

Report on the Progress of Recovery Strategy Implementation for the North Pacific Right Whale (*Eubalaena japonica*) in Canada for the Period 2012 to 2020

North Pacific Right Whale



2023

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« Rapport sur les progrès de la mise en œuvre du programme de rétablissement de la baleine noire du Pacifique Nord (*Eubalaena japonica*) dans les eaux canadiennes pour la période de 2012 à 2020 »

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Preface

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 the protection of species at risk throughout Canada. Under section 46 of the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the competent ministers are responsible for reporting on the implementation of the recovery strategy for a species at risk, and on the progress towards meeting its objectives within 5 years of the date when the recovery strategy was included on the Species at Risk Public Registry and in every subsequent 5-year period, until its objectives have been achieved or the species' recovery is no longer feasible.

Reporting on the progress of recovery strategy implementation requires reporting on the collective efforts of the competent minister(s), provincial and territorial governments and all other parties involved in conducting activities that contribute to the species' recovery. Recovery strategies identify broad strategies and approaches that will provide the best chance of recovering species at risk. Some of the identified strategies and approaches are sequential to the progress or completion of others and not all may be undertaken or show significant progress during the timeframe of a report on the progress of recovery strategy implementation (progress report).

The Minister of Fisheries and Oceans (DFO), and the Minister responsible for Parks Canada (PC) are the competent ministers under SARA for the North Pacific Right Whale and have prepared this progress report.

As stated in the preamble to SARA, success in the recovery of species at risk depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in the recovery strategy and will not be achieved by Fisheries and Oceans Canada, Parks Canada, or any other jurisdiction alone. The cost of conserving species at risk is shared amongst different constituencies. All Canadians are invited to join in supporting and implementing the Recovery Strategy for the North Pacific Right Whale for the benefit of the species and Canadian society as a whole.

Acknowledgments

This progress report was prepared by Tatiana Lee, with updates by Jessica Banning and Alannah Biega (DFO). This progress report has been prepared with input from DFO Science and Fisheries Management branches and Parks Canada. Fisheries and Oceans Canada greatly appreciates all individuals and organizations that contribute to the recovery of North Pacific Right Whales in Canada and abroad.

Executive summary

The North Pacific Right Whale (*Eubalaena japonica*) was listed as endangered under the *Species at Risk Act* (SARA) in 2006. The “Recovery Strategy for the North Pacific Right Whale (*Eubalaena japonica*) in Pacific Canadian Waters” was finalized and published on the Species at Risk Public Registry in 2011 ([DFO 2011a](#)).

The main threats identified for the North Pacific Right Whale include: marine traffic and ship strikes, anthropogenic noise, entanglement in fishing gear, and pollution.

The population and distribution objectives for North Pacific Right Whale are:

Short-term objective:

- 1) confirm the presence of North Pacific Right Whales in Pacific Canadian waters

Long-term objectives (contingent on first achieving the first objective above):

- 2) determine population structure, abundance, and seasonal distribution
- 3) work toward an increasing population trajectory
- 4) promote re-occupation of historical habitat in Pacific Canadian waters

The recovery objectives for the North Pacific Right Whale are:

Short-term objective:

- 5) characterize and determine the extent of potential habitat in Pacific Canadian waters

Long-term objective:

- 6) maintain or increase the relative proportion of Right Whales in Pacific Canadian waters compared to the whole population, by ensuring that as threats are identified, they do not significantly reduce potential habitat or distribution of the North Pacific Right Whale

The “Report on the Progress of Recovery Strategy Implementation for the North Pacific Right Whale in Canada for the Period of 2012 to 2020” (progress report) reports on the progress made by Fisheries and Oceans Canada (DFO) and its partners towards implementing the recovery strategy and achieving its objectives. Due to delays in completing the report on a 5 year cycle, an extension to the reporting period was established in order to capture the most up to date information. During this time period, progress has been made, notably:

- confirmation of the presence of North Pacific Right Whales in Pacific Canadian waters with 2 sightings by Canadian researchers in 2013, a third sighting in 2018 and a fourth in 2020
- collaboration with Indigenous groups, the United States National Oceanic and Atmospheric Administration (NOAA), other government programs, independent research organizations, academia in both Canada and the United States to advance efforts to gain knowledge and identify potential and occupied habitats for North Pacific Right Whales

- completion of annual multi-species cetacean surveys in areas where North Pacific Right Whales could be encountered
- completion of the 2018 Pacific Region International Survey of Marine Megafauna (PRISMM)
- development and implementation of mitigation measures to reduce threats to large whales, including for oil spill response and identification of hotspots for vessel collision risk
- development of outreach and education materials on cetaceans at risk in Canada, best boating practices in proximity of marine mammals, the *Species at Risk Act*, and the *Marine Mammal Regulations of the Fisheries Act*
- installation of new hydrophones in offshore and coastal waters that increase the chance of acoustic detections of North Pacific Right Whales in Canadian Pacific waters

In 2017, Fisheries and Oceans Canada (DFO) published the “Action Plan for Blue, Fin, Sei, and North Pacific Right Whales (*Balaenoptera musculus*, *B. physalus*, *B. borealis*, and *Eubalaena japonica*) in Canadian Pacific Waters” (DFO 2017). Given the rarity of sightings of North Pacific Right Whales in Canadian waters (4 between 2012 and 2020; 10 in 100 years) and their critically low population size (estimated at 50 animals), ongoing work will be required to address the remaining long-term objectives. It is not possible to identify critical habitat in Pacific Canadian waters given the lack of sightings and understanding of the current distribution of these whales. Work completed by DFO to assess and describe North Atlantic Right Whale critical habitat in Atlantic Canada may inform efforts for Pacific waters (for example, DFO 2014; DFO 2016).

In summary, some progress has been made towards meeting the goal, objectives, and performance measures presented in the recovery strategy but due to limited sightings and lack of data on population size, trends in population size cannot be evaluated. Continued monitoring and research is required to collect the data needed to build the body of knowledge on this species required to understand and mitigate threats to support recovery of North Pacific Right Whales in Canada.

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1 Introduction

The “Report on the Progress of Recovery Strategy Implementation for the North Pacific Right Whale (*Eubalaena japonica*) in Canada for the Period 2012 to 2020” (progress report) outlines the progress made towards meeting the objectives listed in the “Recovery Strategy for the North Pacific Right Whale (*Eubalaena japonica*) in Pacific Canadian Waters” (DFO 2011a) during the indicated time period. The reporting period covers 8 years of recovery strategy implementation in order to reflect the most up to date information and should be considered as 1 in a series of documents for this species that are linked and should be taken into consideration together; including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status reports ([COSEWIC 2004](#); [COSEWIC 2015](#)), and action plan ([DFO 2017](#)).

Section 2 of this progress report provides a summary of the threats to the species, population and distribution objectives for achieving its recovery, approaches to meeting those objectives, and performance measures to measure the progress of recovery. For more details, readers should refer back to the recovery strategy (DFO 2011a). For more information on the status of North Pacific Right Whale recovery, see Section 3, which reports on implemented activities associated with the performance measures identified in the recovery strategy in support of achieving the population, distribution and recovery objectives, and Section 4, which summarizes the progress toward achieving the objectives.

2 Background

2.1 COSEWIC assessment summary and threats to the species

The listing of the North Pacific Right Whale under the *Species at Risk Act* (S.C. 2002, c.29) (SARA) in 2006, led to the development and publication of the “Recovery Strategy for the North Pacific Right Whale (*Eubalaena japonica*) in Pacific Canadian Waters” in 2011 (recovery strategy). The recovery strategy is consistent with the information provided in the COSEWIC status report (COSEWIC 2004) and the COSEWIC summary information is included in section 1.1 of the recovery strategy.

In 2015, COSEWIC re-examined and confirmed the status of the North Pacific Right Whale as endangered (COSEWIC 2015).

Section 1.5 of the recovery strategy provides information on the threats to the species’ survival and recovery. These threats include: ship strikes and marine traffic, entanglement in fishing gear, anthropogenic noise, and pollution (DFO 2011a).

Critical habitat for the North Pacific Right Whale has not yet been identified. Section 2.7.2 of the recovery strategy includes a schedule of studies that outlines the research required to identify critical habitat to achieve the species’ recovery objectives (DFO 2011a). Progress in undertaking the schedule of studies is reported on in section 3.2 of this document.

2.2 Recovery

This section summarizes the information, found in the recovery strategy (DFO 2011a), on the population and distribution objectives and recovery objectives that are necessary for the recovery of the North Pacific Right Whale.

Table 1 lists the short- and long-term population, distribution, and recovery objectives (collectively referred to as recovery objectives) along with corresponding performance measures, which provide a way to define and measure progress toward achieving the objectives. The questions outlined in the performance measures are answered in table 4 of this report.

Objectives 2, 3, 4, and 6 (table 1) represent long-term objectives for North Pacific Right Whale recovery for which measurable results or sufficient information/data to evaluate progress towards completion may have not been acquired within the timeframe of this progress report. For these objectives, the implementation of the recovery approaches and critical habitat studies will help support progress towards achievement of the related performance measures.

Table 1. Recovery objectives and corresponding performance measures for the North Pacific Right Whale as found in table 4 of the recovery strategy (DFO 2011a).

Recovery objective	Performance measure
1) Confirm the presence of Right Whales in Pacific Canadian waters	<ul style="list-style-type: none"> • was the network of acoustic monitoring instruments to monitor for the presence of Right Whales in Pacific Canadian waters expanded? • were multi-species surveys conducted off the Pacific Canadian coast? • was support of the British Columbia (BC) Cetacean Sightings and BC Marine Mammal Response Network continued? • was the presence of Right Whales confirmed in Pacific Canadian waters?
2) Determine population structure, abundance, and seasonal distribution	<ul style="list-style-type: none"> • were multi-species surveys conducted off the Pacific Canadian coast? • was coordination undertaken with international research efforts on Right Whales to ensure photographic identification and collection of skin samples in order to contribute to our understanding of migratory behaviour and animal affiliation? • were genetic studies of available samples (including skeletal remains) of the North Pacific Right Whale undertaken?
3) Work toward an increasing population trajectory	<ul style="list-style-type: none"> • was the North Pacific Right Whale population number observed to increase? • was the BC Marine Mammal Response Network supported to track and respond to threats that involve injury or mortality to individual whales? • was it ensured that no human-induced mortality of Right Whales occurred in Pacific Canadian waters? • when threats were identified through research or circumstance, were immediate steps taken to minimize impacts of the threats?
4) Promote re-occupation of historical habitat in Pacific Canadian waters	<ul style="list-style-type: none"> • were North Pacific Right Whales observed in historical habitat? • when threats were identified through research or circumstance, were immediate steps taken to minimize impacts of the threats?
5) Characterize and determine the extent of potential habitat in Pacific Canadian waters	<ul style="list-style-type: none"> • were preferred habitats of Right Whales worldwide characterized in order to identify potential important habitats in Pacific Canadian waters?

Recovery objective	Performance measure
6) Maintain or increase the relative proportion of Right Whales in Pacific Canadian waters compared to the whole population, by ensuring that as threats are identified, they do not significantly reduce potential habitat or distribution of the North Pacific Right Whale	<ul style="list-style-type: none"> • was information on human impacts on Right Whales and other cetaceans worldwide continued to be evaluated in order to determine whether similar activities in Pacific Canadian waters could affect the Right Whale? • were mitigation measures that have been effective for Right Whales in other areas and other cetaceans reviewed, and where appropriate, incorporated into mitigation planning and protocols for the North Pacific Right Whale? • was it ensured that no human-induced mortality of Right Whales occurred in Pacific Canadian waters? • when threats were identified through research or circumstance, were immediate steps taken to minimize impacts of the threats?

3 Progress towards recovery

The recovery strategy for the North Pacific Right Whale (DFO 2011a) divides the recovery effort into 3 broad strategies: 1) scientific research, 2) threats research, and 3) mitigation and protection. Progress in carrying out activities associated with these broad strategies is reported on in section 3.1. Section 3.2 reports on the activities identified in the schedule of studies to identify critical habitat. Section 3.3 reports on the progress towards meeting the performance measures identified in the recovery strategy and information obtained through implementing the recovery strategy.

3.1 Activities supporting recovery

Table 2 provides information on the implementation of activities undertaken to address the approaches and broad strategies identified in the recovery planning table (table 3) of the recovery strategy (DFO 2011a). All activities reported in sections 3.1 are 'in progress' meaning that the planned activity is underway and has not concluded.

Table 2. Details of activities supporting the recovery of the North Pacific Right Whales from 2012 to 2020.

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
<p>1) Conduct multi-species surveys focusing on areas formerly occupied by Right Whales in Pacific Canadian waters</p>	<p>Scientific research</p>	<p>Since 2002, annual multi-species cetacean surveys have been conducted by Fisheries and Oceans Canada (DFO) science. These surveys cover offshore and inshore waters of British Columbia (BC) coast, including areas with confirmed North Pacific Right Whale sightings.</p> <p>There have been 4 sightings of North Pacific Right Whales in Canadian waters between 2012 and 2020. In 2013, 2 separate confirmed North Pacific Right Whale sightings were recorded in Canadian waters (Ford et al. 2016): the first sighting occurred in June off the west coast of Haida Gwaii and the second in October off southwestern Vancouver Island. In June 2018, a confirmed North Pacific Right Whale was sighted by Canadian Coast Guard Services (CCGS) off the west coast of Haida Gwaii. No North Pacific Right Whales were observed during the most recent survey completed in 2019. In May 2020, a confirmed North Pacific Right Whale was sighted by a cargo ship off Brooks Peninsula on West Coast Vancouver Island.</p> <p>Additionally, the following survey efforts were undertaken but did not result in any North Pacific Right Whale sightings:</p> <ul style="list-style-type: none"> • between 2012 and 2015, 34 aerial surveys were conducted in fall and winter in the waters off the west coast of Vancouver Island to assess vessel strike risk to large whales (Nichol et al. 2017b) • in summer 2018, DFO carried out the Pacific Region International Survey of Marine Megafauna (PRISMM). This extensive inshore and offshore survey aimed to provide further information on the distribution and abundance of marine mammals off BC’s coast based on both visual and acoustic data collection • in summer 2019, the Parks Canada (PC) Gwaii Haanas field unit led a collaborative Haida Nation- 	<p>1, 2</p>	<p>DFO, CCGS, PC</p>

¹ Lead participant(s) is/are listed on top and in bold; other participants are listed alphabetically

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>DFO-PC-academia multi-species and multi-disciplinary survey along the west coast of Haida Gwaii</p>		
<p>2) Expand network of acoustic monitoring instruments to monitor for the presence of North Pacific Right Whales and other cetaceans in Pacific Canadian waters</p>	<p>Scientific research</p>	<p>DFO-led acoustic monitoring:</p> <p>Acoustic monitoring efforts in Canadian Pacific waters have expanded significantly in recent years. Over the course of this reporting period, DFO Science deployed 89 autonomous acoustic recording instruments in inshore and offshore waters within Canadian habitat formerly occupied by North Pacific Right Whales (Pilkington, pers. comm. 2021). Deployment locations include 3 locations spanning the west side of Haida Gwaii, including the 2 locations where North Pacific Right Whale were previously sighted (Nichol, pers. Comm. 2021). From 2017 to 2020 (and ongoing), DFO collaborated with PC and the Council of the Haida Nation to deploy a hydrophone off the west coast of Gwaii Haanas to monitor underwater noise levels and cetacean activity (Lee, pers. comm. 2021). In 2018, DFO also deployed 2 hydrophones off the west coast of Haida Gwaii north of Gwaii Haanas, which are included in the total 89 deployed from 2012 to 2020 (Pilkington, pers. comm. 2021).</p> <p>Partner-based acoustic monitoring:</p> <p>During this reporting period, environmental non-government research partners including North Coast Cetacean Society (NCCS), Saturna Island Marine Research and Education Society (SIMRES) and Clayoquot Biosphere Trust (CBT) have also deployed and monitored hydrophones along BC's coasts, supported by <i>Species at Risk Act</i> (SARA) funding programs such as Habitat Stewardship Program (HSP) and Canada Nature Fund for Aquatic Species at Risk (CNFASAR). Their work contributes to the overall network of underwater listening stations throughout habitats for large whales in Pacific Canadian waters.</p>	<p>1, 2</p>	<p>DFO, Transport Canada (TC), Council of the Haida Nation, Environmental Non-Governmental Organizations (ENGOS), Industry, PC</p>

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
<p>3) Continue to support the BC Cetacean Sightings and BC Marine Mammal Response Network to take advantage of opportunistic sightings</p>	<p>Scientific research</p>	<p>The Government of Canada has supported the BC Cetacean Sightings Network (BCCSN) and the BC Marine Mammal Response Network over the period of this report. The BCCSN is an Ocean Wise Conservation Association program that solicits sightings of cetaceans in BC waters from a network of observers comprised of coastal citizens, professional mariners, ecotourism operators, and other groups. Throughout this reporting period, the BCCSN successfully received annual funding for program delivery through the Government of Canada’s HSP. No confirmed sightings of North Pacific Right Whale were reported to the BCCSN during this reporting period.</p> <p>The BCCSN conducts cetacean identification training including information on North Pacific Right Whales with fisheries observers, professional mariners, Coastal Guardian Watchmen, and other groups. This training supports the collection of opportunistic sightings data for North Pacific Right Whales and other cetaceans, and can inform seasonal distribution of all observed cetacean species. Since 2018, sightings reported in real-time have been used to alert captains of large commercial vessels of whales in their vicinity via the Whale Report Alert System (WRAS) to reduce risks of ship strike and acoustic and physical disturbance in the waters of BC, Washington, and southeast Alaska.</p> <p>PC staff report all opportunistic cetacean sightings including North Pacific Right Whale, to the BCCSN as part of marine monitoring programs in Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, Haida Heritage Site (Lee, pers. comm. 2021), Pacific Rim National Park Reserve, and Gulf Islands National Park Reserve (Yakimishyn, pers. comm. 2021).</p> <p>No sightings or incidents involving North Pacific Right Whales were reported through the BC Marine Mammal Response Network from 2012 through 2020 (Cottrell, pers. comm. 2021).</p>	<p>1, 2</p>	<p>DFO, Ocean Wise, ENGOS, general public, PC, TC</p>

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>More information on the BC Marine Mammal Response Network is included under approach 11.</p>		
<p>4) Coordinate with international research efforts on Right Whales to ensure that photographic identification and skin samples are collected and shared in order to contribute to our understanding of migratory behaviour and animal affiliation</p>	<p>Scientific research</p>	<p>In 2013, 2 North Pacific Right Whales in Canadian Pacific waters were photographed to determine if they were previously sighted outside Canadian waters (by international researchers). Identification photos were shared with colleagues at United States National Oceanic and Atmospheric Administration (NOAA). Neither animal matched any individual in the NOAA Marine Mammal Lab's 'North Pacific Right Whale photo-identification catalogue', and thus these are considered 2 new, never before encountered, individuals. Skin and scat samples were collected from 1 of the animals, encountered in June 2013 off Haida Gwaii.</p> <p>Photos taken by CCGS and cargo ship crew from the 2018 and 2020 sightings respectively, were opportunistic sightings that were reported to DFO. Photos from these sightings were taken with sufficient resolution to confirm species but not to identify individuals. Genetic samples were not collected from either of the opportunistic sightings (Nichol, pers. comm. 2021).</p>	<p>1, 2</p>	<p>DFO, NOAA, Academia, Independent researchers,</p>
<p>5) Undertake genetic studies of available samples (including skeletal remains) of the North Pacific Right Whale</p>	<p>Scientific research</p>	<p>Genetic analyses of samples collected from the June 2013 Haida Gwaii encounter showed the individual to be a female, and visual observations suggested it was a sub-adult. Analyses confirmed that it was a North Pacific Right Whale but that it had a haplotype, or genetic material, different from those yet reported for this species (Ford et al. 2016).</p> <p>Based on length, the second animal (sighted in October 2013) was determined to be a sexually mature individual. Due to equipment malfunction, no genetic samples were collected from the whale sighted in October 2013, and gender could not be determined. Genetic samples were not collected, and gender was not determined for the June 2018 and May 2020 sightings, as they were opportunistic sightings reported to DFO (Nichol, pers. comm. 2022).</p>	<p>1, 2</p>	<p>DFO</p>

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>There were no additional opportunities to collect biological samples due to limited sightings during the period of this report (Nichol, pers. comm. 2021).</p>		
<p>6) Characterize preferred habitats of Right Whales worldwide to identify potential important habitats in Pacific Canadian waters</p>	<p>Scientific research</p>	<p>Research to characterize preferred habitat of Right Whales has begun; this measure will remain ongoing as more acoustic or visual sighting data are collected on North Pacific Right Whales worldwide and in Pacific Canadian waters.</p> <p>Preferred habitat characterization in Canada:</p> <p>Analyses of acoustic data for Pacific Canadian waters, which can serve in identifying preferred habitat, are ongoing. DFO has formalized a collaboration with NOAA, and North Pacific Right Whale experts to help process and analyse DFO Science Passive Acoustic Monitoring datasets to detect North Pacific Right Whale (Pilkington, pers. comm. 2021).</p> <p>Nichol and Ford (2012) provided information to assist in the assessment of Pacific Canadian critical habitat for large cetaceans, including North Pacific Right Whale. They concluded that due to limited ship survey effort and acoustic monitoring in offshore areas of BC, there is not yet information with which to identify important habitats in Pacific Canadian waters for North Pacific Right Whales.</p> <p>Previous work has looked at North Pacific Right Whale habitat suitability based on historic whaling records, and found high habitat suitability extending from Haida Gwaii to the central Gulf of Alaska (Gegr 2011). The area off the west coast of Haida Gwaii where the June 2013 sighting took place is within where Gegr (2011) predicted early summer suitable habitat for North Pacific Right Whales (Ford et al. 2016). Ford et al. (2016) observed vigorous feeding behaviour by the whale (over 3 days of observation). The whale was feeding at the surface on the large calanoid copepod, <i>Neocalanus plumchrus</i> (C4 and C5 stages) (Ford et al. 2016).</p>	<p>5</p>	<p>Academia, DFO</p>

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>In 2014, the “Recovery Strategy for the North Atlantic Right Whale in Canada” (DFO 2014) was amended to provide additional information on the species’ critical habitat under SARA. Aspects of the habitat necessary for survival and recovery of North Atlantic Right Whale include areas with predictable inter-annual copepod concentrations to support foraging success (DFO 2014). Areas that allow for unrestricted migration and movement corridors, quality of water, air (for example, pollution) and of the underwater acoustic environment are also noted. This information may be relevant for understanding habitat needs of the North Pacific Right Whale.</p> <p>For further discussions on research in other regions of Canada, including for North Atlantic Right Whales, refer to approach 7 below and table 4.</p>		
<p>7) Continue to evaluate information on human impacts on Right Whales and other cetaceans worldwide to determine whether similar activities in Pacific Canadian waters could affect the Right Whale</p>	<p>Threats research</p>	<p>Threats to North Pacific Right Whales include ship strikes and marine traffic, entanglement in fishing gear, anthropogenic noise, and pollution. The research summarized below provides information on how human activities impact the North Atlantic Right Whale and other large whales, however, the degree to which this applies to North Pacific Right Whales is unknown due to the rarity of sightings and other data on this population.</p> <p>Ship strike and entanglement:</p> <p>Sharp et al. (2019) summarized information from 70 Right Whale mortalities that were documented between 2003 and 2018 from Florida in the United States to the Gulf of St. Lawrence, Canada. The cause of death was determined in 43 cases, of which 88.4% was attributed to human threats (57.9% attributed to entanglements and 42.1% attributed to vessel strikes). Entangled whales were carrying multifilament twisted lines or ropes, 4 of which had attached polyballs, 1 of</p>	<p>3, 4, 6</p>	<p>Academia, DFO</p>

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>which had attached bullet buoys, and 2 of which had attached traps or portions of traps. Identifying the gear origin was possible in 5 out of 14 (35.7%) cases, all of which were recognized as Canadian snow crab fishing gear. Of note, the prevalence of mortalities attributed to entanglements increased from 21% (1970 to 2002) to 51% (2003 to 2018) and the prevalence of mortalities attributed to vessel strikes decreased from 74% (1970 to 2002) to 42.1% (2003 to 2018).</p> <p>Information on impacts and threats to North Atlantic Right Whales may refine threat information for North Pacific Right Whales in Canada. In summer 2017, 12 North Atlantic Right Whale mortalities and 5 live-entanglements were reported in the Gulf of St. Lawrence. Necropsies determined that entanglement and ship strike were the primary causes of mortality for 7 of these individuals. These findings coincided with significant fisheries and maritime traffic in the area (Daoust et al. 2018). This is consistent with the potential current threats to North Pacific Right Whale that are identified in the recovery strategy (vessel strike, entanglement) and the individual North Pacific Right Whale sighted in October 2013 off the west coast of Vancouver Island exhibited severe scarring consistent with a past entanglement (Ford et al. 2016).</p> <p>In 2019, 8 North Atlantic Right Whale mortalities were reported in Canadian waters; necropsies completed for 5 of the 8 whales concluded that ship strikes were likely the primary cause of mortality for these individuals (Bourque et al. 2020).</p> <p>Since 2017, DFO and TC have implemented fisheries and vessel traffic management measures respectively, that are reviewed and adapted annually in order to respond to the significant shift in distribution of the species.</p>		

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>Pollution:</p> <p>Hannah et al. (2017) applied the toxic spills vulnerability framework developed by Thornborough et al. (2017) to determine its suitability to assess “marine biological components” in the Pacific Region and to ensure consideration of all taxa, including marine mammals, in regional oil spill response planning. Information considered included: “marine mammals with feeding structures vulnerable to clogging (for example, baleen whales), subgroups containing species with reduced population levels as indicated by conservation status, species with low reproductive capacity”. Application of this framework to the North Pacific Right Whale indicates a medium risk level for acute impacts of toxic spills.</p> <p>Rosenberger et al. (2017) developed a species-specific conceptual framework to assess potential impact of oil spill exposure on 21 marine mammal species in BC. North Pacific Right Whales were ranked as high risk for oil spill impacts to individuals and at a population level.</p> <p>Anthropogenic noise:</p> <p>The 2010 to 2016 Southern California Behavioural Response Study (SOCAL-BRS) aimed to address questions surrounding risks and effects of mid-frequency military sonar on marine mammals. As part of that study, Goldbogen et al. (2013) determined that controlled exposure to mid-frequency sonar significantly affected Blue Whale feeding behaviour in the Southern California Bight area. Other publications from this research effort include Southall et al. (2015) and Southall (2012). This information may be useful when reviewing effectiveness of policies and programs for seismic and sonar mitigation for large whales.</p>		
8) Review mitigation measures that have been effective	Threats research	Threats and mitigation measures for other large whales are summarized in the “Report on the Progress of Recovery Strategy Implementation for Blue, Fin and Sei Whales	Objective 3, 4, 6	DFO, TC, CCGS, Council of the Haida

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
<p>for Right Whales and other cetaceans, and where appropriate, incorporate such measures into mitigation planning and protocols for the North Pacific Right Whale</p>		<p>(<i>Balaenoptera musculus</i>, <i>B. physalus</i> and <i>B. borealis</i>) for the period 2012 to 2017” (DFO 2022). These measures for other large cetaceans are likely to be effective for mitigating threats to North Pacific Right Whales in Canadian waters as threats, distributions and habitat overlap with that of North Pacific Right Whales. For more information see: Natural Energy Board (NEB) (2018), DND (2008), National Marine Fisheries Service (NMFS) (2018), DFO (2011b), CCGS-USCG (2013), and approach 7 above.</p> <p>Additionally, the Government of Canada and several partners have taken action through multiple initiatives to mitigate threats to cetaceans. For example:</p> <ul style="list-style-type: none"> • as part of the Ocean Protection Program (OPP) and Planning for Integrated Environmental Response, the Government of Canada in collaboration with partners is developing stronger regional emergency response plans to mitigate impacts in the event of a spill. A draft marine mammal-specific operational manual for BC waters is under internal review (Herborg, pers. comm. 2021) • in 2015, the PC Gwaii Haanas field unit began participating in a TC and Council of the Haida Nation led initiative to create a Place of Refuge Contingency Plan for Haida Gwaii. Oil spill preparedness activities for SARA-listed species, including North Pacific Right Whale, are included in the Multi-species Action Plan for Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site (PCA 2016). Work on a Gwaii Haanas Geographic Response Plan and Geographic Response Strategies was ongoing in 2019 to 2020 in collaboration with the Council of the Haida Nation and other agencies to coordinate with Haida Gwaii marine spill response planning initiatives • in 2018, the BCCSN convened a Whale Entanglement Workshop aimed to educate mariners about proper 		<p>Nation, ECCC, ENGOs, NOAA, Ocean Wise, PC, Government of BC</p>

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>reporting and documentation of entangled cetaceans. The workshop was attended by those perceived to be most likely to encounter an entangled cetacean including: researchers, ENGOs, ecotourism operators, fishermen, and professional mariners. The workshop resulted in the development of a Mariner’s Guide to Reporting Entanglements in Western Canada (Ocean Wise Research Institute 2019)</p> <ul style="list-style-type: none"> • in the Atlantic, measures to mitigate the threat of vessel strike to North Atlantic Right Whale have included a voluntary speed restriction and mandatory slow-down zone in 2017 during a portion of the year, based on whale presence (reduced speed to a maximum of 10 knots in an area of the Gulf of St. Lawrence totalling 62,803 km² [DFO 2018a]). Measures to mitigate the threat of entanglement to North Atlantic Right Whale have included in-season fisheries closures and a real-time whale detection system to alert mariners and fishers to whale presence (DFO 2018b). DFO publishes daily updates on fishery management measures and initiatives in Atlantic Canada and Quebec to prevent entanglements in fishing gear. It is too early to determine whether this has resulted in a trend of decreasing mortalities or live-entanglements (Pettis et al. 2020) <p>Advancements have also been made through research that can help inform mitigation planning for North Pacific Right Whale. For example:</p> <ul style="list-style-type: none"> • preliminary studies suggest Right Whales can detect red and orange simulated ropes at greater distances than black ropes (Kraus and Hagbloom 2016), which may suggest adopting these colours might improve Right Whales ability to avoid entanglements • Hamilton and Kraus (2019) assessed the risk of entanglement in fishing groundlines on the seafloor. Mud was found on whales of all age classes including 		

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>calves of the year, and equally among males and females. These observations suggest that any rope resting on, or floating above, the seafloor could pose an entanglement hazard. Although the use of sinking groundlines likely reduces the risk of entanglements for whales swimming near the seafloor (and should still be considered to be used throughout the species range until ropeless technology is available), they may not eliminate the risk for whales making contact with the sea floor</p> <ul style="list-style-type: none"> • Brillant et al. (2017) estimated the risk of lethal fishing gear entanglements in the Bay of Fundy, Scotian Shelf and the Gulf of St. Lawrence. Possible measures to reduce the likelihood of entanglement in fixed gear through spatial and temporal fishery closures were identified • Howle et al. (2019) developed an interactive simulator that allows users to gain a better understanding of how entanglements might occur which may aid scientists, managers, and gear designers in understanding entanglement dynamics and testing potential new gear configurations • the risk of lethal vessel strike increases with vessel speed (Vanderlaan and Taggart 2007; Conn and Silber 2013; Kelley et al. 2021²). Consequently, speed reductions to 10 knots or less in areas where whales and vessels co-occur can help reduce the likelihood of lethal encounters 		

² While outside of the reporting period of this progress report, Kelley et al. (2021) developed a biophysical model for predicting lethal injury as a function of several vessel and whale properties (for example, vessel size, vessel speed, whale size, blubber thickness). The model indicated that vessels of all sizes can cause lethal injury to whales, and large vessels can cause lethal injury even when travelling at reduced speeds (that is, 10 knots or less). The paper presents information on predicting lethality from previous studies and discusses management implications of vessel slowdowns and measures to avoid areas of vessels and whales co-occurrence.

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<ul style="list-style-type: none"> see NARW risk reduction report prepared by Canadian Wildlife Federation under contract for DFO (Cole and Brilliant 2021) <p>Note that the mitigation measures related to avoidance of ship strike and noise as well as fishery interactions cannot be applied for this population given the limitation of the sparse sightings data, specifically 4 sightings over a period of 8 years.</p>		
<p>9) Where possible, maintain prohibitions against human-induced mortality of North Pacific Right Whales in Canadian waters</p>	<p>Mitigation and protection</p>	<p>Pursuant to s.43 of the <i>Fisheries Act</i>, the Marine Mammal Regulations provide direction on conservation and protection of marine mammals, provide guidance for recovery of at-risk species under the <i>Species at Risk Act</i>, and set out provisions related to reducing human disturbance of marine mammals and mandatory reporting requirements in the case there is accidental contact with a marine mammal and a vessel or fishing gear. These regulations were amended in 2018 and now specify mandatory requirements to prevent disturbance of marine mammals (Canada Gazette II 2018).</p> <p>DFO regulates and/or permits research projects and development projects involving marine mammals including research, transport, rehabilitation, possession, and/or works, undertakings or activities related to development projects, amongst others. Authorizations, permits and licenses are issued under the authority of the <i>Fisheries Act</i>, the <i>Species at Risk Act</i> (SARA), the <i>Fisheries (General) Regulations</i>, and the <i>Marine Mammal Regulations</i>. Review of applications for permits, authorizations or licences ensure activities are assessed thoroughly to eliminate or avoid human impact to marine mammals. Where there are unavoidable impacts to marine mammals, including disturbance, a permit or authorization would be issued by DFO and would include a series of conditions depending on the nature of the activity (Rotinsky, pers. comm. 2023).</p>	<p>3, 4, 6</p>	<p>DFO</p>

Approach	Broad strategy	Descriptions and results	Recovery objectives	Participants ¹
		<p>No human-induced mortality of North Pacific Right Whales in Canadian Pacific waters was permitted or reported within the timeframe of this report.</p>		
<p>10) When threats are identified through research or circumstance, take immediate steps to minimize impacts of threats</p>	<p>Mitigation and protection</p>	<p>There are currently no management measures in place to minimize impacts to North Pacific Right Whale specifically, given the rarity of sightings in Canadian Pacific waters. Management measures currently in place target marine mammals or whales more generally. While these overarching measures, such as the disturbance prohibitions and approach distances laid out in the <i>Marine Mammal Regulations</i> under the <i>Fisheries Act</i> may provide benefit to the conservation of North Pacific Right Whale, they were not developed to target North Pacific Right Whale specifically.</p> <p>New threats to North Pacific Right Whales were not identified during the period of this report. Efforts outlined in the approaches 7, 8, and 9 (see above) will inform future actions to protect North Pacific Right Whales. Mitigation measures applicable for North Pacific Right Whales are listed under approach 8.</p>	<p>3, 4, 6</p>	<p>DFO</p>
<p>11) Support the BC Marine Mammal Response Network to track and respond to threats that involve injury or mortality to individual whales</p>	<p>Mitigation and protection</p>	<p>During this reporting period, DFO Pacific Region has continued to lead and support the BC Marine Mammal Response Network in Canadian Pacific waters. The DFO Marine Mammal Response Program (MMRP) works with the province, ENGOs, Indigenous groups, PC, and other partners to respond to reports of dead and distressed marine mammals. The MMRP conducts disentanglements and necropsies, as well as documents evidence of human interactions. The MMRP did not receive any incident reports for North Pacific Right Whale from 2012 through 2020.</p> <p>Information on how to report an entangled cetacean to DFO has been included in the BCCSN's citizen science reporting app, WhaleReport, since 2015. In 2019, a feature was added to WhaleReport to automatically notify DFO by email if an observer reported a dead or distressed cetacean.</p>	<p>3, 4, 6</p>	<p>DFO, ENGOs, Indigenous groups, PC, Government of BC</p>

3.2 Activities supporting the identification of critical habitat

Table 3 provides information on the implementation of the studies outlined in the schedule of studies to identify critical habitat found in the recovery strategy (DFO 2011a). Each study has been assigned 1 of 4 statuses:

- 1) completed: the study has been carried out and concluded
- 2) in progress: the planned study is underway and has not concluded
- 3) not started: the study has been planned but has yet to start
- 4) cancelled: the planned study will not be started or completed

Table 3. Status and details on the implementation of the schedule of studies outlined in the recovery strategy for the North Pacific Right Whale (DFO 2011a).

Study	Timeline	Status	Descriptions and Results	Participants ³
1) Investigate effects of variation in oceanographic conditions on whale occurrence; relationship of Right Whales with primary prey species; and potential habitat characteristics in Pacific Canadian waters	2003 to 2013	In progress	The intent of this proposed activity was to determine a way to predict the distribution of this species in the absence of survey data (sightings and effort). Data from acoustic monitoring and ship based surveys remain limited given the rarity of this species so a methodological approach to predict habitat is still needed. Gregn (2011) and Nichol and Ford (2012) provided initial habitat assessments for North Pacific Right Whale; however, continued acoustic monitoring in offshore areas followed by dedicated ship surveys is required to clarify habitat needs and usage.	Academia, Fisheries and Oceans Canada (DFO)
2) Develop network of acoustic monitoring stations to determine whale occurrence from passive recording of distinctive vocalizations	2003 to 2019	In progress	Acoustic monitoring efforts in Canadian Pacific waters have expanded significantly in recent years. See table 2, approach 2 for details.	DFO, Transport Canada, Academia, Environmental Non-Governmental Organizations (ENGOS),

³ Lead participant(s) is/are listed on top and in bold; other participants are listed alphabetically.

Study	Timeline	Status	Descriptions and Results	Participants ³
				Indigenous groups, PC
3) Determine and characterize occupied high-use habitat and define potential critical habitat regions with similar characteristics	To be determined	In progress	Extreme data limitations for this species in Canada continue to impede progress on this activity. Nichol and Ford (2012) provided an initial assessment of important habitats for large whales in Pacific Canadian waters, including for North Pacific Right Whale; however, areas of high-use or important habitat could not be identified due to limited ship survey effort and acoustic monitoring in offshore areas of British Columbia. The recent confirmed sightings of the species within Pacific Canadian waters may assist in completing this activity.	Academia, DFO, ENGOS

3.3 Summary of progress towards recovery

3.3.1 Status of performance measures

Table 4 provides a summary of the progress made toward meeting the performance measures outlined in table 1. Each measure has been assigned 1 of 4 statuses:

- 1) not met: the performance measure has not been met, and little to no progress has been made
- 2) partially met, underway: moderate to significant progress has been made toward meeting 1 or more elements of the performance measure, and further work is ongoing or planned
- 3) met: the performance measure has been met and no further action is required
- 4) met, ongoing: the performance measure has been met, but efforts will continue until such time the population is considered to be recovered

Table 4. Progress and details of the progress made toward meeting the performance measures outlined in the recovery strategy for the North Pacific Right Whale (DFO 2011a).

Performance measure	Status	Details
Was the network of acoustic monitoring instruments to monitor for the presence of Right Whales in Pacific Canadian waters expanded?	Met, ongoing	Yes. See table 2, approach 2 for additional detail.
Were multi-species surveys conducted off the Pacific Canadian coast?	Met, ongoing	Yes. See table 2, approach 1 for additional detail.

Performance measure	Status	Details
Was support of the British Columbia (BC) Cetacean Sightings and BC Marine Mammal Response Networks continued?	Met, ongoing	<p>Yes. During the period of this report, British Columbia Cetacean Sightings Network successfully received funding through the Habitat Stewardship Program (HSP).</p> <p>During the period of this progress report, the British Columbia Marine Mammal Response Network efforts in Pacific Canadian waters were led and supported by Fisheries and Oceans Canada (DFO) Pacific Region's Marine Mammal Response Program. DFO works with the Government of BC, Environmental Non-Governmental Organizations, Indigenous groups, and other partners to respond to reports of dead and distressed marine mammals.</p> <p>See table 2, approach 3 for additional detail.</p>
Was the presence of Right Whales confirmed in Pacific Canadian waters?	Met, ongoing	<p>Yes. During the period of this progress report, the presence of North Pacific Right Whales in Pacific Canadian waters was confirmed by 4 verified sightings: 2 in 2013, 1 in 2018, and another in 2020.</p> <p>See table 2, approach 1 for additional detail.</p>
Was coordination undertaken with international research efforts on Right Whales to ensure that photographic identification and skin samples were collected in order to contribute to our understanding of migratory behaviour and animal affiliation?	Met, ongoing	<p>Yes. DFO researchers and United States (US) colleagues collaborated on data analyses for the 2013 sightings. See table 2, approach 4 for additional detail.</p>
Were genetic studies of available samples (including skeletal remains) of the North Pacific Right Whale undertaken?	Partially met, underway	<p>Yes. Genetic samples were taken from 1 North Pacific Right Whale sighted in June 2013. See table 2, approach 5 for additional detail. No other genetic samples were collected over the reporting period.</p>
Was the North Pacific Right Whale population number observed to increase?	Not met	<p>No. Due to extremely limited sightings and lack of data on population size, population trends could not be assessed. While the 4 sightings within this reporting period confirm that North Pacific Right Whales have not been extirpated from Canadian Pacific waters, the population size or trajectory remains unknown.</p>

Performance measure	Status	Details
Was the BC Marine Mammal Response Network supported to track and respond to threats that involve injury or mortality to individual whales?	Met, ongoing	Yes. However, no incidents involving North Pacific Right Whales were reported from 2012 through 2020. The animal observed in October 2013 exhibited scarring consistent with entanglement (Ford et al. 2016). See table 2, approach 3 for additional detail.
Was it ensured that no human-induced mortality of Right Whales occurred in Pacific Canadian waters?	Not met	No. This cannot be assessed at this time due to data limitations. No human-induced mortality of North Pacific Right Whales in Canadian waters was reported or permitted with the period of this progress report; however, given the rarity of sightings and data of North Pacific Right Whales in Pacific Canadian waters, it is not possible to gauge level of human-induced mortality at this time. See table 2, approach 9 for additional detail.
When threats were identified through research or circumstance, were immediate steps taken to minimize impacts of the threats?	Not met	No. This cannot be assessed at this time due to data limitations. The lack of data on North Pacific Right Whales in Canadian waters precludes development of species-specific threat mitigation measures. Threats to North Pacific Right Whales have been identified to the extent possible, using information on severity and impact for other cetaceans. See table 2, approaches 7, 8, 9, and 10 for additional detail.
Were North Pacific Right Whales observed in historical habitat?	Met, ongoing	Yes. A total of 4 confirmed sightings of North Pacific Right Whales in Canadian waters were recorded during the time frame of this report.
Were preferred habitats of Right Whales worldwide characterized in order to identify potential important habitats in Pacific Canadian waters?	Not met	No. This cannot be assessed at this time due to data limitations. No habitat modelling for North Pacific Right Whales occurred during the period of this progress report. See table 2, approach 6, and table 3, studies 1 and 3 for further detail.
Was information on human impacts on Right Whales and other cetaceans worldwide continued to be evaluated in order to determine whether similar activities in Pacific Canadian waters could affect the Right Whale?	Met, ongoing	<p>Yes. Extensive research has been carried out that relate to threats and impacts to large cetaceans that may increase understanding of threats and impacts on North Pacific Right Whales in Canada. Examples of results of such research that may be relevant to the North Pacific Right Whale population include:</p> <ul style="list-style-type: none"> • Themelis et al. (2016) summarized information on human-induced serious injury and mortality to cetaceans, including Right Whales • Hannah et al. (2017) assessed vulnerability of marine species to toxic spills • Nichol et al. (2017a) analysed ship strike risk off south-western Vancouver Island BC for Humpback and Fin Whales

Performance measure	Status	Details
		<ul style="list-style-type: none"> • Erbe et al. (2014) identified noise hotspots off Prince Rupert and in Hecate Strait where high levels of anthropogenic underwater noise overlaps with increased Fin Whale densities • Goldbogen et al. (2013) documented mid-frequency sonar impacts on Blue Whales • Rosenberger et al. (2017) modelled impact risks for oil spills on 21 marine mammal species • Sharp et al. (2019) summarized information from 70 Right Whale mortalities that were documented between 2003 and 2018 from Florida in the US • DFO (2018a, 2018b) assessed ship slow-down measures and effectiveness of recovery measures for North Atlantic Right Whales • DFO (2019) reviewed North Atlantic Right Whale occurrence and risk of entanglements in fishing gear and vessel strikes in Canadian waters <p>See table 2, approaches 1, 7 and 8 for additional details.</p>
<p>Were mitigation measures that have been effective for Right Whales in other areas and other cetaceans reviewed, and where appropriate, incorporated into mitigation planning and protocols for the North Pacific Right Whale?</p>	<p>Not met</p>	<p>No. Due to the low number of sightings and lack of data, no mitigation planning or protocols have been developed or reviewed for applicability to North Pacific Right Whales. However, information for Right Whales in other areas as well as for other cetaceans is available through various sources. See table 2, approaches 7, 8, 9, and 10. Further, information on mitigation measures for North Atlantic Right Whales is available (DFO 2018a, 2018b).</p>

3.3.2 Completion of action plan

The “Action Plan for Blue, Fin, Sei and North Pacific Right Whales (*Balaenoptera musculus*, *B. physalus*, *B. borealis*, and *Eubalaena japonica*) in Canadian Pacific Waters” was published in 2017 (DFO 2017). It is a multi-species plan that addresses research needs and threat mitigation common to Blue, Fin, Sei and North Pacific Right Whales.

3.3.3 Critical habitat identification and protection

At this time, limited sightings and understanding of the current distribution of North Pacific Right Whales does not allow for the identification of critical habitat in Canada. Continued monitoring and research as outlined in the Schedule of Studies within the Recovery Strategy is required to close data gaps and identify habitat necessary for the survival and recovery of the species in Canadian Pacific waters.

3.3.4 Recovery feasibility

Recovery of North Pacific Right Whales utilizing Canadian Pacific waters is considered feasible. Details on the determination of recovery feasibility for this species are outlined in section 2.1 of the recovery strategy (DFO 2011a). Their current small population size is thought to be the main factor limiting North Pacific Right Whales recovery and presence in Canadian Pacific waters. However, this population has the potential to increase in size because evidence of reproduction exists outside of Canadian waters in the North Pacific and suitable habitat is available (DFO 2011a). Several potential threats have been identified for North Pacific Right Whale and these need to be monitored and mitigated as required.

4 Concluding statement

Over the last 9 years, through the implementation of the activities identified in the “Recovery Strategy for North Pacific Right Whales (*Eubalaena japonica*) in Pacific Canadian Waters” (DFO 2011a), moderate progress has been made in recovering the North Pacific Right Whale, such as:

- the presence of North Pacific Right Whales in Pacific Canadian waters has been confirmed, meeting the short-term population and distribution objectives for this species
- DFO has collaborated with Indigenous groups, United States National Oceanic and Atmospheric Administration and other government programs, independent research organizations, and academia in both Canada and the United States to advance efforts to gain knowledge and identify potential and occupied habitats for North Pacific Right Whales
- annual multi-species cetacean surveys were completed in areas where North Pacific Right Whales could be encountered
- the 2018 PRISMM was implemented
- new hydrophones have been installed in offshore and coastal waters that increase chance of acoustic detections of North Pacific Right Whales in Canadian Pacific waters

The recent sightings within Canadian Pacific waters provide valuable information on this endangered population in Canadian Pacific waters. However, population trends cannot be evaluated due to lack of data. North Pacific Right Whales would benefit from continued acoustic

monitoring in offshore areas and dedicated ship surveys to clarify habitat needs and usage and address the remaining population, distribution and recovery objectives for this species.

The Government of Canada remains committed to recovering the North Pacific Right Whale. The work started and completed to date has built a strong foundation for continued research and management of this species over the next reporting period. Progress made to date would not have been achieved without the contributions from our partners. The Government of Canada is looking forward to continuing this successful collaboration and welcomes the participation of additional partners.

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