



Soil and Water Science

Research Brief

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National Wetlands Biogeochemical Database and Survey of Southeastern Wetlands Biogeochemical Condition

Policies to protect the nation's water bodies have been implemented since the Clean Water Act was passed in 1972. Although many improvements in point source discharges have been made, many rivers and lakes still appear on the impaired waters list, many of which are listed due to nutrient impacts. To address this continued impairment of water resources, EPA in 1999 established a new initiative whereby quantitative water quality criteria would be developed by water body types and regional areas. The four water body types include lakes and reservoirs, rivers and streams, estuaries, and wetlands. Establishment of numeric nutrient criteria would provide states with antidegradation benchmarks by which their water resources could be monitored and preserved.

Establishing numeric criteria either requires a clear cause and effect relationships between contaminants and loss in quality of a designated use, or a criterion based on least impacted or "reference" conditions that is presumably protective of the water bodies designated use. In the case of lakes, rivers and estuarine systems, the relationships have been established between nutrients and degradation, such as the response of planktonic algal communities to phosphorus enrichment. In the case of wetlands, however, specific stimulus and response relationships have not been as well established, and specific designated use of these systems is often unclear.

In response to this information shortfall, two projects are underway at the Wetland Biogeochemical Laboratory to assist EPA, states and tribal governments in developing

numeric criteria for wetlands and to select cross-community water quality indicators. The first project, initiated in September 2000, will create a National Wetland Biogeochemical Database (NWBD) compiling existing literature on biogeochemical data of the nation's natural wetlands from 1975 to present. This database presently has 1350 wetlands and 65,000+ data points. It is hoped that this database will become publicly accessible in the near future, although the specific user interface has not yet been decided by EPA.

The second research effort is in response to limited uniform distribution of spatial data identified within the NWBD and the lack of consistency (and therefore comparability) in methods and analytical techniques used in the literature. As a result, a survey of water quality indicators within wetlands of the southeastern United States is being conducted using comparable field and laboratory methods. This survey will evaluate twenty different possible indicators of wetland quality including plant, litter, soil and water column nutrient parameters. Two hundred and twenty wetlands will be surveyed among forested, herbaceous, riparian and non-riparian communities throughout the Southeast. Wetlands will also be separated by least-impacted watersheds within nine National Forest and adjacent watersheds with likely elevated nutrient conditions (Figure 1).

Evaluating the responses of these 20 parameters in impacted and unimpacted sites will provide an indication of which parameters are sensitive to nutrient change. Data will also be used to determine the variability of nutrient conditions under least impacted and impacted sites, among regional areas, among vegetative community types and among hydrologic connectivity.

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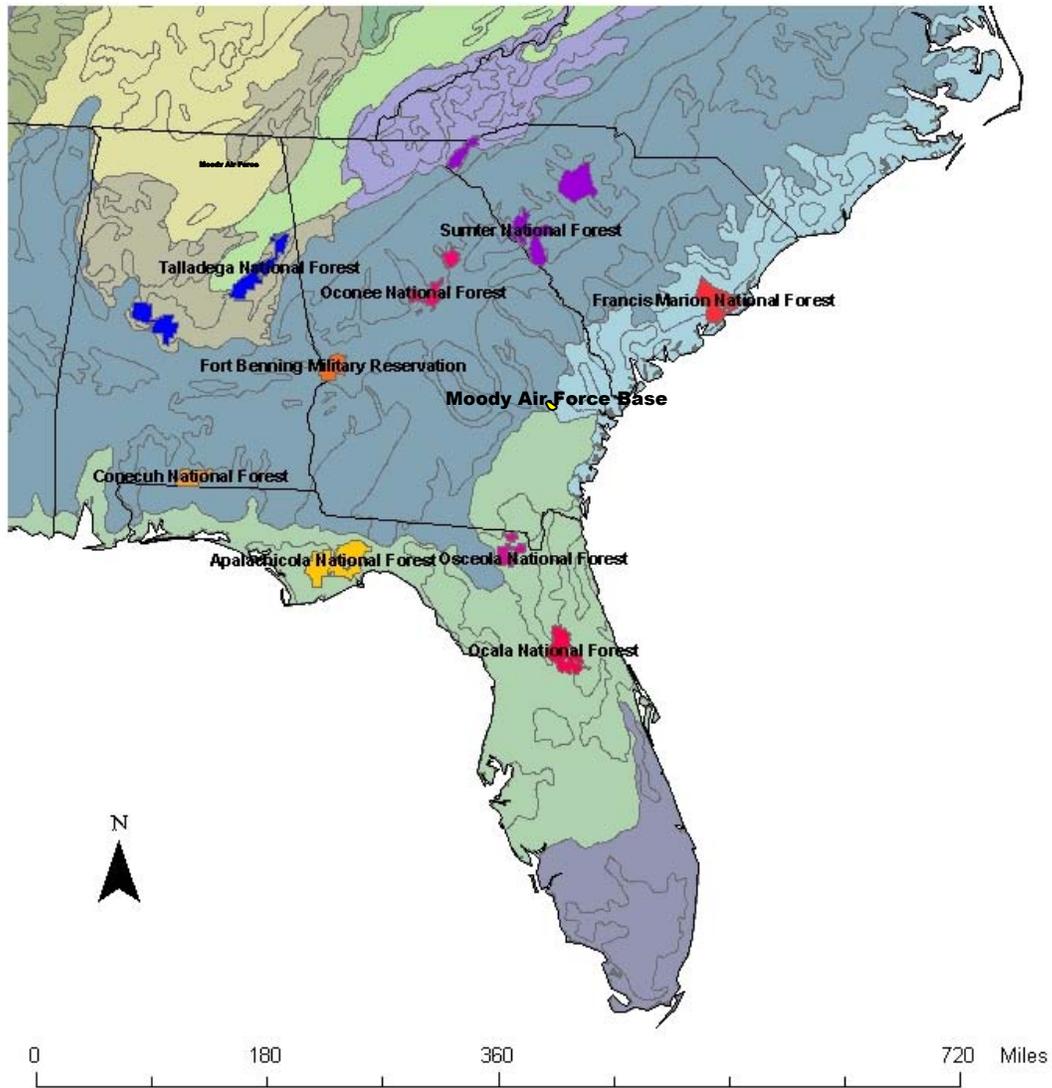


Figure1: Map of least impacted wetland sampling sites, most occur within National Forests or Military installations. Additional sites in central Florida and southeastern Georgia will be added in 2004. Background color pattern demarcates EPA level II Ecoregions.