



Building an innovative “whale-release” endline for whales and fishermen

Expression of Interest

We are seeking proposals to develop a 3/8” diameter endline with 1700lb virgin breaking strength that is comparable to those currently used in northwest Atlantic lobster pot fisheries. The concept is to use a rope that is practical for many pot fisheries while facilitating escape should whales come into contact with them.

Innovative “whale-release” ropes should be developed according to the specifications provided below. We offer facilitation to test these ropes with fishermen in the northeastern US using a rigorous protocol developed between our scientists and lobster fishermen. We also have small seed grants available should they be necessary to support the research and development of prototypes, and support for relatively small production runs to produce sufficient coils for preliminary testing with fishermen. We are not interested in being part of any patent on whale-release rope ideas submitted, but are only committed to facilitating their evaluation and eventual adoption if they are shown to achieve the objectives laid out herein. ***Expressions of interest will be accepted at any time, however concepts submitted by June 1, 2018 stand a better chance of receiving support*** owing to the urgency for solutions to the current crisis facing North Atlantic right whales (NARWs).

The Need

Ropes extending vertically from the seafloor to surface buoys (endlines) are one of the principal sources of fatal entanglements to endangered NARWs and other large whales. Several years ago, the Consortium for Wildlife Bycatch Reduction, which includes both lobster fishermen and wildlife scientists, experimented with weaker endlines. The rationale for using ropes of reduced breaking strength was that they might be fished practically while increasing the probability that whales entangled in them might break free more quickly. A recent study (Knowlton et al, 2016) bears this out, and indicates that ropes of this breaking strength may be one of the simplest modifications to fishing gear to reduce deadly whale entanglements. Reducing the breaking strength of ropes from ≥ 3000 lbs to 1700lbs (all else being equal, including the same rope diameter), should increase the probability that all but the smallest individual whales can exert sufficient force to break them, thereby releasing the whale before a complex entanglement occurs.

NARWs are dying at an accelerated rate from entanglement, leading to a population decline since 2010 (Pace et al, 2017). This has prompted U.S. and Canadian regulators to identify 1700lb ropes as a priority bycatch mitigation technique. Among the rope prototypes we have tested to date, including ropes with “weak links” produced by splicing in braided sleeves, we are seeking to evaluate prototypes that are 1700lb breaking strength along their entire length.

Optimal Rope Specifications

A three-strand twisted polypropylene or another poly blend rope with a diameter of 3/8" and virgin breaking strength of around 1700 lbs. Two versions of the same rope are needed, one that is positively and one negatively buoyant in seawater. Innovative designs and ideas are encouraged provided they will not eventually be overly cost-prohibitive at a commercial scale. Ropes should be relatively easy to splice, and able to run through pot haulers.

Additional Preferred Property – Color/Luminosity

Research by the New England Aquarium and collaborating scientists has demonstrated that NARWs show an aversion response sooner when presented with ropes colored orange-red than with other hues (green, black, white, etc.), during daylight hours in shallow waters where there is sufficient light penetration. Optimal rope designs would incorporate red-orange coloring in at least two strands ($580 \leq n \leq 620\text{nm}$), while the third strand could have a phosphorescent substance coating or impregnating the rope so that it has a UV-charged blue-green glow at $\sim 494\text{nm}$. This should improve the visual perception of ropes to whales in well-lit surface waters, and also at night and in deeper waters.

Why not fish with ropes of lesser diameter?

We are frequently asked why we just don't use ropes of lower diameter to achieve the target breaking strength. This is because research that we and others have undertaken show that thinner lines have a tendency to produce more severe lacerations to whales that become entangled in them.

How much in seed funding is available?

We anticipate providing up to three grants of \$5000/ea, but this will depend on our internal evaluation of the concepts received. Estimates for producing experimental ropes for testing (cost/coil) should also be provided but will be considered separate from seed funds.

What is the next step if I am interested in collaborating?

Whether or not seed funding is requested, any rope designer or manufacturer should describe the prototype to be produced, its material, construction, dimensions, properties, estimated price/coil, when a prototype can be available, and any other information necessary for evaluating the concept. All those requesting seed funds should provide us with what they require to develop a prototype.

Contact: Richard Malloy, Bycatch Consortium/ACCOL, rmalloy@neaq.org, 617-226-2217.

References:

Knowlton, A. R., Robbins, J., Landry, S., McKenna, H.A., Kraus, S.D. and Werner, T.B. (2016). Effects of fishing rope strength on the severity of large whale entanglements. *Conservation Biology* 30: 318-328.

Richard M. Pace, I., Corkeron, P. J., & Kraus, S. D. (2017). State-space mark-recapture estimates reveal a recent decline in abundance of North Atlantic right whales. *Ecology and Evolution*, 7, 8730-8741.