

Presentation by Bob Swanson USGS Recent Developments in the USGS Groundwater-Water Program

Nebraska Wellhead Protection Network Meeting

March 2, 2009 – Holiday Inn – Kearney, Kearney, Nebraska

Economic Stimulus – 10 million of 140 million to USGS going to deferred maintenance – abandoned gages and cableways, and wells.

Webpage – <http://ne.water.usgs.gov> - Real-time data – includes the quantity and evaluation of the state of water. Data can be downloaded. There are a variety of ways to look at information. Historical USGS data can be access, 1985 – to present.

<http://wdr.water.usgs.gov/nwisgmap/index/html>

Mapping application - fast and light weight, seems pretty efficient – don't know how everything is showing up in the database. USGS wells only doesn't include all wells

Oldest water level 1895 Hays Springs recorded on USGS

Can get information sent/emailed to you everyday for real time data (surface or groundwater)

Groundwater-water Watch / Water-atch / Surface Water - real time quality information

Active Groundwater Level Network – every well in the network with a reading within the last year. (NRD and USGS collecting information within last few years.)

QUESTION: (RG) Are they combination of municipal and rural?

ANSWER: (GS) Very few municipal most irrigation and monitoring

Climate Response Network – Strict guidelines – not represented well in Nebraska
Which are no human influence, shallow, direct connection – leave sandhills, 2 in the state

Real time network – working on getting more switched over to real time

Magnetic Resonance Scanning –

- measures water content of aquifers
- improved estimates of recharge and ET rates
- underway in Central Platte NRD

Water molecule is bipolar (positive and negative), sends magnetic resonance into the ground, charges molecule up – send bolts into the ground and molecules will line up, once released get resonance and that is what is being measured

Coordinate with aquifer tests at the same sights – long term 96hour test, to see if can use magnetic resonance instead – noninvasive method –

Valuable tool, especially if have contaminant that would have to be containerized
USGS is working with Stanford on this project. It is MRI for the earth.

Helicopter Electromagnetic Surveys –

- Better understanding of geological framework
- Faster geological mapping

Improved parameter estimation for gw model
ENWRA and North Platter NDD in 2009

3D model – give lots of data

Measure how resistance the soil is if absorbs a lot of energy, if resist that can see where the sands and gravels are. Clays are not resistive, doesn't work as well.

Amount of detail is amazing

C&D, NRDs, Geologic discipline, DNR providing some of the funding,

Finding contour lines of Base of Aquifer >100 ft different from previous estimates. Better definition of aquifer than was ever possible before. Key to getting water availability and sustainability data.

Not a replacement for test holes, need the calibration.

Microgravity surveys –

- Measures changes in water mass

- Improved estimates of recharge and ET Rates

- Possible development of remote sensing

- Underway in the north platter nrd

- Measures amount of water that has changed – porosity effects

- Can calibrate –gravity satellites...? Can know how much water is pumped out of High Plains Aquifer is past X number of days --- in the future,

Groundwater Recharge Network –

- Paired sites

- Crop

- Pasture

- Seven locations in Nebraska continual expanding

- Better recharge estimates

Plan for national groundwater availability assessment studies

Current regional groundwater availability studies, starts this year

High Plains Water Availability Study

- done last time in the 70s

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Modeling entire High Plains Aquifer

- Focus on the northern high plains

- 1 Kilometer grids

- Goes beyond political boundaries

Water quality assessment tool for production wells:

[Http://pubs.usgs.gov/fs/2004/3096/fs2004-3096.pdf](http://pubs.usgs.gov/fs/2004/3096/fs2004-3096.pdf)

Izbicki pump, Isolates samples by depth. Preserve higher quality water in the well field.

Source water assessment tools

Evaluation of groundwater near Sidney, western Nebraska, 2004-2005

<http://pubs.usgs.gov/sir/2007/5086/>

Podcast with a water science focus. New topics monthly

Most recent topic – Elkhorn Loup groundwater

Way to get information out fast or on hot topics

On itunes

Brought some USGS reports – Water Quality Assessment of High Plains Aquifer – only one copy left – can get copies if anyone wants one.