



# 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



2005

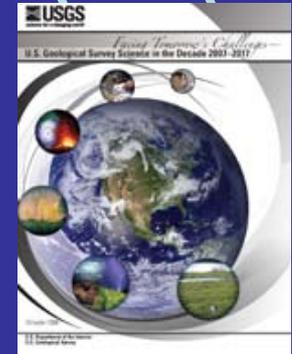


2011

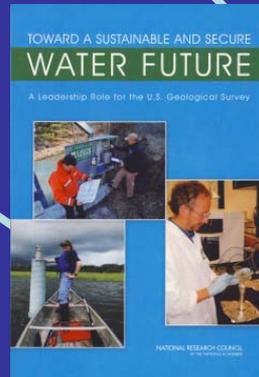


Water Availability and Use Assessment

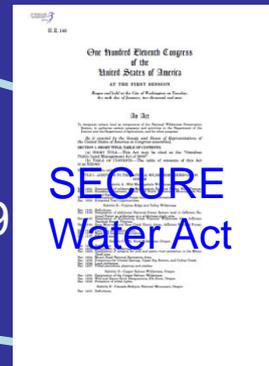
2007



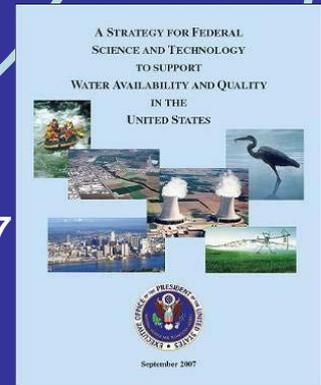
2009



2009



2007



# How do the National Water Census and WaterSMART Interrelate?



## The National Water Census

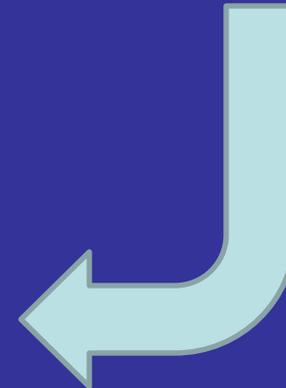
is a Department of the Interior initiative on water conservation. It includes activities in:

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

is an integral part of the U.S. Geological Survey's Science Strategy to conduct an ongoing assessment of the Nation's water resources



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)**

**Section 9501: Findings**

**Section 9502: Definitions**

**Section 9503: Reclamation Climate Change and Water Program**

**Section 9504: Water Management Improvement**

**Section 9505: Hydroelectric Power Assessment**

**Section 9506: Climate Change and Water Intergovernmental Panel**

**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

Ecological Flow

Groundwater

Water Quality

Biology

Geography

Geology

Climate Change

Pilot Studies

Surface Water

Information Technology

Program  
Integration

Water  
Use

Ecological  
Flows

Availability  
Indicators

Products,  
Info Mgmt,  
Decision  
Support

# Stakeholders on ad hoc committee

Organization	Acronym
Association of Fish and Wildlife Agencies	AFWA
Association of Metropolitan Water Agencies	AMWA
Association of State Drinking Water Administrators	ASDWA
American Water Resources Association	AWRA
American Water Works Association	AWWA
Interstate Council on Water Policy	ICWP
National Ground Water Association	NGWA
The Nature Conservancy	TNC
Water Systems Council	WSC
Western States Water Council	WSWC
Bureau of Reclamation	BOR
National Aeronautics and Space Administration	NASA
US Fish and Wildlife Service	USFWS
US Dept. of Energy - Energy Information Administration	DOE - EIA
NOAA National Weather Service	NOAA-NWS
US Army Corps of Engineers	USACE
US Dept. of Agriculture - Economic Research Service	USDA - ERS
US Dept. of Agriculture - NASS	USDA - NASS
US Dept. of Agriculture - NRCS	USDA - NRCS
US Environmental Protection Agency	USEPA

## 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 concensus reached for the Water Census.

The timeframe for this effort is February – August, 2010.

# Integration of programs around the Theme of Water Availability

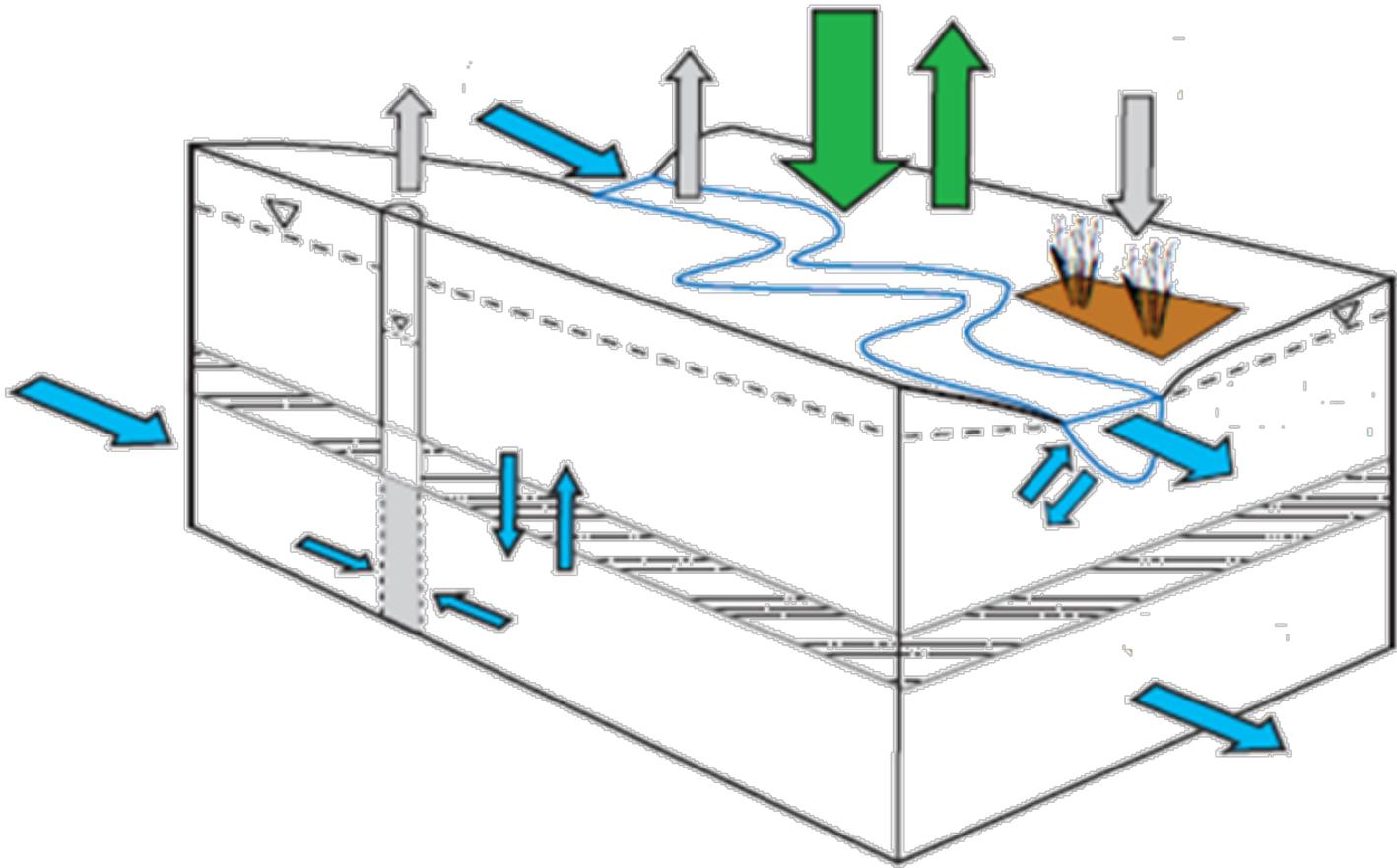


# How will we apply the 2011 funds?

Total Initiative

\$9.0 M

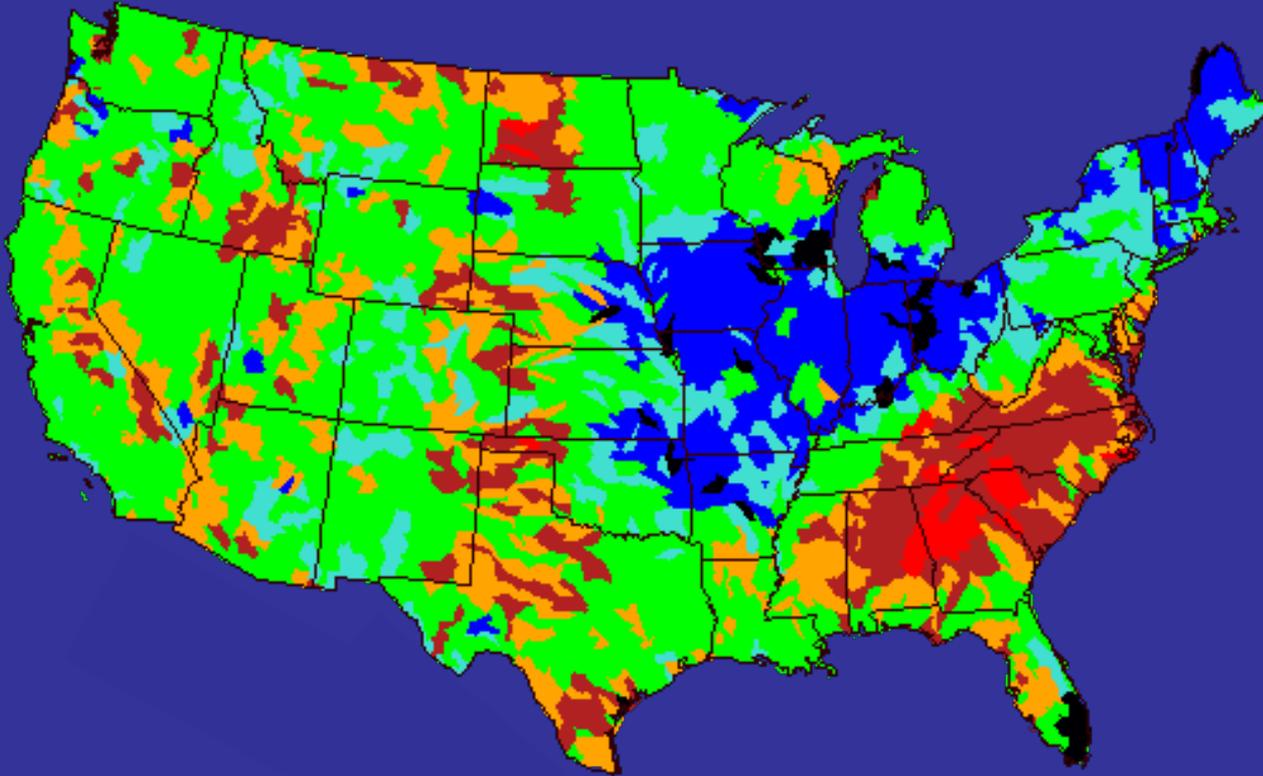
# Account for water with a “budget”



# A Nationwide System to deliver water accounting information addressing

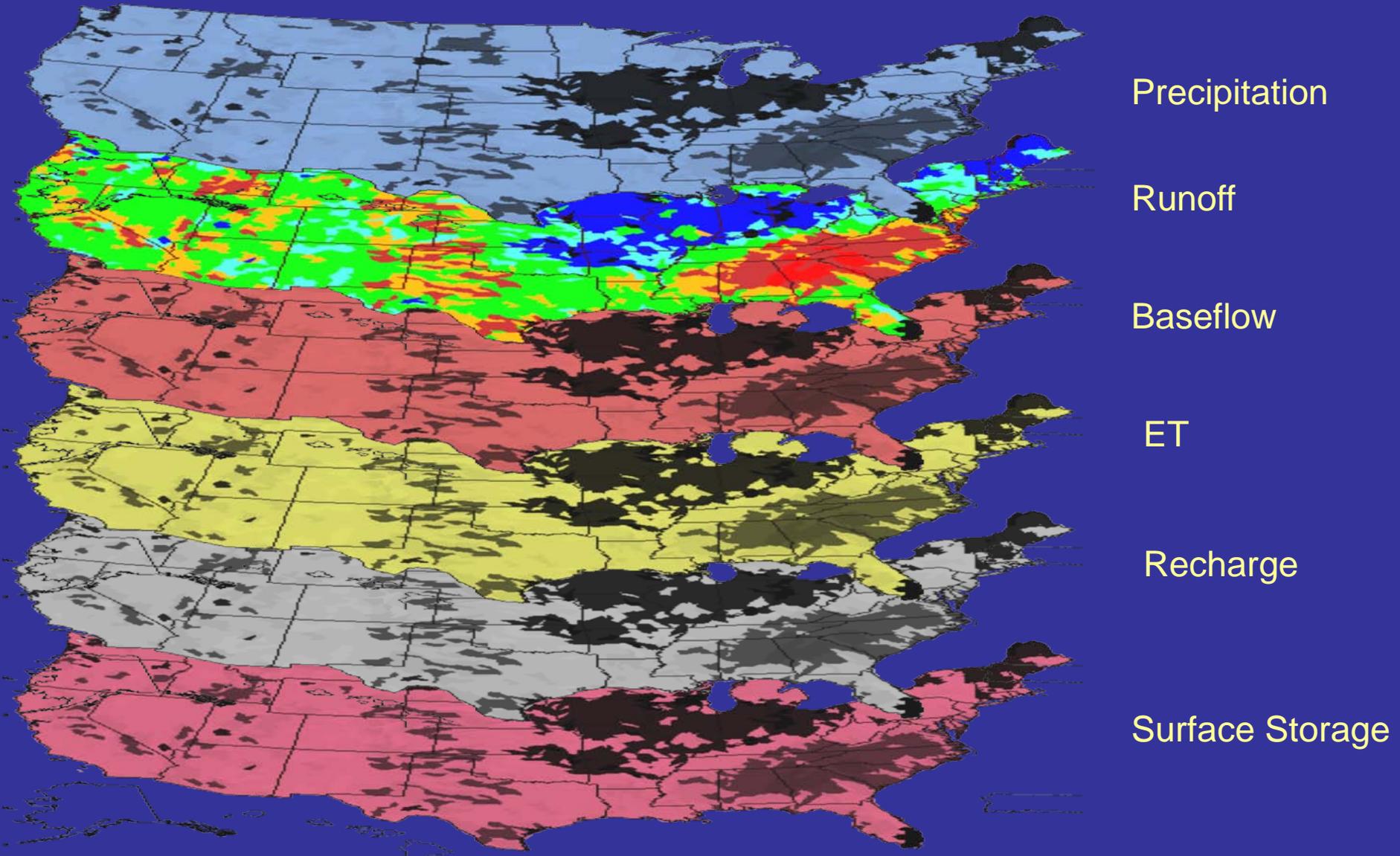
- Precipitation
- Evapotranspiration
- Storage in Reservoirs, Lakes, Snow and Ice
- Surface Water
- Groundwater
  - Recharge rates
  - Water level in aquifers
- Ecological Needs
- Water Withdrawals
- Return Flows
- Consumptive Uses
- Run-of-the-River Uses

# 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



# Information Delivery

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

USGS  
Idaho StreamStats

ZoomIn ZoomOut Pan GetInfo FullExtent LastExtent EditBasin FlowStats BasinChar ClearBasin Download GageInfo Print Help

Scale  
Zoom To: water GO  
Enter Water Resource

Map Layers Locator Map  
BASE LAYERS  
WATER  
POLITICAL

USGS Scale 1:7627084

Refresh Map Reset Layers

Accessibility FOIA Privacy Policies and Notices  
U.S. Department of the Interior | U.S. Geological Survey  
URL: <http://streamstats.usgs.gov/idstreamstats/>  
Page Contact Information: StreamStats Help  
Page Last Modified: September 17, 2007

Streamstats Status News ⚠️

FIRST GOV  
The U.S. Government's Official Web Portal

TAKE PRIDE IN AMERICA

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?

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
<b>Total</b>	<b>\$9.0 M</b>

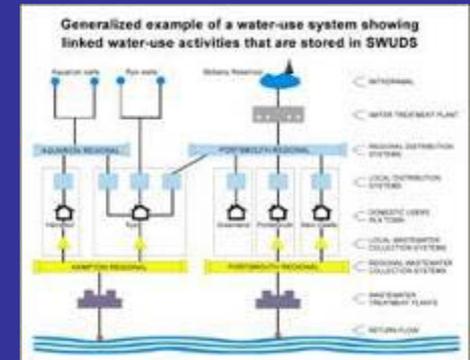
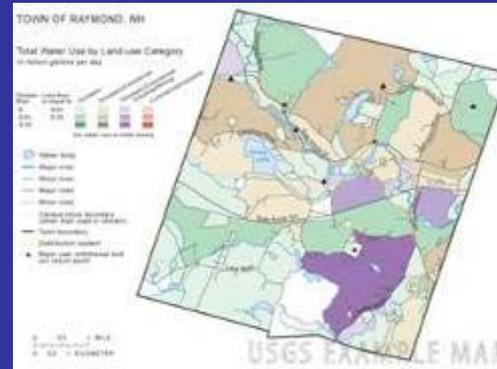
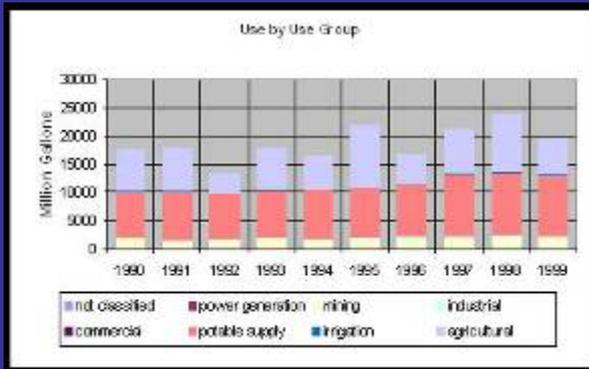
# Enhancing the Nation's Water Use Information

## Use New Methods to Estimate Water Use

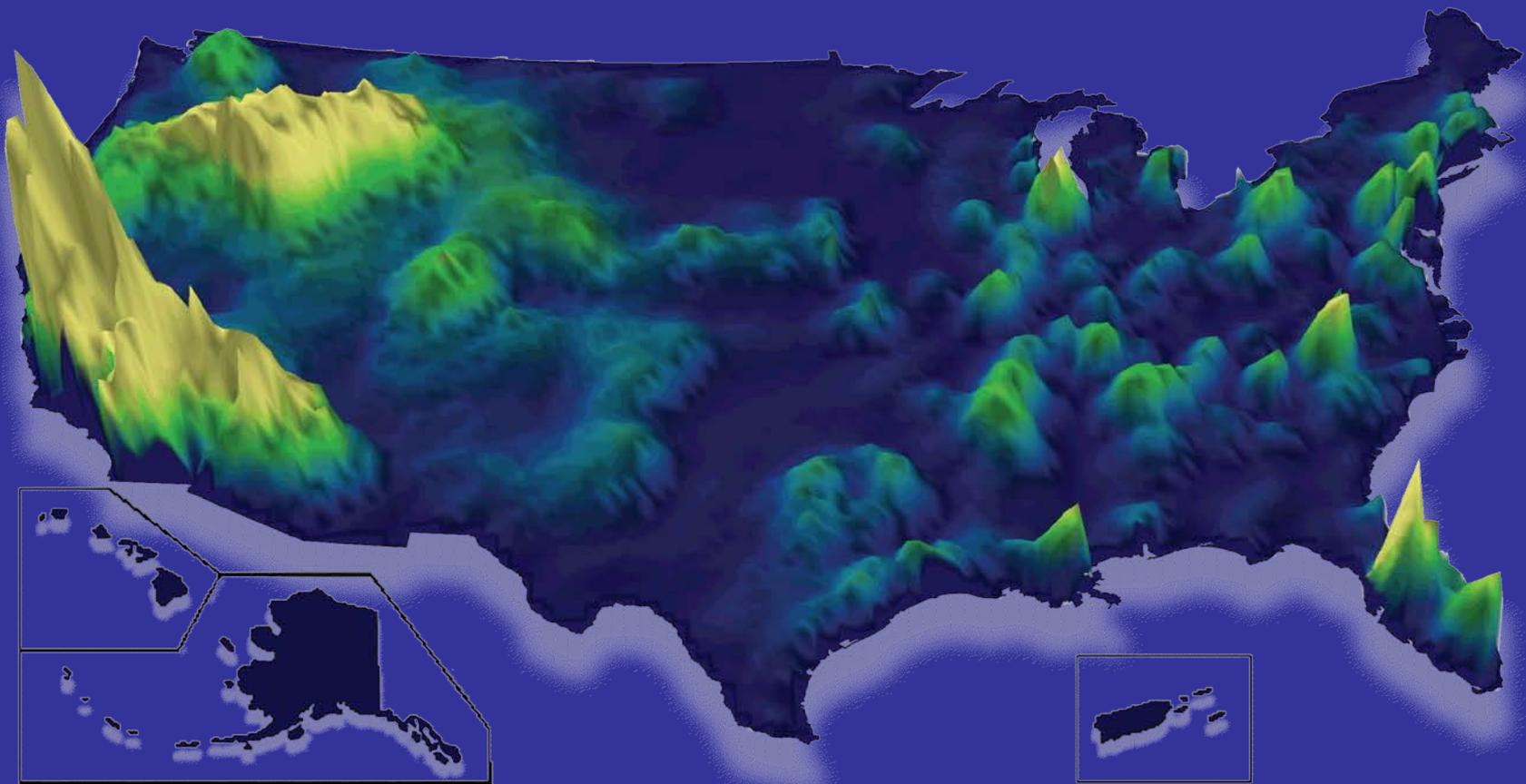
- Stratified Random Sampling
- Regression Models

Develop models of water use based on land use

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



# New Authority: Water Use Grants to States



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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



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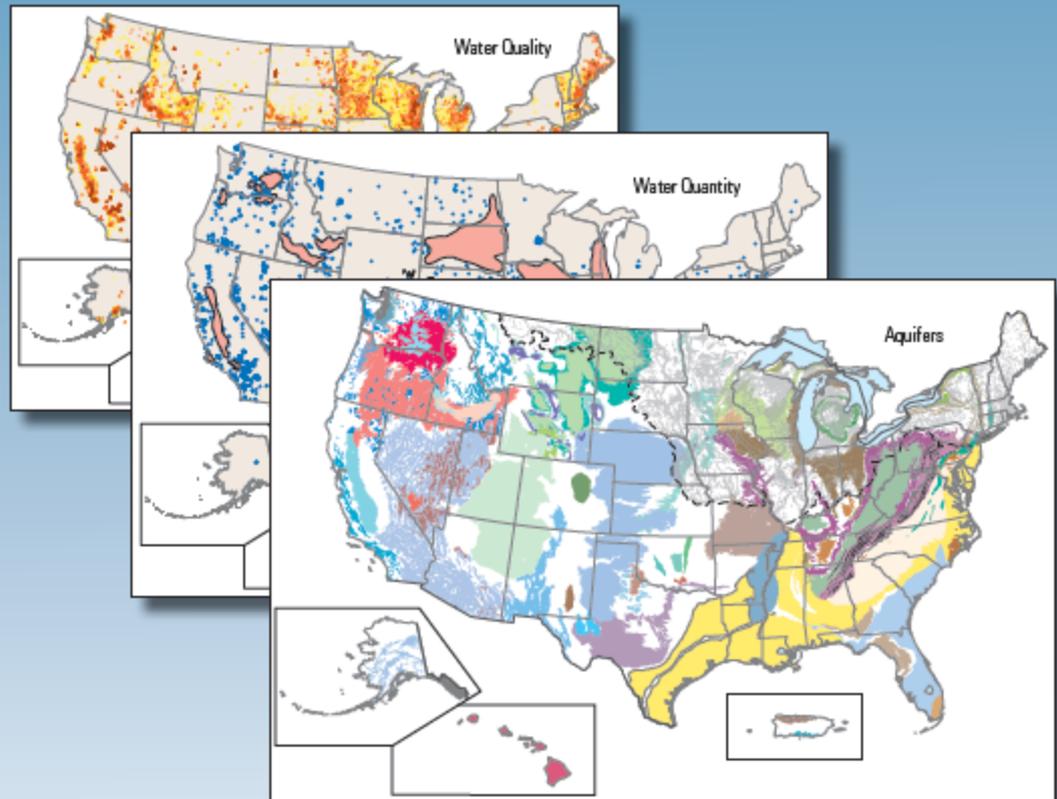
# Assess Groundwater's role in Water Availability

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

Ground-Water Resources Program

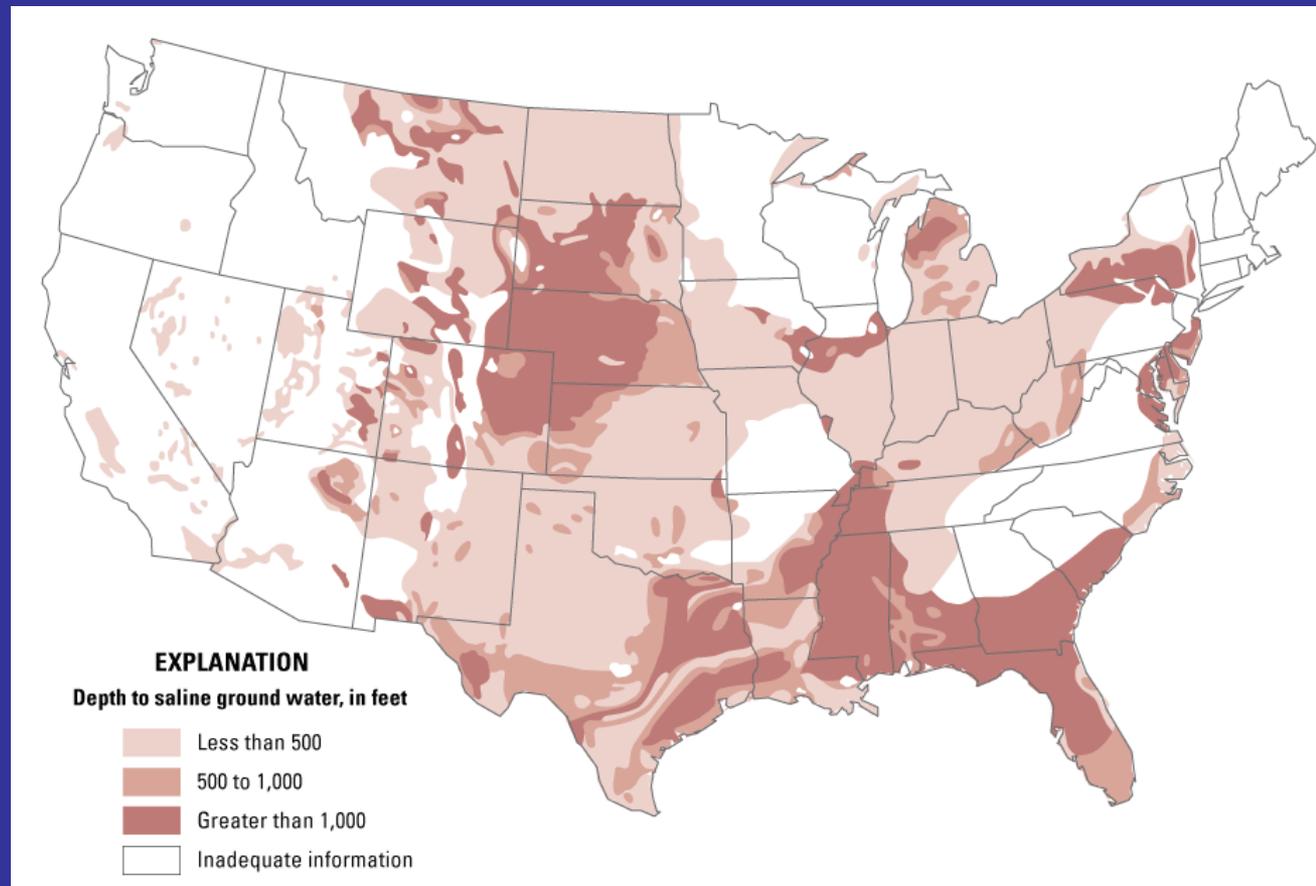
## Ground-Water Availability in the United States



# 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

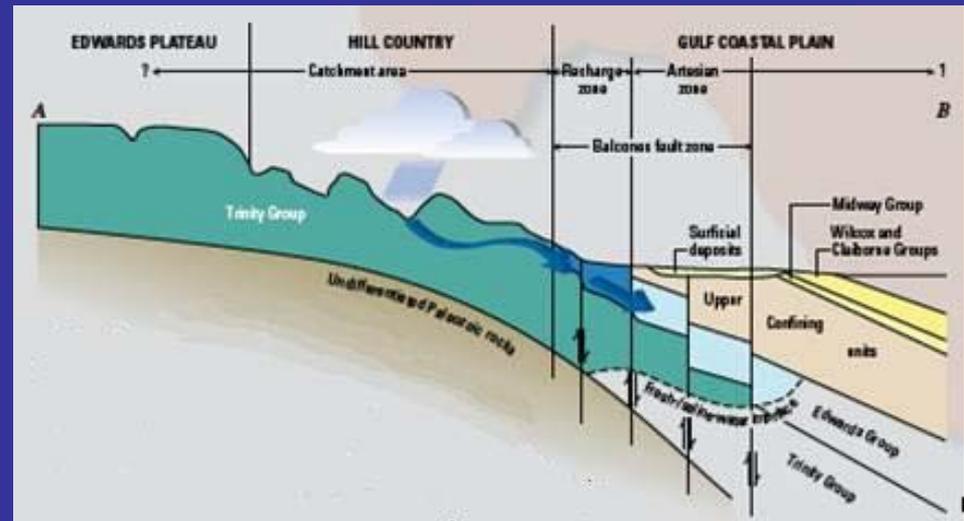


# National Cooperative Geologic Mapping Program

Integration of:

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

to develop geologic and hydrologic frameworks



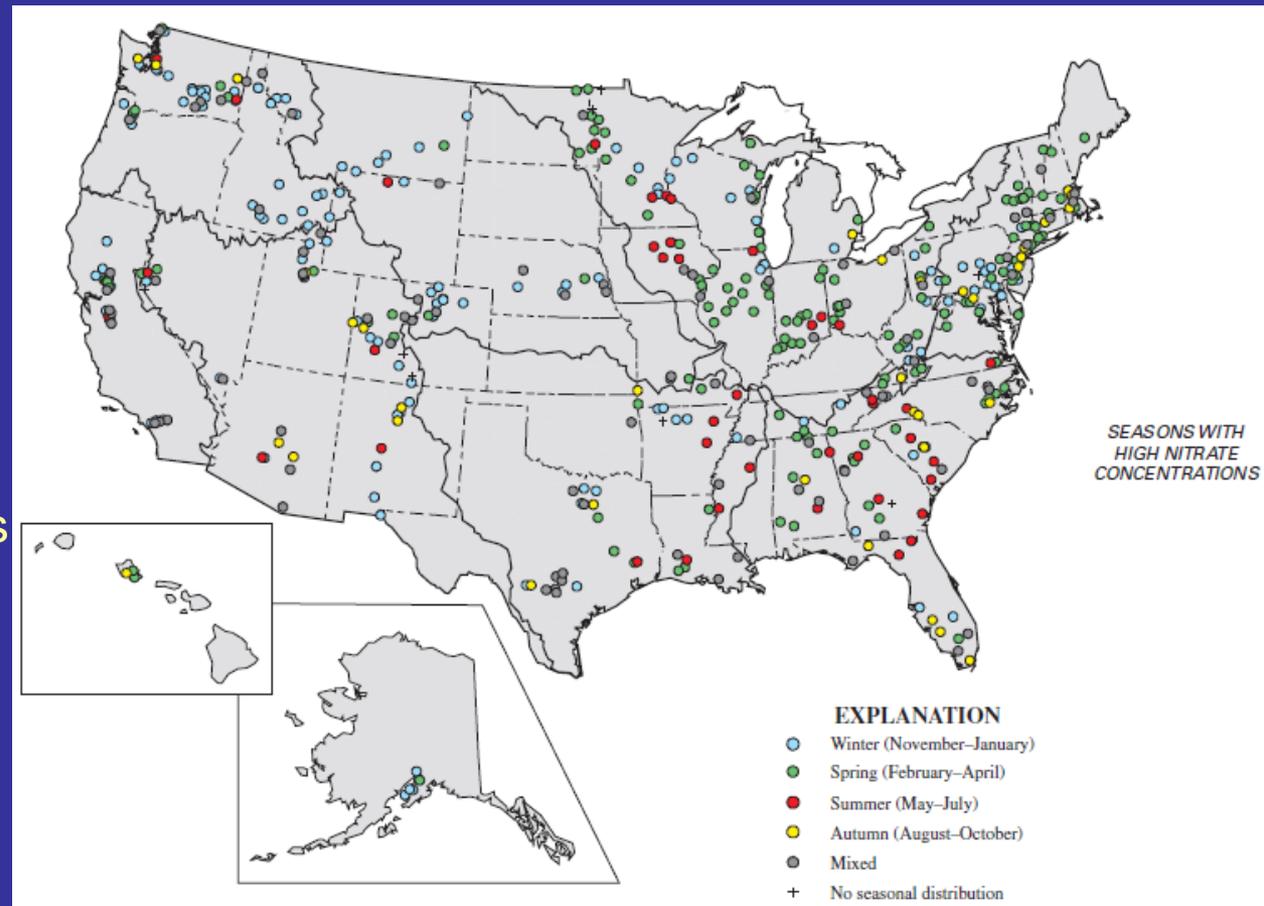
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# Assess Water Quality's role in Water Availability

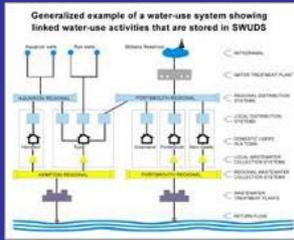
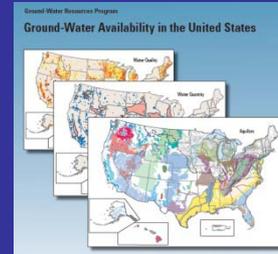
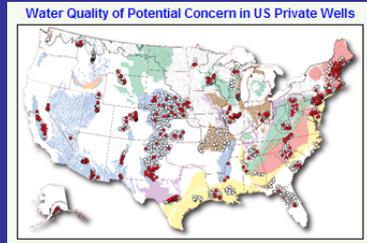
Use the strength of the NAWQA Program and tools like SPARROW to:

- 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

SW Trends, Precipitation, etc



Eco Flows

Global Change

State, Local, Regional Stakeholder Involvement



Defined Technical Questions to be Answered

# How will we apply the 2011 funds?

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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.

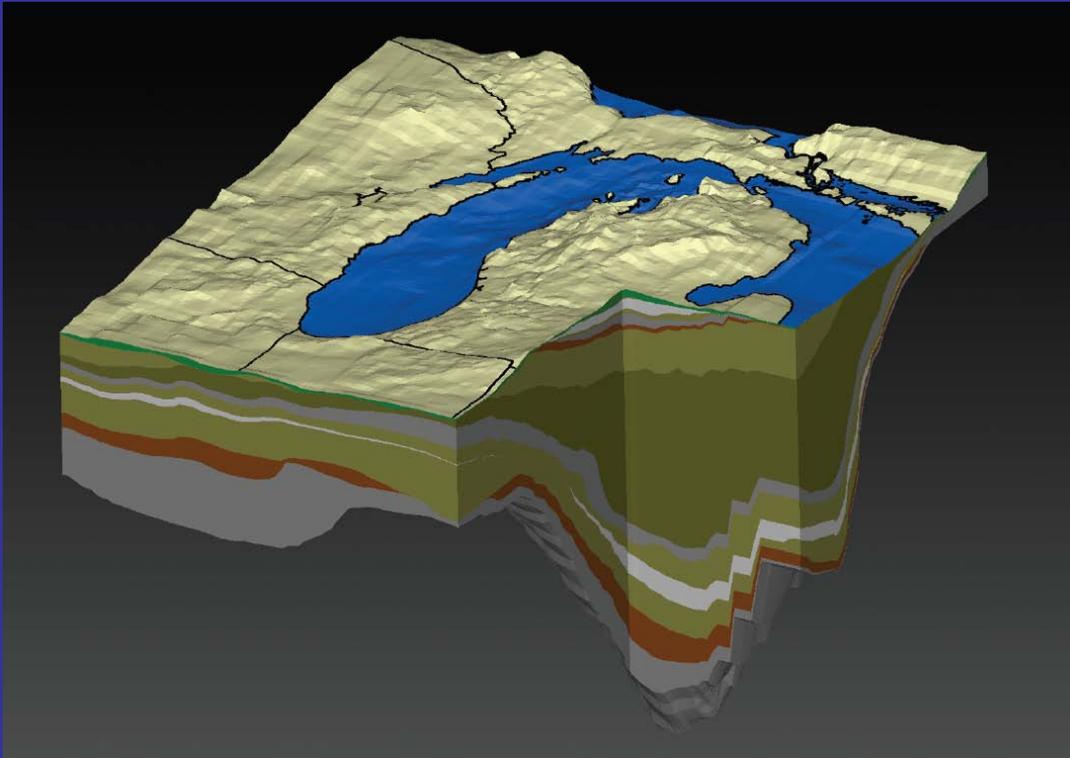
# GREAT LAKES BASIN PILOT PROJECT



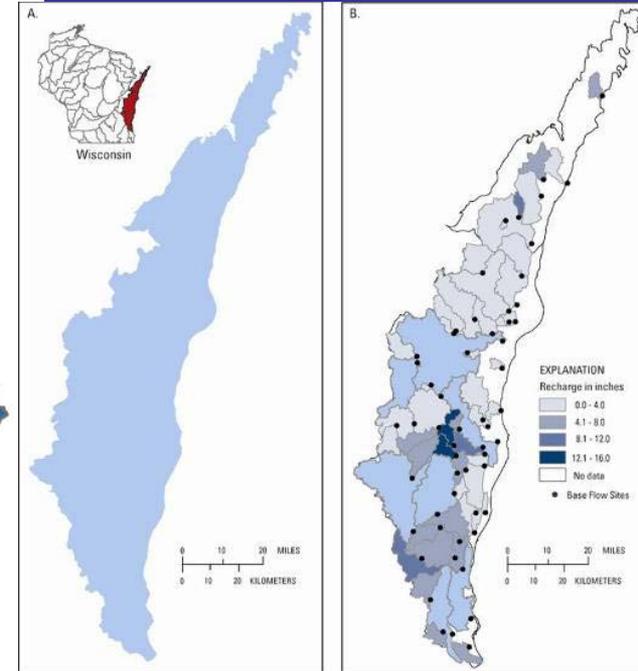
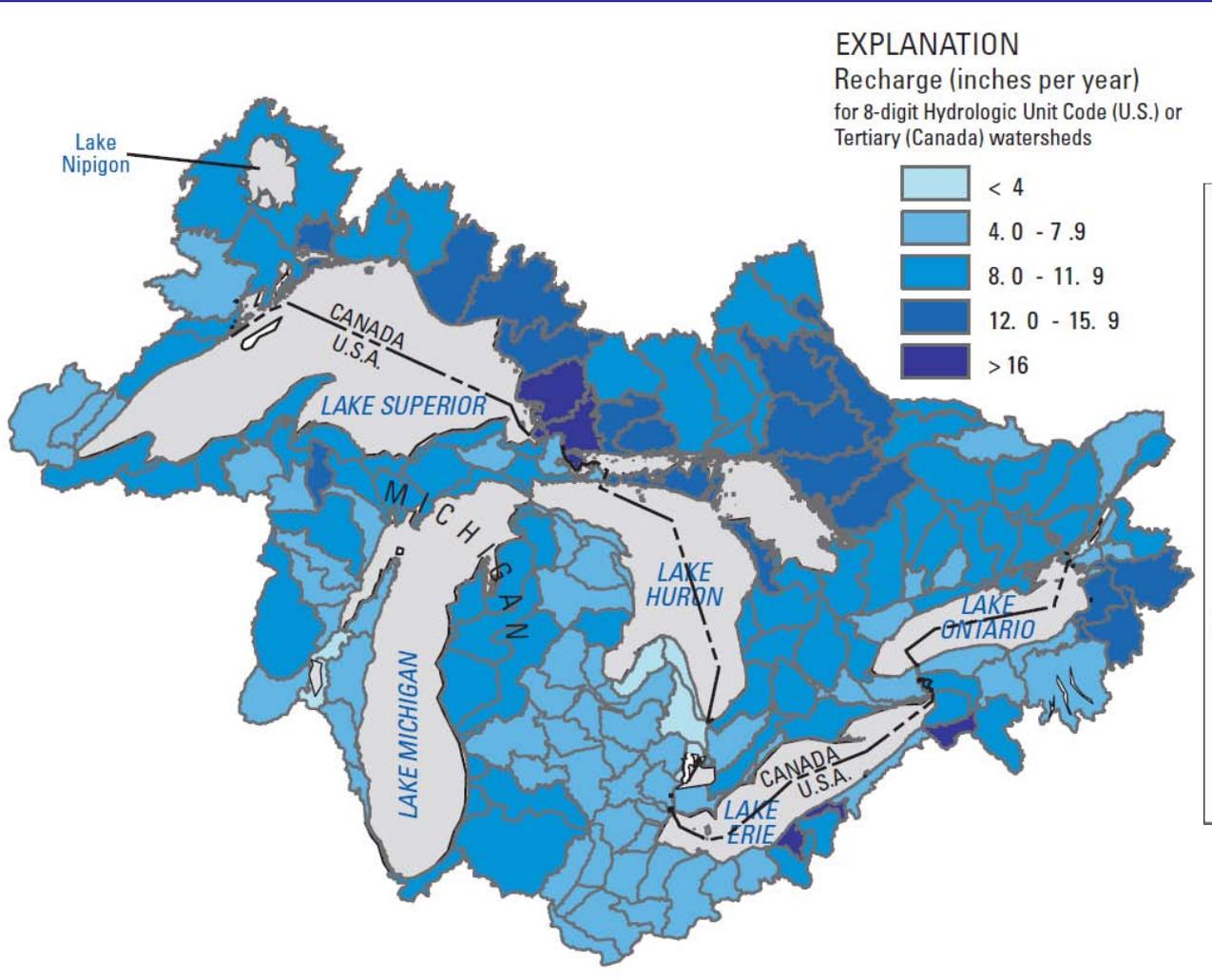
<http://water.usgs.gov/wateravailability/greatlakes>

# National Emphasis—Regional Focus

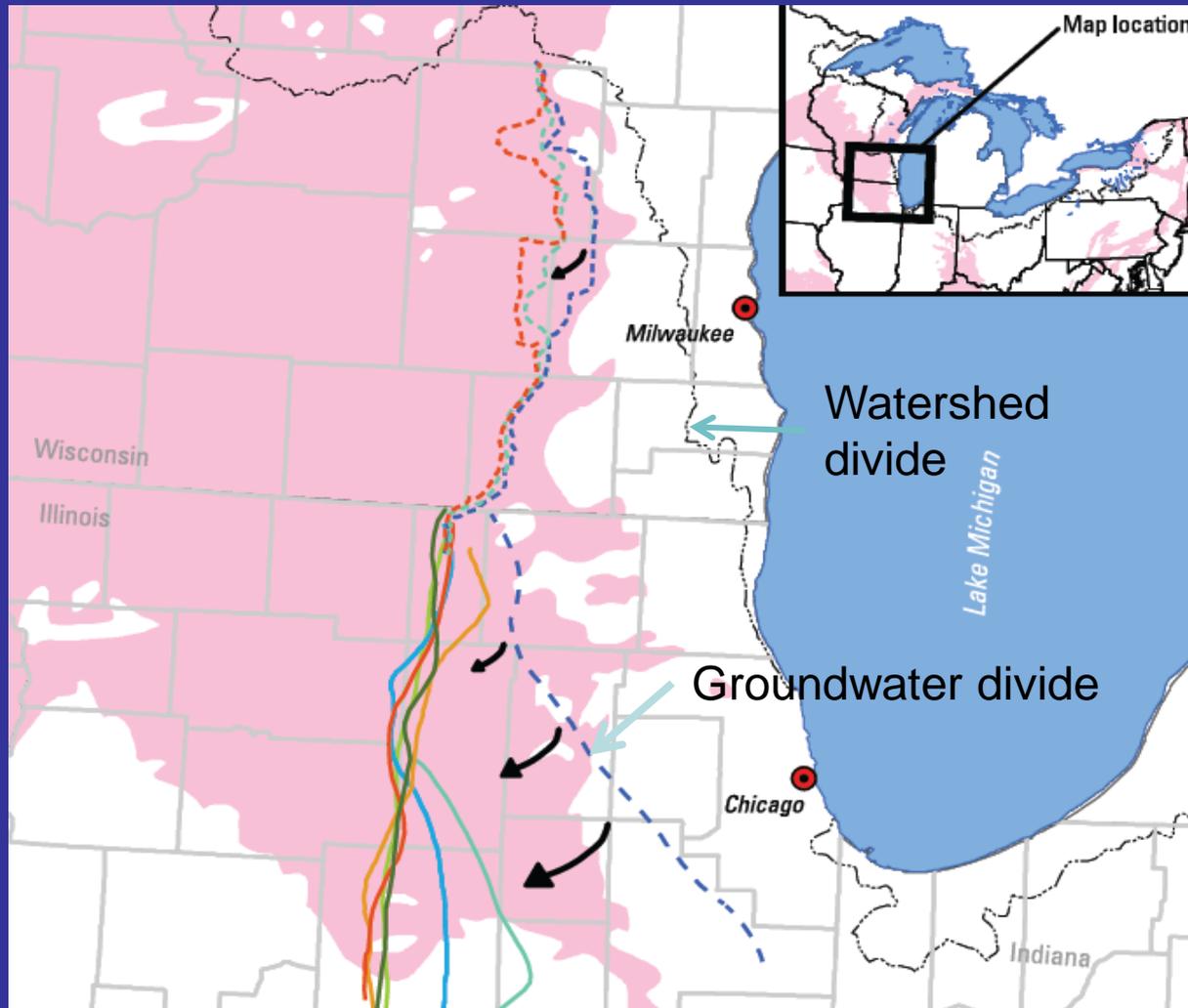
- Develop methods applicable to national program
- Respond to Great Lakes issues—Compact



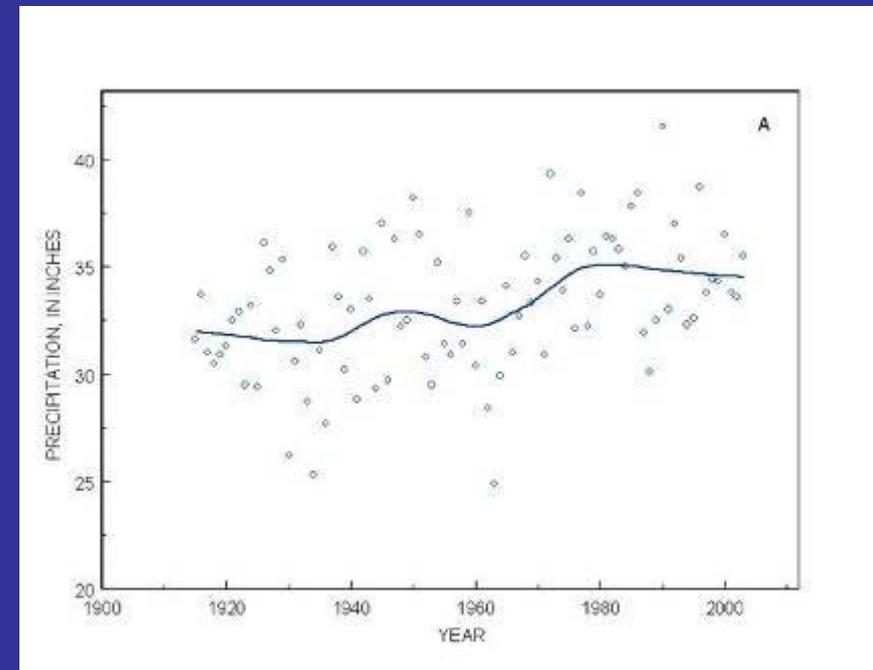
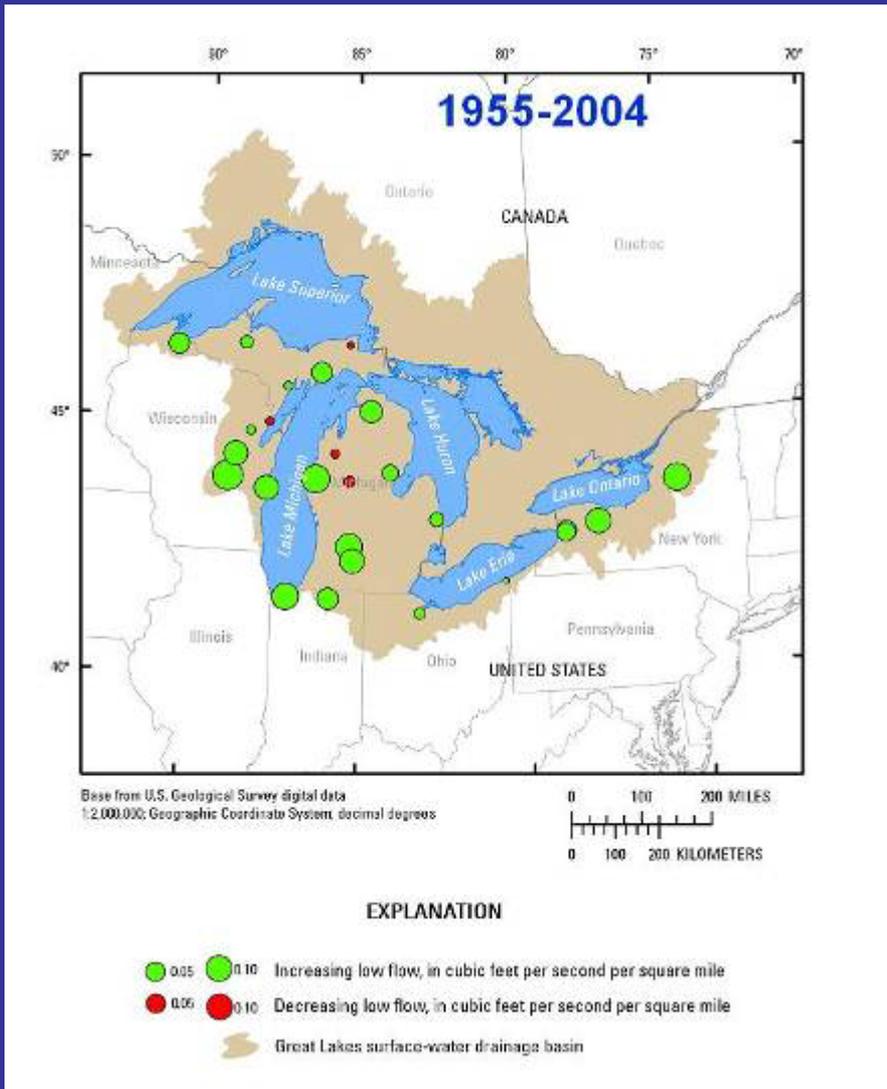
# Regional Recharge



# Groundwater Divides



# HISTORICAL CHANGES IN PRECIP. AND STREAMFLOW



# LAKE-LEVEL VARIABILITY



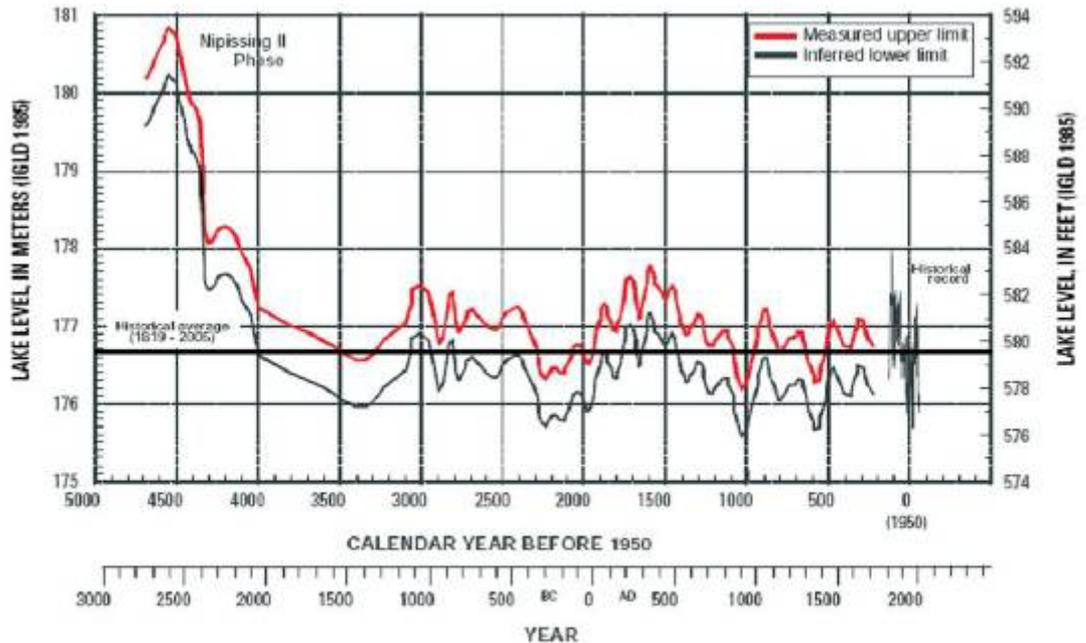
National Water Availability and Use Program

Lake-Level Variability and Water Availability  
in the Great Lakes



Circle 1311

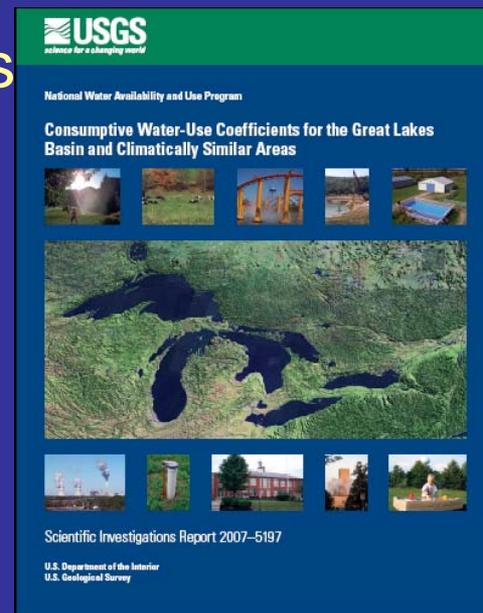
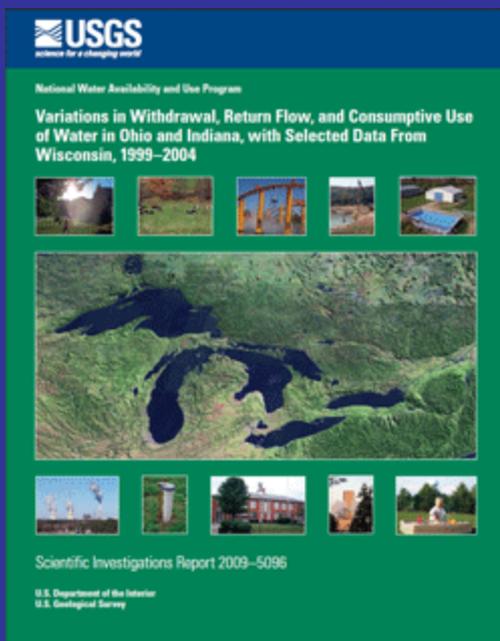
U.S. Department of the Interior  
U.S. Geological Survey



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.

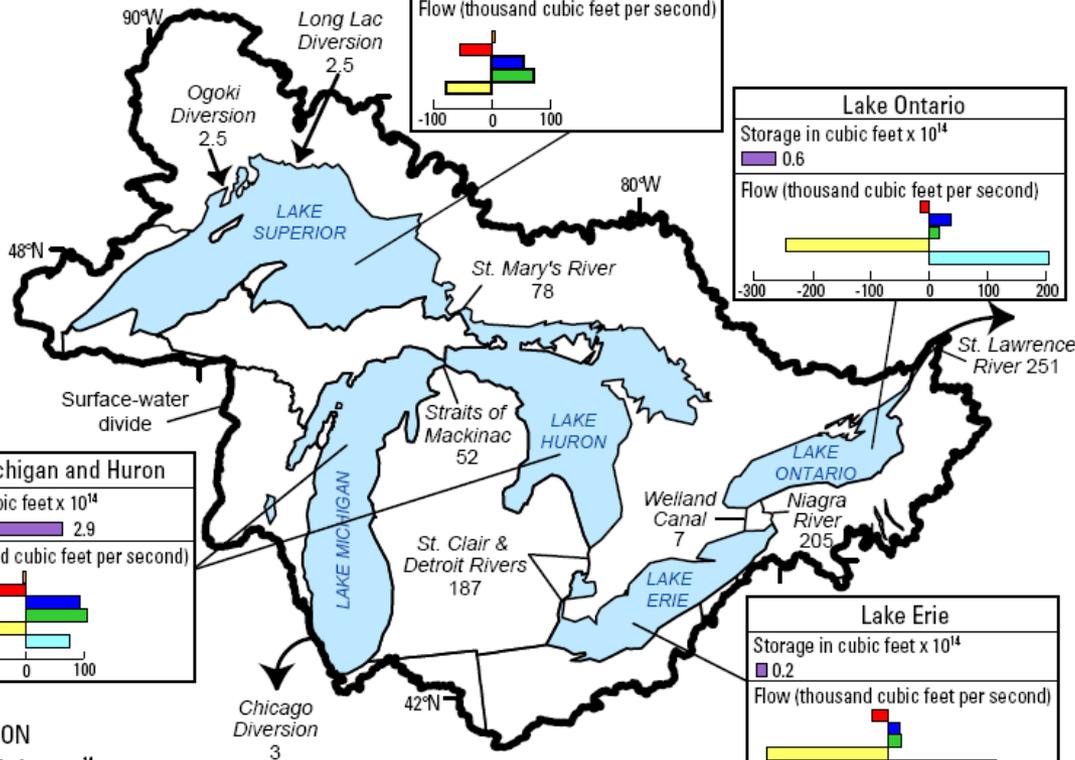
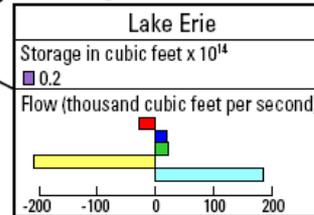
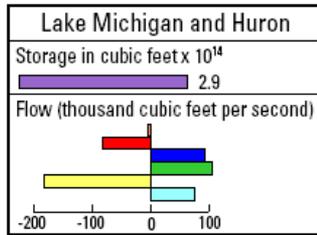
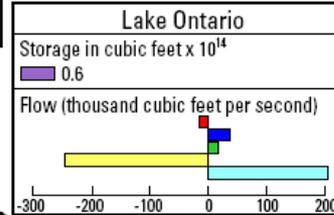
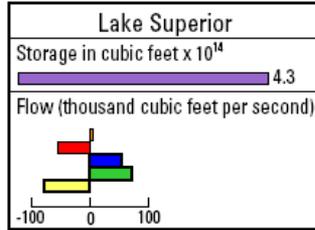
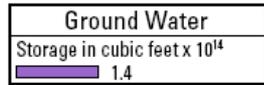
# WATER-USE PRODUCTS

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



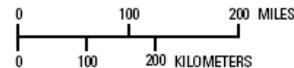
### EXPLANATION

Storage in cubic feet x 10<sup>14</sup>

0 1

Flow into a lake (positive) or out of a lake (negative) in cubic feet per second

- Diversion
- Evaporation
- Runoff
- Direct Precipitation
- Connecting Channel Out
- Connecting Channel In



NOTE:

Numbers beside Rivers and Diversions represent flow in thousands of cubic feet per second

- 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

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

**USGS**  
National Water Availability and Use Program

**Metallurgy in Withdrawal, Return Flow, and Contents of Water in Dike and Inflow, with Collected Data in Wisconsin, 1896-2004**



Scientific Investigations Report 2009-5086  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program

**Consumptive Water-Use Coefficients for the Great Lakes Basin and Climatologically Similar Areas**



Scientific Investigations Report 2007-5197  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program

**Consumptive Water Use in the Great Lakes Basin**

Abstract

Consumptive water use is defined as the volume of water that is withdrawn from a water body and does not return to the water body in the same form and location. Consumptive water use is a critical component of the water balance of a water body and is an important factor in determining the sustainability of water resources. This report provides a comprehensive overview of consumptive water use in the Great Lakes Basin, including a description of the data sources, methods, and results. The report also includes a map of the Great Lakes Basin showing the distribution of consumptive water use.



Scientific Investigations Report 2009-5188  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program—Great Lakes Basin File

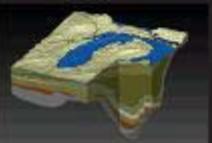
**Application Guide for AFINCH (Analysis of Flows in Networks of Channels) Described by NHDPlus**



Scientific Investigations Report 2009-5188  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program

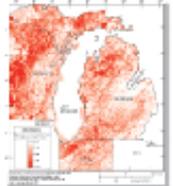
**Hydrologic Framework of Bedrock Units and Initial Salinity Distribution for a Simulation of Groundwater for the Lake Michigan Basin**



Scientific Investigations Report 2009-5260  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program

**Processing, Analysis, and General Evaluation of Wetland Data for the Estimating Hydrologic Parameters of the Global Soil Water in a Cross-Water Model of the Lake Michigan Basin**



Scientific Investigations Report 2009-5188  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program

**Estimates of Ground Water in Storage in the Great Lakes Basin, United States, 2006**



Scientific Investigations Report 2008-5120  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program

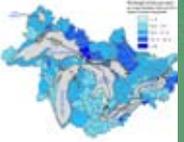
**Compilation of Regional Ground-Water Dividers for Principal Aquifers Corresponding to the Great Lakes United States**



Scientific Investigations Report 2008-5102  
U.S. Department of the Interior  
U.S. Geological Survey

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

**Estimation of Shallow Ground Water Recharge Great Lakes Basin**



Scientific Investigations Report 2005-5294  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program

**Lake-Level Variability and Water Availability in the Great Lakes**



October 2011  
U.S. Department of the Interior  
U.S. Geological Survey

**USGS**  
National Water Availability and Use Program

**Great Lakes Basin Water Availability and Use**  
A Study of the National Assessment of Water Availability and Use Program

Abstract

The Great Lakes Basin is a critical water resource for the United States and Canada. This report provides a comprehensive overview of water availability and use in the Great Lakes Basin, including a description of the data sources, methods, and results. The report also includes a map of the Great Lakes Basin showing the distribution of water availability and use.



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

**USGS**  
National Water Availability and Use Program

**Historical Changes in Precipitation and Streamflow in the U.S. Great Lakes Basin, 1915-2004**



Scientific Investigations Report 2007-5176  
U.S. Department of the Interior  
U.S. Geological Survey



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