

Water-Quality Issues Related to Urban Development of the upper Chattahoochee River Watershed

EVERYONE LIVES DOWNSTREAM

Rapid growth in Metropolitan Atlanta (see 1) is transforming the headwaters of many watersheds in Georgia from forests and pastures to suburban and urban land. This transformation includes the upper Chattahoochee River watershed that provides the area with drinking water and many outdoor recreational opportunities. From the headwaters of the Chattahoochee River to the Gulf of Mexico, EVERYONE LIVES DOWNSTREAM. What effect has the expansion of Metropolitan Atlanta had on rivers and streams, and what challenges lie before us in managing our water resources?

The growth of Metropolitan Atlanta has had a wide range of effects on the water resources in the upper Chattahoochee River watershed. This poster summarizes water-quality issues related to urban development of the watershed. The continuing spread of the metropolitan area has begun a cycle of land disturbance with associated erosion and sedimentation (see 2) that last occurred during periods of widespread logging, cotton cultivation, and hydraulic mining in the area (see timeline). Increased storm runoff from roofs, roads, driveways, and parking lots has a wide range of effects on the upper Chattahoochee River and tributaries that supply drinking water (see 3).

Municipalities are spending large amounts of money to expand and upgrade sewer systems, sewage-treatment facilities, and systems that supply drinking water to meet the demands of the growing population and the more stringent Federal and State environmental regulations (see 4 and 5). However, as water quality from point sources in the metropolitan area improves, assessments indicate the growing importance of nonpoint sources of contaminants in and downstream of the metropolitan area. State monitoring programs show widespread impairment of streams in the metropolitan area, primarily from bacteria and toxic metals present in

urban runoff (see 6 and 7). A water-quality assessment of the Chattahoochee watershed conducted by the U.S. Geological Survey shows numerous pesticides are present in streams within the metropolitan area (see 8). Traces of toxic chemicals, though now banned from use, persist in area streams and fish, and thus, pose a continued threat to aquatic and human health (see 9).

The long-term challenge for managing the water resources in the upper Chattahoochee River watershed is to minimize nonpoint-source contamination in the Atlanta Metropolitan area.

In recognizing this challenge, the Georgia Department of Natural Resources, local governments, and citizen groups are implementing the following strategy: Watershed protection through planning, zoning, establishing buffer zones, controlling building densities, increasing use of stormwater retention ponds, and street cleaning. Public education to demonstrate that part of anything put on the ground or street ends up in a stream where it can affect nearby water resources; and Adopt-A-Stream programs that train local volunteers to evaluate and protect water resources.

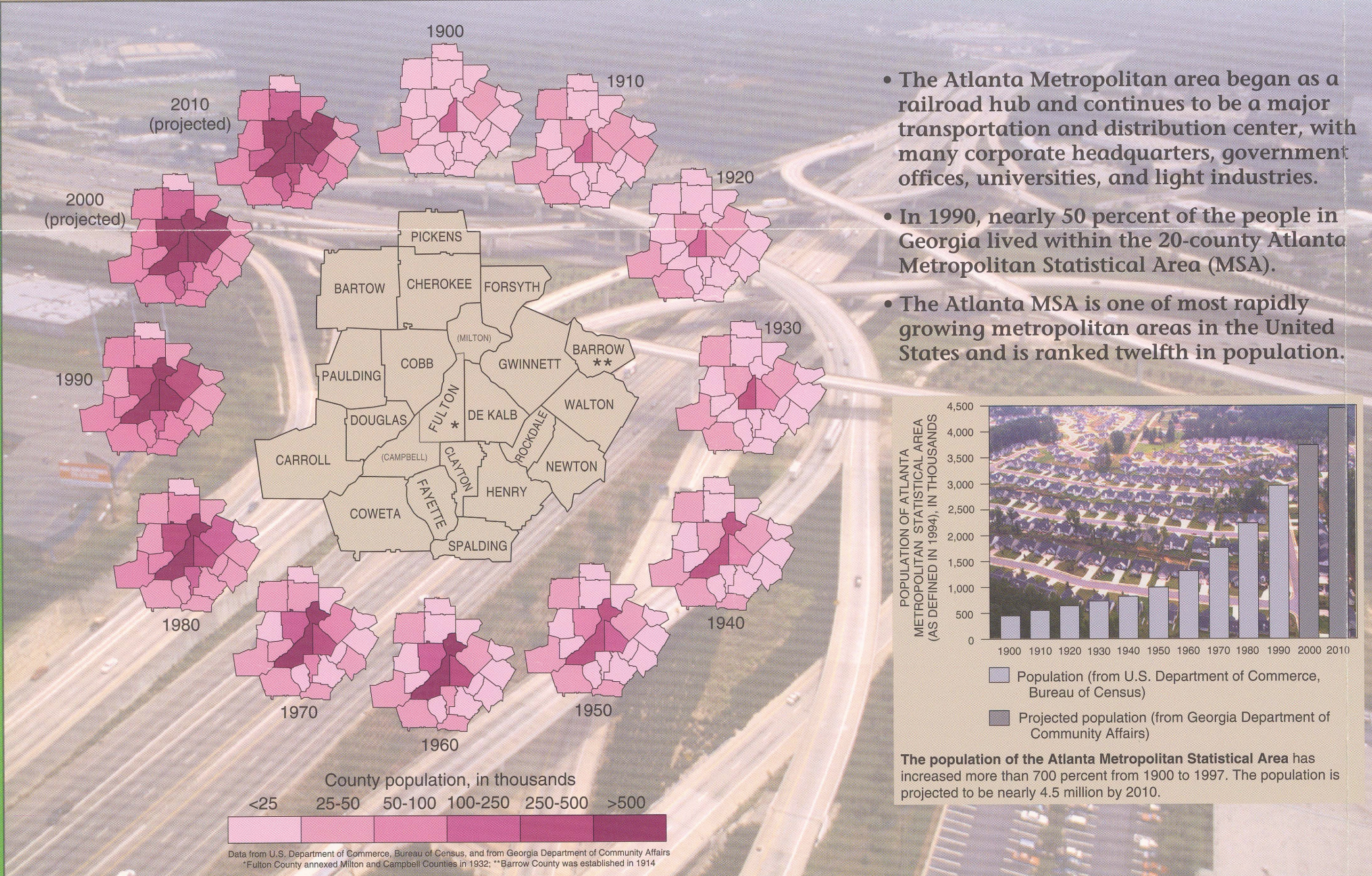
9 PCBs AND CHLORDANE IN FISH

The Georgia Department of Natural Resources (DNR) has determined that some fish species in the upper Chattahoochee River contain concentrations of PCBs (polychlorinated biphenyls) and chlordane that exceed current Federal and State fish-consumption guidelines. These guidelines are based on exposure to current levels of chlordane and PCB contamination for a period of 30 years and are designed to protect consumers from an increased risk of cancer. DNR recommends limited consumption of certain species and sizes of fish, and advises consumers on methods to clean and cook fish that minimize ingestion of these contaminants.

TYPE OF FISH	AFFECTED REACHES OF THE UPPER CHATTAHOOCHEE RIVER			
	Bulford Dam to Morgan Falls Dam	Morgan Falls Dam to Peachtree Creek	Peachtree Creek to West Point Reservoir	West Point Reservoir (4.5 to 12 miles)
Barbel	PCBs	PCBs	PCBs	PCBs
Bluegill	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane
Channel Catfish	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane
Crappie	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane
Catfish	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane
Channel Catfish	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane	PCBs and Chlordane
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- PCBs are synthetic oils, banned from use in 1976, that were used in electrical transformers, hydraulic oil, lubricants, and lighting ballasts.
- Chlordane is a banned pesticide that was used in agriculture until 1974 and for termite control until 1988.
- Both chemicals, even though not currently used, break down slowly and are persistent in the environment.

1 POPULATION GROWTH



- The Atlanta Metropolitan area began as a railroad hub and continues to be a major transportation and distribution center, with many corporate headquarters, government offices, universities, and light industries.
- In 1990, nearly 50 percent of the people in Georgia lived within the 20-county Atlanta Metropolitan Statistical Area (MSA).
- The Atlanta MSA is one of the most rapidly growing metropolitan areas in the United States and is ranked twelfth in population.

2 EROSION AND SEDIMENTATION

The upper Chattahoochee River watershed has a sloping landscape, erodible soils, and frequent periods of heavy rainfall. Clearing and regrading land for development increases the rates of soil erosion and sedimentation in the watershed. Eroded soil is carried from construction sites to streams and lakes where it causes: (1) excess turbidity that harms aquatic life, increases water treatment costs, and diminishes recreational use; and (2) sedimentation that clogs drainage ditches, stream channels, water intakes, and reservoirs, and destroys aquatic habitats.

- Erosion and sedimentation controls include a wide range of temporary and permanent measures. Hydroseeding is used to stabilize soils to minimize erosion. Sedimentation ponds and silt fences are used to contain surface runoff and minimize sedimentation in nearby streams.
- Without proper design, installation, and maintenance of erosion and sedimentation controls, sediment-laden runoff from construction sites can damage streams and adjacent properties.

3 URBAN RUNOFF

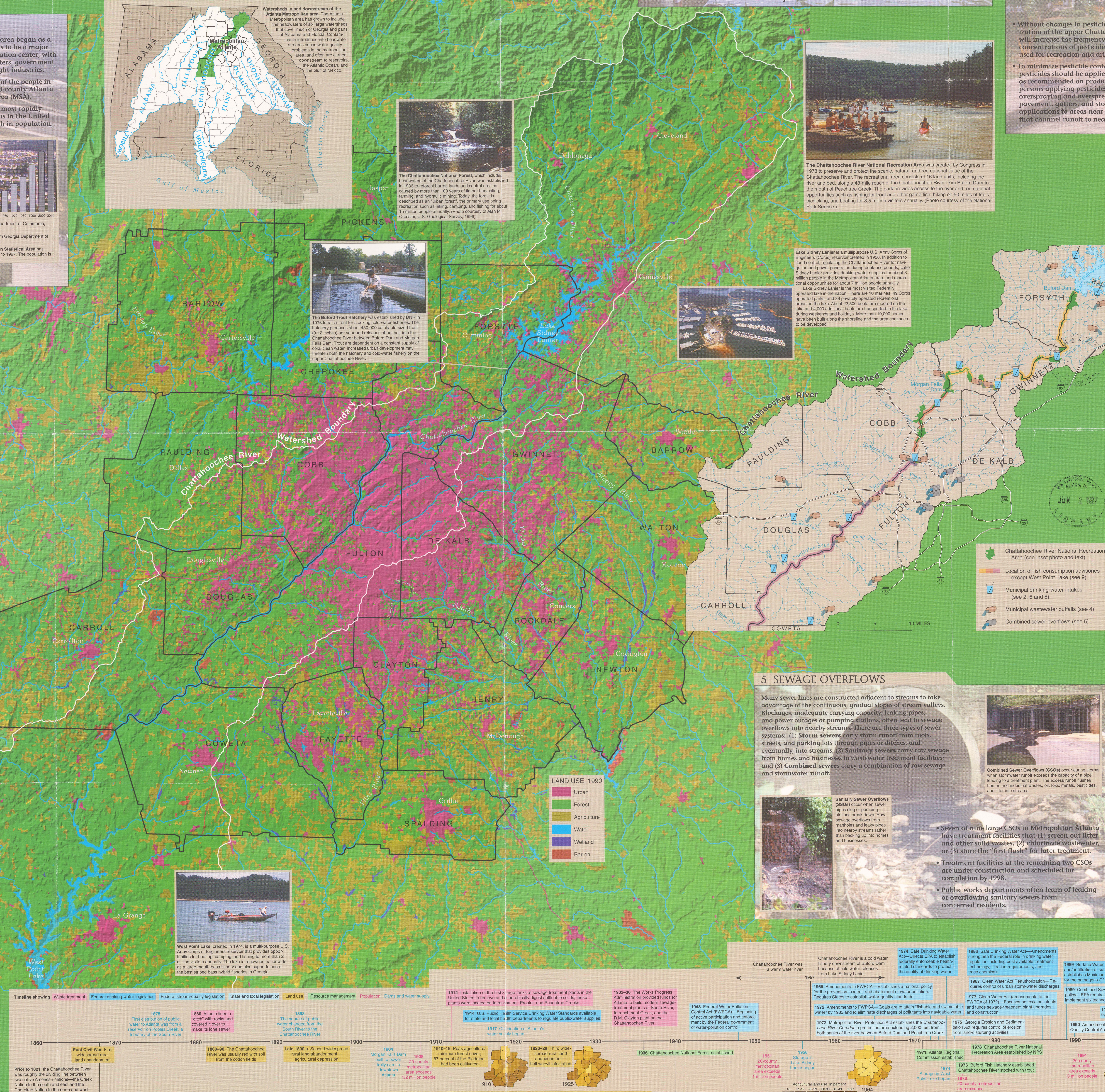
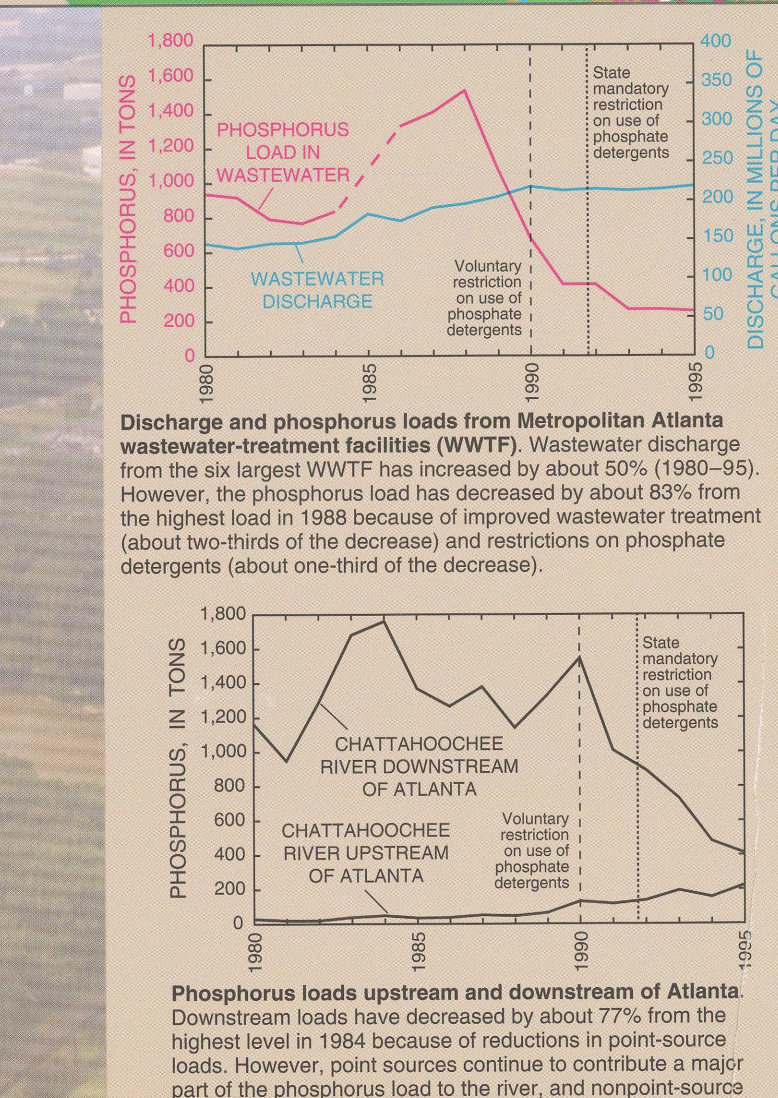
Rainfall in watersheds having forests and pastures is absorbed into the porous soils (infiltration), is stored as ground water, and is slowly discharged to streams through seeps and springs. Storm runoff is a small part of the annual streamflow in these watersheds. As watersheds are urbanized, much of the vegetation and top soil is replaced by impervious surfaces such as buildings and pavement. As the infiltration area is reduced, extensive drainage systems that combine curbs, storm sewers, and ditches are required to carry stormwater runoff to storage ponds or directly to streams.

- In urban areas, drainage systems provide a direct path for the movement of nonpoint sources of contaminants from impervious areas to streams.
- Following summer storms, runoff from urban areas causes rapid increases in stream temperature that can produce thermal shock and death in many fish.
- Use of stormwater impoundments and porous paving materials can reduce stormwater runoff and movement of contaminants to streams.
- Controls on the location and amount of impervious area from new development can minimize additional changes to streamflow and movement of contaminants to streams.

4 PHOSPHORUS

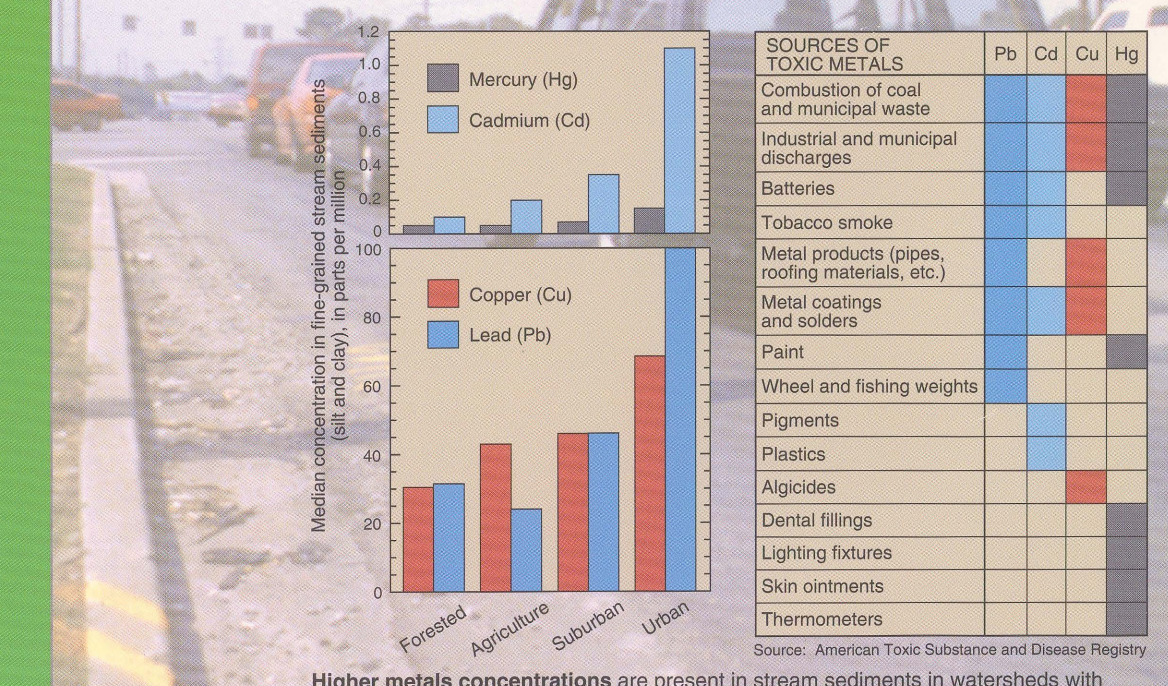
Phosphorus is an essential nutrient for plant life, but when present in water at high concentrations, it can accelerate eutrophication of rivers and lakes. In Metropolitan Atlanta, phosphorus load to streams from point sources, primarily wastewater-treatment facilities (WWTF), have caused West Point Lake to become highly eutrophic. Compliance with State legislation to reduce phosphorus loads from WWTF and to restrict the use of phosphate detergents has caused large reductions in phosphorus load in the Chattahoochee River and West Point Lake.

- Municipalities in the metropolitan area continue to expand and to upgrade WWTF to handle the increasing volume of wastewater and to meet more stringent regulations on effluent and river quality.
- Additional control of phosphorus from non-point sources (such as applications of lawn fertilizers and disposal of animal wastes) may be necessary to maintain or improve the water quality in the Chattahoochee River and West Point Lake.



7 TOXIC METALS

Low concentrations of some toxic metals tend to accumulate in the food chain and can damage living things. Historically, major contributions of toxic metals were from mining activities and point sources such as wastewater-treatment plant outfalls and smoke-stack emissions. Compliance with Federal and State regulations has reduced inputs of some toxic metals from these point sources. However, high concentrations of toxic metals persist in the sediments of many urban streams in Metropolitan Atlanta, in part from metal-laden runoff from nonpoint sources.



- Many streams in the Atlanta Metropolitan area do not support recreation and fishing because of high concentrations of toxic metals in stream sediments.
- Concentrations of toxic metals in stream sediments could be reduced if:
 1. Trash is properly disposed or recycled.
 2. Major streets and parking lots are routinely cleaned.
 3. Stormwater is retained in ponds to trap metal-laden sediments.

6 WATERBORNE PATHOGENS

Waterborne pathogens are disease-causing bacteria, viruses, and protozoans that are transmitted by consumption of untreated or inadequately treated water. The protozoans, Giardia and Cryptosporidium, are of special health concern because their consumption can lead to severe gastrointestinal (intestinal discomfort, diarrhea, and dehydration) that can be life threatening for the very young, very old, or individuals with damaged or depressed immune systems. Routine stream monitoring measures indicator bacteria that, although harmless, have similar sources (animal and human waste) as do most waterborne pathogens. Lakes and streams with few indicator bacteria are deemed suitable for recreational uses such as swimming. Treated water from public drinking water supplies is routinely monitored for indicator bacteria. Additional monitoring for some waterborne pathogens has begun for larger suppliers of public drinking water.

- Urban streams in Metropolitan Atlanta often do not support recreational uses because of high levels of indicator bacteria.
- However, the presence or absence of indicator bacteria is an imperfect measure of the safety of water for consumption or recreation.
- Methods are being developed to more easily and reliably identify harmful pathogens in streams and drinking water.

U.S. DEPARTMENT OF THE INTERIOR
Bruce Abbott, Secretary
U.S. GEOLOGICAL SURVEY
Gordon P. Eaton, Director
Water-Resources Investigations Report 96-4302
By:
Daniel J. Hippert—Text and photography
Carol J. Wiparuth—Design and layout
Evelyn A. Hopkins—Cartography
Elizabeth A. Fries—Text and illustrations
David J. Waples—Text and photography
FOR ADDITIONAL INFORMATION PLEASE CONTACT:
State Representative
U.S. Geological Survey
National Park Service
3030 Avenue Road, Suite 100
Dunwoody, GA 30306
Phone: (770) 930-9189
Fax: (770) 930-9189
Please visit the USGS on the Internet. The Apalachicola-Chattahoochee-Flint River Basin National Water-Quality Assessment Program (NAWAQ) site is:
<http://www.gsa.gov/nawaq>
and provides access to USGS data, maps and interpretive information on the upper Chattahoochee River watershed.