WATER FACT SHEET

U.S. GEOLOGICAL SURVEY, DEPARTMENT OF THE INTERIOR

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM—The Hudson River Basin

In 1991, the U.S. Geological Survey (USGS) began to implement a full-scale National Water-Quality Assessment (NAWQA) program. The long-term goals of the NAWQA program are to describe the status of and trends in the quality of a large, representative part of the Nation's surface- and ground-water resources and to identify the major natural and human factors that affect the quality of these resources. In addressing these goals, the program will produce a wealth of water-quality information that will be useful to policy makers and managers at the national, State, and local levels.

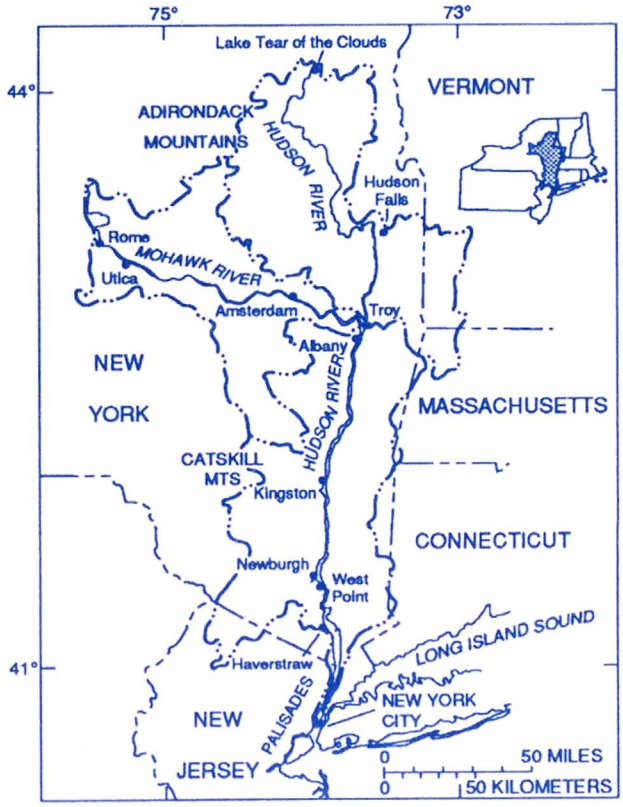
A major asset of the NAWQA program is that it will allow for the integration of water-quality information collected at several scales. A major component of the program is the study-unit investigation, the foundation on which national-level assessment is based. The 60 study units are hydrologic systems that include parts of most major river basins and aquifer systems. These study units cover areas from 1,200 to more than 65,000 square miles and represent 60 to 70 percent of the Nation's water use and population served by public water supplies. In 1991, the Hudson River basin was among the first 20 NAWQA study units selected for study under the full-scale implementation plan.

STUDY UNIT DESCRIPTION

The 13,400-square-mile Hudson River basin lies almost entirely (93 percent) within New York State, but includes parts of Vermont (3 percent), Massachusetts (2 percent), New Jersey (2 percent), and Connecticut (less than 1 percent). The basin is divided into three parts, the upper and lower Hudson River and Mohawk River basins, because the areas differ significantly in hydrologic characteristics. The upper Hudson River has a drainage basin area of 4,590 square miles. The source of the Hudson River is Lake Tear of the Clouds, a small lake in the Adirondack Mountains 4,322 feet above sea level. The river flows south-southwest out of the mountain region through primarily forestland. At Hudson Falls, the river includes flow from several tributaries and has dropped to an elevation of about 200 feet above sea level. From Hudson Falls to Albany, the river is maintained for commercial traffic at a depth of about 12 feet. From Hudson Falls south, the river flows through forest and farmland to its confluence with the Mohawk River near Troy.

The Mohawk River drains 3,500 square miles and is the largest tributary to the Hudson River. Its average flow (near its mouth) is 5,670 cubic feet per second. The Mohawk flows east-southeast from near Rome through mainly forest and farmland, although it passes some industrial areas east of Amsterdam.

The lower Hudson River begins at the Federal Dam at Troy just downstream from the confluence with the Mohawk. Average flow at the Federal Dam is 13,600 cubic feet per second; daily average flow has been as high as 152,000 cubic feet per second and as low as 882 cubic feet per second. The entire 154 miles of the lower Hudson River is tidal and can undergo a reversal in the direction of flow four times a day. The mean water elevation at



Drainage divides of the Mohawk and upper and lower Hudson River basins.

Albany is 2 feet above sea level, and the average range in tide is about 4 feet. The lower Hudson river is maintained at a depth of at least 32 feet for commercial traffic from the port of Albany to New York City, but is as deep as 200 feet in places. The lower Hudson River flows south through farmland for 60 miles, but passes through some industrial areas before entering the Hudson Highlands area where it flows through a deep, narrow channel with steep banks and forested mountain slopes. The river then widens near Haverstraw where it attains a width of 3.5 miles before narrowing as it passes the cliffs of the Palisades and continues south to upper New York Harbor. The lowermost part of the basin has a far greater percentage of residential, commercial, and industrial land than does the rest of the basin.

Average annual precipitation in the basin is 40 to 48 inches, average annual runoff is 18 to 24 inches, and the average annual temperature is 47 degrees Fahrenheit, although these figures vary significantly from the northern to the southern end of the basin. The basin is about 50 percent forested; 15 percent agricultural; 5 percent residential, commercial, or industrial; and 30 percent other uses. The basin includes parts of the Adirondack and Catskill Parks as well as many smaller State parks and national historic sites.

Most major aquifers in the basin are primarily surficial sand and gravel deposits. Many of these aquifers cover small areas and have little or no hydraulic connection with other aquifers. Five aquifers have been designated primary water-supply aquifers by the State; one of these, the Schenectady aquifer, has been designated a sole-source aquifer by the U.S. Environmental Protection Agency (EPA). The upper Hudson River basin is underlain almost entirely by igneous and metamorphic rock. Bedrock in the Mohawk River basin is mostly limestone, shale, and shaley sandstone. The bedrock throughout much of the lower Hudson River basin is similar to that in the Mohawk basin, but includes some areas of igneous and metamorphic rock as well as some sandstone.

WATER USE

In 1985, about 4.2 million people were served by public water supplies (12 percent from ground water and 88 percent from surface water). These figures do not include private wells. Nearly 60 percent of the water supplied in the basin is for commercial or industrial use. Several reservoirs within the Hudson River basin contribute to the New York City water-supply system, which supplies water for about 8 million people.

MAJOR WATER-QUALITY ISSUES

Some major water-quality issues that face local and State water-resources managers include:

- Polychlorinated biphenyl (PCB) contamination of the bottom sediments in the upper Hudson River, subsequent release of PCBs to the river water, and accumulation of PCBs in the food chain. The EPA has designated part of the Hudson River a Superfund site because of the PCB contamination.
- Point and nonpoint sources of hazardous chemicals, including urban and agricultural runoff, in sections of the upper and lower Hudson and Mohawk Rivers. A national goal of NAWQA is to study the occurence of and trends in pesticide contamination.
- Point and nonpoint sources of nutrients, particularly in tributary basins with agriculture or rapid urban growth. Another national goal of the NAWQA program is the study of rivers contaminated by nutrients and sediment.
- Salinity of the lower Hudson River as it relates to use for public supply and to aquatic and wildlife habitats. The Hudson River contains 35 areas designated as significant habitat, including important spawning grounds for the east coast fisheries.
- Effects of acid rain on poorly buffered streams and lakes in stream headwaters and tributary basins.

The entire lower Hudson River is included in New York State's Estuary Management program. The river flows into New York Harbor, which is part of the New York/New Jersey Estuary Management program (EPA's National Estuary Management program). One goal of the NAWQA program is to identify some of the pollutants entering sensitive estuaries.

COMMUNICATION AND COORDINATION

Communication and coordination between the USGS and other scientific and water-management organizations are critical components of the NAWQA program. Each study-unit investigation will have a local liaison committee consisting of representatives from Federal, State, and local agencies, universities, and the private sector who have water-resources responsibilities. Specific activities of each liaison committee will be to exchange information on water-quality issues of regional and local interest; identify sources of data and information; assist in the design and scope of project elements; and review project planning documents and reports. The liaison committee for the Hudson River basin study unit will be formed in 1991.

Additional information on technical reports and hydrologic data related to the NAWQA program can be obtained from:

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Open-File Report 91-166 W.O. Freeman, 1991

U.S. GOVERNMENT PRINTING OFFICE: 1991 0—865-382