

Project Proposal – Prepared by Steve Eayrs (GMRI)

Title:

Collaborating with fishermen to evaluate the efficacy of semi-pelagic doors to improve profitability and reduce environmental impact in the New England groundfish fishery: A win-win for fishermen and the environment

Principal Investigators:

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Introduction:

Fishermen operating in a catch-share managed fishery can optimize their profitability by reducing fishing costs and increasing the value of landings for a given allocated catch entitlement. The consumption of diesel fuel is a major fishing cost that significantly limits the profitability of fishermen, and options to reduce fuel consumption in the groundfish fishery include the use of semi-pelagic doors to eliminate seabed contact and friction. These doors should also reduce substantially the physical impact of trawling on the seabed.

Project Goal:

To evaluate the ability of semi-pelagic doors to improve profitability and reduce the environmental impact of demersal trawling.

Project Objectives:

To evaluate the ability of semi-pelagic doors to:

- i) reduce the consumption of diesel fuel during the trawl operation,
- ii) maintain the catch of commercial species in comparison to traditional bottom-tending doors, and,
- iii) eliminate door induced impact on the seabed.

Methods:

All fishermen involved in the semi-pelagic door financing option will agree to allow GMRI scientists to collect data to evaluate the impact of these doors on trawl geometry, fuel consumption, and catch, or will agree to collect these data themselves using standards and protocols provided by GMRI. The particular data collection option selected will be determined based on the outcomes of discussions between each fisherman and GMRI.

Data collection is timed for the fall of 2012 to late summer 2013 onboard 4-5 commercial boats operating in the New England groundfish fishery. Fishing will occur as per normal practice with the exception that both semi-pelagic and bottom-tending doors will be incorporated alternately into the fishing operation. This will most likely require the collection of data using the bottom-tending doors during one fishing trip followed by the collection of data using the new semi-pelagic doors during another fishing trip. An acoustic trawl mensuration system will be used to measure and record door spread, wingend spread, and headline height during each tow. The fuel flow meter will be fitted to the vessel prior to the experiment to measure fuel consumption when each door is being used. Catch collection will include catch weight by key species and length-frequency measurements (measurement of fish length will occur when time permits, and only collected by GMRI scientists - fishermen are not required to collect fish-length measurements). When weather and water clarity permits, efforts will be

made to film the doors in operation. All data collection processes will be designed to avoid influencing the commercial fishing operation.

If possible, on at least one boat with adequate deck space, efforts will be made to carry onboard both sets of doors. In this way they can be alternated after consecutive tows during the fieldwork. Based on normal tow duration of 2 - 3 h a total of 4 tows are expected to be completed each day over a 5-day period. Each door will be towed twice before replacement, and efforts made to ensure reciprocal towing directions; thus an AABB BBAA towing sequence will be used where A = semi pelagic doors and B = traditional doors.

During this experiment the commercial catch remains the property of the captain or boat owner.

Seabed impact

To check if the semi-pelagic doors are operating clear of the seabed, they will be visually inspected at the completion of each tow for signs of bottom contact, including scratch marks or polish on the shoe of the door. If necessary, black paint will be applied to the bottom of each door to assist with visual inspection and assessment of seabed contact. Based on the measurement of door spread, we will calculate a reduction in seabed contact as a proportion of total lateral trawl spread.

Fuel consumption

For each tow the rate of fuel consumption (gph) will be recorded. This data will be combined with trawl mensuration data to calculate the rate of fuel consumption per square meter of mouth opening; this measurement enables comparison of fuel consumption by accounting for differences in trawl geometry when each door is used. The key hypothesis to be tested is:

Ho: There is no significant difference in the rate of fuel consumption using either door type

Catch

For each tow the catch will be sampled. All commercial (kept and discarded) and non-commercial species will be identified and weighed, and when GMRI scientists are onboard they will also be measured. When catches are large a sub-sample will be collected for analysis. Key hypotheses to be tested are:

Ho: There is no significant difference in the commercially valuable fish catch using the semi-pelagic doors

Ho: There is no significant difference in the size composition of the commercially valuable fish catch using the semi-pelagic doors

Ho: There is no significant reduction in the catch of non-commercial fish using the semi-pelagic doors

This process will be repeated on at least one other boat, and preferably two. The cost of such fieldwork renders repeating this process on all boats prohibitive, and the collection of data on these remaining boats will include requesting fishermen to collect data from the acoustic sensors, fuel flow meter, and catch, and providing the data to GMRI staff at the completion of their fishing trips. Training and data sheets will be provided to fishermen by GMRI staff.

Data analysis and Outreach:

GMRI staff will statistically evaluate all data using appropriate analytical techniques, including paired t-tests to compare means between data sets and a Kolmogorov-Smirnov test to compare length-frequency distributions of each species. The findings of this experiment will be discussed in terms of their environmental impact, their impact on the profitability of fishing activity, and their potential uptake by other fishermen. Thereafter, the results of this experiment will be presented to fishermen verbally (by word of mouth and presentation at industry meetings) and by providing a one-page summary brochure for distribution. Depending on the quality of the data, efforts may be made to complete a paper for publication in industry literature such as Commercial Fishermen's News and National Fisherman, and in the scientific literature. A poster will also be produced for presentation at various industry meetings and symposia. The final report is expected to be completed in September, 2013. Providing sufficient footage can be collected a brief video documenting the performance of the doors will be produced, highlighting their stability during the fishing operation, clearance above the seabed, and influence on catch and fuel. Access to this video can be made available online via the GMRI website.

Other considerations:***Insurance***

GMRI requires each participating fisherman to be insured, preferably to \$1,000,000, be coast guard certified, and to make arrangements with their own insurance company to have two GMRI scientists included as additionally insured for the duration of the fieldwork. This cost of insurance is typically only about \$250 and is the responsibility of each fisherman.