A National Water Census

* Part of the Initiative
Our objective for the Water Census:

To place technical information and tools in the hands of stakeholders, allowing them to answer two primary questions about water availability:

Does the Nation have an enough freshwater to meet both human and ecological needs?

Will this water be present to meet future needs?
How did we get to where we are today?

2002
- SECURE Water Act

2005
- Great Lakes Pilot Study

2007
- Water Availability and Use Assessment

2009
- TOWARD A SUSTAINABLE AND SECURITY WATER FUTURE

2011
- waterSMART
How do the National Water Census and WaterSMART Interrelate?

The National Water Census is an integral part of the U.S. Geological Survey’s Science Strategy to conduct an ongoing assessment of the Nation’s water resources.

is a Department of the Interior initiative on water conservation. It includes activities in:

- Bureau of Reclamation
- U.S. Geological Survey
- Office of the Ass’t. Sec. for Water and Sci.

The Water Availability and Use Assessment proposed in the 2011 budget is part of WaterSMART and the National Water Census.
# P.L. 111-11 Subtitle F
(SECURE Water Act as signed by the President March 30, 2009)

<table>
<thead>
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<th>Section 9501:</th>
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## Section 9507: Water Data Enhancement by United States Geological Survey

*Full National Streamflow Information Program.*

*Creates a National Groundwater Resources Monitoring Program and a Brackish Groundwater Assessment.*

## Section 9508: Water Availability Assessments

*Creates a national program to study water quality and quantity.*

*Requires first report in 2012 and every 5 years thereafter.*

*Grants are available to assist state agencies in developing and integrating state water use data.*

## Section 9509: Research Agreement Authority

## Section 9510: Effect
Report to Congress - Every 5 years thereafter:

1. The **current availability** of water resources in the United States,

2. **Significant trends** affecting water **availability**, including documented or projected impacts as a result of global climate change,

3. The **withdrawal and use** of surface water and groundwater by various sectors,

4. **Significant trends** relating to each **water use** sector, including significant changes in water use due to the development of new energy supplies,

5. **Significant water use conflicts or shortages** that have occurred or are occurring,

6. Each **factor** that has **caused**, or is causing, a conflict or shortage.
USGS Implementation Team

Water Use
Water Quality
Geology
Surface Water

Ecological Flow
Biology
Climate Change
Information Technology

Groundwater
Geography
Pilot Studies

Program Integration
Water Use
Ecological Flows
Availability Indicators
Products, Info Mgmt, Decision Support
<table>
<thead>
<tr>
<th>Organization</th>
<th>Acronym</th>
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<tbody>
<tr>
<td>Association of Fish and Wildlife Agencies</td>
<td>AFWA</td>
</tr>
<tr>
<td>Association of Metropolitan Water Agencies</td>
<td>AMWA</td>
</tr>
<tr>
<td>Association of State Drinking Water Administrators</td>
<td>ASDWA</td>
</tr>
<tr>
<td>American Water Resources Association</td>
<td>AWRA</td>
</tr>
<tr>
<td>American Water Works Association</td>
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<tr>
<td>Interstate Council on Water Policy</td>
<td>ICWP</td>
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<tr>
<td>National Ground Water Association</td>
<td>NGWA</td>
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<tr>
<td>The Nature Conservancy</td>
<td>TNC</td>
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<tr>
<td>Water Systems Council</td>
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<tr>
<td>Western States Water Council</td>
<td>WSWC</td>
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<tr>
<td>Bureau of Reclamation</td>
<td>BOR</td>
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<tr>
<td>National Aeronautics and Space Administration</td>
<td>NASA</td>
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<tr>
<td>US Fish and Wildlife Service</td>
<td>USFWS</td>
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<tr>
<td>US Dept. of Energy - Energy Information Administration</td>
<td>DOE - EIA</td>
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<tr>
<td>NOAA National Weather Service</td>
<td>NOAA-NWS</td>
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<td>US Army Corps of Engineers</td>
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<td>US Dept. of Agriculture - Economic Research Service</td>
<td>USDA - ERS</td>
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</table>
Charge to the ad hoc committee

The ad hoc committee will work with the Implementation Team to improve the concepts, efforts, and products proposed for inclusion in the Water Census so that they best meet stakeholders needs.

The output from the committee will be brief report to the Associate Director for Water, USGS, on the consensus reached for the Water Census.

The timeframe for this effort is February – August, 2010.
Integration of programs around the Theme of Water Availability
How will we apply the 2011 funds?

Total Initiative $9.0 M
Account for water with a “budget”
A Nationwide System to deliver water accounting information addressing

- Precipitation
- Evapotranspiration
- Storage in Reservoirs, Lakes, Snow and Ice
- Surface Water
- Groundwater
  - Recharge rates
  - Water level in aquifers
- Ecological Needs
- Water Withdrawals
- Return Flows
- Consumptive Uses
- Run-of-the-River Uses
Generating and delivering information for water accounting

Envision a seamless coverage of information for a water accounting component
And if you could get that info for all accounting components

- Surface Storage
- Recharge
- ET
- Baseflow
- Runoff
- Precipitation
Information Delivery

A web application for delivering water availability information at scales that are relevant to the user

Select the area of interest.

Generate information on water accounting components.

Work with the online tool to construct your water budget.

Access trend information.
How will we apply the 2011 funds?

<table>
<thead>
<tr>
<th>Category</th>
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<tr>
<td>Nationwide Analysis System</td>
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Enhancing the Nation’s Water Use Information

Use New Methods to Estimate Water Use
• Stratified Random Sampling
• Regression Models

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

Develop models of water use based on land use
New Authority: Water Use Grants to States
How will we apply the 2011 funds?

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Flows Needs for Wildlife and Habitat

- Assist classifying the streams for their hydro-ecological type
- Provide tools to systematically assess the ecological affects of hydrologic alteration
- Assist users to develop flow alteration – ecological response relationships by “h-e” type
How will we apply the 2011 funds?

Nationwide Analysis System $1.6 M
Water Use $3.0 M
Ecological Flow $1.3 M
Groundwater and Brackish Studies $1.6 M
Focus Area Studies $1.5 M

Total $9.0 M
Assess Groundwater’s role in Water Availability

Use the strength of and enhance the resources within this program to provide the information on:

- Recharge
- GW yields
- Changes in storage.
- Saltwater Intrusion
- Trends in GW Indices
- Artificial Recharge
- GW/SW Interactions
Assess the Nation’s Brackish Resources

Continue and strengthen the effort begun under the Challenge Projects RFP for 2010

- Locations of the res.
- Hydrologic properties
- Water quality properties
- Current uses

EXPLANATION
Depth to saline ground water, in feet
- Less than 500
- 500 to 1,000
- Greater than 1,000
- Inadequate information
National Cooperative Geologic Mapping Program

Integration of:
- geologic mapping,
- geophysical surveys,
- geochronology,
- three-dimensional modeling,
- geochemistry

to develop geologic and hydrologic frameworks
How will we apply the 2011 funds?

- Nationwide Analysis System: $1.6 M
- Water Use: $3.0 M
- Ecological Flow: $1.3 M
- Groundwater and Brackish Studies: $1.6 M
- Focus Area Studies: $1.5 M

Total: $9.0 M
Assess Water Quality’s role in Water Availability

Use the strength of the NAWQA Program and tools like SPARROW to:

• Demonstrate the degree of water quality impairment that limits water availability
• Define the main compounds of importance.
• Relate to water use and return
• Trends
Finally, three studies focused on selected watersheds: the Colorado River, the Delaware River, and the ACF Rivers - where there is significant competition over water resources. Here, the USGS will work collaboratively with stakeholders to comprehensively assess the technical aspects of water availability.
Focused Water Availability Assessments

Water Quality

Groundwater Resources

Water Use

Global Change

Eco Flows

SW Trends, Precipitation, etc

State, Local, Regional Stakeholder Involvement

Defined Technical Questions to be Answered

Water Quality of Potential Concern in U.S. Private Wells

Ground-Water Availability in the United States

Past and future effects of climate change on western water

General example of a water use system showing surface-water-use activities that are stored in ERDOS

Map depicting water use activities stored in ERDOS

Past and future effects of climate change on western water
How will we apply the 2011 funds?

Nationwide Analysis System $1.6 M
Water Use $3.0 M
Ecological Flow $1.3 M
Groundwater and Brackish Studies $1.6 M
Focus Area Studies $1.5 M

Total $9.0 M
The objective is to place the information and tools into stakeholders' hands to answer the questions they are facing.
GREAT LAKES BASIN PILOT PROJECT

http://water.usgs.gov/wateravailability/greatlakes
National Emphasis—Regional Focus

- Develop methods applicable to national program
- Respond to Great Lakes issues—Compact
Groundwater Divides

Watershed divide

Groundwater divide

Map location

USGS

science for a changing world
HISTORICAL CHANGES IN PRECIP. AND STREAMFLOW
LAKE-LEVEL VARIABILITY
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
• Groundwater equals another Great Lake
• Annual flow out of GL is 1 percent of water in storage
• Water use is 65,000 cfs
• Consumptive use is 3000 cfs