Proposal for a Nationwide Ground-Water Monitoring Program

Presentation to the Advisory Committee on Water Information
by the
Subcommittee on Ground Water
February 11, 2009

Representing SOGW:

Bob Schreiber, CDM
Non-Federal Co-Chair
Bill Cunningham, USGS
Federal Co-Chair
Christine Reimer, NGWA
Executive Secretary

Briefing Outline

- Drivers for the Ground-Water Network
- Background on the Subcommittee
- Report Highlights
- Recommendations
- Request for Report Approval/ACWI Resolution

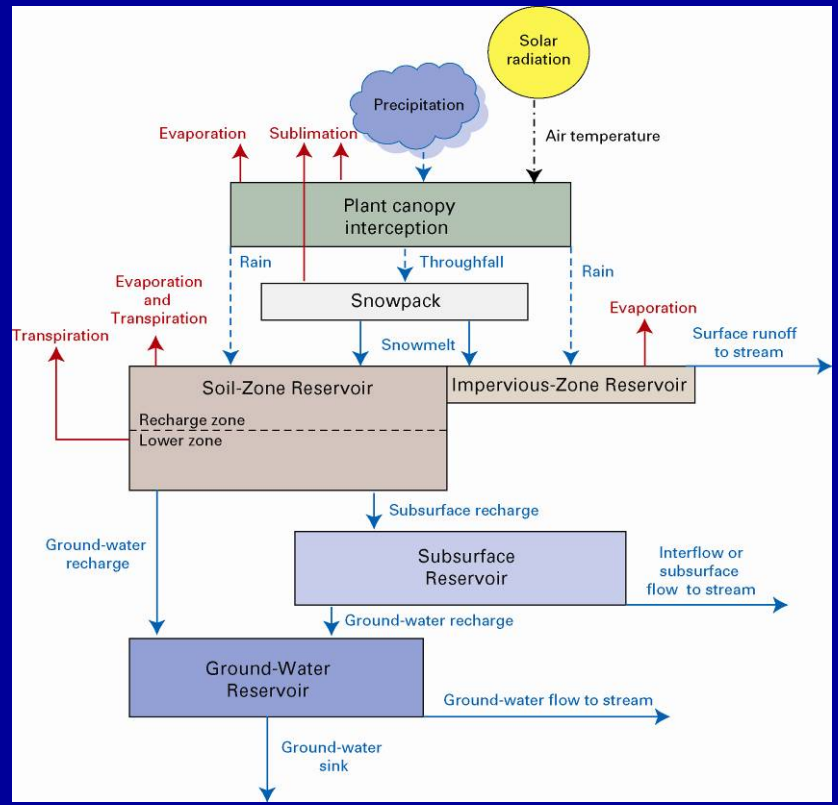
Drivers for a National GW Network

- 2003 GAO Report
  - 36 states expecting shortages
- SWAQ Report calling for Water Census
- Heinz Reports
  - ground-water data are “inadequate for national reporting”
- NWQMC
- NEST, SECURE Water Act, and others

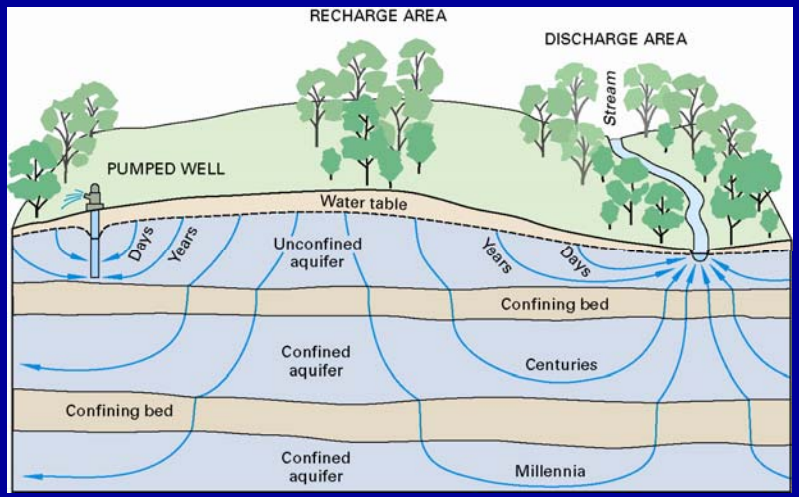
Comprehensive Water Monitoring

One step toward a long-term goal of "one place for water data"

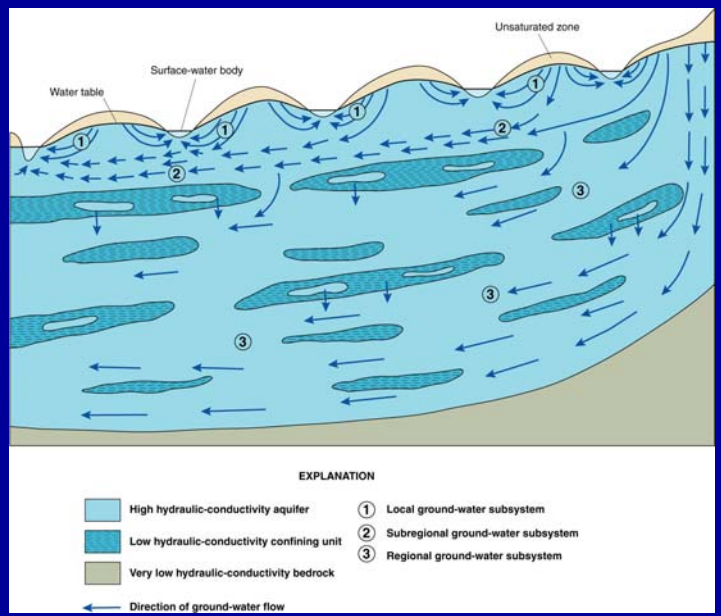
- Atmospheric water
- Unsaturated Zone
- Surface-water discharge
- Surface-water quality (NWQMC)
- Ground-water levels (SOGW)
- Ground-water quality (NWQMC & SOGW)

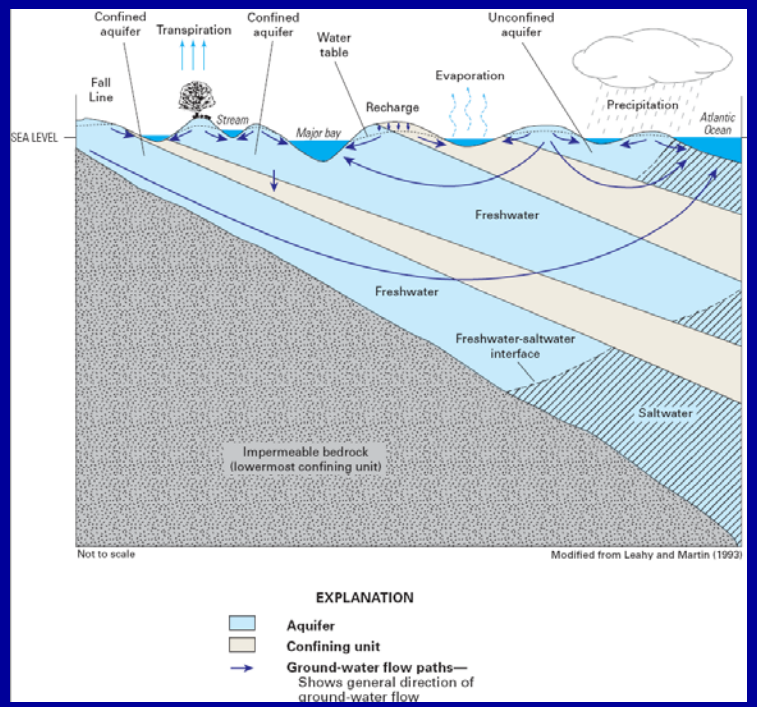


Special Aspects of Ground Water



- Spatial
- Temporal
- Geochemical





History of SOGW

NWQMC efforts in Ground-Water Quality Networks

- Ground Water people on NWQMC felt more GW effort needed.

Ground-Water Level Networks

- No national efforts for framework or data elements.

TIMELINE

January 2006:

- NGWA presentation to ACWI on report to OSTP about national GW monitoring network
- Initial ACWI “roundtable” discussion to form a GW subgroup

May 2006:

- Evening Session at National Monitoring Conference in San Jose

August 2006:

- Ad Hoc Steering Committee (SC) is formed

January 2007:

- ACWI establishes SOGW and gives them charge

January 2007-December 2008

- Bi-weekly conference calls; other Work Group efforts; two face-to-face meetings

ACWI Charge to SOGW

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.

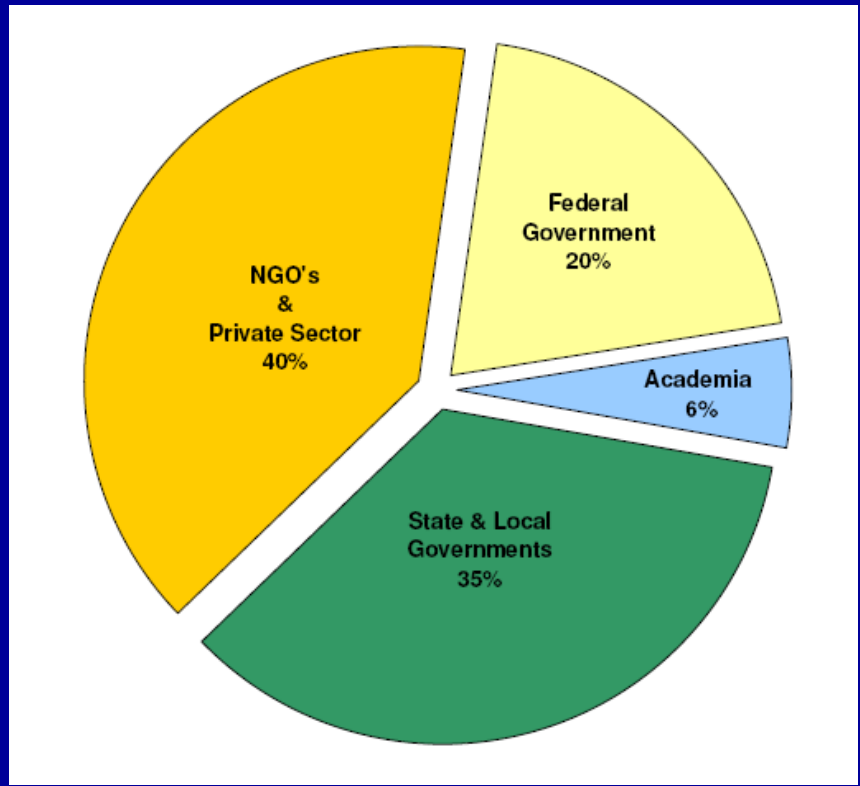
Scope: This national framework for ground-water monitoring and collaboration will be developed to assist in assessments of the quantity of U.S. ground-water reserves, as constrained by ground-water quality.

SOGW Members & Helping Hands

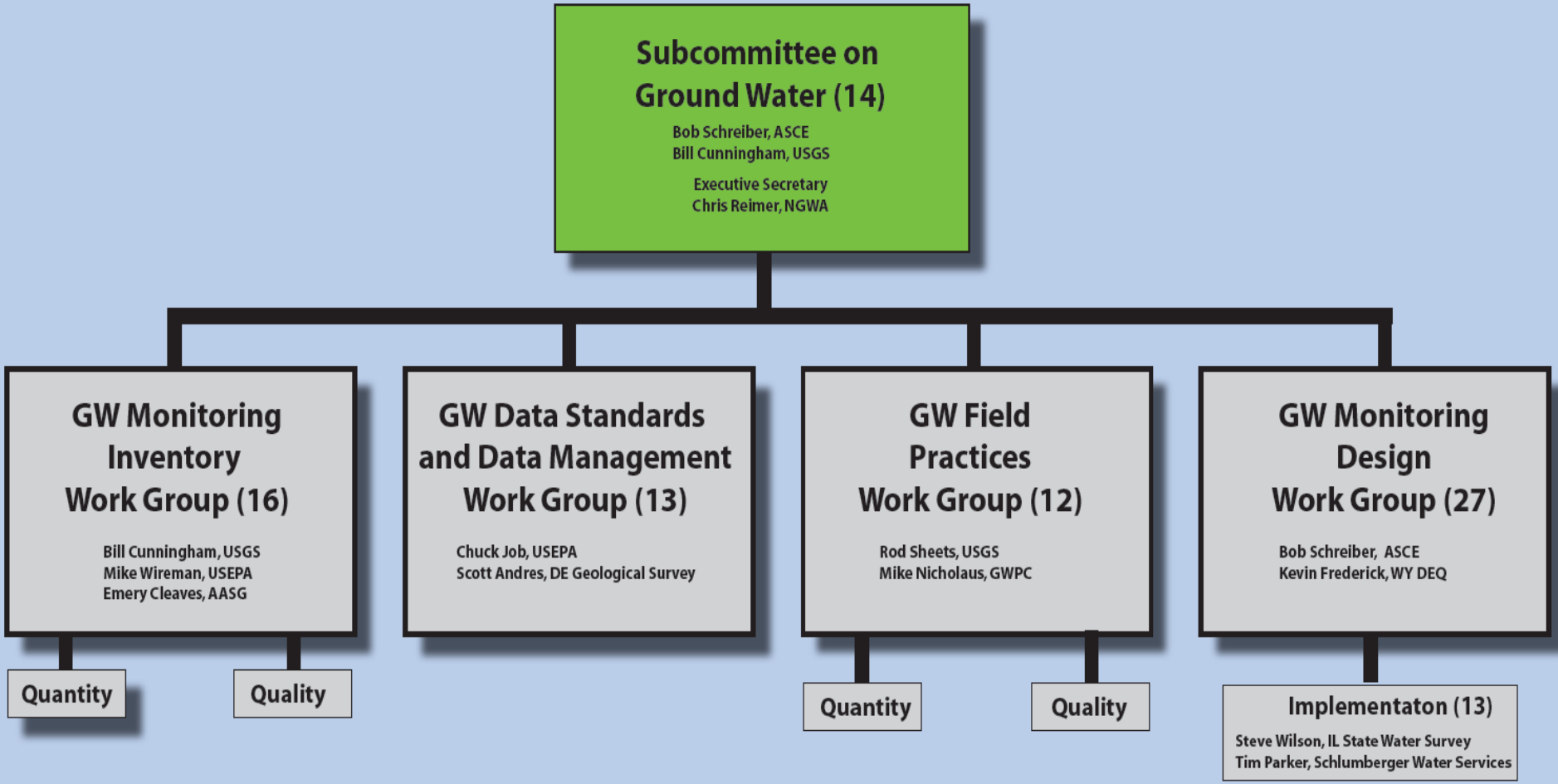
Subcommittee Members

- *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*

Subcommittee and Work Groups:
70 people from 54 organizations



SOGW Work Groups



Connections and Collaboration

- National Water Quality Monitoring Council
  - NWQMC Meetings
  - National Monitoring Conference
- CUASHI Hydrologic Information System
- Office of Science Technology and Policy
- National Environmental Status and Trends (NEST) Indicators project

Significant Outreach Effort

Regular updates to the ACWI and to the National Water Quality Monitoring Council

2007 Presentations and Publications

- Hill Visits, including Napolitano, Bingaman, and others in May 2007
- Texas Groundwater Protection Committee, IAH Newsletter article, Ground Water Monitoring Review article, EPA GW Protection Strategy Work Groups, Region 8, 9, and 10, 2007 Midwest Ground Water Conference, NGWA Expo 2007

2008 Presentations and Publications

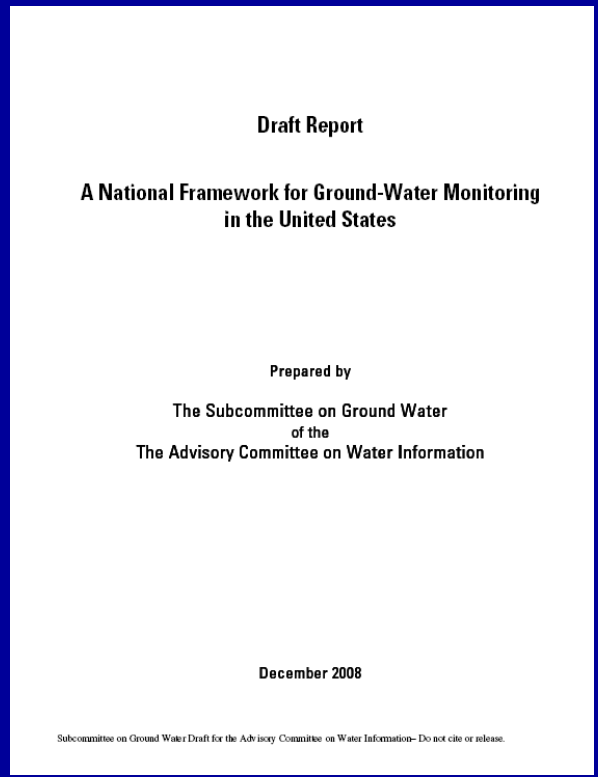
- National Monitoring Conference, April 2008 (Exhibit and 5 talks)
- NGWA Summit Technical Presentations April 2008 (2 talks)
- State Meetings: Water Management Association of Ohio 2008, Montana AWRA Section 2008
- WEF-TEC 2008 (Article and Presentation)
- Association of American State Geologists Annual Meeting, June 2008
- CUASHI Biennial Colloquium July 2008
- Ground Water Protection Council Technical Presentations Sept 2008 (2 talks)
- Western States Water Council, November 2008
- NGWA Expo, December 2008

Scheduled 2009 Presentations and Publications

- CA Groundwater Resources Association Feb 2009
- NGWA Summit April 2009
- AWWA June 2009

Reports to ACWI

- February 2008 ACWI Presentation
- January 5, 2009 Draft Report
- Review Comments through January 30, 2009
- Today - address comments and request approval



Draft Report

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

Prepared by

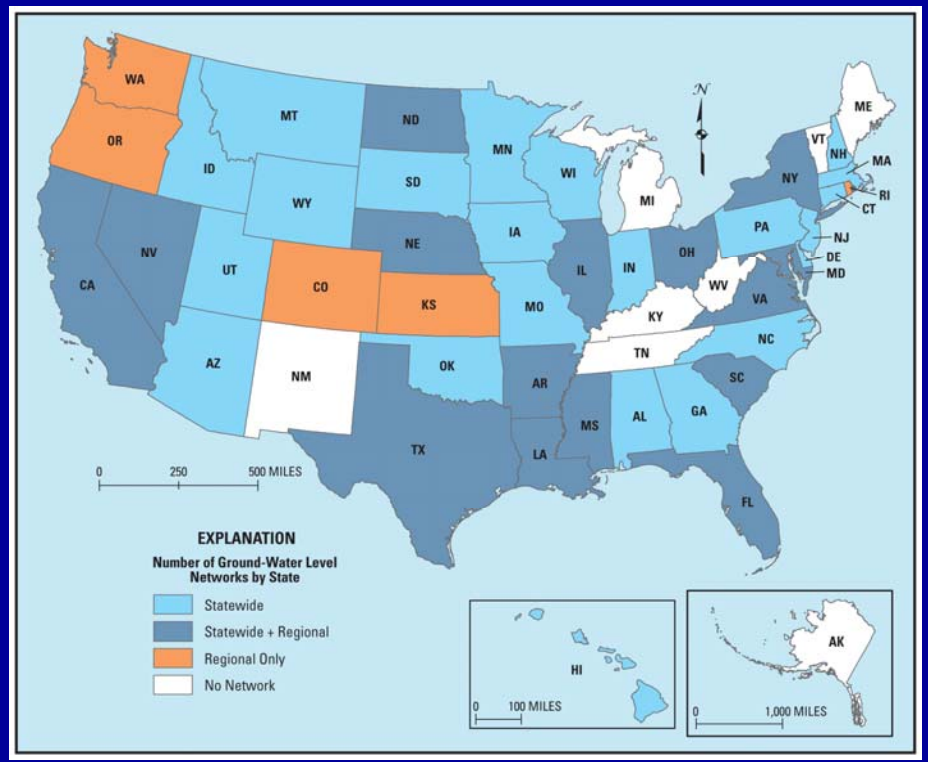
The Subcommittee on Ground Water
of the
The Advisory Committee on Water Information

December 2008

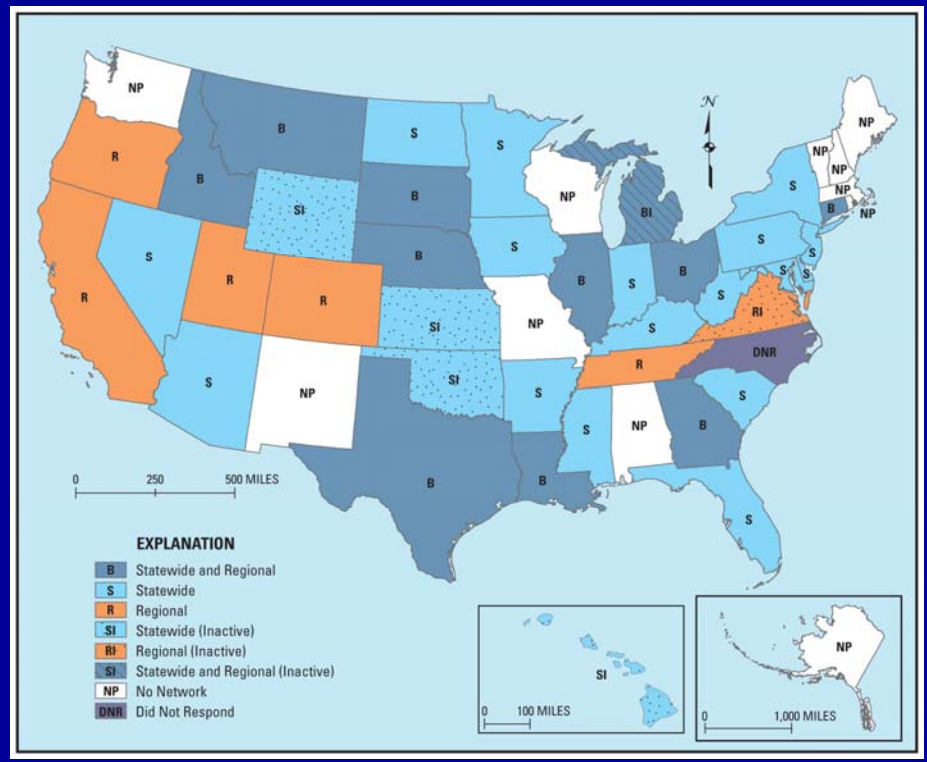
Subcommittee on Ground Water Draft for the Advisory Committee on Water Information– Do not cite or release.

Chapter 2: Statewide Programs

- "Patchwork Quilt" of networks
- 42 States have statewide water-level network, 17 have statewide water-quality network (32 statewide or regional)



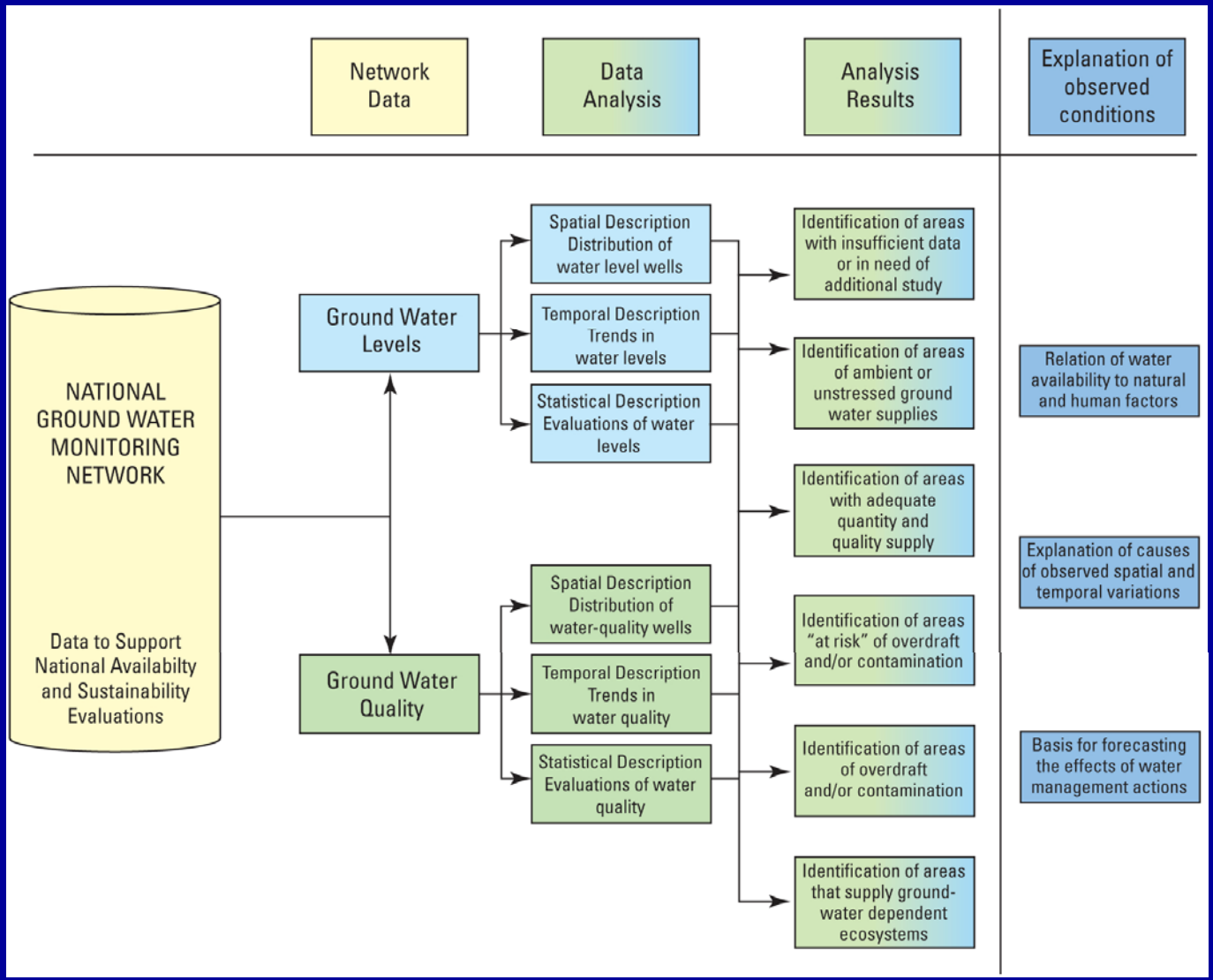
Ground-Water Levels



Ground-Water Quality

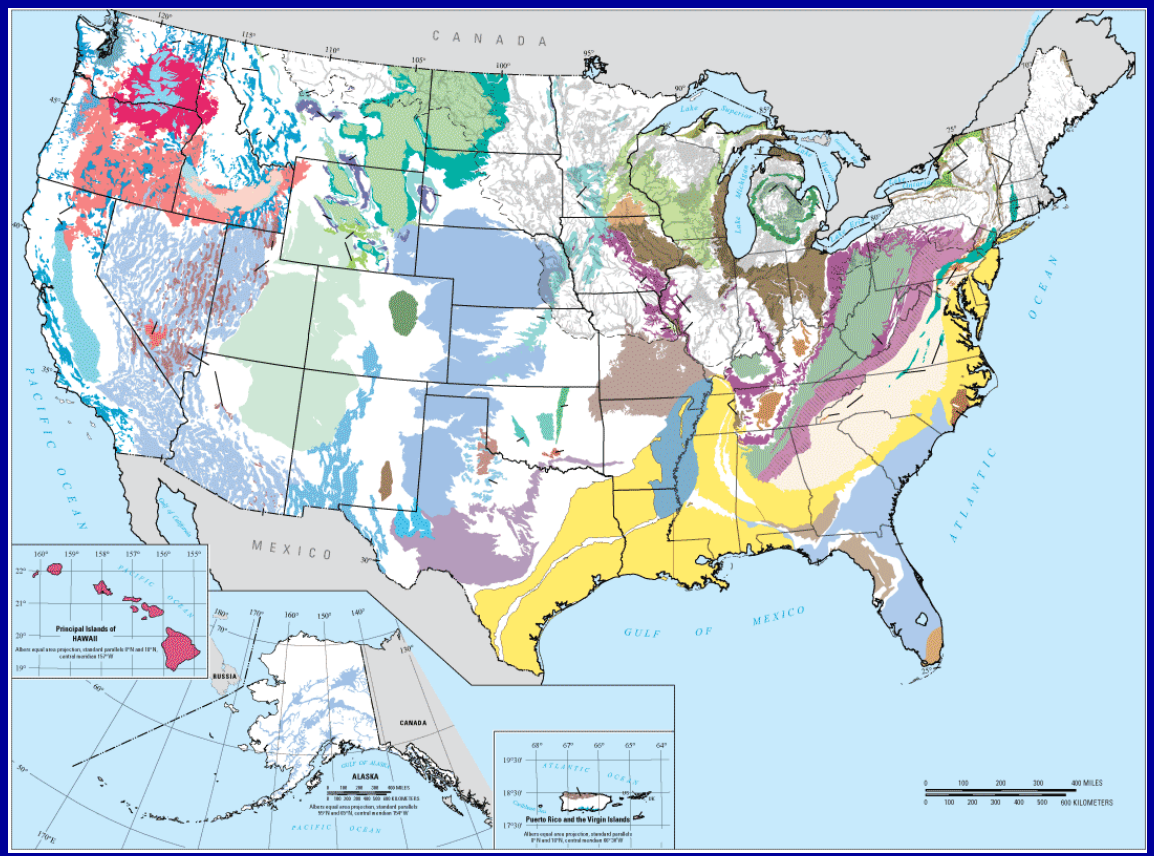
Chapter 3&4: Goals and Design

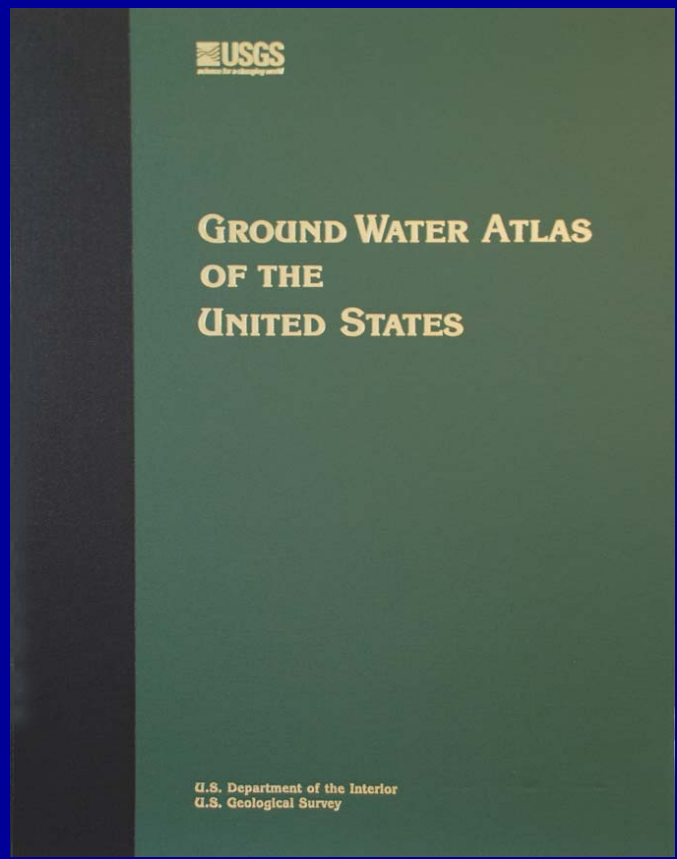
Relation between Levels and Quality



Chapter 3&4: Goals and Design

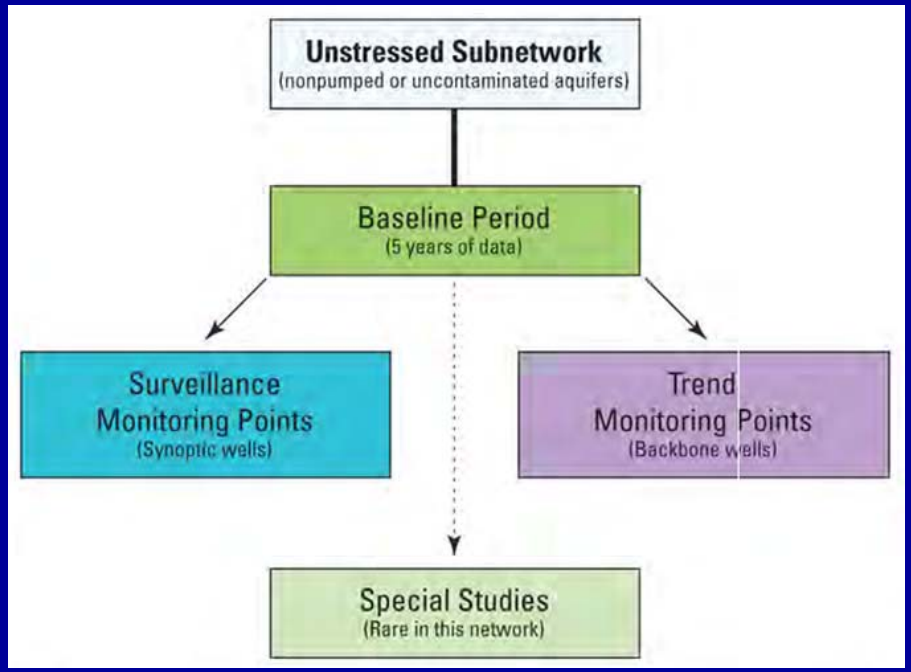
Principal and Major aquifers

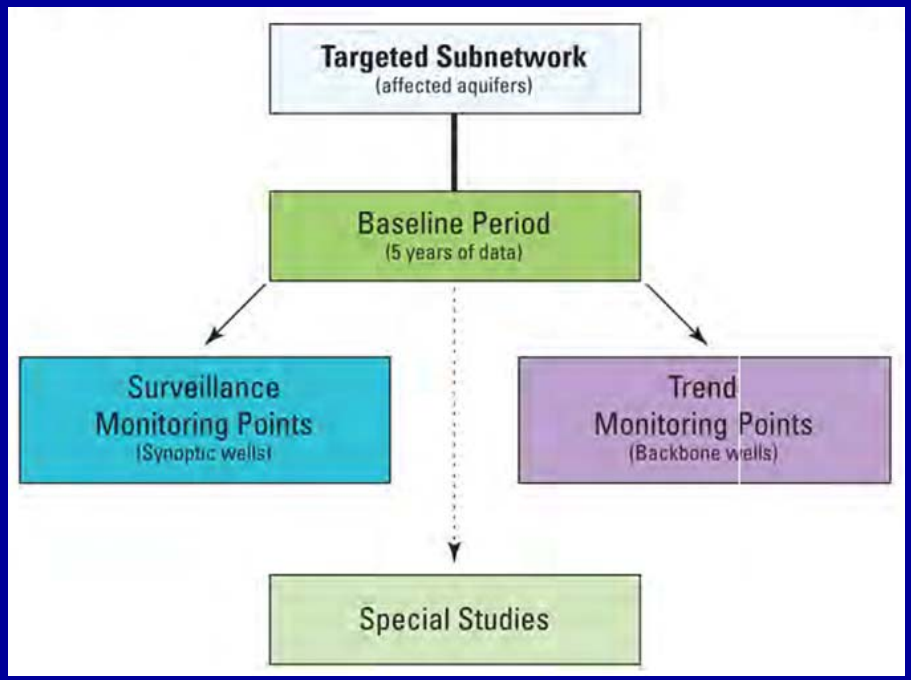


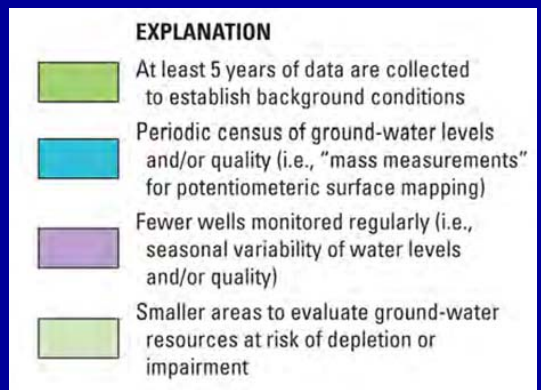


Chapter 3&4: Goals and Design

Types of Networks

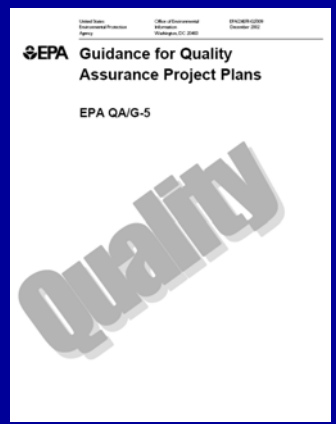






Chapter 5: Field Practices

- No strict requirements on specific aspects of individual data-collection programs used by NGWMN data providers---flexible and adaptable.
- Requires adequate documentation of techniques in order to ensure comparability of data and to assure quality in ground-water measurement and sampling activities.
- New technologies will be incorporated into the NGWMN as appropriate.



Chapter 6: Data Standards and Management

- Minimum Data Elements for wells and measurements are provided
- Minimum data elements to be provided to the Methods Board
- A Data Portal is the most critical component, and needed early in the process
  - Existing systems evaluated included WQX/STORET, WQX/NWIS Web Services, NWISWeb, and CUASHI-HIS

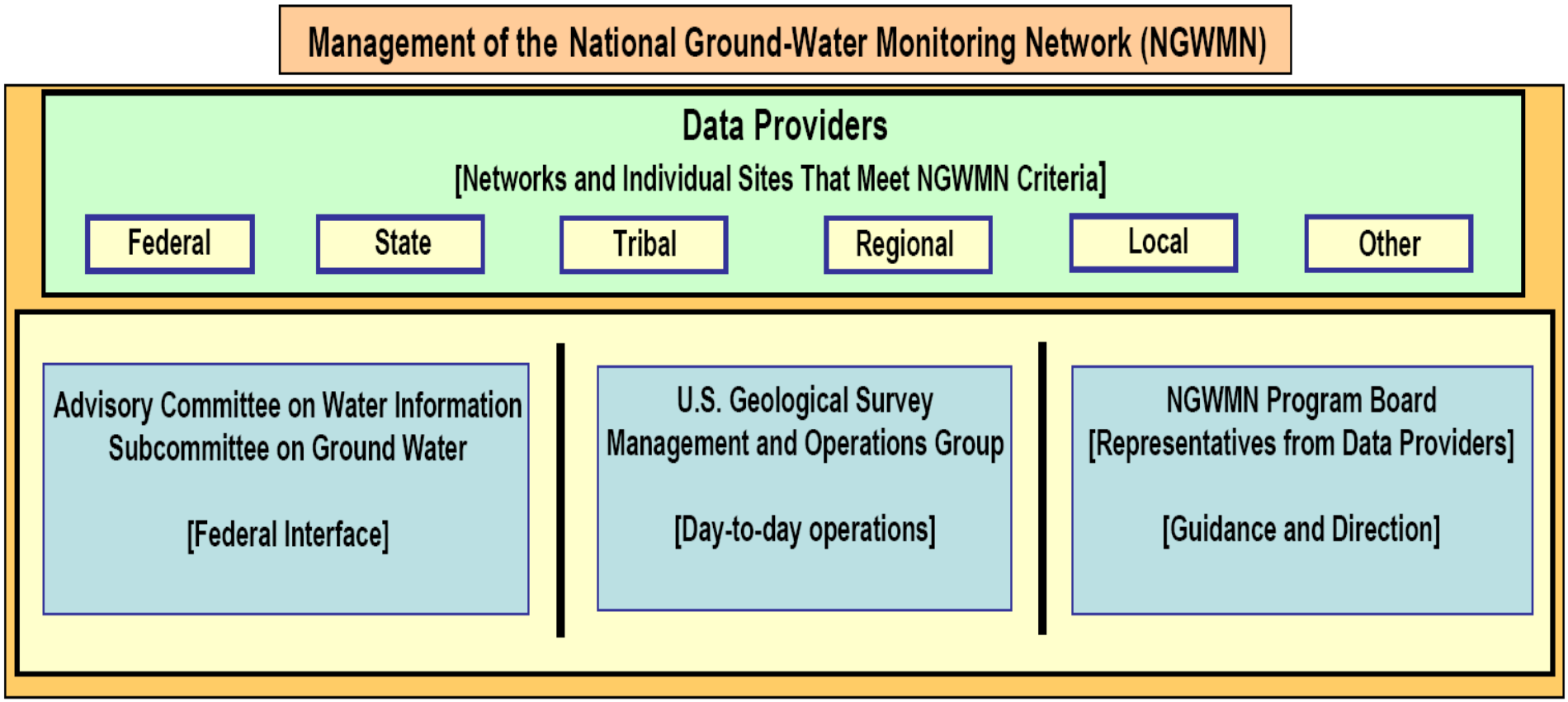
Chapter 7: Implementation/Recommendations

1. Establish a National Ground-Water Monitoring Network, according to the design-parameters in the Framework Document
2. Explore and facilitate Federal funding opportunities, cooperative agreements, and any and all feasible options to help support the Network
3. Initiate Pilot Projects

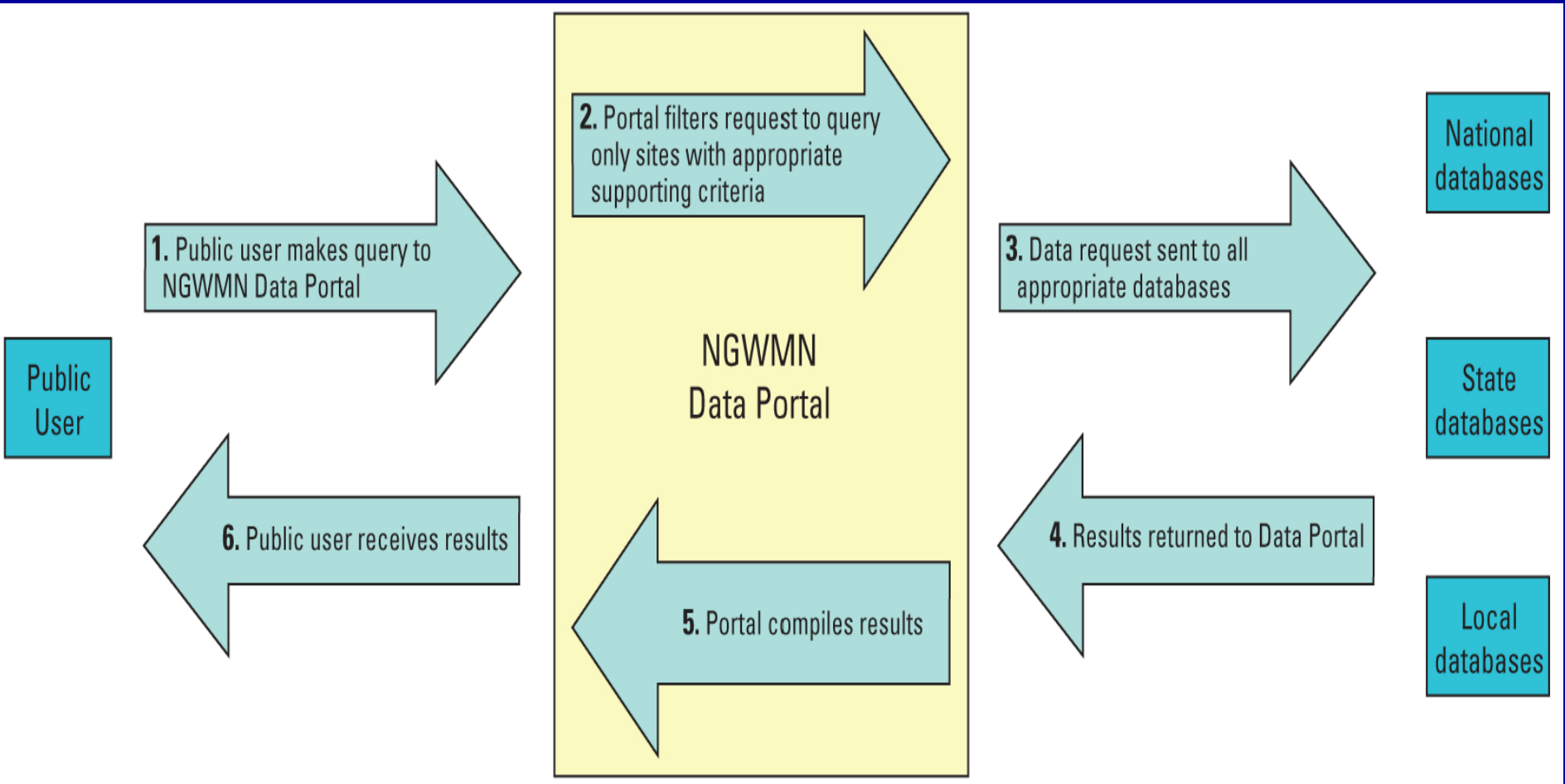
1. Establish the NGWMN

- Create a network management structure,
- Create a national ground-water data portal, and,
- Incorporate data from various data-sources, including States, Federal agencies, regional entities, and other organizations

Proposed Management Structure



Proposed Data Portal



2. Funding Options

1. Various **Federal Programs** and **Federal-to-Federal collaboration** can provide for direct Federal monitoring of backbone network sites, such as those in the USGS Climate Response Network or NAWQA water-quality monitoring, or for monitoring sites at locations with restricted access, such as in national parks or military installations.
2. **USGS Cooperative Water Program** agreements are appropriate for cooperators that have funding for long-term monitoring but lack the technical expertise or personnel to collect the data.
3. **A modified STATEMAP/NGWMN** funding option is appropriate for cooperators who have no operating network, or an existing long-term ground-water monitoring network; and need to build or enhance their infrastructure, instrumentation, or frequency of data collection; the technical expertise and personnel to successfully collect the data; long-term ground-water monitoring funding; and a mission closely aligned with that of the NGWMN.
4. **USEPA** funding for NGWMN has great potential to add data-collection sites, enhance infrastructure, and provide for more frequent measurement and instrumentation. However, USEPA and USGS must coordinate closely at the agency level so that duplication of effort is minimized.

3. Pilot Project Goals

With respect to the Goals of the Framework:

- Evaluate one or more State water-level network,
- Evaluate one or more State water-quality network,
- Interact with one or more State water-level databases in order to work toward a data portal that will serve data from the State(s) water-level database(s), water-quality databases, NWIS (GW levels) and Water Quality--likely via the NWIS/WQX collaboration.

3. Initiate Pilot Projects

Task 1 – Determine Key Concepts and Issues

Task 2 – Request ACWI Approval (today)

Task 3 – Conduct Research on Existing Well Networks (to possibly be done concurrently)

Task 4 – Develop and Issue Solicitation

Task 5 – Evaluate Responses & Select Pilots

Task 6 – Pilot Projects with Selected Networks

Task 7 – Develop Report to Evaluate Network Design, Identify Issues & Recommend Next Steps

3. Initiate Pilot Projects, cont

Proposed Schedule (approx. 18 months):

- Solicit and Select Pilot Networks
- Conduct Pilots/Submit Individual Reports
- Develop Pilots/Network Evaluation Report
- Prepare Recommendations for ACWI

Next Steps…..

- Request passage of the proposed ACWI Resolution on the SOGW Framework document
  - Approves Framework Document
  - Approves Administrative Change to the Design Work Group–evolving to Pilot Work Group
  - Approves a path forward for Pilot Projects

Comments from:

- NWQMC:
  - Fall 2009 Meeting (via Dave Wunsch)
  - Chuck Spooner (NMN Perspective)
- NOAA – Gary Carter
- Manatee County – Greg Blanchard
- SOGW Organizations

Categories of Comments:

- Coordination and Interaction with:
  - Other ACWI and NWQMC Initiatives
  - NOAA's Related Activities
  - Data Portal Development Efforts
- Enhanced Acknowledgment of:
  - GW-Surface Water Interconnection
  - Related Impacts of One on the Other

NOAA – GaryCarter

- NOAA will benefit from NGWMN
- Unified web portal will benefit many
- 5-year baseline – adequate?
- Frequency – monthly minimum needed
- Include NOAA in network definition
- “Voluntary” participation – workable?
- Include contact / participation with GEO, including major aquifer mapping
- Include NSF-sponsored activities (CUAHSI, CLEANER, and WATERS for example)

Greg Blanchard
Manatee County FL

- Overall: Acknowledge linkage between GW and Surface Water
- Specific Suggestions:
  - Note the influence on network design
  - Provide more examples (agricultural contamination, ASR/injection impacts, reuse impacts, etc.)
  - Emphasize linkage in analytical framework and in goals/objectives setting

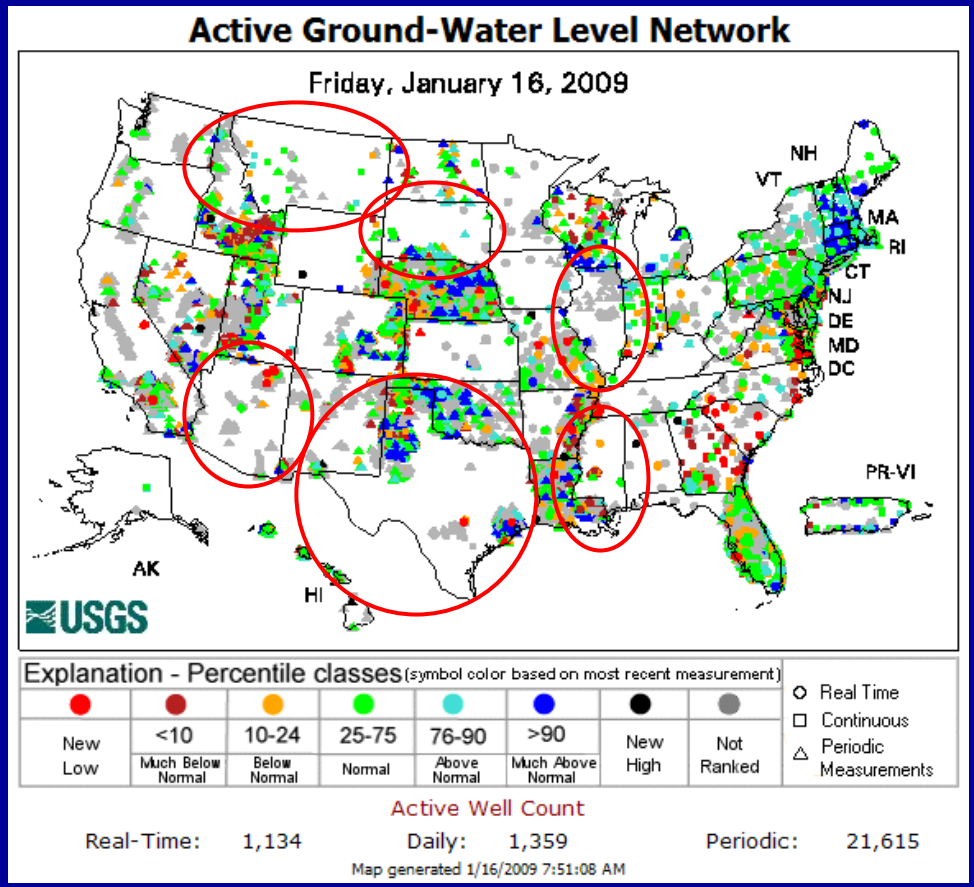
NWQMC
via Dave Wunsch to SOGW

- Accept comments on Framework Document (see next slide)
- Meet with NWQMC in March to coordinate
- Consider NGWMN piloting in NMN pilot areas
- Maintain GW presence via NWQMC activities:
  - Facilitate GW tracks at bi-annual conference
  - Participate in Council forums and similar events
- Interact with Methods Board re GW data elements
- Explore following initiatives for NGWMN portal:
  - WQX and similar systems
  - CUAHSI and WATERS

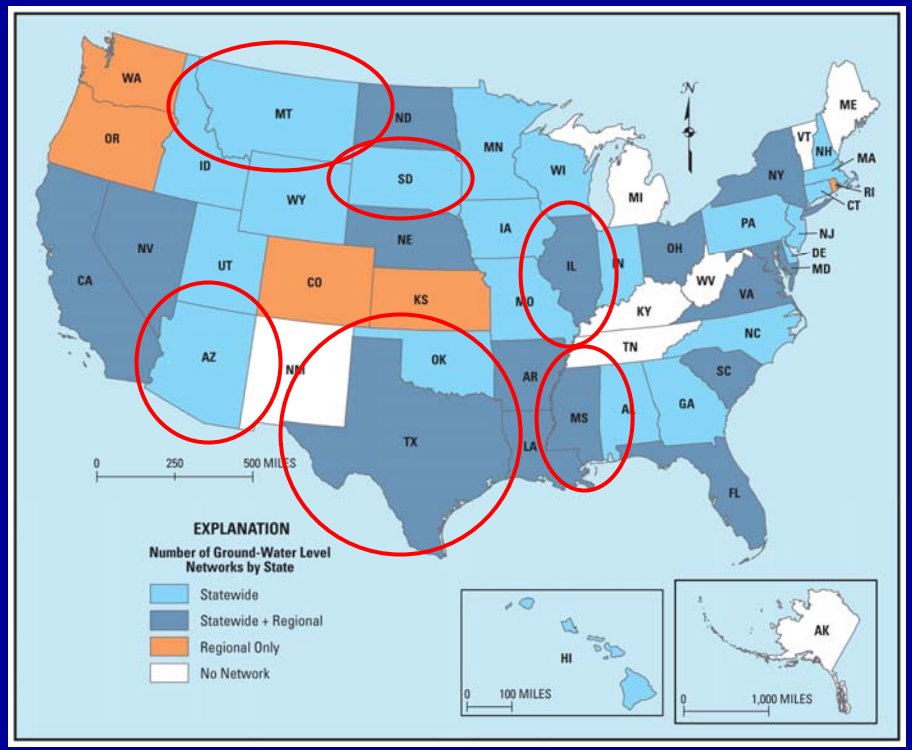
Chuck Spooner
NWQMC & NMN Perspective

- Explore incorporation of NGWMN in NMN
- Involve NMN in selection of NGWMN sites
- Use NWIS & STORET in NGWMN portal
- Submit NGWMN data elements as addition to NWQMC Methods Board listing

Combining Federal and State Efforts



Status of State Water-Level Networks

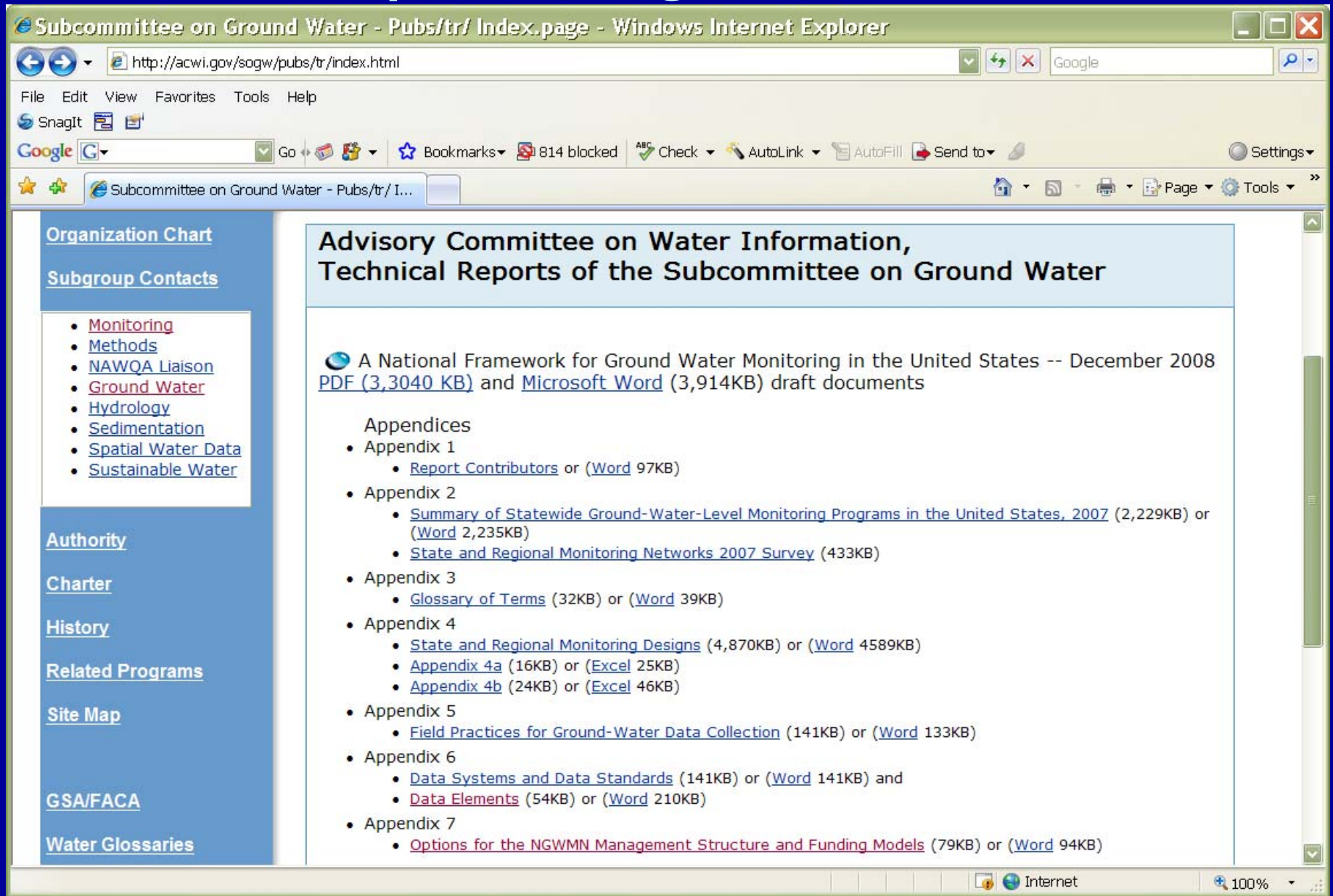


Example using water-level networks…….

Why is Water Use Missing?

- “Walk Before We Run”
- Water use data are difficult to obtain
- No uniform regulatory drivers
- Water use can be evaluated indirectly from ground-water levels
- Water use will be considered in the future

Report Organization



Water Use by Principal Aquifer

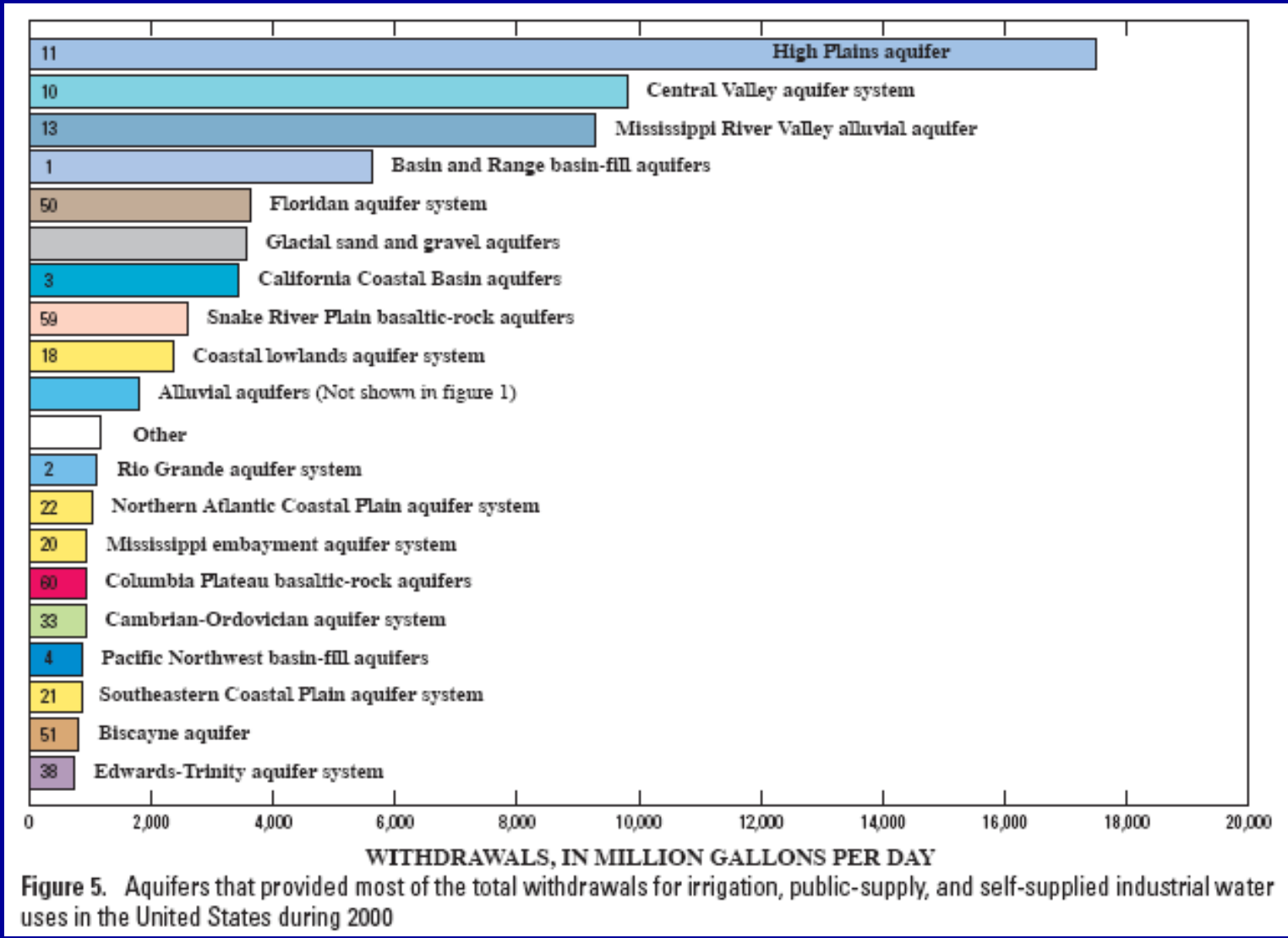
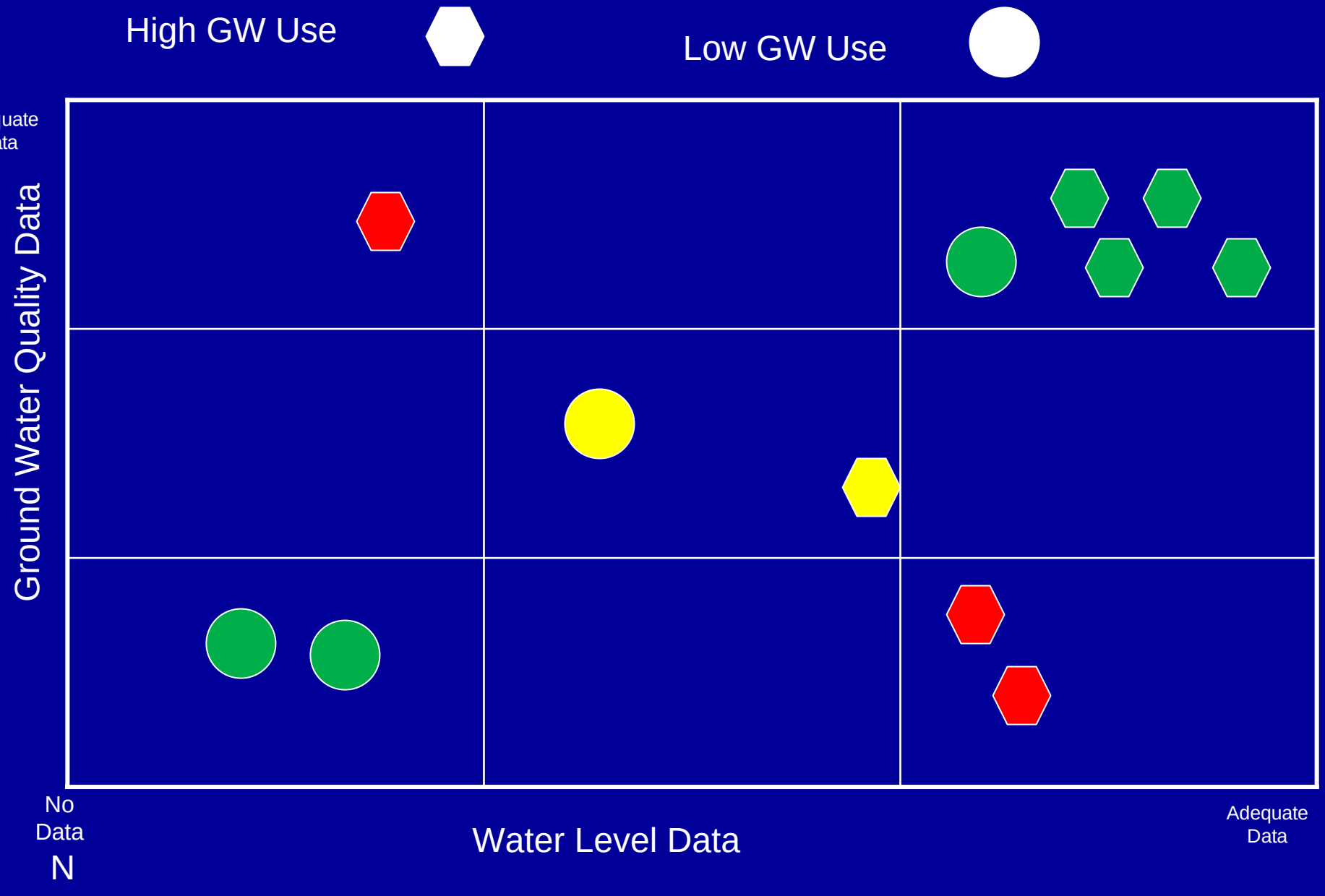


Figure 5. Aquifers that provided most of the total withdrawals for irrigation, public-supply, and self-supplied industrial water uses in the United States during 2000

An alternate depiction ?

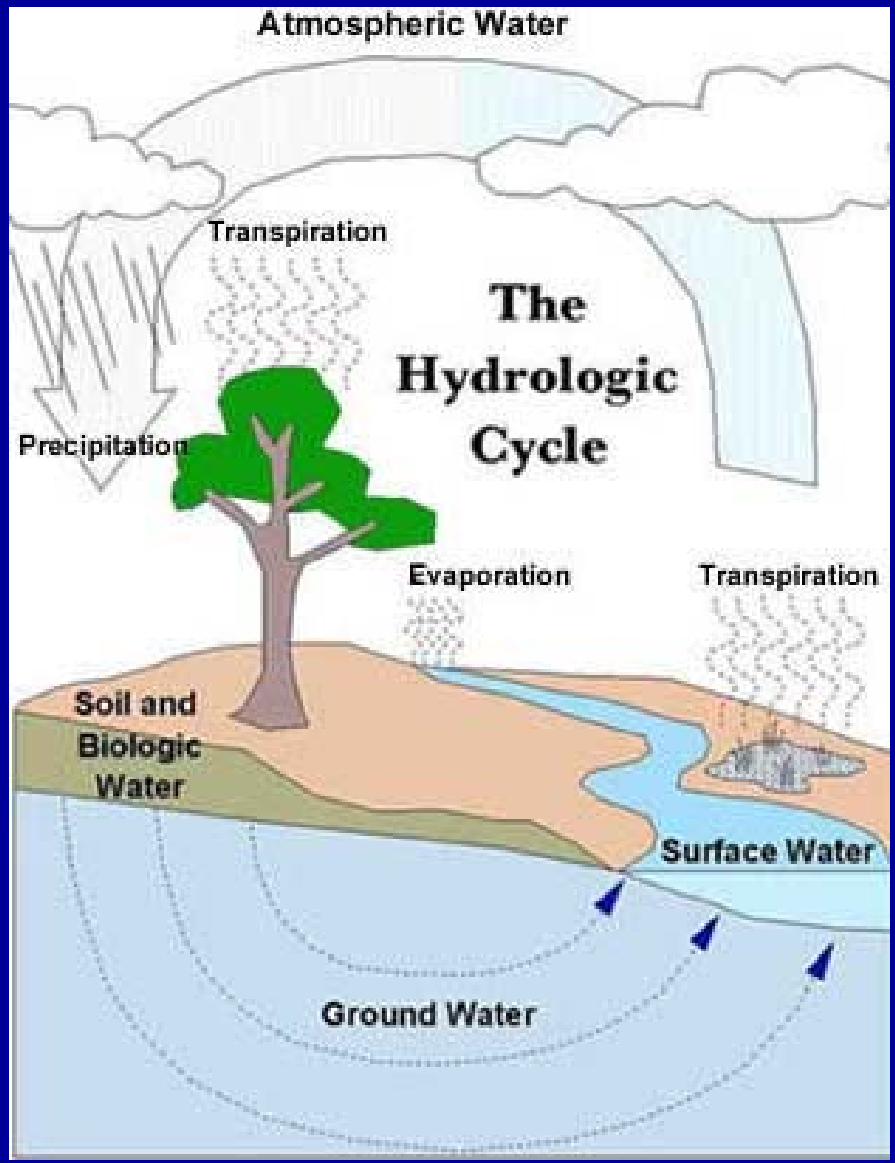


Ground Water Data Management Is Inadequate

CSS Proposed Insert

- Local entities often do not recognize established data formats & standards
- The existence of GW data is often not known
- Access to GW data is uncertain
- These are the same problems that surface water monitoring has faced, but has begun to conquer
- Recommendations:
  - Find a point where GW and SW data specifications can be common (ACWI WQDE?)
  - Merge GW data into the NWIS- STORET data portal

Comprehensive Water Monitoring Program



- **Surface Water**
  - Quantity
  - Quality

USGS science for a changing world

NWQMC National Water Quality Monitoring Council Working Together for Clean Water

- **Ground Water**
  - Quality
  - Quantity

NGWMN

- **Atmospheric Water**

NOAA

NRCS