



# Water for America Initiative

**Eric J. Evenson**  
**Briefing to the SWRR**  
**June 26, 2008**

U.S. Department of the Interior  
U.S. Geological Survey

***“The United States has a strong need for an ongoing census of water that describes the status of our Nation’s water resource at any point in time and identifies trends over time.”***

National Science and Technology Council report,  
“A Strategy for Federal Science and Technology to Support Water Availability and Quality in the United States.”

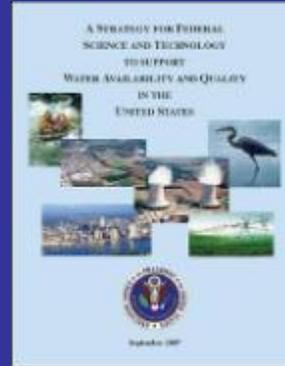
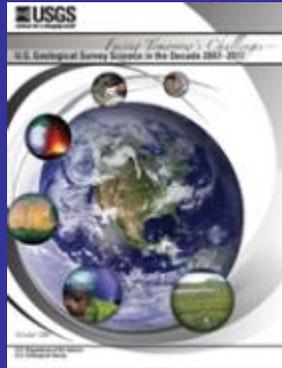
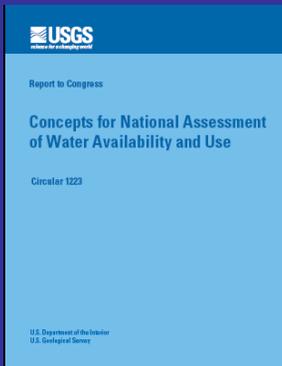


In the next decade, the Nation will have a new appraisal for water availability. In the FY 2009 Budget, the President has requested funds for an initiative to:

- Conduct a nationwide assessment of water availability through regional-scale and focused areas studies.
- Improve our understanding and analysis of water use information.
- Cooperate with States geological surveys to map the geologic framework of aquifers.
- Modernize the Nation's 7,000 streamgages.



2002



2009

**Water for America Initiative**



National Water Availability Pilot Study on the Great Lakes

The Initiative is proposed at \$9.5M through program changes to:

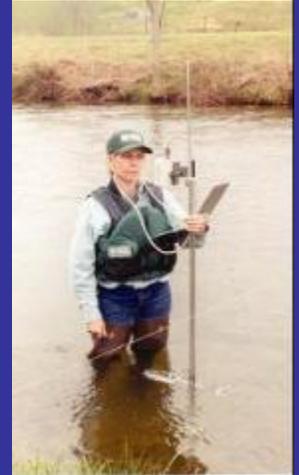
- The National Streamflow Information Program (NSIP) +\$5.0 M
- The Ground-Water Resources Program (GWRP) +\$3.0 M
- The National Cooperative Geologic Mapping Program (NCGMP) +\$1.5 M



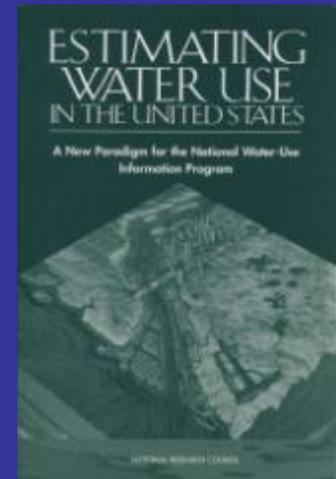
# The Initiative will devote resources to:

## –The Streamgaging Network \$2.75 M

- Add 350 high data rate radios per year \$2.0M
- Re-establish 50 streamgages recently discontinued \$0.75M



## –Water Use Science Program and Database Enhancements needed to manage and serve information \$1.05 M



–The Regional and Focus Area Studies  
+\$4.2 M

–The National Cooperative Geologic  
Mapping Program (NCGMP) +\$1.5 M

- Enhance geologic mapping and hydrogeologic knowledge of the Regions being studied.
- FEDMAP and STATEMAP



# Water for America at the Bureau of Reclamation

- Three Reclamation Components:
  - Planning for Our Nation's Water Future; \$8M – River basin supply & demand studies with partners
  - Increasing Water Supplies through Improved Efficiency; \$15M – Challenge Grants Program
  - Securing Water Supplies by Accelerating Species Recovery; \$8.9M
    - CVP Delta Division \$2.7m
    - Columbia Snake River Salmon Recovery \$3m
    - ESRIP, Platte River \$0.5m
    - Klamath Project \$2m
    - Middle Rio Grande \$0.7
- 2009 Reclamation Budget Request: \$31.9 million
- Coordination with Robert Quint, Director, WO Operations and Avra Morgan, Program and Policy Services

# Expanding and Enhancing Our Streamflow Information Infrastructure



Re-establish 50 streamgages



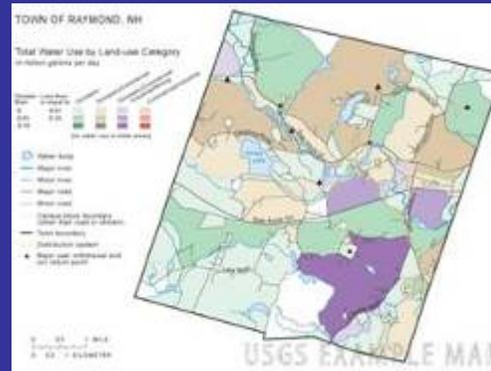
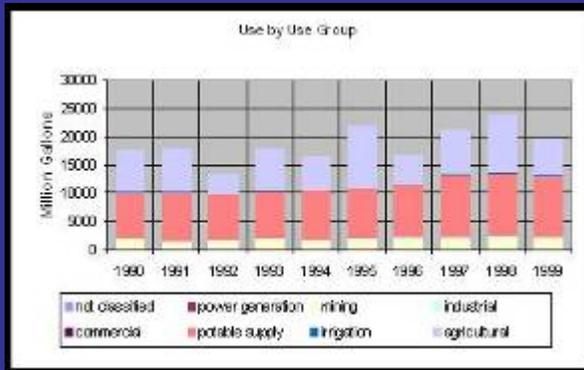
Ensure rapid realtime communications  
with 350 high data rate radios

# Enhancing the Nation's Water Use Information

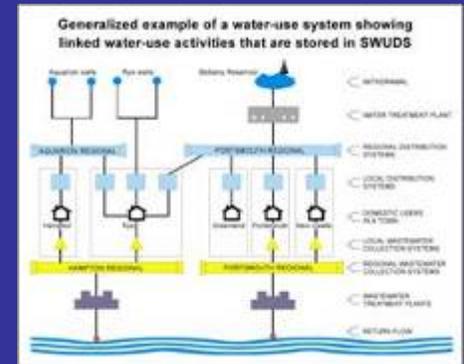
## Use Recommendations of the National Research Council Report

- Stratified Random Sampling
- Regression Models

Develop water use characteristics by types of land use



Ability to track water from point of withdrawal thru to return of flow.



# Nationwide Study Plans

Study activities will be organized around the 21 Water Resource Regions established in Circular 1223



## Regional Studies

- Coverage Entire Nation
- Basis 21 Water Res. Regions
- Scale Large Basins / Princ. Aq.
- Duration Three years
- Funding ~\$1M total
- Products Water Budgets  
Trends in Hydrology



## Focused Area Studies

- Only Nine Selected Areas
- Designed for major themes –  
Nested in a Water Region
- Smaller Basins / Aquifers
- Duration Three years
- Funding ~\$3M total
- Relevant Studies and Products  
to expand our knowledge on  
on important hydrologic  
processes



# Hydrologic Unit Code Boundaries

HUC 2-digit - 21 total  
example: Ohio River Basin



HUC 4-digit – 221 total  
example: Wabash-White River Basin



HUC 6-digit – 378 total  
example: White River Basin



# Regional Studies



HUC 2



HUC 4



HUC 6



Six to seven Regional Studies will be started every three years.

- HUC 2 delineations
- Prescriptive study design to be followed
- Generate water budgets for each HUC 6
- Examine trends in components of the water budget
- Complete the Nation in 10 years

# Regional Scale Studies - Water Budgets

- Provides basis for evaluating change
- Accounts for system gains and losses
- Will strive to generate for each HUC 6
  - Precipitation
  - Infiltration – Recharge
  - Stream Flow (runoff & baseflow)
  - Evapotranspiration
  - Ground Water and Surface Water Withdrawals, Return Flows, Consumptive Use
  - Interbasin Transfers
- Examine trends in budget components



# Focus Area Studies

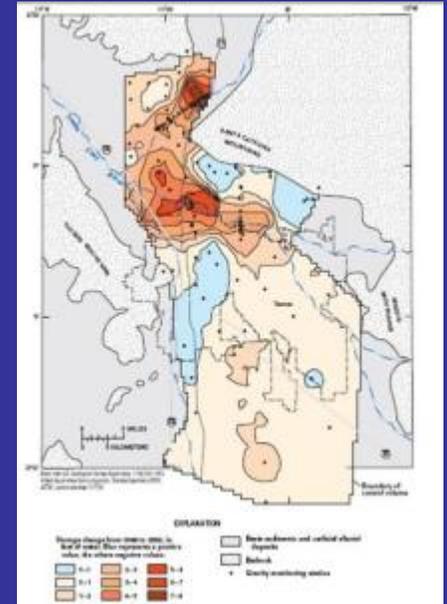
## Ecosystem flow issues



Three Studies will be started every three years.

- Nested inside Regional Studies
- Designed to expand knowledge on important hydrologic processes at the end of ten years
- Higher Funding
- Address the themes of ecosystem flows/habitats and gw/sw interactions

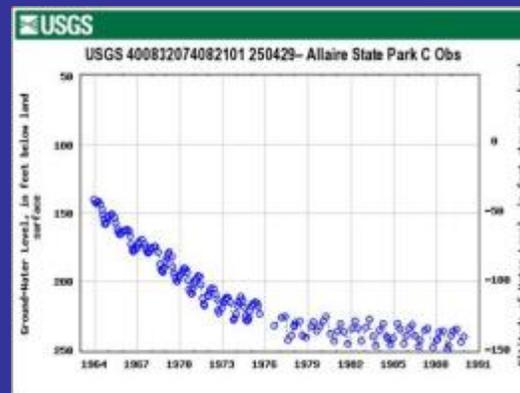
## GW/SW Interactions



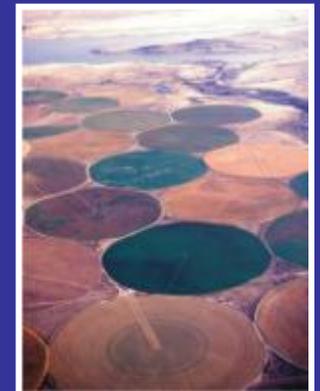
## Water Quality



Effects of current and past water use



Changing land use

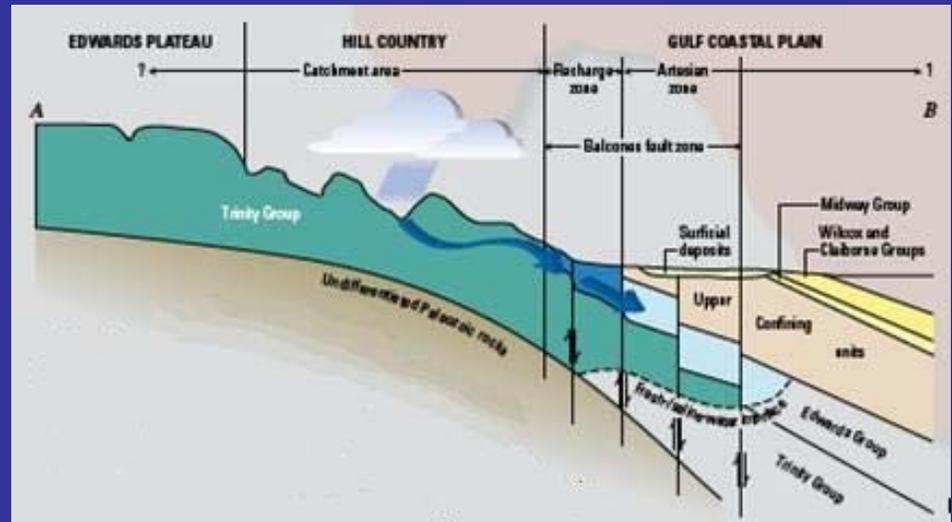


# National Cooperative Geologic Mapping Program

Integration of:

- geologic mapping,
- geophysical surveys,
- geochronology,
- three-dimensional modeling,
- geochemistry

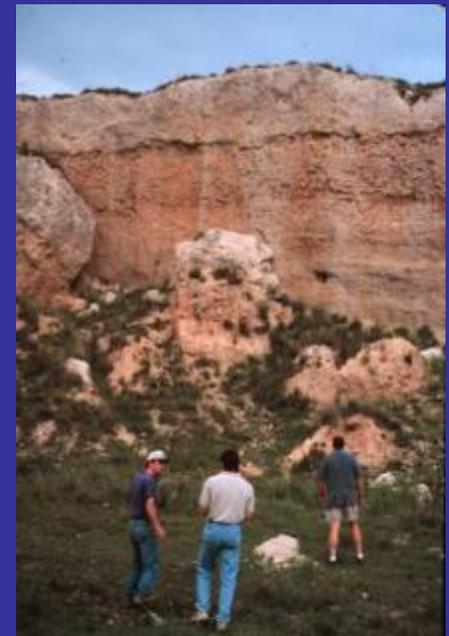
to develop geologic and hydrologic frameworks



# Other Activities within the NCGMP effort could include:

- determine the geologic influences on gw quality,
- understand geologic controls on gw/sw interactions,
- analyze conditions where aquifer storage and recovery is a prominent practice,
- assist in the development of ground-water budgets for the initiative

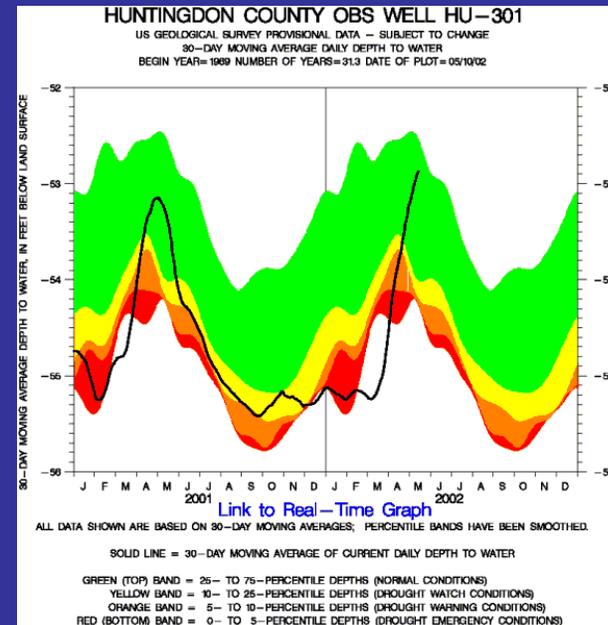
| System     | Series                   | Geologic Unit                    | Thickness, in feet  |
|------------|--------------------------|----------------------------------|---------------------|
| QUATERNARY | Pleistocene and Holocene | Valley-fill deposits             | 0 to 80             |
|            |                          | Dune sand                        | 0 to 300            |
|            |                          | Loess                            | 0 to 250            |
| TERTIARY   | Pliocene                 | Unconsolidated alluvial deposits | 0 to 550            |
|            |                          | Missouri                         | Ogallala Formation  |
|            | Oligocene                | Ankarep Group                    | 0 to 1,000          |
|            |                          | White River Group                | Bull Fork Formation |
| CRETACEOUS | Upper                    | Chadron Formation                | 0 to 700            |
|            | Lower                    | Undifferentiated rocks           | 0 to 8,000          |
| JURASSIC   | Middle and Upper         | Undifferentiated rocks           | 0 to 700            |
|            | Upper                    | Undifferentiated rocks           | 0 to 600            |
| TRIASSIC   | Upper                    | Dookum Group                     | 0 to 2,000          |
|            | Lower and Upper          | Undifferentiated rocks           | 300 to 3,000        |



# Expanding National Capabilities

New Cyber Infrastructure  
Providing Hydrologic Data  
to the Public

Enhance Accessibility of Data  
ACWI, Subcommittee on Ground Water  
Expand Capability to Share Ground-Water  
Data Across Agencies that Collect Them.



# Program Integration

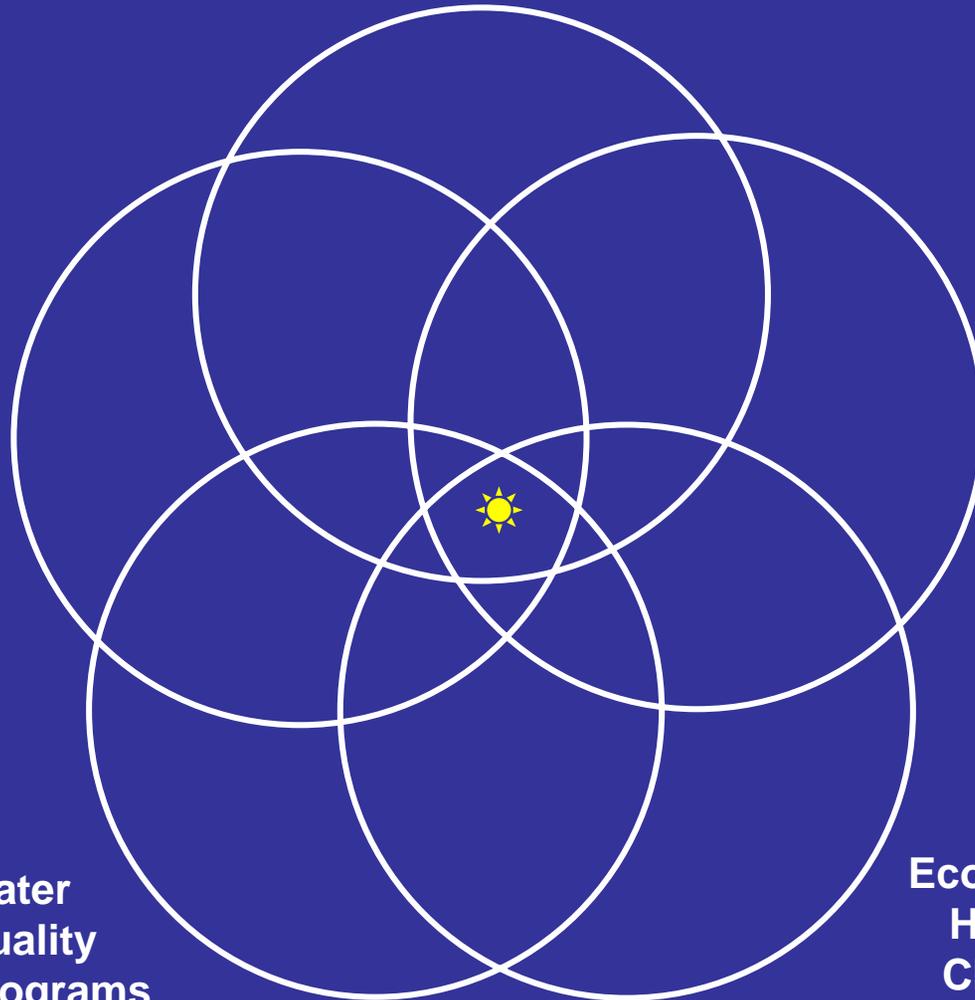
Climate Change

Water for  
America

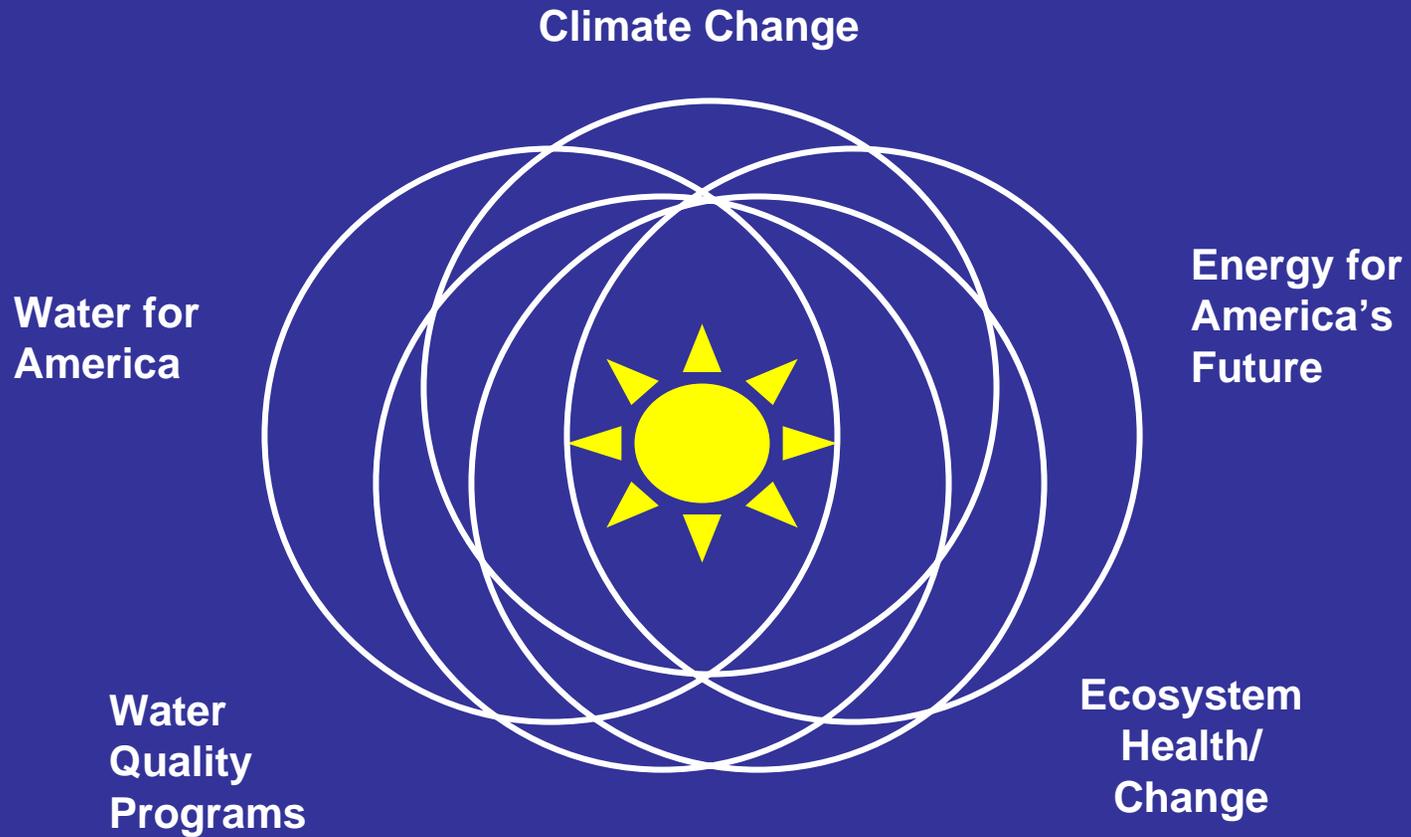
Energy for  
America's  
Future

Water  
Quality  
Programs

Ecosystem  
Health/  
Change



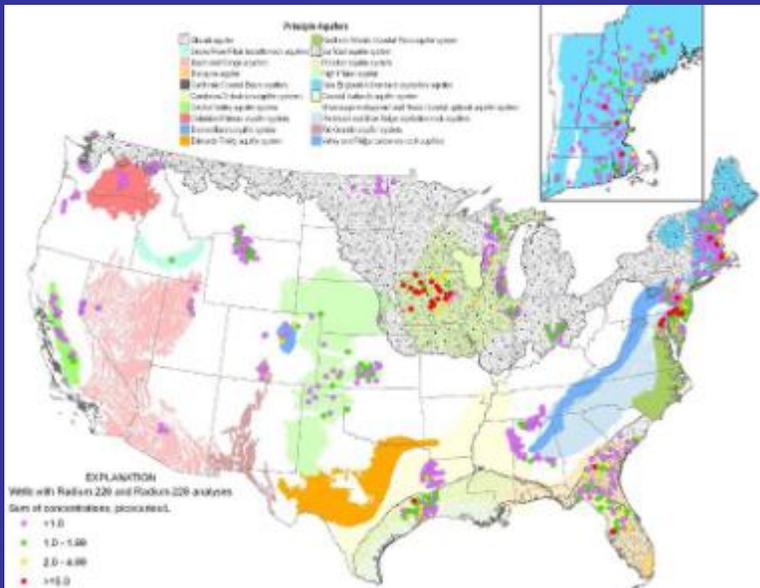
# Program Integration



# Collaborative Work Under Discussion

## Water Quality

How do widespread naturally occurring constituents like total dissolved solids, arsenic or radionuclides influence water availability?

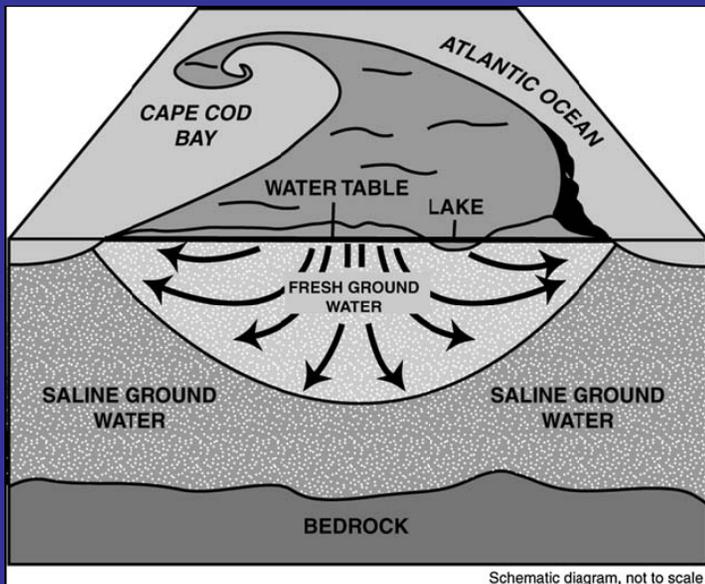


How do widespread anthropogenically-introduced constituents like high nitrate ground water influence water availability?

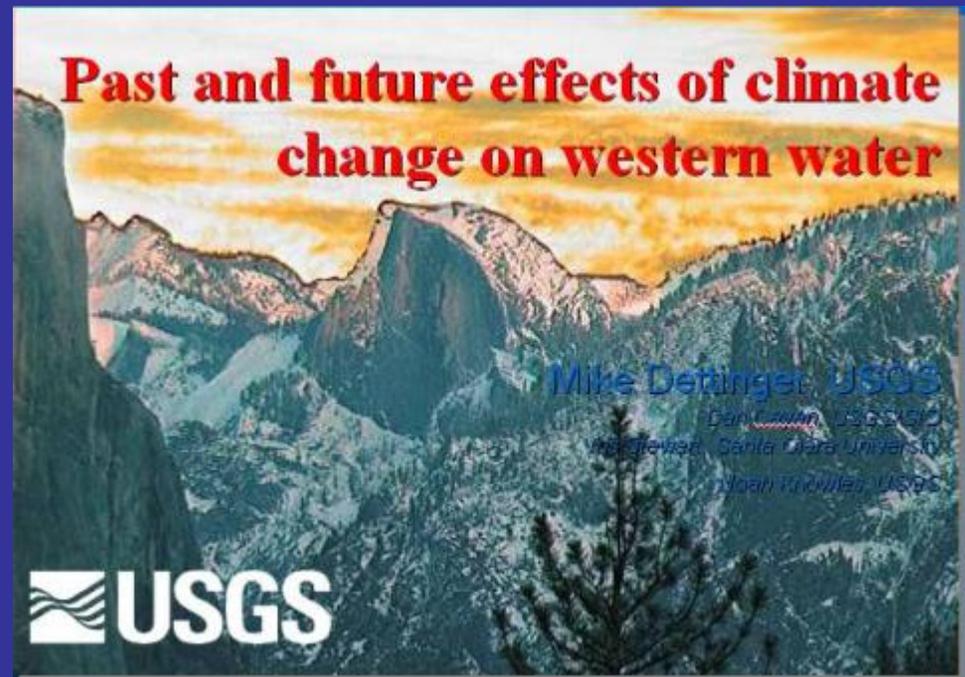
# Collaborative Work Under Discussion

## Climate Change

How will projected sea-level rise influence coastal ground water and surface water sources?



J.P. Masterson, S.P. Garabedian GROUND WATER 45, no. 2: 209–217

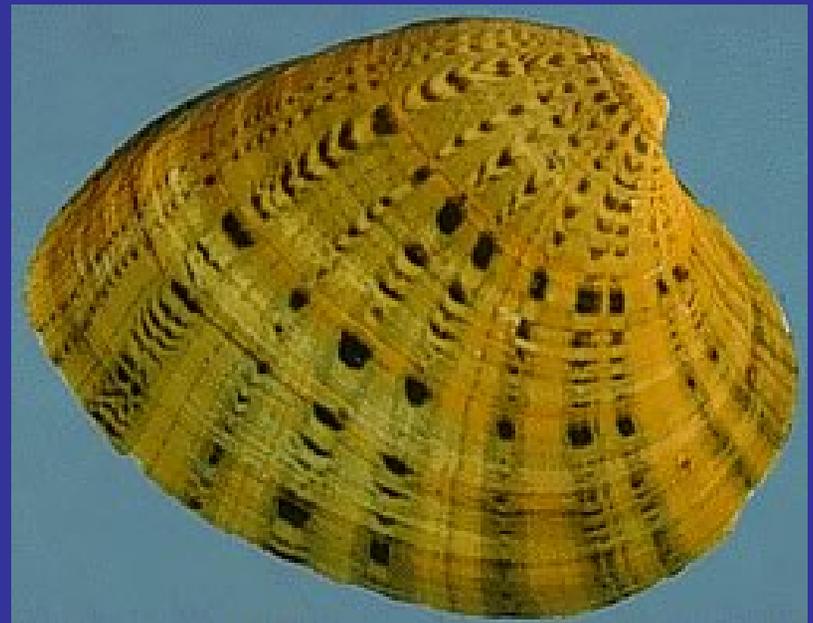


How will climate variability affect existing water sources?

# Collaborative Work Under Discussion

## Ecosystem Flows / Habitat

- Classify the streams across the nation for their hydro-ecological type
- Develop a regionalization approach to provide ecological flow estimates for regional-water-budget studies
- Better understand the ecological needs of aquatic species for quality aquatic habitat and streamflow



# Collaborative Work Under Discussion

## Geographic Research

Develop new approaches to monitoring and tracking changes in land cover, including changes due to irrigation activities, that can be used to drive predictive models



# GREAT LAKES BASIN PILOT PROJECT



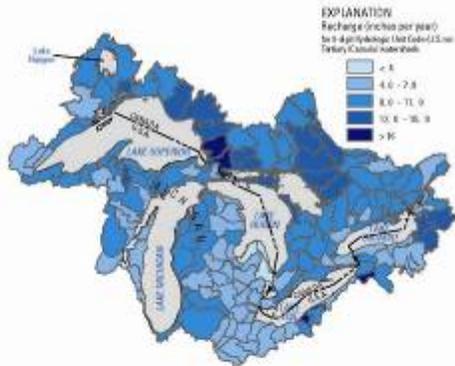
<http://water.usgs.gov/wateravailability/greatlakes>

# GROUND-WATER RECHARGE



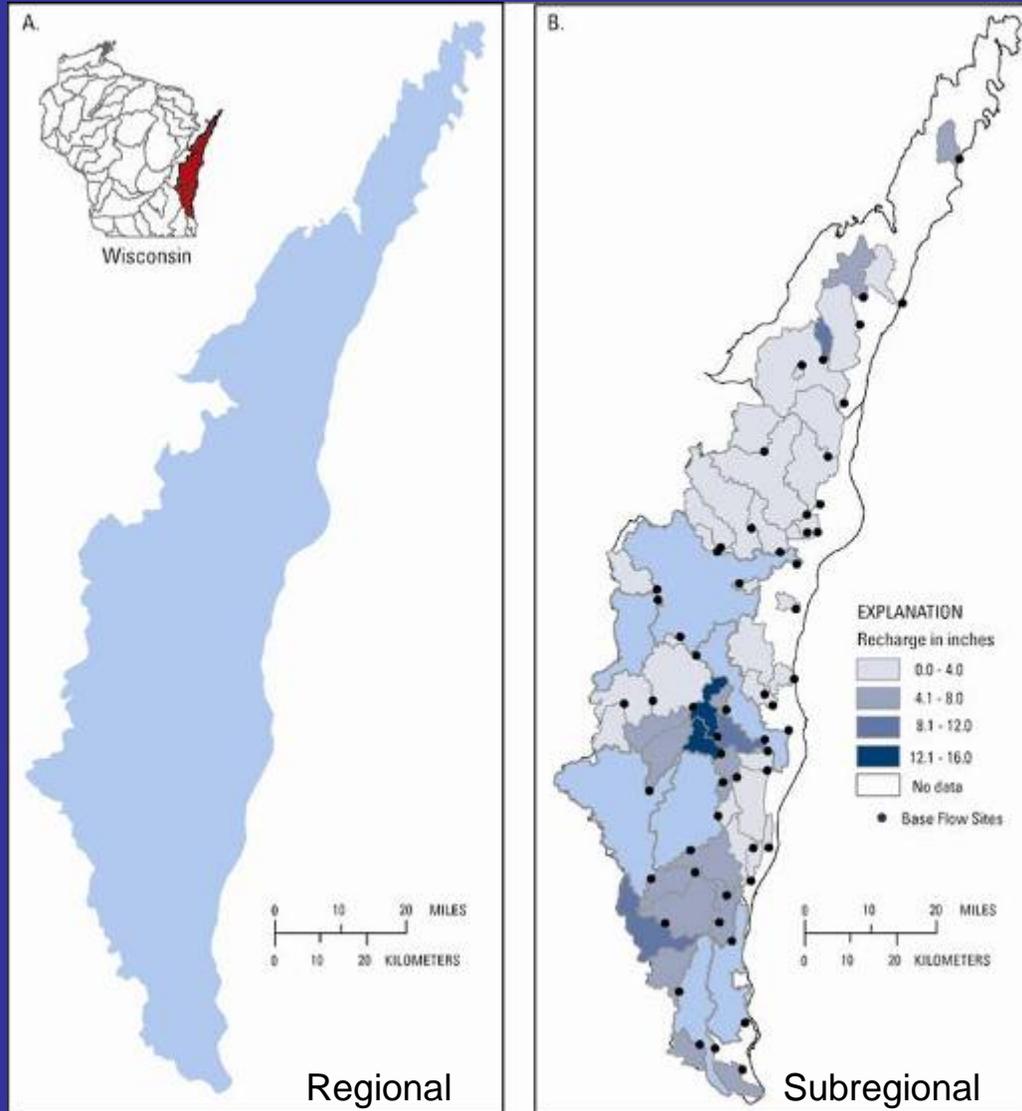
In cooperation with the National Water Research Institute, Environment Canada  
National Assessment of Water Availability and Use Program

## Estimation of Shallow Ground-Water Recharge in the Great Lakes Basin



Scientific Investigations Report 2005-5284

U.S. Department of the Interior  
U.S. Geological Survey

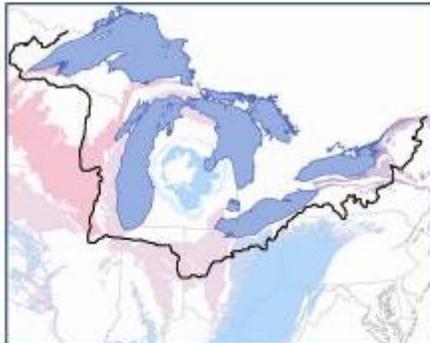


# GROUND-WATER STORAGE AND DIVIDES



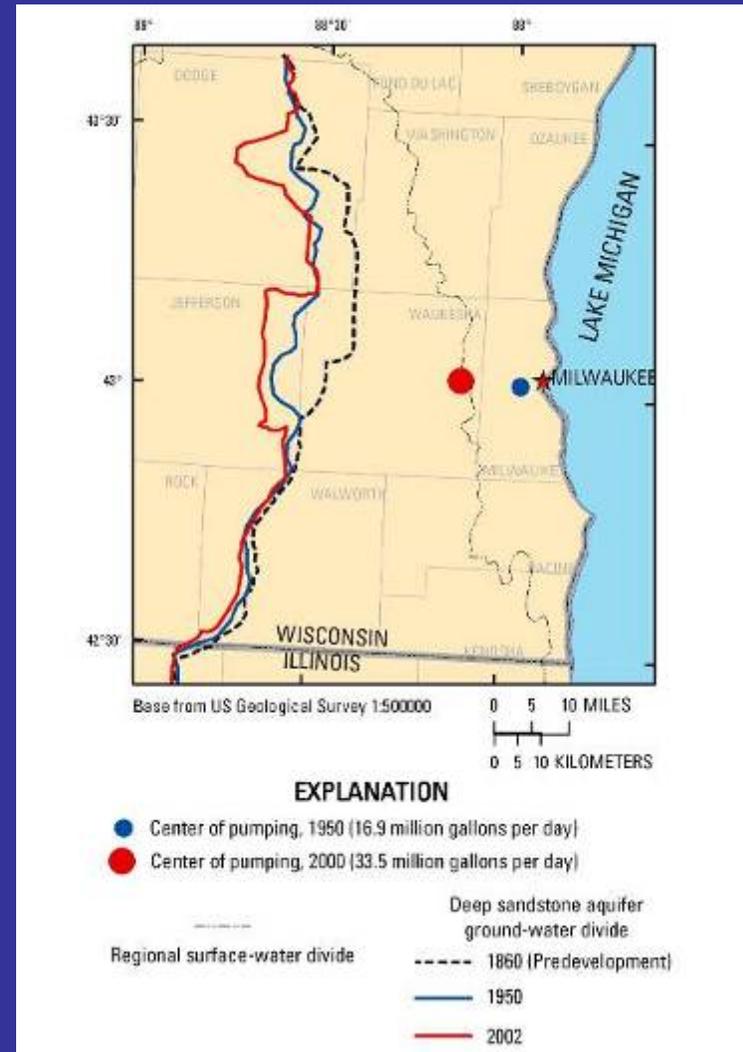
National Water Availability and Use Program

## Compilation of Regional Ground-Water Divides for Principal Aquifers Corresponding to the Great Lakes Basin, United States

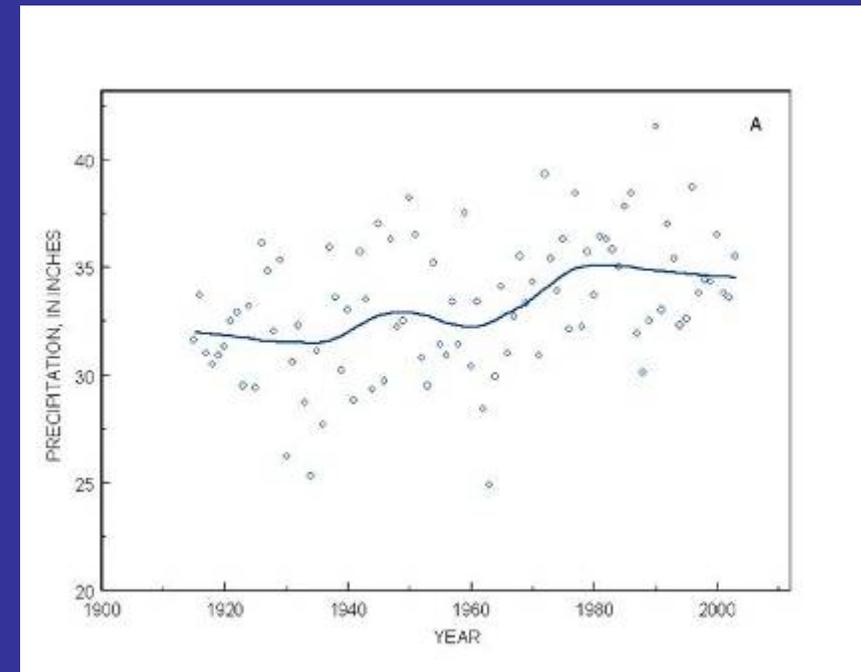
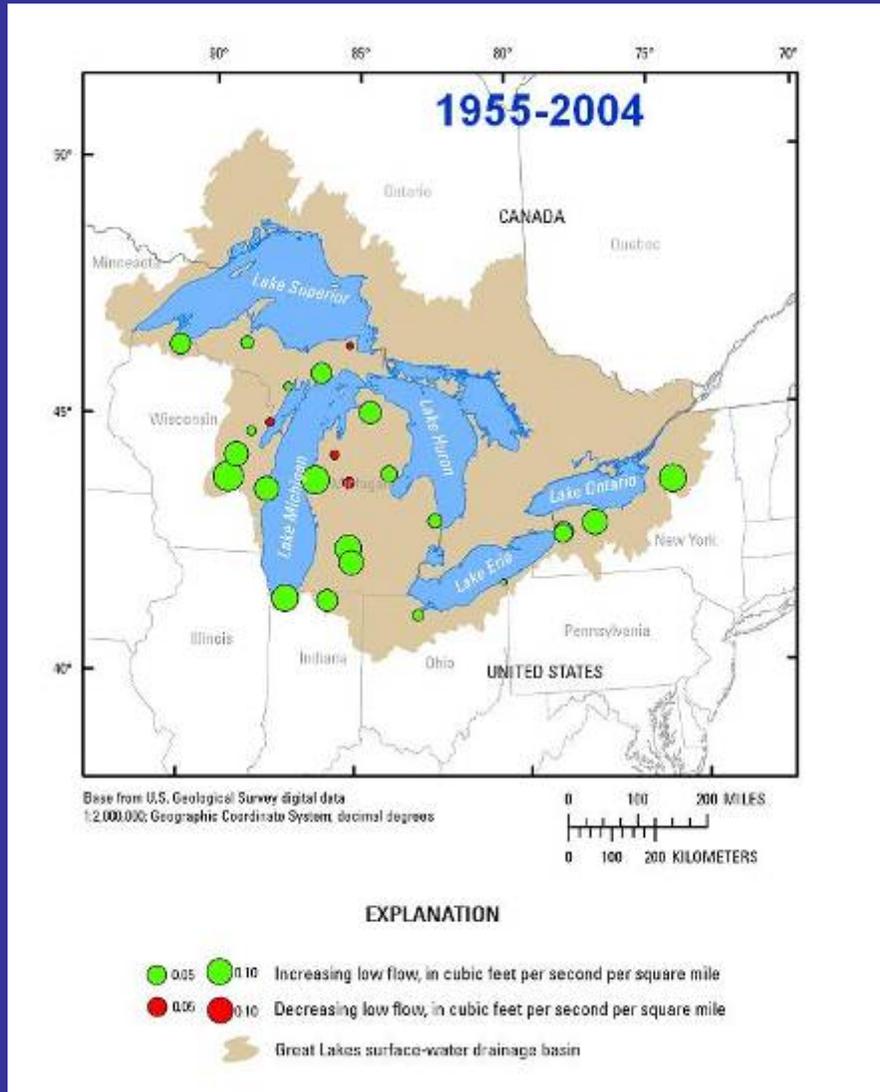


Scientific Investigations Report 2006-5102

U.S. Department of the Interior  
U.S. Geological Survey

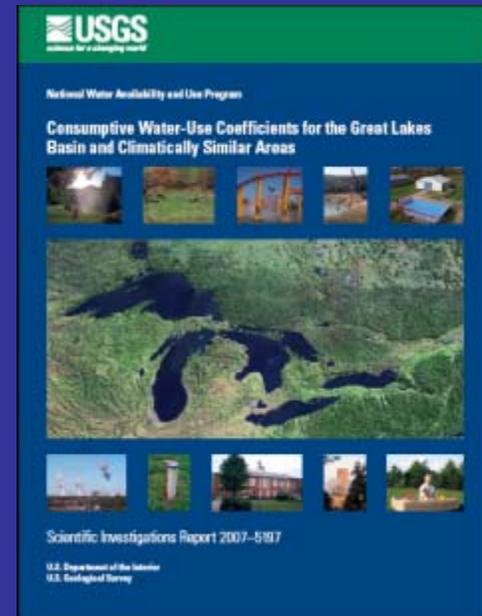


# HISTORICAL CHANGES IN PRECIP. AND STREAMFLOW



# WATER-USE PRODUCTS

- Consumptive water-use coefficients for the Great Lakes Basin and climatically similar areas.



- Seasonal and monthly water use and consumptive use for selected water-use categories and water-use types.
- Estimated use of water in the Great Lakes Basin by hydrologic unit code (HUC 8) in 2005

# LAKE-LEVEL VARIABILITY



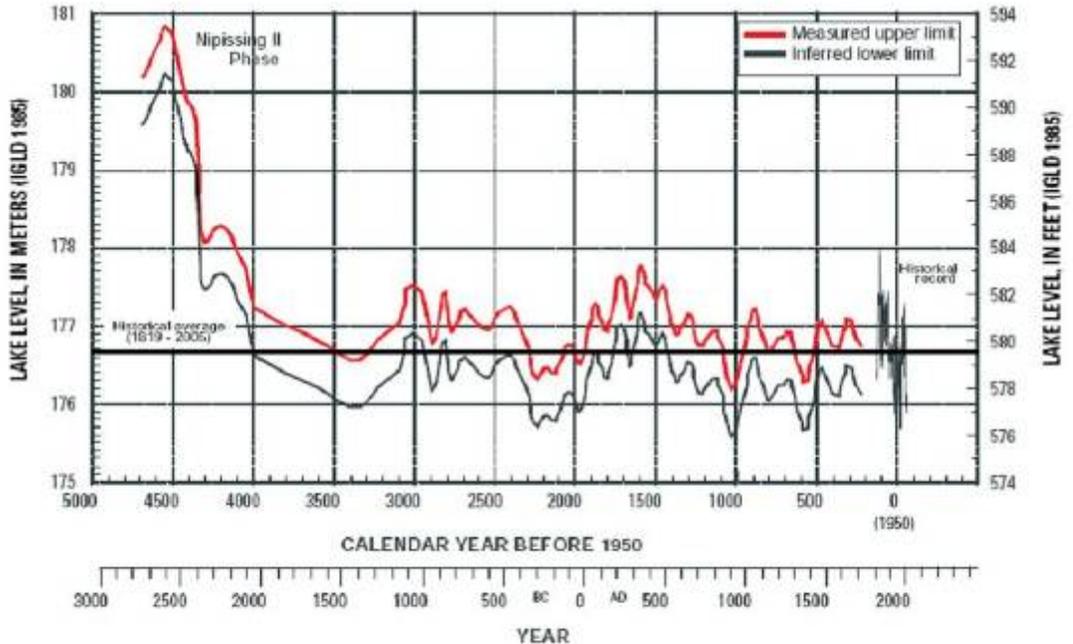
National Water Availability and Use Program

Lake-Level Variability and Water Availability in the Great Lakes



Circular 1311

U.S. Department of the Interior  
U.S. Geological Survey



Hydrograph of late Holocene lake level and historical lake level for Lakes Michigan and Huron. The red line is interpreted from beach-ridge studies, whereas the lower black line is an inferred lower limit using range of the historical record as a guide.

# Lots of Stakeholder Involvement has occurred to date

## Advisory Committee for Water Information

02/20/08 - Briefed ACWI on the Initiative

03/17/08 - Comments on the Initiative

03/24/08 - Respond to all Comments

## Joint Meeting of ICWP / ASIWPCA / WSWC

## Association of American State Geologists

## Staff - House Resources Committee, Subcommittee on Water and Power

## Association of Metropolitan Water Agencies

## Tennessee Valley Water Partnership

## Sustainable Water Resources Roundtable

# What is the Feedback so far?

- Overall, very positive!
- Wyoming State Engineer representative stated:  
*“I used to be skeptical about a Federal role in this area, until we tried to conduct our own effort at a multi-state level. Now I’m convinced there needs to be federal leadership.”*

# Future Briefings and Coordination

## Federal Agencies

US EPA  
Dept. of Agriculture  
Department of Commerce (NOAA)  
DOE (National Laboratories)  
DHS (FEMA)  
DOD (Army Corps of Engineers)  
NPS  
USFWS

## NGOs

AWRA  
AWWA  
NRWA  
NAWC  
ASDWA  
ASFPM  
WEF  
Farm Bureau  
National Congress of American  
Indians (NCAI - Dan Cordalis)  
The Nature Conservancy

# Stakeholder Involvement

## Purpose:

- Involve partners shaping the process for selecting cycle of regions and location and timing of focused areas starts.
- Involve partners in deciding what products would be most useful.
- Suggest ways to best incorporate existing information into the regional and focused area assessments and to collaborate with ongoing efforts.

## Process:

- Need to reach a large audience.
- Utilize a request for input, as we did in formulation of Circular 1223.
- Stakeholder input can be provided through a variety of media.
- We will be glad to attend Stakeholders meetings this Summer to obtain their input.

# Issues we would like stakeholders to weigh in on

- What criteria should be used to decide where to start our first regional studies?
- What criteria should be used to identify candidate areas for focused area studies?
- What are the appropriate spatial and temporal scales for work within the study units (both Regional and focus area studies)? For instance, if we are constructing a water budget for each watershed within a water resource region, how big should each watershed be?

# Issues we would like you to weigh in on

- What considerations should be taken in making the greatest use of existing water availability and use studies and information, which have been conducted at a regional or finer scale, to further the Water for America objectives? Are there ongoing water availability and use efforts that the USGS should collaborate with in conducting this Initiative?
- States and regional organizations collect and maintain significant amounts of hydrologic data, particularly for ground water and water use. How should this information be incorporated into the regional and focused area assessments?

# Issues we would like you to weigh in on

- What specific variables or indicators would be most useful to inform national and regional water availability and use decisions?
- At what scale of watershed does your organization assess the cumulative affects of various water supply stresses?
- What products and information will be most useful to you from these assessments?

Visit the USGS Water for America website at:  
<http://water.usgs.gov/wsi>