Implications for Water-Quality Monitoring and Assessment

The assessment and management of water resources could benefit from an improved understanding of the influence of natural landscape and hydrologic factors on chemical and biological indicators of water quality. For example, nutrient concentrations in Midwestern streams during late summer were related more to antecedent runoff and algal-nutrient processes than rates of fertilizer or manure application. Herbicide concentrations in agricultural streams during the same time period were proportional to herbicide use in the basin; however, basin soil conditions and riparian tree density along stream segments appear to influence the fate of herbicide parent compounds and the rate of herbicide-degradation processes. The effectiveness of riparian zones as a buffer for intercepting runoff of agricultural contaminants may be influenced by soil properties, drainage characteristics, and the amount of rainfall in stream basins prior to water-quality assessment. Biological indicators of water quality were influenced by physical factors such as streamflow and riparian conditions; however, algal and invertebrate indicators of degraded water quality increased with the intensity of organic enrichment, as indicated by large amounts of algal seston and dominance by blue-green algae, high rates of stream productivity and respiration, and commensurately low DO concentrations that occur during early morning hours (Porter, 2000; Sorenson and others, 1999). Thus, temporal and spatial variability of natural factors are likely to influence the chemical and biological classification of water quality in streams and rivers, as well as the effectiveness of land-use management practices.

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