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Data Collection for Assessing Surface Water-Groundwater Interaction

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26th GRA Annual Meeting
October 4, 2017

Presentation Goals

- Share field approaches to characterizing SW/GW interactions
- Discuss lessons learned
- Present ongoing work and some additional tools and approaches

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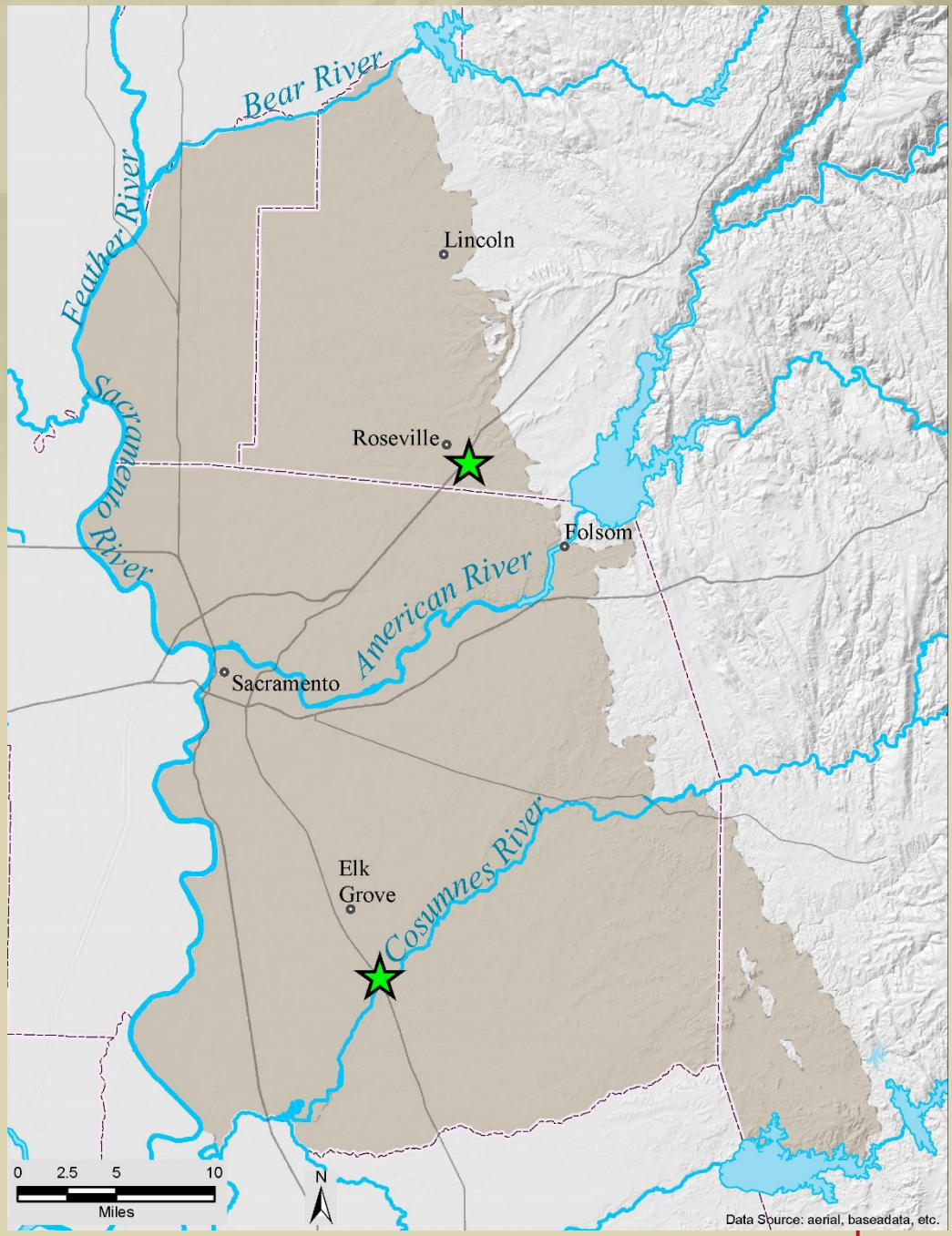
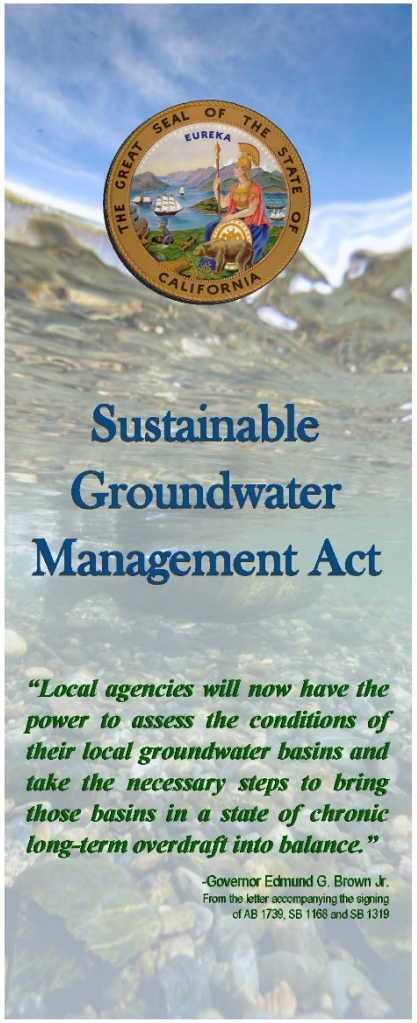
Project Locations

- Roseville Area Recharge Study
- Cosumnes River Data Collection



Importance to SGMA

- Undesirable result: Surface Water Depletion
- Effect on GDEs
- Water budget and modeling
- Hydrogeologic Conceptual Model
- Management actions



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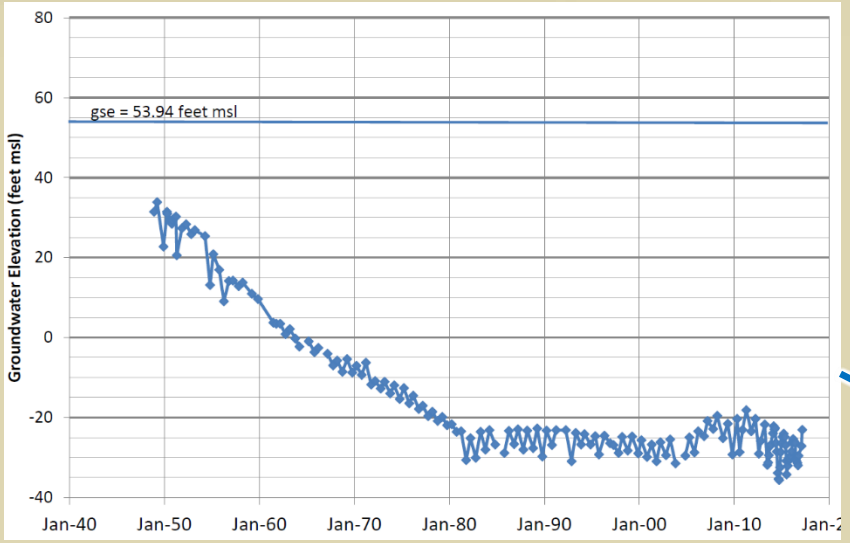
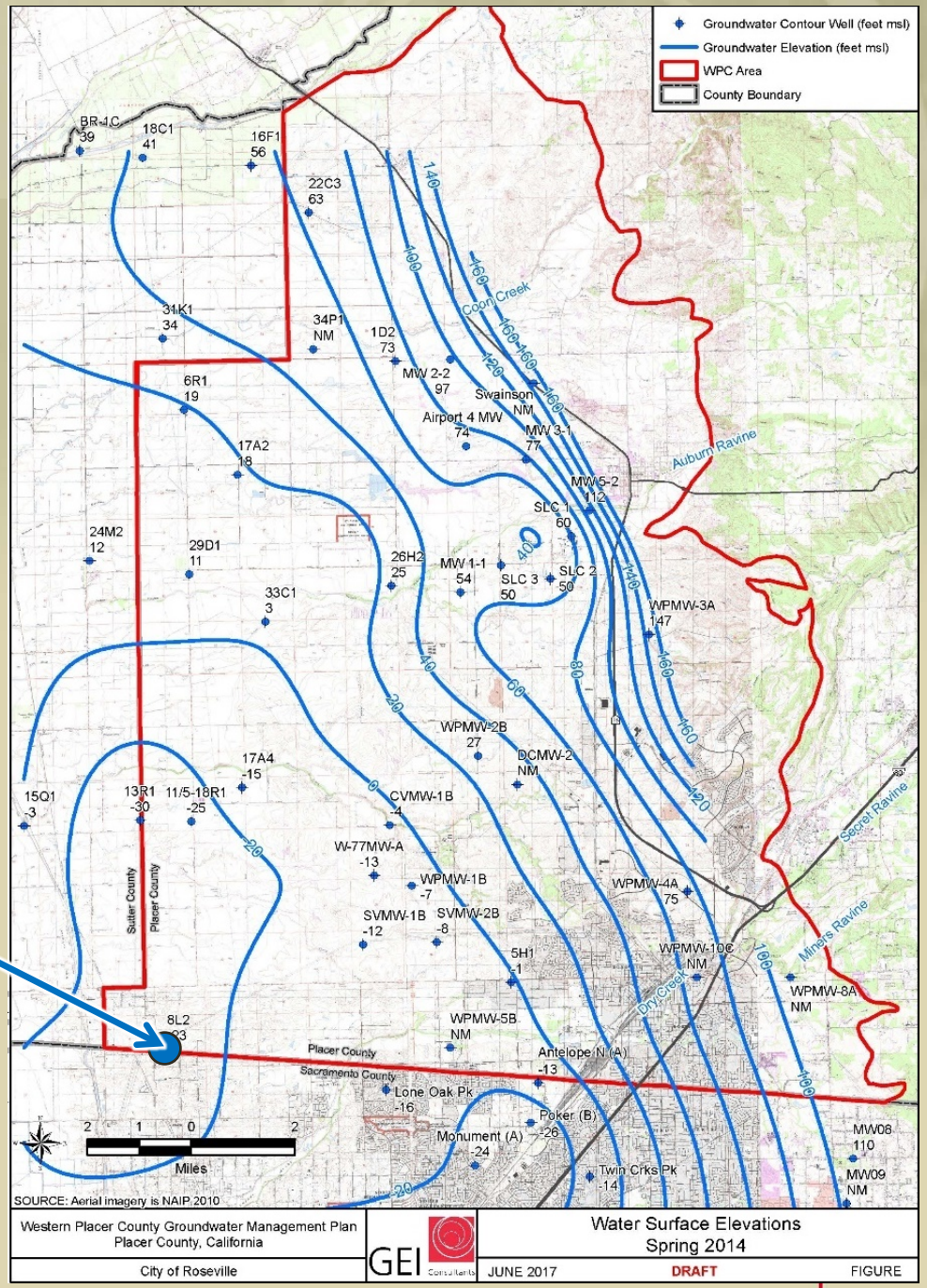
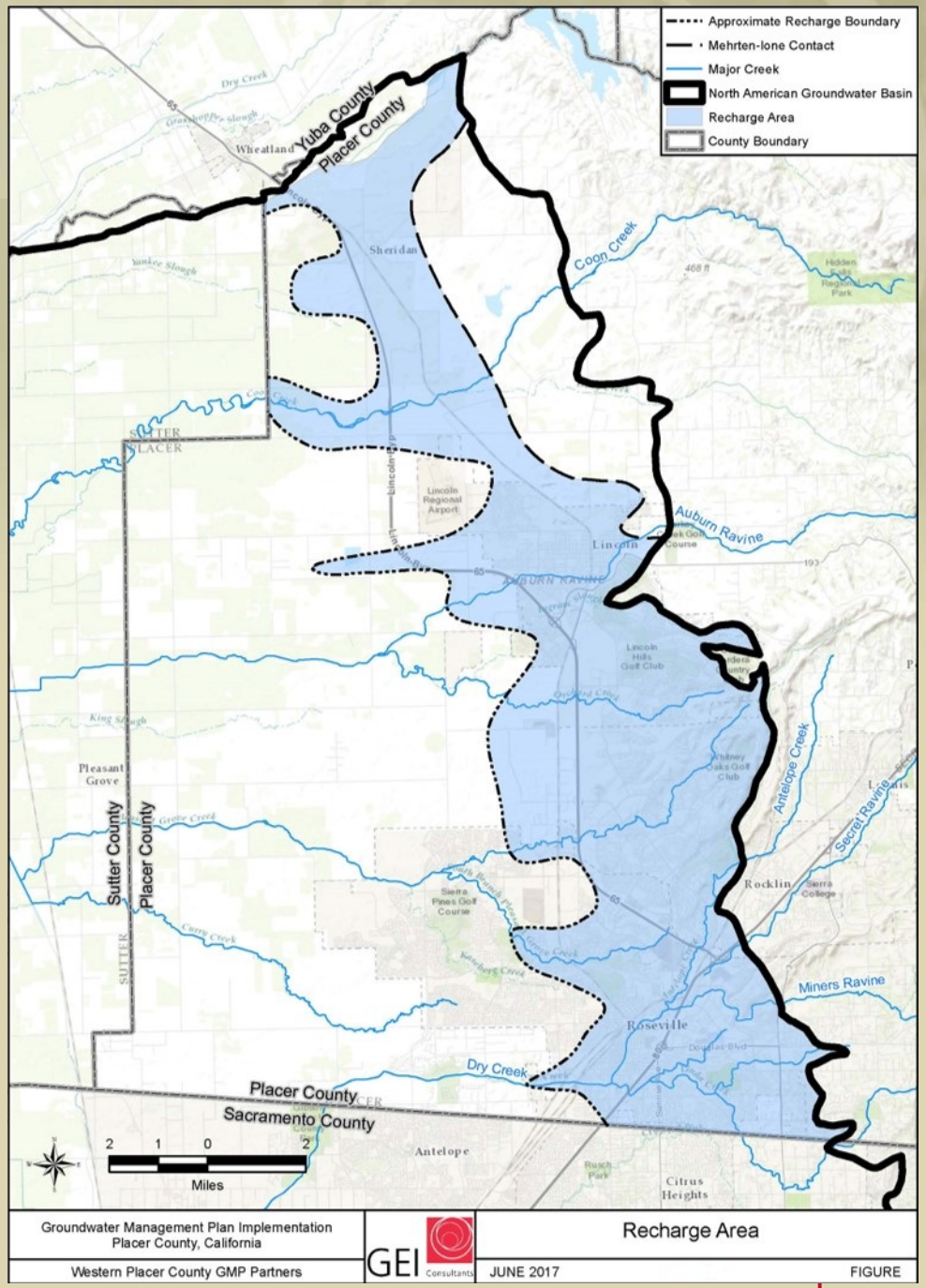
Roseville Area Recharge Background





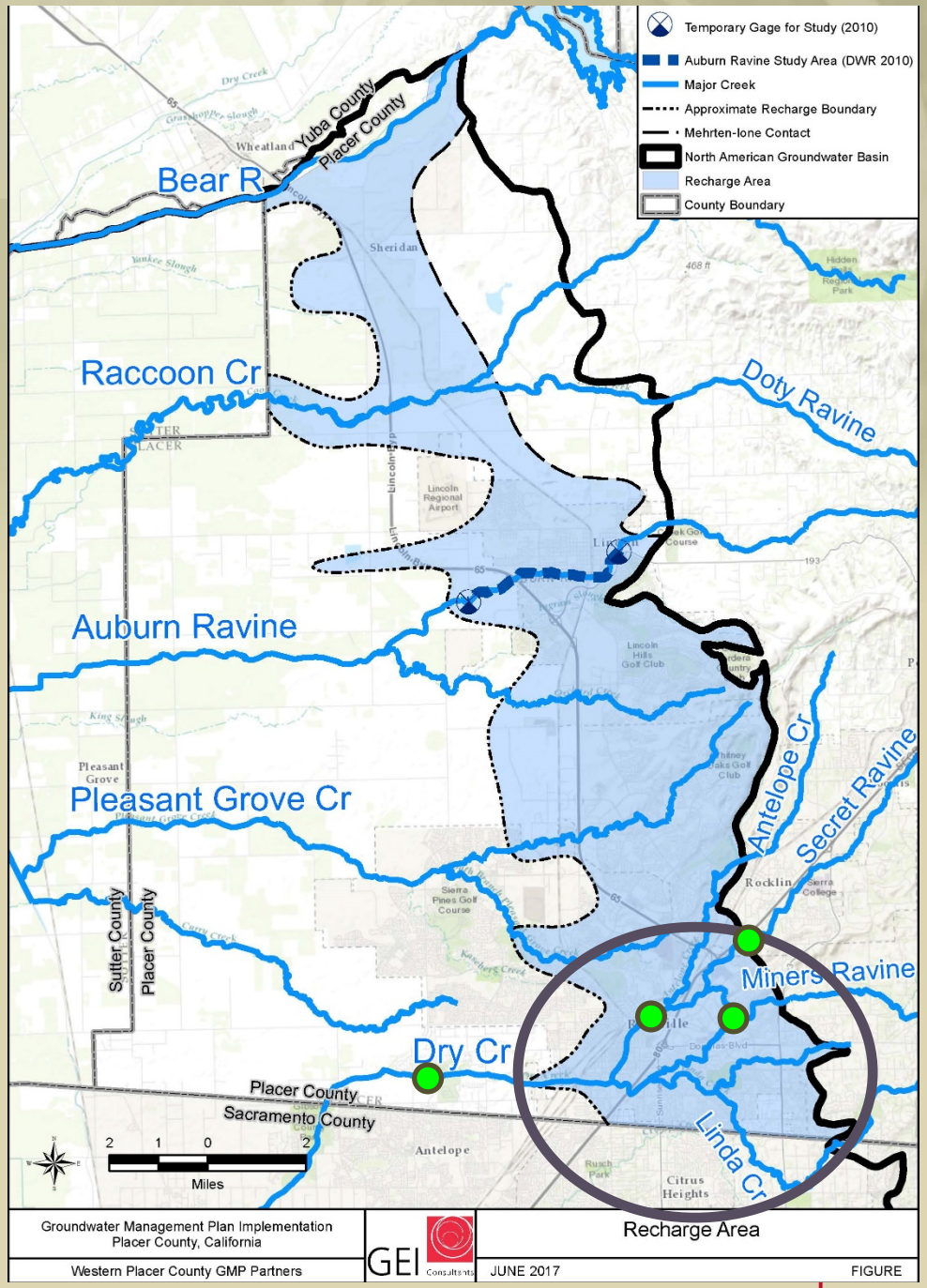
Recharge Area Delineation

- Estimated based on
  - Soils
  - Geology
  - Cross Sections

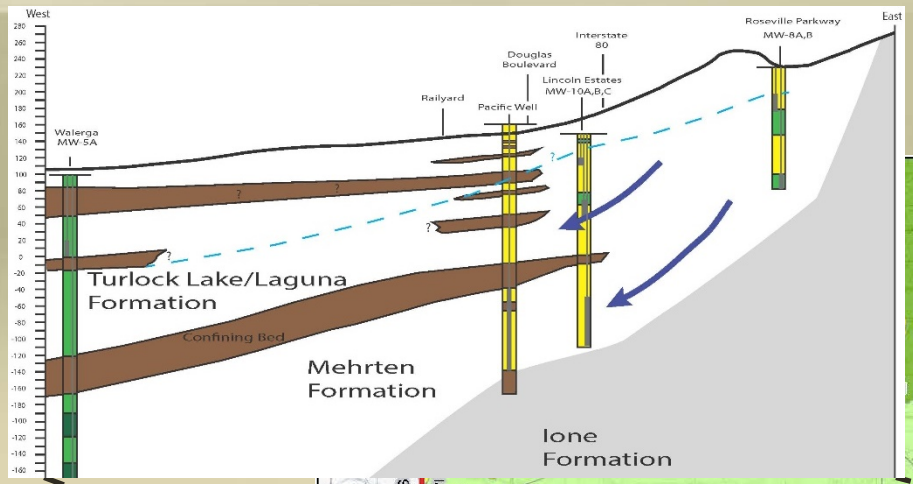


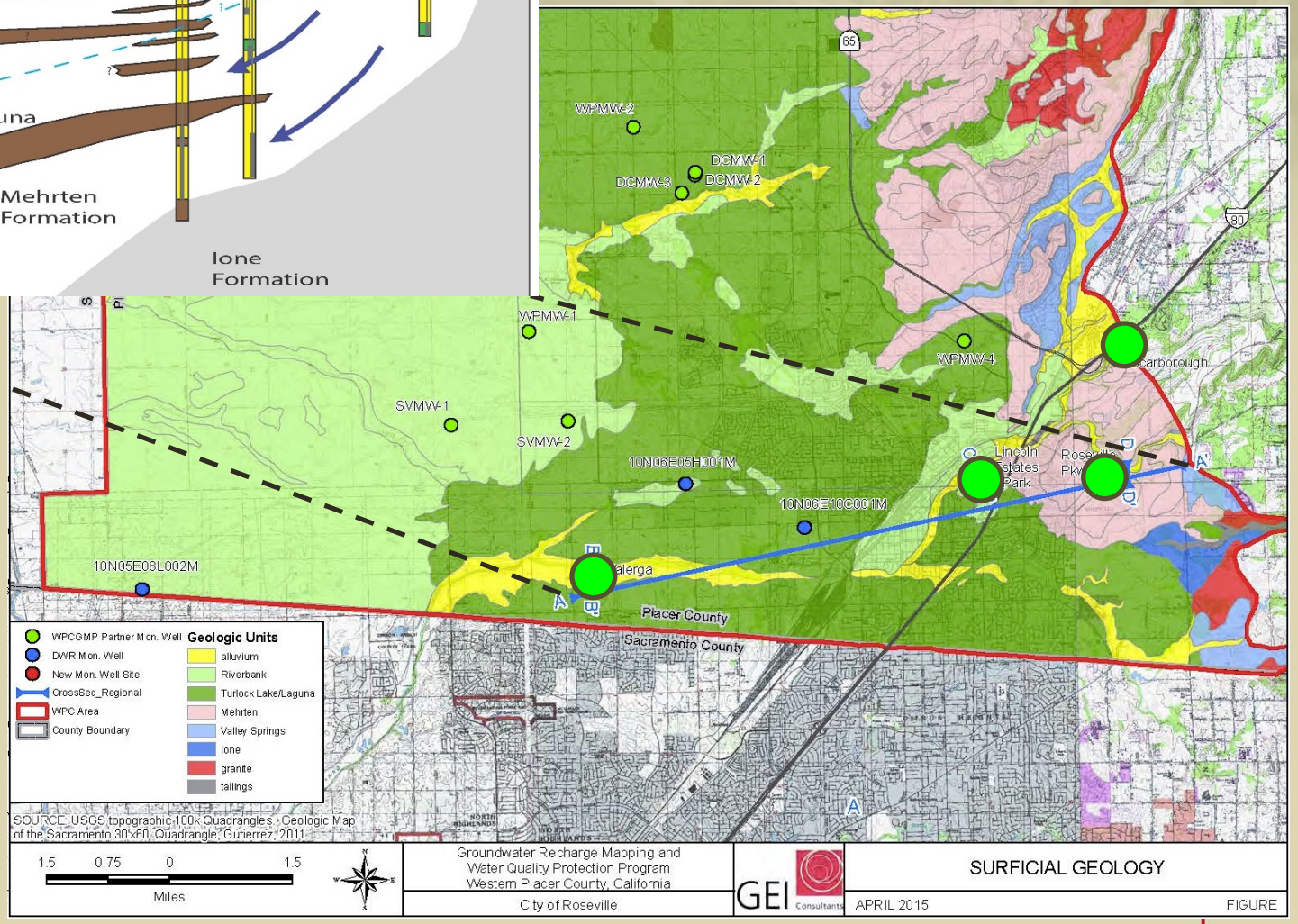
Recharge Study Methods

- 10 New Monitoring Wells at 4 sites
  - Water Quality
  - Water Levels
- Stream gage data



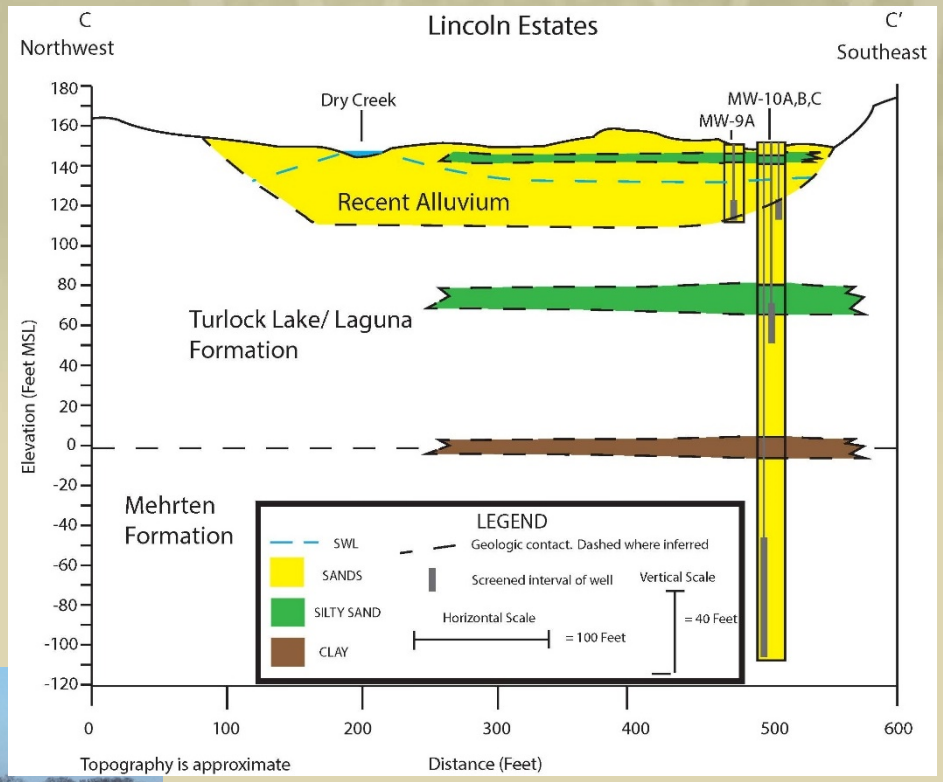
Wells constructed at 4 sites





Monitoring Well Design

- Single shallow well close to creek
- Nested wells further from creek



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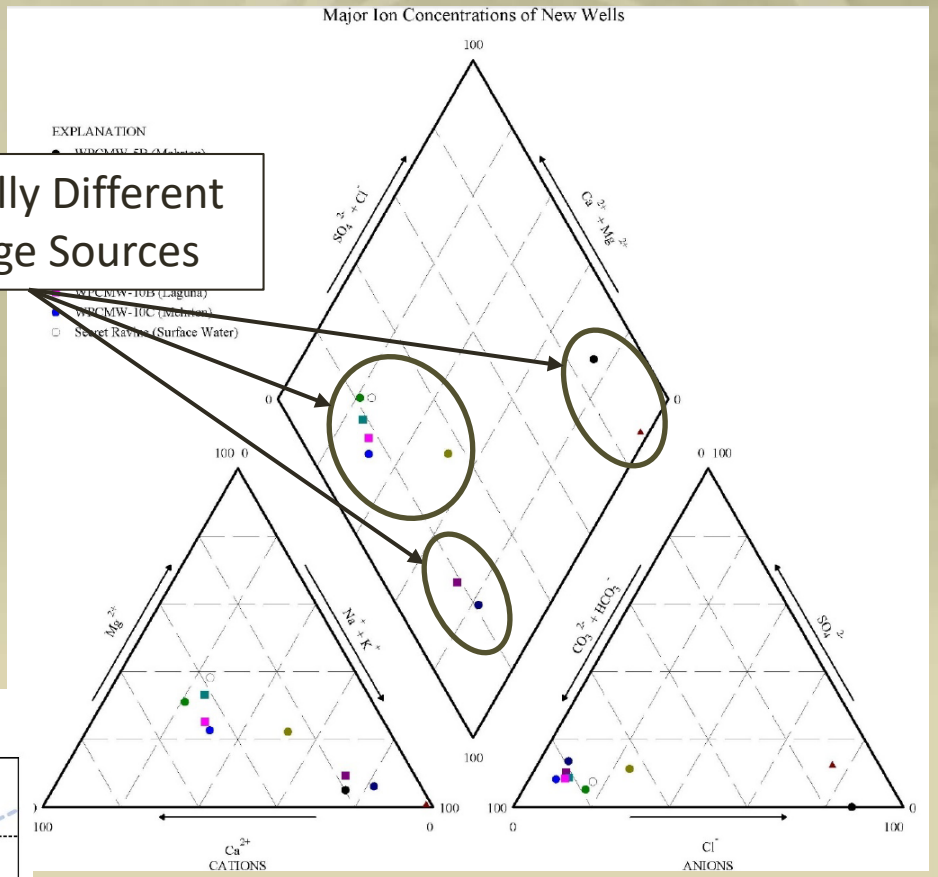
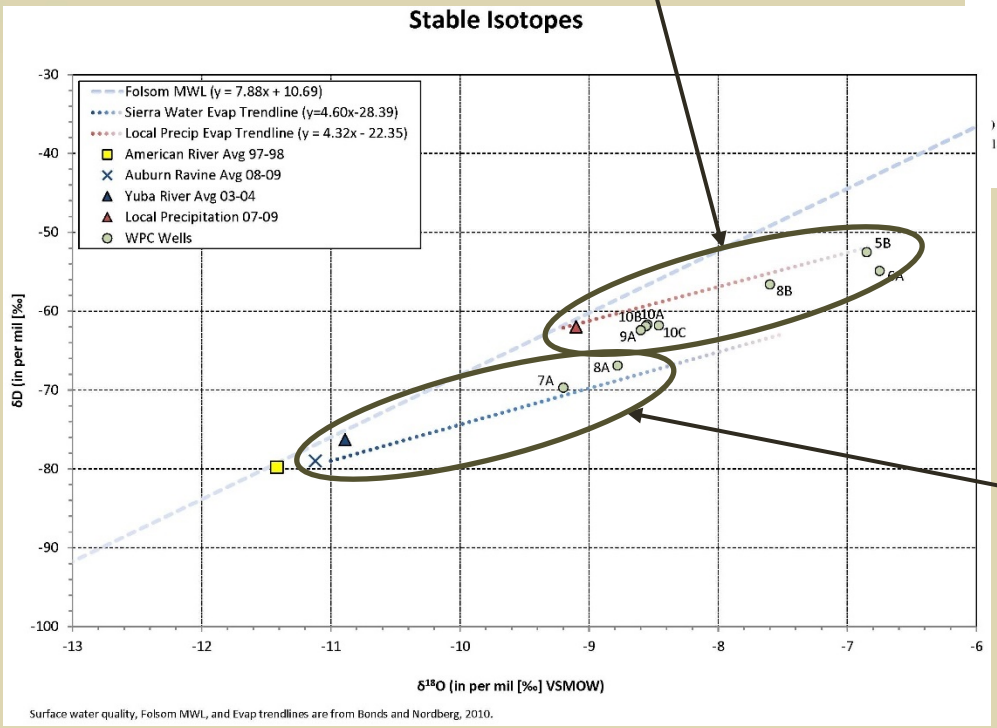
Water Quality Results

Potentially Different Recharge Sources



Local Recharge Source (low elevation)



Surface water quality, Folsom MWL, and Evap trendlines are from Bonds and Nordberg, 2010.

Sierra Recharge Source (high elevation)

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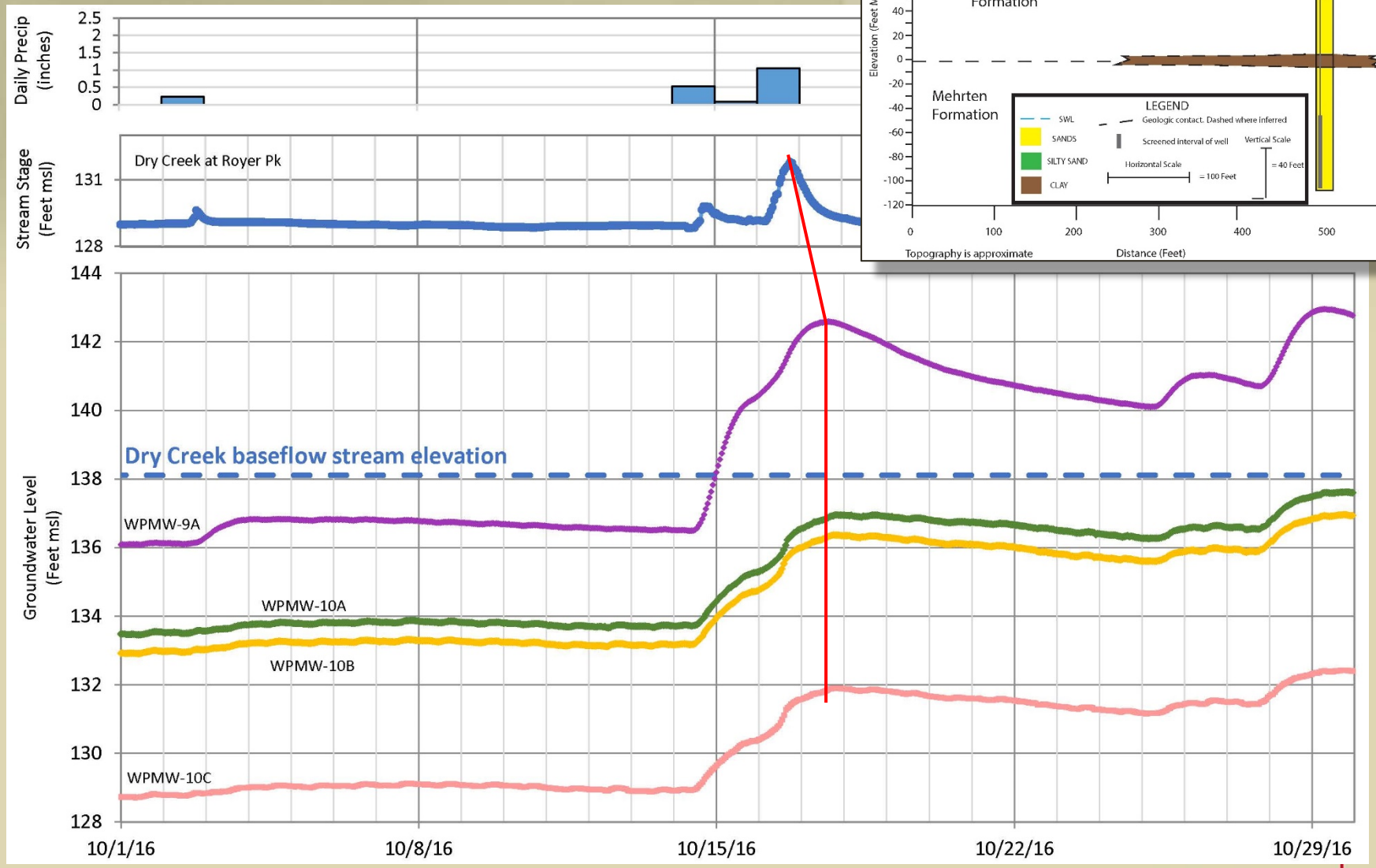
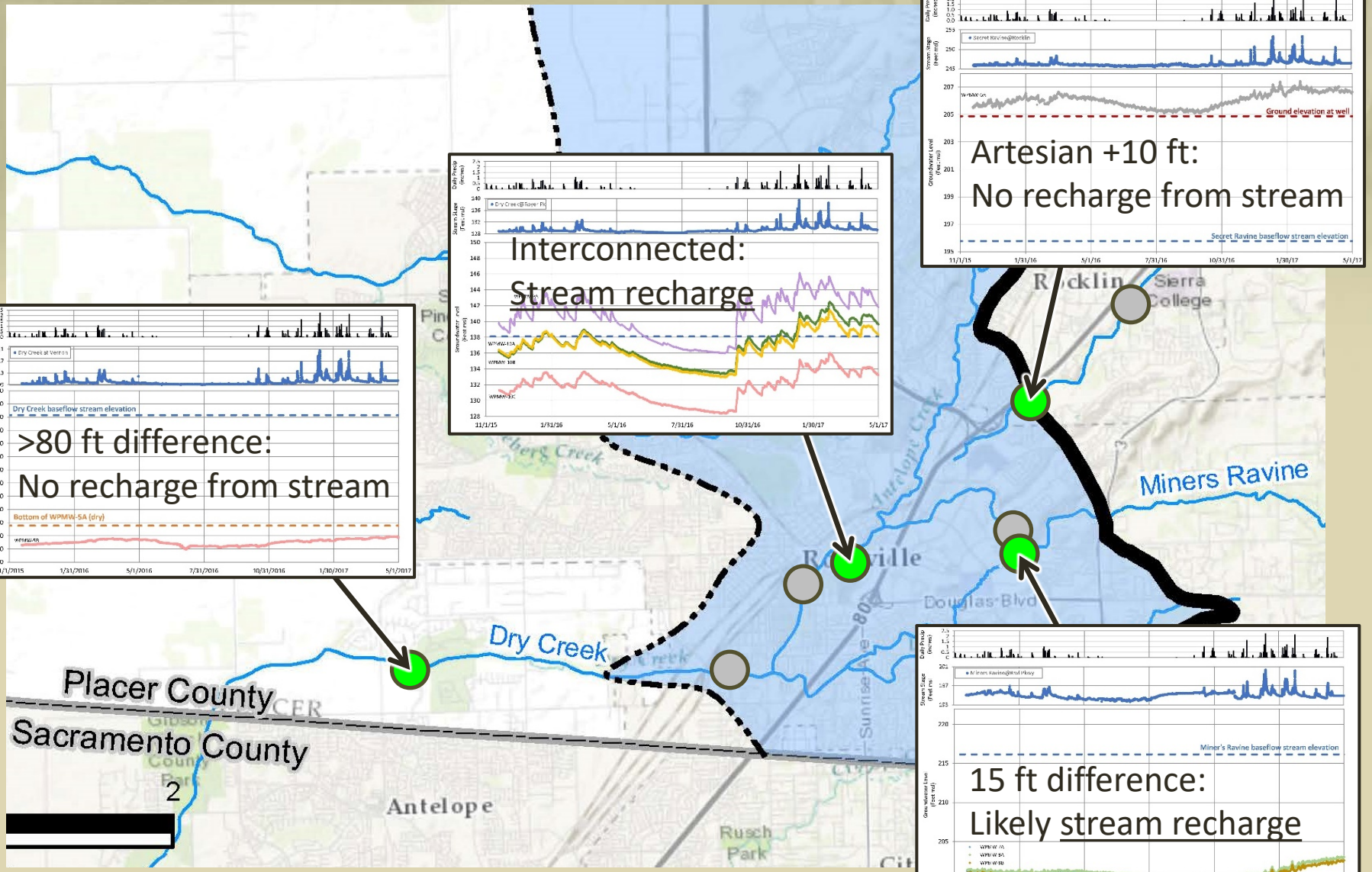
Groundwater Level Response



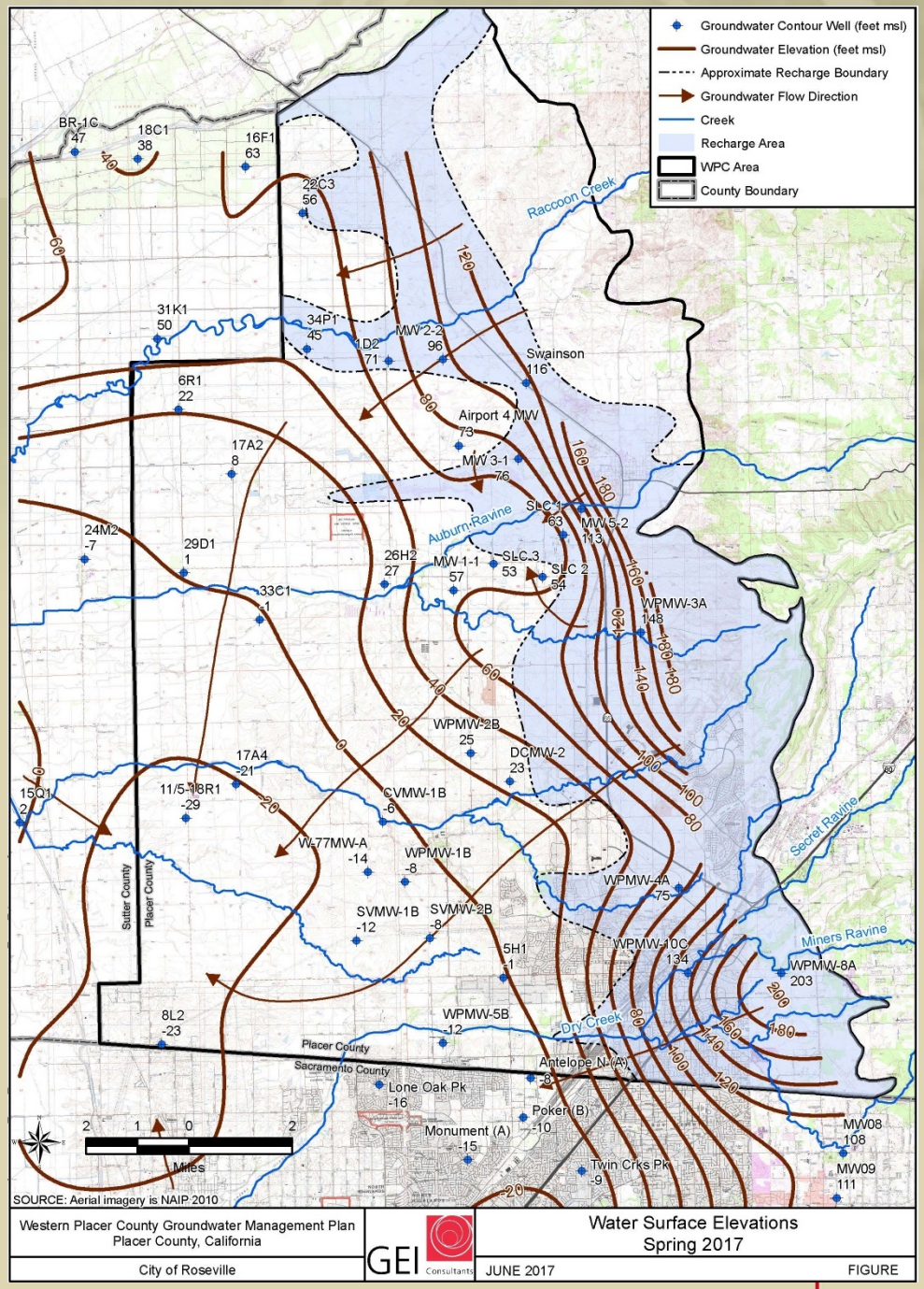
Groundwater levels and stream gages



Conclusions / Takeaways

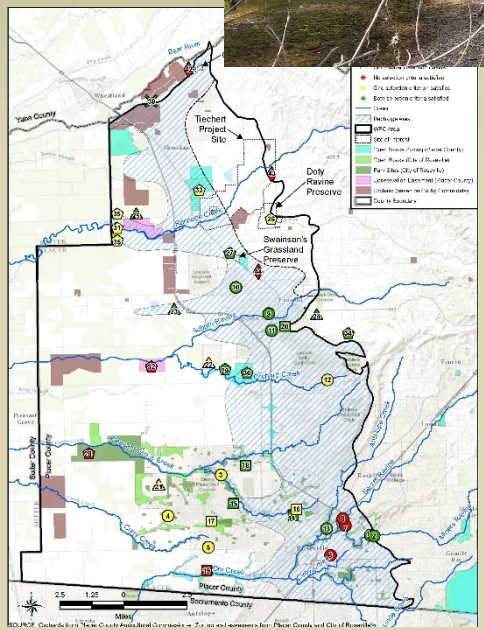
- Contours now reflect Roseville Creeks
- Field data will help to constrain models

- No silver bullets
- Multiple approaches
  - Water quality
    - Recharge source
  - Water levels
    - Stream interconnection
    - Gaining vs losing
    - Timing of recharge
  - Streamflow gaging
    - Volume estimate



Ongoing Work

- Roseville/Placer County
  - Streamflow gaging
    - Pairs of gages: upstream and downstream
  - Identify sites for recharge projects



- Cosumnes River
  - Telemetry using cellular networks
    - Real-time data
    - Available to all stakeholders

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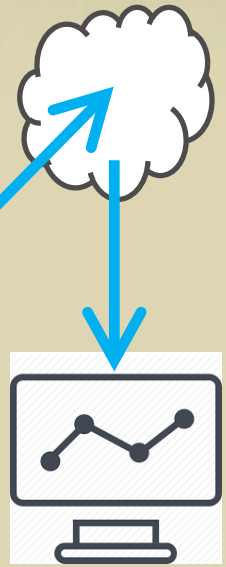
Cosumnes River SW/GW Interactions Data Collection

- Water Level-Temperature-Conductivity Probes
- Telemetric Data Logger / Transmitter
- 1-inch Well (52 feet deep) in Levee of Cosumnes River
- 12-inch Domestic Well – 3 homes at ranch ~3,500 from river



- River Stage at McConnell, +1 mile downstream

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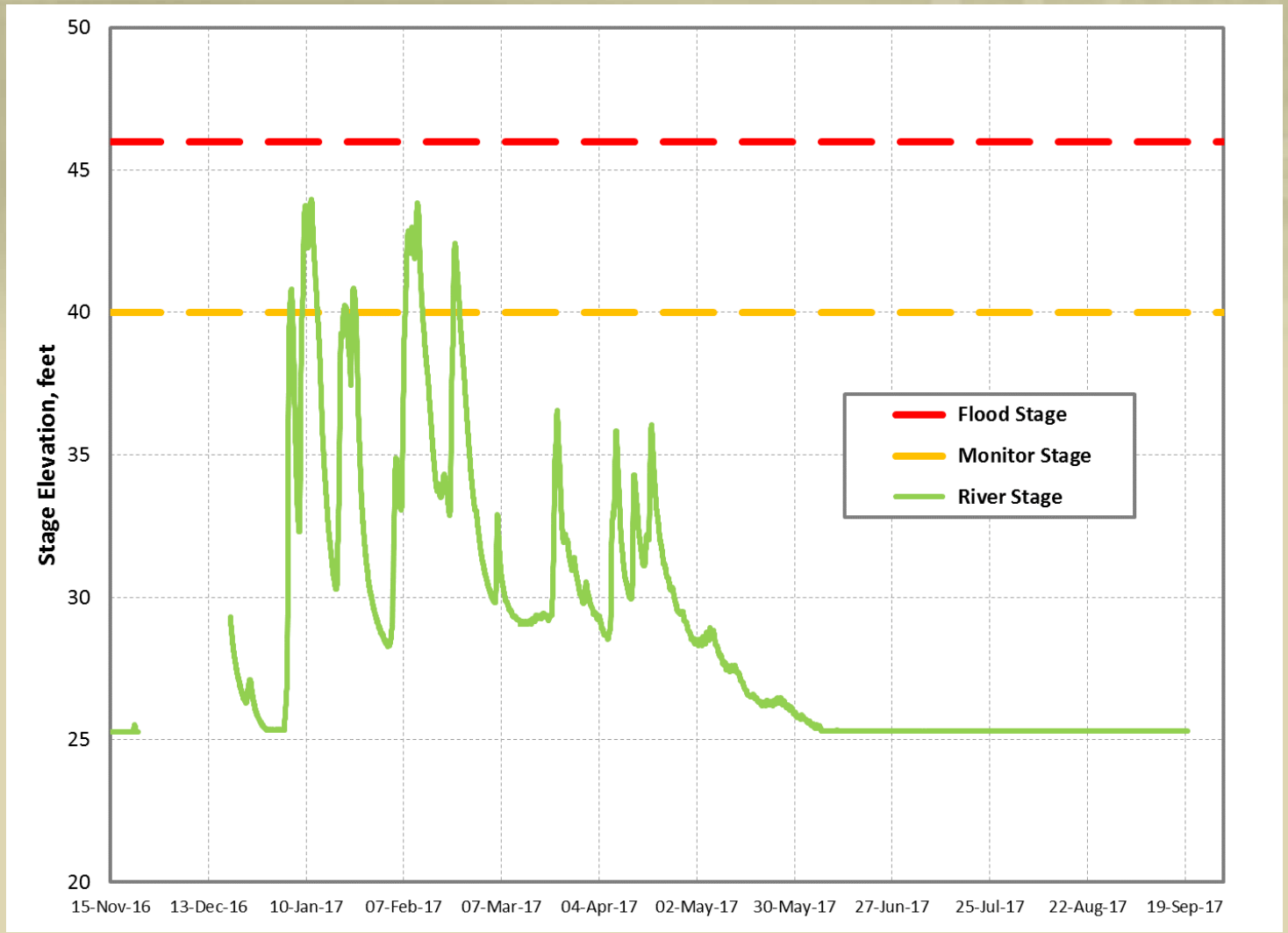
Cosumnes River at McConnell
(Highway 99 Overcrossing)



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Cosumnes River at McConnell
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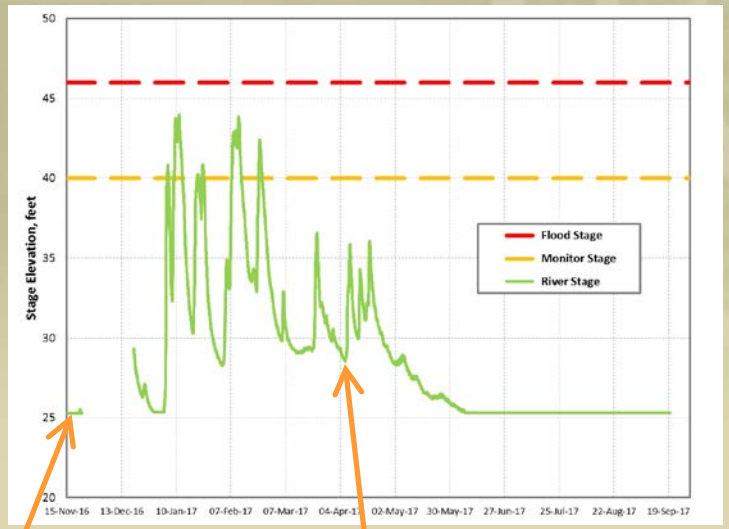

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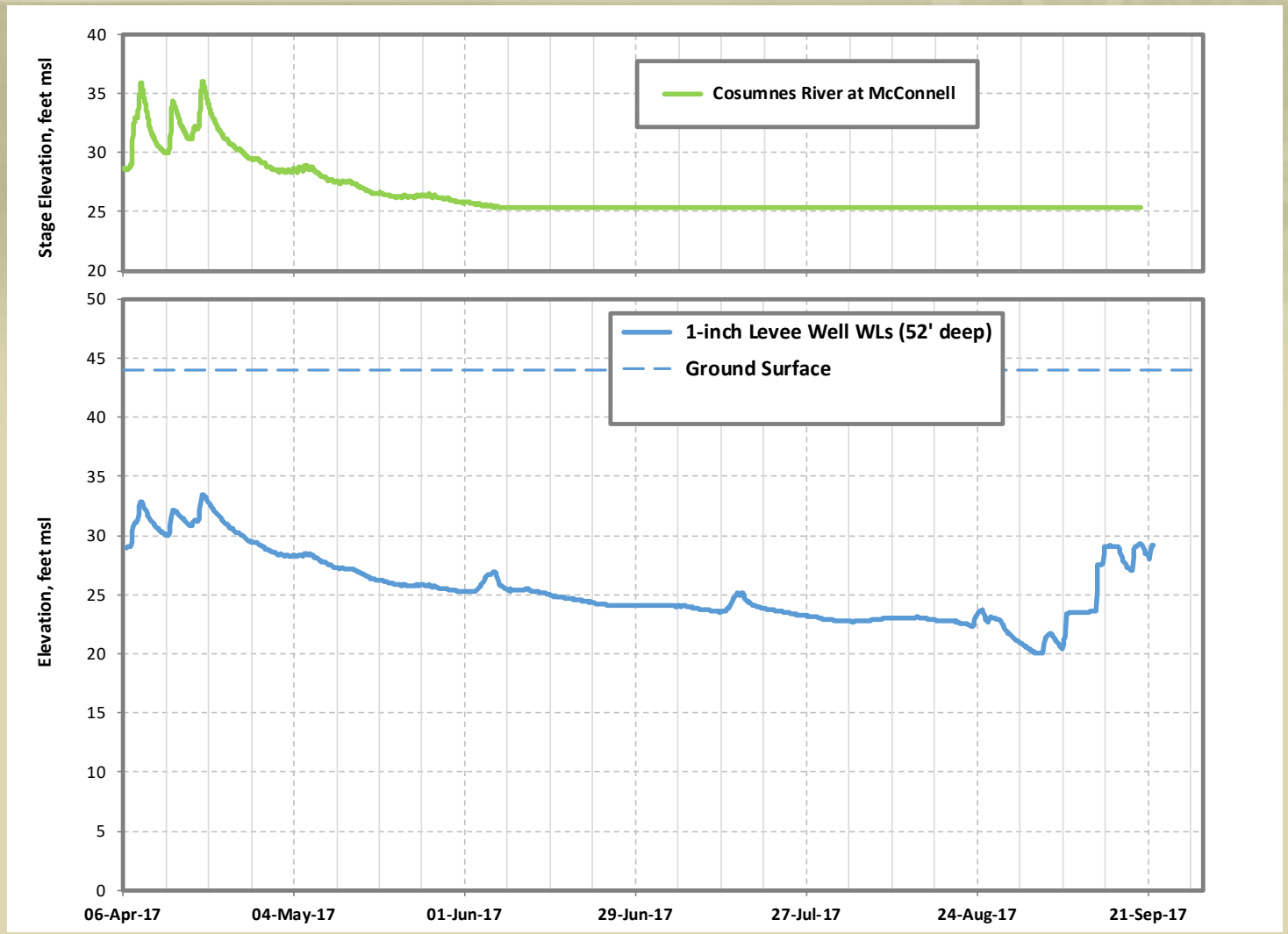
Water Level Monitoring Data



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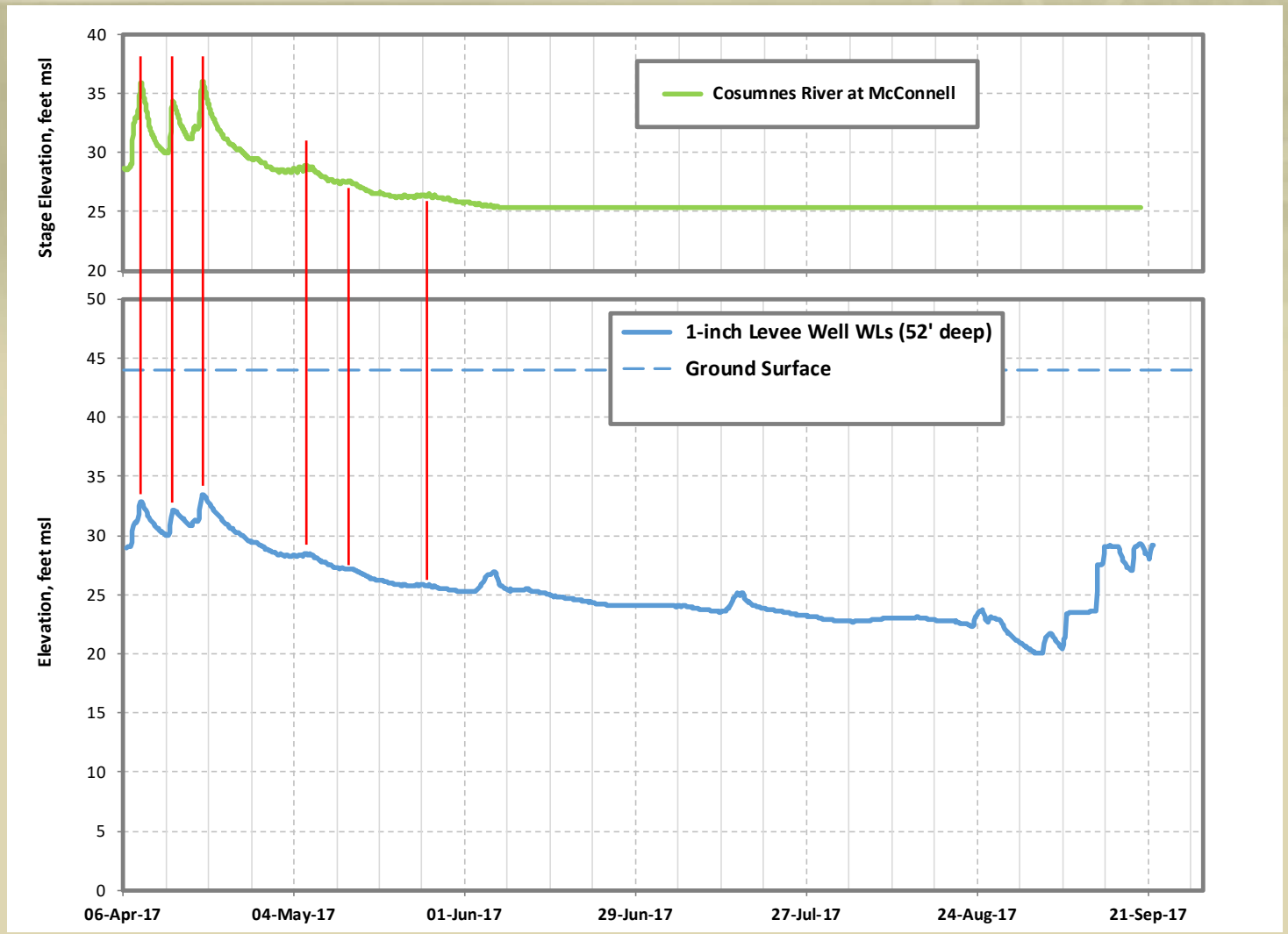

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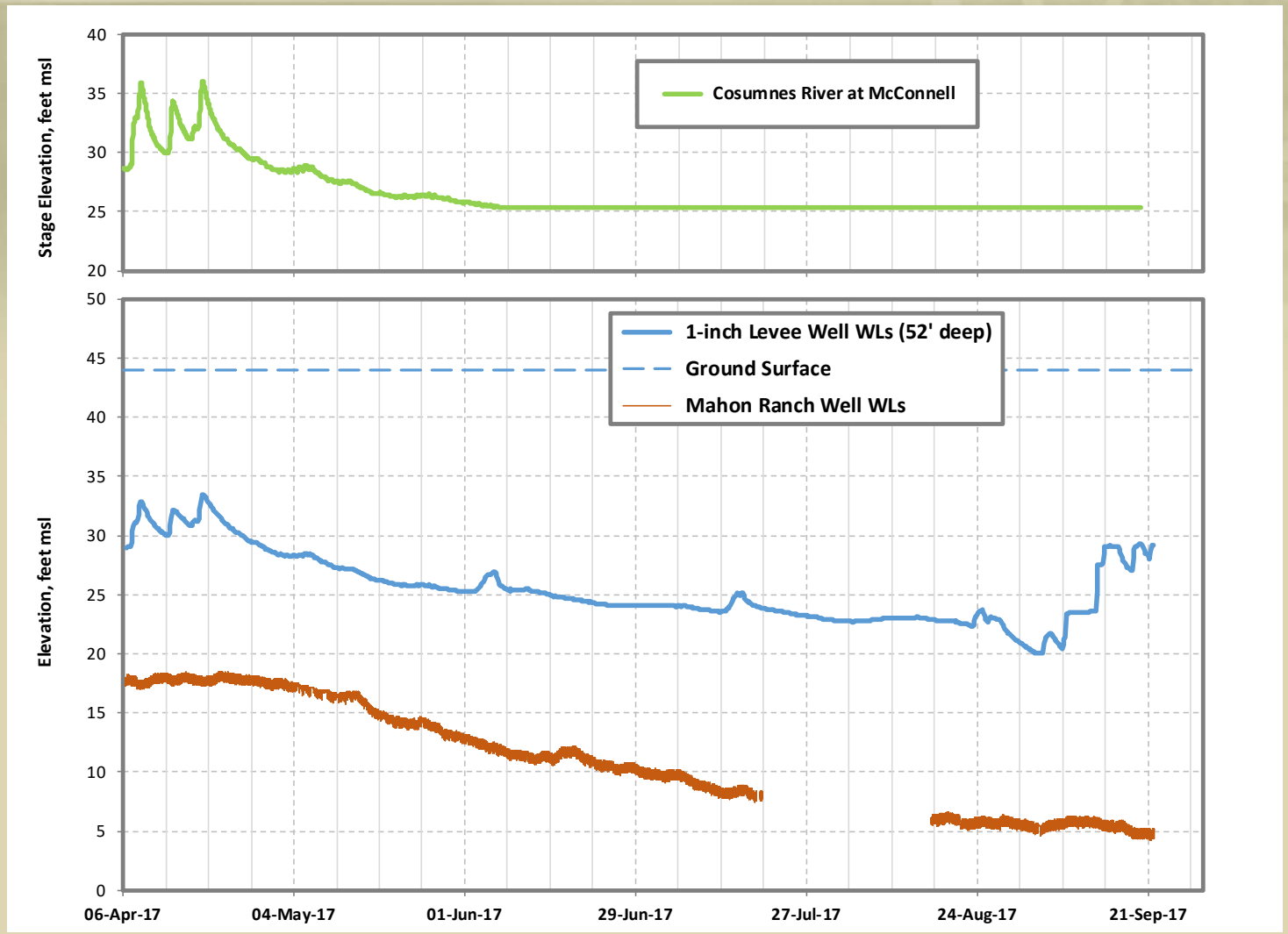

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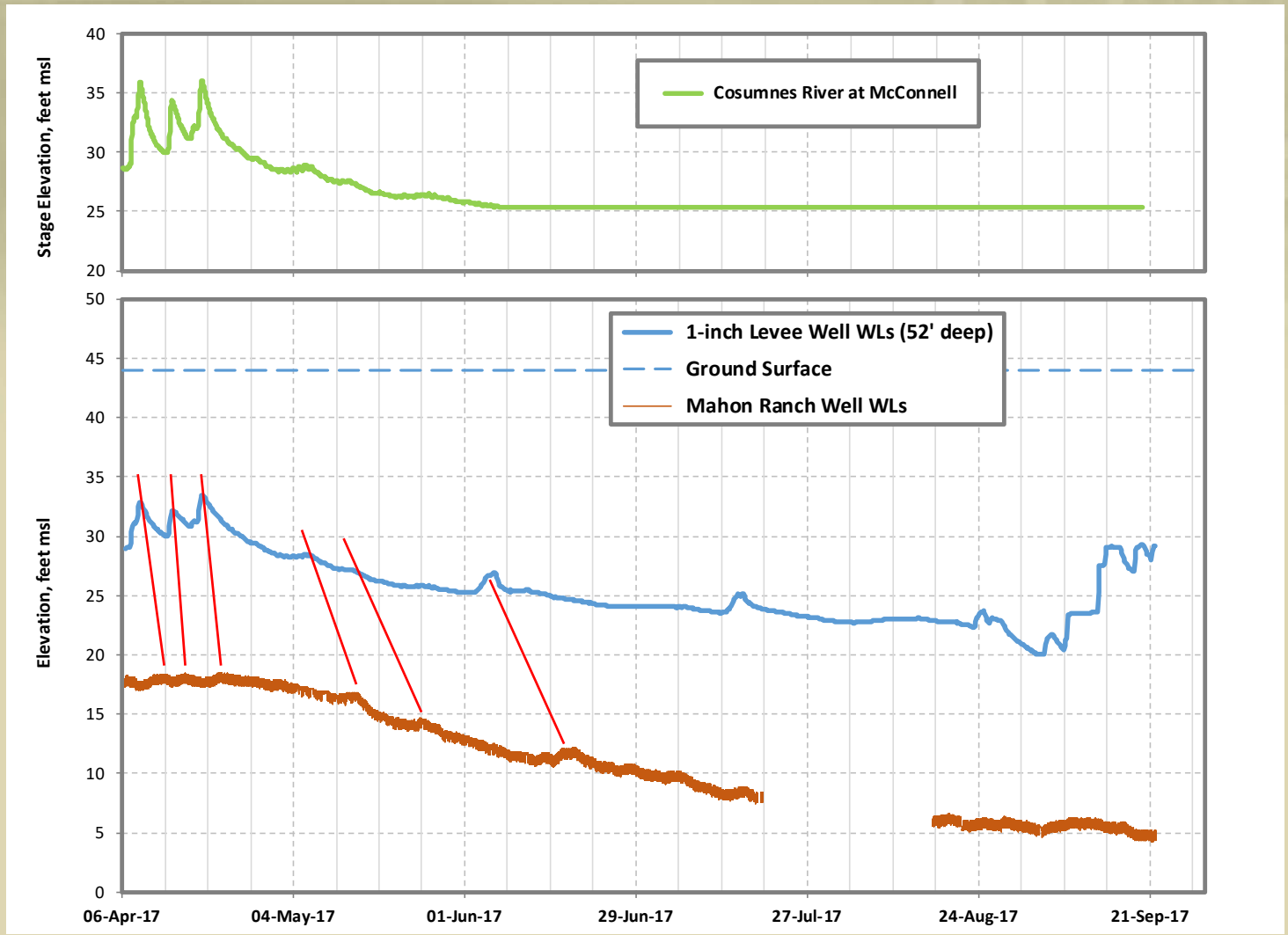

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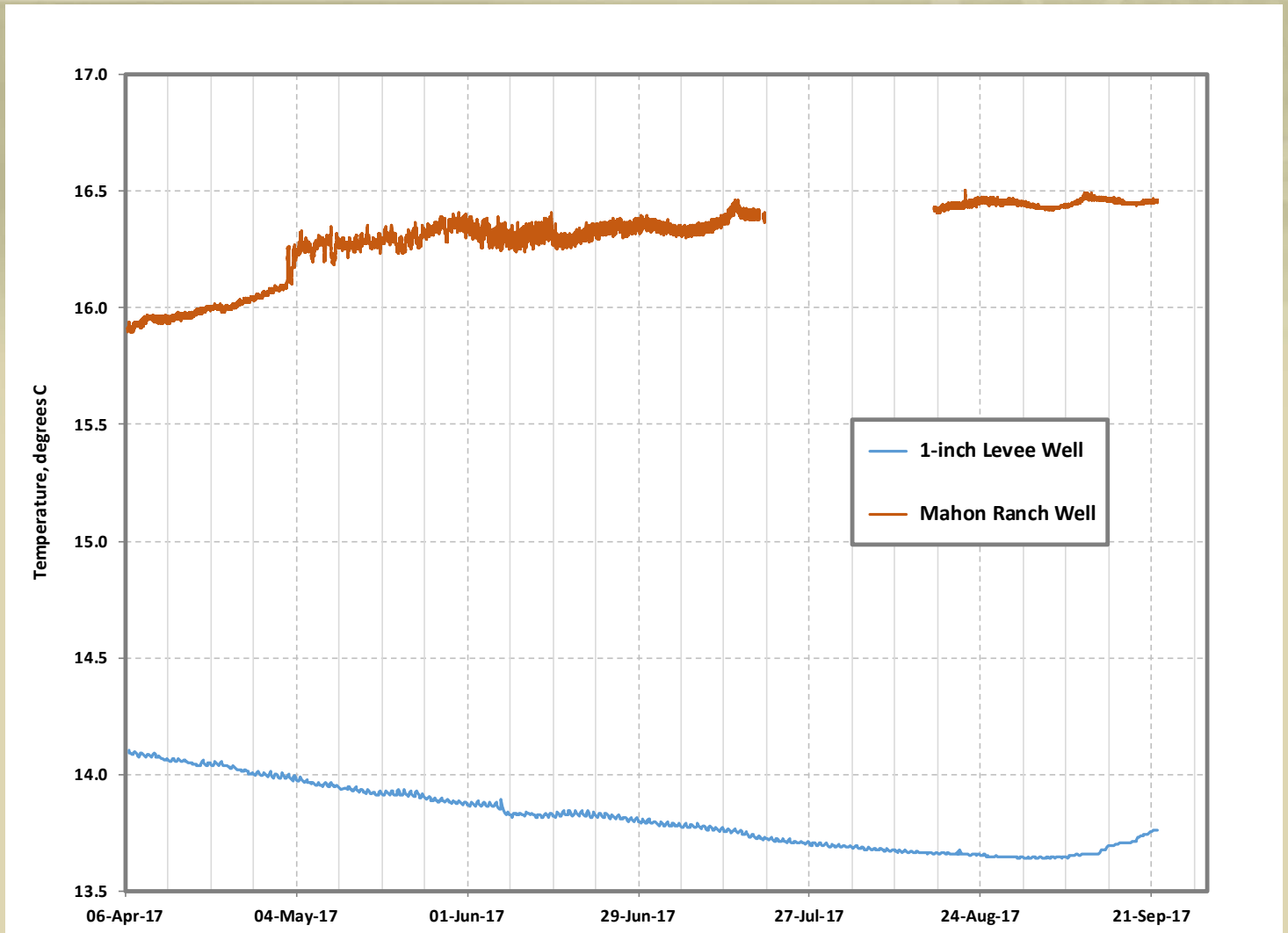
Temperature Data



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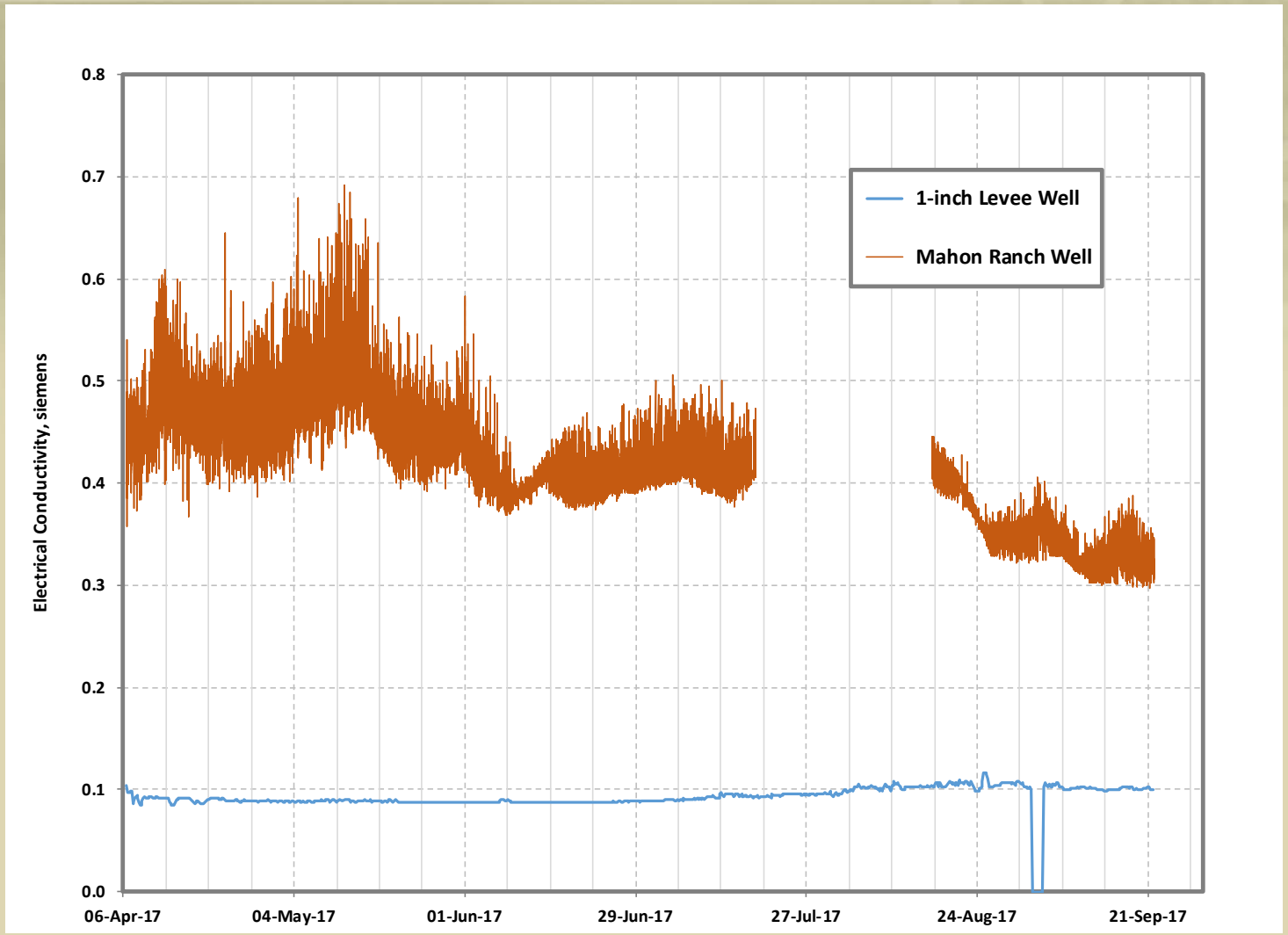
Electrical Conductivity Data



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Conclusions

- SW-GW interactions are complicated
- Most challenging of six sustainability indicators
- Field measurements are necessary to constrain development and calibration of a model
  - Groundwater levels
  - Stage levels
  - Ground surface elevations

  And don't forget
  - Streamflow

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Acknowledgments

- Western Placer County GMP Partners
- Department of Water Resources
- City of Roseville
  - Kelye McKinney, Jim Mulligan
- GEI Consultants
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- Tom Mahon, Mahon Ranch

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THANK YOU

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