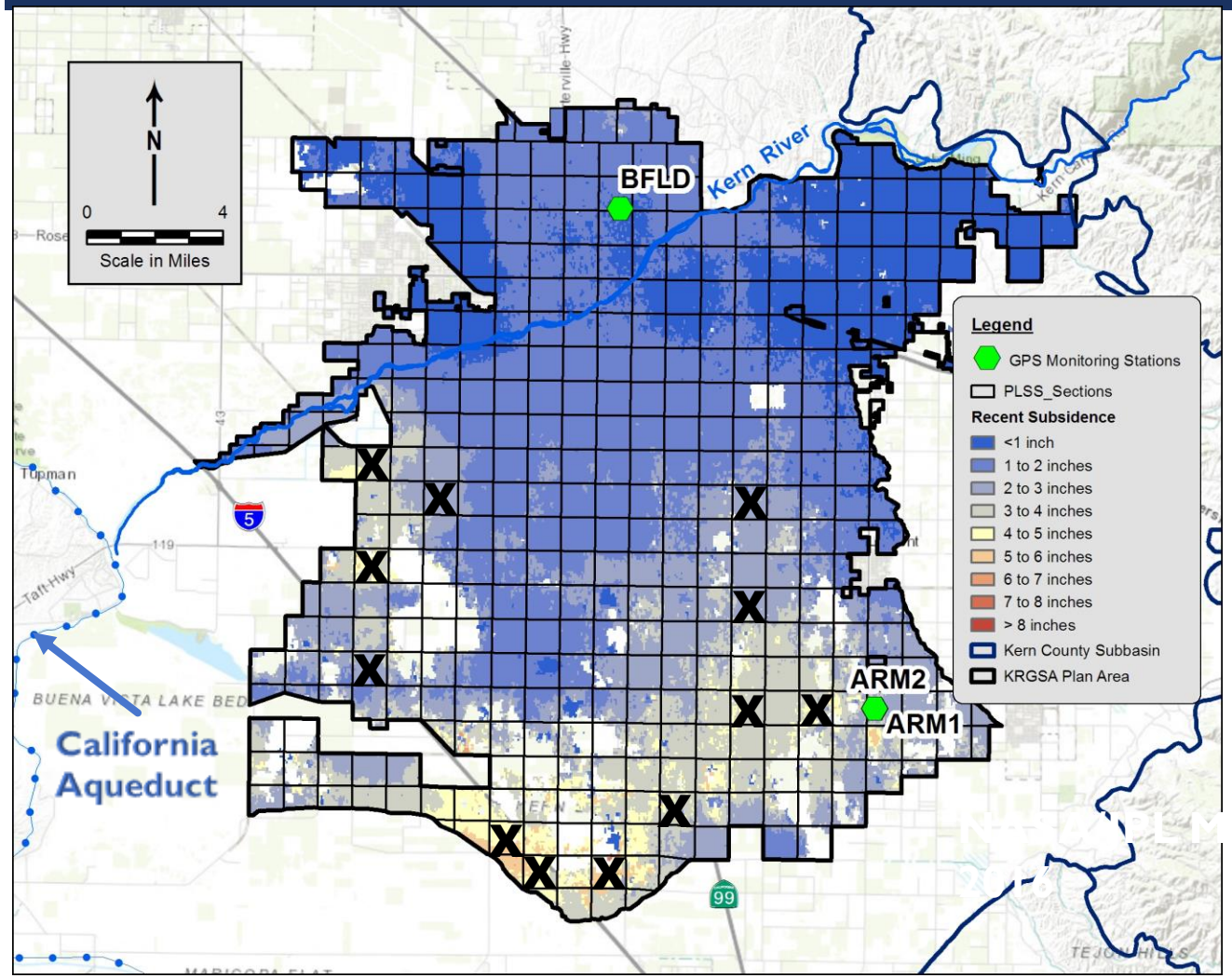
EXAMPLE – LAND SUBSIDENCE MONITORING STRATEGIES – KERN RIVER GSA



- GPS stations (USBR)
- InSAR online data from DWR
- Subbasin-wide monitoring (CGPS) for shared critical infrastructure (California Aqueduct and Friant-Kern Canal)
- Supplements water level monitoring (MTs at or near historic low levels)

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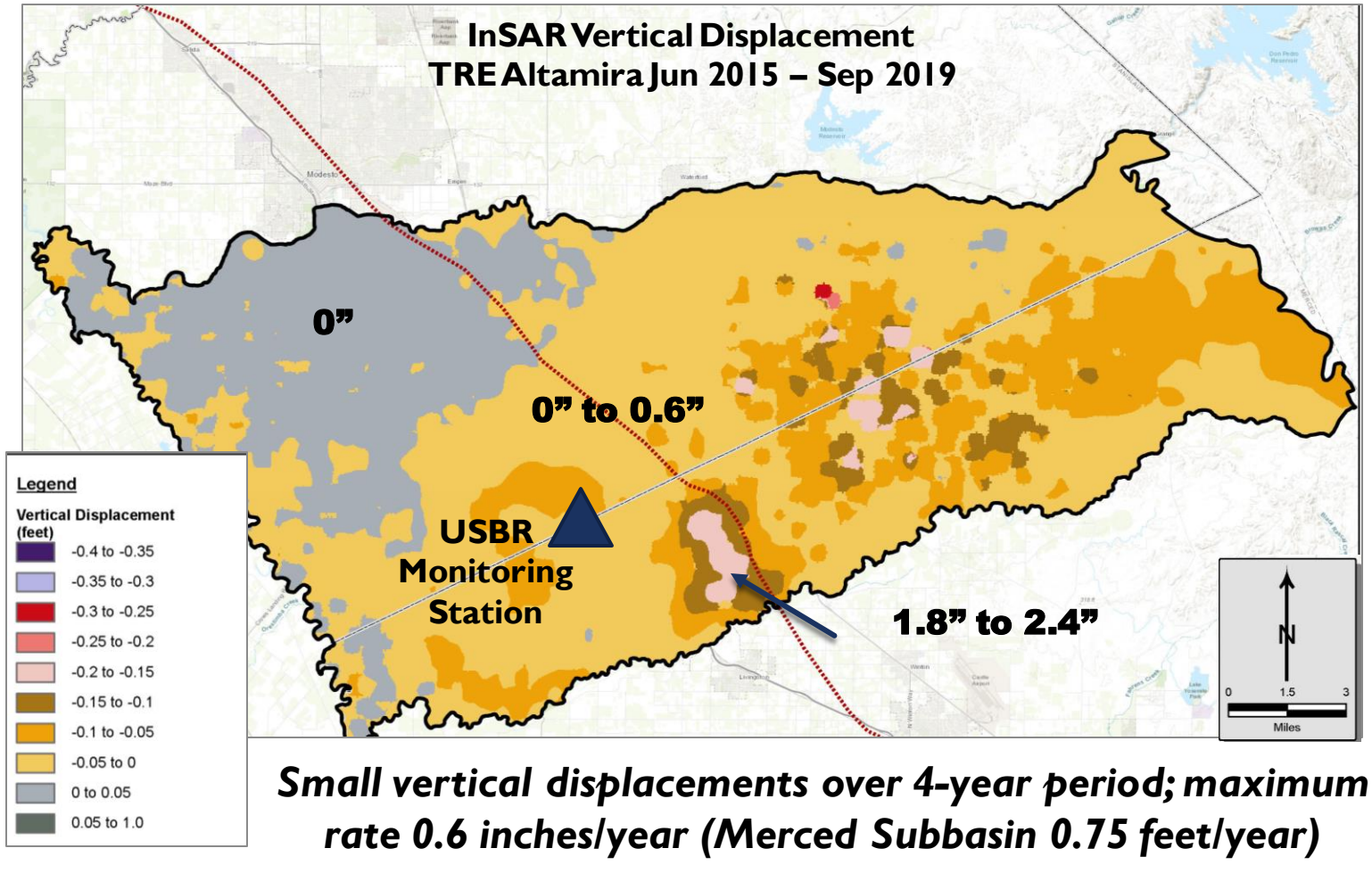
LAND SUBSIDENCE
TURLOCK SUBBASIN MONITORING STRATEGIES



Small vertical displacements over 4-year period; maximum rate 0.6 inches/year (Merced Subbasin 0.75 feet/year)

- USBR Monitoring Station
- Online DWR InSAR data
- Direct monitoring
  - Continuous GPS Station
  - Extensometer
- Water Levels as a proxy
  - MTs at historic low water levels mitigate future subsidence

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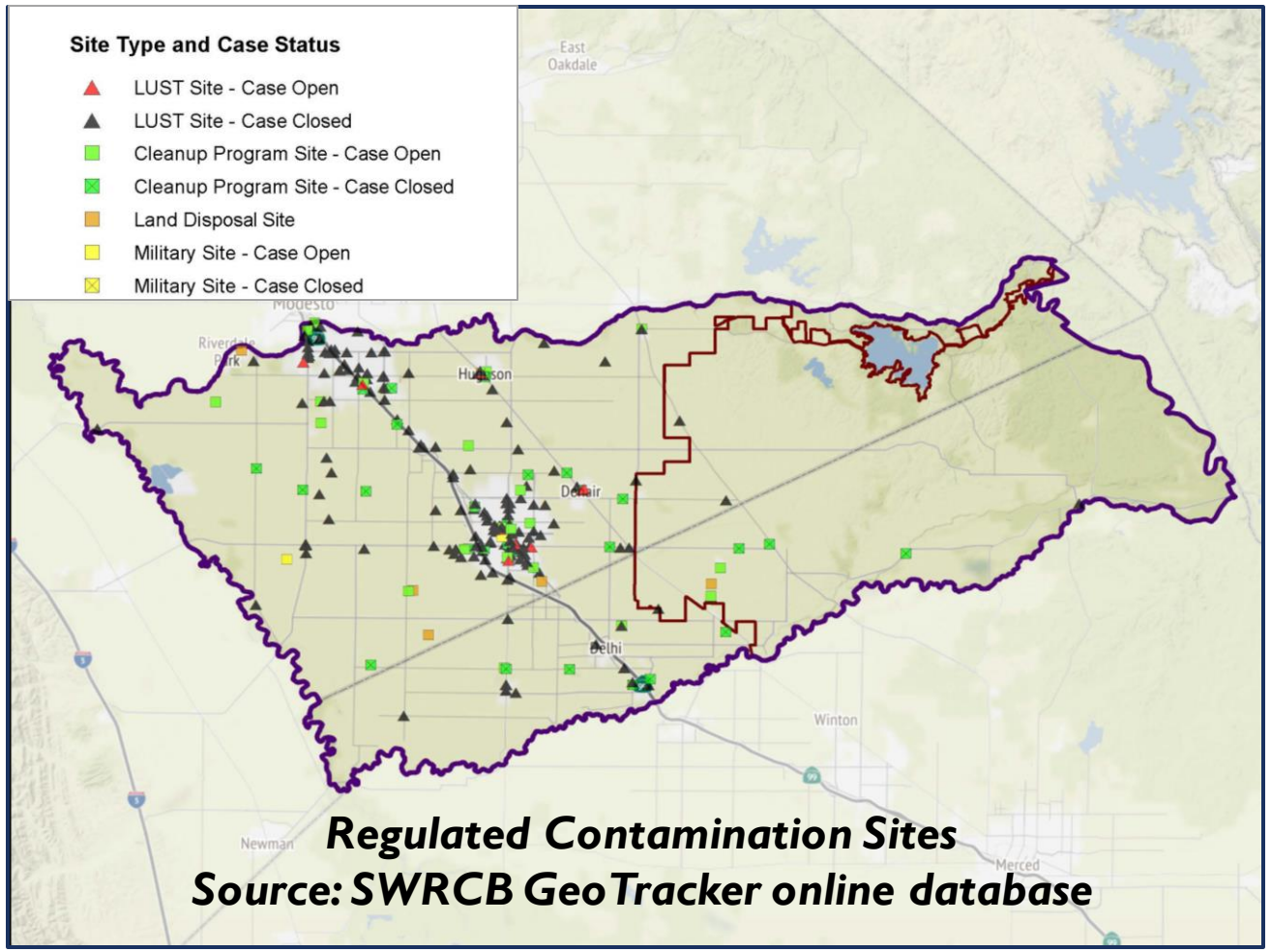
DEGRADED WATER QUALITY SUSTAINABILITY INDICATOR



Regulated Contamination Sites
Source: SWRCB GeoTracker online database

- GSP not meant to duplicate water quality authority for other regulatory programs
- Minimum Thresholds shall consider local, state, and federal water quality standards
- Complement other programs by combining data and targeting un-monitored issues and areas
- Consider potential for management actions to impact water quality including migration of contaminant plumes
- Minimum Thresholds shall be based on:
  - Number of supply wells
  - Volume of water impacted or isocontour that exceeds concentration for undesirable results

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BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

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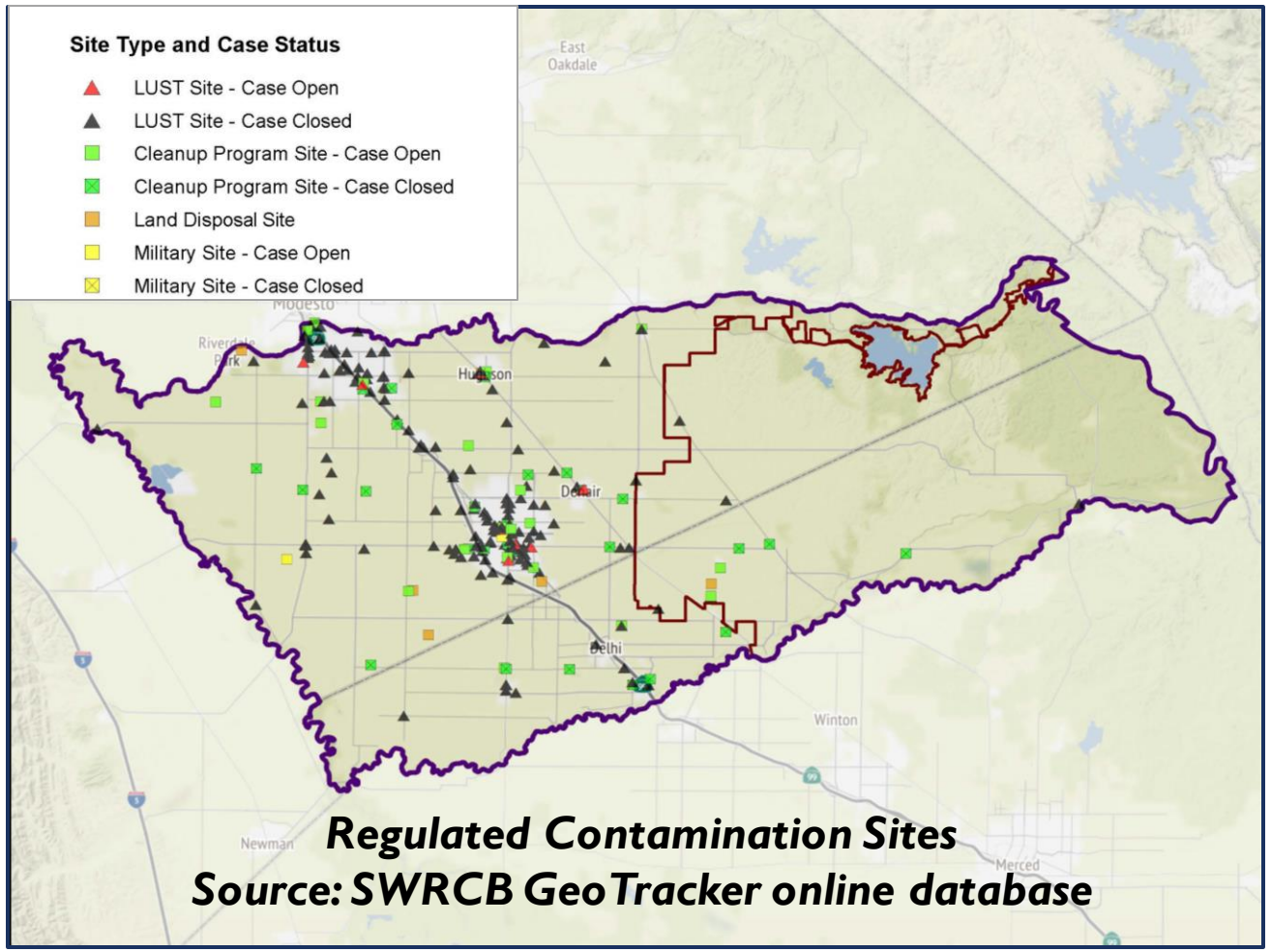
COORDINATION WITH WATER QUALITY MONITORING PROGRAMS



Regulated Contamination Sites
Source: SWRCB GeoTracker online database

- State Water Resources Control Board, Division of Drinking Water (Public Water Suppliers)
- CV-Salts and ILRP monitoring and BMPs
- Regional Water Board cleanup programs
- Agricultural wells and tile drains
- Surface water quality (Turlock Lake, creeks, rivers, canals)
- **Constituents of concern?**
  - Nitrate
  - Arsenic
  - 1,2,3-TCP
  - ***Others?***

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BUILDING RELATIONSHIPS ONE PROJECT AT A TIME

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NEXT STEPS

- Projected Water Budgets and Sustainable Yield Analysis
- Develop undesirable results definition for Sustainability Indicators
- Select preliminary Sustainable Management Criteria
  - Minimum Thresholds
  - Measurable Objectives
- Projects and Management Actions to meet Subbasin Sustainable Yield

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QUESTIONS?

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