Assessment of Interrelationships between the Fisheries Community and Limnological Characteristics in Iowa Lakes

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Goals and Objectives:

- Evaluate patterns in fish assemblage structure among Iowa lakes using extant fisheries data,
- Describe and assess age structure and growth rates of indicator fish species,
- Develop a classification index based on fisheries quality, and
- Examine relationships among fish assemblage structure, limnological conditions, lake basin morphology, and watershed characteristics.

Progress:

The purpose of this study is to investigate relationships between fish assemblage characteristics and habitat quality in 132 Iowa lakes. Understanding the relationships between fish assemblages and habitat quality (e.g., watershed condition, limnological characteristics) is the first step in developing water quality standards (e.g., nutrient standards) and biological assessment criteria (e.g., Index of Biotic Integrity), which can then be used to guide protection and restoration programs for lakes in Iowa.

Standardized fisheries data were collected by the Iowa Department of Natural Resources (DNR) during 2001-2004. Length, weight, and count data as well as hard structures (e.g., scales, spines, otoliths) for age and growth analysis were collected for black bullhead *Ameiurus melas*, black crappie *Pomoxis nigromaculatus*, bluegill *Lepomis macrochirus*, common carp *Cyprinus carpio*, largemouth bass *Micropterus salmoides*, northern pike *Esox lucius*, smallmouth bass *M. dolomieu*, white crappie *P. annularis*, and yellow perch *Perca flavescens*. All length, weight, and count data have been entered into a database for storage and analysis. Iowa State University researchers and DNR fisheries personnel are currently aging the hard structures and entering information into a database for future analysis. Quality assurance and quality control have been performed on the data and preliminary analysis has begun. Preliminary analyses show that lakes with high levels of nutrients (e.g., total phosphorous, chlorophyll a) and total suspended solids tend to have fewer bluegill and largemouth bass and more common carp compared to lakes with lower levels of nutrients and total suspended solids. In order to assist in developing nutrient standards for Iowa lakes, additional analyses have been conducted to identify threshold levels of nutrients that may influence sportfishing opportunities. Initial findings from our analyses coincide with values derived from other analyses being conducted by DNR.

Future Plans:

Researchers will complete analysis of age and growth data and continue data analysis. Analysis will be completed to evaluate patterns in fish assemblage structure, describe and assess age structure and growth rates of indicator fish species, develop a classification index based on fisheries quality, and examine relationships among fish assemblage structure, limnological conditions, lake basin morphology, and watershed characteristics.