19 June 2017

Mr. Samuel D. Rauch III
Acting Assistant Administrator for Fisheries
National Marine Fisheries Service
1315 East-West Highway
Silver Spring, MD 20910

Dear Mr. Rauch:

On 19 April 2017 the Marine Mammal Commission (the Commission) wrote to you with preliminary thoughts concerning the recovery of North Atlantic right whales (NARWs) based on a review of the species' status at our Annual Meeting in North Falmouth, MA on 5-7 April 2017. We write now to expand on those initial thoughts, taking account of what was heard at that meeting, as well as at the subsequent Atlantic Large Whale Take Reduction Team (ALWTRT) meeting convened by the National Marine Fisheries Service (NMFS) on 25-27 April in Providence, RI.

As discussed below, recent analyses of NARW biology and entanglement records indicate that abundance is declining and recovery will require substantial revision of the Atlantic Large Whale Take Reduction Plan (hereafter also called the "Large Whale Plan" or "the Plan") to reduce fishery-related mortality and injury. A number of new mitigation measures are already being explored that, if adequately tested and implemented, hold promise for reducing NARW entanglement mortality and injury. However, the Commission is also concerned that the take reduction team process upon which NMFS relies to reduce NARW entanglement risks is not working and needs to be revised. To address these issues, we offer the following comments and recommendations.

Declining NARW Population Trend and the Role of Entanglement in the Decline

The Commission believes that NARWs are in far greater trouble than previously recognized. At both our meeting and the ALWTRT meeting, information was presented on a new analysis of population trends led by Richard Pace of the NMFS Northeast Fisheries Science Center. Using a hierarchical life history model, this new analysis indicates that NARW abundance declined between 2010 and 2015 due to both elevated mortality, particularly of females, and lowered calf production. Both of these trends appear to be at least partially due to anthropogenic factors (i.e., ship strikes and entanglement). Given continuing human-induced mortality and even lower calf production since 2015, it is likely that this decline is continuing. The new analysis also shows that since 1990, there have been at least two other short decline episodes interspersed with periods of no or slow population growth. This inconsistent overall trend, with its relatively slow rate of increase during the best of times, stands in sharp contrast to what has been observed in many other populations of large whales that were similarly reduced to very low abundance levels but increased steadily for many

years at rates of 7 percent or more per year as they rebounded after protection from commercial whaling.

The new model appears to present a more accurate depiction of NARW population trends over the past 25 years than did previous analyses, such as those considered in NARW stock assessment reports. Those analyses generally used averaged counts over periods of decades to suggest that the population was increasing steadily at a rate of about 2.5 percent per year. The ongoing decline indicated by the new model is especially concerning because of (1) the increasing number of entanglement-related deaths over the past 20 years, (2) the increasing numbers of moderate to severe entanglement injuries to live whales over that same period, and (3) new analyses indicating that entanglement injuries are affecting both calf production and female survival. As indicated in the attached graph showing the proportion of NARW deaths ascribed to ship strikes and entanglements each year since 1990, approximately half of all documented mortality since at least the early 1990s has been related to human activities. This suggests that human-induced mortality may have effectively doubled the NARW mortality. The graph also shows that, whereas management measures implemented by NMFS between 2007 and 2008 have significantly reduced ship strike deaths, that reduction has, in effect, been replaced or offset by a corresponding increase in entanglement deaths over the past 20 years. This latter increase in entanglement-related deaths has occurred despite management measures applied to fisheries that were intended to reduce right whale entanglement beginning in the late 1990s.

Moreover, the above-noted modeling analysis suggests that total mortality, including undocumented or "cryptic" mortality, is likely twice the number of confirmed deaths. If this is true and undocumented deaths due to fisheries, ship strikes, and natural causes occur at the same rates as those seen among documented deaths, some 28 NARWs would have been killed by fishing gear between 2006 and 2016. According to NMFS stock assessment reports over that same period, the cumulative potential biological removal level (PBR) was just 6.2 whales. Thus, entanglement deaths alone could be four times greater than PBR over the past 11 years. When the 28 documented "serious injuries" documented over that same period (which are also counted against PBR) are added to this mortality, fishery interactions alone could have been eight times greater than the NMFS PBR threshold over the past decade. This again illustrates, even more clearly, how the statutory goal of reducing NARW fishery-related incidental mortality to below the PBR has not been even close to being achieved.

Regarding the impact of entanglement injuries on calf production, recent studies reveal that entanglement injuries are more likely to impair the health of mature females than males (Robbins et al. 2015). In addition, the number of NARWs sustaining moderate to severe entanglement injuries has increased significantly over the past 20 years, and females sustaining moderate to severe injuries are less likely to become pregnant or to rear their calves to weaning. This decline in reproductive success is thought to be due to the increased energy demands related to drag forces and compromised health caused by entanglement injuries (Knowlton et al. 2016, Rolland et al. 2016, Pettis et al. 2017). These considerations, combined with the fact that 83 percent of all photo-identified females bear evidence of entanglement and approximately 25 percent of all NARWs are entangled annually (Knowlton et al. 2012), mean that entanglement in fishing gear is a contributing, if not a major, factor in depressing calf production and survival to weaning. It may also help explain the unusually long calving interval in NARWs. The calving interval for mature females giving birth in 2016 was 6.6 years (North Atlantic Right Whale Consortium 2016) compared to calving intervals that typically average around 3 years for other large whales, including southern right whales.

Moreover, the combined effects of stress from entanglement wounds, the drag from attached gear, and the demands of pregnancy, calving, and nursing apparently cause disproportionate mortality of adult females (Robbins et al 2015). These effects could explain the strong male bias of the NARW population's sex ratio, as revealed by the above-noted modeling study. These effects also likely shorten the average reproductive life span of adult females and thereby further reduce calf production over the long-term.

Given the information summarized above, the Commission believes that entanglement has not only replaced ship strikes as the leading anthropogenic constraint on NARW recovery, but it is also getting worse. Thus, reducing fishing-related deaths and injuries is now the single highest priority for this species' recovery. We therefore consider it imperative that NMFS move quickly and decisively to significantly modify the Large Whale Plan, including its current regulatory provisions. As discussed below, we believe that another major rulemaking action is necessary. New efforts are needed to improve gear marking requirements and mitigation measures, and perhaps new gear reporting requirements are needed to identify what gear is set and where. In addition, the Commission believes that non-regulatory actions are needed to improve the development and operation of this Plan.

Improving Gear Marking Regulations

Perhaps the largest constraint on developing an effective plan to reduce entanglement impacts has been a lack of knowledge about precisely where and in what fisheries entanglements occur. NMFS took an important step toward resolving this need by establishing regulations that greatly expanded gear marking requirements in its 2014 regulations revising the Large Whale Plan. This allows finer-scale determination of where right whales are being entangled and which fisheries are involved from lines removed from entangled whales. However, to improve information in this regard, the current gear marking requirements must be expanded. Among other things, gear marking provisions should (1) require more frequent marks on long lengths of line, (2) apply to all East Coast trap and gillnet fishermen, (3) include unique marks for more fishing areas, and include marks to distinguish the specific gear parts involved in entanglements. The Commission believes that this is the only way to provide the information needed to evaluate the effectiveness of current mitigation measures and to make informed decisions on any further measures that may prove necessary. Therefore, the Commission recommends that NMFS advise the ALWTRT that it plans to revise the current gear marking regulations under the Large Whale Plan, and ask the team to form a working group to develop an expanded gear marking system that takes into account and builds on the current marking codes.

In the Commission's view, an adequate gear marking plan should include the following features:

1. all East Coast trap and gillnet fishermen, including those currently exempted from the Large Whale Plan's gear modification requirements, are required to mark their buoy lines and endlines;
2. the frequency and spacing of marks on endlines are set at intervals determined from an analysis of the average length of lines removed from whales to increase the probability of recovering marked portions of line from entangled whales (e.g., if most lines removed from whales are 60 feet or longer, marks should be located at 60-foot intervals);

3. all groundlines are marked with a unique color or color combination to distinguish them from buoy lines and assess the effectiveness of regulations specific to each;
4. buoys are marked in such a way as to ensure that fishing permit numbers do not disappear due to abrasion and wear when towed for weeks or months by an entangled whale;
5. a distinctive color or color combination is used to distinguish buoy lines for gillnets from buoy lines for traps;
6. boundaries delimiting current color codes for gear set in different geographic areas are subdivided with additional color codes to provide greater geographic resolution regarding the source of entangling gear; and
7. gear marking requirements are developed in consultation with Canadian officials to ensure that any gear markings required for Canadian trap and gillnet fisheries can be readily distinguished from those required for gear set in U.S. fisheries.

With regard to point 6 above, the greatest attention to increasing the geographic specificity of gear marking should focus on New England. This region contains approximately 90 percent of all U.S. East Coast traps. NARWs also appear to spend the most of their time in this portion of their range when in U.S. waters. Thus, it is likely that most NARW entanglements in U.S. waters occur in New England. To determine more precisely where they occur, the Commission suggests that the recommended working group consider unique marks for buoy lines in each of the following areas: (1) all exempted waters along the coast of Maine; (2) non-exempted waters in Lobster Management Area 1 (LMA) off the eastern half of the Maine coast, (3) non-exempted waters off the western half of the Maine coast in LMA 1 and off New Hampshire, (4) waters in LMA 1 off Massachusetts from the New Hampshire-Massachusetts border to Cape Cod Bay; (5) waters in LMA 1 along the outer coast of Cape Cod; (6) offshore waters in the Gulf of Maine in LMA 3 east and north of Cape Cod, (7) southern near-shore waters from New York to the Virginia-North Carolina border; (8) southern near-shore waters off North Carolina, (9) offshore waters from Cape Cod to the Virginia-North Carolina border; and (10) offshore waters from North Carolina through Florida.

To address point 7 above and ensure that U.S. and Canadian gear marking requirements complement each other, the Commission also recommends that NMFS encourage Canadian fishery managers to adopt gear marking measures similar to those under the Atlantic Large Whale Plan and invite appropriate Canadian officials to attend and participate in meetings of the recommended ATLWTRT gear marking working group.

Improving Mitigation Measure Regulations

In 2014 NMFS adopted a "vertical line" rule initially proposed in July 2013 to mitigate entanglement risks to large whales, particularly NARWs, from buoy lines deployed in trap and gillnet fisheries along the U.S. East Coast. The final rule applied different strategies to New England and areas south of New England. In New England, where the vast majority of traps and buoy lines are deployed, NMFS implemented a "trawling up" strategy to reduce the number of buoy lines by increasing the number of traps per trawls. Assuming that fishermen would fish the same number of traps they fished before the new rule, rather than adding additional traps to short trawls to meet minimum trawl length requirements, NMFS concluded that its trawling up strategy would reduce the number of buoy lines in the water column and thereby reduce the number whales that would

encounter and become entangled in those lines. However, there are insufficient data on numbers of buoy lines deployed either before or after the 2014 rule went into effect to assess the rule's effectiveness in actually reducing the number of buoy lines.

For areas south of New England, NMFS adopted a different strategy that was designed to protect calves born in that region and migrating north along the coast with their mothers. Specifically, there was a concern that if young calves became entangled in long, heavy trawls of traps, they would be unable to break free and the lines would more likely cause deep cuts and severe injuries. Therefore, regulations for areas south of New England sought to (1) reduce the number of traps on a trawl instead of increasing them, and (2) require the use of low-breaking-strength buoy lines that are sufficiently strong to haul gear, but weak enough for even young calves to break free.

In its 13 September 2013 comments on the proposed rule, the Commission expressed support for the trawling-up concept for New England waters, and the limits on trawl length and buoy line breaking strengths south of New England. However, it also noted that benefits of these measures could not be adequately assessed using the co-occurrence model (see below) due to model weaknesses and that stronger measures were necessary to achieve the required reductions in whale entanglements.

Reducing fishery-related NARW deaths and injuries has proven to be one of the nation's most difficult marine mammal conservation challenges. Despite the many substantial changes made in the Large Whale Plan following an adaptive management approach, there is no evidence to suggest any appreciable reduction in entanglement rates has been achieved. Therefore, the Commission believes that current mitigation measures are inadequate. The NARW population's declining trend and increasing number of severe injuries, which seem correlated with increasing rope strength (Knowlton et al. 2012, 2016), raise troubling doubts about the wisdom of the trawling-up strategy now used off New England to reduce entanglement impacts.. That is, the combination of stronger ropes now in widespread use by fishermen, with longer, heavier strings of pots required by the new regulations, could actually be *increasing* the likelihood of whale deaths and severe injuries off New England.

At the time the vertical line rule was developed, little information was available on the relationship between line breaking strength and the severity of whale entanglement injuries. Thus little consideration was given to limiting buoy line breaking strengths off New England or to the possible additional risk that the trawling-up strategy might pose. It is now clear that such consideration is required, and the Commission believes that the ALWTRT should immediately consider expanding the use of low-breaking strength buoy lines and revisit possible approaches and opportunities to remove more buoy lines from the water column.

Expanded Use of 1,700 lb Breaking Strength Line: As noted above, the increased severity of NARW entanglement injuries over the past 20 years coincided with an increase in the breaking strength of ropes used for buoy lines (Knowlton et al. 2016). As rope manufacturers shifted from manila rope to polypropylene line beginning in the 1950s and from polypropylene to copolymer line in the mid-1990s, buoy line breaking strength tripled. For example, whereas the breaking strength of manila ropes typically was about 1,100 lbs for 3/8 inch line and 3,900 lbs for 5/8 inch line, for polypropylene line of the same diameters breaking strengths increased to 2,100 lbs and 5,300 lbs, respectively, by the 1990s. For copolymer ropes now in widespread use they increased to 4,200 lbs

and 10,500 lbs, respectively (Knowlton 2016)[1]. As line strengths have increased, severe injuries also have increased because entangled whales have to pull harder against heavy gear as they attempt to break free. As a result, lines cut deeper into a whale's skin and muscle and the wrapped lines around body parts become tighter and more difficult to shed. Whereas adult NARWs can exert an estimated maximum pulling force of 8,000 lbs (Arthur et al. 2015), calves and juveniles are less able to exert the pulling forces needed to break entangling lines and shed attached gear. Based on an examination of the breaking strength of lines removed from whales of different age classes, it has been determined that a breaking strength of 1,700 lbs would allow most NARWs, including calves and juveniles, to break lines and thereby increase their chances of shedding gear with less severe injuries (Knowlton et al. 2016).

These analyses suggest that limiting buoy line breaking strength to no more than 1,700 lbs could significantly reduce severe injuries, and thereby reduce entanglement-related mortality and the sublethal effects on calf production and survival of adult females. The Large Whale Plan already limits the breaking strength of buoy lines for at least some fishing areas south of New England (e.g., 1,500 lbs for traps in Florida state waters and 2,200 lbs for traps off Georgia and South Carolina). However, no limits exist for buoy line breaking strengths in New England. The Commission understands that typical buoy line breaking strengths of 4,000 to 5,000 lbs are far stronger than necessary to haul traps in many fishing situations, particularly in shallow nearshore areas where trawls are often short (e.g., five or fewer traps per string) and hauling lines are shorter and thus less heavy. There may be many areas off New England where lines with breaking strengths of 1,700 lbs or less would be adequate to meet fishing needs and where their use could be phased in over a period of years. The Commission therefore recommends that NMFS take steps to evaluate and identify fisheries and fishing areas where 1,700 lb breaking strength buoy lines could be used successfully and, based on those results, develop regulations to phase in their use in those areas.

Expanded Use of "Ropeless" Fishing Techniques: For many years, scientists and conservationists on the ALWTRT have urged adoption of "ropeless" fishing techniques that either completely eliminate buoys and buoy lines, or limit their presence in the water column to times when fishermen haul their pots. Fishing with no buoys or buoy lines has been successfully practiced in at least one deep-sea (>700 ft) fishery in the United States since the 1990s (i.e., the golden crab fishery in the southeast). That fishery retrieves 30 to 35 trap trawls using a grappling system to catch floating groundlines (South Atlantic Fishery Management Council, 1995). Given what is known about right whale distribution and diving depths, the risk of floating groundlines deeper than 700 ft in this fishery may be minimal. The fishing methods used in the golden crab fishery seem very similar to deepwater trap fisheries for lobsters and other crustaceans elsewhere along the U.S. Atlantic coast. Buoy lines in offshore trawls are believed to be particularly hazardous to NARWs because they tend to be longer and have heavier strings of traps and stronger rope than is the case in nearshore trap fisheries. Research and training to encourage use of this grappling fishing technique in additional deepwater trap fisheries in other areas could substantially reduce entanglement risks to whales from such gear. Some scientists on the ALWTRT have also suggested that complete elimination of buoy lines might be possible in the future by using "autonomous traps" that move along the bottom and are brought to the surface under remote command similar to research moorings and gliders now used by oceanographers. Such traps, however, would require considerable further research to design and field test, and thereby move beyond the conceptual stage.

[1] A.R. Knowlton slide presentation at the ALWTRT meeting, 25-27 April 2017, Providence, RI.

"On-call," "at-call," or "pop-up" buoy systems capable of storing buoys and buoy line at the bottom between deployments have also been tested and might be effective in at least some fishing situations (Turner et al. 1999, DeAlteris 1999, Allen and DeAlteris 2007). This technology stores buoys and buoy line in bags or boxes affixed to the first trap in a line of traps on the bottom between tending operations. When fishermen need to haul their gear, an acoustic signal activates a triggering mechanism that releases the buoys and line so they can float to the surface for hauling the trawl. This technology keeps entangling buoy lines out of the water column except during short gear retrieval periods. Such technology has been used for decades by the oceanographic community to avoid vandalism or theft of expensive scientific equipment that is possible when surface buoys are present. The Commission is currently funding work to test a new on-call buoy system which uses a rope spool to store line. Although on-call buoy systems are more expensive, they are being tested currently in other fisheries. The use of on-call buoys developed by the U.S. company Desert Star Systems is being explored as a means to avoid trap vandalism and the loss of buoys to passing ships and whales in the deepwater rock lobster fishery in Australia (Marino 2011, Anonymous 2014). With further research and training, such systems might be phased in for deepwater trap fisheries, especially those that tend to use fewer and longer trawl, fish larger traps, and operate on an industrial scale capable of absorbing their costs.

Given the above information, the Commission recommends that NMFS (1) identify and evaluate deep-sea fisheries and fishing areas where techniques to eliminate the need for buoy lines could be used or further developed, including grappling for floating groundlines as is done in the southeast golden crab fishery and deploying on-call buoy systems, (2) collect data on costs and earnings in these fisheries in order to better assess the economic viability of ropeless fishing techniques, and 3) based on the results of those efforts, develop regulations to phase-in the use of such techniques or systems in fisheries and fishing areas where it is deemed practical.

Experimental Trap Fishing Areas: Providing incentives to fishermen for using new fishing techniques or equipment that improve the protection of whales is a challenge but nonetheless important. It is critical that fishermen be encouraged to experiment with low-breaking-strength buoy lines and ropeless fishing techniques, which appear, at this juncture, to reduce the risk of entangling or injuring whales. One means of providing incentives for this work would be to designate high-use right whale habitats where current fishing is now allowed (e.g., Jeffreys Ledge, the Great South Channel, and Jordan Basin) as "experimental fishing areas" where only specific gear types or fishing techniques would be authorized. The designation of such areas would improve whale protection by ensuring that only truly whale-safe gear and techniques are used in areas where NARWs and fishing are most likely to overlap. It would also provide opportunities for collecting data necessary to evaluate the effectiveness of these mitigation measures. Therefore, the Commission recommends that NMFS identify experimental fishing areas encompassing high-use NARW habitat within which only specified fishing techniques or equipment determined to be least likely to entangle or injure whales (e.g., ropeless fishing and low-breaking-strength line) are permitted.

Expanded Gear Reporting

Entanglement risks and mitigation measures subject to the Large Whale Plan are evaluated using a co-occurrence model that predicts entanglement risk for different areas based on whale and buoy line densities. Encounter rates between whales and gear, as calculated from these data, are then used as a proxy for entanglement risk. To date, the lack of empirical data on the amounts of line in the water in different areas at any particular time has precluded the generation of confidence limits

around model results. Moreover, recent shifts in right whale distribution and densities may create a need to update whale input to the model. As a result, there is no credible basis for assessing the accuracy or reliability of model predictions concerning entanglement risk or the effectiveness of mitigation measures. To address this problem, empirical data are required from all areas for a number of parameters, particularly how much line is in the water column in different geographic areas at different times of the year. Currently, such data are not recorded or reported systematically by fishermen in most areas and the quality of available data varies broadly across states and regions. An ALWTRT monitoring working group met in April 2016 to identify the specific kinds of data needed to assess entanglement risk using the co-occurrence model and recommended a series of data fields describing what gear is deployed where and when, that all trap and gillnet fishermen should fill in as part of their fishing trip reports.

Recognizing the need for better data to manage both large whale entanglement risk and the lobster fishery itself, the Atlantic States Marine Fisheries Commission (ASMFC) convened its own working group to identify additional gear reporting requirements under its American Lobster Management Plan which guides management of all lobster fishing along the Atlantic coast. Preliminary recommendations by the ASMFC working group were presented to the ALWTRT at its April 2017 meeting. As we understand it, the ASMFC working group's final recommendations are to be provided to the ASMFC governing board later in fall 2017 and could be presented to the ASMFC for a final decision in 2018. According to the presentation at the ALWTRT meeting, the new reporting requirements under the ASMFC lobster management plan would be phased in over a period of years and require all lobstermen to record data in their trip reports on the number of endlines deployed, the number of hauls made, the date and GPS location or other location data for each deployment and haul, the number of traps per trawl, and the depth of set gear.

The preliminary ASMFC recommendations appear to go a long way toward meeting data needs identified by the ALWTRT monitoring working group. At its recent meeting the ALWTRT did not thoroughly consider whether or how all other data needs identified by the ALWTRT working group (e.g., thickness of buoy lines, weight of traps, and similar data for trap fisheries other than lobster) might be met. Therefore, the Commission recommends that NMFS reconvene the ALWTRT monitoring working group to meet with a representative of the ASMFC working group to review the AMFSC recommendations and determine how gear reporting in addition to that being proposed under the American lobster fishery management plan could or should be supplemented. NMFS should advise the ASMFC of its plans in this regard to ensure that data needs for the Large Whale Plan are reflected to the extent possible in any recommendations that the ASMFC working group forwards to its board.

Research

In addition to regulatory matters such as those noted above, the Large Whale Plan includes provisions to fund and carry out research, such as developing and testing new mitigation measures, monitoring the status of large whales, and evaluating the effectiveness of mitigation measures. Based in part on comments noted above, the Commission recommends that NMFS prioritize and fund or carry out the following research activities under the Atlantic Large Whale Take Reduction Plan:

1. assess the feasibility and test the application of deepwater grappling techniques now used in the golden crab fishery to other deepwater trap fisheries for lobsters and crabs along the Atlantic coast;
2. measure the load force on buoy lines, both while the gear is deployed and during hauling operations in different areas and under different environmental conditions, and test the practicality of applying low-breaking-strength buoy lines (e.g., 1,700 lb) to meet fishing needs in those areas and conditions where use of such line may be feasible;
3. assess the feasibility, test available technology, and develop technological improvements for on-call buoys, particularly in deepwater lobster and crab fisheries where this technology is likely to be most practical and economical;
4. for those fisheries most likely to be able to adopt one or more of the above technological modifications or alternative approaches, calculate the impact on net revenues of fishing operations in order to evaluate economic feasibility;
5. enlist the fishing community to deploy and retrieve small-scale commercially available passive acoustic recorders for short periods (e.g., 90 day periods) to evaluate the presence and seasonality of right whales in traditional fishing grounds; and
6. continue to assess and develop co-occurrence modeling approaches that provide meaningful confidence limits for estimated entanglement risks.

Expanded Outreach and Enforcement

A high rate of compliance with the Large Whale Plan's requirements is essential for achieving its conservation goals. This includes compliance not only with regulations for mitigation measures, but also for gear marking and gear reporting. This is difficult for the Large Whale Plan because it involves thousands of fishermen, in many different fisheries, spread across the entire Atlantic coast. It is also difficult because of the Plan's complexity and variability among different geographic areas and different fisheries. In order to move toward greater compliance, the Commission recommends that NMFS (1) continue to engage operators (fishermen and their representatives) in the testing and analysis of new techniques, (2) support the preparation of outreach materials that clearly explain all Plan requirements as they apply to specific fisheries and fishing areas, and (3) inspect a representative sample of deployed gear to check for compliance with required mitigation and gear marking provisions.

Additionally, U.S. fishermen are more likely to comply with Plan requirements if they can see that comparable measures are being enacted and enforced in Canadian fisheries, which are no less important for successfully reducing entanglements. The Commission therefore recommends that NMFS officials consult with their Canadian counterparts at the Department of Fisheries and Oceans on measures in place or proposed to mitigate entanglement and reduce the threat of injury or mortality to NARWs. Both parties are obliged to ensure compliance with the Marine Mammal Protection Act Import Rule (81 Fed. Reg. 54390) that requires Canadian trap fisheries with the potential to take right whales (including lobster, crab, and other fisheries) to meet take reduction standards comparable to those imposed on U.S. fisheries before being allowed to export products to U.S. markets.

Modifying the Take Reduction Team Process

The Commission strongly believes that the ALWTRT and take reduction process is not working as it should and needs to be changed. There is no evidence that entanglement rates have been reduced over the past 30 years for this, one of the world's most endangered species of large whale. The ALWTRT is the only TRT to have *never* reached consensus on a complete set of measures designed to meet the statutory goals of reaching a take level below the Potential Biological Removal level within six months of adoption and further reducing the take to levels approaching the zero mortality rate goal within five years of Plan adoption. Despite three major revisions since the initial Large Whale Plan was completed in 2002, these goals have not been achieved and entanglement impacts have instead actually increased.

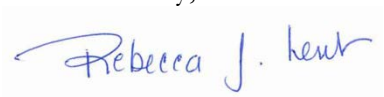
There are likely many reasons for the failure of this particular TRT. Perhaps foremost is that the problem of reducing right whale entanglement is simply an extraordinarily difficult task with no single solution that is simple or low-cost. Another factor, however, may be the sheer size of the ALWTRT. With some 60 members, it is twice as large as any other TRT established by NMFS making it all the more difficult to reach consensus. Moreover, given the size of the ALWTRT, convening its full membership is very costly to NMFS , which make its inability to achieve its mandated charge even more troubling. Given the team's record of failure on reaching consensus for any major take reduction mitigation measures, the Commission does not believe the expense of continuing to convene such a large team is justified, especially in times of tight agency budgets, unless there is a substantial change in how it operates and what NMFS expects of the team.

Given our experience with this Plan and the urgent need for effective measures to reduce the take of NARWs, the Commission recommends that NMFS immediately convene a small group of experienced fishery and marine mammal management experts from government agencies and independent research/academic/industry groups to review the statutory provisions for convening TRTs and the overall experience with the take reduction process, to consider alternative means of successfully developing an effective Large Whale Plan. For example, NMFS might convene a small group of agency and independent experts to draft a plan that it believes would be adequate to meet statutory requirements that could be put before the full ALWTRT with instructions that the draft plan's component provisions could be modified, replaced, or supplemented only if the full team reaches consensus on those changes. Alternatively, several smaller teams might be established, with each responsible for addressing different fisheries, subsets of fisheries, or fishing regions. NMFS would then be responsible for combining recommendations from those teams into a single overall plan. Other options can be explored. In the final analysis, however, the Commission does not believe NMFS should continue to rely on the same ineffective and expensive planning process that after 30 years has failed to achieve even a slight reduction in NARW entanglements. We welcome the opportunity to discuss these ideas with you or your staff.

As noted above, reducing fishery-related NARW deaths is one of the nation's most difficult marine mammal conservation challenges. With entanglement-related deaths and injuries increasing rather than decreasing over the 20 year history of the Large Whale Plan and planning process, we believe both must be carefully reevaluated and substantially revised. We hope these comments and

recommendations will be useful in this regard and look forward to working with you and your staff as efforts to reduce NARW fishery impacts continue to evolve.

Sincerely,



Rebecca J. Lent, Ph.D.,
Executive Director

Attachment

Cc with attachment: Donna S. Wieting, National Marine Fisheries Service
Jonathan A. Hare, National Marine Fisheries Service
Roy E. Crabtree, Ph.D., National Marine Fisheries Service
John Bullard, Greater Atlantic Regional Fisheries Office
John Henderschedt, National Marine Fisheries Service

References

Allen RB and J DeAlteris. 2007. Use of pop up buoys in fixed gear commercial fisheries: a demonstration. National Fish and Wildlife Foundation Project 2005-0237-002. Washington, D.C. 21p.

Anonymous. 2014. Acoustic release technology. Australian Southern Rocklobster Industry News 26 (February 2014):6. *In* Appendices to Hodges, R. 2015. Final Report: communications and extension in the southern rock lobster fishery. Australian Fisheries Research and Development Corporation and Rocklobster Limited. Melbourne, Australia. 15 p. + Appendices. Available at: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=3&ved=0ahUKEwjJqsXy6uXTAhVDeSYKHQKJBKoQFggxMAI&url=http%3A%2F%2Ffrdc.com.au%2Fresearch%2FFinal_reports%2F2012-511-DLD.pdf&usg=AFQjCNFz67-qLbnowrOhLbukBnXOXihWnQ&sig2=fswrpUqDkSHLt3Rr5zwOIg

Arthur, LH, WA McLellan, MA Piscitelli, SA Rommel, BL Woodward, JP Winn, CW Potter, and DA Pabst. 2015. Estimating maximal force output of cetaceans using axial locomotor muscle morphology. Marine Mammal Science. DOI:10.1111/mms12230.

DeAlteris, J. 1999. Design, testing and evaluation of an acoustic release system for offshore lobster pot buoy lines. NMFS Project No. 40EANF800065 submitted to Al Blot at the NMFS Fisheries Engineering Group, Kingston, Rhode Island. 16p.

Knowlton, AR, PK Hamilton, MK Marx, HM Pettis, and SD Kraus. 2012. Monitoring North Atlantic right whale *Eubalaena glacialis* entanglement rates: a 30 yr retrospective.

Knowlton, AR, J Robbins, S Landry, HA McKenna, SD Kraus, and TB Werner. 2016. Effects of rope strength on the severity of large whale entanglements. Conservation Biology 30(2): 318-328.

Marino, M. 2011. Innovation ends specter of ghost traps. Fish: 19(4) December 2011:12-13. Available at: http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0ahUKEwjJqsXy6uXTAhVDeSYKHQKJBKoQFggrMAE&url=http%3A%2F%2Ffrdc.com.au%2Fknowledge%2Fpublications%2Ffish%2FDocuments%2FFISH%252019-4.pdf&usg=AFQjCNHwrGyfxBF3uJxZND8a27kTuHVl2g&sig2=orMNHBh5CBT6z-0Js54upQ

North Atlantic Right Whale Consortium. 2016. North Atlantic right whale report card – 2016. Available at: http://www.narwc.org/index.php?mc=9&p=29.

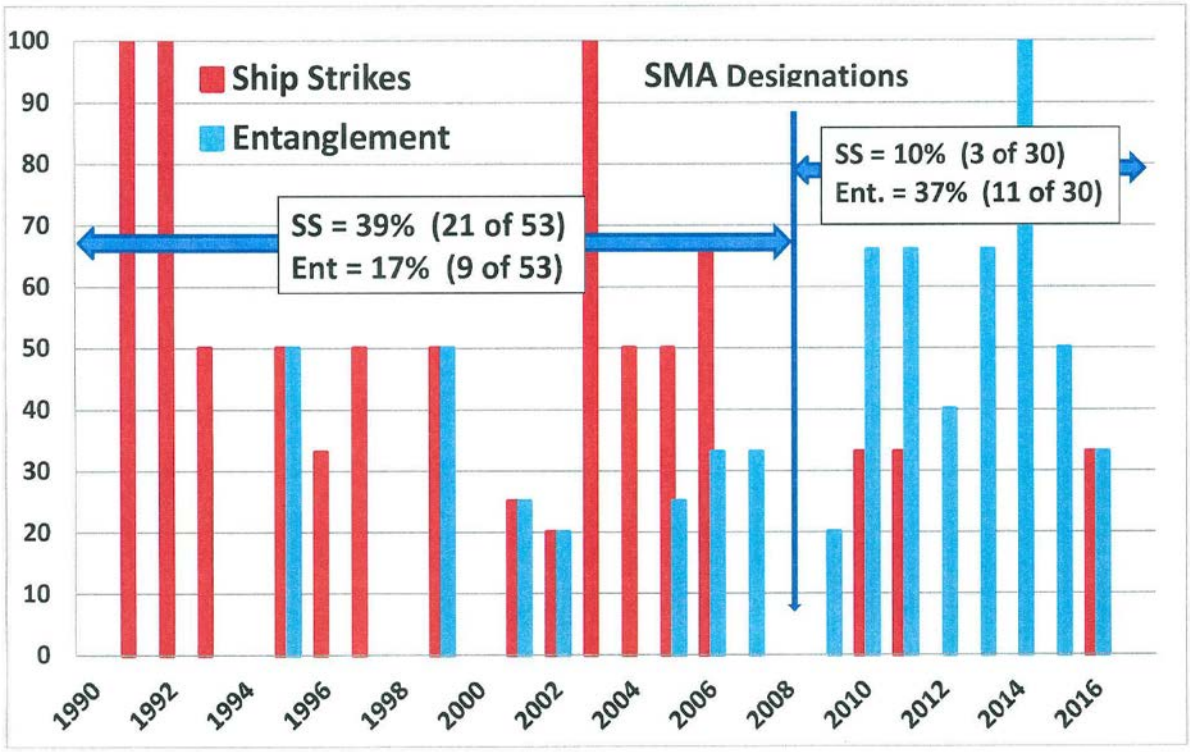
Pettis, HM, RM Rolland, PK Hamilton, AR Knowlton, EA Burgess, and SD Kraus. 2017. Body condition changes arising from natural factors and fishing gear entanglements in North Atlantic right whales *Eubalaena glacialis*. Endangered Species Research 32:237-249.

Robbins, J, AR Knowlton, and S Landry. 2015. Apparent survival of North Atlantic right whales after entanglement in fishing gear. Biological Conservation 191:4421-427.

Rolland, RM, RS Schick, HM Pettis, AR Knowlton, PK Hamilton, JS Clark, and SD Kraus. 2016. Health of North Atlantic right whales *Eubalaena glacialis* over three decades: from individual health to demographic and population health trends. Marine Ecological Progress Series 542:265-282.

Turner, H, J DeCrew, D Goldsmith, and S Brimlow. 1999. BLT: acoustically triggered buoyless lobster trap recovery system. University of New Hampshire/University of Maine Sea Grant College Program. 89p.

Attachment



Proportions of total North Atlantic right whale mortality each year from 1990 through 2016 caused by ship strikes (red) and entanglement in fishing gear (blue).