

ANNUAL REPORT

HABITAT ASSESSMENT FUNDED RESEARCH

Project Title:

Physiological ecology and habitat suitability: combining experiments and surveys to inform stock assessments

Funding Fiscal Year: FY14/FY15**Report Fiscal Year:** FY14**Date Submitted:** 2 Mar 2015**InPort ID#:** _____**Principal Investigator(s):**

Jonathan Hare, John Manderson, David Richardson, Mark Wuenschel, and Grace Saba

Goals:

1. Measure respiration as a function of temperature and body size using in situ experiments
2. Estimate respiration as a function of temperature and body size using a biochemical assay
3. Compare habitat suitability models derived from survey-based species distribution models, experimental-based respirometry experiments and biochemical assay of metabolic potential

Approach:

We propose to parameterize mechanistic thermal niche models by measuring temperature and size-dependent metabolic rates for Atlantic Butterfish. We propose two experimental approaches: in situ respirometry (goal 1) and biochemical assays (goal 2). We will then compare these results with the habitat suitability model derived from survey operations (goal 3).

Work Completed:

On the administrative side, a respirometer has been purchased from Loligo Systems and funds have been transferred to Rutgers University through the Cooperative Institute of the North Atlantic Region. These were the primary administrative tasks required for FY14.

On the research side, progress has been made on the first two goals. The respirometer was successfully used on the November Ecosystem Monitoring Survey. Three staff, Dr. Grace Saba (Rutgers), Dr. Richard Bell (NEFSC/NRC), and Mr. Chris Talyor (NEFSC/Integrated Statistics) set up the respirometers and made measurements of fish captured in a mid-water trawl. All logistical issues were worked out. Very few butterfish were encountered, but the experience will be used in staging future field deployments of the respirometers. Work has also been underway to measure ETS activity from butterfish captured at different temperatures. Butterfish were obtained from the NEFSC fall trawl survey and returned frozen to the Narragansett Laboratory. Preliminary measurements of ETS were successful and now the assay is being optimized.

Owing to the few butterfish captured during the November Ecosystem Monitoring survey, the survey team is debating whether to start making respiration measurements in the laboratory.

Dr. John Manderson is considering the feasibility of setting the equipment up at the Sandy Hook Laboratory and working with local pound netters to obtain fish for the experiments.

Applications:

The research will provide an alternative to the survey based model of butterfish habitat. This model of butterfish habitat was successfully used to bound catchability in the 2013 stock assessment model. Having multiple, independent measurements of the physiological response to temperature will increase confidence in the habitat model.

Publications/Presentations/Webpages:

- None to date

Please attach visuals for Habitat Science Webpage (pictures, maps, charts from project)