2017 NGWA Summit

The Power of Networks –
Increasing the Visibility of Local Groundwater Resources

Sara Chudnoff - New Mexico Bureau of Geology & Mineral Resources
Charles Dunning - WellntelNick Hayes - Wellntel

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The Power of Networks –
Increasing the Visibility of Local Groundwater Resources

Overview
Point Monitoring for Groundwater-Levels
- Traditional Approaches and Regional Networks
- New Approaches and Local Networks

NMBGMR Collaborative Groundwater Monitoring Network
- Best Practices for Network Design and Operation
- Increased Visibility and Understanding of Groundwater Resource
- Quantifying Gradients, Flow, Risks, and Availability
- Increased Resilience of Communities and their Groundwater Resource

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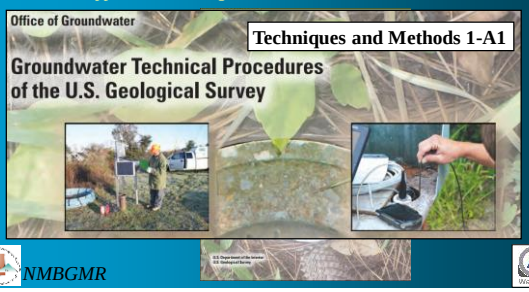
Point Monitoring for Groundwater-Levels
- Traditional Approaches and Regional Networks



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Point Monitoring for Groundwater-Levels
- Traditional Approaches and Regional Networks

Water-level measuring devices in non-flowing wells (Nielson, 1991)

Measurement method	*Accuracy in feet*	*Major interference or disadvantage*
Steel tape and chalk	0.01	Cascading water
Electric tape	0.02-0.1	Cable wear; hydrocarbons on water
Pressure transducers	0.01-0.1	Temp. change; elect. drift; blocked capillary
Acoustic probe	0.02	Cascading water; hydrocarbons on water
Ultrasonics	0.02-0.01	Temperature change; well materials
Floats	0.02-0.05	Float or cable drag; float size or lag
Poppers	0.1	Well noise; well equipment; well depth
Air Lines	0.25-1.0	Air line or fitting leaks; gage inaccuracies

Nielson, D.M. (ed.), 1991, Practical handbook of ground-water monitoring: Lewis Publishers, Inc., Chelsea, Mi., 717 p.

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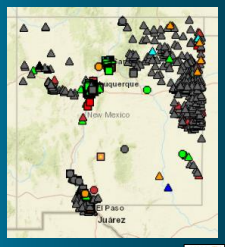
Point Monitoring for Groundwater-Levels
- Traditional Approaches and Regional Networks

USGS Groundwater Watch
NM Active Groundwater Level Network

855 sites
711 periodic
125 continuous
(101 of those sites in two counties!)
18 real-time
1 spring



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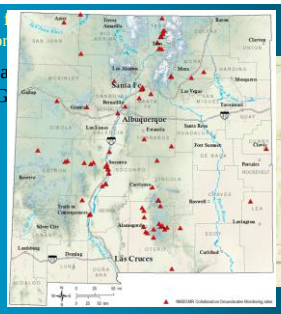
Point Monitoring
- Traditional Appr

USGS Groundwa
NM Real Time G

Collaborative Groundwater Monitoring Network



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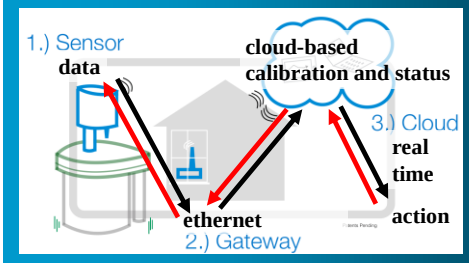

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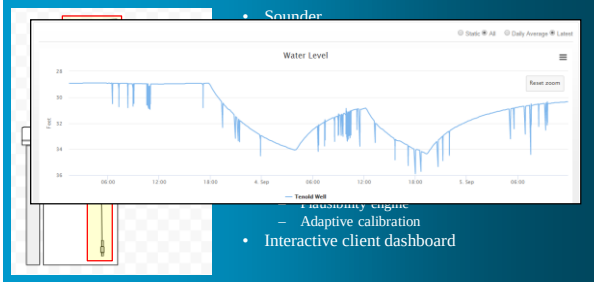
- New Approaches and Local Networks



- Sounder
- Adaptive calibration
- Interactive client dashboard

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Best Practices for Network Design and Operation

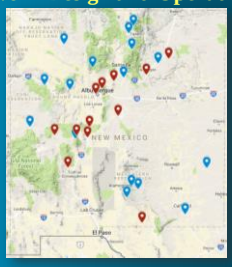
NMBGMR Collaborative Groundwater Monitoring Network

Best Practices for Network Design and Operation

Wellntel systems deployed as part of NMBGMR Collaborative Groundwater Monitoring Network

Systems with radio telemetry

Systems without radio telemetry



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NMBGMR Collaborative Groundwater Monitoring Network

Increased Visibility and Understanding of Groundwater Resource

"As native New Mexicans, and land stewards, we are very interested in field data that inform us about what is happening with water resources on our northern New Mexico property. The simple, high quality well logging instrumentation that has been made available to us through the collaborative is greatly appreciated. We also find tremendous value in being part of a professional community that is willing to share knowledge about water resources."

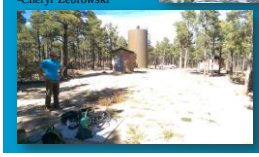
Thank you for including us, Margie Tatro and Mark Reineke, Reineke Construction.

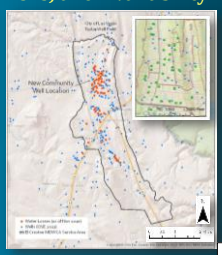
NMBGMR Collaborative Groundwater Monitoring Network

Quantifying Gradients, Flow, Risks, and Availability

"It's good to know how much water you have, and especially helpful to track the level over time in order to see trends."

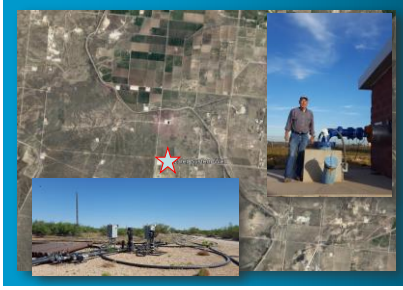
-Cheryl Zebrowski





NMBGMR Collaborative Groundwater Monitoring Network

Increased Resilience of Communities and their Groundwater Resource



"The demands for water that is good enough to drink is a primary concern for Malaga Domestic Water Association. The mining of water for fracking purposes in our area is phenomenal. This non renewable resource is scarce, thus, we are glad to have upcoming data available to assist us in planning and preparing for potential future shortfalls."

-C. Ogden

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Networks of new generation acoustic sensors:

- compliment established state and federal agency data collection
- involve people most affected by local water resource conflicts
- advance understanding of New Mexico's hydrogeology
- create dense temporal and spatial data sets to support data based policy decisions and sophisticated numerical models

Acknowledge NMBGMR
Healy Foundation

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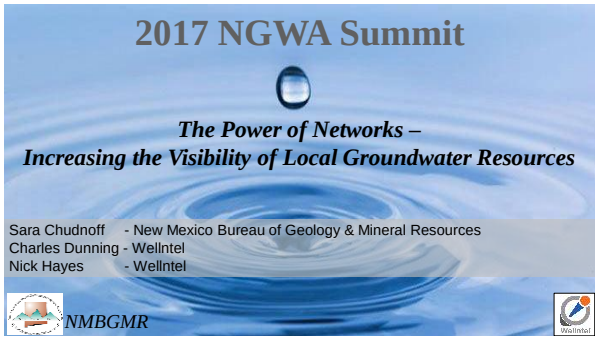
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