

Solano Subbasin Groundwater Conditions

Groundwater Workshop

January 30, 2025

Nick Watterson

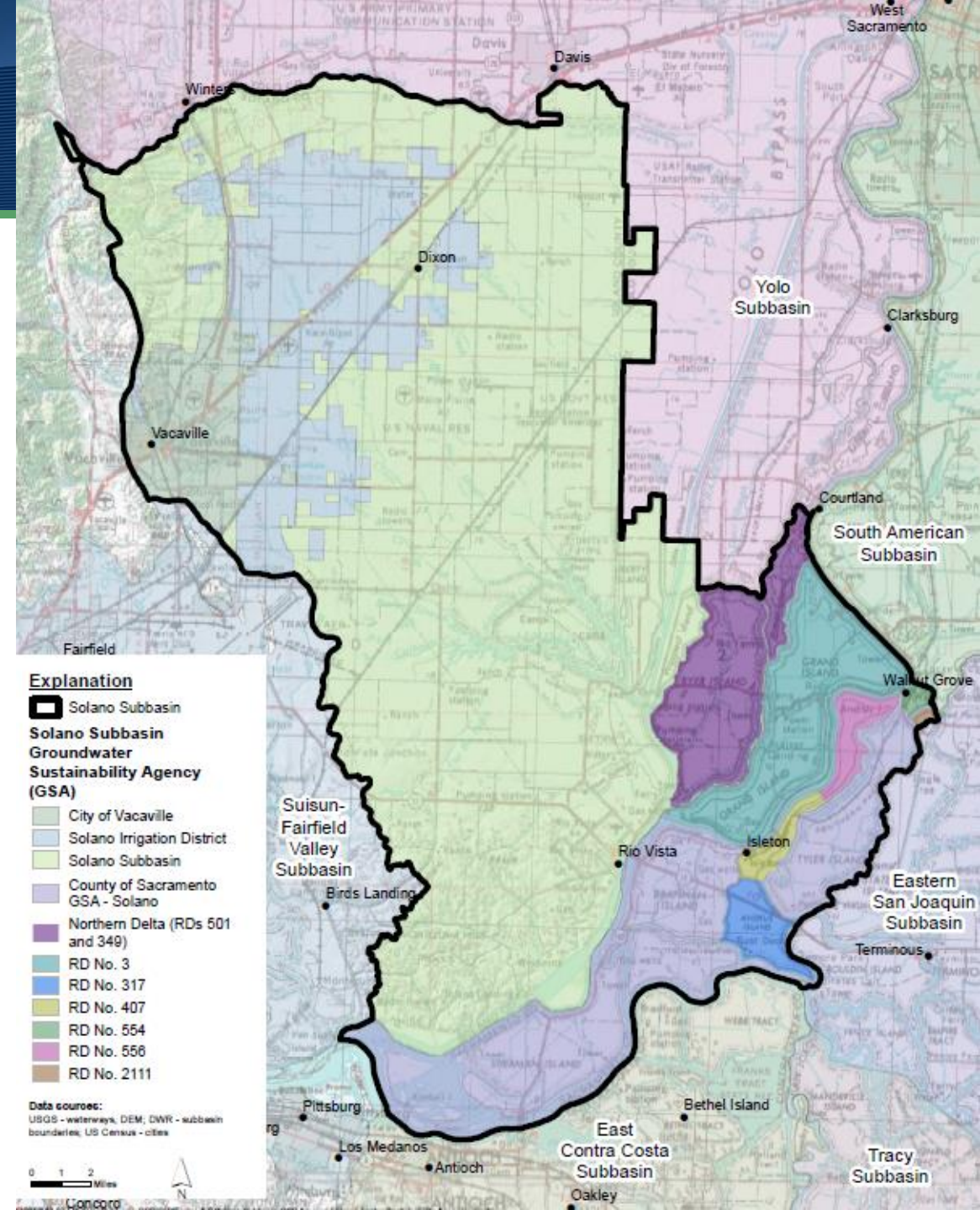
Principal Hydrogeologist



**Luhdorff &
Scalmanini**
Consulting Engineers

Outline

- Solano Subbasin GSP Background
- Preview of WY 2024 Groundwater Conditions in the Solano Subbasin
- GSP Implementation Activities

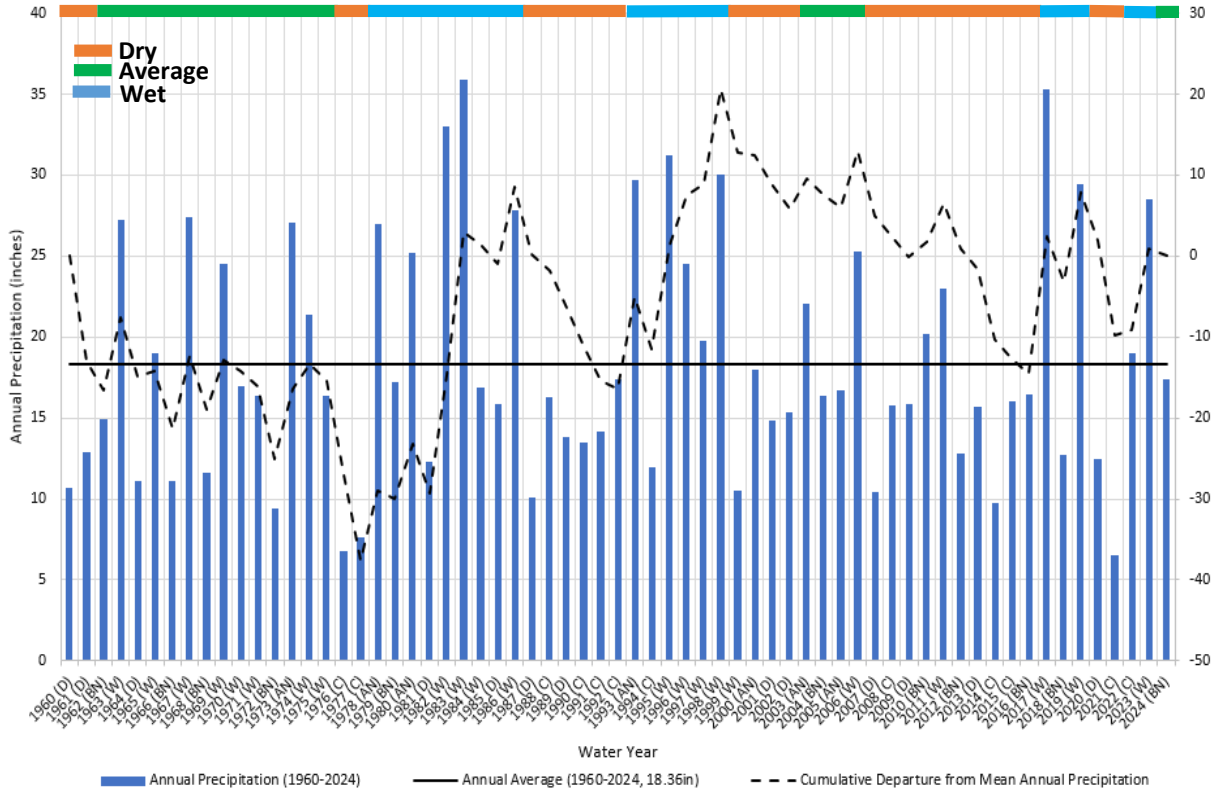


Groundwater Sustainability Plan Background

- Historical sustainable groundwater conditions
- Northwest Focus Area is area of special attention, including for opportunities to enhance recharge
- GSP annual reports to be completed by April 1 – WY 2024 report in progress
 - Document groundwater conditions (e.g., water levels, water quality, subsidence)
 - Water use by source and sector
 - Estimates of groundwater pumping and change in groundwater storage
 - Evaluate conditions relative to sustainable management criteria in GSP
 - Document projects and management actions occurring

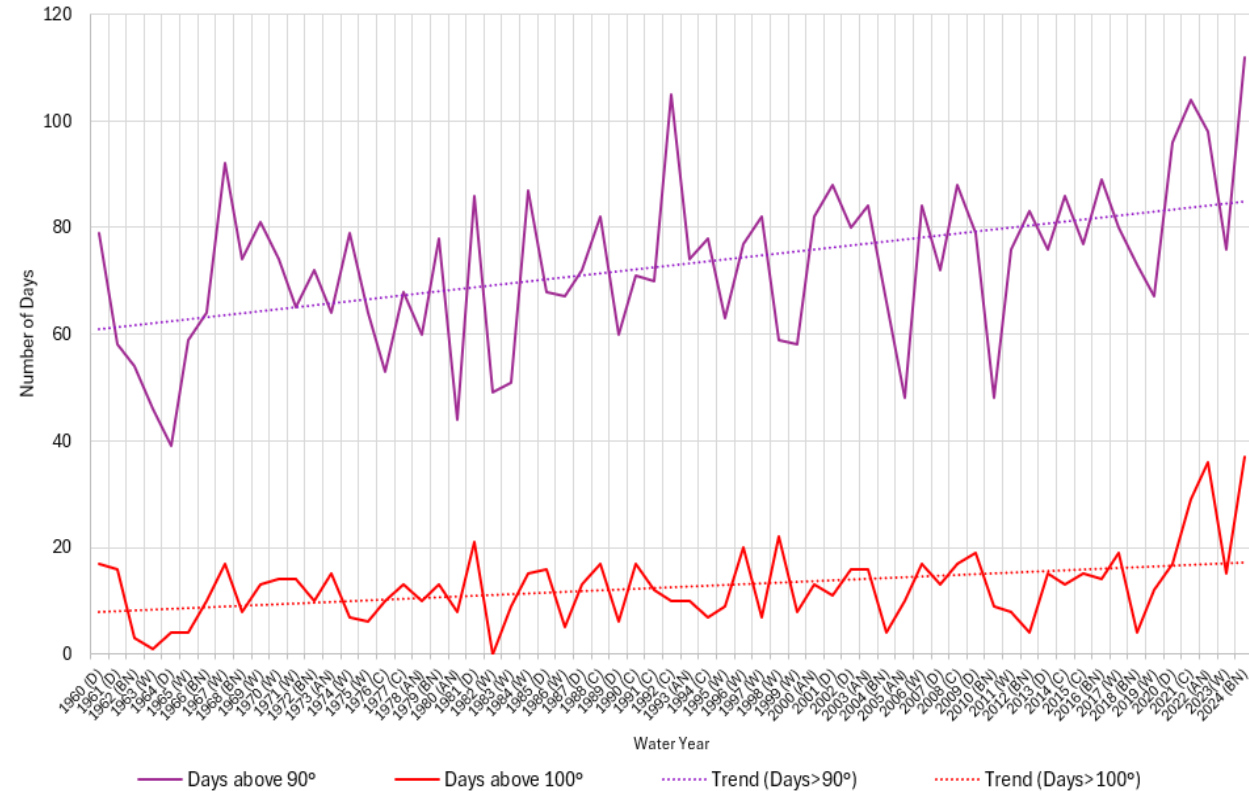
Precipitation and Temperature

Precipitation



- Drier than average in many recent years
- 2024: 17.39 inches, ~1 inch below avg

Temperature

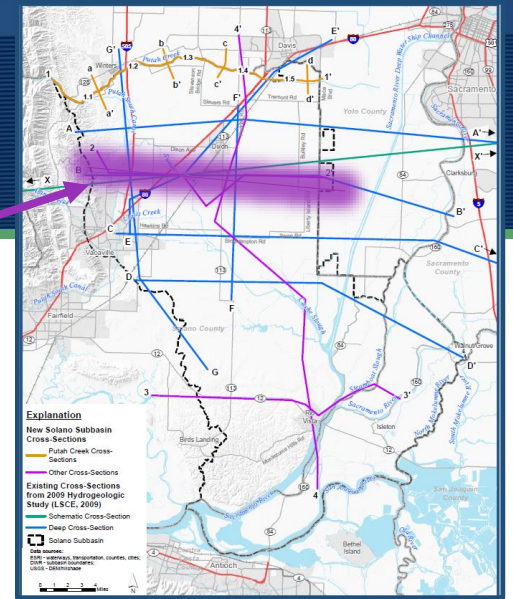
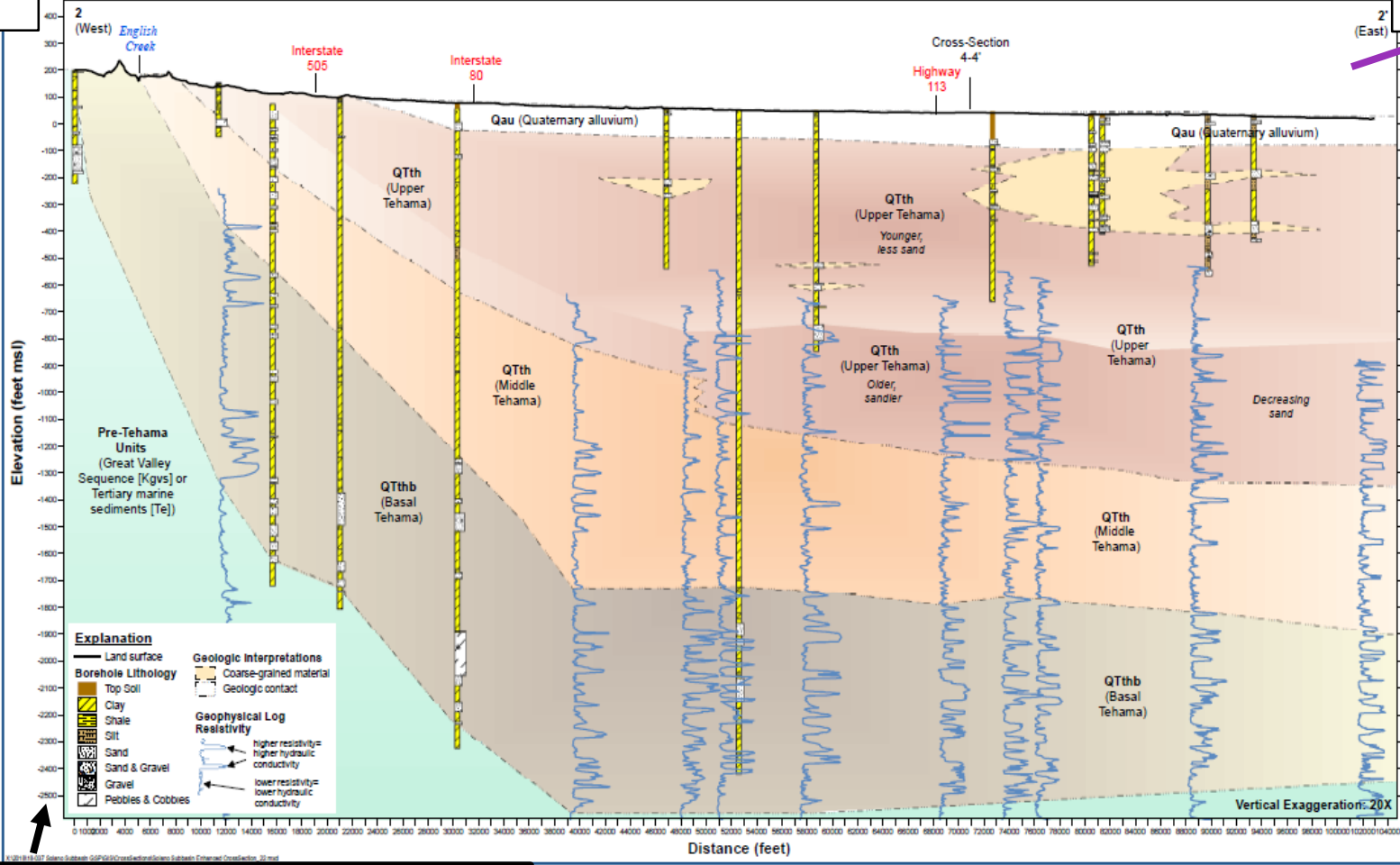


- Increasing number of hot days
- WY 2024: 112 days >90°, 37 days >100°

Hydrogeology

West

East



Alluvial/Upper Tehama Zone is primary aquifer for agricultural and small domestic wells

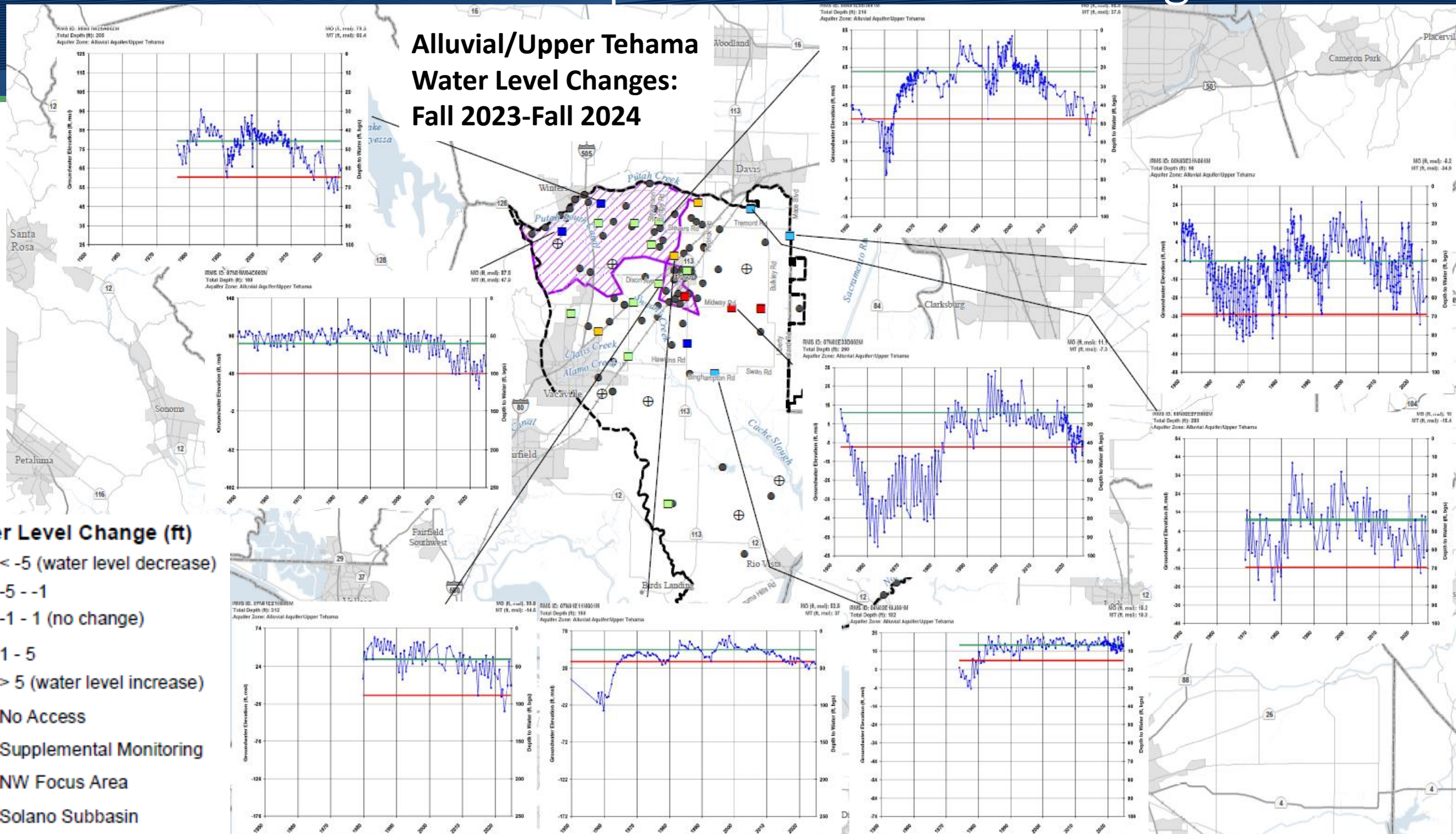
-2500 Ft Elev.; ~2,700 Ft. Deep

Groundwater Levels – Representative Monitoring Sites

Alluvial/Upper Tehama Water Level Changes: Fall 2023-Fall 2024

Water Level Change (ft)

- < -5 (water level decrease)
- -5 - -1
- -1 - 1 (no change)
- 1 - 5
- > 5 (water level increase)
- ⊕ No Access
- Supplemental Monitoring
- NW Focus Area
- Solano Subbasin

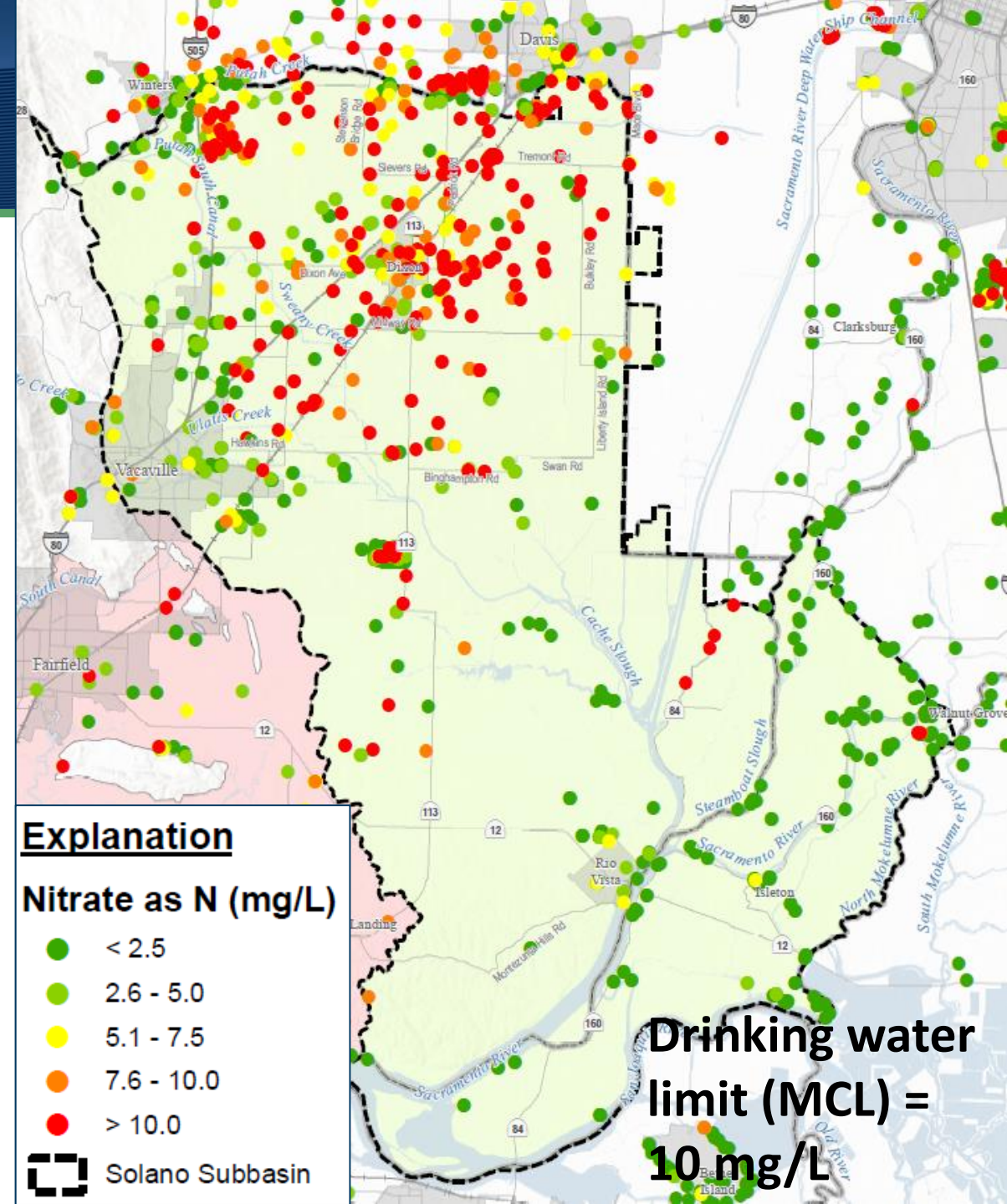


Summary of Recent Water Levels

- Water level recovery evident in many Alluvial/Upper Tehama zone wells since Fall 2022
 - 27 of 30 RMS wells stable or increasing
 - 12 of 30 RMS wells increasing >5 foot
- Wet WY 2023 increased groundwater recharge
- Full benefit to deeper groundwater system from WY 2023 recharge may be delayed
- Decreased groundwater pumping in WY 2023 (estimates for WY 2024 in progress)
- Potential changes in recent water demand from land use/crop transitioning

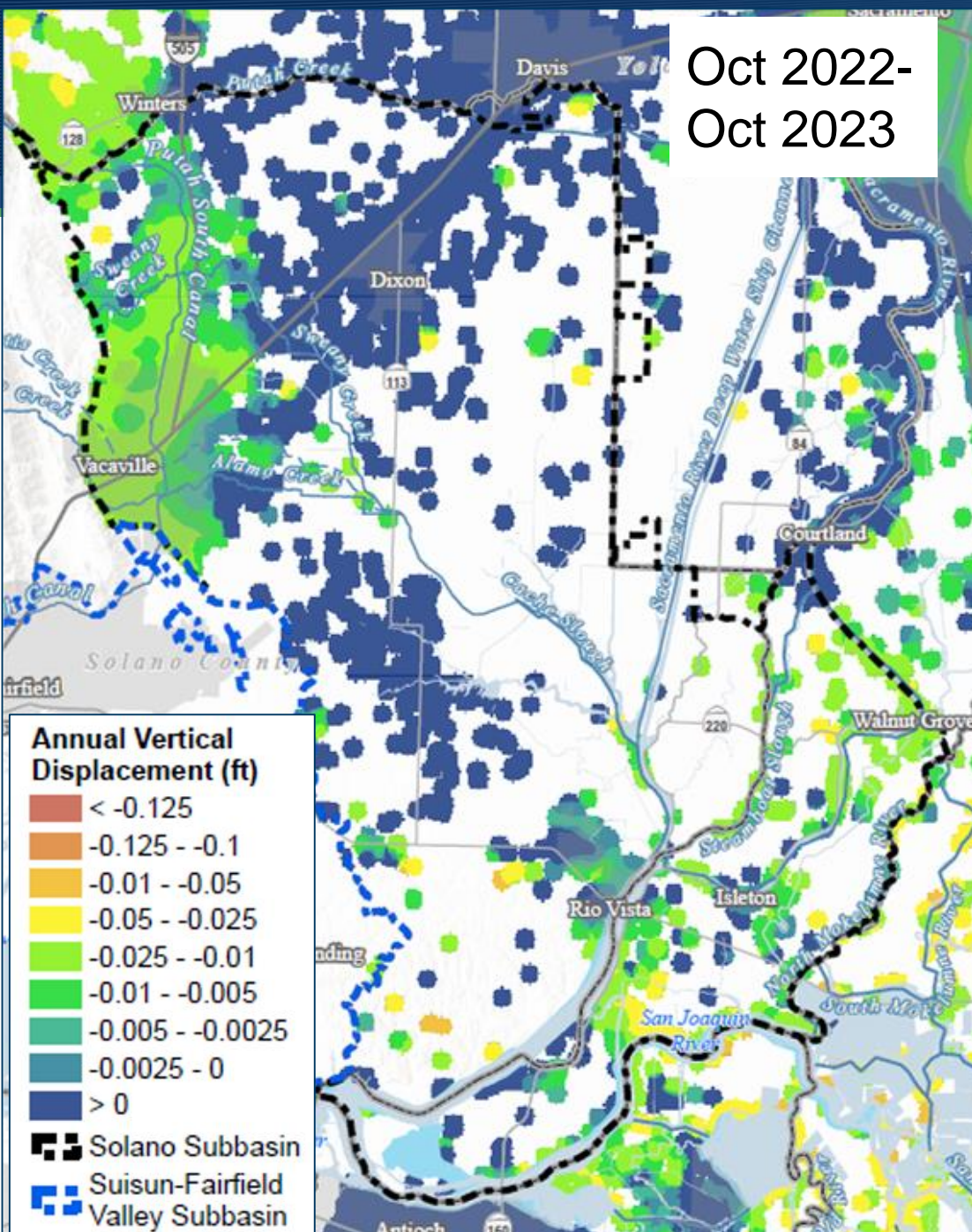
Groundwater Quality

- Constituents of interest
 - chloride, total dissolved solids, nitrate, arsenic, chromium-6, boron
- Recent monitoring suggests broader occurrence of elevated nitrate in GW
- Nitrate management challenges:
 - Shallow GW conditions
 - Historical loading/residual nitrogen
- GSP has limited responsibility over management of water quality conditions



Subsidence

Oct 2022-
Oct 2023



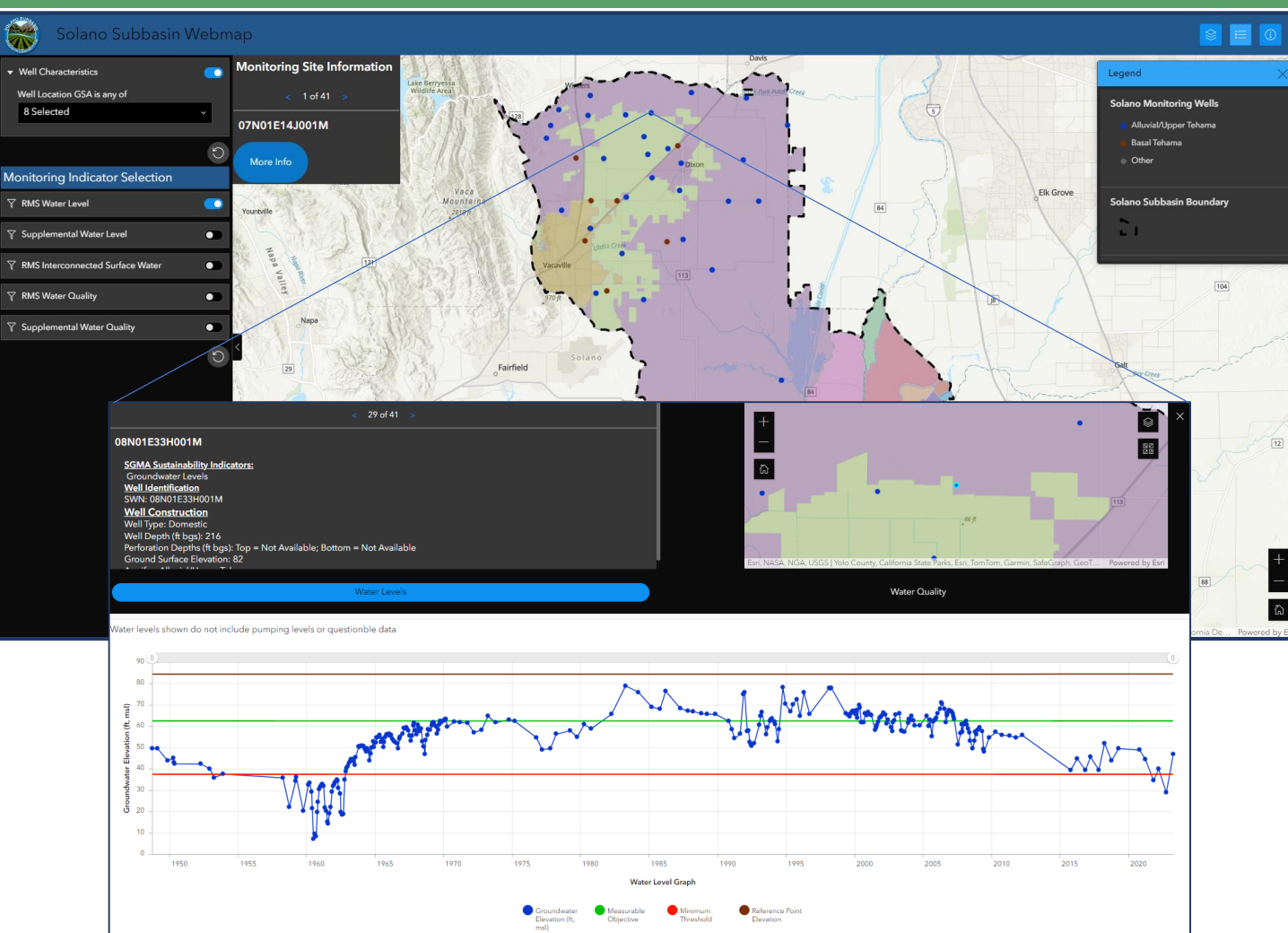
- Tracked with continuous GPS station sites and remote sensing data
- No apparent land subsidence from GW withdrawals
- WY 2024 data still in preparation

Key GSP Implementation Activities



- DWR GSP Implementation Grant funding many activities
- Monitoring enhancements (well network additions and automation)
- Interactive web map enhancements
- Refining data on water sources and uses; hydrologic model refinements
- Projects and management actions to enhance recharge and reduce runoff
- Policies and incentives to ensure sustainable groundwater management

Solano Subbasin Interactive Monitoring Web Map



- Tool for updating water users/managers on conditions
- Current focus on GSP Representative Monitoring Sites (RMS) - groundwater levels and quality
- Future enhancements planned
- No private well information - precise locations not shown
- www.solanogsp.com/subbasin/conditions/

GW Well and SW Diversion Inventory



State and County well data

- Well Completion Reports & permits

Surface Water Diversions

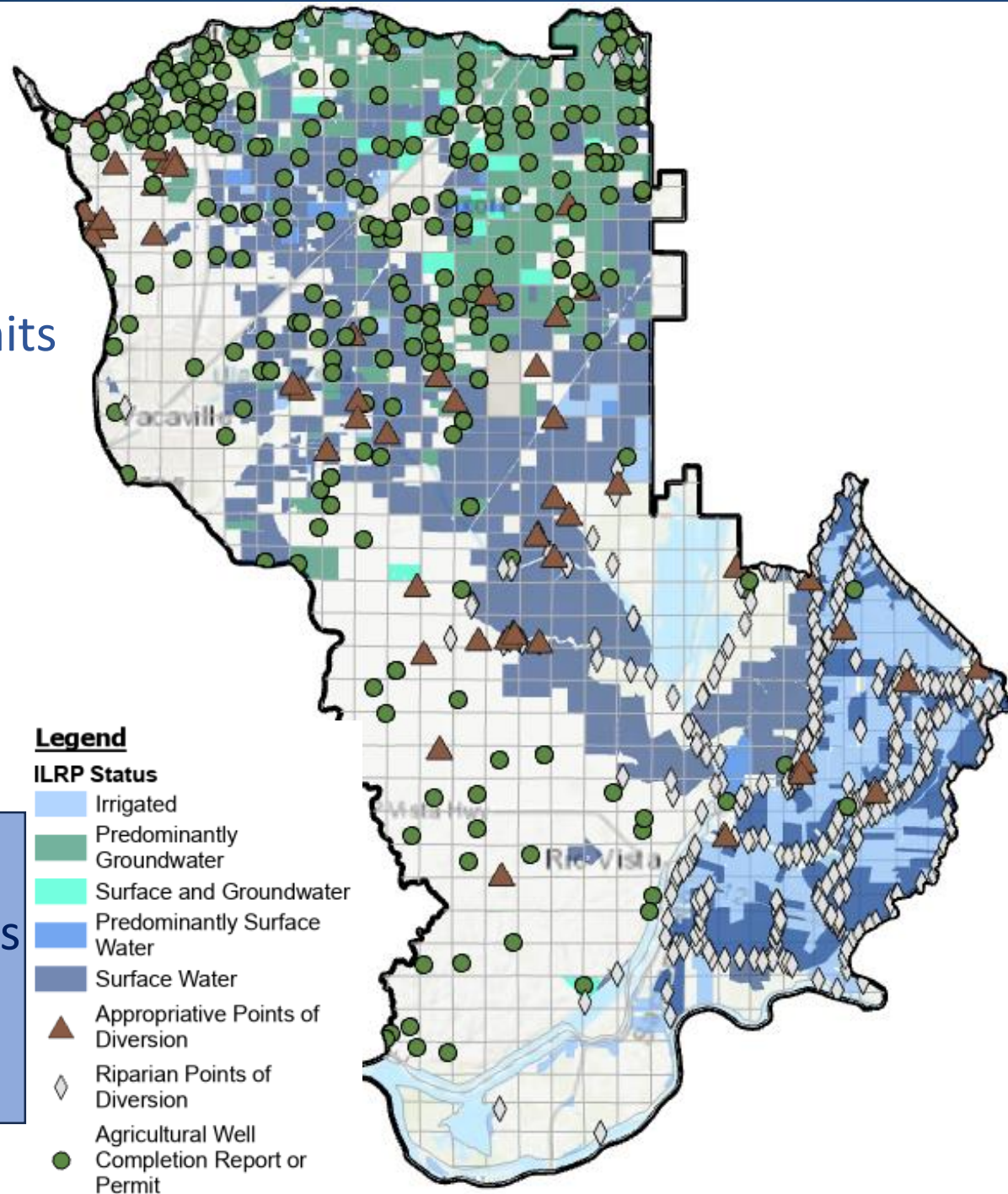
- SWRCB points of diversion and place of use

Irrigated Parcel Water Source

- From ILRP surveys

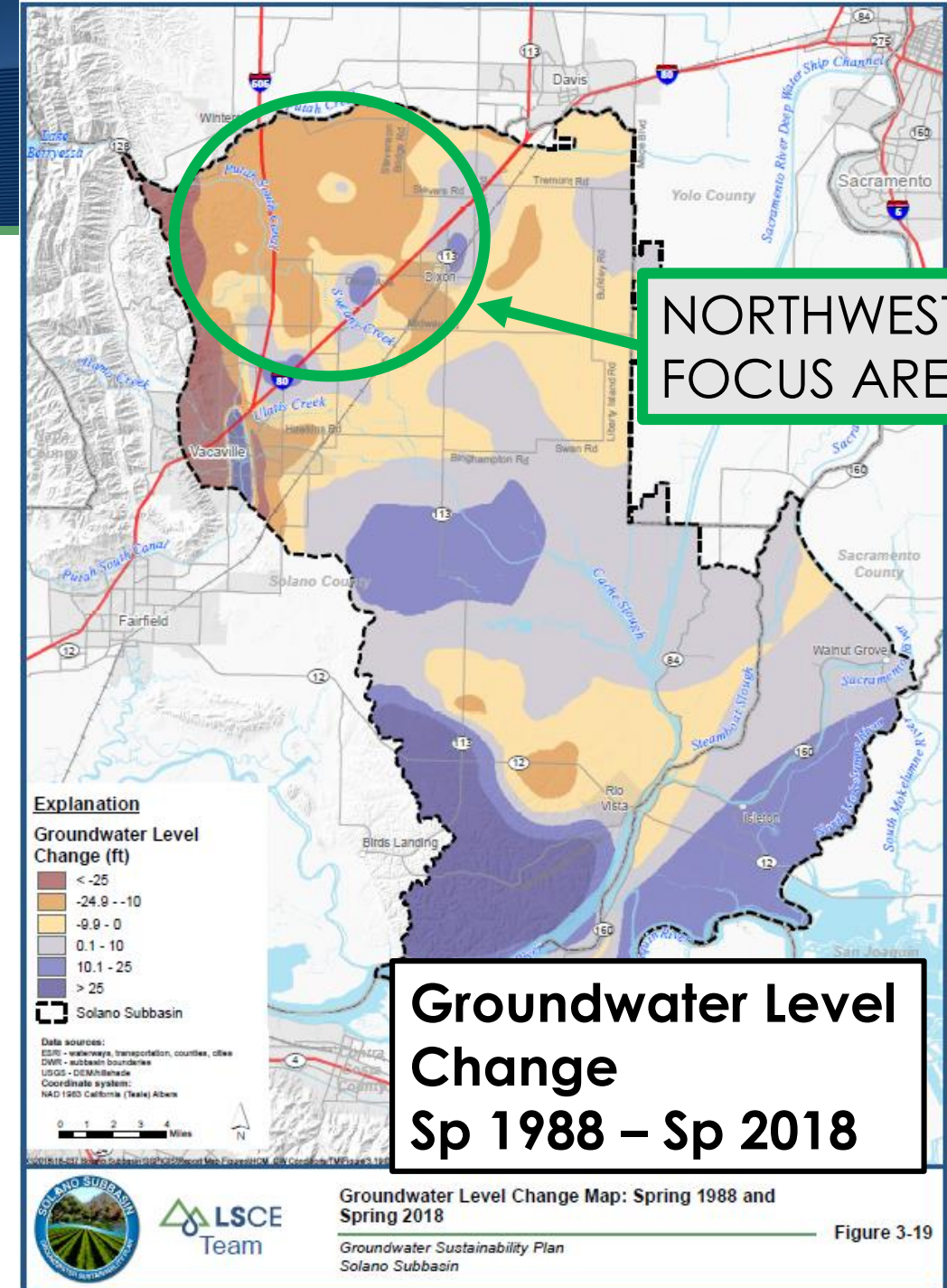
Next Steps

- Targeted well sampling to address WQ data gaps
- Hydrologic model refinements



Enhancing Groundwater Recharge

- Achieve multiple benefits: increase groundwater recharge in NW Focus Area and improve stormwater management
- Interest from land owners/managers in exploring possibilities
- GSAs, in partnership with RCDs, exploring many project concepts for piloting and/or future implementation



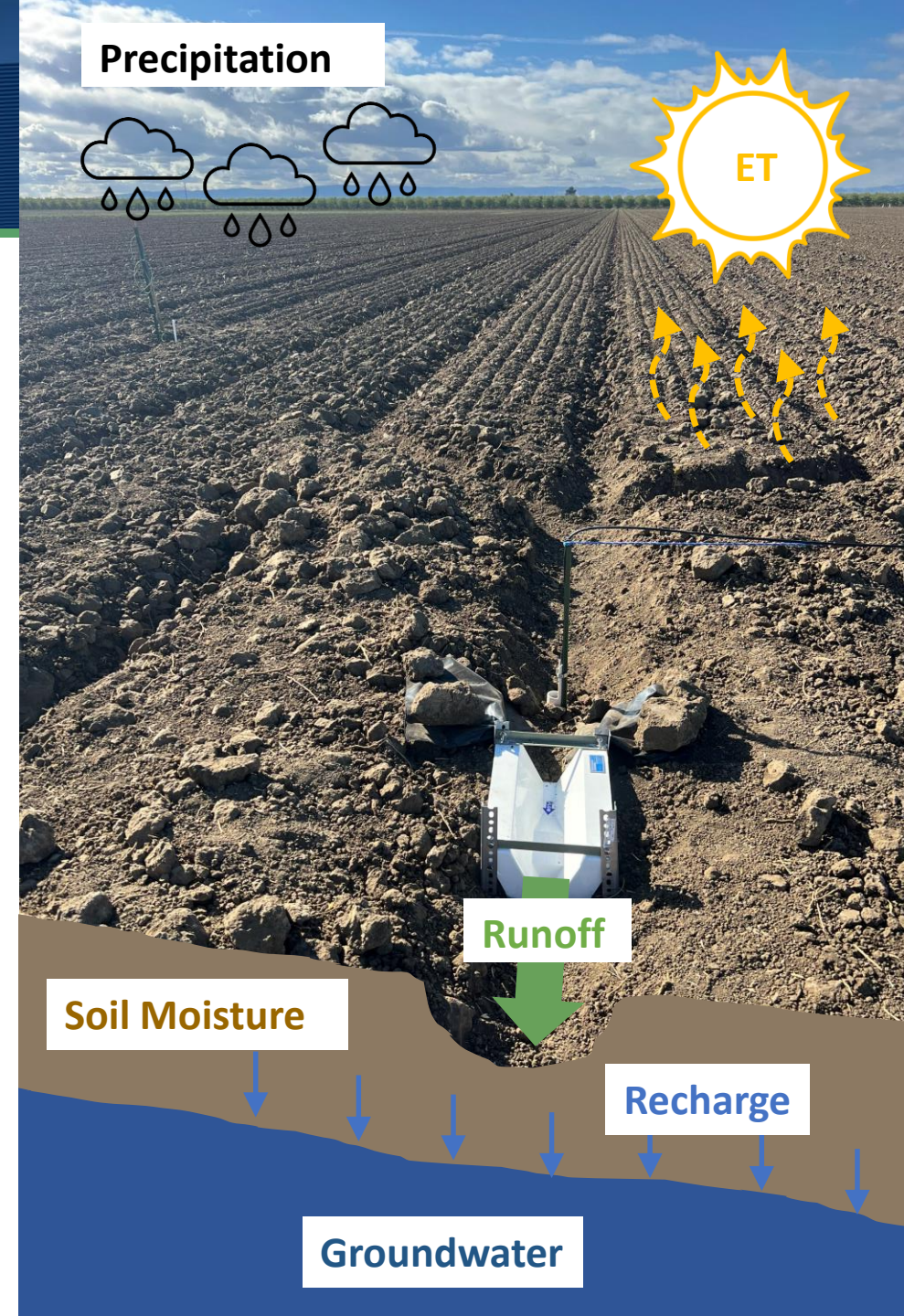
Cover Crop Study

- Assess benefits of furrow cover cropping
- Collaboration with multiple farmers

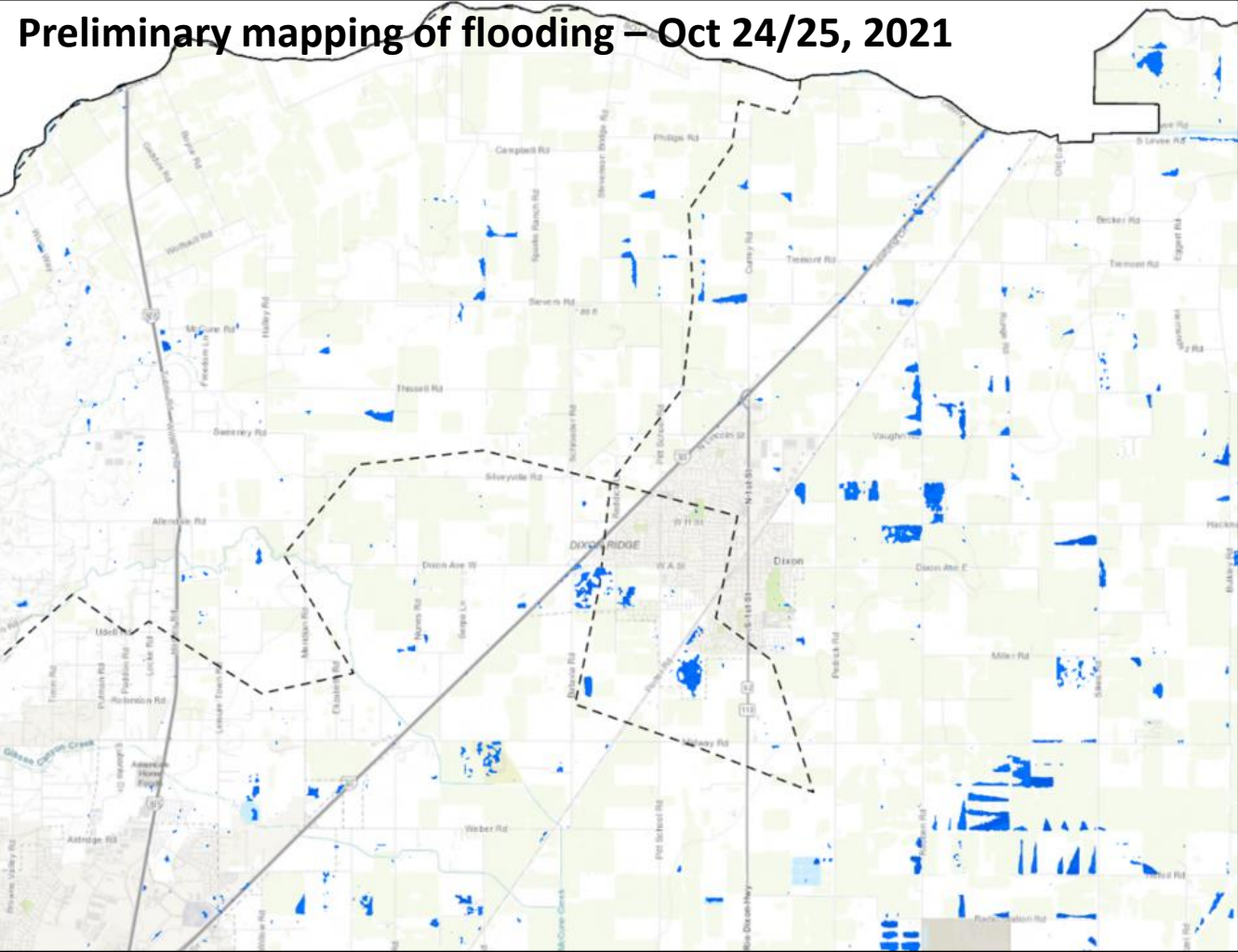
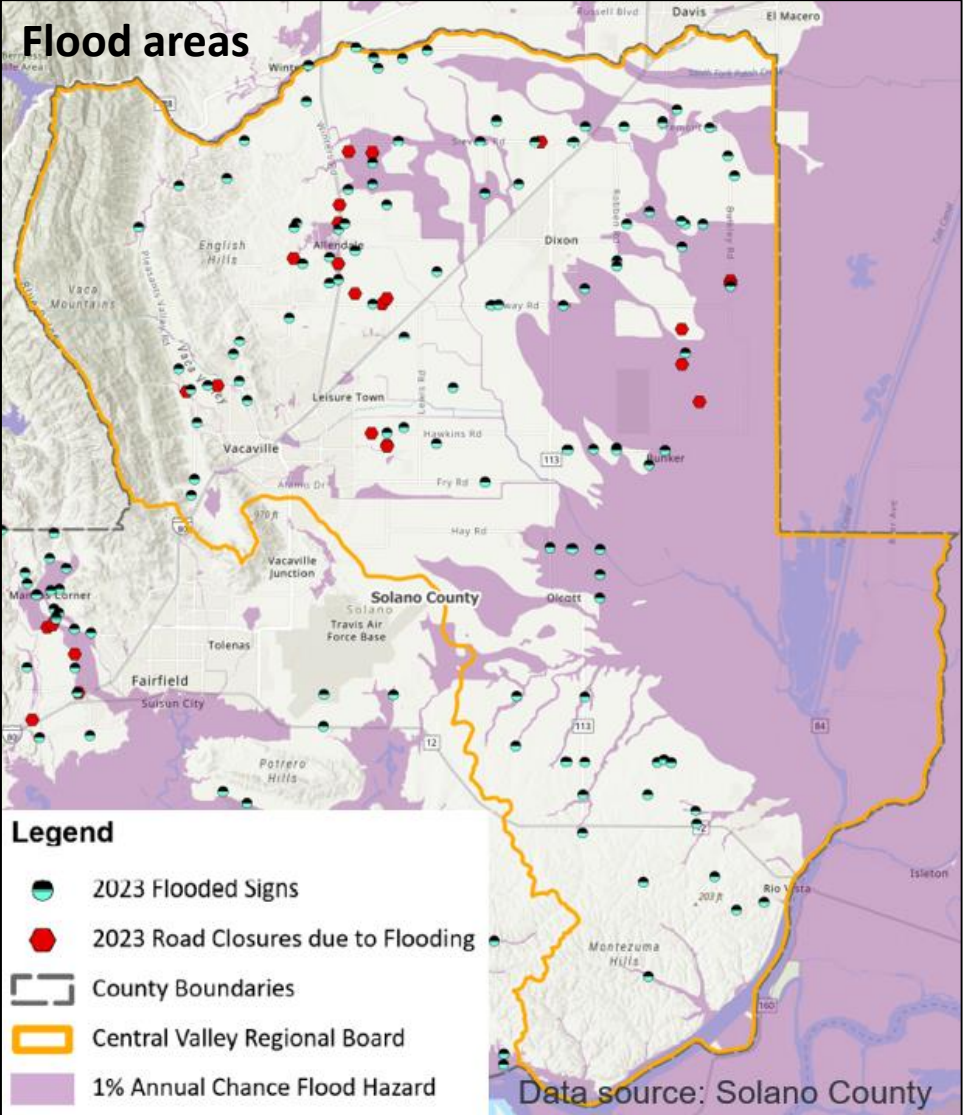


- Monitoring components:
 - Precip
 - **Runoff**
 - **Evapotranspiration (ET)**
 - **Soil moisture**

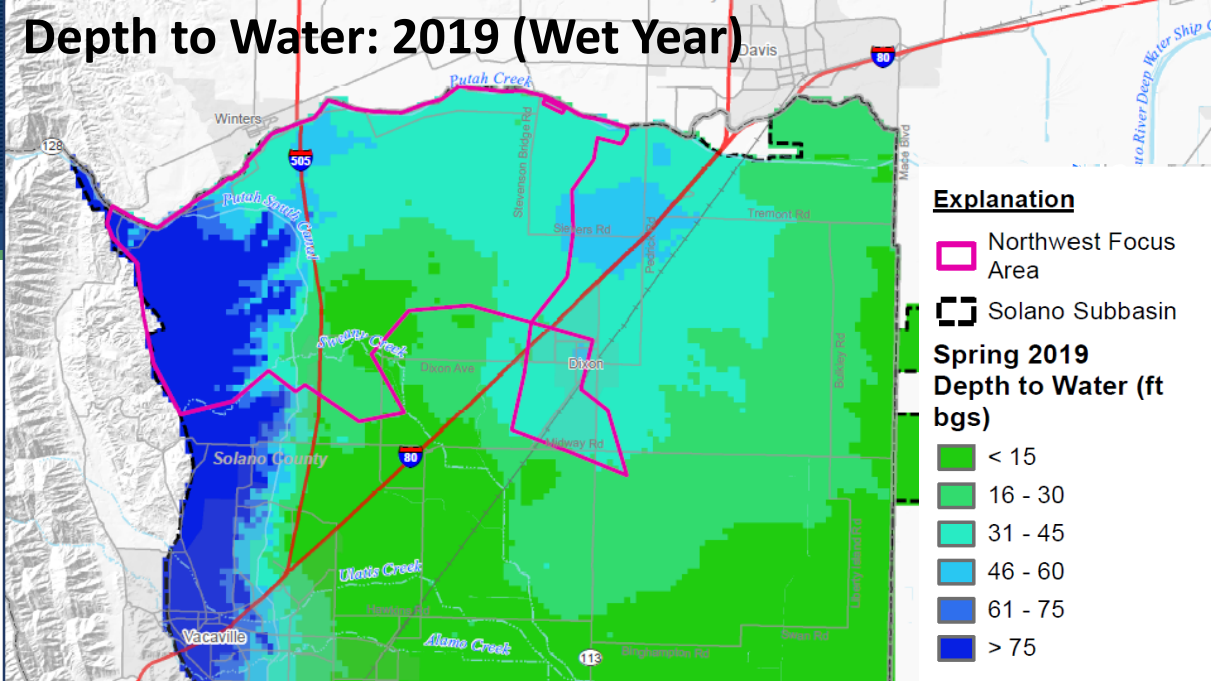
- Estimate infiltration and deep percolation (groundwater recharge)
- Other observations of benefits or challenges



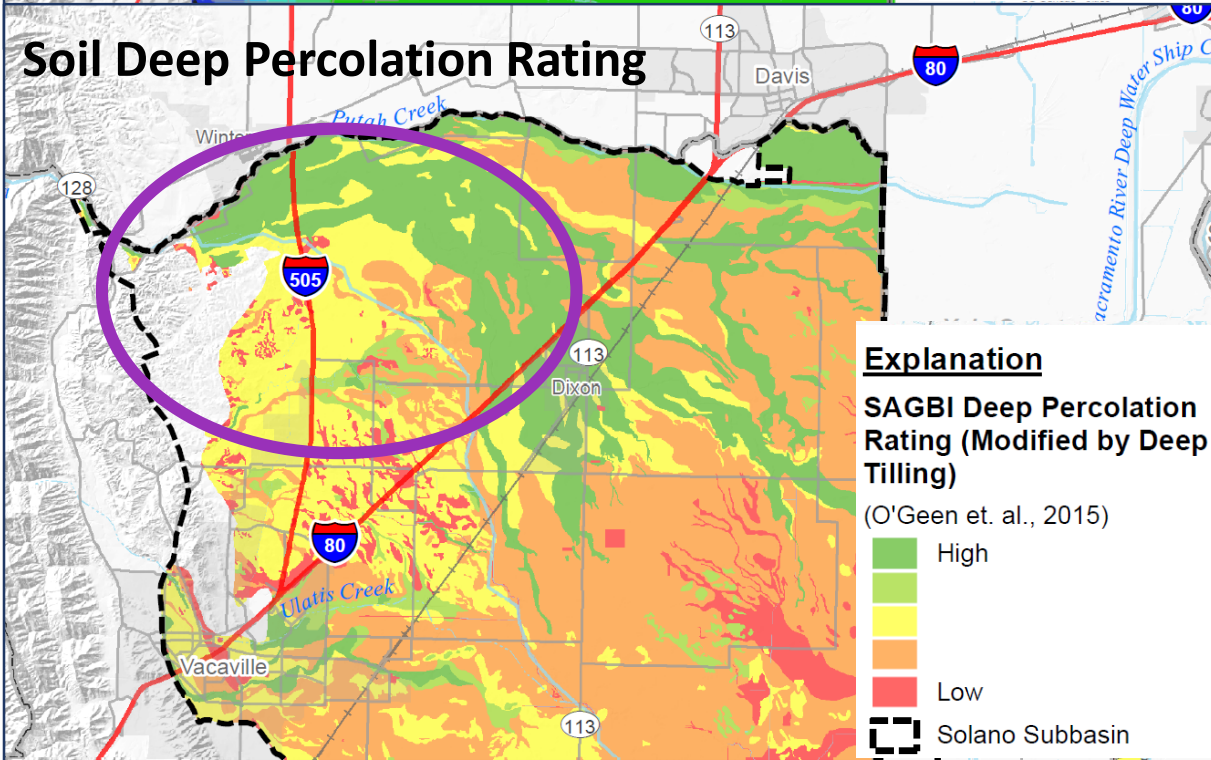
Multi-Benefit Project Planning: Stormwater Runoff



Depth to Water: 2019 (Wet Year)



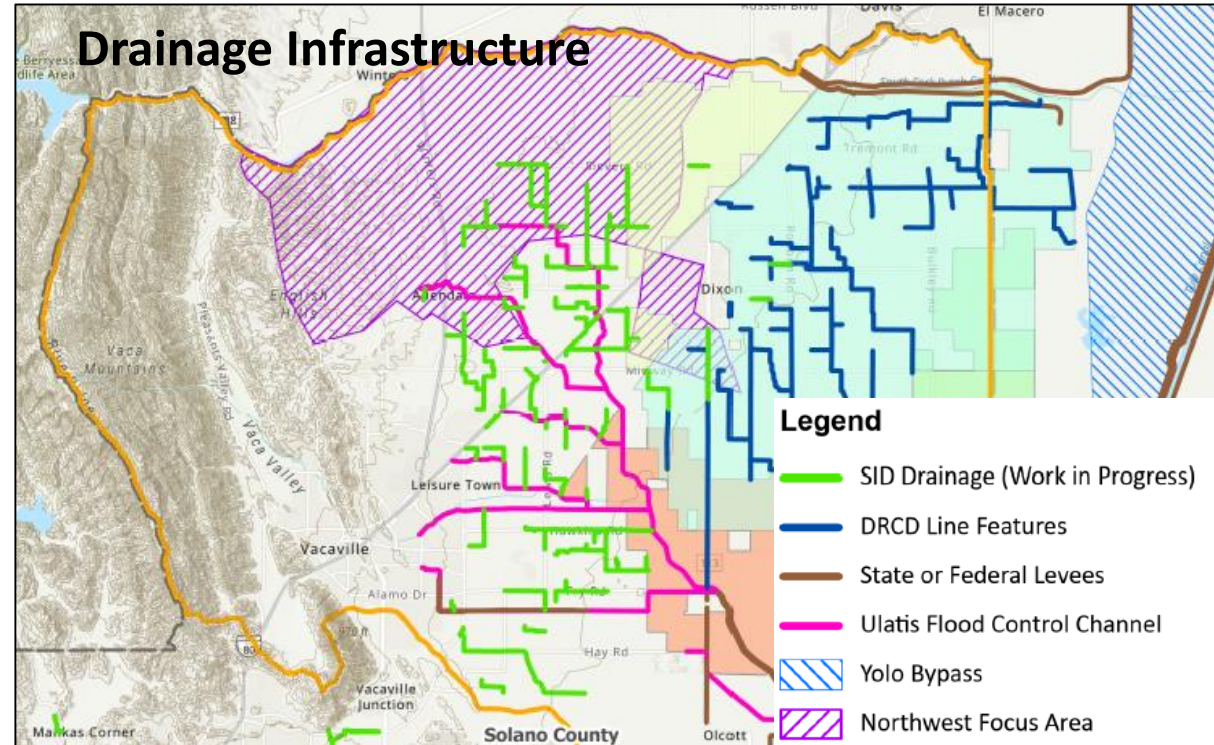
Soil Deep Percolation Rating



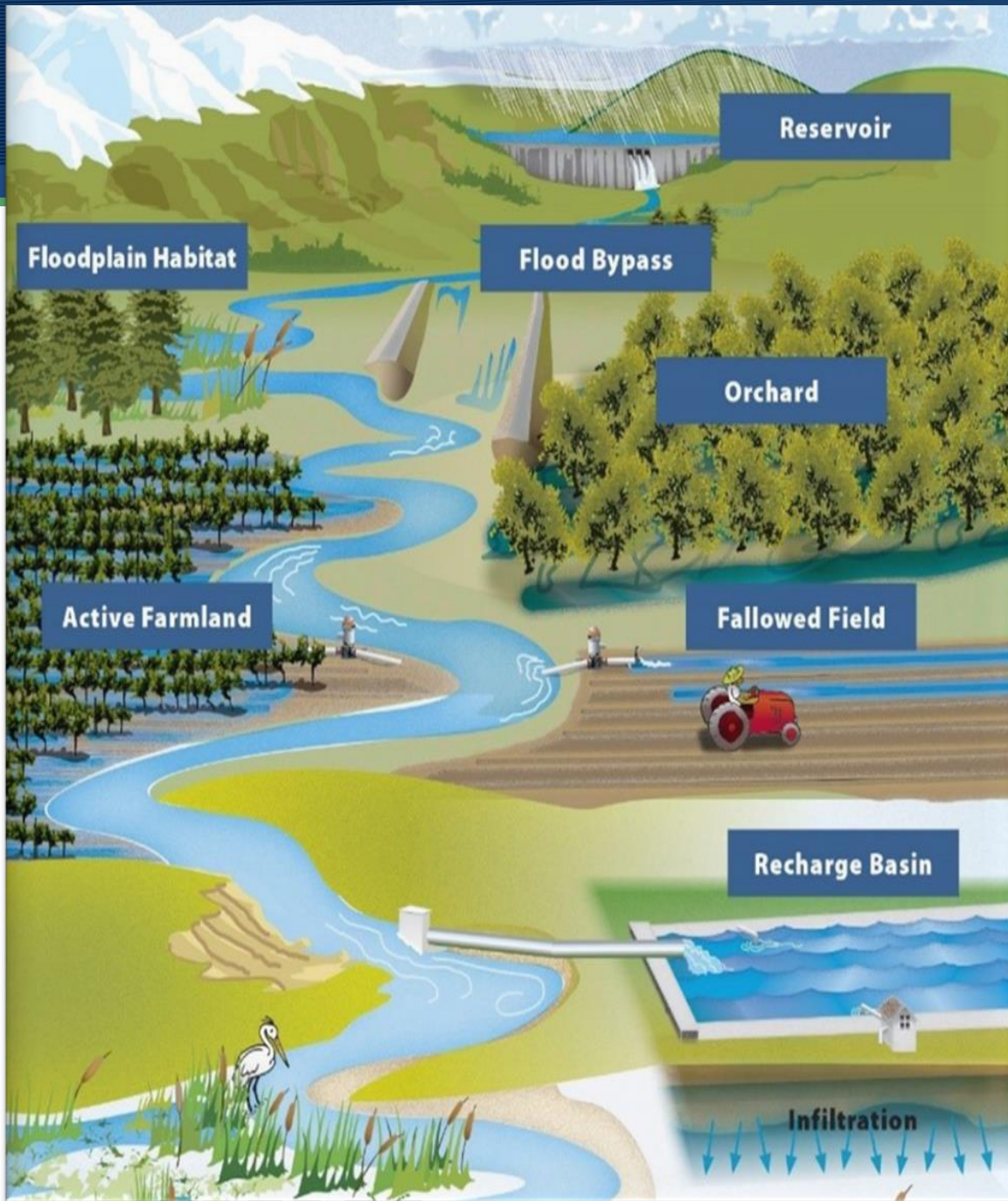
Multi-Benefit Project Planning: Recharge Opportunities

- Solano Subbasin characteristics align with multi-benefit opportunities

Drainage Infrastructure



Implementation of Actions and Evaluation of Incentives



- Prioritization of areas and concepts for implementation of projects and actions
- Exploring potential incentives and policies to improve Subbasin resilience and sustainability
- Coordination between many stakeholder groups on proactive measures



THANK YOU