BHP Canada Exploration Drilling Project EL 1157 and 1158 Seabed Survey EA Addendum

Prepared for:
BHP Petroleum (New Ventures) Corporation
235 Water St.
Suite 701
A1C 1B6

Prepared by:
Stantec Consulting Ltd.
141 Kelsey Drive
St. John's, NL A1B 0L2
Tel: (709) 576-1458
Fax: (709) 576-2126

File No: 121416241

Report

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1.0 INTRODUCTION

BHP Canada (BHP) is planning to conduct petroleum exploration drilling and related activities on Exploration Licences (ELs) 1157 and 1158 in the Orphan Basin, with an initial well planned as early as 2021. ELs 1157 and 1158 are in the eastern Newfoundland offshore region. BHP is planning a visual survey of the seabed using a remotely operated vehicle (ROV) or autonomous underwater vehicle (AUV) at potential drilling locations within ELs 1157 and 1158 to characterize seabed features (the "Project").

This Environmental Assessment (EA) Addendum is provided as a supplement to the original EA Report of December 2019 and provides a response to consolidated comments received from the Canada-Newfoundland Offshore Petroleum Board on February 20, 2020 and follow-up comments from Environment and Climate Change Canada (ECCC) on April 03, 2020. Responses are indented and revisions to original EA text are **bolded** and underlined.

2.0 REVIEW COMMENTS

2.1 ENVIRONMENT AND CLIMATE CHANGE CANADA

Please note, the following two documents are attached for inclusion with these comments:

- Environment and Climate Change Canada's Canadian Wildlife Service (2017). Birds and Oil – CWS Response Plan Guidance
- Environment and Climate Change Canada's Canadian Wildlife Service. (2016). Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada.

2.1.1 General Comments:

2.1.1.1 Migratory Birds

Migratory birds, their eggs, nests, and young are protected under the *Migratory Birds Convention Act* (MBCA). Migratory birds protected by the MBCA generally include all seabirds (except cormorants and pelicans), all waterfowl, all shorebirds, and most landbirds (birds with principally terrestrial life cycles). The list of species protected by the MBCA can be found at https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/convention-act.html. Bird species not listed may be protected under other legislation.

Under Section 6 of the *Migratory Birds Regulations* (MBR), it is forbidden to disturb, destroy, or take a nest or egg of a migratory bird; or to be in possession of a live migratory bird, or its carcass, skin, nest or egg, except under authority of a permit. It is important to note that under the MBR, no permits can be issued for the incidental take of migratory birds caused by development projects or other economic activities.

Furthermore, Section 5.1 of the MBCA describes prohibitions related to depositing substances harmful to migratory birds:

"5.1 (1) No person or vessel shall deposit a substance that is harmful to migratory birds, or permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

(2) No person or vessel shall deposit a substance or permit a substance to be deposited in any place if the substance, in combination with one or more substances, results in a substance – in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area - that is harmful to migratory birds."

It is the responsibility of the proponent to ensure that activities are managed so as to ensure compliance with the MBCA and associated regulations.

2.1.1.2 Accidental Events

The proponent must ensure that all precautions are taken by the contractors to prevent fuel leaks from equipment, and that a contingency plan in case of oil spills is prepared. Furthermore, the proponent should ensure that contractors are aware that under the MBR, "no person shall deposit or permit to be deposited oil, oil wastes or any substance harmful to migratory birds in any waters or any area frequented by migratory birds." Biodegradable alternatives to petroleum- based chainsaw bar oil and hydraulic for heavy machinery are commonly available from major manufacturers. Such biodegradable fluids should be considered for use in place of petroleum products whenever possible, as a standard for best practices. Fueling and servicing of equipment should not take place within 30 meters of environmentally sensitive areas, including shorelines and seabird colonies.

Provisions for wildlife response activities should be identified in the Oil Spill Prevention and Response Plan to ensure that pollution incidents affecting Wildlife are effectively and consistently mitigated. The document "Birds and Oil – CWS Response Plan Guidance" is attached and is provided to offer guidance on the development of wildlife response activities.

The following information should be included in any Oil Spill Prevention and Response Plan and Wildlife Emergency Response Plan (WERP):

- Measures for containing and cleaning up spills (of various sizes).
- Equipment that would be available to contain spills.
- Specific measures for the management of large and small spills (e.g., breaking up sheens).
- Information on the wildlife potentially at risk in the area.
- Mitigation measures to deter migratory birds from coming into contact with the oil.
- Mitigation measures to be undertaken if migratory birds and/or sensitive habitat becomes contaminated with the oil.
- The type and extent of monitoring that would be conducted in relation to various spill events.

The proponent is recommended to consult with ECCC-CWS when developing Oil Spill Prevention and Response Plans, specifically when developing the WERP. ECCC-CWS is available to review WERPs prior to their implementation.

BHP Response

Under the IMO's International Convention for the Prevention of Pollution from Ships (MARPOL), and International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC), as well as the *Canada Shipping Act*, survey vessels greater than 400 tons are required to maintain an approved Shipboard Oil / Marine Pollution Emergency Plan (SOPEP / SMPEP) to respond to spill events. In the event of a spill, survey vessels are required by Transport Canada to implement the approved SOPEP and the Canadian Coast Guard takes what measures are deemed necessary to repair, remedy, reduce or prevent pollution damage from the vessel, under the *Canada Shipping Act*. There is no requirement for an additional Oil Spill Prevention and Response Plan, given the nature of a vessel-based seabed survey.

BHP will provide awareness training of the *Migratory Birds Convention Act* (MBCA) and *Migratory Bird Regulations* (MBR) and requirements during the Project orientation. A copy of the MBR and all regulations will be on board the vessel.

The ROVs require hydraulic fluids for operation and given their direct exposure to the marine environment, the ROVs will use PANOLIN HLP SYNTH 32, which is a synthetic biodegradable hydraulic oil. This oil has been approved by C-NLOPB on previous programs.

Fueling and servicing of equipment will not take place within 30 m of environmentally sensitive areas, including shorelines and seabird colonies. An inventory of equipment aboard is outlined in the SMPEP. Systems are maintained as per the vessel planned maintenance system. Deck drains and save-alls around bunker stations and tank vents are closed during bunkering operations.

2.1.1.3 Light Attraction and Migratory Birds

Attraction to lights at night or in poor visibility conditions during the day may result in collision with lit structures or their support structures, or with other migratory birds. Disoriented migratory birds are prone to circling light sources and may deplete their energy reserves and either die of exhaustion or be forced to land where they are at risk of depredation.

To reduce risk of incidental take of migratory birds related to human-induced light, ECCC-CWS recommends implementation of the following beneficial management practices:

- The minimum amount of pilot warning and obstruction avoidance lighting should be used on tall structures. Warning lights should flash, and should completely turn off between flashes.
- The fewest number of site-illuminating lights possible should be used in the project area. Only strobe lights should be used at night, at the lowest intensity and smallest number of flashes per minute allowable by Transport Canada.
- Lighting for the safety of the employees should be shielded to shine down and only to where it is needed.

- LED lights should be used instead of other types of lights where possible. LED light fixtures are less prone to light trespass (i.e. are better at directing light where it needs to be, and do not bleed light into the surrounding area), and this property reduces the incidence of migratory bird attraction.

BHP Response

Survey vessel lighting requirements are regulated by Transport Canada. However, opportunities to reduce light emitted from the survey vessel will be evaluated, including directional lighting and window shades. The contracted vessel's ROVs are within hangers, therefore no back deck operations are required. Lighting will be reduced when safe deck operations do not require floodlights.

2.1.1.4 Effects of the Project on Migratory Birds - Stranded Birds

Original Comment

Many migratory birds' foraging ranges (e.g. Leach's Storm-petrel) overlap directly with the Project Area and may be attracted to artificial lighting in the offshore environment. There is the potential for migratory birds to be attracted to and potentially be stranded on the survey vessels associated with the Project activities.

Should birds become stranded on the survey vessels, both during construction and operations phases, the proponent is recommended to adhere to Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada (attached). Systematic deck searches for stranded birds undertaken by trained observers are more effective as mitigation than opportunistic searches. These systematic searches should occur at least daily (preferably at dawn) on installations and supply vessels, with search efforts documented and observations recorded (including notes of efforts when no birds are found). ECCC has expertise in this area and should be consulted in the development of systematic monitoring protocols that are specific to each installation, vessel, etc. If species at risk are found stranded on the vessels, the proponent should immediately contact ECCC-CWS for further instructions. The contact is Sabina Wilhelm (ECCC-CWS Marine Issues Biologist) at sabina.wilhelm@ec.gc.ca or 709-764-1957.

A seabird handling permit will likely be required to implement the instructions in this reference document and the proponent must be advised that such a permit would have to be in place prior to the initiation of proposed activities. Please note that MBCA permit applications can be obtained from ECCC-CWS via email at ec.scfatlpermis-cwsatlpermits.ec@canada.ca.

BHP Response

Routine systematic checks will be conducted daily (at dawn) on the survey vessel for stranded birds and handling of stranded birds will follow "Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada (ECCC 2016). A Live Seabird Salvage permit will be acquired from Canadian Wildlife Service (CWS) prior to operations and stranded birds (or mortalities) will be reported to CWS in accordance with the permit.

ECCC Reply

Section 5.4 – Mitigations (pg. 47)

ECCC-CWS acknowledges that the proponent has corrected the reference to the systematic search protocols, as requested.

ECCC-CWS requests that the proponent add a statement to Section 5.4 that states that the proponent will consult with ECCC-CWS in the development of vessel-specific systematic search protocols and that the searches will be undertaken by trained, experienced observers, as per the recommendations outlined in the final report of the Regional Assessment of Offshore Oil and Gas Exploratory Drilling East of Newfoundland and Labrador. ECCC-CWS suggests the following wording (see underlined additions):

"Routine systematic searches will be conducted on the survey vessels for stranded birds by trained, experienced observers. Handling and documentation of stranded birds will follow "Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada (ECCC 2016). ECCC will be consulted in the development of vessel- specific systematic search protocols, in advance of their implementation."

BHP Response

BHP agrees with the ECCC's reply and revised the paragraph as follows:

> Routine systematic searches will be conducted on the survey vessels for stranded birds **by trained, experienced observers. Handling and documentation** of stranded birds will follow "Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada (ECCC 2016). **ECCC will be consulted in the development of vessel- specific systematic search protocols, in advance of their implementation.**

2.1.2 Specific Comments

Section 5.4 Mitigation (pg. 47) – Quote "Routine systematic checks will be conducted daily on the survey vessels for stranded birds and handling of stranded birds will follow "Documenting Stranded Birds Encountered on Infrastructure Offshore Atlantic Canada" (ECCC 2016)."

The proponent has not referenced the search protocols document correctly. The correct reference is Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada (ECCC 2016), so ECCC requests that the proponent amend the statement to reference the document correctly.

BHP Response

The third bullet in Section 5.4 is revised to:

- Routine systematic checks will be conducted daily on the survey vessel for stranded birds and handling of stranded birds will follow "**Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada**" (ECCC 2016)

Section 6.2 Accidental Events (pg. 52)

The proponent should include a statement in this section to clarify that the timing and location of potential spills can affect the magnitude of the effect of accidental events on marine and migratory birds. This has already been included in the paragraph related to commercial fisheries, but ECCC requests that this also be included in the paragraph related to marine and migratory birds.

BHP Response

The second paragraph in Section 6.2 is revised to:

Marine and/or migratory birds would be most at risk, as exposure to a small amount of hydrocarbons can result in physical injury or mortality of birds through external exposure (e.g., oiling of feathers), inhalation (e.g., inhalation of volatile hydrocarbons), or ingestion (e.g., as a result of preening oiled feathers or drinking contaminated water). **The location and timing of a potential spill can affect the magnitude of the effect of accidental events on marine and migratory birds.** Oiling of feathers can result in thermal and buoyancy deficiencies and affect flight, which can result in death from a combination of heat loss, starvation, and/or drowning (Leighton 1983). The severity of effects can depend on the species, type of oil, weather conditions, time of year, volume of the spill, and duration of exposure (Gorsline et al. 1981). In the unlikely event of a spill, BHP will consult with CWS for appropriate response, handling, and monitoring of marine and/or migratory birds as applicable.

Original Comment

Section 6.4 Cumulative Environmental Effects (pg. 53)

The discussion of cumulative effects must be shaped primarily by the valued ecosystem components under consideration. While an accounting of past, present and future projects and activities is a starting point in a cumulative effects assessment, the analysis must consider how impacts from the proposed project will combine with impacts from other projects and activities. In the context of marine birds, for example, the proponent must consider how the project will contribute to existing impacts (e.g., attraction, increase in predation, loss of foraging habitat) on birds from other activities (e.g., other oil and gas activities, fishing, shipping). ECCC requests that the proponent update the cumulative effects section to include additional information relating to VEC-specific cumulative effects.

BHP Response

Section 6.4 has been revised to:

Residual environmental effects from the Project could potentially interact cumulatively with effects from other past, present or likely future projects and activities in the Regional Area, including other environmental or geophysical programs, exploration drilling, fisheries, and shipping. **Although the thresholds of sound and light emissions from the Project are below thresholds that would adversely impact VCs (as noted above in Section 6.1), when combined with physical activities from other projects, there is the potential that the effects could compound,**

eventually reaching a level that could adversely affect VCs. Potential cumulative adverse effects are discussed below.

Marine Fish and Fish Habitat

Operation of the survey vessel and the ROV / AUV survey will result in a temporary, localized increase in underwater sound levels within an acoustic environment that is already dominated by sound emissions produced by shipping and other surveys. Cumulative adverse effects on marine fish and fish habitat could include changes in movement patterns in order to avoid areas of increased sound. The limited temporal scope of the survey is not expected to result in long-term cumulative effects to marine fish.

Marine and/or Migratory Birds

Operation of the survey vessel will result in a temporary, localized increase in artificial lighting in the marine environment. Potential cumulative adverse effects on marine and/or migratory birds include attraction to artificial lighting, which may cause an increase in predation (Wiese et al. 2001; Ronconi et al. 2015). The presence of the survey vessel, along with the presence of vessels in the area for other reasons (e.g., other oil and gas activities, fishing, shipping), has the potential to cause a decrease in accessibility for marine and/or migratory birds to foraging grounds. While the 24-hour per day operation of the survey may result in an increase in attraction to the survey vessel, the limited temporal scope is not expected to result in long-term cumulative effects to marine and/or migratory birds.

ECCC Reply

ECCC-CWS acknowledges that the proponent has added additional details to the cumulative effects section, as requested, but further information/clarification is required.

ECCC-CWS requests that the proponent provide additional information and/or clarification in the section related to cumulative effects on marine and migratory birds, as follows:

- Additional information related to the potential impacts of attraction to artificial lighting, which are not limited to increased predation (as stated) but can also result in strandings that can lead to oiling and/or mortality, unnecessary energy expenditure while circling, etc.
- Clarification on how the presence of vessels can decrease accessibility to foraging grounds – the proponent should expand on this with additional information and references to support the statement.

BHP Response

A key interaction with the Project that could affect marine birds is nocturnal disturbance (e.g., increased opportunities for predators, attraction to the vessel and subsequent collision or stranding resulting in mortality) due to illumination levels from artificial lighting during different weather conditions and seasons. Operation of the survey vessel will result in a temporary, localized increase in artificial lighting in the marine environment. Potential cumulative adverse effects on marine and/or migratory birds include attraction of

nocturnally-active birds, which may result in direct mortality or injury through collisions with facility infrastructure, predation, or through stranding on the platform (i.e., birds are unable to regain flight and die from dehydration, starvation or hypothermia) (Baird 1990; Montevecchi et al. 1999; Wiese et al. 2000; LGL 2017). Disoriented birds may also circle around lights for long periods of time, depleting energy resources, delaying foraging or migration, and potentially increasing their exposure to predation (Bourne 1979; Sage 1979; Wiese and Montevecchi 1999; Wiese et al. 2001; Jones and Francis 2003; Bruinzeel and van Belle 2010; Ronconi et al. 2015). Leach's storm-petrel, a species that has been found to be particularly vulnerable to light attraction and stranding events, pass through existing producing oilfields between their nesting colonies and deep-water foraging areas.

Marine Mammals and Sea Turtles

Operation of the survey vessel and the ROV / AUV survey will result in a temporary, localized increase in underwater sound levels within an acoustic environment that is already dominated by sound emissions produced by shipping and other surveys. The survey vessel will also create potential incremental risks of vessel collision with marine mammals and sea turtles. The limited temporal scope of the survey is not expected to result in long-term cumulative effects to marine mammals and sea turtles.

Species at Risk

Cumulative effects as noted above for not at-risk marine fish, marine and/or migratory birds, marine mammals and sea turtles would be the same for species at risk.

Special Areas

A cumulative adverse effect on special areas is not predicted to occur given the limited temporal and spatial scope and non-intrusive nature of survey activities.

Fisheries and Other Ocean Users

A cumulative adverse effect on fisheries and other ocean users is not predicted to occur given the limited temporal and spatial scope and non-intrusive nature of survey activities. Mitigation measures in advance of and during the ROV / AUV survey, as outlined in Section 5.4, will also help to reduce potential conflicts.

Summary

The incremental contribution of Project-related effects to cumulative effects is considered to be negligible given the short time frame of the Project (seven to ten days), reversibility of effects, limited geographic scope, the non-intrusive nature of Project activities, and implementation of mitigation, as described above.

> With the application of proposed Project-related mitigation, residual cumulative effects on marine fish and fish habitat, marine and/or migratory birds, marine mammals and sea turtles, species at risk, special areas, or fisheries and other users are predicted to be not significant. No additional mitigation measures beyond those in place to mitigate the Project's direct effects are needed to address potential cumulative effects.

Additionally, the proponent has not included the cumulative effect of artificial light as a part of their cumulative environmental effects assessment. ECCC requests that the proponent provide additional information regarding the potential cumulative effect of artificial lighting on the attraction of marine and migratory birds.

BHP Response

> See above response.

2.2 FISHERIES AND OCEANS CANADA (DFO) GENERAL COMMENTS

2.2.1 General Comments

In the past for similar projects, the ROV survey and video data have been acquired under the supervision of an experienced marine biologist. Please advise as to whether this is the case for BHP's visual seabed survey.

BHP Response

> We confirm a marine biologist will on board during the survey.

The scientific name should be included along with the common name the first time a species is mentioned in the EA report.

BHP Response

> Species names have been added to Tables 4.5 to 4.8.

Table 4.5 Shellfish Species Collected from DFO RV Transects Conducted within the Regional Area from 2013 to 2017

Species Common Name (Scientific Name)	Catch Weight (t)	Mean Catch Depth (m)
Northern shrimp (***Pandalus borealis***)	0.04	77
Shrimp – other ***(Acanthephyra pelagica)***	0.01	241
Shrimp - other ***(Sergestes arcticus)***	0.01	241
Crimson Pasiphaeid ***(Pasiphaea tarda)***	<0.01	345
Pink glass shrimp ***(Pasiphaea multidentata)***	<0.01	301
Shrimp - other ***(Atlantopandalus propinqvus)***	<0.01	N/A
Shrimp- other ***(Sergia robusta)***	<0.01	121
Friendly blade shrimp ***(Spirontocaris liljeborgi)***	<0.01	73
Shrimp – other ***(Pasiphaea sp.)***	<0.01	N/A
Norwegian shrimp ***(Pontophilus norvegicus)***	<0.01	605
Sars shrimp (***Sabinea sarsii)***	<0.01	N/A
Polar Lebbeid ***(Lebbeus polaris)***	<0.01	N/A
Shrimp – other ***(Gennadas sp.)***	<0.01	N/A
Grooveback shrimp ***(Parapasiphae sulcatifrons)***	<0.01	902
Krill ***(Euphausiid)***	<0.01	278
Snow crab ***(Chionoecetes opilio)***	<0.01	132
Toad crab ***(Hyas coarctatus)***	<0.01	316

Table 4.6 Summary of Seasonal Presence and Relative Abundance of Marine and Migratory Birds in the Project Area

Common Name (Scientific Name)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Phalaropes												
Red-necked phalarope (***Phalaropus lobatus***)*					S	S	S	S	S			
Red phalarope (***Phalaropus fulicarius***)					S	S	S	S	S	S		
Gulls and Terns												
Black-legged kittiwake (***Rissa tridactyla***)	C	C	C	C	C	C	C	C	C	C	C	C
Ivory gull (***Pagophila eburnea***)*	VS	VS	VS	VS								
Sabine's gull (***Xema sabini***)					VS	VS		VS	VS			
Ross's gull (***Rhodostethia rosea***) *	VS	VS	VS	VS	VS					VS	VS	VS
Herring gull (***Larus argentatus***)	U	U	U	U	U	S	S	S	S	S	S	S
Iceland Gull (***Larus glaucoides***)	S	S	S	S						S	S	S
Lesser black-backed gull (***Larus fuscus***)					VS	VS	VS	VS	VS	VS	VS	VS
Glaucous gull (***Larus hyperboreus***)	S	S	S	S						S	S	S
Great black-backed gull (***Larus marinus***)	U	U	U	U	U	S	S	U	C	C	U	U
Arctic tern (***Sterna paradisaea***)					S	S	S	S	S			
Skuas and Jaegers												
Great skua (***Stercorarius skua***)					S	S	S	S	S	S		
South polar skua (***Stercorarius maccormicki***)					S	S	S	S	S	S		
Pomarine jaeger (***Stercorarius pomarinus***)				S	S	S	S	S	S	S		
Parasitic jaeger (***Stercorarius parasiticus***)					S	S	S	S	S	S		
Long-tailed jaeger (***Stercorarius longicaudus***)					S	S	S	S	S			
Auks, Murres, Puffins, and Guillemots												
Dovekie (***Alle alle***)	C	C	C	C	U	VS	VS	VS	S	C	C	C
Common murre (***Uria aalge***)	S-U	S-U	S-U	C	C	C	C	C	C	C	C	C
Thick-billed murre (***Uria lomvia***)	C	C	C	C	C	S-U	S-U	S-U	U-C	C	C	C
Razorbill (***Alca torda***)				S	S	S	S	S	S	S	S	

Table 4.6 Summary of Seasonal Presence and Relative Abundance of Marine and Migratory Birds in the Project Area

Common Name (Scientific Name)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Atlantic puffin ***(Fratercula arctica)***				S	S	S	S	S	U	U	U	U
Fulmarine Petrels, Shearwaters, and Gadfly Petrels												
Northern fulmar ***(Fulmarus glacialis)***	C	C	C	C	C	C	C	C	C	C	C	C
Great shearwater ***(Puffinus gravis)***					U	C	C	C	C	C	S	
Sooty shearwater ***(Puffinus griseus)***					S	S-U	S-U	S-U	S-U	S-U	S	
Manx shearwater ***(Puffinus puffinus)***					S	S	S	S	S	S		
Cory's shearwater ***(Calonectris borealis)***							VS	VS	VS			
Bermuda petrel ***(Pterodroma cahow)***		VS	VS	VS	VS							
Zino's petrel ***(Pterodroma madeira)***				VS	VS	VS	VS	VS	VS	VS		
Desertas petrel ***(Pterodroma deserta)***	VS	VS	VS								VS	VS
Storm-Petrels												
Leach's storm-petrel ***(Oceanodroma leucorhoa)***					U-C	C	C	C	C	C	S	
Band-rumped storm-petrel ***(Oceanodroma castro)***					VS	VS	VS	VS				
Wilson's storm-petrel ***(Oceanites oceanicus)***							S	S	S	S		
Gannets												
Northern gannet ***(Morus bassanus)***				S	S	S	S	S	S	S		
Cormorants												
Great and double-crested cormorants ***(Phalacrocorax carbo* and *Phalacrocorax auratus)***				VS	VS				VS	VS		
Ducks, Geese, and Swans												
Waterfowl (passage migrants)			VS	VS					VS	VS		
Plovers and Sandpipers												
Shorebirds (passage migrants)							S	S	S	S		

Table 4.6 Summary of Seasonal Presence and Relative Abundance of Marine and Migratory Birds in the Project Area

Common Name (Scientific Name)	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Landbirds												
Landbirds (vagrant migrants)				VS	VS			VS	VS	VS		

Notes: * Species with conservation designation (see Section 6.2.4). C = Common, present daily in moderate to high numbers; U = Uncommon, present daily in small numbers; S = Scarce, present, regular in very small numbers; VS = Very Scarce, very few individuals or absent. Blank spaces indicate not expected to occur in that month.

Table 4.7 Cetacean Sightings in the Project Area based on Compiled Data

Species	Project Area		
	Number Sightings	Number Individuals	Months Sighted
Mysticetes (Baleen)			
Fin whale (***Balaenoptera physalus***)	45	68	May-Oct
Sei whale (***Balaenoptera borealis***)	23	39	May-Oct
Humpback whale (***Megaptera novaeangliae***)	83	148	Jan-Feb, May-Sep, Nov
Minke whale (***Balaenoptera acutorostrata***)	26	34	Jan, Jun-Sep, Nov
North Atlantic right whale (***Eubalaena glacialis***)	1	2	Jun
Fin / sei whale	10	16	Jun-Sep
Unidentified baleen whale	47	69	May-Nov
Sperm whale (***Physeter macrocephalus***)	81	152	Jan-Dec
Northern bottlenose whale (***Hyperoodon ampullatus***)	24	66	May-Sep, Oct
Beluga (***Delphinapterus leucas***)	1	1	Jul
White-beaked dolphin (***Lagenorhynchus albirostris***)	6	38	May-Jul, Oct-Nov
Atlantic white-sided dolphin (***Lagenorhynchus acutus***)	33	726	Feb, Jun-Nov
Bottlenose dolphin (***Tursiops* sp.**)	5	24	May-Jun, Sep
Common dolphin (***Delphinus* sp.**)	11	517	Jul, Sep-Nov
Striped dolphin (***Stenella coeruleoalba***)	2	15	Aug
Killer whale (***Orcinus orca***)	6	21	May-Aug, Oct
Long-finned pilot whale (***Globicephala melas***)	157	2,722	May-Nov
Harbour porpoise (***Phocoena phocoena***)	17	65	Jun-Jul, Sep
Unidentified dolphin	110	1,425	Mar-Nov
Unidentified toothed whale	2	4	Jul-Aug
Others			
Unidentified whale	4	7	Oct-Nov
Unidentified cetacean	103	173	Jan-Oct, Dec
Sources for marine mammals: Lawson and Gosselin (2009); Mactavish and Penney-Belbin (2018); C-NLOPB database, DFO database; Equinor Canada database. Sources for turtles: Halpin et al. (2009); DFO database.			

Table 4.8 Species at Risk that have the Potential to Occur within the Project Area and Their Status / Designation

Species	Status / Designation[1, 2]			
Common Name	NL ESA	SARA	COSEWIC	IUCN
Fish				
Acadian redfish **(Atlantic population) (*Sebastes fasciatus*)**			T	E
Albacore tuna **(*Thunnus alalunga*)**				NT
American eel **(*Anguilla rostrata*)**	V		T	E
American plaice **(Newfoundland and Labrador population) (*Hippoglossoides platessoides*)**			T	
Atlantic bluefin tuna **(*Thunnus thynnus*)**			E	E
Atlantic cod **(Newfoundland and Labrador population) (*Gadus morhua*)**			E	V
Atlantic halibut **(*Hippoglossus hippoglossus*)**				E
Atlantic salmon **(*Salmo salar*) - South Newfoundland population**			T	
Atlantic salmon **– Nova Scotia Southern Upland population**			SC	
Atlantic salmon - **Gaspe-Southern Gulf of St. Lawrence population**			SC	
Atlantic salmon - **Eastern Cape Breton population**			E	
Atlantic salmon - **Quebec Eastern North Shore population**			SC	
Atlantic salmon **- Quebec Western North Shore population**			SC	
Atlantic salmon - **Outer Bay of Fundy population**			E	
Atlantic salmon - **Anticosti Island population**			E	
Atlantic salmon **(Inner St. Lawrence population)**			SC	
Atlantic wolffish **(*Anarhichas lupus*)**		SC	SC	
Barndoor skate **(*Dipturus laevis*)**				E
Basking shark **(Atlantic population) (*Cetorhinus maximus*)**			SC	V
Bigeye tuna **(*Thunnus obesus*)**				V
Blue shark **(Atlantic population) (*Prionace glauca*)**				NT
Common lumpfish **(*Cyclopterus lumpus*)**			T	
Cusk **(*Brosme brosme*)**			E	
Deepwater redfish **(Northern population) (*Sebastes mentella*)**			T	LC
Greenland shark **(*Somniosus microcephalus*)**				NT
Haddock **(*Melanogrammus aeglefinus*)**				V
Little skate **(*Leucoraja erinacea*)**				NT
Northern wolffish **(*Anarhichas denticulatus*)**		T	T	
Porbeagle **(*Lamna nasus*)**			E	V
Roundnose grenadier **(*Coryphaenoides rupestris*)**			E	CE
Shortfin mako **(Atlantic population) (*Isurus oxyrinchus*)**			E	V

Table 4.8 Species at Risk that have the Potential to Occur within the Project Area and Their Status / Designation

Species	Status / Designation[1, 2]			
Common Name	**NL ESA**	**SARA**	**COSEWIC**	**IUCN**
Smooth skate **(Funk Island Deep population) (*Malacoraja senta*)**			E	E
Spiny dogfish **(Atlantic population) (*Squalus acanthias*)**			SC	V
Spinytail skate **(*Bathyraja spinicauda*)**				NT
Spotted wolffish **(*Anarhichas minor*)**		T	T	
Thorny skate **(*Amblyraja radiata*)**			SC	V
White hake **(Atlantic and Northern Gulf of St. Lawrence population) (*Urophycis tenuis*)**			T	
White shark **(Atlantic population) (*Carcharodon carcharias*)**		E	E	V
Winter skate **(Eastern Scotian Shelf-Newfoundland population) (*Leucoraja ocellata*)**			E	E
Marine and Migratory Birds				
Red-necked phalarope **(*Phalaropus lobatus*)**		SC	SC	
Black-legged kittiwake **(*Rissa tridactyla*)**				V
Ross's gull **(*Rhodostethia rosea*)**		T	T	
Ivory gull **(*Pagophila eburnea*)**	E	E	E	NT
Leach's storm-petrel **(*Oceanodroma leucorhoa***				V
Bermuda petrel **(*Pterodroma cahow*)**				E
Desertas petrel **(*Pterodroma deserta*)**				V
Zino's petrel **(*Pterodroma madeira*)**				E
Marine Mammals and Sea Turtles				
Blue whale **(Atlantic population) (*Balaenoptera musculus*)**		E	E	E
Fin whale **(Atlantic population) (*Balaenoptera physalus*)**		SC	SC	V
Northern bottlenose whale **(Scotian Shelf population) (*Hyperoodon ampullatus*)**		E	E	DD
North Atlantic right whale **(*Eubalaena glacialis*)**		E	E	E
Northern bottlenose whale **(Davis-Strait-Baffin Bay-Labrador Sea population) (*Hyperoodon ampullatus*)**			SC	DD
Sowerby's beaked whale **(*Mesoplodon bidens*)**		SC	SC	DD
Loggerhead sea turtle **(*Caretta caretta*)**		E	E	V
Leatherback sea turtle **(Atlantic population) (*Dermochelys coriacea*)**		E	E	V

Note: Shaded cells indicate Schedule 1 SARA-listed species and are described in greater detail in Table 4.9

[1] Least Concern (LC), Vulnerable (V), Near Threatened (NT), Special Concern (SC), Threatened (T), Endangered (E), Critically Endangered (CE)

[2] Multiple designations refer to multiple populations or sub-populations.

2.2.2 Specific Comments:

Section 2.4.1 Operation of a Survey Vessel (pg. 6): The survey vessel has the potential to interact with the environment through the following pathways: Interactions with marine mammals, e.g. collisions, should be listed here as well.

BHP Response

The Bullet list in the third paragraph of Section 2.4.1 has been revised to:

The survey vessel has the potential to interact with the environment though the following pathways:

- Underwater sound emissions
- **Interactions with marine mammals (e.g., collisions)**
- Atmospheric emissions (light, air, and sound)
- Solid and liquid waste discharges

Section 4.1.3 Weather Conditions, Table 4.2 (pg. 11): Recommend removing Thunderstorms from table title as the table does not mention thunderstorms.

BHP Response

Table 4.2 title has been revised to remove Thunderstorms:

Table 4.2 Frequency of Occurrence (%) of Precipitation (ICOADS), Project Area, 1980-2019

Month	Rain / Drizzle	Freezing Rain / Drizzle	Rain / Snow Mixed	Snow	Hail
Jan	8.3	0.6	2.7	21.2	0.4
Feb	7.8	0.0	0.3	19.8	0.8
Mar	17.4	0.0	2.6	11.4	0.0
Apr	9.0	0.0	0.4	4.5	0.7
May	13.3	0.0	0.7	4.8	0.0
Jun	10.2	0.0	0.8	0.4	0.0
Jul	9.5	0.0	0.0	0.0	0.0
Aug	9.5	0.0	0.2	0.0	0.0
Sep	11.0	0.0	0.0	0.0	0.0
Oct	14.8	0.0	0.0	0.6	0.0
Nov	14.0	0.0	0.5	5.0	0.3
Dec	9.5	0.3	1.6	11.0	0.3
Annual	11.2	0.1	0.9	7.2	0.2
Source: Based on Research Data Archive et al. (2019)					

Section 4.2 Marine Fish and Shellfish, Table 4.4 (pg. 14): Recommend removing the footnote, "Taxonomic group: F – family", if it is not used.

BHP Response

Table 4.4 revised to remove footnote:

Table 4.4 Dominant Fish Species within the Project Area (Canadian RV surveys, 2012 to 2017)

Depth Zone	Functional Group	Common Name	Scientific Name[1]
Upper Slope (225 to 700 m) (64 trawls)	Plank-piscivore	Deepwater redfish	*Sebastes mentella*
	Planktivore	Capelin	*Mallotus villosus*
	Piscivore	Black dogfish	*Centroscyllium fabricii*
	Piscivore	Atlantic halibut	*Hippoglossus hippoglossus*
	Piscivore	Atlantic cod	*Gadus morhua*
	Large Benthivore	Thorny skate	*Amblyraja radiata*
	Large benthivore	American plaice	*Hippoglossoides platessoides*
	Large benthivore	Roughhead grenadier	*Macrourus berglax*
	Piscivore	Greenland halibut	*Reinhardtius hippoglossoides*
	Large benthivore	Spinytail skate	*Bathyraja spinicauda*
	Large benthivore	Northern wolffish	*Anarhichas denticulatus*
	Medium benthivore	Witch Flounder	*Glyptocephalus cynoglossus*
	Medium benthivore	Common lumpfish	*Cyclopterus lumpus*
Middle Slope (701 to 1,400 m) (11 trawls)	Piscivore	Greenland shark	*Somniosus microcephalus*
	Piscivore	Greenland halibut	*Reinhardtius hippoglossoides*
	Medium Benthivore	Witch flounder	*Glyptocephalus cynoglossus*
	Large Benthivore	Roughhead grenadier	*Macrourus berglax*

Section 4.2 Marine Fish and Shellfish, Table 4.5 (pg. 16): Recommend listing the common names and scientific names of species where possible.

BHP Response

See revised Table 4.5 in response above

Section 4.4 Marine Mammals and Sea Turtles, Table 4.7 (pg. 24-45): Recommend listing the common names and scientific names of species where possible.

BHP Response

See revised Table 4.7 in response above

Section 4.5 Species at Risk, Table 4.8 (pg. 30-31): If there are multiple designations for a species, the name of the population or sub-population should be included. Also, as noted above, both the common names and scientific names of species should be stated.

BHP Response

See revised Table 4.8 in response above

Section 5.4 Mitigation (pg. 46): Mitigation measures should indicate that an experience Marine Mammal and Seabird Observer (MMSO) will be onboard during the survey.

BHP Response

The following bullet is added to Section 5.4:

- **An experienced Marine Mammal and Seabird Observer (MMSO) will be onboard during the survey. However, given that there is no sound-emitting survey equipment to be used, the primary duties of the MMSO will be to conduct seabird surveys and follow the CWS "Eastern Canada Seabirds at Sea (ECSAS) Standardized Protocol for Pelagic Seabird Surveys from Moving and Stationary Platforms" (Gjerdrum et al. 2012) and to conduct stranded seabird surveys and document findings according to "Procedures for handling and documenting stranded birds encountered on infrastructure offshore Atlantic Canada" (ECCC 2016). Nonetheless, all marine mammal sights will also be recorded.**

Section 5.4 Mitigation (pg. 46): In the past for similar projects, there has been a Fisheries Liaison Officer (FLO) onboard the survey vessel to mitigate potential interactions with fishing activities in the area. Please advise as to whether and FLO will be onboard for BHP's visual seabed survey.

BHP Response

This project is different than most previous seabed survey or wellsite survey projects in that the only equipment deployed from the vessel will be a tethered ROV. There will be no seismic, multibeam or sidescan sonar equipment deployed. According to the One Ocean Risk Management Matrix (http://www.oneocean.ca/pdf/Matrix.pdf), an FLO is not required for a wellsite survey even when the area is being activity fished. The BHP seabed survey will be conducted within an area closed to all bottom contact fishing. The fishing industry has been consulted during the preparation of the environmental assessment and they have not raised the need for a FLO. The Petroleum Industry Liaison at the Fish, Food and Allied Workers (FFAW) Union will be notified in advance of all operations outside of the Field Safety Zone, as suggested by the One Ocean Risk Management Matrix. BHP will liaise with fishers and fishing community prior to scope of work. The survey vessel will operate as per the requirements of the *Collision Regulations*. Navigation officers will be familiar with local practices and engage other vessels and fishers in a respectful manner, if encountered.

2.3 FISH, FOOD & ALLIED WORKERS (FFAW)

The FFAW requests the following clarifications to ensure there is an appropriate level of understanding of the dynamic nature of the fishery offshore:

Section 4.7 Fisheries and Other Ocean Uses

Greenland halibut, also known as turbot, is primarily fished using bottom trawls (pg. 40). The larger offshore boats, with more quota to fish, utilize mobile gear to catch fish. The inshore fishery however primarily uses fixed gear (i.e., gill nets) to harvest smaller allocated amounts of quota. As such, there are more fishing vessels on the water using fixed gear than the larger vessels trawling for the same species, depending on the fishing season. This is an important point that warrants discussion in the document when considering transit routes for the survey vessel (if it is during the fixed turbot fishing season).

BHP Response

Section 4.7 first paragraph after Table 4.12 has been revised to:

Within the Project Area, Greenland halibut are mostly fished **by larger vessels (>65 feet)** using bottom trawls, while shrimp are fished using modified trawls. Both of these are mobile gear types. Locations of commercial fishing activity for mobile gear type with respect to the Project Area for May to October are shown in Figure 4-13. **Greenland halibut are also commercially fished by smaller inshore fleets using gill nets, a fixed gear type, and locations of fishing may overlap interfere with Project activities during transit to / from the Project Area. Given the length of a survey (seven to ten days), it is not expected that there would be a crew change during the survey; therefore, the vessel will only transit to / from the site once each way, reducing the likelihood that the survey would interfere with the fixed Greenland halibut fishery.**

The shrimp fishery in Shrimp Fishing Area 7 (NAFO Division 3L) has been closed since 2015 (not 2017, page 40). While this area is not expected to open for shrimp fishing in 2020 the closure is not a permanent closure. The proponent should review the status of the closure annually.

BHP Response

Section 4.7 first paragraph after Table 4.12 has been revised to:

The Project Area overlaps with the Northeast Newfoundland Slopes Marine Refuge; bottom contact fishing activities have been prohibited since 2017. The Project Area also overlaps with Shrimp Fishing Area 7, which encompasses all of NAFO division 3L, and is currently closed to shrimp fishing activity as a species conservation strategy. The closure has been in effect since 201**5 and is a temporary closure, but is expected to carry into 2020 and 2021 (NAFO 2020). BHP would review the status of this closure prior to a survey, but the planned mitigation would also be applicable to it should it be open.** If northern or spotted wolffish are caught as by-catch within their designated critical habitat (Figure 4-11), then they are to be released.

New Reference:

NAFO (Northwest Atlantic Fisheries Organization). 2020. Conservation and Enforcement Measures. FC Doc. 20-01, Serial No. N7028, 188 pp. Available at: https://www.nafo.int/Portals/0/PDFs/COM/2020/CEM-2020-web.pdf

While it is not expected that inshore fish harvesters will fish directly within EL1157 and EL1158 there may be some international fishing activity in the area, depending on the timing of the survey (page 43). Seismic and other exploration project vessels have encountered swordfish fishing, for example, in the general area over the years.

BHP Response

Section 4.7 fourth paragraph after Table 4.12 has been revised to:

Due to the location of the Project ELs (in deep water) and the existence of closure areas that overlap with the Project ELs, minimal commercial fishing activity has occurred historically, and in 2017, there was no commercial fishing activity by domestic fleets within the Project ELs, based on the DFO geospatial data (Table 4.13). **NAFO data available through the STATLANT21A dataset (NAFO 2019b), indicates that tuna, shark and swordfish have been commercially fished in NAFO Division 3K between 2014 to 2018. Although the exact locations of international fishing activity for these species is not known, depending on the timing of the seabed survey, there is the possibility that the survey vessel may encounter foreign vessels conducting commercial fishing activity near the Project Area.**

New Reference:

NAFO (Northwest Atlantic Fisheries Organization). 2019b. STATLANT 21A dataset. Available at: https://www.nafo.int/Data/STATLANT

Further to this, there is still a potential for interaction between fishing and project activities (page 45, 51). While advance communication is beneficial to all parties it will not necessarily eliminate space conflicts during the survey. Respectful on-the-water dialogue will be vital to resolving space conflicts, should they arise.

BHP Response

The following bullet is added to Section 5.4:

- **Space conflicts at sea with other ocean users (i.e., marine transportation, fishing, other survey vessels) will be addressed through respectful on-the-water dialogue. The survey vessel will operate as per the requirements of the *Collision Regulations* offshore. Navigation officers will be familiar with local practices and engage other vessels and fishers in a respectful manner.**

3.0 OTHER

Since receipt of these comments, DFO has finalized the recovery strategies for northern and spotted wolffish and the action plan for Atlantic wolffish (DFO 2020). Table 4.9 is provided with edits to reflect the release of this document.

Table 4.9 Distribution / Habitat / Ecology of SARA Schedule 1 Species at Risk Which Could Potentially Occur in the Project Area

Species	Distribution / Habitat / Ecology
Marine Fish	
Atlantic wolffish (Special Concern)	The Atlantic wolffish is found offshore Newfoundland, in nearshore waters up to 918 m and is most frequently found in water depths of 150 m to 350 m (DFO 20**20**). It is widely distributed across the North Atlantic, with the centre of its western Atlantic distribution off the coast of northeast Newfoundland. The Atlantic wolffish occurs in shallower waters on the southern Grand Banks, unlike northern and spotted wolffish (DFO 20**20**). The life stages of the Atlantic wolffish vary slightly, in that the larvae are pelagic but adult Atlantic wolffish are relatively sedentary. However, adult Atlantic wolffish do take part in seasonal migrations, of a few kilometres, between offshore waters and shallow waters (<120 m deep) for spawning purposes (which occurs in September) (COSEWIC 2012a; DFO 20**20**). A Management Plan has been **finalized** for the Atlantic wolffish (DFO 20**20**).
Northern wolffish (Threatened)	The distribution of the Northern wolffish spans boreal and subarctic waters on both sides of the North Atlantic and in the Arctic. The Shelf, off northeastern Newfoundland and in the Labrador Sea, hosts the highest densities, at temperatures between 2°C and 5°C. Typically, Northern wolffish are found in water depths of 500 and 1,000 m, but have been found in water depths ranging from 38 to 1,504 m. Spawning occurs from September through November (COSEWIC 2012b). A Recovery Strategy has been **finalized** for the northern wolffish that includes **designated** critical habitat **(DFO 2020)**. The critical habitat slightly overlaps with the Regional Area and Project Area, but does not overlap with Project ELs (Figure 4-11) and is approximately 9 km from the nearest Project EL.
Spotted wolffish (Threatened)	Spotted wolffish is found in the Arctic Ocean and on both sides of the North Atlantic, in water depths between 200 and 750 m on the continental shelf or in deep trenches. Fertilization is internal and likely occurs in the summer, after which eggs are deposited on the bottom. While the larval stages are pelagic, juveniles and adults are bottom dwellers (COSEWIC 2012c). A Recovery Strategy has been **finalized** for the spotted wolffish that includes **designated** critical habitat **(DFO 2020)**. The critical habitat for spotted wolffish slightly overlaps with the Regional Area and Project Area, but does not overlap with Project ELs (Figure 4-11).
White shark **(Atlantic population)** (Endangered)	The white shark has a distribution that ranges from sub-polar to tropical seas of both hemispheres. In Atlantic Canada, it has been recorded from the Northeast Newfoundland Shelf to the Bay of Fundy, which represents the northern fringe of its range. The white shark also occupies a wide depth range, from just below the surface to just above the bottom, down to depths of least 1,200 m. The Mid-Atlantic Bight of the Atlantic Ocean has been identified as a possible white shark pupping area (COSEWIC 2006a).

Table 4.9 Distribution / Habitat / Ecology of SARA Schedule 1 Species at Risk Which Could Potentially Occur in the Project Area

Species	Distribution / Habitat / Ecology
Marine and/or Migratory Birds	
Red-necked phalarope (Special Concern)	Red-necked phalaropes nest in freshwater ponds in the Arctic and Subarctic, and winter in pelagic waters of the tropics and sub-tropics. During the pelagic portion of their annual cycle, these species are thought to forage primarily at areas of upwelling caused by ocean currents conflicting with shelf edges, shorelines and other currents feeding on zooplankton at the surface (Rubega et al. 2000; Tracy et al. 2002). Phalaropes occur in the Project Area as passage migrants during spring and fall (Moulton et al. 2006; Smith et al. 2014). It has not been possible to calculate densities in the Project Area or the Regional Area because they are seldom recorded during at-sea surveys due to their low density and they are often seen only in flight (Moulton et al. 2006; Bolduc et al. 2018). However, these species have been observed in small numbers off-transect from mid-May to early June and during August and September (Moulton et al. 2006). No recovery strategy or action plans for this species have been prepared yet.
Ross's gull (Threatened)	Ross's gull nests in the Canadian Arctic and have wintering areas from the Labrador Sea to the Orphan Basin. This has been established by tracking geolocators and satellite transmitters used to tag gulls (Maftei et al. 2015). Based on the northern wintering areas, this species may be present in very small numbers in the Project Area during winter, but is not likely to be encountered during Project activities due to the planned timing of the survey (May to October). A Recovery Strategy has been prepared for this species, although critical habitat has not yet been identified (Environment Canada 2007).
Ivory gull (Endangered)	Ivory gulls have two nesting locations, the Canadian Arctic and Greenland, and winter from Baffin Bay to the Northeast Newfoundland Shelf, based on studies that fitted the birds with satellite transmitters (Gilg et al. 2010; Spencer et al. 2016). Most of the world's population of Ivory gulls are comprised of individuals from those two nesting populations, so the wintering area has global importance for this species. Bird surveys at the Bay de Verde Wellsite in the winter of 2014 to 2015 reported two sightings of Ivory gulls (Statoil 2015). In late winter and early spring, when sea ice is present, Ivory gull can be expected to occur in small numbers in the Project Area and likely occurs irregularly south of 50°N among the ice pack during heavier ice years. A Recovery Strategy identified critical habitat for Ivory Gull at breeding colonies in Nunavut (Environment Canada 2014). Additional critical habitat is to be identified in a future Action Plan for the species.
Marine Mammals	
Blue whale **(Atlantic population)** (Endangered)	The blue whale, the largest animal on the planet, is found in all oceans of the world. During industrial whaling, Blue whales became severely depleted and remain at relatively low densities in the North Atlantic. Current estimates for the blue whale in the western North Atlantic are between 400 to 600 whales (Waring et al. 2011). Based on the DFO sightings database (1947-2015), there have been no sightings of Blue whales in the Project Area. The most recent proposed Action Plan for the Northwest Atlantic population of the blue whale (DFO 2018) focuses on recovery objectives intended to increase knowledge of the population, its habitat and threats, and implement measures to mitigate threats (e.g., underwater sound, vessel collisions, spills). No critical habitat has yet been defined for the blue whale.
Fin whale **(Atlantic population)** (Special Concern)	With the exception of the Arctic Ocean, fin whales are found in all the oceans of the world. Fin whales spend the winter months at lower latitudes, breeding and calving (DFO 2017b). The North Atlantic population inhabits eastern Canadian coastal waters (primarily in the summer) (DFO 2017b) and are therefore expected to be common throughout Project Area, particularly between June and August. In 2017, DFO released a Management Plan for the fin whale (DFO 2017b).

Table 4.9 Distribution / Habitat / Ecology of SARA Schedule 1 Species at Risk Which Could Potentially Occur in the Project Area

Species	Distribution / Habitat / Ecology
Northern bottlenose whale (Scotian Shelf population) (Endangered)	The northern bottlenose whale is found only in the North Atlantic, primarily in offshore waters. The only endangered northern bottlenose whale population is the Scotian Shelf population. Individuals from this population are found regularly between the Gully, Shortland Canyon, and Haldimond Canyon offshore Nova Scotia (DFO 2016b). In the DFO sightings database between May and September, there have been sightings of northern bottlenose whale recorded in the Project Area. However, it is likely that these individuals sighted are associated with the Davis Strait-Baffin Bay-Labrador Sea population (which is not listed on SARA Schedule 1). Northern bottlenose whales from the endangered Scotian Shelf population are expected to be uncommon in the Project Area. A recovery strategy was amended, and an action plan was proposed for the Scotian Shelf population of northern bottlenose whale, updating critical habitat measures (DFO 2016b, 2017b).
North Atlantic right whale (Endangered)	The right whale can be found from Florida to Newfoundland and the Gulf of St. Lawrence, in the western North Atlantic. The Scotian Shelf and Bay of Fundy hosts two-thirds of the North Atlantic population in summer and fall, with smaller numbers reported in the Gulf of St. Lawrence (COSEWIC 2013). The population size of North Atlantic right whales remains low, despite being the first whale to receive total international protection from hunting in 1937. The population has been declining since 2010 (Pace et al. 2017; Corkeron et al 2018; Pettis et al. 2018); at the end of 2017, the population size was estimated at 411 whales (Pettis et al. 2018). Twelve dead North Atlantic right whales were reported in the Gulf of St. Lawrence between June and September 2017. Necropsies were performed on seven whales, and it was determined that four whales had died due to blunt trauma and two, due to drowning as a result of entanglement. The cause of death could not be determined in the case of one whale for which post-mortem decomposition was very advanced (Daoust et al. 2017). In addition to these mortalities, additional entanglements were reported within the same timeframe (Daoust et al. 2017). Based on DFO sightings database near the Flemish Cap, the North Atlantic right whale would be considered a rare visitor to the Project Area, with one recorded sighting of two individual right whales south of the Project Area and vocalizations recorded in slope waters off southern Newfoundland (Delarue et al. 2018). A Recovery Strategy (DFO 2014) and proposed Action Plan (DFO 2016a) to achieve objectives in the recovery strategy have been developed for the North Atlantic right whale in Atlantic Canada waters. Critical habitat for this species has been designated in the Grand Manan Basin (Bay of Fundy) and Roseway Basin (off southwestern Nova Scotia).
Sowerby's beaked whale (Special Concern)	There is a paucity of information on the occurrence of Sowerby's beaked whale in the waters of offshore Newfoundland and Labrador. Most of the available information that has been gathered is based on strandings records (Lien and Barry 1990, in Husky 2012). It is relatively difficult to detect Sowerby's beaked whales as they have short surface durations, offshore distribution, and faint blows (Hooker and Baird 1999a, in Husky 2012). They have most often been observed in deep waters and continental shelf edges or slopes (Kenney and Winn 1987, in Husky 2012; COSEWIC 2006b) and presumably make deep dives to forage on medium- to large-bodied squid (COSEWIC 2006b). There is one sighting of four Sowerby's beaked whales in the Project Area in the DFO sightings database (Figure 4-8), and a sighting of four individuals was made during a seismic survey in Orphan Basin in September 2005 (Moulton et al. 2006). There are also several stranding records for Newfoundland and Labrador (DFO 2017c). Sowerby's beaked whale vocalizations were detected year-round in the Project Area during August 2015 to July 2017 (Delarue et al. 2018). Just to the east of the Project Area, detections were made from spring through fall. Sowerby's beaked whale clicks were concentrated along the edge of the Scotian Shelf, and high detection rates also occurred along the shelf edge of the Grand Banks (Delarue et al. 2018). Sowerby's beaked whale is likely to be rare in the Project Area. In 2017, DFO released a management plan for Sowerby's beaked whale (DFO 2017c).

Table 4.9 Distribution / Habitat / Ecology of SARA Schedule 1 Species at Risk Which Could Potentially Occur in the Project Area

Species	Distribution / Habitat / Ecology
Loggerhead turtle (Endangered)	The loggerhead sea turtle is widely distributed in the Atlantic, Pacific, and Indian Oceans. Nesting populations along the southeast United States and Caribbean coast of Mexico can be found in Atlantic Canada, primarily in offshore waters (COSEWIC 2010). There are no sightings of loggerhead turtles within the Project Area in the DFO sightings database. occurrence of loggerhead sea turtles in the Project Area would be considered rare. No Management Plan or Recovery Strategy has been published for the loggerhead sea turtle.
Leatherback turtle **(Atlantic population)** (Endangered)	Leatherback turtle's foraging behaviour and movements has recently been obtained from studies in Atlantic Canada using satellite telemetry and camera tags, as well as vessel-based sightings reported in the offshore waters off Nova Scotia and Newfoundland (Stewart et al. 2013; Dodge et al. 2014; Archibald and James 2016; Chambault et al. 2017). An estimated 34,000 to 94,000 adult leatherback sea turtles are present throughout the North Atlantic, as of 2006 (TEWG 2007). While the size of the seasonal foraging population in Atlantic Canada is not known, sightings data suggest that the population in Canadian Atlantic waters numbers in the thousands (COSEWIC 2012d). Archibald and James (2016) suggested that Canadian waters may have the highest density of foraging leatherbacks throughout their range. Although critical habitat has not yet been designated for this species in Atlantic Canadian waters (ALTRT 2006), areas previously identified as important foraging habitat have now been identified in the proposed recovery strategy as critical habitat areas for leatherbacks (DFO 2016c). The Southwestern Scotian Slope Area, the Gulf of St. Lawrence-Laurentian Channel Area, and the Placentia Bay Area are the three proposed critical habitat areas that have been identified (DFO 2016c). Bycatch in fisheries is the main threat facing leatherback sea turtles in Canadian waters, although globally, the species is threatened by ship strikes, marine debris, and oil and gas exploration (COSEWIC 2012d). Hamelin et al. (2017) reported several incidental captures of leatherback sea turtles in fishing gear in the waters off Newfoundland, including on the Grand Banks. There are no sightings of leatherback turtles within the Project Area (Figure 4-10). However, some leatherback sea turtles have been observed to the south and west of the Project Area. Occurrence of leatherback sea turtles in the Project Area would be considered rare.

New Reference:

DFO (Fisheries and Oceans Canada). 2020. Recovery Strategy for Northern Wolffish (*Anarhichas denticulatus*) and Spotted Wolffish (*Anarhichas minor*), and Management Plan for Atlantic Wolffish (*Anarhichas lupus*) in Canada. Fisheries and Oceans Canada, Ottawa, ON. vii + 81 pp.