# Minutes
# Subcommittee on Ground Water (SOGW)
# May 21-22, 2007

Briefings:

In order to provide a baseline of information and learn from others, speakers were invited to brief Subcommittee members on related activity at the national and international level. Additionally speakers shared with participants details of specific state programs from which lessons could be learned regarding coordination, costs, barriers and approaches. Additional information is contained in speaker slide shows, which will be posted to the SOGW web site when available. Attachment 1 highlights some of the points made by various speakers during the two day meeting.

Key Questions Requiring Data to Address:

Participants held a brainstorming session to identify policy questions that require ground water monitoring data for decision-making. A preliminary list of policy questions is included as Attachment 2. At this time, the list has not been evaluated relative to the preliminary ground water monitoring goals and objectives discussed and whether those goals and objectives will provide the data necessary to respond to these questions. An initial list of words requiring definition was also identified during the brainstorming session. Attachment 3 contains that list.

Preliminary Consensus Items and Framework Document Components:

Participants were asked to share their visions for a nationwide ground water monitoring network. Following discussion preliminary consensus was reached on the following.

- Network will have two components:
    1. A "backbone" network for ground water levels / quantity and ground water quality, to identify and include "background"/representative monitoring locations and
    2. Targeted locations with the intent to identify trends – spatial and temporal
- In designing the backbone network, the design will include representative monitoring locations with focus on defined / targeted aquifers; however, the design will allow for possible use of pumped/impacted sites, with guidance and constraints for use of data.
- Major/Primary Objective will be to monitor trends that are representative of land use, climate, and other influences on ground water.
- Framework will also aim to foster "ground water professionals" participation in formulation, development, and implementation of "Network of Networks"

Framework Document:

Participants discussed what should be included in the framework document and what principles should underlie framework development. Attachment 4 provides a preliminary list of the components of the framework document and sets out key principles for future document development.

Work Group Work Plan and Deliverables:

Work groups reported back on their early decisions, their next steps and identified what action they require from other work groups to proceed. Attachment 5 contains additional information from the Design Work Group on what they identified as preliminary objectives in designing the background and targeted components of a nationwide network.

Attachment 6 contains further information on the plans, deliverable and feedback needed from other work groups.

**Action Item:**

1. **Bob Schreiber will develop a flow chart identifying work flow among the work groups, especially looking at critical paths.**

2. **Bill Cunningham will draft conceptual model.**

Outreach

Attendees discussed upcoming conference and outreach events. At some point in the future, it may be that the SOGW wants to turn from a focus on volunteer recruitment to one focusing on inviting input into draft documents. No decision was made as to the exact timeline. Attendees were also briefed on the planned May 23 meetings with Congressional offices. Discussion ensued regarding possible future informational briefings for policymakers.

Participants made the following decisions:

1. Bi-weekly SOGW phone calls will continue.

2. Regarding SOGW Public Web Site:

    a. Decided not to add section to web site for posting of conferences that may be of interest. Each organization has this type of information at its own web site.

b. Add list of SOGW representatives, their organizations and links to their web sites

3. Regarding SOGW and Work Group Drafting Web Site:

a. Set up a page for each work group on mygroundwater.org where draft documents, references and other items under development and review can be posted.
b. Estimate of several weeks to complete this task.

**Action Items:**

**Groups to Involve in Some Way:**

1. **American Water Resources Association – suggest a note to Harry Zhang**
2. **Ground Water Management/Conservancy District Association -**
3. **NSF – ask them to brief SOGW; not necessarily membership**
4. **National Research Council**
5. **State Farm Bureaus**
6. **Volunteer Monitoring Groups**
7. **USDA's NRCS – Toni Johnson has new contact and she will provide information to Bill Cunningham.**
8. **UCOWR – note Mac McKee is member of work group**
9. **Water Resources Institutes – Bill Cunningham can draft letter to John Schefter requesting member from WRRI.**
10. **WEF Ground Water Committee – Rob Schweinfurth will check**

**Outreach Work Group – Rob Schweinfurth will check on his availability to help coordinate outreach and education efforts.**

Adjournment

There being no additional business before the Subcommittee, the meeting was adjourned with thanks to all for their contributions.

Respectfully submitted: Christine Reimer, Executive Secretary, SOGW

Attachment 1:

# Speaker Presentation "Take Away" Messages

**Meeting – 05/21-22/07**

The following are some of the points made by speakers during the May 21-22, 2007 Subcommittee on Ground Water meeting. The following list is not all inclusive. Individuals are referred to the speaker slide shows for further information.

- Role of SOGW as an advisory group and importance of open process.
- Examples are out there and support the usefulness of powerful data sets to help policymakers make ground water-related decisions.
- The difficulty in undertaking an inventory of existing monitoring efforts without getting overwhelmed.
- Some states are working to integrate their existing state monitoring programs and make state monitoring information available to the public. Some states may be well down path and others are just beginning either program and/or integration.
- Federal and state cooperative efforts are underway now, with USGS and states working cooperatively in some states on ground water monitoring. Where there are strong state programs there may be few USGS monitored wells.
- Important to relate federal and state role that resonates with everyone involved – partnerships.
- Consideration of an iterative approach that includes an initial proposal, followed by pilot studies, and then demonstration projects where additional information may be gathered and the concepts tested and refined.
- Opportunity exists to work with the National Water Quality Monitoring Council to ensure that ground water is properly characterized in their pilot projects
- Estimating cost for national program by developing a model design, comparing the model design to current conditions, identifying gaps and then estimating costs to fill identified gaps.
- The costs of doing ground water monitoring is high
- Suggestion to consider multiple-scale, nested studies so one can aggregate information up to larger scale. Need to use consistent design and have minimum data requirements to do this.
- Various approaches have been taken by the states or other nations to developing a ground water monitoring program. For example, the UK is using a risk-based approach that includes development of conceptual model for natural system, identifying pollution sources and basing sample frequency on risks and susceptibility. Texas is looking at a framework that will include monitoring to provide a basic understanding of the ambient ground water, provide a reference point by looking at the least disturbed areas, and monitoring in areas where there are known problems.
- Potential impact of varying abstraction (water withdrawal) regimes.

- Possibility of incorporating various well types, i.e. public water supply wells, monitoring wells, domestic wells, as sampling locations
- Question of data and information availability around the country, e.g. California's well log restrictions and lack of water use reporting in some ground water basins.
- Sampling frequency may vary within a state monitoring program, to include real time, continuous recorders and manual water level measurements. In New Jersey, annual sampling is supplemented by sampling of additional wells on a five year periodic basis. Participants were also cautioned not to forget indirect approaches.
- State identified major aquifers do not necessarily parallel USGS major aquifers
- Spatial variability, e.g. England and Wales estimates 1 well per 19 square miles; NAWQA has 1 well for every 700 square miles.
- Monitoring and modeling are strongly related. Each can inform the other.
- Monitoring programs should not be considered as static, but flexible requiring changes over time.
- Walk before you run

Attachment 2

# List of Possible Policy Questions Requiring Ground Water Data to Answer

**Preliminary List - 05/21/07**

1. How much ground water is contaminated and how much would it cost to clean up?

2. What is the real value of the ground water?

3. How much ground water can be stored in our basins and how much would it cost?

4. How much water does an aquifer have?

5. How does water quality and water levels change with depth?

6. How much ground water is currently being used?

7. What is the current background or baseline against which future changes can be measured?

8. What are the nationwide trends in ground water availability and quality?

9. What are the existing or emerging water quality constraints that will affect water availability?

10. What are the impacts to the ground water resource from overuse of the aquifer?

11. How much ground water can be used for human use without unacceptable consequences to ecosystems or other uses?

12. What is the uncertainty in the information that you are providing?

13. How do we optimize the use of our water supplies?

14. Does the local community need to look for a different water source?

15. What will be the cost of supplying water in the future when easy resources are used up?

16. How much ground water is available that requires minimum treatment/cost to use? How much is available for use with more expensive treatment? (consider different end uses of ground water in developing response)

17. What are the impacts of climate change on the ground water system nationally and regionally?

Attachment 3

# List of Possible Definitions Needed

**Preliminary List – 05/21/07**

1. Aquifer
2. Major and minor aquifers
3. Framework
4. National and nationwide
5. Ambient
6. Sustainable
7. Availability
8. Base flow
9. Ecological impacts
10. Business case
11. Aquifer characterization
12. Integrator site
13. Vulnerability or susceptibility
14. Monitoring network
15. Ground water quality – what is usable for different uses
16. Ground water
17. Risk-based
18. Water supply – ground water, surface water, conjunctive use
19. Usable in terms of ground water storage
20. Water use – drinking water, industrial, agricultural
21. Ground water dependent ecosystem
22. Monitoring site
23. Monitoring
24. Quantity versus levels versus flows
25. Ground water management

Attachment 4

# Components of Framework Document and Key Principles

**Preliminary List – 05/22/07**

- Framework document should facilitate sharing and dissemination of ground water data
- Framework document should define the questions that the "framework" should answer and then use that to guide development of additional components.
- Framework document must include clear statement of needs and objectives
- Framework document should provide "framework" and guidance while leaving management decisions to state, regional or local entities.
- Framework document should articulate national role as one focusing on long-term trends and coverage, while States/Regional/Local entities focus on ….
- Framework document must lay foundation for implementation, including possible funding support
- Framework document must provide general / appropriate guidance for monitoring in identified types of hydrogeologic settings
- Framework document must identify needs for data standards, best mgt practices, etc.
- Framework document should acknowledge and take advantage of surface water (and other) monitoring data
- Framework Document should identify gaps and inconsistencies, and recommend resolutions

Attachment 5

# Objectives for Design of Background Network Component

**Draft – 05/22/07**

- Funding – Need to "take monitoring locations under our wing"
- Trends – spatial and temporal
- Climate change
- Variability
- Background water chemistry
- Baseflow (link to surface water and basic hydrology)
- Land use impacts
- Resource use and sustainability
- Water use and availability
- Recharge areas
- Control data (e.g., for judging difference between unimpacted and impacted)
- Classification suitability

# Objectives for Design of Targeted Network Component

**Draft – 05/22/07**

- Funding – may need to help, for example, City with well shut down (e.g., due to arsenic or "ground water under the influence of surface water)
- Trends – spatial and temporal
- Drought – climate variability
- Water chemistry
- Stressed areas
- Impacts on and from surface water, wetlands, spring flow, and induced infiltration.
- Land use impacts
- Resource use and sustainability
- Water use and availability /classification suitability
- Recharge areas – wellhead protection; quantity impact from development, mining of ground water
- Injection impacts – aquifer storage and recovery, CO2 sequestration, managed aquifer recharge (recycled water, stormwater, etc.)
- Saline water intrusion (coastal or inland)
- Impacts from contaminated sites / features (landfills, USTs, hazardous waste sites, etc.)
- Subsidence and EQ triggering / seismic

- Hydrologic modification (e.g., urbanization, agricultural, etc.)
- Irrigation and irrigation management

Question who is “designing” the network of networks?

**Attachment 6**

# Work Plans, Needs from Others and Deliverables

**Draft – 05/22/07**

## Design Work Group

**Path Forward:**

- Adopt USGS' Climate Network as starting point – noting limitations such as "shallow predominantly"
- Select wells from States' background monitoring well networks for inclusion in Background Network
- Aquifer characterization
- Consider climate divisions as guide for high-level definition
- Merge with / consider USGS' Principal Aquifers, including strong encouragement to add areas now missing (e.g., New England bedrock)
- Rely on States' ID / definition of aquifer
- Then look vertically – encourage ID of appropriate 3D extent of monitoring to cover objectives
- ID "orphan" areas and decide how to handle
- GW Focus Group (1997) – Kevin Frederick – provide to Design WG
- Kelly Warner: NAWQA – 3 documents;
- EU/WFD documents – Bob Schreiber
- Kelly Warner – Glacial Aquifer (26 states) "framework document" [setting, susceptibility, & vulnerability]
- Kevin Frederick – Wyoming effort
- Kevin Frederick provide Dave Bean, Dave report – Minimum set of data elements
- USGS Climate Network – included in existing list

**Need from Other Work Group:**

- From Inventory: Need "dots on a map" showing what ground water monitoring is being done, where, coverage, frequency, 3D, etc.

**Deliverable:**

- None identified

## Inventory Work Group

**Path Forward:**

- Develop draft list of information needs, including what other work groups need from Inventory Work Group effort.
- Compile list of organizations or groups who may have this information. Suggestions included Association of American State Geologists, Ground Water Protection Council, other SOGW member organizations, water districts, water conservancy districts.
- Work with others to identify and gather existing information or identify sources for new information
- Anticipate doing a couple rounds of information gathering so as not to be overwhelmed or overwhelm.

**Need from Other Work Group:**

- Need contact information for SOGW, work group and speakers who may be able to help compile information.

**Deliverables:**

- List of information needs – May 31, 2007
- Preliminary report -- ?

## Field Practices Work Group

**Path Forward:**

- Overall approach – "set bar low" to foster inclusion yet with appropriate QA/QC for ensuring adequate level of quality. Also, make progress without specific data types/elements specified yet – by producing more general procedures guidance.
- Related basic assumption – If State/entity in responsible charge has created and implemented an appropriate set-of-procedures, then will be considered acceptable.
- Established set of measurable elements – e.g., written procedures for sample handling (not actual procedures, but just make sure procedures are used).
- Work plan done for "quantity"
- TBD – work plan for "quality"
- Will merge into one document.
- Will include citations/references

**Need from Other Work Group:**

- From Inventory Work Group: Information on what is happening in states.
- From other Work Groups: Deadline for draft Field Practices document.
- From SOGW: Decision as to whether anyone other than a ground water professional will be using the Framework Document. Should "amateur" sampling be included in "Network(s)"? Could take attitude that if amateur sampler is using appropriate documentation/procedures, then can be considered "professional".
- From Design Work Group: Need specific data types/elements, but not needed immediately. Should include "metadata" (e.g., lab method)?
- From Design Work Group: Need indication of analytes, and frequency of sampling for deciding on inclusion of such methods as data-loggers for water levels.

**Deliverables:**

- Final document – late September.
- Interim / draft document – earlier, to help other Work Groups.

## Data Management and Data Standards Work Group

**Path Forward:**

- ID datasets not comparable – already ID'd 2 case studies.
- Exchange nodes and processes, document what exists. EPA; CUAHSI; others?
- Compare at "data element level" (attributes level) range of info systems, to compare data they contain
- Further down the road (after comparison in "Needs" above) – propose optimal and minimum set of data elements.
- Deadlines to be set during next DMWG conference call.

**Need from Other Work Group:**

- From Inventory Work Group: information on what states are doing.
- From Field Practices Work Group: input regarding data types, formats, etc.
- From Design Work Group: underlying conceptual model for design and its fundamental components
- From Design Work Group: what is missing from metadata (for a monitoring point) to assist in determining its representativeness