

# USE AND OCCURANCE OF PESTICIDES IN THE APALACHICOLA-CHATTAHOOCHEE-FLINT RIVER BASIN, GEORGIA, ALABAMA, AND FLORIDA, 1960-91

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## ABSTRACT

The Apalachicola-Chattahoochee-Flint (ACF) River basin was one of the first 20 study units selected in 1991 by the U.S. Geological Survey for its National Water-Quality Assessment (NAWQA) program. Because pesticide contamination of surface water and ground water is a concern nationwide, a major emphasis of the NAWQA program is to examine the occurrence and distribution of pesticides in the water resources of these study unit basins. An understanding of the types and distribution of land uses; pesticide properties, pest-control practices, and pesticide use; and an evaluation of the occurrence and distribution of pesticides in the water resources of the ACF are necessary to meet this objective of the NAWQA program. This report describes land use and pesticide use at a county level, and the occurrence and distribution of pesticides in the water resources of the ACF River basin on the basis of previously-collected data.

About 33 percent of the ACF River basin is used for agriculture, 16 percent is used for silviculture, and about 5 percent of the basin is in urban and suburban settings; primarily the Columbus, Albany, and Atlanta Metropolitan areas. The remainder is in wetlands and non-silvicultural forest. A broad range of synthetic-organic herbicides, insecticides, and fungicides are applied to land in agricultural, silvicultural, urban, and suburban areas. The period of intensive pesticide applications extends from March to October.

Pesticide data available for the period from 1971 through 1989 in the U.S. Geological Survey National Water Information System (NWIS) and for the period from 1960 through 1991 in the U.S. Environmental Protection Agency Storage and Retrieval System (STORET) were analyzed to describe the occurrence and distribution of pesticides in water resources of the ACF River basin. Collectively, the NWIS and STORET databases contain about 19,600 individual analyses for pesticide concentration in the ACF River basin. Pesticide concentrations were at or above a minimum reporting level in about five percent of all analyses. Most of the pesticide analyses and most of the analyses having concentrations above minimum reporting levels in these databases are for organochlorine insecticides in samples collected five or more years before this study. With few exceptions, most of organochlorine insecticides are now banned from use in the United States. Concentrations of currently (1991) used pesticides were at or above a minimum reporting level in about 0.3 percent of the analyses.

The geographic patterns in the occurrence and distribution of pesticides in the ACF River basin (as defined by data collected during 1960-91) are, as expected, somewhat defined by land-use patterns. DDT (together with DDD and DDE) were detected in wide distribution in the sediments and aquatic biota of primarily mainstem and reservoir sites in the Chattahoochee, Flint, and Apalachicola drainages. DDT was used through 1973 as an insecticide on cotton, fruits, and vegetables; and for mosquito control, so its widespread occurrence in both urban and agricultural settings is consistent with its use. Chlordane, heptachlor, dieldrin, and related compounds were agriculturally used through 1974, but predominantly as termiticides through the late 1980's. Compounds in these groups have been found in the sediments and aquatic biota of tributary streams draining the Atlanta Metropolitan area and of mainstem reaches and reservoirs of the Chattahoochee River downstream from the Atlanta and Columbus, Ga., Metropolitan areas. The phenoxy-acid herbicides are widely used in residential, commercial/industrial, agricultural, and silvicultural areas of the ACF River basin. Detectable concentrations of 2,4-D were found in most of the surface-waters sampled in the Atlanta Metropolitan area.

It is unfortunate that only limited inference can be drawn on temporal patterns. Many of the Federal and State agency pesticide-monitoring programs have been targeted to known sources and areas of contamination, an approach consistent with regulatory requirements focused on human health; and either were synoptic in nature or were conducted during a limited period of time. Thus, the composite temporal picture represented by these sampling efforts is inherently patchy.