Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

National Capital Region

Canadian Science Advisory Secretariat
Science Advisory Report 2026/006

IMPORTANT HABITAT OF NORTHERN BOTTLENOSE WHALES, SCOTIAN SHELF POPULATION

Photo credits: Northern Bottlenose Whale Project, 2016.

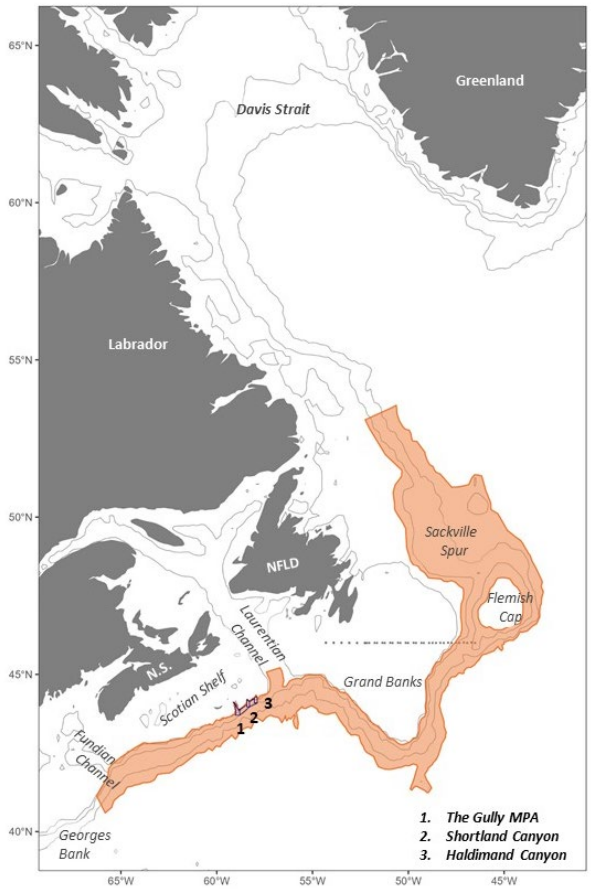

Figure 1. Area of important northern bottlenose whale (NBW) habitat identified in orange. Grey dashed line represents the arbitrary division between NBW designatable units used by the Committee On the Status of Endangered Wildlife in Canada (COSEWIC).

CONTEXT

The Scotian Shelf population of northern bottlenose whales (NBW) was listed as Endangered under Canada's *Species at Risk Act* (SARA) in 2006. Critical Habitat for this population was identified in the Recovery Strategy using the best available information at the time of publication in 2010, and consists of the Gully, Shortland, and Haldimand canyons of the eastern Scotian Shelf. In 2019, evidence for use of inter-canyon areas by NBW was assessed and these regions

were identified as important, functioning as foraging habitat and movement corridors between canyons. As NBW are known to occur in other areas outside the eastern Scotian Shelf, a broader assessment of important habitat was sought covering the full range of the Scotian Shelf population, outside of the areas already identified as important habitat or Critical Habitat. DFO Science was requested to present any data available to support identification of additional important habitat areas, and to:

1. Provide their locations, spatial extents, and temporal uses;
2. Assess their biophysical functions, features, and attributes; and
3. Identify the activities likely to destroy their functions, features, and attributes.

This Science Advisory Report is from the February 20-24, 2023 national peer review meeting Identification of Important Habitat for Northern Bottlenose Whale (Scotian Shelf Population). Additional publications from this meeting will be posted on the Fisheries and Oceans Canada (DFO) Science Advisory Schedule as they become available.

SUMMARY

- The Endangered Scotian Shelf population of northern bottlenose whales (NBW) consists of fewer than 170 individuals. The Gully, Shortland, and Haldimand canyons have been designated as Critical Habitat for the population while the inter-canyon areas have been identified as important habitat.
- Multiple sources of data were considered, including sightings, satellite telemetry data, and detections of NBW foraging clicks from towed hydrophone array surveys and bottom-moored passive acoustic monitoring (PAM) systems.
- Detected foraging clicks were used to estimate temporal persistence of relative habitat use and develop robust ensemble species distribution models (SDMs) using environmental predictors to help assess additional important habitat for the population.
- Some reservations were expressed by committee members regarding the model results that may influence the quantitative description of habitat suitability within the proposed boundaries of important habitat; however, the important habitat boundaries are also supported by the other sources of data.
- Continental slope waters (400-3,200 m bottom depth) extending from the Canada-US border to southern Labrador were identified as important habitat with year-round presence of NBW. Deeper waters and areas farther north were not assessed.
- The functions supported by this identified important habitat include foraging, feeding, and movement. Acoustic detections of foraging clicks indicate that foraging occurs throughout the identified important habitat, with most persistent foraging occurring in the Gully and areas northeastward. The habitat identified among areas of higher persistent foraging is important for movement across the entire important habitat area.
- Other potential habitat functions, such as socialization, resting, and reproduction, could not be evaluated with the available data.
- The biophysical features supporting foraging, feeding, and movement are the continental slope marine environment, water quality, acoustic environment, physical space including the entire water column, and food supply. There may be additional features that have not yet been defined or evaluated.

- Quantitative attributes were defined for the continental slope marine environment as areas within a 400-3,200 m bottom depth range. Data were insufficient to define quantitative attributes for the other biophysical features listed above.
- Activities likely to destroy this habitat are associated with the published threats of climate change, acoustic disturbance, fisheries interactions, vessel presence (associated with the threat “vessel strike” but more relevant for assessing impacts on habitat), and pollution and chemical contaminants.
- It is unknown if the important habitat identified here is sufficient to achieve the recovery objectives for the population and additional important habitats may remain to be identified. A revised Schedule of Studies should focus on continued data collection in continental slope waters to increase understanding of habitat functions, features, and attributes within this area, as well as data collection in deeper waters to determine if additional important habitat exists beyond continental slope waters.

INTRODUCTION

Northern bottlenose whales (NBW; *Hyperoodon ampullatus*) inhabit deep offshore waters of the North Atlantic Ocean. They are managed as two genetically distinct populations (Designatable Units; DUs) off eastern Canada, though there is uncertainty in the level of geographic and genetic overlap between populations. The Scotian Shelf population is a small, isolated population (<170 individuals) listed as Endangered under the *Species at Risk Act* (SARA) in 2006. The more northern Davis Strait-Baffin Bay-Labrador Sea population has been assessed by COSEWIC as Special Concern and is awaiting a listing decision under SARA. The geographic delineation between the DUs (Figure 1) was not based on scientific evidence due to a poor understanding of NBW distribution throughout the Northwest Atlantic.

SARA requires that the full extent of Critical Habitat, defined as “the habitat that is necessary for the survival or recovery of a listed wildlife species”, be identified for Endangered species. For the Scotian Shelf population, the Gully submarine canyon and Marine Protected Area (MPA) and nearby Shortland and Haldimand submarine canyons are core habitat areas for NBW that have been the focus of much research effort. These canyons were identified as Critical Habitat for the population in the Recovery Strategy first published in 2010, as they support the important life functions of feeding, foraging, socializing, mating, birthing, nursing, and rearing young (DFO 2016). In 2019, the inter-canyon areas between these Critical Habitats were identified as important foraging habitat and corridors for movement (DFO 2020).

NBW regularly occur in areas outside the eastern Scotian Shelf canyons, but habitat use outside this region is poorly understood. To support the identification of additional important habitat areas, a broader assessment of NBW important habitat covering the full range of the Scotian Shelf population was requested. Available data were used to investigate the location, spatial extent, and temporal use of additional important habitat for the population. The biophysical functions, features, attributes, and activities likely to destroy this important habitat were reviewed. This information will contribute to further identifying and/or refining Critical Habitat for the species.

ANALYSIS

Sightings, satellite telemetry, and acoustic detection data were used to inform the geographic extent and distribution of NBW habitat in eastern Canada. Acoustic detections were further used

to estimate temporal persistence of relative habitat use, and to build ensemble species distribution models (SDMs) to predict areas of potential NBW habitat.

Extent and Distribution of Occurrence

The following data were considered to assess the extent and distribution of NBW occurrence off eastern Canada:

- Sightings data obtained from DFO Maritimes region's Whale Sightings Database (n = 1,501 sightings from 1980-2022), DFO systematic aerial surveys (n = 57 sightings from 2007-2021), and vessel-based surveys conducted by the Whitehead Lab of Dalhousie University (n = 1,825 sightings from 1988-2021).
- Satellite telemetry data from NBW encountered in the Davis Strait (n = 17 tagged individuals from 2019 and 2021; note that two individuals were each tagged twice in 2019, resulting in 19 tag deployments total).
- Acoustic detections of NBW foraging clicks from towed hydrophone array surveys (n = 1,122 10-minute recording segments with detections from 2015-2019).
- Acoustic detections of NBW foraging clicks from bottom-moored passive acoustic recording systems (n = 4,404 days with detections from 2012-2022).

The distribution of NBW sightings extended from just south of the Canada-US border to 70°N in the Arctic, and was largely contiguous along the shelf edge, though occasional sightings in on-shelf waters have also been documented (Figure 2). The majority of sightings (>70%) occurred in summer months, corresponding to when most survey effort was conducted. Satellite telemetry data indicated that most tagged animals remained in the vicinity of the tag deployment area in the Davis Strait. Southern movements were restricted to waters off Labrador, with the exception of two individuals that demonstrated larger-scale movements into waters off Newfoundland (Figure 2). NBW were acoustically detected from the Georges Bank/Fundian Channel area to southern Labrador (Figure 3), with foraging activity most prevalent in the Gully, southern Grand Banks and Sackville Spur-Flemish Pass area (Figure 3).

Most visual, satellite tag, and acoustic detections of NBW occurred in continental slope areas with an average bottom depth of 1,200 m. However, very little research effort has occurred in waters deeper than 3,000 m, and several satellite-tagged whales spent time in deeper ocean areas up to 5,000 m (Figure 2, Figure 4).

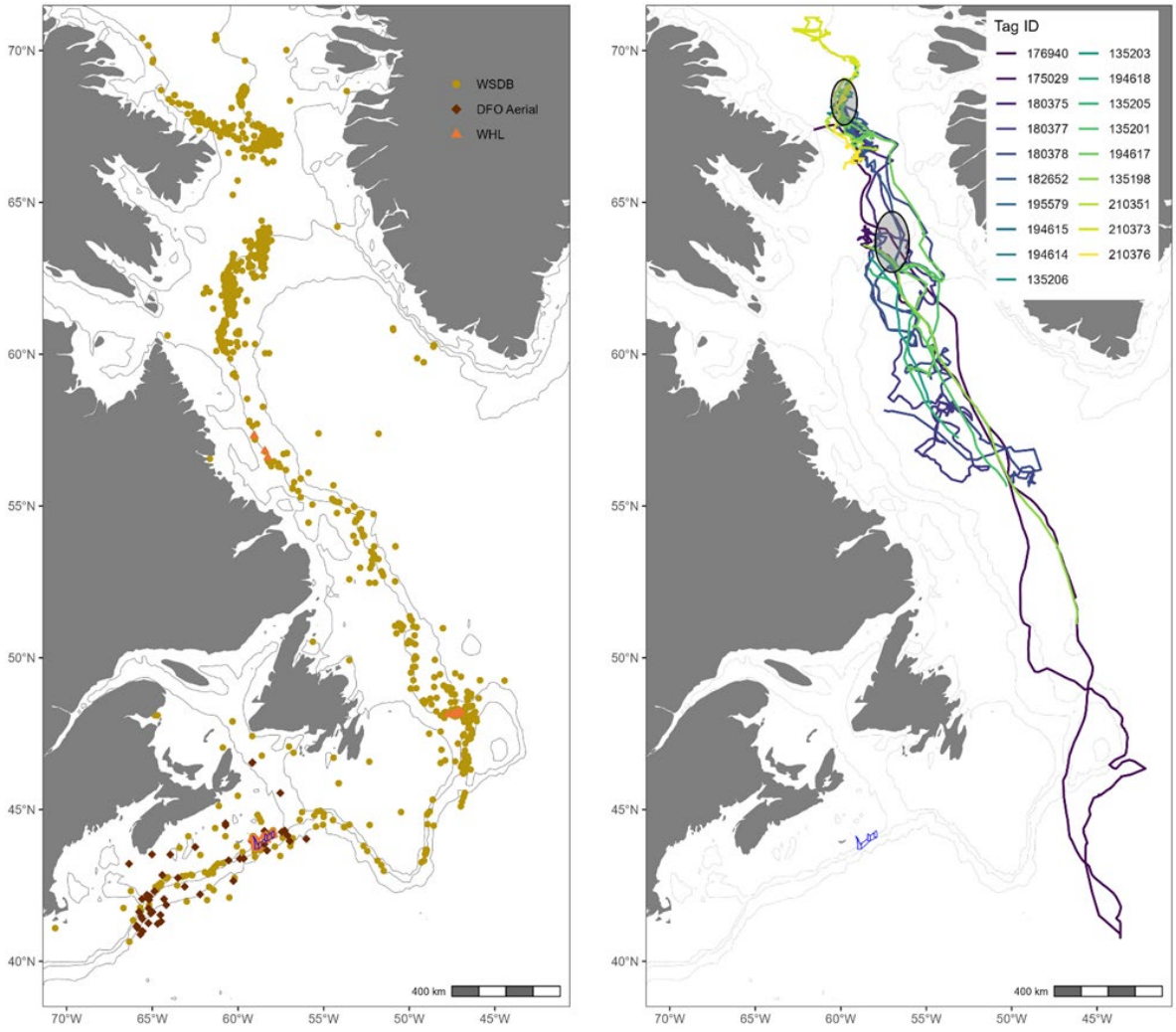

Figure 2. Distribution and extent of NBW sightings (left) from opportunistic sources (gold circle, Whale Sightings Database; WSDB), systematic aerial surveys conducted by DFO (brown diamonds, DFO Aerial), and vessel-based beaked whale surveys conducted by the Whitehead Lab of Dalhousie University (orange triangles, WHL); and (right) from individually tracked NBW tagged in the Davis Strait (black circles indicate tagging location in 2021 – upper and 2019 - lower). Existing Critical Habitat areas (Gully, Shortland, and Haldimand canyons) and inter-canyon important habitat areas are outlined in blue. Light gray lines reflect 200, 1,000 and 2,500 m depth contours.

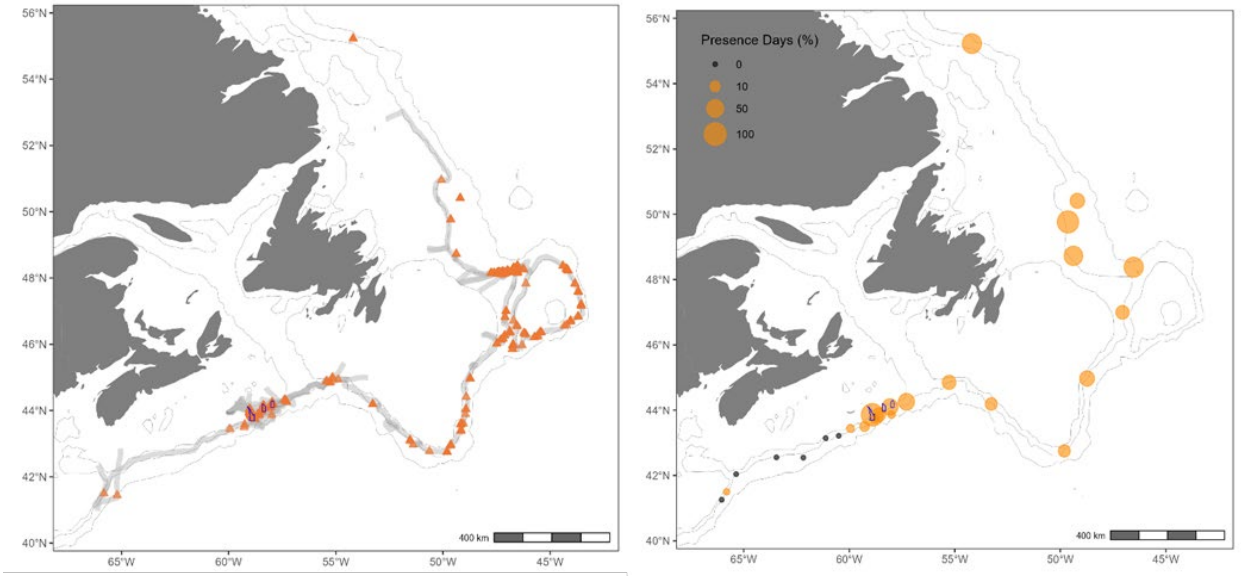

Figure 3. Distribution of NBW acoustic detections from (left) towed hydrophone array surveys and bottom-moored PAM stations (orange triangles) with thick grey lines reflecting the survey track; and (right) relative acoustic presence of NBW acoustic detections at 25 bottom-moored PAM stations. Size of circles indicates the percent of recording days with acoustic detections (effort varied across sites). Gray dots indicate stations with recording effort but no detections. Existing Critical Habitat areas (Gully, Shortland, and Haldimand canyons) are outlined in blue. Light gray lines represent 200 m, 1,000 m, and 2,500 m depth contours.

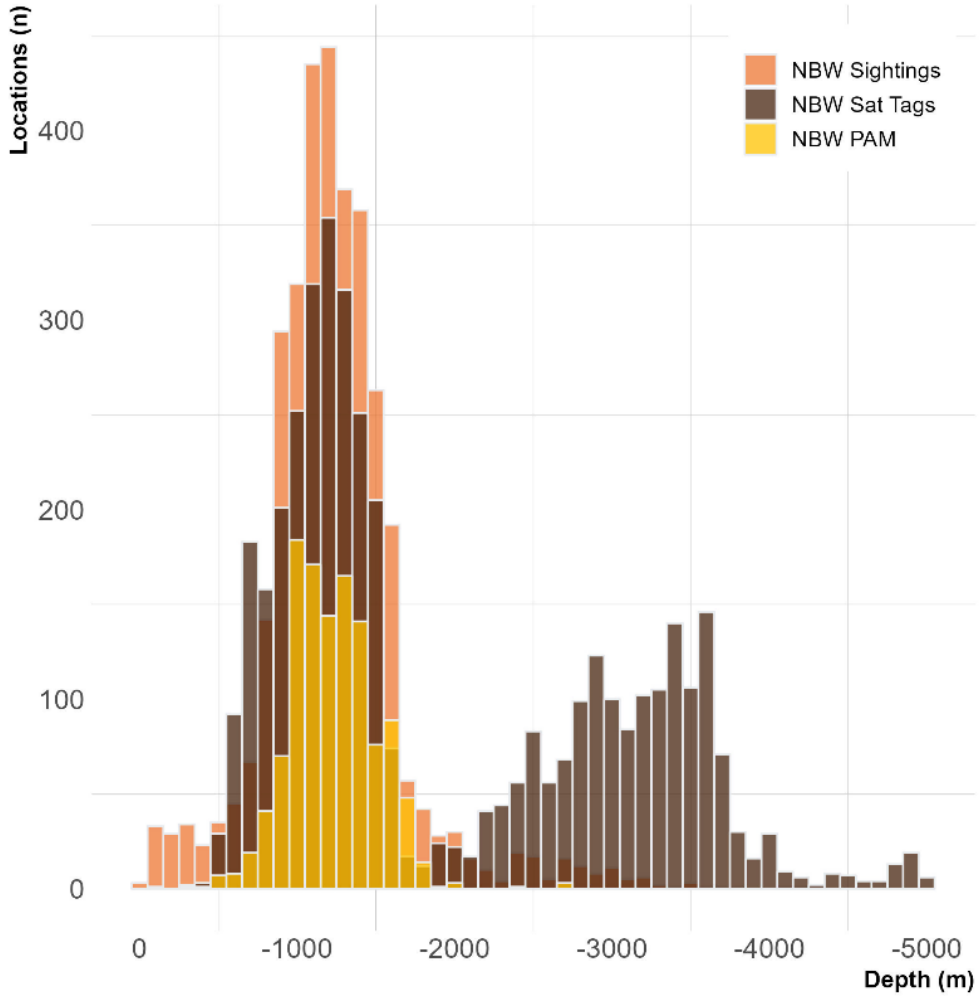

Figure 4. Distribution of depths for NBW sightings, individual satellite tags, and acoustic detections (PAM) estimated from underlying bathymetry of each recorded point location.

Temporal Persistence

Temporal persistence, defined as the percent days of year (DOY) with NBW foraging clicks detected in the available recordings from each bottom-moored PAM station, was assessed to quantify the relative prevalence of NBW foraging activity across the study region.

Temporal persistence of NBW was highest in the Gully and surrounding area, as well as northeast of Newfoundland, while moderate persistence was found between these two regions (Figure 5, Figure 7b). Acoustic detections of NBW were largely absent from PAM stations to the southwest of the Gully, with the exception of three days with NBW foraging clicks detected near the Fundian Channel.

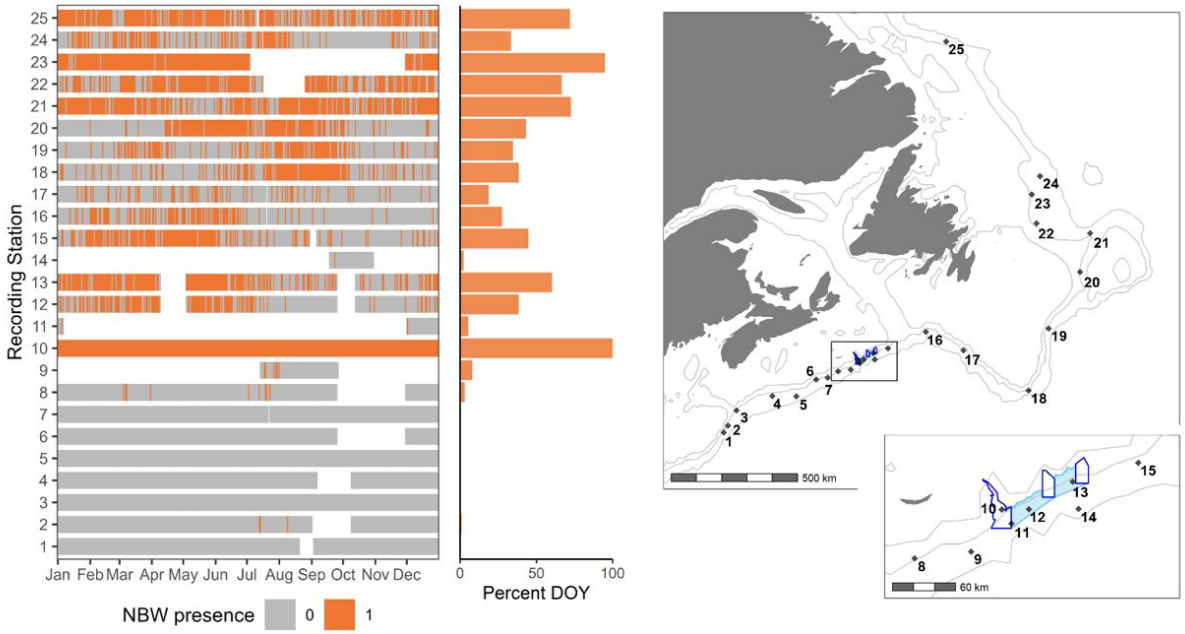

Figure 5. Recording effort and NBW presence by day of year (DOY) and percent DOY across 25 bottom-moored PAM stations shown on map. Inset map shows existing Critical Habitat outlined in blue and previously identified inter-canyon important habitat areas as blue shading. Light gray lines reflect 200, 1,000 and 2,500 m depth contours.

Species Distribution Models and Habitat Maps

Species distribution models (SDMs) were developed for a study area extending from southwest Nova Scotia to northern Newfoundland using a robust ensemble modelling approach. Presence-absence of NBW foraging clicks on PAM datasets were chosen as the response variable (species occurrence) for the ensemble SDMs as acoustic methods are highly reliable for assessing beaked whale occurrence and were the only broad-scale effort-based dataset with sufficient data currently available. Species data (detections of NBW foraging clicks) and environmental predictor layers (informed by other beaked whale modelling studies and selected based on ecological links to NBW or their prey) were used to build and validate presence-absence ensemble SDMs. The area of the SDMs was defined by the extent of the acoustic surveys, which encompassed Canadian slope waters with bottom depths of 106-3,242 m.

The SDM results for relative likelihood of occurrence of NBW (predicted habitat), generally had moderate to good accuracy and moderate predictive performance. In environment-only models, the strongest predictors of NBW presence were bottom temperature, bottom currents (U – latitudinal), depth, and sea surface temperature. However, including a spatial predictor layer to account for autocorrelation improved the model's performance but reduced the relative influence of all environmental predictors (together explaining less than 25% of the model variation). These results suggest that other environmental or biological factors not included in the model, such as direct measures of prey, social factors, or barriers to movement, are also influential. The prevalence and relative likelihood of NBW occurrence across the study area was low. The highest concentration of NBW were predicted along the edge of the continental slope from the Fundian Channel, along the eastern edge of the Scotian Shelf, in scattered areas along the edge of Grand Banks, extending into deeper waters around the Flemish Cap and off the Sackville Spur. There were higher predicted concentrations in known "hotspots" for NBW

including the Gully and eastern Scotian Shelf canyons, and the Sackville Spur and Flemish Cap region (Figure 7c and 7d).

Assessment of Important Habitat

Applying a precautionary approach, for a small Endangered population such as that of the Scotian Shelf NBW, any identified habitat may be considered important for the survival and recovery of the population, especially in the face of uncertainty and changing climatic conditions. NBW have a continuous distribution along the shelf edge from southwest Nova Scotia to the Arctic, as evidenced by the different data sources and analysis results presented above (Figures 2-5). Important habitat for NBW was identified as continental slope waters (400-3,200 m bottom depth) extending from the Canada-US border to southern Labrador (Figure 6). There is evidence of year-round presence of NBW within this habitat (Figure 5), and this area captures the majority of visual sightings, acoustic detections, and predicted habitat areas (Figure 7a-d).

Acoustic detections of foraging clicks indicate that the whales forage throughout the identified habitat, though variation in temporal persistence of foraging clicks indicates that not all of the habitat is used equally (Figure 5). Consistent with previous studies, the Gully and eastern Scotian Shelf area is an important foraging hotspot for NBW with persistent foraging occurring throughout the year. The Sackville Spur appears to be another particularly important foraging hotspot for NBW, with year-round presence of foraging clicks.

Sightings records of NBW throughout the important habitat and between areas where persistent NBW foraging was identified (e.g., between the Fundian Channel and the Gully; Figure 7a) indicate that all habitat areas support movement and potentially foraging. Movement is an important function because it provides connectivity between and within foraging sites. It is possible that some of the areas where data collection was sparse (such as along the continental slope off the Grand Banks) could also support persistent foraging, but more data collection is needed to confirm the extent to which these areas are used. The important habitat identified could also support other important life history functions, but these were not assessed here.

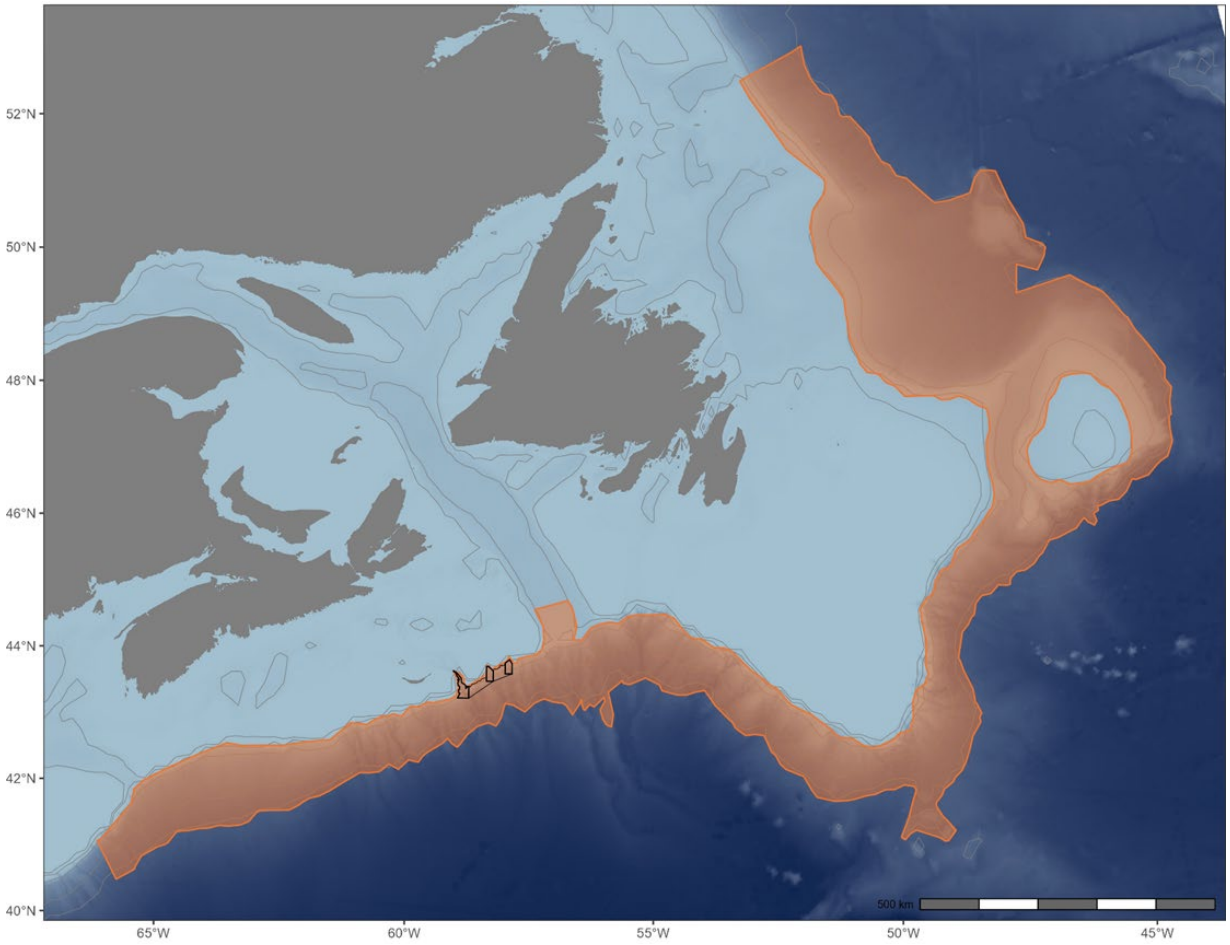

Figure 6. Important habitat for NBW (orange shaded area) is continuously distributed along the slope between depths of 400-3200 m and supports foraging, feeding and movement functions.

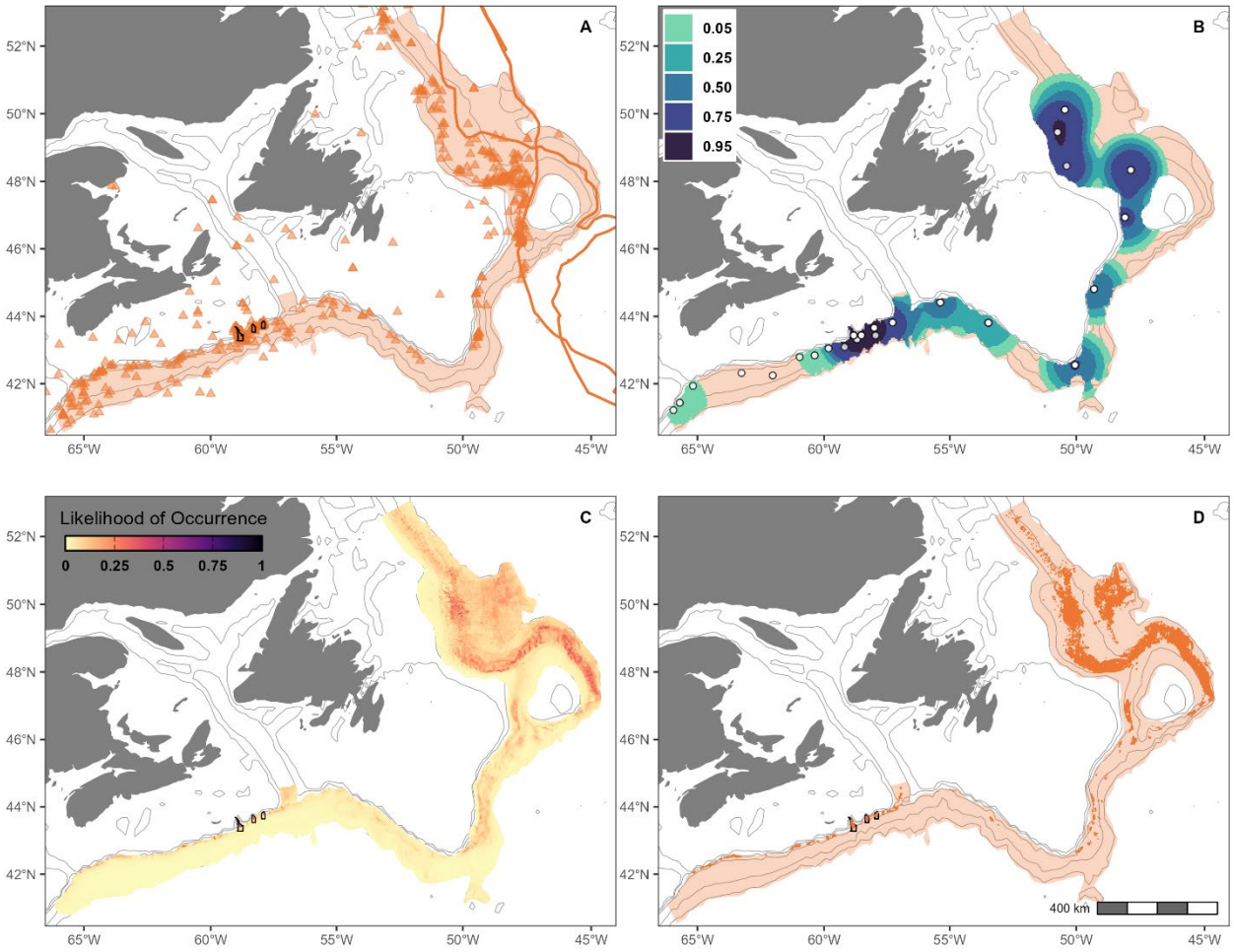

Figure 7. Evidence used to support the identification of important habitat for NBW (orange shaded area) from (A) sightings (orange triangles) and satellite tags (orange lines); (B) temporal persistence in NBW foraging from acoustic detections of foraging clicks (relative density contours indicated by green and blue shading) measured across days of the year by bottom mounted acoustic recorders (white triangles); and results from species distribution models, (C) average likelihood of occurrence shown within the boundaries of identified NBW important habitat; and (D) occurrence likelihood greater than 0.15 (dark orange areas).

Functions, Features and Attributes

In accordance with the Directive on identifying Critical Habitat for aquatic species at risk, a **function** is a life-cycle process of the species taking place in critical habitat (for example, spawning, nursery, rearing, feeding, migration). Each life-cycle function is supported by one or more **feature(s)**, which are the essential biophysical components of the critical habitat. Features are composed of one or more **attributes**, which are measurable characteristics of a feature and they provide the greatest level of detail about the critical habitat.

The functions of the habitat identified above, which apply throughout the year, include foraging, feeding, and movement. The foraging and feeding function is evidenced by the acoustic detections of foraging clicks throughout this area. The movement function is supported by acoustic detections (movement is inferred as animals have to move between persistent foraging

areas), visual sightings, satellite tag data, and by previous research on important habitat in the inter-canyon areas that assessed movement between foraging areas using photo-identification-based movement models and inference. Other potential habitat functions that may occur across this area, such as socialization, resting, and reproduction, could not be evaluated with the available data.

No new data were presented to evaluate the biophysical features of the foraging, feeding, and movement habitat identified (with the exception of depth); however, the features associated with these habitats are likely similar to those of the canyon and inter-canyon habitat areas that have been previously identified (DFO 2016, 2020). These include:

- Continental slope marine environment (supported by acoustic detections, visual sightings, satellite tag data, and SDMs presented in this study, as well as by the historical data and scientific knowledge of the evolutionary biology of beaked whales as deep-diving species);
- Water quality;
- Acoustic environment (to allow animals to successfully echolocate and coordinate foraging and transits between foraging areas via social communications; supported by acoustic detections presented in this study);
- Physical space including the entire water column (to allow animals to move freely and unimpeded by physical structures such as vessels or fishing gear during foraging and transits between foraging areas); and,
- Food supply (supported by acoustic detections).

There may be additional features associated with these habitats that have not yet been defined or evaluated.

Specific attributes associated with these biophysical features are more challenging to define, and while some features and attributes have been described in previously published documents, there is insufficient data to support quantitative attributes for most of the features listed above. The depth attribute of the continental slope marine environment for the important habitat identified in Figure 6 can be defined by a bottom depth range of approximately 400-3,200 m. This is broader than the previously defined bottom depth range for NBW habitat of 500-2,200 m; however, it is important to note that the deeper boundary remains uncertain as this is largely limited by the extent of available data, and NBW are known to occur in deeper waters as evidenced by sightings and satellite tagged animals (Figure 2, 4).

Activities Likely to Destroy Habitat

When Critical Habitat has been identified, SARA requires examples of activities likely to destroy (ALTD) that habitat. The Directive on identifying Critical Habitat for aquatic species at risk states that an activity is considered to be destructive when there is a temporary or permanent loss of a function of the Critical Habitat. ALTD should be consistent with the threats to the species previously identified. Threats to NBW were identified and assessed during a comprehensive review and threat assessment process conducted in 2021, and included the following threat categories: climate change, historical whaling, acoustic disturbance, fisheries interactions, vessel strikes and pollution and chemical contaminants. Most threats to individuals and the population (with the exception of historical whaling) could also impact habitat of NBW. No new data were presented to specifically evaluate the ALTD the biophysical features of the foraging, feeding, and movement habitats identified; however, the ALTD these habitats are likely similar to those described in previously published documents (Table 1).

Table 1. Threats to NBW and associated example activities that may destroy the features and attributes that support the functions of NBW habitat. This table is not exhaustive.

Threat	Example Activities	Feature(s) Affected
Climate Change	Global greenhouse gas emissions from human activities	Water quality Acoustic environment Food supply
Acoustic Disturbance	Military sonar Vessel presence Seismic airgun surveys Drilling operations Use of echosounders Mining	Acoustic environment Food supply
Fisheries Interactions	Presence of fishing gear Extraction of prey species (through directed fisheries or as bycatch)	Physical space including the entire water column Acoustic environment Food supply
Vessel presence[1]	Fishing Shipping Oil and gas extraction Military	Physical space including the entire water column
Pollution and Chemical Contaminants	Dumping and discharges of pollution and chemical contaminants	Water quality Food supply

[1] Threat listed in Threat Assessment as “vessel strike” which is more relevant to impacts on individuals and populations, whereas “vessel presence” is more relevant to impacts on habitat as presence of vessels could potentially impede free movement throughout their habitat.

Sources of Uncertainty

There is uncertainty in the level of geographic and genetic overlap between populations, and the current delineation of the Canadian DU boundary is not based on scientific evidence. Further studies are needed to determine the range and offshore extent of the Scotian Shelf NBW population and overlap with the range of other populations.

Although SDMs can be used to explore relationships with environmental features, there are important ecological processes and habitat dimensions that may be difficult to capture in a model at the relevant spatial and temporal scales. While some predictors were sampled at a relatively fine temporal scale (e.g., sea surface temperature), the three main variables were annual, thus seasonal SDMs could not be developed. The moderate predictive performance of the SDM and the impact of adding spatial structure to the models suggests there are likely missing predictors, or other ecological processes such as barriers, site fidelity, or social factors, that influence habitat use by NBW. Environmental predictors are not direct measures of prey quality and availability and should not be extrapolated beyond the SDM area. Further investigation of the influence of site fidelity or other underlying drivers of NBW spatial structure could improve model results and strengthen ecological interpretation related to habitat function.

There was uncertainty associated with a parameter value used in one of the individual models, which might have resulted in overfitting of that individual model. Because the ensemble modelling approach averages the outputs from multiple individual models, impacts from this potential overfitting on the ensemble model outputs were likely minimal, though this was not explicitly explored. While overfitting may potentially influence the quantitative description of NBW suitable habitat within the proposed boundaries of important habitat, this is not expected to result in significant changes to the important habitat boundaries themselves, which are also supported by the other sources of data.

Acoustic monitoring effort was variable across bottom-moored recording stations and years, so it was not possible to assess seasonal patterns or inter-annual variability in habitat use. Acoustic detections provide a minimum estimate of NBW presence due to recording schedules and because only echolocating whales are detected. The detection range of recorders was limited to within a few kilometres of the locations where they were deployed.

CONCLUSIONS AND ADVICE

Important habitat for NBW was identified as continental slope waters (400-3,200 m bottom depth) extending from the Canada-US border to southern Labrador, as presented in Figure 6. The functions of this habitat include foraging, feeding, and movement. The biophysical features include the continental slope marine environment, water quality, acoustic environment, physical space including the entire water column, and food supply. Quantitative attributes were defined for the continental slope marine environment as areas within a 400-3,200 m bottom depth range. Activities likely to destroy this habitat are associated with threats identified for NBW which include climate change, acoustic disturbance, fisheries interactions, vessel presence, and pollution and chemical contaminants.

It is unknown if the important habitat identified here is sufficient to achieve the recovery objectives for the Scotian Shelf population and additional important habitat may remain to be identified. A revised Schedule of Studies should include research to refine knowledge on the functions, features, attributes, and activities likely to destroy identified important habitat (such as continued data collection in slope waters to increase understanding of habitat use in these areas), as well as research to identify additional areas of importance to the population (such as data collection in deeper waters beyond the continental slope). Sightings and satellite tag data for NBW provide valuable insights on their distribution and movements, while long-term PAM is critical for understanding the foraging and feeding functions and temporal use of the important habitat identified. Continued data collection efforts could help address remaining knowledge gaps.

OTHER CONSIDERATIONS

The identification of important habitat will benefit NBW throughout eastern Canada. The Davis Strait-Baffin Bay-Labrador Sea population of NBW was not a focus of this study and further research effort is required to understand the habitat used by the specific populations.

Environmental variability may result in distributional changes, which are predicted to continue as cetaceans respond to shifting prey resources and increasing ocean temperatures due to climate change. Changing environmental conditions may impact the extent, distribution, and function of important habitat for NBW.

LIST OF MEETING PARTICIPANTS

Name	Organization/Affiliation
Stéphanie Ratelle	DFO - Science, Gulf Region
Susan Heaslip	DFO - Science, Maritimes Region
Angelia Vanderlaan	DFO - Science, Maritime Region
Hilary Moors-Murphy	DFO - Science, Maritimes Region
Joy Stanistreet	DFO - Science, Maritimes Region
Laura Feyrer	DFO - Science, Maritimes Region
Christine Abraham	DFO - Science, National Capital Region
James Kristmanson	DFO - CSAS, National Capital Region
Shelley Lang	DFO - Science, Newfoundland Labrador Region
Pierre Goulet	DFO - Science, Newfoundland Labrador Region
Lianne Postma	DFO - Science, Ontario and Prairie Region
Marianne Marcoux	DFO - Science, Ontario and Prairie Region
Steve Ferguson	DFO - Science, Ontario and Prairie Region
Sean MacConnachie	DFO - Science, Pacific Region
Thomas Doniol-Valcroze	DFO - Science, Pacific Region
Brianna Wright	DFO - Science, Pacific Region
Justine Hudson	DFO - Science, Ontario and Prairie Region
Arnaud Mosnier	DFO - Science, Quebec Region
Véronique Lesage	DFO - Science, Quebec Region
Caroline Sauvé	DFO - Science, Quebec Region
Anne Provencher St-Pierre	DFO - Science, Quebec Region
Valérie Harvey	DFO - Science, Quebec Region
Luca Montana	DFO - Science, Quebec Region
Geneviève Parent	DFO - Science, Quebec Region
Jean-François Gosselin	DFO - Science, Quebec Region
Pascale Caissy	DFO - Science, Quebec Region
Jory Cabrol	DFO - Science, Quebec Region
Limoilou-Amélie Renaud	DFO - Science, Quebec Region
Charline Le Mer	DFO - Species at Risk Program, Quebec Region
Clair Evers	DFO - Species at Risk Program, Maritimes Region
Cristiane Albuquerque	Parks Canada Agency
Sarah Khan	Nunavik Marine Region Wildlife Board
Laurie Beaupré	Makivik Inc.
Rod Hobbs	Indep.
David Lee	Nunavik Tunngavik Inc/McGill University
Tim Tinker	UC Santa Cruz, Nhydra Ecological Research
Shannon Gowans	Eckerd College
Alejandro Buren	Instituto Antártico Argentino

Name	Organization/Affiliation
Robert Michaud	GREMM
Alain Zuur	Highland Statistics
Stéphane Lair	University of Montreal

SOURCES OF INFORMATION

DFO. 2016. Recovery Strategy for the Northern Bottlenose Whale, (*Hyperoodan ampullatus*), Scotian Shelf population, in Atlantic Canadian Waters [Final]. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. vii + 70 pp.

DFO. 2020. Assessment of the Distribution, Movements, and Habitat Use of Northern Bottlenose Whales on the Scotian Shelf to Support the Identification of Important Habitat. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2020/008.

DFO. 2022. Threat assessment for Northern Bottlenose Whales off eastern Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2022/032.

Feyrer, L.J., Stanistreet, J., Gomez, C., Adams, M., Lawson, J., Ferguson, S., Heaslip, S., Lefort, K.J., Davidson, E., Hussey, N.E., Whitehead, H., and Moors-Murphy, H. 2024. Identifying important habitat for northern bottlenose and Sowerby's beaked whales in the western North Atlantic. Aquatic Conservation: Mar. Freshwater Ecosystems. 34(1): e4064.

THIS REPORT IS AVAILABLE FROM THE:

Center for Science Advice (CSA)
National Capital Region
Fisheries and Oceans Canada
200 Kent Street, Ottawa, ON K1A 0E6

E-Mail: DFO.CSAS-SCAS.MPO@dfo-mpo.gc.ca
Internet address: www.dfo-mpo.gc.ca/csas-sccs/

ISSN 1919-5087
ISBN 978-0-660-97833-8 Cat. No. Fs70-6/2026-006E-PDF

Correct Citation for this Publication:

DFO. 2026. Important Habitat of Northern Bottlenose Whales, Scotian Shelf Population. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2026/006.

Aussi disponible en français :

MPO. 2026. Habitat important des baleines à bec communes, population du plateau néo-écossais. Secr. can. des avis sci. du MPO. Avis sci. 2026/006.