

MERCURY IN AQUATIC ECOSYSTEMS IN THE PIEDMONT AND COASTAL PLAIN OF GEORGIA AND FLORIDA, 2002

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Abstract. Mercury bioaccumulation in aquatic ecosystems has been responsible for increasing numbers of consumption advisories nationwide during the last decade. While mercury dynamics in lakes and reservoirs have been well studied, little work has been conducted in riverine systems. The National Water-Quality Assessment (NAWQA) program of the U.S. Geological Survey is currently investigating the occurrence of total mercury (THg) and methylmercury (MeHg) in water, streambed sediment, and fish (total mercury only) at approximately 112 stream sites throughout the nation. The primary objective of this study is to identify potential mercury sources, land use characteristics (agriculture, urbanization, forest and wetland), and environmental variables (biogeochemistry of the water-column and stream sediment) that may contribute to the bioaccumulation of mercury in these ecosystems. Sites were selected to cover large regional and national gradients of mercury deposition, transport, and methylation efficiencies across aquatic ecosystems. A network of 15 sites was identified for synoptic and process-related studies across the piedmont and coastal plain of Georgia and northern Florida. In addition to THg and MeHg, dissolved organic carbon (DOC), dissolved sulfate (SO_4^{2-}), dissolved oxygen (DO), and pH were measured in surface water at each site. Throughout the study area (Figure 1), data for surface water ranged as follows: THg from 0.07 to 10.9 nanograms per liter (ng/L); and MeHg from 0.04 to 4.06 ng/L; DOC from 0.1 to 76.9 milligrams per liter (mg/L); SO_4^{2-} from 0.1 to 25.4 mg/L; DO from 1.7 to 8.6 mg/L; and pH from 6.3 to 7.8. The THg in fish tissue ranged from 0.4 to 6.1 micrograms per gram (recoverable dry weight). Preliminary results indicate a significant positive correlation between percent wetland coverage in a basin and the THg in surface water and THg in tissue of *Micropterus salmoides* (Largemouth

Bass) and *Micropterus catarractae* (Shoal Bass). Linear regression indicates a positive trend between surface water concentrations of DOC and mercury load in biota (specifically *Micropterus* spp., $r^2=0.51$), and between DOC and Hg (both THg, $r^2=0.78$; and MeHg, $r^2=0.52$).

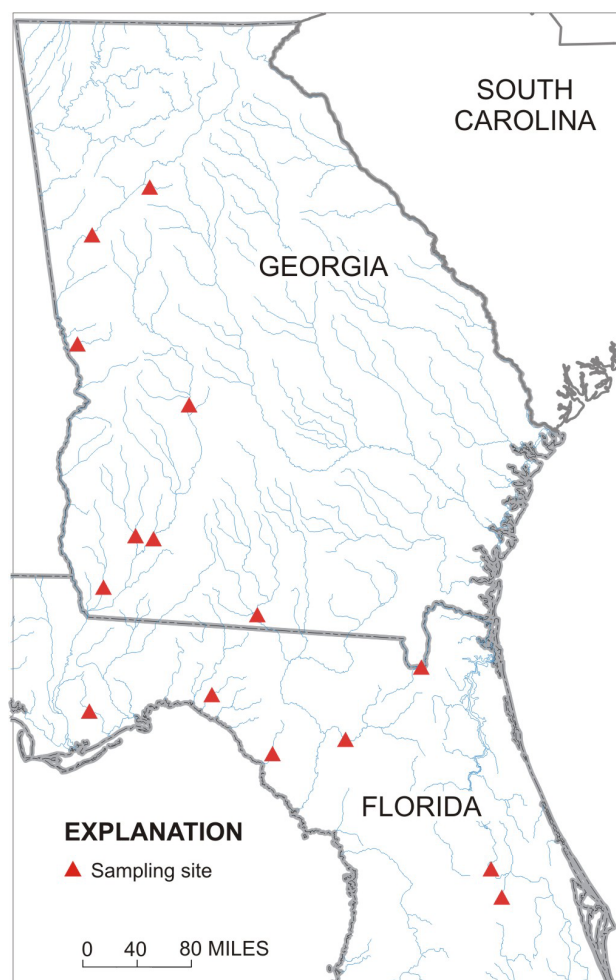


Figure 1. Location of sampling sites.