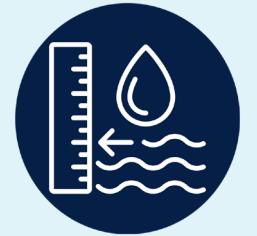




Item 7 Groundwater Level Strawman



Vina Stakeholder Advisory Committee
June 24, 2026

Presentation by: Christina Buck, Ph.D.

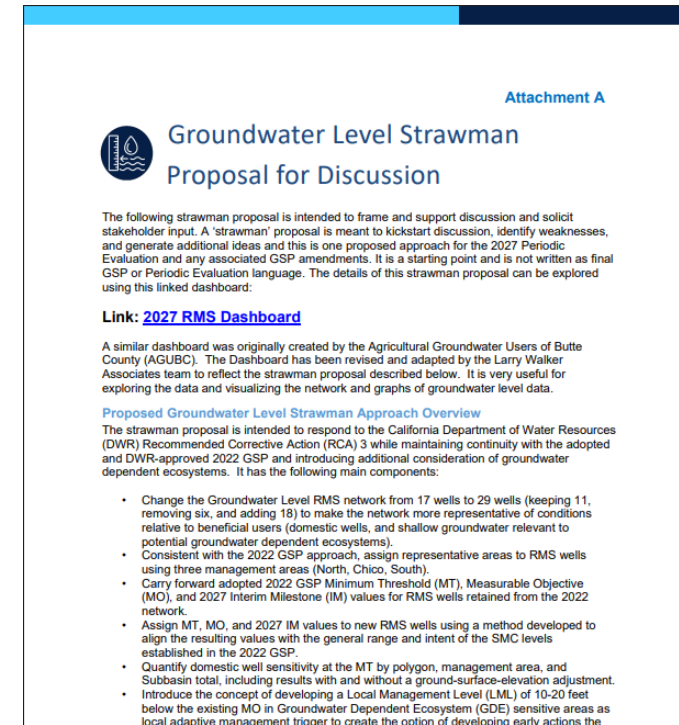
Assistant Director, Butte County Water and Resource Conservation

[Providing technical staff support to the Vina GSA]

Today

- Introduction to the Groundwater Level Sustainability Indicator Strawman
- Provide historical context on groundwater conditions in the Vina Subbasin
- Definition of terms: “groundwater” and perched groundwater
- Review the main strawman elements and how they connect to other sustainability indicators.
- Highlight RMS network changes to support SHAC discussion and feedback

Goal today: lay the groundwork for further discussion and refinements of the GWL Strawman. Receive initial feedback on proposed changes to the RMS network



Attachment A

Groundwater Level Strawman Proposal for Discussion

The following strawman proposal is intended to frame and support discussion and solicit stakeholder input. A 'strawman' proposal is meant to kickstart discussion, identify weaknesses, and generate additional ideas and this is one proposed approach for the 2027 Periodic Evaluation and any associated GSP amendments. It is a starting point and is not written as final GSP or Periodic Evaluation language. The details of this strawman proposal can be explored using this linked dashboard:

Link: [2027 RMS Dashboard](#)

A similar dashboard was originally created by the Agricultural Groundwater Users of Butte County (AGUBC). The Dashboard has been revised and adapted by the Larry Walker Associates team to reflect the strawman proposal described below. It is very useful for exploring the data and visualizing the network and graphs of groundwater level data.

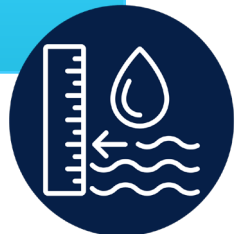
Proposed Groundwater Level Strawman Approach Overview

The strawman proposal is intended to respond to the California Department of Water Resources (DWR) Recommended Corrective Action (RCA) 3 while maintaining continuity with the adopted and DWR-approved 2022 GSP and introducing additional consideration of groundwater dependent ecosystems. It has the following main components:

- Change the Groundwater Level RMS network from 17 wells to 29 wells (keeping 11, removing six, and adding 18) to make the network more representative of conditions relative to beneficial users (domestic wells, and shallow groundwater relevant to potential groundwater dependent ecosystems).
- Consistent with the 2022 GSP approach, assign representative areas to RMS wells using three management areas (North, Chico, South).
- Carry forward adopted 2022 GSP Minimum Threshold (MT), Measurable Objective (MO), and 2027 Interim Milestone (IM) values for RMS wells retained from the 2022 network.
- Assign MT, MO, and 2027 IM values to new RMS wells using a method developed to align the resulting values with the general range and intent of the SMC levels established in the 2022 GSP.
- Quantify domestic well sensitivity at the MT by polygon, management area, and Subbasin total, including results with and without a ground-surface-elevation adjustment.
- Introduce the concept of developing a Local Management Level (LML) of 10-20 feet below the existing MO in Groundwater Dependent Ecosystem (GDE) sensitive areas as local adaptive management trigger to create the option of developing early actions the

What is a Strawman Proposal?

An initial draft created to jump-start discussion and identify potential weaknesses or areas for improvement, serving as a starting point for collaborative refinement.



GWL Strawman Introduction

There are essentially two key choices for the GSA Boards to consider:

1. Revise the RMS monitoring network?

This directly influences the assessment of impacts on beneficial users, as requested in the Recommended Corrective Actions (RCA).

- 1) Replace at least two RMS wells in the Vina South Management Area (due to frequent questionable measurements and/or location outside of the subbasin) and,
- 2) Improve representativeness of the network based on new information available since the adoption of the 2022 GSP.

2. Make changes to the Sustainable Management Criteria (MT etc.)?

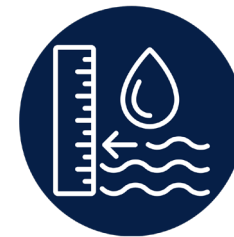
Goes beyond the scope of the RCA, but may be considered in light of new information and some stakeholder concerns

Connections to Storage, Subsidence, and Interconnected Surface Water

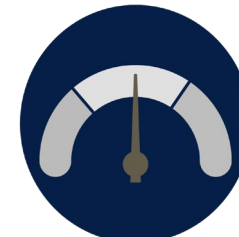
Groundwater level RMS monitoring network is referenced by more than one SGMA sustainability indicator in the 2022 GSP

- **Groundwater storage:** storage change estimates rely on groundwater level changes across the monitoring network.
- **Land subsidence:** groundwater levels can help interpret subsidence risk and changes in aquifer-system stress

Recent Board-approved amendments identify the Groundwater Level RMS network as the locations for Land Subsidence RMS.



Groundwater Levels



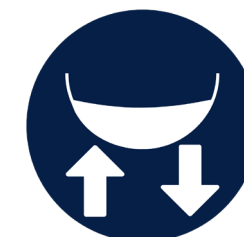
Groundwater Storage



Water Quality



Land Subsidence



Interconnected Surface Water

Change in Storage Calculations

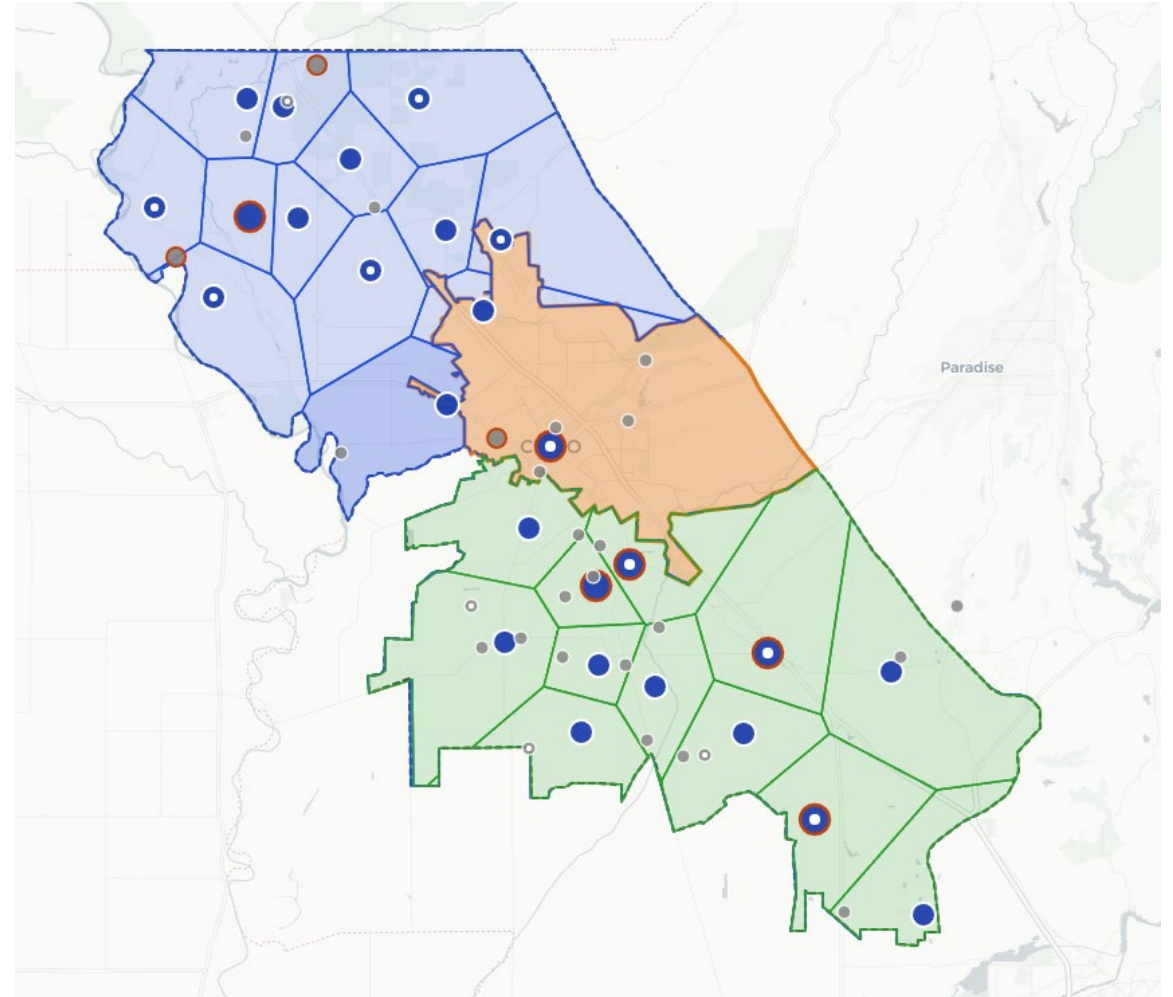
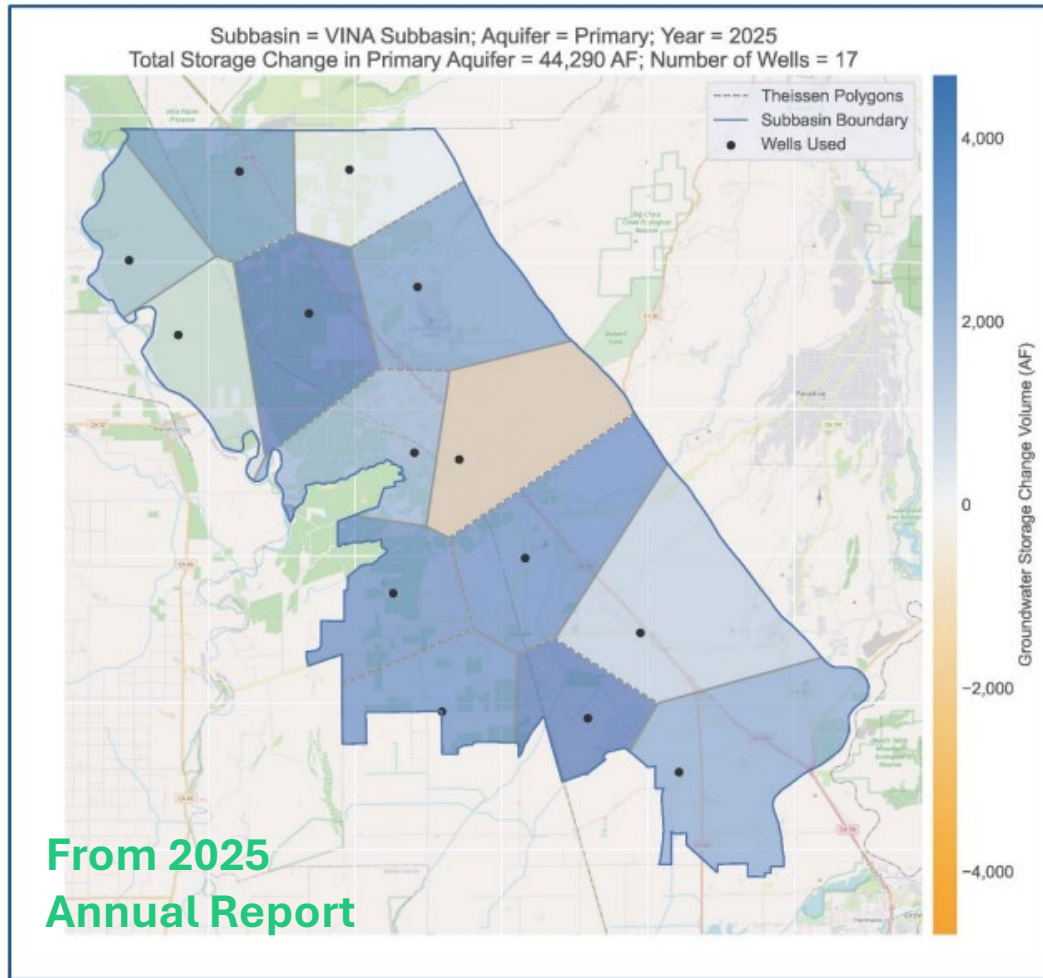
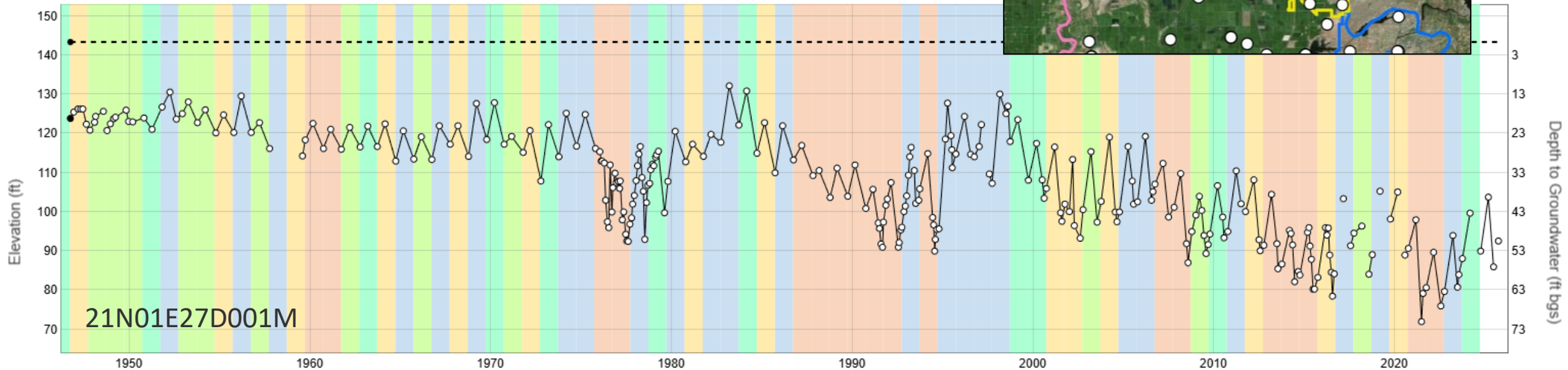
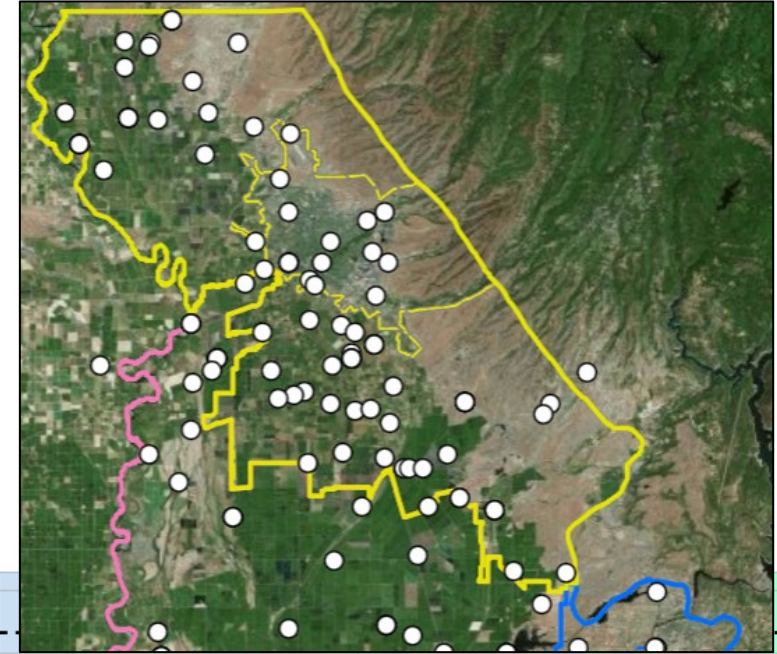


Figure 4-2. VINA Subbasin Change in Groundwater Storage from Spring 2024 to Spring 2025

Historical Context: Monitoring and Conditions

Groundwater levels respond to wet and dry cycles and long-term pumping/recharge patterns

- Vina has a long record of groundwater level monitoring by County and DWR staff
- Groundwater levels generally decline during dry periods and rise during wet periods, but not uniformly everywhere.
- Reached new historical lows in 2022 in some monitoring wells
- Groundwater levels have come up since then



Groundwater vs. Water Underground

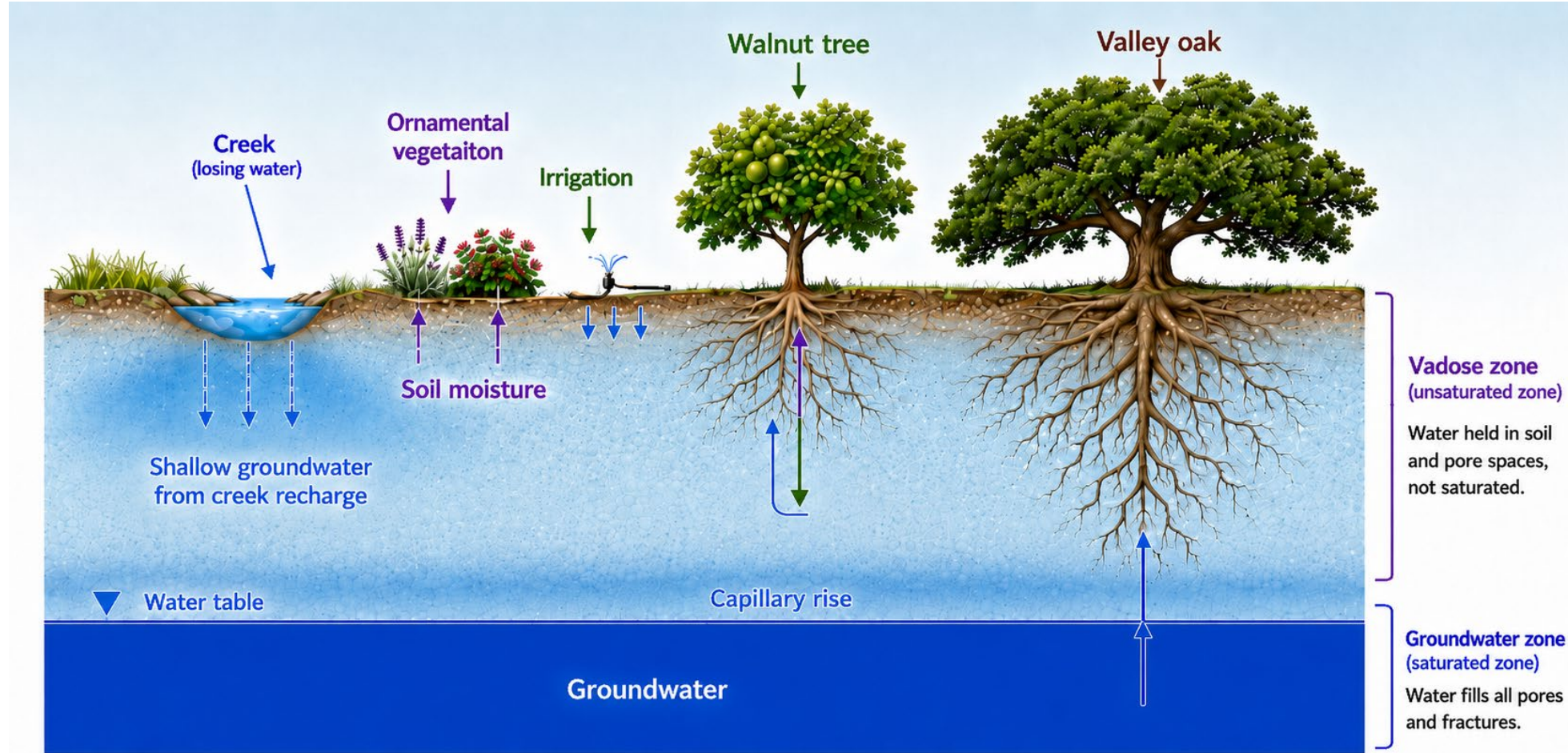
Not all water below land surface is “groundwater”

SGMA Definition:

“Groundwater” means water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water that flows in known and definite channels.

USGS definition:

Groundwater is water that exists underground in saturated zones beneath the land surface. The upper surface of the saturated zone is called the water table.



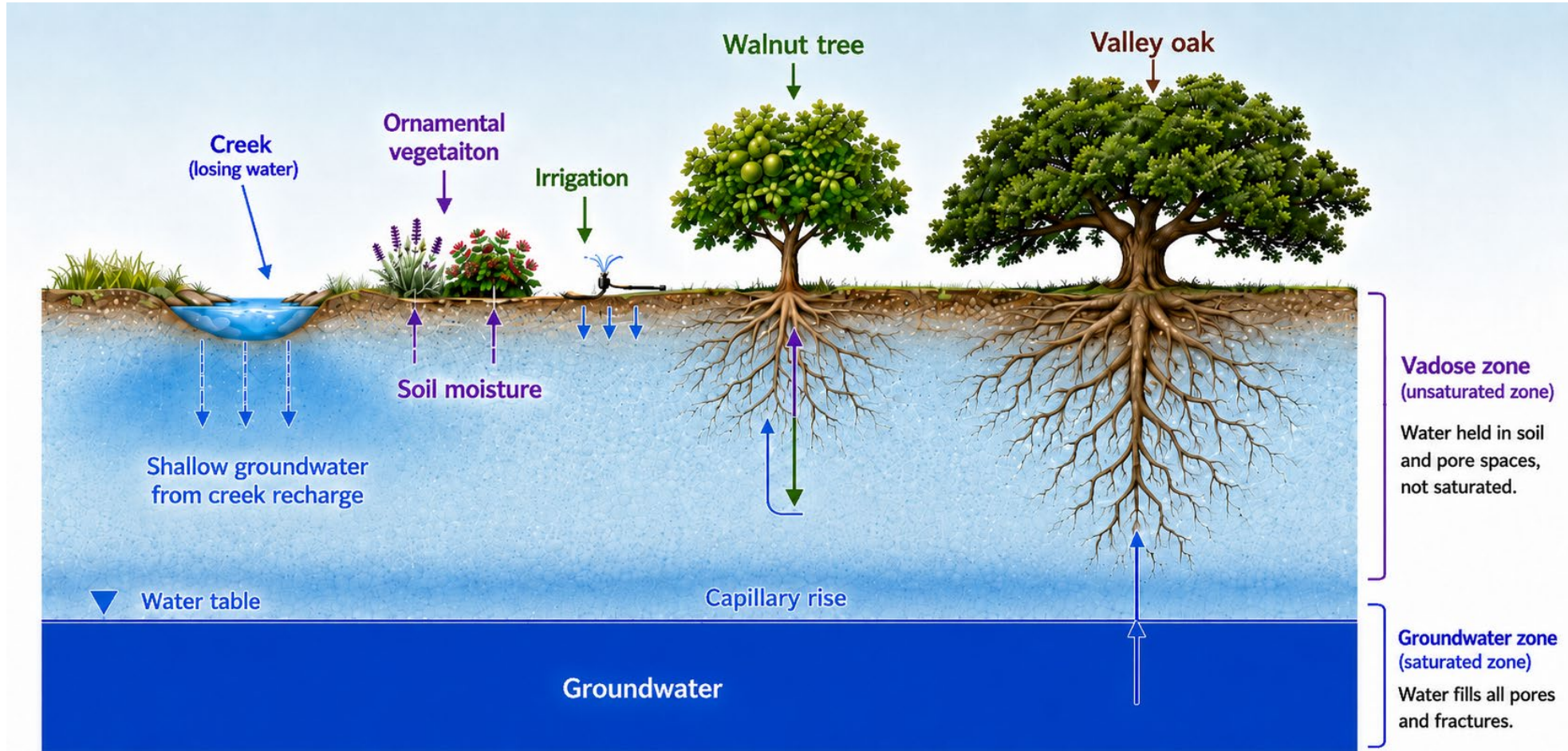
Plants can use different water sources underground. Soil moisture and shallow water are not the same as deeper groundwater.

Groundwater vs. Water Underground

Not all water below land surface is “groundwater”

Other water sources available to vegetation:

- Soil moisture: water held in the root zone after rain or irrigation.
- Shallow or perched water: localized water that may sit above a less-permeable layer (i.e. clay).
- Water soaking into the ground from a creek, stream, or other drainage



Plants can use different water sources underground.
Soil moisture and shallow water are not the same as deeper groundwater.

Perched and Shallow Groundwater Concepts

Localized shallow water can be important for vegetation, but may not represent the "principal aquifer" or regional groundwater conditions

- Perched groundwater can form where water is held above a clay or other low-permeability layer (e.g., cemented lahar).
- Shallow groundwater may be seasonal, localized, or influenced by creeks, drainages, irrigation, or recharge.

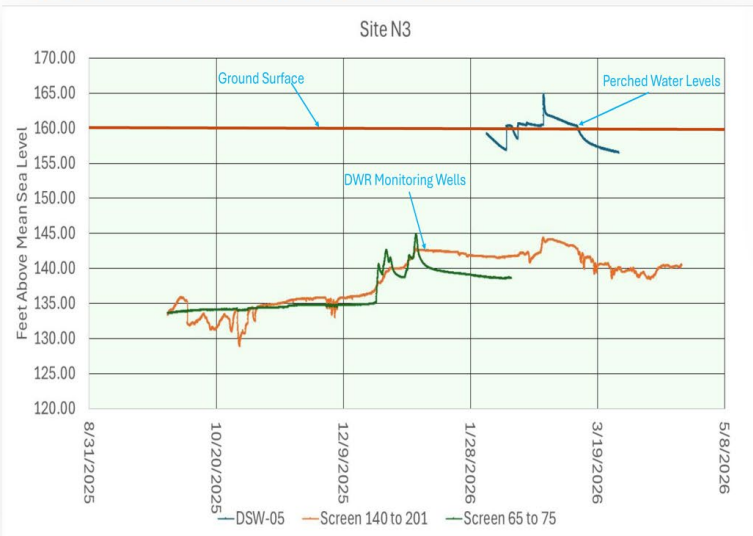


Perched Groundwater Systems

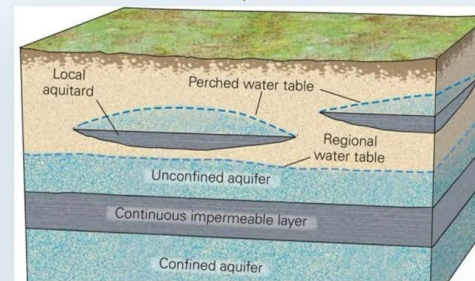
VINA GSA GRANT

COMPONENT 5

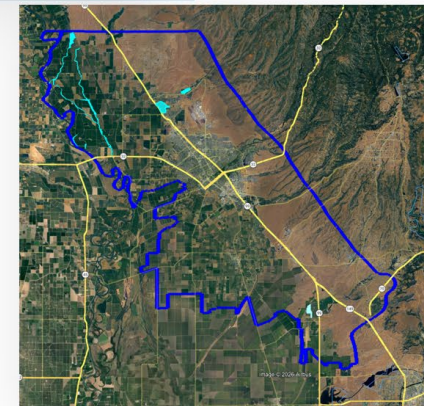
Site N3 — Groundwater Level Response



Conceptual Model

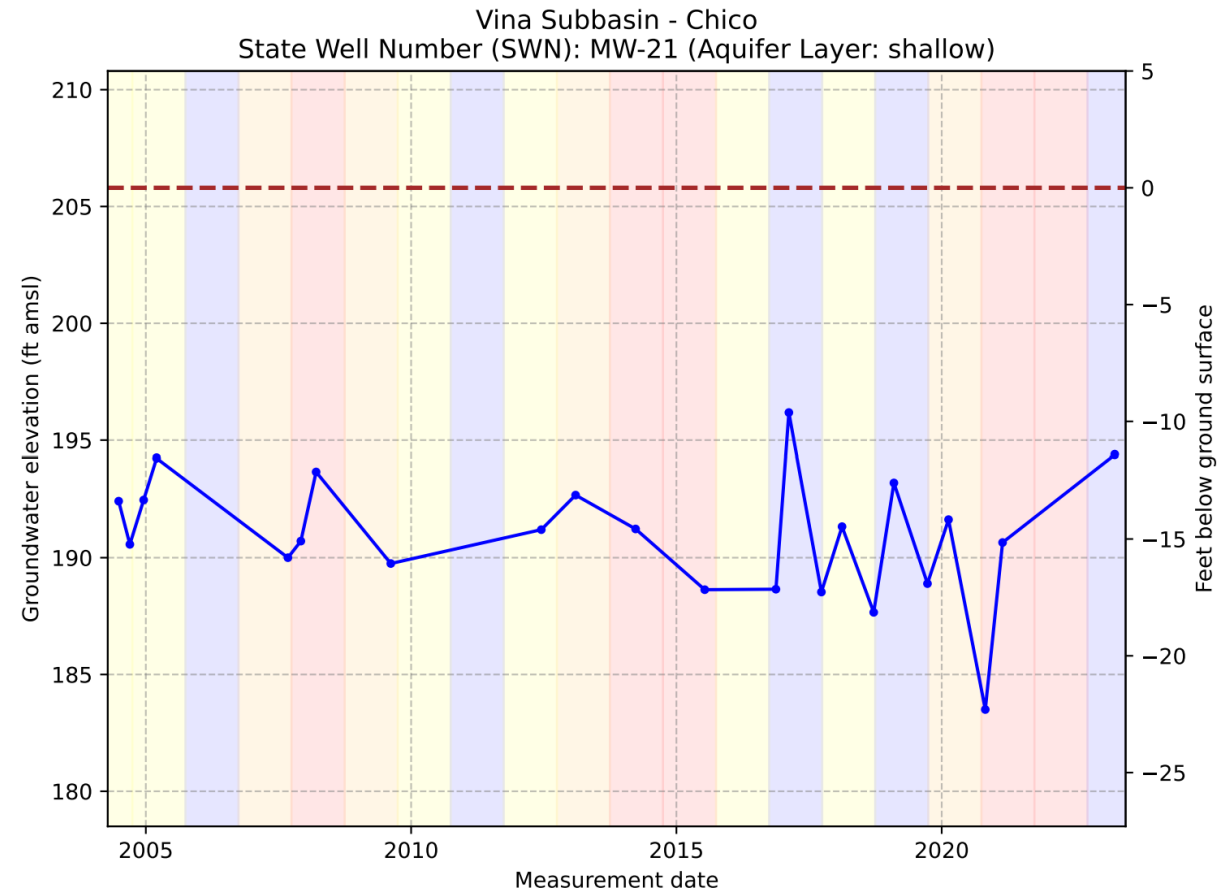
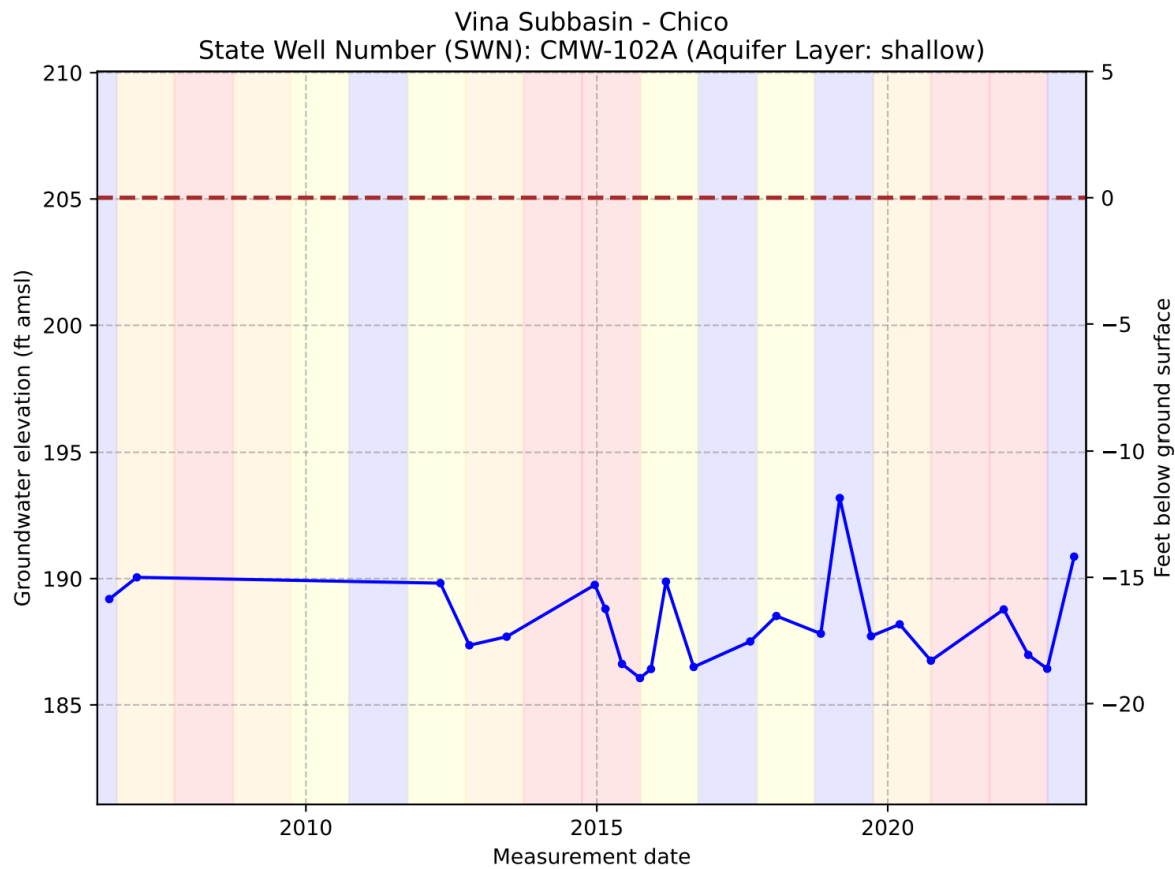


Shallow perched water tables exist above the regional aquifer in portions of the Subasin. These must be characterized before recharge projects can be designed, as they constrain infiltration and surface water management.



Example: City of Chico - North and South of Big Chico Creek

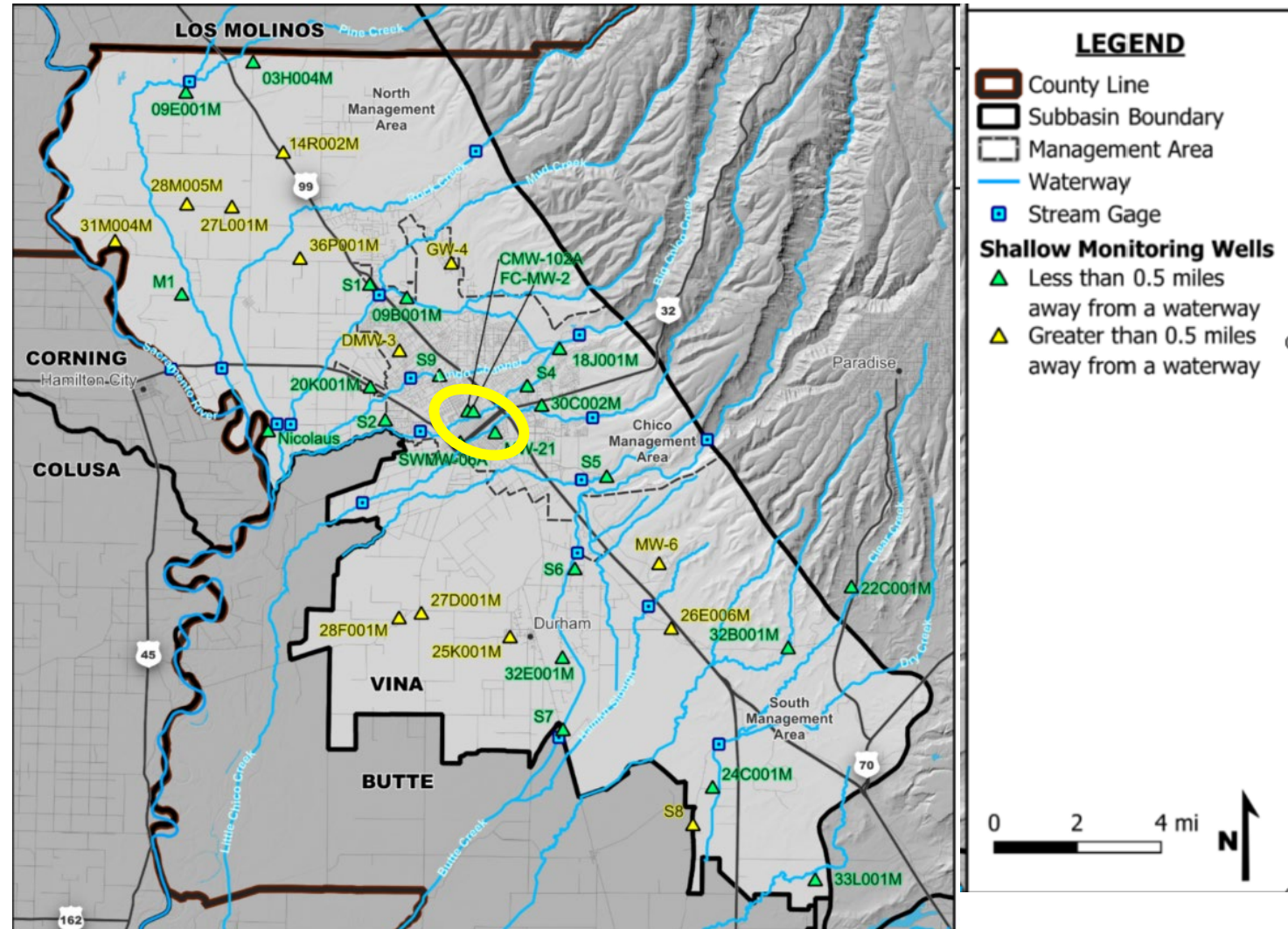
Good news – shallow groundwater in the heart of Chico has been relatively stable through wet and dry cycles



Data Gap Project identified informative monitoring wells relative to regional shallow groundwater conditions

Three categories of wells:

1. Existing DWR monitoring wells with historical data
2. Existing monitoring wells with historical data from other programs (ex. Nitrate monitoring program in Chico)
3. New wells to be installed with SGM grant funds to expand shallow monitoring data set



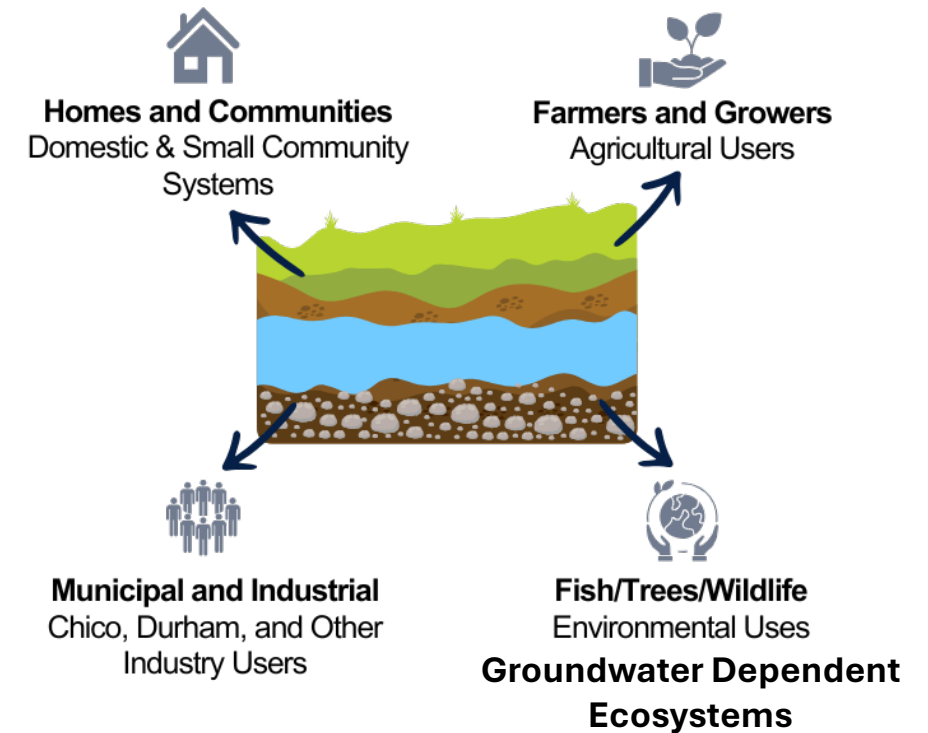
One Location Can Have Different Depth-to-Water Conditions

Well construction controls what part of the aquifer a measurement represents

- A very shallow monitoring well may track conditions relevant to vegetation or interconnected surface water.
- A domestic well may be screened deeper and reflect household water reliability concerns.
- A municipal or irrigation well may be much deeper and reflect regional supply conditions relevant to deeper wells.

What are we trying to protect?

“Beneficial Uses and Users”

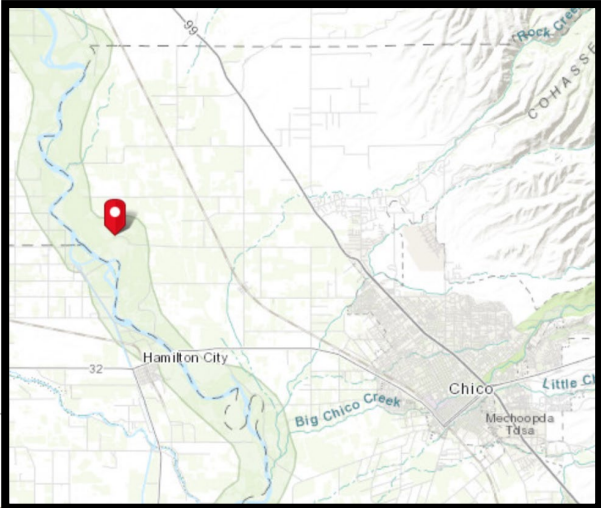


Different water-bearing zones can tell different stories at the same location.

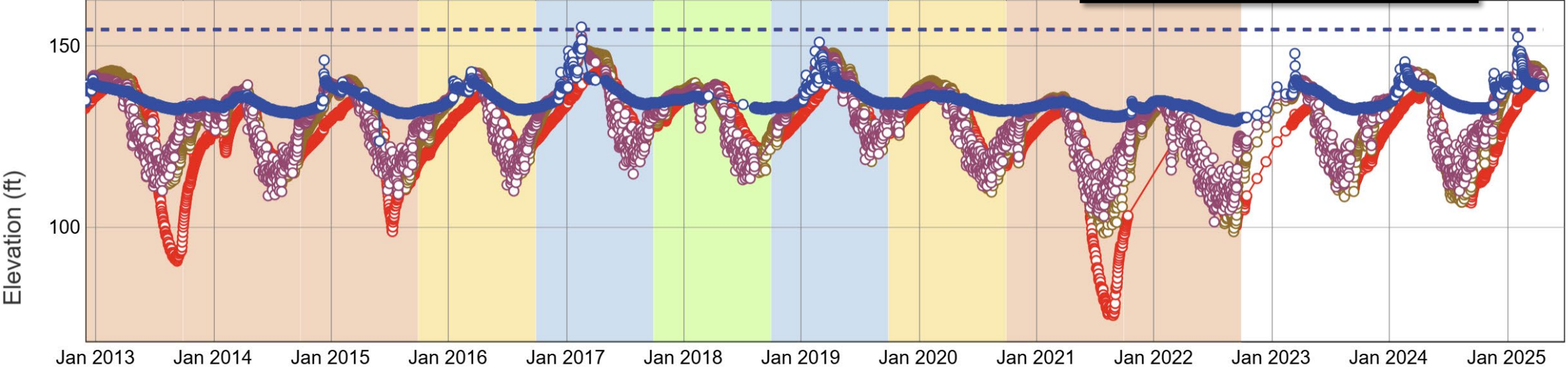
One Location Can Have Different Depth-to-Water Conditions: Near Sacramento River

- ✓ — WSE 398028N1220294W001 : 969.0 - 1030.0
- ✓ — WSE 398028N1220294W002 : 545.0 - 600.0
- ✓ — WSE 398028N1220294W003 : 140.0 - 201.0
- ✓ — WSE 398028N1220294W004 : 66.0 - 76.0

Approx. 0.9 miles from Sac. River

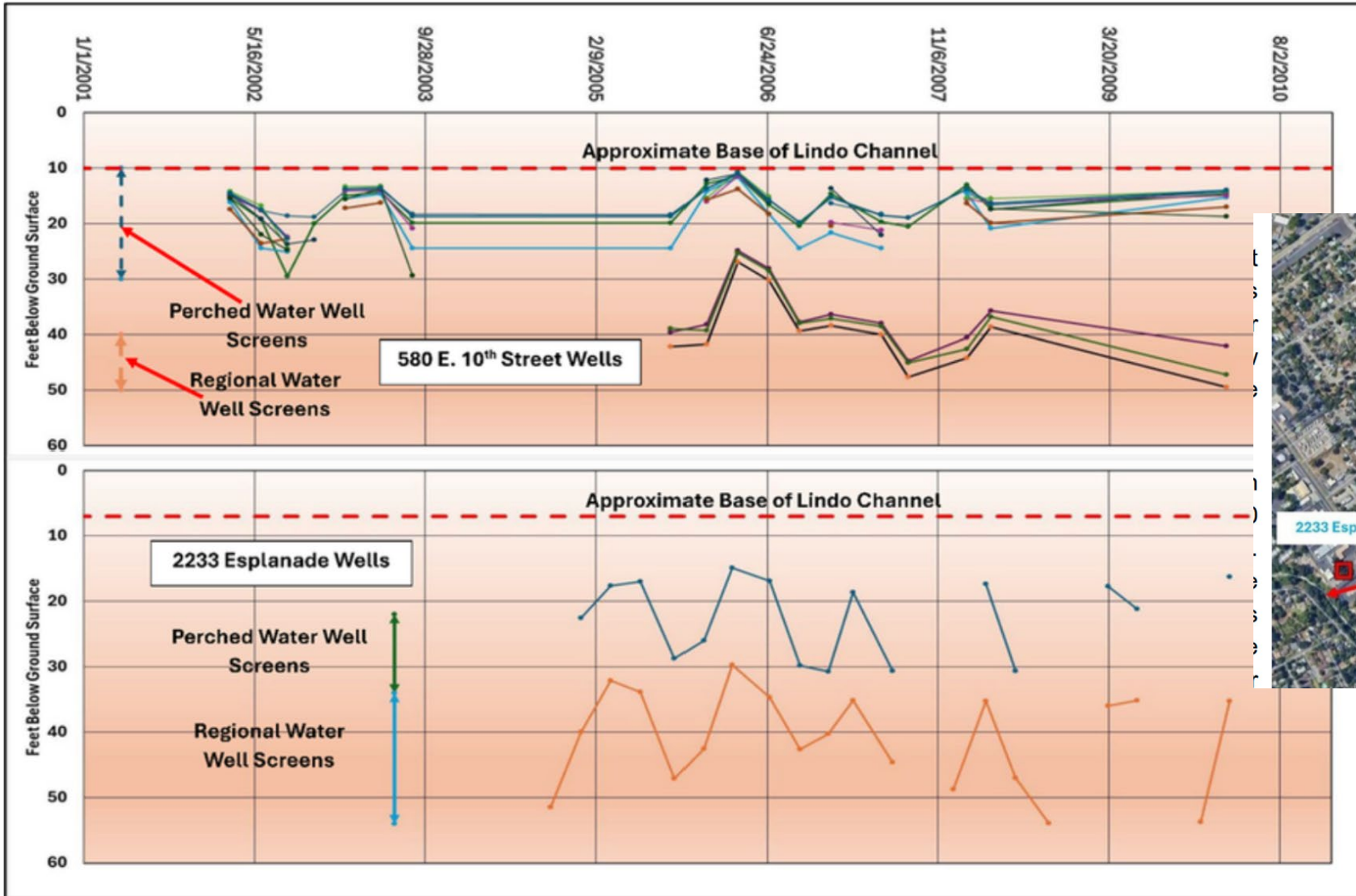


Groundwater Levels



Different water-bearing zones can tell different stories at the same location.

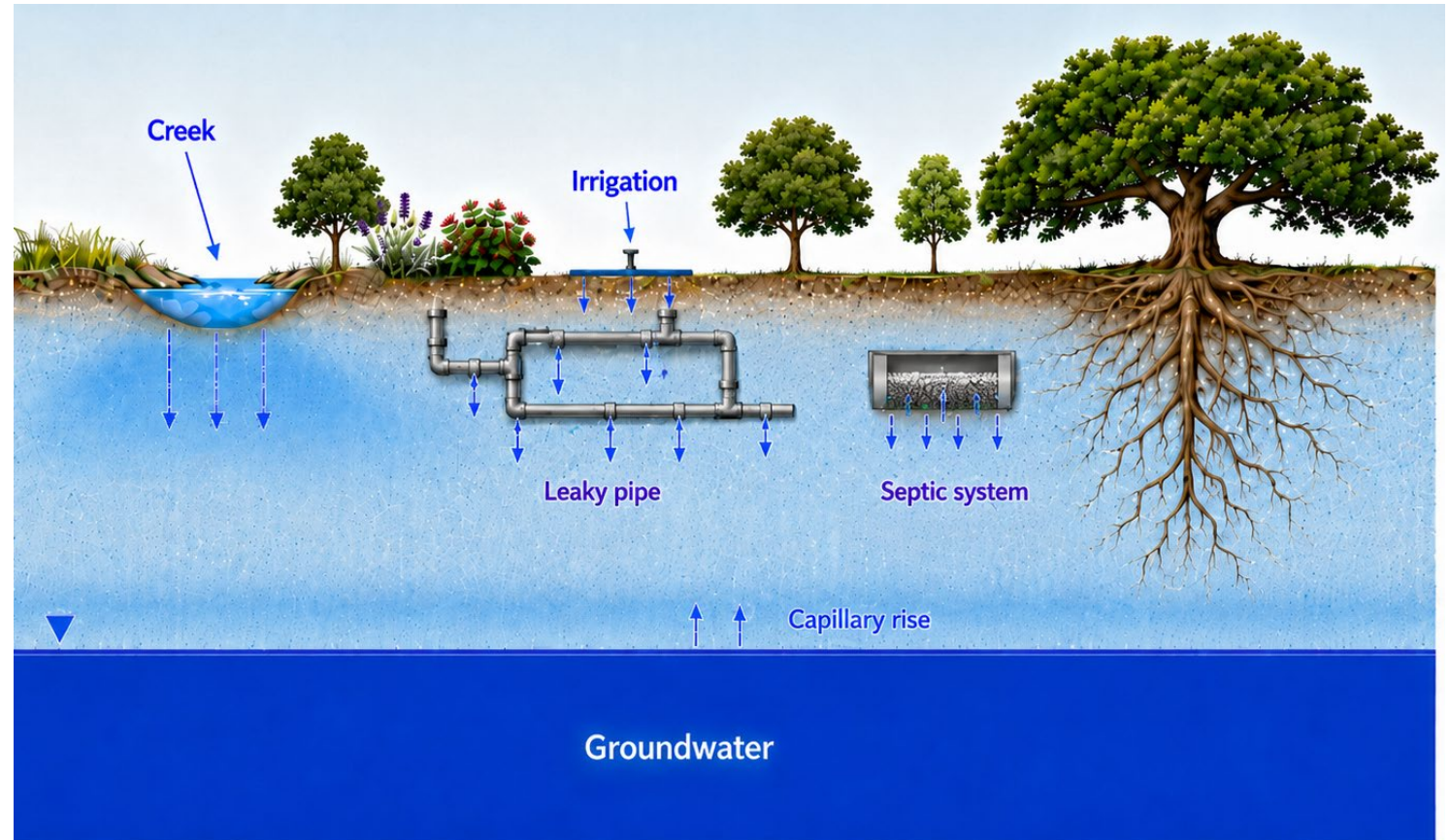
One Location Can Have Different Depth-to-Water Conditions: Near Lindo Channel in Chico



Chico Urban Forest

Vegetation health can reflect multiple water sources and stressors

- Chico urban forest is a diverse community of vegetation:
 - Bidwell Park – riparian and non-riparian, unirrigated
 - Irrigated landscaping – ornamental
 - Non-irrigated deeper-rooted trees
- Other water sources in the urban environment: leaky pipes, septic systems
- Deep-rooted vegetation may use shallow groundwater, soil moisture, or both depending on location and season.
- Available data has been identified related to shallow groundwater conditions → missing piece is vegetation health



Monitoring should help distinguish regional groundwater trends from localized or drought-related vegetation stress.

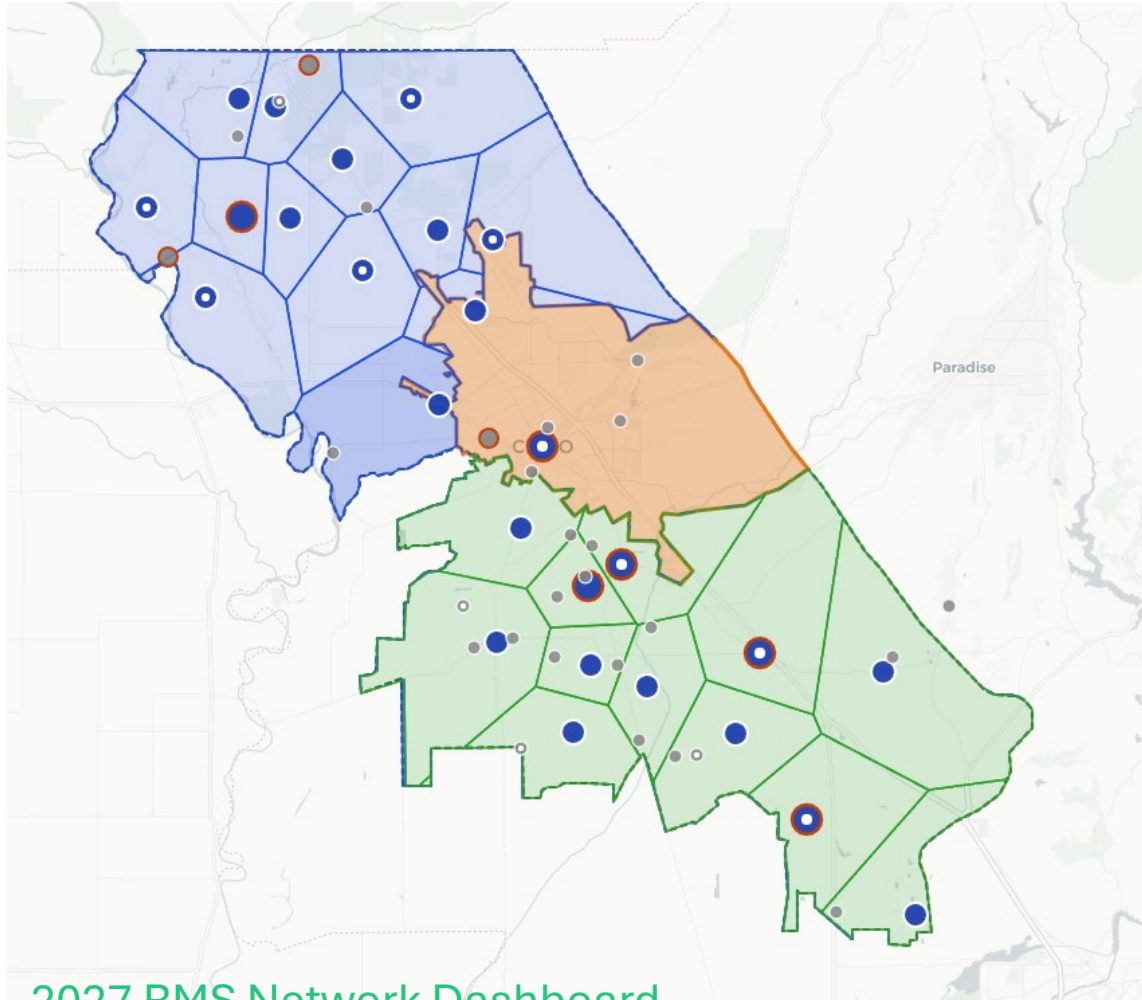
Key Question for Groundwater Management:

What's the vulnerability of deep-rooted vegetation/GDEs to changes in regional groundwater conditions?

- Water sources in urban environment: Big Chico Creek/Lindo Channel recharge, irrigation, leaky pipes, septic systems
- Deep-rooted vegetation may use soil moisture, shallow groundwater, or both depending on location and season.
- Drought can reduce precipitation-derived soil moisture at the same time groundwater levels decline.
- **Because causes are complicated, the strawman emphasizes better monitoring and adaptive management rather than assuming all vegetation stress would be caused by regional groundwater decline.**

Strawman Component 1: RMS Network Updates

Targeted refinement to improve representation of Representative Monitoring Site (RMS) network



[2027 RMS Network Dashboard](#)



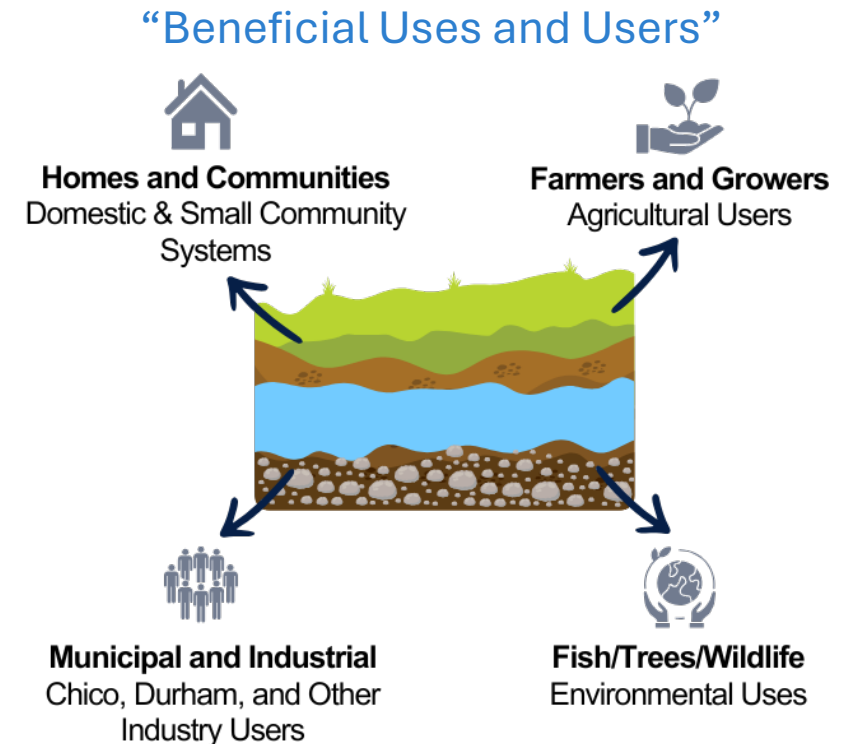
- Remove or replace wells with questionable data, missing data, or boundary/location limitations.
- Add wells to improve spatial coverage and alignment with beneficial-user considerations (domestic wells and shallow groundwater).
- Maintain the 2022 GSP approach: Continue using management areas and representative polygons for SMC evaluation.

Beneficial Users and Purpose of Monitoring: Why RMS Wells Matter

RMS wells are the compliance sites used to evaluate Sustainable Management Criteria (SMC)

- RMS wells should be reliable, representative, and useful for evaluating conditions that matter to beneficial users.
- They are not intended to capture every localized condition in the Subbasin.
- The monitoring network directly affects how impacts to beneficial uses and users are evaluated (i.e. assignment of Minimum Thresholds etc.)

What are we trying to protect?



Strawman Component 2: SMC Continuity + Local Management Levels (LMLs)

An early-warning concept for GDE-sensitive areas without revising basin-wide MTs

- Carry forward MT, MO, and 2027 IM values for retained 2022 GSP RMS wells
- Assign Sustainable Management Criteria (SMC) to new RMS wells using a comparable method tied to the SMC adopted in the 2022 GSP
- Consider non-regulatory LMLs 10–20 feet below the Measurable Objective in GDE-sensitive areas to trigger evaluation and adaptive management.

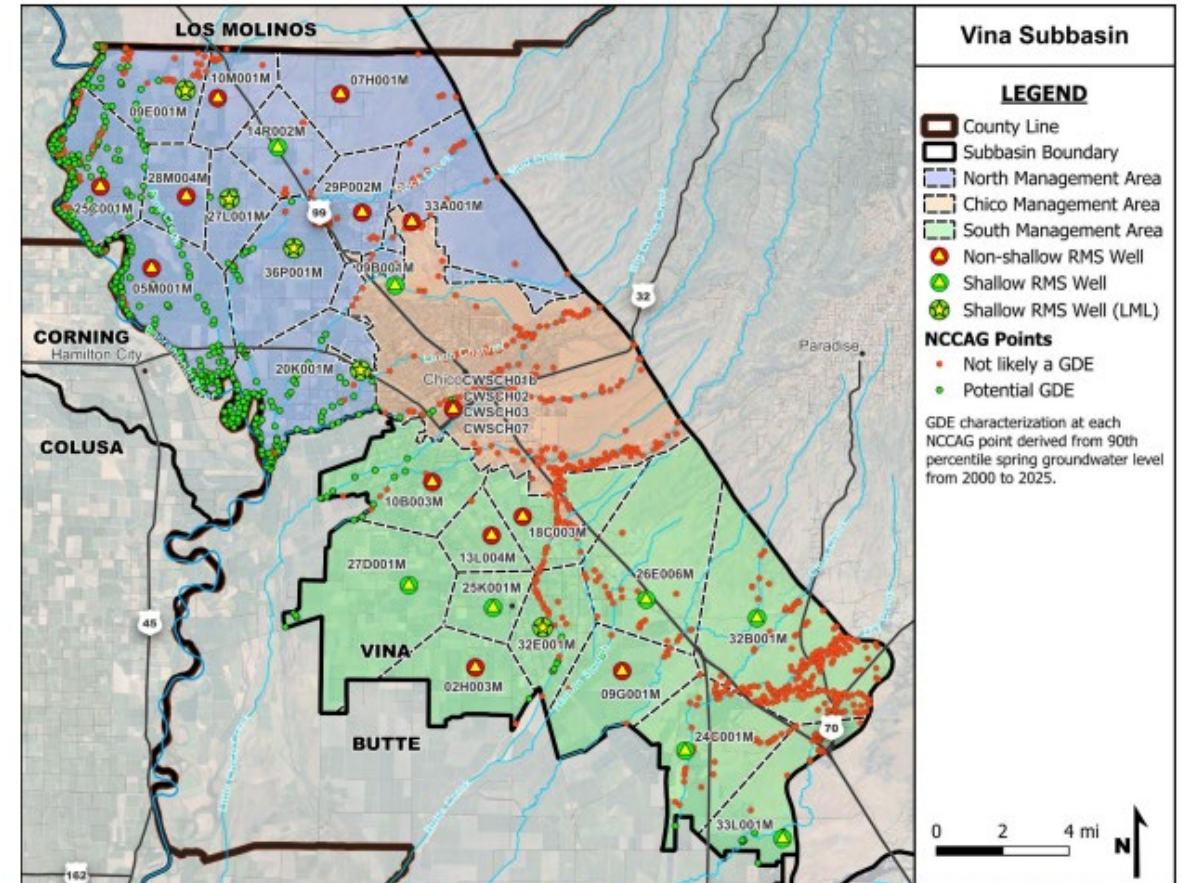


Figure 2. Vina Groundwater Level RMS Monitoring Network showing RMS zones, wells identified as shallow RMS wells, and RMS wells assigned an LML.

The LML would not define an undesirable result; it would flag the need to investigate and consider appropriate response actions.

Requested Feedback from the SHAC

1. Feedback on the proposed RMS network - is there support for, or concern with, the proposed expansion of the RMS network? Is it clear:

- why the changes are being proposed?
- what the benefits of an expanded network may be?
- are there concerns or further refinements?

Discussion could also weigh in on:

2. Initial feedback on Local Management Levels concept?

3. What additional figures, maps, or tables would help explain the approach to stakeholders and the Boards?

Save the Date: GWL Strawman Public Discussion July 14, 2026 4:30-6:00 PM