



High-frequency phosphorus and nitrate measurements for improved statutory water quality monitoring and management

Magdalena Bieroza

Swedish University of Agricultural Sciences, Soil and Environment, Uppsala, Sweden (magdalena.bieroza@slu.se)

High-frequency nutrient (phosphorus and nitrogen) monitoring using wet-chemistry analysers and optical sensors has revolutionised the collection of biogeochemical data from streams, rivers and lakes. Matching the nutrient measurement time with timescales of hydrological responses has revealed biogeochemical patterns and nutrient hydrological responses not observed previously. Capturing a wider range of nutrient concentrations compared to traditional coarse resolution sampling enables more accurate estimation of mean concentrations and loads and thus improved water body classification. However, to date the scientific insights from the high-frequency nutrient monitoring studies have not been translated into policy and operational responses. The pertinent question is where and how often to measure nutrients to satisfy statutory monitoring requirements for the Water Framework Directive and the Nitrates Directive. Therefore this paper discusses how the reduced data uncertainty and improved process understanding obtained with the high-frequency measurements can improve statutory nutrient monitoring, using case studies from England and Sweden.