Data Needs to Determine Designated Use for Benthic Impairment: A Virginia Case Study

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In Virginia, all waters are designated for the following uses: recreational (e.g., swimming and boating); support of aquatic life; and production of edible and marketable natural resources (e.g., fishing and shellfishing). The water quality standard to support aquatic life is a general narrative statement: "All state waters, including wetlands, shall be free from substances … which interfere directly or indirectly with designated uses…or which are harmful to human, animal, plant, or aquatic life."

At present, 111 stream segments (455 miles) are included in Virginia's 303(d) list because of benthic impairments. Therefore, Maximum Total Daily Loads (TMDLs) must be calculated for the pollutants believed to cause the benthic impairment. This is a challenging task because TMDL plans for benthic impairments have significant uncertainty owing to the multiple factors and interactions of the environmental conditions that impact the benthic community.

Since all waters in Virginia are designated for multiple uses, it is critical to determine the existing use(s) of a stream before it is listed as impaired, and thus the need for a Use Attainability Analysis. Several sets of data are needed to evaluate the stream segment for all possible uses. Uses should include all the uses defined above plus the aesthetic value of the stream. The aesthetic value may be particularly critical in urban environments. Data are needed to evaluate the socio-economic effects of all possible uses and to determine the attainable uses. Comprehensive watershed stakeholder input will be needed to determine the attainable uses. In addition, data will be needed to determine limitations in attaining certain uses. Data needs can be categorized as follows: stream characteristics (morphology, physical, chemical and biological); documentation of current uses; land use assessment for the stream riparian zone and the watershed; watershed stakeholder perception of current uses, zoning ordinances, land ownership and prices along the riparian areas; and potential costs for implementation of possible stream restoration projects.

The presentation will use the Stroubles Creek watershed in southwest Virginia as a UAA case study. About 4.8 miles of the stream is designated as impaired due to the benthic condition. The mixed land use (urban, agricultural, and forest) of the small watershed (14,336 acres) presents a unique opportunity to test the UAA hypothesis to determine the attainable uses of the stream. Data have been collected for benthic surveys, fish resources, physical/chemical characteristics of water, stream morphology, stream corridor and watershed land use, and land ownership. The presentation will provide a discussion of how these elements can be linked in conjunction with stakeholder input for decision-making regarding attainable uses of the Stroubles Creek.