

Report on the Progress of Management Plan Implementation for the Eastern North Pacific Grey Whale (*Eschrichtius robustus*) in Canada for the Period 2016 to 2022

Eastern North Pacific Grey Whale



2023

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Preface

The *Species at Risk Act* (S.C. 2002, c.29) (SARA) requires reporting on the implementation of the management plan for species listed as special concern (via a progress report) and the progress towards meeting its objectives within 5 years of the date when the final management plan was posted to the Species at Risk Public Registry, and in every subsequent 5 years, until its objectives have been achieved.

The Minister of Fisheries and Oceans and the Minister responsible for the Parks Canada Agency are the competent ministers under SARA for the Eastern North Pacific Grey Whale and have prepared this progress report.

Reporting on the progress of management plan implementation requires reporting on the collective efforts of the competent ministers, provincial and territorial governments, and all other parties involved in conducting activities that contribute to the species' conservation. Management plans identify broad strategies and approaches to achieving the management goals and objectives for the species. Some of the broad strategies and approaches identified in the management plan 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 management plan implementation (progress report).

As stated in the preamble to SARA, success in the conservation of species at risk depends on the commitment and cooperation of many different groups that will be involved in implementing the directions set out in the management plan and will not be achieved by Fisheries and Oceans Canada (DFO) and 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 management plan for the Eastern North Pacific Grey Whale for the benefit of the species and Canadian society as a whole.

Acknowledgments

This progress report was prepared by Madeline Cashion, Alannah Biega, and Jade Shiller (DFO). To the extent possible, this progress report was prepared with inputs from DFO, Parks Canada, Cascadia Research Collective, University of Victoria, Pacific WildLife Foundation, and Ocean Wise Conservation Association. DFO would also like to express its appreciation to all individuals and organizations who have contributed to the conservation of the Eastern North Pacific Grey Whale.

Executive summary

The Eastern North Pacific Grey Whale¹ (*Eschrichtius robustus*) was listed as a species of special concern under the *Species at Risk Act* (SARA) in 2005. The “Management Plan for the Eastern Pacific Grey Whale (*Eschrichtius robustus*) in Canada” (DFO 2011) was finalized and published on the Species at Risk Public Registry in 2011.

The main threats identified for the Eastern North Pacific Grey Whale include: increased human activity in Mexican breeding lagoons, environmental variability, disruption or destruction of benthic feeding habitat, acute noise, and toxic spills.

The management goal for the Eastern North Pacific Grey Whale is: “to maintain the migration route and foraging habitat in British Columbia (BC) for Eastern Pacific Grey Whales, in order to contribute to the maintenance of a self-sustaining population” (DFO 2011).

The “Report on the Progress of Management Plan Implementation for the Eastern North Pacific Grey Whale in Canada for the Period 2016 to 2022” reports on the progress made by DFO, Parks Canada, and their partners towards implementing the management plan and achieving its objectives. During this time period, progress has been made by:

- strengthening protections for Grey Whales through amendments to the Marine Mammal Regulations under the *Fisheries Act*
- routinely responding to incidents of entangled, injured, or deceased Grey Whales
- advancing toxic spill response planning specifically for marine mammals
- conducting collaborative research on Grey Whale distribution and habitat use in Canadian Pacific waters
- promoting the Be Whale Wise guidelines
- improving international partnerships through the formation of the Pacific Coast Feeding Group Consortium and the Unusual Mortality Event Investigative Team

Through the implementation of the activities identified in the management plan, the management goal of maintaining the migration route and foraging habitat for Eastern North Pacific Grey Whales has been met, and efforts are ongoing to advance progress towards the distribution, research, and management objectives. While Grey Whale population sizes were depleted by commercial whaling in the last century, numbers have increased and are now well above what they were in the middle of the 20th century. A recent evaluation by COSEWIC (2017) assessed a large portion of the Eastern North Pacific population (now recognized as the North Pacific Migratory population) as not at risk due to the increase in abundance, while a smaller subset (now recognized as the Pacific Coast Feeding Group population) was assessed as endangered. Grey Whales remain vulnerable to several threats and it is important to continue implementing actions that support their conservation. In 2019, the United States (US) National Oceanic and Atmospheric Association (NOAA) declared an Unusual Mortality Event for Pacific Grey Whale due to the increase of Grey Whales mortalities along the coasts of Mexico, the US, and Canada. Between 2019 and 2022 there were 608 confirmed Grey Whale mortalities, including 25 in Canada. More data are needed to understand its cause. Further research on habitat use and distribution in Canadian Pacific waters is also needed to identify areas and times where Grey Whales face a higher risk of entanglement or vessel strike in order to

¹ “Eastern North Pacific” is used throughout this document, rather than “Eastern Pacific” (which was used in the management plan), to align with the population name listed in the Species at Risk Public Registry.

advance the goal and objectives outlined in the management plan. DFO and Parks Canada remain committed to continuing to implement conservation actions that support the conservation of Grey Whale in Canada.

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1 Introduction

The “Report on the Progress of Management Plan Implementation for the Eastern North Pacific Grey Whale in Canada for the Period 2016 to 2022” (progress report) outlines the progress made towards meeting the objectives listed in the “Management Plan for the Eastern Pacific Grey Whale (*Eschrichtius robustus*) in Canada” (management plan; Fisheries and Oceans Canada [\[DFO\] 2011](#)) during the indicated time period. It should be considered as one in a series of documents for this species that are linked, including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) status reports (COSEWIC [2000](#), [2004](#), [2017](#)), the management plan, the previous progress report ([DFO 2019a](#)), the recovery potential assessment ([Gavrilchuk and Doniol-Valcroze 2021](#)), the “Multi-species Action Plan for Pacific Rim National Park Reserve of Canada” ([Parks Canada 2017](#)), and the “Multi-species Action Plan for Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site” ([Parks Canada 2022](#)).

Section 2 of the progress report summarizes information on the threats to the species and the management goal and objectives. For more detail, readers should refer back to the management plan. Section 3 reports on the progress of conservation actions identified in the management plan, to support achieving the management goal and objectives. Section 4 summarizes the progress toward achieving the goal and objectives.

2 Background

2.1 COSEWIC assessment summary and threats to the species

The listing of the Eastern North Pacific Grey Whale as special concern under SARA in 2005 led to the development and publication of the management plan (DFO 2011). The information provided in the management plan was based on the information provided in the previous COSEWIC status reports (COSEWIC 2000, 2004).

In 2017, COSEWIC re-assessed the status and population structure for Grey Whales in Canadian Pacific waters, resulting in the Eastern North Pacific population now being divided into 2 populations (COSEWIC 2017):

- the Northern Pacific Migratory (NPM) population (~21,000 individuals), assessed as not at risk
- the Pacific Coast Feeding Group (PCFG) population (~243 individuals), assessed as endangered

Members of the NPM population of Grey Whales migrate annually between winter calving grounds in Mexico and summer feeding areas in the Bering, Chukchi, and Beaufort seas. Individuals in PCFG, formerly called the Pacific Coast Feeding Aggregation, share a migratory corridor with the NPM population but do not complete the full migration all the way to the Bering Sea and northward in the summer. Instead, these individuals demonstrate high site fidelity to feeding sites at lower latitudes in the Pacific Northwest (between northern California and southeast Alaska). The PCFG population is considered demographically distinct due to this characteristic behavioural trait.

Within this report, all references to “Grey Whales” refer to the Eastern North Pacific designatable unit that is currently (as of 2023) listed under SARA and described in section 1.1 of the management plan (DFO 2011). Similarly, references to the PCFG in this report refer to the subset of the population that does not undertake the full migration to Arctic feeding areas, and instead spends the summer feeding in temperate coastal waters between northern California and southeastern Alaska.

The management plan (DFO 2011; section 5), the COSEWIC status report (COSEWIC 2017), and the recovery potential assessment (Gavrilchuk and Doniol-Valcroze 2021) provide information on threats to the species. These threats include: increased human activity in the breeding lagoons in Mexico, environmental variability, entanglement in fishing gear, vessel collisions, disruption or destruction of feeding habitat, physical disturbance, acute and chronic noise, pollutants, and disturbance resulting from some scientific research activities.

2.2 Conservation

This section summarizes the information found in the management plan (DFO 2011; section 2) on the management goal and objectives for the conservation of the Eastern North Pacific Grey Whale.

Management goal:

To maintain the migration route and foraging habitat in British Columbia (BC) for Eastern North Pacific Grey Whales, in order to contribute to the maintenance of a self-sustaining population.

Distribution objective:

D1. Maintain the current known distribution and migration route of Grey Whales in Pacific Canadian waters.

Research and monitoring objectives:

R1. Monitor abundance and distribution in BC on an ongoing basis.

R2. Contribute to, or foster, the understanding of the habitat use and feeding ecology of Grey Whales in Pacific Canadian waters.

R3. Contribute to, or foster the understanding of the migration route of Grey Whales through Pacific Canadian waters.

R4. Support, foster, and contribute to research addressing uncertainties surrounding degradation of benthic habitat, competition with fisheries, toxins, and effects of other identified and non-identified threats to this population.

R5. Assess available methods and estimate levels of annual human-caused mortality that the population can sustain while achieving the distribution objective.

Management objectives:

- M1. Reduce the risk of catastrophic spills impacting Grey Whales or their habitat in Canada.
- M2. Protect benthic feeding habitat from degradation, such that it does not displace PCFG whales from known feeding habitat in Canada.
- M3. Minimize the exposure of Grey Whales to acute sound levels (in excess of those considered to cause behavioural or physical harm in cetaceans) and prevent disturbance such that it does not displace Grey Whales from known migration routes or feeding habitat in Canada.
- M4. Protect the population from commercial whaling in Canada and reduce the likelihood of negative impacts to the PCFG from subsistence whaling activity.
- M5. Promote international collaboration, independent research, education, and outreach on management and conservation initiatives.

The management plan did not include performance measures. The progress towards achieving the management goal and objectives will be informed by the progress made under each action in section 3.1 below.

3 Progress towards conservation

The management plan (DFO 2011) divides the conservation effort into 6 broad strategies (BrS):

- BrS 1) Protection: actions 1 to 2
- BrS 2) Management: actions 3 to 6
- BrS 3) Research on Grey Whale biology: action 7
- BrS 4) Research to clarify identified threats: actions 8 to 9
- BrS 5) Monitoring and assessment: actions 10 to 12
- BrS 6) Outreach and communication: action 13

Progress in carrying out actions under each broad strategy is reported in section 3.1 (table 1).

3.1 Actions supporting conservation

Table 1 provides information on the implementation of actions undertaken to address the objectives identified in the implementation schedule table of the management plan (DFO 2011; section 3).

Table 1. Details of activities supporting the conservation of the Eastern North Pacific Grey Whale from 2016 to 2022.

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
<p>BrS-1: Protection</p> <p>1. Protect from acute acoustic disturbance, mitigate negative effects</p>	<p>a) Apply Fisheries and Oceans Canada (DFO) standards for mitigation of seismic noise, regional implementation protocols</p>	<p>The Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment (SOCP) is currently being applied for mitigation of seismic noise effects on Grey Whales. The SOCP was first published in 2008 and, in 2020, a comprehensive scientific review was published that identified potential areas of improvement to the SOCP based on advances in the scientific literature (Moulton et al. 2020). This review also resulted in a Science Advisory Report containing recommendations applicable at the national level to review and potentially update the mitigation measures in the SOCP (DFO 2020). Updates to the SOCP have not yet been completed.</p>	<p>D1,M3</p>	<p>DFO, Crown-Indigenous Relations and Northern Affairs Canada³, National Energy Board, Natural Resources Canada</p>
<p>BrS-1: Protection</p> <p>1. Protect from acute acoustic disturbance, mitigate negative effects</p>	<p>b) Review of Department of National Defence (DND) protocol for tactical sonar use, revise if necessary</p>	<p>The current DND policy on marine mammal mitigation is contained in the Maritime Command Order “Marine Mammal Mitigation Procedures for Active Sonar Use” (MARCORD 46-13). DND recognizes the potential impact their activities may have and has worked to address these risks, including an update to its active sonar impact management approach (Thomson and Binder 2021).</p>	<p>D1, M3</p>	<p>DND, DFO</p>
<p>BrS-1: Protection</p> <p>2. Protect from disturbance (physical and acoustic)</p>	<p>a) Complete amendment of Marine Mammal Regulations (MMR)</p>	<p>Amendments to the Canadian MMR came into force in 2018 (Justice Canada 2018). The amendments aim to reduce the risk of disturbance, displacement from habitat, collisions with vessels, entanglement in fishing gear, and the effects of acoustic disturbance to marine mammals, including Grey Whales. The minimum approach distances were amended to 100 metres (m) for Grey Whale and 200 m if resting or with a</p>	<p>D1</p>	<p>DFO</p>

² Lead participant(s) is/are listed on top and in bold; other participants are listed alphabetically. Not all activities have specific participants identified.

³ Formerly Indigenous and Northern Affairs Canada.

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		calf. Additionally, disturbance to marine mammals is now clearly defined as approaching, attempting to feed, swimming or interacting with, moving, enticing or causing movement, separating from groups/calves, trapping, tagging, or marking.		
<p>BrS-1: Protection</p> <p>2. Protect from disturbance (physical and acoustic)</p>	<p>b) Continue enforcement of MMR, promote regional guidelines</p>	<p>DFO enforces the MMR and promotes regional Be Whale Wise (BWW) guidelines for marine mammal viewing (DFO 2022b). DFO educates mariners and the public about regulations and investigates reports of disturbance and violations (DFO 2019b).</p> <p>Parks Canada (PC) requires holders of business licences to adhere to BWW guidelines and MMR while in park reserve and national marine conservation area reserve waters. PC Wardens also enforce the MMR and promote regional BWW guidelines for marine viewing in park reserve and national marine conservation area reserve waters (Yakimishyn pers. comm. 2023; Lee pers. comm. 2023).</p> <p>In addition to the BWW guidelines, North Island Marine Mammal Stewardship Association (NIMMSA) and Pacific Whale Watch Association (PWWA) have developed regionally specific voluntary marine mammal viewing guidelines (NIMMSA 2019, PWWA 2021).</p>	<p>D1</p>	<p>DFO, Industry, PC</p>
<p>BrS-2: Management</p> <p>3. Review project proposals, provide advice for mitigation or avoidance</p>	<p>Not applicable</p>	<p>DFO conducts regulatory reviews of works, undertakings or activities under the <i>Fisheries Act</i> and the <i>Species at Risk Act</i> (SARA). Guidance is provided to proponents through policies, guidelines and standards in order to prevent the harmful alteration, disruption or destruction (HADD) of Grey Whale habitat. If HADD cannot be avoided, additional mitigation measures or offsetting is required.</p> <p>When conducting impact assessments of activities proposed to occur in Pacific Rim National Park Reserve (NPR) and</p>	<p>D1, M2, M3</p>	<p>DFO, PC</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		<p>Gwaii Haanas NPR, National Marine Conservation Area Reserve (NMCAR), and Haida Heritage Site (HHS) waters, PC identifies adverse effects to Grey Whales and ensures that measures are taken to avoid or lessen those effects and to monitor them (Yakimishyn pers. comm. 2023; Lee pers. comm. 2023).</p>		
<p>BrS-2: Management</p> <p>4. Develop comprehensive toxic spill response to mitigate impacts</p>	<p>a) Develop emergency response plan to include marine mammal expertise into spill response initiatives</p>	<p>The DFO-led Pacific Marine Mammal Spill Response Plan was drafted during this reporting period and finalized in 2023. The document describes how spill response for marine mammals is implemented in the Pacific region, and includes species or group-specific response considerations, including large cetaceans like Grey Whale. DFO's response planning effort supports Area Response Plans as led by the Canadian Coast Guard (Hawryshyn pers. comm. 2023).</p> <p>Additional marine spill response planning focused on incorporating marine mammal-specific expertise is ongoing and being co-developed by the Council of the Haida Nation (CHN) and the Government of Canada. A Haida Gwaii Geographic Response Plan with an annex for Gwaii Haanas NPR, NMCAR and HHS, and site-specific Geographic Response Strategies have been drafted (Lee pers. comm. 2023).</p> <p>In 2018, the Western Canada Marine Response Corporation (WCMRC), a Transport Canada-certified marine response organization on Canada's West Coast, published a marine mammal oil spill response protocol. The protocol provides detailed operational-level information regarding roles and responsibilities should a spill occur (Sea View Marine Sciences 2018).</p>	<p>D1, M1, M2</p>	<p>Government of Canada, CHN, Government of British Columbia (BC), WCMRC</p>
<p>BrS-2: Management</p>	<p>b) Marine mammal-</p>	<p>See response under action 4a above.</p>	<p>D1, M1, M2</p>	<p>Government of Canada, CHN,</p>

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Broad strategy	Action	Descriptions and results	Objectives	Participants ²
4. Develop comprehensive toxic spill response to mitigate impacts	specific operational manual			Government of BC, WCMRC
BrS-2: Management 5. Permitting of non-DFO research, monitoring and assessments	Not applicable	<p>From 2016 through 2022, DFO issued ten permits to undertake research on Eastern North Pacific Grey Whales in Canada (Withers pers. comm. 2023). In order to authorize an activity that is otherwise prohibited under the MMR, several conditions must be met. For example, a scientific research vessel might be permitted to approach a cetacean at distance closer than the MMR allow if the engagement time per whale is limited to 60 minutes or less each day.</p> <p>PC requires a permit to conduct research and/or undertake an activity prohibited by the <i>Canada National Parks Act</i> or the <i>National Marine Conservation Areas Act</i> within its managed areas. This permitting system can be used to place conditions on activities to avoid or reduce impacts to Grey Whales (Parks Canada 2020).</p>	R1 to R5, M1 to M5	DFO, PC
BrS-2: Management 6. Proactively mitigate for threats indicated to have high mitigation potential	a) Continue development of fisheries observer reporting standards and guidelines for marine mammal species identification	<p>Depending on monitoring requirements, at-sea observer coverage and electronic video monitoring varies by fishery. Monitoring requirements are managed through annual Integrated Fisheries Management Plans and conditions of licence.</p> <p>DFO's National Fishery Monitoring Policy (DFO 2019c) outlines a decision-making approach to guide the establishment of fishery monitoring in federally managed wild-capture fisheries. Effective fishery monitoring is necessary to meet the Department's policy objectives under</p>	D1, R4	DFO, Industry, Ocean Wise, PC

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
	and data collection on fisheries interactions	<p>the Policy on Managing Bycatch (2013), which aims to further improve the management of bycatch in Canadian fisheries by building on the success of existing management practices (DFO 2019d). In 2018, reporting of collisions or accidental contact between vessels or fishing gear and marine mammals became mandatory under Canada’s MMR, and fishery Conditions of Licence were updated to integrate this new reporting requirement. An online form is available to fishers for submitting details on any interactions with marine mammals.</p> <p>Data on marine mammal interactions, including Grey Whales, is collected for threat assessment and marine mammal bycatch evaluation for Canadian commercial fisheries (as required under the United States (US) <i>Marine Mammal Protection Act</i>).</p> <p>Between 2016 and 2022, Ocean Wise’s Sightings Network (formerly known as the BC Cetacean Sightings Network) provided over 200 training workshops on marine mammal species identification to fisheries observers and other organizations, including Archipelago Marine Research, DND, DFO, Coastal Guardian Watchmen, Prince Rupert Port Authority, Haida Gwaii Marine Stewardship Group, PC (Gwaii Haanas), and BC Parks (Scott pers. comm. 2023).</p>		
<p>BrS-2: Management</p> <p>6. Proactively mitigate for threats indicated to have high</p>	b) Promote development of alternative gear types (fishing, aquaculture)	DFO is supporting industry efforts to explore and test whalesafe gear technologies, including low breaking-strength gear and on-demand gear that removes rope from the water column (DFO 2021). If successful, these initiatives could be more broadly implemented to help reduce the amount of rope in the water and lower the risk of entanglements to Grey Whales in the future.	D1, R4	DFO, Industry

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
mitigation potential				
<p>BrS-2: Management</p> <p>6. Proactively mitigate for threats indicated to have high mitigation potential</p>	<p>c) Develop co-management strategies for traditional whaling, in support of treaty negotiated rights</p>	<p>Grey Whale harvest is not currently undertaken or permitted in Canadian Pacific waters and DFO has not received any proposals from Indigenous organizations to recommence harvest.</p> <p>The Maa-nulth First Nations Final Agreement, which came into force in 2011, includes a side agreement which commits to a 25 year moratorium on the harvest of Grey Whales (Maa-nulth First Nations Final Agreement Side Agreement 2006). DFO and PC remain open to discussing potential future sustainable harvesting opportunities of Grey Whales by Maa-nulth in accordance with Maa-nulth First Nations' treaty right.</p> <p>In the US, National Oceanic and Atmospheric Administration (NOAA) Fisheries is conducting an evaluation of the Makah Tribe's request for authorization to hunt Eastern North Pacific Grey Whales (NOAA 2022), a tradition secured by the 1855 Treaty of Neah Bay. At the time of writing, NOAA Fisheries had not yet made a final decision on the Makah Tribe's request.</p>	<p>D1, R4</p>	<p>DFO, Maa-nulth First Nations, Makah Tribe, NOAA, PC</p>
<p>BrS-2: Management</p> <p>6. Proactively mitigate for threats indicated to have high mitigation potential</p>	<p>d) Continue implementation of the Marine Mammal Response Network (MMRN)</p>	<p>DFO's Marine Mammal Response Program continues to track and respond to reported incidents of entangled, injured, or deceased Grey Whales (DFO 2022a). The BC MMRN is a collaborative network of federal and provincial governments, Environmental Non-governmental Organizations (ENGOS), Indigenous groups, and other experts that assist DFO in responding to injured or entangled whales and performing necropsies (Moore pers. comm. 2023).</p>	<p>R4, M5</p>	<p>DFO, ENGOS, Government of BC, Indigenous partners, PC</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
<p>BrS-3: Biology Research</p> <p>7. Priority research</p>	<p>a) Undertake satellite-tracking of animals during migration</p>	<p>Within the reporting period, DFO has not tagged or tracked Grey Whales. Refer to the previous progress report (DFO 2019a) for information on previous studies.</p> <p>NOAA Fisheries has an active satellite-tagging program focusing on Pacific Coast Feeding Group (PCFG) whales. In September 2020, researchers tagged 3 individuals off the coast of Washington (NOAA 2021). Two of the whales moved offshore shortly after tagging and the tags stopped transmitting within a month; the third whale remained close to shore off the coast of Washington and BC until April 2021. See NOAA (2021) for more information.</p>	<p>R1, R2, R3</p>	<p>NOAA, DFO</p>
<p>BrS-3: Biology Research</p> <p>7. Priority research</p>	<p>b) Studies to identify PCFG occurrence north of Cape Caution</p>	<p>DFO opportunistically photographs Grey Whales while undertaking research efforts along BC's north coast; however, there has been no systematic effort to identify PCFG occurrence north of Cape Caution (Doniol-Valcroze pers. comm. 2023). The Ocean Wise Sightings Network long-term dataset shows low to medium relative Grey Whale abundance during the summer off Cape Caution; however, a dedicated survey program to identify occurrence and habitat use in the area is still considered a knowledge gap and future research objectives include incorporating population identification of individual sightings (Gavrilchuk and Doniol-Valcroze 2021).</p>	<p>R1, R2</p>	<p>N/A</p>
<p>BrS-3: Biology Research</p> <p>7. Priority research</p>	<p>c) Contribute and collaborate, when feasible, to studies addressing general habitat use in BC</p>	<p>In March 2022, DFO began conducting boat surveys to photo-identify known Grey Whale individuals and document their use of habitat in Canadian waters. An update on the outcomes of this project will be provided in a future report (Doniol-Valcroze pers. comm. 2023).</p> <p>Since 1998, there has been ongoing collaboration between groups involved in Grey Whale research and monitoring, facilitated by Cascadia Research Collective, to examine</p>	<p>D1, R2</p>	<p>Academia, DFO, ENGOs, PC</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		<p>habitat use and residency periods of the PCFG between feeding areas (Calambokidis et al. 2019) with long-term regular surveys of summer foraging sites (for example, Burnham and Duffus 2018).</p> <p>Researchers at the Whale Lab at the University of Victoria continue to study cow-calf site fidelity and fine-scale site use. Published results indicate that specific nearshore foraging sites in BC are used by cow-calf pairs and that weaned calves return to the same sites in subsequent years (Burnham and Duffus 2020).</p> <p>PC collaborates with DFO to deploy and retrieve autonomous hydrophones on the east and west coasts of Gwaii Haanas that measure ambient ocean noise and acoustic detection of cetaceans throughout the year. Hydrophone recordings from the east and west coasts of Gwaii Haanas are being examined for the presence and site use of Grey Whales to better establish their summer presence, and foraging and migratory behaviours throughout the year (Lee pers. comm. 2023; Frouin-Mouy et al. 2022).</p>		
<p>BrS-3: Biology Research</p> <p>7. Priority research</p>	<p>d) Contribute to, support, and foster research on Grey Whale prey needs</p>	<p>In March 2022, DFO began collecting skin, blubber, fecal, and prey samples from Grey Whales in Canadian Pacific waters to investigate diet. Stable isotope, fatty acid, and fecal analyses are ongoing. An update on the outcomes of this project will be provided in a future report (Doniol-Valcroze pers. comm. 2023).</p> <p>In 2018, a study was published in which researchers examined patterns of Grey Whale foraging intensity in Clayoquot Sound from 1997 to 2013. Results indicate that mysid species living along the seafloor are the primary prey consumed in this area (Burnham and Duffus 2018).</p>	<p>P1, D1, R2</p>	<p>Academia, DFO</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
<p>BrS-3: Biology Research</p> <p>7. Priority research</p>	<p>e) Photo-identification and genetic studies for PCFG</p>	<p>Several photo-identification efforts are ongoing for the PCFG. In 2019, Cascadia Research Collective published the results of a 22 year (1996 to 2017) study of the abundance and population structure of Grey Whales from Northern California to BC (Calambokidis et al. 2019). This was a collaborative effort involving DFO and multiple other research groups and independent researchers. DFO is collaborating with Cascadia Research Collective to analyse archived photographs of PCFG whales using Canadian Pacific Waters in the early spring. An update on the outcomes of this project will be provided in a future report (Doniol-Valcroze pers. comm. 2023).</p> <p>Pacific Rim National Park Reserve undertakes Grey Whale photo-identification efforts within park reserve waters and contributes to the Cascadia Research Collective since 2019 (Yakimishyn pers. comm. 2023).</p> <p>Pacific WildLife Foundation completed a Grey Whale catalog containing photo-identifications from the West Coast of Vancouver Island from 1970 to 2020 (Darling and Byington 2022). In 2019, Strawberry Isle Marine Education and Research Society and the Cedar Coast Field Station both published local Grey Whale field guides of the whales observed and photographed most frequently in Clayoquot Sound in recent years (Strawberry Isle Marine Education and Research Society 2019; Cedar Coast Field Station 2019).</p> <p>DFO supports Grey Whale photo-identification work through funding programs including the Habitat Stewardship Program, the Canada Nature Fund for Aquatic Species at Risk, and the Aboriginal Fund for Species at Risk.</p>	<p>P1, D1, R1</p>	<p>ENGOS, Academia, DFO, Indigenous groups, NOAA, PC</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		<p>Within the reporting period, no genetic studies on the PCFG were completed. Refer to the previous progress report (DFO 2019a) and the 2017 COSEWIC reassessment (COSEWIC 2017) for information on past studies.</p>		
<p>BrS-3: Biology Research</p> <p>7. Priority research</p>	<p>f) Assess methods for determining sustainable human-caused levels of mortality for PCFG population</p>	<p>The recovery potential assessment for Grey Whales in Canadian waters (Gavrilchuk and Doniol-Valcroze 2021) addresses the level of sustainable human-caused mortality (also known as “allowable harm” or “Potential Biological Removal”) at a population level, including both inside and outside of Canadian Pacific waters. For PCFG, Potential Biological Removal was calculated as 1.8 PCFG whales per year excluding natural mortality (Gavrilchuk and Doniol-Valcroze 2021). This calculation was made using recovery factors based on Canadian criteria and therefore differs slightly from the US calculation provided below. Allowable harm was not calculated for the Eastern North Pacific population.</p> <p>The US National Marine Fisheries Service estimated the Potential Biological Removal to be 3.5 whales per year for the PCFG and 801 whales per year for the Eastern North Pacific population (Carretta et al. 2021).</p>	<p>R5, M1 to M4</p>	<p>DFO, US National Marine Fisheries Service</p>
<p>BrS-4: Threat Research</p> <p>8. Contribute to, support and foster analysis of scarring rates of individuals (photographs)</p>	<p>Not applicable</p>	<p>Corsi et al. (2021) completed a photo analysis study of baleen whale scarring specifically from Killer Whale predation attempts. Compared to Blue Whales and Humpback Whales, Grey Whales have nearly twice the incidence of rake marks on their flukes in the Northeast Pacific; 42% of the Grey Whales identified from the late 1980s to 2017 had scarred or missing portions of tail flukes from Killer Whale attacks.</p> <p>DFO marine mammal responders and partners take photos of scars on dead and injured Grey Whales which can</p>	<p>R4</p>	<p>Academia, DFO, ENGOs, PC</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		<p>contribute to future analyses of Grey Whale scarring rates (Moore pers. comm. 2023).</p> <p>Refer to the previous progress report for more information on past studies (DFO 2019a).</p>		
<p>BrS-4: Threat Research</p> <p>9. Conduct assessments of vulnerability to identified threats</p>	<p>a) Collect data on incidents involving Grey Whales</p>	<p>DFO’s Marine Mammal Response Program tracks and responds to Grey Whale incidents, including entanglements, injuries, or dead animals through the 24-hour Marine Mammal Incident Hotline (1-800-465-4336), email (DFO.ORR-ONS-MPO@dfo-mpo.gc.ca), or vessel radio (VHF Channel 16) (DFO 2022a).</p> <p>If Grey Whale carcasses are in suitable post-mortem condition and safely accessible, a response can be initiated to collect photographs, measurements, and tissue samples, or conduct a post-mortem examination following a DFO protocol. Evidence of human interaction is documented.</p> <p>PC reports incidents and participates in data collection and necropsies within Pacific Rim NPR (Yakimishyn pers. comm. 2023) and in Gwaii Haanas NPR, NMCAR and HHS with the help of the CHN (Lee pers. comm. 2023).</p> <p>An Unusual Mortality Event (UME)⁴ was declared in 2019 by NOAA in response to the large number of Grey Whales mortalities occurring along the west coast of North America from Mexico through Alaska. The UME is ongoing and enhanced efforts are underway to assess nutritional status, evidence of entanglement, vessel strike, and Killer Whale</p>	<p>R4</p>	<p>DFO, CHN, Government of BC, NOAA, PC</p>

⁴ An Unusual Mortality Event (UME) is defined under the US *Marine Mammal Protection Act* as a stranding event that is unexpected, involves a significant die-off of any marine mammal population, and demands immediate response. One criteria used to determine whether a mortality event is “unusual” is a marked increase in the number of mortalities when compared to prior records.

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		predation to help determine its cause (Moore pers. comm. 2023).		
<p>BrS-4: Threat Research</p> <p>9. Conduct assessments of vulnerability to identified threats</p>	<p>b) Investigate increased risk associated with potential lifting of moratorium on offshore fossil fuel extraction</p>	<p>The federal moratorium was imposed indefinitely in 1972 and remains in effect. The Government of BC is reviewing the moratorium and has commissioned a scientific review panel to examine whether offshore oil and gas resources can be extracted in a scientifically sound and environmentally responsible manner (Government of British Columbia 2021).</p>	<p>D1, R4, M1, M2; M3</p>	<p>Government of BC, Government of Canada</p>
<p>BrS-4: Threat Research</p> <p>9. Conduct assessments of vulnerability to identified threats</p>	<p>c) Assess potential for fisheries interactions in terms of temporal and spatial occurrence of species-specific fisheries</p>	<p>To date, no analysis has been completed by DFO to identify specific areas where Grey Whales may face a higher risk of being entangled in fishing gear or struck by vessels. In the future, data that are being collected on distribution and habitat use could be combined with data on fishing activity to identify areas and times when Grey Whales may face higher risk of entanglement in fishing gear.</p> <p>Silber et al. (2021) completed an assessment of range wide risks posed to Grey Whales by vessels. Risk appeared greatest during migration. Tanker, container, and bulk-carrier ships represent considerable risk, but the large geographical extent of commercial fishing activities suggests that fisheries are also a substantial source of risk.</p>	<p>D1, R4</p>	<p>Academia, DFO</p>
<p>BrS-4: Threat Research</p> <p>9. Conduct assessments of vulnerability to identified threats</p>	<p>d) Tissue sample collection</p>	<p>When deceased whale body condition allows, (i) tissues are sampled to assess nutritional condition (blubber) and screen for pathogens, (ii) fecal samples are collected to screen for domoic acid and saxitoxin, biotoxins that are known to cause mortality and illness in marine mammals, and (iii) baleen, full thickness blubber, and barnacles are also collected for natural history research (Raverty pers. comm. 2021).</p>	<p>R4</p>	<p>DFO, Government of BC</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
<p>BrS-5: Monitoring and Assessment</p> <p>10. Increase understanding of Grey Whale abundance and distribution in BC</p>	<p>a) Contribute, collaborate, when feasible to photo-identification programs</p>	<p>Please see action 7e above.</p>	<p>R1</p>	<p>ENGOS, Academia, DFO, Indigenous groups, NOAA, PC</p>
<p>BrS-5: Monitoring and Assessment</p> <p>10. Increase understanding of Grey Whale abundance and distribution in BC</p>	<p>b) Annual population estimates during southward migration</p>	<p>An assessment of Grey Whale population abundance and distribution in BC was provided in COSEWIC (2017).</p> <p>NOAA monitors Grey Whale population abundance using shore-based surveys during the southward migration from December to February at Granite Canyon, California. In 2016, NOAA estimated the size of the eastern North Pacific Grey Whale population to be nearly 27,000, which was one of the highest estimates of their time series data that extends back to 1967. However, following the UME that started in 2019, this estimate declined to approximately 20,500 whales in winter 2019/2020 and even further to approximately 16,650 whales in the winter of 2021/2022 (Eguchi et al. 2022).</p> <p>Over the reporting period, DFO did not conduct any systematic surveys of Grey Whale in Canadian Pacific waters that can be used to estimate population abundance. However, opportunistic sightings of Grey Whale are recorded during multi-species cetacean surveys, and DFO's Cetacean Research Program has been actively collecting Grey Whale distribution data in recent years along the west coast of Vancouver Island to improve understanding of abundance</p>	<p>R1, R3</p>	<p>NOAA, Academia, DFO</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		and distribution of PCFG whales (Doniol-Valcroze pers. comm. 2023).		
<p>BrS-5: Monitoring and Assessment</p> <p>11. Contribute, when feasible, to measuring body condition of animals (photographs)</p>	Not applicable	<p>In 2022, DFO started collecting overhead photographs of Grey Whales in Canadian Pacific Waters using a drone (Doniol-Valcroze pers. comm. 2023). The drone research will be used to develop body condition measurements, and if successful, used to monitor changes in individuals over time, as well as to compare whales in different global populations.</p> <p>As part of the Cetacean Health and Life History Program, NOAA began an annual monitoring program in 2015 to assess Grey Whale health using unmanned aircraft. This monitoring assesses the condition of females, the growth and condition of calves, and links calf production to feeding condition in the Arctic (NOAA 2020).</p>	D1, R1, R4	DFO, NOAA
<p>BrS-5: Monitoring and Assessment</p> <p>12. Continue to support the collection of sightings information</p>	Not applicable	<p>DFO partially funds Ocean Wise’s Sightings Network; a volunteer-based network to collect sightings reports of cetaceans and sea turtles. Between 2016 and 2022, they received 1,454 reports of Grey Whale sightings from government, industry, researchers, and recreational observers throughout BC, Washington and Southeastern Alaska (Scott pers. comm. 2023). Sightings data are used by researchers in DFO, academia, and ENGOS to study species distributions and habitat use.</p> <p>In addition to collecting Grey Whale sightings opportunistically during other surveys, DFO has been processing Grey Whale fine-scale distribution data collected by collaborators since 1996 in an index area along the west coast of Vancouver Island to address information gaps on abundance and distribution of PCFG whales (Doniol-Valcroze pers. comm. 2023).</p>	D1, R1	DFO, Canadian Public, ENGOS, PC

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		<p>PC staff in Pacific Rim NPR, Gulf Islands NPR and Gwaii Haanas NMCAR and HHS also report Grey Whale sightings to the Ocean Wise Sightings Network and take photos to contribute to PCFG cataloging efforts (Lee pers. comm. 2023; Yakimishyn pers. comm. 2023).</p> <p>Passive acoustic monitoring is also being used to detect Grey Whales. This method has a greater detection rate than visual surveys during the night and inclement weather (Burnham et al. 2018) and therefore can bolster data on Grey Whale presence and habitat use at times of year when visual detections are less frequent (Frouin-Mouy et al. 2022).</p>		
<p>BrS-6: Outreach and Communication</p> <p>13. Foster communication networks</p>	<p>a) Develop emergency response communication networks</p>	<p>Please see action 4a above.</p>	<p>M1, M5</p>	<p>Government of Canada, CHN, Government of BC, WCMRC</p>
<p>BrS-6: Outreach and Communication</p> <p>13. Foster communication networks</p>	<p>b) Promotion of BWW guidelines</p>	<p>DFO, Transport Canada, and PC promote BWW guidelines during land and on-water outreach as well as through web and social media platforms (Moore pers. comm. 2023; Yakimishyn pers. comm. 2023; Lee pers. comm. 2023).</p> <p>Between 2017 and 2019, 2 interpretive programs featuring information about Grey Whales, including BWW guidelines, were delivered weekly in the summer months in Pacific Rim NPR, reaching over 2,250 people. In-person programming ceased in 2020 and 2021 due to COVID-19, but resumed again in 2022, reaching a total of 727 people that season (Schoeler pers. comm. 2023).</p>	<p>M5</p>	<p>DFO, ENGOs, PC</p>

Broad strategy	Action	Descriptions and results	Objectives	Participants ²
		<p>Within the reporting period, DFO provided funds for stewardship and outreach activities to various groups: the Ocean Wise Sightings Network, BC Ferries, Cetus, Marine Education and Research Society, North Coast Cetacean Society, Haida Gwaii Marine Stewardship Group, and Saturna Island Marine Research & Education Society. Activities focused on promotion of BWW guidelines and responsible vessel operation around marine mammals were accomplished through presentations, on-water outreach, community events, signage, social media, and other outreach materials.</p>		
<p>BrS-6: Outreach and Communication</p> <p>13. Foster communication networks</p>	<p>c) Trans-boundary, inter-jurisdictional collaboration</p>	<p>Canada and the US continue to maintain an inter-jurisdictional collaboration for Grey Whale research which includes sharing data and supporting research carried out under DFO and NOAA research permits (Doniol-Valcroze pers. comm. 2023).</p> <p>In 2020, the international PCFG Grey Whale Consortium was established to facilitate long-term collaboration and data sharing between PCFG Grey Whale researchers. DFO currently sits on the board of the Consortium. Efforts are focused primarily on studying whale habitat use and population structure, with the initial focus on the sharing of sighting information and photos (Doniol-Valcroze pers. comm. 2023).</p> <p>In response to the ongoing Grey Whale UME, NOAA convened an international Investigative Team, including representatives from DFO, to review the data collected, sample deceased whales, and consider possible causes of the mortality event (NOAA 2023).</p>	<p>R1, R2, R3, M5</p>	<p>DFO, NOAA</p>

3.2 Summary of progress towards conservation

Thirty actions from the management plan are reported on in table 1. Of these, 3 actions (10%) are complete and 3 actions (10%) have not yet started. The remaining 24 actions (80%) are in progress, many of which are ongoing with no specific endpoint. Collectively these actions achieve the management goal and distribution objective of maintaining the known distribution, migration route, and foraging habitat of Eastern Pacific Grey Whale in BC.

Efforts are ongoing to advance progress towards the research, monitoring, and management objectives outlined in the management plan. Between 2016 and 2022, progress towards achieving management objectives has included strengthened protections for Grey Whales through the amendment of the Marine Mammal Regulations under the *Fisheries Act*, development of marine mammal toxic spill response plans, and improved international partnerships. Importantly, incident response has continued as well as DFO funding programs that support partners in implementing actions that help mitigate threats to Grey Whale, such as physical and acoustic disturbance, vessel strikes, and entanglement in fishing gear.

Progress towards achieving research and monitoring objectives over this reporting period has included new research on Grey Whale distribution and habitat use in Canadian Pacific waters, new calculations of allowable harm levels, and continued photo-identification efforts.

Some actions have not been started, including an analysis of potential fisheries interactions where there is temporal or spatial overlap with Grey Whale occurrence, and studies to identify Pacific Coast Feeding Group Grey Whale occurrence north of Cape Caution.

4 Concluding statement

Between 2016 and 2022, through the implementation of activities identified in the management plan, the management goal of maintaining the migration route and foraging habitat for Eastern North Pacific Grey Whales has been met.

While Grey Whale populations in the Pacific were depleted by commercial whaling in the last century, numbers have increased and remained well above what they were in the middle of the 20th century. A recent evaluation by COSEWIC (2017) assessed a large portion of the Eastern North Pacific population (now recognized as the North Pacific Migratory population) as not at risk due to the increase in abundance, while a smaller subset (now recognized as the Pacific Coast Feeding Group population) was assessed as endangered. Grey Whales remain vulnerable to several threats and it is important that conservation actions continue to be implemented.

For example, in 2019, NOAA declared an Unusual Mortality Event (UME) for Pacific Grey Whale due to the increase of Grey Whale mortalities along the coasts of Mexico, the US, and Canada (NOAA 2023). Between 2019 and 2022 there were 608 confirmed Grey Whale mortalities, including 25 in Canada (table 2)⁵. The cause of the UME is unknown, although an independent team of experts, including representatives from DFO, are investigating. Although necropsies are not always possible due to advanced state of decomposition, there is mounting evidence of

⁵ A previous analysis indicated that only 3.9 to 13.0 percent of all Eastern North Pacific Grey Whales that die in a given year are found on land and are observed and reported (Punt and Wade 2010).

emaciation of stranded whales, similar to the last Grey Whale UME that occurred in 1999 and 2000 (Christiansen et al. 2021).

Table 2. Total number of deceased Grey Whales found along the Pacific coast of North America from 2019 to 2022 (NOAA 2023).

Country	2019	2020	2021	2022	Total
Canada	11	5	5	4	25
US	122	79	55	47	303
Mexico	83	88	55	54	280
Total	216	172	115	105	608

Conservation actions have continued over this reporting period, including Grey Whale incident response, photo-identification and cataloguing efforts, and outreach to raise awareness of Marine Mammal Regulations and Be Whale Wise guidelines that help mitigate physical and acoustic disturbance to Grey Whales.

In addition, the following new actions have been implemented from 2016 to 2022:

- the Marine Mammal Regulations under the *Fisheries Act* were amended to strengthen protections against physical and acoustic disturbances to marine mammals, including Grey Whales
- toxic spill response planning was improved through the development of area and species-specific response guidance
- collaborative new research on Grey Whale distribution and habitat use in Canadian Pacific waters was started
- international partnerships were improved through the formation of the Pacific Coast Feeding Group and the UME Investigative Team

Knowledge gaps exist that limit progress toward achieving the research and monitoring objectives as defined in the management plan. In particular, more research is needed to understand the cause, and possibly mitigate, the UME of Eastern North Pacific Grey Whales. Furthermore, more research is needed on habitat use and distribution of Grey Whales in Canadian Pacific waters to identify areas and times where they may face a higher risk of entanglement or vessel strike. Alternative gear types such as on-demand gear should also be further tested and applied in relevant fisheries to lower entanglement risk.

Following the COSEWIC reassessment (COSEWIC 2017), a listing process is currently underway to determine whether to list the Pacific Coast Feeding Group population as endangered under SARA. Regardless of the listing decision for the Pacific Coast Feeding Group, all Grey Whale populations and their habitat will continue to receive protection under the *Fisheries Act* and the Marine Mammal Regulations.

DFO and Parks Canada remain committed to the conservation and management of Grey Whales in Canadian waters and continuing to foster transboundary partnerships for research and incident response throughout their distribution range. The work started and completed to

date has built a strong foundation for continued research and management of this species going forward. Progress made would not have been achieved without the contribution from our partners. DFO and Parks Canada are looking forward to continuing this successful collaboration and welcome the participation of additional partners.

5 References

- Burnham, R.E. and D.A. Duffus. 2018. Patterns of predator-prey dynamics between gray whales (*Eschrichtius robustus*) and mysid species in Clayoquot Sound. *International Journal of Cetacean Research and Management* 19: 95–103.
- Burnham, R.E. and D.A. Duffus. 2020. Maternal behaviors of gray whales (*Eschrichtius robustus*) on a summer foraging site. *Marine Mammal Science* 36(4): 1212–1230.
- Burnham, R.E., D.A. Duffus, and X. Mouy. 2018. Gray whale (*Eschrichtius robustus*) call types recorded during migration off the west coast of Vancouver Island. *Frontiers in Marine Science* 5: 329.
- Calambokidis, J., J. Laake, and A. Perez. 2019. Updated analysis of abundance and population structure of seasonal gray whales in the Pacific Northwest, 1996-2017. Final Report to NOAA, Seattle, Washington: 1–72.
- Carretta, J.V., E.M. Oleson, K.A. Forney, M.M. Muto, D.W. Weller, A.R. Lang, J. Baker, B. Hanson, A.J. Orr, J. Barlow, J.E. Moore, and R.L. Brownell Jr. 2021. U.S. Pacific Marine Mammal Stock Assessments: 2020. U.S. Department of Commerce, NOAA-TM-NMFS-SWFSC-646: 161–171.
- Cedar Coast Field Station. 2019. [Grey Whale Sightings Report and Identification Catalogue](#). Accessed 17 February 2023.
- Christiansen, F., F. Rodríguez-González, S. Martínez-Aguilar, J. Urbán, S. Swartz, H. Warick, F. Vivier, and L. Bejder. 2021. Poor body condition associated with an unusual mortality event in gray whales. *Marine Ecology Progress Series* 658: 237–252.
- Corsi, E., J. Calambokidis, K.R. Flynn, and G.H. Steiger. 2021. Killer whale predatory scarring on mysticetes: a comparison of rake marks among blue, humpback, and gray whales in the eastern North Pacific. *Marine Mammal Science* 38(1): 1–12.
- COSEWIC. 2000. [COSEWIC assessment and status report on the grey whale *Eschrichtius robustus* in Canada](#). Committee on the Status of Endangered Wildlife in Canada. Ottawa. v + 35 pp.
- COSEWIC. 2004. [COSEWIC assessment and update status report on the grey whale \(Eastern North Pacific population\) *Eschrichtius robustus* in Canada](#). Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 31 pp.
- COSEWIC. 2017. [COSEWIC assessment and status report on the grey whale *Eschrichtius robustus*, Northern Pacific Migratory population, Pacific Coast Feeding Group population and the Western Pacific population, in Canada](#). Committee on the Status of Endangered Wildlife in Canada. Ottawa. xxi + 74 pp.
- Darling, J.D. and J.K. Byington. 2022. Gray Whale Catalog: Photo-identifications from the West Coast, Vancouver Island, British Columbia, Canada, 1970-2020. Pacific WildLife Foundation. 81 pp. Available by request (info@clayoquotwhales.ca).

- DFO. 2011. [Management Plan for the Eastern Pacific Grey Whale \(*Eschrichtius robustus*\) in Canada](#). *Species at Risk Act* Management Plan Series. Fisheries and Oceans Canada, Ottawa. v + 60 pp.
- DFO. 2019a. [Report on the Progress of Management Plan Implementation for the Eastern Pacific Grey Whale \(*Eschrichtius robustus*\) in Canada for the Period 2011-2015](#). *Species at Risk Act* Management Plan Report Series. Fisheries and Oceans Canada, Ottawa. iii+ 31 pp.
- DFO. 2019b. [Enforcement of the Fisheries Act](#). Accessed 17 February 2023.
- DFO. 2019c. [Fishery Monitoring Policy](#). Accessed 15 May 2023.
- DFO. 2019d. [Guidance on Implementation of the Policy on Managing Bycatch](#). Accessed 17 February 2023.
- DFO. 2020. [Review of the Statement of Canadian Practice with Respect to the Mitigation of Seismic Sound in the Marine Environment](#). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2020/005.
- DFO. 2021. [Whalesafe fishing gear](#). Accessed 15 May 2023.
- DFO. 2022a. [Marine Mammal Response Program](#). Accessed 13 February 2023.
- DFO. 2022b. [Watching Marine Wildlife](#). Accessed 17 February 2023.
- Doniol-Valcroze, T., pers. comm. 2023. Email correspondence with A. Biega. March 2023. Research Scientist, Pacific Region Cetacean Research Program, Fisheries and Oceans Canada, Nanaimo, BC.
- Eguchi, T., A.R. Lang, and D.W. Weller. 2022. [Abundance and migratory phenology of eastern North Pacific gray whales 2021/2022](#). U.S. Department of Commerce, NOAA Technical Memorandum NMFS-SWFSC-668.
- Frouin-Mouy, H., X. Mouy, J. Pilkington, E. Kusel, L. Nichol, T. Doniol-Valcroze, and L. Lee. 2022. [Acoustic and visual cetacean surveys reveal year-round spatial and temporal distributions for multiple species in northern British Columbia, Canada](#). *Nature Scientific Reports* 12: 19272.
- Gavrilchuk, K., and T. Doniol-Valcroze. 2021. [Recovery potential assessment for the grey whale \(*Eschrichtius robustus*\): Pacific Coast Feeding Group and Western Pacific population in Canadian waters](#). DFO Can. Sci. Advis. Sec. Res. Doc. 2021/020. iv + 52 pp.
- Government of British Columbia. 2021. [Sedimentary Basins of B.C.](#) Accessed 17 February 2023.
- Hawryshyn, J., pers comm. 2023. Email correspondence with A. Biega. May 2023. Environmental Incident Coordinator, Fisheries and Oceans Canada, Vancouver, BC.
- Justice Canada. 2018. [Marine Mammal Regulations](#). Accessed 16 February 2023.

- Lee, L., pers. comm. 2023. Comments provided via email by D. Casimir to A. Biega. April 2023. Ecologist, Gwaii Haanas National Marine Conservation Area Reserve and Haida Heritage Site, Parks Canada, Skidegate, BC.
- Maa-nulth First Nations Final Agreement Side Agreement. 2006. [Maa-nulth First Nations Final Agreement \(the "Final Agreement"\) – Harvesting of Grey Whale and Sei Whale](#). Accessed on 17 February 2023.
- Moore, K., pers. comm. 2023. Email correspondence with A. Biega. March 2023. Acting Regional Manager, Marine Mammals, Marine Mammal Unit, Fisheries and Oceans Canada, Vancouver, BC.
- Moulton, V.D., A. d'Entremont, and J.R. Christian. 2020. [Review of the 2008 Statement of Canadian Practice with Respect to the Mitigation of Seismic Sound in the Marine Environment](#). DFO Can. Sci. Advis. Sec. Res. Doc. 2020/041. xi + 109 pp.
- NIMMSA. 2019. [Regionally Specific Viewing Conduct for Northern Vancouver Island](#). Accessed 17 February 2023.
- NOAA. 2020. [Photogrammetry](#). Accessed 17 February 2023.
- NOAA. 2021. [International Collaboration to Monitor and Respond to Tagged Gray Whale](#). Accessed 17 February 2023.
- NOAA. 2022. [Makah Tribal Whale Hunt](#). Accessed 17 February 2023.
- NOAA. 2023. [2019–2023 gray whale unusual mortality event along the west coast and Alaska](#). Accessed 17 February 2023.
- Parks Canada. 2017. [Multi-species Action Plan for Pacific Rim National Park Reserve of Canada](#) - *Species at Risk Act* Action Plan Series. Parks Canada Agency, Ottawa. v + 29 pp.
- Parks Canada. 2020. [Research and Collection Permit System](#). Accessed 17 February 2023.
- Parks Canada. 2022. [Multi-species Action Plan for Gwaii Haanas National Park Reserve, National Marine Conservation Area Reserve, and Haida Heritage Site \(2016-2021\)](#). *Species at Risk Act* Action Plan Series. Parks Canada Agency, Ottawa. vi+ 14 pp.
- Punt, A.E., and P.R. Wade. 2010. Population status of the eastern North Pacific stock of gray whales in 2009. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-207. 43 pp.
- PWWA. 2021. [Leaders in Responsible Whale Watching](#). Accessed 17 February 2023.
- Raverty, S., pers. comm. 2021. Email correspondence with M. Cashion. August 2021. Veterinary Pathologist, Animal Health Centre, Ministry of Agriculture, Food, and Fisheries, Province of British Columbia, Abbotsford, BC.
- Schoeler, R., pers. comm. 2023. Email correspondence with A. Biega. February 2023. Public Outreach Education Officer, Coastal BC Field Unit, Parks Canada, Vancouver, BC.

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Scott, J., pers. comm. 2023. Email correspondence with A. Biega. February 2023. Senior Manager, Whales Initiative, Ocean Wise, Vancouver, BC.

Sea View Marine Sciences. 2018. [Marine Mammal Oil Spill Response Protocol](#). Accessed 17 February 2023.

Silber, G.K., Weller, D.W., Reeves, R.R., Adams, J.D., and T.J. Moore. 2021. Co-occurrence of gray whales and vessel traffic in the North Pacific Ocean. *Endangered Species Research* 44: 177-201.

Strawberry Isle Marine Research Society. 2019. [Grey Whale of Clayoquot Sound: a quick ID guide for mariners](#). Accessed 17 February 2023.

Thomson, M.D. and C.M. Binder. 2021. Recalibrating the Department of National Defence approach to active sonar impact management. *Marine Pollution Bulletin* 173: 113044.

Withers, J., pers. comm. 2023. Email correspondence with A. Biega. March 2023. Licensing Officer, Marine Mammal Unit, Fisheries and Oceans Canada, Vancouver, BC.

Yakimishyn, J. pers. comm. 2023. Comments provided via email by D. Casimir to A. Biega. April 2023. Marine Ecologist, Pacific Rim National Park Reserve, Port Alberni, BC.