

Status Report from the Subcommittee on Ground Water

Presentation to the Advisory Committee on Water Information
on the
National Ground Water Monitoring Network
July 11, 2012

Bob Schreiber, Co-Chair, (ASCE), CDM Smith

Mike Wireman, USEPA

Christine Reimer, National Ground Water Association

Bill Cunningham, Co-Chair, USGS



Representing products of the SOGW
and
SOGW Work Groups



Agenda

- Background, Framework, and Pilot Results
 - Bob Schreiber, SOGW/CDM-Smith
- Recent Accomplishments
 - Framework Changes
 - Mike Wireman, USEPA/Region 8
 - Congressional Activity
 - Christine Reimer, NGWA
 - Outreach, Network Portal
 - Bill Cunningham, SOGW/USGS
- Resolution and Next Steps
 - Bob Schreiber, SOGW/CDM
- Q&A



Acknowledgements

- SOGW Members and contributors
- ACWI, NWQMC, & other ACWI groups:
 - Coastal network
 - Ongoing support, guidance, & interaction
- Exec Secy & admin support
 - NGWA
 - USGS HQ & CIDA
- Many others

Advisory Committee on Water Information Subcommittee on Ground Water (est 2007)

- Purpose: The overall goal of the SOGW is to 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: This national framework for ground-water monitoring and collaboration will be developed to assist in assessments of the quantity of U.S. ground-water reserves, as constrained by ground-water quality.

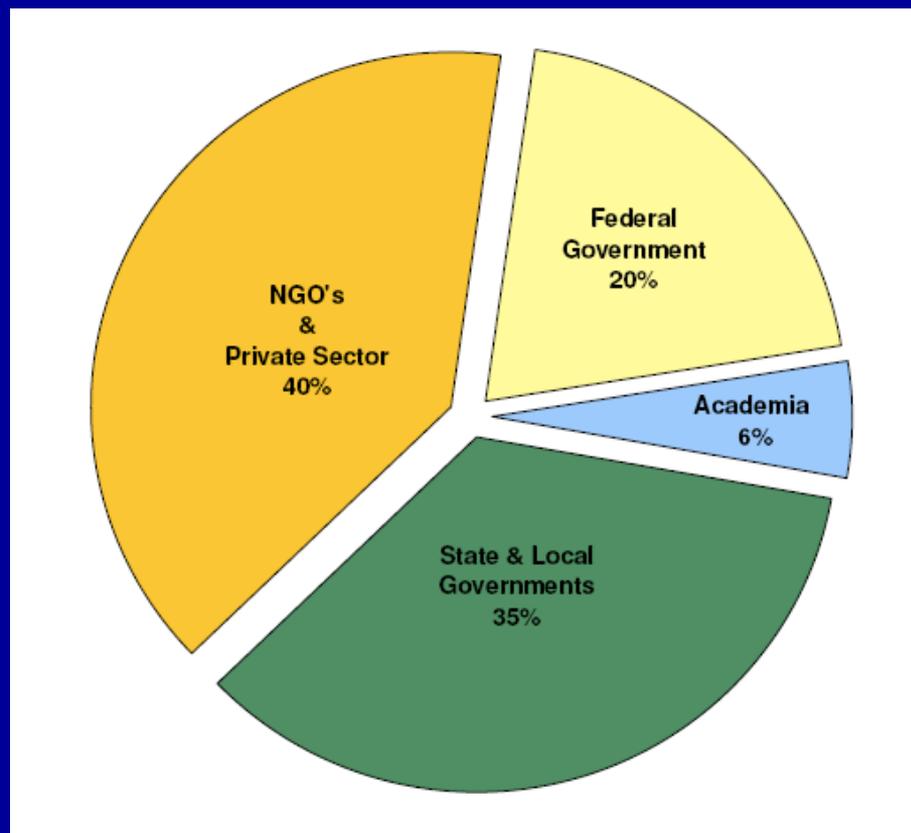
SOGW Mantra

- Walk before running
- Flexibility, adaptability, & durability
- Encouragement & guidance
- Respect for:
 - Local knowledge & expertise
 - Data-ownership
 - Data-providers' constraints
- Collaboration & interaction

SOGW Members & Supporters

- *American Society of Civil Engineers*
- *Ground Water Protection Council*
- *Interstate Council on Water Policy*
- *Association of American State Geologists*
- *National Ground Water Association*
- *Texas Commission on Environmental Quality*
- *US Geological Survey*
- *USEPA Headquarters and Region 8*
- *Association of State Drinking Water Administrators*
- *Water Environment Federation*
- *USDA Forest Service*
- *Association of State and Interstate Water Pollution Control Administrators*

**Subcommittee & Work Groups:
>70 people from >54 organizations**



SOGW Timeline

January	2007	SOGW formed by ACWI
February	2009	Framework Document approved by ACWI
December	2009	Five Pilots selected
January	2011	Pilot projects reports completed
July	2011	NGWMN Portal released
September	2011	SOGW releases Pilot synthesis report
Summer	2012	Framework Document revisions complete
	2013	Formal Implementation of NGWMN?

National GW Monitoring Network

- Design for a collaborative National GW Monitoring Network
- Inventoried Federal and State monitoring programs
- Guidance for Field Methods
- Guidance for Minimum Data Elements, Standards, & Mgmt
- Implementation Plan and Recommendations

**A National Framework for Ground-Water Monitoring
in the United States**

Prepared by

The Subcommittee on Ground Water
of the
The Advisory Committee on Water Information

Final Version approved by the Advisory Committee on Water Information

June 2009

Existing Nationwide Coverage

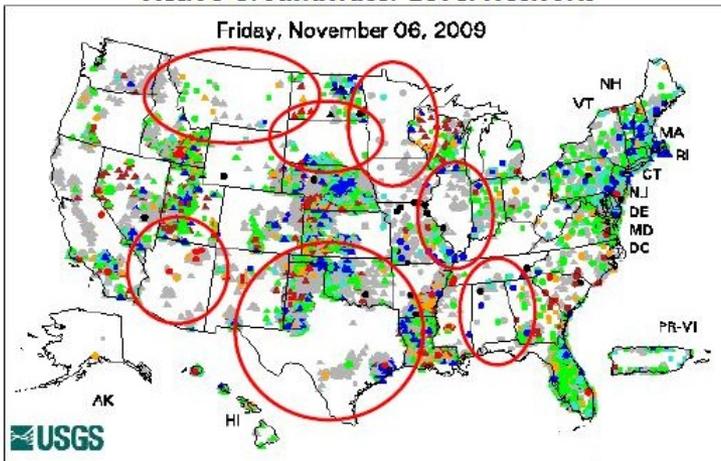
example: water levels

Wells operated by USGS

Groundwater Watch

Active Groundwater Level Network

Friday, November 06, 2009



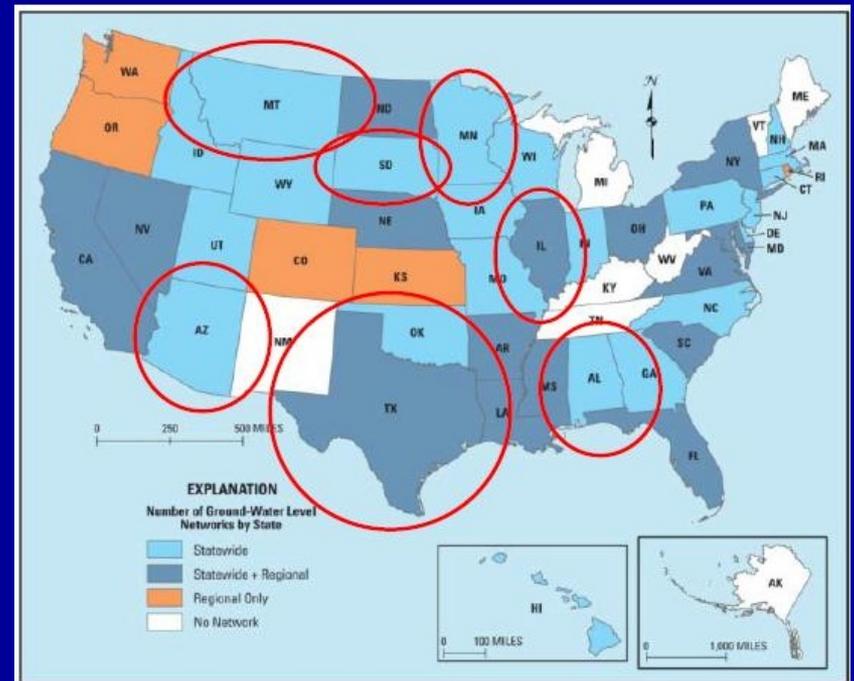
Explanation - Percentile classes (symbol color based on most recent measurement)							Real Time		Continuous		Periodic Measurements	
●	●	●	●	●	●	●	○	□	□	△	△	
New Low	<10	10-24	25-75	76-90	>90	New High	Not Ranked					
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal							

Active Well Count

Real-Time: 1,176 Daily: 1,142 Periodic: 23,777

Wells operated by States

Results from survey of State networks



EXPLANATION
Number of Ground-Water Level Networks by State

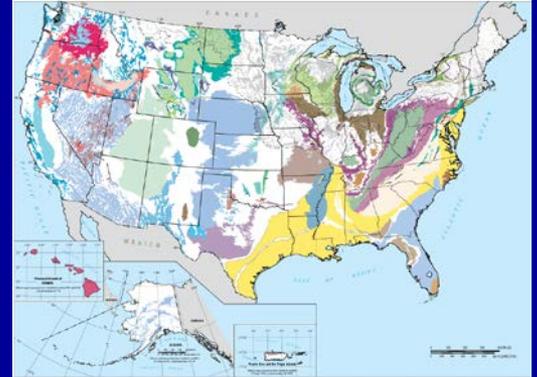
- Light Blue: Statewide
- Medium Blue: Statewide + Regional
- Dark Blue: Regional Only
- White: No Network

ACWI

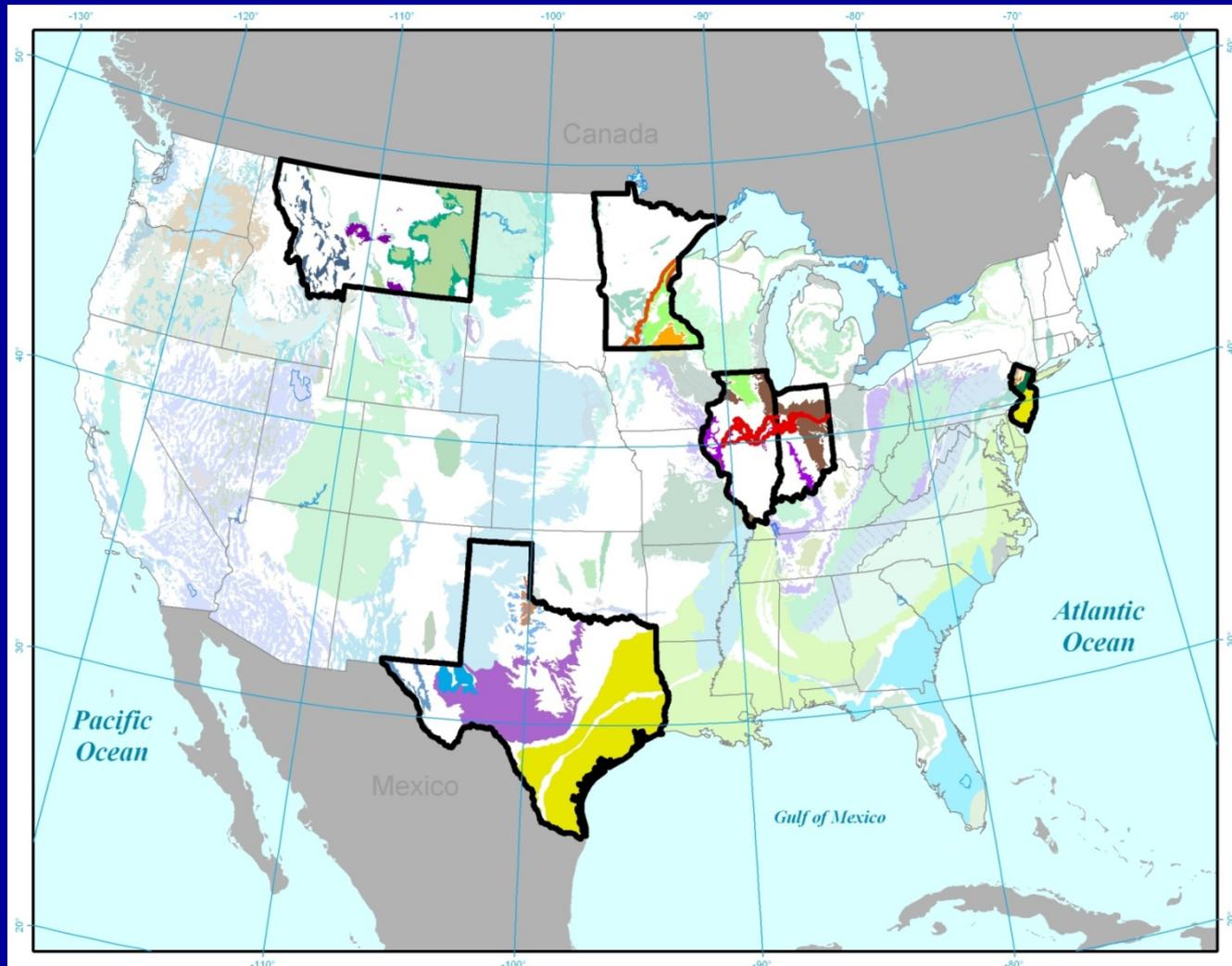
Advisory Committee
on Water Information

NGWMN Design Elements

- **Groundwater Monitoring Network for the Principal and major aquifers of the U.S.**
- **Groundwater levels and quality. Focus is availability.**
- **Priority on wells/springs with long-term data.**
- **Composed of data from willing data providers: State, Federal, Tribes and others**
- **Data available to all without restriction or cost via an Internet portal.**
- **Data provider is the authoritative data source. The NGWMN is not a “master database”.**



National Ground Water Monitoring Network Pilot Projects





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, “tagging”, spatial distribution
- Evaluate field practices, data elements stored in their GW database, and data management procedures and their documentation,
- Identify network gaps
- Evaluate ability to transmit data to the data portal
- Identify all costs of potential participation in the NGWMN



Pilot Conclusions

- A collaborative NGWMN is feasible.
- Pilot states record data differently and use different database platforms, but most “minimum data elements” are available.
- Incremental costs of incorporating data from existing state monitoring systems are low. Existing monitoring will not fill all data gaps.
- The NGWMN Internet data portal is a key element to the success of a NGWMN

Pilot Benefits

Pilots benefited from:

- a single, consistent dataset for shared interstate GW resources
- an opportunity to share data among state agencies
- a critical review of field procedures and data management procedures
- the opportunity to raise awareness for GW monitoring

NGWMN Framework Changes

Mike Wireman

U.S. Environmental Protection Agency

NGWMN Pilot Studies

- Pilot phase followed Framework approval.
- 5 pilots from 6 states tested original Framework
- Presented to ACWI in July 2011
- Report Final in September 2011

The Subcommittee on Ground Water of The Advisory Committee on Water Information

National Ground-Water Monitoring Network— Results of Pilot Studies



September 2011



Post-Pilot Updates to: *A National Framework for Ground-Water Monitoring in the United States* (June 2009):

Changes Necessary To:

- **accommodate new understandings;**
- **results of 5 State pilot monitoring projects**
- **to remove redundancy; make necessary corrections; address concerns of SOGW members**



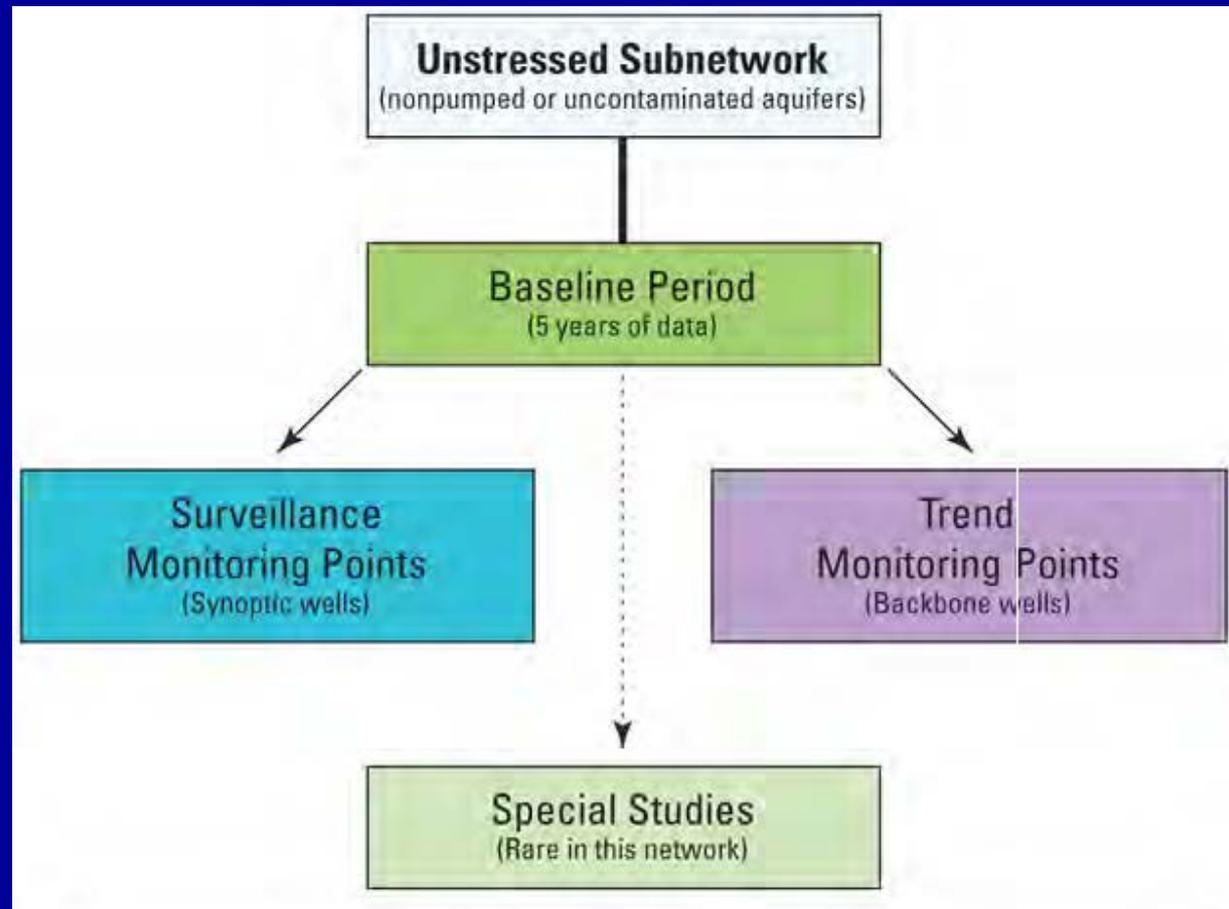
Post-Pilot Updates to: *A National Framework for Ground-Water Monitoring in the United States* (June 2009):

Key Areas for Revision:

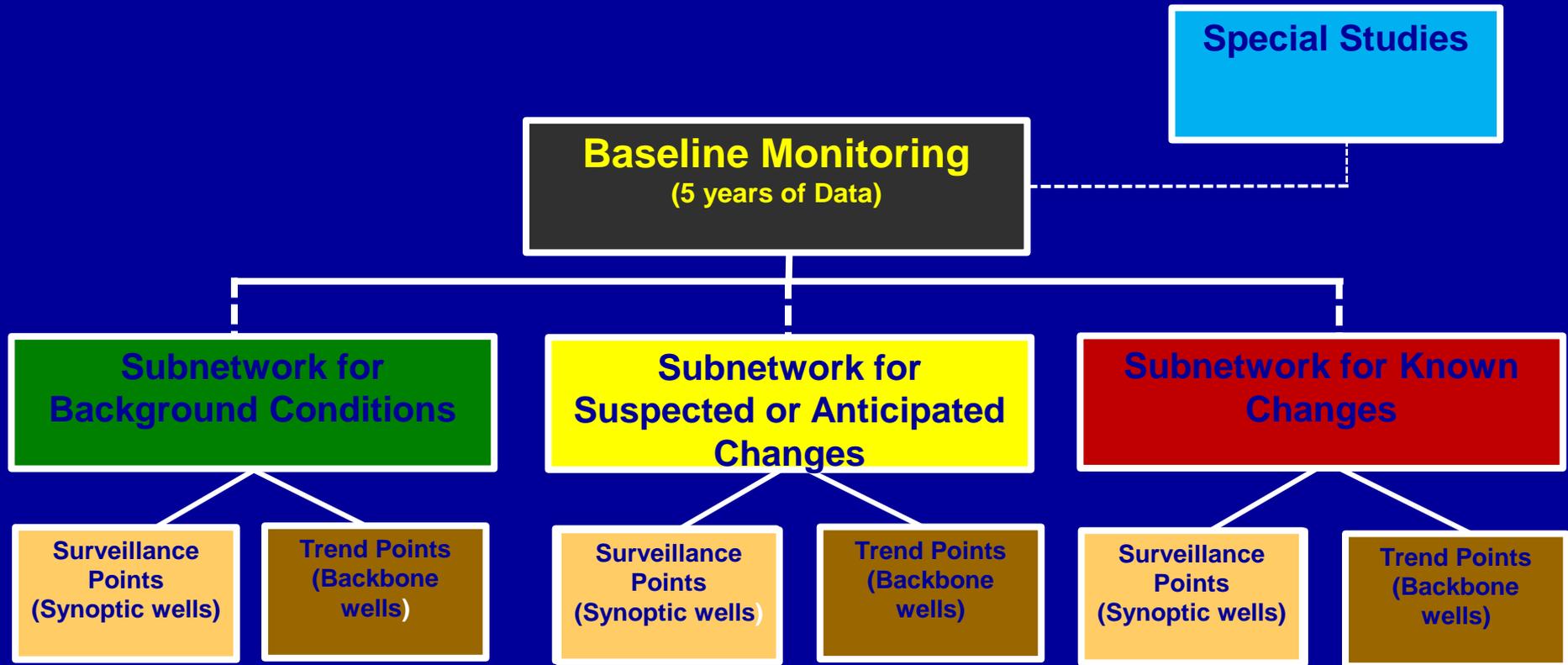
- 1. Baseline monitoring defined**
- 2. Network/well classification issues**
- 3. Measurement/Sampling frequency**
- 4. Density of wells in given aquifer**
- 5. Cost information**
- 6. Portal changes**

Original Network Design

- Two Subnetworks: Unstressed and Targeted
- Confusion about “Baseline”
- Network descriptions
- Well Classifications

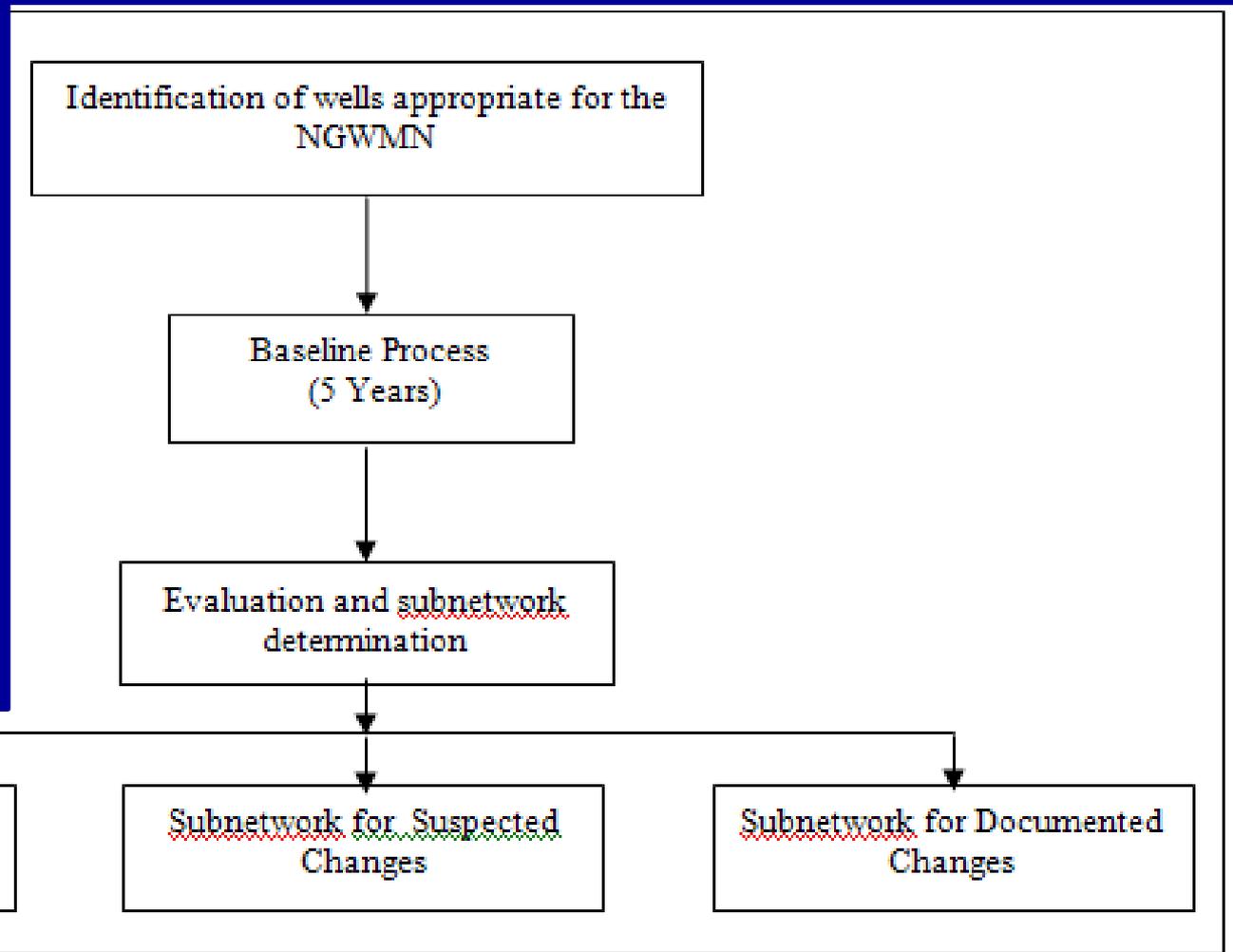


Updated Network Design



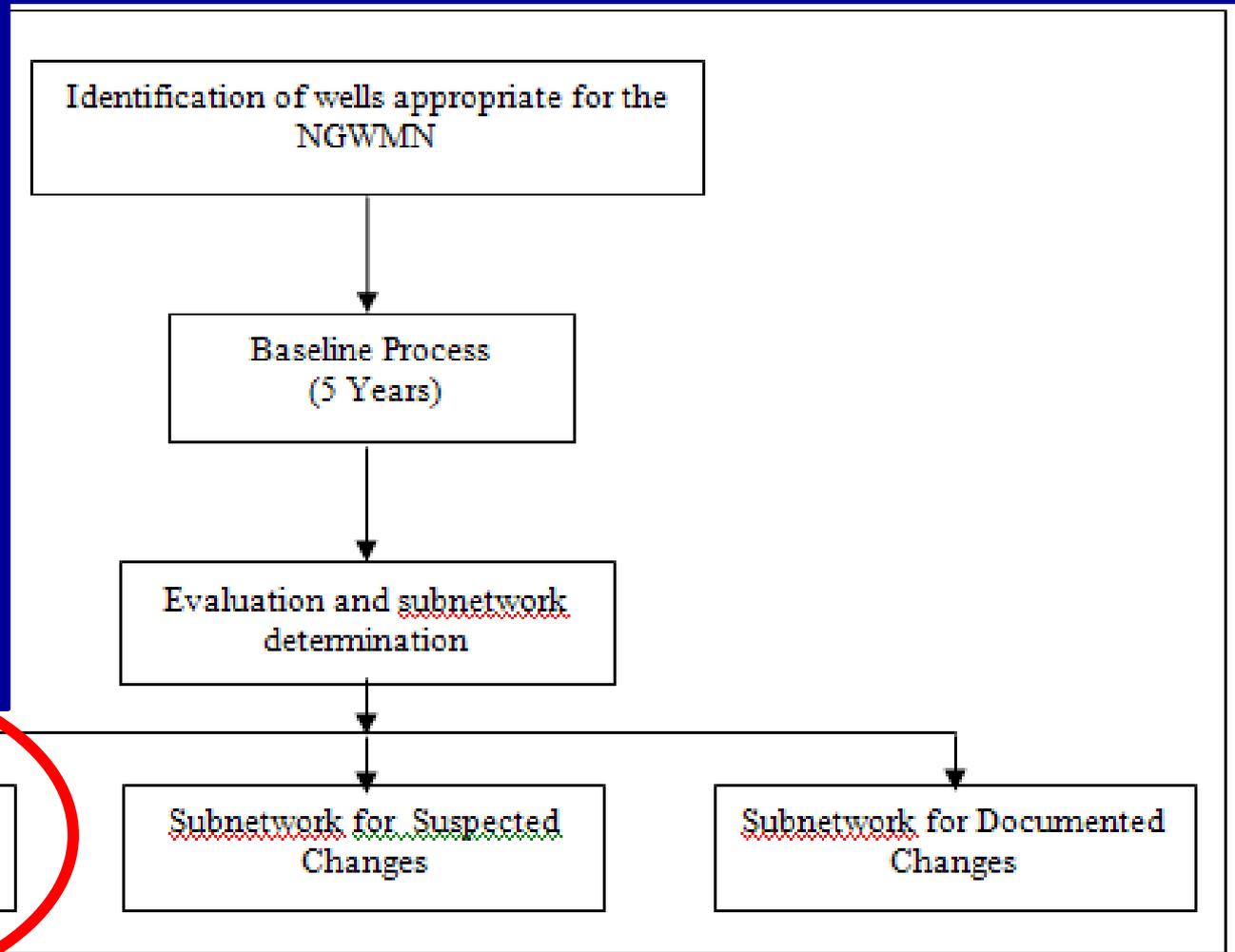
Updated Network Design

- **Baseline Process re-defined**
- **Now 3 Subnetworks**



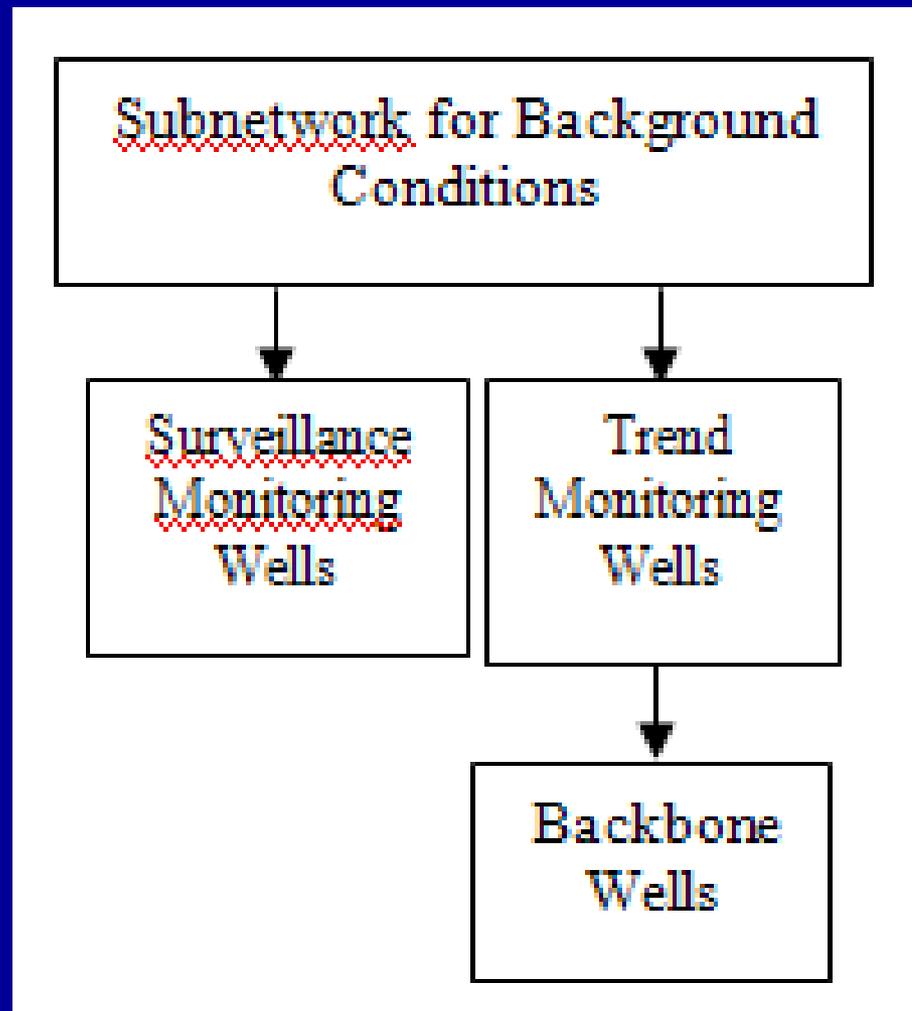
Updated Network Design

- **Baseline Process re-defined**
- **Now 3 Subnetworks**



Monitoring Frequency within Subnetworks

- Guidance cleaned up on monitoring frequency
- Backbone wells more prominent



Suggested water-quality monitoring frequencies for surveillance and trend monitoring categories

Monitoring Category	Aquifer Type	Flow Characteristics			
		<i>Porous Medium</i>	<i>Porous Medium</i>	<i>Fractured Rock</i>	<i>Karst</i>
		<i>Deep Well</i>	<i>Shallow Well</i>	<i>All Wells</i>	<i>All Wells</i>
Surveillance Category	Unconfined				
	"low" recharge (<5 in/yr)	Recommended: Annual Or per study design	Recommended: Annual, or per study design	Recommended: Annual, or per study design	Twice per year
	"high" recharge (>5 in/yr)	Recommended: Annual or per study design	Recommended: Annual, or per study design	Recommended: Annual, or per study design	Recommended: Annual, or per study design
	Confined				
	"low" hydraulic conductivity (<200 ft/d)	Every 5 years	Every 5 years	Every 5 years	Every 5 years
	"high" hydraulic conductivity (>200 ft/d)	Every 2 years	Every 2 years	Every 2 years	Every 2 years
Trend Category	All aquifer types throughout range of hydraulic conductivity	Recommended: Quarterly Minimum: Annual	Recommended: Quarterly Minimum: Annual	Recommended: Quarterly Minimum: Annual	Recommended: Quarterly Minimum: Annual

Suggested water-quality monitoring frequencies for surveillance and trend monitoring categories

Monitoring Category	Aquifer Type	
		<i>Porous Medium</i>
		<i>Deep Well</i>
Surveillance Category	Unconfined	
	“low” recharge (<5 in/yr)	Recommended: Annual Or per study design

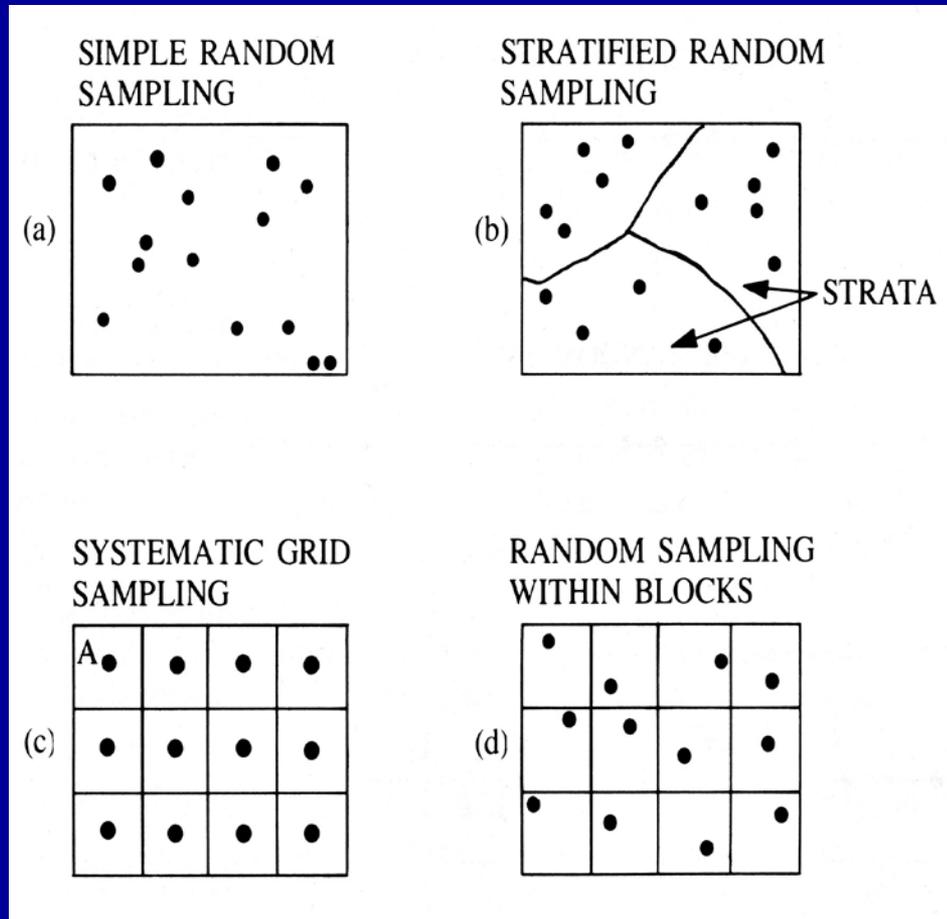
Example of water-level measurement frequency guidelines based on environmental factors

Monitoring Category	Aquifer Type	Nearby Long-Term Aquifer Withdrawals		
		Small Withdrawals	Moderate Withdrawals	Large Withdrawals
Trend Monitoring Category	Unconfined			
	"low" recharge (<5 in/yr)	Once per quarter	Once per quarter	Once per month
	"high" recharge (>5 in/yr)	Once per quarter	Once per month	Once per day
	Confined			
	"low" hydraulic conductivity (<200 ft/d),	Once per quarter	Once per quarter	Once per month
	"high" hydraulic conductivity (>200 ft/d)	Once per quarter	Once per month	Once per day
Surveillance Monitoring Category	Unconfined			
	"low" recharge (<5 in/yr)	Multi-year	Once per year	Twice per year
	"high" recharge (>5 in/yr)	Once per year	Twice per year	Once per quarter
	Confined			
	"low" hydraulic conductivity (<200 ft/d),	Multi-year	Every two years	Once per year
	"high" hydraulic conductivity (>200 ft/d)	Multi-year	Every two years	Once per year

Example of water-level measurement frequency guidelines based on environmental factors

Monitoring Category	Aquifer Type	Nearby Low
		<i>Small Withdrawals</i>
Trend Monitoring Category	Unconfined	
	“low” recharge (<5 in/yr)	Once per quarter

Distribution of Monitoring Points Within Aquifer Systems: How many?



Distribution - Stratified random sampling within blocks

Number of monitoring points

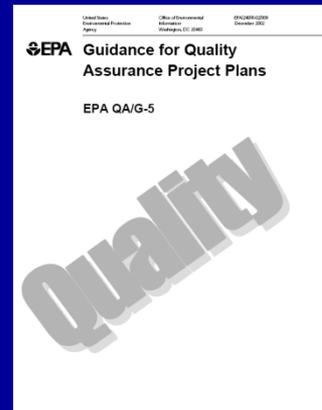
- 1. Specify minimum # of points per aquifer**
- 2. Specify # of points based on a prescribed density**

Chapter 5: Field Practices

- Requires adequate documentation of techniques

Chapter 6: Data Standards and Management

- Minor changes made to the Minimum Data Elements for wells and measurements



Review of Pilot Costs

- \$32K average cost to evaluate network, select wells, and set up portal communication
- Monitoring costs vary widely. Cost drivers included:
 - Aquifer system complexity
 - Demands on the groundwater resource
 - Threats to the groundwater resource
 - Level of data provider expertise, history of monitoring, and existing network
 - Legal or regulatory framework

Pilot Capital Costs (\$1K)

Category	Range	Average	Median
New Well Capital Cost	\$0 - \$3,525	\$1,356	\$1,515
Average per New Well Cost	\$0-\$25.9	\$13.7	\$9
Other One Time & Capital Costs	\$40-\$190	\$226	\$112
Average per Well Costs	\$0.08 - \$2	\$.03	\$0.015

Pilot O&M Costs (\$1K)

Category	Range	Average	Median
Total Annual O&M Costs	\$68 – \$4,919	\$1,107	\$137
Annual O&M Cost per Total Wells	\$0.085-\$4	\$1.7	\$0.6

Lessons Learned

- Wide range in costs from pilot to pilot
- SOGW expects limited federal dollars
- Decisions remain, including
 - Funding model(s)
 - Equitable distribution of funds among data providers
- Oversight Board designed to help address these decisions

Revision of: A National Framework for Ground-Water Monitoring in the United States (June 2009)

- Provides more flexibility re: sampling frequency and well distribution
- Adds new appendix - ***Examples of the Use of Statistics in Addressing National Ground Water Monitoring Network Questions***
- Adds new appendix with definition of terms

NGWMN Congressional Activity

Christine Reimer

National Ground Water Association

ACWI

Advisory Committee
on Water Information

Other Accomplishments and Portal update

Bill Cunningham
USGS

Additional Accomplishments

- Outreach Presentations:
 - Midwest GW Conference (Sept 2011)
 - **Open Geospatial Consortium (ongoing)**
 - GWPC Annual Meeting (Sept 2011)
 - Geological Society of America (Oct 2011)
 - National Monitoring Meeting (April/May 2012)
 - NGWA Summit (May 2012)
 - USGS Congressional Briefing (July 2012)

Additional Accomplishments

- Coordination with other Subcommittees
 - Shared approach with NWQMC for their National Network of Reference Watersheds
 - Portal activities coordinated via USGS CIDA
 - Presentation to ACWI's SWRR



Additional Accomplishments

- Exploring Tribal Participation
 - Three Affiliated Tribes (ND) have expressed interest
 - SOGW determining next steps



NGWMN Pilot Portal

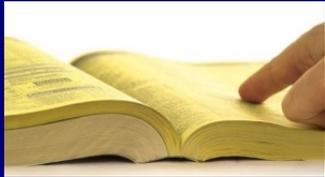
ACWI

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on Water Information

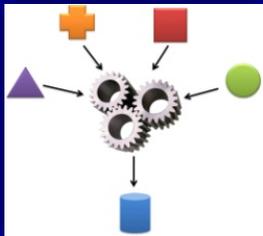
Hub Components:



1. **NGWMN Portal** - Provides mapping interface to display and search the Network

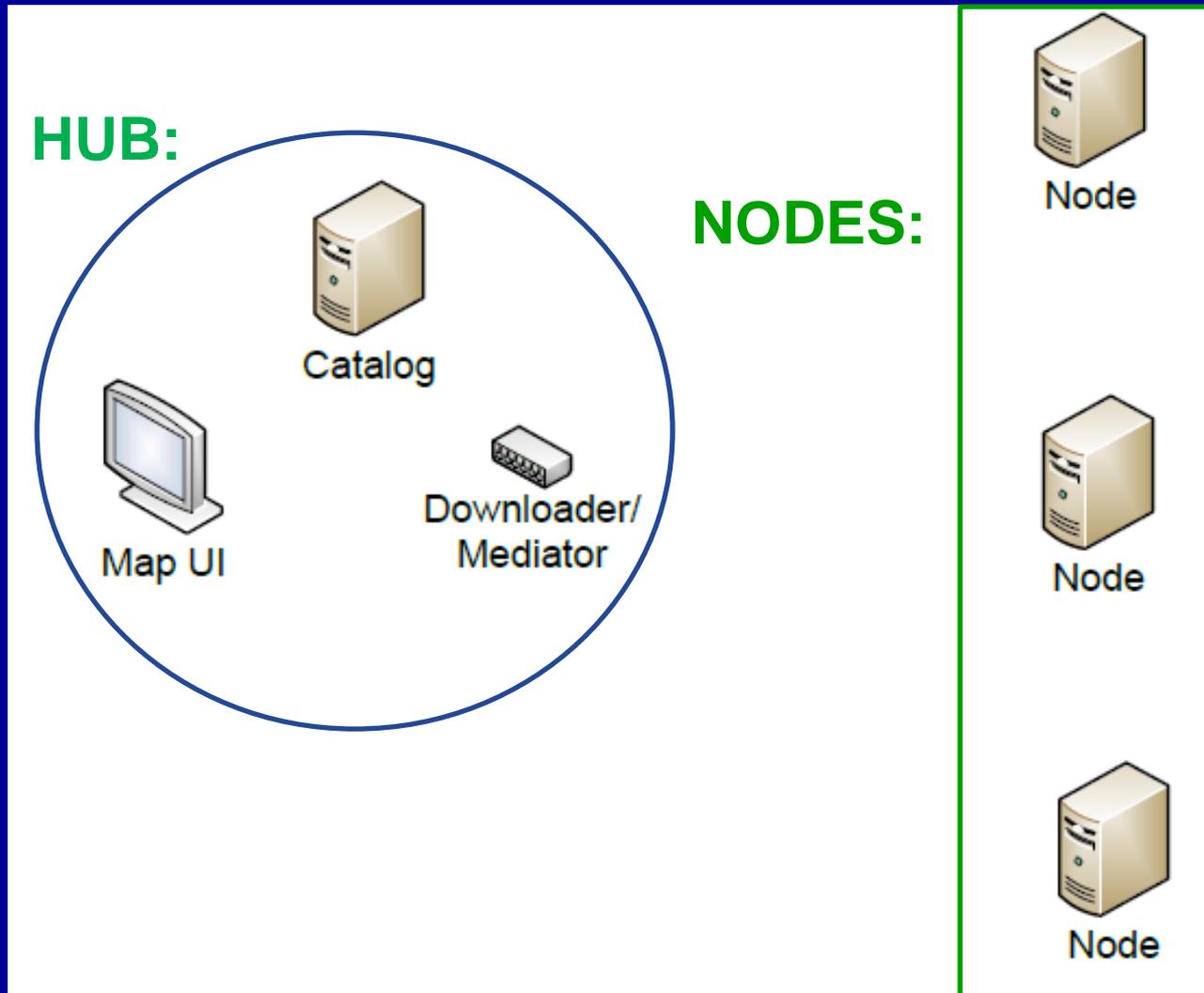


2. **Well Registry** - Harvests metadata to power Network searching and intelligent parceling of search to nodes (data providers)

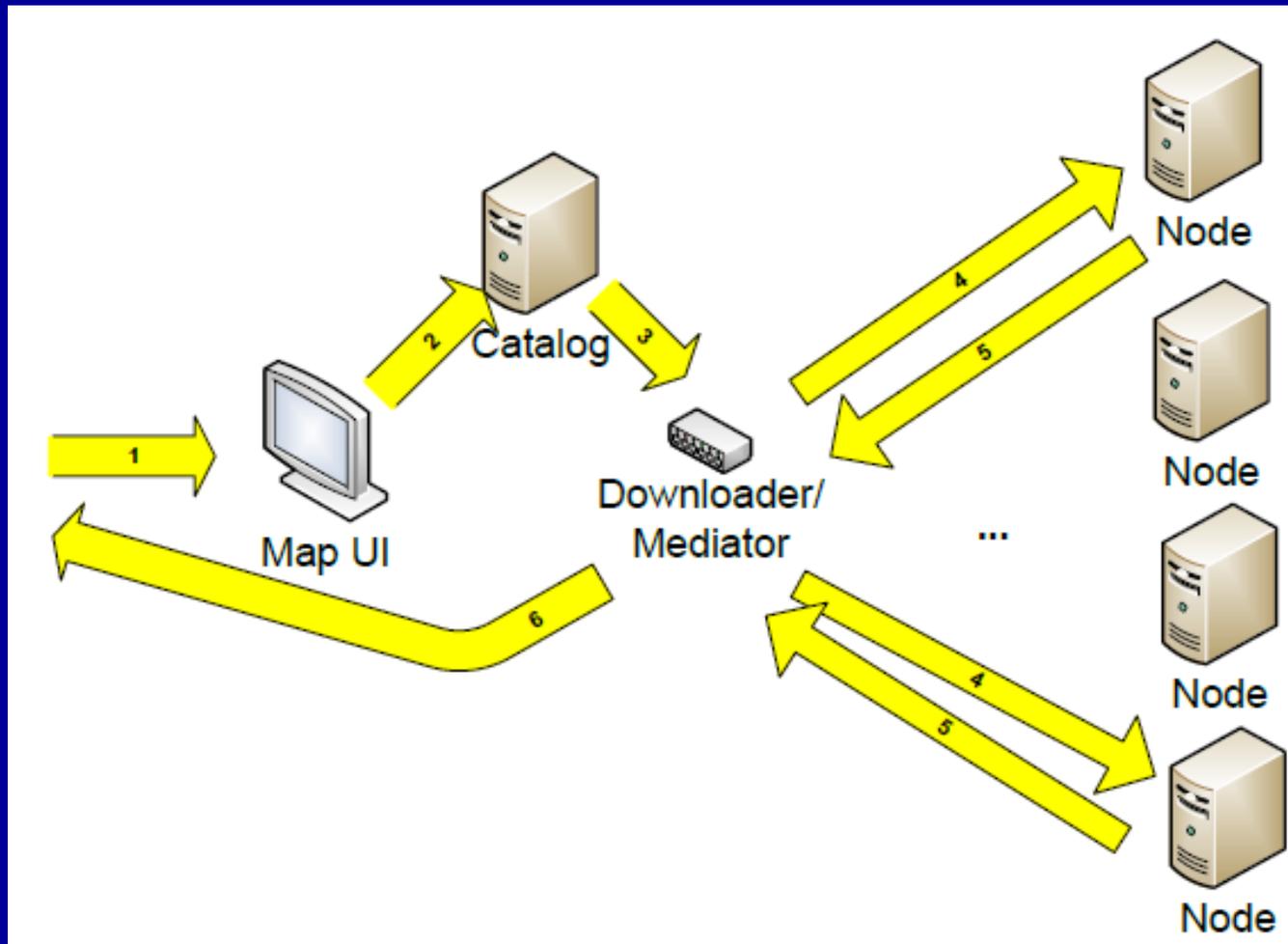


3. **Data Mediator** - Collects data from each node and mediates independent formats to common ones

Hub-Spoke Architecture



Data Retrieval Workflow:



NGWMN Pilot Portal



National Ground Water Monitoring Network Data Portal (BETA)

National Ground Water Monitoring Network Data Portal of the Federal Advisory Committee on Water Information Subcommittee on Ground Water

This page serves as a gateway to a pilot U.S. National Ground Water Monitoring Network (NGWMN) data portal developed as part of a NGWMN pilot study. The Network Portal can be accessed [here](#) or by clicking the image below.

Information about the NGWMN and the Pilot study, definitions of terms used in the portal follow, and links to related websites follow.



<http://acwi.gov/sogw>



Disclaimer: Please note that this is a beta version of the Pilot NGWMN Data Portal, which is still undergoing development and testing. Should you encounter any bugs, glitches, lack of functionality or other problems with the, please contact the site administrator immediately so they can rectify these accordingly.



National Ground Water Monitoring Network Data Portal (BETA)

Filter Map Data

Agency Contributing Data
ctrl + click to select more than one

- All Organization IDs
- ARKANSAS SOIL & WATER CONSERV
- IL Env't Protection Agency
- IL State Water Survey
- MT Bureau of Mines and Geology

U.S. Principal Aquifer Name
ctrl + click to select more than one

- All National Aquifers
- Ada-Vamoosa aquifer
- Alluvial aquifers
- Arbuckle-Simpson aquifer
- Biscayne aquifer

Water Level Network
ctrl + click to select more than one

- All Water Level Sub Networks
- Surveillance - Background
- Surveillance - Suspected / Anticipated C
- Surveillance - Known Changes
- Trend - Background

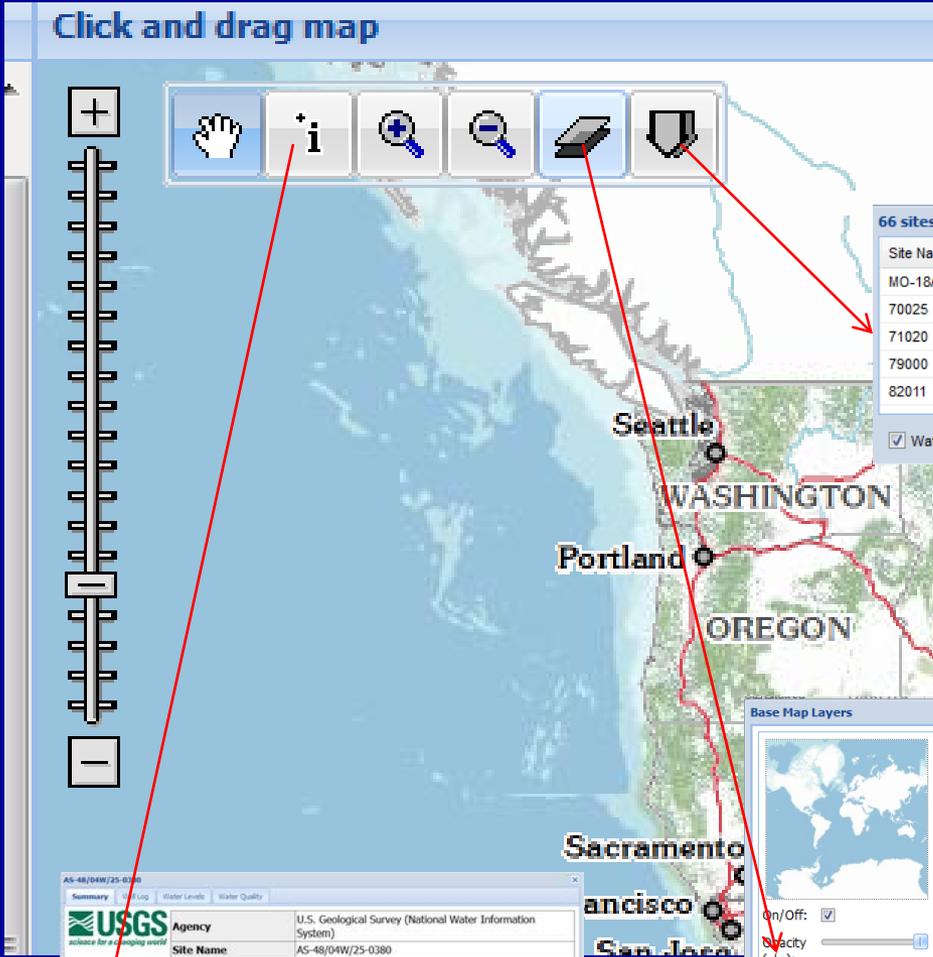
Water Quality Network
ctrl + click to select more than one

- All Water Quality Sub Networks
- Surveillance - Background
- Surveillance - Known Changes
- Trend - Background
- Trend - Known Changes



Map

Click and drag map



66 sites were identified.

Site Name	Ntl Aquifer Name	Agency
MO-18/02W/29-0017	Cambrian-Ordovician aquifer syst...	USGS
70025	Cambrian-Ordovician aquifer syst...	MN DNR
71020	Cambrian-Ordovician aquifer syst...	MN DNR
79000	Cambrian-Ordovician aquifer syst...	MN DNR
82011	Cambrian-Ordovician aquifer syst...	MN DNR

Water Level
 Water Quality
 Construction
 Lithology

[Download data](#)

Base Map Layers

Vector Fills

Description: Vector fills is a dynamic map service with the vector base map polygon area fills, i.e. the green national forest areas or the blue water areas. The fills have been split into separate services: `_Small`, which has tiles for the small scales cached, down through 1:289,000; and `_Large`, which is dynamic and covers scales 1:144,000 and larger.

On/Off:

Opacity:

(-/+)

Vectors

Description: This is the beta version of new The National Map, in the Web Mercator projection. There are 20 scales total, from 1:591,657,527 (global) down through 1:1,128. The Vector base map service has been split into two services: `_Small`, with tiles cached for the small scales, down through 1:288,000; and `_Large`, a dynamic service for 1:144,000.

Close

AS-48/D4W/25-0380

Summary | [Full Log](#) | [Water Levels](#) | [Water Quality](#)

Agency	U.S. Geological Survey (National Water Information System)
Site Name	AS-48/D4W/25-0380
Site #	463635090481101
Lat/Long(WGS84)	46.6090, -90.8030
Well Depth	217 ft
Local Aquifer Name	Lake Superior Sandstone Aquifer
National Aquifer Name	Cambrian-Ordovician aquifer system
Water Level Network	Trend - Known Changes
Water Quality Network	-
Additional info	Link

[Download Data](#) [Done](#)



National Ground Water Monitoring Network Data Portal (BETA)

Filter Map Data

Agency Contributing Data

ctrl + click to select more than one

- All Organization IDs
- ARKANSAS SOIL & WATER CONSERV
- IL Env't Protection Agency
- IL State Water Survey
- MT Bureau of Mines and Geology

U.S. Principal Aquifer Name

ctrl + click to select more than one

- All National Aquifers
- Ada-Vamoosa aquifer
- Alluvial aquifers
- Arbuckle-Simpson aquifer
- Biscayne aquifer

Water Level Network

ctrl + click to select more than one

- All Water Level Sub Networks
- Surveillance - Background
- Surveillance - Suspected / Anticipated C
- Surveillance - Known Changes
- Trend - Background

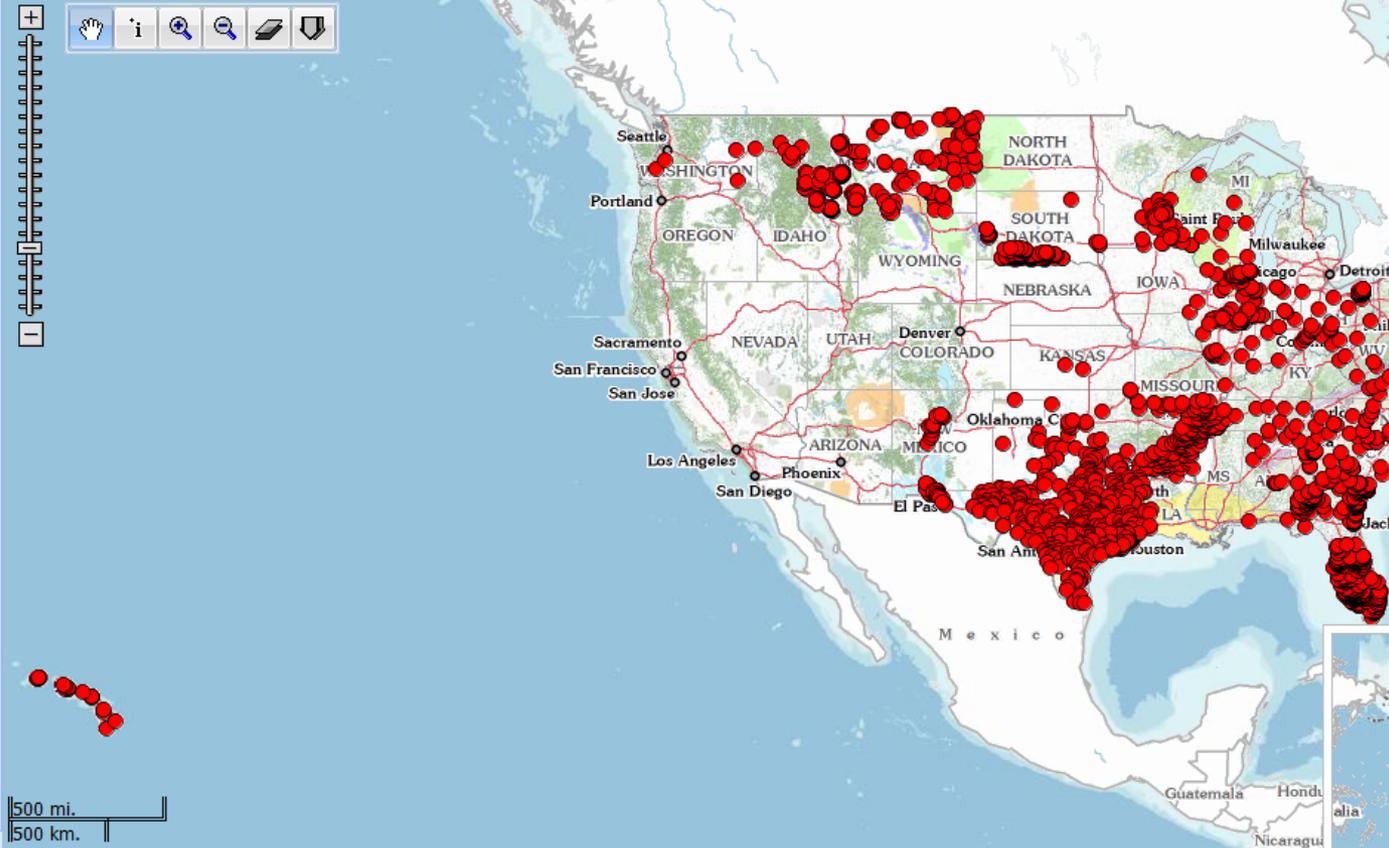
Water Quality Network

ctrl + click to select more than one

- All Water Quality Sub Networks
- Surveillance - Background
- Surveillance - Known Changes
- Trend - Background
- Trend - Known Changes

Map

Click and drag map



Number of points meeting criteria: 2560



National Ground Water Monitoring Network Data Portal (BETA)

Filter Map Data

Agency Contributing Data

ctrl + click to select more than one

All Organization IDs

- ARKANSAS SOIL & WATER CONSERV
- IL Env't Protection Agency
- IL State Water Survey
- MT Bureau of Mines and Geology

U.S. Principal Aquifer Name

ctrl + click to select more than one

All National Aquifers

- Ada-Vamoosa aquifer
- Alluvial aquifers
- Arbuckle-Simpson aquifer
- Biscayne aquifer

Water Level Network

ctrl + click to select more than one

All Water Level Sub Networks

- Surveillance - Background
- Surveillance - Suspected / Anticipated C
- Surveillance - Known Changes
- Trend - Background

Water Quality Network

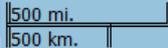
ctrl + click to select more than one

All Water Quality Sub Networks

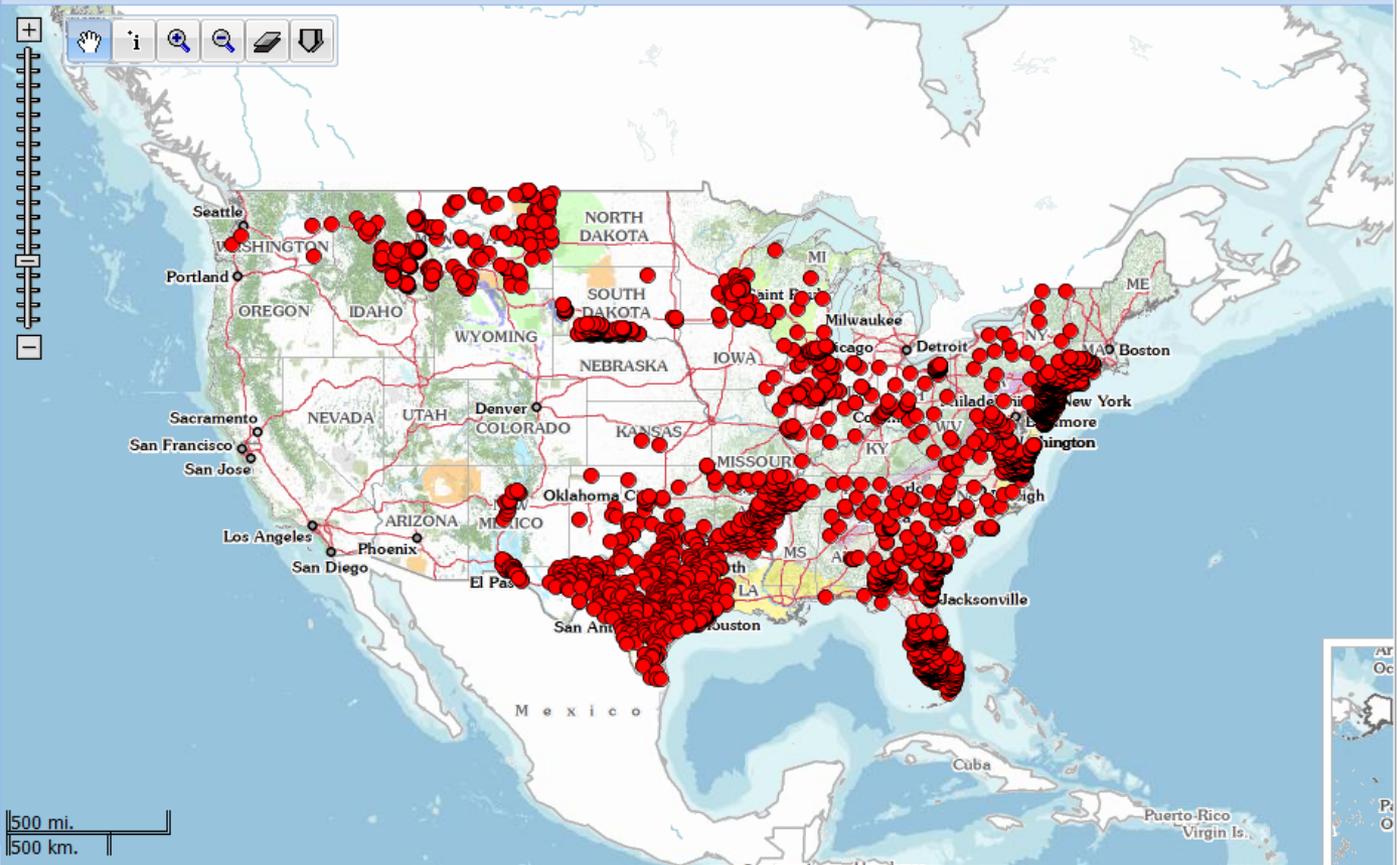
- Surveillance - Background
- Surveillance - Known Changes
- Trend - Background
- Trend - Known Changes

Map

Click and drag map



Number of points meeting criteria: 2560



Filter Map Data

Agency Contributing Data

ctrl + click to select more than one

All Organization IDs

ARKANSAS SOIL & WATER CONSERV

IL Env'tl Protection Agency

IL State Water Survey

MT Bureau of Mines and Geology

U.S. Principal Aquifer Name

ctrl + click to select more than one

Piedmont and Blue Ridge crystalline-ro

Puget Sound aquifer system

Rio Grande aquifer system

Rush Springs aquifer

Sand and gravel aquifers (glaciated req

Water Level Network

ctrl + click to select more than one

All Water Level Sub Networks

Surveillance - Background

Surveillance - Suspected / Anticipated C

Surveillance - Known Changes

Trend - Background

Water Quality Network

ctrl + click to select more than one

All Water Quality Sub Networks

Surveillance - Background

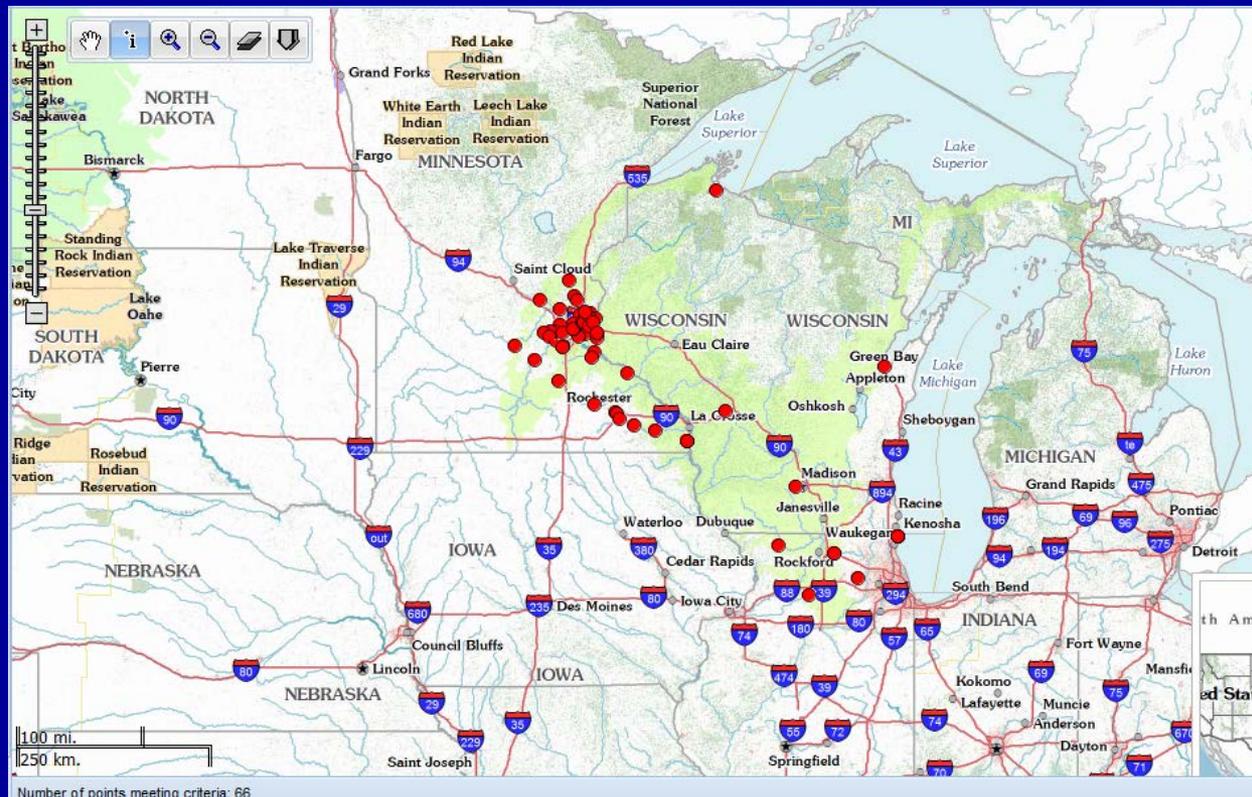
Surveillance - Known Changes

Trend - Background

Trend - Known Changes

Map

Filtered for Cambrian-Ordovician aquifer system



Includes data from Minnesota Pilot (2 agencies) and USGS data from Wisconsin

National Ground Water Monitoring Network Data Portal (BETA)

Filter Map Data

Agency Contributing Data

ctrl + click to select more than one

All Organization IDs

- ARKANSAS SOIL & WATER CONSERV
- IL Env't Protection Agency
- IL State Water Survey
- MT Bureau of Mines and Geology

U.S. Principal Aquifer Name

ctrl + click to select more than one

- New York and New England carbonate
- New York sandstone aquifers
- Northern Atlantic Coastal Plain aquifer s
- Northern Rocky Mountains Intermontane
- Ordovician aquifers

Water Level Network

ctrl + click to select more than one

All Water Level Sub Networks

- Surveillance - Background
- Surveillance - Suspected / Anticipated C
- Surveillance - Known Changes
- Trend - Background

Water Quality Network

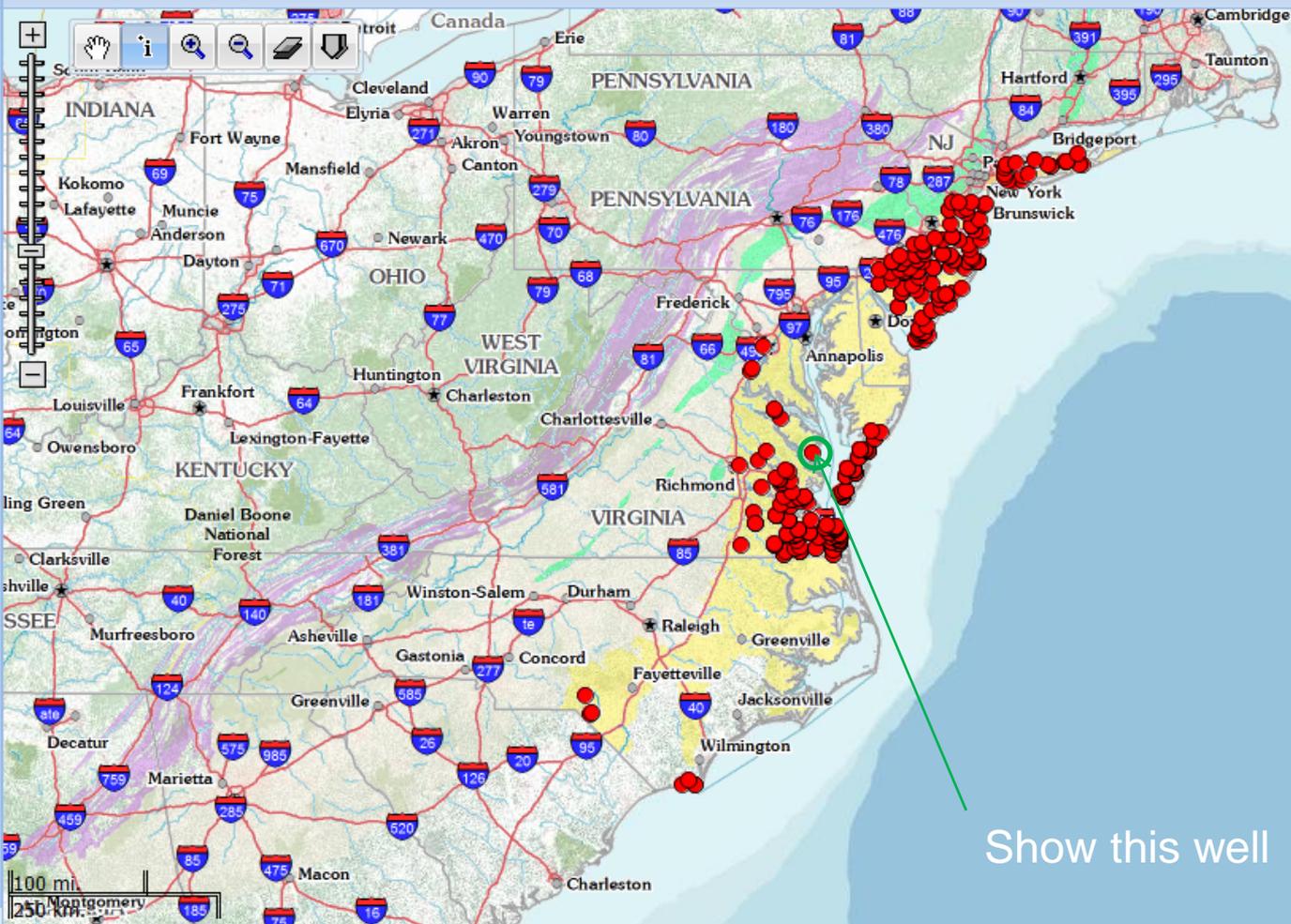
ctrl + click to select more than one

All Water Quality Sub Networks

- Surveillance - Background
- Surveillance - Known Changes
- Trend - Background
- Trend - Known Changes

Map

Click on map to identify a point of interest



Number of points meeting criteria: 301

Show this well



Advisory Committee
on Water Information



Agency	U.S. Geological Survey (National Water Information System)
Site Name	59K 1 SOW 015
Site #	374249076230101
Lat/Long(WGS84)	37.7130,-76.3830
Well Depth	716 ft
Local Aquifer Name	Upper Cretaceous Series
National Aquifer Name	Northern Atlantic Coastal Plain aquifer system
Water Level Network	Surveillance - Suspected / Anticipated Changes
Water Quality Network	-
Additional info	link

Download Data

Done

Summary

Well Log

Water Levels

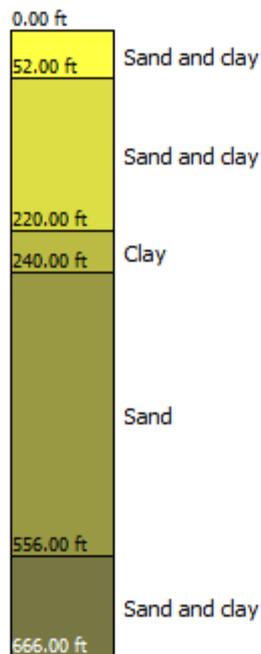
Water Quality

Longitude: -76.3833

Latitude: 37.7137

Elevation: 90.00 ft.

Well Depth: 716.00 ft.



Depth From (ft)	Depth To (ft)	Lithology	Description
0.00	52.00	SAND, CLAY	Sand and clay
52.00	220.00	SAND, CLAY	Sand and clay
220.00	240.00	CLAY	Clay
240.00	556.00	SAND	Sand
556.00	666.00	SAND, CLAY	Sand and clay

Depth From (ft)	Depth To (ft)	Screen/Casing Material
706.00	716.00	Screen, Type Not Known

Download Data

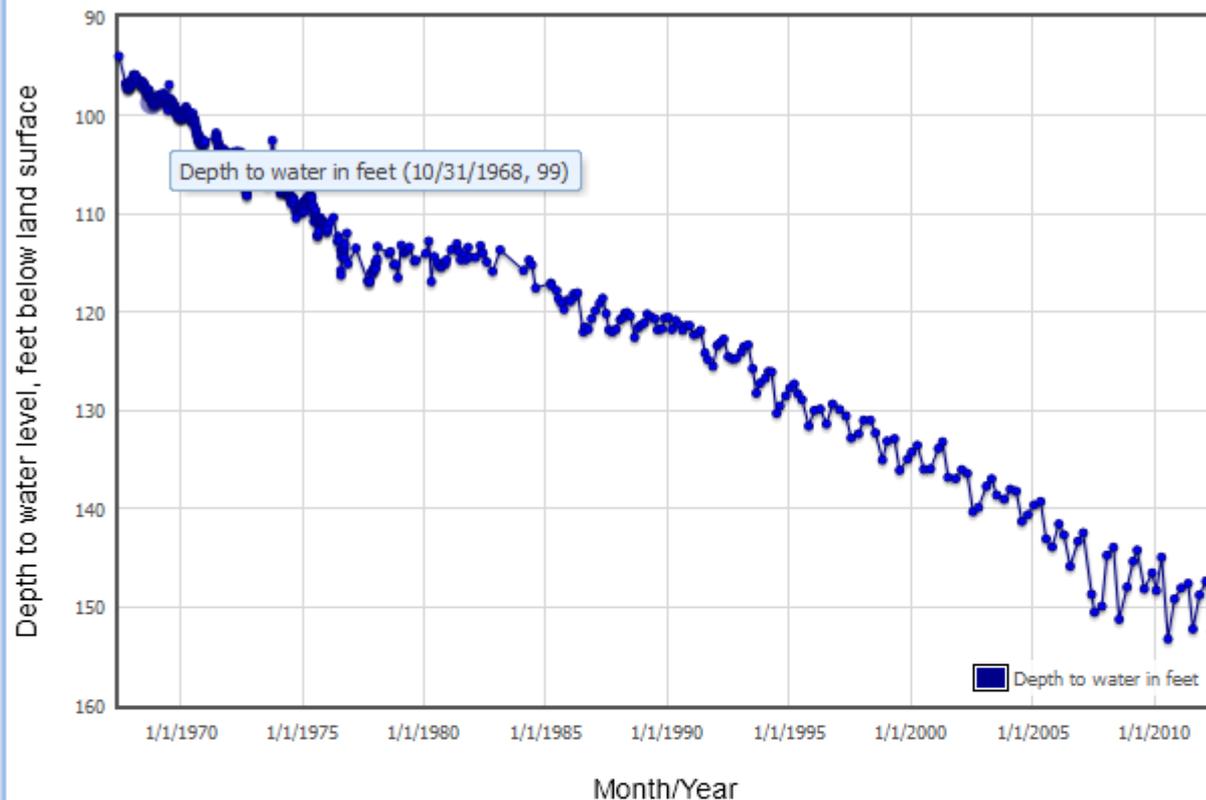
Done

Summary

Well Log

Water Levels

Water Quality



Date created: 07/02/2012 12:20:36

Date ▾	Time	Value	Unit	Comment
05-15-2012	19:01-04:00	152.45	feet	Steel-tape measurement.
02-09-2012	18:50-05:00	147.35	feet	Steel-tape measurement.
11-03-2011	18:30-04:00	148.75	feet	Steel-tape measurement.
07-28-2011	17:00-04:00	152.21	feet	Steel-tape measurement.
05-17-2011	16:10-04:00	147.59	feet	Steel-tape measurement.
02-01-2011	17:23-05:00	148.04	feet	Steel-tape measurement.
10-26-2010	18:25-04:00	149.15	feet	Steel-tape measurement.

Download Data

Done

Summary

Well Log

Water Levels

Water Quality

Activity Start Date ▾	Activity Start Time	Time Zone	Characteristic Name	Measure Value	Units	Detectio
1999-05-14	11:52:00	EDT	Carbon dioxide	1.6	mg/l	
1999-05-14	11:52:00	EDT	Iron	44.3	ug/l	
1999-05-14	11:52:00	EDT	pH, lab	8.8	std units	
1999-05-14	11:52:00	EDT	Specific conductance	688	uS/cm @25C	
1999-05-14	11:52:00	EDT	Total hardness -- SDWA NPDWR	9.06	mg/l CaCO3	
1999-05-14	11:52:00	EDT	Alkalinity	339	mg/l CaCO3	
1999-05-14	11:52:00	EDT	Hydrogen ion	Not Detected		Detected
1999-05-14	11:52:00	EDT	Manganese	2.63	ug/l	
1999-05-14	11:52:00	EDT	Temperature, air	15.0	deg C	
1999-05-14	11:52:00	EDT	Sodium, percent total cations	95	%	
1999-05-14	11:52:00	EDT	Carbonate (CO3)	9	mg/l	
1999-05-14	11:52:00	EDT	Temperature, water	19.3	deg C	
1999-05-14	11:52:00	EDT	Calcium	2.24	mg/l	
1999-05-14	11:52:00	EDT	Sodium adsorption ratio	24.2	None	
1999-05-14	11:52:00	EDT	Sodium	167	mg/l	
1999-05-14	11:52:00	EDT	Fluoride	2.70	mg/l	
1999-05-14	11:52:00	EDT	Silica	20.9	mg/l	
1999-05-14	11:52:00	EDT	Sulfate	11.3	mg/l	
1999-05-14	11:52:00	EDT	Barometric pressure	755	mm/Hg	
1999-05-14	11:52:00	EDT	Specific conductance	739	uS/cm @25C	
1999-05-14	11:52:00	EDT	Magnesium	0.843	mg/l	
1999-05-14	11:52:00	EDT	Potassium	8.29	mg/l	
1999-05-14	11:52:00	EDT	Bicarbonate	395	mg/l	
1999-05-14	11:52:00	EDT	Bromide	0.04	mg/l	
1999-05-14	11:52:00	EDT	Chloride	3.20	mg/l	
1999-05-14	11:52:00	EDT	Total dissolved solids	420	mg/l	
1999-05-14	11:52:00	EDT	Total dissolved solids	0.57	tons/ac ft	

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Download Data

Done

USGS_374249076230101.xls [Read-Only]

	E	F	G	H	I
1	Date	Time	TimeZone	Value	Unit
2	1967-06-23	12:00-06	:00	94	feet
3	1967-10-05	12:00-06	:00	96.82	feet
4	1967-10-10	12:00-06	:00	96.72	feet
5	1967-10-15	12:00-06	:00	96.8	feet
6	1967-10-20	12:00-06	:00	97.27	feet
7	1967-10-25	12:00-06	:00	96.9	feet
8	1967-10-31	12:00-06	:00	97.1	feet
9	1967-11-05	12:00-06	:00	97.02	feet
10	1967-11-10	12:00-06	:00	97.28	feet
11	1967-11-15	12:00-06	:00	97.17	feet
12	1967-11-20	12:00-06	:00	97.05	feet
13	1967-11-25	12:00-06	:00	96.92	feet
14	1967-11-30	12:00-06	:00	96.93	feet
15	1967-12-05	12:00-06	:00	96.99	feet
16	1967-12-10	12:00-06	:00	96.95	feet
17	1967-12-15	12:00-06	:00	96.8	feet
18	1967-12-20	12:00-06	:00	96.99	feet
19	1967-12-25	12:00-06	:00	96.97	feet

Well Log Water

USGS_374249076230101.xls [Read-Only] [Compatibility Mode]

	A	D	E	F
1	Activity Start Date	Characteristic Name	Value	Unit
2	1972-04-04	Temperature, water	15.5	deg C
3	1972-04-04	Iron	430	ug/l
4	1972-04-04	Calcium	2.60	mg/l
5	1972-04-04	Sodium adsorption ratio	1.7	None
6	1972-04-04	Sodium	14.0	mg/l
7	1972-04-04	Carbonate (CO3)	8	mg/l
8	1972-04-04	Fluoride	0.20	mg/l
9	1972-04-04	Silica	0.700	mg/l
10	1972-04-04	Sulfate	0.2	mg/l
11	1972-04-04	Phosphate	0.020	mg/l
12	1972-04-04	Depth	716	ft
13	1972-04-04	Depth	727.00	ft
14	1972-04-04	Color	10	PCU
15	1972-04-04	Magnesium	1.40	mg/l
16	1972-04-04	Potassium	13.0	mg/l
17	1972-04-04	Alkalinity	58	mg/l CaCO3
18	1972-04-04	Bicarbonate	55	mg/l

Well Log Water Levels Water Quality

USGS_374249076230101.xls [Read-Only] [Compatibility Mode]

	C	D	E	F	G	H	I	J	
		Lithology Depth From	Lithology Depth To	Lithology Controlled Concept	Lithology Description	Observation Method	Screen Material	Screen Depth From	Screen Depth To
2	0.00	52.00	SAND, CLAY	Sand and clay	borehole				
3	52.00	220.00	SAND, CLAY	Sand and clay	borehole				
4	220.00	240.00	CLAY	Clay	borehole				
5	240.00	556.00	SAND	Sand	borehole				
6	556.00	666.00	SAND, CLAY	Sand and clay	borehole				
7						Screen, Type Not Known	706	716	
8									
9									
10									

Well Log Water Levels Water Quality

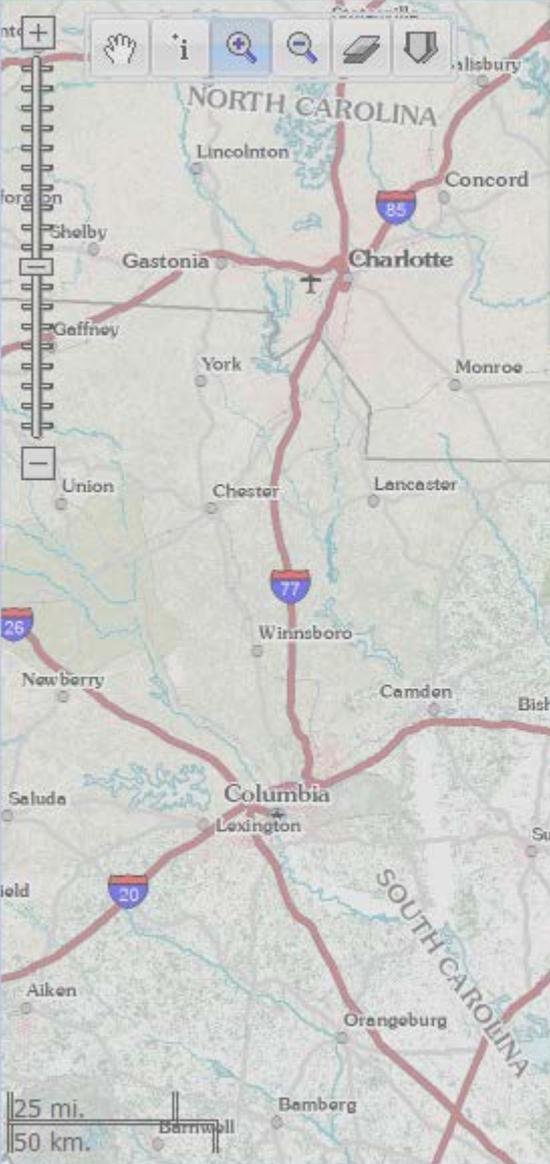
Click or click and drag on map to zoom in

7 sites were identified.

Site Name	Ntl Aquifer Name	Agency
BR-079 SUNSET HARBOR RS (PEEDEE)	Northern Atlantic Coastal Plain aq...	USGS
BR-081 (NC-197) SOUTHPORT RS (PEEDEE)	Northern Atlantic Coastal Plain aq...	USGS
BR-082 (NC-198) SOUTHPORT RS (CASTLE HAYNE)	Northern Atlantic Coastal Plain aq...	USGS
BR-100 WELL 15A (CASTLE HAYNE/PEEDEE)	Northern Atlantic Coastal Plain aq...	USGS
SC-040 IN LAURINBURG, NC (BLACK CREEK)	Northern Atlantic Coastal Plain aq...	USGS

- Water Level Water Quality Construction Lithology

[Download data](#)



Number of points meeting criteria: 301



	A	B	C	D	E	F
13449	USGS	335631078003604	2012-06-10T00:00:00.000	ft	44.69	P
13450	USGS	335631078003604	2012-06-11T00:00:00.000	ft	44.62	P
13451	USGS	335631078003604	2012-06-12T00:00:00.000	ft	44.54	P
13452	USGS	335631078003604	2012-06-13T00:00:00.000	ft	44.06	P
13453	USGS	335631078003604	2012-06-14T00:00:00.000	ft	44.52	P
13454	USGS	335631078003604	2012-06-15T00:00:00.000	ft	44.54	P
13455	USGS	335631078003604	2012-06-16T00:00:00.000	ft	44.52	P
13456	USGS	335631078003604	2012-06-17T00:00:00.000	ft	44.49	P
13457	USGS	335631078003604	2012-06-18T00:00:00.000	ft	44.48	P
13458	USGS	335631078003604	2012-06-19T00:00:00.000	ft	44.6	P
13459	USGS	335631078003604	2012-06-20T00:00:00.000	ft	44.65	P
13460	USGS	335631078003604	2012-06-21T00:00:00.000	ft	44.62	P
13461	USGS	335631078003604	2012-06-22T00:00:00.000	ft	44.64	P
13462	USGS	335631078003604	2012-06-23T00:00:00.000	ft	44.68	P
13463	USGS	335631078003604	2012-06-24T00:00:00.000	ft	44.72	P
13464	USGS	335631078003604	2012-06-25T00:00:00.000	ft	44.66	P
13465	USGS	335631078003604	2012-06-26T00:00:00.000	ft	44.65	P
13466	USGS	335631078003604	2012-06-27T00:00:00.000	ft	44.61	P
13467	USGS	335631078003605	1970-01-23T12:00-06:00	feet	29.36	Reported, method not known.
13468	USGS	335631078003605	1970-08-26T12:00-06:00	feet	30.3	Reported, method not known.
13469	USGS	335631078003605	1970-09-18T12:00-06:00	feet	29.84	Reported, method not known.
13470	USGS	335631078003605	1970-10-19T12:00-06:00	feet	29.41	Reported, method not known.
13471	USGS	335631078003605	1970-11-10T12:00-06:00	feet	29.73	Reported, method not known.
13472	USGS	335631078003605	1971-04-29T12:00-06:00	feet	29.18	Reported, method not known.
13473	USGS	335631078003605	1971-05-27T12:00-06:00	feet	28.3	Reported, method not known.
13474	USGS	335631078003605	1971-06-25T12:00-06:00	feet	29.35	Reported, method not known.
13475	USGS	335631078003605	1971-07-29T12:00-06:00	feet	29.14	Reported, method not known.
13476	USGS	335631078003605	1971-08-25T12:00-06:00	feet	28.88	Reported, method not known.
13477	USGS	335631078003605	1971-09-29T12:00-06:00	feet	29.09	Reported, method not known.
13478	USGS	335631078003605	1971-10-28T12:00-06:00	feet	29.13	Reported, method not known.
13479	USGS	335631078003605	1971-11-24T12:00-06:00	feet	29.04	Reported, method not known.
13480	USGS	335631078003605	1971-12-30T12:00-06:00	feet	28.48	Reported, method not known.
13481	USGS	335631078003605	1972-01-27T12:00-06:00	feet	28	Reported, method not known.

Next Steps and Resolution

Bob Schreiber
ASCE ACWI Representative
CDM Smith



Implementation: NGWMN Next Steps

- SOGW will complete “Framework” updates
- SOGW will solicit additional volunteer data providers and advise
- USGS will
 - Incorporate remaining USGS sites
 - Continue transition from the Pilot to Production Portal
 - Provide assistance to additional data providers



Implementation: NGWMN in Future Years

- With adequate funding, plans include:
 - Continue implementation with groundwater levels and groundwater quality data from all interested State data providers
 - SOGW guidance/assistance to data providers
 - Complete transition from pilot-scale to production-scale NGWMN portal
 - Establish a **National Program Board** of data providers to provide NGWMN advice/guidance

Network Implementation: *Recommended Management Structure*

Management of the National Ground-Water Monitoring Network (NGWMN)

Data Providers

[Networks and Individual Sites That Meet NGWMN Criteria]

Federal

State

Tribal

Regional

Local

Other

Advisory Committee on Water Information
Subcommittee on Ground Water

[Federal Interface]

U.S. Geological Survey
Management and Operations Group

[Day-to-day operations]

NGWMN Program Board
[Representatives from Data Providers]

[Guidance and Direction]

Interaction & Collaboration – Key Opportunities

- Technical challenges:
 - Web-based data-delivery
 - Multiple data providers
- Drivers & focus areas:
 - FED agency initiatives
 - SECURE Water Act provisions
 - User needs (FED, State, Tribal, private, etc.)

SOGW Member Comments

- Federal Agencies
- State/Tribal Data Providers
- Private Industry

Q&A and Discussion

ACWI Resolution

SOGW is requesting

- Approval of the Pilot summary report
- Approval of the implementation strategy
 - Update Framework Document
 - Continue Portal Development
 - Additional data providers