STATE OF MAINE
DEPARTMENT OF MARINE RESOURCES
21 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0021

JANET T. MILLS
GOVERNOR

PATRICK C. KELIHER
COMMISSIONER

December 27, 2019

Michael Pentony
Regional Administrator
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, Massachusetts 01930

Dear Mr. Pentony

The Maine Department of Marine Resources (ME DMR) submits to NOAA Fisheries its proposal for regulatory changes to the Atlantic Large Whale Take Reduction Plan (ALWTRP). This proposal is in response to the finding that the removal of North Atlantic right whales is above the Potential Biological Removal established in the Marine Mammal Protection Act (MMPA). The document includes proposed regulatory modifications to the Maine lobster fishery.

The attached proposal was developed by ME DMR staff, with input from industry. It focuses regulatory change on areas where right whales are most likely to be present in Maine's coastal waters, with the goal of achieving protective measures where they are needed most and would be the most effective. It also balances this conservation with the safety concerns highlighted by industry and the economic viability of the lobster fishery. As stated at NOAA Fisheries' scoping meetings, the lobster fishery is the economic and social cornerstone of Maine's coastal and island communities. It includes not only license holders but crew, lobster dealers, processors, distributors, and a multitude of associated restaurant and tourism industries. This fishery has been a model of conservation, not only in the management of the lobster resource, but also in its two-decade participation in regulations aimed at protecting large whales. In fact, a right whale entanglement has not been directly linked to the Maine lobster fishery in well over a decade.

ME DMR's proposal is comprised of several components. They include reductions in the number of vertical lines, weakening of remaining vertical lines, increased gear marking, and increased harvester reporting. There is also a discussion regarding the enforcement benefits and potential impacts of tracking on federally permitted vessels. In combination, these measures not only minimize the risk of serious injury and mortality which may result from an entanglement but also reduce the potential of an entanglement occurring. Further, these measures improve the effort and location data collected by the Maine lobster fishery. Our hope is that, if future conversations are needed, an improved data set will enable measures to be targeted to fisheries and regions with high right whale densities and known entanglements. The

proposal also includes a provision for conservation equivalency so that regional differences in fishing practices and oceanographic conditions can be considered. This level of flexibility is critical so that safety issues not addressed in the state-wide approach can be ameliorated prior to implementation.

In addition, this proposal outlines several concerns that ME DMR has had with the ALWTRT process, the development of supporting analyses, and the timing of pending management versus needed scientific data. These concerns have prompted the Department to develop its own supporting analyses given a completed model was not available at the time of proposal submission. Given management measures related to the protection of right whales are generally reviewed on a five-year schedule, my hope in raising these issues is to ensure the process can be improved for the future.

I am confident the measures outlined in this proposal provide significantly greater protection to right whales transiting through the Gulf of Maine. As such, we request NOAA Fisheries include these measures as preferred alternatives in the upcoming proposed rule.

ME DMR remains committed to working with NOAA during the upcoming regulatory process. If you have any questions, please do not hesitate to reach out.

Sincerely,

Patrick Keliher
Commissioner

Maine Department of Marine Resources' Proposal to Amend the Atlantic Large Whale Take Reduction Plan

The following proposal includes a series of measures intended to prevent right whale serious injury and mortality, and to reduce the presumed risk of entanglement posed by the Maine lobster fishery. The proposal was developed after thorough analyses regarding the location of right whales in the Gulf of Maine, the location of Maine lobster gear, the relative threat of different gear configurations, and the risk reduction associated with various management tools. Development of the proposal also considered several important criteria including safety of fishermen, feasibility, enforceability, and economic impacts to the fishery.

ME DMR has been an active participant on the Atlantic Large Whale Take Reduction Team (ALWTRT) and has routinely worked with state and federal partners to better the science and data needed to support this group's discussions. We are committed to solving issues regarding the endangered status of right whales and recognize that the ALWTRT process allows for input from multiple caucuses, including fishermen, Non-Governmental Organizations, and state agencies. While at the April 2019 meeting ME DMR supported the preliminary recommendations put forth by the ALWTRT, the Department also reserved its right to disagree with this recommendation in the future, pending analysis to determine what a 50% vertical line reduction meant in practice and to consider new, changing, or emerging data. After conducting this analysis, it became clear a 50% vertical line reduction placed the largest portion of the burden on the fishery within Maine's exemption line – an area NOAA found, based on scientific data, that endangered large whales rarely venture.[1] This large burden in exempted waters resulted because roughly 70% of vertical lines associated with the lobster fishery in Maine state waters are located within Maine's exemption line. Consequently, an overall 50% vertical line reduction forced drastic measures primarily in areas where whales do not frequent. This would have resulted in large economic hardship for inshore fishermen, a reduction in the diversity of the Maine lobster fleet, and minimal benefits to right whales.

Given this information, ME DMR completed its own analysis, using many of the same data inputs as NOAA Fisheries, to understand Maine's 'risk' resulting from the overlap between the Maine lobster fishery and the transiting of right whales through the Gulf of Maine. The results showed the risk in Maine waters increases with distance from shore, with the majority of Maine's risk occurring outside the 12-mile line. Thus, this proposal focuses measures in federal waters.

This proposal includes management measures and data collection tools. Many of the measures are differentiated by distance from shore given Maine's expansive coast and vast regional differences. Detailed explanations of these measures are provided in the sections that follow. A cornerstone of ME DMR's proposal is the request for conservation equivalency and an individual safety program. This flexibility is needed to address significant regional differences such as traditional fishing practices, tides, and vessel traffic.

[1] 72 Fed. Reg. 57104, 57162 (Response to comment 337)

Without this management flexibility, future rules will fail to take into account the diversity of Maine's lobster fleet and differing oceanographic conditions within the Gulf of Maine.

This proposal does not include any trap reductions or area closures. As outlined in ME DMR's September 2019 scoping comments (Appendix IV), both trap reductions and area closures present several concerns in Maine. Because there are often multiple traps fished on a single endline or trawl, a practice known as trawling up, trap reductions do not decrease vertical lines on a one-to-one basis. This means substantial trap reductions are needed to see a modest reduction in the number of vertical lines, prompting serious economic consequences. For area closures, their efficacy is based on the assumption that gear is brought to shore. However, the year-round nature of the offshore lobster fishery makes it unlikely this assumption would be met. Instead, it is more likely gear would be moved to adjacent fishing grounds yielding denser aggregations of gear around areas intended to protect whales. Or, risk associated with the gear could simply be shifted to another location.

ME DMR identified several challenges with the decision support tool presented to the ALWTRT. These challenges included incomplete analysis, particularly in regard to the gear threat score, and frequently changing risk reduction percentages as methodologies and data inputs changed. As a result, the Department developed its own tool (Appendix I) to calculate the risk reduction gained using certain management measures. Section B in this document describes the challenges that prompted ME DMR to develop its own tool, as well as concerns with the overall process, in greater detail.

A. Background on the Maine Lobster Fishery and Regulations To-Date

American lobster is the most valuable single species landed in the U.S. The Maine lobster fishery is a critical component of the State's economy and culture. Since the early 2000's, landings in the lobster fishery have exponentially increased from roughly 57.2 million pounds in 2000 to a high of 132.6 million pounds in 2016.[2] In 2018, 121.3 million pounds of lobster were landed in Maine, representing an ex-vessel value of $491 million dollars.[3] These 2018 landings represented 82% of the total lobster landings in the U.S.[4]

The fishery encompasses roughly 4,800 lobster license holders and 1,100 student license holders. Underscoring the importance of commercial fishing to Maine is the most recent data from the Atlantic Coastal Cooperative Statistics Program which reveals that Maine commercial harvesters took more than twice the number of commercial fishing trips than any other state on the east coast. In 2017, Maine harvesters reported 447,523 trips while harvesters from Virginia, the next highest state, reported just 217,940.[5] Importantly, participation in the lobster fishery is much greater, as is its value to Maine's coastal economy. Many individuals who do not have a lobster license are an integral part of the fishery's operations, including dealers, processors, sternmen, bait dealers, trap builders, and boat mechanics. Many more participate in the logistics and tourism businesses associated

[2] ME DMR landings data: https://www.maine.gov/dmr/commercial-fishing/landings/documents/lobster.table.pdf
[3] ACCSP Data Warehouse. Data pull on 12/23/19.
[4] ACCSP Data Warehouse. Data pull on 12/23/19.
[5] ACCSP Data Warehouse. Data pull on 12/11/19.

with the lobster industry. In fact, a recent economic study concluded the Maine lobster supply chain has an economic impact to the state of $1 billion annually.[6] Maine's coastal communities are particularly dependent on lobster fishing and related business due to low alternate wages and limited career options in those communities.[7]

ME DMR has actively contributed to the development and implementation of protective measures for right whales and has a history of expanding federal measures beyond the minimum federal requirements. Since the establishment of the ALWTRP, ME DMR has implemented 600 lbs weak links on buoy lines to ensure low breaking strengths, gear markings to identify trap/pot gear, sinking groundline to reduce entanglements, and trawling-up requirements to reduce the number of vertical lines in the fishery. ME DMR has also expanded many of these requirements to areas exempted from the federal ALWTRP. For example, ME DMR prohibits float rope on the surface for all lobster pot gear, including gear fished inside the exemption line. ME DMR has also been at the forefront of efforts to improve the spatial resolution of gear marking; the State has already adopted rules to implement new gear marking requirements which prescribe a Maine-specific purple gear mark, increase the frequency of markings on a rope, and expand gear marking requirements into exempted waters. These new regulations will be implemented in 2020, ahead of the federal regulatory process. Finally, Maine Marine Patrol and the Bureau of Marine Science collaborate with NOAA Fisheries, serving as primary regional responders to address whale entanglements on the Maine Coast. There are approximately 46 uniformed field personnel trained to a minimum of Level I that are capable of responding to entanglements for initial assessment and stand-by purposes. Nine officers and one Bureau of Marine Science staff have undergone apprentice training and hold their Level III authorizations under the Marine Mammal Health and Stranding Response Program's permit. This authorization designates the holder as a primary responder for disentanglement activities. As a part of the Atlantic Large Whale Disentanglement Network, ME DMR's primary responders work with NOAA Fisheries and other network members to engage in assessment, reporting, and response when reports of entanglements are received.

Many of the above regulations and activities have been adopted with minimal data linking the Maine lobster fishery to cases of right whale entanglement, particularly in the last decade. Since 2017, there have been thirty documented cases of right whale serious injury and mortality. None of these cases have been attributed to the Maine lobster fishery. In fact, entanglement records indicate the most recent known right whale entanglement in Maine lobster gear occurred fifteen years ago in 2004. Thus, the data from known entanglements suggest the Maine lobster fishery is not the primary source of right whale serious injury and mortality. The data also suggest previous regulations, particularly the implementation of sinking groundline which occurred in 2009, have been effective. In fact, since the sinking groundline rule went into place, there have been no right whale entanglements linked to groundlines from the US lobster fishery.

[6] Lobsters to Dollars: The Economic Impact of the Lobster Distribution Supply Chain in Maine by Michael Donihue, Colby College. June 2018.

[7] Gulf of Maine Research Institute. Understanding Opportunities and Barrier to Profitability in the New England Lobster Industry 13 (2014), https://www.gmri.org/sites/default/files/resource/gmri_ 2014_lobster_survey.pdf.

In contrast, there is a mounting level of evidence which indicates that other fisheries, particularly the Canadian snow crab fishery, and vessel strikes are contributing to an increasing portion of right whale serious injuries and mortalities. Of the thirty documented cases of right whale serious injury and mortality since 2017, twenty-one have occurred in Canada.[8] This includes nine cases of serious injury and mortality which occurred in 2019. Further, an additional two mortalities, which were first sighted in US waters, have been attributed to Canadian snow crab gear entanglements. Looking further back to 2012- 2016, the years used by NOAA to calculate a recommended risk reduction, the only case of serious injury and mortality attributed to a US fishery was the result of an entanglement with netting, not trap/pot gear. Additionally, evidence suggests that vessel strikes are a significant contributor to right whale serious injury and mortality. Out of the thirty cases of serious injury and mortality since 2017, eight have been attributed to vessel strikes, including a case in US waters.

Information collected from right whale entanglements also indicates the vast majority of rope taken off of right whales is not indicative of the Maine lobster fishery. Based on a 2018 industry survey, ME DMR found the most prominent rope diameters used in the Maine lobster fishery are 3/8" rope followed by 7/16" rope (Appendix V). Results of the survey also showed that over 79% of rope used in the Maine lobster fishery is less than ½" in diameter. In contrast, entanglement records indicate that, between 2010 and 2018, 81% of all recovered rope taken off right whales was greater than ½" diameter.[9] This data further suggests that the Maine lobster fishery is not a primary contributor to right whale entanglements.

Right whale habitat use and residency times in historically known feeding habitats are also changing. Since 2010, right whale occurrence in the Gulf of Maine has declined.[10] A similar decrease of habitat use has also been documented across the same time frame in what had been critical late summer feeding habitat in the Bay of Fundy.[11] Hypotheses explaining this shift include large-scale changes in food supply, namely the copepod *Calanus finmarchicus*. A recent study supports this hypothesis by documenting an increase in the bottom temperature experienced in the basins within the eastern Gulf of Maine.[12] This ecosystem change is acting to drive down the availability of the calanus copepod in the Bay of Fundy and can potentially predict whether right whales will be seen there year to year. Other

[8] NOAA Fisheries. 2017-2019 North Atlantic Right Whale Unusual Mortality Event. https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2019-north-atlantic-right-whale-unusual-mortality-event

[9] ALWTRT October 2018 Meeting. Presentation by GARFO Staff re: Line Diameter. https://archive.fisheries.noaa.gov/garfo/protected/whaletrp/trt/meetings/October%202018/eg_line_diameter.pdf

[10] Davis, G. E., Baumgartner, M. F., Bonnell, J. M., Bell, J., Berchok, C., Thorton, J. B., Brault, S., Buchanan, G., Charif, R. A., Cholewiak, D., Clark, C. W., Cockeron, P., Delarue, J., Dudzinski, K., Hatch, L., Hildebrand, J., Hodge, L., Klinck, H., Kraus, S., Martin, B., Mellinger, D. K., Moors-Murhpy, H., Nieukirk, S., Nowacek, D. P., Parks, S., Read, A. J., Rice, A. N., Risch, D., Sirovic, A., Soldevilla, M., Stafford, K., Stanistreet, J. E., Summers, E., Todd, S., Warde, A., and S. M. Van Parijs. 2017. Long-term passive acoustic recordings track the changing distribution of North Atlantic right whales (Eubalaena glacialis) from 2004 to 2014. Scientific Reports. 7:13460 (1-12).

[11] Davies K.T.A., Brown M.W., Hamilton P.K., Knowlton A.R., Taggart C.T., and A.S.M. Vanderlaan. 2019. Variation in North Atlantic right whale *Eubalaena glacialis* occurrence in the Bay of Fundy, Canada, over three decades. Endangered Species Research. 39:159-171.

[12] Record, N., Runge, J. A., Pendleton, D. E., Balch, W. M., Davies, K. T. A., Pershing, A. J., Johnson, C. L., Stamieszkin, K., Ji, R., Feng, Z., Kraus, S. D., Kenney, R. D., Hudak, C. A., Mayo, C. A., Chen, C., Salisbury, J. E., and C. R. S. Thompson. 2019. Rapid Climate-Driven Circulation Changes Threaten Conservation of Endangered North Atlantic Right Whales. *Oceanography*, 32, 2: 162-169.

feeding habitats, outside of the Gulf of Maine, have seen increases in use by right whales over the last decade. Cape Cod Bay and the surrounding waters in Massachusetts have seen an increase in individuals sighted or detected in this important early season feeding habitat.[13]

As the use of the Gulf of Maine as a summer feeding ground has decreased, sighting and acoustic surveys have documented a shift towards summertime use of the Gulf of St. Lawrence by right whales.[14] The shifts in habitat use documented above show a decreasing reliance on the Gulf of Maine as a feeding habitat for right whales. This is likely particularly true for waters very near to shore where most of the lobster fishery is executed. ME DMR again notes that the majority of Maine state waters, where most lobster permits are held, are exempted from the ALWTRP and outside designated right whale critical habitat. This spatial designation (e.g. the exemption line and critical habitat boundary) was based on the low number of right whale sightings as well as studies which show low concentrations of calanus which do not support the aggregation of right whales.[15]

B. Review of September 2018 – Present; Challenges and Concerns

ME DMR has been an engaged partner in the ALWTRT process since the group's inception. However, over the last few years, ME DMR has expressed concerns about the thoroughness of analyses being conducted, the availability of preparatory work prior to meetings, and the existence of new, changing, or emerging data. This has impacted ME DMR's ability to fully engage in the process and make informed decisions when developing this plan.

In September 2018, the Northeast Fisheries Science Center (NEFSC) released a technical memo entitled "*North Atlantic Right Whales – Evaluating Their Recovery Challenges in 2018*". While the title of the memo suggested the document would be a comprehensive review of many challenges facing right whales, the memo focused on a single fishery in a single region: the American lobster fishery in the Gulf of Maine. Throughout the memo, hypotheses were stated as fact, with inappropriate or no data to support the assumptions and conclusions. For example, the memo incorrectly suggested the 2015 vertical line regulations increased the strength of rope used, and therefore the severity of entanglements; however, the data provided to support this assumption included a paper which looked at data from 1994-2010, well before the regulatory change. Many of the datasets cited in the memo were inappropriate for the context, including the citation of an industry newsletter which approximated the number of traps fished. This figure was then used to inform an absolute

[13] Mayo C., Ganley L., Hudak C.A., Brault S., Marx M.K., Burke E., and M.W. Brown. 2018. Distribution, demography and behavior of North Atlantic right whales (*Eubalaena glacialis*) in Cape Cod Bay, Massachusetts 1998-2013. Marine Mammal Science. 34(4): 979-996; Charif R.A., Shiu Y., Muirhead C.A., Clark C.W., Parks S.E., and A.N. Rice. 2019. Phenological changes in North Atlantic right whale habitat use in Massachusetts Bay. Global Change Biology, 00:1-12.
[14] Simard Y., Roy N., Giard S., Aulanier F. 2019. North Atlantic right whale shift to the Gulf of St. Lawrence in 2015, revealed by long-term passive acoustics. Endangered Species Research. 40: 271-284; DFO. 2019. Review of North Atlantic right whale occurrence and risk of entanglements in fishing gear and vessel strikes in Canadian waters. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2019/028.
[15] Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations, 72 Fed. Reg. 57103 (October 5, 2007); Endangered and Threatened Species; Critical Habitat for Endangered North Atlantic Right Whale, 81 Fed. Reg. 4837 (January 27, 2016).

number of traps in the memo. Many more statements were not cited. ME DMR communicated its serious concerns about the merit of this technical memo and its basis for the upcoming ALWTRT meeting in an October 2018 letter to the Director of the NEFSC (Appendix II). Unfortunately, despite ME DMR's concerns regarding the inaccuracies in the document, the Technical Memo remains published without substantial edits by the NEFSC and continues to be cited on NOAA's own website[16]. In fact, the only change made to the memo was the addition of the word "may" to a statement to indicate it is a hypothesis.

On April 5, 2019, less than three weeks before the ALWTRT meeting, NOAA released a statement indicating the agency would be seeking a risk reduction target of 60-80%. This announcement included minimal data to support its conclusions and, because it was distributed via email, did not provide an opportunity for questions and discussion. In response to numerous questions from the Maine Lobstermen's Association, a follow-up email from NOAA Fisheries staff was sent on April 18, 2019 which indicated other approaches were considered to calculate the risk reduction target; however, yet again, minimal rationale was provided for the method ultimately chosen. Of greatest concern to ME DMR was the assumption that 50% of unattributed cases of serious injury and mortality (SI&M) were the result of U.S. entanglements and 50% were the result of Canadian entanglements. This assumption did not match recent trends which show Canadian fisheries are responsible for an increasing portion of SI&M. Unfortunately, no time was set aside ahead of the April 2019 ALWTRT meeting to discuss these assumptions or the risk reduction target. At the April 2019 ALWTRT meeting, members were discouraged from discussing the risk reduction target given time constraints.

At the same time, NOAA announced weeks before the April 2019 ALWTRT meeting that it was developing a model, called the "decision support tool", to calculate risk reduction percentages achieved through various management tools. While ME DMR had no objection to this goal and fully supported additional modeling efforts to help inform the recommendations of the ALWTRT, ME DMR was concerned about the short timeframe for a model to be thoughtfully developed, tested, and reviewed. These concerns were realized on an April 16th webinar in which NEFSC staff walked through preliminary results of the model. First, ME DMR expressed concern about the components of the model. The severity score was based off a poll given to the ALWTRT members which was neither developed nor reviewed by a social scientist or someone with direct expertise in survey methodology. In addition, there was a clear incentive for ALWTRT members to inflate or deflate gear severity scores given the data would directly impact management recommendations. Unsurprisingly, ALWTRT members voted along caucus lines resulting in a wide range of scores for most gear configurations. Sensitivity analyses run by ALWTRT members during the April 2019 meeting confirmed the results from the tool were highly dependent on the gear severity scores derived from the poll. Additionally, the whale habitat component of the model raised concerns as it lacked key data components including the most recent standardized whale surveys, and available information from alternative sighting sources and acoustic deployments. It also had low effort in inshore Gulf of Maine where the bulk of the lobster fishery is promulgated. As a result, recent changes in right whale distribution were

[16] https://www.fisheries.noaa.gov/new-england-mid-atlantic/marine-mammal-protection/right-whales-and-entanglements-more-how-noaa

not reflected in the data outputs, whale distribution data were ‘stretched’ within the exemption line, and there was a high level of uncertainty where the majority of vertical lines are deployed.

The compilation of these concerns resulted in puzzling risk reduction model results. While areas south of Nantucket, where right whales are known to visit but fishing effort is low, were given low risk scores, areas of inshore Gulf of Maine, where fishing effort is high but right whales are extremely infrequent, were given high risk scores. This result did not match NOAA’s stated intention of identifying overlapping areas of high gear density and frequent whale presence. In the end, the risk reduction model used at the ALWTRT meeting was not a finished product; data inputs were not finalized, the code was not perfected, and the model was not peer-reviewed. In fact, the model crashed during a Maine break-out session at the meeting when the Maine delegation tried to look at measures differentiated by distance from shore. The suite of ME DMR’s concerns regarding the risk reduction target and the decision support tool were outlined in a letter to the Regional Administrator dated April 19, 2019 (Appendix III).

Since the April 2019 ALWTRT meeting, ME DMR has struggled to develop a proposal due to instability in the risk reduction percentages achieved by various management measures. In April 2019, calculations from the decision support tool showed vertical line reductions received, by far, the highest percent risk reduction of the measures considered. This output was used to derive Maine’s preliminary plan. However, since the April 2019 ALWTRT meeting, changes have been made, and continue to be made, to the model in response to the concern expressed by many ALWTRT members, and to changing and emerging data. While ME DMR is appreciative that NEFSC staff continue to develop and improve the decision support tool, the modifications have resulted in frequent changes to the risk reduction percentages associated with various management options. These percentages continue to change as of the writing of this proposal. Most notably, the risk reduction percentage associated with the implementation of rope which breaks at 1,700 lbs has significantly increased relative to percentages given at the ALWTRT meeting. These changes in the risk reduction percentages have not been communicated to the broader ALWTRT.

Further, the November 2019 Peer Review of the decision support tool highlighted that many of the concerns raised in ME DMR’s April 2019 letter to NOAA have not been addressed. ME DMR staff attended the Peer Review in hopes of learning more about the model since no documentation has been shared with the ALWTRT. Unfortunately, it became clear from the meeting that several components of the model were not finalized. Specifically, the updated whale habitat data, which is critical to understanding the new migration patterns of right whales, is delayed and was not available for the peer review. Further, a substitute for the gear severity poll had not yet been developed or tested. In fact, a potential new gear severity score presented on the last day of the Peer Review showed confounding results in which the highest gear severity in Maine was calculated to be in a lobster zone with the fewest participants and the lowest trap allocation. As a result, it was clear that significant work was still needed on the decision support tool. Further, ME DMR was concerned to hear that, for some portions of the offshore lobster fishery, catch was being used as a proxy to estimate the number of vertical lines. While ME DMR recognizes data on effort in the offshore lobster fishery is limited, we have repeatedly commented that it is inaccurate to assume an increase in landings is correlated to an equal increase in fishing

effort (this proposal provides data regarding landings and effort on pages 14-16). This is particularly true given the exponential increase in the abundance of lobster within the Gulf of Maine/Georges Bank stock. As a result, the model is likely overestimating the number of vertical lines in the offshore lobster fishery given the increase in abundance, catch per trap, and landings.

As the decision support tool continues to be developed, it is unclear how the model results will be used in the upcoming proposed rule. While advancements are still needed on the decision support tool, the management process required to implement new ALWTRP regulations continues to move forward. As a result, there is a clear disconnect between the timeline for the science intended to support management and the implementation of new regulations. NOAA has previously acknowledged this discrepancy. During a meeting with NOAA on July 11, 2019, NOAA staff indicated the co-occurrence model, not the risk reduction model, would be used in the proposed rule. This was a significant departure from what ME DMR anticipated, particularly given the co-occurrence model was not discussed at the April 2019 ALWTRT meeting. Further, without a gear threat score, it is unclear how differences between gear configurations will be considered or how rope which breaks at 1700 lbs, a key component of the discussions at the April 2019 ALWTRT, will be evaluated. Most importantly, this change has not been communicated to the full ALWTRT.

Given uncertainty about ongoing and future changes to the decision support tool, the constantly changing percentages produced by a model which is being updated, the lack of clarity of how the decision support tool will be used in the proposed rule, and uncertainty about how the co-occurrence model will evaluate rope which breaks at 1700 lbs, ME DMR endeavored to produce its own analysis to determine the risk reduction associated with this proposal. This in-state analysis was conducted because a clear and stable alternative from NOAA was not available before this proposal was due. If ME DMR had not conducted its own analysis, it is unclear how the state would have calculated a risk reduction for various management options and engaged the industry when weighing the options. A description of ME DMR's analysis is included in Appendix I.

C. Elements of Maine's Proposal

I. Vertical Line Reductions

ME DMR proposes a vertical line reduction in the Maine lobster fishery, to be achieved through changes to the trawling up requirements. As noted in ME DMR's scoping comments to NOAA fisheries on September 16, 2019 (Appendix IV), the Department has pursued measures associated with trawling up because it appears to provide some of the strongest conservation benefits; it reduces the risk of SI&M under the MMPA and the risk of entanglement under the Endangered Species Act (ESA). The proposed trawling up requirements are separated by distance from shore in recognition of differing fishing practices between inshore and offshore fishermen, as well as the likelihood of right whale occurrence along Maine's coast the farther one gets from shore.

a. Shoreline to Exempted Waters Line (<1% of Maine's whale-days, see Appendix I)

Proposal: Status quo; maintain exempt status for all such waters.

Rationale: The addition of trawling-up regulations within Maine's exempted waters would result in significant safety concerns, reduce diversity in the fleet, and have negative economic impacts for the lobster fishery, while providing minimal, if any, protections for right whales. Established in 2007, the Maine exemption line designates inshore waters, including bays and rivers, where right whale sightings are extremely rare. It was created in recognition that additional regulations in these areas would not have a significant benefit to large whales.[17] As a result, past modifications to the ALWTRP have not included regulations in exempted waters. The exemption line was subsequently used when denoting critical habitat as it concluded "late stage copepods in quantities sufficient to trigger right whale foraging are not present inshore of the Maine exemption line".[18] Sightings data corroborate the finding that right whales are extremely rare shoreward of the exemption line. Recent data on changing and decreasing copepod abundance in the eastern Gulf of Maine further corroborates these findings.[19]

Establishing trawl minimums in exempted waters would also unnecessarily result in large economic impacts by increasing operating costs and lowering the efficiency of inshore fishermen. The majority of the Maine lobster fishery's catch and effort occurs in state waters (shoreline to 3-mile limit). In 2016, 68% of landings and 81% of trips occurred inside state waters.[20] With over 70% of state waters existing within the exemption line, a significant portion of the fishery is executed close to shore. Much of the fishery in this area uses small boats and skiffs which have limited capacity to haul and store multiple traps. Thus, consideration of trawl limits in exempted waters precipitates large safety concerns as it could force fishermen to operate beyond their boat's means, resulting in fishermen being caught in additional rope on deck, fishermen going overboard or losing limbs, and vessels sinking. Further, trawling up requirements would have significant economic consequences on the fleet. Longer trawls would almost certainly increase gear loss as trawls are set over one another, increasing marine debris. It is also likely small boat captains would have to hire an additional crew member or purchase a larger boat to safely fish under the new requirements. Finally, longer trawls would result in lower trap efficiency due to a decreased ability to maneuver traps on to specific ledges and cracks where lobsters are frequently found.

[17] Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations, 72 Fed. Reg. 57103 (October 5, 2007).
[18] Endangered and Threatened Species; Critical Habitat for Endangered North Atlantic Right Whale, 81 Fed. Reg. 4837 (January 27, 2016).
[19] Record et al., 2019.
[20] Based on harvester reporting collected in the Maine lobster fishery.

b. Exempted Waters Line to Three Miles from Shore (0.8% of Maine's whale-days and 4% Maine's of overall risk, see Appendix I)

Proposal: Require a minimum trawl length of three traps per single endline.

Rationale: A three-trap trawl considers safety concerns of small boat, state-waters fishermen with the goal of reducing the number of endlines and the associated risk to right whales. Unique safety concerns for small boat fishermen include lack of deck space and frequently operating a vessel without a crew. Particularly in mid-coast Maine, moving to a three-trap trawl minimum will be a substantial change from current fishing practices where, due to bottom type, many people presently fish doubles.

c. Three Miles to Six Miles from Shore (Three to twelve miles from shore represents 11% of Maine's whale-days and 30% of Maine's overall risk, see Appendix I)

Proposal: Require a minimum trawl length of eight traps per two endlines, or four traps per single endline.

Rationale: An eight (four) trap trawl minimum recognizes the historical sighting of right whales in the Gulf of Maine is higher in federal waters than state waters and that higher trawl length minimums are needed to reduce the risk of entanglement. Various fishing practices along the coast make the unilateral transition to an eight-trap trawl with two endlines difficult; this region includes small boat fishermen who fish just over the three-mile line, as well as larger vessels which traditionally fish offshore. The ability to fish a four-trap trawl with a single endline provides needed flexibility to the fleet and achieves the same conservation value.

d. Six Miles to Twelve Miles from Shore (Three to twelve miles from shore represents 11% of Maine's whale-days and 30% of Maine's overall risk, see Appendix I)

Proposal: Require a minimum trawl length of fifteen traps per two endlines, or eight traps per single endline.

Rationale: A fifteen-trap trawl configuration is expected to result in substantial endline reductions in this area. The flexibility to use either a fifteen-trap trawl with two endlines or an eight-trap trawl with a single endline, near equivalent configurations from a conservation standpoint, allows for greater compliance with the regulations and recognizes that fishing practices differ along the coast. This flexibility in trawl configuration also considers fishermen safety and boat capacity, as some fishing operations in the region may not be able to safely haul and stow fifteen traps on a boat. Load cell data collected by ME DMR also informed the proposal for a fifteen-trap trawl length (see Section C-II). In particular, some of the load cell data collected to evaluate the placement of weak points measured loads on the vertical line of fifteen-trap trawls. This provided a level of data to inform both the trawling-up and weak point components of ME DMR's proposal.

e. Twelve Miles from Shore to the Lobster Management Area 1/3 Boundary (88% of Maine's whale-days and 66% of Maine's overall risk, see Appendix I)

Proposal: Require a minimum trawl length of twenty-five traps per two endlines.

Rationale: This trawl length provides the lowest ratio of vertical lines to traps in Maine's proposal. It also pushes the bounds of fishermen's safety. At ME DMR's June 2019 industry meetings, fishermen from many parts of the coast expressed significant concern that few vessels are equipped to handle thirty- or forty-trap trawls in addition to the mile of rope needed to fish at these trawl lengths. Requiring fishermen to operate beyond their boat's capacity would result in dangerous fishing practices and the potential loss of human life. A twenty-five-trap trawl length recognizes that vertical lines in the offshore areas of the Gulf of Maine pose a greater risk to right whales given whales are more frequently sighted in this area; however, it also acknowledges the limits on the capacity of fishing vessels in the area. Finally, this trawl length is enforceable, but longer trawls likely would not be. With current vessel platforms, it would be nearly impossible for Maine's Marine Patrol to safely haul long trawls (i.e. greater than 30 traps per trawl) to check compliance with ALWTRP measures.

Modifications to Maine's Approach on Vertical Line Reductions

At the April 2019 ALWTRT, there was a consensus statement that each state and/or Lobster Management Area (LMA) would meet a 60% risk reduction in their respective region. At the time, one way for Maine to achieve this target was to take a 50% vertical line reduction (equivalent to a 50% risk reduction) and implement 1700 lbs breaking strength rope in the top 75% of all vertical lines in federal waters (equivalent to a 10% risk reduction).

Since that time, outputs of the decision support tool have substantially changed based on modifications to the model as well as emerging and changing data. As a result, the information available to ME DMR is different than what was available at the time of the ALWTRT meeting. Specifically, the risk reduction attributed to weak rope has steadily increased. This is corroborated by peer reviewed literature which suggests a full weak rope would significantly reduce the risk of serious injury and mortality for multiple large whale species by 72%.[21] It also matches results of the analysis conducted by ME DMR (Appendix I). Given these changes, ME DMR has relied more heavily on weak points in the line (see Section C-II) as a method to achieve risk reduction.

Furthermore, analysis by ME DMR following the ALWTRT April 2019 meeting showed that, to achieve a 50% vertical line reduction, a substantial portion of this reduction would have to be taken within exempted waters. This is because roughly 70% of state waters, where the majority of the Maine lobster fishery is licensed, are within the exempt area.[22]

[21] Knowlton, A. R., Robbins, J., Landry, S., McKenna, H. A., Kraus, S. D., and T. B. Werner. 2015. Effects of fishing rope strength on the severity of large whale entanglements. *Conservation Biology*, 30, 2:318-328.

[22] Currently, reporting requirements do not allow for effort to be discerned between exempt and non-exempt waters. It is therefore assumed that 70% of vertical lines in the Maine state waters lobster fishery are shoreward of the exemption line because this is the percentage of area that is included shoreward of that line. This is also the assumption made in the

Implementing strict vertical line reduction measures in this area does not align with right whale sightings data and the associated risk of entanglement. Right whales are rarely sighted in Maine's exempted waters and copepod abundance does not support right whale feeding aggregations[23], hence why they were designated as areas where additional regulations would not provide meaningful conservation benefits to right whales. As a result, a 50% vertical line reduction would have forced the greatest regulatory change on areas where whales do not frequent, having minimal effectiveness. In contrast, the vertical line reductions put forward in this proposal focus on areas outside of exempted waters and provide more meaningful protections to right whales. We believe this is a stronger and more defensible plan which balances right whale conservation with maintaining a viable lobster fishery.

Trends Regarding Latent Effort in the Maine Lobster Fishery

A potential concern with vertical line reductions via trawling up is that latent licenses will become active and negate the intended conservation benefits. ME DMR reviewed trends in latent lobster licenses in Maine and found them to be extremely stable (Figure 1). In particular, over the last ten years, there has been little perturbation in the number of latent licenses in the Maine lobster fishery. This corresponds to a time of record high landings when we may have expected latent fishermen to re-engage in the fishery. Furthermore, this stability persisted through previous changes to the ALWTRP, including the 2014 vertical line rule which established the previous trawling-up minimums. Given these trends, ME DMR is confident the activation of latent licenses will not negate the conservation benefit gained by the proposed trawling-up scenarios and will result in meaningful reductions in vertical lines.

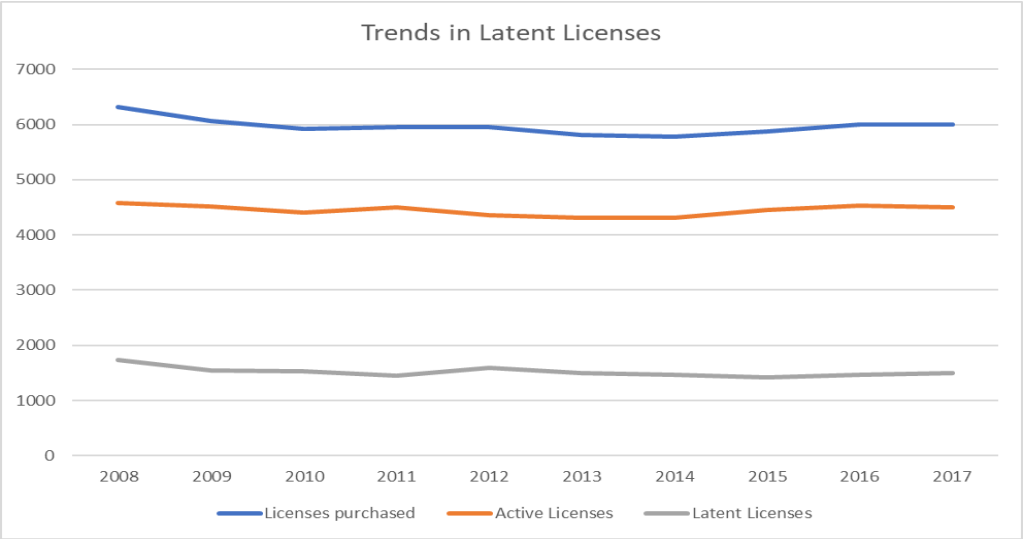

Figure 1: Trends in Maine lobster licenses, including number purchased, active licenses, and latent licenses. Data come from Maine DMR's license and 100% dealer reporting databases. Dealers are required to report purchases from all harvesters. Any harvesters without any reported purchased landings are considered latent.

Industrial Economics model of the fishery, which is used in the Decision Support Tool and accepted by both NOAA Fisheries and the ALWTRT as best available information.

[23] Endangered and Threatened Species; Critical Habitat for Endangered North Atlantic Right Whale, 81 Fed. Reg. 4837 (January 27, 2016).

Misconceptions about Changes in the Maine Offshore Lobster Fishery

It has been repeatedly alleged that effort in the offshore lobster fishery is expanding and thereby increasing the risk of entanglement posed by the fishery. In fact, this allegation is a basis for the conclusions made in the NEFSC's September 2018 technical memo. ME DMR sought to investigate this claim by looking at landings, number of trips, and catch per unit effort by distance from shore. Outside of 3 miles from shore, pounds landed (Figure 2) in the Maine lobster fishery has increased over time. However, a similar trend is not reflected in the number of trips; the number of trips in the federal Maine lobster fishery has been relatively stable (Figure 3). This suggests that there has been an increase in the landings per trip, rather than an increase in effort, which has contributed to the increased harvest offshore. This conclusion is supported in Figure 4; regardless of distance from shore, all areas have seen an increase in average catch per trap in the Maine lobster fishery. The slope of this increase is greater in federal waters than state waters. Thus, while it is accurate to say landings have increased in the federal Maine lobster fishery, there has also been a significant increase in average catch per trip.

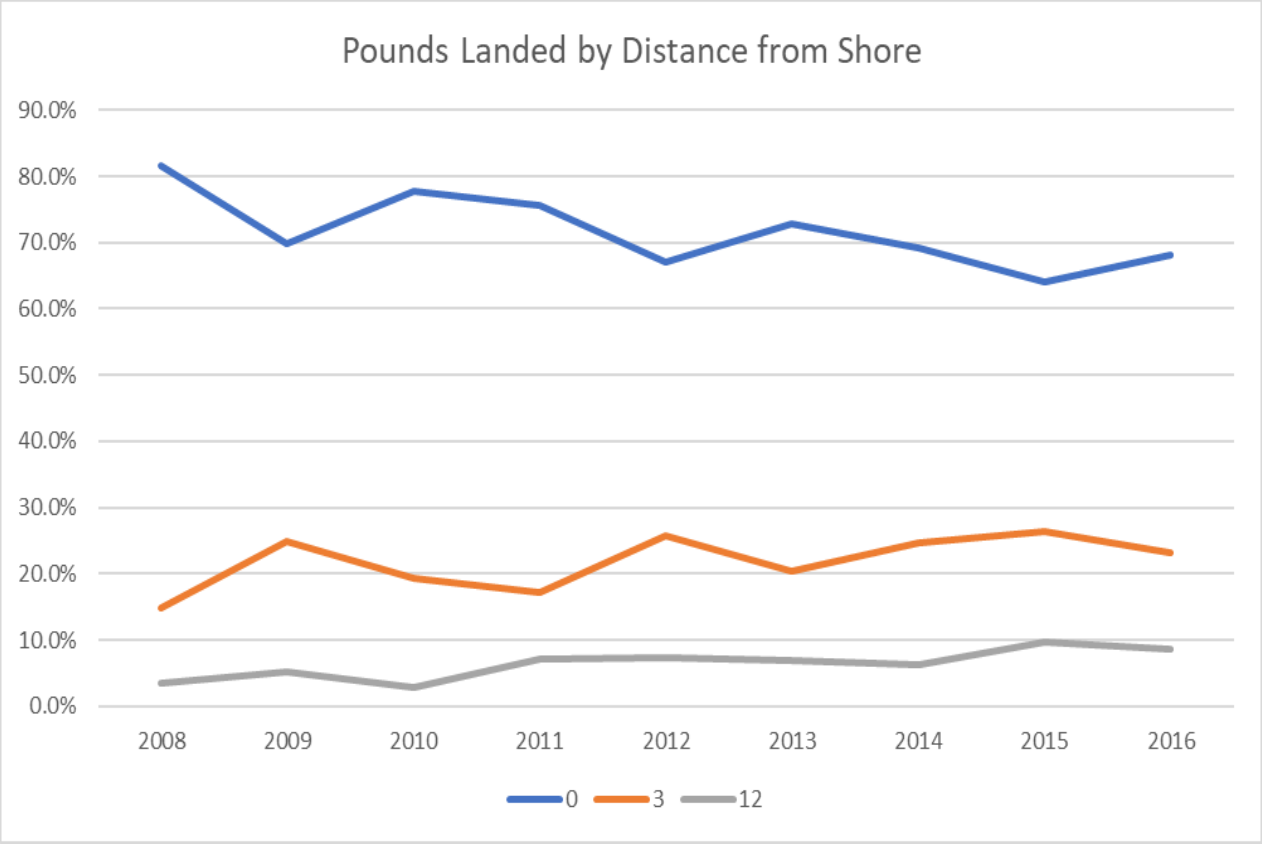

Figure 2: Proportion of pounds of American lobster landed by distance from shore in Maine. The blue line represents 0-3 miles from shore. The orange line represents 3-12 miles from shore. The grey line represents 12 miles to the LMA 1/3 boundary. Data come from Maine DMR's harvester reporting database.

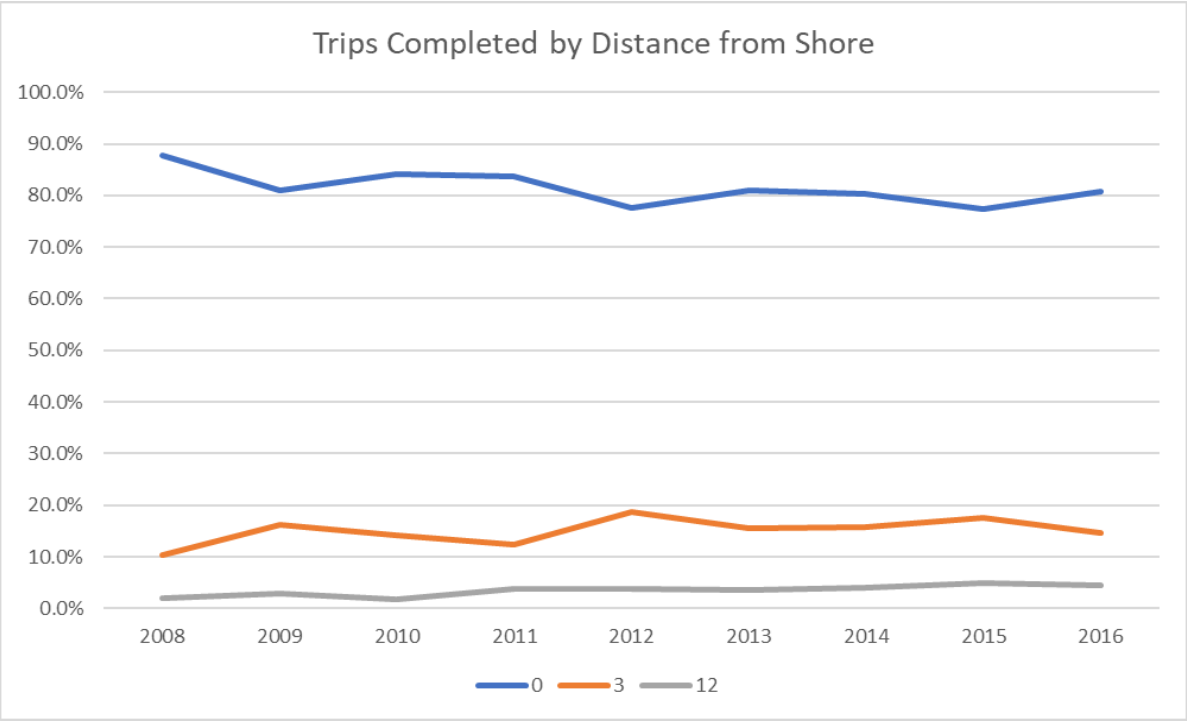

Figure 3: Proportion of directed American lobster trips in Maine since 2008. The blue line represents 0-3 miles from shore. The orange line represents 3-12 miles from shore. The grey line represents 12 miles to the LMA 1/3 boundary. Data come Maine DMR's harvester reporting database.

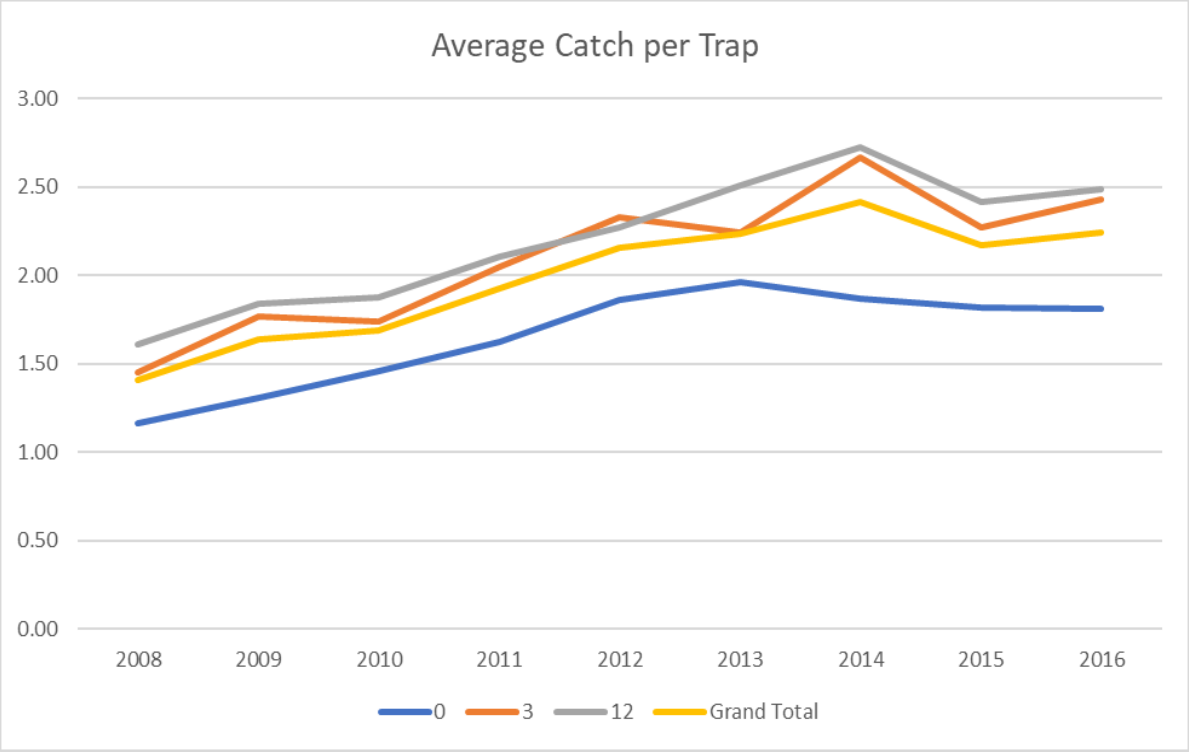

Figure 4: Average catch per trap (in pounds) in the Maine lobster fishery. The blue line represents 0-3 miles from shore. The orange line represents 3-12 miles from shore. The grey line represents 12 miles to the LMA 1/3 boundary. Data come from Maine DMR's harvester reporting database.

II. 1700-Pound Weak Points

This proposal includes the addition of weak points to remaining vertical lines in the Maine lobster fishery. This measure will result in rope breaking at 1700 lbs, a value determined in the literature to be weak enough to allow a right whale to break free.[24] Moreover, Knowlton *et al*., concluded from their research that a 1700 lbs breaking strength will significantly reduce the rate of serious injury and mortality to right whales as a result of entanglements. Thus, it offers a level of protection for all lines left in the water.

Appendix V describes results of ME DMR's research initiative to determine the breaking strength of vertical lines already being used by the fishery, as well as various rope and weak point configurations. This analysis is provided to NOAA Fisheries to begin the development of a list of 1700 lbs weak points options approved for use in the fishery. ME DMR has specifically focused on weak points which result from alterations to existing rope. This aligns with ME DMR's goal of reducing economic impacts on the fishery. As such, ME DMR plans to continue this work with the industry and requests the ability to continue to refine and add to the list of options approved for use as 1700 lbs weak points.

ME DMR highlights that weak points, in combination with the minimum trawling-up levels proposed, must be in conjunction with conservation equivalency. Due to the varying fishing conditions along the coast, a 'one size fits all' approach does not work in Maine. As a result, a method for flexibility must be included in the proposed rule so that, in consideration of local practices and challenges, fishermen can suggest modifications to the regulations to achieve the same level of protection for right whales. Conservation equivalency is particularly important for safety; without a method to modify the state-wide proposal to fit regional oceanographic conditions, fishermen will be required to partake in unsafe fishing practices. ME DMR is committed to ensuring the safety of fishermen throughout this regulatory process and feels conservation equivalency is a key to this endeavor. Sections VI and VII provide greater detail on this management flexibility.

a. State Waters (shoreward of the 3-mile line)

Proposal: Through state regulations enacted by ME DMR, a single 1700 lbs weak point will be required half way down vertical lines in the Maine lobster fishery.

Rationale: The inclusion of weak points in all vertical lines means rope will part at the 1700 lbs breaking strength recommended in literature and by the ALWTRT. In particular, including a weak point in exempted waters provides protection such that, in the rare event a right whale enters exempted waters and gets entangled, the encounter will not result in a SI&M. It is important to note that the risk reduction associated with the weak point in exempted waters is not included in ME DMR's analysis as shown in Appendix I. As a result, the risk reduction achieved from the implementation of a weak point in exempted waters is in addition to the risk reduction percentage calculated in Appendix I.

[24] Knowlton et al., 2015.

ME DMR intends for this measure to be implemented in state regulations and not in the federal ALWTRP. It is recommended NOAA Fisheries cite the state regulation when federal regulations are published. If necessary, ME DMR would support a clause that, if Maine removes this state regulatory requirement, NOAA Fisheries would take emergency action to implement the same regulatory measure in the ALWTRP.

b. Federal Waters (3-mile line out to 12 miles)

Proposal: Two 1700 lbs weak points will be required in the top half of all vertical lines in the Maine lobster fishery from the 3 -mile line out to 12 miles. One weak point should be roughly 25% down the vertical line and the other roughly 50% down the vertical line.

Rationale: The inclusion of weak points in all vertical lines means rope will part at the 1700 lbs breaking strength recommended in literature and by the ALWTRT. As a result, this substantially reduces the risk of serious injury and mortality in Maine's waters.

Based on industry comments, ME DMR is concerned that, in some areas, a weak point 50% down the vertical line may compromise fishermen safety when hauling, particularly as the minimum trap-per-trawl requirement increases. Maine's Commercial Fishing Safety Council, a body established in state statute charged with providing information and advice concerning fishing safety issues, also expressed concerns particularly when fishing in large tides. Given it is likely that a weak point 50% down the vertical line may work for some fishermen and not for others, ME DMR highlights the importance of having a method for conservation equivalency and individual safety exemptions in the federal proposed rule (see Sections VI and VII). This flexibility would allow some lobster management zones and/or individuals in Maine to achieve the same level of conservation by adopting a different measure (e.g. greater level of trawling-up, trap reduction) in order to move the weak points further up the vertical line.

c. Federal Waters (outside 12 miles)

Proposal: One 1700 lbs weak point one-third of the way down the vertical line in the Maine lobster fishery outside 12 miles from shore.

Rationale: The inclusion of weak points in all vertical lines means rope will part at the 1700 lbs breaking strength recommended in literature and by the ALWTRT. As a result, this substantially reduces the risk of serious injury and mortality in Maine's waters. Proposing one weak point further up the vertical line outside 12 miles is in response to safety concerns heard from the fishing industry and Maine's Commercial Fishing Safety Council. Trawl minimums of 25-trap trawls fished in deeper waters at this distance from shore put higher hauling loads on the vertical lines and could result in safety issues. Putting a weak point one-third of the way down the vertical line, as per the recommendation of the Maine Commercial Fishing Safety Council, puts a protection measure in place for right whales encountering the top of the vertical line, while ensuring the safety of fishermen utilizing these waters. A greater description of these safety concerns and associated data are included on pages 22-25.

Maine's proposal for weak points was developed by focusing on three factors: feasibility, enforceability, and protections to right whales. ME DMR originally began to consider the inclusion of weak points in vertical lines because a 1700 lbs manufactured rope is currently not available at marine supply stores. Further, ME DMR's testing of various functional breaking strengths (Appendix V) indicated a 5/16th diameter rope would be needed to meet the threshold of breaking at 1700 lbs. At industry meetings, fishermen consistently commented that 5/16th diameter rope would be too small for their haulers. Given these constraints, ME DMR began to consider weak points as a way to reduce the breaking strength of vertical lines.

Enforceability of Proposed Weak Point Measures

In its development of a weak point proposal, ME DMR had several conversations with law enforcement personnel to determine what types of weak point measures can be enforced on the water. Maine Marine Patrol agreed that implementing regulations requiring a specific number of weak points in broad fishing areas is enforceable; but requiring weak points based on a prescribed depth interval is not. More specifically, if a regulation were to require weak points at a specified depth spacing, each fisherman would have a different weak point requirement for each of his or her lines depending on the depth at which his or her traps were submerged. As a result, enforcement personnel would have to know the depth of water when the traps were set and then count the associated number of weak points to determine compliance. Not only is this time consuming but it is impractical given depths change throughout the day due to tides. Further, traps can be moved in large storms, meaning a trap legally set at one depth may be moved to a different depth and be in violation of the ALWTRP.

Trying to create uniformity in weak point regulations by lobster zone also poses enforcement challenges. Depths vary between and within Maine lobster zones. For example, offshore regions of Zone G (adjacent to the New Hampshire border) have much shallower sections than its neighboring Zone F. As a result, regulations based on depth would result in different weak point requirements for the two zones. This disparity between zones creates complications given fishermen can, and often do, move between adjacent areas. Under Maine's regulations, fishermen can fish up to 49% of their traps in an adjacent zone. This means, for example, a Zone G fisherman can fish 49% of his or her traps in Zone F. If fishermen setting traps side by side are subject to different regulations, enforcement of these regulations becomes extremely difficult.

Operational Feasibility for Industry

Another key consideration for ME DMR when discussing weak points was their feasibility for industry. Staff at the NEFSC compiled information showing the number of points which would result if weak points were required every 40 ft in the top half of a vertical line (Figure 5). While this analysis was intended for discussion, it highlighted the impracticality of weak points at this spacing. Specifically, fishermen in three to six miles would be required to have roughly 3 to 8 weak points in the top half of their line as water depths increased; fishermen in six to twelve miles would be required to have roughly 5 to 13 weak points in the top half of their line; and fishermen outside of twelve miles would be required

to have anywhere from 5 to 20 weak points in the top half of their line. These numbers of weak points would likely incentivize the use of more rope, increasing the risk of whales getting entangled in the water column and fishermen getting entangled in additional rope on deck. At ME DMR's industry meetings, fishermen commented that, in response to an initial proposal that 75% of their vertical line break at 1700 lbs, they would likely lengthen their vertical line to ensure a safe rope strength when hauling traps. ME DMR believes a similar response would occur if numerous weak points are required; fishermen will likely lengthen line, even at the cost of adding more weak points, to ensure 'strong' rope when hauling. This outcome is counter to the efforts of the ALWTRT as it would result in the presence of additional slack rope in the water, thereby increasing the risk of entanglement.

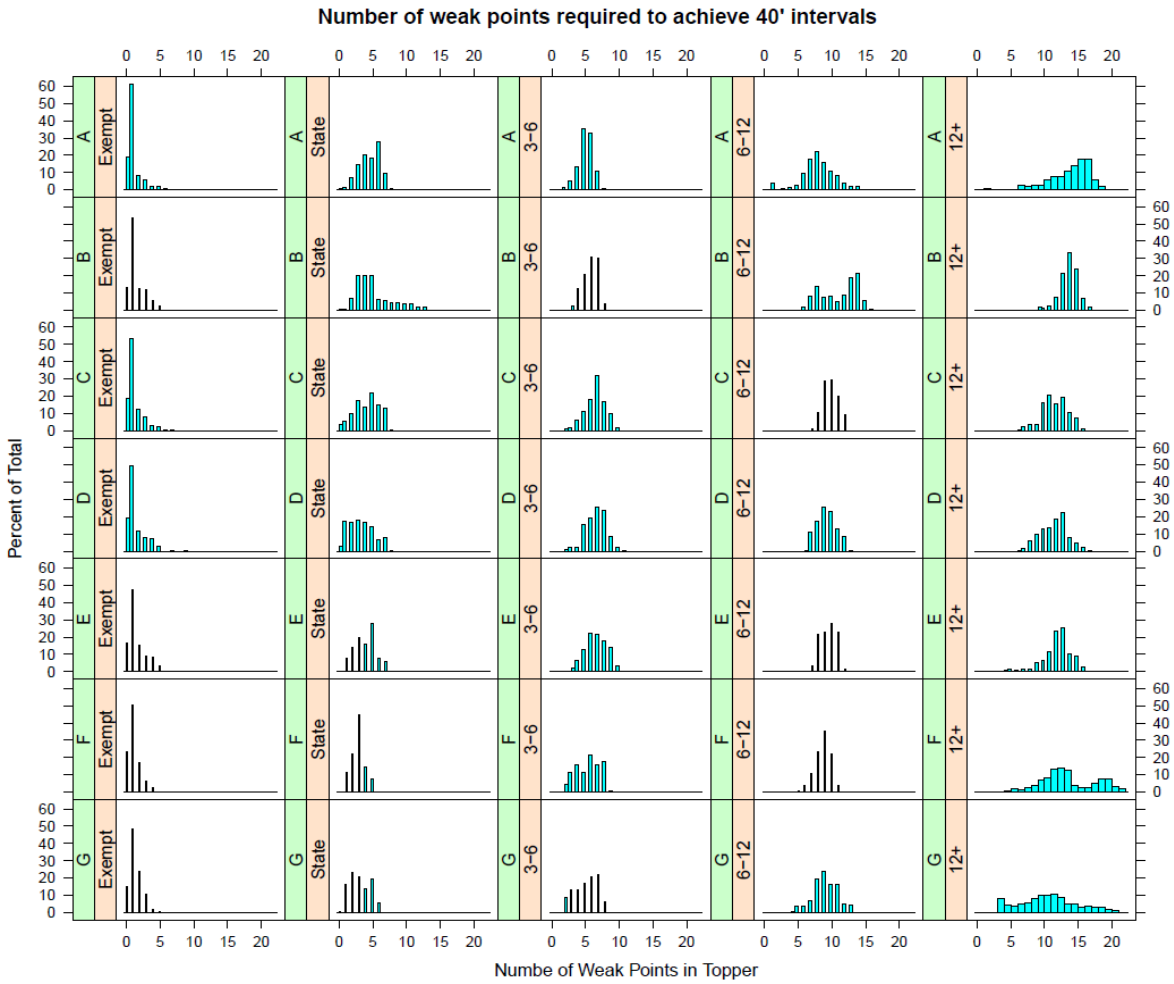

Figure 5: Number of weak points in the top half of a vertical line if required every 40 ft, by Maine lobster zone and distance from shore. Data and figure provided by the NEFSC.

ME DMR is confident that its proposal for 1700 lbs weak points is enforceable, feasible, effective and, most importantly, will not create perverse incentives which jeopardize right whale conservation. A specific number of weak points is enforceable because it is simple and uniform based on distance from shore. This proposal is also feasible for fishermen, helping to ensure compliance with the regulations. ME DMR does not anticipate it will drastically alter current vertical line lengths given rope strength is preserved in the bottom half of the vertical line where load cell data shows the strain is highest.

Development of Weak Point Measures: Data and Previous Discussion

In ME DMR's analysis for this proposal, we found a lack of data or peer-reviewed literature regarding the ideal distance between weak points. Further, the definition of weak rope, how weak points may be integrated into vertical lines, or how much risk reduction should result from these measures were not agreed upon at the April 2019 ALWTRT meeting. Review of the meeting summary for the April 2019 ALWTRT meeting showed neither a discussion regarding the appropriate spacing of weak points nor a definition of what might constitute weak rope was ever made or included in the vote.

In the history of the ALWTRT, there have been discussions and proposals which have included measures which occur every 40 ft; however, it has never been formally agreed that this is the correct spacing for any measure. ME DMR reviewed the origin of the 40 ft spacing and found it was initially a recommendation developed for potential gear marking requirements. The first mention of using 40 ft spacing for gear marking occurred in a 2009 report on experimental wire tags from the International Fund for Animal Welfare. This report was included as a part of the November 2010 ALWTRT meeting. The report suggests that because 90% of the gear recovered from whales is at least 40 ft in length, marking gear every 40 ft would result in 90% of recovered gear having a mark which can be used to discern fishery and/or set location. The data referred to in the report are from a study conducted by John Kenney, a former NMFS gear specialist. Kenney looked at gear taken off of whales from 1997-2003 which ranged in length from 5-1200 ft. He found in the 61 samples analyzed, the average length of line was 181 ft, the median length was 102 ft, and the lower and upper quartiles were 60 and 222 ft, respectively. From this analysis it was concluded that 12 ft spacing would result in 95% recovery of a mark, 40 ft would result in 90% recovery, 60 ft would result in 75% recovery, and 102 ft would result in 50% recovery.

The first place that the 40 ft spacing was used in conjunction with a weak point was in the April 2017 ALWTRP exemption request from the Massachusetts South Shore Lobstermen's Association. In this proposal, the fishermen proposed to implement a weak sleeve (breaks at 1700 lbs) every 40 ft in their vertical lines as a way to be able to fish inside the Massachusetts Restricted Area closure. The 40 ft spacing was used, not because it was determined to be the ideal spacing for weak points, but because they were proposing the sleeves double as their gear marking requirement as well. This proposal was not ultimately accepted by the ALWTRT.

There have also been comments that the 40 ft spacing is consistent with the girth or length of a right whale. ME DMR maintains this has not been discussed by the ALWTRT nor has it been published in peer-reviewed literature. Therefore, 40 ft spacing has no basis as the standard by which the addition of weak points for the conservation benefit of right whales should be held.

Modifications to Maine's Weak Rope Measures

At the April 2019 ALWTRT meeting, the implementation of 1700 lbs breaking strength rope in the top 75% of vertical lines was discussed for the federal Maine lobster fishery. This idea was presented to fishermen at ME DMR's industry meetings in June 2019 and concerns were expressed regarding the ability to safely haul gear. Specifically, fishermen

were concerned that weakening the top 75% of the vertical line in combination with the proposed increases in trawl lengths would reduce safety at sea. Many fishermen commented that, to accommodate the proposed weakening of the majority of their endline, they intended to increase the length of their vertical line to lengthen the bottom 25% of their endline and ensure enough rope strength when hauling traps. Increasing overall amounts of rope in the water is counter to the efforts of the ALWTRT, particularly when such additional line will likely be slack. Industry members that fish in federal waters inshore of the 12 mile line did express that, with existing vertical line lengths, modifications to the top 50% of the rope would be more feasible and preferable, in that it would not likely lead to fishermen's use of increased rope amounts. As a result, ME DMR moved towards examining changes to the top 50% of the rope to ensure industry feasibility and safety in addition to the protection of right whales.

ME DMR has heard from fishermen fishing outside of 12 miles that a weak point 50% of the way down the vertical line would present safety concerns given the 25-trap minimum being proposed in this area. These concerns are supported by the load cell data gathered by ME DMR and presented in Figure 8 (discussed in depth below). Loads recorded on vertical lines for gear being fished in more than 100 fathoms of water and more than 20-traps on a trawl exceeded 2,000 lbs of load. Hauling loads at a weak point 50% of the way down the line would likely result in loads routinely over 1,000 lbs of force. To accommodate weather conditions, hang downs, and set over events, ME DMR worked with industry to propose a weak point one-third of the way down the vertical line.

Using Load Cell Data to Inform Protections for Whales and Safety for Fishermen

The strategy to achieve a conservation benefit for right whales in the top portion of the line, while maintaining safe hauling practices for fishermen, is supported by data collected through ME DMR's vertical line research initiative. Beginning in 2018 and extending through 2019, ME DMR worked with fishermen throughout the Gulf of Maine region to deploy load cells on lobster vessels and document the hauling loads experienced by vertical lines during common fishing conditions. Of the 14 fishermen who fished with load cells on their boats, six of those were from Maine, documenting over 140 hauls in five of the seven Maine Lobster Management Zones (Figure 6). The Maine portion of the dataset occurs in federal waters and includes trawl lengths ranging from 15 to 20 trap trawls in depths of 55-125 fathoms.

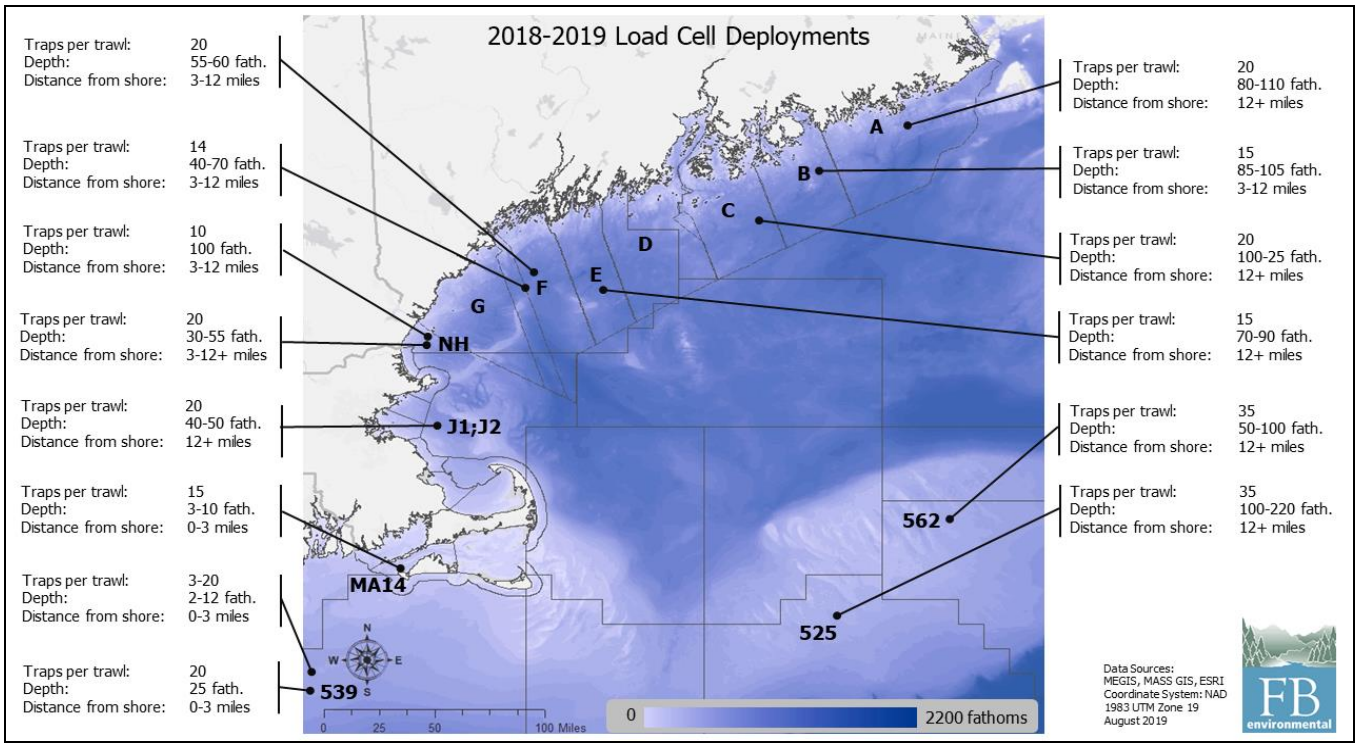

Figure 6. Summary of load cell deployments throughout the Gulf of Maine and New England with associated information on the trawl lengths, depth, and distance from shore.

Results of the load cell deployments show peaks in the load asserted on the line as the trawl is being hauled (Figure 7). Often, the highest peaks in the loads are in the first section of the haul, including the vertical line, because this corresponds to when the maximum number of traps are suspended in the water column. Most of the hauls recorded were in calmer weather and, while some gear set overs (where a trawl is laid over another) were recorded, these results shouldn't be expected to show the highest possible loads that would be experienced by fishermen in more extreme hauling events.

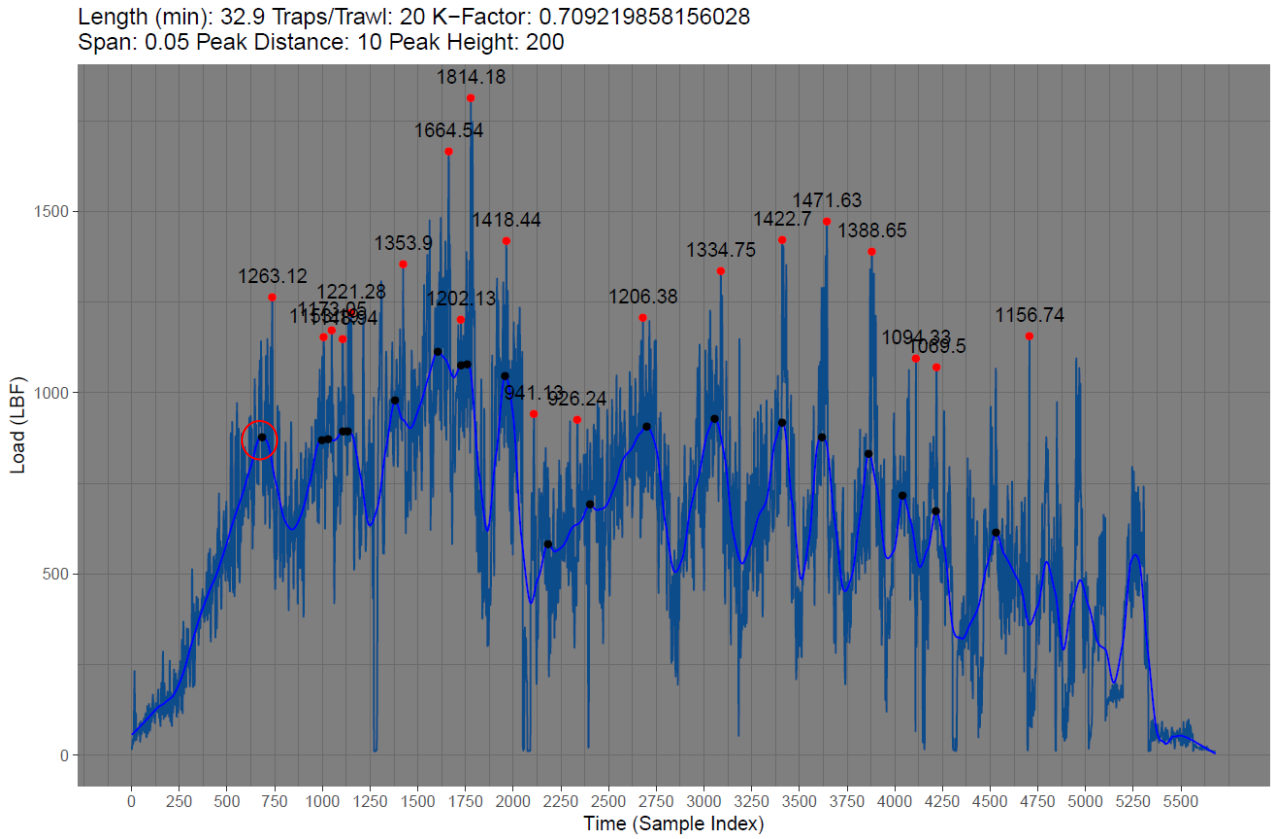

Figure 7. An example of a load cell output from a 20-trap trawl. The portion of the haul that is the load on the vertical line occurs between 0-750 on the time axis and increases steadily as traps are picked up off of the bottom. The first trap coming onboard the vessel is denoted by the red circle and was validated by observers on the vessel. The peak load on the vertical line occurred at the first trap with a load of 1,263 lbs. Loads after this point were hauled on the groundline.

The results from the load cell deployments in Maine federal waters support the concerns expressed by fishermen, namely that the combination of increased trawl lengths and weak points half way down the line could compromise safety. Figure 8 shows the average and range of hauling loads on the vertical lines for a variety of trawl lengths and how those loads are affected by the depth of the trawl. Trawl lengths of 20 traps in more than 100 fathom depths have average vertical line loads greater than 1700 lbs and range over 2000 lbs. As a result, it is essential that this portion of the fishery be allowed a sufficient length of vertical line at the bottom to be able to haul these common working loads safely.

The average hauling loads documented for trawls between 5-20 traps in 50-100 fathoms are below the 1700 lbs threshold for loads. However, this does not allow a safety buffer for more extreme hauling events that include weather, gear set-overs, and getting hung-down (or caught) on rocky bottom. There were 60 hauls of 15-trap trawls in this depth range with the load cells. The maximum load recorded on a vertical line was 2,152 lbs, which is over the weak point 1700 lbs threshold. The average vertical line hauling load of these trawls was 1365 lbs, just 335 lbs below the 1700 lbs target. 25% of these hauls recorded vertical line loads over 1500 lbs and 97% of hauls were over 1000 lbs. Additionally, 100% of hauling loads for the 5-trap trawls in this depth bin were also over 1000 lbs of load.

ME DMR supports the industry's request for safe buffers in working line loads to allow for variables that impact both the load put on lines during hauling and the likelihood that a line may break. These variables include the natural degradation of line strength over time, extreme hauling events, weather, and tides.

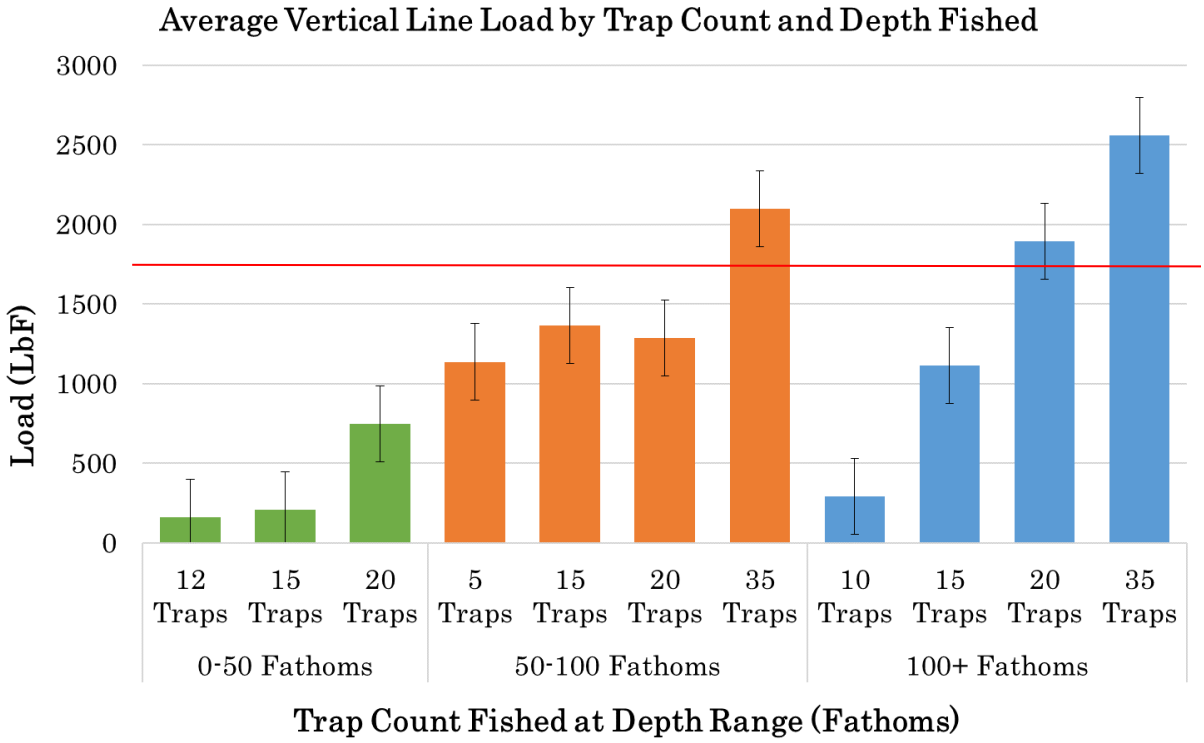

Figure 8. All recorded vertical line loads binned by trawl length and depth fished. Average vertical line loads for more than 20-trap trawls in 100 fathoms of water are above the 1,700 lbs weak point threshold. Trawl lengths from 5-20 in the 50-100 fathom depth bin average below the 1700 lbs threshold, but almost reach over 1000 lbs almost 100% of the time.

Implications for Drag Should Entanglement Occur

In this proposal, varying lengths of vertical line have the potential to be left on a right whale in the event it becomes entangled and the rope breaks at a weak point. The length of the trailing line depends on the initial length of the vertical line and the number of weak points required in the area. Figures 9-11 were developed by the NEFSC for discussion around this topic and show the spectrum of line lengths which could be left on right whales under this weak point proposal. Figure 9 should be used for the state waters (all exempt and non-exempt state waters) proposal of one weak point half way down the vertical line. In general, less than 100 ft of line would be remaining after a break inside the exemption area. Only slightly more, up to 150 ft, could be left on a right whale in Maine's non-exempt state waters.

Figure 10 shows the lengths of line that could result from three to twelve miles in federal waters where two weak points in the upper 50% of the vertical line are required. The results

vary by distance from shore, which is mainly attributable to the differences in depth and therefore the scope of the vertical line in each area. From 3-6 miles from shore the length of line left on a whale could range from about 50-125 ft. The more offshore section from 6-12 miles increases to a range of 100-200 ft.

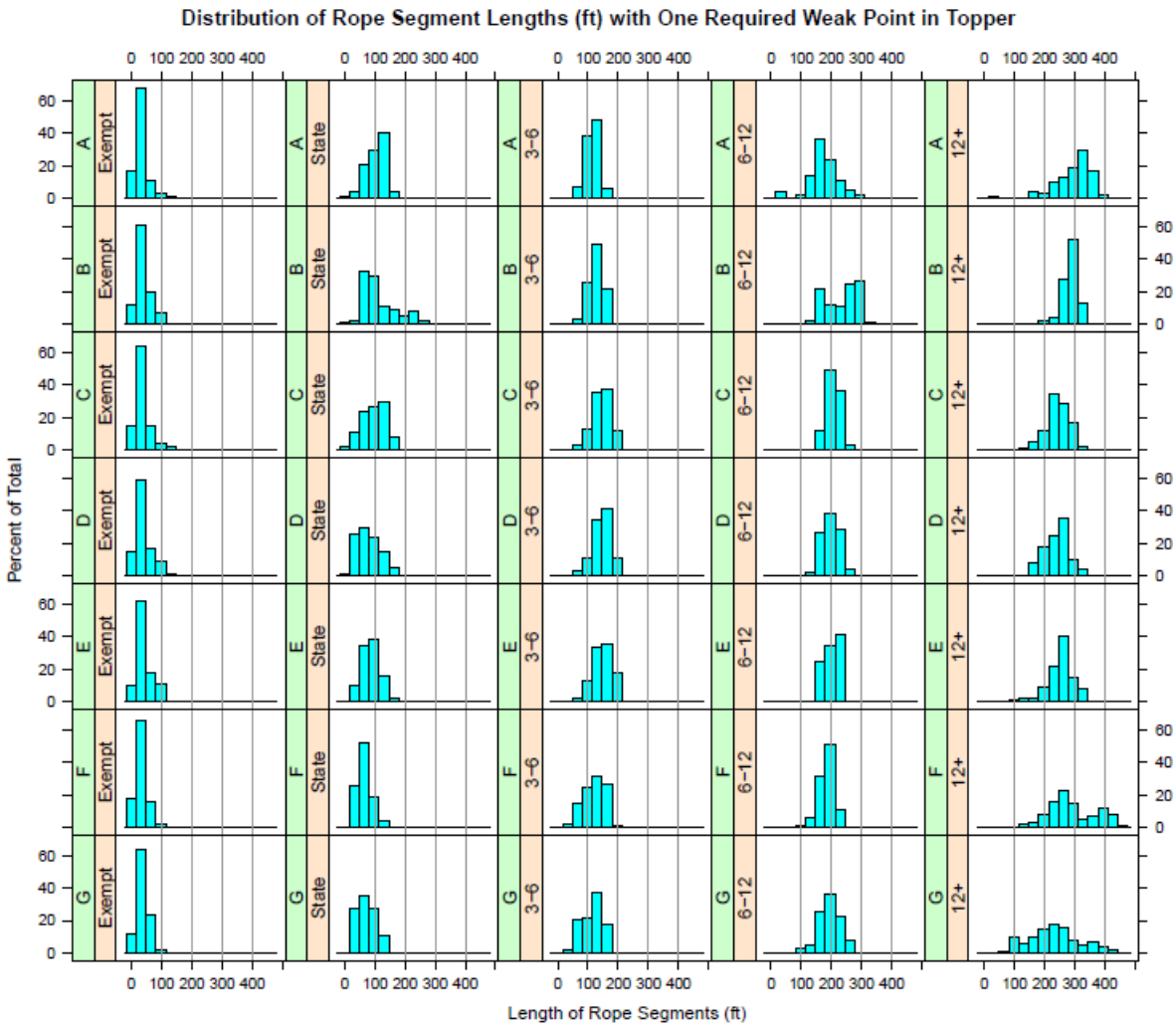

Figure 9. This figure was prepared by the NEFSC for discussion purposes. The first two columns, "exempt" and "state", show the range in lengths of lines that could be left on a right whale after a weak point breaks. This is assuming one weak point 50% down the vertical line in state waters and is categorized by the amount of gear in a given depth. Most gear inside the exemption line would result in less than 100 ft of line remaining on a right whale after a break. Gear in non-exempt or "state" waters would result in slightly longer lengths of line, generally ranging from 100-150 ft.

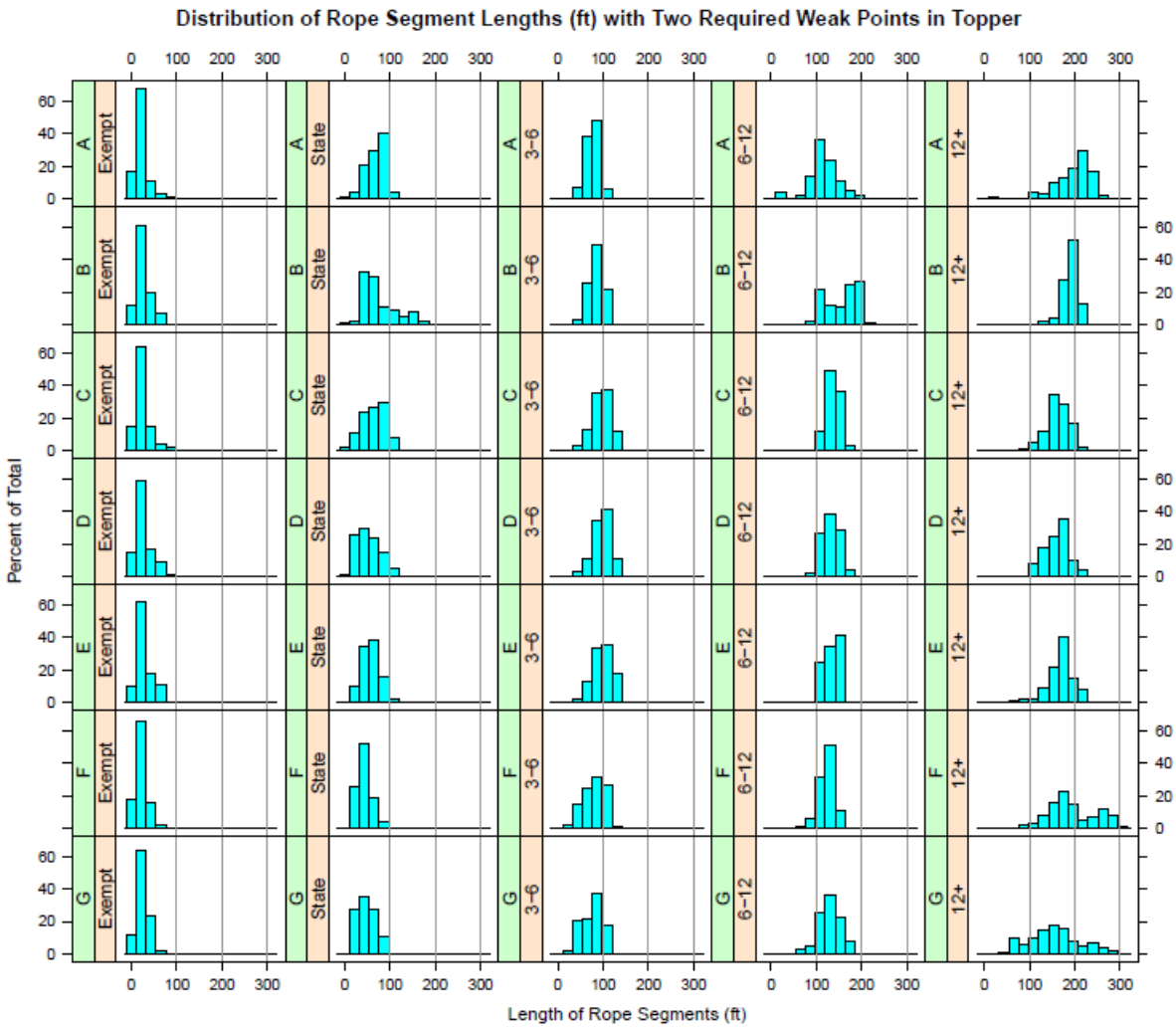

Figure 10. This figure was prepared by the NEFSC for discussion purposes. The columns labeled "3-6" and "6-12" show the range in lengths of lines that could be left on a right whale after a weak point breaks from three to twelve miles in federal waters by distance from shore. This is assuming two weak points in the top 50% of the vertical line in this area and is categorized by the amount of gear in a given depth. Most gear in the 3-6 mile band would range in remaining line length from 50-125 ft. A break in the distance range 6-12+ could result in lines left from 100-200 ft.

Under this proposal the area outside of 12 miles from shore will have one weak point 1/3 of the way down the vertical line from the buoy to accommodate the safety needs of the fleet operating in deeper depths with longer trawls. Figure 11 shows the distribution of vertical lines occurring at different water depths by distance from shore in Maine waters. The fishing area outside of 12 miles can generally range from 50-125 fathoms depth, but most of the vertical lines occupy the depths around 100 fathom. Assuming a 1.5 scope of vertical line length to depth, a common practice in the fishery, the vertical line lengths would range to 188 fathom. A weak point breaking 1/3 of the way down this vertical line could result in a line 62 fathom in length on a right whale.

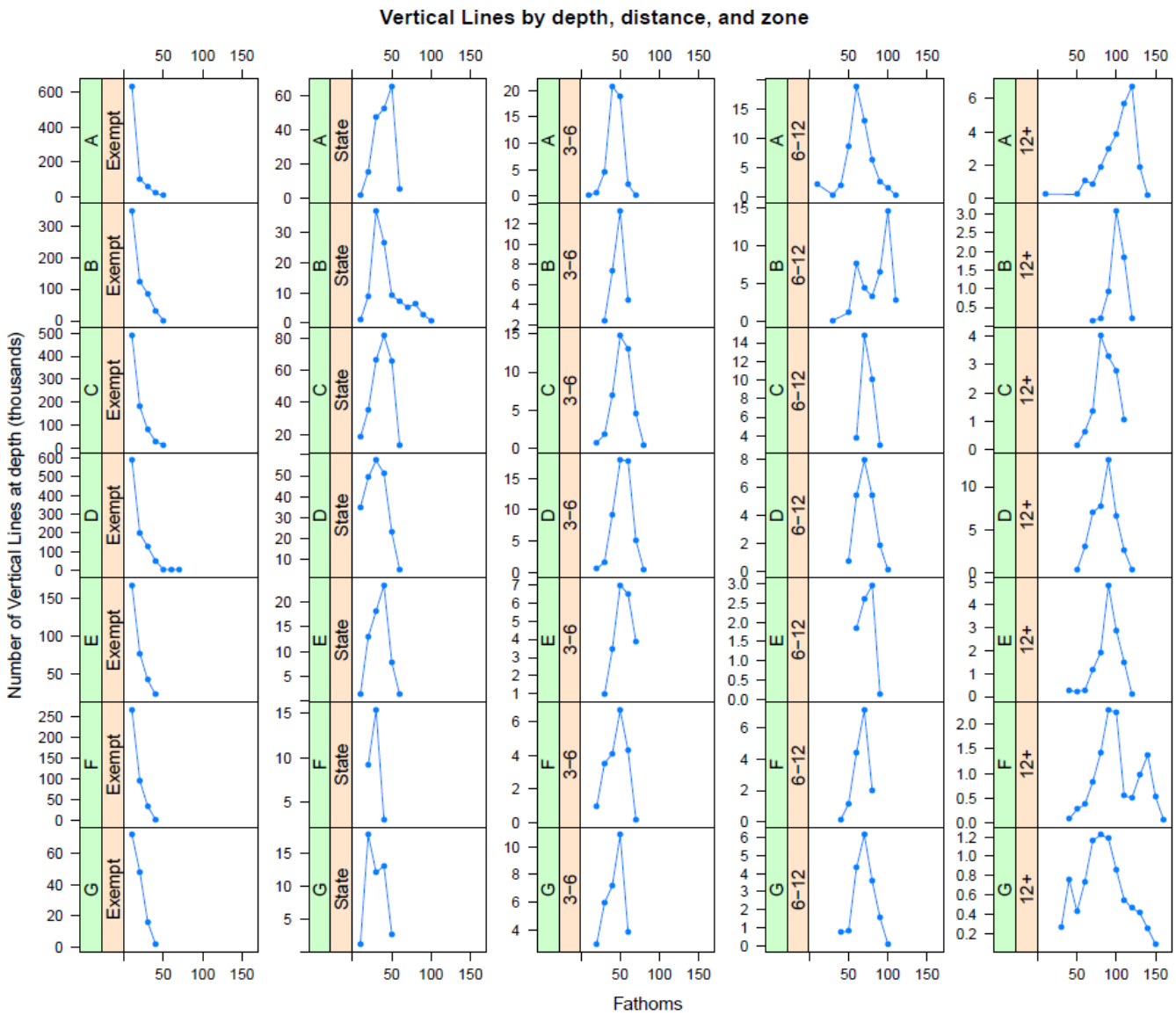

Figure 11. This figure was prepared by the NEFSC for discussion purposes. The last column label "12+" by Maine Lobster Management Zones A-G, shows the number of vertical lines distributed in that area by depth in fathoms. Most of the gear set in the 12+ distance from shore is set in a range around the 100fa depth strata.

Van der Hoop *et al.* (2015)[25] shows some results of the drag resulting from different lengths of 5/16" line and concludes shorter lengths of line are better for whales due to less drag forces being applied to the swimming whale. ME DMR attempted to duplicate these results using two different diameters of rope most common in the fishery: 3/8" and 7/16" sink rope. Van der Hoop used a range of line lengths including 82-480 ft. DMR used a set of three lengths which included 60, 120, and 240 ft. In the ME DMR study (Figure 12), the different diameters and lengths of line were tested using a load cell to measure the pounds of drag force exerted on the lines at varying vessel speeds. The slow speed, around 2.5

[25] Van der Hoop, J. M., Corkeron, P., Kenney, J., Landry, S., Morin, D., Smith, J., and M. J. Moore. 2015. Drag from fishing gear entangling North Atlantic right whales. *Marine Mammal Science*, 32, 2:619-642.

knots, simulates the swimming right whale. The higher speeds may be confounded by the wake created by the vessel exerting more drag force on the lines.

The results show that, at the 2.5 knot speed, drag forces are at or below 10 lbs of force for any of the line lengths in both studies. DMR's results show that at the line lengths of 60 and 120 ft, line drag is less than 5 lbs of force. Lengthening the line out to 240 ft only increased the drag a couple of pounds, up to 7 lbs of drag force. DMR believes that increasing the number of weak points and, therefore, shortening the distance between them will have minimal effect on the potential drag for right whales, but would come at a much greater cost to the fishing industry.

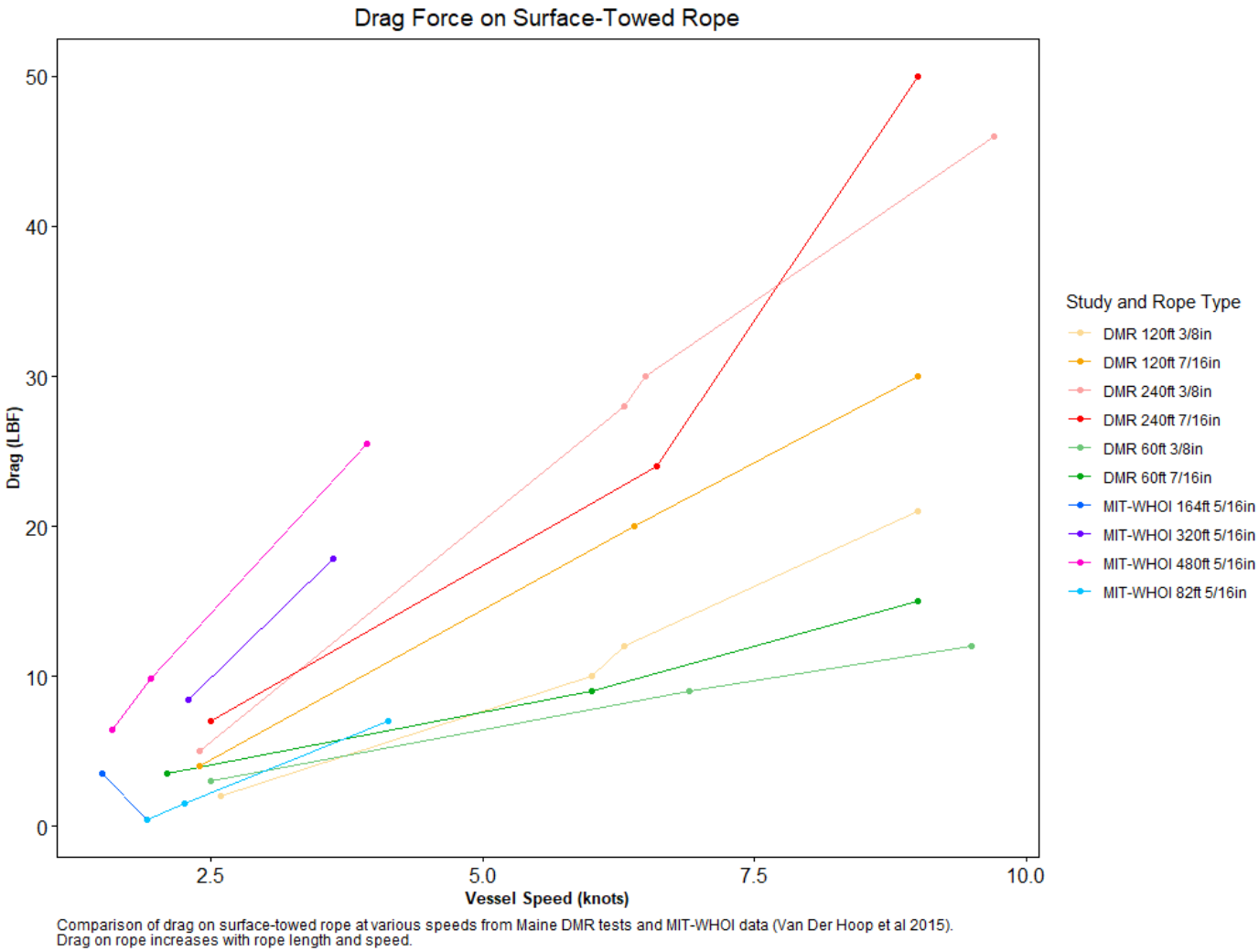

Figure 12. Data from ME DMR field trials assessing the drag force exerted by different diameters and lengths of line are plotting here next to the results from Van Der Hoop *et al*. 2015. At the speed of 2.5 knots, all lengths of line exert less than 10 lbs of drag force, with the 60 and 120 ft lengths exerting less than 5 lbs.

III. Gear Marking

a. Exempt Waters (shoreward of the exemption line)

Proposal: A purple Maine-only gear mark is required at the top, middle, and bottom of the vertical line. The top mark is 36" in length and must be in the top two fathoms of the line. The middle and bottom marks are 12" in length. Gear mark requirements within exempt waters have been finalized by the adoption of state regulations.

Note: ME DMR finalized gear marking requirements for exempt waters at its October 2019 DMR Advisory Council meeting. The regulations set an implementation date of September 2020, ahead of the federal regulatory process, and will allow for individuals to switch to purple gear-marking ahead of the implementation deadline. A copy of the regulations can be found here: https://www.maine.gov/dmr/laws-regulations/regulations/documents/dmrchapter75_11132019.pdf

It is recommended NOAA Fisheries cite ME DMR's regulation when the federal rule is published and include a clause that, if the State removes this requirement, NOAA Fisheries would take emergency action to implement the same regulatory requirement in the ALWTRP.

Rationale: (see rationale included for non-exempted waters below)

b. Non-Exempt Waters

Proposal: A purple Maine-only gear mark replaces the existing 12-inch red marks at the top, middle, and bottom of the vertical line. In addition, a 6" green mark and a 36" purple mark, in the top two fathoms of the line will be required.

Note: ME DMR finalized gear marking requirements for non-exempt waters at its October 2019 DMR Advisory Council meeting. The regulations set an implementation date of September 2020, ahead of the federal regulatory process, and will allow for individuals to switch to purple gear-marking ahead of the implementation deadline. A copy of the regulations can be found here: https://www.maine.gov/dmr/laws-regulations/regulations/documents/dmrchapter75_11132019.pdf

Rationale: It has been clear throughout the ALWTRT discussions that a primary impediment to the development of regulations is the lack of conclusive data on what gear is involved in entanglements. This includes cases in which no gear is present and cases in which gear is retrieved but does not have markings which can be traced to a specific fishery. Maine's gear markings address both of these challenges by increasing the amount of gear that is marked and increasing the frequency of markings on those lines. Maine has adopted these additional gear markings ahead of the federal regulatory process given the importance of spatially-specific data.

The core of Maine's gear marking proposal is the implementation of a state-specific purple mark for Maine's lobster fishery. At present, all Northeast trap/pot gear is identified by a red mark. This lack of spatial specificity means that, if red-marked gear is retrieved during an entanglement, the gear cannot be attributed to a specific state. As a result, it is nearly impossible to develop protections for right whales which are specific to fisheries or regions with confirmed entanglements, and broad-brush management measures must be used as a default. Maine's adoption of a state-specific mark will help provide the basis for spatially specific data and support better management advice in the future. Furthermore, a lack of purple marks in future entanglement records will help Maine justify the success of its right whale protection measures in place at that time.

Another major component of Maine's gear marking plan is the requirement that all commercial lobster gear within Maine's exempted waters be marked. Currently, gear fished shoreward of the exemption line is not subject to the gear marking requirements in the ALWTRP. While scientific evidence does not show that right whales frequent exempted waters or that gear within the exemption area has contributed to a right whale entanglement, the State does recognize that this lack of marking creates holes in the data. Requiring this gear to be marked will address these data gaps and greatly increase the number of marked vertical lines. Further, it will reduce uncertainty surrounding the retrieval of gear that is unmarked since all Maine commercial lobster gear will be subject to marking requirements and, therefore, identifiable.

Gear in both the exempt and non-exempt waters will be required to have a 36" purple mark in the top two fathoms of the line. This requirement stemmed from a Coast Guard and New England Fishery Management Council recommendation intended to increase the visibility and frequency of markings. Specifically, the Coast Guard suggested a 36" mark at the top of the line could enable the identification of fishery-specific gear from various platforms such as boats and planes. This would mean data in the entanglement record could be significantly improved without gear being retrieved. Further, the additional mark increases the number of marks per line by 25%, making it more likely that a piece of retrieved gear from an entangled whale will have a mark.

Finally, Maine is proposing a green mark, in combination with the Maine-only purple mark, be required on vertical lines outside of exempted waters. A cornerstone of Maine's right whale regulations is the exemption line, which identifies inshore waters and bays where right whales are rarely, if ever, present. This exemption line creates a balance between establishing protections for right whales and ensuring a viable lobster fishery in Maine. As all Maine lobster gear becomes marked, it is critical to differentiate between gear in exempted versus unexempted waters given the two regions are subject to different regulations. Requiring an additional green mark, in combination with the purple mark, allows Maine to achieve this objective.

IV. Harvester Reporting

a. All Maine Commercial Lobster License Holders

Proposal: Move the Maine lobster fishery to 100% harvester reporting.

Rationale: Currently 10% of Maine lobster license holders are randomly selected each year to complete harvester reporting. While analysis by the ASMFC's Lobster Technical Committee[26] suggests this level of reporting is enough to get precise estimates of catch, it does not provide the level of information on fishing effort or location needed for current right whale discussions. Increased harvester reporting will close this data gap and provide a complete picture of activity in the Maine lobster fishery. Addendum 26 to Amendment 3 to the Atlantic States Marine Fisheries Commission American Lobster Fishery Management Plan, which was approved in February 2018, requires all states to implement 100% active commercial harvester trip-level reporting by January 1, 2024. Given, the importance of improved fishery effort data to ongoing discussions, ME DMR is considering adopting 100% reporting ahead of the ASMFC requirement.

Moving to 100% harvester reporting in the Maine lobster fishery is a large financial endeavor. The Maine lobster fishery comprises roughly 40% of all commercial fishing trips taken each year by all fisheries along the Atlantic coast. As a result, the anticipated volume of reports requires additional ME DMR staff for QA/QC, technical support, and licensing. Further, options for electronic reporting will need to be developed and offered to defray costs associated with paper reporting. Currently, DMR is under contract with a third-party firm to develop a harvester reporting application (expected to go live in Fall 2020) for iOS and Android devices that will make harvester reporting more efficient and user-friendly. ME DMR has also submitted a proposal for funding to the Atlantic Coast Cooperative Statistics Program (ACCSP). While the exact amount of funding is yet to be determined, it is likely there will be a substantial difference between the level of funding needed and the level of funding received. This deficit means other levels of funding will need to be identified and secured. ME DMR highlights the feasibility of 100% reporting, and the date associated with its implementation, are highly dependent on the level of funding received.

V. Electronic Tracking on Federal Vessels

At the April 2019 meeting, ALWTRT members had a cursory discussion regarding electronic tracking on federally permitted vessels. Given this discussion, ME DMR had conversations with law enforcement and industry to gather feedback.

From an enforcement perspective, vessel tracking in federal waters would be a critical tool to ensure new and existing regulations are properly enforced. Offshore fishing areas pose unique challenges to enforcing regulations because the areas are vast. As a result, many hours can be spent searching for gear. Further, Maine Marine Patrol currently has eight patrol vessels with the capability to haul lobster gear in state waters. Of those eight, only

[26] Addendum 26 to Amendment 3 to the American Lobster Fishery Management Plan. http://www.asmfc.org/uploads/file/5a9438ccAmLobsterAddXXVI_JonahCrabAddIII_Feb2018.pdf

four boats have the capability to effectively and safely inspect lobster gear in areas where larger trawls are fished outside of Maine state waters. As a result, Marine Patrol's capability to enforce lobster regulations drops as one moves further offshore.

Industry has expressed many reservations about adopting tracking on federally permitted vessels. These concerns include the cost of the unit, ongoing expenses associated with data plans, whether technical failures of a tracking device would cause boats to be tied to the dock, and whether vessels which already have VMS onboard will be required to have two different tracking units. Given a webinar on vessel tracking, as discussed at the April 2019 ALWTRT meeting, was never held, many questions remain regarding the parameters and potential impacts of this program.

Given industry's concerns and the lack of clarity around a federal tracking program, ME DMR recommends NOAA work with industry to understand the various tracking technologies which are available and to determine the associated costs. As a starting point, ME DMR notes that during the development of Addendum 26 to Amendment 3 to the American Lobster Fishery Management Plan, the ASMFC's Law Enforcement Committee (LEC) spent significant time discussing vessel tracking in the federal lobster fishery. This group produced several recommendations, including the need for a fast ping rate to discern between steaming and hauling. The LEC concluded the ability to distinguish these actions through a tracking device is important because it can indicate where traps are set and for how long. The LEC also noted that real-time data is not necessary in the lobster fishery given traps are set for multiple days; knowing the location of the traps is more important than getting hourly, real-time data. Given these criteria, it may be that a cellular-based tracking device is a better fit for the federal lobster fishery, and it is available at a substantially lower cost. At present, ASMFC is conducting a pilot program with cellular-based tracking devices in the lobster fishery to better understand their performance. This information may be crucial as NOAA begins to engage with the industry on this issue.

VI. Request for Conservation Equivalency

A unique feature of the Maine lobster fishery is that it is based on a system of co-management. The coast of Maine is divided into seven lobster zones in recognition that areas along the coast differ in habitat and traditional fishing practices. Each zone is represented through a Zone Council, which is comprised of fishermen in the region. These Zone Councils are an integral part of the lobster management process within the State. Under ME DMR's regulations, Zone Councils have the authority to set some measures within their Zone, including exit ratios (number of licenses issued vs. the number of licenses that are not renewed), number of traps fished (as long as this is more conservative than the statewide limit), number of traps on a trawl (as long as it is more conservative than state regulations), and time of day when fishing may occur. Several Zones have used this authority to fit regulations to their region. For example, fishermen in Zone E have adopted a 600-trap limit based on local fishing practices. All fishermen who fish in Zone E, regardless of whether it is their primary zone, are held to the 600-trap limit.

At present, ME DMR's proposal is for all state-licensed fishermen and is not differentiated by Maine's lobster management zones. However, this statewide approach does not

acknowledge the acute regional differences in the Maine lobster fishery. Further, it does not consider that Zone Councils may prefer a different combination of measures to achieve the same level of risk reduction. Allowing for future flexibility in the regulations to meet the same level of risk reduction will be crucial to the success of this rule. As a result, ME DMR recommends NOAA Fisheries include an alternative for conservation equivalency within the proposed rule. This will prevent the need for lengthy rule-making process if regional measures need to be adjusted to achieve the same level of risk reduction. Conservation equivalency is a management tool frequently used by the Atlantic States Marine Fisheries Commission and specific guidance has been developed on its implementation and use.[27]

VII. Individual Safety Program

For a small number of fishermen, the measures included in this proposal exceed the physical limitations of their boat and would require the purchase of a new boat to come into compliance. While ME DMR believes these individual cases are few and far between, we do believe they exist. Given the purchase of a new vessel can be cost prohibitive, ME DMR is asking for the flexibility to address these safety concerns on an individual basis. To be clear, ME DMR is not asking that these individuals be exempt from the risk reduction included in this proposal. Instead, ME DMR is asking for the flexibility to address these individual cases in which a fisherman physically cannot comply with the requirements.

For example, it may be that a fisherman does not have the boat capacity to comply with the new trawling-up requirements. ME DMR is requesting the flexibility to develop an individual plan to achieve the same risk reduction at a lower trawling-up scenario. This could include an individual trap reduction and/or the use of full weak rope to compensate for the lower trawl limit.

Maine Marine Patrol would be notified of these individual cases to ensure enforcement and all analysis showing the individual conservation equivalency would be sent to GARFO staff for review.

[27] Atlantic States Marine Fisheries Commission. Conservation Equivalency: Policy and Technical Guidance Document. Approved May 2004; Edited October 2016. http://www.asmfc.org/files/pub/ConservationEquivalencyGuidance_2016.pdf