

## **A Basinwide Index for Biological Assessment of Potomac Nontidal Streams**

**LeAnne Astin**

Interstate Commission on the Potomac River Basin, 6110 Executive Blvd. Suite 300, Rockville, MD 20852

### **Biographical Sketch of Author**

LeAnne Astin is employed as an Aquatic Ecologist with the Interstate Commission on the Potomac River Basin, an interstate compact agency that helps the Potomac Basin states and the federal government to cooperatively address water quality and related resource problems in the river. Since 2000, she has served as the principle researcher and analyst for the Potomac Basinwide Assessments Project, as well as assisting in a variety of other Commission programs. She is also the acting chair of the Methods and Data Comparability Board's Water Quality Data Elements workgroup.

### **Abstract**

The Interstate Commission on the Potomac River Basin (ICPRB) relies on data collected by member jurisdictions (DC, MD, PA, VA, WV) to assess the health of Potomac waters. The ICPRB has developed a consistent approach for analyzing monitoring data from the nontidal Potomac. Six steps were involved in establishing an assessment framework: 1) develop a database structure to integrate monitoring data provided by the jurisdictions; 2) resolve methods and data compatibility issues; 3) establish consistent abiotic criteria to identify reference and impaired sites; 4) screen for robust biological metrics that can distinguish reference from impaired sites; 5) evaluate the validity of aggregating data across ecoregions; and 6) develop a basinwide, ecoregionally calibrated biotic index for assessing Potomac nontidal streams. Basin states' data were combined in a custom database. Criteria for reference and stressed sites were based upon the common habitat and water quality parameters or their analogs used by the states. Seven metrics effectively discriminated impairment: EPT Richness, Hilsenhoff's Family Biotic Index, Percent Clingers, Percent Collectors, Percent 2 (or 5) Dominance, Percent EPT, and Taxonomic Richness. An aggregated index was developed using these metrics, and its ability to distinguish reference from impaired sites in a validation dataset was evaluated. The index accurately identified impaired sites in the calibration dataset for all ecoregions tested, and clearly separated reference and impaired streams for most ecoregions tested in the validation dataset. Reference communities were also compared between ecoregions. Blue Ridge, Central Appalachian Ridge and Valley, and Central Appalachian communities were indistinguishable, supporting aggregating reference site data across these ecoregions. Results suggest that data from diverse sources can be combined to produce scientifically defensible judgments on the condition of aquatic resources, if the synthesis is done with care.