



Ephesus Prospect Controlled Source Electromagnetic (CSEM) Survey

Response to Regulator Comments

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October 2020

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Abbreviations

A	ampere
The Accord Acts	<i>Canada-Newfoundland and Labrador Atlantic Accord Implementation Act and the Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act</i>
BP	BP Canada Energy Group ULC
CBD	Convention on Biological Diversity
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSEM	controlled source electromagnetic
CWS	Canadian Wildlife Service
dB	decibel
DFO	Fisheries and Oceans Canada
EA	environmental assessment
EBSA	Ecologically and Biologically Significant Area
ECCC	Environment and Climate Change Canada
EL	Exploration Licence
EMF	electromagnetic field
EMGS	Electromagnetic Services ASA
FFAW	Fish, Food and Allied Workers
Hz	Hertz
IAAC	Impact Assessment Agency of Canada
km	kilometre
km/h	kilometre per hour
m	metre
m ²	square metre
MARPOL	International Convention for the Prevention of Pollution from Ships
MBCA	<i>Migratory Birds Convention Act, 1994</i>
NAFO	Northwest Atlantic Fisheries Organization
NL	Newfoundland and Labrador
The Project	Ephesus Prospect CSEM Survey
rms	root mean square
SARA	<i>Species at Risk Act</i>
SBA	Significant Benthic Area
VC	Valued Component

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INTRODUCTION
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1.0 INTRODUCTION

BP Canada Energy Group ULC (BP) is proposing to conduct a controlled source electromagnetic (CSEM) survey over Exploration Licences (ELs) 1145 and 1146 in the Orphan Basin offshore Newfoundland and Labrador. The Ephesus Prospect CSEM Survey (the Project) will collect data that will be used to confirm prospectivity for a proposed future exploration drilling program within these ELs.

The Project will require an authorization as a geophysical survey from the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) pursuant to section 138 of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and section 134 of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* (the Accord Acts).

The C-NLOPB, in consultation with its fishery and environmental review agencies, reviewed the environmental assessment (EA) for the Project. The C-NLOPB determined the EA report does not satisfy all of the information requirements outlined in the Scoping Document provided to BP on March 10, 2020.

This document addresses the consolidated comments provided to BP by the C-NLOPB on August 6, 2020 and October 8, 2020, to allow the C-NLOPB to complete a determination report at the conclusion of the assessment.

Underlined text in BP's response indicates revisions added to original EA text.

2.0 ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC)

2.1 Specific Comments:

Section 6.3.4.1 – Survey Vessel Operation, page 77, Paragraph 2 - Quote – “Regular searches of the vessel deck will be undertaken and accepted protocols for the collection and release of birds that become stranded will be implemented by qualified and experienced personnel, in accordance with applicable regulatory guidance and requirements and the CWS bird handling permit.”

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), with search efforts documented and observations recorded (including notes of efforts when no birds are found). Environment and Climate Change Canada’s Canadian Wildlife Service (ECCC-CWS) has expertise in this area and is available to be consulted in the development of systematic monitoring protocols.

ECCC requests that this statement be revised to “daily systematic searches of the vessel deck will be undertaken and accepted protocols for the collection and release of birds that become stranded will be implemented by qualified and experienced personnel, in accordance with applicable regulatory guidance and requirements and the CWS bird handling permit.”

In addition, ECCC requests that the proponent verify that searches for stranded birds are referred to as “daily systematic searches” or “systematic searches” throughout the document.

BP Response

Section 6.3.4.1, page 77 Paragraph 2 is revised to read as follows:

“Daily systematic searches of the vessel deck will be undertaken and accepted protocols for the collection and release of birds that become stranded will be implemented by qualified and experienced personnel, in accordance with applicable regulatory guidance and requirements and the CWS bird handling permit”.

This revision also applies to the last paragraph of Section 6.4.4.1 (with respect to marine bird species at risk).

These edits are consistent with commitments made elsewhere in the document to conduct daily systematic searches.

3.0 FISHERIES AND OCEANS CANADA (DFO)

3.1 General Comments:

Section 6.0 Environmental Effects Assessment - the Proponent should ensure that all criteria listed in Table 5.3 are described for each VC. For example, in 6.1.4.1, direction and ecological or socio-economic context are not provided. In 6.2.4, criteria appear to be lacking.

BP Response

Table 5.3 from the EA Report is provided as Table 1 to remind reviewers of the defined criteria for characterizing residual environmental effects.

Table 1 EA Table 5.3: Generic Characterization of Residual Environmental Effects

Criteria	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual environmental effect relative to baseline	Positive – a residual environmental effect that moves measurable parameters in a direction beneficial to [VC] relative to baseline Adverse – a residual environmental effect that moves measurable parameters in a direction detrimental to [VC] relative to baseline
Magnitude	The amount of change in measurable parameters or the Valued Component (VC) relative to existing conditions	Negligible – no measurable change <u>Biophysical VCs:</u> Low – a detectable change but within the range of natural variability Moderate – a detectable change beyond the range of natural variability, but with no associated adverse effect on the viability of the affected population. High – measurable change that exceeds the limits of natural variability, with an adverse effect on the viability of the affected population. <u>Socio-economic VC:</u> Low – A detectable change that is within the range of natural variability, with no associated adverse effect on the overall nature, intensity, quality / health or value of the affected component or activity. Moderate - A detectable change that is beyond the range of natural variability, but with no associated adverse effect on the overall nature, intensity, quality / health or value of the affected component or activity. High - A detectable change that is beyond the range of natural variability, with an adverse effect on the overall nature, intensity, quality / health or value of the affected component or activity.

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Table 1 EA Table 5.3: Generic Characterization of Residual Environmental Effects

Criteria	Description	Quantitative Measure or Definition of Qualitative Categories
Geographic Extent	The geographic area in which a residual environmental effect occurs	Project Area – residual environmental effects are restricted to the Project Area Study Area – residual environmental effects extend into the Study Area Regional Area – residual environmental effects extend into the RA
Frequency	Identifies how often the residual effect occurs and how often during the Project	Unlikely event – effect is unlikely to occur Single event – effect occurs once Multiple irregular event – effect occurs at no set schedule Multiple regular event – effect occurs at regular intervals Continuous – effect occurs continuously
Duration	The period of time required until the measurable parameter or the VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short-term - for duration of the activity, or for duration of accidental event Medium-term - beyond duration of activity up to end of Project, or for duration of threshold exceedance of accidental event – weeks or months Long-term - beyond Project duration of activity, or beyond the duration of threshold exceedance for accidental events - years Permanent - recovery to baseline conditions unlikely
Reversibility	Pertains to whether a measurable parameter or the VC can return to its existing condition after the project activity ceases	Reversible – will recover to baseline conditions before or after Project completion Irreversible – permanent
Ecological or Socio-economic Context	Existing condition and trends in the area where residual environmental effects occur.	Undisturbed – The VC is relatively undisturbed in the Regional Area, not adversely affected by human activity, or is likely able to assimilate the additional change Disturbed – The VC has been previously disturbed by human development or human development is still present in the Regional Area, or the VC is likely not able to assimilate the additional change

In order to ensure a consistent approach in characterizing residual effects for all VCs, a matrix (Table 2) has been prepared to summarize the characterization of residual effects based on the analysis presented in the EA Report. Where an interaction between a Project activity and Valued Component (VC) was not identified to occur, that activity is not included in Table 2 for that particular VC. Note that the frequency of effects of “Survey Vessel Operation” has been changed to “continuous” for all VCs in recognition of the continuous operation of the survey vessel during the Project and the potential for continuous effects on VCs.

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Table 2 Summary of Residual Environmental Effects

Residual Effect	Residual Environmental Effects Characterization								
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context	Significance Determination	Level of Confidence
Marine Fish and Shellfish									
Survey Vessel Operation	A	L	PA	ST	C	R	D		
CSEM Source Operation	A	N	PA	ST	R	R	D		
Receiver Deployment and Retrieval	A	L	PA	ST	S	R	D		
Overall Significance Determination								NS	H
Marine Mammals and Sea Turtles									
Survey Vessel Operation	A	L	PA	ST	C	R	D		
CSEM Source Operation	A	L	PA	ST	R	R	D		
Overall Significance Determination								NS	H
Marine and Migratory Birds									
Survey Vessel Operation	A	L	PA	ST	C	R	D		
Overall Significance Determination								NS	H
Species at Risk									
Survey Vessel Operation	A	L	PA	ST	C	R	D		
CSEM Source Operation	A	N-L	PA	ST	R	R	D		
Receiver Deployment and Retrieval	A	N	PA	ST	S	R	D		
Overall Significance Determination								NS	H
Sensitive Areas									
Survey Vessel Operation	A	L	PA	ST	C	R	D		

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Table 2 Summary of Residual Environmental Effects

Residual Effect	Residual Environmental Effects Characterization								
	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Ecological and Socio-economic Context	Significance Determination	Level of Confidence
CSEM Source Operation	A	L	PA	ST	R	R	D		
Receiver Deployment and Retrieval	A	L	PA	ST	S	R	D		
Overall Significance Determination								NS	H
Fisheries and Other Ocean Users									
Survey Vessel Operation	A	L	PA	ST	C	R	D		
CSEM Source Operation	A	L	PA	ST	R	R	D		
Receiver Deployment and Retrieval	A	L	PA	ST	S	R	D		
Overall Significance Determination								NS	H
<p>KEY:</p> <p>N/A: Not Applicable</p> <p>Direction: P: Positive A: Adverse</p> <p>Magnitude: N: Negligible L: Low M: Moderate H: High</p> <p>Geographic Extent: PA: Project Area SA: Study Area</p> <p>Duration: ST: Short-term MT: Medium-term LT: Long-term P: Permanent</p> <p>Frequency: UL: Unlikely S: Single event IR: Irregular event R: Regular event C: Continuous</p> <p>Reversibility: R: Reversible I: Irreversible</p> <p>Significance: S: Significant NS: Not significant</p> <p>Level of Confidence: L: Low M: Moderate H: High</p> <p>Ecological / Socio-Economic Context: D: Disturbed U: Undisturbed</p>									

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Section 6.0 Environmental Effects Assessment - it is recommended that confidence levels be provided for determination of significance.

BP Response

As shown in Table 2, for all VCs, residual effects have been characterized as being adverse, but negligible to low in magnitude, confined in geographic extent to portions of the Project Area, short-term, single event (receiver deployment / retrieval) to continuous (vessel operation), and predicted to be not significant for all VCs. Given the nature of Project activities, residual effects characterizations and in consideration of the VC-specific thresholds defined for significant adverse residual environmental effects, this prediction is made with a high level of confidence for all VCs.

3.2 Specific Comments:

Section 1.1 Project Overview, Figure 1.1, page 2 – Justification for the shape of the Project Area is not provided in the EA Report. Why does it border EL 1146, but extends beyond the border of EL 1145? An explanation for the selection of the Project Area should be provided.

BP Response

The shape of the Project Area accounts for the size, shape, and location of the proposed survey grid. The focus of the survey will be on EL 1145, although survey lines could extend into 1146. The Project Area extends beyond EL 1145 to account for vessel turning movements.

Section 2.5.2 Electromagnetic Emissions, page 11, final paragraph – Aside from incorporating 10,000 A, how does the modelling apply to the Project?

BP Response

The estimate of magnetic and electric fields shown in Tables 2.2 and 2.3 of the EA Report, respectively, were derived from modelling conducted for the EMGS East Canada CSEM Survey (2014-2018) (see LGL Limited 2017, Table 1). The Project Area for the Project falls within the Project Area assessed for EMGS's East Canada CSEM Survey (see LGL 2014) and BP is proposing to use the same or similar electromagnetic source as used in the EMGS East Canada CSEM Survey (for which the modelling was conducted).

References:

LGL Limited. 2014. Environmental Assessment East Canada CSEM Survey, 2014-2018. LGL Rep. SA1248. Rep. by LGL Limited, St. John's, NL for Electromagnetic Geoservices Canada (Operator) (EMGS), Vancouver, BC. 192 pp. + Appendices.

LGL Limited. 2017. Environmental Assessment EMGS East Canada CSEM Survey, 2014-2018 Amendment. LGL Rep. FA0110. Rep. by LGL Limited, St. John's, NL, for Electromagnetic Geoservices Canada Inc., Vancouver, BC. 6 pp.

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Section 4.3 Marine Fish and Shellfish, page 24, paragraph 1, final sentence – The scientific name for Northern Wolffish should also be provided.

BP Response

The scientific name for northern wolffish is previously provided in the first paragraph on Page 23 of the EA: “The most abundant fish species found in the Study Area (based on 2015-2016 DFO research vessel survey data) include redfish, Greenland halibut, roughhead grenadier, roundnose grenadier, witch flounder (*Glyptocephalus cynoglossus*), and northern wolffish (*Anarhichas denticulatus*). These species would be expected to be present in the Study Area year-round.”

Section 4.3 Marine Mammals and Sea Turtles, Table 4.6, pages 25-26 – Ringed Seal is assessed as Special Concern by COSEWIC and should be bolded. Other species that could be included: Bowhead Whale (Eastern Canada – West Greenland population; see Figure 4.2) and Beluga Whale (Ungava Bay population; see Figure 4.3). It should be clarified why the Sei Whale and Northern Bottlenose Whale are considered uncommon (see Figures 4.2 and 4.3).

BP Response

EA Table 4.6 lists marine mammals and sea turtles with a reasonable likelihood of occurrence in the Study Area. EA Figures 4.2 and 4.3 display sightings (May to October compiled from the DFO sightings Database 1947 to 2015) for baleen whales and toothed whales, respectively.

As shown on EA Figure 4.2, sei whales are uncommon in the Project and Study Areas and have been identified further south and in shallower areas. As shown by the limited sightings displayed on EA Figure 4.3, northern bottlenose whale could be considered rare in the Project and Study Areas, with more individuals identified south in the vicinity of the Sackville Spur. Bowhead whale (Eastern Canada-West Greenland population; see EA Figure 4.2) and beluga whale (Ungava Bay population; see EA Figure 4.3) would both be considered rare in the Study Area based on historic sightings data. Additionally, the Ungava Bay population of the beluga whale is very small and may be extirpated (Government of Canada 2019) so any occurrence of this species would be rare in the Study Area.

Revised EA Table 4.6 is provided as Table 3.

Table 3 Revised EA Table 4.6: Marine Mammals and Sea Turtles with Reasonable Likelihood of Occurrence in the Study Area

Species	Scientific Name	Study Area		Habitat
		Occurrence	Season	
North Atlantic Right Whale	<i>Eubalaena glacialis</i>	Rare	Summer	Coastal, shelf and pelagic
Humpback Whale (Western North Atlantic population)	<i>Megaptera novaeangliae</i>	Common	Year-round, but mostly May-Sep	Coastal and banks
Minke Whale	<i>Balaenoptera acutorostrata</i>	Common	Year-round, but mostly May-Oct	Coastal, shelf, and banks

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Table 3 Revised EA Table 4.6: Marine Mammals and Sea Turtles with Reasonable Likelihood of Occurrence in the Study Area

Species	Scientific Name	Study Area		Habitat
		Occurrence	Season	
Sei Whale (Atlantic population)	<i>Balaenoptera borealis</i>	Uncommon	May–Nov	Pelagic
Fin Whale ((Atlantic population))	<i>Balaenoptera physalus</i>	Common	Year-round, but mostly summer	Shelf breaks, banks and pelagic
Blue Whale (Atlantic population)	<i>Balaenoptera musculus</i>	Uncommon	Year-round	Coastal and pelagic
Sperm Whale	<i>Physeter macrocephalus</i>	Common	Year-round, but mostly summer	Slope, canyons and pelagic
<u>Bowhead Whale (Eastern Canada-West Greenland population)</u>	<i>Balaena mysticetus</i>	Rare	Unknown	<u>Open water to areas with thick, unconsolidated pack ice</u>
<u>Beluga Whale (Ungava Bay population)</u>	<i>Delphinapterus leucas</i>	Rare	Unknown	<u>Coastlines to deep-water areas</u>
Northern Bottlenose Whale ((Davis Strait-Baffin Bay-Labrador Sea population))	<i>Hyperoodon ampullatus</i>	Rare	Year-round	Slope, canyons and pelagic
Sowerby’s Beaked Whale	<i>Mesoplodon bidens</i>	Rare	Year-round	Slope, canyons and pelagic
Striped Dolphin	<i>Stenella coeruleoalba</i>	Rare	Summer	Shelf and pelagic
Atlantic Spotted Dolphin	<i>Stenella frontalis</i>	Rare	Summer	Shelf, slope and pelagic
Short-beaked Common Dolphin	<i>Delphinus delphis</i>	Common	Summer	Shelf and pelagic
White-beaked Dolphin	<i>Lagenorhynchus albirostris</i>	Common	Year-round, but mostly Jun-Sep	Shelf and pelagic
Atlantic White-sided Dolphin	<i>Lagenorhynchus acutus</i>	Common	Year-round, but mostly summer-fall	Coastal and shelf
Common Bottlenose Dolphin	<i>Tursiops truncatus</i>	Rare	Summer	Coastal and pelagic
Risso’s Dolphin	<i>Grampus griseus</i>	Rare	Year-round	Continental slope
Killer Whale (Northwest Atlantic / Eastern Arctic population)	<i>Orcinus orca</i>	Uncommon	Year-round	Coastal and pelagic
Long-finned Pilot Whale	<i>Globicephala melas</i>	Common	Year-round, but mostly spring-fall	Shelf break, pelagic and slope
Harbour Porpoise (Northwest Atlantic population)	<i>Phocoena phocoena</i>	Uncommon	Year-round, but mostly spring-fall	Coastal, shelf and pelagic
Harp Seal	<i>Pagophilus groenlandicus</i>	Common	Year-round, but mostly winter-spring	Pack ice and pelagic
Hooded Seal	<i>Cystophora cristata</i>	Common	Year-round, but mostly winter-spring	Pack ice and pelagic

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Table 3 Revised EA Table 4.6: Marine Mammals and Sea Turtles with Reasonable Likelihood of Occurrence in the Study Area

Species	Scientific Name	Study Area		Habitat
		Occurrence	Season	
Grey Seal	<i>Halichoerus grypus</i>	Uncommon	Year-round, but mostly summer	Coastal and shelf
Ringed Seal	<i>Pusa hispida</i>	Uncommon	Winter-spring	Landfast ice with snow cover
Bearded Seal	<i>Erignathus barbatus</i>	Uncommon	Year-round	Coastal, shallow and ice edge
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	Rare	Apr to Dec	Shelf and pelagic
Loggerhead Sea Turtle	<i>Caretta caretta</i>	Rare	Summer and fall	Pelagic
Green Sea Turtle	<i>Chelonia mydas</i>	Rare	Summer	Pelagic

Note: Bolded species have conservation designations (see EA Section 4.5).

New Reference:

Government of Canada. 2019. Species at Risk Registry. Beluga Whale (*Delphinapterus leucas*), Ungava Bay population. Species Summary. Available at: <https://species-registry.canada.ca/index-en.html#/species/189-148>

Section 4.5 Species at Risk, page 38, first sentence – Newfoundland and Labrador’s *Endangered Species Act* should also be considered in identifying species at risk.

BP Response

The text is revised to read:

For the purpose of this report, species at risk are defined as those listed as endangered, threatened or of special concern under Schedule 1 of SARA, or by the Committee of the Status of Endangered Wildlife in Canada (COSEWIC). In addition, ivory gull and American eel are also listed under the Newfoundland and Labrador (NL) *Endangered Species Act*. Species listed under Schedule 1 of the *Species at Risk Act* (SARA) and NL *Endangered Species Act* are legally protected. There are several fish, bird, mammal, and sea turtle species designated at risk that have the potential to occur in the Regional Area or Study Area (Table 4.8) although for most, occurrence in the Study Area and/or Project Area would be uncommon.

Section 4.5 Species At Risk, Table 4.8, pages 38-39 – Missing from this table are Spiny Dogfish (Atlantic population; Special Concern - COSEWIC), Beluga Whale (Ungava Bay population; Endangered - COSEWIC), Bowhead Whale (Eastern Canada – West Greenland population; Special Concern - COSEWIC), Ringed Seal (Special Concern – COSEWIC) and Atlantic Salmon (Inner Bay of Fundy population; Endangered SARA Schedule 1). “Common lumpfish” can be changed to “lumpfish”. Atlantic population should be added for Acadian Redfish, Blue Whale, and Basking Shark. No population should be provided for Atlantic Bluefin Tuna.

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BP Response

Revised EA Table 4.8 is provided as Table 4. Note that most reports indicate that Inner Bay of Fundy salmon marine habitat is focused on the Bay of Fundy and Gulf of Maine (DFO 2013, 2016). Recent EAs of offshore exploration drilling projects (BP 2018; BHP Petroleum (New Ventures) Corporation 2020) have not included the Inner Bay of Fundy population in their assessments and the Impact Assessment Agency of Canada (IAAC) EA Report on the BP exploration drilling assessment indicated that the “presence of the Inner Bay of Fundy Atlantic Salmon is considered to be unlikely” (IAAC 2020); therefore it has not been added to the revised table.

Table 4 Revised EA Table 4.8: Species at Risk listed under SARA and/or under Consideration by COSEWIC with Potential to Occur within the Study Area

Common Name	Scientific Name	SARA Schedule 1 Status	COSEWIC Designation
Marine Fish			
Acadian redfish (<u>Atlantic population</u>)	<i>Sebastes fasciatus</i>	Not Listed	Threatened
American eel	<i>Anguilla rostrata</i>	Not Listed	Threatened
American plaice (NL population)	<i>Hippoglossoides platessoides</i>	Not Listed	Threatened
Atlantic bluefin tuna	<i>Thunnus thynnus</i>	Not Listed	Endangered
Atlantic cod (NL population)	<i>Gadus morhua</i>	Not Listed	Endangered
Atlantic salmon (Outer Bay of Fundy)	<i>Salmo salar</i>	Not Listed	Endangered
Atlantic salmon (South Newfoundland population)	<i>Salmo salar</i>	Not Listed	Threatened
Atlantic salmon (Nova Scotia Southern Upland)	<i>Salmo salar</i>	Not Listed	Endangered
Atlantic salmon (Eastern Cape Breton)	<i>Salmo salar</i>	Not Listed	Endangered
Atlantic salmon (Gaspé-Southern Gulf of St. Lawrence)	<i>Salmo salar</i>	Not Listed	Special Concern
Atlantic salmon (Quebec Eastern North Shore population)	<i>Salmo salar</i>	Not Listed	Special Concern
Atlantic salmon (Quebec Western North Shore population)	<i>Salmo salar</i>	Not Listed	Special Concern
Atlantic salmon (Inner St. Lawrence population)	<i>Salmo salar</i>	Not Listed	Special Concern
Atlantic salmon (Anticosti Island population)	<i>Salmo salar</i>	Not Listed	Endangered
Atlantic wolffish	<i>Anarhichas lupus</i>	Special Concern	Special Concern
Basking shark (<u>Atlantic population</u>)	<i>Cetorhinus maximus</i>	Not Listed	Special Concern
Cusk	<i>Brosme brosme</i>	Not Listed	Endangered
Deepwater redfish (Northern population)	<i>Sebastes mentella</i>	Not Listed	Threatened

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Table 4 Revised EA Table 4.8: Species at Risk listed under SARA and/or under Consideration by COSEWIC with Potential to Occur within the Study Area

Common Name	Scientific Name	SARA Schedule 1 Status	COSEWIC Designation
<u>Lumpfish</u>	<i>Cyclopterus lumpus</i>	Not Listed	Threatened
Northern wolffish	<i>Anarhichas denticulatus</i>	Threatened	Threatened
Porbeagle shark	<i>Lamna nasus</i>	Not Listed	Endangered
Roundnose grenadier	<i>Coryphaenoides rupestris</i>	Not Listed	Endangered
Shortfin mako shark (Atlantic population)	<i>Isurus oxyrinchus</i>	Not Listed	Endangered
Smooth skate (Funk Island Deep Population)	<i>Malacoraja senta</i>	Not Listed	Endangered
<u>Spiny Dogfish (Atlantic population)</u>	<u><i>Squalus acanthias</i></u>	<u>Not Listed</u>	<u>Special Concern</u>
Spotted wolffish	<i>Anarhichas minor</i>	Threatened	Threatened
Thorny skate	<i>Amblyraja radiata</i>	Not Listed	Special Concern
White hake (Atlantic and Northern Gulf of St. Lawrence population)	<i>Urophycis tenuis</i>	Not Listed	Threatened
White shark (Atlantic population)	<i>Carcharodon carcharias</i>	Endangered	Endangered
Winter skate (Eastern Scotian Shelf – Newfoundland population)	<i>Leucoraja ocellata</i>	Not Listed	Endangered
Marine Mammals			
<u>Beluga whale (Ungava Bay population)</u>	<u><i>Delphinapterus leucas</i></u>	<u>Not Listed</u>	<u>Endangered</u>
Blue whale (Atlantic population)	<i>Balaenoptera musculus</i>	Endangered	Endangered
<u>Bowhead whale (Eastern Canada-Western Greenland population)</u>	<u><i>Balaena mysticetus</i></u>	<u>Not Listed</u>	<u>Special Concern</u>
Fin whale (Atlantic population)	<i>Balaenoptera physalus</i>	Special Concern	Special Concern
Harbour porpoise (Northwest Atlantic population)	<i>Phocoena phocoena</i>	Not Listed	Special Concern
Killer whale (Northwest Atlantic/Eastern Arctic population)	<i>Orcinus orca</i>	Not Listed	Special Concern
North Atlantic right whale	<i>Eubalaena glacialis</i>	Endangered	Endangered
Northern bottlenose whale (Scotian Shelf population)	<i>Hyperoodon ampullatus</i>	Endangered	Endangered
Northern bottlenose whale (Davis Strait-Baffin Bay-Labrador Sea population)	<i>Hyperoodon ampullatus</i>	Not Listed	Special Concern
Sei whale (Atlantic population)	<i>Balaenoptera borealis</i>	Not Listed	Endangered
Sowerby's beaked whale	<i>Mesoplodon bidens</i>	Special Concern	Special Concern
<u>Ringed seal</u>	<u><i>Pusa hispida</i></u>	<u>Not Listed</u>	<u>Special Concern</u>

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Table 4 Revised EA Table 4.8: Species at Risk listed under SARA and/or under Consideration by COSEWIC with Potential to Occur within the Study Area

Common Name	Scientific Name	SARA Schedule 1 Status	COSEWIC Designation
Sea Turtles			
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	Endangered
Loggerhead sea turtle	<i>Caretta caretta</i>	Endangered	Endangered
Marine Birds			
Ivory gull	<i>Pagophila eburnea</i>	Endangered	Endangered
Red-necked phalarope	<i>Phalaropus lobatus</i>	Special Concern	Special Concern
Ross's gull	<i>Rhodostethia rosea</i>	Threatened	Threatened

New References:

BHP Petroleum (New Ventures) Corporation. 2020. BHP Canada Exploration Drilling Project (2019-2028). Prepared for BHP by Stantec Consulting Ltd., Wood Environment & Infrastructure Solutions, and LGL limited, with the support of Canning and Pitt, RPS, JASCO Applied Sciences, Environmental Research Consulting, and Jay Hartling.

BP Canada Energy Group ULC. 2018. The Newfoundland Orphan Basin Exploration Drilling Program Environmental Impact Statement. Prepared by Stantec Consulting Ltd. Available at: <https://ceaaacee.gc.ca/050/documents/p80147/121406E.pdf>

DFO (Fisheries and Oceans Canada). 2013. Important Marine and Estuarine Habitat of Inner Bay of Fundy Atlantic Salmon. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2013/054. Available at: http://www.dfo-mpo.gc.ca/csas-sccs/Publications/SAR-AS/2013/2013_054-eng.html

DFO (Fisheries and Oceans Canada). 2016a. Updated information on fishing bycatch of Atlantic Salmon, Inner Bay of Fundy population, and its impact on the survival or recovery of this Atlantic Salmon designatable unit (DU). DFO Can. Sci. Advis. Sec. Sci. Resp. 2016/023. Available at: http://publications.gc.ca/collections/collection_2016/mpo-dfo/Fs70-7-2016-023-eng.pdf

IAAC (Impact Assessment Agency of Canada). 2020. Newfoundland Orphan Basin Exploration Drilling Project: Environmental Assessment Report. Available at: <https://iaac-aeic.gc.ca/050/documents/p80147/133806E.pdf>

Section 4.5 Species at Risk Table 4.9, pages 40-43 – Atlantic Salmon (Inner Bay of Fundy population) should be incorporated. For the North Atlantic Right Whale, a proposed Action Plan from 2020 is available. Population (Atlantic) should be noted for the Fin Whale. The Action Plan for the Scotian Shelf population of Northern Bottlenose Whale is not proposed. It should be explained why Northern Bottlenose Whales sighted in the Project Area are likely associated with the Davis Strait-Baffin Bay-Labrador Sea population. The proposed Recovery Strategy and associated critical habitat for Leatherback Sea Turtles is not publicly available and should not be discussed. An Action Plan for this species was released in 2020. Given the Endangered status of Loggerhead Sea Turtles, a Management Plan is not anticipated.

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BP Response

Revised EA Table 4.9 is provided as Table 5. Please refer to the preceding response regarding the presence of the Inner Bay of Fundy Atlantic Salmon.

The Scotian Shelf population of northern bottlenose whale is genetically distinct from the Davis Strait-Baffin Bay-Labrador Sea population; Dalebout et al. (2006, in DFO 2017) estimated fewer than two individuals move between the populations each generation. Recent genetic analysis of 128 individuals indicated that the Endangered Scotian Shelf population is distinct from the combined populations of Northern and Southern Labrador, Davis Strait, and Iceland, and a newly discovered group off Newfoundland (Feyrer et al. 2019). As there are currently only two recognized populations, it is assumed that the individuals in the Project Area are likely associated with the Davis Strait-Baffin Bay-Labrador Sea population.

Table 5 Revised EA Table 4.9: Distribution / Habitat / Ecology of SARA Schedule 1 Species at Risk that Could Potentially Occur in the Study Area

Species	Distribution / Habitat / Ecology
Marine Fish	
Atlantic wolffish (Special Concern)	<p>The Atlantic wolffish is widely distributed across the North Atlantic, with the centre of its western Atlantic distribution off the coast of northeast Newfoundland. Offshore Newfoundland, it is found in nearshore waters up to 918 m and is most frequently found in water depths of 150 to 350 m (DFO 2020). Unlike northern and spotted wolffish, it has been found in shallower waters on the southern Grand Banks (DFO 2020). Although larvae are pelagic, adult Atlantic wolffish are relatively sedentary. However, the species can conduct short (few km) seasonal migrations between offshore waters and shallow waters (<120 m deep) for spawning (which occurs in September) (COSEWIC 2012a; DFO 2020).</p> <p>A Management Plan has been finalized for the Atlantic wolffish (DFO 2020).</p>
Northern wolffish (Threatened)	<p>The northern wolffish inhabits boreal and subarctic waters on both sides of the North Atlantic and in the Arctic. It is most abundant on the shelf off northeastern Newfoundland and in the Labrador Sea, with highest densities at temperatures between 2°C and 5°C. While northern wolffish has been found in water depths ranging from 38 to 1,504 m, it is found mainly between 500 and 1,000 m water depth (COSEWIC 2012b). Critical habitat is thought to be at depths from 118 m to 636 m (DFO 2020). Spawning is thought to occur late in the year (COSEWIC 2012b).</p> <p>A Recovery Strategy has been finalized for the northern wolffish that includes designated critical habitat (DFO 2020). This critical habitat for northern wolffish overlaps with the Project Area and Study Area. This species is considered “data poor” in that basic life history information is only partially understood. For example, in the offshore, there is limited knowledge on what functional role specific habitat features play in supporting/maintaining the life cycle processes of northern wolffish (DFO 2020).</p>
Spotted wolffish (Threatened)	<p>Spotted wolffish are found on both sides of the North Atlantic and in the Arctic Ocean. They typically occupy water depths between 200 and 750 m on the continental shelf or in deep trenches. Mating likely occurs in the summer and fertilization is internal. Eggs are deposited on the bottom. Larvae are pelagic; juveniles and adults occupy bottom water (COSEWIC 2012c).</p> <p>A Recovery Strategy has been finalized for the spotted wolffish that includes designated critical habitat (DFO 2020). This critical habitat for spotted wolffish occurs within the Regional Area. Like northern wolffish, this species is considered “data poor” in that basic life history information is only partially understood (DFO 2020).</p>

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Table 5 Revised EA Table 4.9: Distribution / Habitat / Ecology of SARA Schedule 1 Species at Risk that Could Potentially Occur in the Study Area

Species	Distribution / Habitat / Ecology
White shark (Endangered)	The white shark is found in 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. Canadian waters represent the northern fringe of the white shark's range. In the water column it can be found from just below the surface to just above the bottom, down to depths of least 1,200 m. Possible white shark pupping areas in the Atlantic Ocean have been identified in the Mid-Atlantic Bight (COSEWIC 2006a). Ocearch (2019) has tagged several white sharks with satellite tags; while individual sharks travel to the Grand Banks and the Flemish Cap, they do not typically travel further north into the Orphan Basin.
Marine Mammals	
Blue whale (Endangered)	The blue whale is the largest animal on the planet and is found in all oceans of the world. Blue whales became severely depleted during industrial whaling and still occur at relatively low densities in the North Atlantic. It has been estimated that 400 to 600 whales may be found in the western North Atlantic (Waring et al. 2011). There are no sightings of blue whales in the Study Area based on the DFO sightings database (1947 to 2015). The latest proposed Action Plan for the Northwest Atlantic population of the blue whale (DFO 2018) recommends 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 Northwest Atlantic blue whale.
North Atlantic right whale (Endangered)	In the western North Atlantic, the right whale can be found from Florida to Newfoundland and the Gulf of St. Lawrence. Two-thirds of the North Atlantic population can be found on the Scotian Shelf and Bay of Fundy in summer and fall, with smaller numbers reported in the Gulf of St. Lawrence (COSEWIC 2013). In spite of being the first whale to receive total international protection from hunting in 1937, the population size of North Atlantic right whales remains low. The current best estimate is 451 animals and this number has been declining since 2010 (Pace et al. 2017; Pettis et al. 2017). Between June and September 2017, 12 dead North Atlantic right whales were reported in the Gulf of St. Lawrence. Necropsies were performed on seven of the whales and it was determined that the cause of death was blunt trauma in four instances and drowning as a result of entanglement in two instances. 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). The North Atlantic right whale would be considered a rare visitor to the Regional Area, with one recorded sighting of two individual right whales south of the Regional Area in the DFO sightings database near the Flemish Cap. A Recovery Strategy (DFO 2014) 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). <u>A proposed Action Plan has been released for the North Atlantic right whale (DFO 2020a).</u>
Fin whale (<u>Atlantic population</u>) (Special Concern)	Fin whales are found in all the oceans of the world, except the Arctic Ocean. Fin whales breed and calve in winter at lower latitudes (DFO 2017a). The North Atlantic population inhabits eastern Canadian coastal waters, mostly in summer (DFO 2017a). Fin whales are expected to be common throughout the Study Area and Regional Area, particularly between June and August. In 2017, DFO released a Management Plan for the fin whale (DFO 2017a).

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Table 5 Revised EA Table 4.9: Distribution / Habitat / Ecology of SARA Schedule 1 Species at Risk that Could Potentially Occur in the Study Area

Species	Distribution / Habitat / Ecology
<p>Northern bottlenose whale (Scotian Shelf population) (Endangered)</p>	<p>The northern bottlenose whale is found only in the North Atlantic, primarily in offshore waters. The Scotian Shelf population of northern bottlenose whale is the only endangered population. Individuals from this population are found regularly between the Gully, Shortland Canyon, and Haldimond Canyon offshore Nova Scotia (DFO 2016b).</p> <p>There have been sightings of northern bottlenose whale recorded in the Project Area in the DFO sightings database between May and September. 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 Study Area.</p> <p>A recovery strategy was amended for the Scotian Shelf population of northern bottlenose whale, updating critical habitat measures (DFO 2016b) and <u>an Action Plan has been posted (DFO 2017).</u></p>
<p>Sowerby's beaked whale (Special Concern)</p>	<p>To date, there is little information known on Sowerby's beaked whale in the waters of offshore NL. The majority of information that has been gathered is based on strandings records (Lien and Barry 1990, in Husky 2012). Sowerby's beaked whales are also relatively difficult to detect at sea due to their short surface durations, apparent offshore distribution, and barely detectable 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).</p> <p>There is one sighting of four Sowerby's beaked whales in the Regional Area in the DFO sightings database (Figure 4.3). The 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 NL (DFO 2017c). It is considered rare in the Study Area.</p> <p>In 2017, DFO released a management plan for Sowerby's beaked whale (DFO 2017c).</p>
<p>Sea Turtles</p>	
<p>Leatherback sea turtle (Endangered)</p>	<p>Leatherback turtles outfitted with satellite telemetry tags and vessel-based sightings have been 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). As of 2006, there were an estimated 34,000 to 94,000 adult leatherback sea turtles throughout the North Atlantic (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 anywhere throughout their range.</p> <p>The main threat facing leatherback sea turtles in Canadian waters is bycatch in fisheries, 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.</p> <p>There are no sightings of leatherback turtles within the Study Area and only one recorded sighting in the Regional Area (Figure 4.4). However, some leatherback sea turtles have been observed to the south and west of the Regional Area. Occurrence of leatherback sea turtles in the Study Area would be considered rare.</p> <p><u>An Action Plan has been released (DFO 2020b).</u></p>
<p>Loggerhead sea turtle (Endangered)</p>	<p>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/Study/Regional Area in the DFO</p>

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Table 5 Revised EA Table 4.9: Distribution / Habitat / Ecology of SARA Schedule 1 Species at Risk that Could Potentially Occur in the Study Area

Species	Distribution / Habitat / Ecology
	<p>sightings database. Occurrence of loggerhead sea turtles in the Project Area would be considered rare.</p> <p>A Recovery Strategy has been proposed for the loggerhead sea turtle (DFO 2020c).</p>
Marine and/or Migratory Birds	
<p>Ivory gull (Endangered)</p>	<p>Ivory gulls nesting in the Canadian Arctic and Greenland and fitted with satellite transmitters wintered from Baffin Bay to the Northeast Newfoundland Shelf (Gilg et al. 2010; Spencer et al. 2016). Individuals from those two nesting populations comprise most of the world's population, so this wintering area has global importance for this species. Ivory gulls were recorded twice during bird surveys at the Bay de Verde Wellsite in the winter of 2014-2015 (Statoil 2015). Ivory gull can be expected to occur in small numbers in the Regional Area during periods when sea ice is present (i.e., late winter and early spring). It probably occurs irregularly south of 50°N among the ice pack during heavier ice years.</p> <p>A Recovery Strategy (Environment Canada 2014) identified critical habitat for Ivory Gull at breeding colonies in Nunavut. Additional critical habitat is to be identified in a future Action Plan for the species.</p>
<p>Ross's gull (Threatened)</p>	<p>Ross's gulls nesting in the Canadian Arctic that have been tagged with geolocators and satellite transmitters have been tracked to a wintering area that reaches from the Labrador Sea to Orphan Basin (Maffei et al. 2015). As a result, this species may be expected to be present in very small numbers in the Regional Area during winter. This species is not likely to be encountered during Project activities due to the planned timing of the survey (May to October).</p> <p>A Recovery Strategy (Environment Canada 2007) has been prepared for this species, although critical habitat has not yet been identified.</p>
<p>Red-necked Phalarope (Special Concern)</p>	<p>Red-necked phalaropes occur in the pelagic waters of the Regional Area as migrants in passage between nesting grounds on the Arctic tundra and pelagic wintering areas in the tropics and sub-tropics. At sea, red-necked phalarope feed at the surface on zooplankton and are thought to forage primarily at ocean fronts bordered by upwelling (Rubega et al. 2000; Tracy et al. 2002).</p> <p>Phalaropes migrate in small flocks in low densities, and are often seen in flight, so they have not been recorded in Orphan Basin during surveys of seabirds at-sea in a sample sufficient to calculate densities (e.g., Moulton et al. 2006; Bolduc et al. 2018). However, they have been recorded off-transect in small numbers from mid-May to early June and during August and September in the Project Area (e.g., Moulton et al. 2006).</p>

New References:

BP Canada Energy Group ULC. 2018. The Newfoundland Orphan Basin Exploration Drilling Program Environmental Impact Statement. Prepared by Stantec Consulting Ltd. Available at: <https://ceaaacee.gc.ca/050/documents/p80147/121406E.pdf>

DFO (Fisheries and Oceans Canada). 2017. Action Plan for the Northern Bottlenose Whale (*Hyperoodon ampullatus*), Scotian Shelf population, in Atlantic Canadian waters. *Species at Risk Act* Action Plan Series. Fisheries and Oceans Canada, Ottawa, ON. iv + 37 pp.

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DFO (Fisheries and Oceans Canada). 2020a. Action Plan for the North Atlantic Right Whale (*Eubalaena glacialis*) in Canada [Proposed]. *Species at Risk Act* Action Plan Series. Fisheries and Oceans Canada, Ottawa, ON. v + 40 pp.

DFO (Fisheries and Oceans Canada). 2020b. Action Plan for the Leatherback Sea Turtle (*Dermochelys coriacea*), Atlantic population, in Canada. *Species at Risk Act* Action Plan Series. Fisheries and Oceans Canada, Ottawa, ON. iv + 28 p.

DFO (Fisheries and Oceans Canada). 2020c. Recovery Strategy for the Loggerhead Sea Turtle (*Caretta caretta*) in Canada [Proposed]. *Species at Risk Act* Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa, ON. vi + 35 pp.

Feyrer, L.J., P. Bentzen, H. Whitehead, I.G. Paterson and A. Einfeldt. 2019. Evolutionary impacts differ between two exploited populations of northern bottlenose whale (*Hyperoodon ampullatus*). *Ecology and Evolution*, 9(23): 13567-13584. <https://doi.org/10.1002/ece3.5813>

IAAC (Impact Assessment Agency of Canada). 2020. Newfoundland Orphan Basin Exploration Drilling Project: Environmental Assessment Report. Available at: <https://iaac-aeic.gc.ca/050/documents/p80147/133806E.pdf>

Section 4.6 Sensitive Areas, Table 4.10, page 45 – Missing from this table is Spotted Wolffish Critical Habitat. Although there is no overlap with the Project Area, there is overlap with the Study Area. Another column stating overlap or distance from Project Area to Sensitive Area would be beneficial. Funk Island Deep Closure is not number 10 (unlabeled in Figure 4.10).

Orphan Spur EBSA is number 10, which means all numbering downward needs to be changed. It appears that after number 10, the numbers in the table do not correspond to the labels in Figure 4.10. “Northeast Shelf and Slope” should be “Northeast Slope”. Bonavista Bay EBSA is missing (14 in Figure 4.10), as is Baccalieu Island EBSA (16 in Figure 4.10). Based on Figure 4.10, it appears that Small Gorgonian SBA overlaps the Project Area and should be bolded. Changes should be made elsewhere in the EA Report, as appropriate.

BP Response

Revised EA Table 4.10 is provided as Table 6. Revised EA Figure 4.10 is provided as Figure 1.

Table 6 **Revised EA Table 4.10: Sensitive Areas within or Adjacent to the Regional Area**

Number ¹	Name of Designated Sensitive Area	Category of Designation	<u>Distance to nearest edge of Project Area (km)</u>
1	Orphan Knoll	Convention on Biological Diversity (CBD) Identified EBSA	<u>128</u>
2	Seabird Foraging Zone in the Southern Labrador Sea	CBD Identified Environmentally or Biologically Significant Area (EBSA)	<u>395</u>

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Table 6 Revised EA Table 4.10: Sensitive Areas within or Adjacent to the Regional Area

Number¹	Name of Designated Sensitive Area	Category of Designation	<u>Distance to nearest edge of Project Area (km)</u>
3	Slopes of the Flemish Cap and Grand Bank	CBD Identified EBSA	<u>128</u>
4	Orphan Knoll	Northwest Atlantic Fisheries Organization (NAFO) Seamount Closure	<u>130</u>
5	Flemish Pass / Eastern Canyon	NAFO Sponge, Coral and Seapen Closure	<u>370</u>
6	Northwest Flemish Cap	NAFO Sponge, Coral and Seapen Closure	<u>404</u>
7	Sackville Spur	NAFO Sponge, Coral and Seapen Closure	<u>280</u>
8	Crab Exclusion Zone	Exclusion	<u>128</u>
9	Northeast Newfoundland Slope	Marine Refuge	<u>overlap</u>
10	Orphan Spur	DFO EBSA	<u>overlap</u>
<u>11</u>	Northeast Slope	DFO EBSA	<u>92.5</u>
<u>12</u>	Notre Dame Channel	DFO EBSA	<u>146</u>
<u>13</u>	Fogo Shelf	DFO EBSA	<u>191</u>
<u>14</u>	Bonavista Bay	<u>EBSA</u>	<u>229</u>
<u>15</u>	Smith Sound	DFO EBSA	<u>280</u>
<u>16</u>	Baccalieu Island	<u>EBSA</u>	<u>219</u>
<u>17</u>	Eastern Avalon	DFO EBSA	<u>301</u>
<u>18</u>	Lobster Closure Area	Marine Refuge	<u>328</u>
<u>19</u>	Eastport Marine Protected Area	Marine Protected Area	<u>279</u>
<u>20</u>	Eastport Migratory Bird Sanctuary	Migratory Bird Sanctuary	<u>298</u>
<u>21</u>	Sea Pen Significant Benthic Area (SBA)	SBA	<u>overlap</u>
<u>22</u>	Small Gorgonian SBA	SBA	<u>overlap</u>
<u>23</u>	Large Gorgonian SBA	SBA	<u>138</u>
<u>24</u>	Funk Island Deep	<u>Marine Refuge</u>	<u>147</u>
<u>25</u>	<u>Candidate Representative Marine Area</u>	<u>Possible site for National Marine Conservation Area</u>	<u>318</u>
n/a²	Northern Wolffish Critical Habitat	SARA-designated Critical Habitat	<u>overlap</u>
n/a²	Southern Wolffish Critical Habitat	SARA-designated Critical Habitat	<u>1.8</u>

¹Refer to Figure 1 below (Revised EA Figure 4.10)
²Refer to EA Figure 4.9
 Note: Bolded entries indicate intersection with Project Area.

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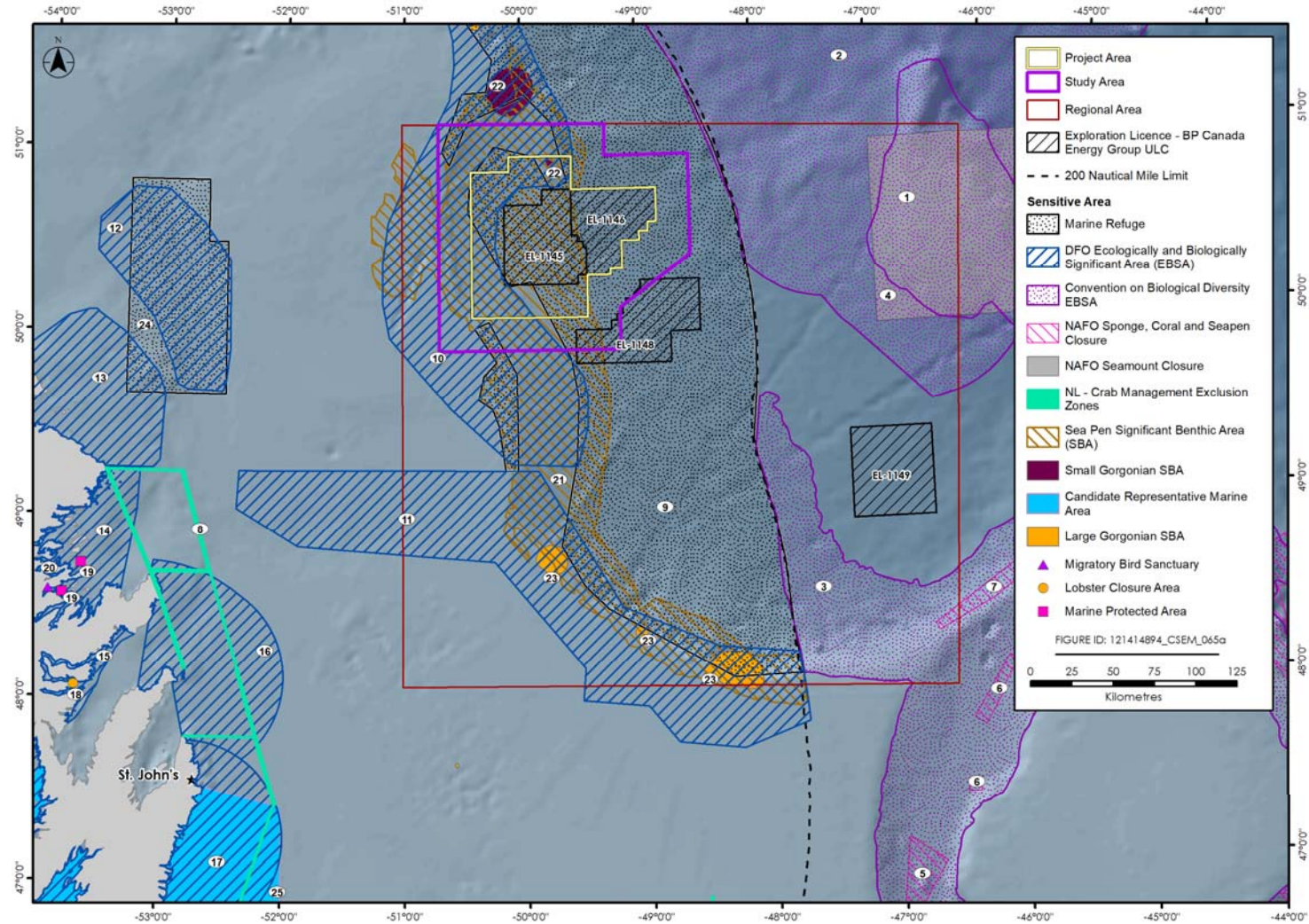


Figure 1 Note: Refer to Table 6 above for key.
Revised EA Figure 4.10: Sensitive Areas

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Section 4.6 Sensitive Areas, Figure 4.10, page 46 – The bright blue delineation in the bottom- left corner does not appear in the legend (or Table 4.10). The transit route and associated zone of influence should be drawn.

BP Response

Revised EA Figure 4.10 is provided as Figure 1. The bright blue delineation in the bottom- left corner is a Candidate Representative Marine Area; no Project interactions are predicted. The scope of the Project to be assessed does not include vessel transit to/from the Project Area. As stated in Section 2.2, page 5, there is only one planned trip to and from the Project Area from the selected shorebase (not yet chosen). As the shorebase has not been selected, the specific route to and from the Project Area is unknown. The vessel will travel approximately 22 km/h (12 knots) on average during transit and will take the most efficient route from the shorebase to the Project Area.

Section 4.6 Sensitive Areas, page 47, final paragraph – Are there other sensitive areas that could intersect the potential transit route?

BP Response

As stated above, the scope of the Project to be assessed does not include vessel transit to/from the Project Area and a single return trip of the survey vessel is not predicted to have adverse effects on sensitive areas in the Regional Area. This approach is consistent with other recent survey EAs for which vessel transit is not a regular activity (LGL 2014; EMGS 2017; BHP 2019; BP 2019).

New References:

BHP Petroleum (New Ventures) Corporation. 2019. BHP Canada Exploration Drilling Project EL 1157 and 1158 Seabed Survey Environmental Assessment. Prepared by Stantec Consulting Ltd. for BHP Petroleum (New Ventures) Corporation, St. John's, NL. iv + 64 pp.

BP Canada Energy Group ULC. 2019. Ephesus Prospect ROV Survey (2019-2024): Environmental Assessment Report. Prepared by Stantec Consulting Ltd. for BP Canada Energy Group ULC. iii + 58 pp.

EMGS (Electromagnetic Geoservices Canada, Inc.). 2017. Western Newfoundland 2017 Controlled Source Electromagnetic (CSEM) Survey– Environmental Assessment. Prepared by Stantec Consulting Ltd. for Electromagnetic Geoservices Canada, Inc. 228 pp.

LGL Limited. 2014. Environmental Assessment East Canada CSEM Survey, 2014-2018. LGL Rep. SA1248. Rep. by LGL Limited, St. John's, NL for Electromagnetic Geoservices Canada (Operator) (EMGS), Vancouver, BC. 192 pp. + Appendices.

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Section 4.7 Fisheries and Other Ocean Users, page 47, paragraph 2, sentence 4 – Is “35” meant to be “3K”?

BP Response

“Unit Area 35” should be “Unit Area 3K”. The sentence is revised as follows:

“Redfish in Unit Area 3K is co-managed by NAFO and the Northeast Atlantic Fisheries Commission.”

Section 4.7 Fisheries and Other Ocean Users, page 48, final paragraph – It is not clear how the statement “within the Project Area, domestic commercial fishing activity appears to be focused primarily on Greenland halibut, along with northern shrimp and snow crab, as shown in Table 4.11” is derived from Table 4.11.

BP Response

This sentence is incorrect and should read: “Within the Project Area, domestic commercial fishing activity appears to be focused primarily on Greenland halibut and other groundfish species such as roughhead grenadier, redfish, witch flounder and Atlantic halibut”. While northern shrimp and snow crab have been harvested within the study area between 2013 and 2017, it is not a common occurrence and major fishing grounds for these species are located outside the Project Area.

Section 4.7 Fisheries and Other Ocean Users, Figure 4.15, page 53 – It is not clear how Figure 4.15 differs from Figure 4.11.

BP Response

Figure 4.11 and 4.15 are duplicate figures. Figure 4.15 should be ignored. Both figures show commercial fishing harvest activity for all species from May-October from 2013-2017. Figure 4.11 caption should read: “Figure 4.11 Domestic Harvesting Locations, All Species (May to October 2013 to 2017)”.

Section 4.7.3 Other Ocean Users, pages 57-60 – A depiction of shipping traffic could be useful.

BP Response

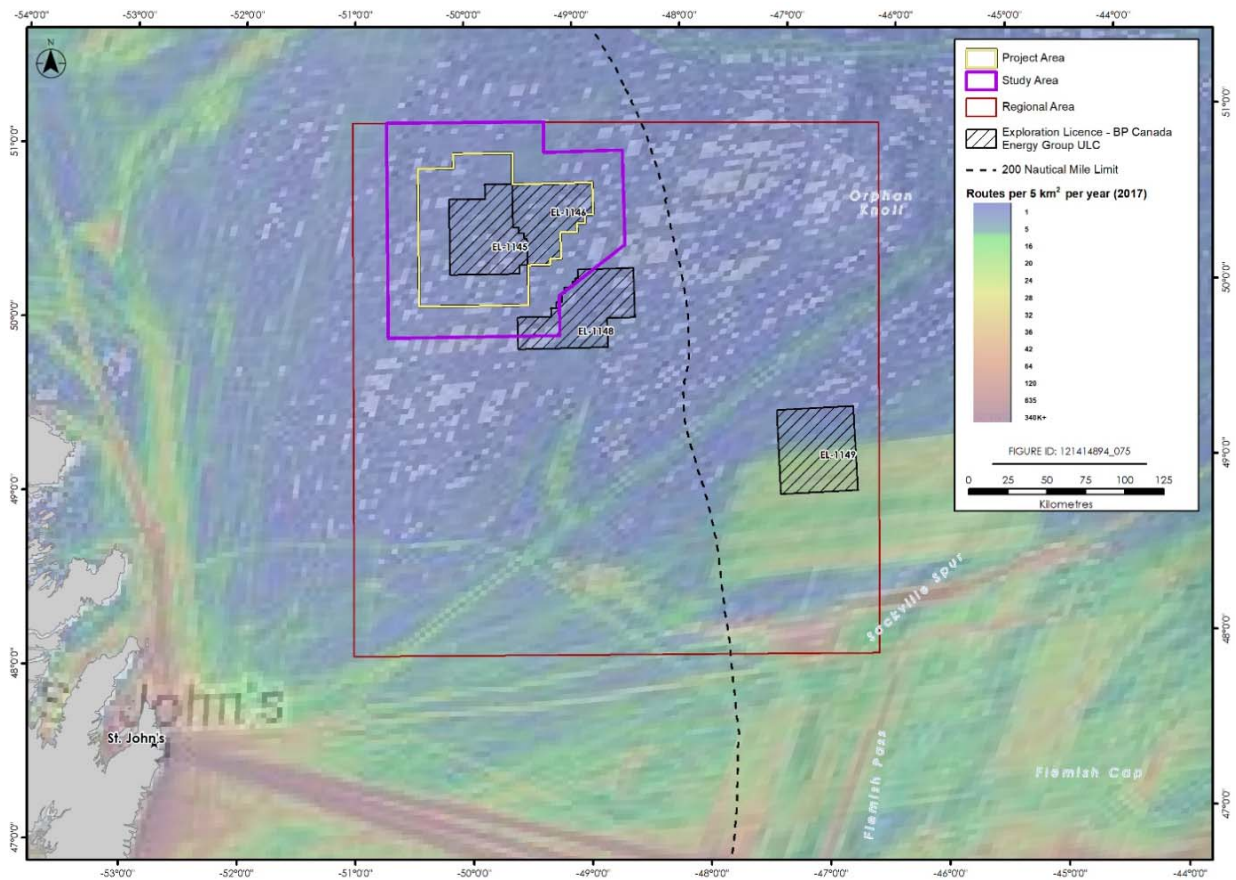
A yearly composite of the shipping traffic from Marine Traffic for 2017 is shown in Figure 2. The Project Area has low shipping traffic and is not on a major shipping route.

New Reference:

Marine Traffic. 2019. Density Maps. Available at: <https://www.marinetraffic.com/en/ais/home/centerx:-49.5/centery:46.8/zoom:7>.

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Source: Marine Traffic 2019

Figure 2 Common Vessel Traffic Routes in Offshore Newfoundland and Labrador

Section 5.1 Spatial and Temporal Boundaries, page 61, paragraph 1, sentence 2 – The ELs referenced are incorrect.

BP Response

ELs 1155 and 1156 were referenced in error. Section 5.1, Paragraph 1, sentence 2 is revised as follows: “Survey locations would be primarily contained within ELs 1145 and 1146, although Project Area boundaries have been extended to account for survey vessel turning movements”.

Section 5.2 Selection of Valued Components, Table 5.1, page 62 – For Marine Fish and Shellfish, why is only essential habitat considered?

BP Response

All fish habitat was considered in the assessment. Revised Table 5.1 is provided as Table 7.

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Table 7 Revised Table 3.1 Selection of VCs

VC	VC Rationale
Marine Fish and Shellfish	<p>Marine Fish and Shellfish includes fish and invertebrates (including corals and sponges) as well as <u>habitat</u> (including spawning, feeding, overwintering) that may be affected by Project activities.</p> <p>Marine Fish and Shellfish was selected as a VC in consideration of the ecological value provided to marine ecosystems, the socio-economic and cultural importance of fisheries resources, the potential for interactions with Project activities, regulatory considerations, and requirements in the Scoping Document.</p>
Marine Mammals and Sea Turtles	<p>The Marine Mammal and Sea Turtle VC includes baleen whales, toothed whales, dolphins, porpoises, seals, and sea turtles that could potentially be affected by Project activities.</p> <p>Marine mammals and sea turtles were selected as a VC in recognition of important habitat for these species in the offshore waters of NL, the cultural and recreational value placed on these species by Indigenous peoples and the general public, the potential vulnerability of marine mammals to underwater sound and vessel movement, regulatory considerations, and requirements in the Scoping Document.</p>
Marine and/or Migratory Birds	<p>Marine and/or Migratory Birds includes oceanic, neritic and littoral zone seabirds, waterfowl, loons, grebes, and shorebirds protected under the <i>Migratory Birds Convention Act, 1994</i> (MBCA) and additional marine-associated birds not protected under the MBCA (i.e., cormorants).</p> <p>Marine and/or Migratory Birds was selected as a VC due to their ecological value to marine and coastal ecosystems, the economic and cultural importance of recreational and subsistence hunts, vulnerability to artificial light attraction, vulnerability to oil on water, regulatory considerations, and requirements in the Scoping Document.</p>
Species at Risk	<p>The Species at Risk VC includes species listed on Schedule 1 of SARA and species assessed as at risk by the COSEWIC. There are various fish, bird, mammal, and sea turtle species at risk that could occur in the Regional Area and potentially be affected by Project activities. Critical habitat has been designated for the northern and spotted wolffish on the Northern Grand Banks (refer to Figure 4.9 which shows a small portion of the Project Area overlapping with northern wolffish critical habitat).</p> <p>Species at Risk were selected as a VC in recognition of their ecological value to marine ecosystems, vulnerability to disturbance, regulatory considerations, and requirements in the Scoping Document.</p>
Sensitive Areas	<p>The Sensitive Areas VC includes areas designated as being of special interest due to their ecological and/or conservation value. This VC includes but is not limited to protected areas designated under federal legislation (e.g., <i>Oceans Act, Fisheries Act</i>) as well as EBSAs. Of particular relevance to this VC is the Northeast Newfoundland Slope closure, which is a marine refuge closed to bottom contact fishing to protect corals and sponges and overlaps the Project Area. Additional sensitive areas which overlap with the Project Area include a Significant Benthic Area for sea pens, the Orphan Spur EBSA and critical habitat for northern wolffish.</p>
Fisheries and Other Ocean Users	<p>Fisheries and Other Ocean Users is considered a VC because of the commercial and cultural importance fishing has for the province of NL, and the importance of other ocean activities such as offshore research, subsea communications, military training, and shipping activities that occur in offshore waters.</p>

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Section 6.1 Marine Fish and Shellfish, page 66, paragraph 1 – Recommend using exact wording from the Fisheries Act.

BP Response

The text is revised as follows:

As defined under the *Fisheries Act*, “fish includes (a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals” while “fish habitat means water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas”. This VC considers relevant fish species, plankton, algae, benthos, and relative components of their habitat, such as water and sediment quality. Fish species at risk are considered under Section 6.4. Other marine animals (marine mammals and sea turtles) are addressed in Section 6.2. Although the effects assessment in this section considers the potential environmental effects on fisheries resources, the potential environmental effects on fisheries are assessed separately in Section 6.6.

Section 6.1.3 Mitigation, page 66, bullet 3 – What will occur for depths < 500 m? Are there any shut-down protocols? For the time elapsed since the last sighting prior to the start of ramp-up, why is 20 minutes being used instead of 30 minutes? How will observations of animals be made? These questions also apply to Marine Mammals and Sea Turtles (Section 6.2.3) and Species at Risk (Section 6.4.3).

BP Response

The minimum water depth where the electromagnetic source would be activated for the survey is >500 m (the approximate water depth over most of the proposed survey area is 1,350 m). The electromagnetic source will be turned off when data are not being collected (e.g., during vessel turns). Mitigation procedures with respect to ramp-up and shutdown of the electromagnetic source are revised as follows:

The electromagnetic source will be ramped up over a 20-minute period. Regardless of water depth, the electromagnetic source will not be initiated if a shark, marine mammal, or sea turtle is observed 30 minutes prior to ramp-up within a 500 m safety zone. Ramp-up will not occur until the animal has moved beyond the 500 m zone or 30 minutes have elapsed since the last sighting. These ramp-up procedures will be directed by visual observations made by the seabird and marine mammal observer. If a SARA-listed species is observed within 500 m of the energy source, the electromagnetic source will be shut down, with operations resuming as per the ramp-up procedures noted above.

Section 6.1.3 Mitigation, page 66, bullet 5 – Will any mitigation measures be implemented to prevent effects on the benthic species and habitat from sand anchors (e.g., surveys to identify placement locations)? Also see comment for Section 6.1.4.3 below.

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BP Response

No mitigation will be implemented to prevent effects on benthic species and habitat from sand anchors. Deployment of the receivers to the seafloor may result in temporary, localized effects on the benthic habitat and result in injury or mortality to benthic species (including corals and sponges) within a limited footprint. Considering there will be up to approximately 100 receivers, there could be up to approximately 75 m² of benthic habitat that would be temporarily disturbed and within which benthic species could be crushed or smothered. It is recognized that the Project Area is located within a Significant Benthic Area for sea pens and that other corals and sponges may also occur within the Project Area, any of which could potentially be injured or killed as a result of deployment of receivers (and associated and anchors) on the sea floor. While there may be an abundance of sea pens in the region, the predicted disturbed area from receiver deployment on the sea pen population is low and effects are predicted to be temporary (with disturbed areas recolonized from adjacent areas).

Section 6.1.4.1 Survey Vessel Operation, page 67 – Discharges are noted as potentially having effects, yet they are not discussed. Include discussion of potential effects from discharges.

BP Response

While there will be interactions between discharges of sanitary and domestic waste from the survey vessel and fish and fish habitat, marine birds, marine mammals and sea turtles, special areas, and commercial fisheries, the volumes will be relatively small and discharges will adhere to current waste discharge regulations (e.g., International Convention for the Prevention of Pollution from Ships [MARPOL]). As such, discharges will be treated prior to release and will undergo rapid dispersal, thereby limiting potential effects of any interactions to the immediate area of the discharge point. Hazardous waste will be stored and returned to shore for disposal by a licensed waste handler. Residual environmental effects from vessel-related waste are considered negligible and therefore not significant.

Section 6.1.4.3 Receiver Deployment and Retrieval, page 68 – It should be mentioned that deployed anchors may crush and/or kill sensitive corals, sponges, or other benthic species. Potential effects on benthic organisms should be described. Will any mitigation measures be implemented to prevent damage or destruction of sensitive benthic species?

BP Response

Deployment of the receivers to the seafloor may result in temporary, localized effects on the benthic habitat and result in injury or mortality to benthic species (including corals and sponges) within a limited footprint. Considering there will be up to approximately 100 receivers, there could be up to approximately 75 m² of benthic habitat that would be temporarily disturbed and within which benthic species could be crushed or smothered. It is recognized that the Project Area is located within a Significant Benthic Area for sea pens and that other corals and sponges may also occur within the Project Area, any of which could potentially be injured or killed as a result of deployment of receivers (and associated and anchors) on the sea floor. While there may be an abundance of sea pens in the region, the predicted disturbed area from receiver deployment on the sea pen population is low and

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effects are predicted to be temporary (with disturbed areas recolonized from individuals from adjacent areas). No mitigation will be implemented to prevent effects on benthic species and habitat from sand anchors.

Section 6.2.2, page 69 – A brief description as to why light and discharges are not anticipated to affect marine mammals and sea turtles would be useful.

BP Response

Light would not have a direct effect on marine mammals and sea turtles as it would only penetrate a few metres into the water column, but may attract some prey species at night. This would be very localized effect and could have a minor indirect positive effect on marine mammals and sea turtles. White light from the towfish will be generated at depth (metres above the substrate) but any effect on receptors would be temporary and transient as the light is towed through the water column.

While there will be interactions between discharges of sanitary and domestic waste from the survey vessel and marine mammals and sea turtles, the volumes will be relatively small and discharges will adhere to current waste discharge regulations (e.g., MARPOL). As such, applicable discharges will be treated prior to release and will undergo rapid dispersal, thereby limiting potential effects of any interactions to the immediate area of the discharge point. Hazardous waste will be stored and returned to shore for disposal by a licensed waste handler. Residual environmental effects from vessel-related waste are considered negligible and therefore not significant.

Section 6.2.4.1 Survey Vessel Operation, page 71, paragraph 1, final sentence – What is the anticipated attenuation of sound?

BP Response

A survey vessel would generate sound levels similar to fishing or support vessels operating in the region. The highest sound level produced would be when the vessel is using dynamic positioning and thrusters for station keeping (e.g., while deploying or retrieving receivers). Sound generated by a survey vessel is typically of low frequency (e.g., 1 to 500 Hz), ranging from 170 to 185 decibel (dB) root mean square (rms) re 1 μ Pa @ 1 m (Electromagnetic Geoservices Canada, Inc. 2017; Matthews et al. 2018). An acoustic assessment conducted for the Newfoundland Orphan Basin Exploration Drilling Program modelled transmission loss for a semi-submersible drill rig, drillship, and a support vessel in EL 1145 and predicted sound level from a support vessel would experience a 20 dB transmission loss in less than 0.02 km from the sound source and a 80 dB transmission loss in approximately 38 km to 50 km from the sound source (Matthews et al. 2018).

New References:

Electromagnetic Geoservices Canada, Inc. 2017. Western Newfoundland 2017 Controlled Source Electromagnetic (CSEM) Survey– Environmental Assessment. Prepared by Stantec Consulting Ltd.

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Matthews, M-N, T.J. Deveau, C. Whitt, and B. Martin. 2018. Underwater Sound Assessment for Newfoundland Orphan Basin Exploration Drilling Program. Document 01592, Version 4.0. Technical report by JASCO Applied Sciences for Stantec.

Section 6.2.4.1 Survey Vessel Operation, page 71, paragraph 3, sentence 2 – The Proponent notes that there are results for gray and humpback whales, but does not present the results.

BP Response

The text is revised as follows:

Reactions of gray and humpback whales to vessels have been studied (see Richardson et al. 1995 and Southall et al. 2007 for reviews), with both displaying behavioural responses from single airguns at 140-180 dB sound pressure level.

Section 6.4 Species at Risk, page 78, paragraph 2, sentence 1 – Roughhead Grenadier is not a species at risk and should be removed.

BP Response

The sentence is revised as follows:

The potential for occurrence of marine fish species at risk in the Project Area ranges from migratory / transient to high, with deepwater redfish, northern wolffish, and roundnose grenadier having the highest potential for occurrence in the Project Area.

Section 6.4.4.1 Survey Vessel Operation – Marine Fish Species at Risk, pages 79-80 – Population should be noted for White Shark when discussing its status under the SARA. This comment may apply to other species and other portions of the EA Report. Given that light and discharges are noted in 6.1.4.1, their effects should be discussed in 6.4.4.1.

BP Response

Refer to Table 4 (revised EA Table 4.8) where populations are listed; when referring to species at risk in the text we are referring to the populations in this table.

As noted in Section 6.1.4.1, effects from artificial lighting are expected to be temporary in any one location and expected to attenuate quickly. Effects of lighting on species at risk are predicted to be negligible.

With respect to effluent discharges from the survey vessel, the volumes will be relatively small and discharges will adhere to current waste discharge regulations (e.g., MARPOL). As such, applicable discharges will be treated prior to release and will undergo rapid dispersal, thereby limiting potential effects of any interactions to the immediate area of the discharge point. Residual environmental effects from vessel-related discharges are considered negligible for species at risk and therefore not significant.

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Section 6.5.4.1 Survey Vessel Operation, page 84 – Is light expected to have any effect on sensitive areas? Justification should be provided for the statement “although sound and emissions associated with Project activities are not expected to affect these sensitive areas to the extent that the ecological value of the sensitive area and the functions it provides would be compromised”.

BP Response

Most of the special areas that overlap with the Project / Study Areas are designated due to their benthic habitat (i.e., Northeast Newfoundland Slope, Sea Pen Significant Benthic Area (SBA), and Small Gorgonian SBA) and are at water depths that light from the survey vessel will not reach (i.e., northern wolffish critical habitat and Orphan Spur [which extends from 400 m to 2,000 m depth]). Light from vessel not expected to reach beyond a few metres deep into the water column.

Operation of the survey vessel would result in a temporary, localized increase in underwater sound levels. The potential for masking of marine mammal calls and/or important environmental cues is considered limited from survey vessels given the relatively low source level and attenuation of sound to levels below measured ambient levels in the region (BP 2018). Marine mammals show variable behavioural responses to vessel sounds and typically, avoidance of vessels is localized and temporary. Recent modelling (Alavizadeh and Deveau 2019) indicates that marine mammals may exhibit avoidance behaviour of sound generated by supply vessels at distances ranging from approximately 3 to 6 km.

New References:

Alavizadeh, Z. and T.J. Deveau. 2019. 2019 BHP Exploration Drilling in the Orphan Basin: Underwater Sound Modelling Report. Document 01832, Version 3.0. Technical report by JASCO Applied Sciences for Stantec Consulting Ltd.

BP Canada Energy Group ULC. 2018. The Newfoundland Orphan Basin Exploration Drilling Program Environmental Impact Statement. Prepared by Stantec Consulting Ltd. Available at: <https://ceaaacee.gc.ca/050/documents/p80147/121406E.pdf>

Section 6.6.2 Project Interactions, page 86 – Why aren't light, sound and discharges described as potential project interactions for fisheries and other ocean users?

BP Response

Light, sound and discharges are considered as indirect potential Project interactions as they could have an impact on specific fish species. Indirect Project interactions for Fisheries and Other Ocean Users are covered in EA Section 6.1 (Marine Fish and Shellfish [Page 66]), which discusses light, sound, and discharges and determined that any potential effects would be negligible to low in magnitude. In consideration of the nature and duration of Project activities and implementation of proposed mitigation measures, adverse residual environmental effects of the light, sound and discharges on Fisheries and Other Ocean Users are predicted to be not significant.

4.0 FISH, FOOD & ALLIED WORKERS (FFAW)

It would be useful if the mapping done for this project EA delineated the Northeast Slope Marine Refuge with fixed gear fishing activity. Fixed gear fishing for turbot (Greenland turbot) occurs mostly along the shelf-break and is not permitted with the refuge. The seasonality varies from year to year but this fishery can occur from June to October. This wasn't clear in the document. Depending on the exact location of this project there may need to be some considerations taken for the turns of the project vessel. Deployment of a Fisheries Liaison Officer for the project will help communication at-sea as well as in the event of other possible activity in the refuge.

BP Response:

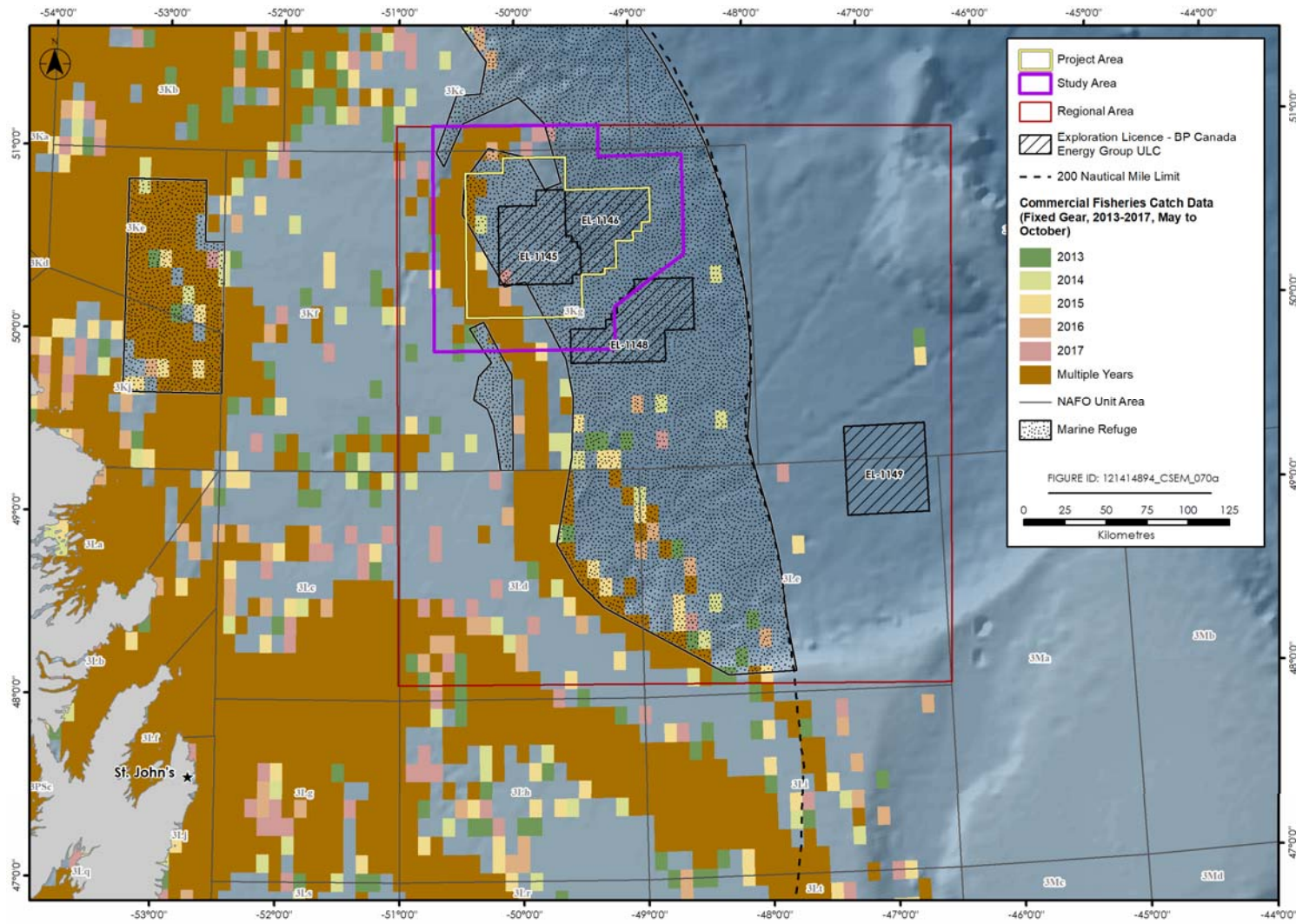
EA Figure 4.14 indicates the seasonality of commercial fishing activity in the Project Area using fixed gear, which does indicate that groundfish are harvested from June to September (based on DFO data from 2013 to 2017).

Overlap of the marine refuge with fixed gear fishing activity (2013-2017) is shown in Figure 3. The shape of the Project Area accounts for the size, shape, and location of the proposed survey grid. The focus of the survey will be on EL 1145, although survey lines could extend into 1146. The Project Area extends beyond EL 1145 to account for vessel turning movements. The areas of high activity along the shelf break will continue to be active fishing locations for groundfish species.

As indicated in Sections 2.4.1, 6.6.3, and 6.6.4.1, and Chapter 10, the vessel will have a fisheries liaison officer.

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Source: DFO 2018b

Figure 3 Fixed Gear Domestic Harvesting Locations, All Species, 2013 to 2017