



Newfoundland Orphan Basin Exploration Drilling Program

Project Description Summary

Submitted by:
BP Canada Energy Group ULC

Prepared with the assistance of:
Stantec Consulting Ltd.

January 2018

Table of Contents

1	Introduction.....	1
1.1	Project Context and Objectives.....	1
1.2	Proponent Information.....	1
1.3	Regulatory Context.....	3
2	Project Description.....	5
2.1	Project Location.....	5
2.2	Project Components and Activities	6
2.3	Emissions, Discharges and Waste Management.....	9
2.4	Project Schedule.....	12
2.5	Potential Accidental Events	13
3	Environmental Setting	14
3.1	Physical Environment	14
3.2	Biological Environment.....	15
3.3	Human Environment.....	19
3.4	Existing Environmental Studies	24
4	Consultation and Engagement	26
4.1	Indigenous Engagement.....	26
4.2	Stakeholder Engagement.....	28
5	Potential Project-Related Changes to the Environment and Scoping Considerations	30
5.1	Routine Project Activities.....	30
5.2	Non-routine Project Activities.....	33
5.3	Scoping Considerations.....	36
6	References.....	38

List of Tables

Table 1	Project Area Coordinates	6
Table 2	Species of Conservation Interest with Potential to Occur in the Project Area and in Surrounding Areas	15
Table 3	Commercial Communal Fishing Licenses Issued in the Project Area and Surrounding Areas (NAFO Unit Areas 3KLM).....	22
Table 4	New Brunswick / Nova Scotia / Prince Edward Island / Quebec Indigenous Groups with FSC Fisheries Rights and/or and Commercial Communal Swordfish Licences.....	22
Table 5	Potential Environmental Interactions with Routine Project Activities	30
Table 6	Potential Environmental Interactions with Accidents and Malfunctions during Project Activities	34

List of Figures

Figure 1	Project Area Location	2
Figure 2	Schematic of Semi-submersible and Drillship.....	6
Figure 3	Initial Drilling Sequence	8
Figure 4	Special Areas in the Eastern Newfoundland Offshore Area	18
Figure 5	Commercial Fishing Activity in the Project Area and Surrounding Areas	20
Figure 6	Indigenous Communities in Newfoundland and Labrador.....	21

List of Acronyms

ADW	Approval to Drill a Well
BOP	blowout preventer
BP	BP Canada Energy Group ULC
CEA Agency	Canadian Environmental Assessment Agency
CEAA, 2012	<i>Canadian Environmental Assessment Act, 2012</i>
C-NLOPB	Canada-Newfoundland and Labrador Offshore Petroleum Board
CNSOPB	Canada-Nova Scotia Offshore Petroleum Board
CO	carbon monoxide
CO ₂	carbon dioxide
CO ₂ e	carbon dioxide equivalent
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
DP	dynamic positioning
EA	environmental assessment
EBSA	Ecologically and Biologically Significant Areas
ECCC	Environment and Climate Change Canada
EEZ	Exclusive Economic Zone
EIS	Environmental Impact Statement
EL	Exploration Licence
FSC	food, social and ceremonial
GHG	greenhouse gas
km	kilometres
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
MARPOL	International Convention for the Prevention of Pollution from Ships
MCPEI	Mi'kmaq Confederacy of Prince Edward Island
MFN	Miawpukek First Nation
MMS	Mi'gmawei Mawiomi Secretariat
MODU	mobile offshore drilling unit
MTI	Mi'gmawe'l Tplu'tagann Inc.
NAFO	North Atlantic Fisheries Organization
NB	New Brunswick
NEB	National Energy Board
NGO	non-governmental organization
NL	Newfoundland and Labrador

nm	nautical mile
NO _x	nitrogen oxides
NRCan	Natural Resources Canada
NS	Nova Scotia
OA	Operations Authorization
OWTG	Offshore Waste Treatment Guidelines
P&A	plugged and abandoned
PEI	Prince Edward Island
PM	particulate matter
PSV	platform supply vessel
QC	Quebec
QMFNB	Qalipu Mi'kmaq First Nation Band
ROV	remotely operated vehicle
SAR	species at risk
SARA	<i>Species at Risk Act</i>
SBM	synthetic-based mud
SO ₂	sulphur dioxide
SOCC	species of conservation concern
VSP	vertical seismic profiling
WBM	water-based mud
WNNB	Wolastoqey Nation of New Brunswick

1 Introduction

BP Canada Energy Group ULC (BP) is proposing to conduct an exploration drilling program on Exploration Licences (ELs) 1145, 1146, 1148, and 1149 in the Orphan Basin located between 270 and 470 km east of the Island of Newfoundland, Canada (the Newfoundland Orphan Basin Exploration Drilling Program; the Project; refer to Figure 1). The Project may involve drilling up to 20 exploration wells over the term of the ELs (2017 to 2026), with an initial well proposed to be drilled in 2019 or 2020, pending regulatory approval.

Offshore exploration drilling, under certain circumstances, is a designated activity under the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). A Project Description was submitted to the Canadian Environmental Assessment Agency (CEA Agency) to determine the requirement for an environmental assessment (EA) process under CEAA 2012. The CEA Agency is required to consult the public on a summary of the Project Description that is posted on the Canadian Environmental Assessment Registry (CEAR) internet site. This Project Description Summary provides an overview of the information required under sections 1 to 19 of the *Prescribed Information for the Description of a Designated Project Regulations* under CEAA 2012.

1.1 Project Context and Objectives

On November 9, 2016, the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) announced BP and its co-venturers had been awarded exploration rights to ELs 1145, 1146, 1148, and 1149 with a work expenditure bid of \$425,805,000. The term of these ELs extends from January 15, 2017, to January 15, 2026. The issuance of an EL confers the exclusive right to drill and test for petroleum within the EL. BP is required to drill one exploratory well on or before the expiry date of the first term (January 15, 2023) of each licence as a condition to maintaining tenure of the ELs for the second term.

BP shares ELs 1145, 1146, and 1148 with co-venturers Hess Canada Oil and Gas ULC and Noble Energy Canada ULC, and EL 1149 with Noble Energy Canada ULC. BP will serve as the operator for the drilling program. BP is proposing the exploration program to determine the presence, nature, and quantities of the potential hydrocarbon resource and to help BP fulfil its work expenditure commitments over the term of the licences.

1.2 Proponent Information

BP is a global energy company, operating in almost 80 countries around the world with well-established operations in Europe, North and South America, Australasia, Asia, and Africa. BP has decades of experience managing the extraction of oil and natural gas in all types of environments around the world, both onshore and offshore. In Canada, BP focuses on developing energy from Canada's oil sands and is also pursuing offshore opportunities in Newfoundland and Labrador and Nova Scotia.

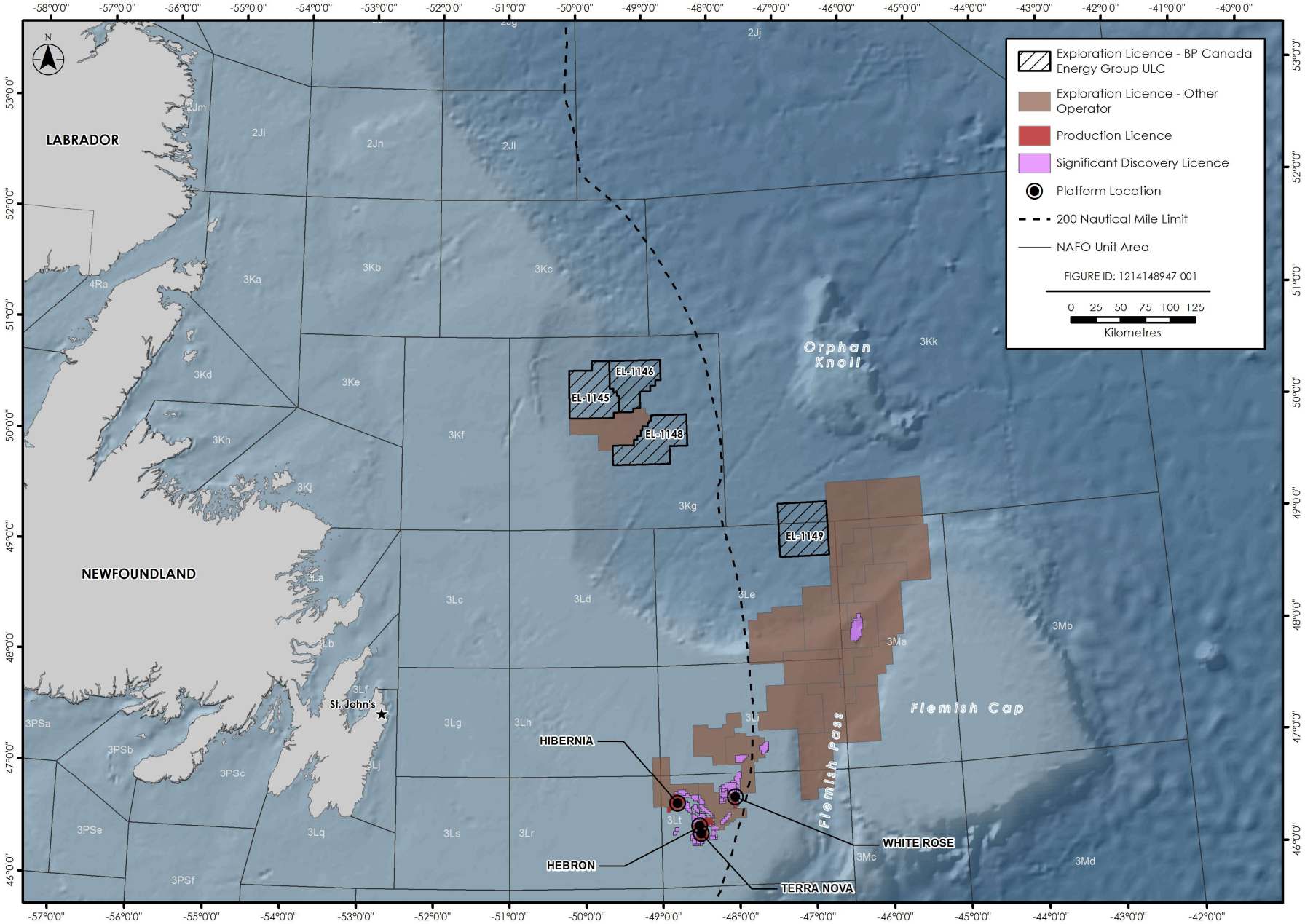


Figure 1 Project Area Location

BP has established an office in Halifax, Nova Scotia, to oversee its planned deep-water exploration drilling offshore Nova Scotia. The proposed Scotian Basin Exploration Drilling Project involves drilling an initial well in Q2 of 2018, pending regulatory approval. BP intends to establish a physical presence in St. John's, Newfoundland ahead of and during the proposed drilling program, although preliminary planning is being conducted by BP staff based primarily in Halifax, with technical resources drawn from BP's Canadian headquarters in Calgary, Alberta, and BP's global operations in the United Kingdom and Houston, Texas.

All communications regarding the environmental assessment for the Project should be directed to the following contacts:

BP Canada Energy Group ULC

Newfoundland Orphan Basin Exploration Drilling Program

Anita Perry
Regional Manager, Atlantic Canada
VP Communications and External Affairs Canada
Tel: (902) 420-2338
anita.perry@bp.com

BP Canada Energy Group ULC
10th floor, Founders Square
1701 Hollis Street
Halifax, NS B3J 3M8
Canada

Heather Giddens
Environmental Impact Assessment Advisor
Tel: (902) 420-2332
heather.giddens@bp.com

BP Canada Energy Group ULC
10th floor, Founders Square
1701 Hollis Street
Halifax, NS B3J 3M8
Canada

1.3 Regulatory Context

1.3.1 Accord Acts

Petroleum activities in the Newfoundland and Labrador (NL) offshore area are regulated by the C-NLOPB, a joint federal-provincial agency reporting to the federal and provincial Ministers of Natural Resources. In 1986, the Government of Canada and the Province of Newfoundland and Labrador signed the Canada-Newfoundland and Labrador Offshore Petroleum Resource Accord to promote social and economic benefits associated with petroleum exploitation. The federal and provincial governments established mirror legislation to implement the Accord. The *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* are collectively referred to as the Accord Acts.

Offshore petroleum activities and the C-NLOPB's decision-making processes are governed by a variety of legislation, regulations, guidelines, and memoranda of understanding. Exploration drilling programs require an Operations Authorization (OA) under the Accord Acts. For each well

in the drilling program, a separate Approval to Drill a Well (ADW) is required. This authorization process involves specific details about the drilling program and well design.

There are several regulations under the Accord Acts which govern specific exploration or development activities. There are also various guidelines, some of which have been jointly developed with the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) and National Energy Board (NEB), which are intended to address environmental, health, safety and economic aspects of offshore petroleum exploration and development activities. Of particular relevance to the EA of this Project are the Drilling and Production Guidelines (C-NLOPB and CNSOPB 2017), the Offshore Waste Treatment Guidelines (OWTG) (NEB et al. 2010) and the Offshore Chemical Selection Guidelines for Drilling and Production Activities on Frontier Lands (NEB et al. 2009).

1.3.2 Environmental Assessment

Offshore exploration drilling, under certain circumstances, is a designated physical activity subject to the requirements of the CEAA 2012 in certain cases. Section 10 of the *Regulations Designating Physical Activities under CEAA 2012* includes:

The drilling, testing and abandonment of offshore exploratory wells in the first drilling program in an area set out in one or more exploration licences issued in accordance with the Canada-Newfoundland Atlantic Accord Implementation Act or the Canada-Nova Scotia Petroleum Resources Accord Implementation Act.

The Project will constitute the first drilling, testing, and abandonment of offshore exploratory wells within the ELs issued to BP by the C-NLOPB. Following submission of the Project Description document, the CEA Agency will conduct a screening process and determine the requirement for an EA under CEAA 2012. Should a federal EA process be required under CEAA 2012, it is expected that an Environmental Impact Statement (EIS) will be required and that the EIS will also satisfy the C-NLOPB requirements for an EA as part of the OA review process under the Accord Acts. Should a federal EA process not be required under CEAA 2012, BP will still prepare an EA Report to satisfy C-NLOPB requirements as part of the OA review process.

1.3.3 Other Regulatory Requirements and Interests

As defined by the Accord Acts, the Newfoundland and Labrador offshore area regulated by the C-NLOPB includes the greater of lands within Canada's 200 nautical mile (nm) Exclusive Economic Zone (EEZ) or to the edge of the continental margin. CEAA 2012 defines federal lands as those lands which include the continental shelf of Canada. Therefore, the Project will be carried out on federal lands under the jurisdiction of the C-NLOPB. There is no federal funding involved in this Project.

In addition to the OA and ADW from the C-NLOPB pursuant to the Accord Acts, and EA approval under CEAA 2012 (if required), the Project is subject to various federal legislative and regulatory requirements, including:

- *Canada Shipping Act*
- *Canadian Environmental Protection Act, 1999*

- *Fisheries Act*
- *Migratory Birds Convention Act, 1994*
- *Species at Risk Act* (SARA)
- *Navigation Protection Act*

A Migratory Bird Handling Permit will likely be required from Environment and Climate Change Canada (ECCC) to permit the salvage of stranded birds on offshore vessels during the Project.

A provincial EA under the *Environmental Protection Act* is not anticipated to be required based on the proposed Project scope. BP will not be constructing onshore facilities as part of the Project. No provincial or municipal permits are currently anticipated to be required for the Project, including for the onshore supply base which will be sited at an existing facility. An existing third-party operator of the supply base will be responsible for obtaining any necessary approvals for the supply base that are not already in place.

2 Project Description

2.1 Project Location

BP proposes to drill up to 20 exploration wells on ELs 1145, 1146, 1148, and 1149 during the term of the ELs. The ELs are located in the Grand Banks Region, with ELs 1145, 1146 and 1148 located in the West Orphan Basin within Canada's 200 nm EEZ, and EL 1149 located in the East Orphan Basin, beyond the EEZ. Water depths in these ELs range from 1,000 m to 3,000 m. Specific well sites are not yet known but drilling operations will be conducted within the defined boundaries of ELs 1145, 1146, 1148 or 1149. The ELs are approximately 350 km from St. John's; the nearest community is Elliston (approximately 280 km), on the Bonavista Peninsula. The nearest "residences" to the Project Area would be the SeaRose floating, production, storage, and offloading vessel at Husky's White Rose oil development field, approximately 250 km from EL 1149.

A Project Area has been proposed which encompasses the four ELs and incorporates an approximate 20 km buffer. The EIS (if required under CEAA 2012) would define study area boundaries that will extend beyond the Project Area based on potential environmental interactions with routine and unplanned Project activities and in recognition of potential cumulative effects. Further direction on setting spatial boundaries may be provided in the EIS Guidelines, should it be determined that a federal EA process under CEAA 2012 is required. The Project Area is shown on Figure 1; Project Area coordinates are provided in Table 1.

There are no zoning designations that apply to the Project Area. The Project will not take place on lands that have been subject to a regional study as described in Sections 73-77 of CEAA 2012; however, the Project Area falls within the study area for the Eastern Newfoundland Strategic Environmental Assessment completed by the C-NLOPB in August 2014 (AMEC 2014) (refer to Figure 1).

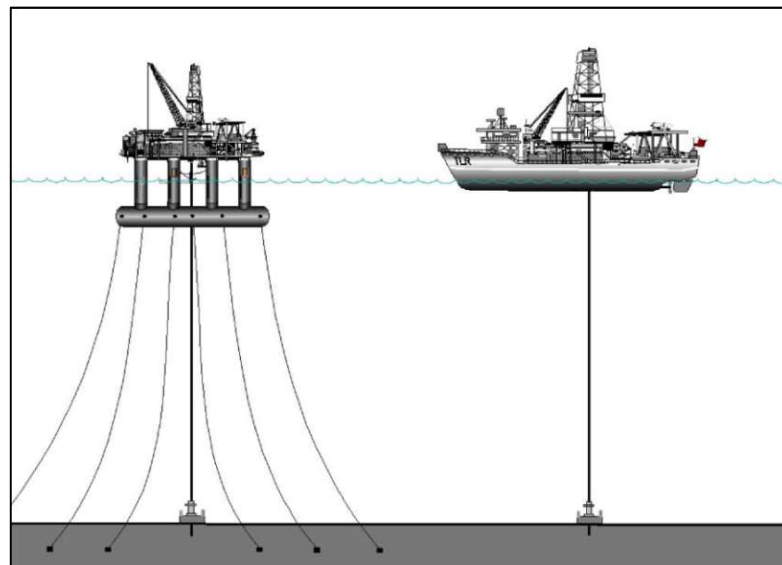
Table 1 Project Area Coordinates

Vertex Label	WGS 84		NAD83 UTM ZONE22N	
	X	Y	X	Y
A	50° 25' 55.634" W	50° 57' 47.150" N	539879.34	5645874.69
B	48° 33' 55.067" W	50° 57' 47.112" N	670967.10	5648542.28
C	46° 17' 33.285" W	49° 35' 59.349" N	840097.99	5504788.98
D	46° 19' 24.131" W	48° 46' 12.260" N	843582.30	5412452.89
E	47° 32' 58.040" W	48° 46' 12.260" N	753521.20	5407640.85
F	49° 49' 41.068" W	49° 39' 12.035" N	584589.89	5500748.33
G	50° 25' 55.634" W	50° 5' 12.038" N	540624.92	5548422.36

2.2 Project Components and Activities

2.2.1 Drilling

Wells will be drilled using either a semi-submersible rig or a drillship, referred to generically as a mobile offshore drilling unit (MODU). A semi-submersible rig would either be moored in position over the drilling site, or, as more likely for this drilling program, maintained on station by dynamic positioning (DP). A drillship would maintain its position by DP. The standard mooring technique for a semi-submersible is an eight-point spread mooring arrangement using a combination of wire rope, chains, and anchors. The anchors are set in a pre-determined pattern using an anchor handling offshore vessel. In the DP mode, a semi-submersible or drillship maintains position using thrusters positioned on the hulls, which are controlled by a computerized positioning system. Figure 2 shows a schematic of a semi-submersible rig using mooring (rather than DP) and a drillship for comparison purposes.



Source: Adapted from MMS 2000

Figure 2 Schematic of Semi-submersible and Drillship

Prior to drilling, proposed wellsite locations are surveyed, generally using a remotely operated vehicle (ROV) to inspect the seabed for potential hazards and sensitive habitat (e.g., habitat-forming corals).

The drilling of an offshore well can be broken down into two phases: riserless drilling and riser drilling. Drilling fluid can be a water-based mud (WBM) or synthetic-based mud (SBM) suspension of clays and is used in well drilling to help equalize pressure, keep the drill bit cool, and flush out cuttings from the wellbore. The initial (i.e., surface) sections are normally drilled without a riser system, which serves as a conduit to bring mud and cuttings back to the MODU in a closed loop system. These “riserless” sections are drilled using a WBM, with mud and cuttings returned to the seabed as permitted by the OWTG.

The well design has not yet been completed. In general, following the drilling of the initial sections, the drill string (assembly of drill pipes) is removed and a steel casing is cemented into place to prevent the wall of the well from caving in and prevent seepage of muds and other fluids. The casing also provides adequate pressure integrity to allow a blowout preventer (BOP) and riser system to be installed. The BOP is a critical piece of safety equipment which, in the event of an emergency or equipment failure, allows the wellbore to be closed, thereby preventing hydrocarbons from escaping the wellbore into the environment.

Once a riser system has been installed, the deeper (lower hole) sections of the wells may be drilled with SBM. The riser returns mud and cuttings to the drilling vessel in a closed loop system for treatment prior to disposal to the seabed in accordance with the OWTG. More information on the management of drilling waste is provided in Section 2.3.3. An unplanned or planned side-track (i.e., drilling a second wellbore away from an original wellbore) may be drilled to meet the Project objectives. Figure 3 presents a schematic demonstrating the initial drilling sequence of a well.

BP proposes to commence drilling in 2019 or 2020, pending regulatory approval. Depending on the results of the initial well, up to 20 wells may be drilled over the term of the ELs. It is anticipated that it will take approximately 60 days to drill each well.

2.2.2 Vertical Seismic Profiling

Following the drilling of each well to its target depth (where hydrocarbon reservoirs are predicted to be located), vertical seismic profiling (VSP) is conducted to obtain accurate “time to depth ties” which allows the correlation of seismic data (which is recorded in time measurements) to well depth (recorded in metres). VSP operations involve deploying an acoustic sound source from the drilling or support vessel, while several receivers are positioned at different levels within the drilled hole to measure the travel time.

Typically, between three and six sound sources are used, with a volume of 150 to 250 cubic inches each, although larger source arrays could include up to 12 sound sources. These sound sources are generally positioned at 5 to 10 m water depth. VSP operations are typically of short duration, taking approximately one to three days to complete for each well. Specific details of the VSP program will depend on the geological target and the objectives of the VSP operation.

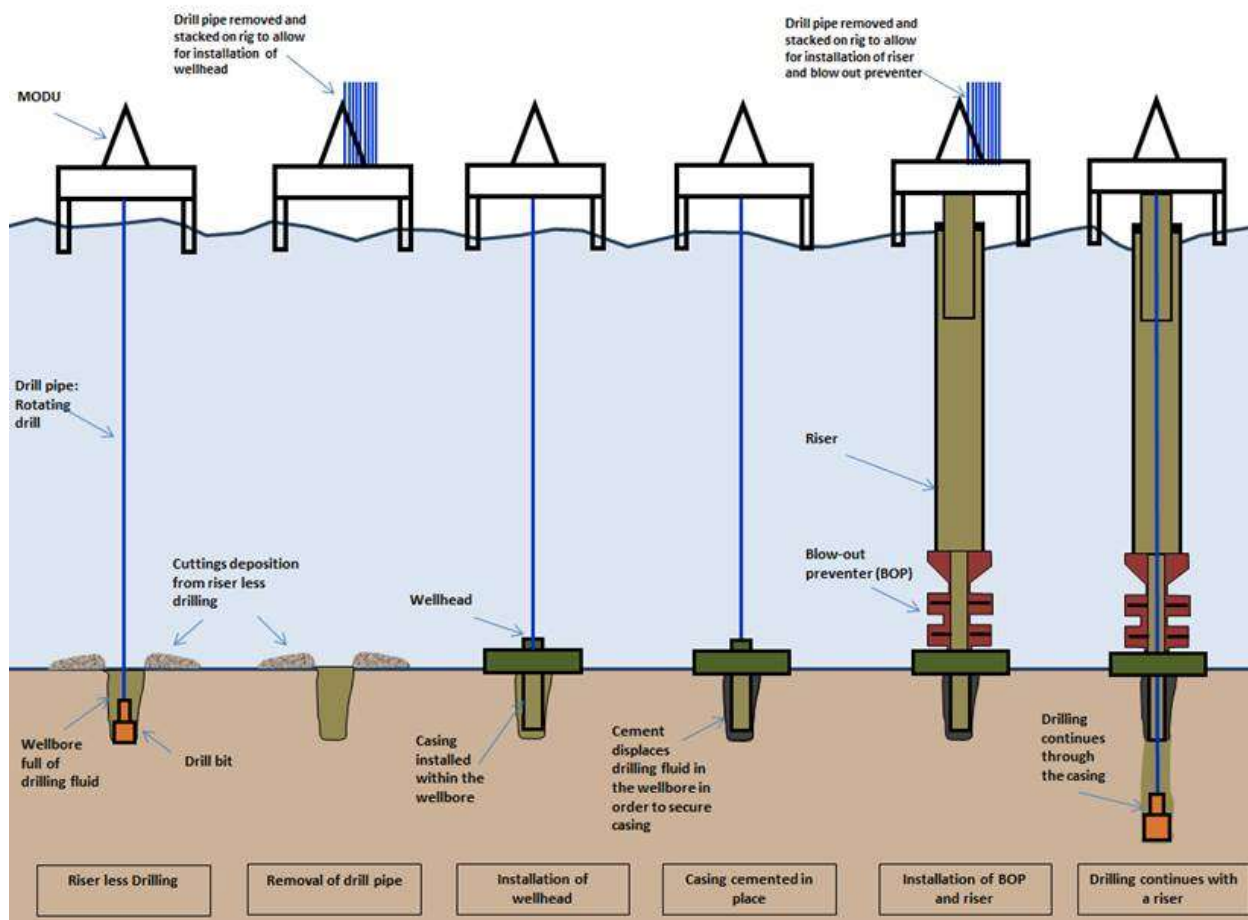


Figure 3 Initial Drilling Sequence

2.2.3 Well Evaluation and Testing

If exploration drilling results indicate the potential presence of hydrocarbons, the well will be evaluated and possibly tested to provide further information to help determine the viability of a prospect and commercial potential of the reservoir. In line with industry practice, well flow testing involves flowing the well fluids through temporary test equipment located on the drilling vessel, and requires flaring of gases or other hydrocarbons that come to surface for safe disposal. It is anticipated that testing would occur over a one to three-month period after drilling is complete. As part of any well test program, there are likely to be separate periods of flaring which may comprise the following activities:

- Several main flow test periods each involving an approximate 24 hours of flaring for any one period
- Other flaring periods for operational purposes including flushing and/or bleeding off surface equipment (these periods are likely to last between one and six hours each and the flow rates during these periods are expected to be small)

2.2.4 Well Abandonment

All wells drilled in the drilling campaign will likely be permanently plugged and abandoned (P&A) after completion of data acquisition and evaluation programs, in accordance with BP recommended practice and any applicable regulations. Depending on the results of the well, it may be suspended and re-entered for additional data acquisition and evaluation before final P&A. Suspension and P&A procedures are designed to isolate the well and prevent the release of wellbore fluids to the marine environment.

P&A operations involve setting a series of cement and mechanical plugs within the wellbore, including plugs above any hydrocarbon bearing intervals, at appropriate barrier depths in the well and at the surface. A seabed survey is typically conducted for each well using an ROV to survey the seabed for debris.

2.2.5 Supply and Servicing

Offshore drilling operations will be supported by logistics arrangements for supply and servicing activity. Such arrangements will allow the transportation and movement of equipment and personnel between the MODU and land, and will allow sufficient stocks of equipment and supplies to be maintained for reliable, ongoing drilling operations. Existing facilities in eastern Newfoundland will be used for supply, support, and logistical functions. These shore-based facilities are owned and operated by independent third-party service providers and currently service multiple operators and their activities. They are also certified as compliant port facilities under the *Marine Transportation Security Act*. Third-party services and support will be procured through a competitive bid process in accordance with the requirements of the Accord Acts. The Project will not require the development of new infrastructure or any upgrades to existing facilities to support Project operations. Third-party service providers will be responsible for maintaining applicable regulatory approvals to operate their facilities.

It is likely that two to three platform supply vessels (PSVs) will be required, with one vessel on stand-by at the MODU at all times. It is estimated that the PSVs will make a total of two to three round trips per week between the MODU and the supply base during the course of drilling each well. Existing shipping lanes will be used as available and practicable to reduce incremental marine disturbance. Where these do not exist, PSVs will follow a straight-line approach to and from port to the Project Area.

Aircraft (helicopter) support for the Project will be based at the St. John's International Airport. Helicopters will be used for crew changes on a routine basis and to support medical evacuation from the MODU and search and rescue activities in the area if required. It is estimated that approximately two helicopter trips per day may be required to transfer crew and any supplies not carried by the PSV to the MODU. The MODU will be equipped with a helideck for safe landings.

2.3 Emissions, Discharges and Waste Management

Efforts will be made to reduce waste emissions and discharges generated during the Project. All waste generated will be managed and disposed according to regulatory requirements and applicable guidelines. Offshore waste discharges will be managed in compliance with the

International Convention for the Prevention of Pollution from Ships (MARPOL) and/or the OWTG, as applicable. Wastes brought to shore for disposal will be managed in accordance with the Newfoundland and Labrador Waste Management Strategy and other applicable regulatory requirements (including municipal by-laws). A Waste Management Plan will be prepared as part of the OA application process with the C-NLOPB prior to drilling operations. The following subsections provide a general description of typical wastes to be generated over the course of Project activities and how these wastes will be managed.

2.3.1 Atmospheric Emissions

Atmospheric emissions expected to be associated with Project activities are primarily related to the combustion of marine fuel by the drilling vessel and PSVs. Emissions are also associated with short-term flaring during well testing, if testing is performed. These emissions will include carbon monoxide (CO), carbon dioxide (CO₂), sulphur dioxide (SO₂), nitrogen oxides (NO_x), and particulate matter (PM). BP will comply with the provincial *Air Pollution Control Regulations, Ambient Air Quality Objectives* under the *Canadian Environmental Protection Act*, regulations under MARPOL and the intent of the Global Gas Flaring Reduction Partnership (which seeks to increase the use of associated natural gas and thus reduce flaring and venting).

With respect to greenhouse gas (GHG) emissions, it is estimated that there could be approximately 300 tonnes of carbon dioxide equivalent (CO₂e) emissions associated with operational drilling and vessel traffic per day or approximately 18,000 tonnes CO₂e per well, assuming a 60-day drilling program. Assuming that there could be between zero to three wells drilled per year over the term of the ELs, annual GHG emissions resulting from the Project are estimated to be up to approximately 54,000 tonnes CO₂e. These emissions represent 1.10% of the total reported provincial GHG emissions for 2015 (4,924,713 tonnes CO₂e) and 0.01% of the national emissions (264,163,368 tonnes CO₂e) (ECCC 2017). If well flow testing is conducted, flaring will result in additional GHG emissions. Assuming approximately four well flow testing events over the life of the Project (one target tested per EL), it is estimated that an additional 17,448 tonnes of CO₂e could be emitted.

Artificial light emissions associated with the Project include navigation and deck lighting from the MODU and PSVs. Artificial lighting will be reduced to the extent that it does not affect worker and vessel safety. In the event of flaring during well testing, there will be temporary (e.g., up to two or three days) light and thermal emissions associated with the flare.

Atmospheric sound will be generated by the MODU, PSVs, and helicopter traffic. However, there is limited predicted interaction with human receptors given the distance of the MODU offshore and that the PSVs and helicopter will operate out of existing port and airport facilities. The sound generated by Project traffic will be comparable to existing vessel and helicopter traffic. Underwater sound is discussed below.

2.3.2 Underwater Sound

Underwater sound is generated by the MODU and PSVs as well as during VSP operations. The level of underwater sound generated by a drilling vessel is influenced by the type of drilling vessel (e.g., semi-submersible versus drillship) and method of positioning on station (e.g., use of thrusters for dynamic positions versus anchoring). Underwater sound associated with the MODU is continuous during a drilling program. Underwater sound generated during VSP operations is impulsive, with higher sound level pulses occurring over of a much shorter duration (up to approximately three days, depending on the VSP method selected).

2.3.3 Drilling Waste

The initial (i.e., surface) sections are normally drilled riserless with WBM, with mud and cuttings returned to the seabed where they will accumulate near the wellhead. The discharge of WBM cuttings at the seabed, while drilling the first two hole sections is accepted as industry standard practice and is consistent with the OWTG. Spent and excess WBM may be discharged from the drilling vessel without treatment as per the OWTG. The deeper (lower hole) sections of the wells will likely be drilled with SBM. The marine riser located between the BOP and the drilling vessel acts as a conduit for the return of drilling mud and cuttings back to the drilling vessel for treatment prior to disposal to the seabed in accordance with the OWTG.

On the drilling vessel, the drilled cuttings and drilling mud are separated and cleaned using solids control equipment. The mud returns carrying the drilled cuttings initially pass through a shale shaker where the majority of mud is separated from the cuttings. Where SBM is used, cuttings from the shale shaker pass through a cuttings dryer, which removes SBM from cuttings. Residual synthetics-on-cuttings discharged to the marine environment is treated in accordance with the OWTG prior to discharge. Monitoring of the residual base mud-on-cuttings levels is carried out during well sections involving use of SBM. After recovery and treatment of drill muds, the drill cuttings are discharged from the drilling vessel at the well site. No surplus SBM is discharged to the sea; spent SBM that cannot be reused during drilling is brought to shore for disposal in an approved licensed facility.

The extent of drilling discharge deposition can only be predicted accurately through a drilling discharge dispersion modelling exercise, which will be carried out as part of the EIS. The zone of deposition would depend on the particle size distribution in the discharge stream, water depth, and currents. The depositional thickness will vary by water depth and is likely to be greater during the riserless drilling associated with the upper well section as WBM cuttings are released directly at the seafloor, which limits the likelihood of cuttings distribution through the water column.

Cement is used to set the well casing strings during drilling. Prior to installation of the riser package (e.g., during drilling of the conductor and surface holes), surplus cement is discharged at the seafloor. Following installation of the riser, surplus cement is brought to shore for disposal in an approved facility.

If a well test is deemed necessary, the wellbore fluids (gas and liquid phases) will be managed in accordance with industry standard practice and any applicable regulations.

2.3.4 Liquid Discharges

A number of liquid wastes could be generated from the MODU and/or the PSVs including:

- Produced water
- Bilge and deck drainage water
- Ballast water
- Grey/black water (sewage)
- Cooling water
- Well treatment fluids
- Fire control testing water
- BOP fluid

The OWTG contain performance targets for each of these discharges, including in some cases, required sampling and analysis prior to ocean discharge. Where discharges occur offshore, the points of discharge will be below the water surface. Liquid discharges that do not meet OWTG performance targets for ocean disposal are transported to shore for disposal at an approved licensed disposal facility.

2.3.5 Hazardous and Non-Hazardous Solid Wastes

Hazardous and non-hazardous solid wastes will also be generated by Project activities. Food wastes will be macerated in accordance with the OWTG prior to discharge at sea (below the water surface). All other solid waste generated offshore will be transported to shore for appropriate treatment and/or disposal in accordance with applicable regulations and municipal by-laws. Non-hazardous wastes may include domestic waste, scrap metal, recyclables, and other miscellaneous non-hazardous wastes. Hazardous wastes (including waste dangerous goods) could include oily waste (filters, rags, waste oil), waste chemicals and containers, batteries, and biomedical waste.

BP will retain a third-party licensed waste management contractor to manage and dispose of wastes transported onshore. Hazardous wastes will be disposed of at approved facilities in compliance with applicable regulations and approvals.

2.4 Project Schedule

BP proposes to commence exploration drilling with an initial well in 2019 or 2020 pending regulatory approval to proceed. Up to 20 exploration wells could be drilled over the term of the ELs (2017 to 2026), contingent on the drilling results of the initial well. Drilling activities will not be continuous and will be in part determined by rig availability and previous well results. It is anticipated that each well will take approximately 60 days to drill.

BP's preference is to conduct drilling between May and October, although the EIS (if required under CEAA 2012) will assume year-round drilling. VSP operations will take approximately one to three days per well and well testing, where required, would occur over a one to three-month period. Well abandonment will likely be conducted following drilling and/or well flow testing. Wells may be designed for suspension and re-entry but this will be determined through further prospect evaluation.

2.5 Potential Accidental Events

BP uses a systematic process to identify and manage potential risks and unplanned events that could occur during its global activities. Multiple preventative and response barriers are put in place to manage risk, both in terms of the incident arising in the first place, and to mitigate and respond to incidents to manage potential consequences. Potential accidental events that could occur during exploration drilling and potentially result in a release to the environment, include vessel collision, dropped objects, loss of well control (e.g., blowout), and spills and releases from MODU or PSVs. If an EA under CEAA 2012 is required for the Project, the EIS will include detailed information about accidental event scenarios and spill prevention and response measures. Spill trajectory modelling will be conducted to inform the assessment of environmental effects associated with hydrocarbon releases.

3 Environmental Setting

3.1 Physical Environment

The geology of the Eastern Newfoundland offshore area is complex and dynamic, and the current bedrock and surficial characteristics of the area have been shaped by various natural and human factors and processes over time (AMEC 2014). A combination of rifting and salt tectonics in the area created a series of Mesozoic rift basins. The main sedimentary basins in the area include the Orphan, Flemish Pass, Jeanne d'Arc, and Carson basins (Fader et al. 1989).

The topography of Orphan Basin and surrounding areas consists of at least four distinct types, including the eastern portion of the northeast Newfoundland Shelf (depths ≤ 200 m), the northeast Newfoundland Shelf Slope (depths >200 to $2,000$ m), the Orphan Basin proper (depths $2,000$ to $>3,000$ m), and the Flemish Pass (depths >1000 m) (LGL Limited 2003a, in LGL Limited 2011a). Surficial sediment in this area ranges from fine muds and clays to extremely coarse boulders and bedrock (LGL Limited 2011a).

The climate of the Project Area is dynamic and is largely controlled by the passage of high and low circulation systems. There is a prevailing westerly flow, typical of the upper layers of the atmosphere in the mid-latitudes, due to the normal tropical to polar temperature gradient (LGL Limited 2011a). The mean strength of this westerly flow is stronger in winter months than during the summer months (LGL Limited 2011a). The area between the northern Grand Banks and the Orphan Knoll experiences weather conditions typical of a marine climate, including reduced visibilities, low cloud heights, and substantial amounts of precipitation (LGL Limited 2011a). In the Orphan Basin, most of the observed precipitation events are in the form of rain and snow, while other precipitation types, such as mixed rain and snow, freezing rain, and hail, occur far less frequently (AMEC 2014).

The Orphan Basin and Grand Bank areas experience seasonal sea or pack ice from January to April, with the maximum southern extent occurring from February to the middle of March (AMEC 2014). The Flemish Pass and Tail of the Grand Banks areas rarely experience sea ice (typically one or two weeks in mid-March when it is present) (LGL 2010; AMEC 2014). Icebergs can occur in the Orphan Basin, Grand Bank, and Flemish Pass areas from February to July, especially in the region nearest the Grand Banks (AMEC 2014); large icebergs are rarely seen in the Tail of the Grand Banks area (LGL 2010).

Air quality within the Project Area, and in surrounding areas, is anticipated to be good, with occasional exposure to exhaust products from PSVs, other marine traffic, helicopters, and existing offshore oil production facilities in the Jeanne d'Arc Basin (Hibernia, Terra Nova, White Rose, and Hebron). The general area also receives long-range contaminants from the Northeast Seaboard and industrial Midwest of the United States (ExxonMobil Canada Properties 2011, in Husky Energy 2012).

3.2 Biological Environment

The eastern Newfoundland offshore area is a highly-productive ecosystem and there are many species of fish, marine mammals, sea turtles, and marine birds that occur, or could potentially occur, in the Project Area. There are currently 32 species of conservation interest (i.e., listed by SARA or assessed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC)) that could occur within the Project Area. Of these, there are 22 species of fish, seven species of marine mammal, two species of sea turtle, and one species of marine bird listed / assessed (see Table 2).

Table 2 Species of Conservation Interest with Potential to Occur in the Project Area and in Surrounding Areas

Common Name	Species	Status	
	Scientific Name	SARA	COSEWIC
Fish			
White shark (Atlantic population)	<i>Carcharodon carcharias</i>	Schedule 1 Endangered	Endangered
Northern wolffish	<i>Anarchias denticulatus</i>	Schedule 1 Threatened	Threatened
Spotted wolffish	<i>Anarchias minor</i>	Schedule 1 Threatened	Threatened
Atlantic wolffish	<i>Anarchias lupus</i>	Schedule 1 Special Concern	Special Concern
Atlantic bluefin tuna (Grand Banks of Newfoundland only)	<i>Thunnus thynnus</i>	No Status	Endangered
Atlantic cod (Newfoundland and Labrador population)	<i>Gadus morhua</i>	No Status	Endangered
Cusk	<i>Brosme brosme</i>	No Status	Endangered
Porbeagle shark	<i>Lamna nasus</i>	No Status	Endangered
Roundnose grenadier	<i>Coryphaenoides rupestris</i>	No Status	Endangered
Winter skate (Eastern Scotian Shelf – Newfoundland population)	<i>Leucoraja ocellata</i>	No Status	Endangered
Acadian redfish	<i>Sebastes fasciatus</i>	No Status	Threatened
American eel	<i>Anguilla rostrata</i>	No Status	Threatened
American plaice (Newfoundland and Labrador population)	<i>Hippoglossoides platessoides</i>	No Status	Threatened
Atlantic salmon (South Newfoundland)	<i>Salmo salar</i>	No Status	Threatened
Atlantic salmon (Gaspé-Southern Gulf of St. Lawrence)	<i>Salmo salar</i>	No Status	Special Concern
Atlantic salmon (Outer Bay of Fundy)	<i>Salmo salar</i>	No Status	Endangered
Atlantic salmon (Eastern Cape Breton)	<i>Salmo salar</i>	No Status	Endangered
Atlantic salmon (Nova Scotia Southern Upland)	<i>Salmo salar</i>	No Status	Endangered
Atlantic salmon (Quebec Eastern North Shore population)	<i>Salmo salar</i>	No Status	Special Concern
Atlantic salmon (Quebec Western North Shore population)	<i>Salmo salar</i>	No Status	Special Concern

Table 2 Species of Conservation Interest with Potential to Occur in the Project Area and in Surrounding Areas

Species		Status	
Common Name	Scientific Name	SARA	COSEWIC
Atlantic salmon (Anticosti Island population)	<i>Salmo salar</i>	No Status	Endangered
Deepwater redfish (Northern population)	<i>Sebastes mentella</i>	No Status	Threatened
Shortfin mako shark (Atlantic population)	<i>Isurus oxyrinchus</i>	No Status	Threatened
White Hake (Atlantic and Northern Gulf of St. Lawrence population)	<i>Urophycis tenuis</i>	No Status	Threatened
Basking Shark (Atlantic population)	<i>Cetorhinus maximus</i>	No Status	Special Concern
Blue shark (Atlantic population)	<i>Prionace glauca</i>	No Status	Special Concern
Roughhead grenadier	<i>Macrourus berglax</i>	No Status	Special Concern
Spiny dogfish (Atlantic population)	<i>Squalus acanthias</i>	No Status	Special Concern
Thorny skate	<i>Amblyraja radiata</i>	No Status	Special Concern
Marine Mammals			
Blue whale (Atlantic population)	<i>Balaenoptera musculus</i>	Schedule 1 Endangered	Endangered
North Atlantic right whale	<i>Eubalaena glacialis</i>	Schedule 1 Endangered	Endangered
Fin whale (Atlantic population)	<i>Balaenoptera physalus</i>	Schedule 1 Special Concern	Special Concern
Sowerby's beaked whale	<i>Mesoplodon bidens</i>	Schedule 1 Special Concern	Special Concern
Harbour porpoise (Northwest Atlantic population)	<i>Phocoena</i>	Schedule 2 Threatened	Special Concern
Killer whale (Northwest Atlantic – Eastern Arctic population)	<i>Orcinus orca</i>	No Status	Special Concern
Northern bottlenose whale (Davis Strait – Baffin Bay – Labrador Sea population)	<i>Hyperoodon ampullatus</i>	No Status	Special Concern
Sea Turtles			
Leatherback sea turtle (Atlantic population)	<i>Dermochelys coriacea</i>	Schedule 1 Endangered	Endangered
Loggerhead sea turtle	<i>Caretta</i>	Schedule 1 Endangered	Endangered
Marine Birds			
Ivory gull	<i>Pagophila eburnea</i>	Schedule 1 Endangered	Endangered

A large number and variety of marine fish species are known to occur in Newfoundland and Labrador waters (Templeman 2010, in AMEC 2014). Fish species known to occur in the Project Area include wolffish, skate, hake, cusk, eel, spike, sculpin, sand lance, tuna, and shark species (AMEC 2014), and several other commercially important fish and shellfish species.

Benthic invertebrate species known to occur in the Project Area, and in surrounding areas, include polychaetes, whelks, echinoderms, hydroids, isopods, crustaceans, molluscs, corals, and sponges. There is a high abundance and diversity of structure-forming benthic invertebrate species that occur in the Orphan Basin and in surrounding areas, including corals, sponges, and sea pens (AMEC 2014). Corals identified include alcyonaceans (small and large gorgonians, soft corals), pennatulaceans (sea pens), scleractinians (stony corals), and antipatharians (black corals).

The eastern Newfoundland offshore area supports a high abundance and diversity of marine mammal species. There are over 20 species of cetacean (whales, dolphins, and porpoises), and several species of seal that are known to occur in the region. These include mysticetes (baleen whales) such as minke and humpback whales, and odontocetes (toothed whales) such as sperm whales, dolphins, and porpoises. Some marine mammal species may occur in the region year-round, while many frequent the area seasonally and are most abundant during the summer and fall.

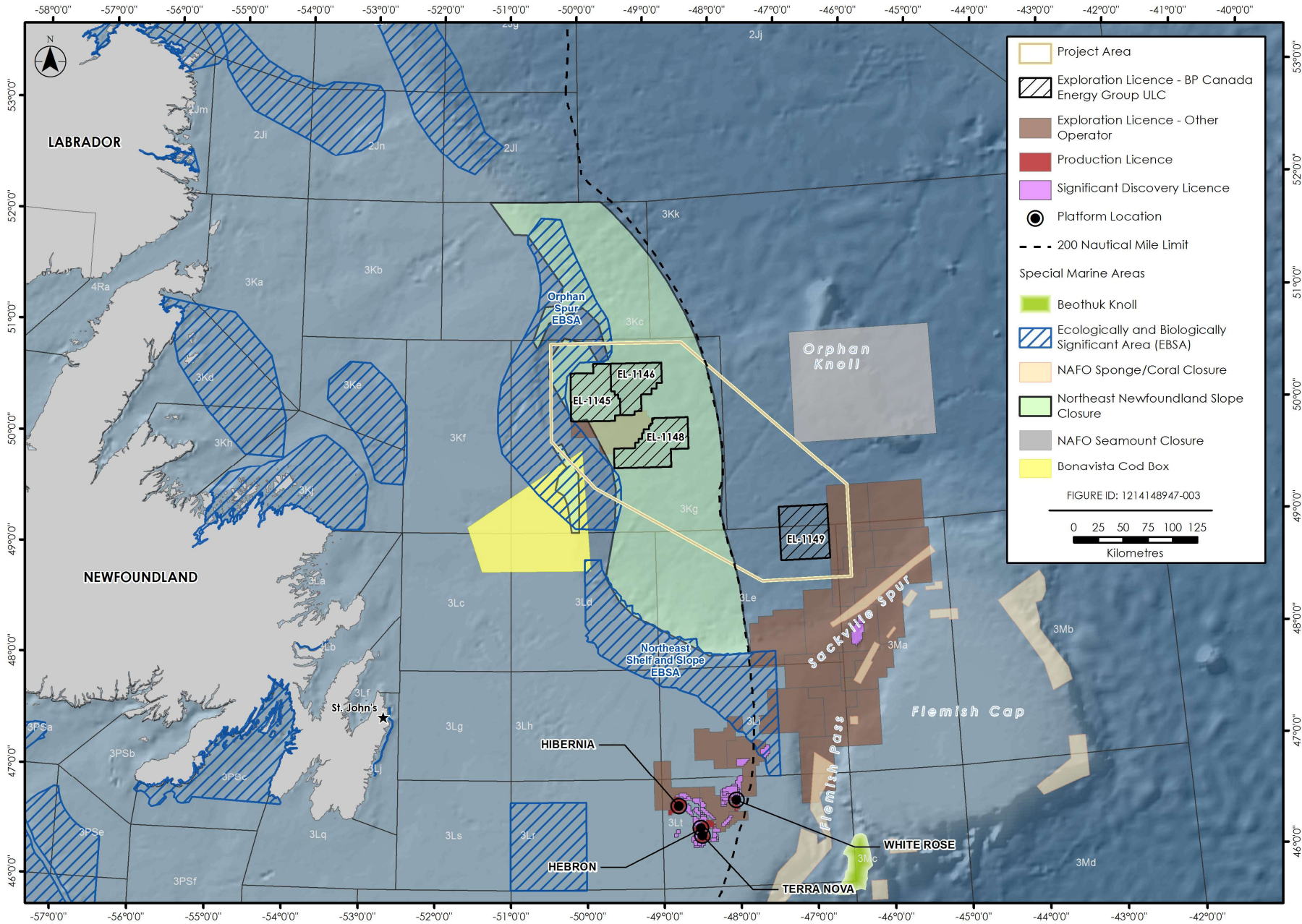
There are at least two species of sea turtle that may occur seasonally in the Project Area and in surrounding areas. These include the leatherback sea turtle and loggerhead sea turtle; both are listed species.

The Project Area and surrounding areas, including the Flemish Pass, the Flemish Cap, and the deeper water associated with the Orphan Basin, are known to support an abundance of seabird species, with the highest density occurring during the spring and summer months (Templeman 2010; AMEC 2014). These include kittiwakes, fulmars, gannets, gulls, shearwaters, and storm-petrels. Other seabird species that may occur in the Project Area, and in surrounding areas, include puffins, razorbills, phalaropes, skuas, and jaegers. One listed bird species, the ivory gull, has been identified to occur in or near the Project Area.

Multiple areas in offshore Newfoundland and Labrador have been identified by Fisheries and Oceans Canada (DFO) as Ecologically and Biologically Significant Areas (EBSAs). Two of these EBSAs overlap with the Project Area: the Northeast Shelf and Slope and Orphan Spur (Figure 4). Currently there are no Marine Protected Areas within the vicinity of the Project Area; however, a newly established marine refuge, the Northeast Newfoundland Slope Closure, overlaps considerably with the Project Area. This marine refuge has been established to protect significant coral / sponge concentrations from bottom contact fishing gear.

The Northwest Atlantic Fisheries Organization (NAFO) has identified multiple Vulnerable Marine Ecosystems in the eastern Newfoundland offshore area and some of these are located near the Project Area, including the Sackville Spur, Northern Flemish Cap, and Northeast Shelf and Slope (within Canadian EEZ) (Figure 4).

NAFO has also designated Fisheries Closure Areas in the eastern Newfoundland offshore area, and some of these are located near the Project Area, including the Orphan Knoll, Sackville Spur, Northern Flemish Cap, and Northwest Flemish Cap (Figure 4).



An additional special area in or near the Project Area is the “Bonavista Cod Box”, which is an important spawning and migration area for Atlantic cod, American plaice, and redfish (AMEC 2014). There is overlap between the northeast tip of the “Box” and the Project Area (see Figure 4).

3.3 Human Environment

Commercial fishing activity occurs in the Project Area, and in surrounding areas; particularly in NAFO Unit Areas 3KLM, which overlap with the Project Area. Most commercial fishing activity near the Project Area occurs along the slope of the continental shelf, and along the slope of the Flemish Cap, where upwelling contributes to a highly productive marine environment (LGL Limited 2008). Commercially-important fish species that occur in the Project Area, and in surrounding areas, include Atlantic cod, Greenland halibut, yellowtail and witch flounder, roughhead and roundnose grenadier, redfish, skate, capelin, and mackerel (Jacques Whitford Environment Limited 2002a; Suncor Energy 2013; AMEC 2014). Commercially-important invertebrate species found in the area include snow crab and shrimp. The commercial fishing footprint with reference to the Project Area (including NAFO fishing areas and Canadian commercial fishing activity from 2011-2015) is shown in Figure 5.

There are five Indigenous communities and/or governing bodies within Newfoundland and Labrador, three in Labrador (Nunatsiavut Government, Innu Nation, and Nunatukavut Community Council) and two on the Island of Newfoundland (Miawpukek First Nation; Qalipu Mi’kmaq First Nation) (Figure 6). A number of Indigenous groups have commercial communal fishing licences in the Project Area, and in surrounding areas, in NAFO Unit Areas 3KLM. A summary of commercial communal fishing licences issued under the Aboriginal Communal Fishing Licenses Regulations is provided in Table 3. There is no food, social, and ceremonial (FSC) fisheries in the Project Area, or in surrounding areas. The only FSC fishery in Newfoundland and Labrador is a multi-species coastal fishery undertaken by Miawpukek First Nation in Conne River, over 500 km to the southwest of the Project Area.

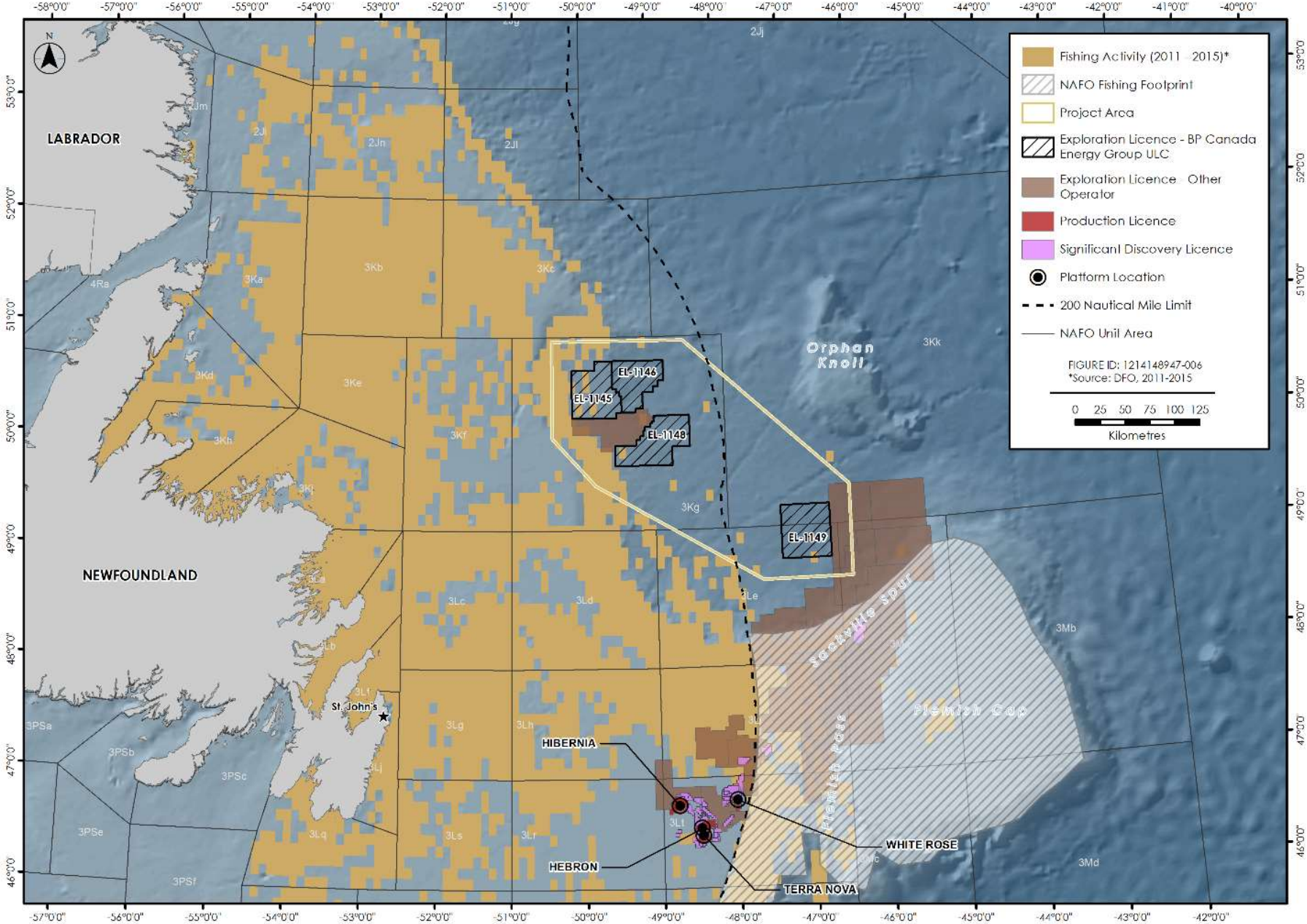


Figure 5 Commercial Fishing Activity in the Project Area and Surrounding Areas

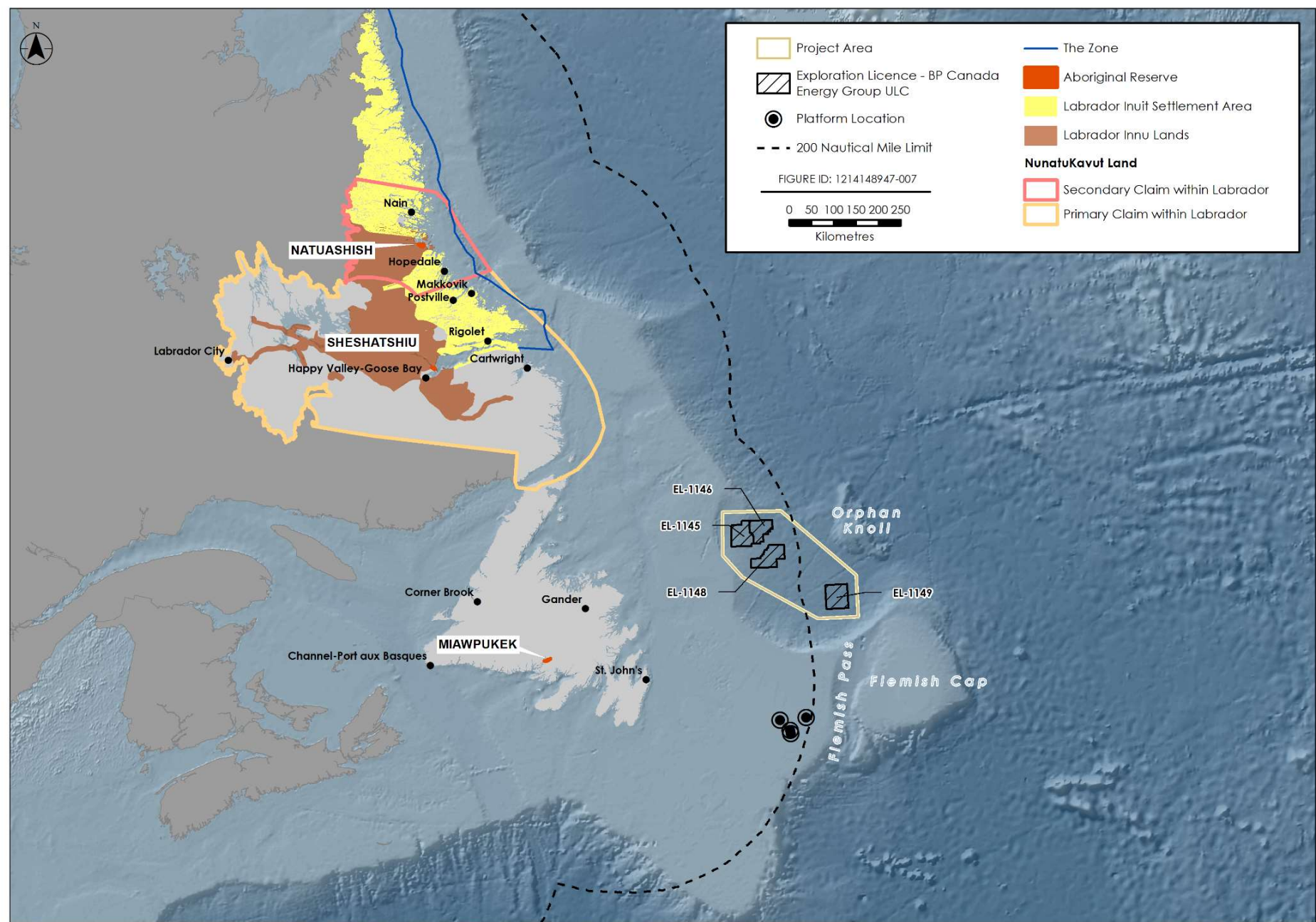


Figure 6 Indigenous Communities in Newfoundland and Labrador

Table 3 Commercial Communal Fishing Licenses Issued in the Project Area and Surrounding Areas (NAFO Unit Areas 3KLM)

Group	Commercial Communal Fishing License
Innu Nation	Mid-shore enterprise (65 to 100 ft.) with a groundfish licence permitting access to a variety of areas (Atlantic-wide), including NAFO Unit Areas 3KLMN, and an Area 6 (3K) shrimp licence. Also hold an inshore enterprise with a mobile gear and fixed gear groundfish licence that can operate in 3KL.
Nunatsiavut Government	Three inshore groundfish enterprises with access to NAFO Unit Areas 3KL. Also have two seal licences that permit access in Seal Fish Areas (SFAs) 4 – 33 (Atlantic-wide).
NunatuKavut Community Council	Nine inshore enterprises with access to NAFO Unit Areas 3KL groundfish. Two of these enterprises also have an Area 6 (3K) shrimp licence. Also have two seal licences permitting access in SFAs 4 – 33 (Atlantic-wide).
Miawpukek First Nation (MFN)	Nine enterprises that permit access to NAFO Unit Areas 3KL. Also hold one seal licence that permits access in SFAs 4 – 33 (Atlantic-wide).
Qalipu Mi'kmaq First Nation Band (QMFNB)	One inshore enterprise with a groundfish licence permitting access to NAFO Unit Area 3K, a shrimp licence for Area 6 (3K), and pelagic fishery access (herring, mackerel, and capelin) which occurs close to shore in 3KL.
Mi'kmaq Alsumk Mowimsikik Koqoey Association (formed by MFN and QMFNB under DFO's Aboriginal and Aquatic Resources Management Program)	One enterprise with a groundfish licence permitting access to NAFO Unit Areas 3KL.

For other similar offshore EAs, the CEA Agency has identified Indigenous groups in New Brunswick (NB), Nova Scotia (NS), Prince Edward Island (PEI), and Quebec (QC) (Table 4) that have the right to harvest Atlantic salmon (*Salmo salar*) for food, social and ceremonial purposes and/or harvest swordfish (*Xiphias gladius*) under commercial communal fishing licences in NAFO Areas 3, 4 and 5. While these Indigenous communities hold commercial communal licences for several species, the swordfish licence is the only licence which overlaps with the Project Area.

Table 4 New Brunswick / Nova Scotia / Prince Edward Island / Quebec Indigenous Groups with FSC Fisheries Rights and/or and Commercial Communal Swordfish Licences

Group Name	Provincial Origin
Elsipogtog First Nation	NB
Tjipōgtōtjg (Buctouche) First Nation	NB
Natoaganeg (Eel Ground) First Nation	NB
Ugpi'ganjig (Eel River Bar) First Nation	NB
Esgenoôpetitj (Burnt Church) First Nation	NB
Amlamgog (Fort Folly) First Nation	NB
L'nui Menikuk (Indian Island) First Nation	NB
Metepenagiag Mi'kmaq Nation	NB
Oinpegitjoig (Pabineau) First Nation	NB
Kingsclear First Nation	NB
Madawaska Maliseet First Nation	NB
Oromocto First Nation	NB
Saint Mary's First Nation	NB
Tobique First Nation	NB

Table 4 New Brunswick / Nova Scotia / Prince Edward Island / Quebec Indigenous Groups with FSC Fisheries Rights and/or and Commercial Communal Swordfish Licences

Group Name	Provincial Origin
Woodstock First Nation	NB
Passamaquoddy	NB
Acadia First Nation	NS
Annapolis Valley First Nation	NS
Bear River First Nation	NS
Eskasoni First Nation	NS
Glooscap First Nation	NS
Membertou First Nation	NS
Potlotek First Nation	NS
We'koqmaq First Nation	NS
Sipekne'katik First Nation	NS
Paq'tnkek First Nation	NS
Pictou Landing First Nation	NS
Wagmatcook First Nation	NS
Millbrook First Nation	NS
Abegweit First Nation	PEI
Lennox Island First Nation	PEI
Conseil des Montagnais de Natashquan	QC
Conseil des Innus de Ekuanitshit	QC
La Nation Micmac de Gespeg	QC
Listuguj Mi'gmaq Government	QC
Micmacs of Gesgapegiag	QC

Other ocean users include shipping, marine research, oil and gas exploration, and military operations. International shipping lanes transit through the eastern Newfoundland offshore area, and there is potential for vessel traffic in the Project Area and in surrounding areas.

Marine research and scientific studies regularly occur in the Project Area, and in surrounding areas. DFO typically conducts research annually in the Project Area and in the Newfoundland and Labrador region. Activities include annual multi-species trawl surveys to monitor fish populations, collection of data from buoys and moorings for DFO's Rapid Climate Change Program Study, and the Atlantic Zone Off-Shelf Monitoring Program. Bottom trawl surveys typically occur in NAFO Unit Areas 3LNPs in the spring during the Spring Atlantic Zone Monitoring Program, and in Unit Areas 2HJ3KLMNO in the fall (AMEC 2014).

Other research activities, including collaborations between DFO and the Fish Food and Allied Workers-Unifor, may occur within the Project Area during the duration of the Project. For example, post-season trap surveys are conducted in NAFO Unit Areas 2J3KLOPs4R, where approximately 1,500 stations are sampled annually.

Offshore oil and gas production has been occurring off the coast of Newfoundland and Labrador for approximately 20 years, and exploration in the region has occurred for a much longer period.

There are four producing oil fields on the Grand Banks in the Jeanne d'Arc Basin. These include the Hibernia (Hibernia Management and Development Company Limited), Terra Nova (Suncor Energy), White Rose (Husky Energy), and Hebron (ExxonMobil Canada).

The Royal Canadian Navy and Royal Canadian Air Force conduct routine surveillance operations throughout Atlantic Canadian waters, which may include aircraft or marine patrols within the Project Area. Military vessels, at times, also provide support to DFO research operations and fishery patrols (AMEC 2014).

Marine subsea cables, both active and non-active, are known to occur in the eastern Newfoundland offshore area and within the Project Area. Most of these cables connect North America to the United Kingdom and Europe, and span the Atlantic Ocean. There is also the potential for new subsea cables to be constructed in the Project Area during the duration of the Project.

While shipwrecks have been identified in the eastern Newfoundland offshore area (AMEC 2014), there are no known shipwrecks in the Project Area. Pre-drilling ROV surveys will confirm the absence of unidentified subsea infrastructure at well locations.

3.4 Existing Environmental Studies

Environmental assessments have been completed for various exploration drilling, production drilling, and seismic survey projects for approximately 25 years in the eastern Newfoundland offshore area.

The primary studies that are cited in the Project Description to describe the existing environmental setting in the Project Area and surrounding areas (Orphan Basin), include project-specific EAs conducted for other projects with similar spatial boundaries, and the Strategic Environmental Assessment for the eastern Newfoundland offshore region (AMEC 2014). It is anticipated that the reports listed below, and other relevant studies, will provide sufficient data to characterize the existing environment in the Project Area, and to assess the potential environmental effects associated with the Project.

Key environmental studies relevant to this EA include:

- Eastern Newfoundland Strategic Environmental Assessment (AMEC 2014)
- Environmental Assessment East Canada CSEM Survey, 2014-2018 (LGL Limited 2014)
- Suncor Energy's Eastern Newfoundland Offshore Area 2D / 3D / 4D Seismic Program, 2014-2024 (Suncor Energy 2013)
- White Rose Extension Project Environmental Assessment (Husky Energy 2012)
- Hebron Project Comprehensive Study Report (ExxonMobil Canada Properties 2011)
- Environmental Assessment of Chevron's North Grand Banks Regional Seismic Program, 2011-2017 (LGL Limited 2011a)
- Environmental Assessment of Statoil's Geophysical Program for Jeanne d'Arc Basin and Central Ridge / Flemish Pass Basins, 2011-2019. (LGL Limited 2011b).

- Environmental Assessment of Husky Energy's Jeanne d'Arc Basin / Flemish Pass Regional Seismic Program, 2012-2020 (LGL Limited 2011c)
- Environmental Assessment of StatoilHydro Canada Ltd. Exploration and Appraisal / Delineation Drilling Program for Offshore Newfoundland, 2008-2016 (LGL Limited 2008)
- Husky Delineation/Exploration Program for Jeanne d'Arc Basin Area, 2008-2017, Environmental Assessment (LGL Limited 2007)
- Husky White Rose Development Project: New Drill Centre Construction and Operations Program Environmental Assessment (LGL Limited 2006).
- Orphan Basin Strategic Environmental Assessment (LGL Limited 2003a)
- Orphan Basin Exploration Drilling Program Environmental Assessment (LGL Limited 2005)
- Husky Lewis Hill Prospect Exploration Drilling Program Environmental Assessment (LGL Limited 2003b)
- White Rose Oilfield Comprehensive Study (Husky Oil Operations Limited 2000)
- Flemish Pass Drilling Environmental Assessment (Jacques Whitford Environment Limited 2002a)
- Environmental Assessment of Exploration Drilling in Annieopsquotch (EL 1052), Bonnewinkle (EL 1056) and Gambo (EL 1048) Leases (Jacques Whitford Environment Limited 2002b)

4 Consultation and Engagement

BP recognizes the importance of early and ongoing Indigenous and stakeholder engagement that continues over the life of the Project. BP believes that it is important to maintain a social licence to operate in Newfoundland and Labrador by building relationships with Indigenous groups and key stakeholders.

4.1 Indigenous Engagement

BP recognizes the potential for the Project to affect Indigenous interests and acknowledges the importance of engaging Indigenous organizations to provide Project information and obtain feedback on potential issues and concerns.

As noted in Section 3.3, there are several Indigenous organizations in Eastern Canada that hold commercial communal fishing licences for NAFO Divisions that overlap the Project Area, although it is currently not known whether or not any actual fishing takes place in the Project Area. There are no documented FSC licences within or near the Project Area. Species harvested for commercial or FSC purposes outside the Project Area may potentially interact with Project activities (planned or unplanned) during migration to traditional fishing grounds. The list of Indigenous organizations which may have a potential interest in the Project includes groups and communities in Newfoundland and Labrador, Quebec, New Brunswick, Prince Edward Island, and Nova Scotia.

In recognition of this potential interest in the Project, BP has initiated engagement with the following groups to introduce the Project and to inquire about potential interests and concerns as well as preferred method of engagement going forward.

Newfoundland and Labrador

- Labrador Inuit (Nunatsiavut Government)
- Labrador Innu (Innu Nation)
- NunatuKavut Community Council
- Qalipu Mi'kmaq First Nation Band
- Miawpukek Mi'kmamawey Mawi'omi (Miawpukek First Nation)

Quebec

- Mi'gmawei Mawiomi Secretariat (MMS) which represents the following Mi'gmaq First Nation groups:
 - Micmas of Gesgapegiag
 - La Nation Micmac de Gespeg
 - Listuguj Mi'gmaq Government
- Les Innus de Ekuanitshit
- Montagnais de Nutashkuan

New Brunswick

- Mi'gmawe'l Tplu'taqnn Inc. (MTI) which represents the following Mi'kmaq First Nation groups:
 - Fort Folly First Nation
 - Eel Ground First Nation
 - Pabineau First Nation
 - Esgenoôpetitj First Nation
 - Buctouche First Nation
 - Indian Island First Nation
 - Eel River Bar First Nation
 - Metepnagiag Mi'kmaq First Nation
- Elsipogtog First Nation
- Wolastoqey Nation of New Brunswick (WNNB), which coordinates consultation with the following five Maliseet First Nations (letters were sent to individual communities; follow up occurred with the WNNB):
 - Kingsclear First Nation
 - Madawaska Maliseet First Nation
 - Oromocto First Nation
 - St. Mary's First Nation
 - Tobique First Nation
- Woodstock First Nation
- Peskotomuhkati Nation at Skutik (Passamaquoddy)

Prince Edward Island

- Mi'kmaq Confederacy of PEI (MCPEI) which represents the following Mi'kmaq First Nations in consultation (letters were sent to individual communities; follow-up occurred with MCPEI):
 - Abegweit First Nation
 - Lennox Island First Nation

Nova Scotia

- Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO) which represents the following 11 Mi'kmaq First Nations in Nova Scotia in consultation and engagement (letters were sent to individual communities; follow-up occurred with the KMKNO):
 - Acadia First Nation
 - Annapolis Valley First Nation
 - Bear River First Nation
 - Eskasoni First Nation
 - Glooscap First Nation
 - Membertou First Nation
 - Paqtnkek Mi'kmaw Nation
 - Pictou Landing First Nation
 - Potlotek First Nation
 - Wagmatcook First Nation
 - We'koqmaq First Nation

- Sipekne'katik First Nation
- Millbrook First Nation

Representatives from the KMKNO in Nova Scotia, the MCPEI, and the WNNB were contacted through copies of introductory letters to individual First Nation communities. BP then followed up with emails and phone calls to confirm receipt of information and confirm interest in engagement. Initial concerns raised to date include issues surrounding species that are of cultural importance to communities, potential effects on both commercial and traditional fisheries, most notably migratory species, effects on species at risk, and the potential for the Project to impact asserted or proven Aboriginal and/or Treaty rights.

BP recognizes that some Indigenous groups may prefer to participate through the Crown consultation process, or may not have an interest in the Project. Ongoing engagement will include confirmation of appropriate organization and/or community contacts and methods for future engagement, learning more about how these groups may potentially be affected by Project activities, providing Project planning updates, and listening and responding to questions and concerns raised by Indigenous groups in a timely manner. Feedback obtained during engagement will be incorporated into Project planning as applicable and appropriate. The EIS will document concerns and priorities raised and demonstrate how these have influenced Project planning and/or been addressed in the EIS.

4.2 Stakeholder Engagement

BP employs a broad definition of stakeholders, to include fisheries organizations, environmental non-governmental organizations (NGOs), industry associations, government, and the interested public.

Government/Regulatory Stakeholders

Key regulatory stakeholders for the Project that have been and/or will be engaged by BP for the Project include:

- C-NLOPB
- Government of Newfoundland and Labrador
 - Municipal Affairs and Environment
 - Fisheries and Land Resources
 - Natural Resources
- Government of Canada
 - CEA Agency
 - DFO
 - Canadian Coast Guard
 - Natural Resources Canada (NRCan)
 - Department of National Defence (DND)
 - Transport Canada
 - Environment and Climate Change Canada (ECCC)

Fisheries Stakeholders

A key form of mitigation of potential effects of the Project on fisheries is early and ongoing consultation with the fishing industry. BP has initiated engagement with the following fisheries stakeholders to discuss interests and concerns related to the Project:

- One Ocean
- Fish, Food and Allied Workers – Unifor
- Association of Seafood Producers
- Ocean Choice International
- Groundfish Enterprise Allocation Council
- Canadian Association of Prawn Producers

On November 29 and 30, 2017, BP met with One Ocean, Fish, Food and Allied Workers, the Association of Seafood Producers, and Ocean Choice International to introduce BP and proposed exploration plans. Concerns were raised about potential cumulative loss of fishing access due to existing and proposed fisheries closure areas for marine conservation and fishing exclusion areas associated with offshore oil exploration and development. During these meetings, the Groundfish Enterprise Allocation Council and Canadian Association of Prawn Producers were also identified as key fisheries stakeholder for engagement. Introductory letters were sent to these groups on December 12, 2017.

BP will continue to engage fisheries stakeholder groups throughout the EIS and Project planning process to provide updates and obtain feedback. The EIS will document concerns and priorities raised and demonstrate how these have influenced Project planning and/or been addressed in the EIS.

Other Public Stakeholder Groups

Engagement with other public stakeholder groups (e.g., industry associations, non-governmental organizations) will be primarily related to promotional communications and/or local benefits/services. BP will monitor activities and communications generated by these groups and participate in local industry events as appropriate including supplier information sessions, seminars, and conferences. In addition, BP will also include pertinent Project information on its external website. www.bp.com/canada. Quarterly or semi-annual newsletters will be prepared and posted on the website.

5 Potential Project-Related Changes to the Environment and Scoping Considerations

5.1 Routine Project Activities

Project activities have potential to result in changes to the environment. Potential routine Project activities that may result in changes to the environment include:

- Presence and operation of the drilling vessel (including lights and flare, underwater sound, and safety zone)
- VSP surveys (underwater sound)
- Discharges and emissions (e.g., drill muds and cuttings, liquid discharges, atmospheric emissions)
- Well abandonment
- PSV (underwater sound) and helicopter operations

Under CEAA, 2012, the Project Description is required to describe potential changes to fish and fish habitat, aquatic species, and migratory birds that may be affected as a result of carrying out the Project. The Project Description must also provide information on the effects of any potential environmental changes to federal or transboundary lands as well as on Indigenous peoples.

An overview of the potential environmental interactions with routine Project activities that may result in changes to the environmental components identified in CEAA 2012 are provided in Table 5. Should a federal EA process be required under CEAA 2012, these potential interactions would be assessed in more detail in the EIS.

Table 5 Potential Environmental Interactions with Routine Project Activities

Environmental Component of Concern	Relevant Section of CEAA 2012	Potential Environmental Interactions
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	<p>Routine Project activities have the potential to result in changes affecting fish, fish habitat, aquatic species as defined under SARA, marine mammals, and other aquatic species (including aquatic plants), due to the following interactions:</p> <ul style="list-style-type: none"> ▪ Aquatic species response to underwater sound emissions associated with PSV transit, drilling and VSP activities ▪ Localized degradation and disturbance to the benthic environment (including benthic species) due to seabed disposal at drill site(s) (i.e., drill mud/cuttings, cement) including potential smothering and mortality of benthic organisms ▪ Localized effects on marine water quality due to routine ocean discharges (e.g., waste water) from the drilling vessel and PSVs ▪ Potential injury or mortality to marine mammal(s) from PSV collisions

Table 5 Potential Environmental Interactions with Routine Project Activities

Environmental Component of Concern	Relevant Section of CEAA 2012	Potential Environmental Interactions
Migratory Birds	5(1)(a)(iii)	<p>Routine Project activities have the potential to result in changes affecting migratory birds, as defined under the Migratory Birds Convention Act, 1994, due to the following interactions:</p> <ul style="list-style-type: none"> ▪ Attraction of migratory birds to PSV and drilling vessel lighting (including flares) and discharges (e.g., food wastes) ▪ Mortality or stranding of migratory birds on the drilling vessel or PSVs
Project Activities Occurring on Federal Lands	5(1)(b)(i)	<p>Routine Project activities may result in changes to the environment that would occur on federal waters as a result of the Project Area being located within Canada's EEZ and thus within federal waters under the jurisdiction of the Government of Canada. These potential effects occurring in federal waters are described within this table. In addition to components of the environment previously addressed above (e.g., effects on water quality, fish, fish habitat, aquatic species, and migratory birds) there could also be effects on the atmospheric environment (e.g., air emissions, sound emissions).</p>
Transboundary Issues	5(1)(b)(ii)	<p>In addition to components of the environment previously addressed above (e.g., effects on water quality, fish, fish habitat, aquatic species, and migratory birds) there could also be effects on the atmospheric environment (e.g., air and noise emissions).</p>
Health and Socio-Economic Conditions for Indigenous People	5(1)(c)(i)	<p>Routine Project activities have the potential to result in the following changes to the environment that may affect Indigenous fishing activities, including those carried out under commercial communal licences in and around the Project Area, and associated potential effects to socio-economic conditions:</p> <ul style="list-style-type: none"> ▪ Establishment of a safety zone (fisheries exclusion zone) around the drilling vessel during drilling activities, as required by the C-NLOPB, and associated spatial and temporal restrictions on Indigenous fish harvesting activity ▪ Fish species response to underwater sound emissions, including changes in behaviour and distribution of targeted species <p>Routine PSV operations outside of the safety zone will be consistent with existing offshore and nearshore shipping traffic in the region and are not anticipated to result in any changes to the environment that would affect Indigenous fishing activities.</p> <p>Routine Project activities are not expected to result in any changes to the environment that would affect the health conditions of Indigenous peoples.</p>

Table 5 Potential Environmental Interactions with Routine Project Activities

Environmental Component of Concern	Relevant Section of CEAA 2012	Potential Environmental Interactions
Health and Socio-Economic Conditions	5(2)(b)(i)	<p>Routine Project activities have the potential to result in the following changes to the environment that may affect commercial fishing activities, including those carried out under commercial licences in and around the Project Area:</p> <ul style="list-style-type: none"> ▪ Establishment of a safety zone (fisheries exclusion zone) around the drilling vessel during drilling activities, as required by the C-NLOPB, and associated spatial and temporal restrictions on commercial fish harvesting activity ▪ Fish species response to underwater sound emissions, including changes in behaviour and distribution of commercial fish species <p>The Project is also expected to have economic benefits, including economic and contracting opportunities.</p> <p>Routine PSV operations outside of the safety zone will be consistent with existing offshore and nearshore shipping traffic in the region and are not anticipated to result in any changes to the environment that would affect commercial fishing activities.</p> <p>Routine Project activities are not expected to result in any changes to the environment that would affect health conditions.</p>
Physical and Cultural Heritage or Resources of historical, Archaeological, Paleontological, or Architectural Significance	5(1)(c)(ii) 5(1)(c)(iv) 5(2)(b)(ii) 5(2)(b)(iii)	<p>Routine Project activities are not anticipated to result in any changes to the environment that would affect physical and cultural heritage areas or resources including shipwrecks that have been recorded in the Project Area. Information gathered during 3D seismic surveys previously conducted by others and pre-drill ROV site surveys in the Project Area will document the presence / absence of marine heritage resources on the seabed before any seabed disturbance takes place.</p> <p>If any concerns related to this matter are identified during Indigenous engagement for this Project, they will be considered in the EIS.</p>
Current Use of Lands and Resources for Traditional Purposes by Indigenous People	5(1)(c)(iii)	<p>Routine Project activities are not anticipated to result in any changes to the environment that would influence the current use of land and resources for traditional purposes by Indigenous peoples, other than commercial communal fisheries and associated socio-economic interactions (discussed above), given the Project Area's water depth and distance from shore. Routine PSV activities will be consistent with existing shipping traffic in the region and are not anticipated to result in any changes to the environment that would influence traditional Indigenous fisheries and resource use.</p> <p>Additional information regarding traditional Indigenous fisheries and traditional resource use will be gathered through Indigenous engagement, and concerns related to this matter identified during engagement will be considered in the EIS.</p>

Table 5 Potential Environmental Interactions with Routine Project Activities

Environmental Component of Concern	Relevant Section of CEAA 2012	Potential Environmental Interactions
Other Changes to the Environment Directly Related or Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of Duty or Function in Support of the Project	5(2)(a) 5(1)(b)(i)	<p>Routine Project activities authorized by the C-NLOPB have the potential to result in directly related or necessarily incidental changes to the atmospheric environment due to the following interactions with the environment:</p> <ul style="list-style-type: none"> • Release of air emissions

5.2 Non-routine Project Activities

Environmental interactions can also occur from non-routine Project activities such as accidental events and malfunctions (refer to Table 6). Potential accidental events that could occur during exploration drilling include blowouts (uncontrolled release of hydrocarbons during drilling), and platform and vessel spills and releases (e.g., hydraulic fluid, drilling mud, diesel). Collectively, these accidental releases are referred to as “spills”. A spill has the potential to occur in the offshore (e.g., during drilling) or nearshore (e.g., during PSV transit) environment. Spill trajectory modelling will be conducted as part of the environmental assessment process to predict areas that could potentially be affected by a spill. Potential environmental interactions can occur within the spill trajectory or as a result of transitory species or their prey travelling through an affected area.

Table 6 Potential Environmental Interactions with Accidents and Malfunctions during Project Activities

Environmental Component of Concern	Relevant Section of CEAA 2012	Potential Environmental Interactions
Fish, Fish Habitat, and Aquatic Species	5(1)(a)(i) 5(1)(a)(ii)	<p>A spill during Project activities could potentially result in changes to fish, fish habitat, aquatic species as defined in SARA, marine mammals, and other aquatic species, including:</p> <ul style="list-style-type: none"> • Reduced availability and quality of habitat • Degradation and reduction in marine water quality • Injury, mortality and/or reduced health for fish and other aquatic species
Migratory Birds	5(1)(a)(iii)	<p>A spill during Project activities could potentially result in changes to migratory birds, as defined under the <i>Migratory Birds Convention Act</i>, 1994, including injury, mortality, and/or reduced health for migratory bird species.</p>
Project Activities Occurring on Federal Lands	5(1)(b)(i)	<p>A spill during Project activities could potentially result in changes to the environment that would occur in federal waters as a result of the Project Area being located within Canada's EEZ and thus within federal waters under the jurisdiction of the Government of Canada. These potential effects occurring in federal waters are described within this table. Components of the environment not previously addressed above include potential effects on the atmospheric environment (e.g., air and noise emissions).</p>
Transboundary Issues	5(1)(b)(ii)	<p>A spill may result in transboundary effects outside of Newfoundland and Labrador or Canadian offshore areas. A spill may enter international waters, which fall outside the Canadian EEZ. Spill-related effects in international waters could include adverse effects to birds, fish, fish habitat, and commercial fisheries.</p>
Health and Socio-Economic Conditions for Indigenous People	5(1)(c)(i)	<p>A spill during Project activities could potentially result in the following changes to the environment that may affect Indigenous fisheries and associated socio-economic conditions:</p> <ul style="list-style-type: none"> • Contamination-related closure of commercial fishing areas, and associated restrictions on commercial communal fish harvesting activity • Reduced catchability associated with damage to fishing gear (e.g., fouling) and changes in population health, behaviour, and distribution of commercial fish species as a result of marine pollution • Changes in population size and health of individuals among commercial fish species, and associated loss of income through reduced catch value <p>A vessel collision with fishing gear could also potentially result in changes to the environment that may affect human health and safety for Indigenous peoples.</p>

Table 6 Potential Environmental Interactions with Accidents and Malfunctions during Project Activities

Environmental Component of Concern	Relevant Section of CEAA 2012	Potential Environmental Interactions
Health and Socio-Economic Conditions	5(2)(b)(i)	<p>A spill during Project activities could potentially result in the following changes to the environment that affect fisheries:</p> <ul style="list-style-type: none"> • Contamination-related closure of commercial fishing areas, and associated restrictions on commercial fish harvesting activity • Reduced catchability associated with damage to fishing gear (e.g., fouling) and changes in population health, behaviour, and distribution of commercial fish species as a result of marine pollution • Changes in population size and health of individuals among commercial fish species, and associated loss of income through reduced catch value <p>A vessel collision with fishing gear could also potentially result in changes to the environment that may affect human health and safety.</p>
Physical and Cultural Heritage or Resources of historical, Archaeological, Paleontological, or Architectural Significance	5(1)(c)(ii) 5(1)(c)(iv) 5(2)(b)(ii) 5(2)(b)(iii)	<p>A spill during Project activities could potentially cause a change to the environment that may affect physical and cultural heritage area (including shipwrecks). However, given the location of the Project offshore, and the ROV survey prior to drilling, non-routine Project activities are not expected to result in changes to resources of historical, archeological, paleontological, or architectural significance.</p>
Current Use of Lands and Resources for Traditional Purposes by Indigenous People	5(1)(c)(iii)	<p>A spill during Project activities could potentially result in the following changes to the environment that may affect traditional Indigenous fisheries, including the Aboriginal and/or Treaty rights to fish, in the area:</p> <ul style="list-style-type: none"> • Contamination-related closure of traditional fishing areas, and associated restrictions on traditional fish harvesting activity • Reduced catchability associated with damage to fishing gear (e.g., fouling) and changes in population size, behaviour, and distribution of targeted fish species as a result of marine pollution • Changes in population size and health of individuals among targeted fish species, and associated reduction in value of fishery for traditional use <p>These changes could potentially occur within the spill trajectory or as a result of migratory fish species transiting through the affected area.</p>

Table 6 Potential Environmental Interactions with Accidents and Malfunctions during Project Activities

Environmental Component of Concern	Relevant Section of CEAA 2012	Potential Environmental Interactions
Other Changes to the Environment Directly Related or Necessarily Incidental to a Federal Authority's Exercise of a Power or Performance of Duty or Function in Support of the Project	5(2)(a) 5(1)(b)(i)	A spill occurring as a result of Project activities authorized by the C-NLOPB could potentially result in temporary and localized changes to marine and atmospheric environment. These potential changes have been discussed above.

Spill prevention and response measures will be implemented to prevent and/or reduce risk of adverse environmental effects. If a federal EA process is required under CEAA, the EIS will provide additional details regarding these preventative measures designed to prevent accidental events, and contingency and emergency response measures designed to minimize adverse environmental effects in the unlikely event that they should occur.

5.3 Scoping Considerations

If a federal EA process is required under CEAA 2012, the potential interactions of the Project will be evaluated in the EIS by considering individual biophysical and socio-economic components that could be affected by the Project, and resultant Project-related effects. Although final direction on these matters would be provided in the EIS Guidelines, the proposed valued components (VCs) to be assessed in an EIS (if required) include:

- Marine Fish and Fish Habitat (including species at risk [SAR] and species of conservation concern [SOCC])
- Marine and Migratory Birds (including SAR and SOCC)
- Marine Mammals and Sea Turtles (including SAR and SOCC)
- Special Areas
- Commercial Fisheries and Other Ocean Users
- Indigenous Communities and Activities

This scoping has been based on the interactions discussed in Tables 3 and 4 as well as guidance from previously completed C-NLOPB scoping documents, Strategic Environmental Assessments, and project-specific EAs of offshore exploration projects. Species at risk and species of conservation concern are considered as part of the Fish and Fish Habitat VC, the Marine Mammals

and Sea Turtles VC, and the Migratory Birds VC rather than as a stand-alone VC. The selection of environmental components also considers relevant regulations and guidelines for routine exploration-related activities. It is recognized that Project-specific EIS Guidelines will be issued by the CEA Agency following a public review of the Project Description as well as input received from stakeholder and Indigenous engagement; this information may influence the selection of the final components to be assessed.

The selection of proposed environmental components considers existing facilities in eastern Newfoundland will be used for supply, support, and logistical functions. The Project will not require the development of new infrastructure or any upgrades to existing facilities to support Project operations. Third-party service providers will be responsible for obtaining and/or maintaining applicable regulatory approvals to operate their facilities. It is proposed that the scope of the EIS will therefore be limited to offshore components should a federal EA be required. Logistical support from PSVs and helicopters is also well established for the offshore Newfoundland oil and gas industry but is proposed to be assessed as it travels from the onshore supply base to the MODU.

6 References

- AMEC Environment and Infrastructure. 2014. Eastern Newfoundland Offshore Area Strategic Environmental Assessment. Prepared for the Canada – Newfoundland and Labrador Offshore Petroleum Board, St. John's, NL. Available at: <http://www.cnlopb.ca/sea/eastern.php>.
- C-NLOPB (Canada – Newfoundland and Labrador Offshore Petroleum Board) and CNSOPB (Canada-Nova Scotia Offshore Petroleum Board). Drilling and Production Guidelines. August 2017. Available at: http://www.cnlopb.ca/pdfs/guidelines/drill_prod_guide.pdf?lbisphpreq=1
- Environment and Climate Change Canada. 2017. 2015 Emissions Data, Facility GHG Emissions by Province/Territory. Available at: <http://ec.gc.ca/ges-ghg/donnees-data/index.cfm?do=province&lang=En&year=2015>. Accessed October 18, 2017.
- ExxonMobil Canada Properties. 2011. Hebron Project Comprehensive Study Report. Submitted to the Canada – Newfoundland and Labrador Offshore Petroleum Board, St. John's, NL.
- Fader, G.B., Cameron, G.D.M. and M.A. Best. 1989. Geology of the Continental Margin of Eastern Canada, Geological Survey of Canada. Map 1705A.
- Husky Energy. 2012. Husky Energy White Rose Extension Project Environmental Assessment. Prepared by Stantec Consulting Ltd., St. John's, NL for Husky Energy, St. John's, NL.
- Husky Oil Operations Limited. 2000. White Rose Oilfield Comprehensive Study. Submitted by Husky Oil Operations Ltd., St. John's, NL.
- Jacques Whitford Environment Limited. 2002a. Flemish Pass Drilling Environmental Assessment. Prepared for Petro-Canada, St. John's, NL. ix + 198 pp. + Appendices.
- Jacques Whitford Environment Limited. 2002b. Environmental Assessment of Exploration Drilling in Annieopsquotch (EL 1052), Bonnavinkle (EL 1056) and Gambo (EL 1048) Leases. Prepared for EnCana Corporation, Halifax, NS. vii + 153 pp. + Appendices.
- LGL Limited. 2003a. Orphan Basin Strategic Environmental Assessment. LGL Rep. SA767. Prepared by LGL Limited, St. John's, NL for Canada – Newfoundland Offshore Petroleum Board.
- LGL Limited. 2003b. Husky Lewis Hill Prospect Exploration Drilling Program Environmental Assessment. LGL Rep. SA746. Rep. by LGL Limited, St. John's, NL, Oceans Limited, St. John's, NL, PAL Environmental Services, St. John's, NL, and SL Ross Environmental Research Limited, Ottawa, ON for Husky Oil Operation Limited, St. John's, NL. 324 pp. + Appendices.

- LGL Limited. 2005. Orphan Basin Exploration Drilling Program Environmental Assessment. LGL Rep. SA825. Rep. by LGL Limited, St. John's, NL, Canning & Pitt Associates Inc., St. John's, NL, SL Ross Environmental Research, Ottawa, ON, Oceans Limited, St. John's, NL, Lorax Environmental, Vancouver, BC and PAL Environmental Services, St. John's, NL for Chevron Canada Limited, Calgary, AB, ExxonMobil Canada Ltd., St. John's, NL, Imperial Oil Resources Ventures Limited, Calgary, AB and Shell Canada Limited. 353 pp.
- LGL Limited. 2006. Husky White Rose Development Project: New Drill Centre Construction & Operations Program Environmental Assessment. LGL Rep. SA883. Rep. by LGL Limited, St. John's, NL for Husky Energy Inc., Calgary, AB. 299 pp. + Appendices.
- LGL Limited. 2007. Husky Delineation / Exploration Drilling Program for Jeanne d'Arc Basin Area, 2008-2017, Environmental Assessment. LGL Rep. SA935. Rep. by LGL Limited, St. John's, NL, Canning & Pitt Associates Inc., St. John's, NL, Oceans Limited, St. John's, NL, and PAL Environmental Services, St. John's, NL for Husky Energy Inc., Calgary, AB. 231 pp. + Appendices.
- LGL Limited. 2008. Environmental Assessment of StatoilHydro Canada Ltd. Exploration and Appraisal / Delineation Drilling Program for Offshore Newfoundland, 2008-2016. LGL Rep. SA947b. Rep. by LGL Limited, St. John's, NL, Canning & Pitt Associates Inc., St. John's, NL and Oceans Limited, St. John's, NL for StatoilHydro Canada Ltd., St. John's, NL. 292 pp. + Appendices.
- LGL Limited. 2011a. Environmental Assessment of Chevron's North Grand Banks Regional Seismic Program, 2011-2017. LGL Report SA1119. Prepared by LGL Limited in association with Canning and Pitt Associates Inc., St. John's, NL, and Oceans Ltd., St. John's, NL for Chevron Canada Limited, Calgary, AB. 226 p. + Appendices.
- LGL Limited. 2011b. Environmental Assessment of Statoil's Geophysical Program for Jeanne d'Arc and Central Ridge / Flemish Pass Basins, 2011-2019. LGL Rep. SA1121. Rep. by LGL Limited, St. John's, NL, Canning & Pitt Associates Inc., St. John's, NL and Oceans Limited, St. John's, NL for Statoil Canada Ltd., St. John's, NL. 227 pp. + Appendices.
- LGL Limited. 2011c. Environmental Assessment of Husky's Jeanne d'Arc Basin / Flemish Pass Regional Seismic Program, 2012-2020. LGL Rep. SA1144. Rep. by LGL Limited, St. John's, NL, Canning & Pitt Associates Inc., St. John's, NL, and Oceans Limited, St. John's, NL for Husky Energy, St. John's, NL. 320 pp. Appendices.
- LGL Limited. 2014. Environmental Assessment East Canada CSEM Survey, 2014-2018. LGL Rep. by LGL Limited, St. John's, NL for Electromagnetic Geoservices Canada (Operator) (EMGS), Vancouver, BC. 192 pp. Appendices.
- MMS [Minerals Management Service]. 2000. Gulf of Mexico Deepwater Operations and Activities. Environmental Assessment. Minerals Management Service, Gulf of Mexico OCS Region. OCS EIS/EA MMS 2000-001.

NEB (National Energy Board), Canada-Newfoundland and Labrador Offshore Petroleum Board and Canada-Nova Scotia Offshore Petroleum Board. 2009. Offshore Chemical Selection Guidelines for Drilling and Production Activities on Frontier Lands. iii + 13 pp.

NEB (National Energy Board), Canada-Newfoundland and Labrador Offshore Petroleum Board and Canada-Nova Scotia Offshore Petroleum Board. 2010. Offshore Waste Treatment Guidelines. vi + 28 pp.

Suncor Energy. 2013. Environmental Assessment of Suncor Energy's Eastern Newfoundland Offshore Area 2D / 3D / 4D Seismic Program, 2014-2024. LGL Rep. SA1233. Rep. by LGL Limited, St. John's, NL for Suncor Energy, St. John's, NL. 210 pp. + Appendices.

Templeman, N.D. 2010. Ecosystem status and trends report for the Newfoundland and Labrador Shelf. Canadian Science Advisory Secretariat Research Document 2010/026.