



# MARINE MAMMAL COMMISSION

1 March 2021

Mr. Michael Pentony, Regional Administrator  
Greater Atlantic Regional Fisheries Office  
National Marine Fisheries Service  
55 Great Republic Drive  
Gloucester, MA 01930-2276

Subject: Comments on Proposed Amendments to the Atlantic Large Whale Take Reduction Plan

Dear Mr. Pentony:

On 31 December 2020, the National Marine Fisheries Service (NMFS) published a proposed rule and request for comments on an amendment to the Atlantic Large Whale Take Reduction Plan (the ALWTRP or Plan, herein) (85 Fed. Reg. 86879). At the same time, NMFS published a Draft Environmental Impact Statement (DEIS) and Regulatory Impact Review / Initial Regulatory Flexibility Analysis. The stated goal of the proposed amendment to the ALWTRP is to reduce the risk of ‘human-caused mortality and serious injury’ (MSI) of North Atlantic right whales (*Eubalaena glacialis*; right whales herein) and other large whales caused by the entanglement in Northeast Region lobster and Jonah crab trap/pot fisheries. The DEIS analyzes the potential environmental impacts of alternative potential amendments to the ALWTRP under the National Environmental Policy Act (42 U.S.C. § 4321 et seq.).

Section 118 of the Marine Mammal Protection Act (MMPA), added to the Act in 1994, governs the “Taking of Marine Mammals Incidental to Commercial Fishing Operations”. Section 118(a)(1) establishes as the MMPA’s “immediate goal” the reduction of MSI due to commercial fishing to “insignificant levels approaching zero within 7 years after the date of enactment,” i.e., by 30 April 2001. This goal is carried forward in section 118(b), which mandates that commercial fisheries meet the goal by the specified date. Further, for strategic stocks taken by Category I or II fisheries,<sup>1</sup> section 118(f) requires NMFS to “develop and implement a take reduction plan designed to assist in the recovery or prevent the depletion of each [such] stock.” In addition, section 118(f)(2) identifies two ALWTRP goals, the reduction of: (1) MSI due to fisheries interactions (fMSI) to a level less than the stock’s potential biological removal level (PBR) within six months of plan implementation, and (2) fMSI to “insignificant levels approaching a zero mortality and serious injury rate” within five years, “taking into account the economics of the fishery, the availability of existing

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<sup>1</sup> MMPA section 118(c)(1) requires NMFS to publish a list of fisheries that cause “(i) frequent incidental mortality and serious injury of marine mammals; (ii) occasional incidental mortality and serious injury of marine mammals; and (iii) a remote likelihood of or no known incidental mortality or serious injury of marine mammals.” In implementing regulations (60 Fed. Reg. 45086, August 30 1995), NMFS defines fisheries as being Category I (“frequent” MSI): the fishery is “itself responsible for the annual removal of 50 percent or more of any stock’s potential biological removal level”; or Category II (“occasional” MSI): “collectively with other fisheries, is responsible for the annual removal of more than 10 percent of any marine mammal stock’s potential biological removal level and that is by itself responsible for the annual removal of between 1 and 50 percent, exclusive, of any stock’s potential biological removal level”.

technology, and existing State or regional fishery management plans.” What became known as the ‘zero mortality rate goal’ (ZMRG) was set by NMFS in regulation as 10 percent of a stock’s PBR (50 CFR § 229.2). Section 117 of the MMPA, also enacted in 1994, requires NMFS to prepare and publish stock assessments for all U.S. marine mammal stocks that occur in U.S. waters on a prescribed schedule. Those stock assessments provide estimates of the best and minimum estimates of population size, PBR, fMSI, MSI due to other human causes, and the total MSI (tMSI). Stocks for which tMSI exceeds PBR or that are listed as endangered or threatened under the Endangered Species Act (ESA) are designated as ‘strategic’ stocks.<sup>2</sup> The North Atlantic right whale is a ‘strategic’ stock under both criteria, as it was listed as an endangered species in 1970, and the stock’s tMSI has exceeded PBR in every year since these values were first calculated in 1995.<sup>3</sup>

As thoroughly documented in the DEIS and Biological Opinion,<sup>4</sup> North Atlantic right whales are declining and at an increasing risk of extinction. As detailed herein (see the Appendix), despite earlier population growth, the number of right whales has decreased significantly since 2010. Entanglement in lobster- and crab-trap gear is the primary proximate driver of the decrease, which is also significantly contributed to by vessel strikes. In addition to deaths from these causes, persistent entanglement injuries have caused a decline in the condition and health of individuals, and, in females, reduced fecundity. NMFS and the entire community of individuals and organizations linked to the issue of right whale entanglement (e.g., fishermen, scientists, conservationists), are well aware that a significantly improved mitigation effort is needed to reverse the decline in the population.

Considering the population status, and in recognition of its statutory obligations, NMFS used its take-reduction process and consultations with New England states to develop the mitigation measures, Preferred Alternative, and Non-preferred Alternative in the proposed amendment to the ALWTRP (see the Appendix for details). As described in the Appendix, NMFS is proposing the implementation of measures that would (1) reduce the number of vertical lines deployed; (2) expand existing, and establish new, time-area closures to buoyed trap fishing, (3) require the use of so-called weak line (ropes used for buoy- or end-line that can be broken by a right whale that becomes entangled in them), and (4) improve gear-marking regulations; see the Appendix for a discussion of these and other mitigation measures.

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 ALWTRP amendment options and DEIS alternatives.

The Commission found NMFS’s proposed amendment to be substantially inadequate to meet the requirements of the MMPA, and therefore in need of extensive revision. The Commission’s recommendations, described in detail below in the Recommendations and Rationale section, are summarized here:

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<sup>2</sup> A ‘strategic’ stock is defined in the MMPA, section 3(19), as one “for which the level of direct human-caused mortality exceeds the potential biological removal level”, or “which is listed as a threatened species or endangered species under the Endangered Species Act of 1973”.

<sup>3</sup> NMFS North Atlantic right whale stock assessments are available at:

<https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-stock-assessment-reports-species-stock>.

<sup>4</sup> Released on 15 January 2021. The Commission’s comment letter on the Biological Opinion can be found at: <https://www.mmc.gov/wp-content/uploads/21-02-19-Pentony-Biological-Opinion.pdf>

1. NMFS has been managing North Atlantic right whales and attempting to mitigate the impact of lobster- and crab-trap fisheries for over 25 years, and has yet to fulfill its MMPA section 118 obligations to reduce this source of fMSI to insignificant levels (ZMRG). Neither the Preferred nor the Non-preferred Alternative of the proposed amendment would achieve the necessary outcome. To do so, NMFS must replace the proposed rule with regulations and TRP amendments that have a much higher likelihood of immediately meeting the requirements of the MMPA.
2. In the final rule implementing the TRP amendment, NMFS must: 1) rely on measures most likely to meet expectations, namely direct line controls, dynamic time-area closures, rope that is weak throughout, and so-called ropeless gear; and 2) use a short-term, adaptive management approach to assess and recalibrate the measures to reach the expected effectiveness at achieving TRP goals.
3. NMFS has crafted its proposed measures to attain a risk-reduction target that is substantially too low. In light of: 1) the agency's long-standing failure to reduce fMSI to required levels, 2) uncertainty regarding the efficiency of the newly proposed measures, 3) underestimation of the expected risk reduction due to double counting, and 4) the agency's failure to set a target that adequately takes account of unobserved deaths (cryptic mortality), NMFS must set a much more risk-averse target, and take into account the best available data and science to ensure the accuracy of that target.
4. For the reasons articulated in the previous recommendations, NMFS must reject the Preferred Alternative, and select the Non-preferred Alternative with these modifications or modifications similar in effect:
  - A. Mitigation measures designed to achieve an expected risk reduction sufficiently in excess of 80 percent to account for (i) performance uncertainty, (ii) double counting, and (iii) the best-available scientific estimate of the total mortality rate, which could be achieved by:
    1. Increasing the sizes or durations of proposed closures, or establishing additional closures;
    2. Designing dynamic time-area closures similar to those implemented in Canada;
    3. Capping the number of vertical lines at much lower levels; and
    4. Establishing additional buoyless restricted areas<sup>5</sup> in offshore areas, or requiring the offshore fishery to adopt pop-up gear within three years.
  - B. Monitoring and adaptive modification of these measures and their proximate effects are mandated as an annual or biennial process to ensure that the actual performance of the proposed measures is matching expected performance.
5. To increase understanding of the dynamics of entanglement to better inform mitigation measures and the derivation of more accurate, site-specific, risk-reduction targets, NMFS must implement gear marking regulations that (i) are specific to more jurisdictional and environmental areas than currently proposed, (ii) applicable to all elements of the gear,

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<sup>5</sup> These are areas in which all fixed gear fishing that uses persistent surface buoys are prohibited, but do allow fixed gear that uses pop-up technology.

- (iii) require 40-60 foot spacing along all lines, and (iv) require marks that are replaced before they become unreadable.
6. Given that the maximum gear-marking benefit would be accomplished if marks were specific to each fisherman, NMFS should undertake the necessary research and development to enable manufacturers to create individual marking schemes or devices that are operationally feasible and affordable.

## **Recommendations and Rationale**

*Failure to meet MMPA requirements.* NMFS has been attempting to achieve the “immediate” goal of section 118(f) of the MMPA for right whales—to reduce fMSI to below the species’ potential biological removal level within six months of take reduction plan implementation—for 27 years. Since 1999, when it published the first TRP for these fisheries, the agency has yet to achieve even that short-term goal, and remains even further away from meeting the Act’s more ambitious ZMRG goal, or from satisfying the negligible impact standard necessary to obtain the separate incidental take authorization required under section 101(a)(5)(E). Although NMFS had consistently predicted that U.S. fishery-management programs would be sufficiently protective of right whales to meet MMPA requirements and enable the agency to make ‘no jeopardy’ findings under the Endangered Species Act (ESA), it is clear in retrospect that those predictions were based on overly optimistic assumptions concerning the programs’ expected and actual effectiveness.

NMFS’s failure is attributable in part to the difficulty the ALWTRT encountered over the years in trying to reach consensus on prescribing strong mitigation measures, and in part to NMFS’s failure to adequately supplement the team’s recommended plan and amendments in order to meet the MMPA’s take reduction mandates. Once again, it appears that the agency is overestimating the effectiveness of the measures being proposed as amendments to the ALWTRP. In a related process, NMFS released a draft Biological Opinion on 15 January 2021 assessing the impacts of 10 Greater Atlantic Region fisheries, including the lobster fishery, on species listed as endangered or threatened under the ESA, including the North Atlantic right whale.<sup>6</sup> NMFS, in an implicit recognition that the measures included in the proposed rule would, by themselves, not reduce fMSI sufficiently to meet the applicable ESA and MMPA standards, created what it is calling a Conservation Framework.<sup>7</sup>

The Conservation Framework describes a series of mitigation measures to be implemented in phases over the next decade. In phase one of the 10-year implementation period, the proposed rule and the amendments to the ALWTRP under review in this rulemaking would be implemented during the first half of 2021. NMFS expects these measures to reduce fMSI of right whales by roughly 60 percent. In phase two, in 2023, NMFS would implement measures to reduce mortality and serious injury in gillnet and other trap fisheries (besides the American lobster and Jonah crab fisheries) by 60 percent. After implementing phases one and two, NMFS intends to evaluate the performance of those measures. Phase three, which NMFS would implement through rulemaking in 2025, is designed “to further reduce [fMSI] by 56% in all federal fixed gear fisheries....”<sup>8</sup> Phase three

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<sup>6</sup> <https://www.fisheries.noaa.gov/bulletin/draft-biological-opinion-10-fishery-management-plans-released>

<sup>7</sup> <https://www.greateratlantic.fisheries.noaa.gov/public/nema/PRD/NARWConservationFrameworkGARFO.pdf>

<sup>8</sup> The 60 percent reduction in mortality and serious injury expected to result from the measures in the proposed TRP amendment would occur in both federal and state waters. Because most of the risk of mortality and serious injury occurs in federal rather than state waters, the risk reduction in federal waters will be slightly less than the overall target of 60 percent, namely 57 percent.

will be followed by another evaluation period in 2025-2026. NMFS intends to implement phase four in 2030 with the goal “to further reduce [mortality and serious injury] ([by] up to 87%) in fixed gear fisheries.”

The Biological Opinion sets the current level of right whale MSI at 4.94 whales per year due to fisheries operating in federal waters, with an additional 1.78 whale deaths and serious injuries occurring annually in state waters. Assuming that measures implemented under the Conservation Framework are as effective as predicted, fMSI in federal waters would be reduced in phase one from its current level of 4.94 to 2.2, in phase two to 2.13, in phase three to 0.85, and finally in phase four (i.e., in 2030) to 0.11. While specific measures have been identified and proposed for phase one of the Conservation Framework, NMFS has not identified any specific measures that would be adopted under the latter three phases to achieve the specified take-reduction targets. Additionally, NMFS explains that the “Conservation Framework specifies targets rather than particular measures to be implemented” and that NMFS is “committed to working with [its] partners on the implementation of measures to meet the goals of the Conservation Framework.” In the Conservation Framework, NMFS does list measures that could be employed, which include, but are not limited to, further trawling up, weakening of vertical lines, the use of pop-up gear, additional time-area closures for buoyed gear, and buoy-line reduction, perhaps through an allocation program that would cap line numbers.

Even if take-reduction measures proposed in the Preferred Alternative and phases 2-4 of the Conservation Framework prove fully effective, entanglement risk to right whales will not be reduced to insignificant levels approaching a zero rate for at least another ten years, roughly 30-35 years longer than required by the 1994 MMPA amendments. Moreover, fMSI of right whales would continue to exceed the species’ PBR level for most of the next decade despite the directive in section 118(f) that the immediate goal of the TRP is to reduce fMSI to below PBR within six months. NMFS states that it is committed to “implement[ing] measures that are necessary for the recovery of right whales....” However, it is impossible to know at this point whether the yet-to-be-specified measures that NMFS ultimately adopts over the next ten years will be adequate to achieve that goal. The increasing extinction risk facing right whales demands that NMFS take actions having a greater likelihood of success. The Conservation Framework stresses that NMFS will have to engage in adaptive management to ensure that the Framework is successful. The Commission agrees and commends NMFS for recognizing this necessity, but notes that the Framework provides scant information on fisheries monitoring, evaluation of efficacy, and development of subsequent adaptive measures. Given the long history of failure to adopt effective take reduction measures, the Commission stresses the necessity of promulgating stronger more immediately effective measures rather than assuming that a successful outcome will result from the vaguely defined Conservation Framework. The Commission submitted comments on the draft Biological Opinion and Conservation Framework on 19 February 2021, raising similar concerns regarding the Agency’s track record and optimistic predictions, with respect to the proposed no-jeopardy finding and associated incidental take statement.

Therefore, the Commission recommends that NMFS fulfill its obligations under section 118 of the MMPA by replacing the proposed rule with regulations and TRP amendments that have a much higher likelihood of immediately reducing fMSI of right whales across all commercial fisheries (including cryptic mortality) to below PBR and with a detailed proposal for further reducing fMSI to

insignificant levels (i.e., below ZMRG) in less than five years.<sup>9</sup> The proposed amendment to the TRP and the Preferred Alternative are insufficient to achieve either of these outcomes. The Commission's concerns over the proposed rule and options for strengthening the agency's response are detailed below.

*Insufficient risk reduction.* In light of the historical failure of past risk-reduction measures, there are reasons to expect that the measures proposed herein will also fail to achieve the risk-reduction target set in the proposed amendment, let alone the immediate and long-term goals of the MMPA and the ALWTRP.

First, static time-area closures are a potentially highly effective means to reduce the number of vertical lines in the water, but they only work as long as the whales continue to aggregate in the designated times and areas. Arguably, the North Atlantic right whale is in increased peril now because of an environmental regime shift that occurred over an unknown timespan around 2010, which resulted in the population's distribution shifting, thus increasing the risks from anthropogenic impacts. There are no guarantees that ocean warming-driven shifts in distribution will not continue, further reducing the effectiveness of static time-area closures. In addition, trawling-up as a means to reduce the number of vertical lines is an as yet unproven method to reduce entanglement frequency, and there is every reason to expect that entanglements that do still occur will be more severe. Fishermen are well known for finding innovative and unanticipated ways to adapt to regulations that restrict their fishing practices. Often their best choice is to comply with a regulation, but sometimes they choose a legal option that does not change their practices as the regulators intended (i.e., in this case reducing the number of vertical lines in the water). NMFS could avoid this uncertainty if it chose to control the number of lines directly by capping their numbers, i.e., by adopting this element of the Non-preferred Alternative. Finally, the best available science (Knowlton et al. 2015) provides a strong expectation that weaker buoy lines will reduce the severity of entanglement injuries and the likelihood of deaths. However, much less is known about how large whales free themselves from entanglements by breaking entangling ropes. It is not known whether the complicated and varying schemes for weakening buoy lines in the Preferred Alternative will have the desired outcome. Experts have argued that numerous weak insertions placed in buoy lines every 40 feet or so, or rope that is weak throughout, should be the most effective at reducing entanglement, but even that is largely conjectural. Nonetheless, if the experts are correct, then the Non-preferred Alternative should be more effective at reducing injury severity. The efficacy of the proposed measures will not be known until they are in widespread use, and then only with adequate monitoring. Monitoring of the proximate effects of the measures (e.g., whether trawling up is achieving the anticipated vertical line reduction; what could be called 'operational performance') can be conducted annually or biennially, but detecting intermediate effects (e.g., reduced entanglement rates), or ultimate effects (e.g., improved demographic rates) will take years. During those years, if the expected risk reduction does not occur, North Atlantic right whales will suffer and the species will become further imperiled.

The Commission suggests that these sources of effectiveness or performance uncertainty require the agency's attention. It is not acceptable management practice to implement measures of highly uncertain effectiveness, and assume that they will work until proven otherwise. In part, that is how the agency has arrived at this juncture, where more than 25 years of management have not

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<sup>9</sup> As noted above, NMFS and the fisheries should be achieving the ZMRG immediately—they are 20 years overdue in meeting this mandate. However, even reducing incidental take to below PBR would be an important first step.

produced the desired results and right whales are declining toward extinction. The Commission fully understands that the availability of “proven entanglement mitigation measures” is limited and that often what is available are measures that experts and experienced individuals can only predict to have a good chance of working.

In this situation, the Commission recommends that the appropriate path forward is to: 1) rely on the measures that are most likely to be as effective as expected (specifically—direct line controls, dynamic time-area closures, rope that is weak throughout, and pop-up gear, which holds the promise of greatest effectiveness if it can be made practicable in the densely fished areas), and 2) use a ‘quick-cycle’,<sup>10</sup> adaptive management approach to assess and readjust the suite of mitigation measures being used to achieve ALWTRP goals. We emphasize ‘quick-cycle’ (e.g., 1-2 years) because ineffective management that is in place for five years before being assessed will result in an unacceptable increase in the risk of extinction.

Second, the Preferred Alternative includes a risk-reduction ‘credit’ of 9.9 percent to account for the likely benefits provided by the Massachusetts Restricted Area (MRA). That credit is included in the estimated risk reduction expected from the Preferred Alternative, but its effect should already be reflected in the 2017 baseline fMSI. Thus, the actual expected risk reduction of the Preferred Alternative is less than even the lower limit of the 60-80 percent target. The DEIS states—

Given the large scale of the current MRA and the importance of the area for right whales, the take reduction team agreed that Massachusetts fishermen should get equivalent credit for maintaining the closure from February through April. This closure was implemented effective June 2015 through modifications to the Atlantic Large Whale Take Reduction Plan, impacting a portion of LMA One and the outer cape LMA. The Take Reduction Team recognized the high and increasing value of this recently expanded area, and recognizes its disproportionate impact on Massachusetts fishermen when they recommended inclusion of the closure area risk reduction towards the 60 percent risk reduction target.

The Commission’s representative and several other Team members opposed inclusion of MRA credit in calculating risk reduction achieved by the measures included in the Preferred Alternative. Although the Commission appreciates the desire of Massachusetts fishermen to receive credit for their considerable past and ongoing conservation efforts, which are undeniable, NMFS will have to include additional risk-reduction measures in the Preferred Alternative if it is going to reach the predicted risk reduction of 64 percent.

Third, as mentioned above, the 80-percent upper limit of the risk-reduction target was included by NMFS to account for cryptic mortality. The lower limit takes into account only known fMSI. NMFS stated that its approach, at the time Team members were developing their recommendations, was to assume that “half of the estimated undocumented incidents occurred in U.S. waters and were caused primarily by incidental entanglements.” In the DEIS, NMFS states—

If we assume half of the estimated mortalities and serious injuries [observed and cryptic] occur incidental to U.S. fisheries (5.25), mortality and serious injury is more than five times higher than potential biological removal and requires an 83% reduction ... [and] serious

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<sup>10</sup> One that is focused on the operational performance, i.e., the proximate effects of the newly implemented measures

injury and mortality of right whales in U.S. fishing gear must be reduced by 60% (documented) to 80% (estimated) to achieve potential biological removal.

However, NMFS noted that “given the assumptions and other sources of uncertainty in the 80 percent target, as well as the challenges of achieving such a target without large economic impacts to the fishery, the Take Reduction Team focused on recommendations to achieve the lower 60 percent target.” The Commission suggests that the difficulty the Team faced in trying to get risk reduction above 60 percent also stemmed from the lack of agreement about including additional time-area closures. This resulted in the Team simply aiming, by default, to achieve the lower limit of the target (i.e., 60 percent).

Throughout the Team’s deliberations, NMFS was very clear that not all the carcasses of North Atlantic right whales that die are detected and reported and that this necessitates reducing risk by roughly 80 percent. The Commission is therefore perplexed that NMFS would adopt the lower limit as the target in the proposed amendment. In the DEIS, NMFS notes the difficulty in apportioning cryptic mortality between entanglement and ship strike, but this difficulty should not have precluded the agency from placing bounds on the proportion likely due to entanglement. To adopt the 60-percent target is to implicitly assume that there is zero undetected/unreported, i.e., cryptic, mortality, which the agency knows is not true and runs counter to the findings of its own scientists. Additionally, NMFS fails to acknowledge in the DEIS that the magnitude of cryptic mortality is likely much greater than was thought in 2019 to be the case. In deriving the 80-percent target to account for cryptic mortality, NMFS relied on an estimate provided by an analysis led by a NMFS scientist. As described in the DEIS and above, using the methods of Pace et al. 2017, an estimated 40 percent of right whale deaths are not observed and reported (i.e., they are ‘cryptic’). However, a new analysis focused explicitly on estimating the cryptic mortality rate found that cryptic mortality accounts for 64 percent of the estimated total number of deaths in the population (Pace et al. 2021), an increase of 60 percent over the Pace et al. 2017 estimate. Thus, even the 80-percent risk reduction target is a significant underestimate of the magnitude of decrease in fMSI that is needed to reach the ZMRG level. It is not clear why the proposed rule and DEIS fail to cite or incorporate the cryptic mortality results in Pace et al. 2021. While this paper was published after NMFS had released the proposed rule and DEIS, the lead author is a NMFS scientist and the agency would have been in possession of the results approved by its own internal review process prior to the paper’s being submitted for publication in July 2020. It is clear that the proposed rule and DEIS have not used the best available data and science as presented in Pace et al. (2021).

In light of all the issues raised in this section, the Commission recommends that NMFS (a) reassess its risk-reduction target in light of: 1) the agency’s long-standing failure to reduce fMSI to required levels, 2) uncertainty regarding the efficiency of the newly proposed measures, 3) underestimation of the expected risk reduction due to double counting of the effect of the MRA, and 4) the agency’s failure to set a target that adequately takes account of cryptic mortality; and (b) promulgate a final ALWTRP amendment that includes those measures that have the greatest chance of achieving the requisite risk-reduction level. The first two factors mentioned above suggest that NMFS should set a conservative (i.e. substantially more risk-averse) risk-reduction target that has an uncertainty buffer as a way of improving the chance that the nominal target will be reached, while the latter two factors require that NMFS take into account the best available data and science to ensure the accuracy of that target.



*Alternatives.* The Commission believes it highly unlikely that the Preferred Alternative will be as effective as anticipated. Effectiveness in this context relies on measures that are to varying degrees untested or potentially unreliable. Rather than directly regulating the number of vertical lines that can be fished at any given time, the Preferred Alternative relies on an indirect method, trawling-up, to reduce the number of vertical lines, without any assurance that this approach would achieve the expected magnitude of line reduction. The Preferred Alternative also relies on weak-rope configurations that have not been tested. There is reasonably strong scientific support for requiring ropes to break at 1700 pounds or less, but it is unknown whether right whales will be able to break lines that have just one or two weak insertions, rather than lines with insertions every 40 feet or that are weak throughout, as recommended by scientists. Therefore, whether the proposed configurations will be effective is almost entirely speculative. Finally, the Preferred Alternative further relies heavily on fixed closures to continue providing protection for right whale hotspots, which is problematic in an era when marine environments are changing in response to ocean warming. This is in contrast to dynamic closures such as those being used in Canada, apparently with considerable success. The Commission therefore recommends that NMFS reject its Preferred Alternative as inadequate for the many reasons articulated above.

The Non-preferred Alternative will likely be more effective than the Preferred Alternative, but is likely still inadequate to achieve the goals of the MMPA. On the positive side, it relies on direct control of the number of vertical lines. This is an improvement on the trawling-up approach, but it is not without challenges. Although capping line numbers appears straightforward and could be achieved by permitting lines in addition to traps, Massachusetts is the only State where buoy or end lines currently are counted or regulated. Other states currently lack the data and regulatory mechanisms for implementing this approach. Implementing line caps will require a phase-in period during which regulatory agencies develop the necessary policies to regulate and monitor vertical line numbers, and collect baseline data on the number of lines being used. Another improvement offered by the Non-preferred Alternative would be the establishment of a larger closure south of Nantucket, which has become recognized as important winter habitat for right whales, and another closure north of Georges Bank. In addition, the Non-preferred Alternative would, for the most part, require fully weak rope. In contrast to these positive elements, however, the Non-preferred Alternative would not offer much improvement in the risk reduction in LMA3, and it also does not achieve the upper limit of the take-reduction target. NMFS and independent experts suspect that LMA3, where the offshore fishery operates, is responsible for a disproportionate number of entanglements, especially severe entanglements, that lead to fMSI. Because of the depths at which the gear is fished, the strong currents, and the large number of traps per trawl, that fishery uses very heavy (strong) lines, which almost certainly cannot be broken by adult right whales, let alone younger animals. Also, because of these factors it is difficult for the gear to incorporate weak insertions without compromising the ability of the fishermen to successfully retrieve their gear. As a result, under either alternative it is not likely that the offshore fishery will be able to achieve a risk reduction of more than 15 percent (Table 3.4 in the DEIS).

Considering the discussion and recommendations above, the Commission recommends that NMFS adopt the Non-preferred Alternative, with the following modifications—

- 1) Changes are made to the proposed mitigation measures to achieve an expected risk reduction sufficiently in excess of 80 percent to account for (i) performance uncertainty, (ii) double counting of the MRA ‘credit’, and (iii) the 64-percent cryptic mortality rate estimated by Pace et al. 2021, the best available science, which could be achieved by:

- a. Increasing the sizes or durations of proposed closures, or establishing additional closures targeted at right whale hotspots with moderate to high entanglement risk;
  - b. Designing dynamic time-area closures similar to those implemented in Canada;
  - c. Capping vertical lines at much lower than present levels;<sup>11</sup> and
  - d. Establishing additional buoyless restricted areas in LMA3, or requiring the offshore fishery to adopt pop-up gear within three years.
- 2) Monitoring and adaptive modification of these measures and their proximate effects are mandated as an annual or biennial process to ensure that the actual performance of the proposed measures is matching expected performance.

*Gear marking.* One of the major sources of uncertainty in determining appropriate area-specific risk-reduction targets is the shortage of information on the types and sources of gear that entangles right whales. As described in the DEIS, the source (e.g., country, state, or fishery) could be identified in just 24 percent of the cases of whales found to be seriously injured or dead as a result of entanglement. Identifying the gear involved is critical to deriving accurate area-specific risk-reduction targets, and for improved understanding of the entanglement dynamics that lead to serious injuries and deaths. NMFS recognizes this imperative, as evidenced by the expanded gear-marking regulations included with the 2014 amendment to the ALWTRP, and by the improved marking schemes that are part of the proposed amendment's Preferred and Non-preferred Alternatives (see Table 3.3 in the DEIS). While the new regulations would allow, in some cases, retrieved gear to be linked to a state or management area (e.g., federal waters), the Commission believes that they fall well short of what is needed.

To improve understanding of entanglement dynamics and derive more accurate and site-specific risk-reduction targets, the proposed marking regulations need to be strengthened considerably. Among other things, gear-marking provisions should require more marks on lines and include unique marks for more fishing areas and marks that distinguish whether the rope was used as a buoy or end line or as a groundline. 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 necessary further measures.

Therefore, at a minimum, the Commission recommends that NMFS revise the gear-marking measures in the proposed TRP amendment to include the following features:

1. Area-specific marking schemes are developed for jurisdictional areas (e.g., United States vs Canada, individual states, state vs federal waters) and areas of high entanglement risk (e.g., hot spots where there is a strong correlation or overlap between whale abundance and gear density);
2. All vertical end or buoy lines and groundlines are marked, including with an additional mark to distinguish vertical lines from groundlines;

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<sup>11</sup> The Decision Support Tool (DST) should be used to determine the actual amount of vertical line reduction, in combination with other measures, necessary to account for serious injuries and total deaths in the population.

3. Identifying marks are sufficiently spaced, such as every 40-60 feet, to ensure that the maximum amount of recovered gear can be identified; and
4. Marks on buoys, lines and traps are replaced before they become unreadable due to abrasion or other degradation processes.

The Commission recognizes the difficulty and added expense associated with jurisdictionally and/or geographically fine-scale marking schemes. A fisherman who fishes widely in state and federal waters might need to have several sets of lines, each with a different set of marks. There is, however, a simple and powerful solution to this problem, which is to make all marks specific to the owner of the gear. Thus, each fisherman would mark his or her gear with a unique combination of marks, or a strand of uniquely identifiable wire or tape woven into all ropes, throughout or at regular intervals along the rope. Although this would be more expensive, within a few years it likely would settle the question of to what extent each fishery is responsible for the entanglement of right whales, and it would provide detailed information to be used in studies of entanglement dynamics, data that are critical for developing improved mitigation measures. While fishermen might object to being individually identified, this is already a reality because buoys and traps have to be marked individually in the two states with the largest number of lobster fishermen, Maine and Massachusetts. Therefore, the Commission recommends that NMFS undertake the necessary research and development to enable manufacturers to create individual marking schemes or devices that are operationally feasible and affordable.

### **Conservation Action**

The Commission supports NMFS's intention to protect and recover right whales, but believes, as reflected by the agency's decision to undertake this rulemaking, that it must be much stronger and that additional actions are needed to meet the various mandates of the MMPA.<sup>12</sup> Most pressing is the need for the United States and Canada to prevent any human-caused mortality and serious injury, thereby beginning to reverse the downward population trend. Adoption of vessel-speed regulations and entanglement mitigation measures by the United States over roughly the past three 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 2.8 percent was substantially below what might be expected for this species given the 5.3-7.2 percent population growth rates observed in the closely related southern right whale, and the 4.0 percent intrinsic rate of increase ( $R_{max}$ ) estimated for the North Atlantic right whale (Corkeron et al. 2018).

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

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<sup>12</sup> 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)).

Mr. Michael Pentony

1 March 2021

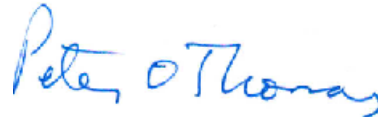
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standards, rather than continuing to depend on a complex, shifting, inefficient, and ineffective network of regulatory measures to protect the whales. The guiding principle should be to separate high-risk human activities from right whales, in both 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 at an alarming rate. The protection of right whales can no longer rely on unproven measures and overly optimistic projections. If strong mitigation measures prove to be effective in reducing MSI below PBR, then NMFS can assess whether economic and other considerations weigh in favor of scaling those measures back and take 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 vessel-strike deaths that occurred in the Gulf of St. Lawrence in 2017, and the United States should follow suit.

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

Sincerely,



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

Cc: Jennifer Anderson, Assistant Regional Administrator for Protected Resources,  
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## **APPENDIX – Additional, Supporting and Background Information.**

### **Population Status**

Since 2010, the right whale population has been declining steadily at approximately one percent per year, and faces an increasing risk of extinction (Kraus et al. 2016, Pace et al. 2017, Pettis et al. 2020). A recent population assessment revealed poor body condition of North Atlantic right whales compared to three populations of southern right whales (Christiansen et al. 2020). Both lethal and sub-lethal anthropogenic trauma from entanglements and vessel collisions are thought to contribute to this decline in population abundance (Sharp et al. 2019, Christiansen et al. 2020, Moore et al. 2021). Sub-lethal effects of entanglements of individual whales whose health is already compromised, as evident from poor body condition, can result in reproductive failure. The best available scientific information clearly identifies entanglements in fishing gear, especially lobster and crab pots or traps (generically, traps hereafter), and vessel strikes in both the United States and Canada as the two main anthropogenic drivers of the decline (NMFS 2019). Vessel 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, Moore et al. 2021).<sup>13</sup> Early analyses of rules designed to limit vessel speeds in U.S. waters to reduce the number of vessel strikes of large whales indicated that the regulations were having the desired effect (Laist et al. 2014, van der Hoop et al. 2015), but a recent analysis indicates that the effect is not very large (NMFS 2020a, Moore et al. 2021). Vessel strikes were a significant cause of right whale deaths in Canada in 2017 (Daoust et al. 2017) and again in 2019.<sup>14</sup>

Although the population had been increasing at a relatively slow rate of 2.8 percent per year during the 1990s and 2000s (Pace et al. 2017, Corkeron et al. 2018), it peaked at an estimated 483 whales in 2010 and decreased to an estimated 356<sup>15</sup> whales at the end of 2019 (DEIS, Biological Opinion, Pettis et al. 2020), a decline of 36 percent in just a decade. On the positive side, in 2020, only two whales are known to have died in U.S. waters and 10 calves were observed. As of mid-February 2021, 15 calves had been detected, although one is known to have died due to a vessel strike. Particularly alarming is the fact that no more than 90 reproductive-age females remained as of 2017 (Hayes et al. 2018), and their numbers are declining more rapidly than males' (Pace et al. 2017). Two studies have found that females accounted for 66 percent of deaths of adults (Moore et al. 2004, Sharp et al. 2019).

Entanglement in fishing gear is so frequent 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 average, 26 percent of the whales acquire new entanglement 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

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<sup>13</sup> From 2012 to 2016, over twelve times as many whales died due to entanglement compared to vessel strikes (NMFS 2019).

<sup>14</sup> Right Whale News, September 2019, at: <https://www.narwc.org/uploads/1/1/6/6/116623219/rwn-sep19.pdf>

<sup>15</sup> NMFS, using the method of Pace et al. 2017 estimated there were 366 individuals in the population as of January 2019 (95-percent credible interval 353-377), from which Pettis et al. 2020 subtracted the number of known deaths in 2019 to produce the estimate of 356 at the end of January 2021. The actual number was probably somewhat lower because Pettis et al. (2020) did not account for likely undetected deaths, which easily could have equaled or exceeded the number of known deaths (Pace et al. 2017, Pace et al. 2020).

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 the likelihood that an entanglement leads to death or serious injury is increasing by 6.3 percent per year (Hayes et al. 2018).

The known number of right whales dying has increased rapidly since 2010 (Figure 1, Pace et al. 2021), and the proportion of deaths attributable to entanglements also has increased substantially (Figure 4, NMFS 2020b), although population modeling has indicated the mortality rate of adult right whales has not declined (Pace et al. 2017).<sup>16</sup> Roughly 34 deaths and serious injuries of entangled right whales have been documented in the most recent five years of data (2014-2018; NMFS 2020b). NMFS's North Atlantic right whale stock assessment reports<sup>17</sup> indicate that the annual mean of observed MSI increased from 1.3 prior to 1999, to 5.8 from 2000-2009, and to 6.9 from 2014 to 2018. Moreover, this should be considered a minimum, as the carcasses of an estimated 64% percent of all right whales presumed to be dead go undetected ('cryptic mortality'; Pace et al. 2021). Thus, the number of undetected deaths from 2014 to 2018 could have been as high as 19 right whales, although Pace et al. (2021) recommend making such extrapolations cautiously as the likelihood of detection of MSI differs substantially between entanglements and vessel strikes. In a recent presentation to the NMFS's Atlantic Scientific Review group Dr. Pace cautioned that most deaths predicted to have occurred by his population model (Pace et al. 2017) go undetected and that the number of detected deaths and serious injuries is a very poor predictor of the total.

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. 2017, Knowlton et al. 2018), and this contributes to the recent and prolonged low calving rate (Kraus et al. 2016, Pace et al. 2017). Females require at least two or three years to build the nutritional reserves needed to calve, and apparently do not calve 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 are entangled during the inter-birth period. The mean inter-birth interval increased from roughly 3-4 years during 2009-2011, to 4.5-6.5 years between 2012 and 2016, to 7-10 years from 2017 to 2020 (Pettis et al. 2020). 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 observed each year (range, 7-22), but only 22 calves in total were seen from 2017-2020 (average=5.5 per year, range, 0-10; Pettis et al. 2020). Entanglement-caused health decline is not the only driver of lower calving rates,<sup>18</sup> but it is a significant factor (Corkeron et al. 2018). Further, 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.

### **Mitigation Measures**

The mitigation of entanglement risk for North Atlantic right whales rests primarily on two approaches: 1) reducing the likelihood of entanglement, which is achieved mostly by removing entangling lines from the environment, and 2) reducing the severity of entanglements and the

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<sup>16</sup> This suggests that the increase in the number of known deaths is a change in the discover/reporting rate, and that the decline in the population is due to a decrease in the reproductive rate.

<sup>17</sup> 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>.

<sup>18</sup> Reproductive rates are also dependent on prey availability and energy expenditure, both of which have been changing (references in Hayes et al. 2018).

resulting injuries, which is achieved primarily by making it more likely that an entangled whale can break the line and shed the attached gear. While right whales can become entangled in ground lines, the large majority of entanglements appear to be in buoy or end lines (often referred to generically as vertical lines).

*Likelihood of Entanglement.* Eliminating vertical lines would virtually end the entanglement of right whales.<sup>19</sup> Although this could be achieved by closing fisheries, such an action is socially, economically, and politically infeasible. So-called ropeless, buoyless, or pop-up gear eliminates the need for vertical lines while allowing fishing to continue, conceivably without reducing fishing effort. This option is seen by many as the ideal solution, but by others as infeasible, particularly those engaged in trap fisheries. In 2018, when the current take reduction plan (TRP) amendment process began, pop-up gear designs were deemed insufficiently advanced for adoption in American and Canadian lobster and crab trap fisheries. However, a great deal of progress has been made in the last two years, and several trials that are underway various types of pop-up gear are showing encouraging early results. Some developers claim that their gear is ready to use now in certain segments of the fisheries. The biggest current obstacle to widespread implementation of pop-up gear is the lack of a universally available interoperability system that would enable everyone to “see” deployed pop-up gear virtually.<sup>20</sup>

Effort reduction is another approach to reducing the number of vertical lines. It is generally believed that direct control, which would be achieved by capping the number of lines permitted to be used by individual fishermen or the fishery as a whole, would be the most effective form of effort control. However, the states have not embraced this approach<sup>21</sup> and have instead focused on indirect approaches for reducing the number of vertical lines, such as allowing or requiring an increased number of traps per vertical line, a practice referred to in New England as ‘trawling up’.

Vertical-line reduction can also be achieved by reducing fishing effort (e.g., number of permitted traps, fishermen or vessels) or prohibiting fishing where and when whales are most likely to be present. Such fixed time-area closures are being used now in parts of Massachusetts and adjacent federal waters (referred to as restricted areas),<sup>22</sup> and dynamic time-area closures are being used in Canada to reduce the risk of entanglement and in the U.S. and Canada to reduce the risk of vessel strikes. Dynamic management areas (DMAs) implemented to reduce vessel-strike risk in the U.S. have had some success (NMFS 2020a). However, fishery DMAs trialed by NMFS in the early 2000s were rejected due to logistical difficulties encountered by fishermen (e.g., the difficulty of pulling gear quickly) and the accompanying monitoring requirements. 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, as the Canadians have demonstrated in the last four years. With the right whale population declining and at a much greater

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<sup>19</sup> However, even in the absence of vertical lines, traps would still be connected by ground lines. Although, the use of sinking ground lines, which are required in all U.S. lobster fisheries, reduces the chance of entangling large whales, that chance is not zero because right whales are known to feed on the bottom.

<sup>20</sup> In the absence of surface marking with a buoy or buoys, and interoperability software system would allow any legitimate user with an acoustic modem (e.g., the owner of the gear, other fishermen in the same fishery or co-occurring fisheries, enforcement agencies) to gain access to data on the location of the pop-up gear.

<sup>21</sup> Some states lack the regulations necessary to set line caps, and/or lack data on how many lines are being used.

<sup>22</sup> Current restricted areas 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.

risk of extinction than it has been for a considerable time, the cost-benefit analysis for fishery DMAs likely has changed.

Other methods have been tested 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 (FAO 2021). A recent research project suggested that red ropes would be more readily detected by right whales than ropes of other colors (Kraus et al. 2014), an idea that has gained some traction with the TRT.

*Severity of Entanglement.* The risk of death and severity of injuries whales sustain increase with entangling rope strength<sup>23</sup> and the mass attached (Knowlton et al. 2015, 2018). Research has found that adult and juvenile right whales are not found entangled in rope with a breaking strength of less than 1,700 pounds, suggesting that right whales are able to free themselves from ropes with lower breaking strength (Knowlton et al. 2015). Most rope currently in use is much stronger, especially in conditions in which high loads are placed on vertical lines during gear retrieval. This occurs when there are strong currents or ‘sticky’ substrates, pots/traps are very heavy (e.g., in the Canadian snow crab fishery), or large numbers of traps are fished together in a single ‘trawl’ (e.g., in the offshore/deep-water lobster fishery).

NMFS and the Atlantic Large Whale Take Reduction Team (the ALWTRT, or the Team) have considered a variety of approaches for reducing the strength of the rope used in New England, referred to in shorthand as ‘1,700-pound equivalents’. More generally, rope that whales are able to break is referred to as ‘weak rope’, whether it is weak throughout or has weak insertions or links. The ‘1,700-pound equivalents’ include 1) rope with a breaking strength of 1,700-pound throughout, and 2) 1,700-pound splices, knots, or sleeves (insertions) used to join sections of rope. Deploying 1,700-pound rope, or stronger rope with 1,700 pound sleeves, has been considered the most promising weak-rope option, although a reliable commercial source of 1,700-pound rope has not yet been found (C. Coogan, GARFO, pers. comm.). Splices and knots are regarded as easier and less expensive options for fishermen to implement, compared to sleeves, but much more difficult to design to ensure that they have the right breaking strength. In addition, there is a strong concern that knots would make the line more likely to get snagged in a whale’s baleen, thus increasing the likelihood of severe injury. Although promising and successfully trialed by a few fishermen, sleeves have not been scientifically tested and it is unknown how they will perform in entanglement situations.

### **Background to Proposed ALWTRP Amendment**

*NMFS’s early actions and performance.* As prescribed in section 118(f)(6)(A) of the MMPA, in 1996, NMFS established a take reduction team, which would become the ALWTRT, and charged it with developing and submitting to NMFS within six months a draft TRP. In February 1999, NMFS published a final rule implementing the TRP. Subsequently NMFS was unable to reduce tMSI to ZMRG within seven years, unable to reduce fMSI to less than PBR within six months, and unable to reduce fMSI to less than ZMRG within five years. In fact, the agency has not achieved the first goal in the 27 years since the amendment of the MMPA in 1994, or the second and third goals in the 21 years since the implementation of the TRP in 1999.

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<sup>23</sup> Rope strength depends on the diameter, construction and composition of the rope.



Although NMFS had not achieved any of the MMPA's prescribed goals, the population was increasing relatively slowly in the late 1990s and 2000s (Waring et al. 2011, Pace et al. 2017, Corkeron et al. 2018), which gave the agency some reason to believe that the take-reduction measures were working. However, several developments over the last decade have countered that view. First, an analysis led by a NMFS scientist found little evidence that past entanglement mitigation measures recommended by the Team, and implemented by NMFS and the states, had been effective (Pace et al. 2014). Second, population modeling has definitively shown that the population has been declining since 2010, MSI has been increasing, and fMSI alone has exceeded PBR by 2-3 whale deaths per year (Pace et al. 2017, Corkeron et al. 2018, Hayes et al. 2019). Third, in 2017, 17 right whales died from vessel strikes and entanglements in the United States and Canada; until that point the number of dead whales found in any one year had not exceeded seven (average 3.15 per year).<sup>24</sup>

*NMFS's response to the crisis.* Concerned about the status of right whales, NMFS convened an in-person meeting of the ALWTRT in October 2018. Before the meeting, Team members were invited to submit proposals specifying the measures they considered necessary to meet at least the first goal of the ALWTRP (reducing fMSI to less than the PBR). The measures developed by Team members representing environmental NGOs or states (likely in collaboration with fishermen and fishing industry representatives), and scientist members, included the use of—

- weak rope/links used for/within buoy lines;
- weaker, smaller-diameter buoy lines;
- direct limits (caps) on the number of buoy lines;
- indirect controls on the number of buoy lines by limiting trap numbers or by 'trawling up';<sup>25</sup>
- transitioning to pop-up gear;
- expanding the duration and area of existing restricted areas (time-area closures to buoyed trap fishing);
- new restricted areas where buoyed trap fishing is not permitted;
- line that is more visible to right whales; and
- improved enforcement.

The proposals also included a variety of measures that would generally contribute to entanglement mitigation indirectly and over time, things such as research, monitoring and gear marking, however, those measures were not included in risk-reduction calculations.

After much discussion of these measures, the Team did not reach consensus on recommendations concerning an amendment to the ALWTRP. It did identify a need for an objective risk-reduction target and a tool for evaluating mitigation options against that target. Multi-stakeholder sub-groups within the team developed 'work-plan' recommendations meant to enable NMFS to focus its data gathering and analyses toward that end before the next meeting, which was scheduled to take place in April 2019.<sup>26</sup>

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<sup>24</sup> Data extracted from Figure 1 in Pace et al. 2021

<sup>25</sup> Increasing the number of traps allowed or required per buoy/vertical line.

<sup>26</sup> Summaries of each of these meetings are available at: <https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/atlantic-large-whale-take-reduction-plan>

Prior to the April 2019 meeting, NMFS assessed the relative contributions of U.S. and Canadian fisheries to the entanglement-related mortality and serious injury of right whales, and completed the development of the first generation of a decision-support tool (model; the DST) to assess entanglement risk reduction that could be expected from proposed mitigation measures, singly or in combination.<sup>27</sup> Based on the best available science, NMFS estimated that, to reduce fMSI to less than 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 in the United States and Canada. NMFS charged the Team with finding a combination of mitigation measures from those identified during the October 2018 meeting that could be implemented immediately<sup>28</sup> and would achieve the target of a 60-80 percent reduction in entanglement risk. The assumption was that implementation of those measures would in practice reduce fMSI by an amount within that range. The 60-percent level reflected the known number of fMSIs, while the 80-percent level reflected the total estimated number of deaths due to fisheries.<sup>29</sup> At the time, it had been estimated that 40 percent of presumed deaths due to all causes go undetected ('cryptic mortality'; Pace et al. 2017). The Team and NMFS recognized that the 60- 80-percent targets had a great deal of associated uncertainty because they were based on analysis of a relatively small number of entanglements and estimating the number of unknown deaths, respectively. Also, much of that uncertainty would remain unresolvable because the source of most gear recovered from right whales cannot be assigned to a particular fishery or fishery component, due largely to inadequate gear marking. As described above, analyses conducted since that meeting have indicated that the level of cryptic mortality is higher than thought at the time. Therefore, the upper bound of the range for the entanglement risk-reduction target should be higher, probably substantially higher, than 80 percent.

At the start of the April 2019 meeting, NMFS signaled its intention to initiate rulemaking in May of that year, and its intention to augment the Team's TRP amendment recommendations if they did not have the potential to reach the 60-percent risk-reduction target at a minimum, and preferably the 80-percent target. In addition, NMFS indicated that the agency wanted to achieve the 80-percent risk reduction. During that meeting, the Team used the DST 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. Due to strong opposition by industry and some state representatives to the expansion, or establishment of additional, time/area closures, those options were effectively excluded from consideration by the Team. This left basically just two mitigation measures on the table – reduction in the number of vertical lines and reduction in the strength of lines. The first is meant to reduce the likelihood that a whale will become entangled, the second, to reduce the severity of injuries once a whale is entangled. It quickly became apparent that the 80-percent risk-reduction target could not be achieved with line-number and rope-strength measures alone, i.e. without the inclusion of time/area closures. Therefore, the Team's efforts ended up focusing on achieving a reduction in risk of at least 60 percent. Finally, because of the necessity to involve states in coordinating their regulations with federal regulations to reach the target risk reduction for the entire region, the Team focused on developing state-specific suites of measures.

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<sup>27</sup> [describe the tool]

<sup>28</sup> The use of pop-up gear was excluded from consideration because it was judged to be several years from being ready to be used in the fisheries in question.

<sup>29</sup> The 60-percent target is based on known mortalities and serious injuries, while the 80-percent target is based on total mortalities, which is the sum of known mortalities and serious injuries and the estimated number of cryptic mortalities.

The suite of measures that was recommended to NMFS as an amendment to the ALWTRP is shown in (Table 3.1 in the DEIS).

For the most part, the measures proposed by the Team in (DEIS Table 3.1) were projected to reach or approach the lower limit of the risk-reduction target with one important exception. Those members representing the offshore lobster fishery, which operates in LMA3 (lobster management area 3),<sup>30</sup> were unable to offer a proposal to meet the risk-reduction target. Because the fishermen in this sector already used long trawls, trawling up would not reduce the number of end lines significantly, and because they fish in deep water with large numbers of traps per trawl, they could not use weak rope. They argued that their fishery 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 trawls with large number of traps, and the fishery overlaps significantly with right whale presence, it likely represents a disproportionately large risk to right whales.

On 2 August 2019, NMFS published a notice of intent to prepare a draft Environmental Impact Statement (DEIS) and a request for comments on potential amendments to the ALWTRP (84 Fed. Reg. 37822). The DEIS was to analyze the potential environmental impacts of alternative potential amendments to the ALWTRP under the National Environmental Policy Act (42 U.S.C. § 4321 et seq.). NMFS stated that proposals recommended by the Team at the April 2019 meeting would form the basis of those alternatives, and that the DEIS would inform subsequent NMFS rulemaking to implement the ALWTRP in order to meet the take reduction requirements of the Marine Mammal Protection Act (MMPA). In its comment letter of 23 September 2019,<sup>31</sup> the Commission recommended that —

1. DEIS alternatives rely most heavily on options that would 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) be most likely to reduce MSI to MMPA-mandated levels;
2. DEIS alternatives should include measures from the following categories: 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) use of weak rope (1,700-pound equivalents) in every trap fishery, 4) use of any other proven measures that will reduce entanglement risk 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;
3. The final rule require the offshore lobster fishery to a make the transition to pop-up gear on an aggressive, time-bound schedule, if it cannot implement a weak-rope option;
4. The DEIS's preferred alternative be crafted to achieve an 80-percent entanglement risk reduction;

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<sup>30</sup> Lobster management areas are labeled in Figure 3.1 of the DEIS.

<sup>31</sup> <https://www.mmc.gov/wp-content/uploads/19-09-23-Pentony-Right-whale-DEIS-scoping.pdf>

5. The DEIS evaluate options for the expansion of and establishment of new restricted areas;
6. The DEIS assess the risk reduction achieved by restricted-area options and the potential for those closures to increase risk in other areas due to displaced effort;
7. The final rule require NMFS to monitor and assess the effectiveness of all fixed closures and to use the results to modify the geographic and temporal extent of the closures on a regular basis;
8. The DEIS evaluate the costs and benefits of using dynamic closures to protect right whale aggregations, similar to those implemented by Canada in 2018, and work with the states to overcome any impediments to implementing dynamic closures in U.S. waters.

### **Proposed ALWTRP Amendment**

On 31 December 2020, NMFS released the draft rule to implement a proposed amendment to the ALWTRP and the DEIS analyzing the effect of that rule. Besides the pro-forma ‘no action’ alternative, the DEIS included a Preferred and a Non-preferred Alternative, both of which included measures in three general categories — line reduction, restricted areas, and weak line (Table 3.2 in the DEIS).

*Line reduction.* In the Preferred Alternative, line reductions are anticipated to result from ‘trawling-up’ requirements that vary among states, from LMAs, and by distance from shore, while the Non-preferred Alternative primarily would require a 50-percent cap on the number of vertical lines that could be fished in federal waters and portions of Maine’s state waters.

*Restricted areas.* The Preferred Alternative would create two new restricted areas (DEIS Table 3.2)—a closure in Maine’s offshore waters from October to January (“LMA1 Restricted Area”), and a closure south and southeast of Nantucket in Massachusetts’s offshore waters in February and April (“Massachusetts South Island Restricted Area”) (Figure 3.1 in the DEIS). The Non-Preferred Alternative also includes the LMA1 Restricted Area, two versions of a larger South Island Restricted Area, and the Georges Basin Restricted Area, an additional area at the Hague Line east of Cape Cod (Figure 3.2 in the DEIS). Both alternatives modify existing closures and establish new closures to allow fishing without buoy lines (i.e., with pop-up gear).

*Weak line.* The Preferred Alternative requires a complex system of weak insertions that vary in number and positioning on the line by state, LMA, and distance from shore (DEIS Table 3.2). The Non-preferred Alternative requires the use of fully weak rope in the top 75 percent of all buoy lines.

*Expected risk reduction.* NMFS used the DST to estimate the expected entanglement risk reduction of different measures and alternatives (Table 3.4 in the DEIS).

The DST estimates that the Preferred Alternative would achieve a 64.3-percent risk reduction. Individual contributions were made by weak-line insertions (14 percent), trawling up (12 percent), the two new closures (15 percent), and a combination of trawling up and weak lines in

LMA3 (8 percent).<sup>32</sup> Interestingly, 9.9 percent of the total risk reduction in the Preferred Alternative is linked to an “MRA credit”. This element reflects a proposal first made by Team members from the State of Massachusetts, and ultimately accepted by NMFS, that Massachusetts be given credit for the risk reduction already achieved through the earlier establishment of the Massachusetts Restricted Area, which includes Cape Cod Bay and areas east of Cape Cod. The risk reduction target of 60-80 percent was based on the latest available estimate of entanglement-related mortality and serious injury attributed to U.S. fisheries, relative to the PBR; 2017 was used as the baseline year for these calculations. Because any risk reduction achieved by the MRA had already affected the level of fMSI, adding it to the predicted risk reduction to be achieved with the Preferred Alternatives amounts to double counting. Therefore, the risk reduction that can be expected to be achieved by the Preferred Alternative would be 54.4, not 64.3 percent.

In contrast, the Non-preferred Alternative would be expected to achieve a 70-73 percent risk reduction depending on which options are chosen. In this case, the 50-percent cap on vertical lines (45 percent), more extensive use of weak-line insertions (35 percent), and closures (33 percent) were the major contributors to the estimated 70+ percent risk reduction.

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<sup>32</sup> The individual risk-reduction estimates are not additive. For example, the effect of a weak-rope measure depends on how much rope is being used. Suppose that a weak-rope, assessed by itself (i.e., under baseline conditions), achieve an X-percent risk reduction, while a line-reduction option assessed by itself achieves a Y-percent risk reduction. Then, the risk reduction achieved by implementing the line-reduction and weak-rope options would be less X+Y, because with the line reduction in effect there is less line than under baseline conditions that could be converted to weak rope.

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