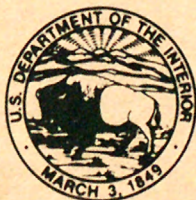


# U.S. GEOLOGICAL SURVEY: NORTH CAROLINA'S WATER RESOURCES

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

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## 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 (NAWQA) or 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 Department of Environment, Health, and Natural Resources; Department of 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, which 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 highlighted programs include the statewide data-collection program, estuarine studies program, the National Water-Quality Assessment program, military hydrology 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 1993-94

### SURFACE-WATER QUALITY

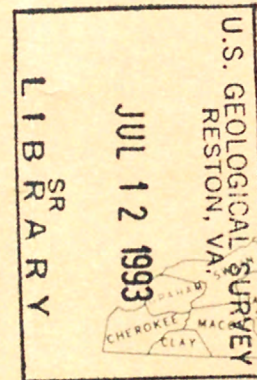
- Treyburn development, Durham County
- Yadkin River index sediment station
- National atmospheric deposition program
- Sediment characteristics of North Carolina streams
- Drinking water and effluent water-quality evaluation
- Baseline water-quality of North Carolina streams

### SURFACE-WATER HYDROLOGY

- Bridge scour warning program at Oregon Inlet
- Urban stormwater hydrology
- Flood documentation studies
- Low-flow characteristics of North Carolina streams
- Flood insurance studies

### AGRICULTURAL WATER QUALITY

- Land-management practices related to water quality, Duplin and Gaston Counties



### LAKE AND RESERVOIR STUDIES

- Falls and Jordan Lakes in Wake, Durham, Granville, and Chatham Counties
- Reservoir sedimentation program
- Reservoir studies along the Catawba River

### MILITARY HYDROLOGY PROGRAM

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

### WATER USE

- Statewide water-use program

### INFORMATION REQUEST PROGRAM

- Low flows of streams
- Streamflow statistics
- Ground water levels
- Publications

### NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

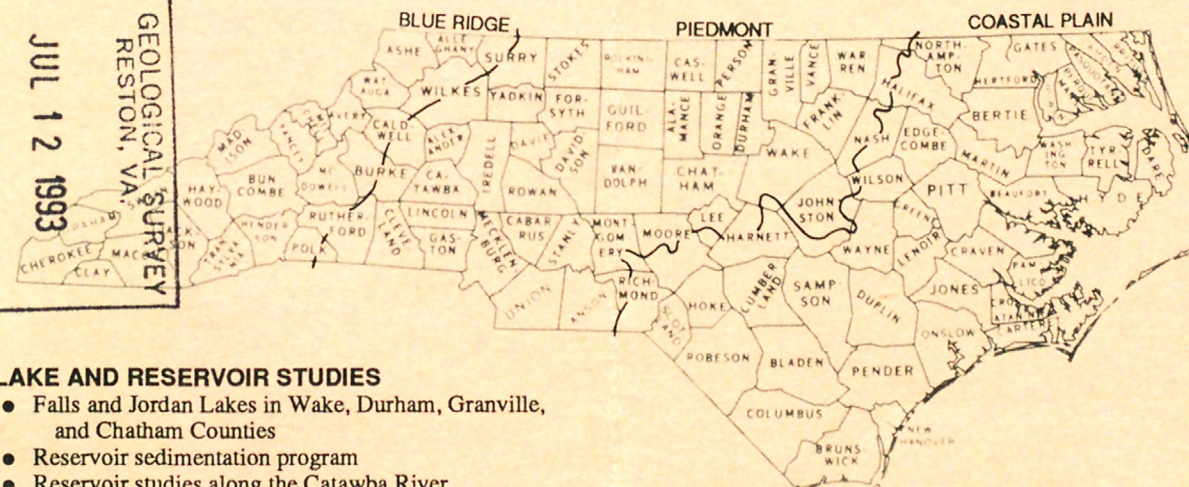
- National protocols for ecological surveys developed by North Carolina Ecology Group
- Water-quality assessment in Albemarle-Pamlico estuarine drainage system

### GROUND WATER

- Ground-water flow model of Indian Creek Basin, Lincoln County
- Definition of ground-water flow system in the southern Coastal Plain aquifers
- Flow-model development for aquifers in the Coastal Plain
- Movement and chemical characteristics of landfill leachate, Mecklenburg County

### NATIONAL STREAM QUALITY ACCOUNTING NETWORK (NASQAN)

- Detection of long-term trends by monitoring physical, chemical, and biological characteristics in seven North Carolina streams
- Supplements ongoing and short-term studies in the State



### 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

### STATEWIDE DATA COLLECTION

- Surface-water gaging stations
- Ground-water observation wells
- Water-quality sampling sites on streams

## STATEWIDE DATA-COLLECTION PROGRAM

### What the USGS does:

- ☐ Collects stream-discharge data from nearly 170 monitored sites and stages at 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:

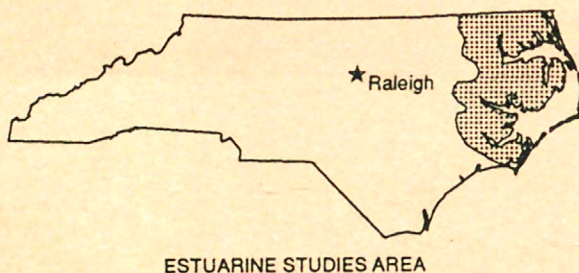
- ☐ Provides data to planners and managers to assess the State's water resources
- ☐ Provides data for bridge and reservoir design and flood-plain delineation
- ☐ Provides operational data for reservoirs and discharge data for those managing surface-water supplies
- ☐ Supplies stream-water quality information for treatment and disposal of wastewater
- ☐ Facilitates warnings of floods, droughts, or other water-related hazards through continual monitoring of the data network
- ☐ Provides data on status of ground-water storage
- ☐ Furnishes information on water-level declines resulting from major ground-water withdrawals
- ☐ 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:

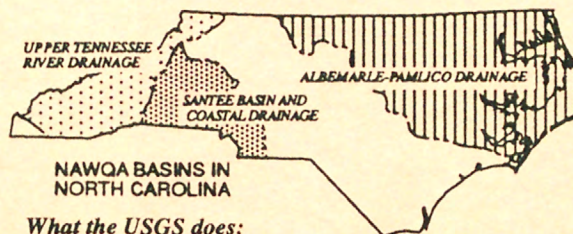
- ☐ Collects and analyzes data relevant to management of artificial drainage of altered wetlands
- ☐ Continuously monitors water quality at sites in the Albemarle and Pamlico Sounds and their tributaries
- ☐ Determines flow and flow patterns in Neuse and Pamlico River estuaries
- ☐ Analyzes flow regime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



### What it means to North Carolina:

- ☐ Reports effects of agricultural water management on freshwater inflows and on 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



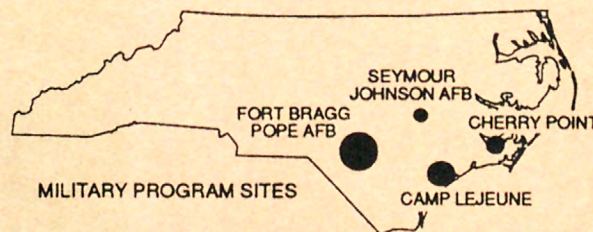
### What the USGS does:

- ☐ Studies three basins in sequence beginning with the Albemarle-Pamlico Basin followed by the Tennessee River and the Santee River and Coastal Drainage Basins
- ☐ Compiles available water-quality information
- ☐ Samples and analyzes a wide array of physical, chemical, and biological constituents
- ☐ Describes current water-quality conditions and long-term 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
- ☐ Involves 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
- ☐ Identifies water-quality issues appropriate for further study

## MILITARY HYDROLOGY PROGRAM



### What the USGS does:

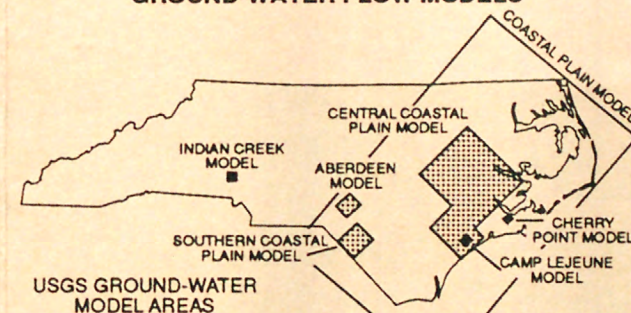
- ☐ Describes hydrologic, geochemical, and biological conditions at military hazardous waste sites

- ☐ Develops plans for remedial action at each site
- ☐ Monitors progress of remedial actions
- ☐ Quantifies nonpoint source waste discharges from bases

### What it means to North Carolina:

- ☐ Site investigations are underway at Ft. Bragg and studies are proposed for other North Carolina bases
- ☐ Provides transferable knowledge and technology for use at other hazardous waste sites in North Carolina
- ☐ Develops solute-transport models to monitor waste movement in ground-water system
- ☐ Furnishes data for NPDES permitting of stormwater discharge from sites

## GROUND-WATER FLOW MODELS



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### What the USGS does:

- ☐ Defines hydrogeology and geochemistry of aquifer systems
- ☐ Develops history of ground-water pumpage and identifies stressed aquifers
- ☐ Defines ground-water flow system and constructs calibrated model that simulates system

### What it means to North Carolina:

- ☐ Provides simulations of pumping scenarios that can help water managers evaluate drawdown effects
- ☐ Provides ground-water models for use by water managers to evaluate well field operations
- ☐ Provides a powerful research tool for investigating ground-water flow systems