

Relationships of Fish Communities and Availability of Deep-water Habitat

Principal Investigator: Clay L. Pierce
Collaborators: Gregory T. Gelwicks, Iowa Department of Natural Resources
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Goals and Objectives:

- The purpose of this study is to examine relationships of fish communities and populations of channel catfish and smallmouth bass with availability of deep-water habitat. The specific objectives are:
 - To quantify the existence of quality deep-water gamefish habitat in stream sections of interest.
 - To quantify fish community characteristics in the stream sections of interest.
 - To quantify channel catfish and smallmouth bass population size and growth rates in the stream sections of interest.
 - To explore relationships of fish communities and gamefish characteristics with availability of deep-water habitat.
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Progress:

Twelve study reaches on 3 eastern Iowa rivers were surveyed for depth profile using a GPS/depth sonar. The data was entered into ArcGIS for analysis, using 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 variables were calculated for each category and analyzed. Preliminary depth zone maps have been created. Fish community data from new collections and existing databases were compiled for all study reaches. Summary statistics from the fish community database have been used in calculations (i.e. fish IBI scores, species abundances, etc.) for each stream reach. Smallmouth bass and channel catfish aging structures were collected from all study reaches. Structures have been cataloged and aged. Relationships between depth variables and fish variables were analyzed using correlation analysis and linear regression.

Species richness was found to be positively correlated to moderately deep ($p=0.01$) and deep ($p=0.05$) water depth frequencies as well as mean depth ($p=0.04$). This suggests that species richness increases as the frequency of moderately deep and deep depth increases. Percent benthic species were found to be negatively correlated ($p=0.01$) to depth coefficient of variation. This suggests the number of benthic species decreases as the depth variability increases. No significant correlations were found between depth variables and sinuosity or streambed slope.

Streambed slope was the only variable that showed linear distribution downstream ($F=69.80$, $p=0.01$). The slope decreases as the river progresses from its headwaters to its mouth.

Future Plans:

Growth rates of smallmouth bass and channel catfish are being calculated and analyzed. Relationships between depth variables, gamefish growth and fish community variables are being analyzed.