Final Report Summary

2. NOAA Grant Number -NA07NMF4550325
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5. Supporting Institution: School for Marine Science and Technology/University of Massachusetts Dartmouth
6. Sub-award amount: $75,529
7. No equipment purchased over $5000.00
8. Tasks Scheduled: Collect specimens of yellowtail, winter, windowpane and summer flounder, identify reflex actions that help determine fish that are stressed versus unstressed, mark all collected fish with an individual identification number, perform experimental tows for each species to impose varying levels of stress, test suite of reflexes after experimental tows, holding fish for 60 days and observe for mortalities.
9. Tasks Accomplished: Specimen collections, marking, reflex identification, experimental tows, reflex testing and holding studies were performed for yellowtail, winter and windowpane flounder.
10. Explanation of problems: The work for summer flounder was not performed because of scheduling conflicts between scientific and industry partner as well as higher than expected initial mortality for all species collected. These issues lead to a timeline that was extended beyond that of the grant.
11. Project results (summarized):

   **Yellowtail flounder**

   The Southern New England Mid-Atlantic yellowtail flounder *Limanda ferruginea* stock has a history of substantial discards and the current stock assessment assumes 100 percent discard mortality. A controlled experimental trawl was used to test seven reflex actions, which combined make up the Reflex Action Mortality Predictors (RAMP), from stressed and unstressed yellowtail flounder. Tow-time and air exposure were tested to identify their effect on mortality. Mortality was significantly related to reflex impairment. Exposure to air was the more influential stressor in the survivability of yellowtail flounder; suggesting that the discard mortality could be reduced in the fishery by limiting the time the fish are exposed to air on deck.

   **Winter flounder**

   Estimating the survival rate of winter flounder, *Pseudopleuronectes americanus*, that are discarded is increasingly important for stock assessment and fishery management because
recent regulations increased discarding. A controlled experimental trawl was used to test seven reflex actions from stressed and unstressed winter flounder. This suite of reflexes combined, make up the Reflex Action Mortality Predictors (RAMP). Tow-time and air exposure were tested to identify their effect on mortality. Mortality was significantly related to reflex impairment, but neither air exposure nor tow-time significantly affected the survivability of winter flounder. Although air exposure did not significantly affect survival, none of the experimental fish exposed to air for 15 minutes or more survived; suggesting that the discard mortality could be reduced by limiting the length of time the fish are on a dry deck.

**Windowpane flounder**

A controlled experimental trawl was used to test seven reflex actions from stressed and unstressed windowpane flounder (*Scophthalmus aquosus*). This suite of reflexes combined, make up the Reflex Action Mortality Predictors (RAMP). Tow-time and air exposure were tested to identify their effect on mortality. Mortality was not significantly related to reflex impairment, and neither air exposure nor tow-time significantly affected the survivability of windowpane flounder. These results indicate that windowpane flounder are highly susceptible to the stresses of the commercial fishing process and are unlikely to survive discarding regardless of the sampling or handling method.