

## **AQUATIC COMMUNITY CLASSIFICATION FOR EASTERN MONTANA: USES IN BIOASSESSMENT AND CONSERVATION**

David Stagliano, Montana Natural Heritage Program, 1515 E. 6th Ave., Helena, MT 59601,  
dstagliano@mt.gov

The Montana Natural Heritage Program developed a hierarchical classification framework defining 38 Aquatic Ecological Systems (AES) within 13 broader lotic ecosystems of the Missouri River Basin of Montana. We used a combination of classification techniques identifying the dominant variables and indicator species structuring river communities from the mountains to the prairies. Twelve macroinvertebrate and 10 significant fish community groups were delineated using taxonomic data from ~1100 sampling sites within the basin. These community groups were related to elevation, geomorphology, stream size and tolerance to anthropogenic impacts. Fish introductions have played a significant role in structuring the transitional river systems, as well as warm-water fish communities. Reference sites for each classification group were determined and the frequency of occurrence of the indicator species calculated. Thus, for each classification type, we developed an “expected” community of fish and macroinvertebrates that can be analyzed against future samples to test the samples similarity to reference condition, and ultimately determine the biointegrity of the system. Our observed versus expected (O/E) analysis of fish/macroinvertebrate samples from the Powder River and Frenchman Creek produced comparable and slightly more robust values than the existing plains IBI. We contend that using O/E values is a truer measure of ecosystem health than traditional multimetric indices, i.e., IBI, BIBI, especially for Montana’s lower-elevation streams that naturally contain species tolerant to environmental and anthropogenic stressors.