

# Development & Pilots for a National Groundwater Monitoring Network

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Toward Sustainable Groundwater in Agriculture  
 June 17, 2010



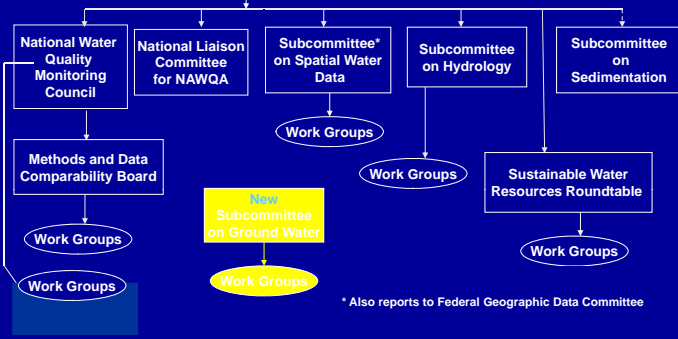
# Presentation Outline

- Framework Background
- Why Pilots? How were they selected?
- Pilot States and Principal/Major Aquifers
- Pilot Tasks
- Data Portal Plans
- Pilot Phase Schedule



WICP Water Information Coordination Program  
 ACWI Advisory Committee on Water Information

## ACWI GROUPS



# ACWI Charge to SOGW

**Purpose:** "...develop and encourage implementation of a nationwide, long-term ground-water quantity and quality monitoring framework that would provide information necessary for the planning, management, and development of ground-water supplies to meet current and future water needs, and ecosystem requirements."

**Scope:** "...will be developed to assist in assessments of the quantity of U.S. ground-water reserves, as constrained by ground-water quality."

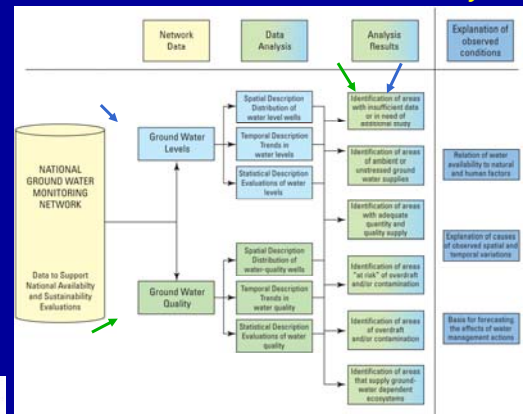


# Drivers for a Nationwide Network

- 2003 GAO Report
  - 36 states expecting shortages
- SWAQ Report calling for a "Water Census"
- Heinz Center Reports on the "State of the Nation's Ecosystems"
  - Ground-water data are "inadequate for national reporting"
- Coastal Monitoring Network



# Network Goals and Design: Relation between Levels and Quality



## Network Goals and Design: Principal and Major Aquifers



## Why Pilot Projects?

- Test the concepts and produce information to evaluate the costs and technical feasibility of the NGWMN
- Improve the “Framework Document” of the NGWMN
- Use this information in the **Implementation Phase** of the National Ground Water Monitoring Network



## Pilot Candidates: Casting a Wide Net

- Request for “Statements of Interest” released September 14, 2009
- National Webinar held October 6, 2009
- No promise of funding!
- SOGW Fixed Maximum Pilots = 5
  - Variation in scales
  - Strong and weak coordination
  - Multi-state or other multiple aquifer/stakeholder situation
  - Consider “issue focused” selection such as SW-GW interaction or saltwater intrusion



## Pilot Selection Committee

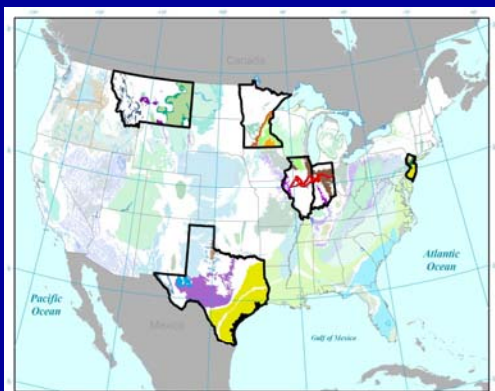
- Committee included representatives from the SOGW with long-term involvement in the process

Federal Government	State Organizations	Professional Organizations
USEPA	AASG	NGWA
USGS	ASDWA	ASCE
	GWPC	

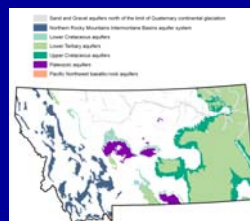
- 9 Quality SOI's received. 5 Pilots Selected. Selections approved by SOGW on Dec. 7, 2010



## National Ground Water Monitoring Network Pilot Projects



## Montana



- **Statewide Principal Aquifers**
  - Sand and gravel aquifers
  - Upper Tertiary,
  - Lower Tertiary,
  - Northern Rocky Mountains Intermontane Basins,
  - Pacific Northwest basaltic rock,
  - Upper Cretaceous,
  - Lower Cretaceous,
  - Paleozoic aquifer systems
- **Primary Agency**
  - Montana Bureau of Mines and Geology
- **Pilot Leader**
  - Tom Patton: Senior Research Hydrogeologist and Program Leader
- **Pool of Candidate Wells**
  - More than 940 wells



# Texas



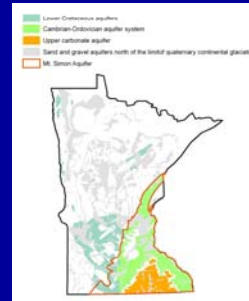
## Principal/Major Aquifers

- Edwards-Trinity aquifer system,
  - [6 major subunits](#)
- Seymour aquifer,
- Blaine aquifer,
- Pecos River Basin alluvial aquifer,
- Coastal lowlands aquifer system,
- Texas coastal uplands aquifer system,
- Rio Grande aquifer system
- **Primary Agencies**
  - Texas Water Development Board (TWDB)
  - Texas Commission on Env. Quality
- **Pilot Leader**
  - Janie Hopkins, Groundwater Monitoring Section Manager, TWDB

- **Pool of Candidate Wells**
  - About 7,000 wells in the Texas monitoring Program



# Minnesota

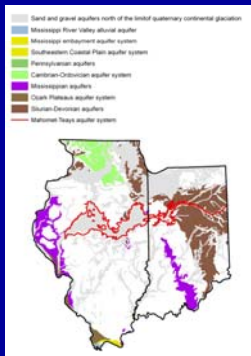


## Principal/Major Aquifers

- Cambrian-Ordovician aquifer system
  - Upper Ordovician aquifers
  - Prairie du Chien-Jordan aquifers
  - Tunnel City/Wonewoc aquifers
  - Mt. Simon aquifer
- **Primary Agencies**
  - Minnesota DNR
  - Minnesota Pollution Control Agency
- **Pilot Leader**
  - Mike MacDonald: Hydrologist, Minnesota Dept of Natural Resources
- **Pool of Candidate Wells**
  - About 140 wells are in the target aquifer system, of more than 700 statewide



# Illinois-Indiana

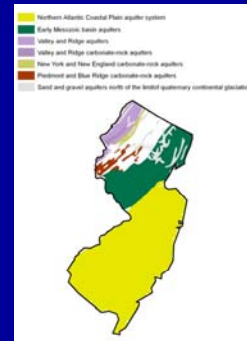


## Major/Principal Aquifers

- Sand and Gravel aquifers
  - [Mahomet-Teays](#)
- **Primary Agencies**
  - Illinois State Water Survey
  - Illinois State Geological Survey
  - Indiana Department of Natural Resources, Division of Water
  - USGS offices in IL and IN
- **Pilot Leader**
  - Al Wehrmann: Head of the Center for Groundwater Science, Illinois State Water Survey
- **Pool of Candidate Wells**
  - More than 180 wells in IL and IN



# New Jersey



## Statewide Principal/Major Aquifers

- Northern Atlantic Coastal Plain,
  - [10 major subunits](#)
- Early Mesozoic Basin,
- Piedmont and Blue Ridge crystalline rock,
- Piedmont and Blue Ridge carbonate rock
- **Primary Agencies**
  - New Jersey Geological Survey
  - USGS NJ Water Science Center
- **Pilot Leader**
  - Karl Meussig: State Geologist, New Jersey Geological Survey
- **Pool of Candidate Wells**
  - More than 1,000 wells



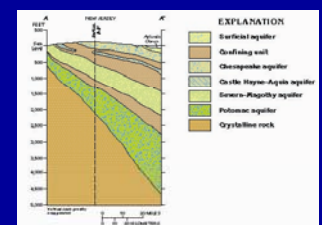
# Summary of Pilot Tasks

- Evaluate the network within the concepts in “Framework for a Nationwide Ground Water Monitoring Network”
  - Select aquifers, well characteristics, frequency, analytes, categorize stressed & unstressed wells, spatial distribution
- Evaluate field practices, data elements stored in the GW database, and data management procedures and their documentation
- Evaluate ability to transmit data to the data portal
- Identify all costs of potential participation in the NGWMN
- Report on the results of the Pilot



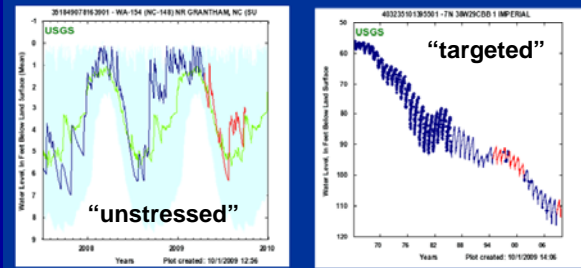
# Pilot Tasks: Network Evaluation

- Evaluate potential monitoring points within each principal, major or other significant aquifer for potential inclusion in the NGWMN



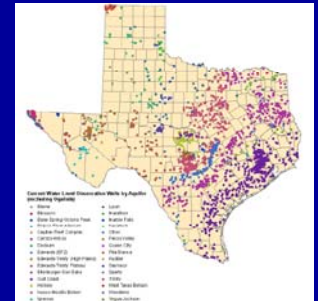
## Pilot Tasks: Network Evaluation

- Categorize all or a subset of proposed monitoring points as meeting NGWMN's "targeted" or "unstressed" subnetwork design criteria



## Pilot Tasks: Network Evaluation

- Identify data gaps
  - Spatial
  - Well characteristics
  - Frequency of water-level measurement
  - Frequency of sampling
  - Analyte lists



## Pilot Tasks: Network Evaluation

### Field Practices

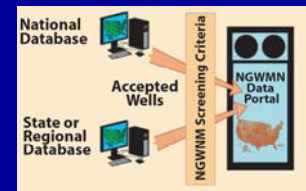
- Determine whether the data provider's field practices meet NGWMN criteria and what changes may be required
- Evaluate documentation of field procedures



## Pilot Tasks: Data Management

### Data Management

- Determine whether the data management standards meet the NGWMN criteria
- Evaluate data storage in comparison to the minimum data elements in Appendix 5
- Evaluate ability to interface with a NGWMN data portal



## Pilot Data Portal

- Design underway at the USGS Center for Integrated Data Analytics in Madison, WI
- Portal will be a new system, designed with knowledge of the data exchange standards used by:
  - The EPA/USGS Water Quality Data Exchange (a STORET and NWIS Data Portal)
  - The Open Geospatial Consortium and associated Groundwater Interoperability Experiment (USGS, NRCan, CSIRO, and CUAHSI)
- Goal is automated data transfer from data providers, through portal, to public user. Intermediate approach may be needed



## Pilot Tasks: Costs

Identify "Ballpark" Costs for:

- Pilot participation
- Operation and management of NGWMN wells
- Interface with data portal
- Capital and O&M needed to fill data gaps
  - Spatial
  - Temporal
  - Analytes



## Pilot Timeline

Task	2010												2011			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	
Evaluate potential monitoring points	█	█	█	█												
"Tag" monitoring points as "stressed" or "unstressed"					█	█	█									
Identify data gaps							█									
Evaluate field practices and data management standards	█	█	█	█	█	█							█	█	█	█
Interface with a NGWMN data portal		█	█	█	█	█	█	█	█	█	█	█				
Prepare report		█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
SOGW Reports										█	█	█	█	█	█	█
Delivery to the ACWI																█

## Summary

- A Framework document for a National Groundwater Monitoring Network has been developed in the US
- Pilots were selected and initiated, with completion targeted for early next year
- The results from the pilots will be used to improve the Framework as necessary, develop further strategy and estimates for fully implementing a nationwide network
- This is a small but necessary step towards developing transparent, readily available information on the Nation's groundwater resources

