

ACWI

Subcommittee on Ground Water's National Ground Water Monitoring Network

*William L. Cunningham, Federal Co-Chair
U.S. Geological Survey, Reston, VA
Robert P. Schreiber, Non-Federal Co-Chair
CDM Smith, Cambridge, MA*

*2012 Sustainable Water Resources Roundtable
May 30, 2012*



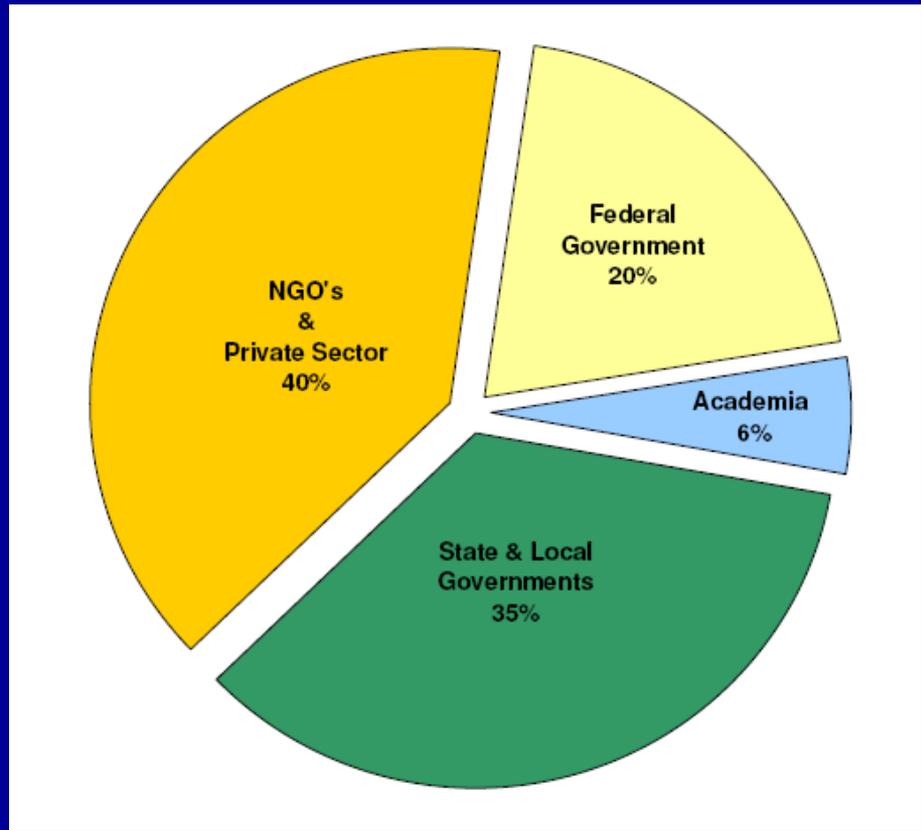
Advisory Committee on Water Information Subcommittee on Ground Water (est 2007)

- 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 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

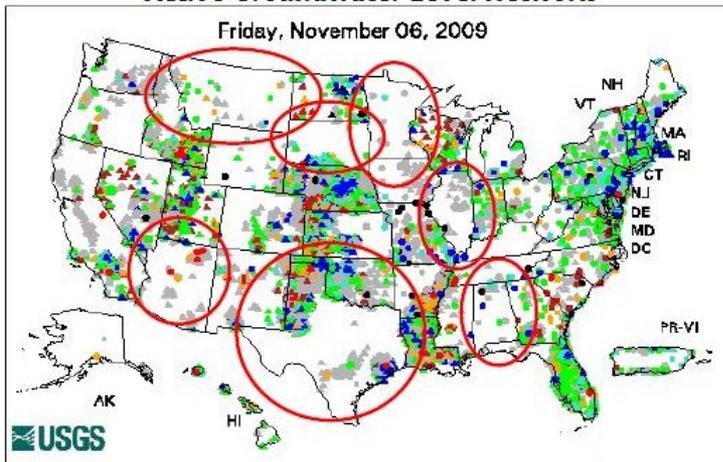
Existing Nationwide Coverage

Wells operated by USGS

Groundwater Watch

Active Groundwater Level Network

Friday, November 06, 2009



Explanation - Percentile classes (symbol color based on most recent measurement)

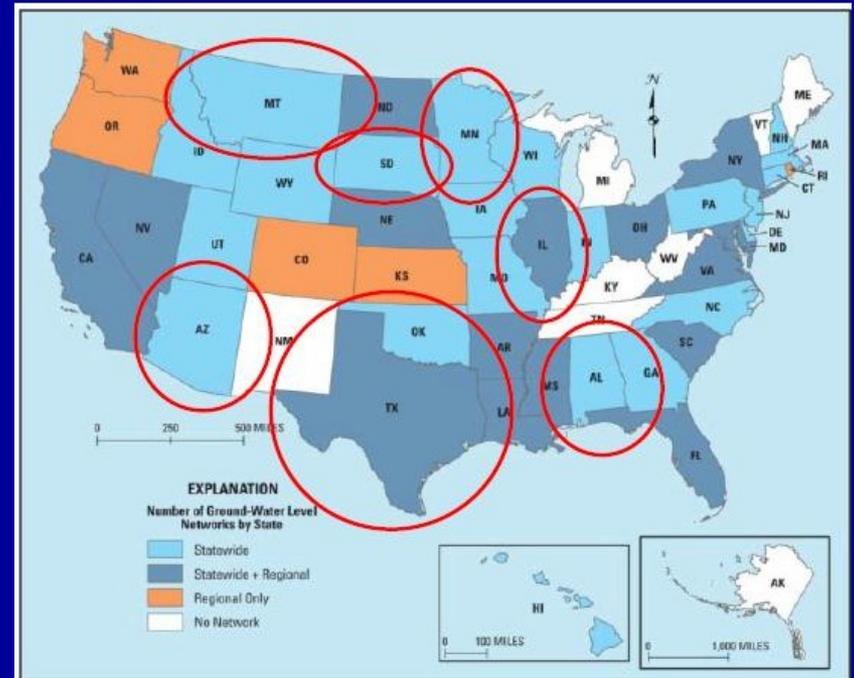
●	●	●	●	●	●	●	○	□	△	
New Low	<10 Much Below Normal	10-24 Below Normal	25-75 Normal	76-90 Above Normal	>90 Much Above Normal	New High	Not Ranked	○ Real Time	□ Continuous	△ Periodic Measurements

Active Well Count

Real-Time: 1,175 Daily: 1,142 Periodic: 23,777

Wells operated by States

Results from survey of State networks

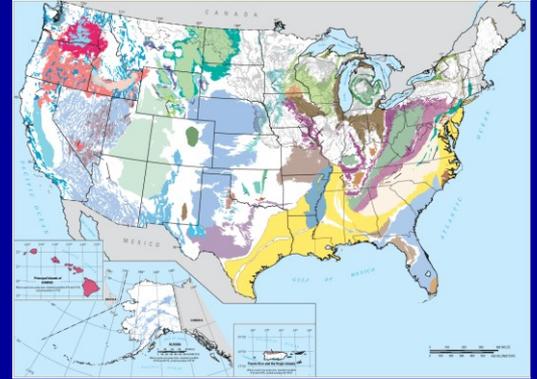


ACWI

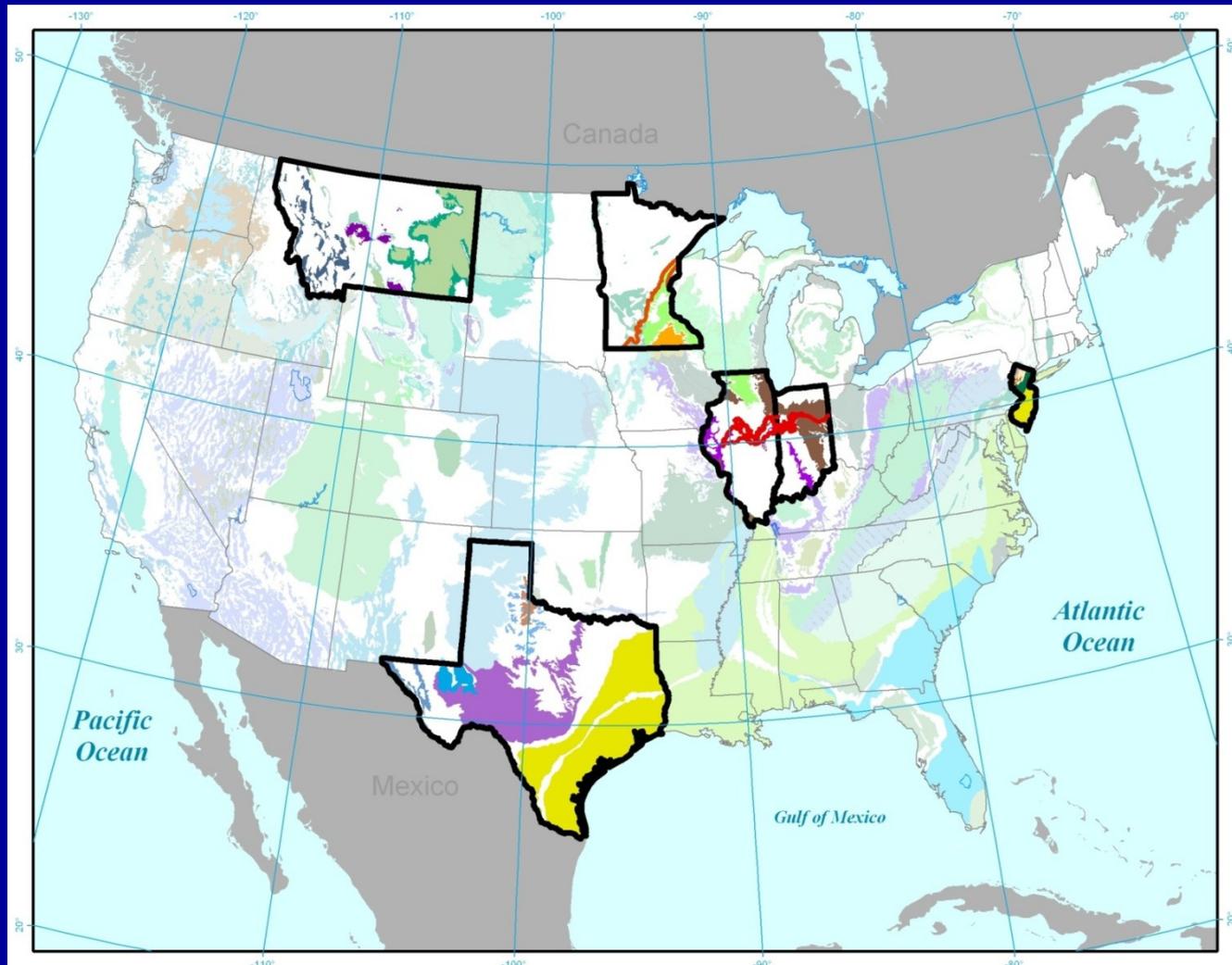
Advisory Committee
on Water Information

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 Pilot Portal



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

Click and drag map

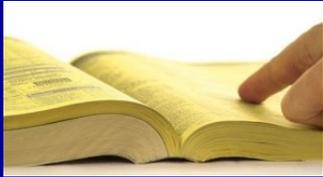
Number of points meeting criteria: 2552

<http://acwi.gov/sogw>

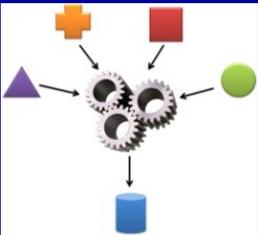
Hub Components:



Web Portal - Provides mapping interface to display and search wells

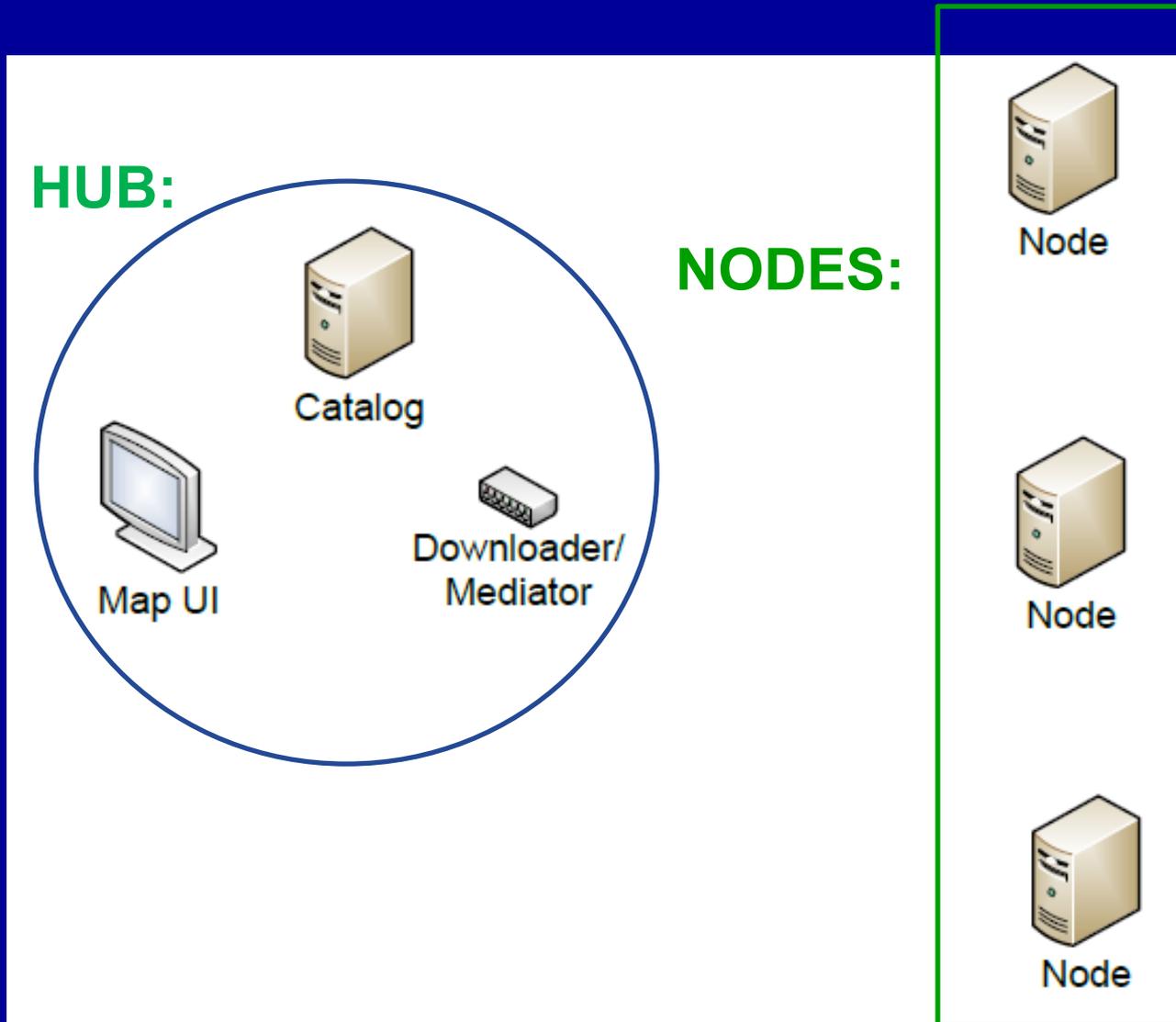


Well Registry - Harvests metadata to power web portal searching and intelligent parceling of search to nodes

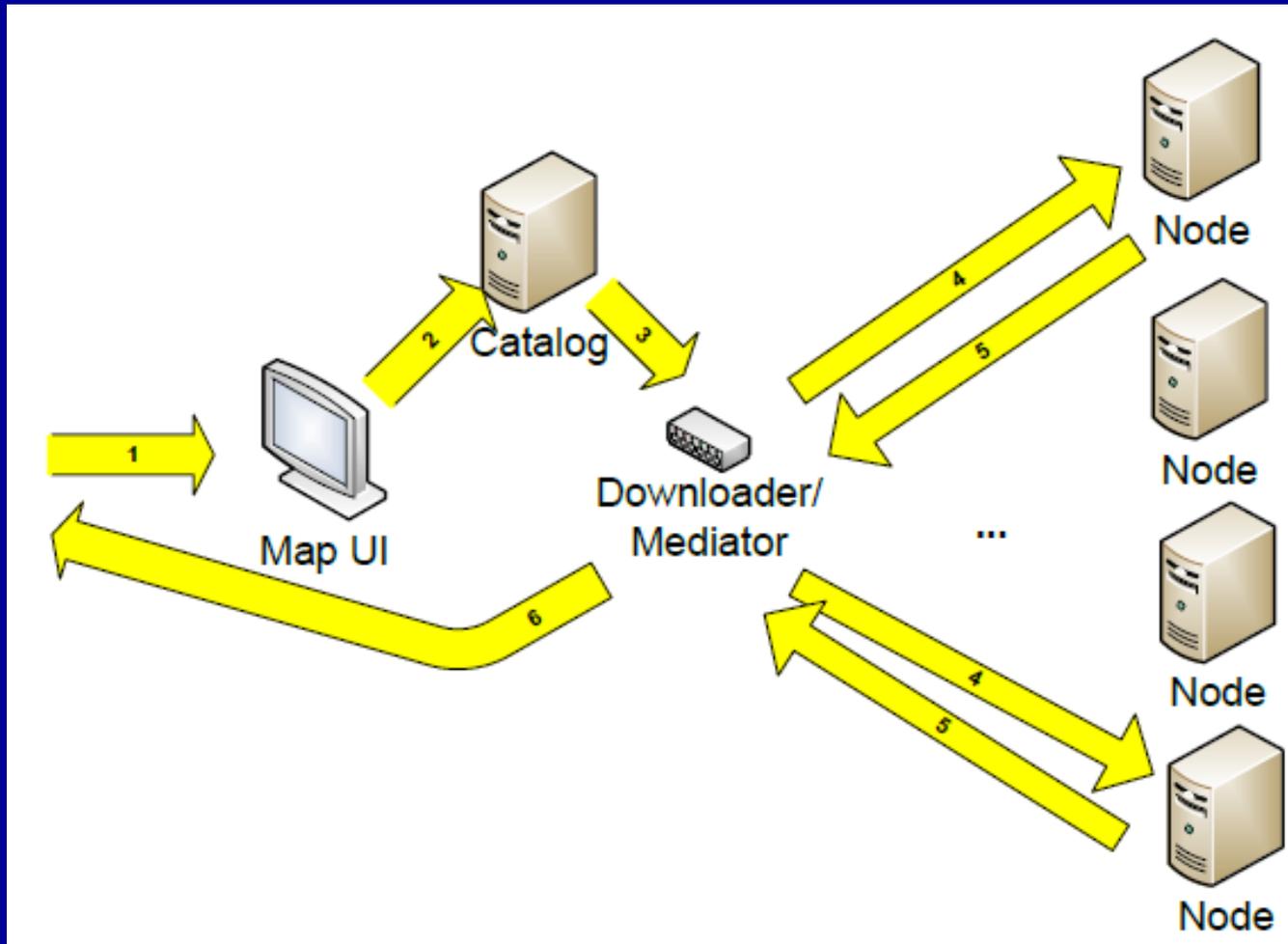


Data Mediator - Collects data from each node and mediates independent formats to common ones

Hub-Spoke Architecture



Data Retrieval Workflow:



Illinois/Indiana Example



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

Click and drag map

Number of points meeting criteria: 2552

Multiple Agencies, Multiple States



National Ground Water Map

Filter Map Data

Agency Contributing Data

ctrl + click to select more than one

- All Organization IDs
- IL Env't Protection Agency
- IN Dept. of Natural Resources
- IL State Water Survey
- MT Bureau of Mines and Geology

U.S. Principal Aquifer Name

ctrl + click to select more than one

- Pecos River Basin alluvial aquifer
- Piedmont and Blue Ridge crystalline-ro
- Rio Grande aquifer system
- Sand and gravel aquifers (glaciated reg
- Seymour aquifer

Water Level Network

ctrl + click to select more than one

- All Water Level Sub Networks
- Surveillance - Targeted
- Surveillance - Unstressed
- Trend - Targeted
- Trend - Unstressed

Water Quality Network

ctrl + click to select more than one

- All Water Quality Sub Networks
- Surveillance - Targeted
- Surveillance - Unstressed

Map

CRESCENT CITY #2 (MTBV 2)

Summary Well Log Water Quality



Agency	IL EPA
Site Name	CRESCENT CITY #2 (MTBV 2)
Site #	P406197
Lat/Long(WGS84)	40.7700,-87.8560
Local Aquifer Name	Mahomet Aquifer
National Aquifer Name	Sand and gravel aquifers (glaciated regions)
Water Level Network	Unknown
Water Quality Network	Surveillance - Unstressed

Download Data Done

121640--Benton 4 (BE 4)

Summary Well Log Water Levels Water Quality



Agency	IN DNR
Site Name	121640--Benton 4 (BE 4)
Site #	402851087213501
Lat/Long(WGS84)	40.4800,-87.3590
Local Aquifer Name	112PLSC, Pleistocene Series
National Aquifer Name	Sand and gravel aquifers (glaciated regions)
Water Level Network	Surveillance - Unstressed
Water Quality Network	Unknown

Download Data Done

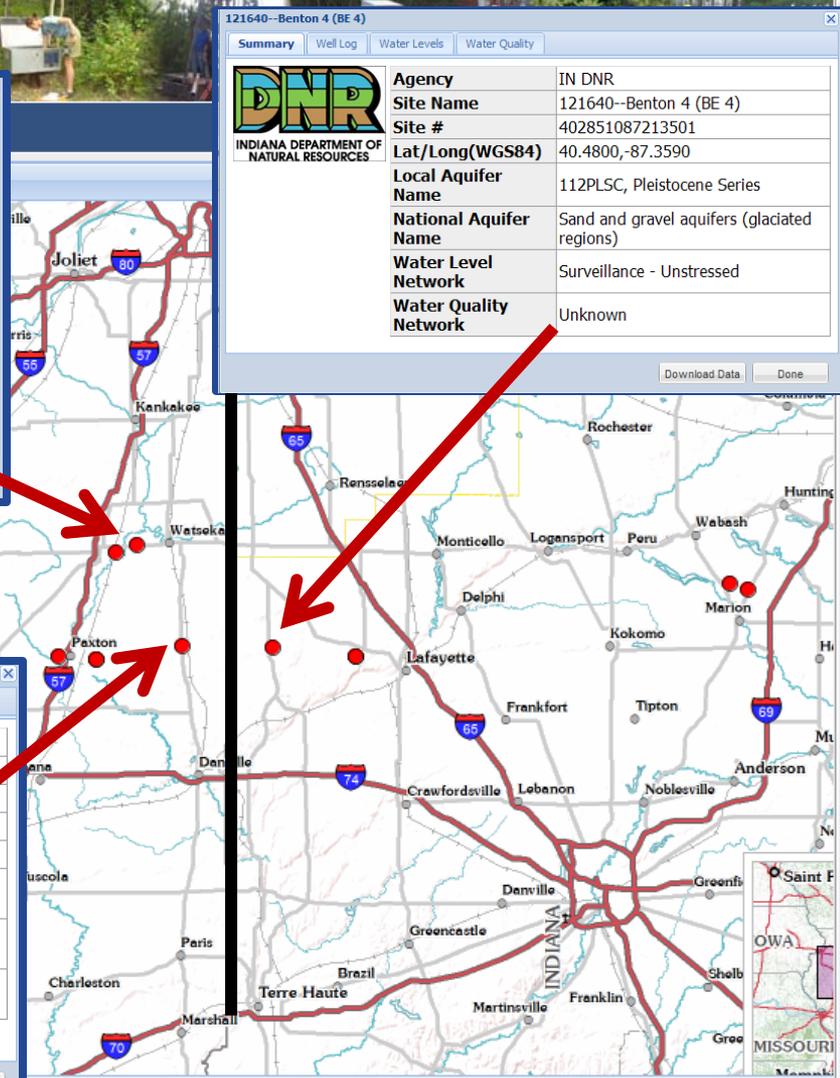
VER-94D (Hoopeston)

Summary Well Log Water Levels



Agency	ISWS
Site Name	VER-94D (Hoopeston)
Site #	P381694
Lat/Long(WGS84)	40.4880,-87.6890
Local Aquifer Name	Mahomet Aquifer
National Aquifer Name	Sand and gravel aquifers (glaciated regions)
Water Level Network	Surveillance - Unstressed
Water Quality Network	Unknown

Download Data Done



Implementation: NGWMN Next Steps

- SOGW will complete “Framework” updates, solicit additional volunteer (State) data providers, and advise new States on approach
- USGS will
 - Incorporate USGS water-level and water-quality data
 - Begin transition from the Pilot Internet Portal to a NGWMN Production Portal, and
 - Provide assistance to additional State volunteer data providers

SWRR Mission

The roundtable mission is to promote sustainability of our nation's water resources through the evaluation of information, development and use of indicators, targeting of research, and the engagement of people and partners to improve the management, conservation, and use of water and related resources. Its vision is a future in which our nation's water resources support the integrity of economic, social, and ecological systems and enhance the capacity of these systems to benefit people and nature

Implementation: NGWMN in Future Years

- FY13 USGS budget specifies funds for some activities identified in Public Law 111-11, including the NGWMN
- USGS NGWMN activities will include:
 - Overall management of the NWGMN
 - Complete transition from pilot-scale to production-scale NGWMN portal
 - Continue implementation with groundwater levels and groundwater quality data from all interested State data providers
 - Establish a **National Program Board** of data providers to provide NGWMN advice/guidance
 - Provide assistance to data providers