Mound Subbasin (4-004.03)

Updated Evaluation of Interconnected Surface Water

Presented to

Mound Subbasin Groundwater Sustainability Agency

December 18, 2025

INTERA

Summary of GSP Findings

- Surface water features in the Subbasin:
  - Santa Clara River and its estuary
  - Smaller barrancas that convey storm flows
- GSP found **no direct depletion of surface waters**, based on:
  - Hydrogeologic Conceptual Model
  - Measured groundwater levels
  - Numerical groundwater flow model results
- GSA planned to confirm this finding with new data obtained from a planned monitoring well.

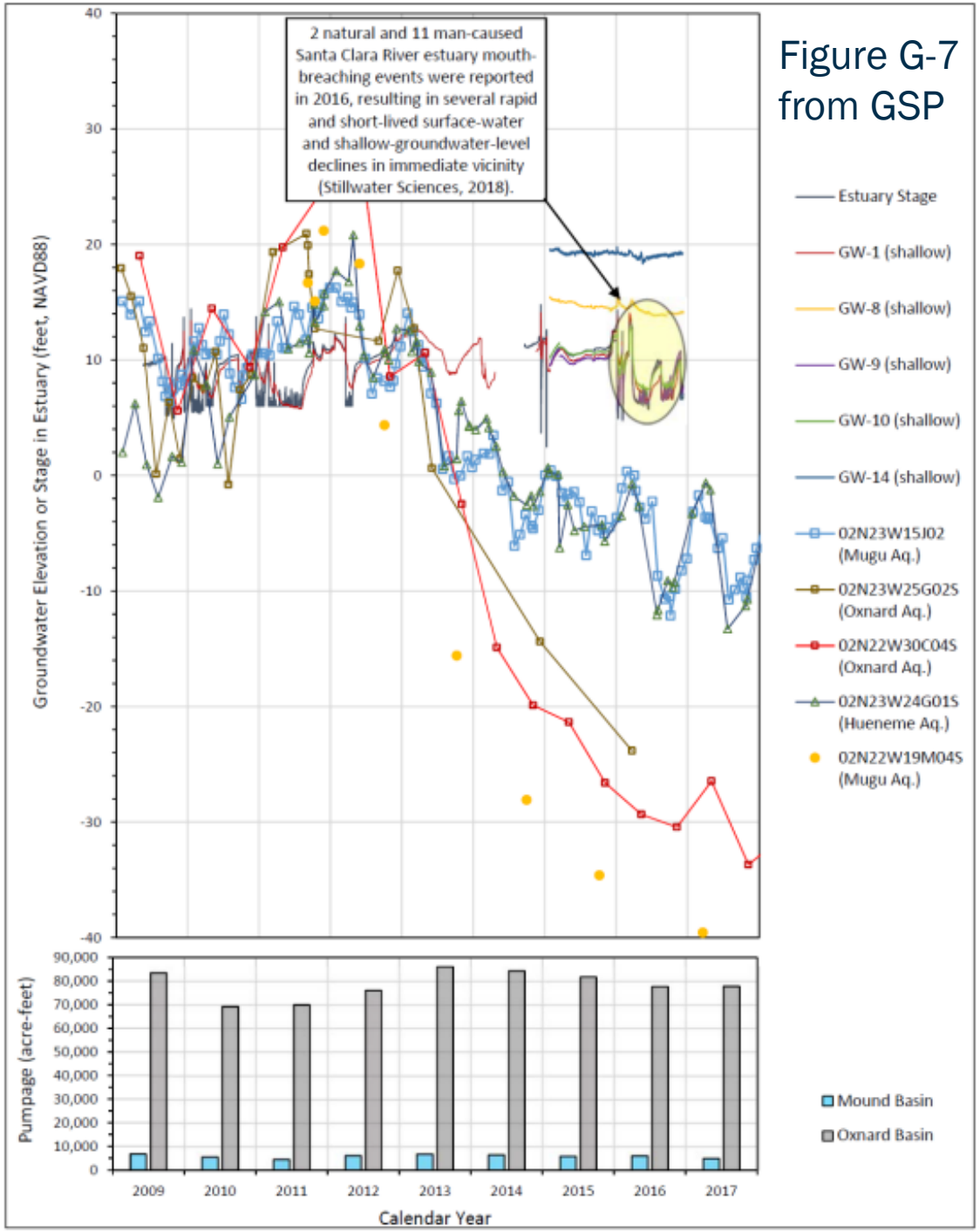


Figure G-7 from GSP

New Information Collected Since Adoption of the GSP

Groundwater Elevation Data

- New clustered Monitoring well located near SCRE:
  - 02N23W23Q03S – Shallow Alluvial Deposits
  - 02N23W23Q02S – Mugu Aquifer
  - 02N23W23Q01S – Hueneme Aquifer
  - Direct measure of relationship between shallow alluvial deposits and principal aquifers
- Higher-frequency groundwater level data characterizing sub-seasonal variations
- Periodic groundwater quality sampling

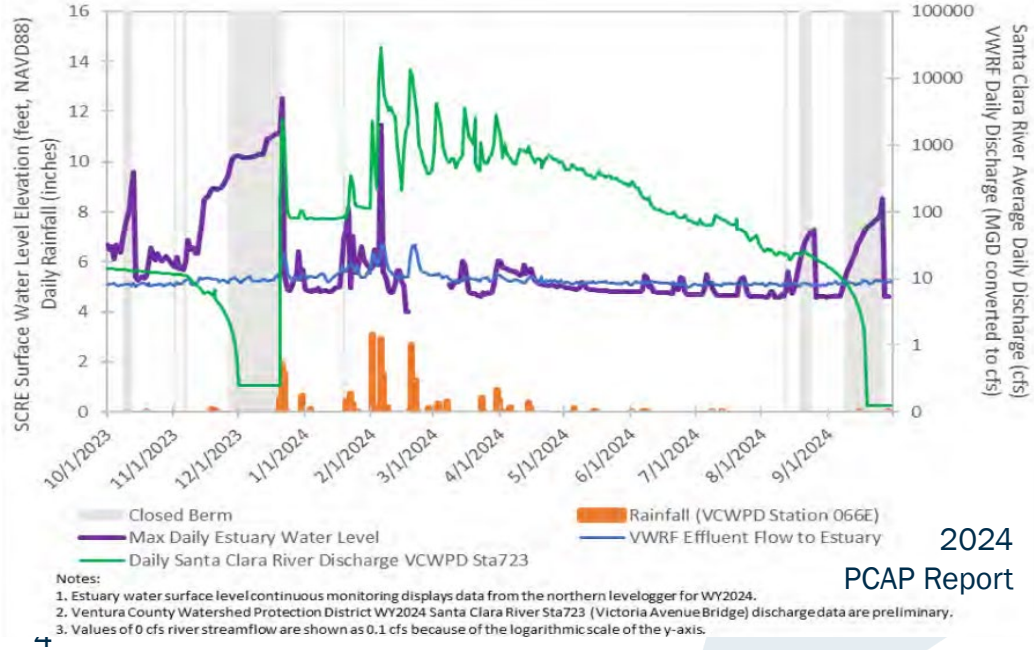
Santa Clara River Estuary Conditions

- City of Ventura Pre-Construction Assessment Program (PCAP)
  - Regular monitoring of physical and ecological conditions of the Santa Clara River Estuary
  - Regular estuary water quality sampling (organic

INTERA

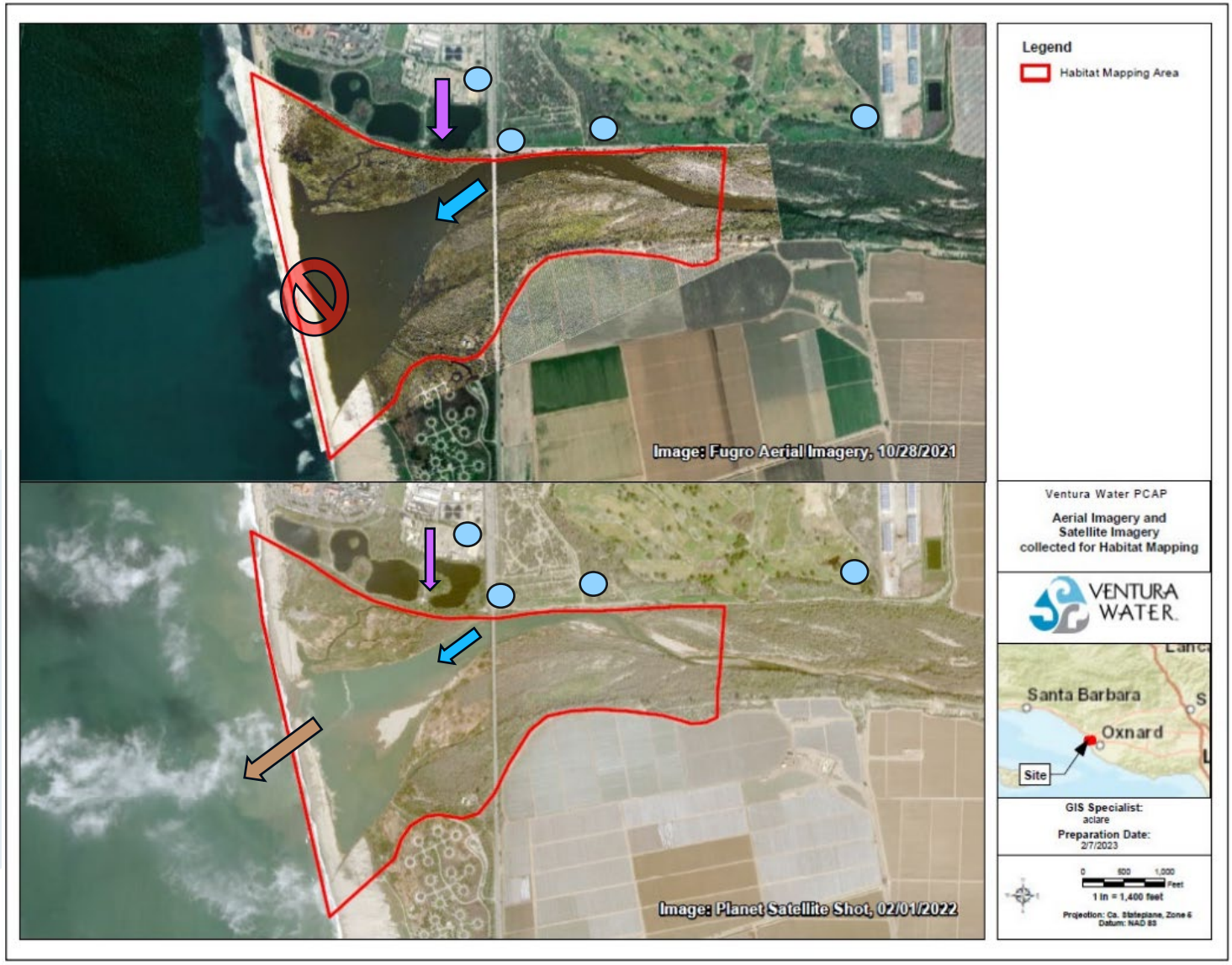
New Information Collected Since Adoption of the GSP

- Three primary drivers of estuary conditions:
  - Santa Clara River Flows
  - Discharges from Ventura Water Reclamation Facility
  - Berm Status



2024 PCAP Report

Shallow monitoring well
Wastewater Discharges
Santa Clara River Flows
Discharges to Pacific Ocean



Groundwater Data Evaluated for the Current Study

Shallow Alluvial Deposits

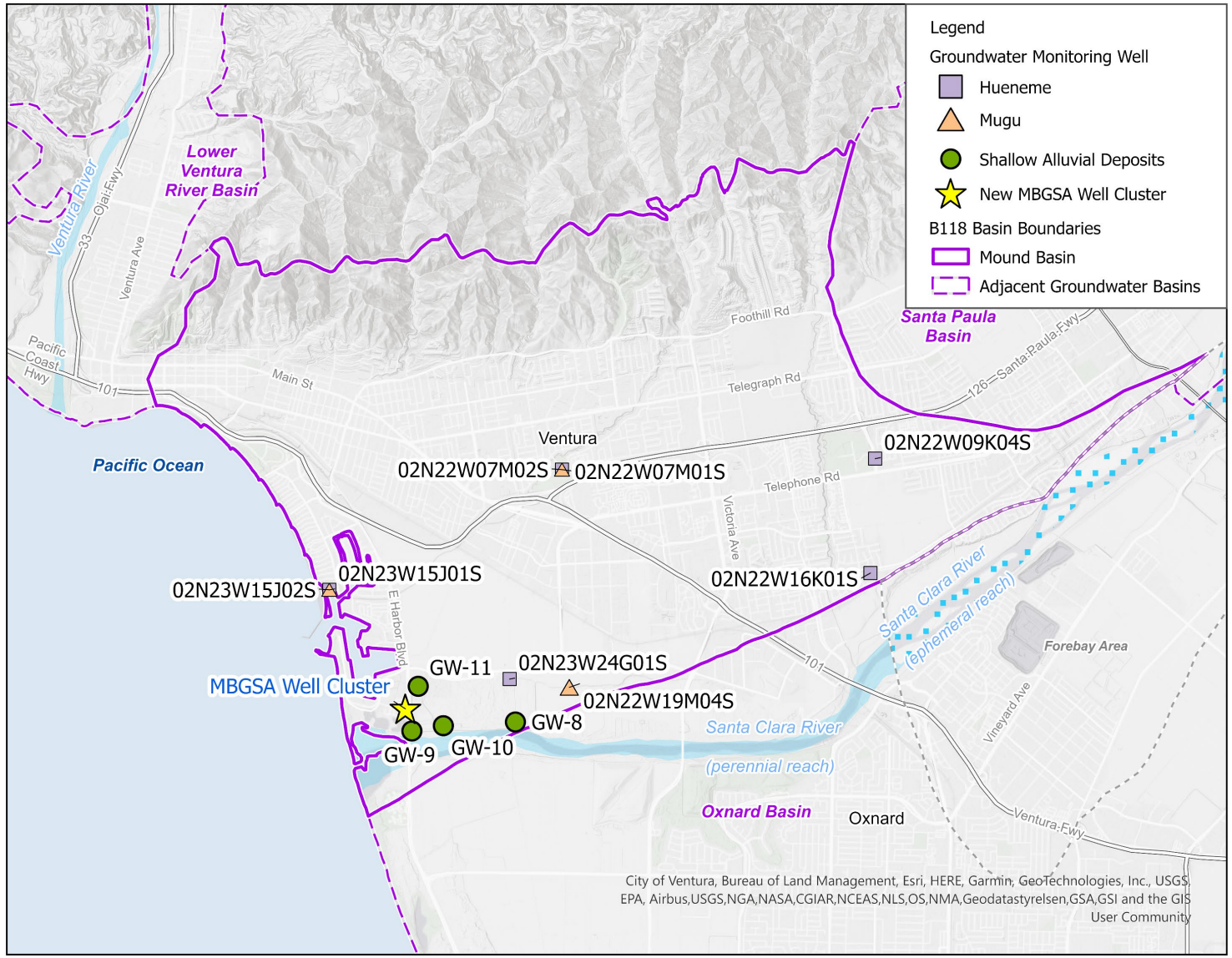
- 5 wells, located proximal to Santa Clara River and its estuary

Mugu Aquifer

- 4 wells, distributed across the Subbasin

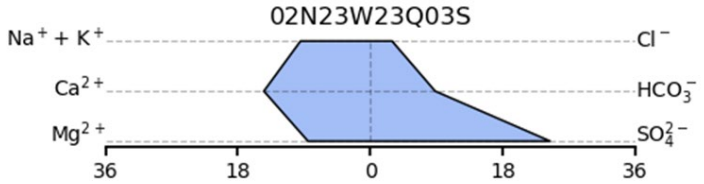
Hueneme Aquifer

- 6 wells, distributed across the Subbasin

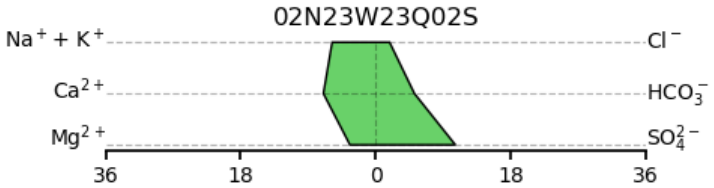


MBGSA Clustered Well
Groundwater Elevations and Quality

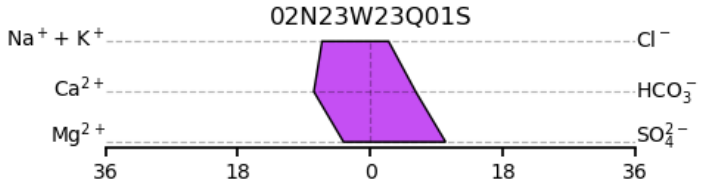
Shallow Alluvial Deposits



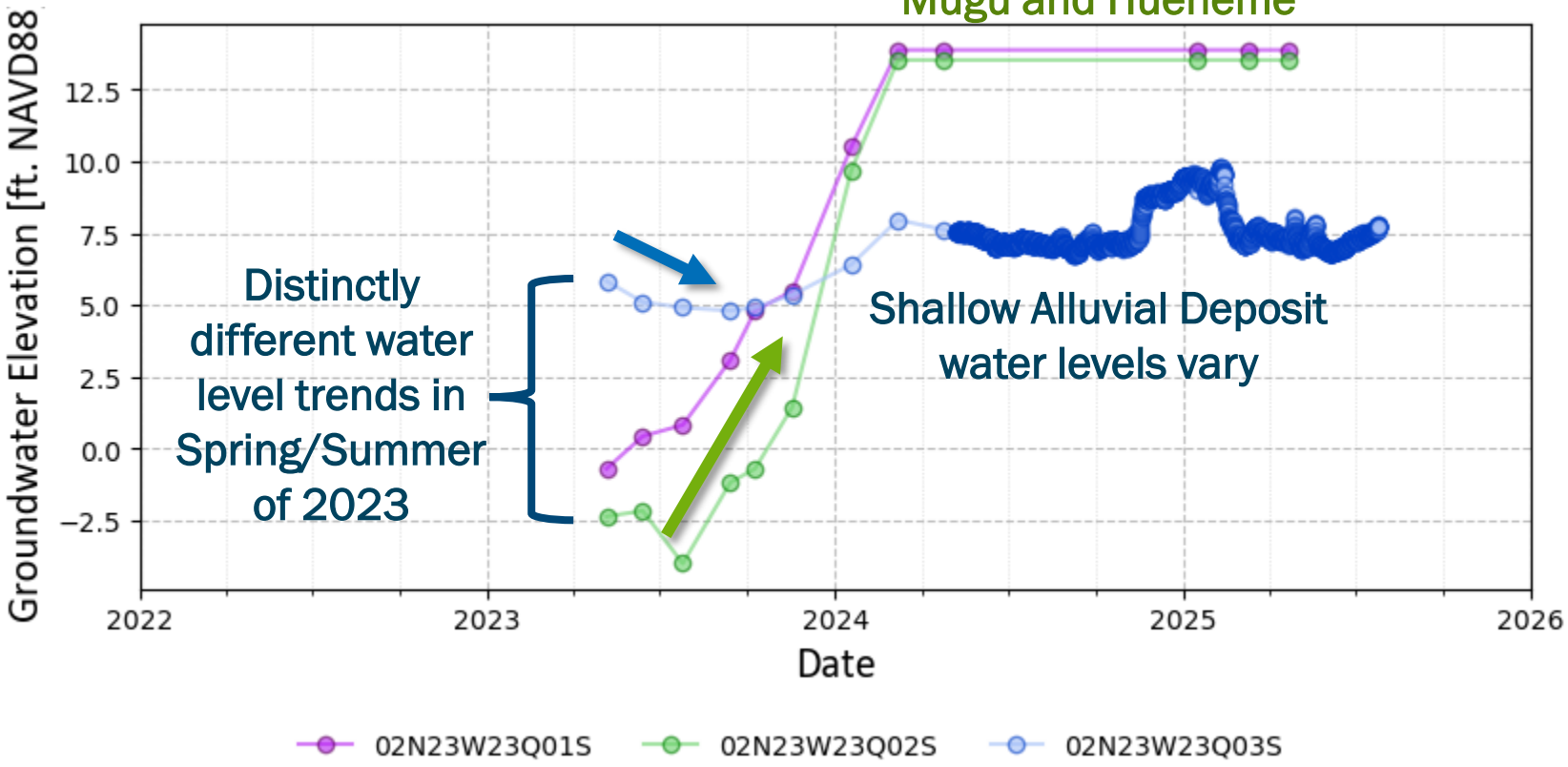
Mugu Aquifer



Hueneme Aquifer



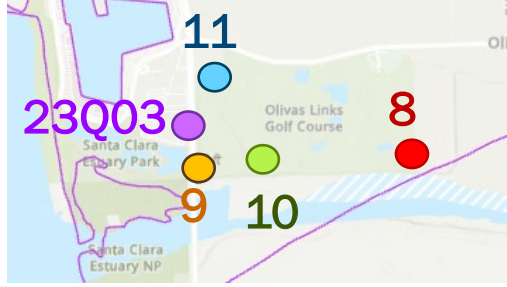
Artesian Conditions in Mugu and Hueneme



Shallow alluvial deposits and principal aquifers show distinct differences in water quality and groundwater elevations.

INTERA

Shallow groundwater conditions vary along the Santa Clara River

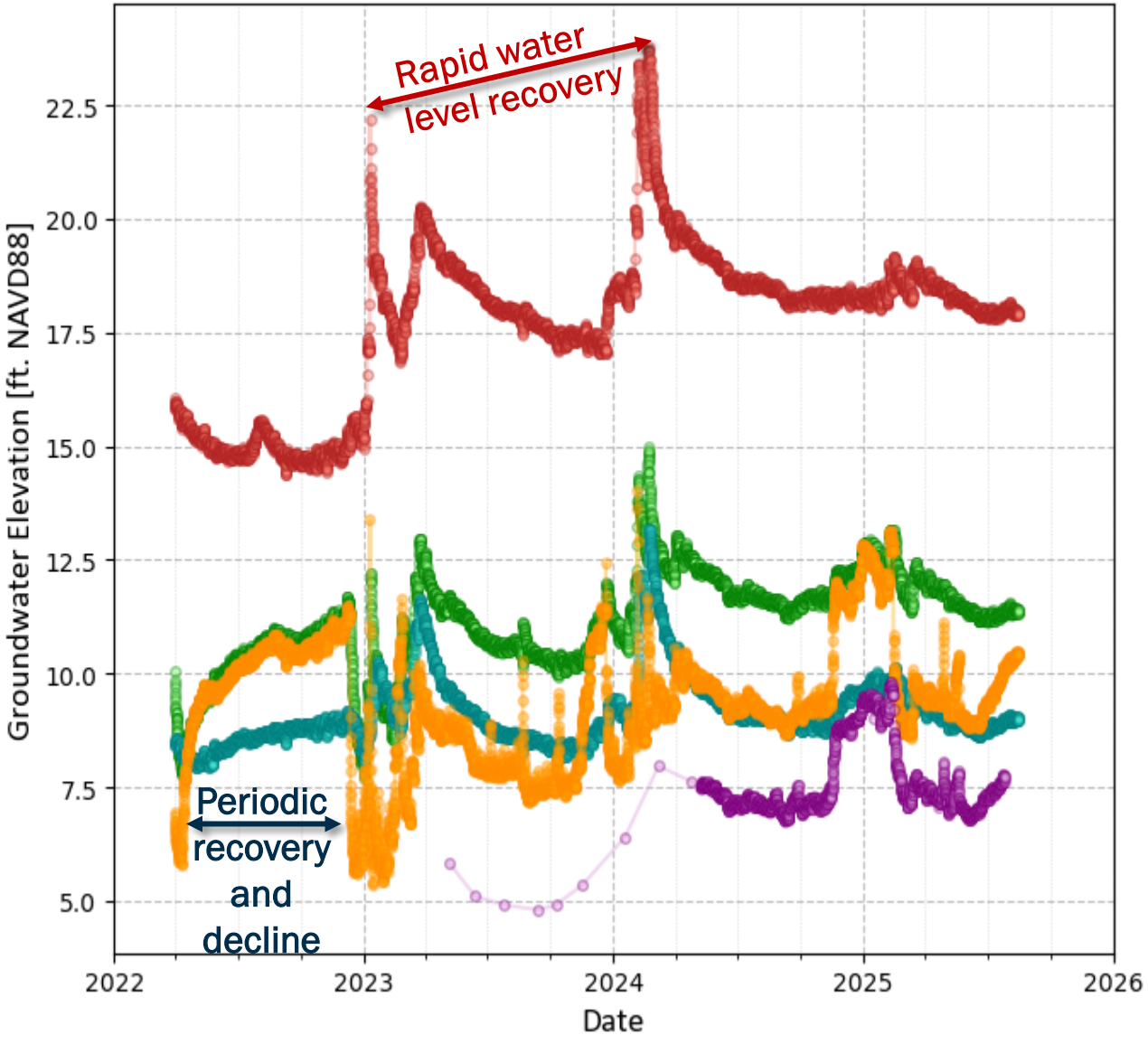


Far from estuary (at MW8):

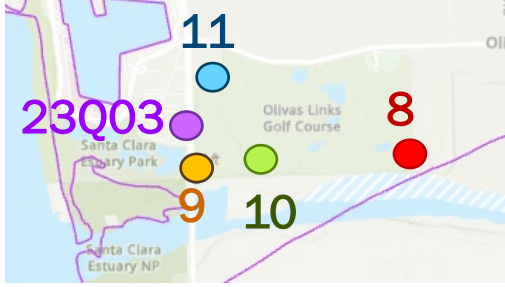
- Rapid increase in winter months
- Gradually decline through spring into fall

Near the estuary (MWs 9-11, 23Q03)

- Rapid increase in winter months, similar to those measured at MW8
- Periodic water level recoveries followed by rapid declines.
  - Timing is not correlated with trends measured at MW8



Shallow groundwater conditions vary along the Santa Clara River



Far from estuary (at MW8):

- Rapid increase in winter months
- Gradually decline through spring into fall
  - ✓ Driven by flows in Santa Clara River

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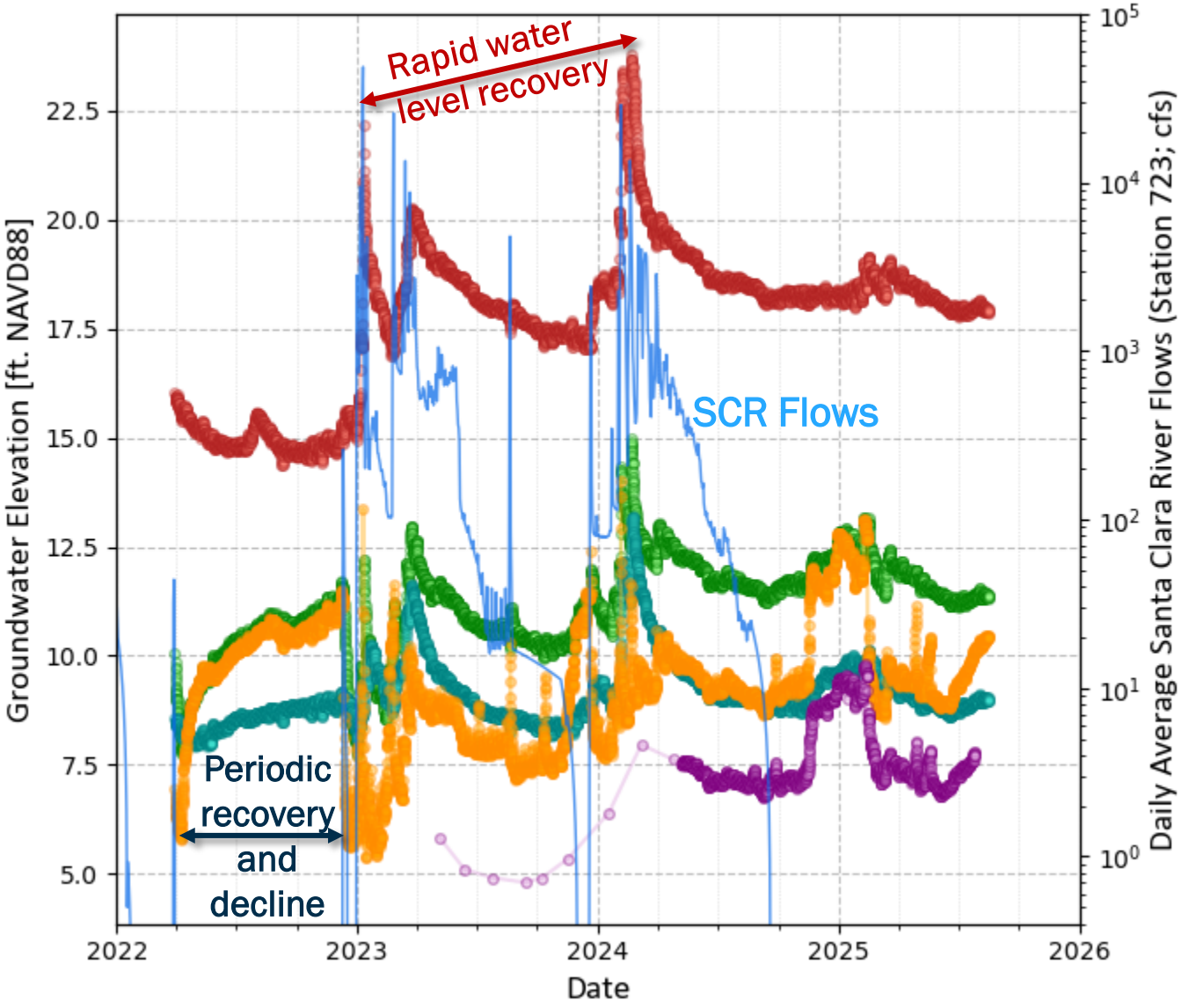

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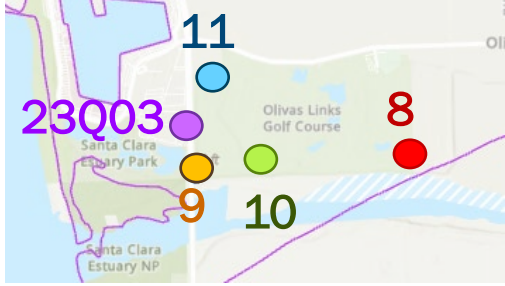

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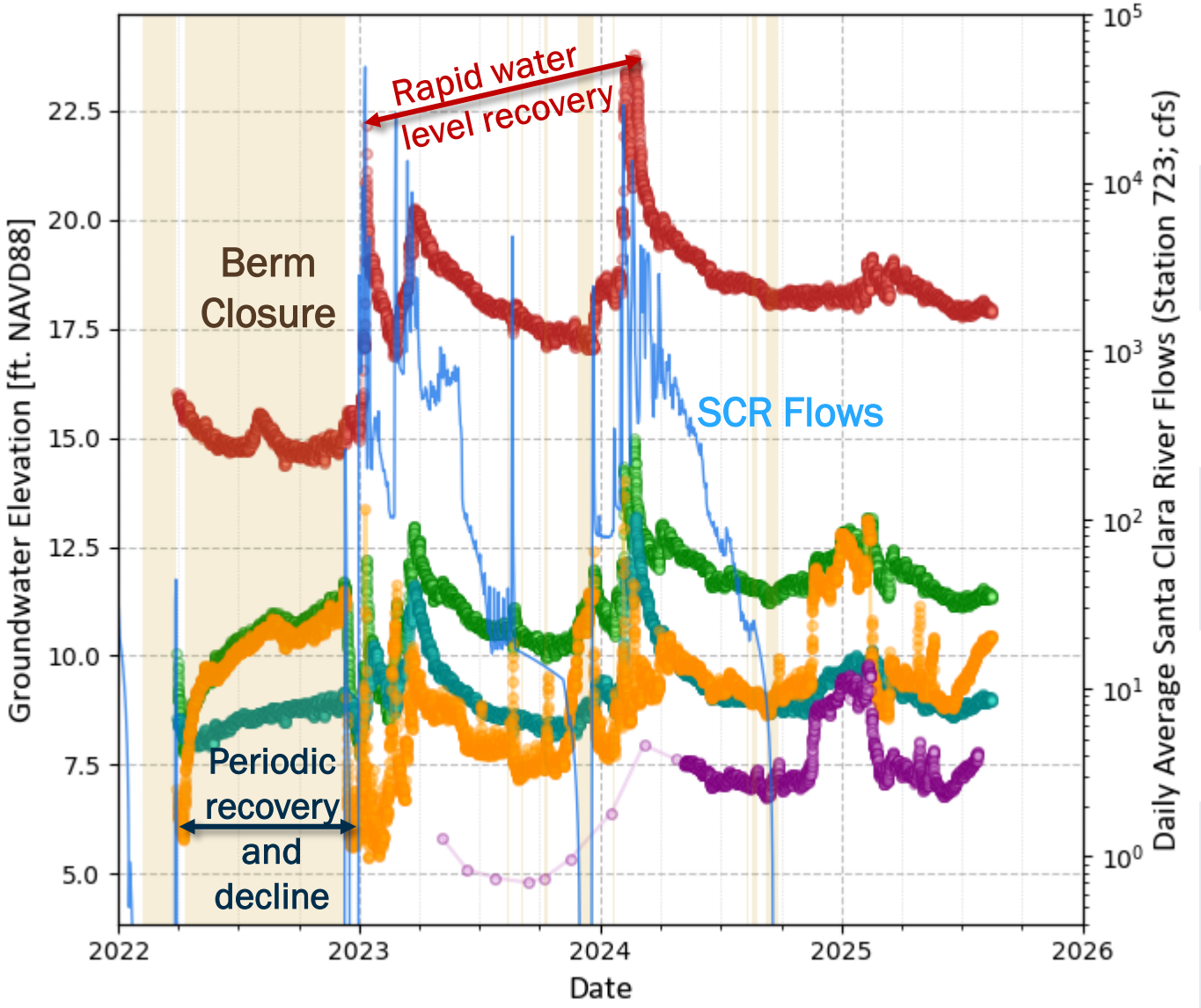
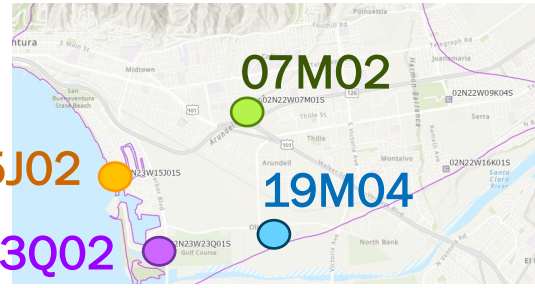
Near the estuary (MWs 9-11, 23Q03)

- Rapid increase in winter months, similar to those measured at MW8
- Periodic water level recoveries followed by rapid declines.
  - Timing is not correlated with trends measured at MW8
  - ✓ Periodic water level recoveries and rapid declines driven by berm status

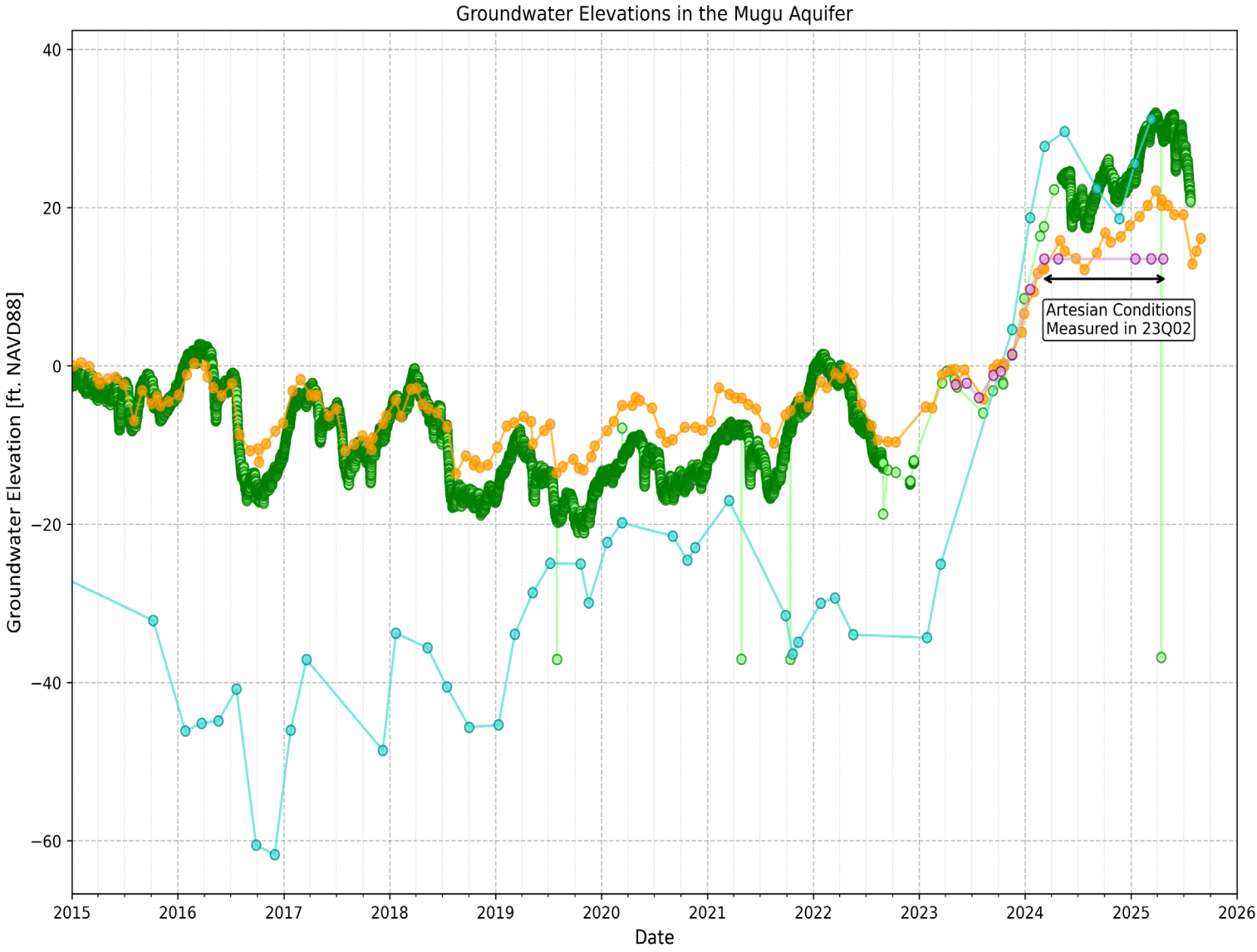


Principal Aquifer Groundwater Levels

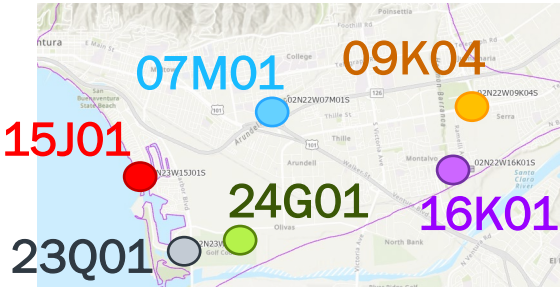


Mugu Aquifer:

- Trends are consistent across the Subbasin.
  - Gradual decline from 2015 through 2019.
  - Large (50 to 80 foot) 2020 through 2024



Principal Aquifer Groundwater Levels



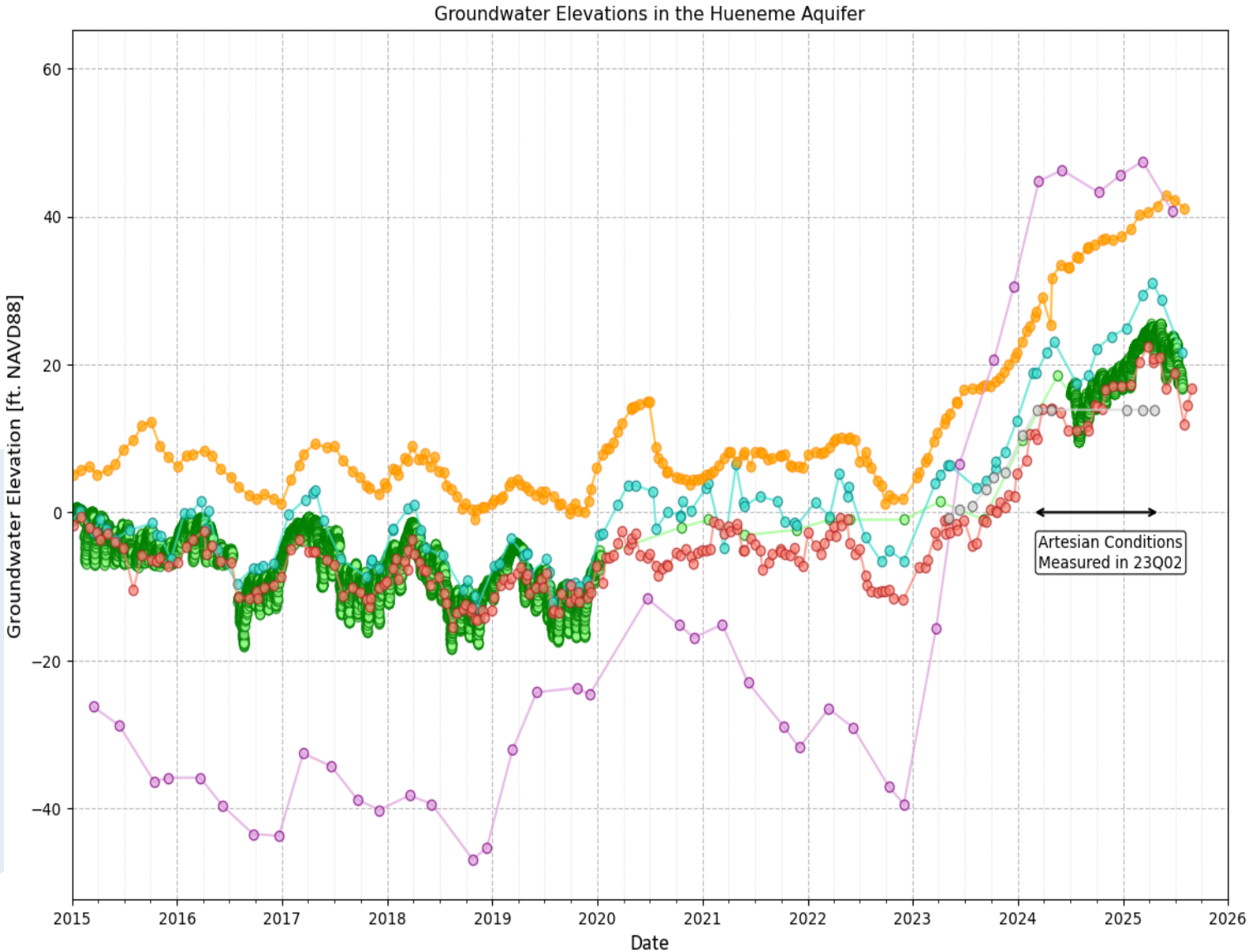
Mugu Aquifer:

- Trends are consistent across the Subbasin.
  - Gradual decline from 2015 through 2019.
  - Large (50 to 80 foot) 2020 through 2024

Hueneme Aquifer:

- Trends are consistent across the Subbasin.
  - ~Stable from 2015 through 2022.
  - Large (50 to 80 foot) recoveries 2023 through 2024

No signature of water level variability observed in the shallow alluvial deposits



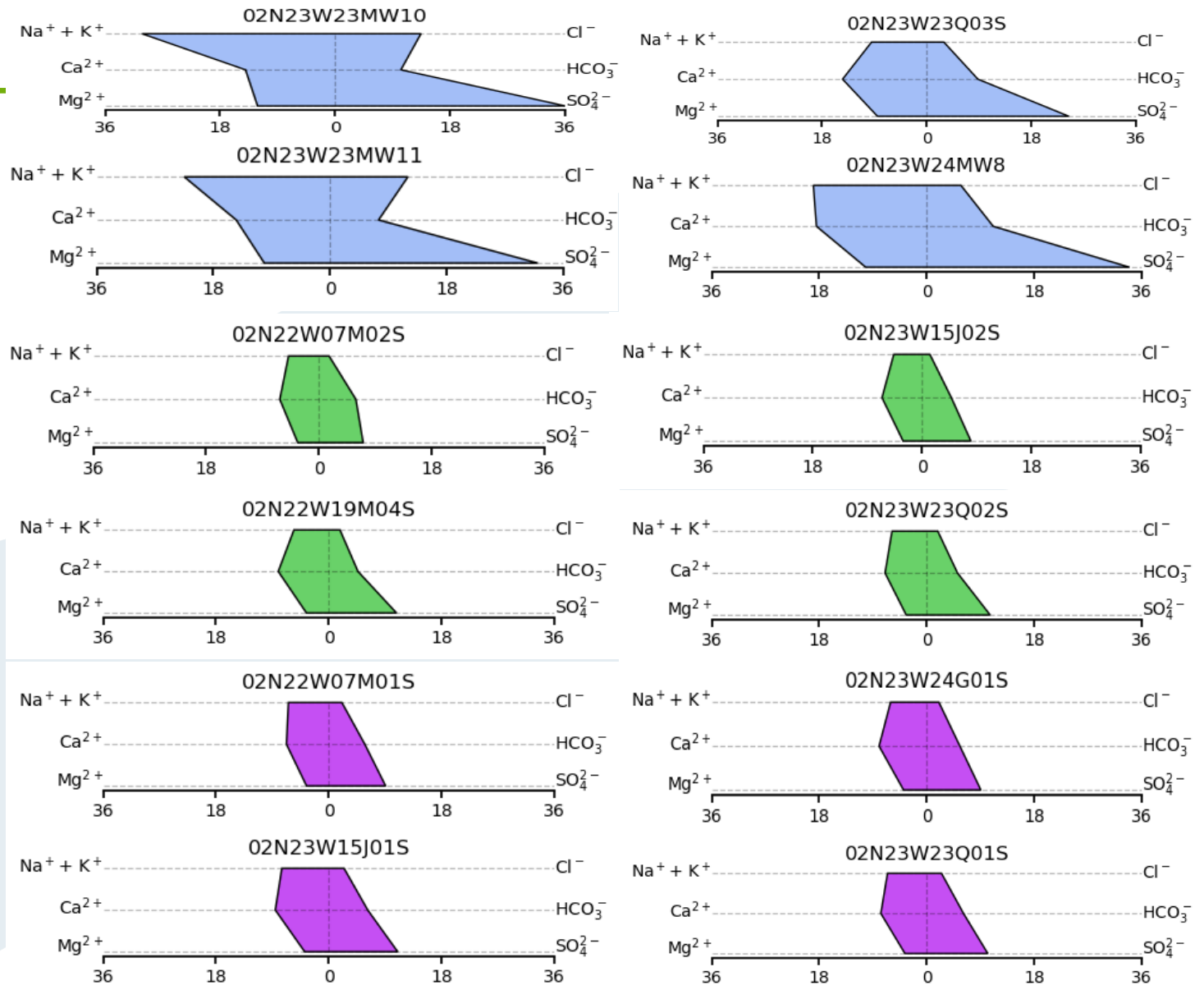
Groundwater Quality

- Shallow alluvial deposits have much higher salinity than the Mugu and Hueneme aquifers
- Water-quality patterns indicate limited exchange between the shallow alluvial deposits and principal aquifers near Santa Clara River and its estuary

Shallow Alluvial Deposits

Mugu

Hueneme



Summary

- Groundwater level data collected since adoption of the GSP demonstrate that the shallow alluvial deposits are hydraulically disconnected from the Mugu and Hueneme aquifers.
  - Supported by measured differences in water quality composition

- City of Ventura PCAP monitoring indicates that groundwater conditions in the shallow alluvial deposits are driven by hydrologic conditions and physical status of the berm that separates the estuary from the Pacific Ocean.

✓**Data confirms that there is no direct depletion of surface water from the Subbasin.**

INTERA