Subcommittee on Ground Water (SOGW), National Ground Water Monitoring Network (NGWMN)

- **Goals and expected outcomes** – To (1) provide updates on the status of the NGWMN (as presented to ACWI) and resolution approved by ACWI.; and, (2) identify intersections with the Council’s National Monitoring Network, including with data management and the water-quality exchange; overlap with pilots (such as in the Great Lakes, Delaware, or San Francisco); NEMI; data elements; and conference planning.

- **Presenters/Panelists (in attendance):**
  - Bill Cunningham (USGS, SOGW)
  - Mike Wireman (EPA) or other EPA participants
  - Dave Wunsch (NHDES, Council Rep. for AASG, and SOGW)

- **Participants (by telephone):**
  - Bob Schreiber (CDM, SOGW)
  - Chris Reimer (NGWA, SOGW)
  - Norm Grannemann (USGS)
Progress Toward a Nationwide Ground-Water Monitoring Network

William L. Cunningham
Co-chair, ACWI Subcommittee on Ground Water
U.S. Geological Survey

Robert P. Schreiber
Non-Federal Co-Chair
CDM

Christine Reimer
Executive Secretary
National Ground Water Association

National Water Quality Monitoring Council
March 11, 2009
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
Comprehensive Water Monitoring

Interest in “one place for water data”

- Atmospheric water
- Unsaturated Zone
- Surface-water discharge
- Surface-water quality
- Ground-water levels
- Ground-water quality
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.”
SOGW Members & Helping Hands

Subcommittee and Work Groups:
70 people from 54 organizations

Subcommittee Members
- 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
- ASTM
SOGW Work Groups

Subcommittee on Ground Water (14)
Bob Schreiber, ASCE
Bill Cunningham, USGS
Executive Secretary
Chris Rekmer, NMWA

GW Monitoring Inventory Work Group (16)
Bill Cunningham, USGS
Mike Wiese, USEPA
Emery Cloves, AASG

GW Data Standards and Data Management Work Group (13)
Chuck Job, USEPA
Scott Andries, DE Geological Survey

GW Field Practices Work Group (12)
Rod Sheets, USGS
Mike Nicholas, GWPC

GW Monitoring Design Work Group (27)
Bob Schreiber, ASCE
Kevin Frederick, WY DEQ

GW Implementation (13)
Steve Wilson, IL StateWater Survey
Tim Parker, Schlumberger Water Services

Quantity
Quality
Quantity
Quality
Implementation
Framework Report to ACWI

- Available to NWQMC in Jan 2009
- Report approved by the ACWI in February 2008
- Available at http://acwi.gov/sogw/pubs
ACWI Resolution, Feb 2009

Now Therefore Be it Resolved that........

- ACWI accepts the Framework Document,
- ACWI adopts the conceptual implementation plan for the National Ground Water Monitoring Network, and
- ACWI charges SOGW to move forward with development and initiation of pilot testing, patterned after the preceding efforts related to the National Water Quality Monitoring Network for U.S. Coastal Waters and Their Tributaries.
Inventory of Monitoring Programs:

State Networks

- “Patchwork Quilt” of networks
- 42 States have statewide or regional water-level network, 32 have statewide or regional water-quality network

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Ground-Water Levels

Ground-Water Quality

State/Regional Ground Water Monitoring Network Report-2007. Joint project of AASG, GWPC, ICWP and NGWA
Summary of Existing Monitoring

- Many networks already exist
- Multiple agencies involved, sometimes multiple agencies within a state
- Ambient level networks more prevalent than quality networks
- National gaps in both
- Gap analysis work to be done
Network Goals and Design: Relation between Levels and Quality

NATIONAL GROUND WATER MONITORING NETWORK

Data to Support National Availability and Sustainability Evaluations

Ground Water Levels

Spatial Description Distribution of water level wells
Temporal Description Trends in water levels
Statistical Description Evaluations of water levels

Ground Water Quality

Spatial Description Distribution of water-quality wells
Temporal Description Trends in water quality
Statistical Description Evaluations of water quality

Network Data

Data Analysis

Analysis Results

Explanation of observed conditions

Identification of areas with insufficient data or in need of additional study
Identification of areas of ambient or unstrained ground water supplies
Identification of areas with inadequate quality and quantity supply
Identification of areas "at risk" of overdraft and/or contamination
Identification of areas of overdraft and/or contamination
Identification of areas that supply groundwater dependent ecosystems

Relation of water availability to natural and human factors
Explanation of causes of observed spatial and temporal variations
Basis for forecasting the effects of water management actions
Network Goals and Design: Types of Networks

**Unstressed Subnetwork**
- Nonpumped or uncontaminated aquifers
- Baseline Period (5 years of data)
- Surveillance Monitoring Points (Synoptic wells)
- Trend Monitoring Points (Backbone wells)
- Special Studies (Rare in this network)

**Targeted Subnetwork**
- Affected aquifers
- Baseline Period (5 years of data)
- Surveillance Monitoring Points (Synoptic wells)
- Trend Monitoring Points (Backbone wells)
- Special Studies

**EXPLANATION**
- At least 5 years of data are collected to establish background conditions
- Periodic census of ground-water levels and/or quality (i.e., "mass measurements" for potentiometric surface mapping)
- Fewer wells monitored regularly (i.e., seasonal variability of water levels and/or quality)
- Smaller areas to evaluate ground-water resources at risk of depletion or impairment
Comparable Field Practices: Levels and Quality

- Few strict requirements--flexible and adaptable.
- Requires documentation of techniques to ensure comparability and assure quality in ground-water measurement and sampling activities.
- New technologies will be incorporated into the NGWMN as appropriate.
Comparable Data Standards and Management

• Minimum Data Elements for wells and measurements are provided*

• A Data Portal is the most critical component, and needed early in the process

* Methods Board
Data Management:
Proposed Data Portal

1. Public user makes query to NGWMN Data Portal
2. Portal filters request to query only sites with appropriate supporting criteria
3. Data request sent to all appropriate databases
4. Results returned to Data Portal
5. Portal compiles results
6. Public user receives results
Network Implementation: A Stepwise Approach

- Initiate Pilot Programs
- Develop Portal System
- Establish Management Structure
- Federal funding needed to facilitate participation by data providers
Network Implementation:
*Pilot Program Goals*

Within the Framework Goals:
- Begin Gap Analysis
- Pilot selections should evaluate one or more water-level network, water-quality network, and/or combinations thereof
- Selections should include a variety of "robustness"
- Interact with EPA, USGS, and one or more State databases in order to develop a ground-water data portal
- Report out and improve Framework
Potential Discussion Topics:

- Comparing SW and GW
- How does this report address the groundwater issues in the Coastal Network?
- Levels versus Quality
- Concentrations versus Loads
- Major aquifers versus local aquifers
- Analytes and Methods