SPECIES in the SPOTLIGHT

Priority Actions 2021–2025

NOAA FISHERIES

North Atlantic Right Whale
(*Eubalaena glacialis*)

Cover: Right Whale "'Naevus"' (#2040) and her calf in the Great South Channel off the New England coast. Image collected under MMPA Research permit number 17355. Photo Credit: NOAA/NEFSC/Christin Khan.

The *Species in the Spotlight* Initiative

In 2015, the National Marine Fisheries Service (NOAA Fisheries) launched the *Species in the Spotlight* initiative to provide immediate, targeted efforts to halt declines and stabilize populations, focus resources within and outside of NOAA on the most at-risk species, guide agency actions where we have discretion to make investments, increase public awareness and support for these species, and expand partnerships. We have renewed the initiative for 2021-2025.

The criteria for *Species in the Spotlight* are that they are listed as endangered under the Endangered Species Act (ESA), their populations are declining, and they are considered a recovery priority #1C (84 FR 18243, 4/30/2019). A recovery priority #1C species is one whose extinction is almost certain in the immediate future because of rapid population decline or habitat destruction, and conflicts with construction, development, or economic activity.

As of January 2021, the following nine species are our Species in the Spotlight:

- Atlantic salmon Gulf of Maine distinct population segment (DPS)
- Central California Coast coho salmon evolutionarily significant unit (ESU)
- Cook Inlet beluga whale DPS
- Hawaiian monk seal
- North Atlantic right whale (added in 2019)
- Pacific leatherback sea turtle
- Sacramento River winter-run Chinook salmon ESU
- Southern resident killer whale DPS
- White abalone

For some of these species, their numbers are so low that they need to be bred in captivity; others are facing human threats that must be addressed to prevent their extinction. In most cases, we understand the limiting factors and threats to these species, and we know that the necessary management actions have a high probability of success. In some cases, we are prioritizing research to better understand the threats so we can fine-tune our actions for the maximum effect. We know we can't do this alone. A major part of the *Species in the Spotlight* initiative is to expand partnerships and motivate individuals to work with us to get these species on the road to recovery.

Priority Action Plans

The 5-year action plan is part of a strategy to marshal resources for species listed under the Endangered Species Act of 1973 ESA for which immediate, targeted efforts are vital for stabilizing their populations and preventing their extinction.

In its first 5 years, the *Species in the Spotlight* initiative has been successful at raising awareness, increasing partnerships, and prioritizing funding, providing or leveraging more than $113 million toward projects that will help stabilize these highly at-risk species.

We renewed the *Species in the Spotlight* initiative for 2021-2025, and have updated the priority action plans that outline what we need to do to prevent extinction.

The 5-year action plans for 2021-2025 build upon existing action, recovery, or conservation plans and detail the focused efforts needed over the next 5 years to reduce threats and stabilize population declines. We will continue to engage our partners in the public and private sectors in actions they can take to support this important effort. We will report on our progress through the Biennial Recovering Threatened and Endangered Species Report to Congress and on our Species in the Spotlight web pages.

This strategy will continue to guide agency actions where we have the discretion to make critical investments to safeguard these most endangered species. The strategy will not divert resources away from the important and continued efforts to support all ESA-listed species under our authority. Many of our species have long-standing conservation programs supported by multiple partners. We remain committed to those programs.

This action plan highlights the actions that can be taken by us, other federal and state resource agencies, environmental organizations, Native American tribes and other partners to work toward turning the trend around for this species from a declining trajectory and toward recovery. We appreciate all of our current partners and collaborators, as the steps we need to take to stabilize these species would not be possible without them.

NOAA Fisheries Contacts

If you are interested in working with us, or if you have questions about any of the priority actions contained in this plan, please contact:

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North Atlantic Right Whale Status

The North Atlantic right whale (*Eubalaena glacialis*) is one of the world's most endangered large whale species. North Atlantic right whales (referred to as "right whales" throughout this plan) have been listed as endangered under the ESA since it was enacted in 1973, with fewer than 400 individuals remaining as of January 2019. Commercial whaling decimated right whales, bringing them to the brink of extinction. Despite protections put in place in the 1970s under both the ESA and the Marine Mammal Protection Act (MMPA), recovery has been slow. In 1990, 268 individuals were estimated to be remaining. The population grew to approximately 481 individuals by 2010. Recently, increasing mortality rates and decreased calving have led to a population decline that has continued at least through 2019.

While whaling is no longer a threat, the species' coastal distribution puts it at continued risk from human interaction, with vessel strikes and entanglements in fishing gear the leading causes of right whale mortality. These human-caused deaths have been outpacing births. A large number of observed right whale deaths that began in 2017 prompted NOAA Fisheries to declare an Unusual Mortality Event (UME) for the species throughout its entire range. The UME involves both dead and seriously injured individuals, is ongoing, and continues to be investigated as elevated mortality and morbidity levels occurred through 2020. The recent decline and current status of the right whale makes it a top priority for NOAA Fisheries and our partners to prevent extinction and promote recovery of this critically endangered species.

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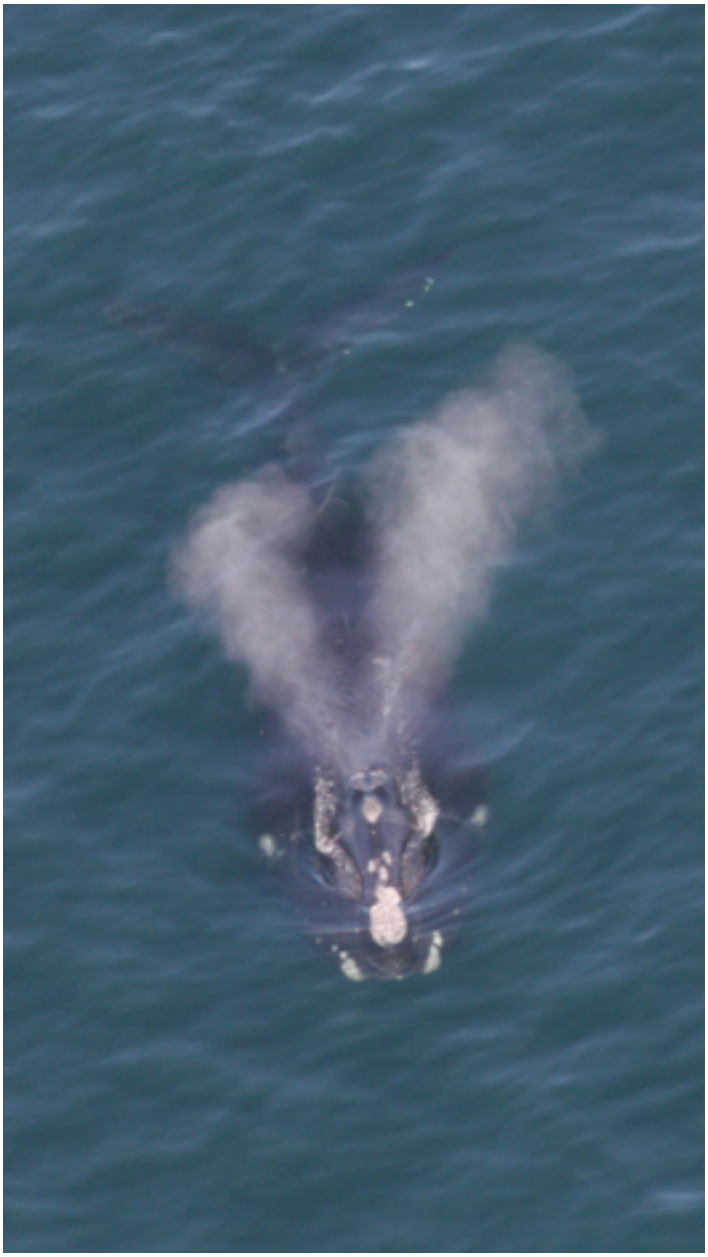
North Atlantic Right Whale Key Conservation Efforts/Challenges



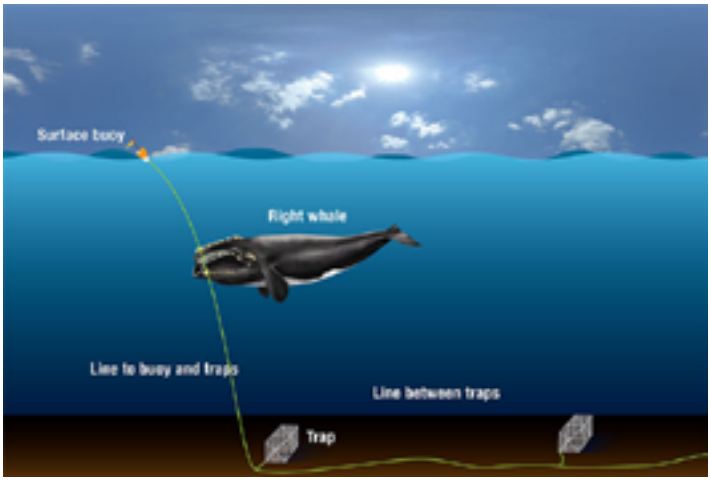
When right whales exhale out of their blowholes, their spouts are shaped like a "V." Image collected under MMPA Research permit number 17355. Photo Credit: NOAA/NEFSC/Christin Khan.

As noted above, the primary threats for right whales are entanglement with fishing gear and vessel collision (NMFS, 2005). Other known or potential threats include habitat degradation, noise, climate and ecosystem change, offshore energy development (e.g., wind) and aquaculture (NMFS, 2005, 2017; Borggaard et al., 2020). We have taken several steps in U.S. waters to reduce the threat of vessel collisions, including implementing measures under the ESA. In addition, we have implemented management measures under the MMPA to reduce whale entanglements in commercial fishing gear in consultation with the Atlantic Large Whale Take Reduction Team—a group of stakeholders consisting of fishermen, scientists, conservationists, and state and federal officials. Our efforts to reduce impacts from various threats also include working with federal action agencies through Section 7 of the ESA and coordinating bilaterally with Canada. Fisheries and Oceans Canada (DFO) and Transport Canada have taken several steps since the 2017 UME declaration to reduce the threat of entanglements in commercial fishing gear and vessel collisions. NOAA Fisheries has been collaborating with Canada on the science and management gaps impeding recovery of right whales in both Canadian and U.S. waters. In response to these challenges, we developed an expanded coastwide U.S. Right Whale Recovery Plan Implementation Team (RWIT; composed of two region-specific implementation teams, one of which includes Canadian members) to advise NOAA Fisheries and assist with implementation of the Recovery Plan. The Recovery Plan's strategy relies on close collaboration with state, federal, international, and private entities to ensure that research and recovery efforts are coordinated.

Key Actions Needed 2021-2025

The key actions that follow represent a small number of targeted high-priority actions that NOAA Fisheries, partners, and the public can take in the next 5 years to promote recovery of right whales. These actions represent short-term (5 years or less) achievable goals that support the long-term elements in the Recovery Plan. There are two geographic implementation teams for right whales—the Northeast U.S. Implementation Team (NEIT) and Southeast U.S. Implementation Team (SEIT). Together, they form the RWIT, which provided input on the key actions identified in this plan. The partners identified below have indicated their interest in helping stabilize the species. This list does not include all potential partners, and we welcome collaboration with others not identified in this plan. Through these strong partnerships, we can continue to develop effective actions to aid in the challenge of right whale recovery.

Protect North Atlantic Right Whales from Entanglement in Fishing Gear



Vertical lines, such as those shown here attached to traps, as well as other gear, like gillnets, can entangle whales. Credit: WHOI Graphic Services, Woods Hole Oceanographic Institution.

Description and Background: NOAA Fisheries implements both regulatory and non-regulatory measures to reduce the threat of entanglement to North Atlantic right whales, including:

- Closed areas: Since 2007, and expanded in 2014 and 2015, a number of areas with predictable aggregations of right whales have been seasonally closed to fixed gear commercial fisheries. Cumulatively, over 6,300 square miles are closed to trap/pot fishing for 3-month closures each year, and over 28,000 square miles are closed to gillnetting for 3 to 6 months, depending on the location.
- Endline reduction: Regulations were implemented in 2014 to reduce the number of vertical lines fished by trap/pot fisheries.
- Sinking groundline: In 2007, floating line on the bottom of the ocean (between trap/pots and between gillnet/gillnet bridle and anchor) was replaced by sinking line in a broad-based manner, removing thousands of miles of entangling line from the water column.
- Weak links: Since 1997, expanded in 2007, weak links have been required in fixed gear fisheries to increase the likelihood that right whales can break free of buoy endlines (called "endlines" hereafter) and gillnet panels.
- Gear marking: Endline marking has been required since 2000 on most fixed gear to improve our understanding of where and how right whales become entangled.

NOAA Fisheries will continue ongoing efforts such as these and assess them so they may be further optimized. This includes continued work with partners to collaborate with the fishing industry to modify gear and consider additional measures necessary to reduce the effects of commercial fisheries on right whales. Commercial fishermen are actively developing and testing gear modifications and new technology, often in partnership with NOAA Fisheries, to reduce the number of endlines fished in trap/pot fisheries or to modify the gear to reduce mortality and serious injury in fixed gear endlines. NOAA's Office of Law Enforcement and our partners (e.g., U.S. Coast Guard, states) will continue to keep fishermen up to date on regulatory requirements and monitor industry compliance.

We will continue to work with the Atlantic Large Whale Take Reduction Team (Team) and partners to develop additional management measures to further reduce mortality and serious injury of right whales due to entanglement in fishing gear. In 2019, the Team met to develop recommended changes to the Atlantic Large Whale Take Reduction Plan (Plan) that would reduce the effects of fixed gear fisheries on North Atlantic right whales. They reached a near consensus on a framework of measures that is expected to achieve a 60 percent

reduction in the risk of serious injury and mortality in lobster and Jonah crab trap/pot fisheries in the Gulf of Maine and southern New England. NOAA Fisheries is working to modify the Plan based on the Team's near-consensus recommendations and a compilation of individual proposals received from New England states and representatives of the offshore lobster fishery. We also anticipate the continuation of annual Team meetings, which will include discussion of additional modifications to the Plan in fisheries and areas outside the current rulemaking effort.

NOAA Fisheries also continues to work to reduce the impacts from federal fisheries through consultations under Section 7 of the ESA. For example, we will soon issue a biological opinion on federal fisheries managed by the Greater Atlantic Regional Fisheries Office (GARFO) under the Magnuson-Stevens Fishery Conservation and Management Act (e.g., Northeast multispecies) and the Atlantic Coastal Fisheries Cooperative Management Act (e.g., American lobster) for 10 fishery management plans. Through this consultation, we will work to ensure that incidental take of ESA-listed species is minimized to the maximum extent possible and that activities are not likely to jeopardize listed species or destroy or adversely modify their critical habitat.[1] We will also continue to monitor these fisheries.

NOAA Fisheries will continue to develop a "strategy to operationalize ropeless fishing"[2] that will identify a research plan to guide progress on ropeless fishing research and development. We are providing funding and working with fishermen, the Team, and our partners on practical technology that will be operationally feasible for commercial fisheries. Our efforts include an active ropeless testing program whereby the agency lends out ropeless fishing gear to fishermen and other researchers for testing and collects data on gear performance and feedback from fishermen. The goal of these efforts is to aid the swift development of reliable, robust ropeless gear systems that are field tested, functional, and fishermen approved. We will continue to implement activities to evaluate the effectiveness of U.S. management measures for reducing the number and severity of right whale entanglements (NMFS, 2018).

Expected Benefits to the Species: Entanglements are one of the primary causes of right whale documented mortality and serious injury, so reducing entanglements directly contributes to right whale recovery. It is important to monitor the effectiveness of fishing regulations and to take additional steps to reduce entanglements if regulations are not achieving the necessary results (NMFS, 2005, 2018). Continued collaboration with industry on gear research, as well as enforcement and education/outreach to ensure compliance with existing measures, are also important to reduce the risk from entanglement.

Source: This effort will contribute to the following recovery plan actions (NMFS, 2005), as well as those identified through a 2017 NMFS North Atlantic Right Whale 5-Year Review, 2018 Right Whale Scenario Planning Initiative, and U.S. regional implementation team prioritization. Actions with an asterisk (*) include top RWIT identified priorities.

Recovery Plan for the North Atlantic Right Whale

- Recovery Action 1.2.1: Develop and implement strategies to modify fishing operations and gear to reduce the likelihood of entanglement, mitigate the effects of entanglements, and enhance the possibility of disentanglement, and assess the effectiveness of such strategies.*
  - **NEIT and SEIT Priority[3] (combined):** Define existing fixed gear fishing locations with high degree of specificity, and improve information on gear configuration and fishing practices.*
  - **Right Whale Scenario Planning Report**
    - Reduce the amount of line in the water column via ropeless fishing (gear research, development, and testing), trap/pot limits, etc. Initiate management rulemaking for ropeless fishing in preparation for when gear is ready.*

1 NOAA Fisheries designated critical habitat for the North Atlantic right whale in 1994 (59 FR 28805) and revised the designation in 2016 (81 FR 4838). Critical habitat for the North Atlantic right whale includes two areas—a foraging area in the Northeast and a calving area in the Southeast.

2 Reference is only to buoy/endline/vertical lines for the United States. This includes a buoy line that is not persistent in the water column (e.g., buoyline-less). "Ropeless" fishing is a term for fishing without persistent buoy lines (though groundline is still used between traps on the seafloor). Fishermen can fish "ropeless" sets by grappling the groundline, or by remotely releasing a buoy or inflating a floatbag attached to rope that is stored on the bottom until retrieved.

3 NEIT and SEIT specified priorities were combined and then prioritized by the joint teams, and either include more specifics on a Recovery Plan action or identify a need not specifically identified in the Recovery Plan.

    - Engage with the mariner community to help solve problems, develop incentives, and gain buy-in for solutions.*
  - **SEIT Priority:** Investigate ropeless gear.*
- Recovery Action 1.2.21: Review and evaluate stranding and photo-identification data to monitor interactions with fishing gear and effectiveness of mitigation measures.
- Recovery Action 1.4.1: Continue and improve programs to ensure that fishing and shipping regulations are enforced.
- Recovery Action 3.3.17: Conduct ESA Section 7 consultations on federal activities with the potential to affect right whales.[4]
- Recovery Action 5.2: Enforce right whale protection laws.

NMFS North Atlantic Right Whale 5-Year Review

- NOAA Fisheries should conduct research to improve gear modifications and gear marking to inform management for the development of more finely scaled commercial fisheries regulations.[5]*

Location: Throughout range of North Atlantic right whales in U.S. waters (Maine through Florida)

Partners: Atlantic Large Whale Take Reduction Team, U.S. Coast Guard, Atlantic States Marine Fisheries Commission, states, regional fishery management councils, fishing industry, Fisheries and Oceans Canada, Ropeless Consortium, and Right Whale Consortium.

Current Status: Enforcement and outreach are ongoing. Rulemaking and gear research, continued discussions with Atlantic Large Whale Take Reduction Team, and gear information efforts are underway.

Resources:

Funding: NOAA Fisheries funding includes:

- We are funding various gear research efforts including ropeless fishing ($950,000 in FY 2020). In 2019, we provided a number of Bycatch Reduction Engineering Program awards to support innovative bycatch reduction research projects specific to right whales including: 1) Maine Department of Marine Resources assessment of the feasibility of Time Tension Line Cutter use in fixed gear fisheries to reduce entanglement risk for the endangered North Atlantic right whale ($198,018); 2) a Sea Mammal Education Learning Technology Society development and testing of innovative ropeless lobster fishing gear to reduce bycatch of North Atlantic right whales ($225,000); and 3) a New England Aquarium investigation into whale release ropes as a large whale bycatch mitigation option in the lobster fishery ($125,000). Maine Department of Marine Resources's 3-year project (through FY 2020), funded through our Species Recovery Grants to States Program (authorized under section 6 of the Endangered Species Act), will continue to assess vertical line use in the Gulf of Maine region fixed gear fisheries to improve the data used to protect endangered North Atlantic right whales ($722,442).
- In FY 2020, we announced that $1.6 million will be used to support recovery actions for North Atlantic right whales through the ASMFC to support reducing the risk of entanglement of right whales in fishing gear while assisting the lobster fishing industry in adapting to the impacts of new measures. Through November 2020, Maine and Massachusetts projects have been approved for funding. ASMFC will continue to work with the states of New Hampshire and Rhode Island to finalize their project plans.

Opportunities for Partners:

- We encourage sustained partnerships and seek additional partners to further gear research on risk reduction to large whales through various funding opportunities (e.g., Bycatch Reduction Engineering Program, ASMFC administered funds).
- We also encourage partners to be involved in the Plan rulemaking process by liaising with their Team member and/or providing comments when proposed Plan modifications are available for public comment.
- We encourage states to use their existing regulatory and outreach mechanisms to help minimize impacts from fisheries (e.g., Massachusetts Division of Marine Fisheries efforts).
- We encourage federal action agencies to fully use their mandates under the ESA and MMPA to help prevent entanglements of right whales.
- We encourage mariners, fishermen, and others to call the Enforcement Hotline at (800) 853-1964 to report federal marine resource violations, including entanglements.

4 Section 7 consultations will also involve monitoring the effects from these actions.

5 NEIT and SEIT noted that, in addition to conducting research, NOAA Fisheries should also support research conducted by other entities.

Protect North Atlantic Right Whales from Vessel Strikes

Right whales often spend time close to shore, overlapping with vessel traffic of all sizes, where they are at increased risk of being injured or killed by vessel collisions. Image taken under NOAA Research Permit 775-1600-10. Photo Credit: Florida Fish and Wildlife Commission.

Description and Background: NOAA Fisheries has taken both regulatory and non-regulatory steps to reduce the threat of vessel collisions with North Atlantic right whales, including the following:

- Vessel Speed Reductions: In 2008, we implemented mandatory speed restrictions of 10 knots or less for most vessels 65 feet or greater in overall length in Seasonal Management Areas along the U.S. East Coast at certain times of the year when whales are likely to be present. We also implement voluntary speed reductions in Dynamic Management Areas and right whale Slow Zones, based on near-real-time right whale detections.
- Separating Whales and Vessels: To reduce overlap between whale habitat and vessel traffic, we created recommended vessel routes, implemented recommended Areas To Be Avoided, and modified international shipping lanes.
- Right Whale Reports: In 1999, NOAA Fisheries developed right whale sighting alert systems and a Mandatory Vessel Reporting System in collaboration with USCG.
- Outreach: We increased outreach and education to recreational and commercial mariners.

We will continue ongoing efforts such as these and assess them so they may be further optimized. This includes continued education and outreach to mariners about regulations and additional measures they can take to reduce the risk of vessel strikes. Additionally, Massachusetts has implemented mandatory speed limits in Cape Cod Bay (state waters) for most vessels less than 65 feet in length during March and April. The NOAA Office of Law Enforcement and our partners (e.g., U.S. Coast Guard, states, National Marine Sanctuaries) monitor mariner compliance with regulations. Through these continued efforts, we will work toward increased compliance with regulations and cooperation with voluntary measures.

We will continue to implement activities to evaluate the effectiveness of U.S. management measures for reducing ship strikes of North Atlantic right whales (NMFS, 2018). We released an assessment of our vessel speed rule that evaluates the biological effectiveness, mariner compliance, outreach and enforcement efforts, navigational safety, and economic impacts of the rule (NMFS, 2020). This assessment also evaluated the voluntary Dynamic Management Area program and reviewed Automatic Identification System (AIS)-equipped small vessel (<65ft) speed profiles within Seasonal Management Areas. The report resulting from this assessment includes recommendations on next steps to further strengthen our overall vessel strike reduction strategy.

Minimizing the risk of vessel strikes (from both small and large vessels) is critical to improving right whale survival. In addition to working with the maritime community, we will continue to work with federal action agencies through the Section 7 consultation process to identify opportunities to minimize effects to right whales.

Expected Benefits to the Species: Vessel strikes are one of the primary causes of documented right whale mortality. It is important to monitor the effectiveness of vessel speed regulations and to take additional steps to reduce vessel strikes if the speed regulations are not achieving the necessary results (NMFS, 2005, 2018). Enforcement, education, and outreach are needed to increase compliance with mandatory speed restrictions and voluntary participation with dynamic speed zones. NOAA Fisheries will use our vessel speed rule review and coordination with partners to help inform future management efforts focused on reducing vessel strikes over the next 5 years. Continued federal interagency cooperation under Section 7 of the ESA provides opportunities to consider conservation measures related to vessel operations and to highlight the responsibility of federal action agencies to promote the recovery of right whales.

Source: This effort will contribute to the following recovery plan actions (NMFS, 2005), as well as those identified through a 2018 Right Whale Scenario Planning Initiative, which supported U.S. regional implementation team prioritization. Actions with an asterisk (*) include top RWIT identified priorities.

Recovery Plan for the North Atlantic Right Whale

- Recovery Action 1.1: Reduce vessel[6] collisions with right whales.*
  - **SEIT Priority[7]:** Assess the potential need for modified or additional [vessel strike] regulatory mechanisms. Compare recent mortality events with spatial gaps between management areas.*
  - **SEIT Priority:** Assess traffic patterns and evaluate compliance with existing regulations.*
- Recovery Action 1.1.16: Assess the effectiveness of vessel strike measures and adjust, as necessary.*
- Recovery Action 1.4.1: Continue and improve programs to ensure that fishing and shipping regulations are enforced.
- Recovery Action 3.3.17: Conduct ESA Section 7 consultations on federal activities with the potential to affect right whales.
- Recovery Action 5.2: Enforce right whale protection laws.

Right Whale Scenario Planning Report:

- Engage with the mariner community to help solve problems, develop incentives, and gain buy-in for solutions.*

Location: Throughout the range of North Atlantic right whales in U.S. waters (Maine through Florida)

Partners: Federal (e.g., U.S. Coast Guard, U.S. Army Corps of Engineers, U.S. Navy, National Marine Sanctuaries, Marine Mammal Commission, National Ocean Service, National Environmental Satellite Data and Information Service) and state agencies, Transport Canada, scientists and agencies contributing data to inform the report, states, Northeast Implementation Team, Southeast Implementation Team, Right Whale Consortium, maritime associations, harbor pilot associations, and other commercial and recreational mariners.

Current Status: Enforcement and outreach are ongoing. Vessel speed review is underway and will help inform the above efforts.

Resources:

Funding: NOAA Fisheries funding includes:

- NOAA Fisheries contributed $200,000 in FY2018-2019 to a study detailing the economic impacts of the speed rule to inform our vessel speed rule report.
- We recently started work on a study targeted at understanding the human dimension of vessel cooperation and compliance with voluntary and mandatory vessel speed restrictions to inform targeted and effective outreach to these mariner communities ($74,500 in FY 2020).
- We also continue to dedicate funding to a right whale vessel strike analysis ($165,000 in FY 2020-2021) to better understand the effectiveness of current vessel strike reduction measures and evaluate options for additional measures.

Opportunities for Partners:

- We encourage existing partnerships and seek additional partners to educate all mariners on the regulations and programs protecting right whales, including continued vessel outreach to commercial operators of vessels >65ft, as well as operators of large pleasure vessels (yachts/power boats >65ft) and smaller (<65ft) vessels.
- We encourage states to use their existing recreational vessel regulatory and outreach mechanisms to help minimize impacts from small (<65ft) vessels (e.g., Massachusetts Division of Marine Fisheries efforts) and raise awareness about the risk of small vessel collisions to right whales.
- We also seek partners to solicit ideas for enhancing/improving our vessel strike mitigation efforts.
- We encourage federal action agencies to fully utilize Section 7 (e.g., Section 7(a)(1) and 7(a)(2)) of the ESA to help prevent vessel strikes of right whales.
- We encourage mariners to call the NOAA Fisheries Enforcement Hotline at (800) 853-1964 to report federal marine resource violations, including vessel strikes.

6 The term "ship" was often used in the Recovery Plan, but it is replaced with "vessel" here and elsewhere to reflect the fact that vessels of various sizes are capable of injuring and killing right whales.

7 SEIT specified priorities were selected by the joint teams, and either include more specifics on a Recovery Plan action or identify a need not specifically identified in the Recovery Plan.

Investigate North Atlantic Right Whale Population Abundance, Status, Distribution, and Health

Researchers gathering documentation of right whales through photo-identification and biopsy sampling. Image taken under MMPA research permit #775-1875. Photo Credit: NOAA Fisheries/Keith Hernandez.

Description and Background: In order to monitor the population, we need to understand right whale habitat, abundance, distribution, and health. Long-term research is critical to establishing a baseline to track population status and threats over time (RWIT, 2019). This action plan describes the key monitoring and research activities that need to be maintained and expanded over the short-term in order to reach long-term goals of understanding how the population is responding to threats. This includes maintaining critical data collection (e.g., mortality/morbidity investigations for every right whale, collection, and maintenance of photo-ID data, update photo-ID catalog yearly) and a common assessment model (e.g., Pace et al., 2017; Population Evaluation Tool Subgroup; RWIT, 2019). We rely on partners to support monitoring frameworks for understanding status as well as informing recovery and protection efforts.

NOAA Fisheries will continue to prioritize and fund a combination of acoustic, aerial, and vessel surveys for right whales. Such efforts are critical given the considerable change in right whale habitat use patterns in areas where most of the population had been observed in previous years (Hayes et al., 2019). We will evaluate the recommendations from the North Atlantic Right Whale Monitoring and Surveillance workshop (Oleson et al., 2020) and develop a comprehensive strategy to inform right whale conservation efforts and maximize our efficiency and ability to leverage resources to answer outstanding questions related to population and health status, as well as to distribution and habitat use. This information will help develop a long-term, cross-regional plan for monitoring right whale populations trends and habitat use (NMFS, 2017), in collaboration with partners (e.g., regional implementation teams).

NOAA Fisheries is prioritizing the development of a population viability analysis (PVA) to determine North Atlantic right whale extinction risk, as recommended in the 5-Year Review (NMFS, 2017), which will help guide recovery efforts. The PVA will allow inquiry into what changes in present-day mortality and reproduction schedules are needed to improve population trajectories. This analysis is underway through the RWIT's North Atlantic Right Whale Population Evaluation Tool (PET) Subgroup and will help identify benchmarks for population status as well as any gaps in research.

We will use the results of the North Atlantic Right Whale Health Assessment workshop hosted by the Working Group on Marine Mammal Unusual Mortality Events (Fauquier et al. 2020) to help recovery efforts related to right whale health. Workshop participants assessed current health information data, including associated data gaps, and identified appropriate available and needed tools and techniques for collecting standardized health data that can be used to understand health effects of environmental and human impacts (e.g. entanglement), and inform fecundity and survivorship models to ultimately guide right whale recovery.

Determining and monitoring the sources of human-caused mortality is critical to inform management. As noted in Hayes et al. (2019), a key uncertainty in detections is the fraction of the actual human-caused mortality represented by the detected serious injuries and mortalities. The methods of Pace et al. (2017) can be extended to produce estimates of annual mortality, and these estimates exceed or equal the number of detected serious injuries and mortalities (Hayes et al., 2019). NOAA Fisheries worked with partners to develop estimates of this cryptic mortality (i.e., unobserved deaths; Pace et al., 2021) and we are investigating the impacts with our partners of sub-lethal human interactions on right whale population dynamics. NOAA Fisheries and the Working Group on Marine Mammal Unusual Mortality Events are also working closely with an international team of U.S. and Canadian experts to investigate the current ongoing UME that began in 2017, which involves both dead and seriously injured whales in U.S. or Canadian territorial waters and is primarily attributed to vessel strikes or entanglements.

Expected Benefits to the Species: Continuing to support multiple research and monitoring projects will help monitor population status (e.g., population modeling, RWIT's Population Evaluation Tool (PET Subgroup)) and impacts to the population (e.g., health, mortality/morbidity investigations) to inform our right whale recovery and conservation efforts. Additionally, the final reports from recent efforts (monitoring and surveillance, health) will provide additional information to build frameworks to support recovery in collaboration with partners. Understanding impacts, including sub-lethal impacts, to right whales are important to continue to monitor through ongoing research and can inform management responses.

In order to monitor the population, we need to understand right whale habitat, abundance, distribution, and health.

Source: This effort will contribute to the following recovery plan actions (NMFS, 2005), as well as those identified through 2017 Atlantic Large Whale Take Reduction Plan Whale Research Needs, 2017 NMFS North Atlantic Right Whale 5-Year Review, 2018 Right Whale Scenario Planning Initiative, 2019 Health Assessment Workshop, UME Investigation team, and U.S. regional implementation team prioritization. Actions with an asterisk (*) include top RWIT identified priorities.

Recovery Plan for the North Atlantic Right Whale

- Recovery Action 3.4: Conduct studies to improve knowledge of the diet, food requirements, feeding habits, and food resources of right whales.
- Recovery Action 4.3: Assess population size, survival rate, and trends on a regular basis.
- Recovery Action 4.4.7: As often as possible and where feasible, photo-identification photographs should be obtained at each sighting.
- Recovery Action 4.4.12: Continue to maintain a database of right whale sightings.
- Recovery Action 4.5: Maintain a photo-identification database.
- Recovery Action 4.6: Respond to strandings.
- Recovery Action 4.6.4: To the extent possible, use necropsies to determine the cause of death and use such data to reduce the susceptibility to death from these causes.
- Recovery Action 4.6.5: Analyze tissue collected from stranded right whales to determine and monitor contaminant levels.
- Recovery Action 4.7.1: Conduct radio and satellite tagging studies to increase knowledge of right whale habitat use, distribution, and habits.

NOAA Fisheries North Atlantic Right Whale 5-Year Review

- NOAA Fisheries should develop a long-term, cross-regional plan for monitoring right whale population trends and habitat use.*
- NOAA Fisheries should continue to prioritize and fund a combination of acoustic, aerial, and shipboard surveys for right whale surveillance.

Right Whale Scenario Planning Report

- Conduct modeling studies (present conditions and projected into future) focused on spatial and temporal movement of right whales and copepods (e.g., current and future whale habitat use and distribution) and climate.*

Right Whale Health Assessment Workshop Report

- Continue to support the photo-identification catalog that provides the ability to track health at the individual level.
- Continue to support the development of the PET Subgroup model and support development of a population-level state-space model with integrated health metrics.
- Continue and expand collection of health assessment data (e.g., biopsy, photos, photogrammetric length and width measurements, blow, feces) and continue longitudinal studies.
- Necropsy response efforts should be continued and enhanced, including continued support for training of large whale necropsy techniques.

NEIT and SEIT Priorities (combined)

- Design research strategies related to distribution/habitat, especially related to identifying where reproductive females are. Consider prey modeling studies.*
- Identify emerging risks (e.g., noise profiles, recreational boat traffic patterns).*
- NOAA Fisheries should continue to fund right whale mortality investigations.*

UME Investigation

- NOAA Fisheries and Canadian officials and partners should respond to and thoroughly investigate all stranded or seriously injured whales to determine the cause of death or injury to the extent possible.
- Ensure the stranding and entanglement response networks have the necessary tools and resources to retrieve and examine carcasses or assist live animals in distress. Ensure that financial support from the UME Contingency Fund or other sources are available.
- Provide timely and accurate information and updates to agencies involved.

Location: Throughout the North Atlantic right whale range in U.S. waters (Maine through Florida)

Partners: Atlantic Large Whale Take Reduction Team, federal agencies (e.g., U.S. Coast Guard, Marine Mammal Commission, U.S. Navy, U.S. Army Corps of Engineers, National Ocean Service, Environmental Protection Agency, National Institute of Standards and Technology, Bureau of Ocean Energy Management (BOEM)), Atlantic States Marine Fisheries Commission, states, regional fishery management councils, Fisheries and Oceans Canada, contractors, stranding and entanglement response network partners, right whale researchers, Right Whale Consortium, Northeast Implementation Team, Southeast Implementation Team, and the Working Group on Marine Mammal Unusual Mortality Events.

Current Status: Numerous efforts are underway.

Resources:

Funding: NOAA Fisheries funding includes:

- We will continue to develop and expand the coastwide Decision Support Tool ($200,000 in FY 2020). The Decision Support Tool (which currently includes only Northeast U.S. trap/pot gear) evaluates relative risk reduction as the result of potential management scenarios. Early efforts include expansion of the Decision Support Tool to include other threats including gillnets, aquaculture gear, and vessel strikes.
- We have a cooperative agreement with Duke University ($245,000 in FY 2020) to enhance understanding of the distribution and density of right whales throughout the range.
- We continue to fund some costs associated with right whale mortality investigations through the UME Contingency Fund and other funds while the Right Whale UME is still open ($48,727 in FY 2020). Outside of these events, the FY 2020 John H. Prescott Marine Mammal Rescue Assistance Grant Program (also known as Prescott Grant Program) is administered by NOAA Fisheries to facilitate the collection and dissemination of reference data on stranded marine mammals and health trends of marine mammal populations in the wild. In FY 2020, awards totalling $3.7 million were made nationwide to eligible members of the National Marine Mammal Stranding Network. Some of these projects support Stranding Network members in their investigations of right whale strandings and health trends. One specific award of $98,974 went to the International Fund for Animal Welfare to support the revision of a database that stores information on right whale mortalities and strandings. All FY 2020 funded awards can be found on this website.
- NOAA Fisheries has allocated funds for aircraft ($717,571 in FY 2020), vessel ($42,138 in FY 2020) and acoustic ($544,413 in FY 2020) monitoring. We also fund the State of Massachusetts and Center for Coastal Studies ($600,000 in FY 2020) to support Cape Cod Bay right whale habitat monitoring, Cape Cod Bay springtime right whale aerial surveys, and large whale disentanglement. We support the New England Aquarium ($645,652 in FY 2020) to maintain a catalog of individual right whales, their identifying features, and database of the resightings of those individuals. We fund the states of Florida and Georgia ($717,188 in FY 2020) to monitor right whale calf production, obtain genetics samples from right whale calves and other unsampled individual right whales, and support right whale disentanglement efforts. Additionally, Florida maintains GIS capabilities to analyze aerial survey, whale habitat, and vessel traffic data, and acquires automatic identification system data to monitor vessel traffic in the Southeast.
- We have also funded telemetry studies ($194,098 in FY 2020) to help develop technologies to safely track right whale movements.

Opportunities for Partners:

- We encourage partnerships (e.g., New England Aquarium, Right Whale Consortium, U.S. Navy, BOEM) and seek additional partners to further research through various funding opportunities as available (e.g., Prescott Grant Program) to assist with continued and expanded population monitoring efforts.

- We seek to collaborate with partners to obtain information on the distribution of mortality based on the cryptic mortality work noted above.
- We also seek partners to continue to investigate sublethal impacts from entanglement, vessels, and other sources (e.g., acoustic) to help inform management.
- We encourage the public to report any dead, injured, or stranded whales (https://www.fisheries.noaa.gov/report). We also encourage the public to report all right whale sightings from Virginia to Maine at (866) 755-6622, and from Florida to North Carolina at 877-WHALE-HELP (877) 942-5343. Right whale sightings in any location may also be reported to the U.S. Coast Guard via channel 16 or through the WhaleAlert app.
- While NOAA Fisheries currently supports the development of safe right whale telemetry technologies, we encourage technology that will enable us to track right whales in a dynamically changing environment, identify new habitats, and provide baseline information for developing management plans.

Collaborate with Canada on North Atlantic Right Whale Recovery

Description and Background: Because right whales are transboundary, recovery efforts require complementary conservation measures in both U.S. and Canadian waters (NMFS, 2017). NOAA Fisheries and Canada engage in long-term efforts to collaborate on transboundary conservation measures (NMFS, 2017). Our leadership (Assistant Administrator for Fisheries, Deputy Assistant Administrator for Regulatory Programs, and Regional Administrator for the Greater Atlantic Regional Fisheries Office) have had discussions with leadership from DFO and Transport Canada on conservation and management efforts for right whales since 2019, and plan to continue these discussions. We also coordinate and cooperate with DFO and Transport Canada through the Canada and United States Bilateral Working Group on North Atlantic Right Whales. This includes discussing lessons learned on fishing and vessel regulations, planning joint scientific activities (e.g., aerial surveys), and coordinating collaboration across all right whale efforts (e.g., UMEs, NEIT, etc.). Staff-level discussions also occur with Transport Canada on their efforts to protect right whales from collisions with vessels in the Gulf of St. Lawrence and their ongoing research into vessel strike risk factors that continue to inform our efforts.

We have received support from Canada on various U.S.-led initiatives and vice-versa. For example, DFO and Transport Canada participate in yearly meetings of the NEIT, and DFO participates in the PET Subgroup meetings. At the invitation of DFO, several NOAA Fisheries staff attended the Gear Innovation Summit in Halifax, Nova Scotia, February 11-12, 2020, to discuss ropeless fishing gear and reducing ghost gear. Also at the invitation of DFO, we attended the North Atlantic Right Whale Metrics Workshop in Dartmouth, Nova Scotia, March 11-12, 2020, to discuss identifying metrics of sound measurement and analysis most relevant to right whales. DFO participates as a member of the North Atlantic Right Whale UME Core Team and is invited to Atlantic Large Whale Take Reduction Plan meetings. We will continue to foster the numerous ongoing initiatives that will enable continued collaborations with DFO and Transport Canada on both management and science.

Expected Benefits to the Species: Bilateral discussions at both the leadership and staff levels will continue to align right whale science and management programs throughout the whales' range. For example, bilateral meetings are important for detailed discussions regarding optimal strategies for addressing vessel and entanglement threats. It is important that both countries coordinate and learn from each other to better inform management approaches and focus on the most effective and viable long-term strategies.

Source: This effort will contribute to the following recovery plan actions (actions with an asterisk (*) include top RWIT identified priorities).

Recovery Plan for the North Atlantic Right Whale (NMFS, 2005)

- Recovery Action 5.5: Promote bilateral cooperative efforts with Canada to maximize protection for right whales.*
- Recovery Action 5.5.1: Convene regular meeting with Canadian officials to facilitate bilateral cooperation on protective measures.
- Recovery Action 5.5.2: Promote actions to enhance protection for areas of importance, especially vessel and fishery interaction issues in Canadian waters.

Location: Throughout range of North Atlantic right whales in U.S. and Canadian waters

Partners: Fisheries and Oceans Canada, U.S. Department of State, Transport Canada, U.S. Coast Guard, Right Whale Consortium, Northeast Implementation Team, and Population Evaluation Tool Subgroup.

Current Status: Coordination with DFO and Transport Canada on right whale management and research is ongoing.

Resources:

Funding: NOAA Fisheries funding includes:

- We will continue to provide the necessary support to participate fully in various bilateral meetings. We will also continue to provide support for NEIT and PET Subgroup meetings.
- We continued to support aerial surveys in Canada in 2020 (portion of funds noted in "Investigate North Atlantic Right Whale Population Abundance, Status, Distribution, and Health") to obtain photo-identification of right whales.

Opportunities for Partners:

- We encourage partners to continue to support management and science initiatives in both countries to further transboundary management and science efforts.

Improve our Knowledge of Additional Factors Limiting Right Whale Recovery

Right whale "Aphrodite" (#1701) and her calf "Eros" (#3701) in the Great South Channel off the New England coast. "Aphrodite" is seen side feeding, but right whales are more commonly seen skim feeding upright at or just below the surface. Image collected under MMPA research permit # 775-1600. Photo credit: NOAA/NEFSC/Peter Duley

Description and Background: As noted in our 5-year review (NMFS, 2017), right whales face a number of complex factors limiting their recovery, due to their near constant interaction with human activities along the coast, which is further complicated by climate change. We recently conducted a scenario planning exercise to help prioritize right whale management and science needs in the short term in light of changing ocean conditions and impacts from anthropogenic activities. Climate, wind energy, aquaculture, and noise are among the short-term priorities identified in that process and are expanded upon here.

In order to recover right whales, we need to continue to work with existing partners as well as establish new partnerships to understand how these new and emerging marine activities may impact right whales.

- ***Climate:*** The NOAA Fisheries Climate Science Strategy was developed to understand, prepare for, and respond to climate change impacts on living marine resources with regional action plans (Link et al., 2015). For example, the Northeast Regional Action Plan (Hare et al., 2016) notes that climate change may impact the productivity of some marine mammals (e.g., decreases in zooplankton prey abundance may reduce productivity of North Atlantic right whales (Meyer-Gutbrod et al., 2015)). Continued climate studies related to right whales are important, including investigations into impacts on prey location/availability and subsequent changes in right whale distribution (Hare et al., 2016; NMFS, 2017). We will continue to work with partners to further understand climate impacts on right whales.
- ***Wind energy:*** Wind energy development is anticipated to rapidly expand along the U.S. East Coast in the coming years. Through the end of 2020, BOEM has issued 15 leases for offshore wind development in areas ranging from Massachusetts to North Carolina. If developed, these projects will introduce both temporary and long-term impacts including increased underwater noise, habitat disturbance, and vessel traffic (e.g., associated with day-to-day operations). In addition, these projects have the potential to create localized impacts to oceanographic processes that may affect the distribution of prey, which are currently not well understood. We will continue to work with BOEM, states, and developers to ensure a robust and comprehensive analysis of the effects of offshore wind development on right whales and to develop effective measures to avoid and minimize effects of construction, operations, and eventual decommissioning.

- ***Aquaculture:*** NOAA Fisheries co-chairs the Interagency Subcommittee on Aquaculture, and also plays a role in developing and implementing policies that enable marine aquaculture and works to ensure that industry complies with federal laws and regulations such as the ESA. Under Section 7, the federal action agency consults with NOAA Fisheries on the permitting of aquaculture sites to determine whether a project is likely to jeopardize the continued existence of an ESA-listed species or adversely modify or destroy critical habitat. As the aquaculture industry continues to develop within areas that include right whale habitat, further research will be needed to assess the risks posed by aquaculture structures and to develop entanglement-safe options. We will continue to work with partners as lines associated with aquaculture operations could pose an entanglement risk to right whales (e.g., NMFS, 2015).
- ***Noise:*** Increased levels of ocean noise from human activities is recognized as a chronic, habitat-level stressor for many marine organisms. NOAA's Ocean Noise Strategy (NOAA, 2016) notes impacts of chronic stress effects can adversely impact individuals and highlights a study (Rolland et al., 2012) indicating evidence of a reduction of stress hormone levels associated with reduced exposure of right whales to noise from large commercial vessels. This strategy was developed to guide the agency toward more effective and comprehensive understanding of ocean noise impacts on marine life in the years 2016-2026. For right whales, this includes better understanding the role that noise plays as one of many cumulative stressors in the environment. Given information needs on the impacts of noise on right whales (e.g., see wind farms above), we will continue to work with partners to further knowledge and reduce impacts from this stressor.

Expected Benefits to the Species: Improving our knowledge of these potential limiting factors in collaboration with other agencies and partners is important to help understand factors affecting right whales and to ensure the successful co-existence between right whales and humans. This includes understanding how marine activities that include vessel activity (e.g., wind energy) or put lines in the water (e.g., aquaculture) impact right whales. Long-term ocean noise monitoring is also important to understand chronic anthropogenic noise impacts on right whales throughout their range. Additionally, increased information on climate change is important to help ascertain impacts to right whale distribution and life history.

In order to recover right whales, we need to continue to work with existing partners as well as establish new partnerships to understand how these new and emerging marine activities may impact right whales.

Source: This effort will contribute to the following recovery plan actions (NMFS, 2005), as well as those identified through a 2018 Right Whale Scenario Planning Initiative and U.S. regional implementation team prioritization. Actions with an asterisk (*) include top RWIT identified priorities.

Recovery Plan for the North Atlantic Right Whale

- Recovery Action: 3.3.5: Take steps to minimize identified adverse effects to right whales from anthropogenic noise.
- Recovery Action 3.3.3: Consultations under ESA Section 7 (anthropogenic noise).
- Recovery Action 3.3.9: Conduct studies to assess possible adverse effects of oil, gas, hard mineral exploration, and other industrial activities.
- Recovery Action 3.3.10: Minimize identified adverse effects from oil, gas, and hard mineral exploration and development.
- Recovery Action 3.3.17: Conduct ESA Section 7 consultations for federal activities with the potential to affect right whales.

Right Whale Scenario Planning Report:

- Engage with the mariner community to: help solve problems, develop incentives, and gain buy-in for solutions.*
- Collect long-term monitoring data on plankton.*
- Conduct modeling studies (present conditions and projected into future) focused on spatial and temporal movement of right whales and copepods (e.g., current and future whale habitat use and distribution); and climate.*

Right Whale Scenario Planning Report Priorities and SEIT Priority (combined):

- Reduce human impacts to habitat and right whales from renewable ocean energy industries and aquaculture.*

Location: Throughout range of North Atlantic right whales in U.S. waters (Maine through Florida)

Partners: Federal agencies (e.g., Environmental Protection Agency, Food and Drug Administration, U.S. Army Corps of Engineers, U.S. Department of Agriculture, NOAA (Sea Grant, Oceanic and Atmospheric Research, National Ocean Service), National Centers for Environmental Information, Bureau of Ocean Energy Management, U.S. Navy, U.S. Coast Guard, Marine Mammal Commission), Right Whale Consortium, Northeast Implementation Team, Southeast Implementation Team, industry, and researchers.

Current Status: Numerous efforts underway to work with federal partners and researchers to gather further information on additional potential limiting factors (e.g., other than commercial fishery entanglements). This includes our collaboration with researchers and industry (e.g., BOEM, wind energy developers, aquaculture industry). Collaboration with climate, zooplankton, oceanography, and acoustic specialists to inform right whale recovery is ongoing.

Resources:

Funding: NOAA Fisheries funding includes:

- NOAA Fisheries provided funding to ASMFC in FY 2020 to issue approximately $575,000 in grants to foster responsible aquaculture and seafood security in the United States. This included a pilot project grant to University of Massachusetts-Boston to create a low-cost automated sensor to ensure integrity of seaweed aquaculture operations by indicating undue stress that would occur during system failure or a large animal entanglement.
- NOAA has various funding sources related to aquaculture and some of these have provided funds in the past to support right whale entanglement research (e.g., NOAA Small Business Innovation Research).
- NOAA Fisheries has collaborated with many partners to support various climate initiatives related to right whales (e.g., $20,000 for investigating potential climate-induced prey changes for right whales in southern New England during 2020).
- We also completed an Interagency Agreement with the U.S. Geological Survey, a member of the PET Subgroup, for a wind energy expert elicitation ($30,358 in FY 2020) to help assess this potential limiting factor. This assessment will contribute to a right whale PVA underway through our RWIT efforts.
- Ocean noise studies are underway and include efforts under "Investigate North Atlantic Right Whale Population Abundance, Status, Distribution, and Health" priority.
- See "Investigate North Atlantic Right Whale Population Abundance, Status, Distribution, and Health" priority for funding information on habitat distribution models to help assess risk.

Opportunities for Partners:

- We encourage sustained partnerships and seek additional partners to further research through various funding opportunities, as available (e.g., NOAA Small Business Innovation Research solicitation specific to aquaculture when available, Bycatch Reduction Engineering Program, ASMFC Marine Aquaculture Pilot Projects, NOAA Climate Program Office Funding Opportunities). Effective implementation of this action will require cooperation of numerous partners to help understand and manage other limiting factors to right whales.

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