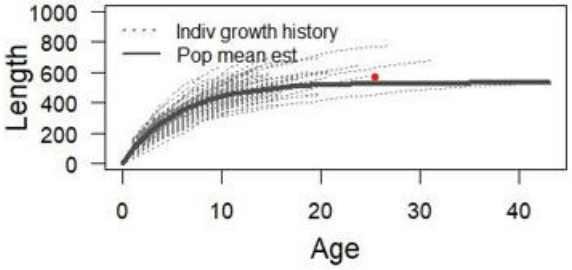
MICHIGAN STATE UNIVERSITY

Quantitative Fisheries Center (QFC) Ongoing Project Briefing

ASSESSING INDIVIDUAL VARIABILITY IN GROWTH RATES FOR GREAT LAKES FISH POPULATIONS

Project Lead: James Bence
Contact info: bence@msu.edu
QFC Collaborators: Travis Brenden
Other Collaborators: Elizabeth Stebbins, Shane Flinn, Mike Hansen, Daniel Iserman, Joe Schmitt, Shannon Davis-Foust

Funding Agency: Great Lakes Fishery Commission
Start Date/Status Date: January 2019 – January 2026



Example of data for a lean lake trout population on Lake Superior showing among individual variation in growth using back-calculated lengths.

Goal: To better understand the nature of among individual variability in individual fish growth and the importance of accounting for it in fishery management

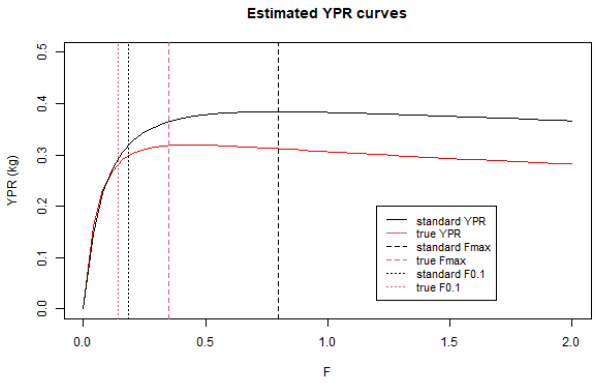
Objectives:

1. Quantify patterns in among-individual growth variability for multiple populations of important Great Lakes region.
2. Determine if and how among-individual variation in growth rate parameters is predictable from system characteristics and stock status.
3. Identify implications of growth rate variability to fish population dynamics and management.

Management Implications: Various fishery management reference points depend upon fish growth and individual variation among fish is ignored in the calculation of the reference points. This research will evaluate whether reference points and resulting management should be altered to account for this variation.

Methods:

- Acquire repeated measures of growth on the same individuals as recorded in hard structures from Great Lakes and inland locations.
- Fit models where individual fish growth parameters deviate from their population mean.
- Relate individual variability in growth parameters to predictor variables.
- Use simulations to evaluate how among individual growth variation influences reference measures such as spawning biomass per recruit.



Preliminary simulation results based on lean lake trout in Lake Superior showing large influence of growth variation on yield per recruit curves and reference points based on them. "True values" account for among individual variation.

Prelim. Findings/ Next Steps:

- Extensive variation among individuals exists for Great Lakes fishes, including Lake Trout, Black Bass, Freshwater Drum, and Walleye. At least for Lake Trout this influences reference points. Additional populations/species need to be evaluated and simulations refined.

QFC Supporting Partners

MICHIGAN STATE UNIVERSITY · DNR MICHIGAN · GREAT LAKES FISHERY COMMISSION · DEPARTMENT OF NATURAL RESOURCES · OHIO DEPARTMENT OF NATURAL RESOURCES · WI DNR · PENNSYLVANIA FISH & BOAT COMMISSION · Illinois Department of Natural Resources · DEPARTMENT OF ENVIRONMENTAL CONSERVATION NEW YORK STATE · Great Lakes Indian Fish & Wildlife Commission · Ontario Ministry of Natural Resources