

Shallow Aquifer Drought (SAD) Monitoring Program

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Overview

- Objective
- Program
- Background
- Data collection
- Collection of water-level measurements
- Map of well locations
- Water-elevation graphs
- Participant interview results
- Summary
- Future work

Objective

- To document changes in ground-water levels in domestic wells within the shallow aquifer due to the impending drought from the winter of '04-'05 and recovery

Program

- Provides baseline, water-level measurements for the private well owner to protect themselves in the future from potential adverse effects due to large regional pumpers and to know how their water level is affected during drought conditions
- Provides a better understanding for PBAC of how the shallow aquifer responds to a drought and subsequent wetting period

Program

- A public service with a nominal fee to participants
- 19 participants
- We provide assurance and education to participants

Background

- Started in June 2005 stemming from well owner's interest in water levels during the drought and a potential increase in large scale pumpers.
- Originally a consulting project but PBAC graciously offered \$5000 for research
- SAD consists of myself and a field assistant (Alyssa Douglass, MS Hydrology)

Background

- Started as a “drought” program to examine data during the summer of 2005 resulting from the previous season drought
- Took time for people to hear about us
- Advertisement:
 - Spoke at POW meeting
 - Flyers at POW table at Moscow Farmer’s Market
 - Sent letters
 - Poster at Water Summit meeting
 - Word of mouth

Background

- Asked participants to agree to 3 measurement periods
- Many participants were interested to have data collected past the summer
- Collected quarterly or monthly measurements based on participant's wishes

Data collection

- Participants address questions related to water quantity and water quality
- Acquire well logs and data related to the well
- GPS location of well-head (PBAC purchased for this project)
- Use DeLorme Topo software for elevation data and to generate maps of well locations

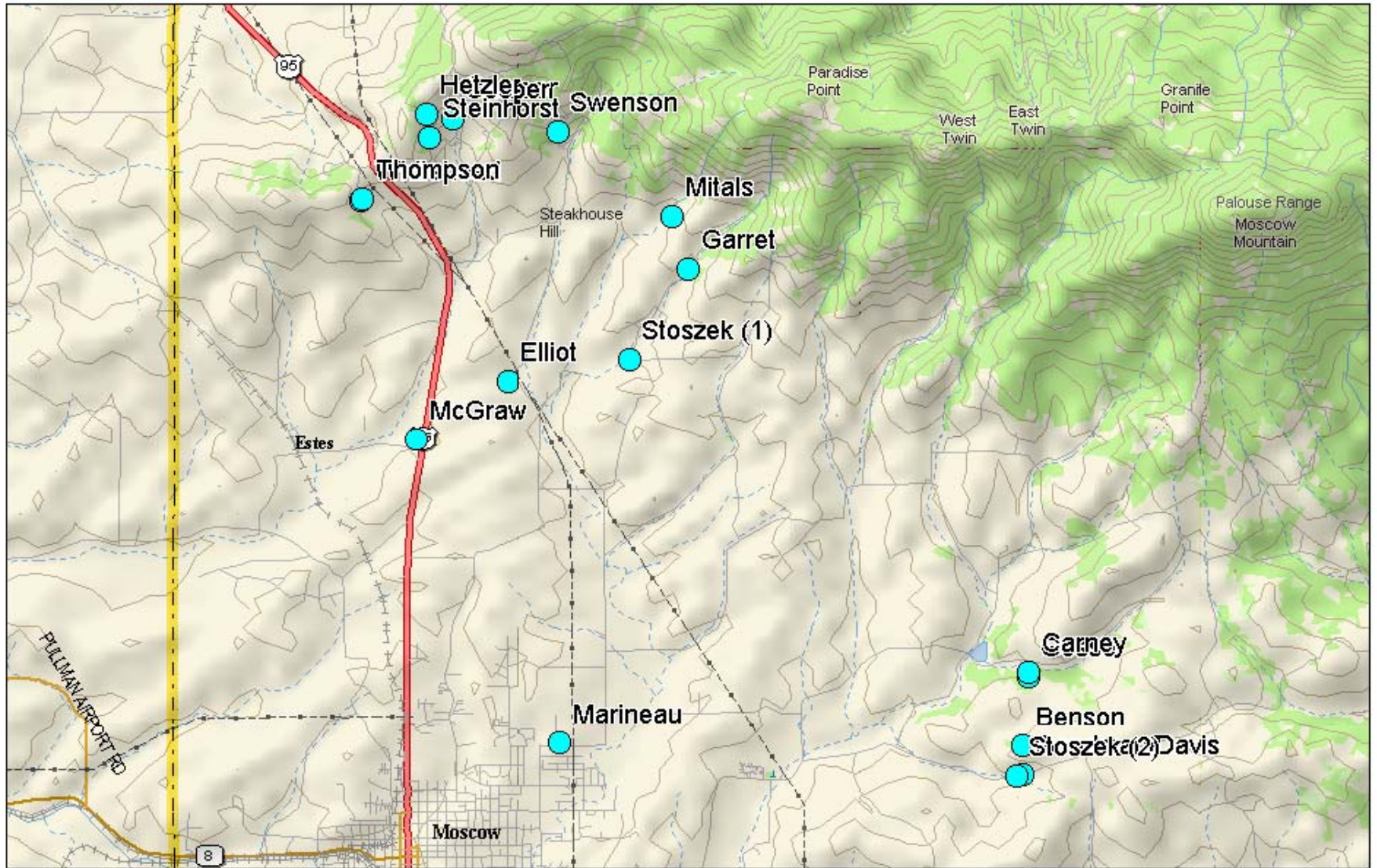
Collection of water-level measurements

- Power to well turned off 2 hours prior to our arrival
- Power to house turned off when we are there
- Steel-measurement tape used to measure water level because less chance of getting stuck in well
- Use electric sounder if water level deeper than 200 ft

Collection of water-level measurements

- Purchased data logger to automatically collect continuous measurements
- Participants are billed after each measurement and are supplied with their data
- Following their participation, they will receive a report with legally binding water-level record and other data collected.
- To date we have collected or billed \$820

Area Encompassing All Wells



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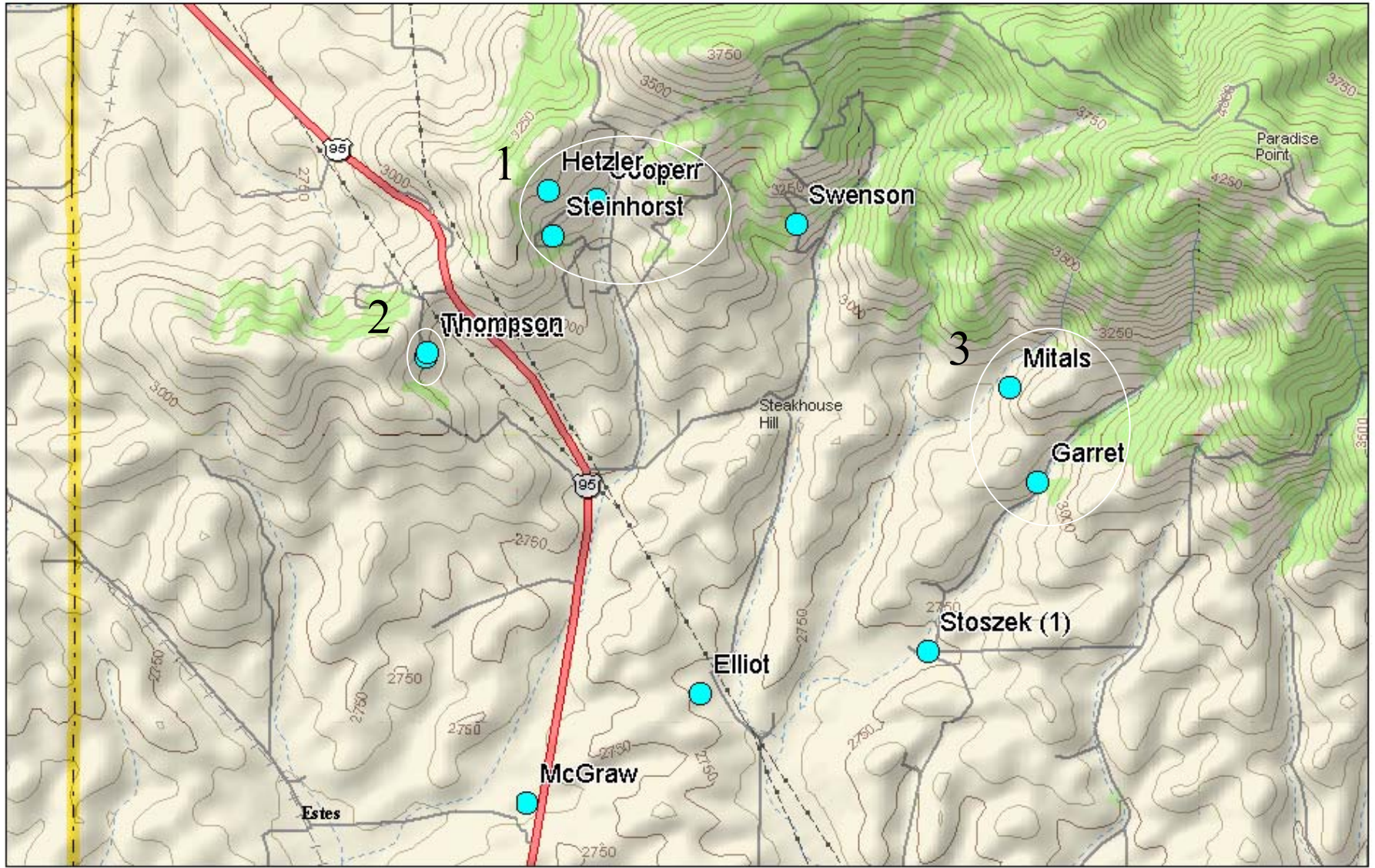
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Data Zoom 11-1

Area of Northern Wells



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○ Groupings

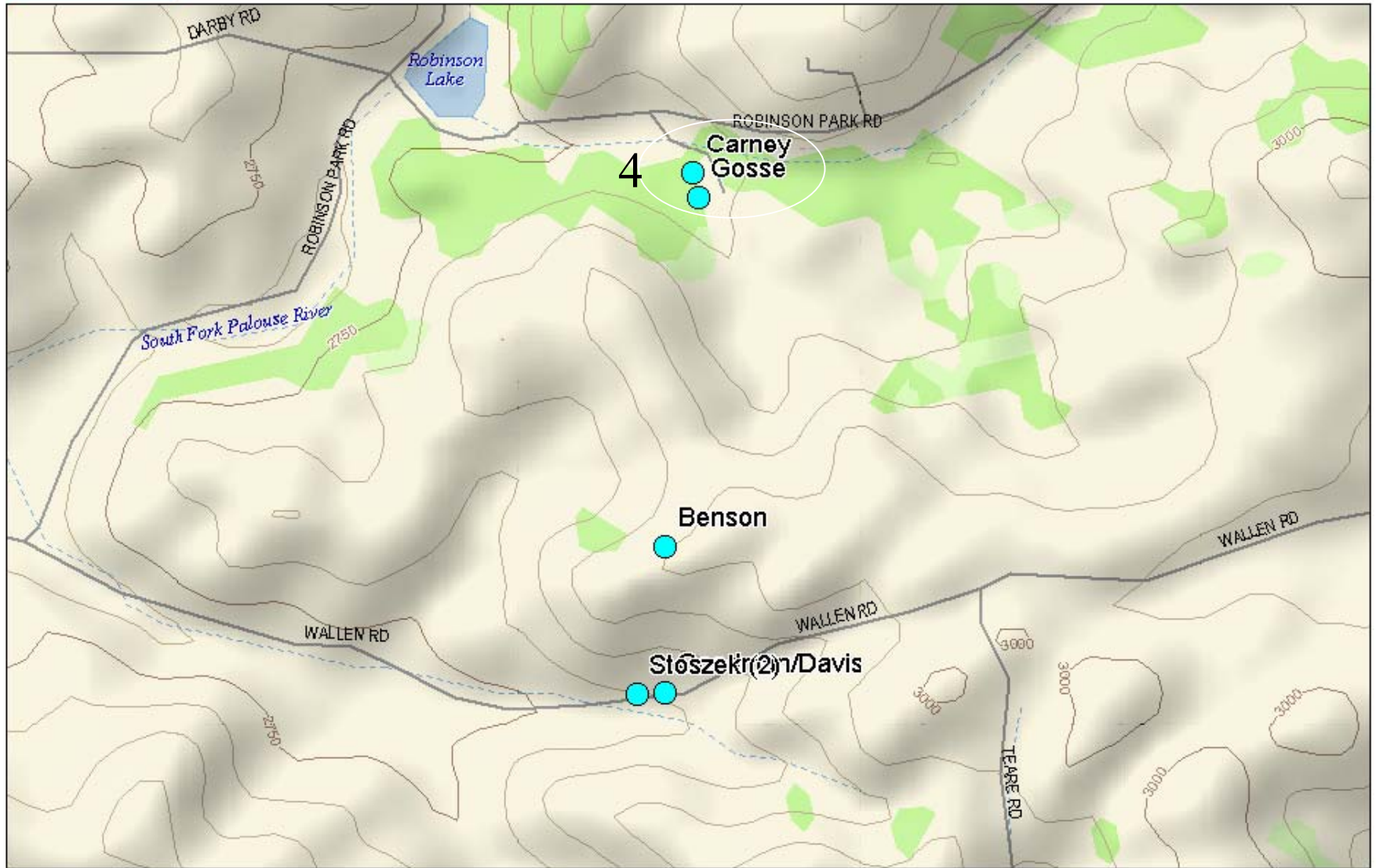


MN (16.0° E)



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Robinson Park Area Wells



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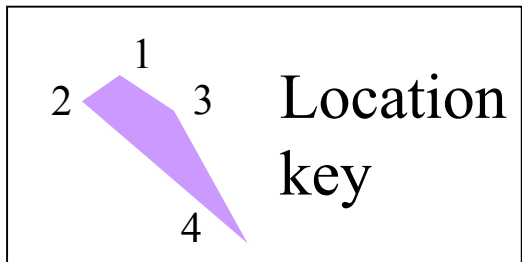
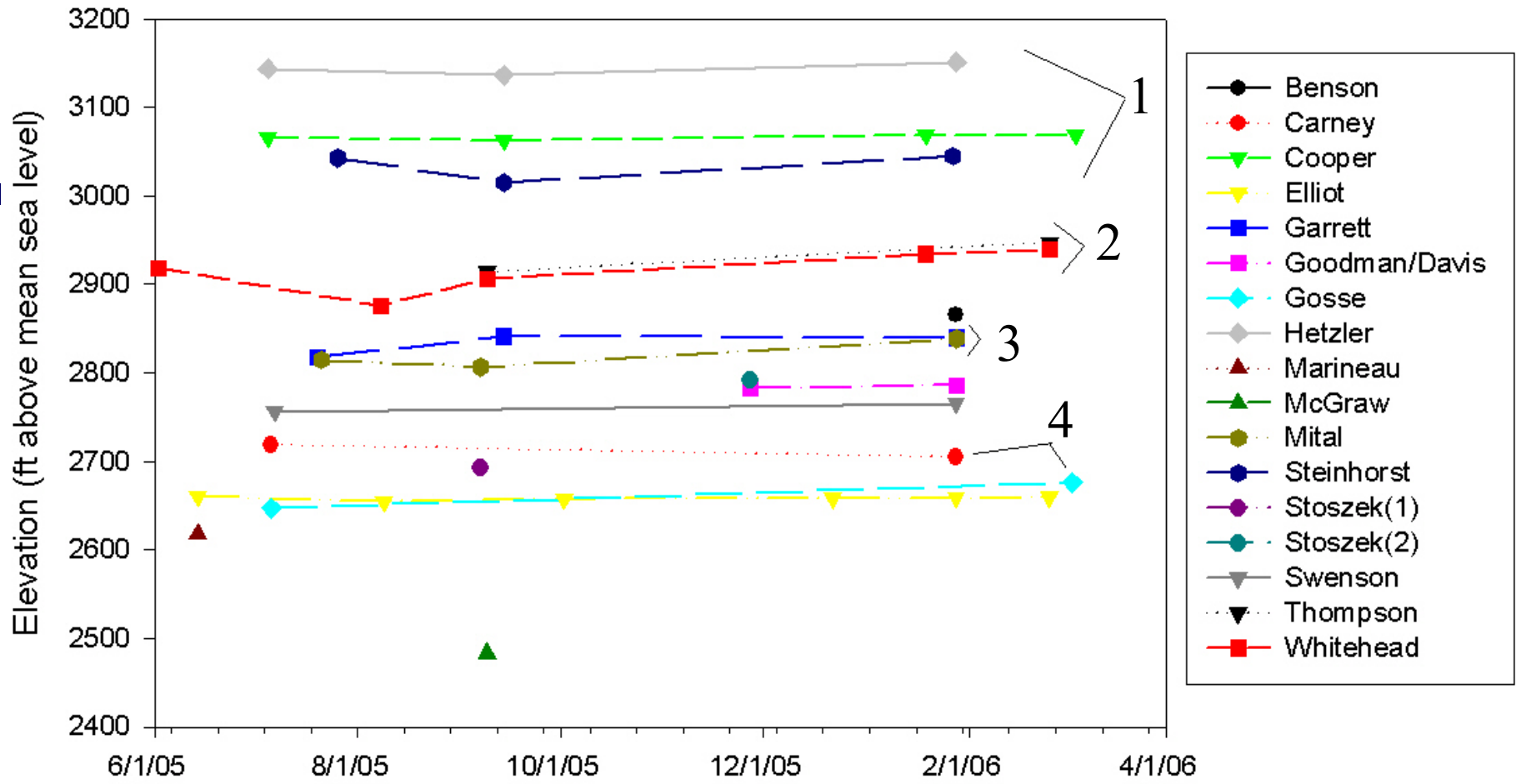
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○ Groupings

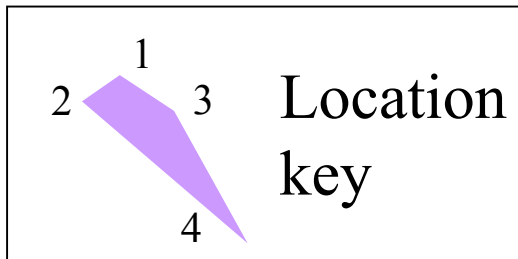
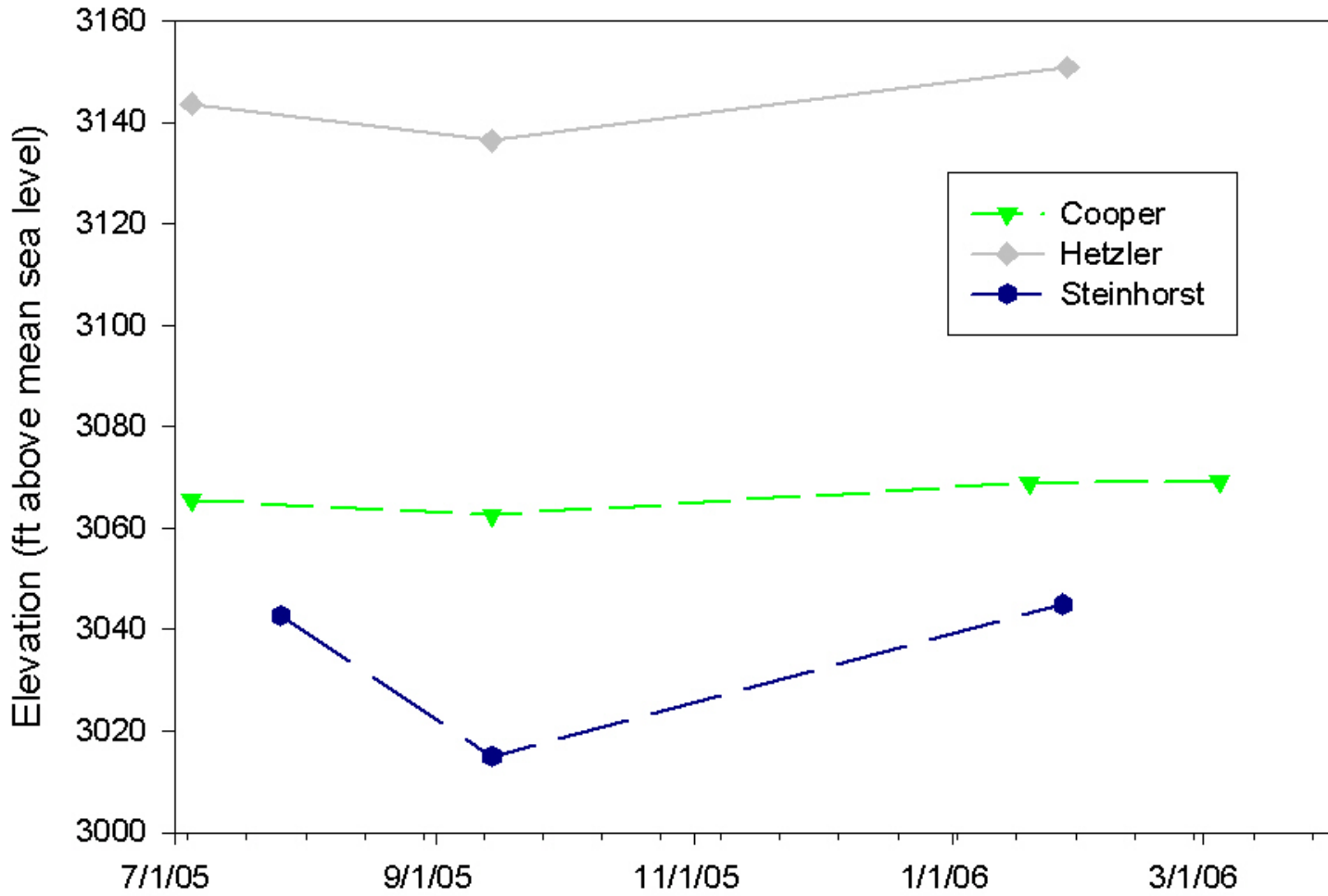


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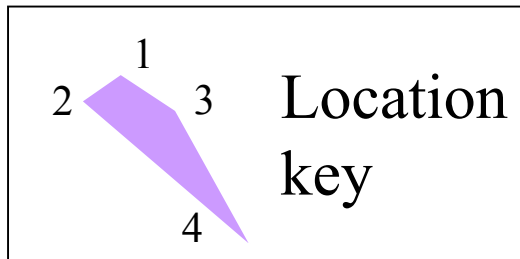
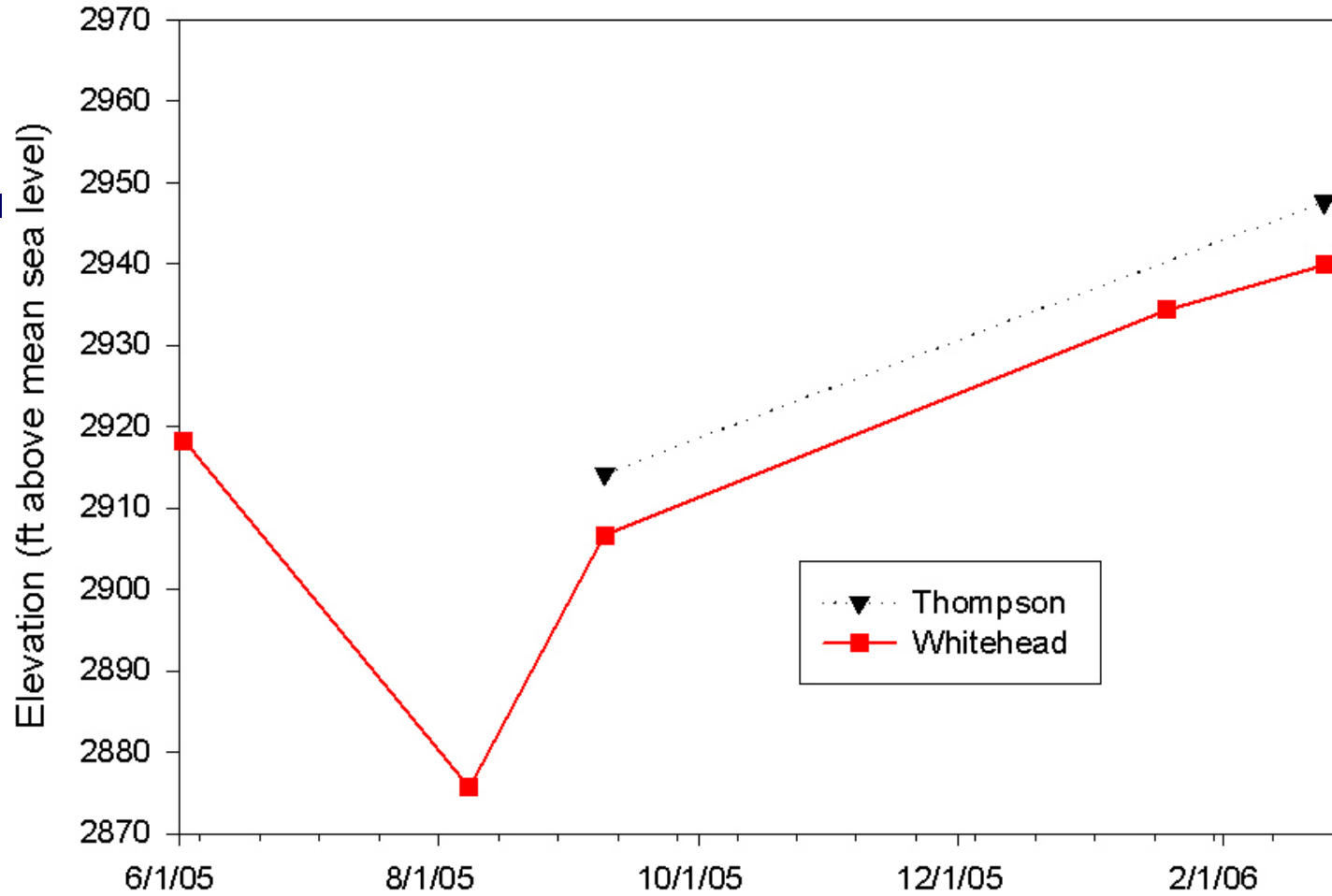
Water-Level Elevations



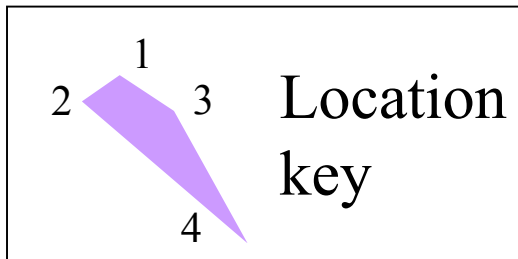
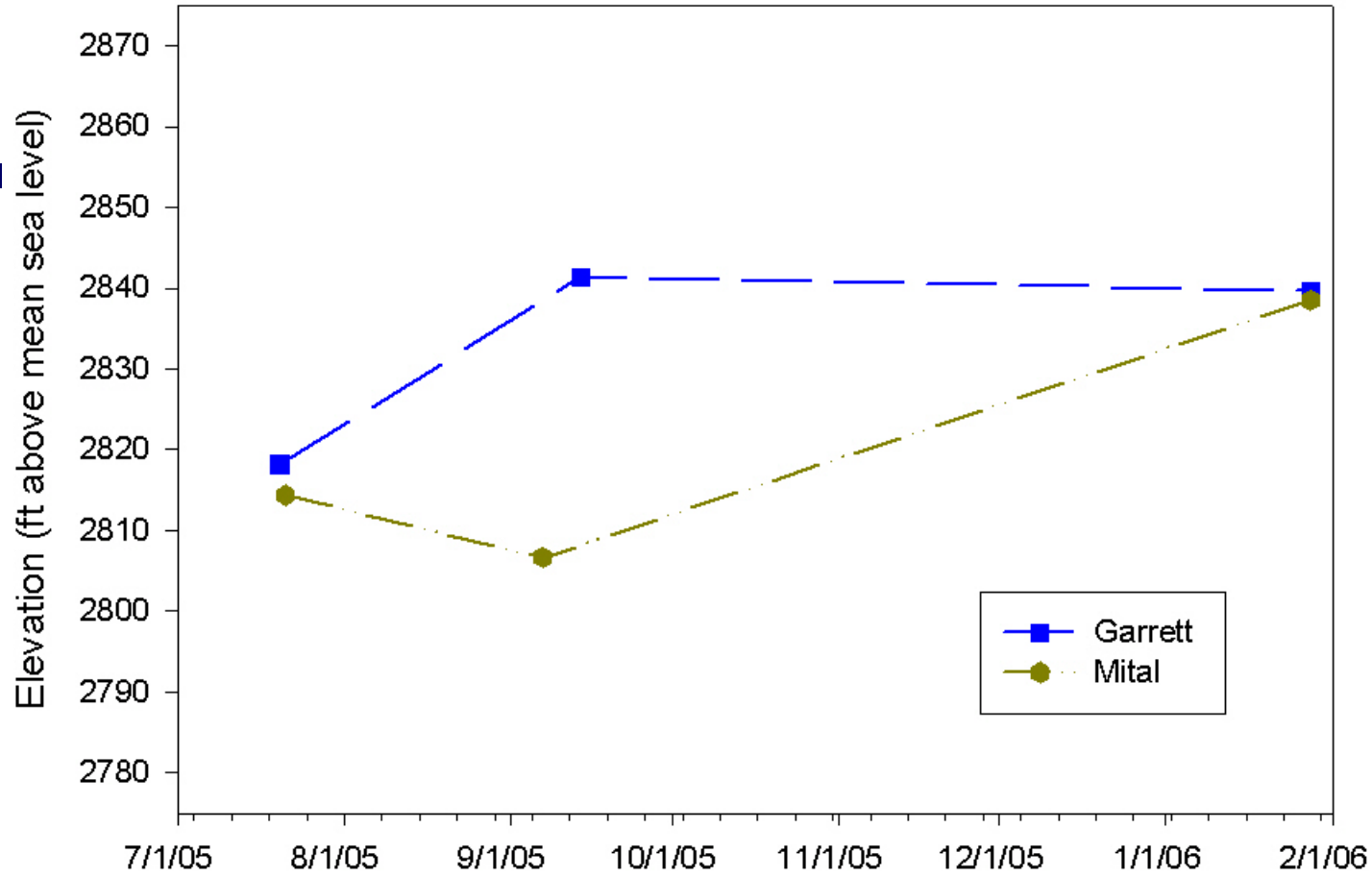
Nearing Addition



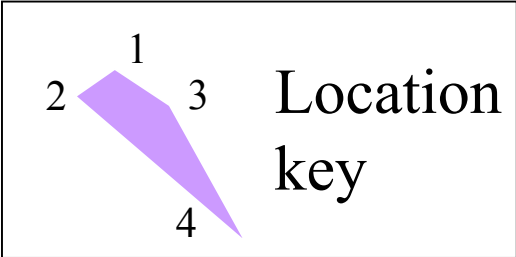
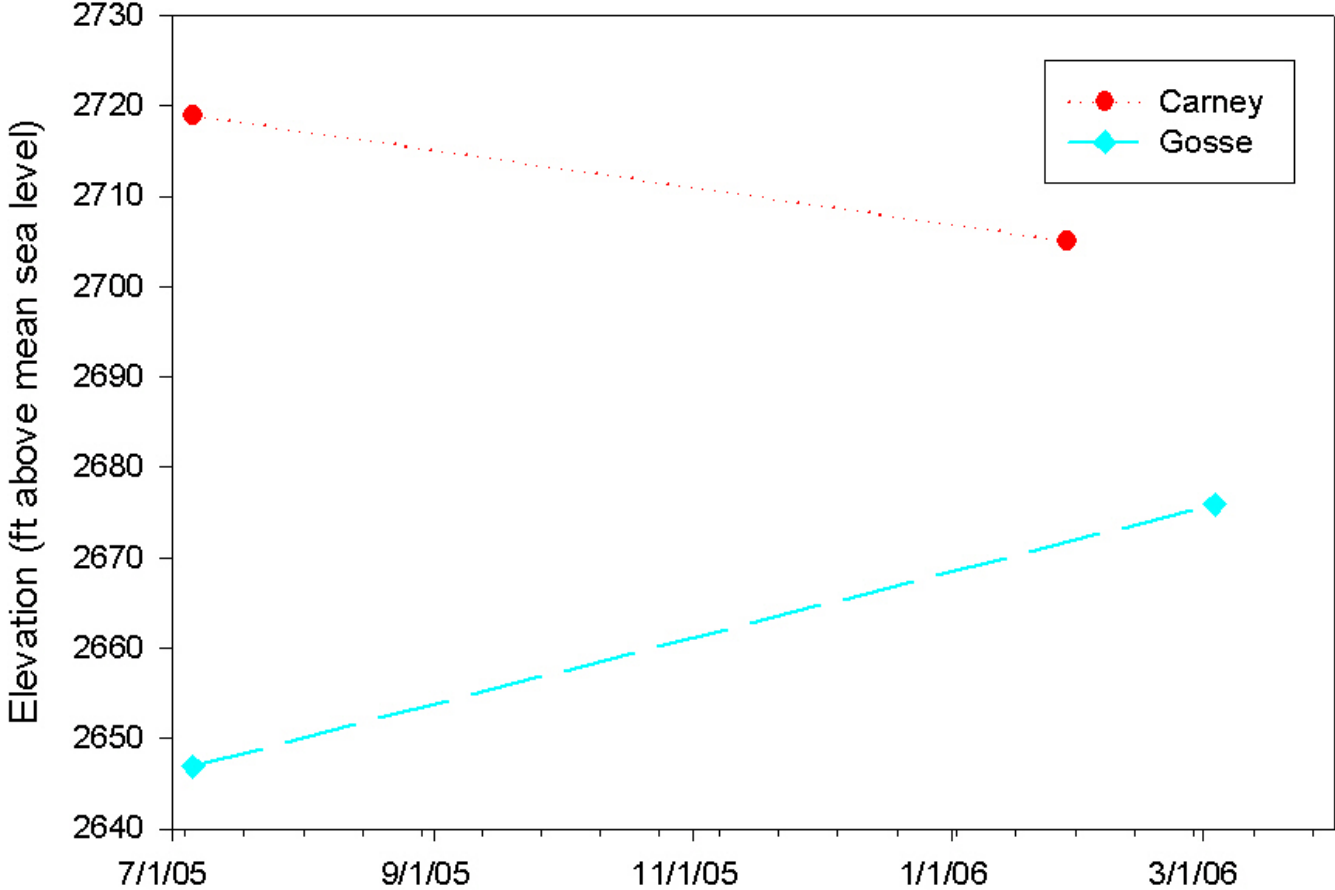
Whitehead/Thompson



Garrett/Mital



Carney/Gosse



Participant interview results

- Most identify stains or precipitates forming on plumbing fixtures
- 2 noted an increase in turbidity and/or taste difference during spring run-off or after a big storm (wells not close)
- 1 noted high iron content
- 2 noted decreases in flow from faucet at some point in the year (wells not close)

Summary

- SAD program provides:
 - GPS data on the wells
 - Well logs
 - Interview information and observations
 - Water level data
- Both PBAC and the well owners benefit with a scientifically sound knowledge of what happens to water levels in the shallow aquifer during a drought and the pursuing wet period at the specific locations

Future work

- Acquire remaining well logs and interview questionnaires
- Compare snow-pack data to water-level trends
- Collect more data into the summer

Acknowledgements

- Well owners
- PBAC
- Larry Kirkland