Introduction
Nitrate nitrogen (NO₃-N) contamination of groundwater in the Seymour Aquifer has been documented since pre-1960. Concentrations as high as 35 mg/L NO₃-N have been reported (3.5 times the EPA allowable standard for drinking water). While most water from the Seymour Aquifer is used for agricultural irrigation, a portion is still used for domestic purposes and poses potential risk to human health. The specific source of NO₃-N contamination is still debated.

Research Approach
Three possible sources of NO₃-N contamination were considered in this study:
- Geology of the aquifer (natural salt accumulation from water confined in patches of Quaternary-age alluvium)
- Contribution of nitrate from sewage and agricultural fertilizers (cotton, wheat, peanuts)
- Historical land use change of the area above the aquifer (leguminous nitrogen-fixing mesquite cleared in the 1930's for agriculture)

Research Findings
- Wells dug with shallower depths along the outer portions of the aquifer have higher log[NO₃-N] concentrations than the central portion of the aquifer throughout all decades.
- Coordinates of wells containing no depth data and/or no NO₃-N data were excluded from this study.
- Depth over all wells sampled meeting the criteria above were broken into quartiles (the 25th, 50th, 75th, and 100th percentile).
- The median concentrations of log[NO₃-N] have increased in deeper wells over time, with a tremendous increase occurring from 1986-1997 in wells between 47-55 ft, and greater than 55 ft deep.
- Further research will include:
  - Consideration of land cover development over time
  - Conducting well sampling transects longitudinally across the middle of the aquifer as well as taking samples from NO₃-N "hot spots" to provide a better view of present aquifer contamination in relation to concentration and depth
  - Conducting a detailed isotopic analysis to differentiate between origins of NO₃-N as soil N and sewage N

Conclusions and Further Research
- Log[NO₃-N] concentrations are significantly higher in shallower wells.
- Over time, median concentrations of log[NO₃-N] are increasing in deeper wells, and two probable scenarios exist:
  1) NO₃-N is leaching downwards into deeper wells over time
  2) Excessive pumping has begun to force NO₃-N contamination into deeper wells
- Further research will include:
  - Consideration of land cover development over time
  - Conducting well sampling transects longitudinally across the middle of the aquifer as well as taking samples from NO₃-N "hot spots" to provide a better view of present aquifer contamination in relation to concentration and depth
  - Conducting a detailed isotopic analysis to differentiate between origins of NO₃-N as soil N and sewage N

Research Approach (Continued)
- Log[NO₃-N] was taken in order to distribute the data normally, and an EBK was performed.

Study Area
- Well data had a Gaussian distribution throughout all decades.
- Coordinates of wells containing no depth data and/or no NO₃-N data were excluded from this study.
- Depth over all wells sampled meeting the criteria above were broken into quartiles (the 25th, 50th, 75th, and 100th percentile).