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Abstract

The National Water-Quality Assessment (NAWQA) Program of the U.S. Geological Survey uses algal data together with other physical, chemical, and biological variables to assess the quality of rivers and streams throughout the United States. Pilot NAWQA studies (1987-1990) led to the development of methods for collecting algal samples from various instream habitats and to the publication of protocols for the identification and enumeration of algal samples to ensure nationally consistent data. During the first decade of the Program, more than 7,000 algal samples were analyzed from more than 1,500 river reaches throughout the United States. These data from the NAWQA Program and related studies have been incorporated into more than 70 publications, 50 of which are cited in this paper. Determinations of algal biomass (algal biovolume, chlorophyll *a*, ash-free dry mass), autecological-guild and pollution-tolerance metrics, indicator taxa, physiognomy, and weighted-average optima and tolerance were used in evaluations of stream-water quality, depending on the focus of each study. Relations of the biological data with trophic condition, hydrologic disturbance, geochemistry, and land use were examined. Although species optima and tolerance values for diatoms differ depending on the scale of assessment (national and regional), species optima determined for indicators of alkalinity, water hardness, specific conductance, chloride, and sulfate were consistent with qualitative, autecological classifications for those taxa in western Europe. The ecological studies summarized here are part of nationally guided studies addressing selected water-quality issues, such as the effects of watershed urbanization and agricultural land use on nutrient enrichment and stream ecosystems. The algal data and related physical, chemical, and biological data are released (after quality reviews) and made available to the public online through the NAWQA website [http : //water.usgs.gov/nawqa/](http://water.usgs.gov/nawqa/).

Key index words : algae, autecology, disturbance, eutrophication, land use, water quality