Proposal to Study Surface-Water/Groundwater Interactions in the Middle Segment of the Brazos River Alluvium Aquifer (BRAA)

- The middle segment includes the counties of **Brazos, Burleson, Milam and Robertson counties.**
- This study will investigate groundwater and surface water interactions among **the river, the BRAA, and the bedrock aquifers** in contact with the river.
- Literature, water levels, chemistry (ionic and Isotopic), and stream flows where feasible and appropriate.
- Quarterly oral progress reports and **a written final report Dec. 2024-spring-summer 2025**
- Baylor University MS and BS geoscience students mentored by Dr. Yelderman.

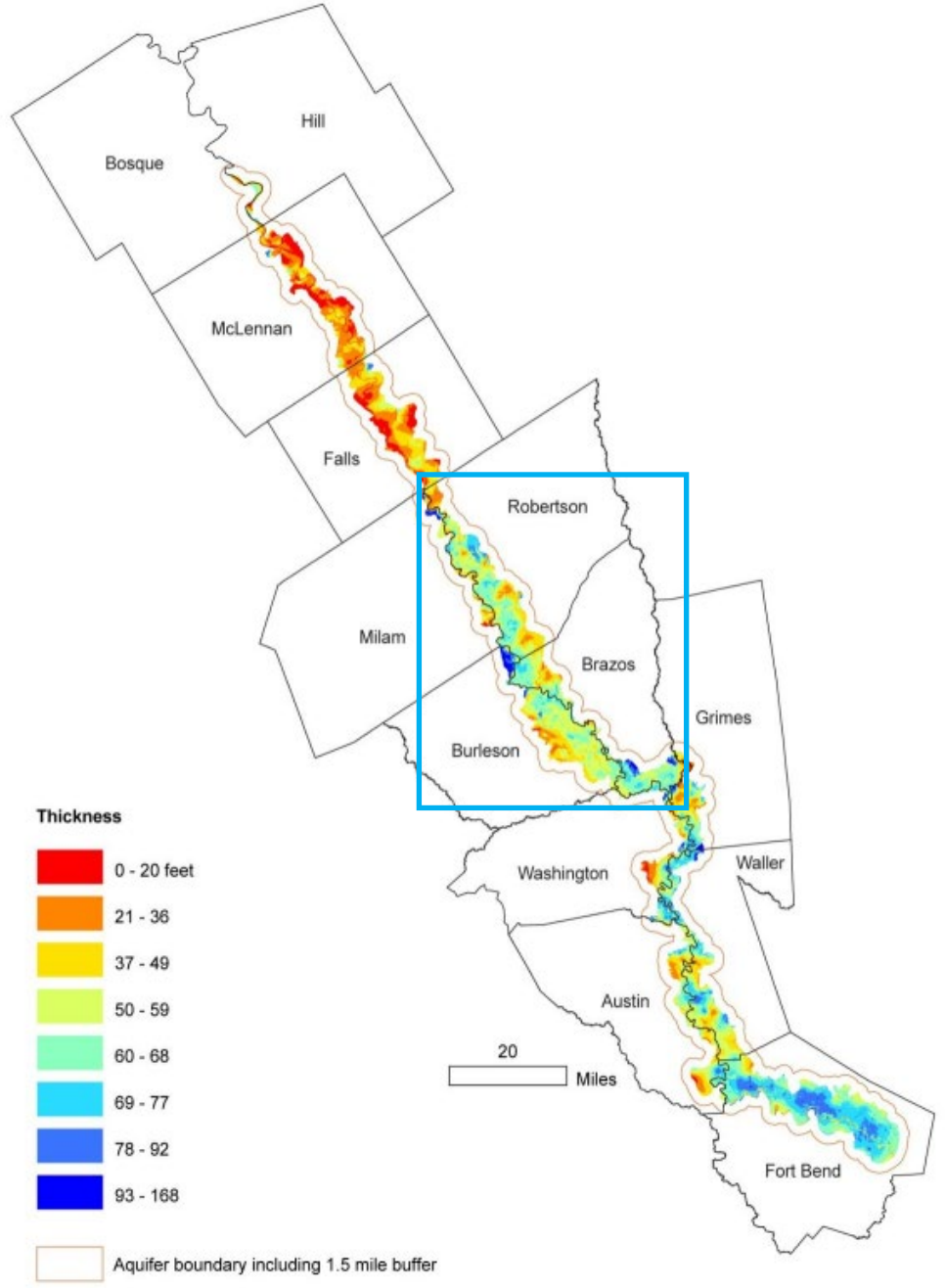


Figure 6-53. Thickness of the Brazos River Alluvium Aquifer, Bosque County to Fort Bend County, Texas (from Shah and others, 2007).

Objectives

1. Determine the present-day **flow directions** in the BRAA in relation to the Brazos River and relevant bedrock aquifers.

2. Describe the present-day **seasonal effects** on water levels and flow directions in the BRAA in relation to the Brazos River and relevant bedrock aquifers.

3. Describe the **historical flow** directions in the BRAA in relation to the Brazos River and relevant bedrock aquifers.

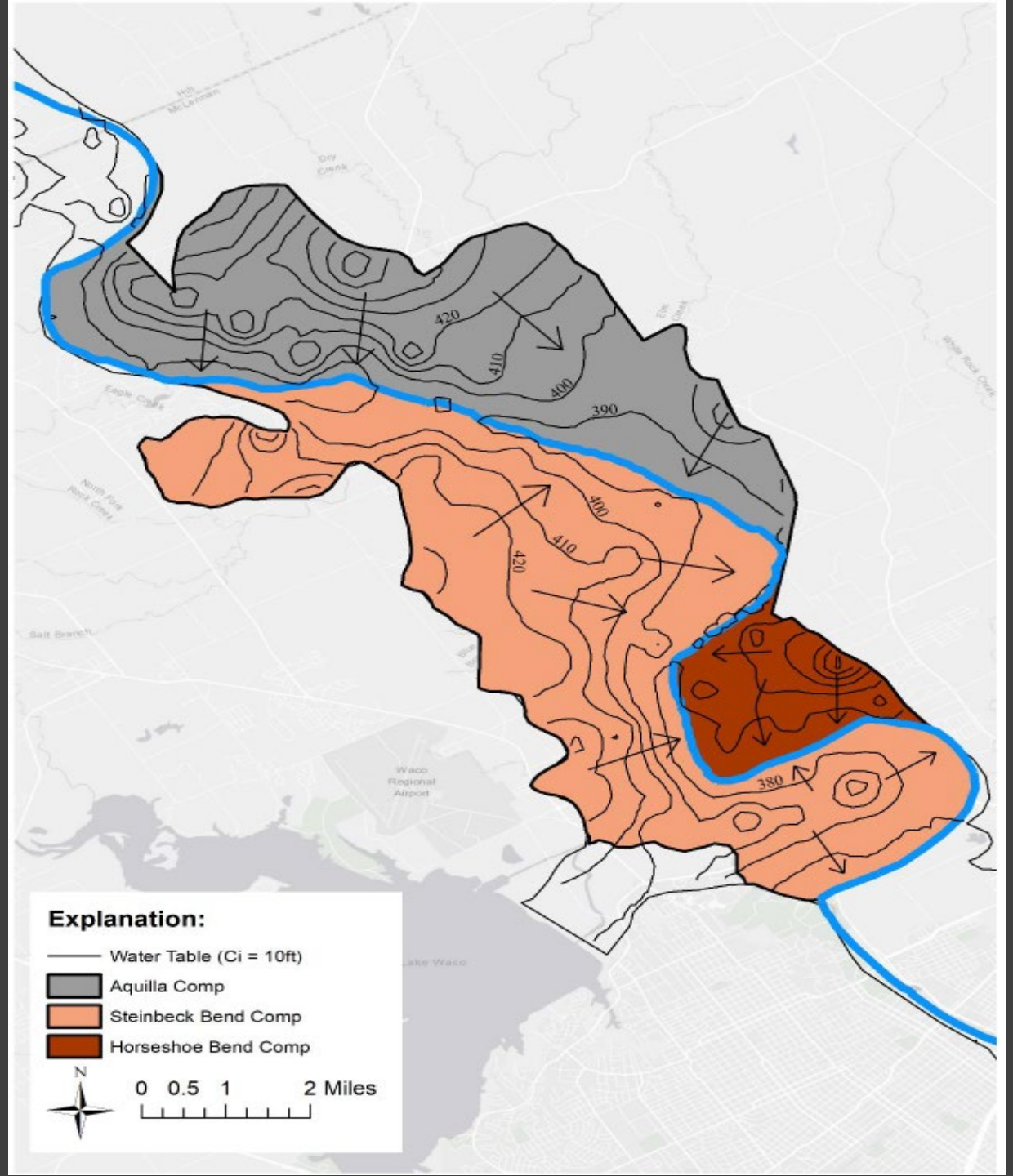
4. Obtain a better understanding of the **rates of flow** into and out of the BRAA.

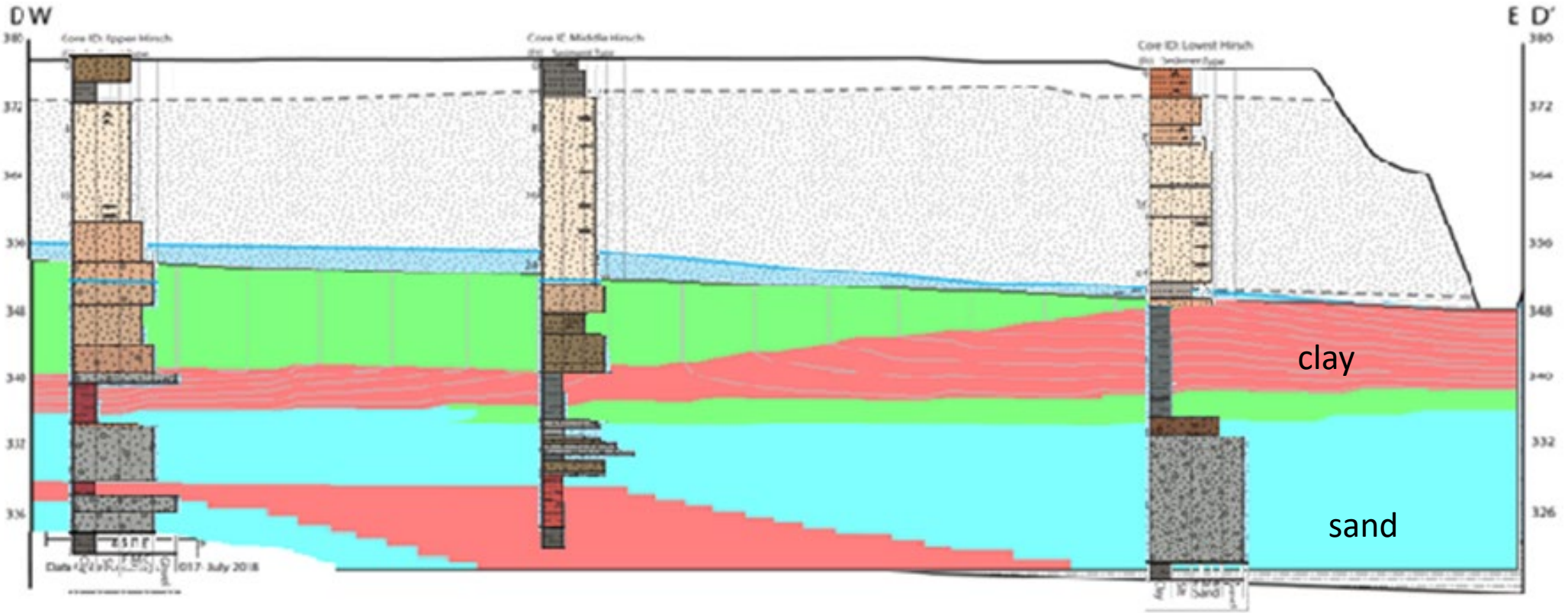
5. Develop a list of **next steps** for additional understanding the BRAA.

Groundwater/Surface-water Interactions – Brazos River

Jacob Jarvis (MS) and Jairon McVea (MS)

- The Brazos River Alluvium Aquifer
- Groundwater flows to the river
- The River acts as a boundary
- What is the interaction like?

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Travel times from a high-water event

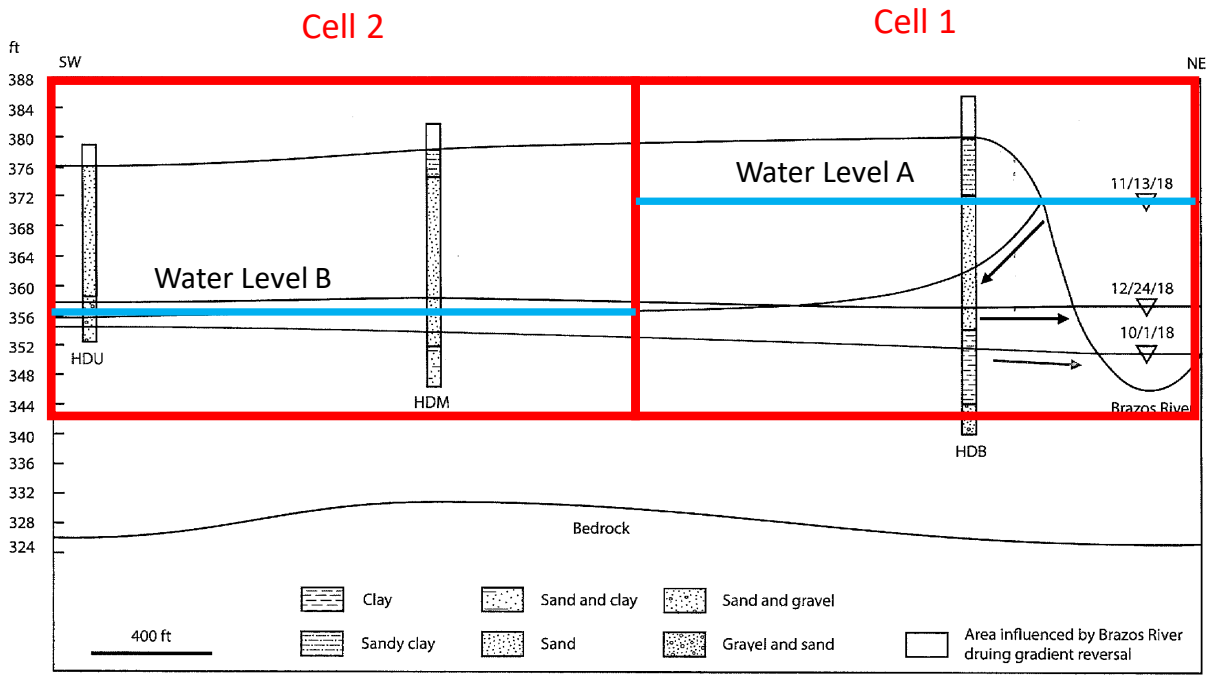
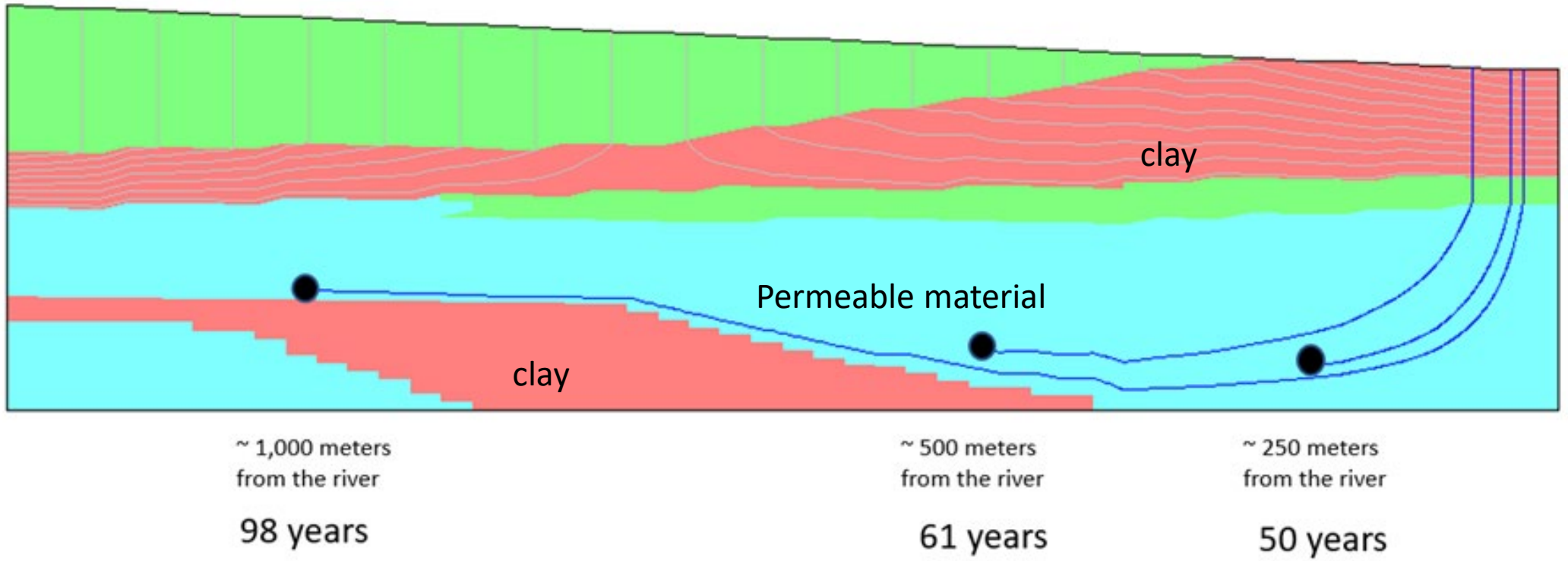


Figure 3.43. Cross section showing water table for wells HDU, HDM, HDB, and the Brazos River on 10/1/18, 10/24/18, and 12/24/18 and the area influenced by the Brazos River during the 37-day gradient reversal.

Travel times from a baseflow event



Proposed Project Schedule

- **August –September 2023**: Conduct intense survey of literature and existing data. This effort will continue through out the study.
- **October- December 2023**: Obtain and/or develop water level maps while becoming familiar with the BVGCD personnel and the study area in the field. Determine monitoring and sampling sites including the need and location for potential piezometers or wells and stream gages that may be useful.
- **January – December 2024**: Collect targeted water level and chemical data.
- **September 2024 – February 2025**: Analyze the data and write the report.
- **April 2025**: Present final report.
- **November 2023, March 2024, June 2024, November 2024, and March 2025: Quarterly oral progress reports.**

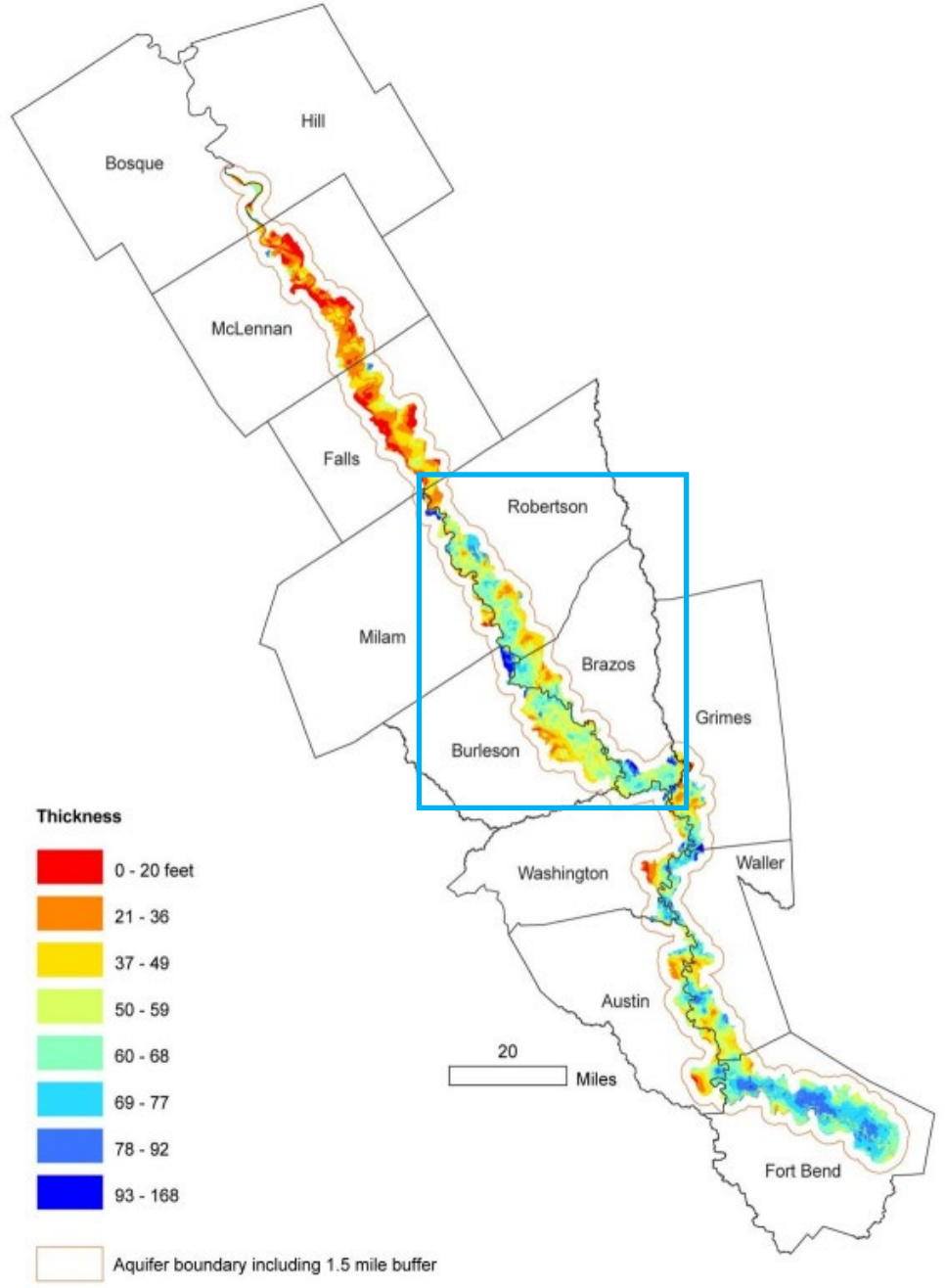
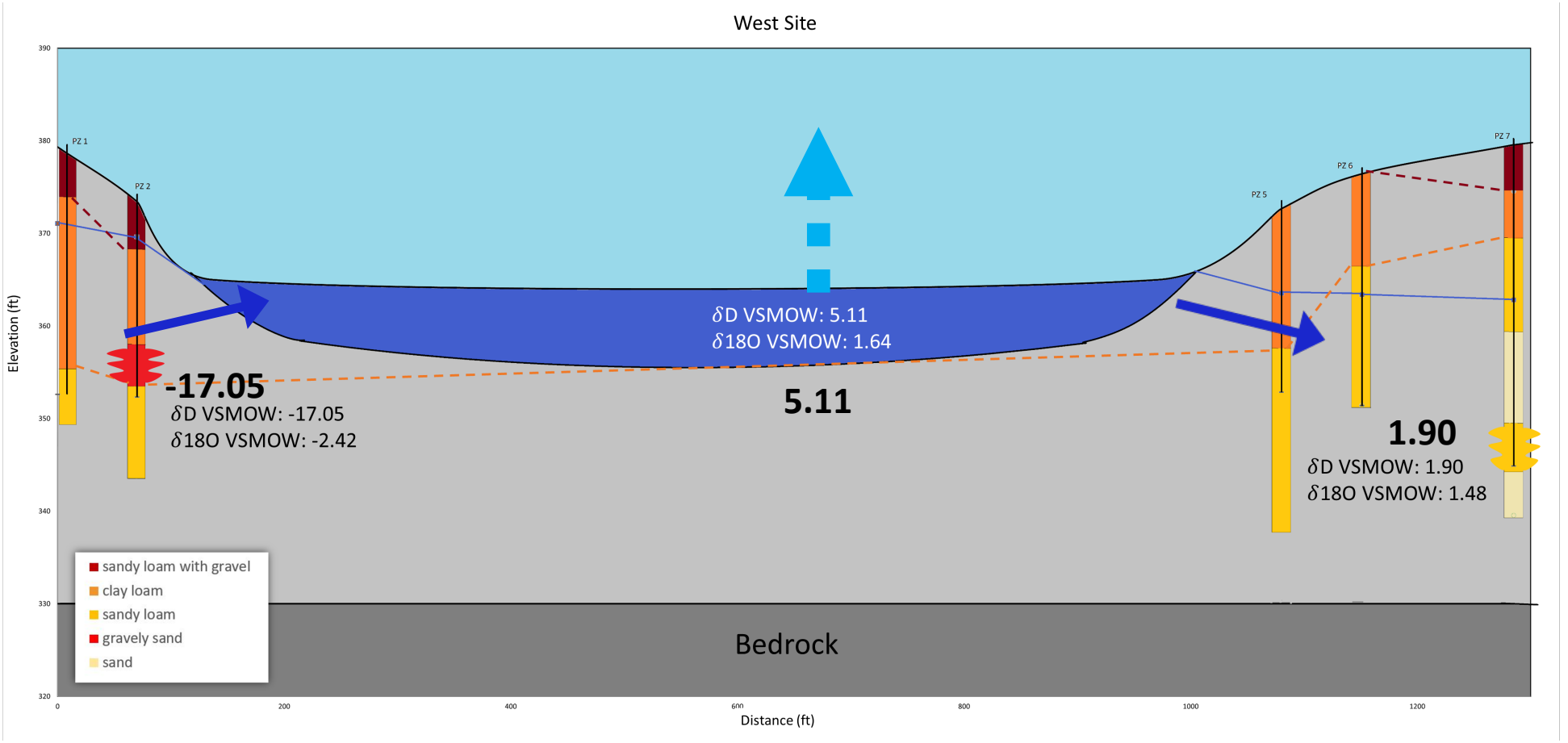


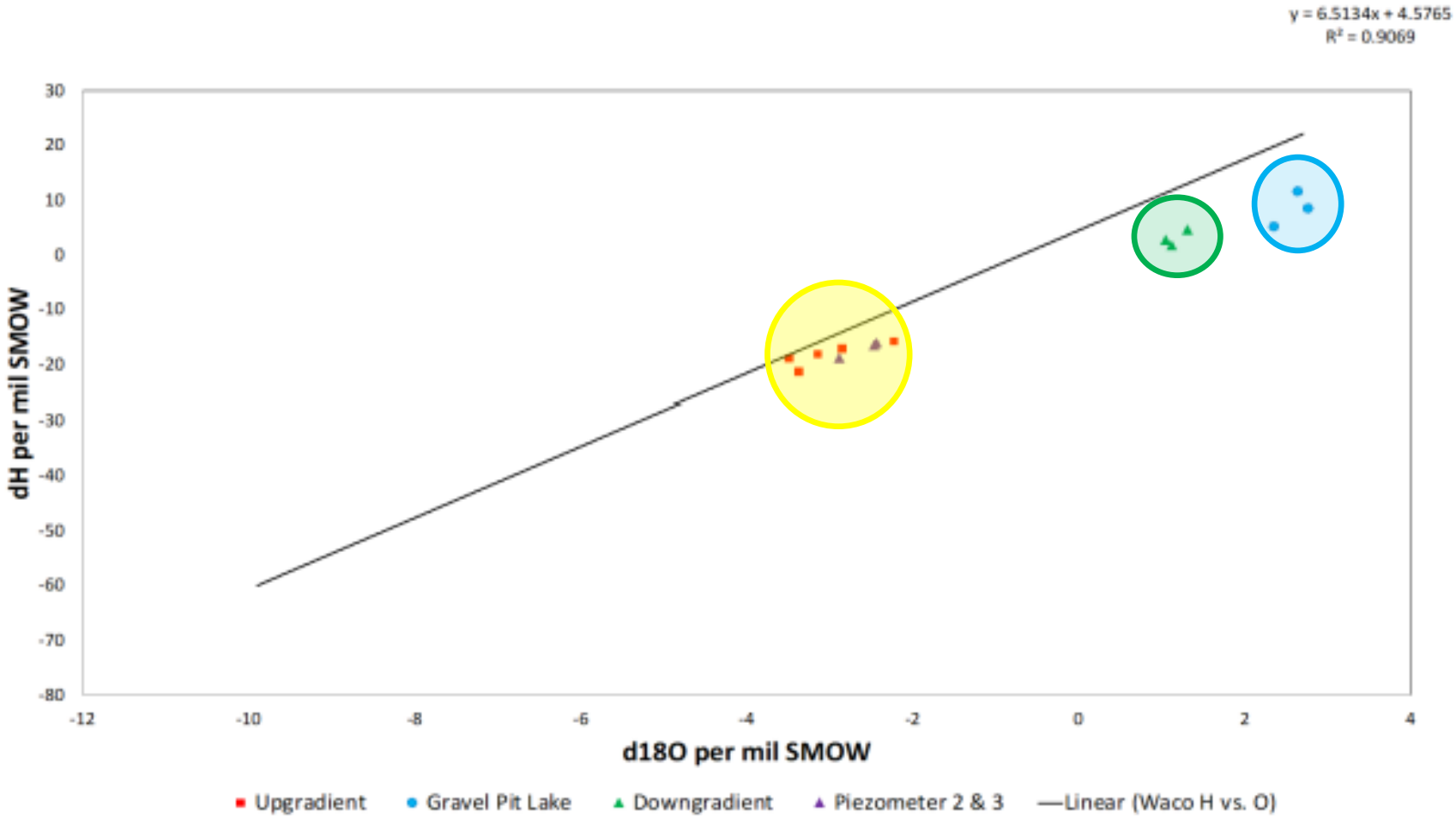
Figure 6-53. Thickness of the Brazos River Alluvium Aquifer, Bosque County to Fort Bend County, Texas (from Shah and others, 2007).

Groundwater/ Surface Water Interactions: Gravel Pit Lakes in the Brazos River Alluvium Aquifer - ISOTOPES

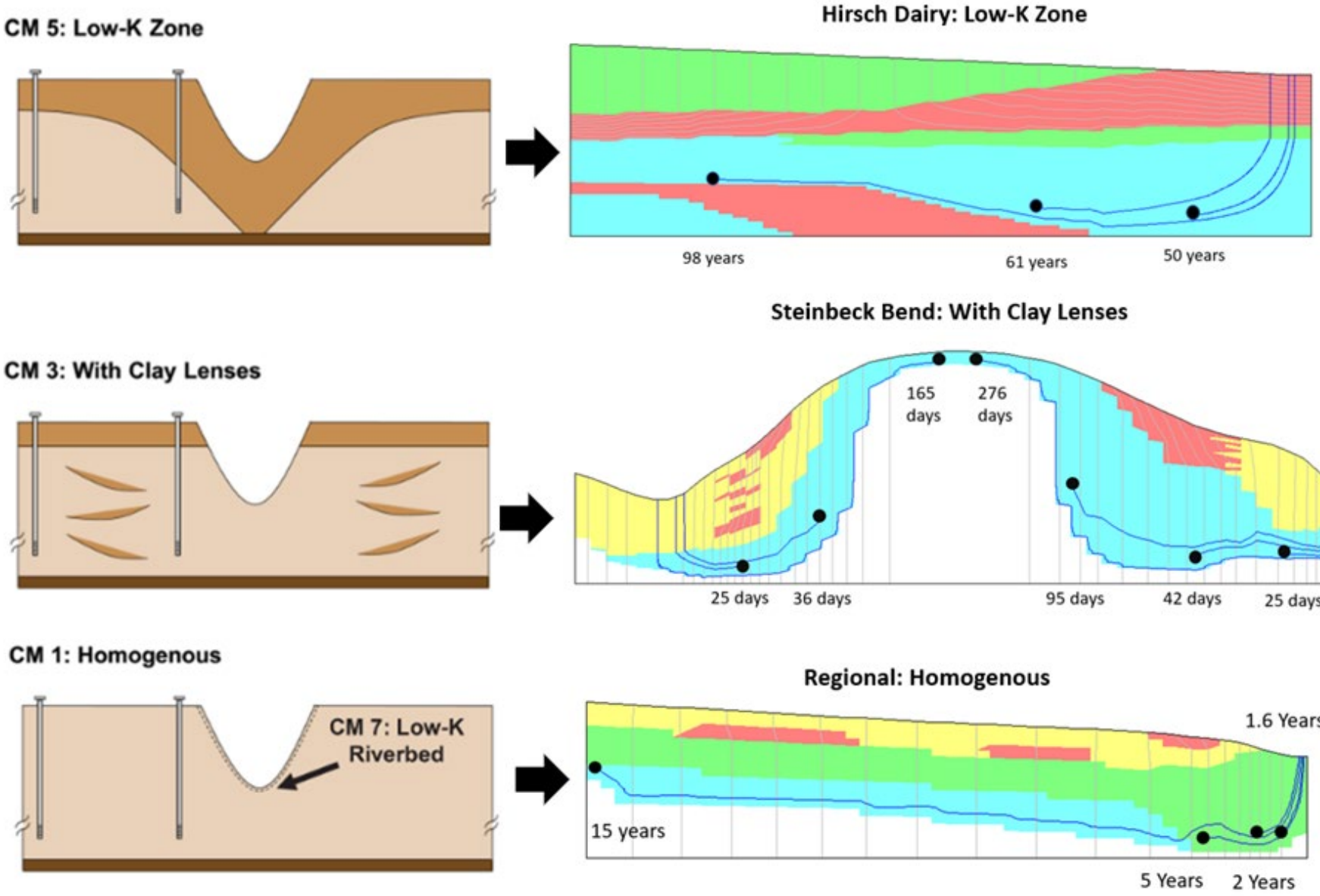
Claudia Dawson
M.S



Oxygen-18 and deuterium isotopes from the East Site upgradient piezometers 7 and 5R (red squares), the gravel pit lake (blue dots), downgradient piezometer 4 (green triangle), and piezometers 2 and 3(purple triangle) plotted on the Waco LMWL , showing differences in isotope concentrations in groundwater and surface water



Other studies Mehmood et. al., 2022



- **Distance to river**
- **Water table gradient**
- **Sediment distribution**