

Fish Assemblage Relationships with Thalweg Depth Characteristics and Barriers to Downstream Passage in Three Eastern Iowa Rivers

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Goals and Objectives:

- The purpose of this study is to characterize depth distributions in three eastern Iowa rivers and explore relationships of depth with fish assemblage characteristics. The specific objectives are to:
 - 1.) Survey the thalweg depth profile of 12 study reaches in three eastern Iowa rivers
 - 2.) Describe the depth distributions in study reaches and the availability and spatial arrangement of deep-water habitats.
 - 3.) Compile and analyze fish assemblage data from study reaches.
 - 4.) Explore relationships of depth distributions and availability of deep-water habitat with fish assemblages.
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Progress:

Twelve study reaches on three rivers in eastern Iowa, the Maquoketa, Turkey, and Wapsipinicon, were surveyed for thalweg depth profile using a GPS/sonar unit. Depth survey data were entered into ArcGIS for analysis, resulting in a series of depth measurements tracing the thalweg at 1-meter intervals. Depths were analyzed as a continuous variable, and as a categorical variable with depths grouped into four categories: shallow (0 to 1 meter), intermediate (1 to 2 meters), moderately deep (2 to 3 meters), and deep (greater than 3 meters). Depth maps of each study reach were created by overlaying the 1-meter interval thalweg depths onto both aerial photos and digitized topographic maps. Depths were color-coded by category. Locations of dams on the three study rivers were obtained to quantify barriers to downstream passage. Fish collection data from the study reaches were obtained from various sources.

Depth variables were calculated for each category and analyzed. We defined pools as contiguous lengths of the thalweg ≥ 2 meters deep. For each reach, we quantified the percentage of reaches as pools, the density of pools (number per km), mean pool length, variation of pool length, mean inter-pool distance, and variation of inter-pool distance. Nonmetric multidimensional scaling ordination was used to express the similarity of reaches based on the full suite of depth variables. Depth zone maps have been created. Fish community data from new collections and existing databases were compiled for all study reaches. Fish community data have been entered into a database and used in summary statistics calculations (i.e. fish IBI scores, species abundances, etc.) for each stream reach. Smallmouth bass aging structures were collected from all study reaches. Structures have been cataloged and aged. Relationships between depth variables, barriers to downstream passage, and fish assemblages were analyzed using a variety of statistical techniques.

Future Plans:

Data analysis is nearly complete. Completion of the final report is anticipated in December 2009.