



HYGEM:
A USGS PERSPECTIVE

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High Priority Areas of Research

- ▣ Development of improved data sets of the physical properties
- ▣ Improvements of calibrations to AEM
- ▣ Uncertainty assessments and coupled data integration strategies
- ▣ Using the various tools to define structure and complicated geology
- ▣ Lithologic and hydrologic inversions that brings actual data in and hydrologic parameters out
- ▣ A Focus on Science for Water Management

Western Nebraska



- ▣ Extensive datasets- water levels, water quality, 3 groundwater models, extensive geophysics, ~400 test holes
- ▣ Ongoing work on hydrogeophysics, hydrogeologic frameworks and groundwater modeling
- ▣ Active groundwater- surface water management area

High Plains Aquifer

- ❑ Largest Fresh Water Aquifer System in America
- ❑ Nebraska has ~60 percent of available water in storage
- ❑ Aquifer Vulnerability to depletion and contamination are major concerns

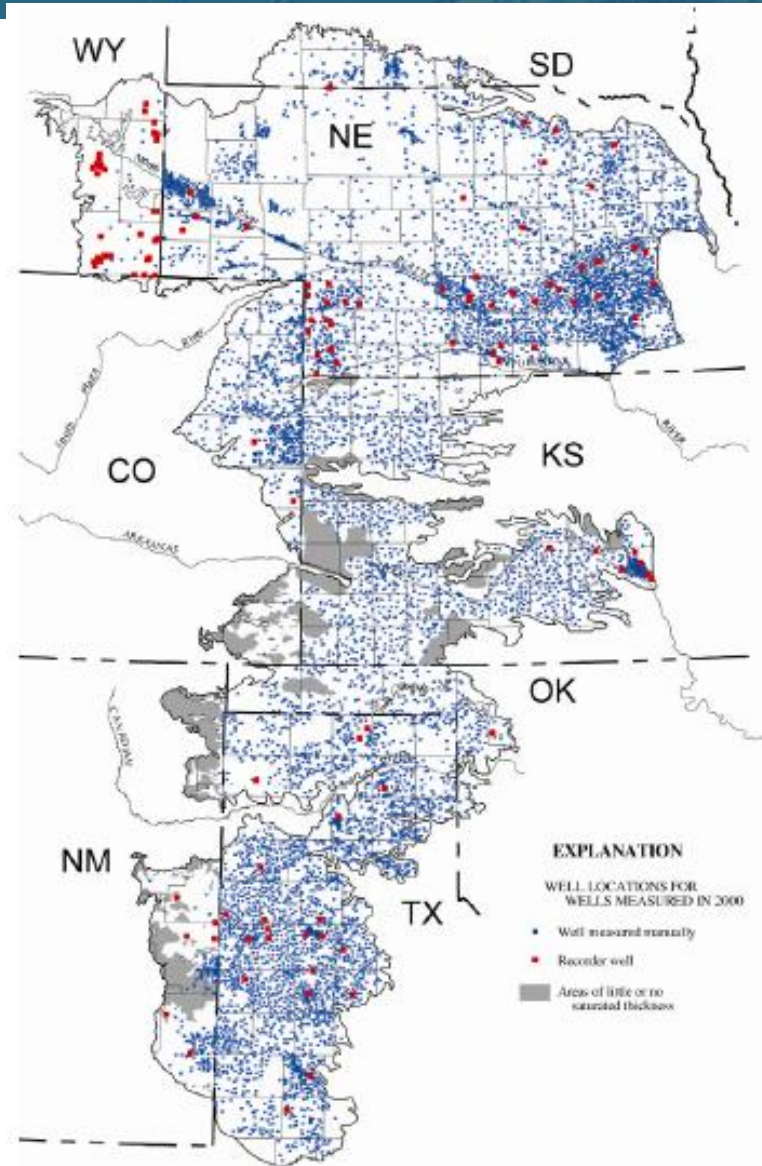
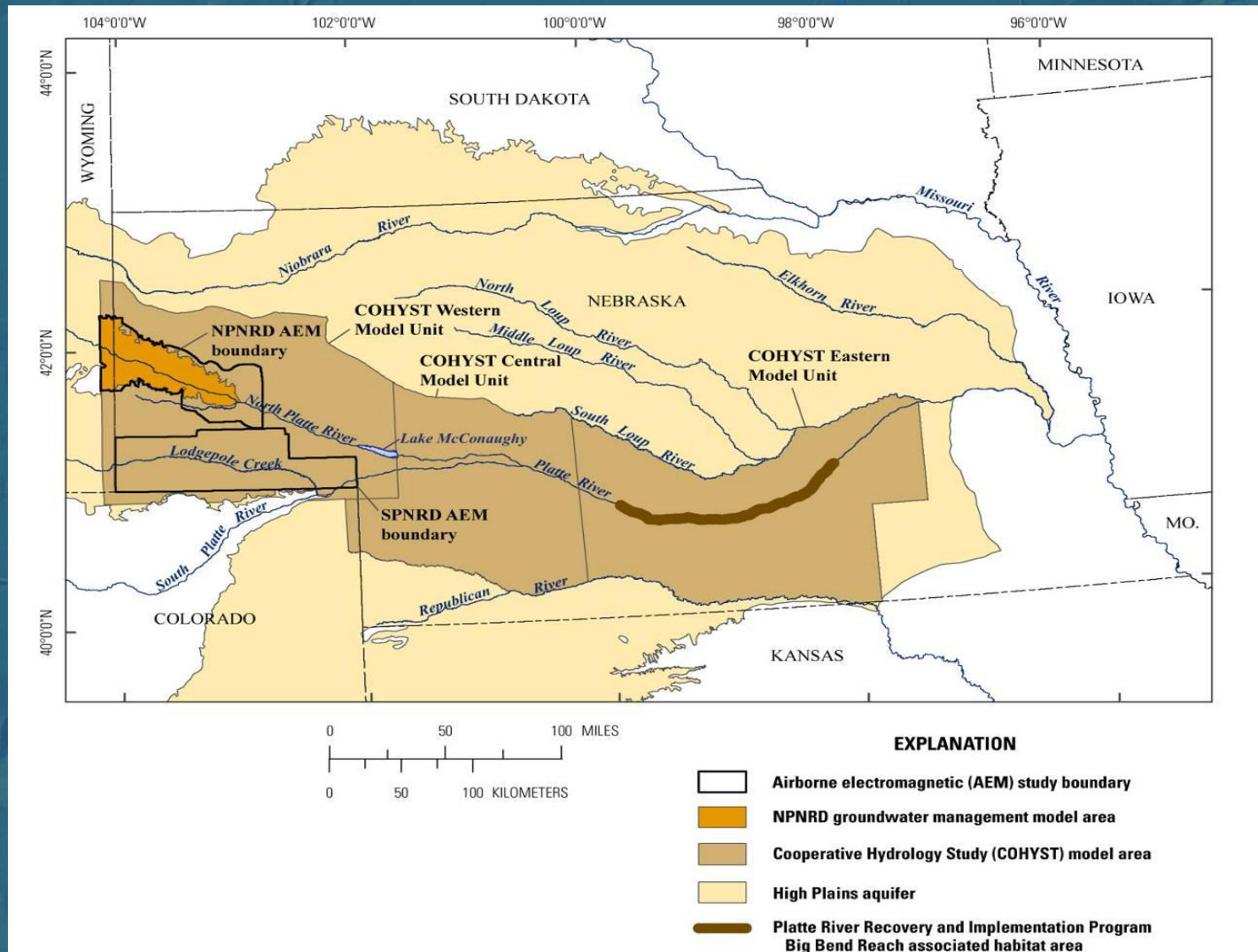
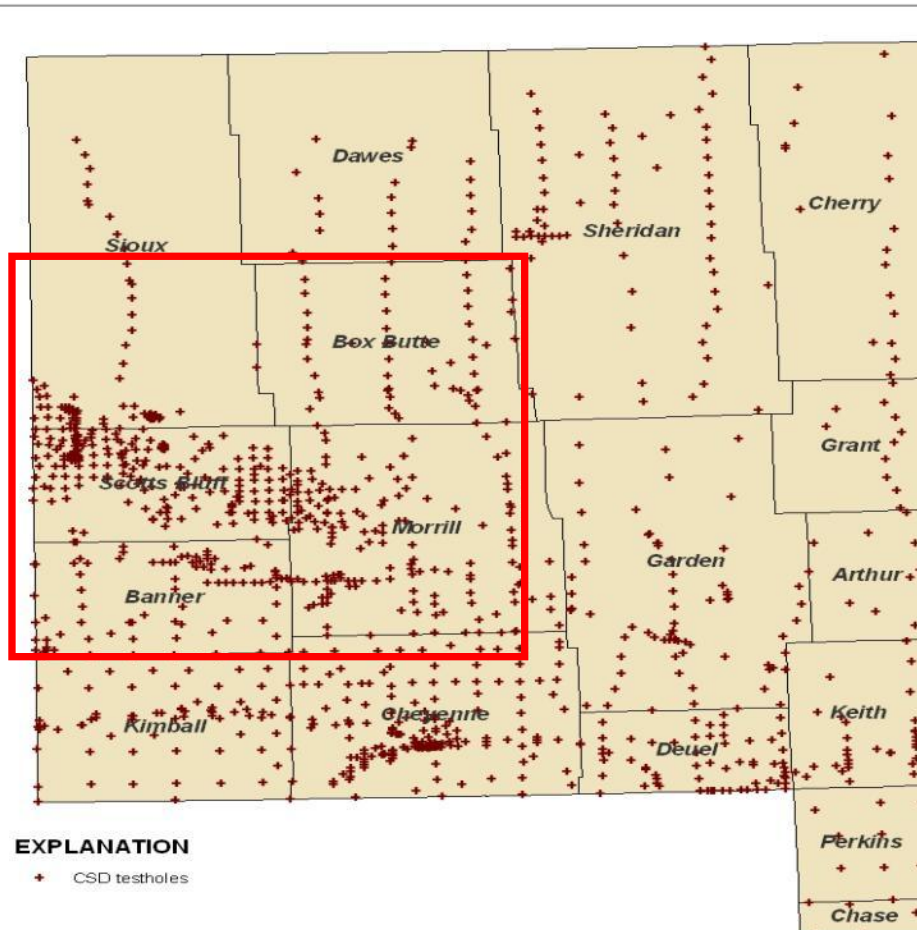


Figure 2. USGS ground-water-level monitoring network within High Plains aquifer.

Study Location and Groundwater Models in the Area

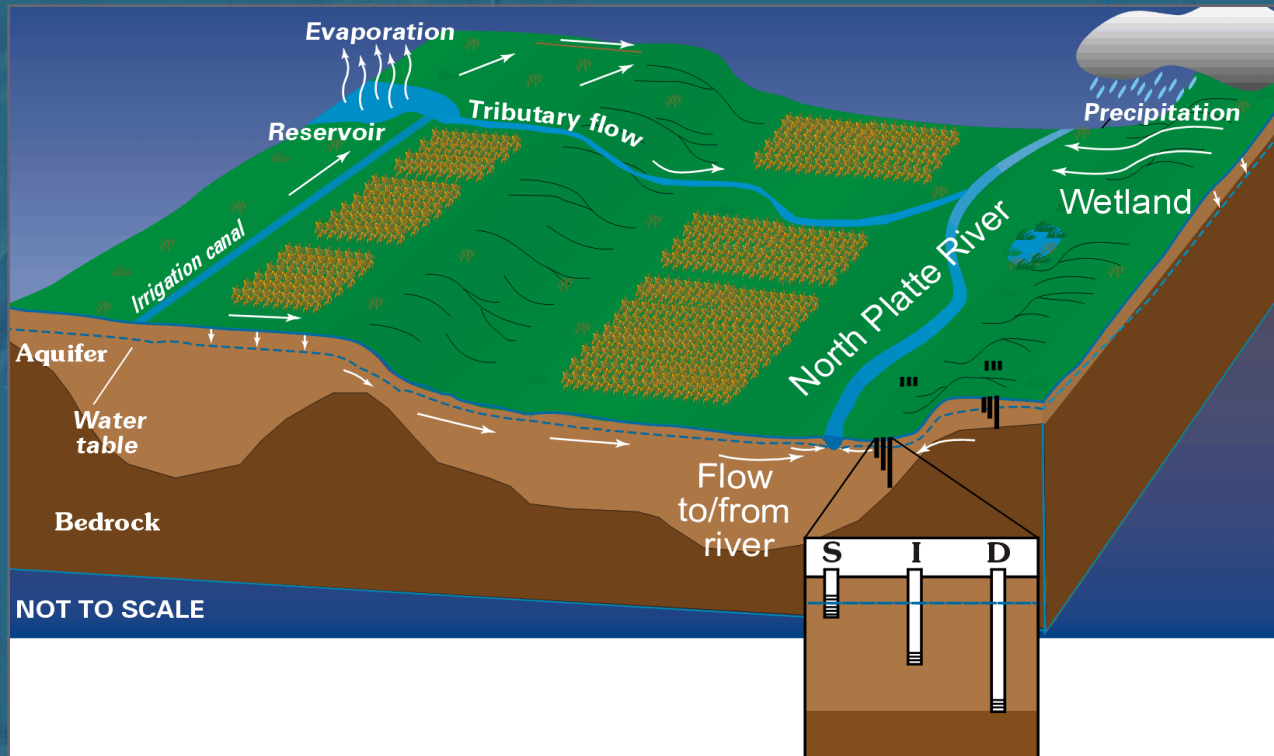


Motivation for Enhancing Hydrogeologic Frameworks



- Difficult models, failure to converge/calibration issues due to poor geologic control
- Poorly estimated bedrock topography despite large amounts of borehole and surficial geologic data
- Groundwater quality will be better understood with new interpretations of geology
- Understanding of groundwater age-dating information can be improved and used to calibrate model with new interpretation

Conceptual Model of North Platte Valley, Hydrogeologic Framework



Complex bedrock topography of buried paleochannels of the ancestral North Platte River eroded into Cretaceous and Tertiary bedrock

Complex groundwater and surface water relationships- 350,000 SW irrigated acres combined with 250,000 GW irrigated acres

Location of Airborne EM Surveys

