National Water-Quality Assessment (NAWQA) Program

NAWQA, 1991–2001

The surface-water fixed site monitoring network of the Cycle 1 study units accounted for 60 to 70 percent of the Nation's water use and population served by public water supplies and covered about half of the land area of the United States. A broad suite of physical, chemical, and biological constituents was selected on the basis of relevance to water-quality issues. A fixed-site design with periodic rotational sampling allowed the National Water-Quality Assessment (NAWQA) Program to collect data at regular intervals and document trends. In Cycle 1, 505 surface-water sites were sampled in 3-year, intensive, water-quality sampling periods according to the original design.

Learn more from Gilliom and others (2001).

NAWQA, 2002–2012

The second cycle of water-quality monitoring (Cycle 2) began in 2002 and extended to the end of Federal fiscal year 2012. Of the 505 stream sites monitored in Cycle 1, 145 were selected for annual trends monitoring at the start of Cycle 2 (2002–12). However, by 2005 available funding could only support monitoring of 84 sites annually, which lasted about 2 years until 2007. From 2007 to 2012, NAWQA maintained 113 sites at the expense of an annual sampling strategy; a rotational design has been employed, whereby most of the sites were sampled 1 of every 4 years. Twelve large river integrator sites—sites on large rivers that drain significant agricultural and urban areas—were sampled yearly. All Cycle 2 sampling sites were selected from Cycle 1 sites for NAWQA to preserve and maintain a long record of consistent data that is useful for trend analysis.

National Stream Quality Accounting Network (NASQAN) Program

NASQAN, 1974–1995

The major impetus for establishing the National Stream Quality Accounting Network (NASQAN) program in 1974 was to develop a baseline water chemistry dataset that was long term and systematically collected throughout the Nation. The original network consisted of more than 500 stations sampled at monthly intervals. Measured constituents included nutrients, major ions, and suspended sediment. Over time, the program was constrained by budget cuts, and corresponding reductions were made in sampling, in terms of numbers of stations and frequency of sampling. By 1994, the program was limited to quarterly sampling at approximately 275 stations.

Data were collected at uniform time intervals, without concern for the hydrologic patterns of high or low flow, and therefore provide a fairly representative description of conditions on any given day. These data are appropriate for trend detection and can be used for load estimation only if a sufficient number of years are considered together so as to cover a broad range of discharges.

Additional water-quality monitoring was conducted by the Hydrologic Benchmark Network (HBN), which was established in 1963. This program focused on relatively small and minimally disturbed watersheds. It provides data that are used to evaluate trends in water quality over time and serves as a control for distinguishing natural variability in small streams from effects caused by human activity.

NASQAN and HBN Station Map
1974–1995 Data and Summary (DDS 37)

NASQAN, 1996—2000

After a major redesign in 1995, the NASQAN program focused on monitoring the water quality of the Nation's largest rivers—the Mississippi (including the Missouri and Ohio), the Columbia, the Colorado, and the Rio Grande. During this phase of the program, NASQAN operated a network of approximately 41 stations where the concentrations of an expanded range of chemicals, including pesticides and trace elements, were measured in tandem with stream discharge. Stations were chosen at major nodes within the river basin network to provide characterization of large subbasins of these rivers.

The sampling strategy was changed to focus on characterizing the variations in chemical and sediment concentrations that occur during a year, particularly the variations that occur between low and high flows and during different seasons. Because of this sampling strategy, NASQAN data can be used to evaluate mass fluxes or loads of constituents to determine regional source areas for these materials.
NASQAN, 2001–2007

In 2001, the NASQAN program entered a five-year special study phase. This effort included substantially decreased sampling in the Colorado and Columbia Basins and redirected resources from that sampling to an intensive sampling program in the Yukon Basin. All sampling in the Colorado and Columbia basins was discontinued except at one or two downstream index stations. In the Yukon Basin, fixed-station monitoring to determine constituent fluxes was supplemented with a series of synoptic cruises. These synoptic cruises were designed to provide baseline data on organic-carbon dynamics in response to the melting of permafrost in the Arctic.

During this period, sampling continued mostly unchanged in the Rio Grande Basin. In the Mississippi River Basin, the station on the Missouri River at Pierre, South Dakota, was moved to the Missouri River at Yankton, South Dakota. New stations were added on the Ohio River at Sewickley, Pennsylvania, and the Cumberland River at Smithland, Kentucky, in 2001. Four stations were added to the lower Mississippi and Atchafalaya River Basin in Louisiana later in the period (the Mississippi River at Baton Rouge in 2004, the Mississippi River at Belle Chase, the Atchafalaya River at Morgan City, and Wax Lake Outlet at Calumet, in 2006).

NASQAN, 2008–2012

Objectives

The first objective for NASQAN during 2008 to present is to address questions about the annual transport of selected constituents from selected large rivers to coastal waters of the United States. These questions include the following:

- What are the concentrations and loads of nitrogen, phosphorus, carbon, silica, dissolved solids, selected pesticides, and suspended sediment discharging to coastal waters of the United States?
- How do concentrations and loads of these constituents change through time?

The second objective for NASQAN during 2008 to present is to address questions specific to the Mississippi-Atchafalaya River Basin related to hypoxia in the Gulf of Mexico. These questions include the following (in addition to questions A and B listed under the first objective):

- What are the seasonal loads of total and dissolved nutrients from the Mississippi River Basin to the Gulf of Mexico?
- What are the concentrations and loads of constituents in major subbasins and selected smaller basins within the Mississippi River Basin?
- How do concentrations and loads of constituents change through time in major subbasins and selected smaller basins within the Mississippi River Basin?

Subnetworks

NASQAN was divided into two subnetworks; a Coastal subnetwork and a Mississippi-Atchafalaya River Basin subnetwork. Examples of Coastal network river stations are those on the Altamaha River, Atchafalaya River, Mississippi River, Potomac River, St. Lawrence River, Susquehanna River, and Yukon River. Together, NASQAN Coastal rivers in the conterminous United States contribute approximately 80 percent of the total discharge of streamflow, nitrogen, phosphorus, and suspended sediment to coastal waters from this part of the United States.

NASQAN Mississippi-Atchafalaya River Basin river stations include two on the Ohio River, three on tributaries to the Ohio, two stations on the Missouri River, one on a tributary to the Missouri River, five stations on the Mississippi River, five stations on rivers tributary to the Mississippi River (excluding the Missouri and Ohio), and two stations on the Atchafalaya River.

In addition to the stations operated by the NASQAN program, several stations with the same objectives are operated as part of the National Monitoring Network (NMN) (National Water-Quality Monitoring Council, 2013). Three of these stations are on coastal rivers (Hudson, Apalachicola, and Brazos) and one is on the Mississippi River.

References Cited
