

Checking the pulse of our aquifers

Natural resources districts are responsible for protecting our groundwater resources. In order to properly manage our groundwater supplies, we need to regularly measure our aquifers and try to discern trends.

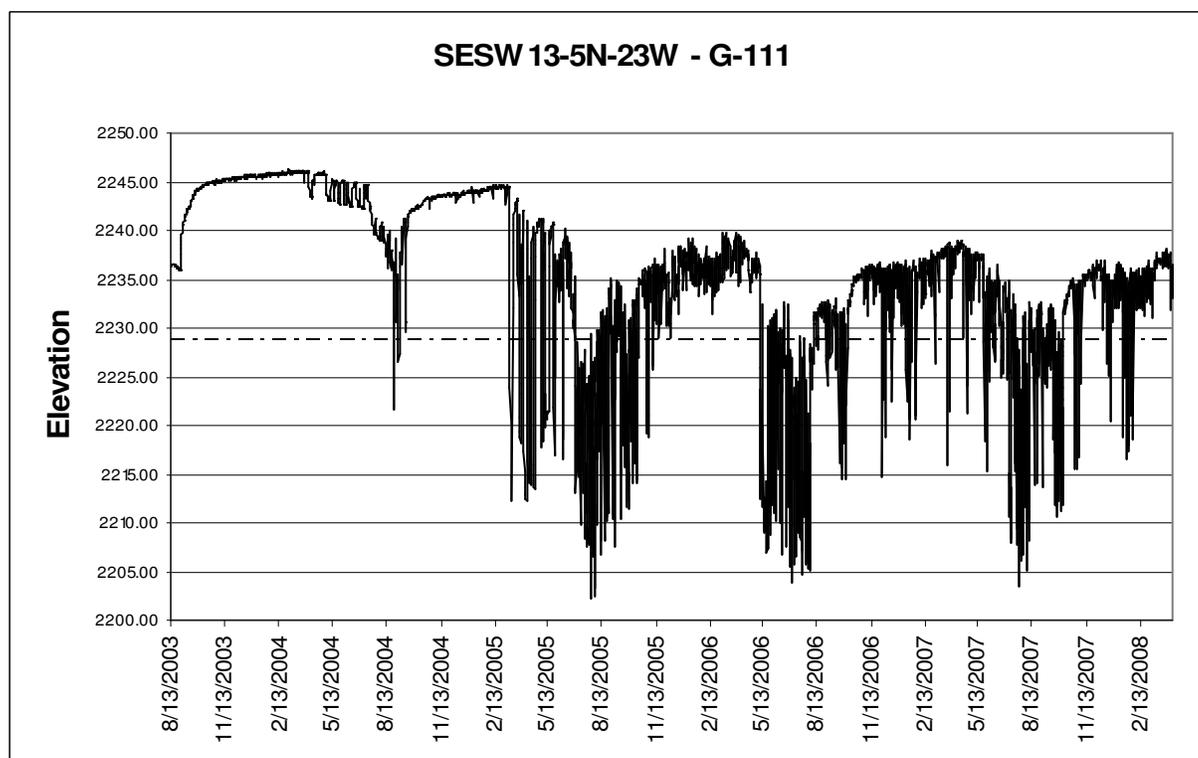
Since the 1970s Tri-Basin NRD personnel have measured groundwater levels in wells twice a year, in spring and fall. We take measurements in April because we believe that aquifers have fully rebounded from irrigation pumping during the previous summer. Our fall measurements are intended primarily to serve as a check on the accuracy of our spring measurements.

Biennial measurements have been standard practice for decades, but they give us just intermittent snapshots of aquifer activity. Most of the wells that we measure are privately-owned irrigation wells. It is impractical to measure these wells during irrigation season but, even if we did, the readings would be distorted by pumping. In order to get accurate water level readings during the irrigation season, we must take measurements from dedicated observation wells. Tri-Basin "inherited" some old dedicated observation wells along the Platte River from the US Bureau of Reclamation and US Geological Survey. We started measuring them monthly back in the 1990s.

We would like to measure more wells, but we simply don't have enough personnel to regularly check dozens of wells. We could install automated equipment instead of measuring wells manually, but until recently, this equipment was bulky, expensive and unreliable. A few years ago, Tri-Basin NRD assistant manager Richard Holloway saw a demonstration of a new type of affordable, reliable electronic datalogger that is no larger than a pint water bottle. This data logger can be used in combination with an electronic water level sensor to automatically measure a well at regular intervals.

With this new technology in mind, Rich proposed to the NRD board of directors that we initiate a project to drill at least one dedicated observation well per township, and equip these wells with sensors and data loggers. We started this project in 2003. This project was accelerated in 2006, thanks to a \$224,000 grant from the Nebraska Department of Natural Resources. We hope to complete our dedicated observation well network this year. Even though we are just starting to gather data from these wells, a fascinating picture of our groundwater aquifers is emerging.

One of our first dataloggers was placed in an observation well within the Arapahoe municipal wellfield in Gosper County. This unit takes two water level readings per day. Because this observation well is within a few hundred feet of a pumping well, it re-



sponds quickly, zig-zagging up and down as the municipal well is turned off and on. The straight dashed line on the graph is the elevation of the streambed of nearby Elk Creek. If the groundwater level drops below the streambed elevation for more than a few days, groundwater contributions to streamflows will decline.

We have always believed that recharge from precipitation takes months or years to reach aquifers. That is certainly true where water-bearing formations are deeply

Figure 1. Dedicated observation well in Arapahoe municipal wellfield, Gosper County.

(cont. on page 2)

(cont. from page 1)
 buried under wind-blown loess. Our data show, however, that some shallow wells in areas with sandy soils respond to rainfall in a matter of days. Figure 2 shows a well in the Platte valley south of Kearney. The two big upward humps in the hydrograph indicate heavy spring rains in 2005 and 2007. A valley in the middle of the graph indicates a drawdown during the 2006 irrigation season.

The final hydrograph shows how the Ogallala and Pleistocene aquifers in southern Gosper County respond to groundwater pumping during irrigation season. The aquifers are drawn down during the summer, but they recover during the fall, winter and spring. At this site, we set up what we refer to as a "cluster" well, which are two separate wells, one screened in each aquifer. We look for differences in response of the two aquifers to pumping stresses to check whether they are interconnected. It appears that water moves freely between the two aquifers at this site, because they respond in tandem.

It will be several years before we have accumulated enough data from our dedicated observation wells to draw conclusions about long-term trends in our groundwater supplies. In the meantime, however, we are getting a much more detailed view of how aquifers respond to a variety of weather conditions and stresses.

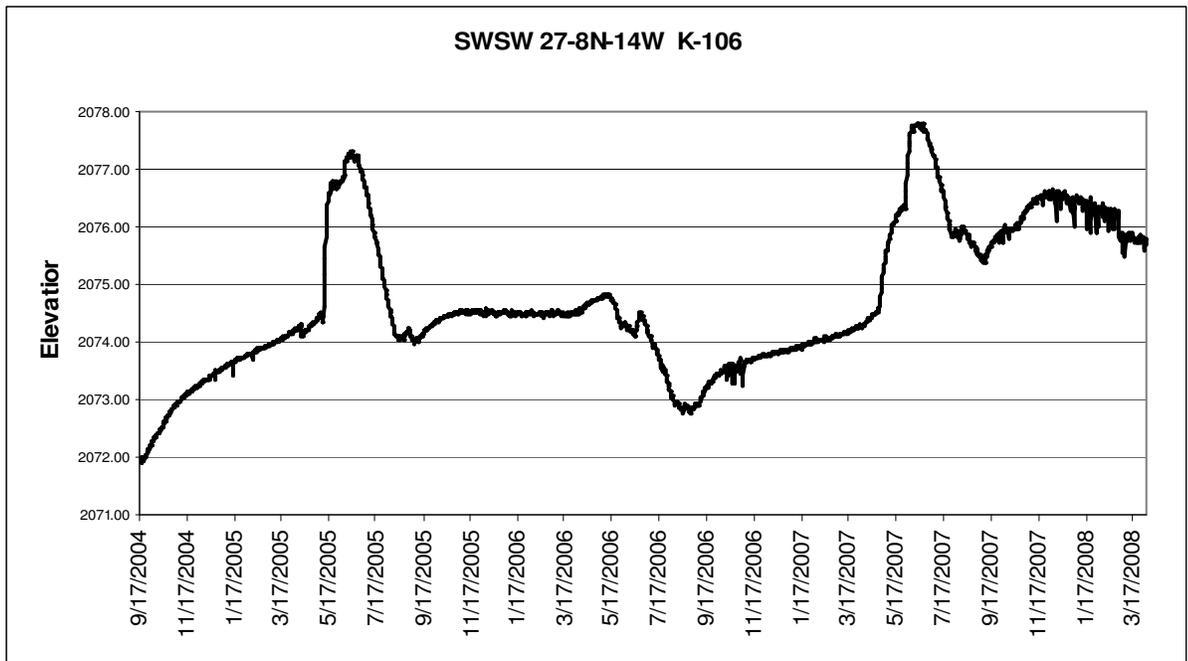


Figure 2. Dedicated observation well near Platte River in Kearney County.

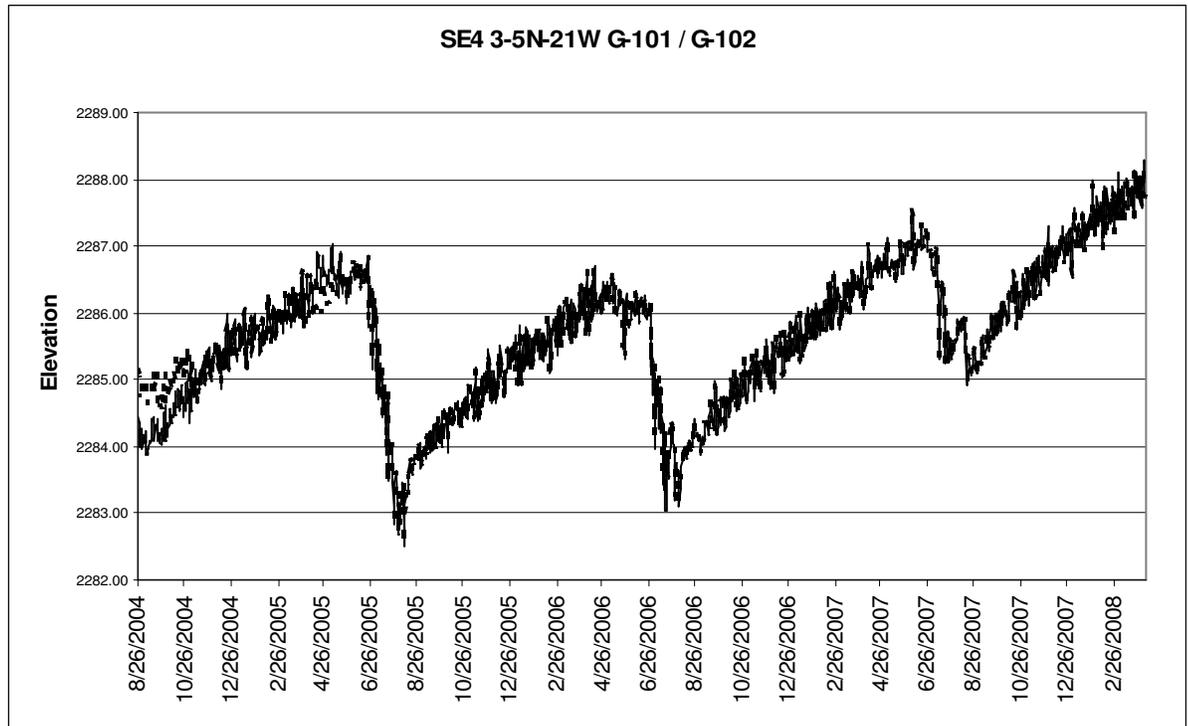


Figure 3. Cluster well in southern Gosper County.

Tri-Basin NRD Directors Consider Groundwater Quantity Management Areas

Tri-Basin NRD will hold a public hearing on August 12, 2008 at 1:30 PM at the American Legion Hall in Elwood to consider whether to designate Union Township (5N, 22W) as a phase 3 Groundwater Quantity Management Area (GQMA) and Elk Creek Township (5N, 23W) as a phase 2 GQMA. Both townships are in southern Gosper County. A public hearing will be held on September 9 at 7:30 PM at the 4-H Building on the Kearney County fairgrounds at Minden to consider whether to designate May Township (6N, 13W) as a phase 2 quantity management area. Contact Tri-Basin NRD toll-free at (877) 995-6688, or visit our website www.tribasinnrd.org for more details about these hearings and groundwater quantity management rules.

Hasenauer is Tri-Basin NRD's New Technician

Alex Hasenauer joined the Tri-Basin NRD staff as Land Resources Technician in May. Alex lives in Holdrege, but is originally from Wellfleet, Nebraska.

He graduated from Chadron State College in May with a bachelor's of science degree in rangeland management and minors in wildlife management and plant sciences.



Alex enjoys spending time outdoors, hunting and fishing. He says his favorite hobby is bowhunting. He is active in the Nebraska Bowhunter Association and is currently serving as the Western Boardmember for the organization.



Tri-Basin NRD's interns Philip Lempke and Andrew Amen

TBNRD Hires Interns

Philip Lempke and Andrew Amen are Tri-Basin NRD's summer interns. They will assist with various projects throughout the summer, including water sampling, weed spraying and IPA maintenance.

Philip Lempke is from Wallace but is currently living with his grandmother, Rosemary Reiter, in Holdrege. His father is a farmer and his mother teaches music at Ogallala. Philip has two older sisters and a younger brother.

He will be a sophomore at the University of Nebraska-Kearney this fall and is majoring in computer science with a minor in mathematics. At UNK, Philip is involved in Kappa Kappa Psi (a music honorary), the Association of Computing Machinery, the UNK drumline, and intramural sports. His hobbies include sports, computers and music.

Andrew Amen lives in Lincoln with his wife Jessie and their daughter, Stella Rae. During the week, he stays with his mom in Holdrege. He is currently writing an undergraduate thesis for his environmental studies major and plans to graduate in August. His thesis is measuring the power consumption of all the computers in the college of business at UNL.

Andrew enjoys the outdoors, spending time mountain biking, fishing and backpacking. He is also interested in computers. He and his wife are active in a house church which meets in their home and volunteer regularly at a soup kitchen in Lincoln.

Water Samples Required for Nitrogen Management Reports

Producers with ground in Phase II or Phase III of the Groundwater Quality Management Area are reminded that water samples are required on all wells that are used. Even if a producer's agronomist takes soil samples and completes the Nitrogen Management forms, the owner or operator of the ground is responsible for taking water samples and reporting the results. Water sample bottles are available at the Tri-Basin NRD office. For more information on the Phase II and Phase III areas, call the Tri-Basin NRD office at 308-995-6688 or 1-877-995-6688.

Tune in to KRVN 880 Rural Radio each Wednesday at 4:17 p.m. for the Natural Resources Report. The report is a short discussion of natural resources issues and events that impact this region of the state. Tri-Basin NRD, Upper Republican NRD, Middle Republican NRD, Lower Republican NRD, Central Platte NRD and Little Blue NRD sponsor the weekly message.



Don't forget to schedule your chemigation inspections!

Call Tri-Basin NRD at 1-877-995-6688.

ONLINE RESOURCES

http://dnrdata.dnr.ne.gov/wellssql/?&	Dept. of Natural Resources Well Data
http://water.usgs.gov/ogw	Ground water information
http://www.cnppid.com/Elevation_Flows2.htm	Reservoir elevation/Platte River Flow
http://tribasinnrd.org/domesticwatertest.html	Domestic Nitrate Testing
http://www.arborday.org	Tree recommendations, identification
http://www.websoilsurvey.nrcs.usda.gov/app/	Determining soil type
http://water.usgs.gov/cgi-bin/daily_flow?ne	Current water resource conditions for Nebraska

CALENDAR OF EVENTS

(All meetings are at NRD office in Phelps County Ag Center unless otherwise noted.)

July

- July 4 Independence Day (office closed)
- July 8 NRD Board Meeting at 1:30 p.m.*
- July 12-17 Kearney County Fair in Minden
- July 20-23 Phelps County Fair in Holdrege
- July 31-Aug. 2 Gosper County Fair in Elwood

August

- August 12 NRD Board Meeting 1:30 p.m.*
(at the American Legion Hall in Elwood)

September

- September 1 Labor Day (office closed)
- September 9 NRD Board Meeting at 7:30 p.m.*
(at Kearney Co. Fairgrounds in Minden)

* Times are tentative

WATER CONSERVATION TIP

Adjust your lawn mower blade to a higher setting. A taller lawn shades roots and holds soil moisture better than if it is closely clipped.



TRI-BASIN TOPICS is a publication of the
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- Nicole Salisbury Office Assistant
- Ruth Nielsen Minden Office Secretary
- Lori Hagan Elwood Office Secretary
- Patty Abrahamson Holdrege Office Secretary

A mailing list is maintained and requests to be placed on the list should be sent to the above address. Comments and suggestions may be addressed to the General Manager.

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*TBNRD's summer interns
*Hasenauer is new technician
*District groundwater levels

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Natural Resources District



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