



Terms of Reference

Consultant Economist:

Economic and policy incentives for ropeless fishing in the Northwest Atlantic

PI: Timothy Werner, PhD. Research Professor, UMASS-Boston, School for the Environment; Senior Associate and Director of Conservation Programs, OAI Consulting (timwerner@oaiconsulting.com)

OBJECTIVE: Carry out policy-relevant macro- and micro-economic analyses targeting ropeless fishing in several fisheries in the Northwest Atlantic. The results will include a cost-benefit analysis of implementing ropeless fishing, help quantify the capital and operational expenses involved in ropeless fishing, identify potential cost reductions (offsetting costs) in relevant fisheries, and provide information for advancing policies to support development and implementation of this fishing technique.

ROPELESS FISHING: The term ropeless fishing refers to a modification of fishing gear in multi-species pot fisheries, mainly crustaceans, in which the vertical line remains at depth except when deploying or retrieving gear. It also includes grappling for the groundline attached to >1 pots and the abandonment of ropes altogether by using inflatable bags to bring pots to the surface. The rationale for this approach is to eliminate ropes suspended in the water column that can entangle whales, leatherback sea turtles, and whale sharks. The focus is on the buoy line and not groundlines (when present) although there is likely a small degree of risk from entanglement in groundlines. However, most groundlines in the Northeast U.S. (NEUS) are negatively buoyant and mainly rest on the sea bed.

Commands to mechanically release gear from depth can be achieved by using timed releases or acoustically triggered releases. The use of the latter is the preferred method because it can be activated at the precise moment required, and can also meet additional needs such as emitting a signal to warn other vessels about the presence of gear when a buoy is absent, and perhaps also improve monitoring of fishing activity by regulatory authorities who can similarly receive signals on where gear is deployed by the fishery and individuals within it.

JUSTIFICATION: Ropeless fishing is the only assured method for eliminating both whale and leatherback sea turtle entanglements in vertical buoy lines. Having pot fishermen convert their gear to a ropeless system requires a major investment in modifying fishing gear and operational practices that use relatively simple technology but nonetheless require new capital outlays and investments. For example, fishermen would need to acquire acoustic releases and have new

software or hardware on board their fishing vessel to communicate with these units. Each pot fisherman would require a number of acoustically unique codes that only that fisherman can release (e.g., cell phone numbers) but that are also detectable by regulators and other fishing boats.

Economic analyses at the scale of an individual fisherman's operation, as well as the fisheries as a whole, are needed to inform a conversion to ropeless fishing. Analyses would include how ropeless technology costs can be incorporated into the business model for pot fishermen, whether government subsidies would be required for the transition from ropes to ropeless fishing, the potential savings that might result from a reduction in derelict gear, an estimate for equipping *all* fishing vessels in a target region (likely the Gulf of Maine) with onboard gear detection systems using acoustic technology, and the anticipated reduction in recurrent costs such as disentanglement programs that might no longer be necessary.

This project is timely and likely to have high visibility. Regulatory decisions leading to the use of ropeless fishing are presently under consideration on the west coast (with the California Dungeness crab fishery) and the east coast (with pot fisheries of the northwest Atlantic). Under this project, there may be an opportunity to carry out a cost comparison between these fisheries.

Some specific economic analysis to undertake for this project:

- What is the potential volume and value of sales of ropeless technology (North America)? This will focus primarily on an examination of where pot fisheries are active and which involve whale entanglements.
- What gear configurations would justify the investment of capital into acquiring and using ropeless gear? For example, is it only longer trawls which means fewer acoustically released pop-up buoys required?
- In which fisheries would the investment in converting to ropeless fishing be most economical relative to the reduction of entanglement risk?
- What are the differences in costs between currently available units?
- What would be the cost to outfit all fishing vessels--primarily pot, trawl and drag fishermen--so that they are aware of, and can avoid, the presence of gear? This should include initial capital outlays and recurrent costs, as best estimated.
- Would ropeless fishing lead to reduced gear loss, and, if so, what would the recoverable expenses be for an individual fisherman and a fishery as a whole?
- What other costs (e.g., whale disentanglement) might become unnecessary in a conversion to ropeless fishing, and how much is the potential savings?
- What economic incentives might reasonably be provided to assist the conversion from current fishing techniques to ropeless ones, acknowledging that new technologies frequently receive subsidies or other start-up investments to become more economically viable?
- What revenues are produced directly and indirectly from businesses that rely on NARWs (e.g., whale watching)?
- Are there any economic or goodwill (social benefits) that would eventuate from the conversion to ropeless fishing?

- How do potential gear failure rates compare between ropeless and currently used systems?

The target fisheries for this study based on known and suspected entanglement risk are the following:

- Northeast/Mid-Atlantic American lobster trap/pot
- Atlantic mixed species trap/pot
- U.S. Mid-Atlantic eel trap/pot
- [and, tentatively, the] Gulf of St. Lawrence snow crab fishery

Similar analyses may also be carried out with Canadian snow crab, lobster and slime eel fisheries using supplemental funding support.

Providing perspectives on the questions above need not require original research for all those listed. Instead, the expectation is a summary study that combined original research, synopses of existing studies, and perspectives of active researchers and fisheries managers. Decisions about information sources will be identified in collaboration with this project's manager, T. Werner.

POTENTIAL INTEGRATION WITH ECONOMIC ANALYSIS BY THE NORTHEAST FISHERIES SCIENCE CENTER: The NEFSC has staff economists working on costs-revenues for commercial lobster fishing vessels. They have volunteered to make this information available which may involve publication restrictions, and the consultant economist should seek out a collaboration with them to avoid duplication of effort. In particular, there is likely an opportunity to use information from commercial lobstering business models and share it with offshore vessels with whom the ACCOL is collaborating to evaluate how closely they correspond to the same economic categories in their operations.

INNOVATIVE INCENTIVES: Often the greatest challenge in bycatch reduction research is not just identification of alternative gear that effectively fishes while reducing bycatch, but in getting new gear adopted in the fishery. Regulatory changes have been the main way to get fishermen to change practices in developed countries such as the U.S. and Canada. Nevertheless, the time it can take to formulate and implement these regulations may not always suit the short timeframe until a species may become extinct or enable the recovery of its population (e.g., effective population size, potential mate encounter rate, etc.). As a complement to an economic analysis, we therefore propose examining other incentives that may provide social, political or commercial incentives.

In tandem with an economic analysis, the economist will need to participate in discussions and reviews of policies that represent innovative approaches for facilitating and perhaps even accelerating the implementation of ropeless and similar pot gear innovations that reduce whale bycatch. There will be a separately funded policy consultant, to assist with:

- A review of the permitting and licensing process for the target fisheries identified above, including transferability of existing licenses.

- Creative leasing options in which fishing licenses, permits, or quotas are acquired and then leased back to fishermen under an agreement that they fish using methods that do not endanger NARWs.
- A tax break or other financial incentive for adopting ropeless gear.
- Incentives to open areas currently closed to commercial pot fishing if they adopt ropeless fishing techniques that do not pose entanglement risk.
- Creation of a seafood consumer market for target catch fished using gear that does not threaten NARWs.
- Other novel approaches.

OUTPUTS: A detailed report for the Project PI. A peer-reviewed publication co-authored with the PI and any other collaborators on the analysis. A presentation at the Ropeless Consortium meeting in November of 2020, and both talks and meetings as part of outreach, coordination, and feedback from stakeholders.

ADMINISTRATION: UMASS-B will administer a grant and solicit regular (bi-monthly) input through a conference call or in-person meeting. ACCOL and hired consultants will also coordinate with NEFSC economists on the focus of the work and outputs. The PI will provide technical input on the target fisheries, and facilitate contact with relevant individuals engaged in those fisheries. The PI is one of the most knowledgeable experts on both whale and leatherback entanglement mitigation, and thus can help evaluate how well different ropeless fishing technologies (e.g., acoustic releases, single versus multiple pot systems, acoustic versus timed or galvanic releases) achieve entanglement risk reduction within the context of economic variables and policy options.

QUALIFICATIONS: A PhD economist or comparable background and expertise with a measurable track record in timely publications. The Consultant will also have good communication and proven collaborative skills with colleagues in order to facilitate the delivery of project outputs. The Consultant should have experience in U.S. fisheries, and be able to apply cutting-edge theoretical economics towards finding practical solutions to challenges such as the one outlined in this project. Familiarity with New England fisheries is also preferred, and the individual should be regionally based for meetings and other local consultations.

APPLICANTS: Please Email a cover letter, CV, list of publications, project experience (including grant source, year, award amount, where appropriate) by August 31, 2020 to: bycatchdotorg@gmail.com.