

Evaluation of Periphyton, Macroinvertebrate, and Fish Community Assessment Techniques as Indicators of Nutrient Enrichment and Changes in Nutrient Stream Loading

Lisa Huff¹ and Ron R. Raschke²

¹ Alabama Dept. of Environmental Management, 1890 Dickinson Drive, Montgomery, Alabama, 36109

² RLR Associates, 4265 Old Lexington Rd., Athens, Georgia, 30605

Biographical Sketches of Authors

Lisa Huff is an Environmental Scientist II with the Alabama Department of Environmental Management.

Ron Raschke specialized in diatom taxonomy and periphyton bioassessment techniques. He has conducted diatom surveys and bioassessments throughout the Southeastern United States during his career as a biologist for USEPA Region IV and RLR Associates.

Abstract

Despite the prevalence of eutrophication in streams, few methods have been shown to effectively monitor biological impairment from nutrients. Periphyton, macroinvertebrate, and fish community assessment methods were tested at 20 stream segments with known or suspected impairment caused by nutrient enrichment. The methods were also tested at 13 ecoregional reference sites for comparison. To provide the most complete characterization of water quality conditions, habitat quality and water chemistry were also collected at reference and study reaches. Periphyton, macroinvertebrate, and fish metrics that were correlated ($p < 0.1$) with average nutrient concentrations, water column or periphyton chlorophyll a, or turbidity were tested for sensitivity and accuracy using stream classifications based on EPA's nutrient regions, Level III Ecoregions, and non-metric, multi-dimensional scaling of the diatom, macroinvertebrate, and fish communities at each reference site.