

## Case Study: Groundwater Availability Determination

Clarkson's municipal water system was dangerously close to running out of water during the 2013 drought. Very little geologic information exists for the area. The groundwater district used new technology and science to identify groundwater resources.

### Snapshot:

**Client:** Lower Elkhorn Nebraska Resource District (LENRD)

**Situation:** Declining groundwater levels due to drought caused concerns over water availability for farmers and municipalities in Clarkson, Nebraska.

#### Solution:

- Extensive background hydrogeological assessment, which included assessment of physical settings, surface hydrology, geologic setting and hydrogeologic setting
- Airborne Electromagnetics
- Ground-based geophysics in the area
- Joint interpretation of hydrogeological and airborne data with existing boreholes and test holes

#### Products:

- Three-dimensional maps of sub-surface water distribution.
- Identification of an unknown deeper aquifer with potential for provision of additional water supply.

## XRI identified 106,608 acre-feet of available water for municipality and agriculture supply.

**W**ater management in the Elkhorn River basin continues to be a difficult task for water managers and users alike. The Elkhorn River basin serves a population of 106,806 and is a size of 4.4 million acres. LENRD Water Resources Manager, Rick Wozniak, said, "Clarkson's municipal water system was dangerously close to running out of water during the drought last year, and the LENRD received several reports of people having trouble with their wells." Very little geologic information exists for the LENRD area, so the LENRD Board of Directors decided to use a new technology to learn more about the area's groundwater.

"The Elkhorn River basin continues to be a difficult system to completely understand. The recent drought conditions in the LENRD have shown that the area around Clarkson has severe water supply problems that

cannot be understood without more data" said Wozniak. XRI entered into an agreement with LENRD to undertake a hydrogeologic study of the area.

For the LENRD to effectively utilize their groundwater management plan, they need detailed information on the aquifers in the area. In particular, they need to understand the aquifer characteristics, interconnection with surface water, interconnection with adjacent aquifers and connection to the existing groundwater production wells.

**XRI** provided a hydrogeologic framework report that included maps of aquifers, estimate of aquifer volume, map of aquifers relationship to current test holes and production groundwater wells, along with a map of estimated potential recharge areas.

### 3-D Model of Quaternary Aquifer

