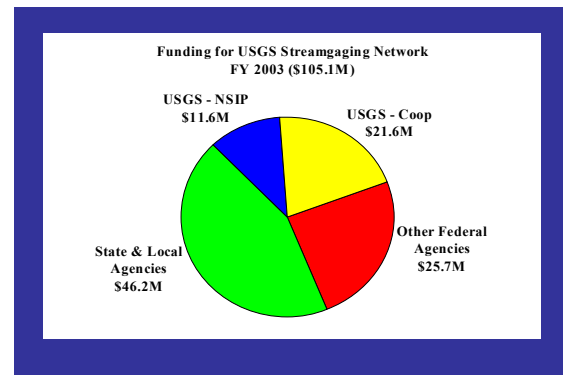
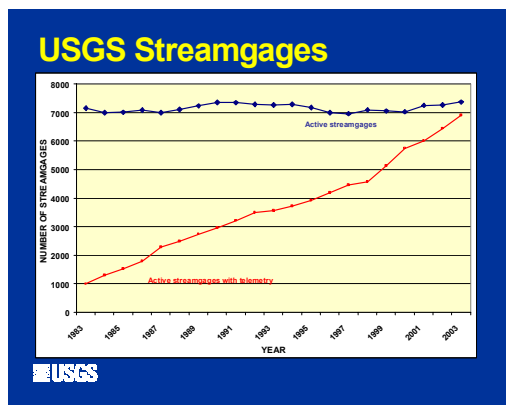


STREAMGAGE FUNDING CAMPAIGN

STREAMGAGE PROGRAM BACKGROUND. At the core of the national streamgaging network of more than 7400 gages operated by USGS is a set of federally funded streamgages strategically positioned across the country that are continuously operated to fulfill five national priorities (described below). This federal “backbone” network is designed and will be developed to assure a long-term set of streamgauge information that will be delivered in real time, without the risk of changing support from funding partners. In addition to operating this federally funded base network, the USGS also operates the Cooperative Water Program (sometimes referred to as the “CWP,” including approximately 4200 of the 7000 gages) with support from over 1400 partners. These additional streamgages provide the breadth and depth of coverage needed by the ever-growing community of data users to meet a broader set of federal, state, tribal, and local needs.

This BACKGROUND discussion will review the importance of water data in assessing national and regional water supplies, preparing for floods and droughts, managing fisheries and wildlife habitat and developing better assessment and management methods before describing the design and development of these two gaging networks.



The Importance of Water Data. Some policy makers are thinking that the measurement of basic data concerning our water resources is less important than other priorities for funding in these tight budget years. Before you decide to agree or disagree, consider the parallel between collection of this data and the collection of data needed to assess other risks and vulnerabilities.

Drought may be the most obstinate of the dramatic natural events that we face because it can last longer and affect larger areas than hurricanes, tornadoes, floods, volcanoes and earthquakes. At its more extreme occurrences, drought creates vast dust bowls—eroding the landscape, causing hundreds of millions of dollars in business and property losses, damaging wildlife habitat and creating widespread conditions for wildfire. Drought brings hardship to water-dependent enterprises such as farming, beverage producers, commercial and recreational fishing, marinas, river outfitters and guides, ski resorts, landscapers, golf courses, and water theme parks. In small communities, downturns in farming, ranching, and recreation have a devastating effect. In many parts of our country, drought requires tough decisions regarding allocation of water and requires stringent water-use restrictions. Drought causes problems in ensuring safe and adequate drinking water supplies for municipal use and rural fire-fighting efforts. In many large river basins, such as the Columbia, Missouri, Colorado, Delaware, Potomac, the Apalachicola-Chattahoochee-Flint and other interstate rivers, drought causes or exacerbates uncertainty (and litigation) about who should get water.

The [National Drought Mitigation Center](#), established in 1995 at the University of Nebraska–Lincoln, estimates that 12% of the US, on average, is in severe drought each year. With the monitoring, prediction and prevention programs currently in place, we suffer between \$6B - \$8B in damage and loss annually, primarily in agriculture, transportation, recreation and tourism, forestry, and energy sectors. Most of the social and environmental impacts identified above are not included in this estimate due to the difficulty evaluating the cost for these impacts, but they are very substantial, too. Our vulnerability to drought is the result of many factors, including population growth and demographic shifts, urbanization, environmental awareness, water use trends and technology, government policy, and social behavior, all of which are changing in different ways and at different rates in different parts of our country.

The National Drought Policy Commission Report, [Preparing for Drought in the 21st Century](#), May 2000, concluded that intelligent preparation, especially comprehensive planning and mitigation measures, can decrease the impact on communities and the economy and can reduce the cost of future emergency relief. The USGS streamgaging and water quality networks were specifically identified in that Report, along with four networks at the Departments of Agriculture and Commerce, among the most critical observation programs because basic weather, water, soil moisture and mountain snow accumulation provide the foundation for the monitoring and assessment activity that alerts our communities and businesses and enables them to reduce the recurring risk of drought.

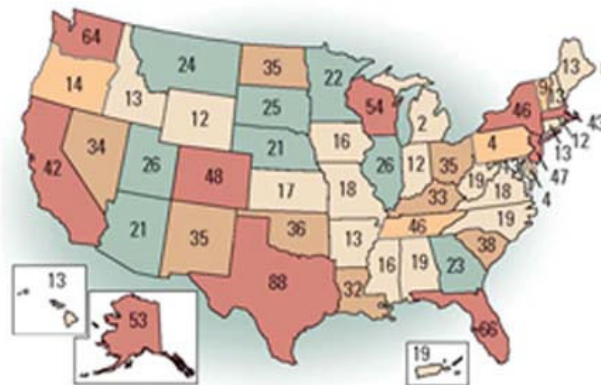
Flooding resulting from severe storms and other causes was the most frequently declared type disaster in 1990-1999, according to [FEMA](#), who committed more than \$7.3 billion of federal taxpayers' funds in response and recovery funding during those ten years. The most costly of these were the Midwest Floods in 1993 (\$1.17 billion) and the Red River Valley Floods in 1997 (\$730.8 million). Among other major flooding events, at least ten required more than \$100 million in FEMA funding during the 1990s; these included the Northeast Coastal Storms in 1992; the Arizona Floods in 1993; the Houston Floods in 1994; the New Orleans Floods in 1995; the Mid-Atlantic and Pacific Northwest Floods in 1996; the Ohio River Valley Floods in 1997; the Texas Floods in 1998; and the California Floods in 1993, 1995 and 1998. A major cause of damage from hurricanes is flooding, often far inland from the coast. For example, in 2004 the four hurricanes that caused major damage in Florida and the Gulf Coast proceeded north to cause flooding in Ohio that resulted in 21 Ohio counties being declared Presidential Disaster areas, with damage in the hundreds of millions of dollars.

Over 20,000 communities in the nation are at risk to flooding. In order to reduce federal disaster expenses, those communities have agreed to guide future development and re-development to reduce flood risk. These communities need sufficient data to map those portions of their area that are subject to the greatest risk of flooding. Calculating that flood risk requires streamgage information from long-term gage stations. Streamgages that are unreliable or do not have adequate records will underestimate the flood risk, especially in rapidly developing watersheds. The result: homes, schools, businesses and other structures get flooded (and repaired) too often.

These damage summaries demonstrate that we suffer somewhere between \$10B and \$25B in flood and drought damage every year, not counting the social and environmental damage that is not as easy to quantify. Investing just 10% of those amounts, maybe \$1.5B to \$2B) each year to anticipate and avoid more of that destruction and loss of opportunity is easily justified. Letting our gaging networks and scientific intelligence continue to degrade is inexcusable.

The Cooperative Water Program (CWP) was organized about 110 years ago to coordinate and gain efficiency with the funds available through the many local, state and federal agencies. The [USGS](#) maintains this Program and their website is very helpful.

The [CWP](#) is a partnership of the USGS with approximately 1,400 state, local, and tribal agencies. The USGS and the Cooperators sign joint-funding agreements to share the cost of specific data collection and investigations undertaken by the USGS.



The CWP funds 65% of the USGS streamgaging network, along with collection of ground-water and water-quality data, and about 300 interpretive studies each year and covers the salaries and expenses for about 40% (1200+) of the USGS Water Resources Discipline field staff.

The Cooperative Water Program supports the collection of basic hydrologic data, studies of specific water-resources problems, and hydrologic research. In 2003, for example, Program funds supported about 4,200 stream-gaging stations (of approximately 7000 in the overall national network of gages) and approximately 750 interpretive projects targeted at specific issues, such as the effects on the quality and quantity of the Nation's water resources of urbanization, dam removal, agricultural practices, and energy development.

Since the data collected in the Cooperative Water Program are directly comparable at the local, regional, and national levels, large-scale syntheses and application of these data to pressing societal and environmental issues are possible. Examples of these syntheses include using historical streamflow information to evaluate regional drought and climate variability, and developing a technique for estimating time of travel for rivers, which provides information for estimating the arrival time for flood waters and chemical spills.

More recently, data from Cooperative Water Program interpretive projects continue to contribute significantly to emerging water-resources issues across the Nation. Examples include

- an improved understanding of the links between land-use changes and the physical habitat of streams ([USGS Circular 1175](#)),
- the behavior of freshwater-saltwater interactions in ground-water environments along the Atlantic coast ([USGS Circular 1262](#)), and

- the role of science in managing ground-water resources ([USGS Circular 1247](#)).

Hydrologic data and results of interpretive projects are published as USGS reports, which are publicly available. In addition, more and more projects result in Internet products ranging from descriptive home pages and online reports, to interactive interfaces that allow users to run predictive models and conduct sophisticated statistical analyses by using data available online. Results from many of these interpretive projects, which are local or regional in scope, have broad transferability to other parts of the Nation where similar water-resources issues exist.

Identifying a national streamgaging network for the future. Data collected by the Cooperative Water Program are incorporated into the National Water Information System (NWIS). The NWIS contains hydrologic information collected by the USGS during the past 120 years. It includes streamflow data from 21,000 sites, water levels from over 1,000,000 wells, and chemical data from rivers, streams, lakes, springs, and ground water at 338,000 sites.

In 1997, the Interstate Council on Water Policy (ICWP) and others began to investigate alternative ways to secure sufficient streamflow information within the programs of the USGS. This inquiry recognized the need to review and clarify the purposes of streamgages throughout the national system and to reassign responsibility for operating and maintaining those gages to the most direct beneficiaries. In some cases, for example, gages supported by the Cooperative Program were mainly operated to satisfy national interests and needs. Conversely, there were a number of gages which were not of high utility to non-federal users.

The ICWP sought to redefine the relationships of the USGS, other federal agencies and the non-federal cooperators in securing long-term streamflow information. This led to the creation of a Streamgaging Task Force in 1995 associated with the Interior Department's Advisory Committee on Water Information (ACWI). The Task Force identified the goals of the existing stream gaging network and evaluated progress toward their achievement. As part of their review, the ICWP held a series of workshops to get input from other Cooperators on the condition of the gaging network, future goals and purposes of streamgaging, and considerations in formulating a national streamgaging network for the future. Input was also provided on delineation of the appropriate responsibility for financially supporting components of this network.

The Federally Funded Base Network. In 1998, the Congress expressed its concern over the limited ability of the USGS streamgaging programs, noting a steady decline in number of stations over the past decade. In the face of growing communities and the diversity of water needs across the 50 states, effective long-term water resource management (including interstate and international rivers) and the protection against future floods and droughts have become essential to the protection of our families, businesses and communities. This is as obvious now among the eastern states as it is among western states and the Congress has alert to the resulting risk for many years.

In November 1998, the USGS reported to Congress that the streamgaging networks across the nation were losing the ability to meet longstanding goals for the scientific information to support intelligent water resource management and preparation for floods and droughts. The long-term reliance on cooperative funding from both federal and non-federal sources has proven disruptive for some essential national purposes (although important regional or local purposes were better served). The result of shared funding decisions has been a disproportionate loss of gages with long periods of record and inability of USGS to operate national-priority gages where state, tribal or local agencies shifted their funding to other priorities.

Therefore, the USGS proposed in 1999 that a new strategic component be added to the National Streamflow Information Program (NSIP) to assure we can meet these national needs for data collection and delivery. A federally funded subset of the USGS gages was proposed as a base network to represent the "backbone" of the measurements for long-term, national purposes. To assure that Congress, the federal agencies and the rest of the nation will have reliable access to reliable measurements of interstate and international waters, river basin and sentinel watershed outflows and water quality, Congress authorized this addition to the NSIP to be funded entirely with federal funds appropriated to the Interior Department for the USGS.

The gages and monitoring wells in this network are considered the most important for long-term, national uses in weather and flood alerts and monitoring stream flows across international, interstate and the most important watershed boundaries. The USGS now operates and maintains a portion of this Program with funding from Congress to provide data needed to meet five specific sets of responsibilities:

- **Interstate and International Waters** - Interstate compacts, court decrees, and international treaties require accurate, long-term, and unbiased measurement at specific sites, including statelines and international boundaries;
- **Streamflow Forecasts** - Real-time stage and discharge data are required to support flood forecasting by the National Weather Service across the country;
- **Sentinel Watersheds** - A network of streamgaging stations is needed to identify the influence of recent and future changes in climate, land use, and water use in 800 watersheds across the country that are relatively unaffected by flow regulation or diversion and typify major ecoregions and river basins;
- **River Basin Outflows** - Resource managers need to account for the contribution of water from each of the Nation's 350 major river basins to the next downstream basin, estuary, ocean or the Great Lakes; and
- **Water Quality** - Streamgaging information is needed to support three national water-quality networks (one that covers the Nation's largest rivers, one for intermediate-sized rivers and a third for small, pristine watersheds).

The National Academy of Sciences recently completed [a review of the USGS's plan for NSIP](#) that concluded NSIP was "a sound, well conceived program that meets the nation's needs for streamflow measurement, interpretation, and information delivery" (The National Academia Press, 2004, Assessing the National Streamflow Information Program).

For additional information on the [National Streamflow Information Program](#), contact the program coordinator, [J. Michael Norris](#), 603-226-7847.

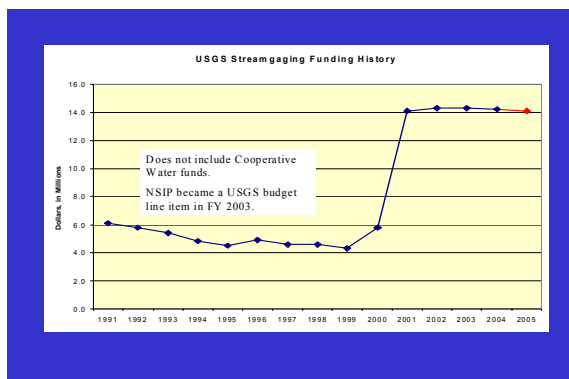
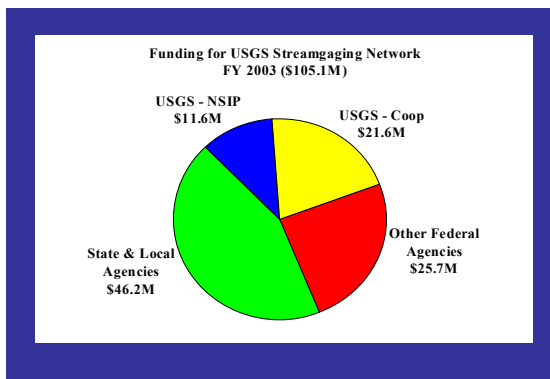
FUNDING & COST OF THE PROGRAMS.

Recent Funding History for USGS National Streamflow Information Programs

Cooperative Water Program

Fiscal Year	Federal Appropriated Funds	Cooperator Funds	Total Available Funds	100% Federally Funded "Base Network"
1999	58.0	107.6	165.6	4.3
2000	60.5	112.9	173.4	5.8
2001	62.7	123.2	185.9	14.1
2002	64.3	130.0	194.3	14.3
2003	64.4	137.3	201.7	14.2
2004	64.0	138.0	202.0	14.2
2005	62.3	138.0	200.3	13.8
2006	63.8	138.0	201.8	14.2

Note: All funds are presented in \$Millions. Cooperator funds for 2005 and 2006 are estimated. 2006 appropriations are based on the House and Senate marks, which agree with the President's request.



Cooperative Water Program. Funding since 1999 is shown in the table above. These records indicate that, while funding commitments from the state, tribal and local Cooperators increased 28%, federal funding for the Cooperative Water Program increased only 10% between 1999-2006. This continues a trend over the past decade in which federal funding increased 19% while the Cooperators' funding has increased 279%.

The President's proposed budget (which both the House and Senate have approved) for next year (FY-2006) includes a 2.3% increase in federal funding for the Cooperative Water Program (from \$62.34M to \$63.77M), which must absorb a \$1.71M increase for pay raises and other uncontrollable operating costs, resulting in a \$280,000 decrease in program funding. When adjusted for other costs of inflation, this continues the pattern of declining purchasing power and leaves the Cooperators to provide over 2/3 (68%) of the available funding while we continue losing important streamgages.

These budget figures reflect the total available funds, not the cost to collect the data we actually need! 2005 estimates of the cost to bring the Cooperative Program gages up to date, collect all the measurements we consider essential in light of our growing needs (domestic, industrial, agricultural, ecological, recreational, etc.) and maintain the streamflow records that we already have, indicate that the Cooperative Water Program needs a federal appropriation of approximately \$103M this year and \$95M per year (indexed to keep up with the cost of inflation) to operate and maintain it. Probably, the extension of this network can be accomplished over a longer period of 5 or more years, but the current level of federal funding (\$63.8M) is obviously inadequate, causing a significant and growing problem that the state, tribal and local Cooperators will confront one way or the other!

You can find out about the [Cooperative Water Program](#) gages in your state from the USGS.

Federally Funded Base Network (also referred to sometimes as the “National Streamflow Information Program.” Faced with documentation of the loss of critical gages and the USGS recommendation for establishing a federally funded base network of streamgages in 1999, Congress has appropriated an additional \$8.3M beginning in 2001 to add gaging stations to the existing network necessary to meet the national goals identified for the NSIP.

You can find out about the federally funded base network gages in your state from the [USGS](#).