Modeling Nearshore Fish Community Responses to Shoreline Types in Lake Erie

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Abstract

Approximately 80 percent of fishes from the Laurentian Great Lakes use the nearshore zone in some way (e.g., feeding, spawning, or nursery area) for at least part of the year. Extensive shoreline alteration and development along Ohio's Lake Erie coast have reduced habitat complexity and changed ecological connections at the interface of land and water. Wy hypothesized that shoreline features affect the nearshore fish community composition and distribution. Relationships between shoreline type and the nearshore fish community were determined by classifying terrestrial vegetation, shoreline armor structure, and a shoreline's exposure to wave energy at 51 coastal sites where fish were sampled between 2011 and 2017. Changes in the species richness as well as predicted total and relative abundances of nearshore fish community groups were modeled based on these shoreline classifications. We found that wave energy was negatively correlated with nearshore fish species richness as well ast total abundance of nearly all fish groups. Shoreline vegetation was inversely related to wave energy but positively associated with nearshore fish species richness and abundance of rare taxa. Shoreline armoring was uncorrelated with wave energy but was positively associated with nearshore fish species diversity at low exposure to energy, however, armoring led to more homogeneous fish communities at high wave energy. Understanding the impacts of shoreline modification on nearshore fish community attributes is critical to em-

ploying best management practices that will protect and sustain nearshore fish habitat in Lake Erie.

Introduction

The quality of fish habitat in freshwater lakes depends on a variety of physical and chemical factors