Water Availability and Use Science Program

WestFAST
September 24, 2015
WAUSP Objective

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

• Does the Nation have enough freshwater to meet both human and ecological needs?
• Will this water be present to meet future needs?

SECURE Water Act
Public Law 111-11, § 9507 and 9508
Water Availability Analysis

The process of determining the quantity and timing-characteristics of water, which is of sufficient quality, to meet both human and ecological needs.

Types of Information

- **Technical**
  - Socio-economic
  - Legal
  - Regulatory
  - Political
Our Approach

• Water Budgets provide a unifying theme to achieve our goals

Precipitation

+ Flow in

= Evapotranspiration

+ Storage Change

+ Flow out
A Nationwide system to deliver water accounting information

Precipitation
Runoff
Baseflow
ET
Recharge
Surface Storage
Scale Matters

Density of hydrologic unit codes (HUCs) at different levels illustrated by using the 2-digit HUC Region 03.
WAUSP Components

- Expected funding for FY16 is approximately $40M
  - National Water Census (WaterSMART)
    - Topical Studies
    - Focus Area Studies
  - State Water Use Grants
  - Research and Development
  - Cooperative Matching Funds
National Water Census
Focus Area Studies

Existing FAS
- ACF
- Colorado
- Delaware

New FAS (2016)
- Red River
- Upper Rio Grande
- Coastal Carolinas
Information Delivery

- Water Budgets
- Streamflow statistics
- Aquatic biology
- Data and reports

http://cida.usgs.gov/nwc/
Surface Water Models Estimating Flows in Ungaged Basins

Models provide us a means of estimating streamflow for time periods where we don’t have record or places where we don’t have monitoring capabilities.
Assess Groundwater’s role in Water Availability

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

- Recharge
- GW yields
- Changes in storage.
- Trends in GW Indices
- GW/SW Interactions
Evapotranspiration

Water Use Effort: For irrigation water use to estimate consumptive use.

Water Budget Effort: Total ET as a component of the water budget.

Small Watershed Scale
Flows Needs for Wildlife and Habitat

- Classify streams - hydro-ecological type
- Tools to systematically assess ecological affects of hydrologic alteration
- Develop flow alteration – ecological response relationships by “h-e” type
Water Withdrawals by Category, 2010

- Livestock: 1 percent
- Self-Supplied Domestic: 1 percent
- Public Supply: 12 percent
- Thermoelectric Power: 45 percent
- Mining: 1 percent
- Aquaculture: 3 percent
- Self-Supplied Industrial: 4 percent
- Irrigation: 33 percent
Population and Total Withdrawals
1950-2010
Water Use Topical Studies

- Public Supply Inventory and Use
- Irrigation Consumptive Use
- Thermoelectric
- Unconventional Oil and Gas
Public Supply Inventory and Use

- Enhance the nation’s public-supply water information
- Track human water as it moves through systems to use
- Withdrawals and deliveries (annual/monthly)—consumptive use and losses
- EPA Safe Drinking Water Information (SDWIS)

- Multi-year project
- About 56,000 systems
- About 8,000 intakes
- About 128,000 wells
Irrigation Consumptive Use
Satellite Data and ET

Annual and monthly ET from MODIS (1 km)
Watershed and county scale

Monthly ET from Landsat (30 m)
Focus Area Study, field scale
Unconventional Oil and Gas Water Use
Focus Area Studies

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Apalachicola, Chattahoochee, Flint River Basin

- Long term conflict over water continues in the ACF Basin among Alabama, Florida, and Georgia (Supreme Court case: FL vs. GA)

- The Chattahoochee River is the primary source of water supply for the Atlanta Metro Area (~6M population and growing)

- Extensive use of groundwater and surface water for agricultural irrigation is increasing and produces lower than normal streamflows in much of the Flint River Basin

- Apalachicola Bay’s oyster population has seen declines that coincide with the development of water resources upstream in the ACF Basin
Colorado River Basin

- Increasing demand
- Drought conditions
- Water Use (incl. ET)
- Snowpack dynamics; runoff forecasting
- Importance of Groundwater (contribution to streamflow)
12,000 square mile four-state basin provides water to >15 million people.

Export from northern reservoirs provide half of New York City supply.

Supreme Court and River Basin Commission mandated flows.

Mandated reductions in ground-water withdrawals in Philadelphia Region due to declining water levels.

Flow needs for endangered and other riverine species are not well understood.

How will changes in land-use and climate impact all of the above?
Coastal Carolinas

- Ongoing/projected population increases in this land limited coastal region = higher population density and shaper interface between fresh and saltwater ecosystems.
- Frequent Droughts/Hurricanes
- Groundwater Capacity-use Area
- Sea-level rise, land-use change and climate change will impact aquifer water levels and frequency, duration and magnitude of streamflow and salinity intrusion near water-supply intakes.
Red River (of the South):

- Increasing water demands (municipal, Ag.)
- Disruption of aquatic ecosystems
- Drought in Texas

- Water quality
  - Salinity
  - Natural chloride
Recent changes in climate, water demand, and water management are placing increased pressure on the Upper Rio Grande Basin’s limited water resources.
Water Use Data and Research (WUDR) (aka State Water Use Grants)

- The SECURE Water Act authorized a program that will provide financial resources, through cooperative agreements with State water resource agencies.

- Funding should be used to improve the availability, quality, compatibility and delivery of water use data that is collected and/or estimated by States.

- Data must be integrated with appropriate datasets that are developed and/or maintained by the USGS.
WUDR, cont.

- $12.5 million over 5 years
- $1.352 million for FY 2015
- Each State $26,000 to write workplan
- $1.5 million for 2016 and beyond (pending)
- Competitive process
- $250,000 State limit
- Grant Program Guidelines provided
WUDR, cont.

- Interstate Council on Water Policy hosting 3 stakeholder meetings
  - Salt Lake City Utah – September 17, 2015
  - Tuscaloosa, Alabama – October 15th, 2015

- Encourages cooperation and collaboration between State agency and USGS to improve and build better water-use databases.

- Tiered criteria for major categories in guidelines.

- Ultimate goals for site-specific, watershed (HUC 8) and aquifer-based data, including improved consumptive use.