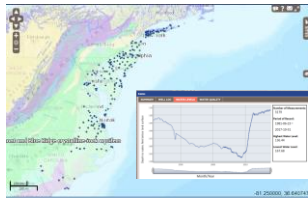




Evaluating Water Levels in the Northern Atlantic Coastal Plain using National Groundwater Monitoring Network Data

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NGWA Groundwater Summit
Nashville, Tennessee
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U.S. Department of the Interior
U.S. Geological Survey

Goals of the NGWMN

- Provide information to define the status and trends in groundwater at the national scale
- Provide data for national-scale decisions
 - Current Groundwater development
 - Future Groundwater development
- Provide data appropriate to assessments of groundwater resources at the Principal aquifer scale



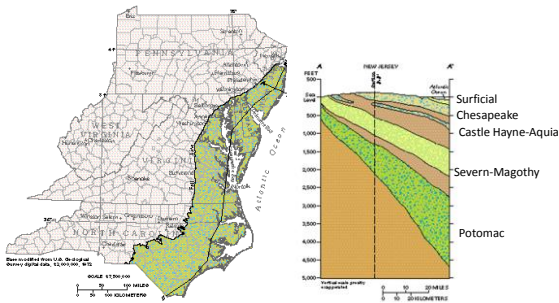
Selected Questions from NGWMN Framework document

- What are the baseline groundwater level conditions?
- How are groundwater levels changing over time?
- What are the effects of climate on groundwater levels?
- What are causes of problems related to groundwater resources?
- Where is groundwater use greater than can be sustained long term?
- Where is additional monitoring needed?



Northern Atlantic Coastal Plain

- The NACP was selected for this analysis because it is one of the first Principal aquifers to have water-level data available for all states
- The NACP is heavily used as a source of water
- The NACP is composed of wedge shaped mass of sediments that thicken and deepen towards the ocean
- The Groundwater Atlas defines five major aquifers within the NACP. These will be used for this analysis



Approach of this analysis

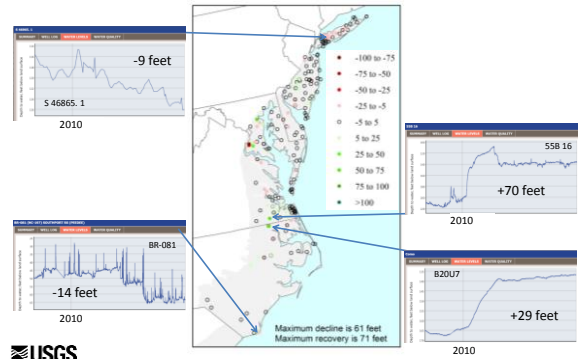
- Focus is primarily on water-level change maps
- Used all water-level trend sites
- Change maps are based on change in mean annual water-levels calculated from NGWMN data
- Will be supplemented by hydrographs
- Hydrographs have different water-level scales
- Changes shown in 25 foot intervals except for -5 to +5 feet which are shown with open circles
- Red indicates decline; Green indicates recovery
- Changes range from recovery of up to 100 feet and declines more than 100 feet



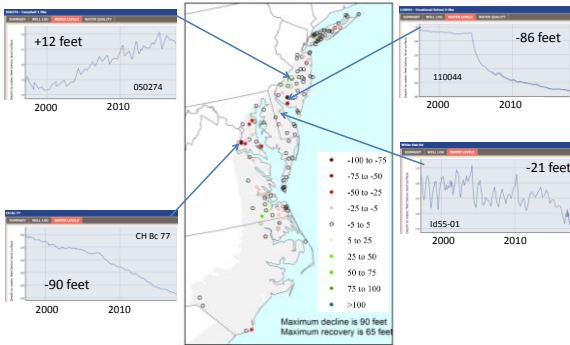
- Initially looked at changes in monthly data (April and September). Did not see large seasonal variations. Long-term wells sometimes dropped out.
- Looked at 10-, 20- and 30-year changes
 - 10-yr Changes occurring in 10-year timeframe over the entire NACP aquifer
 - 20-yr Changes occurring in 20-year timeframe over the entire NACP aquifer
 - 30-yr Show maps of 30-year change by 5 major aquifers



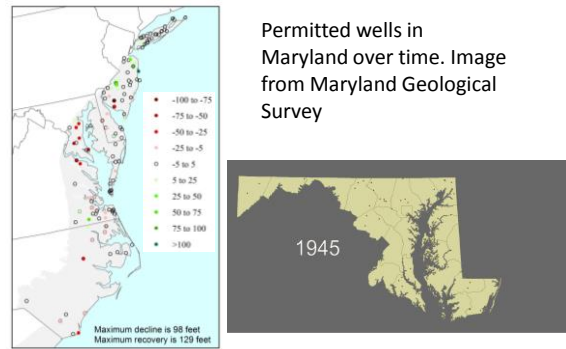
10-year change



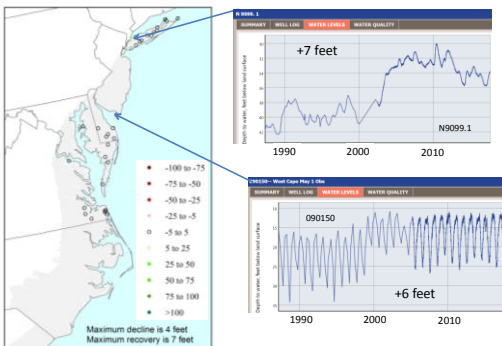
20-year change



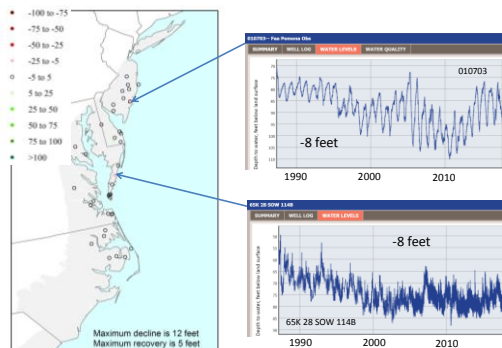
30-year change



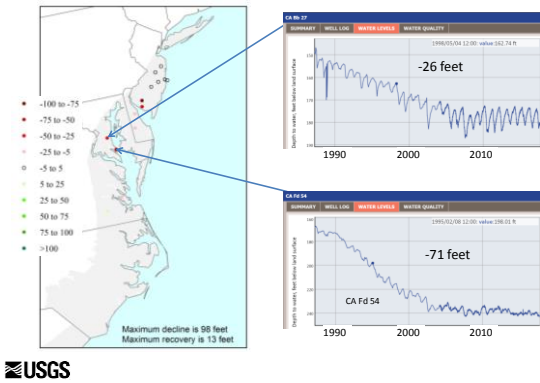
30-year change in the Surficial aquifer



30-year change in the Chesapeake aquifer

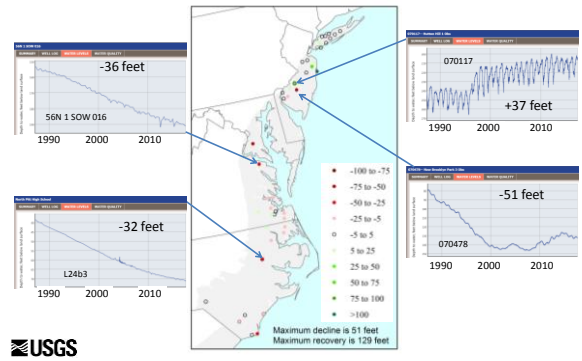


30-year change in the Castle-Hayne Aquia aquifer



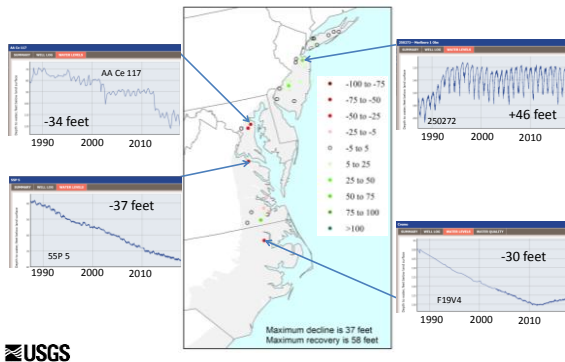
USGS

30-year change in the Severn-Magothy and Peedee-Upper Cape Fear aquifers



USGS

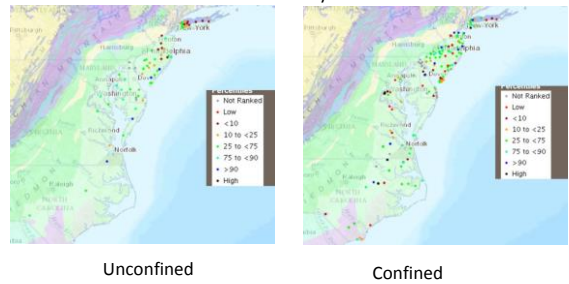
30-year change in the Potomac aquifer



USGS

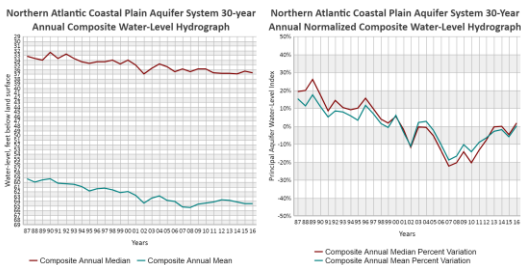
Status of groundwater levels August 2017

Comparison of recent levels to long-term monthly medians Sites with at least 10 years of data



USGS

Composite hydrographs using USGS data
Mean and median water levels for the entire aquifer
Uses available USGS data from 551 wells
limited data from Delaware and North Carolina



USGS

Lessons learned

- Trend wells important for seasonal assessments. Continuous data is best
- Major aquifers within the NACP help explain the changes
- Some work was needed to correlate the Major aquifers across state lines
- Water-level data across state lines is very helpful
- Water-levels are affected by withdrawals/reductions in neighboring states

USGS



Acknowledgements

- NGWMN Data Providers
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Co-Chair: William Cunningham, USGS
- Co-authors

