23 September 2019

Michael Pentony, Regional Administrator
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930–2276

Subject: Comments on Atlantic Large Whale Take Reduction Plan Scoping

Dear Mr. Pentony:

On 2 August 2019, the National Marine Fisheries Service (NMFS) published a notice of intent to prepare a draft Environmental Impact Statement (DEIS), and a request for comments on potential amendments to the Atlantic Large Whale Take Reduction Plan (the TRP) (84 Fed. Reg. 37822). The stated goal of the TRP and its potential amendments is to reduce the risk of human-caused mortality and serious injury (mortality and serious injury) of North Atlantic right whales (right whales; *Eubalaena glacialis*) and other large whales caused, in part, by entanglement in commercial pot/trap gear along the U.S. East Coast. The DEIS will analyze the potential environmental impacts of alternative potential amendments to the TRP under the National Environmental Policy Act (42 U.S.C. § 4321 et seq.). NMFS stated that proposals recommended by the Atlantic Large Whale Take Reduction Team (the TRT) in April 2019 will form the basis of those alternatives, and that the DEIS will inform subsequent NMFS rulemaking to implement the TRP, in order to meet the take reduction requirements of the Marine Mammal Protection Act (MMPA).

The Marine Mammal Commission (the Commission), in consultation with its Committee of Scientific Advisors on Marine Mammals, provides the following comments and recommendations on the TRP amendment options and DEIS alternatives.

Population Status

The DEIS should discuss the status of the North Atlantic right whale, especially in light of recent human-caused deaths and low recruitment. Since 2010, the population has been declining steadily and faces an increasing risk of extinction (Kraus et al. 2016, Pace et al. 2017, Pettis et al. 2018). Scientists and managers are convinced that human-caused mortality and the negative impacts of entanglements on reproductive potential are driving the decline (Sharp et al. 2019). The best available scientific information clearly identifies entanglements in fishing gear, especially lobster and crab fishing gear in the United States and Canada, and ship strikes as the two main contributors to the decline (NMFS 2019). Ship strikes were, for a period of at least 10 years, the primary documented cause of right whale deaths in U.S. waters, but now entanglement in fishing gear is the leading documented cause of both mortality and serious injury (Sharp et al. 2019).[1] Ship strikes in

[1] From 2012 to 2016, over twelve times as many whales died due to entanglement compared to ship strikes (NMFS 2019).

U.S. waters are down significantly since the implementation of speed restrictions and other regulations in 2008 (Laist et al. 2014, Van der Hoop et al. 2015), but they were a significant cause of right whale deaths in Canada in 2017 (Daoust et al. 2017) and again in 2019.[2]

Although the population had been increasing slowly (at 2-3 percent per year) during the 1990s and 2000s (Pace et al. 2017, Corkeron et al. 2018), it has declined by roughly 20 percent (from 500 to 400 whales) since 2010. Particularly alarming is the fact that no more than 95 reproductive-age females remain, and that their numbers are declining more rapidly than males (Pace et al. 2017). If the current trend continues, the population will be reduced to its 1990 level (270 whales) in just over 10 years (Hayes et al. 2018).

Entanglement in fishing gear is so common that 83 percent of all right whales bear entanglement scars (a term meant to encompass both healed and unhealed wounds as well as amputations), and 59 percent have scars from multiple entanglements (Knowlton et al. 2012a). Every year, on the average, 26 percent of the whales acquire new scars (Knowlton et al. 2012a), leading to the conclusion that, over a ten-year period, each whale has a 95 percent chance of being entangled at least once (Hayes et al. 2018). This situation is exacerbated by the fact that moderate to severe entanglements are becoming more frequent, apparently due to increases in the strength of rope used by fishermen (Knowlton et al. 2015), and odds of an entanglement that leads to a serious injury or mortality is increasing by 6.3 percent per year (Hayes et al. 2018).

Serious injuries and deaths of right whales attributed to entanglement are increasing. Roughly 30 mortalities and serious injuries of entangled right whales have been documented in the last five years (2014-2018).[3] NMFS's North Atlantic right whale stock assessment reports indicate that the annual mean of observed mortality and serious injury increased from 1.3 prior to 1999, to 5.8 from 2000-2009, and to 6.7 from 2010 to 2016 (NMFS 2019). Moreover, this should be considered a minimum, as 40-50 percent of all presumed dead right whales go undetected (Pace et al. 2017).

Even minor entanglement in fishing gear can have sub-lethal effects. The condition and health of entangled females can be severely compromised (Knowlton et al. 2012b, Robbins et al. 2015, Rolland et al. 2016, van der Hoop et al. 2016, Knowlton et al. 2018), and this contributes to the recent, historically low calving rate (Kraus et al. 2016, Pace et al. 2017). Females require 2-3 years to build the nutritional reserves needed to calve, and apparently forgo calving if they are in poor condition (Schick et al. 2013). Given the annual scarring rate, it is likely that about half of all reproductive-age females will be entangled during the pre-calving period. The mean inter-calving interval has increased from 3.0 years in 2009 to 10.2 years in 2017 (Pettis et al. 2018). Calving rates declined by nearly 40 percent between 2010 and 2016 (Kraus et al. 2016, Pace et al. 2017) and, in 2018 no calves were seen. From 2010 to 2016, an average of 16 calves were sighted each year (range, 11-22), but only 12 calves in total have been sighted in the last three years (Pettis et al. 2018). Entanglement-caused health decline is not the only driver of lower calving rates,[4] but it is a

[2] Right Whale News, September 2019, at: https://www.narwc.org/uploads/1/1/6/6/116623219/rwn-sep19.pdf
[3] See NMFS North Atlantic right whale stock assessments at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock.
[4] Reproductive rates are also dependent on prey availability and energy expenditure, both of which have been changing (references in Hayes et al. 2018).

significant factor (Corkeron et al. 2017). In addition, the situation is likely worse than these statistics indicate because observed scarring rates do not fully reflect entanglement rates, as not every scar is detected and not every entanglement results in scarring.

Conservation Action

The Commission supports NMFS's efforts to conserve right whales, but the Commission believes, as reflected by NMFS's decision to undertake rulemaking, that additional actions are needed to meet the various mandates of the MMPA.[5] Most pressing is the need for the United States and Canada to prevent human-caused mortality and serious injury, thereby reversing the downward population trend. Adoption of ship speed regulations and entanglement mitigation measures by the United States over roughly the past two decades apparently helped to reduce the mortality rate and contributed to the positive population growth rate observed prior to 2010 (Pace et al. 2017, Corkeron et al. 2018). However, even when the population was growing, the estimated rate of 2-3 percent was substantially below what might be expected for this species given the 5.3-7.2 percent population growth rates observed in populations of the closely related southern right whale, and the 4.0 percent intrinsic rate of increase estimated for the North Atlantic right whale (Corkeron et al. 2018).

The MMPA directs NMFS to reduce mortality and serious injury of marine mammals to below specified thresholds. For strategic stocks, such as the North Atlantic right whale, the MMPA requires NMFS, through the TRT/TRP process, to reduce mortality and serious injury to below the stock's potential biological removal (PBR) level within six months. Further, it is required to reduce mortality and serious injury to achieve the Act's zero mortality rate goal (ZMRG, which NMFS has set at 10 percent of PBR) within five years. Although the TRT was charged with designing a plan to achieve these goals when formed in 1996, even the minimal goal (PBR) has yet to be met; mortalities and serious injuries have exceeded PBR (currently 0.9 whales per year)[6] by a substantial margin every year since.[7] An analysis led by a NMFS scientist, published in 2014, found little evidence that past entanglement mitigation measures recommended by the TRT and implemented by NMFS and the states had been effective (Pace et al. 2014). Since 2010, the number of mortalities and serious injuries due to entanglement has been increasing,[8] and alone has exceeded PBR by 2-3 whales per year. Although NMFS has consistently projected that U.S. fishery-management programs would be sufficiently protective of right whales to enable the agency to make "no jeopardy" findings under the Endangered Species Act, it is clear in retrospect that those projections were based on overly optimistic assumptions concerning the programs' effectiveness. Given this history, the Commission recommends that the rule to be promulgated by NMFS in this instance contain 1) measures that are as certain as the best available science can assure to reduce mortality and serious injury to below

[5] These include reducing mortality and serious injury to less than PBR and ultimately to insignificant levels approaching a zero mortality and serious injury rate (§ 118(f), not allowing the taking of right whales incidental to commercial fisheries unless it would have a negligible impact on the stock (§ 101(a)(5)(E), and ultimately replenishing the stock to the point where it no longer is depleted (§ 2(2), 2(6)).

[6] Because of the large number of mortalities and serious injuries that occurred in 2017 and 2019, which the 0.9 value does not reflect, PBR likely will be considerably lower once the 2017 and 2019 mortalities and serious injuries is accounted for in subsequent years' stock assessments.

[7] See NMFS North Atlantic right whale stock assessments at: https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock.

[8] Ibid.

PBR, and 2) contain provisions to assess the effectiveness of those measures and modify them promptly if the take reduction goal(s) of the MMPA are not achieved.

In 2006, when the right whale population was still growing, a panel convened by the Commission recommended that NMFS adopt a more aggressive and precautionary approach to managing right whale interactions with fisheries (Reeves et al. 2007). The panel's report concluded that:

> "In general, [NMFS] should set higher standards of protection and place greater reliance on the ability of industry to adapt to those standards, rather than continuing to depend on a complex, shifting, inefficient, and ineffective network of regulatory measures to protect the whales. The guiding principle should be to separate high-risk human activities from right whales, in both space and time, to the maximum extent feasible."

Although NMFS chose not to adopt that advice in 2007, it remains relevant, and even more critical to right whale recovery, now that the population is declining. The protection of right whales can no longer rely on unproven measures and overly optimistic projections. If mitigation measures prove to be effective in reducing mortality and serious injury to below PBR, then NMFS can assess whether economic and other considerations weigh in favor of scaling them back and allowing more time to determine how to satisfy the ZMRG. The setting of higher standards, followed by adaptive modifications, is the approach Canada adopted following the large number of entanglement and ship-strike deaths that occurred in the Gulf of St. Lawrence in 2017.

Mitigation Measures

Prior to the April 2019 TRT meeting, NMFS assessed the relative contributions of U.S. and Canadian fisheries to the entanglement-related mortalities and serious injuries of right whales, and developed a decision-support tool to assess anticipated entanglement risk reduction from proposed mitigation measures, singly or in combination. Based on the best available science, NMFS estimated that, to reduce mortality to below PBR, a 60-80 percent reduction in entanglement risk in the United States would be necessary, independent of the mitigation of other sources of risk here and in Canada. The 60-percent level reflects the known number of mortalities and serious injuries, while the 80-percent level reflects the total estimated number of deaths, which is greater because 40-50 percent of presumed deaths are estimated to go undetected (Pace et al. 2017). The TRT and NMFS recognized uncertainty in the target because it was based on analysis of a relatively small number of entanglements, but much of that uncertainty is unresolvable because, due largely to inadequate gear marking, the source of most gear recovered from right whales is unknown. Although the TRT has discussed how to improve gear marking for decades, schemes that would require markings sufficient to enable gear to be traced to specific fisheries and areas have been controversial and strongly opposed by some. Notwithstanding these issues, the decision-support tool is built on the best available data and science, and, along with other tools, analyses and sources of information, is the tool that should guide NMFS in the EIS and rulemaking process.

During the April 2019 meeting, the decision-support tool was used by the TRT to estimate the potential risk reduction of different entanglement mitigation measures, and to build suites of measures designed to achieve the 60-80 percent risk reduction target. Entanglement mitigation options should be analyzed in the DEIS with respect to their potential to 1) decrease the likelihood of entanglement, and 2) decrease the severity of entanglements once they occur.

Likelihood of Entanglement. One of the most necessary approaches to reduce mortalities and serious injuries of right whales due to entanglement in fixed pot/trap lines to minimal levels[9] is to eliminate the vertical lines. Although this could be achieved by closing fisheries, that solution is socially, economically, and politically infeasible. 'Ropeless' gear has the potential to remove the vertical lines while allowing fishing to continue, conceivably without reducing fishing effort. This option is seen by many as the ideal solution, but ropeless gear design has not advanced sufficiently to enable adoption by United States and Canadian lobster and crab pot/trap fisheries now or in the immediate future. Therefore, it was not considered by the TRT, and according to NMFS's statements at the TRT meeting will not be one of the alternatives they will propose or analyze in the DEIS.

Effort reduction is another method with the potential to reduce the number of vertical lines, depending on its form. Vertical line numbers could be capped at specified levels, or other regulations, such as increasing the number of pots/traps per end line, could be used to affect a reduction in the number of vertical lines. The TRT recommended vertical-line reductions, leaving the mechanism for achieving those reductions to NMFS and state fishery management agencies.

Vertical-line reduction can be achieved by reducing fishing effort or prohibiting fishing in areas where and/or at times when whales are most likely to be present. Fixed time-areas closures are being used now in Massachusetts and adjacent federal waters,[10] and dynamic time-area closures are being used in Canada to reduce the risk of fisheries interactions and in the U.S. and Canada to reduce the risk of ship strikes. Although the TRT considered modifying existing closures and establishing new ones, for a variety of reasons none were recommended to NMFS.

Other methods could possibly be employed to reduce the likelihood of entanglement, such as stiff or taut line or acoustic deterrents, but most of these alternatives have been found to be impractical or ineffective (Werner 2018). However, one recent research project showed that red ropes may be more readily detected by right whales than those of other colors (Kraus et al. 2014).

Severity of Entanglements. The stronger the entangling rope,[11] and the more weight attached, the greater the severity of the injuries the whales sustain and the greater the likelihood that those injuries will be fatal (Knowlton et al. 2015). Extensive research by Amy Knowlton of the New England Aquarium and her colleagues has demonstrated the relationship between line strength and 1) likelihood of whales being able to break and thereby shed entangling ropes, and 2) the severity of injuries that result from those entanglements (e.g., Knowlton et al. 2018). Their research has found

[9] Many pots/traps would still be connected by ground line, but when sinking ground lines are used there is a small chance of entangling large whales. That chance is not zero, however, because right and humpback whales are known to feed on the bottom. Sinking ground lines are required in all U.S. lobster fisheries.
[10] Current time-area closures protect large numbers of right whales in Cape Cod Bay and around Cape Cod during February, March, and April, and in the Great South Channel during April, May, and June.
[11] Rope strength depends on the diameter, construction and composition of the rope.

that most whales apparently are able to free themselves from rope with a breaking strength of less than 1,700 pounds (Knowlton et al. 2015). Most rope currently in use is much stronger, especially in conditions in which high loads are placed on end lines during gear retrieval. This occurs when there are high currents, 'sticky' substrates, pots/traps are very heavy (e.g., in the Canadian snow crab fishery), or large numbers of pots/traps are fished together in a single 'trawl' (e.g., in the offshore/deep-water lobster fishery).

The TRT considered a variety of approaches for reducing the strength of the rope used in New England, referred to as a shorthand as '1,700-pound equivalents'. More generally, rope that whales are able to break is referred to as 'weak' rope. The '1,700-pound equivalents' that were considered included 1) 1,700-pound rope, and 2) 1,700-pound splices, knots, or sleeves used to join sections of rope. Deploying 1,700-pound rope or stronger rope with 1,700 pound sleeves was seen as the most promising option. Splices and knots were seen as easier and less expensive options for fishermen to implement, compared to sleeves, but much more difficult to design to ensure that they are sufficiently weak, but not too weak. Although promising, sleeves have not been scientifically tested and it is unknown how they will perform in entanglement situations. Furthermore, sleeves and 1,700-pound rope are not now commercially available in sufficient quantities to supply all U.S. lobster fisheries; this creates some uncertainty regarding their feasibility as entanglement mitigation measures in the short term.

Because the relevant fisheries are managed differently by the states, the TRT recommended state-specific mitigation measures (Table 1). For a variety of reasons, the TRT designed its recommendations based on attaining only the lower limit (60 percent) of the risk reduction target. Given the more than 20-year history of the TRPs designed and redesigned by the TRT, and implemented by NMFS, failing to meet even the minimal goal of reducing right whale mortality and serious injury to below PBR, the Commission believes that a more ambitious target is needed. The Commission therefore recommends that NMFS develop and include DEIS alternatives designed to achieve an 80 percent reduction in entanglement risks, and consider region-wide as well as state-specific approaches for reducing those risks.

For the most part, the measures proposed by the states in Table 1 are projected to reach or approach the lower limit of the risk-reduction target with two important exceptions.

TRT members from Massachusetts proposed that the current Cape Cod Bay closure (Mass Bay Restricted Area (MBRA)), estimated to have reduced entanglement risk by 24 percent since its inception, be counted toward meeting the State's overall goal. However, the risk reduction targets established by NMFS were set relative to baseline conditions, which already reflect any risk reduction from the Cape Cod Bay Closure. Although the Commission fully appreciates the desire of Massachusetts fishermen to receive 'credit' for their past conservation efforts, to reach the risk-reduction target necessary to reduce mortality and serious injury to the level required under the MMPA, Massachusetts likely will have to adopt additional measures. Alternatively, NMFS could take a broader-scale approach and implement measures designed to reach the target for New England as a whole, rather than the approach adopted by the TRT in which each state reaches the target independently. This could be achieved most effectively by requiring greater reductions in end-line numbers throughout the region, and/or the establishment of additional time-area closures. Considering the known areas with consistently moderate to high right whale density, additional closures should be considered in the State waters of Maine and/or federal waters (see below).

Table 1. Management measures to reduce entanglements of large whales, by State and by Lobster Management Area, as recommended by the TRT.[12]

State / Jurisdiction	Vertical Line Reduction	Weak Rope	Total Projected Risk Reduction
Maine (LMA1)	50 percent line reduction (50 percent risk reduction)	100 percent of top 75 percent of lines (toppers) beyond 3 miles (11.6 percent risk reduction)	61.6 percent
New Hampshire (LMA1)	30 percent line reduction (30 percent risk reduction)	100 percent of lines (28.5 percent risk reduction)	58.5 percent
Massachusetts (LMA1, LMA2, and LMA2/3 overlap)	Mass Bay Restricted Area Closure (24 percent risk reduction) 30 percent line reduction in all areas, except by MBRA fishermen (25 percent risk reduction)	100 percent of lines (11 percent risk reduction)	60 percent
Rhode Island (LMA2, LMA2/3 overlap)	Scheduled 18 percent reduction in lines (18 percent risk reduction)	100 percent of lines (43 percent risk reduction)	60 percent
Massachusetts and Rhode Island (LMA2/3 overlap)	'Trawling up'[13] from 20 to 30 traps per buoy line (30 percent risk reduction)	(42 percent risk reduction)	60 percent
LMA3 (offshore)	Accelerate planned percent line reduction (18 percent risk reduction)	Rapid research on alternatives to weak rope	18 percent, with commitment to achieve 60 percent

At the April 2019 TRT meeting, those representing the offshore fishery, which operates in LMA3, were unable to offer a proposal to meet the risk-reduction target. Because this sector already uses long trawls, trawling up would not reduce the number of end lines significantly, and because they fish in deep water with large numbers of pots per trawl, they cannot easily use weak rope. They argued that offshore fishermen needed more time to study the problem and pledged to develop measures that would meet the target. Although relatively few vertical lines in New England belong to this fishery, because it uses heavy rope and has large trawls, and the fishery overlaps significantly with right whale presence, it represents a disproportionately large risk to right whales. The Commission is not aware that participants in the offshore fishery have identified or proposed any

[12] Derived from a summary of the measures provided by GARFO, and Table 1 in the FRN.
[13] Many fishermen string pots together with bottom lines and vertical lines at each end of the string. In New England, such strings are called 'trawls', and increasing the number of pots/traps per trawl is called 'trawling up'.

new measures to achieve the targeted reductions in entanglement risks. Therefore, the Commission recommends that NMFS, on its own initiative, propose additional measures capable of meeting the risk reduction target for this fishery. Ropeless gear is particularly well-suited to the offshore fishery for a number of reasons, and the Commission is encouraged that offshore fishermen already are participating in tests of such gear. However, for the near term, absolute effort reduction and time-area closures in the fishery may be the only effective solutions and should be considered by NMFS in its proposed rule and DEIS.

DEIS Alternatives

The alternatives identified in the DEIS presumably will be grouped into sets of entanglement mitigation measures for particular fisheries, such as those recommended by the TRT and discussed above. The Commission encourages NMFS to include and analyze in the DEIS a wide range of mitigation measures that reduce both the likelihood and severity of entanglement. The Commission recommends that the DEIS alternatives should include and rely most strongly on options that 1) produce the greatest estimated risk reduction, 2) remove substantial numbers of vertical lines from the water column, 3) have strong scientific support, and 4) are most likely to be successful in reducing mortality and serious injury to MMPA-mandated levels. For alternatives with equivalent risk reduction potential, preference should be given to those that will have a smaller economic impact and/or operational risk for fishermen. The analyses of these alternatives should be sufficient to demonstrate, using the decision-support tool and/or other appropriate data-/science-based tools, the likelihood of each alternative meeting or exceeding the 60-percent risk reduction goal. Because of the uncertainty that proposed take reduction measures will be as effective as predicted and the difficulty of accurately determining the number of whales likely to be killed, the Commission recommends that the DEIS analyses whether the included alternatives will achieve not only a 60-percent risk reduction, but also an 80-percent risk reduction to account for undetected mortalities, the relative contribution of which likely varies over time. More importantly, the DEIS should discuss how the various risk reduction targets relate to satisfying the MMPA mandates. Further, if none of the alternatives included in the DEIS are expected to meet the 80-percent risk reduction target, additional alternatives should be added that do have that expectation.

Specifically, the Commission recommends that the entanglement mitigation alternatives include combinations of measures from the following: 1) substantial reductions in vertical line numbers in all states and LMAs, 2) time-area closures to protect the largest and most predictable concentrations and migratory pathways of right whales, 3) the use of 'weak' rope (1,700-pound equivalents) in every pot/trap fishery, 4) the use of any other proven measures that will reduce entanglement severity, such as high-visibility rope, and 5) actions taken or planned by NMFS to secure the cooperation of and the implementation of comparable measures by other jurisdictions, such as state and Canadian management agencies. If it turns out that the offshore lobster fishery cannot make the weak-rope option work, then the Commission recommends that NMFS require the offshore fishery to make the transition to ropeless gear on an aggressive, time-bound schedule. Further, the Commission recommends that NMFS's preferred alternative be designed to achieve a risk reduction of 80 percent.

Closures. Time-area closures need to be placed when and where the fisheries and right whales are most likely to overlap, and they should provide the greatest possible protection to right whale aggregation sites and migratory corridors. The two large closures in Massachusetts already meet this

requirement, but by themselves they are insufficient to provide the needed reduction in entanglement risk throughout New England. Members of the TRT proposed closure modifications and identified new closures to be assessed for their risk-reduction potential. Those included time and area extensions of the closure in Cape Cod Bay that would apply for two weeks longer in the season and outside the area's northern boundary. In addition, the TRT proposed a closure south of Martha's Vineyard and Nantucket,[14] where whales recently have been found consistently in appreciable numbers from November to May. Beyond these areas, it is apparent from data provided to the TRT by NMFS that additional areas should be considered and analyzed. These include: 1) the northern boundary of Georges Bank in May, June, and perhaps July; 2) the central Gulf of Maine north of the Great South Channel in May, June, and July; and 3) the northern Gulf of Maine (around Jeffreys Bank) from October through January. The Commission recommends that NMFS evaluate in the DEIS the potential contribution of modified and additional time-area closures in reducing entanglement risks.

The Commission notes that the analysis of the effectiveness (i.e., risk reduction provided) of time-area closures should take into account increased risk due to effort displacement. While time-area closures eliminate all vertical lines in the closed areas, that effort may not 'go away'. Rather, that effort will likely be partially or entirely displaced to other areas, thus increasing the number of vertical lines in those areas. Assuming that any new or modified time-area closures would be focused where right whales are concentrated, the risk reduction from a closure almost certainly would be greater than the risk increase from displaced effort. The Commission recommends that NMFS should take both effects into account in the DEIS, something that was not done by the TRT in formulating its recommendations (Table 1).[15] We encourage NMFS to work with state lobster management agencies to design measures that will minimize this displacement effect.

The success of any closure also depends on the ability to adjust it over time in response to new information on whale distribution and movements, fishing effort information, and data on the closure's effectiveness. Therefore, the Commission recommends that NMFS include in its discussion of time-area closures in the DEIS an assessment of the effectiveness of all fixed closures(e.g., conducting periodic surveys or deploying passive acoustic monitors in and around the closures, to document the abundance of right whales inside and outside and before, during, and after closures) and to use updated information to modify the geographic and temporal extent of the closures on a regular basis.

The Commission also recommends that NMFS evaluate the use of dynamic closures in the DEIS, such as those that have been implemented in Canada (see below). Dynamic management areas (DMAs) implemented to reduce ship-strike risk in the U.S. have been very successful. The Commission is aware that NMFS tried to use fishery DMAs in the past and rejected their use due to logistical difficulties faced by fishermen (e.g., the difficulty of quickly pulling gear) and the accompanying monitoring requirements. However, the benefits may now outweigh the costs, especially in an era when environmental changes driven by ocean warming are affecting fishing effort and whale distribution patterns from year to year. With the right whale population declining

[14] This area is partially in LMA2 and LMA3.
[15] In Table 1, a vertical line reduction of a certain percentage was credited with a risk reduction of the same percentage without any adjustment to account for associated displacement of fishing effort to other areas and increased risks in those areas.

and at a much greater risk of extinction than it has been for a considerable time, the cost-benefit analysis for fishery DMAs could well have changed. The Commission further recommends that NMFS, working with the states as needed, assess options to overcome difficulties associated with implementing fishery DMAs. The DEIS should, at a minimum, identify the logistical, economic, and operational difficulties, and discuss potential solutions.

Other Mitigation Considerations

Vertical Line Reductions. Two factors complicate the analyses of vertical-line regulations. First, while capping line numbers would appear to be the most straightforward approach, Massachusetts is the only State where end lines currently are counted or regulated. Other states lack the data and regulatory mechanisms for implementing this approach. Rather than requiring a specific reduction of vertical ground lines from a known number, states will likely have to use indirect mechanisms to reduce end-line numbers, which all have their own problems. Indirect approaches, such as 'trawling up', can fail if fishermen comply in a manner that does not result in a proportional reduction in vertical lines. For example, reducing the number of pots/traps allowed by a certain amount or percentage would not reduce vertical lines proportionally if fishermen also reduced the number of pots/traps per 'trawl'. One suggestion reviewed by the TRT was to require fishermen to 'trawl up', which, with a trap limit in place, should reduce the number of end lines. However, this also would increase the likelihood that entangled whales would be severely injured or die because of the increased weight on and strength of the line. Thus, some indirect approaches may have more serious negative unintended consequences than others. The Commission recommends that any alternative involving line reduction be carefully designed to be as direct as possible and to avoid unintended consequences that could reduce effectiveness. On a related point, the Commission recommends that NMFS, in cooperation with the states, take immediate steps to collect data to provide reliable information on the numbers of end lines in use before and after the implementation of any line-reduction measures, thus allowing the effectiveness of such measures to be assessed.

Weak rope. Stronger rope typically has a larger diameter, and therefore is more likely to severely injure or kill an entangled whale because the animal is unable to break free. While smaller-diameter rope may better allow entangled whales to break free, it may still cause severe injuries because it may more easily cut through a whale's tissues. Therefore, it is important that, in assessing any proposed 'weak' rope measures, NMFS take into account the complicated relationship between rope diameter and severity of injury. Placing weak sleeves at set intervals on large-diameter end lines may be a better option than using 1,700-pound rope. One key to the effectiveness of sleeves is the distance between them. The greater the distance, the greater the likelihood of constricting wraps remaining unbroken on entangled whales, which is more likely to lead to severe injury or death. Conversely, shorter distances between sleeves may reduce the likelihood of constricting wraps but result in greater cost in time and money for fishermen. Although the TRT and the broader community have considered the question of optimal distance between weak links such as sleeves, they have not reached a consensus. The Commission recommends, for alternatives that include the weak sleeve option, that NMFS undertake a careful analysis of the pertinent science and make use of modeling to determine the optimal distance between sleeves for right and other large whales, and include that distance in its DEIS analyses and proposed regulations.

Collaboration with Canada. The risk-reduction target established by NMFS assumes that Canada will achieve equivalent risk-reduction thereby allowing the target to be reached for the right

whale population throughout its range. Following the large number of right whale deaths in the Gulf of St. Lawrence in 2017, Canada took the path originally recommended to NMFS by the Commission in 2007, instituting strict, precautionary regulations, and relaxing them only after their effectiveness had been demonstrated. Although the U.S. has been making incremental steps toward reducing entanglement for two decades, Canada, in one step, instituted comprehensive new regulations for the Gulf (including gear modifications, and static and dynamic fishery closures and ship slow-downs), regular monitoring (aerial and acoustic surveys), and additional research into gear-modification solutions. These measures appeared to work well in 2018 when no deaths and only one entanglement were reported in the Gulf of St. Lawrence. In 2019, Canada relaxed its regulations, but apparently by too much and too soon, given that at least eight deaths and an additional four entanglements were documented in the Gulf this past summer. The Commission recognizes the efforts NMFS has made to work with Canada's Department of Fisheries and Oceans and Department of Transport – providing assistance, especially with survey efforts, as Canada struggled to eliminate the threats to right whales from shipping and fishing in its waters. The Commission recommends that NMFS continue and expand on these efforts and that the importance of working with Canada be reflected in the DEIS. Among other things, the DEIS might usefully discuss the applicability of the MMPA fish import rule in helping to ensure that Canada's take reduction program for its fisheries is and remains comparable to that of the United States. The DEIS might also consider steps to formalize ongoing coordination and collaboration with Canada on take reduction and monitoring through a binding bilateral agreement.

Long-term Management

The actions discussed in this letter are primarily measures that can be implemented quickly to reduce mortality and serious injury to below PBR. However, the long history of NMFS taking incremental steps to reduce mortality and serious injury but falling short of achieving the MMPA's requirements, coupled with the recent emergence of similar right whale mortality problems in Canada, underscores that a more holistic approach to research and management is needed to enable North Atlantic right whales to recover. We need additional information to understand the changing spatial and temporal relationships between whales and fisheries. More data are needed on whale distribution, especially as it shifts seasonally and from year-to-year, likely in response to environmental changes that include climate change (Davies et al. 2017, 2019, Mayo et al. 2018). In addition, we need better data on fishing effort – the number of end lines and number of pots/traps deployed by area and season. Understanding the factors that lead to entanglement and those gear characteristics that determine injury severity, requires information on the gear involved, which, in turn, requires information on when and where the gear was used. Fishery-specific, and ideally fisherman-specific, gear marking is essential for obtaining the types of information needed to design and tailor effective mitigation measures, and to promote their improvement over time. The Commission recommends that the DEIS discuss options related to long-term plans for implementing, promoting, and monitoring the effectiveness of the new measures, including 1) continuing and expanding visual and acoustic whale surveys (including an assessment of how frequent and extensive such surveys need to be to meet management objectives), 2) funding/conducting further research on the relationships between types of gear and the severity of injuries, 3) collaborating with the states to collect complete information on lobster fishing effort (e.g., numbers of end lines), and 4) collaborating with the states to implement comprehensive gear marking.

Many researchers and conservationists have concluded that existing measures, and those recommended by the TRT, are unlikely to reduce entanglement mortality and serious injury to below PBR, or to satisfy the MMPA's longer-term goal of ZMRG. They have also concluded that the only viable long-term solution that will put right whales on a path to eventual recovery is to remove all lines from the water column by making the transition from pot/trap fishing that involve the use of vertical lines to 'ropeless' fishing, i.e. without the use of vertical lines. Some pot/trap fisheries, or sectors of such fisheries, if demonstrated to represent a negligible threat to North Atlantic right whales (e.g., through lack of co-occurrence with right whales), could be exempted from adopting ropeless gear. Because ropeless technology is in the early stages of development and, at this stage, is prohibitively expensive, it cannot be adopted by pot/trap fisheries, other than on a limited, experimental basis, at this time. The Commission believes that with sufficient investment, the technological and economic hurdles can be overcome and that the development of ropeless gear offers perhaps the best, long-term prospect for protecting right whales from entanglement and contributing significantly to their recovery. Therefore, the Commission recommends that NMFS substantially increase its investment in ropeless gear development and testing, and with this DEIS begin integrating its long-term plans with the short-term measures to be included in its proposed rule. For example, NMFS should consider, and include in its DEIS analysis, designating existing and proposed closures as areas where ropeless gear testing, and ultimately commercial fishing, can take place.

The measures and alternatives to be considered by NMFS in its proposed rule and the DEIS pertain to U.S. lobster fisheries. However, right whales have been entangled in other gear types (e.g., gillnets and pot/trap gear from other fisheries). The Commission therefore recommends that an immediate next step should be for NMFS to undergo the process necessary to promulgate equivalent regulations for all U.S. fisheries that entangle, or have the potential to entangle, right and other large whales.

We hope these comments and recommendations are helpful. Please contact me if you have questions regarding the Commission's recommendations.

Sincerely,

Peter O. Thomas, Ph.D.,
Executive Director

Cc: Michael Asaro, PhD, Marine Mammal and Sea Turtle Branch Chief, Greater Atlantic Region
Jon Hare, PhD, Science Director, Northeast Fisheries Science Center
Donna Wieting, Director, Office of Protected Resources
Francisco Werner, PhD, Director, Scientific Programs and Chief Science Advisor
Sam D. Rauch, Deputy Assistant Administrator for Regulatory Programs

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