UNDERSTANDING NATURAL PATTERNS IN WATER QUALITY WHEN SETTING WATER QUALITY STANDARDS

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Most water quality standards fail to recognize the water quality potential of waterbodies or the temporal and spatial variability in water quality that occurs in a watershed. These patterns are especially important as we attempt to assess nonpoint source activities. In some cases, even least impaired watersheds cannot achieve current or proposed water quality criteria for dissolved oxygen (DO), nutrients, and temperature. In Louisiana, DO concentrations can fall below the 5 mg/L state standard even for forested watersheds identified as Outstanding Resource Waters and reference streams. DO concentrations in these streams appear to be explainable by considering the sediment oxygen demand (SOD) of stream bottoms and flow (reaeration rate). In Oregon, some wilderness streams cannot achieve the 64ºF temperature standard. Stream temperature can vary with latitude, elevation, natural shade levels, and factors like residence time as surface flow and coastal fog influence. Draft ecoregion nutrient criteria being proposed to the states by EPA have been found to be unachievable even for small, fully-forested research watersheds with no management activities. Large variations in nutrient concentrations can result from nitrogen-fixing plants in the watershed, geology, and many other factors. The recent National Academy of Science Report on the Science of TMDLs makes important recommendations about adopting Use Attainability Assessments (UAAs), defining water quality criteria in terms of magnitude, frequency, and duration, and using both physical/chemical and biological criteria to determine whether a waterbody is impaired. These recommendations recognize that achievable and biologically relevant water quality criteria are needed. Wholesale adoption of UAAs, however, could be an overwhelming burden on already overloaded state water quality protection programs. Water quality standards and criteria that recognize natural patterns can minimize inappropriate listing of waters as impaired that could never achieve artificial standards.