

Toward delisting of the water quality beneficial use impairment in the St. Louis River, MN: A monitoring approach

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Water quality in the St. Louis River Estuary (SLRE), a great lakes area of concern (AOC), is improving. A significant leap forward followed the opening of the Western Lake Superior Sanitary District in 1978. However, desire for continued improvement throughout the estuary was the impetus for including water quality as a beneficial use impairment (BUI) during AOC designation in 1992. Since then, many programs (e.g., best management practices, discharge permitting) have been directed toward increasing SLRE water quality, the objective being BUI removal and eventual AOC delisting. However, before final removal can occur, a defensible record is required, demonstrating that accepted thresholds have been met across the system. How temporally and spatially robust must the monitoring scheme be to demonstrate compliance remains a question. In the summer of 2012 we conducted monthly water quality sampling of the SLRE using an unequal-probability spatially balanced, stratified and randomized site selection design. Here we report on patterns and trends of those metrics essential for BUI delisting. Summaries include cumulative distribution factors and system-wide means further stratified by month, depth, or zone. For example, system-wide monthly TSS, TP, and Chl *a* concentrations were routinely below threshold concentrations, though exceptions were observed. While the final monitoring design and data needs rest with the AOC coordinators, our goal is to present results from an approach that has been used nationally to describe condition relative to specified thresholds, and identify potential hotspots of continued impairment. *This abstract does not necessarily reflect U.S. EPA policy.*

Impact statement: This work contributes to the science needed to quantify changes in environmental conditions of EPA-designated Areas of Concern in the Great Lakes in response to restoration and remediation investments.