MICHIGAN STATE UNIVERSITY

Quantitative Fisheries Center (QFC) Ongoing Project Briefing

Incorporating New Fishery Independent Surveys into SCAA Models: Interactions Among Time Series Length, Life History, and Data Quality/Complexity

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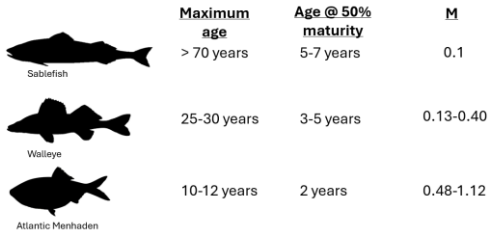
Funding Agency: QFC Base Funds
Start Date/Status Date: 2024/January 2026



Caption: Candidate fish life history types to be evaluated through this project

Goal: Provide guidance as to the minimum time-series length before a new fishery independent survey can be incorporated as a data source into an existing statistical catch at age (SCAA) assessment model and how this is affected by variations in fish life histories and data quality/complexity.

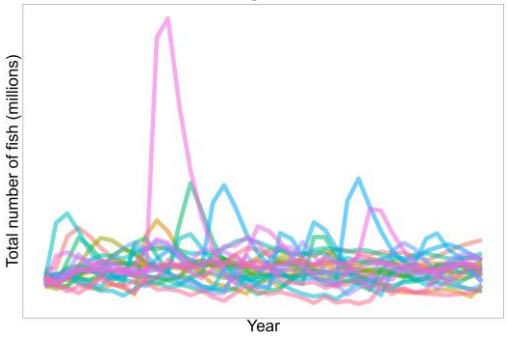
Objectives:

1. Evaluate how fisheries independent survey time series length influences SCAA model convergence, parameter identifiability, and estimation accuracy when the new survey is incorporated into the model and test across different life-history strategies (opportunistic, periodic, equilibrium).
2. Evaluate how complexity of the survey parameterization (e.g., constant vs time varying catchability; selectivity estimated as a function vs. free parameters) affects minimum time series length.
3. Evaluate how type of survey (e.g., recruitment focused survey vs multiple age survey) affects minimum time series length.
4. Evaluate how data quality (e.g., level of observation error) affects minimum time series length.

Management Implications: Little information exists for how long a fishery independent survey should be conducted prior to its incorporation in an SCAA model as a new data source. The minimum time series length is likely to be affected by life history aspects of the assessed species and population (e.g., life span, inter-annual variability in recruitment) and aspects related to the survey (e.g., observation error, number of ages targeted by the survey). Too short of a time series could lead to model convergence issues as well as possible biases in assessment model outputs. Research results will provide guidance to assessment scientists in terms of expectations for when a new survey could be added to an existing model.

Methods:

- Develop an operating model to simulate fish populations with known dynamics (e.g., recruitment, mortality), fishery harvest, and fisheries-independent survey catches under controlled scenarios representing different life histories, survey designs, and levels of process and observation error.
- Fit SCAA model to simulate data sources, incorporating alternative representations of the fisheries-independent surveys.
- Quantify assessment model performance by comparing estimated parameters to true values and evaluating model convergence and parameter identifiability.



Caption: Example output of simulated population dynamics from operating model conditioned on walleye life history characteristics.

Current Status:

- Simulation and assessment models have been coded in R and code extensively checked to ensure models are operating as intended and capable of running a wide range of scenarios.
- Planned scenarios have been identified with simulations be conducted in early 2026.
- Completed results expected in spring or summer 2026.

QFC Supporting Partners

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