Abstracts

Thursday, May 1

Session J2: Novel Biotic Indices

8:00 – 9:30 am | Room 262

Upper Mississippi River Mussel Community Assessment Tool

Heidi Dunn[1], Steve Zigler[2], Teresa Newton[2] and Jon Duyvejonck[3]
[1]*Ecological Specialists, Inc., O'Fallon, Mo.,* [2]*US Geological Survey, LaCrosse, Wis.,* [3]*US Fish and Wildlife Service, Moline, Ill.*

Abstract
Managers in the Upper Mississippi River (UMR) need a quantitative means of evaluating the relative health or value of a mussel bed for identifying and preserving mussel resources, assessing anthropogenic impacts, assessing the efficacy of restoration techniques, and other regulatory tasks. We evaluated a series of statistically derived curves that plot the frequency distribution of different mussel metrics representing the categories conservation status/ sensitivity, taxonomic composition, population processes, abundance, and diversity. Multiple metrics in each category were calculated using existing quantitative data from 25 surveys that spanned low to high quality mussel communities from Navigation Pools 2 to 25. Metrics in each category were evaluated for range, ecological significance, sampling bias, and redundancy. Of the 50 metrics initially evaluated, 10 were selected; percent listed species, percent tolerant taxa, percent tribe Lampsilini, percent freshly dead shells, percent ≤5 years old, percent ≥15 years old, density at the 75th quartile, species evenness, tribe level evenness, and rarefaction species richness. Frequency distributions of these metrics were plotted using the 25 test data sets. Distributions were divided into good, fair, and poor categories based largely on quartile analysis. Scoring categories for metrics assumed that a healthy freshwater mussel community consists of species with a variety of reproductive and life history strategies, a low percentage of tolerant species and a high percentage of sensitive species; has evidence of recruitment, a variety of age classes, and low mortality; and has high abundance, high species richness, and high species evenness. The 25 data sets analyzed in this study provide a preliminary range of values for the selected metrics within the UMR. Although data gaps exist, testing with additional data sets is needed, and categories need refining with additional data, selected metrics appear to provide a tool to assess mussel communities in the UMR.

Implementation of a Long-term Quantitative Mussel Monitoring Program in Kentucky

Jacob Culp, Sue Bruenderman and Ryan Evans
Kentucky Dept. for Environmental Protection, Frankfort, Ky.

Abstract
Because freshwater mussels are extremely long-lived and sensitive to changes in their physical and chemical environment, they are excellent water quality monitoring organisms. The Kentucky Division of Water (KDOW) has begun designing and will implement its first mussel monitoring program in 2014. This network will be added to an existing biological monitoring program tied to KDOW's Ambient Water Quality Monitoring Program, which tracks long-term water quality trends in larger streams and rivers throughout the state. At select fixed ambient stations on approximately 12 rivers representing Kentucky's various bioregions, where monthly surface water chemistry is analyzed, long-term mussel monitoring sites will be established. Mussel assemblages at these stations will be quantitatively sampled and statistically analyzed for mussel population and community trends. We expect that the addition of mussel community monitoring, combined with traditional fish community, habitat and water chemistry assessments, will greatly enhance our ability, and with greater accuracy, to evaluate and identify trends in both the biological and ecological integrity of Kentucky's flowing waters.

Validation of a Headwater Index of Biotic Integrity for New Jersey's High Gradient Streams

Brian Henning
New Jersey Dept. of Environmental Protection, Trenton, N.J.

Abstract
The New Jersey Department of Environmental Protection (NJDEP) collaborated with the Academy of Natural Sciences of Drexel University (ANSDU) to develop an index of biotic integrity (IBI) for high gradient headwater streams to provide a rapid, cost effective assessment of the water quality and condition of New Jersey's high gradient headwater streams. The NJDEP has had an active fish based index of biotic integrity monitoring program since 2000 to assess the condition of streams and small rivers with drainage areas greater than five square miles. However, an estimated 81 % of the non-tidal stream miles north of the fall line in NJ are less than five square miles in watershed size, and 38% of those streams are protected through antidegradation designation. Therefore, an effective tool was sought to monitor these important resources and to expand our biological monitoring in more waters of the state. The Headwater IBI developed by ANSDU was composed of metrics based on the assemblage of fish, crayfish, salamanders and frogs present at a sampling location. The IBI developed by ANSDU was tested against independent data from 30 sites collected by NJDEP in 2013 to validate its ability and effectiveness to classify the quality of high gradient headwater streams based on biotic assemblages. Proposed HIBI metrics were evaluated to test the ability of the multimetric index to discriminate between reference and degraded conditions using classification efficiencies.

Investigating a Rapid Floristic Quality Assessment Method for Mid-Atlantic Wetlands or What's a Nice Intensive Assessment Method Like You Doing in a Rapid Assessment World Like This?

Sarah Chamberlain
Penn State University, University Park, Pa.

Abstract
Floristic Quality Assessment (FQA) has recently emerged as one of the best tools available to evaluate wetland condition. With the completion of the Mid-Atlantic Regional FQA in 2009, it is now possible to deploy the method region-wide. Despite its efficacy as an assessment tool, FQA is an intensive method that requires specialized expertise and an additional commitment of both time and resources. As States move to institutionalize wetland monitoring and assessment programs, most are building their programs around rapid site assessments. This, in turn, has led to an increased interest in developing rapid versions of intensive tools, particularly those that use floristic metrics. We investigated the efficacy of a rapid version of the Floristic Quality Index (FQI) by first conducting a sensitivity analyses on the index to determine which variable(s) drive the model. Using reference wetland plant species lists, we will next examine the behavior of the model when in situ species lists are systematically reduced in richness and floristic quality. This exercise tests the resiliency of the model and simulates how the model will respond as one moves from a comprehensive plant species list to more typical lists with less taxonomic detail, such as those from rapid assessments. Finally, we will test the index using plant lists from Routine Wetland Determination Forms to evaluate if wetland condition could also be ascertained from information gathered during wetland delineations. The ability to effectively deploy FQA in a rapid context would be an important advance in wetland monitoring and assessment in the region.