Project Proposal

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

Principal Investigator:
Steve Eayrs, 350 Commercial St. Portland, ME 04101 Ph: (207) 228 1659, Email: steve@gmri.org

Introduction:
The consumption of diesel fuel is a major fishing cost that significantly limits the profitability of fishing activity. Options to reduce fuel consumption in a demersal trawl fishery include the use of semi-pelagic doors to eliminate seabed contact and friction. These doors should also reduce substantially the physical impact of the trawl system on the seabed.

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

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

Methods:
GMRI will discuss with each fisherman the possibility of either allowing a GMRI scientist to collect data to measure the performance of these doors, or having fishermen collect these data themselves using standards and protocols provided by GMRI.

Data collection is timed for late 2012 to mid-2013 onboard 4-5 commercial boats. 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 collected only by the GMRI scientist - fishermen are not required to collect fish-length measurements). When weather and water clarity permits, efforts will be made to also film the doors in operation. All data collection processes will be designed to avoid influencing the commercial fishing operation. 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. 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:

- 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, measured, and weighed (when GMRI scientists are onboard). When catches are large a sub-sample will be collected for analysis. Key hypotheses to be tested are:

- There is no significant difference in the catch of commercially valuable fish between both types of door
- There is no significant difference in the size composition of the commercially valuable fish between both types of door
- There is no significant reduction in the catch of non-commercial fish between both types of door

This process will be repeated on at least one other boat, and preferably two because the cost of such fieldwork renders repeating this process on all boats prohibitive.

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 Kolmorogov-Smirnoff 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, and be coast guard certified.