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Action plan for the North Atlantic Right Whale (*Eubalaena glacialis*) in Canada: Fishery Interactions

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Fishery Interactions

North Atlantic Right Whale



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For copies of the recovery strategy, or for additional information on species at risk, including COSEWIC Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the [Species at Risk Public Registry](#).

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Preface

Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA) the federal competent Ministers are responsible for the preparation of action plans for species listed as Extirpated, Endangered, and Threatened for which recovery has been deemed feasible and are required to report on progress within five years. The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996) agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada.

Under SARA, an action plan provides the detailed recovery planning that supports the strategic direction set out

in the recovery strategy for the species. The plan outlines what needs to be done to achieve the population and distribution objectives identified in the recovery strategy, including the measures to be taken to address the threats and monitor the recovery of the species, as well as the measures to protect critical habitat. Additionally, the socio-economic costs of the action plan are evaluated as are the benefits to be derived from its implementation. Additional project-specific action plans may be created for a species that address other areas of recovery implementation. The action plan is considered one in a series of documents that are linked and should be taken into consideration together. Those being the COSEWIC status report, the recovery strategy, and the action plan.

The Minister of Fisheries and Oceans is the competent minister for the recovery of the North Atlantic Right Whale and has prepared this action plan to implement the recovery strategy, as per section 49 of SARA. It has been prepared in cooperation with the Provinces of New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland and Labrador, and Aboriginal organizations located in those provinces.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions and actions set out in this action plan and will not be achieved by Fisheries and Oceans Canada, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this action plan for the benefit of the North Atlantic Right Whale and Canadian society as a whole.

Implementation of this action plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

Acknowledgements

Fisheries and Oceans Canada (DFO) is grateful to those who have participated in the development of the action plan for the North Atlantic Right Whale, including members of the North Atlantic Right Whale Recovery Network. Active participants in the network are listed in Appendix C.

Executive summary

This Action plan for the North Atlantic Right Whale (*Eubalaena glacialis*) in Canada: Fishery Interactions ("action plan") supports the strategic direction set out in the recovery strategy for the species (Recovery Strategy for the North Atlantic Right Whale (*Eubalaena glacialis*) in Atlantic Canadian Waters, 2009) ("recovery strategy"). Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA) the Minister of Fisheries and Oceans is the competent minister for the recovery of the North Atlantic Right Whale and has prepared this action plan in cooperation with other federal departments, Provincial governments, Aboriginal organizations, and other interested partners.

The North Atlantic Right Whale (hereafter "Right Whale") is a large migratory whale whose known range extends from coastal waters of Florida to the Gulf of St. Lawrence. Historically, whaling reduced the population from its natural levels and while the population has shown some growth in recent years, the estimated number of individuals remains close to 500. The action plan is meant to contribute to the recovery goal for the Right Whale, as set out in the recovery strategy: "*To achieve an increasing trend in population abundance over three generations*". The Right Whale was assessed as endangered by COSEWIC in 1980, and it was last reassessed as endangered in 2003. The species was added to Schedule 1 of SARA when that legislation came into force.

The two most important threats to the population have been identified as vessel strikes and entanglement in fishing gear (Smedbol 2007). In 2009 the Minister of Fisheries and Oceans published the recovery strategy to address these and other threats. In 2003 and 2008 measures were put in place to remove large commercial vessel traffic from areas that have since been designated as Right Whale critical habitat. The issue of fishery interactions is more complex, and efforts will require a coordinated and sequenced approach over several years to fully address this threat to Right Whales in Canadian waters.

Critical habitat for the Right Whale is identified in Section 1.9 of the recovery strategy (DFO 2014). This section of the recovery strategy was revised in 2014 to update the identification of activities likely to destroy critical habitat, as required under SARA. The critical habitat identified in Grand Manan Basin and Roseway Basin is anticipated to be protected via a SARA section 58(4) Critical Habitat Order which engages the SARA section 58(1) prohibition against the destruction of critical habitat of listed endangered or threatened species in these areas.

This action plan places priority on addressing Objective 2 of the recovery strategy: *Reduce mortality and injury as a result of fishing gear interactions*, and presents two approaches to address this objective: prevention (reduce the probability of Right Whales interacting with fishing gear), and response (reduce the severity of entanglements by responding to reported incidents). Measures that address other recovery objectives are also included in the action plan as long as they support the objective of reducing fishery interactions (Objective 2).

Success in the recovery of the Right Whale depends on the commitment and cooperation of many different constituencies that will be involved in implementing the measures set out in this action plan. All Canadians are invited to join in supporting and implementing this action plan for the benefit of the Right Whale and Canadian society as a whole. These measures may be undertaken by Fisheries and Oceans Canada, other government agencies, the fishing industry, academia, Aboriginal people and non-government organizations. The action plan is designed to provide guidance to managers and partners seeking to identify and implement specific risk-reduction measures that are most effective for whales while ensuring the safety of fishers and supporting sustainable fisheries. This action plan builds upon many successful activities already underway (conducted by DFO or by other organizations), at the same time recognizing that other measures need to be initiated or enhanced. Given the extent of Right Whale distribution and the level of fishing activity in Atlantic Canada, it will be impossible to eliminate the risk of entanglements altogether. Nonetheless, recovery partners continue to collaborate to develop practical actions to reduce entanglement and entrapment risk. Right Whales are migratory animals that cross several international boundaries, most notably between Canada and the U.S. This action plan aims to address the entanglement and entrapment threat in Canadian waters, but is also intended to contribute to international research and conservation initiatives.

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1. Recovery Actions

1.1 Scope of the action plan

This first Chapter of the Right Whale action plan presents a series of measures necessary to reduce mortality and injury to Right Whales resulting from interactions with fishing gear in Atlantic Canada (Objective 2 of the recovery strategy).

Links to the recovery strategy

The North Atlantic Right Whale is listed as Endangered under Schedule 1 of the *Species at Risk Act* (SARA), with two important threats to the population identified: vessel strikes and entanglement in fishing gear (Smedbol 2007). In 2009 the Minister of Fisheries and Oceans published *The Recovery Strategy for the North Atlantic Right Whale (Eubalaena glacialis) in Atlantic Canadian Waters* (DFO 2014) (hereafter referred to as the “recovery strategy”). The recovery strategy describes the following seven recovery objectives for Right Whales:

Objective 1: *Reduce mortality and injury as a result of vessel strikes;*

Objective 2: *Reduce mortality and injury as a result of fishing gear interactions (entanglement and entrapment);*

Objective 3: *Reduce injury and disturbance as a result of vessel presence or exposure to contaminants and other forms of habitat degradation;*

Objective 4: *Monitor population and threats;*

Objective 5: *Increase understanding of life history characteristics, low reproductive rate, habitat and threats to recovery through research;*

Objective 6: *Support and promote collaboration for recovery between government agencies, academia, environmental non-government groups, Aboriginal people, coastal communities and international agencies and bodies; and*

Objective 7: *Develop and implement education and stewardship activities that promote Recovery.*

The measures in the action plan are designed to contribute to the recovery goal as set out in the recovery strategy for the Right Whale: *"To achieve an increasing trend in population abundance over three generations"* (DFO 2014). Reducing the threat of fishing gear interactions raises many challenges that can best be met through coordinated and collaborative efforts on the part of DFO and numerous partners and stakeholders including other government agencies, the fishing industry, Aboriginal groups, academia, and non-government organizations. Some of the activities described here are already underway while others have yet to be implemented.

Right Whales are migratory animals that cross several international boundaries, most notably between Canada and the U.S. This action plan aims to address the entanglement threat in Canadian waters, but is also intended to contribute to international research and conservation initiatives. Geographically, this action plan applies to all known distribution of the Right Whale in Atlantic Canadian waters, including the Bay of Fundy and Gulf of Maine, the Scotian Shelf, the Gulf of St. Lawrence, and waters off Newfoundland and Labrador.

In the context of SARA, a threat to a species at risk is any activity or process (both natural and anthropogenic) that has caused, is causing, or may cause harm, death, or behavioural changes to a species at risk or the destruction, degradation, and/or impairment of its habitat to the extent that recovery objectives are compromised. The term "threat" may refer to any activity or process that imposes a stress on a species at risk population, contributing to or perpetuating its decline, or limiting its recovery. A threat could be a human activity, a human-induced change in a natural process or species dynamic, or a natural process or disaster. Injury and mortality associated with entanglement in fishing gear has been identified as a threat to Right Whales in several documents, such as the recovery strategy (DFO 2014) and Recovery Potential Assessment (RPA) (Smedbol 2007).

This action plan promotes a precautionary approach to Right Whale entanglement, striving to improve knowledge that can be used to make decisions, while proposing practical and feasible means of reducing the identified risks. The action plan is designed to provide guidance to managers and partners seeking to identify and implement specific risk-reduction measures that are most effective for Right Whales while ensuring the safety of fishers and supporting sustainable fisheries.

This action plan is the first chapter of a comprehensive plan in accordance with the recovery strategy. The action plan focuses on Objective 2 of the recovery strategy because interaction with fishing gear has been identified as the highest priority for attention. It also identifies measures that correspond to Objectives 4, 5, 6 and 7 where they directly support the achievement of Objective 2. The preparation of this action plan does not preclude the future preparation of additional action plans for the Right Whale, as per Section 47 of SARA.

This document does not focus on Objective 1 (reducing vessel strikes), which addresses the other most important identified human-caused threat to Right Whales. In recent years, two major conservation actions have been undertaken to significantly reduce the risk of mortality and injury caused by vessel strikes. In 2003, the width and location of the shipping lanes of the Traffic Separation Scheme (TSS) in the Bay of Fundy were amended through a proposal to the International Maritime Organization (IMO). This reduced the overlap of vessel traffic with the highest concentration of Right Whales in the Grand Manan Basin, which has since been designated as

Right Whale critical habitat under SARA. In 2008, a recommended seasonal (June – December) 'Area to be Avoided' (ATBA), for ships of 300 gross tonnage and upwards, was sanctioned by the IMO and implemented by the Government of Canada in Roseway Basin. Since then, Right Whale critical habitat has been designated in Roseway Basin. While these measures do not eliminate all risk of lethal vessel collisions with Right Whales, they were shown to reduce risk of vessel strikes by 90% in the Bay of Fundy TSS and by 82% in the Roseway basin ATBA (Vanderlaan and Taggart 2009). Stewardship efforts have been undertaken by researchers at Dalhousie University and the Canadian Whale Institute to promote and monitor vessel compliance with these measures, supported by the Government of Canada including through the Habitat Stewardship Program.

While some activities are underway, much remains to be accomplished in support of Objective 2, reducing entanglements. According to the United States (U.S.) National Marine Fisheries Service (NMFS) data, 54 Right Whale entanglements were recorded in U.S. and Canadian waters from 1997-2008. Fishing gear or rope was retrieved from 27 of those entangled whales, and in 18 of those cases, the gear was identified to fishery type. Therefore, the fishery of origin is unknown in 67% of Right Whale entanglements over an 11-year period (NMFS 2008, Morin et al. 2010). In addition, NMFS has concluded that the low probability of detecting entanglement incidents, together with inadequate documentation, means that the level "of human impact to these stocks is assumed to be greater than that reported" (Glass et al. 2010). The lack of physical evidence in the form of retrieved gear directly linked to a specific fishery thus does not diminish the actual or potential risk the fishery poses for Right Whales. The issue of fishery interactions is complex, and efforts will require a coordinated and sequenced approach over several years to fully address this threat to Right Whales in Canadian waters. Some of the measures in the action plan are not prescriptive or highly specific because the different fisheries that present the highest risk to Right Whales operate under a wide variety of conditions, seasons and gear configurations. In many cases the solutions are not yet well known, and measures presented in this action plan will contribute to the development of more specific work plans and management actions. DFO and other partners will develop and implement specific measures at any time, as information becomes available.

In their analysis of relative risks posed to Right Whales by different fisheries, Vanderlaan et al. (2011) define 'threat' as the presence of fishing gear that could result in entanglements in areas that may be frequented by Right Whales. 'Risk' exists only when that threat is combined with the presence of Right Whales, i.e. when both the gear and whales are in the same place at the same time. For this reason, a level of relative risk can be assigned to relevant fisheries (i.e. those that employ lines) based on when and where they are undertaken, together with the known or predicted abundance of whales present during the same time period. Greater amounts of gear in the water, and/or a higher abundance of whales will result in higher risk in those areas.

The role of partners in Right Whale recovery

Meeting recovery objectives in Canadian waters is only possible through collaboration among many organizations and groups. To date, many of the accomplishments to understand and reduce fishery interaction risk have come about through collaborative efforts of NMFS in the U.S., DFO, environmental organizations in both Canada and the U.S., universities, fishing industry interests and research organizations such as the New England Aquarium. Many of these organizations are part of the North Atlantic Right Whale Consortium, an informal organization that brings together non-governmental and governmental organizations and individuals in the United States and Canada who work to study and conserve Right Whales. Consortium members work collaboratively on projects of many kinds, sharing data to optimize understanding and minimize duplication of effort.

In Canada, the North Atlantic Right Whale Recovery Network replaced the Recovery Team that developed the recovery strategy. This network includes researchers, fishery organizations, non-government organizations (NGO)s, and Aboriginal groups, and acts as an expert advisory body providing information and guidance to DFO. The recovery network is a working group that can outline needed studies and other recovery activities, and identify potential partners and experts to carry out those studies.

Given the extent of Right Whale distribution and the level of fishing activity in Atlantic Canada, it will be impossible to eliminate the risk of entanglements altogether; however, recovery partners continue to collaborate to develop practical actions to reduce entanglement risk to Right Whales.

1.2 Critical Habitat

Critical habitat is defined under section 2 of SARA as the “*habitat necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species*”. SARA further defines habitat for aquatic species at risk as:

“... spawning grounds and nursery, rearing, food supply, migration and any other areas on which aquatic species depend directly or indirectly in order to carry out their life processes, or areas where aquatic species formerly occurred and have the potential to be reintroduced.” [s. 2(1)]

Critical habitat for the Right Whale is identified in Section 1.9 of the recovery strategy (DFO 2014). The recovery strategy also contains detailed background information on the identification of this critical habitat. This section of the recovery strategy was revised in 2014 to reflect the identification of activities likely to destroy critical habitat, as required under SARA.

1.3 Proposed Measures to Protect Critical Habitat

The Right Whale critical habitat identified in Grand Manan Basin and Roseway Basin is anticipated to be protected via a SARA section 58(4) Critical Habitat Order which engages the SARA section 58(1) prohibition against the destruction of critical habitat of listed endangered or threatened species in these areas.

1.4 Recovery Measures

1.4.1 Rationale

Below is a description of the measures required to reduce, or support the reduction of, the frequency and severity of Right Whale entanglements in fishing gear in Atlantic Canadian waters. The measures described here are listed in the same order as the corresponding objectives in the recovery strategy, providing a natural link to the Right Whale's recovery needs. The numbers accompanying the descriptions below refer to the location of the relevant measure(s) within one or more Tables (See Section 1.4.2).

Long Description for Table

Recovery Objectives

Recovery Objective 2. Reduce mortality and injury as a result of fishing gear interactions (entanglement and entrapment)

Approach A: Prevention - Reduce the risk to Right Whales of interacting with fishing gear

1. Develop and implement mitigation measures to reduce risk (Tables 1, 2, 3)

This action plan does not prescribe specific types of mitigation measures (voluntary or regulatory) needed to reduce the risk of entanglements. Possible mitigation measures that could prevent Right Whale entanglement include temporal and/or spatial closures for fisheries, changes in gear configurations, reducing the amount of gear or line in the water, and others. The selection of specific future mitigation measures will rely upon the output of several other activities (e.g. the outcomes of Recovery Measures 2 and 3).

Such measures may be led and implemented by DFO, by industry, NGOs, other government departments, or any combination of partners. Because participation by many

collaborators is important to Right Whale recovery, discussions should be facilitated to coordinate activities and share lessons learned.

A fundamental part of reducing entanglement risk is an overall decrease of the amount of rope in the water in areas when Right Whales are present, but more specific measures can be designed and implemented by a variety of partners. Gear configurations vary within and among fisheries, and harvesters are well-placed to discuss the potential impacts of gear modification designed to reduce entanglement risk to Right Whales.

Whether mitigation measures are voluntary or regulatory, the potential impact on fisheries and the effectiveness for reducing entanglement risk to Right Whales should be evaluated using measurable standards. It will be important to build in methods to determine compliance levels with any measures.

An example of such a project is the development of a series of voluntary standard practices by fishery associations in Lobster Fishery Areas (LFAs) 33 and 34, in partnership with World Wildlife Fund Canada (WWF). (See Appendix B for a link to a map of lobster fishing areas.) The fishing associations devised a series of practices including reducing the amount of rope used when shifting traps inshore, avoiding setting or hauling around whales, and willingness to report to the Marine Animal Response Society (MARS) hotline and stand by when an entangled whale is sighted. The inshore lobster season in LFA 33 and LFA 34 runs from the end of November to the end of May, when Right Whales are rarely in those areas. This fishery presents a relatively low risk of entanglement to Right Whales, though that risk may be higher at the beginning and end of the season (see Measure 2). Nonetheless, this has been important work and presents a model of collaborative activities that should continue and should be adapted for other fisheries and other areas that present entanglement risk to Right Whales. These entanglement prevention strategies could be adapted for and adopted by other fisheries.

2. Conduct Spatial Analyses of Entanglement Risk Associated with Fishing Gear (Table 2)

Reliable information about the locations and types of fishing activities that may contribute to entanglement and entrapment of Right Whales is needed to improve our estimation of the risk of fishing gear interactions. A comprehensive region-wide analysis of risk in all areas used by Right Whales is needed to help guide the development of mitigation measures.

A recent study analyzed the potential spatial overlap between Right Whales and fishing activity at times when Right Whales are resident (Vandelaan et al. 2011). Researchers from DFO Science and Dalhousie University estimated the relative threat and risk of gear entanglement in the western Scotian Shelf, with a particular focus on Grand Manan Basin and Roseway Basin (the two critical habitat areas). However, since gaps remain in our understanding of the distribution of both Right Whales and fishing activity, additional spatial risk analyses are needed (see Recovery Measures 14 and 15).

The Vandelaan et al. (2011) analysis focused on seven gear types: groundfish gillnet, groundfish hook and line, pelagic hook and line, crab trap, hagfish trap, inshore lobster trap and offshore lobster trap. Among the seven gear types, groundfish hook and line gear was shown to pose the greatest risk to Right Whales during the summer when Right Whales are present in the greatest numbers in the high-use areas. During the spring and autumn migration periods when whales are migrating to and from high-use areas, gear from lobster fisheries may be in the water and thus pose the greatest risk.

This kind of information provides important guidance to both the collection of additional information and the development of measures to reduce the risk of Right Whale entanglement in fishing gear. Some of the measures described in Tables 1 and 2 will build on this work.

A study completed by WWF, Dalhousie University and the Canadian Wildlife Federation (CWF) has calculated the risk of Right Whales encountering different types of fishing gear throughout the majority of their Canadian range (manuscript in prep.). This work analyzed the entanglement risk to Right Whales by specific gear types, locations and times of its deployment, and proposed options that can be applied in the management of relevant fisheries to reduce this risk.

The types of gear configurations used in Atlantic Canadian waters should be documented, which could further refine the relative risk within particular gear types and contribute to the development of mitigation measures. Additional survey work as described in Recovery Measure 12 would also contribute to this spatial analysis.

In 2013 DFO published its "Policy On Managing Bycatch" (See Appendix B for link), which provides guidance for managing and reducing bycatch in commercial fisheries. The department's priorities in the context of the Policy will be informed in part by assessments of the risk bycatch presents to the conservation of aquatic resources including species at risk.

3. Research interactions between gear and Right Whales (Table 2, 3)

DFO and others have conducted work in Canadian waters to determine how gear behaves in specific oceanographic conditions (e.g. Brillant and Trippel 2010). Focused research of this nature should be conducted to help improve knowledge of how entanglements may occur with different types of gear. As researchers understand more about Right Whale movement and behaviour, this kind of information should be incorporated into models of gear behaviour and entanglement risk.

It is necessary to explore the roles and relative risk to Right Whales from different components of fishing gear (e.g. buoy lines, groundlines). To date, mitigation measures in both Canada and the United States have focused on groundlines, though more attention is now turning to vertical lines. Adding distinctive markings to different gear components could enhance determination of the most effective types of mitigation. In the U.S., discussions are underway to consider placing unique markings in the rope used by individual fisheries. Marking options for gear should be explored and tested. Because gear retrieved from whales often consists only of rope, identifying the original gear type can be difficult. (This is distinct from the current practice of marking with Vessel Registration Number or other unique identifiers.)

4. Continue and expand real-time entanglement prevention strategies (Tables 1, 3)

The *Right Whale / Lobster Fishing Mitigation Strategy*, in place since 2006, is an example of a constructive partnership between industry, government and NGOs to reduce risk to Right Whales. Fish harvesters in LFAs 36, 37 and 38), led by the Grand Manan Fishermen's Association (GMFA), set up a hotline for fishermen to report Right Whale sightings, and to check whether sightings have occurred in their area. This hotline can also be used to report sightings of entangled whales. A website with real-time information about the presence of Right Whales has been established. (See Appendix B.)

The lobster fishery in LFAs 36, 37 and 38, which have been identified by the DFO/Dalhousie study (Vanderlaan et al. 2011) as presenting a relatively low risk to Right

	<p>Whales, currently implement this strategy. This program should be continued as a precautionary measure, and should be adapted for other fisheries and other areas that present greater entanglement risk to Right Whales.</p> <p>As part of the Mitigation Strategy, DFO, in partnership with the Grand Manan Whale and Seabird Research Station (GMWSRS), conducts aerial surveys to spot Right Whales that may be in the Grand Manan area just prior to the opening of the lobster season in November. Fishing activity may be postponed in areas with Right Whales present. The aerial survey design should be re-assessed to ensure that coverage is sufficient to detect the presence of Right Whales, since this is vital for this mitigation measure to be effective. Protocols for aerial surveys should be reviewed to ensure that they meet enhanced safety standards for at-sea aerial surveys (Brown 2007).</p>
<p>5. Link to Marine Protected Area Planning (Table 1)</p>	<p>DFO is leading a process to develop a network of Marine Protected Areas (MPAs). While Right Whale habitat is not currently proposed as the basis of future MPAs, the species' high-use habitat areas will be included as one of many layers of information within a region-wide biodiversity conservation analysis currently underway. These analyses should take into account Right Whale aggregations, known risk of fishery interactions, and the potential management processes in place to protect species at risk.</p>
<p>6. Review DFO commercial fishery policies in light of Right Whale recovery (Table 1)</p>	<p>DFO's "Policy on Managing Bycatch" (2013) and "Emerging Fisheries Policy" (2008) should be referenced in the exploration and development of measures to prevent Right Whale entanglement. In turn, Right Whale recovery needs should be referenced in the development and revision of Integrated Fisheries Management Plans (IFMPs) and other fishery management tools. These plans combine the best available science on the species in question, outlining harvest objectives and management measures. IFMPs provide a direct means of incorporating Right Whale recovery actions into fisheries management. As part of their annual review, IFMPs for fisheries identified as presenting an entanglement risk to Right Whales should be updated with the best available information, and incorporate future mitigation measures as they are developed.</p> <p>DFO will take entanglement risk for Right Whales into account in all of its management decisions including the licensing of new and emerging fisheries, and when monitoring increased effort in recovering fisheries.</p>
<p>7. Improve gear recovery and analysis procedures (Table 1, 3)</p>	<p>Canada and the U.S. share information about gear recovered from whales in either country. The study of gear retrieved from entanglement incidents is one of the most important methods used to determine how entanglements occur and thus how they can be prevented. Accurate and precise identification of gear retrieved from whale entanglements requires the development of protocols and a chain of custody process agreed to by both countries.</p> <p>An expert, multi-stakeholder group of whale scientists, fishermen and government representatives should be formed to examine fishing gear retrieved (as per protocols, see above) from entanglements occurring in Canada or suspected to be Canadian in origin. It will be necessary to collaborate with NMFS and expert groups such as the Wildlife Bycatch Consortium. The need for a binational group to examine all entanglement cases should be evaluated, as currently gear analysis is undertaken separately in the two countries.</p>

Approach B: Entanglement and Entrapment Response Reduce severity of entanglements by

responding to reported incidents (Response)**8. Maintain and increase capacity for disentanglement response (Table 1, 2)**

Several partners, including DFO and NGOs, respond to reports of entangled Right Whales, but this capacity is low in many parts of Atlantic Canada. DFO plays an important role in coordinating the necessary response to an entanglement. In Quebec, Parks Canada coordinates response efforts within the Saguenay-St. Lawrence Marine Park, as necessary. In addition, NGOs play a critical role in all regions.

In the Maritime provinces, MARS, operates the toll-free incident reporting hotline and plays a vital coordinating role. Initial reports of entanglements may be called in to DFO or to MARS. On-water disentanglement capacity in the Maritimes, where most Right Whales are observed, is centred around the efforts of the Campobello Whale Rescue Team (CWRT), an NGO based on Campobello Island, New Brunswick. This skilled and experienced group conducts most of its work in the Bay of Fundy, though sometimes in Roseway Basin and Gulf of Maine waters. Because of their specialized expertise, the CWRT has been brought in to entanglement cases as far away as Gaspé and the St. Lawrence Estuary in Quebec. Personnel from other groups such as The GMWSRS and MARS have also received disentanglement training. In addition, the GMWSRS leads efforts to educate and assist weir fishers who occasionally find whales entrapped in their weirs. They strive to release the whales with as little disruption to the weir operation as possible while avoiding harm to the whales.

In 2004, the Groupe de recherche et éducation sur les mammifères marins (GREMM) organized an emergency response network for marine mammals in Quebec, with Parks Canada, DFO and 11 other partners. The Réseau québécois d'urgences pour les mammifères marins (ROMM) operates a call centre and coordinates the network's activities to reduce accidental marine mammal mortalities. They participate in disentanglement efforts, and conduct research to improve knowledge about dead marine mammals (stranded or floating) in the St. Lawrence region of Quebec.

In Newfoundland, the NGO Whale Release and Strandings (WRS) has many years' experience disentangling large whales, though right whale sightings and incidents are rare in that region. They operate a toll-free hotline for entanglement reporting, and they would lead a response effort in Newfoundland and Labrador if a Right Whale is encountered with rope or other gear on it. WRS also conducts disentanglement training for groups in other regions and for DFO fishery officers.

DFO will work with partners to encourage and support regional response networks, including incident reporting hotlines. Vital disentanglement resources needed include funding, trained personnel, equipment, vessels and storage facilities. Adequate resources need to be available in enough strategic locations to optimize emergency response times. For the Government of Canada to respond adequately to entanglement incidents in a safe and timely manner, DFO supports the training of more personnel in basic disentanglement response, to build greater emergency response capacity in Atlantic Canada. DFO is currently developing a program to increase and standardize fishery officer training in marine mammal emergency response. Supporting resources will be required for this to be successful, such as appropriate equipment to conduct responses, and supporting programs such as the Marine Mammal Response Program.

9. Update joint entanglement

Entangled whales may cross international boundaries, requiring timely joint monitoring, communication and response by Canada and the U.S. DFO will continue to work closely

response approaches (Table 1)	<p>with U.S. authorities if an entangled Right Whale crosses the international boundary into or out of Canadian waters. Appropriate response protocols, including notification procedures, should be developed to streamline this process.</p>
Objective 4. Monitor population and threats	
10. Investigate use of At-Sea Observer Program (Table 1)	<p>The At-Sea Fisheries Observer Program is a long-standing fisheries monitoring tool that provides a potential resource for collecting information on marine mammal sightings, fishing gear interactions and mitigation effectiveness. DFO will evaluate the potential contribution the At-Sea Fisheries Observer Program can make to Right Whale recovery by reviewing existing coverage, current protocols concerning encounters with marine mammals, and training requirements. The Observer program can provide information on dead and live Right Whales and information on entanglements.</p> <p>The Observer program could possibly be used to help measure compliance with and the effectiveness of any current or forthcoming fishery mitigation measures implemented within a specific fishery. It may be useful to look to other countries, such as the U.S., to learn how their use of observer programs contributes to monitoring and conservation of species at risk.</p>
11. Conduct necropsies (Tables 1)	<p>DFO and other partners will strive to ensure that a necropsy is conducted on any Right Whale carcass that is observed in Canada, regardless of the condition of the carcass. Necropsies provide important information about causes of injury and mortality, about the population, and can contribute to monitoring the effectiveness of recovery measures at preventing injury and death. Given the importance of understanding the cause of mortalities, this is a high priority activity that occurs on an 'as required' basis and is conducted whenever it is logistically feasible to gain access to the carcass.</p> <p>In the Maritimes Region, an informal group, the Maritimes Marine Animal Response Network (MMARN) (consisting of NGOs, provincial and federal agencies and research institutions) is working to improve protocols for collecting and sharing data obtained during necropsies.</p> <p>A list of suitable necropsy and burial sites should be identified to expedite the process of preparing for a necropsy when a whale is reported and retrieved. This will save time when completing important logistical arrangements, since the need for and timing of necropsies can't be predicted. A list of contacts suitable for long-term storage of skeletal materials and other tissues should be prepared.</p>
12. Monitor Right Whale presence in areas outside critical habitat (Tables 1, 3)	<p>(Measure 12 also supports Objective 5, Research)</p> <p>To date, vessel-based surveys and aerial surveys for Right Whales tend to be conducted in areas where the species is considered most likely to be found, based on previous survey results. Surveys typically identify about two-thirds of the Right Whale population in Canadian waters in a given season (summer-autumn), and during that time the location of the rest of the population is usually not known.</p> <p>Learning the seasonal and spatial distribution of this "missing" population component is necessary to expand entanglement risk analyses (see Recovery Measure 1b). Work is needed to determine the distribution of Right Whales in areas and at times of year beyond the traditional summer surveys in Canadian critical habitat areas. This includes the lower Bay of Fundy and the Gulf of Maine to the Canada-U.S. border (including within</p>

the disputed zone), on the Scotian Shelf and in the Gulf of St. Lawrence, and possibly elsewhere. More data are also needed about the migratory pathways associated with Roseway Basin and the Grand Manan Basin during the months of high occupancy, and also from these areas to the Gulf of St. Lawrence and Gaspé. Mother-calf pairs have been observed in the Gulf of St. Lawrence that did not come to the Bay of Fundy nursery area, so it is assumed that important habitat areas exist that remain unknown (Hamilton et al. 2007). In Quebec, the ROMM has led a program since 2007, in partnership with North Atlantic Right Whale Consortium members, to photo-identify Right Whales observed in the Gulf of St. Lawrence. Other Quebec-based groups have contributed to sightings data, e.g. the GREMM and the Mingan Island Cetacean Society (MICS).

Aerial and ship-based surveys each offer a means of obtaining information on the distribution of Right Whales. They provide systematic population data that can be corrected for effort. Such effort-corrected survey data is needed for the spatial risk analyses to be meaningful.

Acoustic monitoring may also present an opportunity to examine Right Whale presence in a specific area, though it is important to note that Right Whales are not constantly vocal. Passive acoustic monitoring (PAM) is a method used to gather data on the use of a given habitat by whales. It has been used effectively in suspected Right Whale habitats by Mellinger et al. (2007), and is currently deployed in the Gulf of St. Lawrence in Quebec. Right Whales have been recorded near the Magdalen Islands; they have been observed visually and acoustically in the Gaspé region in 2011 and 2012 between June and November (Y. Simard, DFO, unpublished data). DFO deployed acoustic devices on the Scotian Shelf in 2012 that may provide evidence of Right Whales outside of the known critical habitat areas (H. Moors-Murphy pers. comm.). PAM is a tool that could be used to monitor annual changes in Right Whales' use of habitats in the Bay of Fundy, Scotian Shelf and Gaspé regions, in the Cabot Strait and the Strait of Belle Isle. Its use could help define Right Whales' migration season.

Since areas of prey aggregations seem to be the primary driver for Right Whale activity in Canadian waters, efforts to locate additional prey aggregation areas should be supported as they could contribute to the discovery of additional high-use habitat areas.

The Right Whale research and conservation community, especially through the North Atlantic Right Whale Consortium, shares data so that it can be used by many partners. DFO Maritimes maintains Right Whale sighting data as part of a cetacean sightings database. DFO will strive to coordinate sighting holdings among its regions and with partners in the U.S. so that the most up-to-date information is available to all partners.

Aboriginal traditional knowledge, or ATK – also referred to as Indigenous knowledge by some recovery partners – is a potential source of information about historic and current distribution of Right Whales that is poorly understood in the context of species recovery. Exploration of this avenue, through Traditional Knowledge and current information from communal commercial Aboriginal fisheries, may contribute to our knowledge of Right Whales' distribution and habitat use.

13. Monitor scarring rates (Table 2)

The New England Aquarium's study of changes in right whale scarring rates over time can serve as an indicator of the effectiveness of mitigation measures in both Canada and the U.S. This will help improve estimates of the proportion of Right Whales surviving encounters with fishing gear. Canadian partners should foster the continuation of this

	work when possible.
14. Monitor impact of entanglements on population recovery (Table 2)	The long-term effect (lethal and sub-lethal) of entanglements, for example on the reproductive success of entangled individuals, requires further investigation to determine the overall effect that entanglements may have on Right Whales at the population level.
Objective 5. Increase understanding of life history characteristics, low reproductive rate, habitat and threats to recovery through research	
15. Investigate the role of “ghost gear” (Tables 2, 3)	In addition to understanding the role of actively fished gear, some partners are beginning to explore the potential role of 'ghost gear' (gear that has been abandoned or lost) in Right Whale entanglements. The quantities of such gear and the extent of the problem it presents are poorly understood, and potential impacts of ghost gear need to be investigated. In New Brunswick, the Fundy North Fishermen’s Association is conducting a project to investigate and remove ghost gear in the Bay of Fundy; results of this project may provide guidance for additional investigations in other areas.
Objective 6. Support and promote collaboration for recovery between government agencies, academia, environmental non-government groups, Aboriginal groups, coastal communities and international agencies and bodies	
16. Support Right Whale Recovery Network (Table 1)	As resources allow, DFO will convene at least one meeting per year of the North Atlantic Right Whale Recovery Network (RWRN), an advisory body and working group consisting of government personnel, Right Whale experts, stakeholders and Aboriginal organizations. The RWRN serves as a forum for discussion, consultation, communication and advice-sharing on Right Whale recovery, research, conservation and stewardship initiatives. The Network can also outline needed studies and potential experts to carry them out.
17. Support and enhance networks of response organizations (Table 1)	Experts and agencies that are responsible for or interested in responding to entangled or stranded marine animals are participating in networks, e.g. MMARN, and the ROMM network in Quebec. DFO has played and will continue to play a supporting role for these networks. This will include an annual Bay of Fundy coordination meeting to review capacity and contingencies for emergency response in the upcoming year.
18. Coordinate international and trans-boundary activities (Table 1)	Because Right Whales move across the Canada-U.S. border, research and monitoring activities need to be coordinated and collaborative between the two countries. Fishing activities and how they are managed differ between Canada and the U.S. as a result of oceanographic conditions, traditional fishing practices, and regulations. Several bilateral forums are in place for sharing information and coordinating activities, and regular opportunities exist for such collaboration to take place. DFO and NMFS meet regularly to discuss issues related to species at risk including Right Whales. This will continue, to ensure that priority research and conservation activities can be carried out in both jurisdictions.
Objective 7. Develop and implement education and stewardship activities that promote recovery	
19. Encourage,	Stewardship activities related to reducing entanglement risk require ongoing funding

<p>support and undertake stewardship opportunities (Table 1)</p>	<p>support. DFO supports and participates in the Habitat Stewardship Program (HSP) and the Aboriginal Fund for Species at Risk. These are the only national programs sponsored by the Government of Canada specifically supporting stewardship projects for SARA-listed species, and they are necessary to support Canadians' involvement in species recovery. DFO will continue to encourage, review and support projects that promote the recovery of marine species through stewardship activities, including actions outlined in this plan. Stakeholders and interested parties have an important role to play in developing and undertaking stewardship projects related to their expertise and activities, guided by recovery objectives for the Right Whale.</p>
<p>20. Inform mariners about threats to Right Whales and their responsibilities (Table 1)</p>	<p>Information-sharing and outreach to a variety of vessel operators will be an important ongoing component of Right Whale recovery. The Canadian Marine Mammal Regulations of the <i>Fisheries Act</i> are being considered for amendment, and this may have implications for some activities of some marine users. DFO C&P will have a role in enforcing the Regulations.</p> <p>Navigation charts, the Notice to Mariners and Sailing Directions, produced by the Canadian Hydrographic Service (CHS) and distributed by the Canadian Coast Guard (CCG), are vital sources of information for mariners concerning Right Whales, and this information should be reviewed and updated as necessary.</p>
<p>21. Review role of logbooks for reporting (Table 3)</p>	<p>Fishery logbooks are a means for individual license holders to record and communicate information to DFO related to species at risk, including Right Whales. DFO is evaluating the effectiveness of logbooks at collecting and communicating SAR information.</p>
<p>22. Evaluate effectiveness of outreach efforts (Table 3)</p>	<p>For over a decade Right Whale outreach has been conducted with a variety of stakeholders, including the fishing industry. Measuring the effectiveness of such activities is an ongoing challenge that all partners implementing the action plan should acknowledge and strive to meet. In particular, as new mitigation measures are developed, whether regulatory or voluntary, a dedicated effort to monitor the uptake of and compliance with such measures should be developed. Such evaluation would enable a feedback loop to be established that will help refine and improve the effectiveness of mitigation measures over time.</p>

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1.4.2 Implementation Tables

The following tables summarize the recovery measures described in the section 1.4.1. In the preceding section the recovery measures 1-22 are presented in the same order as the relevant objectives in the recovery strategy. In this section the recovery measures are presented in a different order. In these tables the measures are organized based on the groups expected to be involved in implementing them. DFO will play a leading role and has responsibility for activities identified in Table 1. DFO will be a participant or supporter of some of the activities in Table 2, but other organizations are expected to lead them. The activities in Table 3 are not currently underway, and at this time are not known to be committed to by any organizations. Tables 1, 2, and 3 provide additional detail about the measures 1-22, including which organizations are expected to participate, and some estimated timelines. Some of the activities are collaborative in nature and can only be successful if a range of participants are involved. Because of this, certain activities appear in more than one of the tables.

Table Column Headings:

The "Participation" column lists groups currently or potentially involved with undertaking the recovery measures. Priority levels (low, medium or high) are assigned to reflect the direct impact a recovery measure is expected to have on reducing the frequency and severity of entanglement, and thus the likelihood of the activity contributing to the recovery of North Atlantic Right Whales.

- "High" priority measures are considered likely to have an immediate and/or direct influence on the recovery of Right Whales.
- "Medium" priority measures are important but considered to have an indirect or less immediate influence on Right Whale recovery.
- "Low" priority recovery measures are considered important contributions to the knowledge base about Right Whales and entanglement risk, but not expected to directly influence Right Whale recovery.

The "Status" column reflects whether an activity has been initiated, with two status categories:

- not started, or
- underway,

while the "Timeline" column refers to the estimated timeline to completion from the date of publication of this action plan:

- < 2 years,
- 2-5 years,
- > 5 years
- continuous (i.e. the activity will need to be ongoing over time).

Recovery Objective refers to the objectives outlined in the recovery strategy (DFO 2014).

List of Acronyms Used in this Document

CCG

Canadian Coast Guard

CHP

Conservation Harvest Plan

CHS

Canadian Hydrographic Service

C&P

DFO Conservation & Protection

CWF

Canadian Wildlife Federation

DFO

Fisheries and Oceans Canada

DFO RM

DFO Resource Management Division

DFO FM

DFO Fisheries Management Branch

FA

Fishery Association

GMWSRS

Grand Manan Whale and Seabird Research Station

GREMM

Groupe de recherche et éducation des mammifères marins

IFMP

Integrated Fishery Management Plan

LFA

- Lobster Fishing Area
- MMARN
Maritimes Marine Animal Response Network
- MICS
Mingan Island Cetacean Society
- NGOs
Non-government organizations
- NEAq
New England Aquarium
- URI
University of Rhode Island
- NMFS
National Marine Fisheries Service
- ROMM
Réseau d'observation des mammifères marins
- RPA
Recovery Potential Assessment
- RWRN
Right Whale Recovery Network
- SAR
Species at Risk
- SARA
Species at Risk Act
- SARMD
DFO Species at Risk Management Division
- WWF
World Wildlife Fund Canada

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Recovery Measures Implementation Schedule

Long Description for Table 1

Table 1. Activities underway or expected to proceed in near to mid-term (DFO has lead responsibility)

Measure #	Recovery Measures	Participation	Priority level	Status & Timeline
<i>Objective 2A Entanglement Prevention</i>				
1	Expand on and implement further mitigation measures to reduce risk: <ul style="list-style-type: none"> a. For fisheries where higher risk has been identified, explore, evaluate and implement regulatory mitigation measures, where necessary, that reduce the probability of Right Whales becoming entangled. b. Facilitate discussion among fishery groups to coordinate activities and share information about mitigation measures being taken (in Canada and the U.S.) to reduce the risk of interaction. 	DFO Fishing Industry NGOs DFO Fishing Industry NGOs NMFS	High	a) DFO work is ongoing (e.g. IFMPs) b) DFO discussion with advisory committees 2-5 years.

3	Conduct field studies on gear used in Canadian waters to determine which types and configurations could result in entanglements.	DFO Fishing industry	Medium	Underway, 2-5 years
4	Promote and support real-time entanglement prevention strategies, as part of the Right Whale / Lobster Fishing Gear Interactions Mitigation Strategy for Lobster Fishing Areas 36, 37 & 38, with industry partners (see Table 1b, Recovery Measure #3). Expand these activities to cover other areas identified as presenting higher risk of Right Whale / fishery encounters. Review spatial and temporal extent of aerial surveillance to coincide with times of expected Right Whale presence in high-risk areas.	Fishing Industry DFO	High	a) Underway, continuous; flights have been expanded in the Bay of Fundy area (*expansion to other areas not started)
5	Ensure that risk of fishery interaction is considered and evaluated in the Marine Protected Area planning process and other spatial analyses of human activities in Right Whale habitat areas.	DFO	Low	Underway 2 Years
6	Cross-reference DFO Bycatch and Emerging Fisheries policies with Right Whale recovery documents when developing and updating fishery management tools such as IFMPs and Conservation Harvest plans (CHPs). Identify relevant entanglement mitigation strategies.	DFO Industry NGOs	High	Started. Continuous.
7	Establish gear analysis protocols and processes in collaboration with Right Whale experts (NGOs, NMFS, researchers). a. Develop and implement a standard protocol for inspecting gear retrieved from entanglement events in Canadian waters to determine gear type and location. b. Collaborate with U.S. National Marine Fishery Service gear analysis process. Ensure that gear retrieved in either countries' waters can be examined by experts from both countries.	DFO NMFS	High	a) Started. 2-5 years b) Started 2-5 years.
Objective 2B Entanglement Response				
8	Enhance ability to respond to entanglement and entrapment events: a. Train DFO Conservation and Protection personnel in marine mammal disentangling techniques for whales, b. Encourage, and where possible help build capacity for, existing and new disentangling teams that	DFO NGOs	High	All: Underway, continuous

	are supported by the National Marine Mammal Response Program in DFO's Maritimes, Gulf, Quebec and Newfoundland & Labrador Regions to help ensure effective, efficient response to reported entanglements within 24 hours (when logistically feasible).			
9	Coordinate Canadian response with U.S. organizations, and between DFO Regions if an entangled Right Whale crosses management or international boundaries.	DFO NMFS NGOs	High	Underway Continuous
Objective 4 Monitoring				
10	Support marine mammal species identification and data collection under the At-Sea Fisheries Observer Program to report Right Whales sightings and fishery interactions.	DFO NMFS	Medium	< 2 years to develop; Continuous to implement
11	Effective necropsy response: a. Conduct necropsy on all reported Right Whale mortalities whenever feasible, and support protocols for data collection and sharing. b. Prepare a list of suitable necropsy and disposal sites, and contact lists for storage of skeletal materials and tissue samples.	DFO NGOs Academia	High	a) Underway Continuous b) < 2 years
12	Evaluate the use of passive acoustic monitoring to detect Right Whale presence and expand as appropriate. Currently being used by DFO Quebec Region to identify the presence of additional high-use Right Whale habitat (e.g. other feeding and socialization areas) in the Gulf of St. Lawrence. Maritimes region is also deploying acoustic devices on the Scotian Shelf that may support this measure.	DFO NGOs Academia	High	QC – underway Maritimes - underway
Objective 6 Support & Promote Collaboration				
16	Coordinate regular (at minimum, annual) Canadian Right Whale Recovery Network meetings.	DFO Right Whale Recovery Network members	Medium	Underway Continuous
17	Help coordinate and support regular meetings associated with networks of marine mammal rescue groups and experts, e.g. the Maritime Marine Animal Response Network.	DFO NGOs Right Whale Recovery Network	Medium	Underway Continuous

		members		
18	Enhance collaboration between Canada and U.S. on research & monitoring activities where appropriate, including through participation in international meetings and workshops that foster and implement trans-boundary recovery initiatives, e.g. Right Whale Consortium.	DFO NOAA	Medium	Underway Continuous
19	Encourage and promote high-quality Right Whale stewardship and research projects through funding mechanisms such as the Habitat Stewardship Program for Species at Risk and the Aboriginal Fund for Species at Risk.	DFO Right Whale Recovery Network members Aboriginal groups	High	Underway Continuous
Objective 7 Education & Stewardship				
20	Provide up-to-date information to mariners relevant to Right Whale protection: a. Educate whale watching tour operators and recreational boaters about the possible amendments to the Marine Mammal Regulations under the Canadian <i>Fisheries Act</i> . Continue to produce and distribute materials to whale-watching tour operators, boaters, fishers, and shipping industry regarding the importance of proceeding with caution in Right Whale habitat areas. b. Review and update the CCG 'Notice to Mariners' and relevant CHS charts to consistently incorporate advice and information to mariners about high use areas (e.g. critical habitat areas) and relevant management measures.	DFO NGOs	Low	a) Not started (2-5 years) b) Underway Continuous

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Long Description for Table 2

Table 2. Actions underway or expected to proceed with others (NGOs, industry) as lead or the primary participant

Measure #	Recovery Measures	Participation	Priority level	Status / Timeline
Objective 2A Entanglement Prevention				
1	Continue and expand the development of voluntary mitigation measures to reduce the chance of Right Whales becoming entangled in gear for fisheries in areas where higher risk has been identified.	Fishing industry NGOs	High	Some work done e.g. by WWF, LFA33, LFA34. Not

		DFO		started in most fisheries.
2	Continue to identify areas where fishing gear overlaps with Right Whales in space and time, and quantify the amounts of that gear in Atlantic Canadian waters, to determine the risk of interaction (probability that a Right Whale will encounter gear). Update analyses as new data become available.	Academia NGOs Fishing industry DFO	High	1st analysis complete (Vanderlaan et al. 2011). 2-5 years for additional analyses.
4	Promote and support real-time entanglement prevention strategies as part of the Right Whale / Lobster Fishing Gear Interactions Mitigation Strategy for Lobster Fishing Areas 36, 37 & 38 (see Table 1a, Recovery Measure #3). Support the Right Whale sightings hotline and area avoidance, sightings call-in number, radio reporting system and website with real-time sighting report information.	Fishing Industry DFO	High	a) Underway, continuous (*expansion to other areas not started)
Objective 2B Entanglement Response				
8	Increase ability to respond to entanglement and entrapment events: Maintain and publicize a single emergency response and sightings hotline in each region. Currently the Marine Animal Response Society maintains a toll-free reporting hotline that is available in all three Maritime provinces, and Newfoundland & Labrador has 24-hour toll-free hotline for DFO's entanglement response programme. In Quebec the GREMM maintains a toll-free reporting hotline. Ensure broad and effective communication to avoid confusion and delays in reporting incidents. (See Appendix B for contact numbers.)	NGOs DFO	High	Underway, continuous
Objective 4 Monitoring				
13	Encourage monitoring of scarring rates on Right Whales, as an indicator of entanglement rate within the population.	NEAq	Medium	Underway (NEAq) Continuous
14	Monitor the impacts of entanglements on reproduction and abundance of Right Whales, including determining survival rates of entangled whales and disentangled whales.	NEAq, Academia	Low	Underway (NEAq)? > 5 years
Objective 5 Research				

15	Evaluate the potential risk to Right Whales presented by "ghost" fishing gear (abandoned or lost gear).	Fishing industry DFO	Medium	Started (LFA 36 Fundy North FA) Not started, elsewhere 2-5 years
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Long Description for Table 3

Table 3. Remaining opportunities for work to contribute to Recovery Objectives

Measure#	Recovery Measures	Participation	Priority level	Status / Timeline
<i>Objective 2A Entanglement Prevention</i>				
1	Develop and implement ways to measure the level of compliance with mitigation measures (regulatory or voluntary, existing or yet to be developed) used in fisheries.	Fishing industry DFO NGOs	Medium-High	c): Not started. TBD
3	Explore methods to mark types (or components) of gear, and determine the feasibility and accuracy of any proposed gear-marking methods	Fishing industry collaborate with U.S. initiatives DFO Academia NGOs	Medium	Not started, TBD
4	Review the protocols for aerial surveys to ensure they meet scientific and safety standards.	NGOs Academia DFO	Medium	c) Not started TBD
<i>Objective 4 Monitoring Objective 5 Research</i>				
12	Identify the presence of additional high-use habitat (e.g. other feeding and socialization areas) used by Right Whales, i.e. areas outside of and between the two designated critical habitat areas. Areas of investigation include the 'Disputed Zone', the Gulf of Maine, the Scotian Shelf and the Gulf of St. Lawrence: a. Conduct aerial and/or ship-based surveys. b. Evaluate the use of passive acoustic monitoring to detect Right Whale presence and expand as appropriate This measure relates to Table 1a) activity 5 which is underway by DFO in Quebec	NGOs CWI NEAq Academia DFO NMFS Aboriginal groups	High	a) Not started TBD b) Underway (QC); not started (elsewhere) TBD c) and d)

	<p>Region.</p> <p>c. Use existing data where available, and/or conduct surveys to identify <i>Calanus</i> copepod distribution as a measure of potential additional Right Whale feeding habitat.</p> <p>d. Encourage collaborative use of data obtained from surveys as described. Include all Right Whale sightings data collected in relevant cetacean databases, e.g. DFO Maritimes Region Cetacean Sightings Database. Facilitate the sharing of data within and among government departments and with other relevant Canadian organizations. Collaborate with relevant U.S. cetacean databases (NMFS, URI, NEAq) to help ensure completeness of data in Canadian waters.</p> <p>e. Explore Aboriginal knowledge as a potential source of information on historic and current distribution of Right Whales.</p>			Not started TBD
Objective 7 Education / Stewardship				
21	Investigate the use of relevant fishery reporting requirements (i.e. logbooks) to track whale sightings and gear interactions. Review SARA logbook format to ensure information collected is effective and useful.	DFO	Medium	Not started TBD
22	Develop ways to evaluate the effectiveness of outreach activities on fisheries interaction prevention and response.	NGOs Academia DFO	Low	Not started TBD

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2. Socio-Economic Evaluation

In Canada, North Atlantic Right Whales are listed as an endangered species under the List of Wildlife Species at Risk (Schedule 1) of SARA. As such, the species benefits from legal protections and mandatory recovery requirements which are administered by DFO (Government of Canada 2003). North Atlantic Right Whales are also protected from hunting and harassment in Canadian waters as per the Marine Mammal Regulations of the *Fisheries Act*.

North Atlantic Right Whales also benefit from international protection. The species is protected under the International Convention for the Regulation of Whaling, implemented by the International Whaling Commission and is listed as endangered under the Endangered Species Act in the United States and the IUCN (World Conservation Union) Red List of Threatened Species. North Atlantic Right Whales are also included on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which limits international trade in endangered species (CITES 1973). In the U.S., Right Whales are protected by the Endangered Species Act (ESA 1973) and the Marine Mammal Protection Act (1972). NOAA has implemented the Atlantic Large Whale Take Reduction Plan specifically to “reduce injuries and deaths of large whales due to incidental entanglement in fishing gear” ([Atlantic Large Whale Take Reduction Plan](#)).

In addition to the legislative and regulatory protections that are in place in both Canada and internationally, North Atlantic Right Whales have also benefited from significant research and recovery efforts that have occurred

over the course of the last 30 years. A Canadian Recovery Team for the species was formed in 1998, which pre-dates the listing of the species under SARA by several years. This Recovery Team developed a recovery plan for the species in 2000 and in collaboration with government and non-government interests, set out to meet the goals of that plan through various recovery initiatives. Currently, DFO's recovery planning and activities are advised by the Canadian Right Whale Recovery Network. Given that the species faces many common threats in Canada and the United States, the North Atlantic Right Whale Consortium was also established, consisting of government, academic researchers and non-government groups from both countries, to help reduce threats and promote further research and recovery.

A summary of recovery progress and the activities completed is available on the Species at Risk Public Registry (Government of Canada 2011). As noted in Section 1.4, much of this progress has been made possible by successful collaborations among governments, industry, environmental organizations, universities and other organizations/groups in both Canada and the United States. Future recovery efforts, such as those detailed in this action plan, are dependent upon the continued collaboration among these many organizations and groups. For each measure contained in this action plan, the anticipated lead organization(s) and a list of the groups currently or potentially involved is provided in Table 1, 2 and 3.

Methodology

SARA requires the responsible federal minister to undertake *"an evaluation of the socio-economic costs of the action plan and the benefits to be derived from its implementation"* (Government of Canada 2002). This section identifies the anticipated socio-economic impacts associated with the proposed measures listed in Tables 1, 2, and 3. The evaluation addresses the costs and benefits that would be anticipated to occur if the action plan is fully implemented. The analysis only considers costs and benefits which are incremental to the baseline (e.g. costs/benefits associated with new activities or enhancements to existing activities that are above-and-beyond what is part of current practice or formal commitments). Costs and benefits that are real or reasonably expected are included while those of a highly speculative or uncertain nature are not.

Costs and benefits associated with the identification of Critical Habitat for the North Atlantic Right Whale are not considered in this evaluation. A detailed analysis of the incremental impacts will be completed as part of the regulatory process associated with the SARA Protection Order (see section 1.3).

Costs of Implementation

Several of the measures listed in this action plan represent a continuation of current activities or responsibilities and commitments of DFO and/or other groups into the foreseeable future. Unless there is an indication that these activities would cease in the absence of this action plan they are considered to be a continuation of the baseline. It is assumed that these activities would carry no incremental costs.

Implementation of certain measures may require larger investments. It is reasonable to assume that additional costs would be incurred with an expansion of aerial or vessel-based surveys to either enhance real-time entanglement prevention or identify new high-use habitat areas. New projects containing an acoustic monitoring component, or those designed to identify prey distribution, may also require a sizeable investment. When considering costs associated with past projects of a similar nature, it is reasonable to assume that these new initiatives could require investments in the hundreds of thousands of dollars per year. However, it is not possible to quantify the total cost of these activities until a survey design and/or monitoring plan is developed for each project. As noted in Table 1, potential participants in this type of work include DFO, academics, NGOs, and the New England Aquarium.

Other measures may require small-scale investments by DFO, the fishing industry, environmental groups, or other organizations to enhance current capabilities. Examples include potential costs associated with travel to and/or facilitation of meetings, training of DFO Conservation and Protection staff in disentanglement response, and provision of additional equipment to disentanglement teams.

For several of the listed measures insufficient information is available to provide an assessment of potential costs

or cost savings. For example, mitigation measures described in Approach 2a would not be identified until the exploration and evaluation phases are complete. As a result, costs or cost savings associated with implementation cannot be assessed at this time.

Benefits of Implementation

The interim Recovery Goal for North Atlantic Right Whale is to achieve an increasing trend in population abundance over three generations. It is expected that the implementation of this action plan would result in an important contribution towards the recovery of North Atlantic Right Whales. Recovery would be facilitated by reducing significant threats to the species associated with entanglement and entrapment in fishing gear, increasing the capacity to respond to entanglement and entrapment events, improving the understanding of the species and its habitat through research and monitoring, and enhancing awareness through education and stewardship initiatives. As noted in Section 1.4.2, priority levels for each measure noted in the third column of Tables 1, 2 and 3, reflect the likelihood of each activity contributing to the recovery of North Atlantic Right Whales.

This action plan may also result in benefits to other species. In particular, many of the stated measures would be beneficial to other marine mammals and marine reptiles as capacity is improved for entanglement prevention and response in a general way. Other measures, such as systematic aerial or vessel-based surveys, could result in important information on other marine mammals, reptiles and fishes that could be used to improve management and stewardship of these species.

Many of the benefits derived from biodiversity conservation, including the protection and recovery of species at risk, are non-market commodities that are difficult to quantify. The Act recognizes that “wildlife, in all its forms, has value in and of itself and is valued by Canadians for aesthetic, cultural, spiritual, recreational, educational, historical, economic, medical, ecological, and scientific reasons” (SARA Preamble, S.C. 2002, c. 29). A review of the literature confirms that Canadians value the preservation and conservation of species in and of themselves. Actions taken to preserve a species, such as habitat protection and restoration, are also valued. In addition, the more an action contributes to the recovery of a species, the higher the value the public places on such actions (Loomis and White 1996; DFO 2008). Self-sustaining and healthy ecosystems, with their various elements in place, including species at risk, contribute positively to the livelihoods and the quality of life of all Canadians.

Distributional Impacts

As discussed in Section 1.1, implementation of this action plan will require collaboration among many organizations and groups which have participated in North Atlantic Right Whale recovery efforts in the past. To date, this has included contributions from various levels of government, non-governmental organizations, the fishing industry, Aboriginal groups, universities and others. Important contributions by governments and organizations in the United States (such as the New England Aquarium, Provincetown Center for Coastal Studies and NMFS) are also noted. It is also possible that new groups would become involved in future recovery efforts. Probable participants and the potential lead for each measure are noted in Table 1. However, at this time it is not possible to determine the extent to which each of these groups would contribute (financially or otherwise) to this action plan.

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3. Measuring Progress

Table 4. describes indicators that can be used to assess progress toward achieving the recovery objectives for the North Atlantic Right Whale. These indicators are based on the performance measures outlined in Section 2.4 of the recovery strategy (DFO 2009), and reflect activities to be undertaken by DFO and any of the other partners involved in the implementation of this action plan. Under SARA, a report on progress toward addressing the performance measures from the recovery strategy was due in 2014.

Long Description for Table 4

Table 4. Indicators of progress toward achieving North Atlantic Right Whale recovery objectives

Recovery Objective	Indicators of progress
<p>Objective 2:</p> <p><i>Reduce mortality and injury as a result of fishing gear interactions (entanglement and entrapment). Two approaches identified: Prevention and Response</i></p>	<p>Are right whale / fishery interactions monitored or analysed?</p> <p>Are management strategies and mitigation measures prioritized and underway?</p> <p>Are fisheries assessed as higher-risk participating in mitigation activities?</p> <p>Are surveys continued and expanded to identify right whale locations relative to fishing activity?</p> <p>Have interactions between right whales and fishing gear in Atlantic Canadian waters decreased?</p> <p>Are protocols for analyzing gear retrieved from entanglements in place and clearly communicated to partners?</p> <p>Has disentanglement capacity been maintained or increased? Is effective coordination among partners in place?</p>
<p>Objective 4:</p> <p><i>Monitor population and threats.</i></p>	<p>Is right whale presence being recorded by all appropriate partners? Is the population being monitored in Canadian waters?</p> <p>Are sightings and monitoring results being shared at regular forums?</p> <p>Have necropsies been conducted on right whale carcasses when available? Are all appropriate partners involved?</p> <p>Are DFO shared and complementary activities well-coordinated?</p>
<p>Objective 5:</p> <p><i>Increase understanding of life history characteristics, low reproductive rate, habitat and threats to recovery through research.</i></p>	<p>Has research been conducted and published that informs management and conservation decisions related to right whales?</p> <p>Is this information being shared in</p>

<p>Objective 6:</p> <p><i>Support and promote collaboration for recovery between government agencies, academia, environmental non-government groups, Aboriginal groups, coastal communities and international agencies and bodies.</i></p>	<p>regular forums?</p> <p>Are regular meetings being held to discuss and plan recovery activities?</p> <p>Are all relevant groups represented adequately, including Aboriginal partners?</p> <p>Are bilateral or multilateral agreements in place to support and advance right whale research and conservation?</p> <p>What are the outcomes of such agreements?</p> <p>Have Canadian participants been active in bilateral discussions and initiatives for right whale recovery and protection?</p> <p>Are collaborative research projects underway or completed?</p> <p>What are the results or conclusions of such studies?</p>
<p>Objective 7:</p> <p><i>Develop and implement education and stewardship activities that promote recovery.</i></p>	<p>How many and what kinds of communication materials and/or actions were produced and/or undertaken?</p> <p>How many people, and where, did the communications activities reach?</p> <p>What user groups or stewards are involved in entanglement mitigation and prevention activities?</p> <p>What indications of increased awareness resulted from communication and outreach efforts?</p>

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4. Associated Plans

Currently no plans are associated with this action plan.

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Appendix A: Effects on the Environment and Other Species

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals*

and the Species at Risk Act Policies: Overarching Policy Framework (Government of Canada, 2009). The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that implementation of action plans may inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the action plan itself, but are also summarized below in this statement.

This action plan will benefit the environment by promoting the recovery of the North Atlantic Right Whale. The potential for the plan to inadvertently lead to adverse effects on other species was considered. The SEA concluded that this plan will clearly benefit the environment and will not entail any significant adverse effects. The reader should refer to the sections of the document referring to recovery actions for specific details on potential environmental benefits of this action plan.

Appendix B: Whale Emergency Contacts and Information Sources

Emergency Contact information

Quebec

[Réseau Québécois d'urgences pour les mammifères marins](#) (French only) / Quebec Marine Mammal Emergency Response Network
1-877-722-5346

Nova Scotia, New Brunswick, Prince Edward Island:

[Marine Animal Response Society](#)
1-866-567-6277

Newfoundland & Labrador:

[Whale Release and Stranding Group](#)
1-888-895-3003 (Toll-free in Newfoundland and Labrador)

Information resources about Right Whales and other large whale species

Government of Canada SARA Registry – [North Atlantic Right Whale species profile](#)

Grand Manan Fishermen's Association - [Right Whale Sightings](#)

[North Atlantic Right Whale Consortium](#)

[Grand Manan Whale and Seabird Research Station](#)

[New England Aquarium – Right Whale Research](#)

[Canadian Whale Institute – Right Whale information](#)

[The Northeast Fisheries Science Centre Right \(NOAA, NMFS\) North Atlantic Right Whale Sightings website](#) (en anglais seulement)

Information resources about Species at Risk in Canada

[The Species at Risk Public Registry](#)

Information resources about fisheries management in Atlantic Canada

[Map of Lobster Fishing Areas](#)

[Policy on Managing Bycatch](#)

Appendix C: Record of Cooperation and Consultation

The North Atlantic Right Whale is an aquatic species under the federal jurisdiction of Fisheries and Oceans Canada (DFO). It ranges seasonally through most of Atlantic Canadian waters and crosses international borders. This makes collaboration crucial to successful recovery of right whales. To assist in the recovery of this species and the development of this action plan, DFO drew upon the expertise of the RightWhale Recovery Network, whose active members are listed below. The recovery network provided the initial guidance on the format of this action plan, and has provided input at various stages in its development.

The draft Right Whale action plan was also reviewed by DFO sector representatives in Maritimes, Gulf, Quebec, and Newfoundland & Labrador regions, as well National Capital Region. The draft was circulated to relevant provincial government departments, including but not limited to, the Nova Scotia Department of Fisheries and Aquaculture and the New Brunswick Department of Agriculture, Aquaculture and Fisheries.

The draft action plan was shared with commercial fishing industry interests, fishery observers and seafood producers.

The draft document was circulated to regional First Nations and Aboriginal groups. Aboriginal people have representation through the recovery network.

All comments received during these reviews were considered and addressed as appropriate.

Right Whale Recovery Network participants

Sean Brilliant, Canadian Wildlife Foundation (CWF)
Cecelia Brooks, Assembly of First Nations Chiefs in New Brunswick (AFNCNB)
Moira Brown, New England Aquarium (NEAq) / Canadian Whale Institute (CWI)
Sarah Cheney, DFO RM, Southwest NB
William Colson, Maritime Aboriginal Peoples Council (MAPC)
Daryl Comeau, DFO-C&P
Jerry Conway, Campobello Whale Rescue Team (CWRT)
Luke deMarsh, AFNCNB
Isabelle Elliott, DFO-RM
Brenna Frasier, St. Mary's University (SMU)
Tim Frasier, SMU
Luke Gaulton, DFO Communications
David Gouveia, U.S. National Marine Fisheries Service (phone)
Laura Harris, DFO RM, Ottawa
Lei Harris, DFO Science (St. Andrews Biological Station)
Julia Kennedy-Francis, Assembly of First Nations Chiefs in New Brunswick (AFNCNB)
Melissa Landry, DFO RM, Ottawa
Rob MacIntosh, DFO Policy & Economics (P&E)
Ray MacIsaac, DFO SARMD (Gulf Region)
Jim McKinnon, DFO C&P
Joshua McNeely, Maritimes Aboriginal People's Council (MAPC)
Cathy Merriman, DFO Species at Risk Management Division (SARMD) (Maritimes Region)
Laurie Murison, Grand Manan Whale and Seabird Research Station (GMWSRS)
Andrew Newbould, DFO Resource Management (RM)
Leigh-Anne Outhouse, DFO SARMD (Maritimes)
Nick Paul, Maliseet Nation Conservation Council

Christine Penney, Clearwater Seafoods
Hubert Saulnier, Fundy Fixed Gear Council; Maritime Fishermen's Union
Heidi Schaefer, DFO SARMD (Maritimes)
Klaus Sonnenberg, Grand Manan Fisheries Association (GMFA)
Christa Waters, DFO RM
Alicia Williams, JAVITECH
Tonya Wimmer, World Wildlife Fund – Canada (WWF)
Bryan Wood, DFO Conservation and Protection (C&P)

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