

Groundwater level and storage changes for regions of New Mexico

Stacy Timmons, NMBGMR; Alex Rinehart, NMBGMR; Mike Johnson, NMOSE; Nathan Myers, USGS; Matt Ely, USGS; KC Carroll, NMSU

Water level change may indicate variations in nearby surface water, fluctuations in recharge amounts, and changes in the total water remaining in storage for future use.

Goal: Develop and test a streamlined system for estimating groundwater storage changes in NM alluvial aquifers.

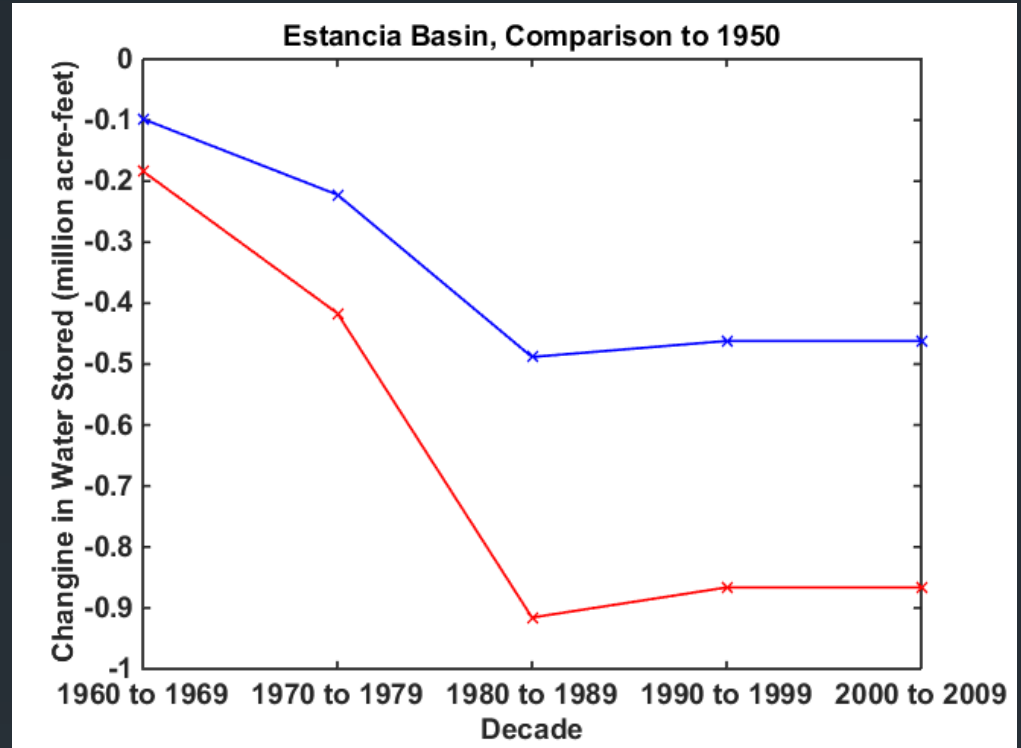
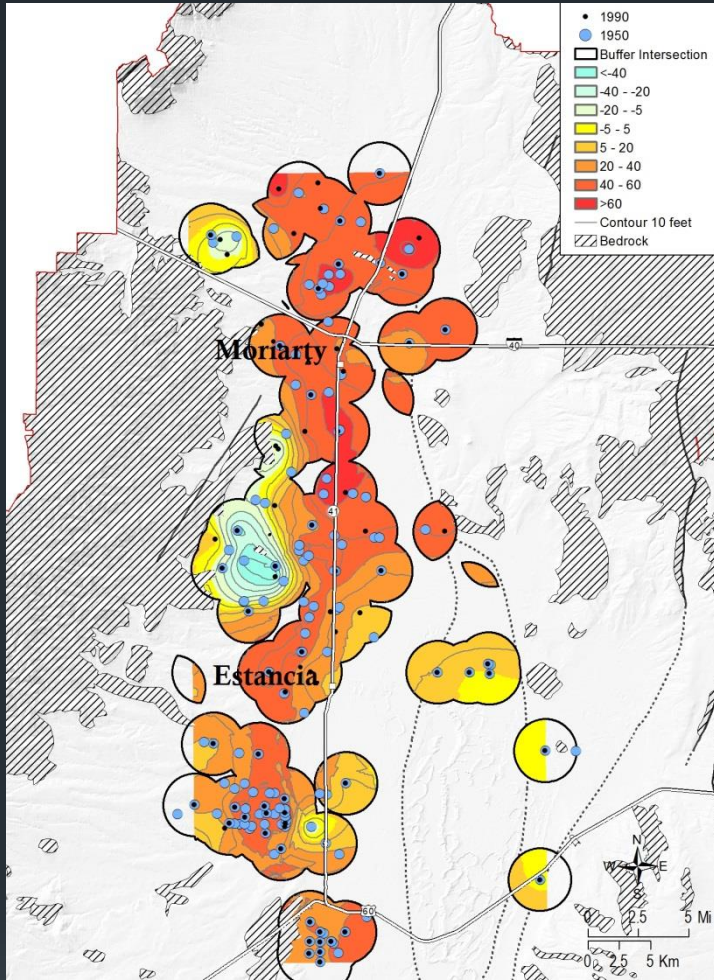
- Step 1: Compile water level data into relational database
- Step 2: Develop method in Mimbres Basin
 - Estimate groundwater storage change as of water level change contours (maps) and time series (basin-wide water volume change).
- Step 3: Test method in Estancia Basin.

Use multiple interpolations and comparisons-in-time to understand level of uncertainty.

Method Summary

- Find median winter unflagged depth-to-water (DTW) for each decade.
- Find distance from well where DTW is uncorrelated.
- Interpolate DTW within correlated distance from wells with IDW and kriging.
- Find difference between DTW in later decades and earlier decades ONLY in intersecting distance from wells.
- Assuming 2 specific yields, find high and low estimates of storage change.

Example from Estancia Basin



Example of water level change in Estancia Basin using kriging, change from 1950s to 1990s. Light blue: > 40 ft increase. Dark red: > 40 ft loss.

- Use of buffers, workflow and multiple interpolations speed calculations.
- Different interpolations and buffers yield consistent storage change estimates.

Mimbres Basin shows between 2 and 4.5 Maf loss from 1950s to present.