



# SCIENCE ADVICE TO ADDRESS FOUR RECOVERY POTENTIAL ASSESSMENT TERMS OF REFERENCE ELEMENTS FOR SEI WHALE (ATLANTIC POPULATION)

## Context

In May 2019 the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed the Atlantic Population of Sei Whale (hereafter simply referred to as “Sei Whale” in this document) as Endangered, primarily due to a possible population decline of greater than fifty percent over the past three generations from past whaling and, more recently, due to other threats.

The Species at Risk Program in Newfoundland and Labrador Region requested that DFO Science provide Science Advice, via a Canadian Science Advisory Secretariat (CSAS) process, regarding the following four elements of a Recovery Potential Assessment (RPA) for the Sei Whale to help inform the listing decision for the species:

1. Element 8: Assess and prioritize the threats to the survival and recovery of the Sei Whale.
2. Element 12: Propose candidate abundance and distribution target(s) for recovery.
3. Element 16: Develop an inventory of feasible mitigation measures and reasonable alternatives to the activities that are threats to the species and its habitat.
4. Element 22: Evaluate maximum human-induced mortality and habitat destruction that the species can sustain without jeopardizing its survival or recovery.

This Science Response Report results from the National Science Response Process ending February 23, 2022, on the Recovery Potential Assessment – Sei Whale (*Balaenoptera borealis*), Atlantic population.

## Background

Multi-species aerial surveys conducted by DFO Science aim to generate population abundance estimates for all large species, including cetaceans, seals, large fishes, and sea turtles, present in the area surveyed. However, a minimum number of visual detections of any given species during the survey are required in order to generate a statistically defensible population estimate for each. In 2016, DFO Science undertook a large scale, multispecies, systematic aerial survey (in collaboration with NOAA) in Canadian Atlantic waters (from the Bay of Fundy to Labrador; Figure 1). Unfortunately, due to an insufficient number of visual detections of Sei Whales during that survey (only three visual detections were made over 21,037 km of tracklines; see Figure 2), it was not possible to generate a population abundance estimate or determine the species’ Canadian distribution. Sei Whales are often difficult to distinguish from Fin Whales from the air (and vessels). Four sightings during this survey were recorded as being “Fin/Sei” (Figure 2) and could not be assigned to one species or the other. Systematic (effort-corrected) aerial surveys for the North Atlantic Right Whale (NARW) conducted by DFO have been ongoing annually since 2018 in Atlantic Canada, but during the >4,500 NARW-dedicated aerial survey flight hours

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over the last four years relatively few Sei Whales have been detected. Generating a Sei Whale population estimate from the relatively few visual detections generated each year from the NARW-focused systematic (i.e., effort-corrected) aerial surveys would require changing the survey methods (e.g., breaking away from the systematic survey track lines to circle a sighting in an attempt to clearly distinguish between Fin and Sei whales). Maintaining comprehensive in-season NARW surveying and monitoring is currently a top priority for the Department, as it directly supports in-season dynamic fisheries management measures and generates necessary data on NARW distribution and abundance in Canadian waters, such that any change in that protocol would not currently be supported.

Opportunistic Sei Whale sightings by external observers and organizations have been made, some of which can be found on [WhaleMap](#). Opportunistic sightings by definition are not effort-corrected and are therefore biased, and in the case of many of the recent opportunistic Sei Whale detections, are biased towards the areas and times where NARW are known to frequent and/or where there are active fisheries and shipping lanes thought to pose a risk to NARW. It is not possible to generate quantitative abundance or distribution estimates for Sei Whale using these opportunistic sightings.

The next large-scale, multi-species aerial survey in Canadian Atlantic waters is currently tentatively scheduled for summer 2023, and it will again aim to provide abundance estimates for all species present in the region, including Sei Whales. If Sei Whales are detected in sufficient numbers during a future survey (although not probable for a single survey with its design based on too few visual detections made in previous surveys), or as the number of visual Sei Whale (and other COSEWIC-assessed species) sightings accumulate with surveys following comparable protocols, it could be possible to generate a population abundance estimate and/or delineate distribution maps in the future that could be provided via a formal CSAS peer review process.

The data and information needed to address the four RPA elements currently being requested for Sei Whales either does not currently exist (element 12, 22) or can be inferred using information from similar species, and/or is already peer reviewed and publicly available (element 8, 16). The four requested RPA elements are addressed below for Sei Whale, to the extent possible given the currently available information, including explanations regarding relevant data availability and/or whether inferences could be made using information for similar species.

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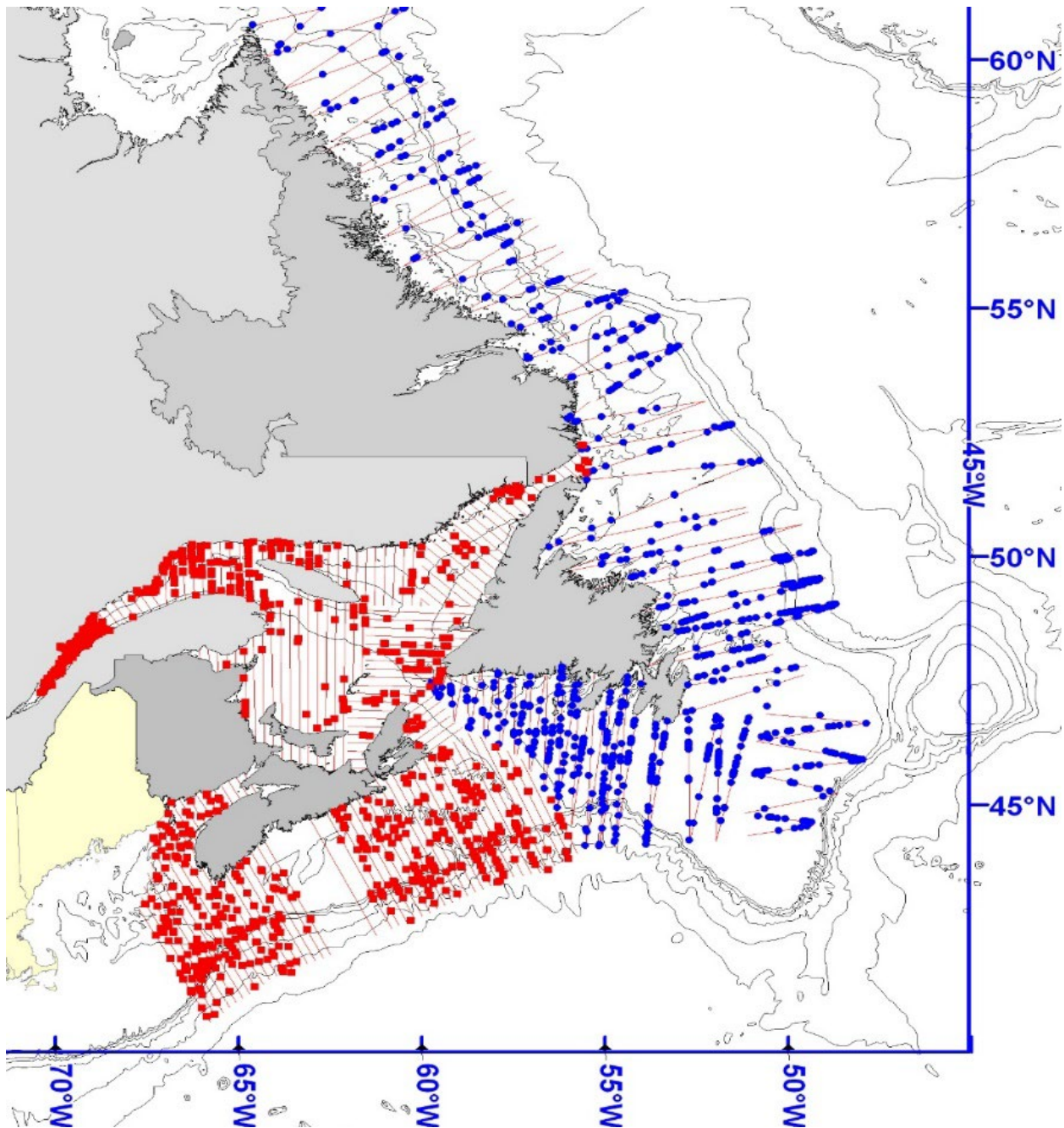


Figure 1. Aerial multispecies cetacean survey effort (transect lines) in Newfoundland and Labrador, Gulf of St. Lawrence, and Scotian Shelf waters in summer 2016. All marine mammal sightings made during the survey are indicated with blue circles (Newfoundland and Labrador effort) and red squares (Gulf of St. Lawrence, Scotian Shelf, and Bay of Fundy effort). The gap in aerial survey effort on the Scotian Shelf is a function of an exclusion zone established for a NATO marine exercise that year.

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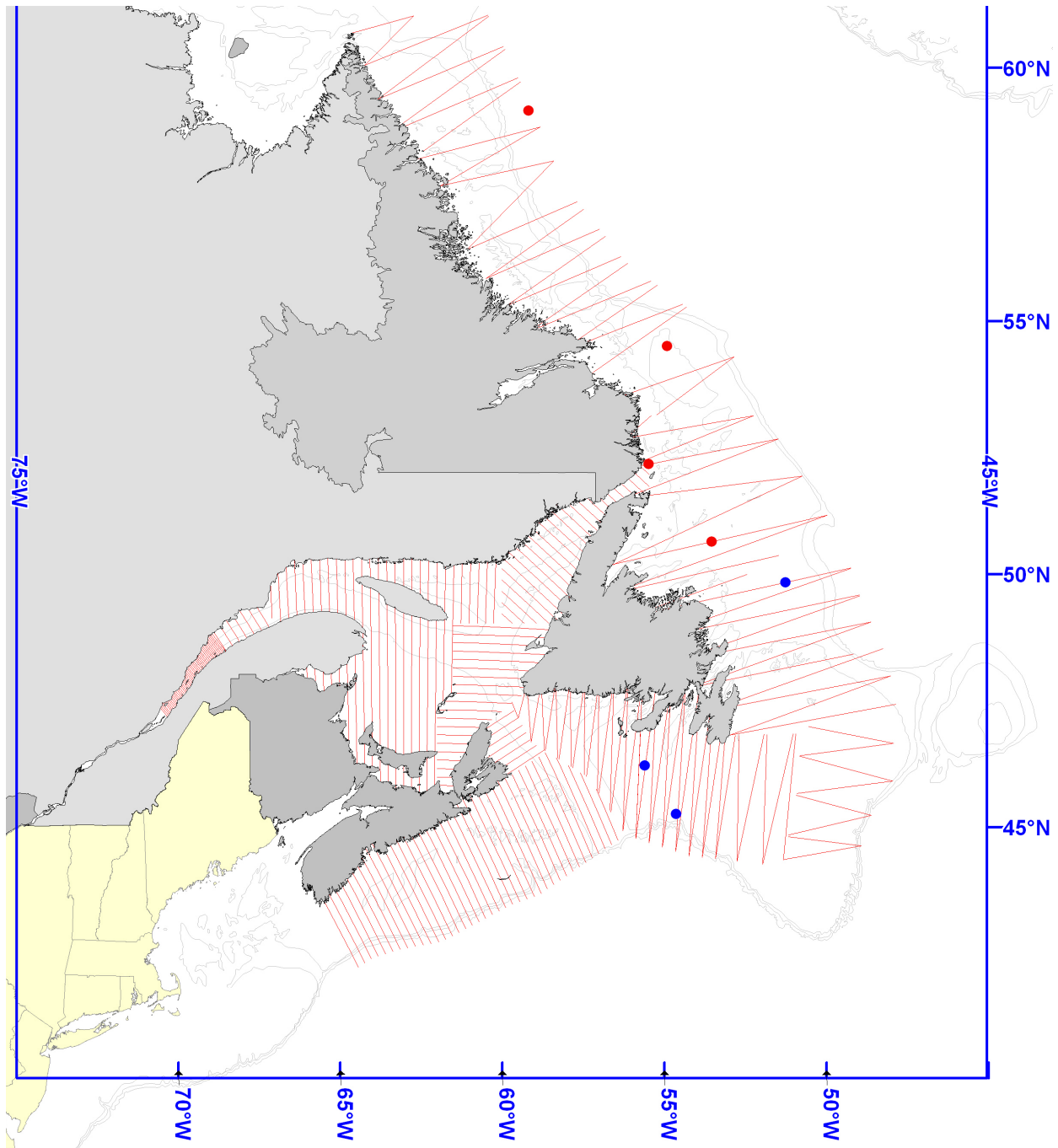


Figure 2. Sei Whale sightings during the 2016 systematic aerial multispecies cetacean survey. Only three definite Sei Whale sightings (blue dots) were made during the entire survey which is insufficient to generate a population abundance estimate or delineate the distribution of this species in Canada. Four sightings during this survey were recorded as being “Fin/Sei” (red dots) and cannot be assigned to one species or the other.

## Analysis and Response

### 1<sup>st</sup> Question: RPA Element 8: Assess and prioritize the threats to the survival and recovery of the Sei Whale

#### Response

The most recent COSEWIC status report for Sei Whale (COSEWIC 2019a) is a peer reviewed document that contains the most up to date information (up to 2019) about the species in Canada. As part of this COSEWIC status assessment, the threats to the species were reviewed, assessed, and prioritized by a group of DFO and external marine mammal experts using the International Union for the Conservation of Nature – Conservation Measures Partnership unified threats classification system. The results of this threats assessment should be referred to as the most up to date information regarding the threats to Sei Whale in Canada and have been adapted and summarized below; presented in decreasing order of assessed severity of impact.

*Underwater noise from seismic exploration for oil and gas, drilling of oil/gas wells, shipping (estimated severity of impact: medium-low)*

The possible negative impacts of underwater noise in baleen whales varies depending on a variety of factors, including whether the noise is acute (e.g., military exercise, seismic airgun pulses) or chronic (e.g., noise from shipping). Negative impacts that have been observed in baleen whales include significant behavioral responses, alteration of foraging behavior, avoidance responses, changes in habitat use, changes in acoustic communication and interference (masking), and even death in certain cases.

Underwater noise associated with offshore oil and gas exploration is a concern for this species and was assessed as the highest ranking threat to Sei Whale in Canadian waters. Recent intensive oil and gas exploration off the east coast of Newfoundland and southern Labrador has been taking place, as well as seismic surveys occurring simultaneously off of the Grand Banks and the Labrador Shelf. Seismic survey effort off of Nova Scotia has been more intermittent thus far. There is currently a ban on oil and gas exploration in the Gulf of St. Lawrence and on George's Bank. However, if these areas saw changes in regulation or in the intensity of resource exploration in the future, they could also become areas of higher concern to Sei Whales (where they overlap in space and time). Baleen whales, including Sei Whales when and where they are present, are likely exposed to shipping noise throughout their distributional range in Atlantic Canada at all times of the year given the widespread distribution of shipping activity in Atlantic Canadian waters.

Please note that the following three threats (vessel strikes, entanglement in fishing gear, and noise from naval exercises) were all assessed at the same severity of impact (i.e., low), however all three of these threats were found to be relatively less of a concern for Sei Whale than underwater noise from offshore oil and gas exploration and drilling/extraction and shipping.

*Collisions with vessels (estimated severity of impact: low)*

Near the Atlantic coast of North America, vessel traffic is a serious threat to several whale species, and there have been recent reports of Sei Whale mortality due to vessel strikes. In one study cited in COSEWIC 2019a, 27 stranding reports of Sei Whales from along the east coast of the U.S. and the Canadian Maritimes spanning 1990 to 2017 were reviewed and 10 of them were confirmed vessel strike interactions, with two additional possible strikes. It is clear from these stranding records that ship strikes have the potential to harm Sei Whales. It is also likely that many vessel strikes go undetected given the pelagic nature of the species. If Sei Whales

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overlap in space and time with the seasonal vessel management measures that have been enacted in parts of Atlantic Canada aimed at reducing risk to the North Atlantic Right Whale and certain other cetacean species (e.g., static and dynamic slowdown zones, voluntary IMO Areas to Be Avoided, voluntary speed limits associated with certain Marine Protected Areas), they too will benefit from some degree of threat reduction in those areas.

*Entanglement in fishing gear, effects of fisheries (estimated severity of impact: low)*

The authors of COSEWIC 2019a found that entanglement was less commonly encountered in the stranding data that they reviewed than vessel strikes. Out of the 27 stranding records from along the U.S. east coast and Canadian Maritimes, only one of the stranded Sei Whales was confirmed to have been entangled in fishing gear and one other individual was suspected to have had a fishing gear interaction. The pelagic nature of this species means that many fishing gear interactions likely go undetected.

Sei Whales frequently forage on the same prey as North Atlantic Right Whales and possibly in similar places. Therefore, it is reasonable to assume that Sei Whales are also likely vulnerable to fisheries entanglement to some degree. Other baleen whales in Atlantic Canada which have overlapping ranges with Sei Whales, such as Fin and Blue Whales, have been recorded entangled in fishing gear in Canada. The 2019 COSEWIC assessment of the Atlantic population of Fin Whale noted two reports of Fin Whales being entangled in Snow Crab fishing gear in Canadian waters, based on observations made by NOAA between 2005 and 2014 (COSEWIC 2019b). The 2002 COSEWIC assessment of Blue Whales in Atlantic Canada states that between 1979 and 2002 fishing gear such as gills nets had caused the drowning death of at least three Blue Whales in the St. Lawrence, which the authors felt warranted further monitoring (COSEWIC 2002).

However, the identification of which specific fisheries are a threat to Sei Whales depends on a variety of factors that are currently unknown, including the extent of overlap in Sei Whale distribution with a given active fishery in space and time, fishing gear type, gear configuration, etc.

*Noise and explosions from naval exercises (estimated severity of impact: low)*

Naval exercises, especially involving mid-frequency sonars as well as explosions, have been known to affect the behavior and distribution of cetaceans and sometimes even kill them. The range of the Sei Whale in Atlantic Canada includes areas where the Canadian Navy, the U.S. Navy, and other navies are active. However, little is currently known about when and where military exercise occur and the impact that these activities may have on whales which limits our current understanding of the extent of this threat to Sei Whales.

*Other considerations*

When the assessments of the above four threat categories are integrated using the International Union for the Conservation of Nature – Conservation Measures Partnership unified threats classification system, the assigned overall threat impact level for Sei Whale in Atlantic Canada is 'high-medium'. It is also worth noting that all of these threats and their impacts on the species are overlaid upon a reduced population size that resulted from heavy 20th century whaling. This species was one of the last to be targeted by whaling operations, which continued up until 1972 in Canada and until 1989 in Iceland. Some Sei Whales have also been taken more recently, for example in an Aboriginal subsistence hunt off western Greenland in 2006; international Whaling Commission information from 2018 indicates that three Sei Whales have been reported caught off western Greenland since 1985.

**2<sup>nd</sup> Question: RPA Element 12: Propose candidate abundance and distribution target(s) for recovery**

**Response**

There is considerable uncertainty regarding the historical (i.e., pre-whaling) abundance of Sei Whale (orders of magnitude of difference) and there is no credible population estimate for the species today. The relatively few available records of this species also prevent the definitive delineation of its current or historical Canadian distribution. Proposing a quantitative candidate abundance-based recovery target would require a current-day minimum population abundance estimate and an indication of the historical population abundance for Sei Whales, which do not currently exist.

It is also worth noting here that other similar whale species that are likely to have similar probabilities of visual detection during aerial surveys were seen in much greater numbers than Sei Whales during the 2016 survey (such as Fin Whales, Minke Whales, and even the endangered Atlantic population of Blue Whale). This suggests that the relatively low number of Sei Whale sightings is not only due to low detection probability, but is also likely a reflection of there being relative few individuals of the species in the region. This point is further supported by the relatively low number of Sei Whale sightings made during the more recent NARW-directed aerial surveys.

Using abundance and/or distribution estimates of one cetacean species as a proxy to estimate those of a different cetacean species is associated with high uncertainty. There is a large degree of variability in cetacean population sizes and trends throughout Atlantic Canada. Each species has different life histories and factors influencing their population dynamics, which can have variable impacts across species. For example, some species such as Humpback Whales appear to have recovered well from the effects of historical whaling, while others such as Blue and North Atlantic Right Whales have not.

In some cases, historical whaling data can provide some insight into “pristine” (pre-whaling) population size and/or distribution. However, the uncertainty around the accuracy of these reports for Sei Whale and the degree to which the number of whales reported caught actually reflects abundance, as well as the absence of any information on effort and vital rates, makes this species a poor candidate for this type of evaluation.

A Dalhousie University graduate student research project that is currently underway is assessing Sei Whale occurrence from May 2015 to November 2017 using recordings from 10 moored passive acoustic monitoring devices that were deployed off of the coasts of Nova Scotia, Newfoundland, and Labrador (Figure 4). Preliminary findings of that research show that validated and confirmed Sei Whale calls were detected at each of the 10 stations in at least one month of the year, with some of the more southern stations having many days with call present consistently throughout the year. Analyses completed thus far indicate possible seasonal trends in daily call presence, though further analysis is underway to investigate and better understand these observed trends. Generally, Sei Whale calls were detected less at more northern stations (e.g., off of Labrador) in January-March, and were more often heard in the late summer and early fall, especially during October throughout the entire range of the recorders in this study. This acoustic information indicates that Sei Whales are wide-ranging in Atlantic Canada, from southern Nova Scotian waters all the way up to northern Labrador waters. This study did not look at the Gulf of St. Lawrence. It should be noted that these results represent minimum presence of Sei Whales as Sei Whales could be present but not emitting calls, some calls that were recorded may be masked by background noise or similar calls of other species, or Sei

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Whales could be present and calling within the general area but are calling outside of the detection range of the recorders. It is not possible to identify the number of calling whales or the exact location of the individual animals that were recorded in this study.

Organizations and observers external to DFO also record acoustic detections and opportunistic Sei Whale sightings in Atlantic Canadian waters, many of which have been associated with the intensive NARW-directed survey and monitoring efforts that have taken place during the late spring, summer, and early fall months since 2018. Some of these acoustic detections and opportunistic sightings are shown on [WhaleMap](#), and include sightings of Sei Whales made in the northwestern and southwestern Gulf of St. Lawrence as well as acoustic detections (via underwater gliders operated by academia) in the northwestern and southwestern Gulf of St. Lawrence, on the Scotian Shelf, and in the Cabot Strait and Roseway Basin Areas.

In the case of opportunistic Sei Whale sightings made during NARW-directed efforts, these efforts have been concentrated in areas known to be frequented by NARW (primarily in the Gulf of St. Lawrence, Scotian Shelf, Bay of Fundy, and Roseway Basin areas) as well as areas where there are active fisheries or shipping lanes. It is important to note that such opportunistic visual detections are not effort-corrected and are therefore biased towards whenever and wherever an observer happens to be looking (or listening), precluding quantitative abundance or definitive distribution estimates. Sei Whale opportunistic sightings from 1975 up to 2015 have been mapped, and an initial Sei Whale species distribution model, has been produced by DFO Science (Figure 3). Complete details of this work can be found in Gomez et al. 2020.

The location of the very few effort-based Sei Whale visual detections that were made during the 2016 systematic aerial multispecies cetacean survey (to the east and south of Newfoundland), the preliminary results of the above-noted acoustic research (acoustic detections made throughout the year from northern Labrador to midway down the east coast of Nova Scotia and extending out to the continental shelf edge), recent opportunistic sightings (including in the northwestern and southwestern Gulf of St. Lawrence), a compilation of opportunistic sightings over the past few decades (Gomez et al.; Figure 3), as well as acoustic detections (including in the Roseway Basin, off the east coast of Nova Scotia, in the Cabot Strait area, and in the northwestern and southern Gulf of St. Lawrence) primarily associated with NARW-directed monitoring efforts, collectively suggest that Sei Whale is a very wide-ranging species and that individuals may be found anywhere throughout Atlantic Canadian waters at any time of the year.

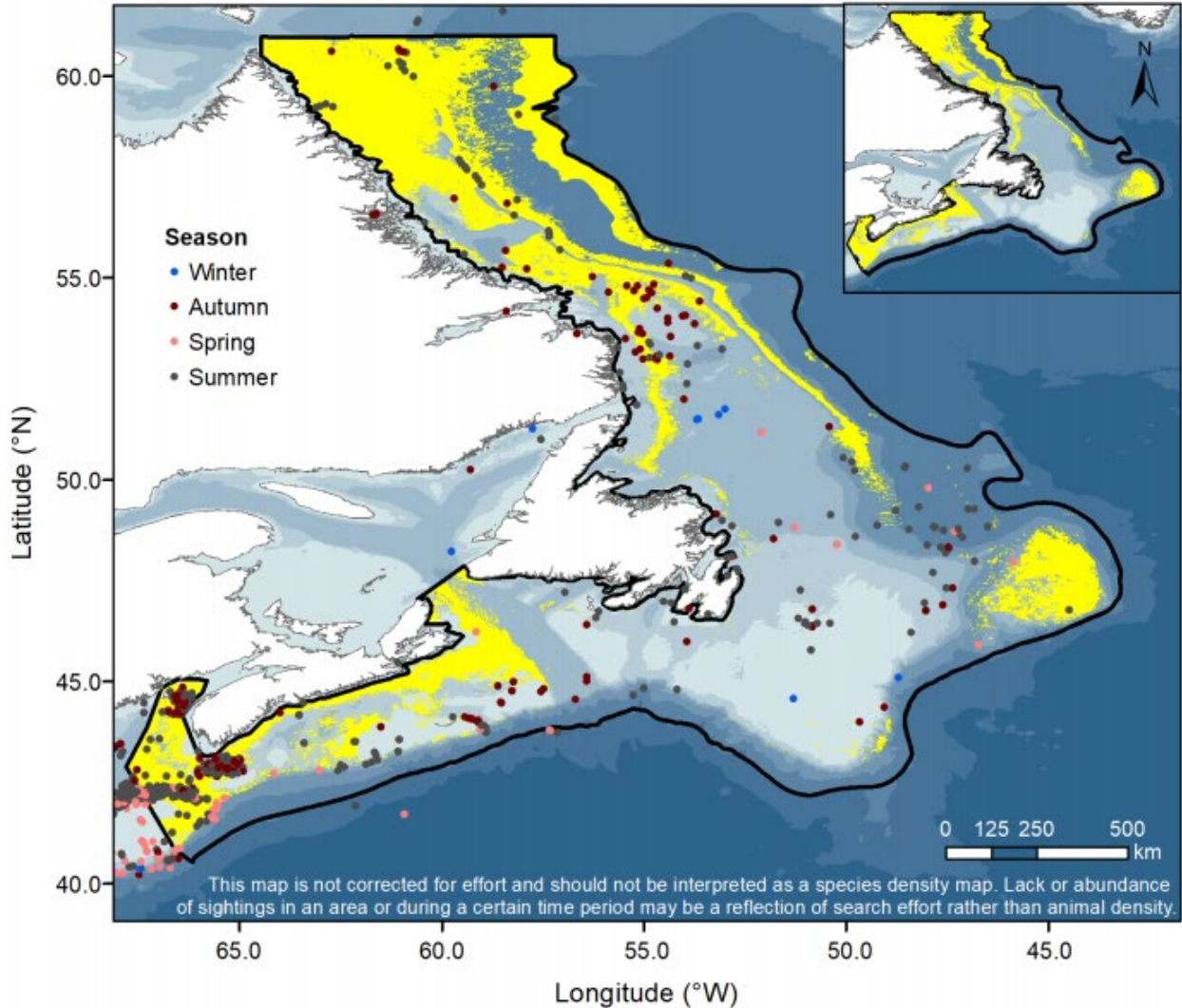
As has been used in some recovery strategies, one possible approach could be to use the maintenance of the current Sei Whale abundance and/or distribution as an interim recovery target. However, it is recognized that the 'maintenance' type of target is of limited utility given there is no way to measure progress towards the target without having established benchmarks to which future comparisons can be made with eventual abundance and distribution values. Another option for an interim abundance-based recovery target would be to use the minimum abundance estimate threshold associated with the 'Threatened' category under COSEWIC assessment criterion D, which is "1,000 mature individuals", and aim to surpass that threshold. However, it is worth noting that although the most recent COSEWIC assessment of Sei Whale suggests that the current population size is likely below 1,000 mature individuals, the assessment did not invoke the estimated population size as the reason for being designated as Endangered, but rather the designation was based on the possible rate of decline (i.e., >50%) over the past three generations.



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As there are no quantitative abundance or definitive distribution estimates currently available for Sei Whales in Atlantic Canada, nor any reliable historical estimates, it is not possible to determine recovery target(s) with any further specificity at this time.



*Figure 3. Opportunistic sightings of Sei Whales by season (from Gomez et al. 2017), collected from 1975 through 2015 (n = 1170, within study area outlined by black line). As noted in the figure, the map is not effort-corrected and therefore should not be interpreted as a species density map and the lack of sightings in a given area or during a certain time period may be a reflection of the search effort rather than actual animal density. Yellow indicates consolidated species distribution model outputs: areas with high (60-100%) relative occurrence rate for any scenarios of sampling bias correction (bias maps and subsampling) during summer. Species distribution model outputs indicate priority areas where monitoring efforts may be targeted.*

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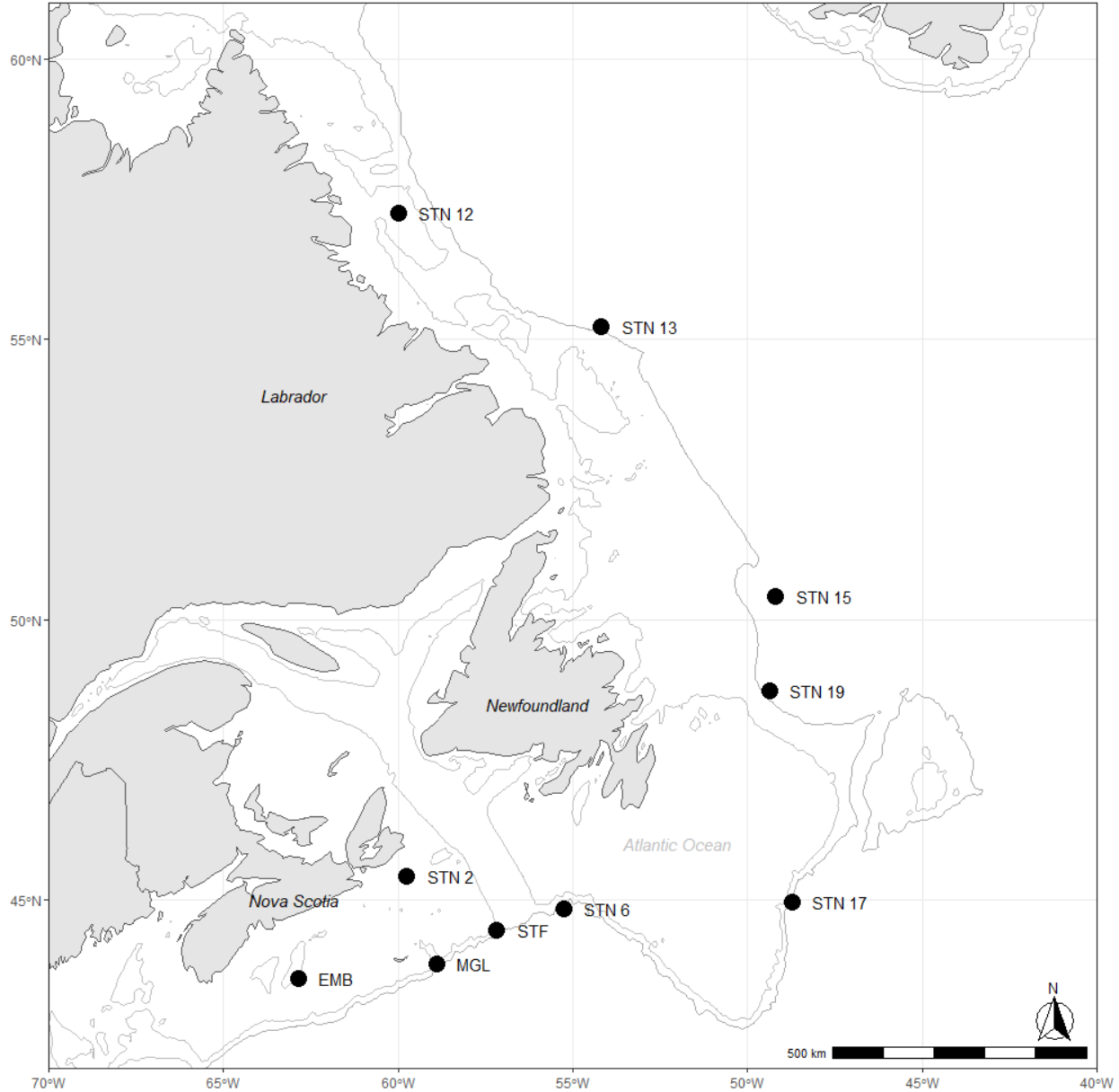


Figure 4. Locations of the 10 passive acoustic recording stations being analyzed for Sei Whale call presence from May 2015 to November 2017 by a Canadian graduate student. Preliminary results indicate that Sei Whales are wide-ranging from southern Nova Scotia all the way up to northern Labrador waters, as calls were detected at all 10 stations and throughout the year on several stations, with some indication of possible seasonal trends in call occurrence.

**3<sup>rd</sup> Question: RPA Element 16: Develop an inventory of feasible mitigation measures and reasonable alternatives to the activities that are threats to the species and its habitat**

**Response**

As indicated in the response to Question 1 above, and according to COSEWIC 2019a, there are four main threats currently thought to negatively impact Sei Whale in Atlantic Canadian waters. Possible mitigation measures to these threats have been extracted from existing federal Species at Risk recovery documents for other baleen whale species in Atlantic Canada and from existing DFO Canadian Science Advisory Secretariat documents, where available and relevant. The information below is not exhaustive, and the lack of further specificity than what is provided is a function of the many knowledge gaps that currently exist for Sei Whale.

*Underwater noise from seismic exploration for oil and gas, drilling of oil/gas wells, shipping*

With respect to underwater noise from seismic exploration for oil and gas or the drilling of oil/gas wells, a possible mitigation measure to help mitigate the impacts to Sei Whales (as with other cetaceans) would be to limit the work or activity to times when the species is absent from the area, or during times that do not interfere with the species' vital functions, e.g., mating, calving, feeding (Fisheries and Oceans Canada 2020a). If the Canadian distribution and habitat use of Sei Whales is found to vary predictably either seasonally or on some other time scale, then this mitigation measure could be an effective approach. DFO Science Advice states that planning seismic surveys to avoid spatial and temporal overlap with areas where SARA-listed cetaceans are anticipated to be present is considered the most effective mitigation measure to reduce impacts on individuals and their critical habitat, but notes that this is dependent upon adequate information on distribution and abundance of the species (DFO 2015).

Since 2008, the [Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment](#) (SOCP; DFO 2015) has been used to guide the minimum mitigation measures required for seismic operations occurring in all non-ice covered marine waters in Canada. This Statement specifies the mitigation requirements that must be met during the planning and conduct of marine seismic surveys, in order to minimize impacts on life in the oceans, including cetaceans (DFO 2017a). The current SOCP only covers seismic surveys that use air source arrays and does not include the use of other sources of pulsed noise such as multibeam echosounders or military sonar.

Table 3 in DFO 2015 contains a review of the mitigation and monitoring measures of the SOCP and their likely effectiveness/ability to avoid or minimize impacts when properly implemented, as well as recommended modifications or additional mitigation measures to be considered. In addition to avoiding the activity during times when the species is present, Table 3 lists other mitigation measures such as: the establishment of a safety zone which is a circle with a radius of at least 500 meters as measured from the center of the air source array(s) (or a radius determined using propagation models based on the best available data and science, whichever is most conservative), having a qualified Marine Mammal Observer continuously observe the safety zone for a minimum period of 30 minutes prior to the start-up of the air source array(s) when the safety zone is visible, and maintaining a regular watch of the safety zone at all other times. Ramp-up procedures or the reduction of the airgun array to a single source element as a potential mitigation measure during seismic surveys are also outlined in the SOCP, but their effectiveness in terms of reducing impacts to cetaceans is not fully understood (DFO 2015).

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More recently, DFO Science was asked to review the current Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment and develop Science Advice that could be used to guide a potential future update of the mitigation measures in the SOCP. This Science Advisory process identified several areas of the SOCP that require updating in terms of mitigation, including the addition of a minimum separation distance between concurrent seismic surveys in the same region to minimize potential cumulative sound exposure on marine fauna, and the implementation of an airgun shut down in the event that the passive acoustic monitoring operator determines that a cetacean vocalization may be that of a 'shut down species' and that the species is likely within or about to enter the pre-defined safety zone (DFO 2020c). The effectiveness of any of these mitigation measures may be limited by the availability of information on distribution, abundance, and behavior of a species (DFO 2015); as is the case currently for Sei Whale. Refer to DFO 2015 and DFO 2020c for further details on potential mitigation measures to underwater noise from seismic activities.

With respect to underwater noise from shipping, potential mitigation measures include the adjustment of shipping lanes according to the areas that are highly frequented by the species (if known) and the implementation of engineering, operational, and maintenance improvement for the various shipping fleets to reduce underwater noise emissions (Fisheries and Oceans Canada 2020a; Fisheries and Oceans Canada 2021). Another way that could be further explored to potentially decrease vessel noise impacts is the convoying of vessels (i.e., minimizing the time window when multiple ships pass through an area). For more details on potential mitigation measures to reduce the impacts of shipping noise on cetaceans, refer to products from a recent workshop that evaluated the scientific evidence to inform the likelihood of the effectiveness of a variety of potential mitigation measures aimed at reducing received levels of shipping noise to the Southern resident Killer Whale on the west coast (DFO 2017b).

*Collisions with vessels*

If and when more is known about Sei Whale distribution and habitat use in Atlantic Canada, potential measures to help mitigate the threat of vessel collisions could include the adjustment of the location of shipping lanes and/or the implementation of slow down or no-go areas couple with posting marine mammal observers on vessel bridges, either seasonally or permanently, according to times and areas that are highly frequented by the species. These concepts are already listed (and in the case of NARW, are already being implemented) as possible mitigation activities for other cetacean species in the Species at Risk Action Plan to Reduce the Impact of Noise on the Beluga Whale and Other Marine Mammals at Risk in the St. Lawrence Estuary (Fisheries and Oceans Canada 2020a) and the Action Plan for the North Atlantic Right Whale (*Eubalaena glacialis*) in Canada (Fisheries and Oceans Canada 2021).

*Entanglement in fishing gear, effects of fisheries*

The Species at Risk Action Plan for NARW lists the development and implementation of entanglement prevention and mitigation measures, such as gear innovation and/or modified gear configurations as one way to help mitigate the threat of entanglement (Fisheries and Oceans Canada 2021). Similar efforts, in areas and at times when Sei Whales are present, are likely to help mitigate this threat to Sei Whales given their partial overlap in diet, feeding behavior, and distribution with NARW. The removal of abandoned, lost, or otherwise discarded fishing gear from NARW habitat is also listed as another way to help reduce the risk of entanglement (Fisheries and Oceans Canada 2021), and it is reasonable to believe that this activity would also provide some threat mitigation benefit to Sei Whales in areas where they occur.

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*Noise and explosions from naval exercises*

A mitigation measure commonly applied in an effort to mitigate the impacts of underwater noise to cetaceans is to limit the work or activity to times when the species is absent, or during times that do not interfere with its vital functions, e.g., mating, calving, feeding (Fisheries and Oceans Canada 2020a). If the Canadian distribution and habitat use of Sei Whales is found to vary seasonally or on some other time scale in a predictable way, then this mitigation measure may be effective in cases where there is some flexibility in the timing of naval exercises. Many of the mitigation measures outlined in the SOCP would also help to reduce possible impacts from military activities, such as the establishment of a safety zone (which the Canadian military already implements for their activities) and shut downs when animals of concern enter this safety zone.

**4<sup>th</sup> Question: RPA Element 22: Evaluate maximum human-induced mortality and habitat destruction that the species can sustain without jeopardizing its survival or recovery**

**Response**

An evaluation of the maximum human-induced mortality and habitat destruction that Sei Whale can sustain without jeopardizing its survival or recovery would require a minimum population abundance estimate for the species in Canada, as well as knowledge of what comprises the species' habitat and where and when it occurs in space and time. As no abundance estimate exists or is currently achievable for Sei Whale, and the necessary knowledge regarding habitat use does not exist, it is not possible to evaluate maximum human-induced mortality or habitat destruction for Sei Whale at this time.

**Contributors**

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<b>Name</b>	<b>Affiliation</b>
Abraham, Christine	DFO National Capital Region Science
Gosselin, Jean-François	DFO Québec Region Science
Lawson, Jack	DFO Newfoundland and Labrador Region Science
Moors-Murphy, Hilary	DFO Maritimes Region Science
Stenson, Gary	DFO Newfoundland and Labrador Region Science

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**Approved by**

Rhea King  
Director General, Science Programs  
National Capital Region  
Fisheries and Oceans Canada  
April 15, 2024

**Sources of Information**

COSEWIC 2002. [COSEWIC assessment and update status report on the Blue whale, \*Balaenoptera musculus\*, Atlantic population, Pacific population, in Canada / Committee on the Status of Endangered Wildlife in Canada](#). Ottawa. vi + 32 pp.

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**This Report is Available from the:**

Center for Science Advice (CSA)  
National Capital Region  
Fisheries and Oceans Canada  
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ISSN 1919-3769

ISBN 978-0-660-71503-2 Cat. No. Fs70-7/2024-024E-PDF

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Department of Fisheries and Oceans, 2024



Correct Citation for this Publication:

DFO. 2024. Science Advice to Address Four Recovery Potential Assessment Terms of Reference Elements for Sei Whale (Atlantic Population). DFO Can. Sci. Advis. Sec. Sci. Resp. 2024/024.

*Aussi disponible en français :*

*MPO. 2024. Avis scientifique concernant quatre éléments du cadre de référence pour l'évaluation du potentiel de rétablissement du rorqual boréal (population de l'Atlantique). Secr. can. des avis sci. du MPO. Rép. des Sci. 2024/024.*