Geochemical Analysis of Groundwater Recharge in Bunker Hill

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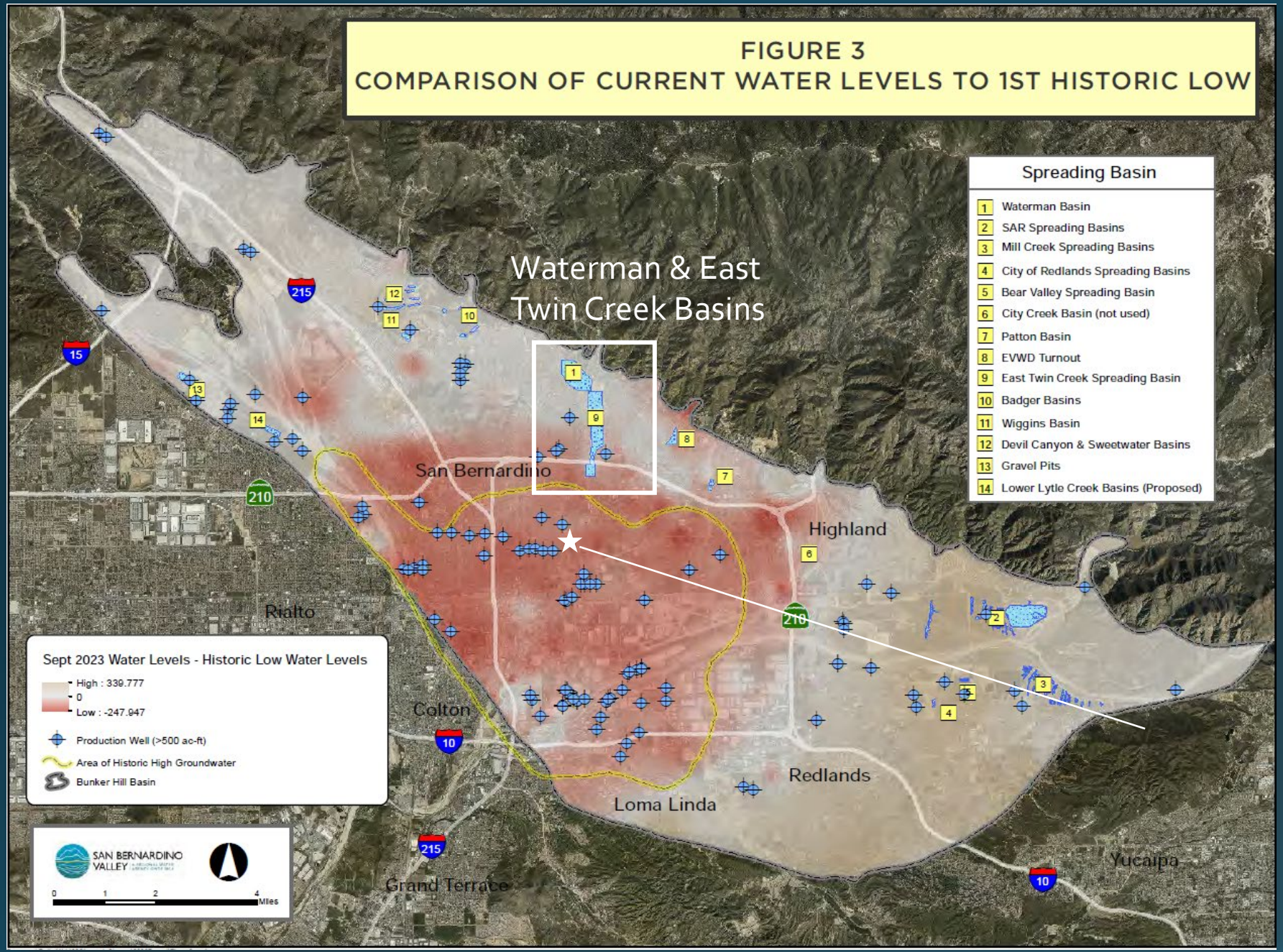
Study Objectives

Identify primary sources of recharge and groundwater flow paths in the western half of Bunker Hill.

Map and constrain fault structures and any influence on groundwater flow.

Inform investments in Active Recharge (PERC) and reduce risk for future well sitings.



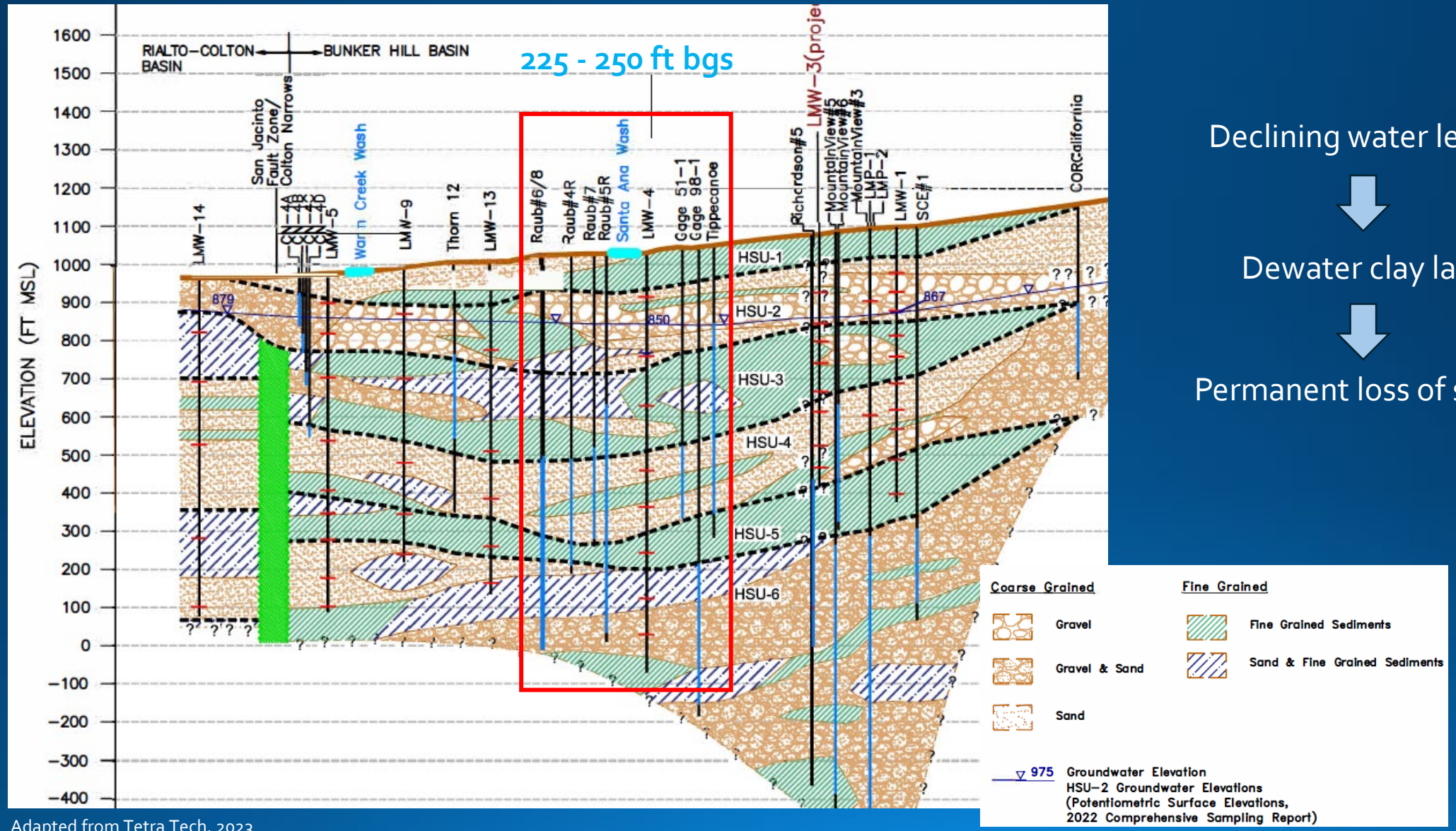
Declining water levels constrained to pressure zone

Pumping distribution

Geologic structure

Excerpt from Annual Change in Groundwater Storage for the San Bernardino, Rialto-Colton and Yucaipa Basins, 2023

Water Levels, Confining Units, and Storage



Declining water levels

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Dewater clay layers

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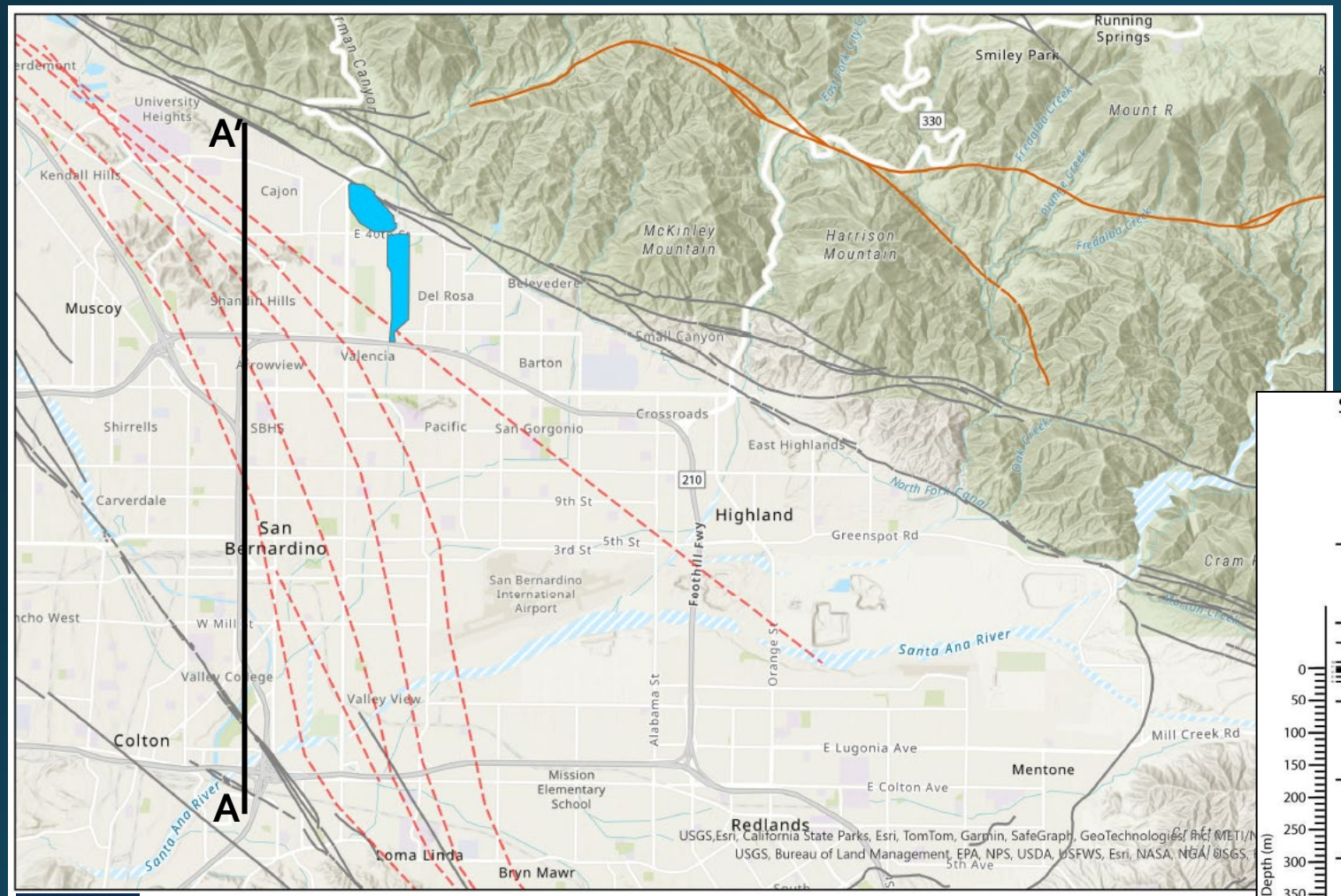
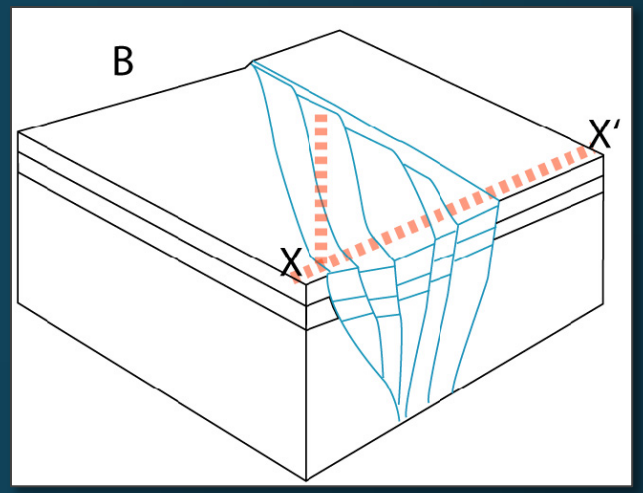
Permanent loss of storage

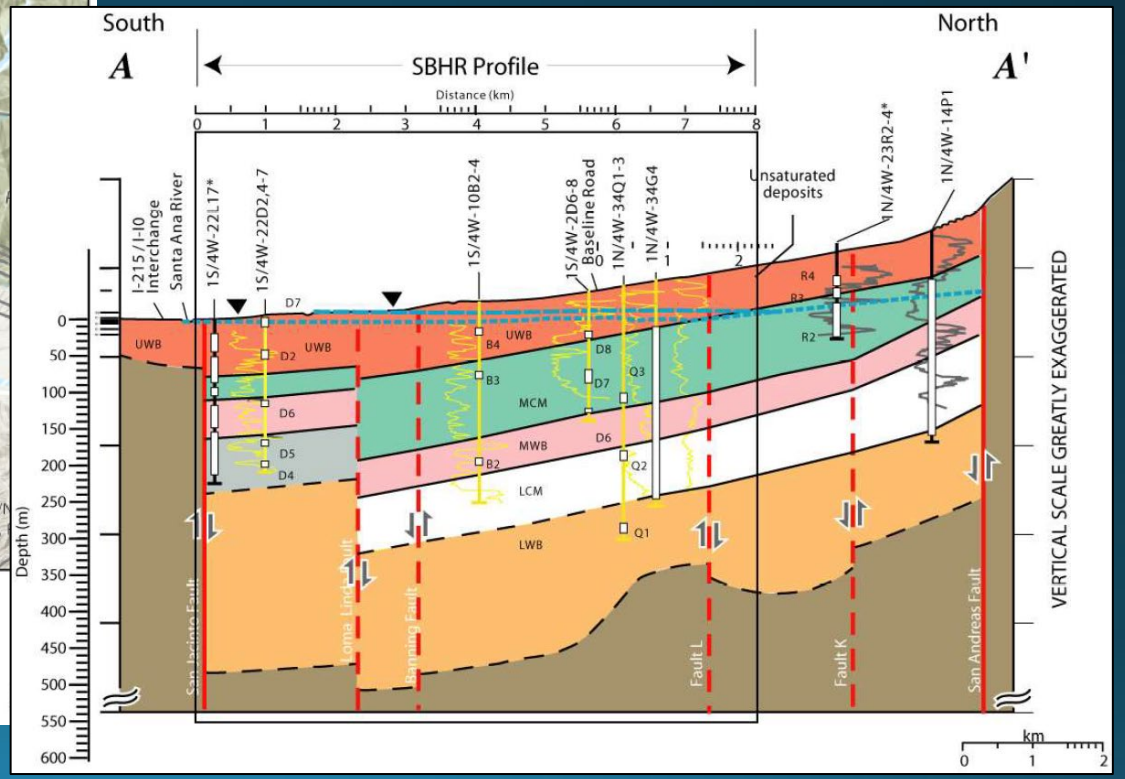
Adapted from Tetra Tech, 2023

Geologic Structure of Bunker Hill





Adapted from Catchings et al., 2008



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0 1 2 4 Miles

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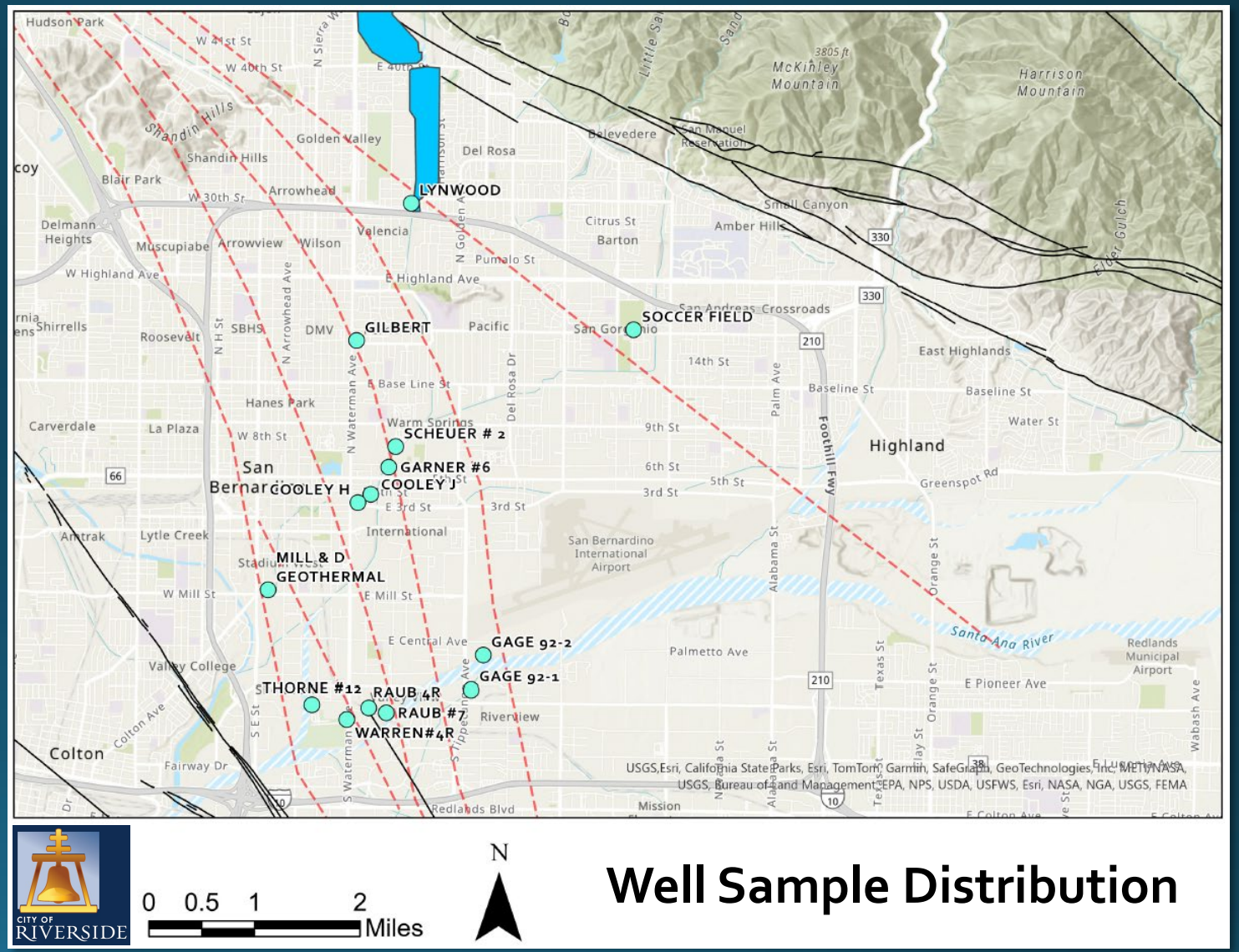
PERC Recharge Basins and Fault Structures in Bunker Hill

Fault model adapted from Catchings et al., 2008

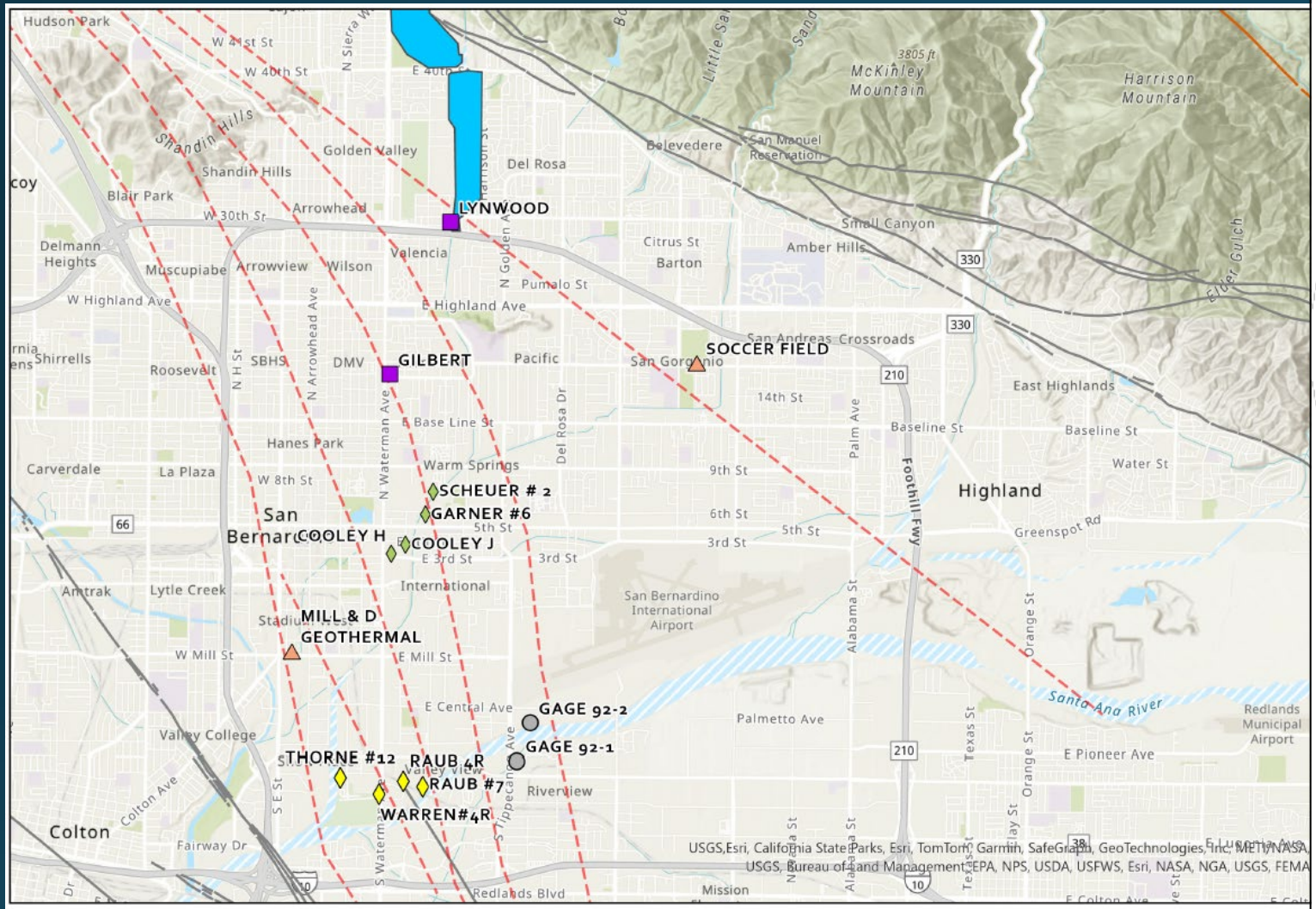
Study Design

- Collect water samples from wells screened for HSU 4 & 6
- Collect samples from:
  - Waterman Basin (SWP endmember)
  - East Twin Creek (natural recharge endmember)
  - Geothermal sources

- Perform analysis of major ions and indicators of geothermal activity
- Stable isotope analysis (O-H ratio)



Major Ion Chemistry



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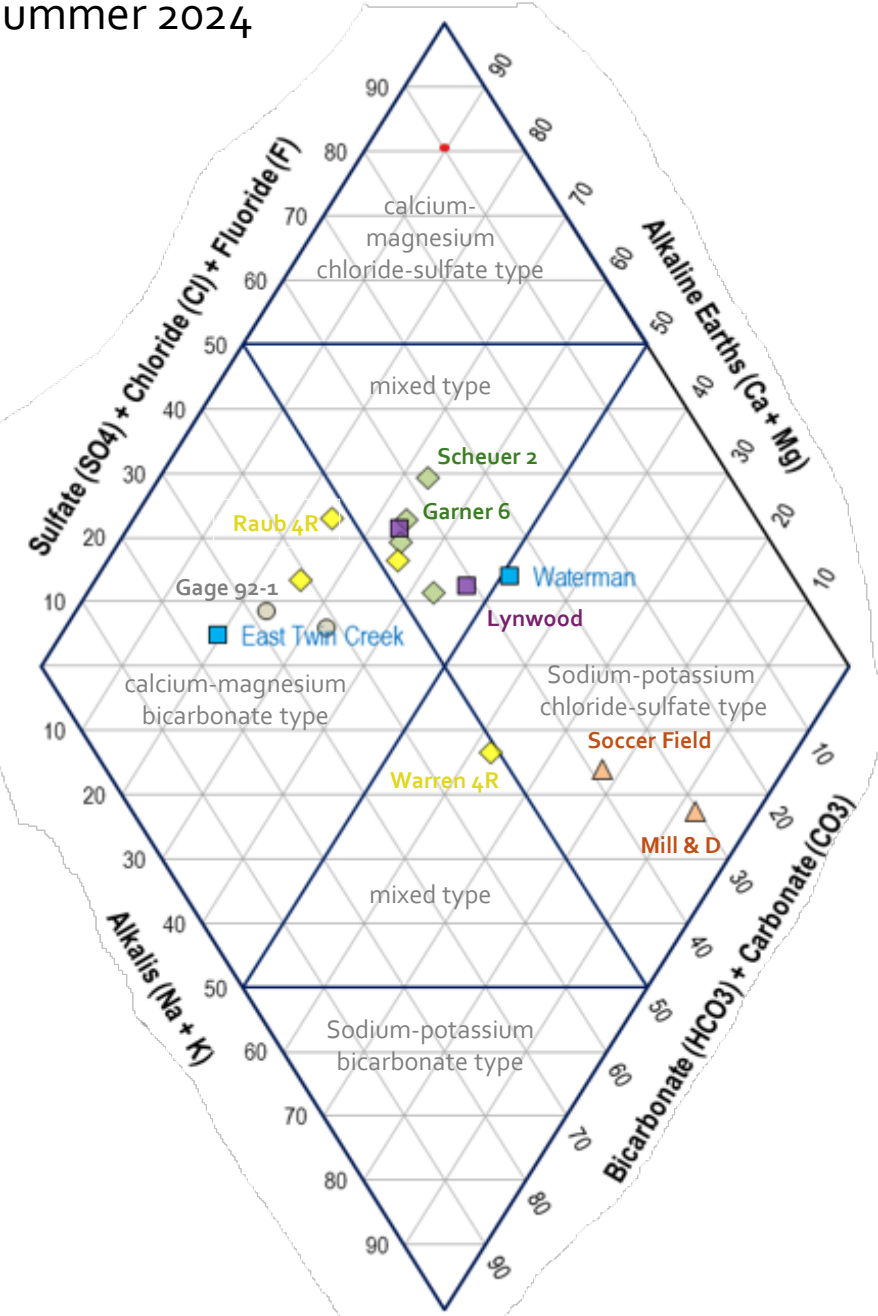
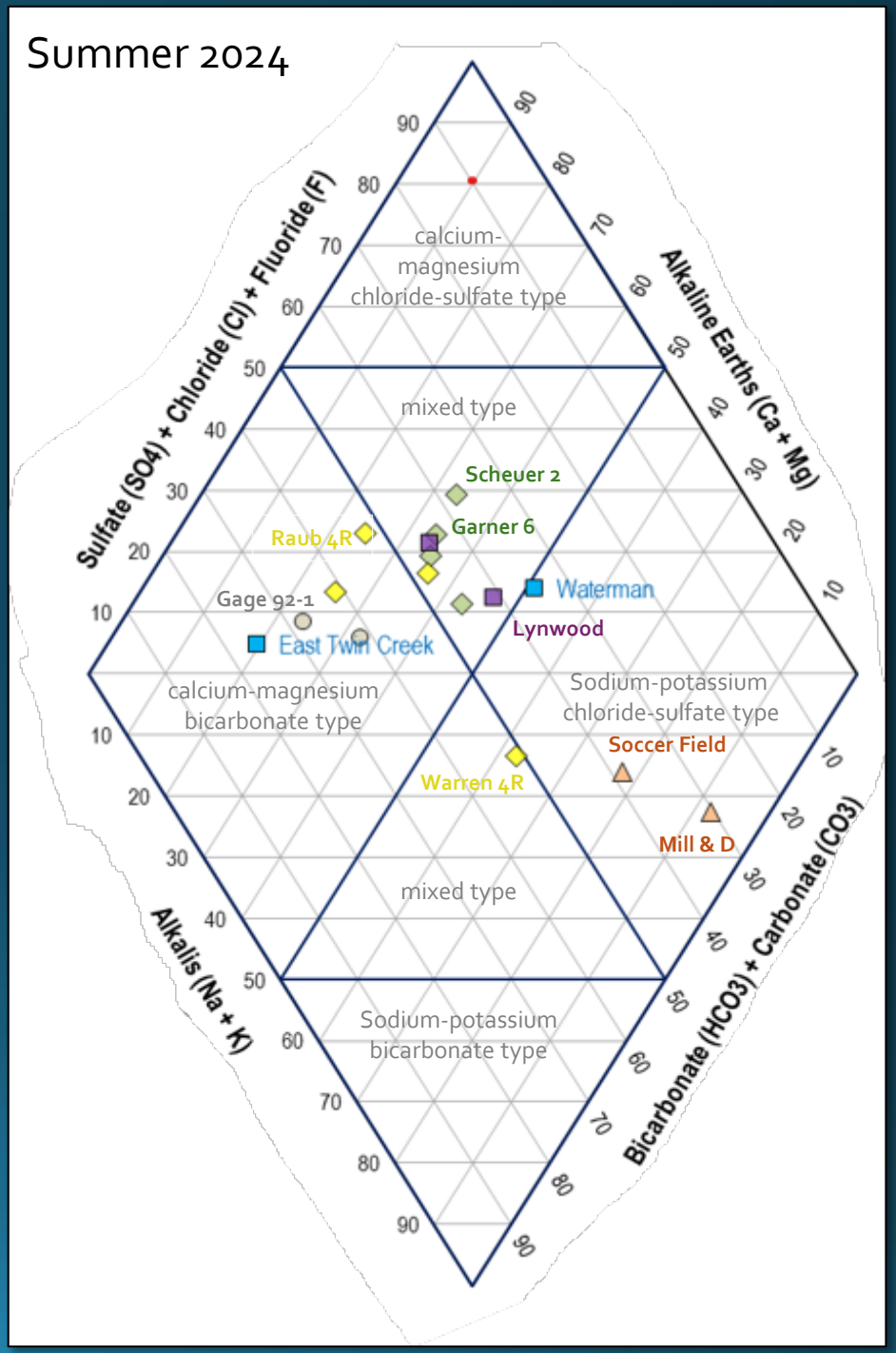
Well Sample Groupings

Summer 2024



Major Ion Chemistry: Recharge Sources

1. Natural recharge San Bernardino Mountains (East Twin Creek)--meteoric water and mountain springs
2. State Water Project (Waterman Basin)
3. Localized, hydrothermal sources
4. Santa Ana River/Mill Creek/Seven Oaks spreading grounds?



Next Steps: Filling in Data Gaps

Use geophysics to constrain fault locations and structure.

Geochemical analysis along East-West transect of SBBA

Use remote sensing to identify regions of subsidence

Identify and optimize local recharge pathways

Acknowledgements