INTRODUCTION

Effective management of the Nation's water resources requires an understanding of hydrologic systems and the factors that determine the availability, distribution, and quality of water. Within the Federal Government, the U.S. Geological Survey (USGS) has the principal responsibility for providing hydrologic information and for appraising the Nation's water resources. The water-resources activities of the USGS are diverse, ranging from individual research investigations of specific aspects of the hydrologic cycle to large programs of regional water-resources investigations such as the National Water-Quality Assessment Program or the operation of nationwide water-data networks.

The USGS provides the hydrologic information needed by others to help manage the Nation's water resources. To accomplish this mission, the USGS cooperates with State and local governments and other Federal agencies in many data-collection and research activities.

For more than 80 years, the Federal-State Cooperative Program in North Carolina has been an effective partnership that provides timely water information for all levels of government. The cooperative program has raised awareness of State and local water problems and issues and has enhanced transfer and exchange of scientific information. Although most studies conducted within the cooperative program address local and State problems, results are of national interest and significance because of their application in other areas of the country.

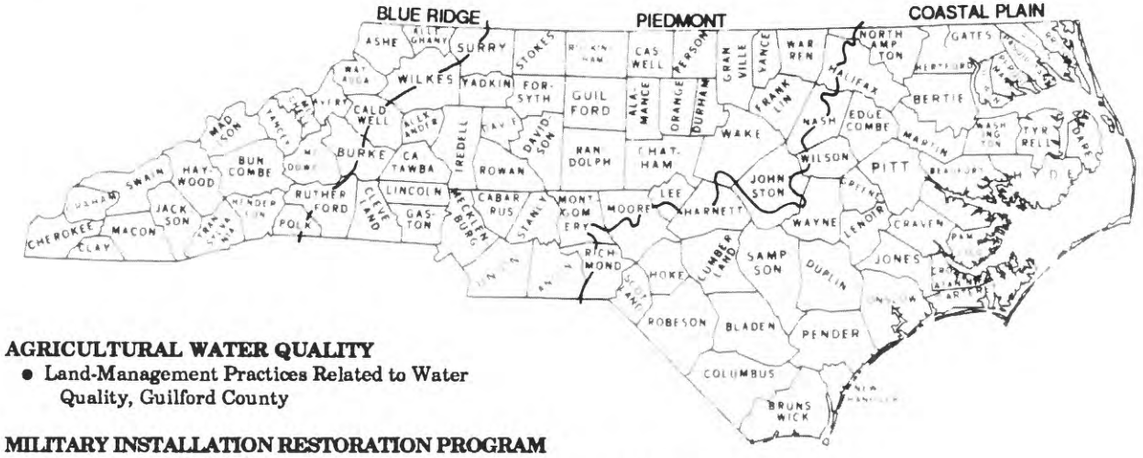
The USGS conducts statewide water-resources investigations in North Carolina that include hydrologic data collection, applied research studies, and other interpretive studies. These programs are funded through cooperative agreements with the North Carolina Departments of Environment, Health, and Natural Resources; Human Resources; and Transportation, as well as more than a dozen city and county governmental agencies. The USGS also conducts special studies and data-collection programs for Federal agencies, including the Department of Defense, the U.S. Soil Conservation Service, the U.S. Fish and Wildlife Service, the National Weather Service, the Tennessee Valley Authority, and the U.S. Environmental Protection Agency that contribute to North Carolina's water information data base.

Some highlights of selected programs are presented here to show the scope of USGS activities in North Carolina and their usefulness in addressing water-resource problems. The reviewed programs include the statewide data-collection program, estuarine studies, the National Water-Quality Assessment program, military installation restoration program, and ground-water flow model-development program in the Coastal Plain and Piedmont provinces. For more information, contact: District Chief, U.S. Geological Survey, 3916 Sunset Ridge Road, Raleigh, North Carolina 27607.

U.S. GEOLOGICAL SURVEY PROGRAMS 1990-91

SURFACE-WATER QUALITY
- Treyburn Development, Durham County
- Yadkin River Index Sediment Station
- National Atmospheric Deposition Program
- Sediment Characteristics of North Carolina Streams
- Falls and Jordan Lakes, Wake, Durham, Granville, and Chatham Counties
- Drinking Water and Effluent Water-Quality Evaluation
- Baseline Water-Quality of North Carolina Streams
- Reservoir Sedimentation Program

SURFACE WATER
- Flood Insurance Study, Mecklenburg County
- Channel Relocation Study, McDowell County
- Low-Flow Characteristics of North Carolina Streams



AGRICULTURAL WATER QUALITY
- Land-Management Practices Related to Water Quality, Guilford County

MILITARY INSTALLATION RESTORATION PROGRAM
- Cherry Point MCAS, Craven County
- Camp Lejeune, Onslow County
- Fort Bragg and Pope AFB, Cumberland and Hoke Counties

HYDROLOGY
- Grove Creek Restoration Study, Duplin County
- Urban Stormwater Hydrology

WATER USE
- Statewide Water-Use Program
- Water Use in Roanoke-Chowan Basin

STATEWIDE DATA COLLECTION
- Surface-Water Gaging Stations
- Ground-Water Observation Wells
- Water-Quality Sampling Sites on Streams

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM
- Development of ecological protocols for National program
- Water-Quality Assessment in Albemarle-Pamlico Estuaries Drainage System
- Development of Ecological Studies

GROUND WATER
- Ground-Water Availability in the Piedmont and Blue Ridge Provinces
- Definition of Ground-Water Flow System in Coastal Plain Aquifers
- Flow-Model Development for Aquifers in the Central Coastal Plain
- Movement and Chemical Characteristics of Landfill Leachate, Mecklenburg County
- Hydrology of Aquifers at EPA Pesticide Superfund Site, Moore County

ESTUARINE STUDIES
- Lower Roanoke River Flows and Albemarle Sound Circulation
- Water Quality Related to Artificial Drainage
- Flow and Flow Patterns in Neuse and Pamlico River Estuaries
- Water-Quality Trends in the Albemarle and Pamlico Estuarine System
- Continuous Monitoring of Estuarine Water Quality

INFORMATION REQUEST PROGRAM
- Low Flows of Streams
- Stream Stages
- Ground-Water Levels
- Publications

STATEWIDE DATA-COLLECTION PROGRAM

What the USGS does:

- ❒ Collects stream-discharge data from nearly 180 monitored sites and stages of 26 lakes and reservoirs
- ❒ Measures ground-water levels in about 60 observation wells
- ❒ Collects and analyzes water-quality data from more than 30 sites

NORTH CAROLINA STATEWIDE DATA NETWORK. SEVERAL TYPES OF DATA MAY BE COLLECTED AT ANY ONE SITE

What it means to North Carolina:

- ❒ Provides data to assess the State's water resources for planners and managers
- ❒ Provides data for bridge and reservoir design and flood plain delineation
- ❒ Provides operational data for reservoirs and discharge data for those managing surface-water supplies
- ❒ Supplies information on streamwater quality needed for treatment and disposal of wastewater
- ❒ Facilitates warnings of floods, droughts, or other water-related hazards through continual monitoring of the data network
- ❒ Facilitates research and special studies through computer access to current and historical statewide data file
- ❒ Provides data for legal or statutory requirements

ESTUARINE STUDIES

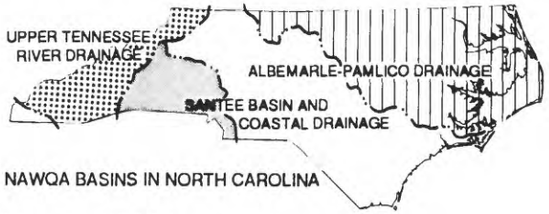
What the USGS does:

- ❒ Collects and analyzes data relevant to management of artificial drainage of altered wetlands
- ❒ Continuously monitors water-quality data at 33 sites in the Albemarle-Pamlico Sounds and their tributaries
- ❒ Determines flow and flow patterns in Neuse and Pamlico River estuaries
- ❒ Analyzes flow regime of lower Roanoke River and circulation patterns in Albemarle Sound
- ❒ Determines spatial and temporal water-quality trends in the Albemarle-Pamlico estuarine system
- ❒ Develops estuarine transport models

What it means to North Carolina:

- ❒ Reports effects of agricultural water management on freshwater inflows, and sediment and nutrient loads
- ❒ Assesses cumulative effects of drainage activities on downstream estuarine nursery areas
- ❒ Characterizes estuary salinity regime using calibrated hydrodynamic models and continuously monitored data
- ❒ Evaluates occurrences of dissolved-oxygen depletion in coastal waters
- ❒ Describes dynamics of water-quality processes and evaluates effects of management actions
- ❒ Describes flow distribution in Roanoke River delta and circulation regime in Albemarle Sound to provide data for fisheries management

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM



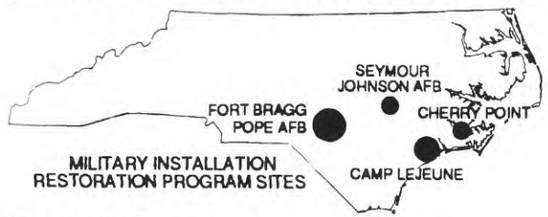
What the USGS does:

- ❒ Studies three basins in sequence, beginning with the Albemarle-Pamlico drainage basin followed by the upper Tennessee River basin or Santee basin and coastal drainage
- ❒ Compiles available water-quality information
- ❒ Samples and analyzes a wide array of physical, chemical, and biological constituents
- ❒ Describes current water-quality conditions, long-term trends, or lack of trends
- ❒ Uses state-of-the-science instruments and methods

What it means to North Carolina:

- ❒ Identifies, describes, and explains major natural and human factors that affect observed water-quality conditions and trends
- ❒ Provides linkages among data from other States in a given basin
- ❒ Includes North Carolina in national and regional assessments
- ❒ Provides improved scientific bases for evaluating water-quality programs and simulating effects of projected changes in management scenarios

MILITARY INSTALLATION RESTORATION PROGRAM



What the USGS does:

- ❒ Delineates hydrology, geochemistry, and biology at military hazardous-waste sites

- ❒ Develops plans for remedial action at each site
- ❒ Monitors progress of remedial actions

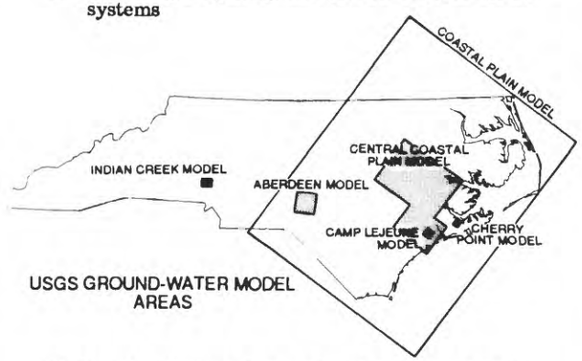
What it means to North Carolina:

- ❒ Installation Restoration Programs are underway at Fort Bragg, and are proposed for four other North Carolina bases
- ❒ Provides transferability of knowledge and technology to other hazardous waste sites in North Carolina
- ❒ Provides solute-transport models to monitor waste movement in ground-water system

GROUND-WATER FLOW MODELS

What the USGS does:

- ❒ Defines hydrogeology and geochemistry of aquifer systems



- ❒ Develops history of ground-water pumpage and delineates stressed aquifers
- ❒ Defines ground-water flow system and constructs calibrated model that simulates system

What it means to North Carolina:

- ❒ Two models completed, one being tested, and three are planned
- ❒ Simulations of pumping scenarios are available to water managers to evaluate drawdown effects
- ❒ Ground-water models may be used in a variety of ways to evaluate wells and well field operations
- ❒ Provides a powerful research tool for investigating ground-water flow systems

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M.D. Winner, Jr. 1991

U.S. GEOLOGICAL SURVEY: NORTH CAROLINA'S WATER RESOURCES

--A Partnership with State, Federal, and Local Agencies

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY