The SAVE Right Whales Act (H. R. 1568)

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Introduction

North Atlantic Right Whales

The critically endangered North Atlantic right whale population is decreasing at drastic rates. Whaling initially decimated the population until protections were established for the species by the International Convention for the Regulation of Whaling in 1949 (Mullen et al., 2013). Named for being the "right" whale to hunt because they float once dead, North Atlantic right whales continue to be threatened by human impacts (NOAA Fisheries). The situation today is dire: ten North Atlantic right whales have died in 2019 thus far (NOAA Fisheries). Overall, there have been thirty whale deaths since 2017--representing an unusual mortality event (NOAA Fisheries). According to current estimates, merely 400 whales remain living today (NOAA Fisheries).

Despite protection from whaling, mortality continues today due to anthropogenic activities. The fishing and shipping industries are primarily to blame; ship strikes and fishing-gear entanglements are the two primary human-driven causes of North Atlantic right whale deaths (NOAA Fisheries). North Atlantic right whales typically feed in both Northeastern coastal waters and close to the continental shelf (NOAA Fisheries). In the fall, females migrate South to calve in the warmer waters bordering South Carolina, Georgia, and Florida (NOAA Fisheries).

Mortality has increased due to shifting migration and habitat zones in response to prey movement. The chief driver of the North Atlantic right whales' migration pattern is zooplankton (*Calanus finmarchicus*), the species' main food source. The North Atlantic right whale is heavily reliant on large volumes of zooplankton, consuming up to 5,000 pounds of zooplankton every day during feeding season (World Wildlife Fund). As temperatures rise in the Atlantic Ocean due to climate change, zooplankton populations are shifting further northward to maritime waters in Canada (Gutbrod and Greene, 2017). North Atlantic right whales are following them into unprotected and unregulated waters, resulting in further incidences of ship strikes and fishing-gear entanglements (Gutbrod and Greene, 2017).

Existing Legislation and Protections

Due to very low population numbers and high mortality and low fecundity rates, North Atlantic right whales have been designated as critically endangered--requiring immediate action on our behalf for the species to survive. The Marine Mammal Protection Act (MMPA) protects all marine mammals, including the North Atlantic right whale. The MMPA criminalizes the killing of marine mammals and created a federal framework to combat unusual mortality events (The Marine Mammal Center). The North Atlantic right whale has been listed as an endangered species since 1970 under the Endangered Species Act (ESA). The ESA mandates that the National Oceanic and Atmospheric Administration (NOAA) create and implement recovery plans for listed species. Under the ESA, agencies determine if a "Critical Habitat" designation is needed to further protect the species. In 1994, NOAA established two "Critical Habitat" designations for the North Atlantic

right whale for their feeding area in the Northeast and calving area in the Southeast (NOAA Fisheries). In 2008, NOAA established Seasonal Management Areas (SMA) for North Atlantic right whales to reduce the likelihood of deaths in areas with high human activities. There are currently seven SMAs along the East Coast. For the purpose of decreasing human-caused whale deaths, these SMAs enforce additional maritime regulations such as speed restrictions, mandatory reporting on whale sightings, concentrated shipping pathways, and area closures (NOAA Fisheries).

The North Atlantic right whale population experienced an increase in numbers after protections were established against whaling. In fact, from 2000 to 2010, the population grew by approximately 50%, peaking at nearly 500 whales ("North Atlantic Right Whale Population 1990-2017"). From this point forward, however, the North Atlantic right whale population began to steadily fall as a result of human activities until reaching current numbers of around 400. Though initially effective, the previously established "Critical Habitat" designations and SMAs do not account for the more recent northward shift of right whales in response to the movement of their prey, zooplankton (Gutbrod and Greene, 2017). Warming waters as a result of climate change are to blame for this northward migration (Gutbrod and Greene, 2017). Further policy is necessary to protect the whales from human activity as they continue to follow their prey into cooler, unprotected waters.

SAVE Right Whales Act

The Scientific Assistance for Very Endangered North Atlantic Right Whales Act of 2019 (SAVE Right Whales Act) aims to assist in the recovery of the species by offering financial support to entities and programs focused on right whale conservation (H.R. 1568, 2019). The Act will also require the surveying of the zooplankton population's abundance and distribution in North Atlantic waters, encouraging cooperation between the United States and Canadian governments in pursuing this goal (H.R. 1568, 2019). The act was introduced by U.S. Congressman Seth Moulton in the U.S. House of Representatives on March 6, 2019. On September 10, 2019, an identical Senate companion bill was introduced as 'S.2453', by Senator Cory Booker, a Democrat from New Jersey.

The bill utilizes three policy mechanisms to achieve its goals: establishing a *Sense of Congress*, creating a grant program, and mandating a U.S.-Canadian plankton survey. A Sense of Congress places fact or opinion-based statements into the federal registrar to immortalize something as a view of Congress. H.R.1568's Sense of Congress acknowledges the importance and history of the North Atlantic right whale and states that the federal government must try to reduce whale mortality. H.R.1568 provides $5 million in grant funding annually for 10 years through a grant program managed by the Department of Commerce intended for projects that assist conservation and population growth of the North Atlantic right whale. This bill is not regulatory legislation,

meaning it will not change any laws or rules that govern current maritime, state, or local practices. Instead, the primary purpose is to provide financial support for conservation projects.

Requirements of the Act

Funding

The Secretary of Commerce will allocate $5 million annually through 2029 for grant projects with a 5 percent limit placed on funding for the use in administrative expenses. Eligible grantees include state and tribal agencies, researchers, nonprofits, and industry companies. Grantees must show promise for improving the viability of the North Atlantic right whale, match 25 percent of the federal grant funds, and complete periodic progress and financial reports. While the bill specifies reporting and compliance requirements, it fails to include specific project guidelines, granting the Department of Commerce discretion on the type of projects it will fund.

Reports

Two years after the bill's enactment, the Secretary of Commerce must submit a report to Congress providing updates on the effectiveness of the grant program. This report will include recommendations for the improvement of the program and will evaluate whether current efforts should continue moving forward.

Plankton Survey

Within 180 days of the enactment of the SAVE Right Whales Act, Canada and the U.S. will begin concomitant plankton surveys. The survey will be conducted by the Northeast Fisheries Science Center within NOAA (115th Congress, H.R.1568). The goal of this survey is to inform the conservation efforts of the North Atlantic right whale by understanding the distribution and density of zooplankton populations. It aims to develop a transboundary understanding of the plankton distribution in coordination with the government of Canada. An annual budget of $300,000 is allocated for the plankton survey for ten years.

Current Status

H.R.1568 has 47 cosponsors, including 42 Democratic and 5 Republican members. These members are mainly comprised of coastal states or pro-animal conservation legislation Democrats (116th Congress, H.R.1568). This cosponsor breakdown exhibits that the bill does fall along party lines, however, this bill is not considered politically controversial as our research has not found public congressional political opposition. The Senate bill was introduced with two original cosponsors: Senator Tom Carper, a Democrat from Delaware, and Johnny Isakson, a Republican from Georgia. In an interview with Senator Booker's legislative aide Lauren Tavar, the office disclosed they waited until they found a Republican partner to co-introduce the bill, to make the bill less partisan (Tavar, 2019).

The lack of congressional opposition may be because the bill is unlikely to be passed into law. H.R.1568 is one of 129 bills related to animal and habitat protection that has been introduced in the 116th Congress (Govtrack, "Wildlife conservation and habitat protection"). The bill's limited scope to one species along the East Coast diminishes countrywide impact. Nonetheless, the bill's presence in both the House and Senate increase the odds of passage as it has multiple avenues for passage and invested parties in both chambers.

Stakeholders

There are several environmental groups in support of increased North Atlantic right whale conservation. National advocacy organizations outspoken on the need for right whale conservation and legislation include Defenders of Wildlife, World Wildlife Fund, and National Resources Defense Council. Allies also include local research groups focused more specifically on whale conservation such as the Woods Hole Oceanographic Institution's Ropless Consortium, North Atlantic Right Whale Consortium, and Whale and Dolphin Conservation.

Our research did not find public opposition to H.R.1568. However, politicians or groups ideologically opposed to federal funding for animal conservation may not support the bill. There is speculation about how the fishing and shipping industries would react to further restrictions and whether voluntary slow speeds and no-fishing zones could be successfully encouraged. However, there is no clear industry stance. Fishers publicly support the conservation of the North Atlantic right whale (Moore, 2019). Despite this, there have been incidences of fisherman opposing increased regulation over fear of economic losses (DeAmbrose, 2019). Senator Booker's office disclosed that fishers in Maine are advocating against the legislation out of fear that future regulation will cover waters off the coast of Maine, which are not currently protected (Tavar, 2019).

There is little time left for the North Atlantic right whale species to recover, and extinction is permanent. The Act's solutions would take years to implement and require political will. Nonetheless, imposing new regulations and implementing innovative technology through the SAVE Right Whale Act is critical in preventing the North Atlantic right whale from going extinct. The below portion of this report addresses the primary methods for implementing the bill, outlines potential challenges and solutions, and defines metrics for monitoring and evaluating success.

Program Design

National Oceanic and Atmospheric Administration

NOAA Fisheries has managed North Atlantic right whale conservation projects for more than 20 years (NOAA Fisheries). NOAA has substantial resources (several regional offices, research centers, and staffed specialists and scientists throughout the country) that make it uniquely

equipped to carry out the SAVE Act requirements effectively and expediently. Given the short timeframe and relatively small budget of the SAVE Act, the disadvantages of a multiple federal agency structure including greater bureaucratic complexity, longer implementation times, and risk of competing agendas make a NOAA-led program most attractive.

NOAA Fisheries currently manages and implement a similar program, the John H Prescott Marine Mammal Rescue Assistance Grant. Given the Prescott Grant offers the same amount in annual grants towards similar conservation efforts, the program's organizational structure and performance measurement metrics are used to model the SAVE Right Whales program after.

The Acquisitions and Grants Office (AGO) at NOAA will process the annual $5 million grant program. The AGO processes $1 billion in funding annually, including similar marine research and rescue programs. Therefore, the SAVE Right Whales Act grant program of $5 million comprises just a small fraction of their overall portfolio. The total estimated budget of the SAVE Act—including contracts, personal, and administrative expenses—is $5.415 million per year, which is consistent with the estimate of $5.3 million provided by the Congressional Budget Office (CPR Survey). Of that amount, 93 percent is allocated towards contracts, including grant funding and hiring a consultant.

Organizational Structure and Budget

NOAA Fisheries is split into regional offices across the country with a total of over 4,200 employees. The SAVE Right Whales program will be based in the 166 staffed Greater Atlantic Regional Office located in Massachusetts at the center of the North Atlantic Right Whale's migration and habitat region.

Implementation of the grant program will be supervised by the Marine Mammal and Sea Turtle Group Lead at NOAA Fisheries who will provide general oversight and manage performance. NOAA has an existing NARW coordinator, who will manage the grant program and conduct research and provide consultation on NARW policies. The NARW coordinator should have experience with Canadian officials, the public, and the lobster industry. More niche support can be provided by the whale monitoring coordinator and one of the staff marine biologists. A dozen staff will assist in the program to focus on entanglement, ship strikes, fishing lane closures, grants, and outreach.

The NARW grant program would fall under the jurisdiction of the National Marine Fisheries Grant Management Division. $5 million per year of grants under the NARW Act will be handled by the National Marine Fisheries Grant Management Division which manages oceanic, marine mammal, and marine fishery grant programs. 8 full-time employees and 2 contractors make up the division's staff that manages $475 million in grants annually. No extra staff is required given the small scale of the SAVE Right Whales program. As a conservative estimate, the budget includes 30 percent of an analyst-level staff member's time, equivalent to $30,000 (Office of Personnel Management).

The program accounts for the existing infrastructure in place and aims to leverage staff and expertise across the organization. $10,000 is allocated for General & Administrative expenses, including office space, utilities, supplies, and administrative needs. $5,000 is factored in for communications and outreach expenses, including printed materials, conference attendance, and website maintenance. The Act details that no more than $80,000 may be spent on administrative expenses each year, which is above our estimated expenditure.

In addition to existing staff, we recommend hiring an analyst-level consultant to assist the full time staff with additional responsibilities in monitoring, reporting, and stakeholder engagement. The consultant will work on a finite set of tasks focused on compiling progress reports and drafting annual reports to Congress. A consultant offers more flexibility than hiring a full-time staff member and offers the option to reduce the hours on an as-needed basis as the program matures.

Grant Program

The grant program efforts for the first year of the SAVE Right Whales Act will focus on funding for the emergency response efforts, research to find solutions for ship strikes and entanglements, research North Atlantic right whale biology and life history, and plankton survey.

Potential grantees will have approximately 70 working days to apply. Should the program be announced in early December, the application period will close in mid-March and NOAA will make final award decisions during mid-April. This timeline applies to the first year when a longer application period is preferred to ensure as many potential applicants can learn about the program and the different funding categories, as later discussed. Following years may require shorter application periods and longer review periods when consideration of annual reports is also necessary.

For the past twenty years, the John H Prescott Marine Mammal Rescue Assistance Grant has successfully provided $4 million annually for marine mammal rescue and rehabilitation proposals. The Prescott Grant serves as an excellent program model to follow, considering it awards a similar size of grants annually. In addition, the program is also measured by NOAA Fisheries, so borrowing pertinent parameters, performance reviews, and other facets of the Prescott Grant would ease any logistical issues with program creation. Working with staff within the same office as the original grant program will also aide in this by allowing us to follow the same protocol, organizational structures, and management practices that NOAA Fisheries has found successful with the Prescott Grant Program. Therefore, we will use metrics and performance reviews already found to work in NOAAs Fisheries office to measure the value of the grant program’s contractees.

First-Year Focus

The SAVE Act will allow for up to $5 million in annual grant funding towards research and conservation efforts and $300,000 in annual funding for surveying the zooplankton population's abundance and distribution in the North Atlantic. Of the $5 million in grant funding, $4 million will be allocated to grants and $1 million will be set aside for emergencies that occur outside of the regular funding cycle and require immediate assistance and resources.

The $4 million in grant funding will specifically focus on whale rescue and response ($2 million), entanglement prevention ($1 million), and North Atlantic right whale research ($1 million). The remaining $1 million in grant funding will be allocated towards an emergency response fund. The fund is specifically allocated for challenges that arise outside of the grant funding

The plankton survey will be conducted through a continuous plankton recorder (CPR Survey). This device is used to gather ocean samples and survey for zooplankton populations. It is a technology that is used around the world, including by NOAA, to survey large areas of ocean (CPR Survey). Research will be shared in a reciprocal arrangement with the Canadian government.

Performance Measurements

Awardees are required to submit quarterly reports to contribute to accurate analyses of the program's performance and the status of the North Atlantic Right Whales. As stated in the bill, an annual report on the level of success of the program will be submitted to Congress. NOAA should use the annual report to determine if changes to the program should be made. A successful outcome will be achieved should population of North Atlantic right whales become stable, meaning the total population does not decrease following the implementation of the program. A population increase would indicate a very successful outcome, though this would likely not take place for several years due to the biology of the species (Frasier).

Even if the North Atlantic right whale population continues to decrease, the program would not be a waste of resources so long as the knowledge gained contributes to the overall goals of science and conservation. New knowledge can be applied to future rescue and recovery interventions for other endangered whales' species. Zooplankton research could greatly benefit other species who consume and track copepods for conservation purposes and migration predictions. The program would be a failure if the population decreases and no contributions to science result from our efforts. This is predicted to be highly unlikely given the program's emphasis on research.

NOAA administrators will measure the success of the program based on North Atlantic right whale population numbers and figures, including the birth and mortality rates of the species. Funding increased resources towards research should increase NARW observation abilities and tracking accuracy. The North Atlantic right whale's rapidly declining mortality rate has disproportionately affected female right whales that are particularly susceptible to ship strikes and entanglement-caused deaths due to their long migration routes along shallow waters through shipping and fishing

zones. Thus, the number of remaining females is an especially important performance measurement of success and should be underscored in analyses and reports.

Plankton Survey

The primary food source of the North Atlantic right whale is *Calanus Finmarchichus,* a species of zooplankton. The whales consume between 2,500-5,000 pounds of zooplankton per day during feeding season (Defenders of Wildlife). Since the North Atlantic right whales rely on zooplankton for their survival, the abundance of zooplankton has a direct impact on the migration patterns and birth rate of the North Atlantic right whale (Record). Due to warming waters, Zooplankton have been observed migrating northward to Canada (Record). By tracking high density areas of zooplankton, the North Atlantic right whales have thus expanded their feeding grounds North to unprotected waters leaving whales vulnerable to human threats (Record). The potential scarcity of zooplankton as a result of climate change will likely cause the North Atlantic right whale birth rate to decrease further as females will not have adequate nutrients to sustain a pregnancy and migrate south for calving season (NOAA Fisheries).

The bill accounts for $300,000 per year to be spent towards the plankton survey of the North Atlantic. The survey will be conducted through using a continuous plankton recorder (CPR Survey). This device is used to gather ocean samples and survey for zooplankton populations. It is a technology that is used around the world, including by NOAA, to survey large areas of ocean (CPR Survey). Research will be shared in a reciprocal arrangement with Fisheries and Oceans Canada. NOAA Fisheries already continuously records and monitors zooplankton numbers and will now collaborate with Fisheries and Oceans Canada to track abundance. Tracking the zooplankton can help predict the feeding zones of the NARW and ensure regulations and protections are implemented in response. Reports from the U.S. and Canada are produced early fall and mid-spring to highlight analysis of peak high and low ocean temperatures during summer and winter, respectively. Tracking zooplankton abundance during summer months is critically important in understanding how the zooplankton are shifting due to the climate-change induced increase in the ocean's temperature and how North Atlantic right whales are moving in response. Understanding the relationship between reproduction performance and zooplankton abundance during the colder months is also very important.

Conclusion

The SAVE Right Whales Act establishes a Sense of Congress, an annual $5 million grant program, and a $300,000 bilateral Canadian plankton survey in efforts to conserve the North Atlantic right whale population. The program design proposed in this report considers the dire circumstances of

the very endangered North Atlantic right whale. At only 400 remaining individuals, increasing death rates, and a limited ten-year program, focus must be primarily directed to reducing population decline followed by researching biology and behavior. The $5 million in grant funding is allocated as follows: $2 million in NARW rescue and response, $1 million in entanglement prevention, and $1 million in emergency responses. The remaining $1 million is dedicated to research. The program will be successful as long as knowledge of NARW and whale conservation in general is gained, which is likely with the dedicated funding towards research. The other metric of success is a stabilization of NARW population, and a very successful outcome would be an increase in population. The entire ten-year program will cost $54 million, which includes the plankton survey, grant program, consultant, and other than personnel non-contract expenses. NOAA's Acquisition and Grants Office will manage the grant program while NOAA Fisheries will be responsible for its implementation. NOAA Fisheries will also be in communication with Fisheries and Oceans Canada to monitor and analyze continuous zooplankton abundance and density to better respond to present NARW migration and feeding zones with protective measures.

To have any chance of saving the North Atlantic right whales, we must act now. This program enhances the efforts of a myriad of groups working to save the NARW. The research obtained through this program will be useful for other conservation concerns beyond the NARW. Through widespread collaboration and accumulation of new knowledge, the SAVE Right Whales Act tackles the impacts of climate change in relation to marine life. To prevent population numbers from dwindling further, the program emphasizes rescue efforts in hopes that the NARW population can rebuild again as it did after the whaling ban. This program offers the best chance of saving the North Atlantic right whale from possible extinction within our lifetimes.

Exhibit 1: Programmatic Budget for the SAVE Right Whales Act

Programmatic Budget for the SAVE Right Whales Act	
Whale rescue and response	**$2,000,000**
Entanglement prevention	**$1,000,000**
Emergency response fund	**$1,000,000**
NARW research	**$1,000,000**
Reporting	**$70,000**
Administration	**$15,000**
U.S. data collection	**$300,000**
TOTAL	
Total	**$5,415,000**

Exhibit 2: Line Item Budget for the SAVE Right Whales Act

Line Item Budget for the SAVE Right Whales Act	
Personal Services	
Budget and Grants Analyst I (Title 6) - 30%	**$30,000**
Sub-Total:	***$30,000***
OTPS - Non-Contracts	
General & Administrative	**$10,000**
Communications & Outreach	**$5,000**
Sub-Total:	***$15,000***
OTPS - Contracts	
Consultant (1 FTE)	**$70,000**
Plankton Survey	**$300,000**
Grants	**$5,000,000**
Sub-Total:	***$5,370,000***

TOTAL	
Total	**$5,415,000**

WORKS CITED

"About Us: Northeast Fisheries Science Center." *NOAA Fisheries,* https://www.fisheries.noaa.gov/about/northeast-fisheries-science-center

"Acquisition & Grants." *National Oceanic Atmospheric Administration,* https://www.noaa.gov/organization/acquisition-grants

"Acquisition and Grants Office." *National Oceanic Atmospheric Administration,* https://www.performance.noaa.gov/wp-content/uploads/Business-Operations-Manual-Section-3.10-0202018.pdf.

Agnew, David J., et al. "Estimating the Worldwide Extent of Illegal Fishing." Plos One, vol. 4, no. 2, doi:https://doi.org/10.1371/journal.pone.0004570.

"Average Government Consultant Salary." *PayScale,* 2 October 2019, https://www.payscale.com/research/US/Job=Government_Consultant/Salary.

"Basic Facts About Right Whales." *Defenders of Wildlife*, 10 Jan. 2019, defenders.org/north-atlantic-right-whale/basic-facts.

Bland, Alastair. "To Save the Whales, Crab Fishers Are Testing Ropeless Gear." Hakai Magazine, June 24, 2019. https://www.hakaimagazine.com/news/to-save-the-whales-crab-fishers-are-testing-ropeless-gear.

Butman, Cheryl Ann, et al. "Whaling Effects on Deep-Sea Biodiversity." *Conservation Biology*, vol. 9, no. 2, 1995, pp. 462–464., doi:10.1046/j.1523-1739.1995.9020462.x.

Conn, P. B., and G. K. Silber. "Vessel Speed Restrictions Reduce Risk of Collision-Related Mortality for North Atlantic Right Whales." *Ecosphere*, vol. 4, no. 4, 2013, doi:10.1890/es13-00004.1.

Endangered Species Act of 1973. Pub. L. 16-35. Stat 1531. *US Code House.gov.* 5 September 2019. https://uscode.house.gov/view.xhtml?req=(title:16%20section:1531%20edition:prelim)

Fisheries and Oceans Canada, Communications Branch. "Fisheries and Oceans Canada." *Government of Canada, Fisheries and Oceans Canada, Communications Branch*, 6 Sept. 2019, http://www.dfo-mpo.gc.ca/index-eng.htm.

Financial Assistance. NOAA, https://www.noaa.gov/organization/acquisition-grants/financial-assistance.

Frasier, T. R., et al. “Patterns of Male Reproductive Success in a Highly Promiscuous Whale Species: The Endangered North Atlantic Right Whale.” Molecular Ecology, vol. 16, no. 24, pp. 5277–5293., 2007, doi:10.1111/j.1365-294x.2007.03570.x.

Fujiwara, Masami, and Hal Caswell. “Demography of the Endangered North Atlantic Right Whale.” Nature, vol. 414, no. 6863, 2001, pp. 537–541., doi:10.1038/35107054.

“FY2018 Financial Assistance.” NOAA, https://www.noaa.gov/organization/acquisition-grants/news/fy2018-financial-assistance.

“GRANTS.GOV.” *Grants.gov,* https://www.grants.gov/web/grants/home.html.

“Greater Atlantic Regional Fisheries Office.” *NOAA*, https://www.fisheries.noaa.gov/about/greater-atlantic-regional-fisheries-office.

“Greater Atlantic Regional Fisheries Office Staff Directory.” *NOAA*, https://www.fisheries.noaa.gov/staff-directory/greater-atlantic-regional-fisheries-office-staff-directory.

Hoop, Julie M. van der, et al. “Vessel Strikes to Large Whales Before and After the 2008 Ship Strike Rule.” Conservation Letters, vol. 8, no. 1, 2015, pp. 24–32. Wiley Online Library, doi:10.1111/conl.12105.

“H.R.1568 - 116th Congress (2019-2020): SAVE Right Whales Act.” *Congress.gov*, 116th Congress, 1 October 2019, www.congress.gov/bill/116th-congress/house-bill/1568/text.

Hammerschlag, Neil, et al. “Ecosystem Function and Services of Aquatic Predators in the Anthropocene.” *Trends in Ecology & Evolution*, vol. 34, no. 4, 2019, pp. 369–383., doi:10.1016/j.tree.2019.01.005

Johnson, Amanda, et al. “Fishing Gear Involved In Entanglements Of Right And Humpback Whales.” Marine Mammal Science, vol. 21, no. 4, 2005, pp. 635–645., doi:10.1111/j.17487692.2005.tb01256.x.

Keller, Cherie A., et al. “North Atlantic Right Whale Distribution In Relation To Sea-Surface Temperature In The Southeastern United States Calving Grounds.” *Marine Mammal Science*, vol. 22, no. 2, 2006, pp. 426–445., doi:10.1111/j.1748-7692.2006.00033.x.

Kraus, Scott, et al. “North Atlantic Right Whales in Crisis.” Ecology, vol. 309, no. 5734, 22 July 2005, pp. 561–562., doi:10.1126/science.1111200.

Laist, David W., et al. “Collisions Between Ships And Whales.” *Marine Mammal Science*, vol. 17, no. 1, 2001, pp. 35–75., doi:10.1111/j.1748-7692.2001.tb00980.x.

Marine Mammal Protection Act of 1972. Pub. L. 16-1361. *US Code House.gov.* 5 September 2019. https://uscode.house.gov/view.xhtml?req=(title:16%20section:1361%20edition:prelim)

Mayo, Charles A., and Marilyn K. Marx. "Surface Foraging Behaviour of the North Atlantic Right Whale, Eubalaena Glacialis, and Associated Zooplankton Characteristics." *Canadian Journal of Zoology*, vol. 68, no. 10, 1990, pp. 2214–2220., doi:10.1139/z90-308.

Meyer-Gutbrod, Erin L., and Charles H. Greene. "Uncertain Recovery of the North Atlantic Right Whale in a Changing Ocean." Global Change Biology, vol. 24, no. 1, 2017, pp. 455–464., doi:10.1111/gcb.13929.

Moulton, Seth. *Text - H.R.1568 - 116th Congress (2019-2020): SAVE Right Whales Act*. 1 May 2019, https://www.congress.gov/bill/116th-congress/house-bill/1568/text.

Mullen, Kaitlyn A., et al. "Has designating and protecting critical habitat had an impact on endangered North Atlantic right whale ship strike mortality?" *Marine Policy*, Vol. 42, Nov. 2013, Pgs. 293-304, https://doi.org/10.1016/j.marpol.2013.03.021.

Myers, Hannah J., et al. "Ropeless fishing to prevent large whale entanglements: Ropeless Consortium report." *Marine Policy*, Vol. 107, Sept. 2019, https://doi.org/10.1016/j.marpol.2019.103587.

NOAA. "National Oceanic and Atmospheric Administration Acquisition and Grants Office Directory." 3 June 2019, https://www.ago.noaa.gov/docs/ago_staff_directory_by_division.pdf

NOAA. "2017-2019 North Atlantic Right Whale Unusual Mortality Event." NOAA, 26 Nov. 2019, https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2019-north-atlantic-right-whale-unusual-mortality-event.

NOAA. "Arlene Simpson Porter." NOAA Acquisition and Grants Office, NOAA, 23 July 2012, https://www.ago.noaa.gov/bios/arlene_simpson.html.

NOAA. *Budget Estimates: Fiscal Year 2020.* Washington D.C. https://www.corporateservices.noaa.gov/nbo/fy20_bluebook/NOAA-FY20-Congressional-Justification.pdf

NOAA. "North Atlantic Right Whale." *NOAA Fisheries*, National Oceanic and Atmospheric Administration, www.fisheries.noaa.gov/species/north-atlantic-right-whale.

NOAA. "Office of Protected Resources." *NOAA*, https://www.fisheries.noaa.gov/about/office-protected-resources.

"NOAA Acquisition and Grants Office Directory." *NOAA*, https://www.ago.noaa.gov/docs/ago_staff_directory_by_division.pdf.

"North Atlantic Right Whale Population 1990-2017." *Anderson Cabot Center For Ocean Life*, https://www.andersoncabotcenterforoceanlife.org/blog/2018-right-whale-report-card/.

"North Atlantic Right Whale." *WWF*, http://wwf.panda.org/knowledge_hub/endangered_species/cetaceans/about/right_whales/north_atlantic_right_whale/.

"OPM Salary Table." *Office of Personnel Management*, 2 October 2019, https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/pdf/2019/GS.pdf.

Record, Nicholas R., et al. “Rapid Climate-Driven Circulation Changes Threaten Conservation of Endangered North Atlantic Right Whales.” Oceanography, vol. 32, no. 2, pp. 162-169, 2019, doi: https://doi.org/10.5670/oceanog.2019.201.

Reese, Robert. H.R. 1568, *SAVE Right Whales Act*. Congressional Budget Office (CBO), 13 May 2019, 10 October 2019, https://www.cbo.gov/system/files/2019-05/hr1568.pdf.

Rogers, John G. “Taking of Marine Mammals Incidental to Commercial Fishing Operations; Atlantic Large Whale Take Reduction Plan Regulations.” Federal Register, vol. 62, no. 140, July 1997, https://www.govinfo.gov/content/pkg/FR-1997-07-22/pdf/97-18997.pdf.

Roland, Rosalind, et al. “Evidence That Ship Noise Increases Stress in Right Whales.” Proceedings of The Royal Society, vol. 279, 8 Feb. 2012, pp. 2363–2368., doi:10.1098/rspb.2011.2429.

Roman, Joe, et al. “Endangered Right Whales Enhance Primary Productivity in the Bay of Fundy.” *PLOS ONE*, vol. 11, no. 6, June 2016, p. e0156553. *PLoS Journals*, doi:10.1371/journal.pone.0156553

Schreiber, Laurie. “Inking Groundline Sunk At NMFS Meeting?” *Fishermen's Voice Monthly Newspaper*, http://www.fishermensvoice.com/archives/sinkinggroundlinesunk.html.

Senator Cory Booker. *Booker, Carper, Nelson Introduce Bicameral Bill to Establish Grant Program for Right Whale Conservation.* 8 June 2018. Washington D.C. https://www.booker.senate.gov/?p=press_release&id=804

Soldevilla M.S., Rice A.N., Clark C.W., Garrison L.P. “Passive acoustic monitoring on the North Atlantic right whale calving grounds.” *Endangered Species Research,* Vol. 25:115-140. https://doi.org/10.3354/esr00603.

“The Continuous Plankton Recorder.” *The Continuous Plankton Recorder | CPR Survey*, https://www.cprsurvey.org/services/the-continuous-plankton-recorder/.

“Transport Canada.” Transport Canada, 28 Aug. 2019, https://www.tc.gc.ca/en/transport-canada.html.