MICHIGAN STATE UNIVERSITY

Quantitative Fisheries Center (QFC) Ongoing Project Briefing

PREDATOR-PREY DYNAMICS IN THE MAIN BASIN OF LAKE HURON

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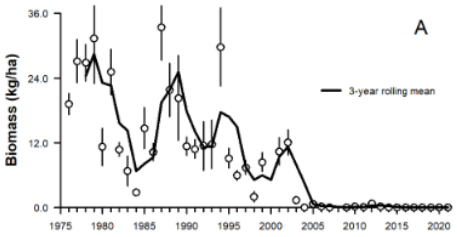


Swept area alewife biomass from USGS trawl survey (O'Brien et al report at: https://www.glfc.org/pubs/lake_committees/common_docs/Status and Trends of the Lake Huron Prey Fish Community, 1976-2021.pdf

Goal: Understand causes for the initial alewife decline and their continued suppression in Lake Huron

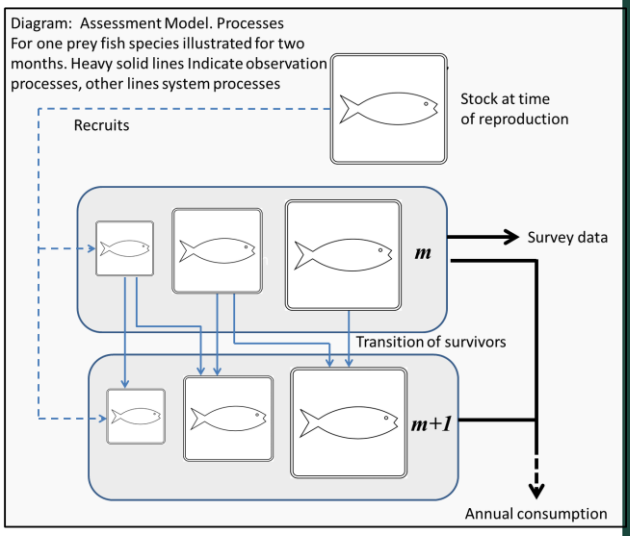
Objectives:

1. Develop estimates of the absolute abundance and dynamics of the major prey species (alewife and rainbow smelt) during and after the major decline of alewife
2. Evaluate how variations in prey fish recruitment, mortality, and individual growth contributed to prey dynamics and were related to piscivory or environmental factors.
3. Predict conditions under which alewife could again become a major ecological contributor in the Lake Huron main basin.

Management Implications: Understanding why alewife declined and remained at low abundance is critical to managing the predator community.

Methods:

- Combine and update existing predator assessment models, growth estimates, and bioenergetics calculations to estimates piscivore consumption of prey fish.
- Develop an age-structured prey fish assessment model.
- Relate the resulting estimates of prey recruitment and mortality to possible causes such as predation and temperature as integrated part of the prey fish assessment.
- Use simulations to evaluate under what conditions alewife might become reestablished as a dominant species.



Assessment model processes illustrated for two moths, showing how prey abundances in different size classes would be updated and influence observed quantities.

Prelim. Findings/ Next Steps:

- Assessments have been compiled and growth analyses were done. Very preliminary assessment completed. Next step is to complete assessment for prey.

QFC Supporting Partners

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