

# Appendix C:

## Bonanza Valley Irrigation Study

## **Bonanza Valley Study**

By Evan Drivas and Laurel Reeves

The Bonanza Valley in Stearns, Pope and Kandiyohi Counties has supported extensive agricultural irrigation without apparent problem since the 1960's. Recent investigation of well interference complaints was the stimulus for the Department of Natural Resources Waters Division (DNR Waters) to implement a plan of focused monitoring and analysis in the Bonanza Valley to evaluate the current state of the groundwater supply. A map of the Bonanza Valley study area is shown in Figure 1.

There are several goals of this study, including sustainable management of ground water, scientific assessment of the area, and development of a framework for water use management that is transferable to other areas. The scientific assessment study will evaluate seasonal water level drawdown and the effect of seasonal pumping on ground and surface water resources in the Bonanza Valley.

In the Bonanza Valley groundwater is pumped from the water table aquifer (QWTA) and from a complex system of buried aquifers (QBAA). Seasonal water level drawdown has increased over the last ten years. Buried aquifer water levels are currently drawn down 80 feet during the irrigation season as measured in DNR Obwell 61037 near Brooten (Figure 2). Water level drawdown of this magnitude raises concern of possible water use conflict between existing water users. The effect of a prolonged drought on groundwater appropriators in the Bonanza Valley is also a concern.

Data collection since 2008 has included three synoptic water level measurements, installation of several shallow wells to create well nests (shallow and deep wells at the same location), collection of a continuous record of water levels in four observation well nests, lake level monitoring and stream flow measurements. In addition, DNR Waters has a 20-year water level record from observation wells in the study area. Future analyses will incorporate precipitation records as well as water level data for wetlands.

Observation wells and domestic wells across the entire study area were measured over a 2-day period for synoptic measurements. The data show buried aquifer water levels measured at the peak of the 2009 irrigation season were at least 20 feet lower than spring water levels measured in several areas where there is a concentration of irrigation wells in the buried aquifer. The water table was generally 1 to 3 feet lower at the peak of the irrigation season across the study area.

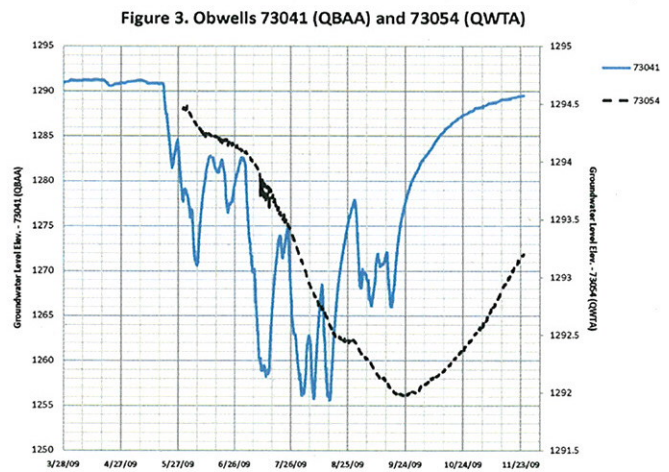
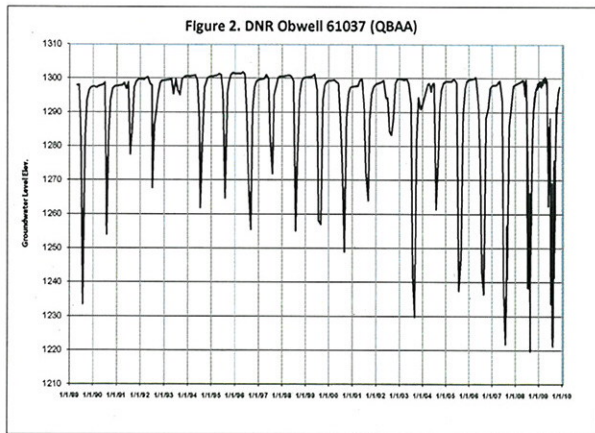
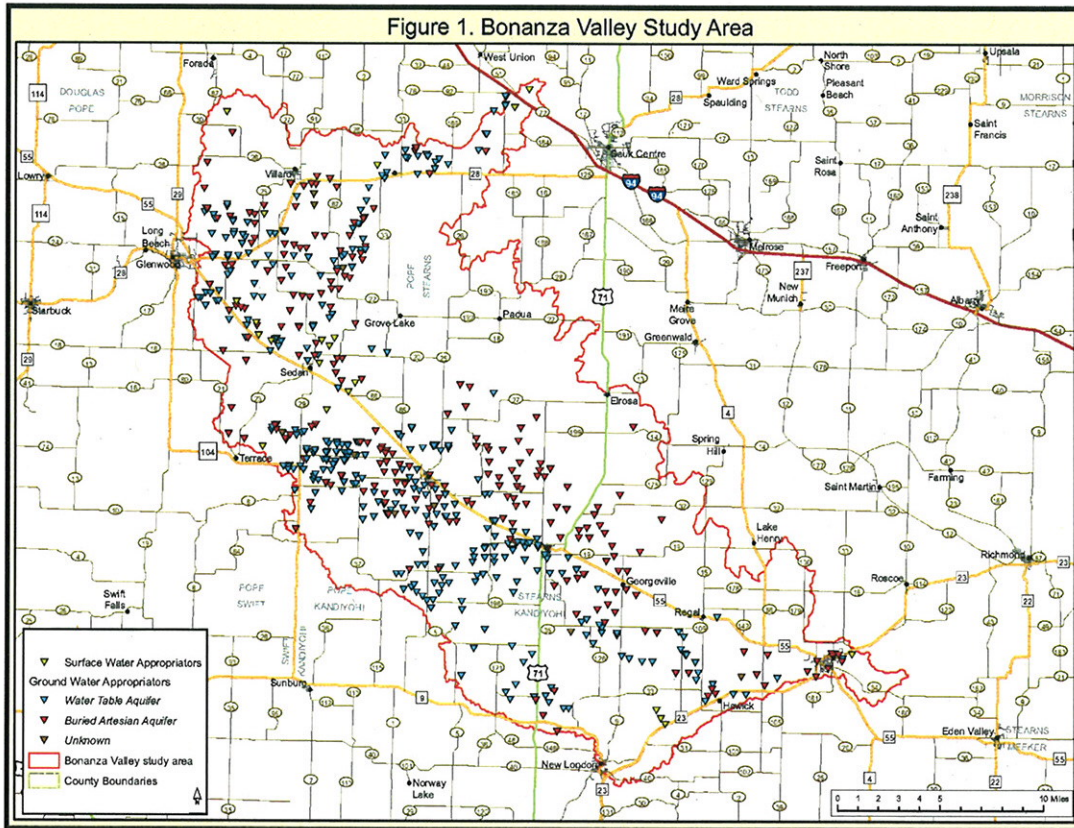
The continuous water level from an observation well nest south of Brooten is shown in Figure 3. The water level in the buried artesian aquifer (Obwell 73041) immediately responds to changes in pumping from the aquifer, and the water level declined from an elevation of 1291 feet to 1256 feet over the irrigation season. The level of the water table aquifer (Obwell 73045) declined a relatively smaller 2.5 feet over the same period. The water level records from the nested wells will be evaluated to determine if there is evidence of leakage between the aquifers.

Stream flow has been measured monthly since August 2009 on the North Fork of the Crow River, the East Branch of the Chippewa River, and Ashley Creek. Fall precipitation complicated the analysis of the potential effect of pumping on the baseflow of streams in the Bonanza Valley, so monthly stream flow measurement will continue. Lake levels across the study area at the peak of the 2009 irrigation season were 0.4 to 1.5 feet lower than spring levels.

Two meetings were held this summer with local interested parties in the Bonanza Valley. Additional meetings are planned. As the study progresses, the technical and public engagement processes are being documented and will be used to design an aquifer or water use management framework.

The Bonanza Valley study was presented to the Legislative Citizen Committee for Minnesota Resources as the proposal, "Next Generation in Water Supply Management- Pilot Study" for possible funding; however, the project was not selected for the current funding cycle. The project remains important, and data collection and information sharing will continue until funding sufficient to also update earlier hydrologic models can be obtained.

For more information on the Bonanza Valley study, please feel free to contact Laurel Reeves at 651-259-5692 or [laurel.reeves@state.mn.us](mailto:laurel.reeves@state.mn.us).





# Bonanza Valley Study Area

