

## TASK 2: GEOLOGIC EXAMINATION OF THE BIRDS NEST AQUIFER

**Problem:** The Birds Nest aquifer is poorly understood and needs further study to determine potential impacts of saline water disposal.

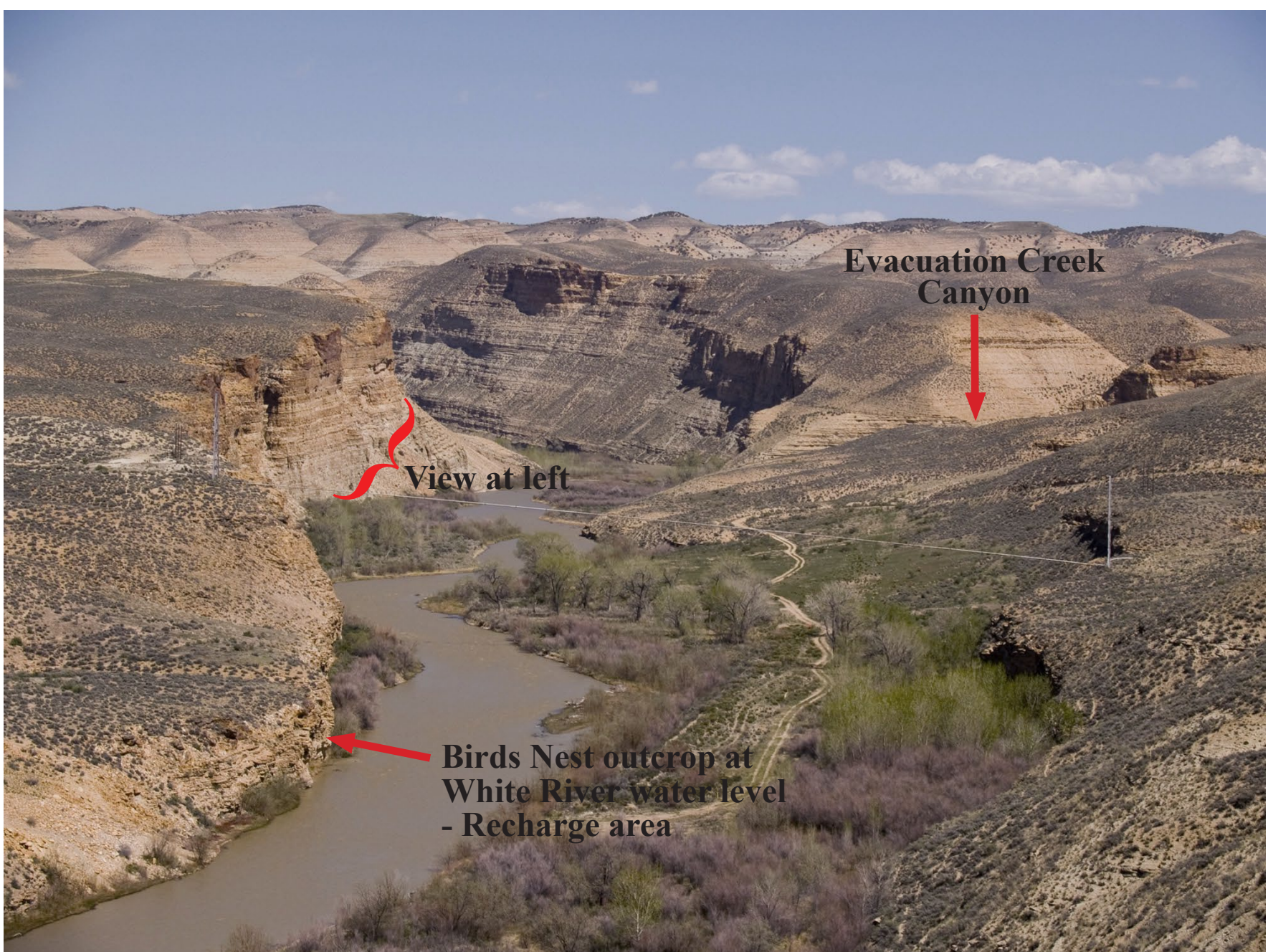
- What is its areal and stratigraphic extent?
- How is it related to Utah's oil shale deposits?
- What causes the differing zones of dissolution and salinity?

Eastern Uinta Basin natural gas producers have identified the Birds Nest aquifer, located in the Parachute Creek Member of the Green River Formation, as the most promising reservoir suitable for large-volume saline water disposal. This aquifer, ranging in thickness from less than 100 feet on the basin margins to greater than 300 feet in the basin's depocenter, formed from the dissolution of saline minerals which left behind large open cavities and fractured rock. Understanding the aquifer's areal extent, thickness, water chemistry, and zones of differential dissolution will help determine possible saline water disposal volumes and safe disposal practices, both of which could directly impact the success of increased hydrocarbon production in the region.

The Birds Nest aquifer is typically several hundred feet above the richest oil shale interval called the Mahogany zone. A significant concern is that saline water disposal into the Birds Nest by conventional gas producers could hinder oil shale development by creating unforeseen water disposal problems.

### Research/Deliverables:

- Comprehensive literature review and historic data collection
- Evaluate the Birds Nest aquifer in core
  - 20 wells have been identified as having all or part of the Birds Nest captured in core
  - 10 cores have been examined to date (see map on panel 3)
- Evaluate the Birds Nest aquifer on outcrop
  - Good outcrop exposures can be found on the eastern side of the basin
- Evaluate the Birds Nest aquifer on geophysical log
- Determine how disposal into the Birds Nest aquifer could affect future oil shale development
- Evaluate the oil shale resource within the Birds Nest interval
- Determine how gilsonite veins might influence water flow and saline mineral dissolution
- Create a GIS database and maps showing:
  - Outcrop
  - Thickness
  - Lateral extent
  - Water quality
  - Interburden between Birds Nest and "economic" oil shale zones



### Isopach of 25 GPT Oil Shale

One of the questions related to disposal of saline water into the Birds Nest aquifer is how such practices might affect potential oil shale development. This map includes the location of the 25 gallon per ton (GPT) oil shale zone, which is considered to be the minimum economic grade. The two cross sections are drawn through the thickest and richest of the oil shale in central Uinta County.

