2019 ENVIRONMENTAL ASSESSMENT UPDATE

Hebron Project Comprehensive Study Report

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1 INTRODUCTION

The Hebron oil field is located offshore Newfoundland and Labrador, Canada in the Jeanne d'Arc Basin, approximately 350 kilometres southeast of St. John's in water depths of approximately 93 metres (mean sea level) (Figure 1.1). The oil field was first discovered in 1980 and is estimated to contain more than 700 million barrels of recoverable resources. The Hebron Project includes offshore surveys, engineering, procurement, fabrication, construction, installation, commissioning, development drilling, production, operations and maintenance and eventual decommissioning activities.

The Hebron field is being developed using a stand-alone concrete gravity based structure (GBS), which is designed and constructed to store approximately 1.2 million barrels of crude oil. The Hebron Platform was towed out to the field in June of 2017, drilling commenced in July of 2017 with first oil recovered in November of 2017. Hebron is a major project that is delivering significant benefits to Newfoundland and Labrador, including those related to its associated engineering, fabrication and construction activities, the employment and training of a diverse workforce, research and development opportunities, and significant royalty and tax revenues.

The Hebron Project was subject to a detailed and comprehensive Environmental Assessment (EA) review, pursuant to the requirements of the *Canadian Environmental Assessment Act* (CEAA). In December 2011 the federal Minister of the Environment issued his EA decision, which stated that “no additional information is necessary” and that “taking into account the mitigation measures described in the CSR, the Project is not likely to cause significant adverse environmental effects”. In June 2013 the Proponent submitted an Addendum to the Hebron Project CSR, which described proposed changes to several planned Project activities. This EA Amendment was also subject to review and the provision of additional information and clarification by the Proponent and was subsequently approved in June 2013.

Since EA approval for the Hebron Project was obtained, the Proponent has subsequently prepared and submitted several EA Updates and EA Amendments for the Project. These EA Updates provide an overview of planned Project activities for the upcoming year, update any applicable environmental baseline information for key environmental components that has become available since the CSR and previous EA Updates were produced, describe any public and stakeholder consultation activities that have occurred, and evaluate and confirm that the nature and scope of the planned activities are within the scope of those assessed and approved in the EA review, including the appropriateness and adequacy of the associated environmental effects predictions and mitigation measures.

This document provides the 2019 EA Update for the Hebron Operations.

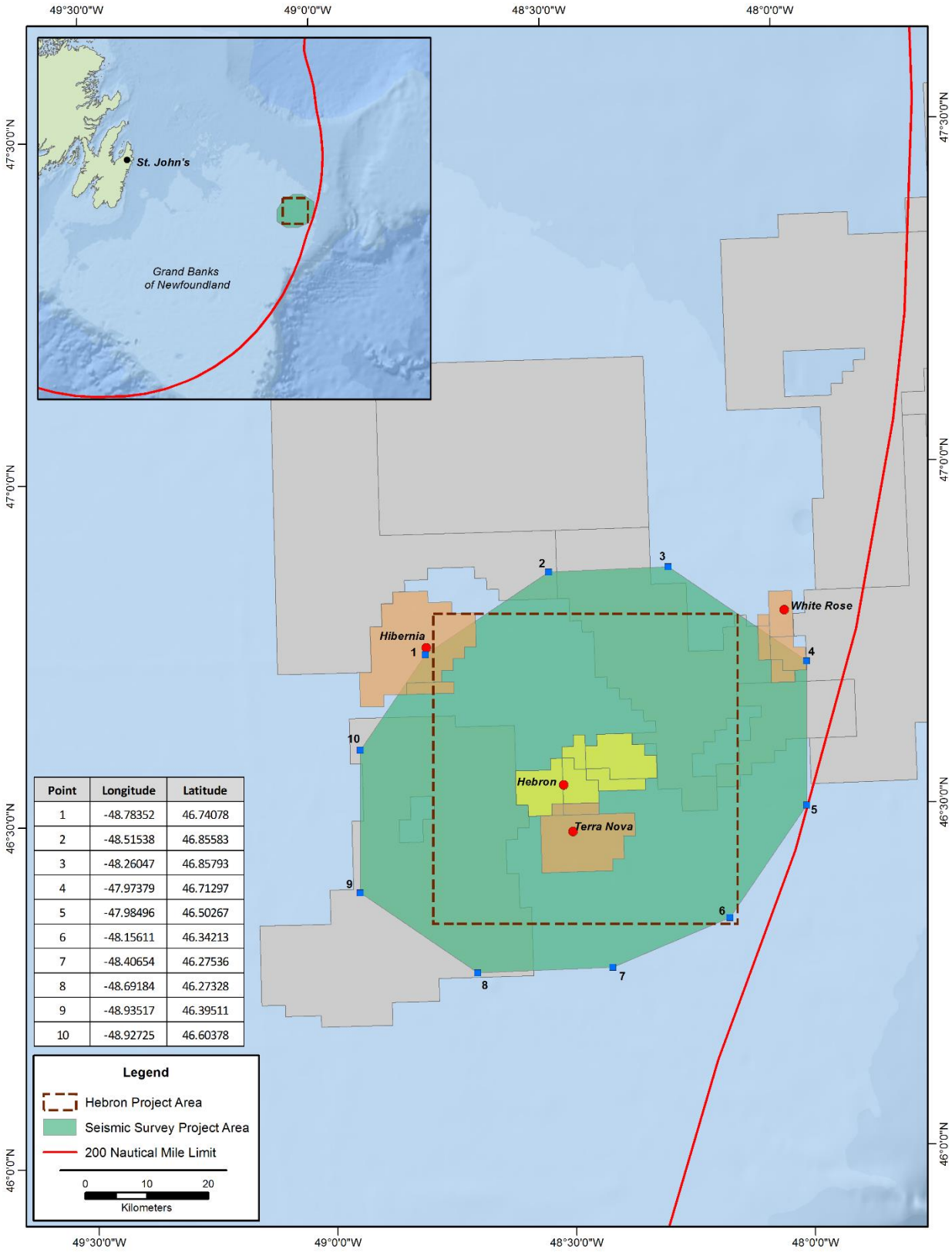


Figure 1-1 Hebron Project Area

2 PROJECT DESCRIPTION (2019 ACTIVITIES)

This section provides an overview of the various Project components and activities that are planned to occur in 2019.

2.1 Offshore Loading System (OLS) Marine Hose Replacement

The Single Anchor Loading (SAL) Bases for the Hebron Offshore Loading System are critical to the successful offloading of oil from the Hebron GBS. The SAL bases are connected to marine hoses used for offloading oil from the platform to oil tankers. The 5th upper hose element is being changed out to conduct performance testing.

The steps to hose replacement includes the following:

- Hose flushing;
- Subsea disconnection upper hose section from mid-line clump weight;
- Recovery of upper hose section via hose reel; and
- Subsea connection of new upper hose section to mid-level clump weight.

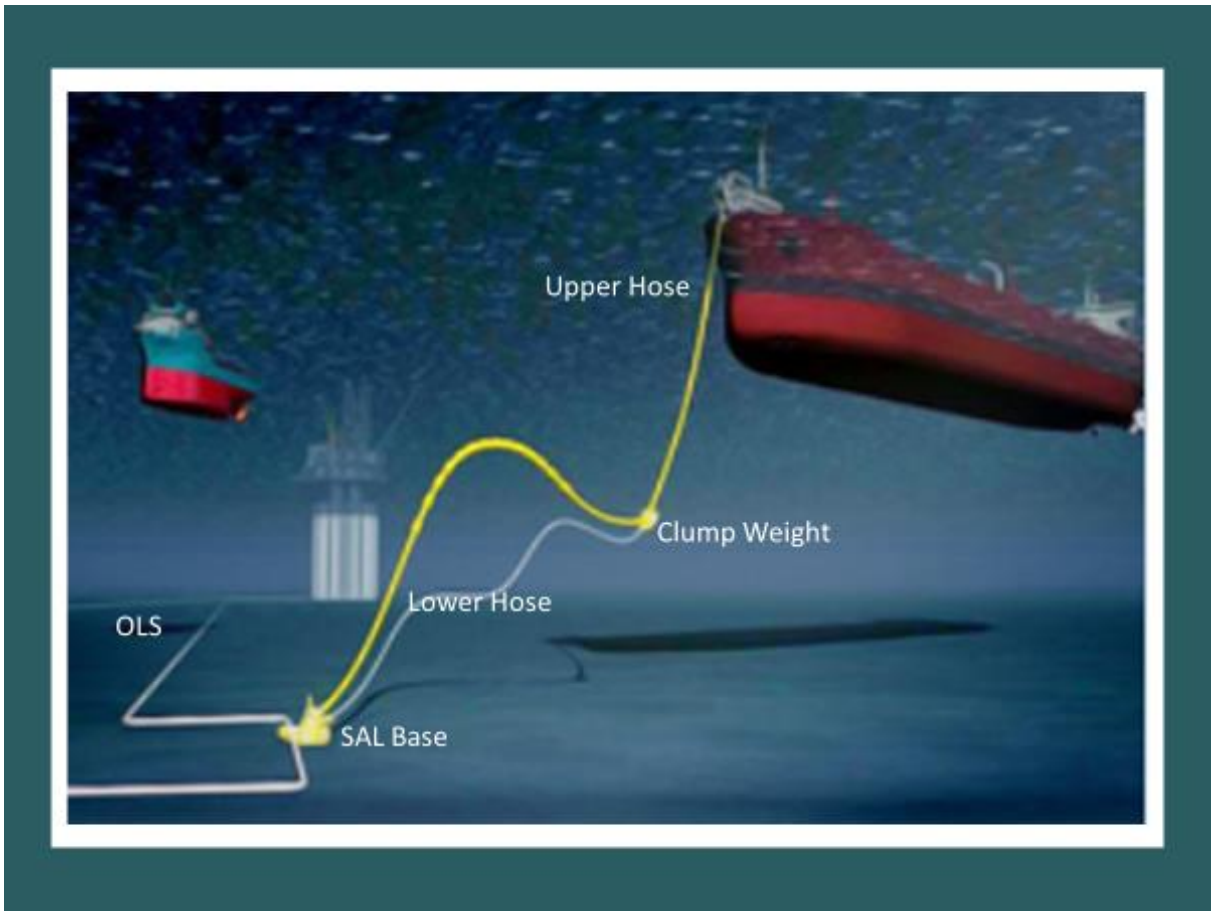


Figure 2-1 Schematic of the OLS system. A portion of the upper hose will be replaced.

Hose Flushing Procedure

Flushing of the marine hose will take place from the platform to the tanker within a closed system. Initially, the riser will be flushed into the main tanks on the tanker to displace excess crude. Once the volume of the riser has been flushed into the main tank the discharge will then be routed directly to the tanker slop tanks. In the case that the slop tanks reach full capacity, the flush water will be routed back to the crude storage cell (following the contingency flushing procedure) where the water will settle, and any entrained oil will separate. Treatment procedures ensures that flush water oil in water (OIW) concentrations will be below thresholds (20 mg/L OIW; EMCP 2018) stipulated in the Hebron's Environmental Compliance Monitoring Plan (ECMP) prior to discharge.

2.2 Consultations on 2019 Project Activities

As part of its on-going operations and activities associated with the Hebron Project, ExxonMobil consults regularly with One Ocean through existing and relevant forums. Details on the various planned 2019 activities that are described in this EA Update will be further communicated to One Ocean Working Group as applicable.

2.3 Potential Environmental Interactions and Associated Mitigations

The nature and scope of the planned 2019 activities associated with the Hebron Project (as described earlier in this Chapter) are in keeping with the scope of the Project as described, assessed and approved under the EA process for the Project.

These activities were listed as project activities in the original CSR (EMCP 2011); specifically, Section 1.5.2 (g) states:

> *Construction, installation, operation, maintenance of offshore loading system (OLS) (may include dredging activities, pile driving, installation and insulation of riser and OLS (rock dumping, concrete mattress pads).*

The relevant discharges were also identified in the CSR (EMCP 2011) and reproduced below (Table 2.1).

Table 2.1 Potential Activities and Potential Discharges / Emissions / Wastes during Production (Table 2-9 in CSR)

Potential Activities	Potential Environmental Interactions / Discharges / Emissions / Wastes
Operation of the Platform and OLS	• Air emissions • Bilge / ballast water • Changes to water quality in receiving environment • Deck drainage • Disposal / discharge of stormwater, potable water, fire water, cooling water, and industrial water • Drilling fluids and cuttings (WBM / synthetic-based mud (SBM)) disposal • Produced water discharge • Seawater / Firewater • Storage Displacement Water Discharges • Well treatment Elevated TSS levels • Noise (including underwater noise) • Possible substrate disturbance • Possible loss of fish habitat • Lights • Safety zone
Maintenance Activities	
Power Generation and Flaring	
Normal Platform and OLS Operational Activities	
Operation of Seawater Systems (cooling, firewater)	
Operation of Oil Storage / Storage Displacement Water System	
Water Requirements (potable water, fire water, cooling water and industrial water)	
Waste Generated (domestic waste, construction waste, hazardous, sanitary waste)[A]	
Operation of Produced Water Treatment / Disposal System[B]	
Corrosion Protection System	
Use of Corrosion Inhibitors or Biocides (*e.g.,* hypochlorite)[C]	
Grey Water and Black Disposal	
Chemical / Fuel Management and Storage	
Operation of Helicopters, Supply, Support, Standby and Tow Vessels / Barges / ROVs	
Offloading of Produced Crude	
Well Workovers (*e.g.*, drilling, completing, testing)	
Preparation and Storage of Drilling Fluids	
Management of Drilling Fluids and Cuttings (reconditioning, discharge or injection)[D]	
Management and Storage of BOP Fluids and Well Treatment Fluids	
Cementing and Completing Wells	
Operation of Possible Disposal Well(s)	
Oil Processing Systems	
Seawater Injection System (to maintain reservoir pressure)	
Gas Injection Systems	
Artificial Lift (gas lift, electric submersible pumps or a combination)	
Oily Water Treatment[E]	
Produced Sand Management[F]	
Vent and Flare System[G]	
Diving Activities	

A Hazardous and non-hazardous wastes will be managed to avoid interactions with the marine environment
B Produced water will be discharged in accordance with OWTG
C The Operator will evaluate the use of biocides other than chlorine. The discharge from the hypochlorite system will be treated to meet a limit approved by the C-NLOPB's Chief Conservation Officer
D WBM cuttings will be discharged overboard in accordance with the OWTG; SBM cuttings will be re-injected into a designated well bore
E Operational discharges will be treated prior to being discharged overboard in accordance with OWTG
F Current drilling designs are focused on the prevention of produced sand to Topsides (downhole sand control). Produced fines are expected. Topsides sand management will be focused on the handling of these fines. In the unlikely event of failure of the downhole sand control system, management of the produced sand will be required (singular event)
G Small amounts of fuel gas will be used for flare pilots and may also be used to sweep the flare system piping or burn excess gas

In addition, all of these discharges have also been detailed in the Environmental Compliance Monitoring Plan. The plan details the sampling and analysis of regulated waste streams and discharges that require and do not require compliance monitoring.

The CSR also identifies and commits to several mitigation measures related to *Offshore Construction and Installation* (including OLS installation and other components), which are summarized in Chapter 17 with the more relevant ones to this scope are listed below:

- Ensure the use of properly maintained and functioning equipment;
- Vessel and helicopter maintenance;
- Use of best practices, continuous improvement programs and best available technology;
- Proper release of stranded birds per Canadian Wildlife Service (CWS) protocol;
- Vessels to maintain minimum distance of 2 km from active marine bird colonies, maintain steady course and speed and avoid concentrations of marine birds or marine mammals;
- Vessels to deviate course to avoid concentrations of marine mammals;
- Standard Notification and communication protocols to be followed;
- Identification of a Single Point of Contact (SPOC) for associated issues, communications and inquiries;
- Safety Zone;
- Operational Protocols; and
- Fishing Gear Compensation Program

Each of these environmental issues / effects and associated mitigations measures (as reflected in the CSR and subsequent EA submissions) remain applicable to the nature and scope of the planned 2019 Project activities and will be implemented in accordance with ExxonMobil's commitments and obligations pursuant to the Project's EA approval and other applicable legislative and regulatory requirements.

3 ENVIRONMENTAL SETTING

The Hebron Project CSR provided a detailed overview of the existing (baseline) environment within and around the proposed Project Area and associated EA Study Area (nearshore and offshore environments), including relevant aspects of the existing physical, biological and socioeconomic environments.

In keeping with previous EA Updates for the Project, this section provides updated information related to the following environmental components, for which any associated changes are considered particularly relevant to on-going environmental planning and management related to the Project:

1) Commercial Fisheries; and

2) Species at Risk.

3.1 Commercial Fisheries

Fisheries were a key area of focus of the EA review for the Project, and on-going Project planning and implementation have likewise placed a high degree of emphasis on addressing the potential for interactions with Project components and activities and commercial fishing activity within and near the Project Area.

The Hebron Project CSR included a detailed description of commercial fisheries in the region based on existing data sources and other information that was available as of the time of EA preparation and submission (see, for example, CSR Section 8.3 and elsewhere). This included fisheries statistics and geospatial data up to 2008, with subsequent EA submissions and updates providing fisheries information up to 2014. Commercial fisheries data are provided by Fisheries and Oceans Canada (DFO) Statistical Services in Ottawa, ON, including geospatial information on the location and timing of fishing activity. The mapping information is currently provided by DFO as an aggregated data set which gives a general indication of fishing areas (by species, gear types, fleet and other pre-determined categories and data classes) for individual grid “cells” that are approximately 6 x 4 nautical miles in size. The DFO datasets record and report domestic and foreign fish harvests that are landed in Canada.

The maps that follow provide an indication of the overall geographic distribution of commercial fishing activity within and adjacent to the Project Area for the year up to 2016 (the most recent year for which data are available) within the grid square system described above. This includes Figures that show all recorded commercial fishing activity (Figure 3-1), followed by gear types (mobile or fixed gear; Figure 3-2 and Figure 3-3, respectively) and abundance maps for key species that were fished near the Project Area (Figure 3-4, Figure 3-5) within that year, and which have been considered and mapped in previous EA Updates.[1.]

As illustrated, the Project Area itself occurs well outside the more intensive commercial fishing areas elsewhere on the Banks and along the shelf, and the planned 2019 activities at that location will not increase or otherwise change the nature or intensity of the Project’s potential interaction with fishing activities, locations and times.

[1] Although the 2016 fisheries data do not show fishing activity for certain species within or near the Project Area, for consistency the same species are included here as were mapped for the initial version of the EA Update.

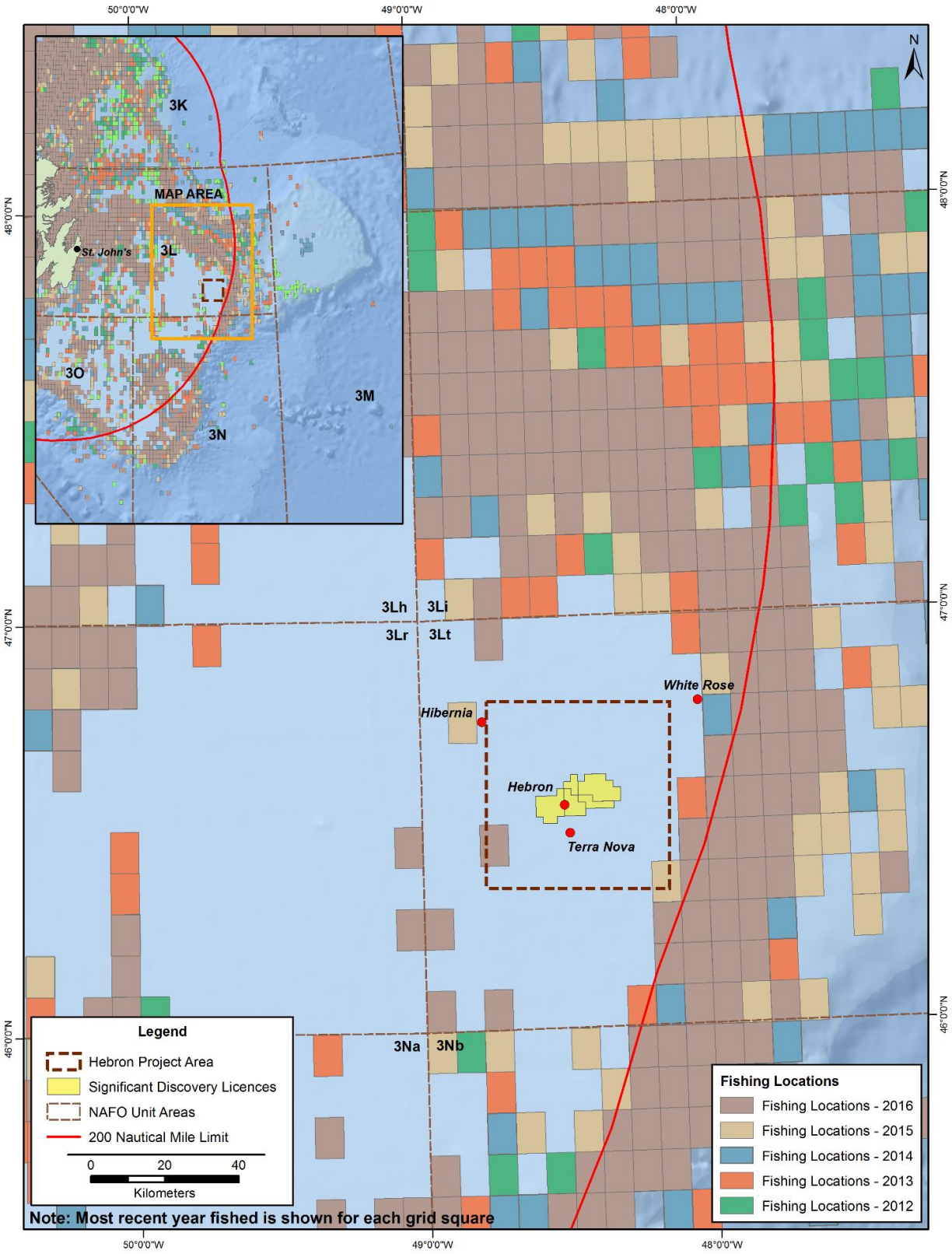


Figure 3-1 Commercial Fishing Locations, All Species/Gear Types (2012-2016)

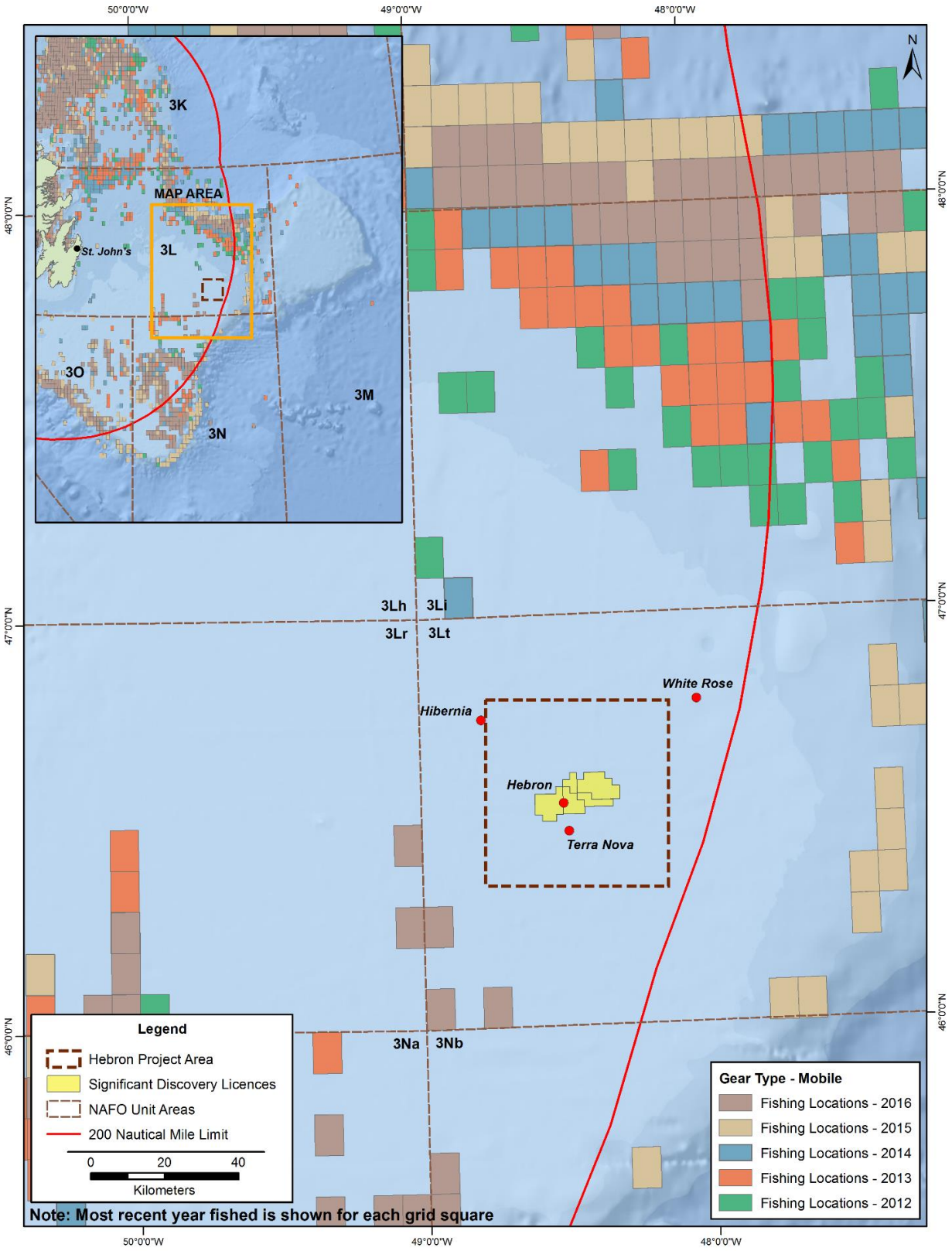


Figure 3-2 Commercial Fishing Locations, Mobile Gear Types (2012-2016)

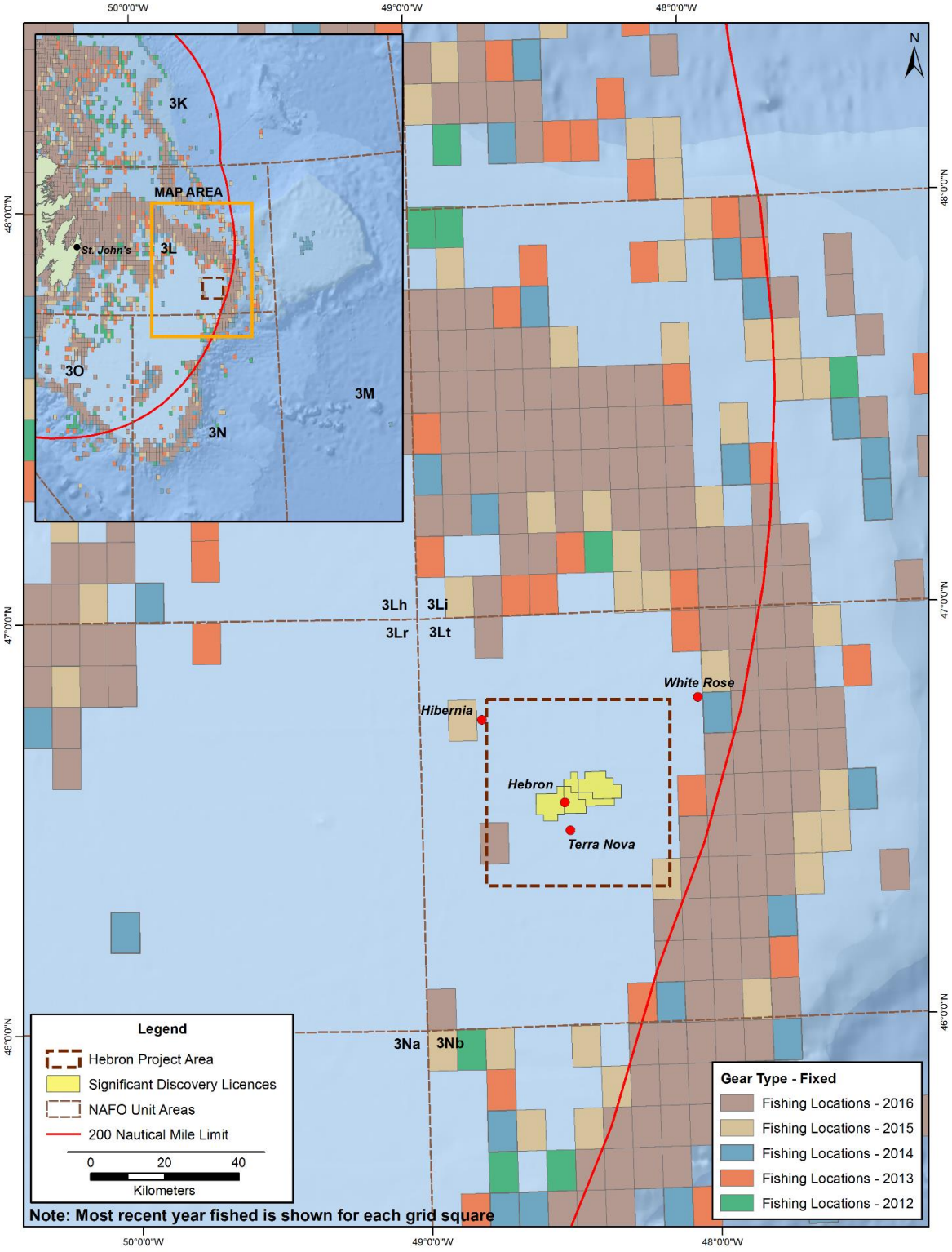


Figure 3-3 Commercial Fishing Locations, Fixed Gear Types (2012-2016)

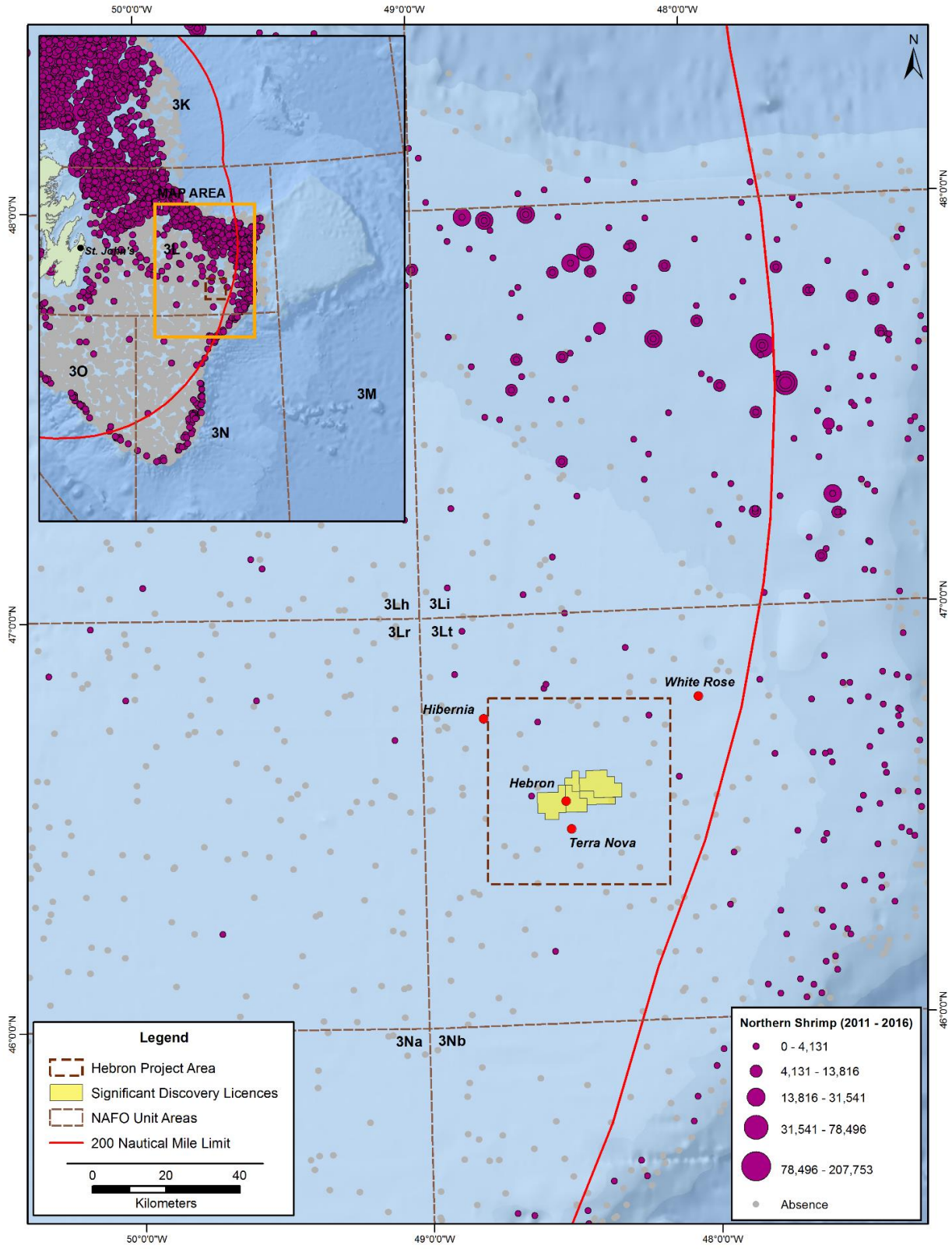


Figure 3-4 Abundance Map, Northern Shrimp Counts (2011-2016)

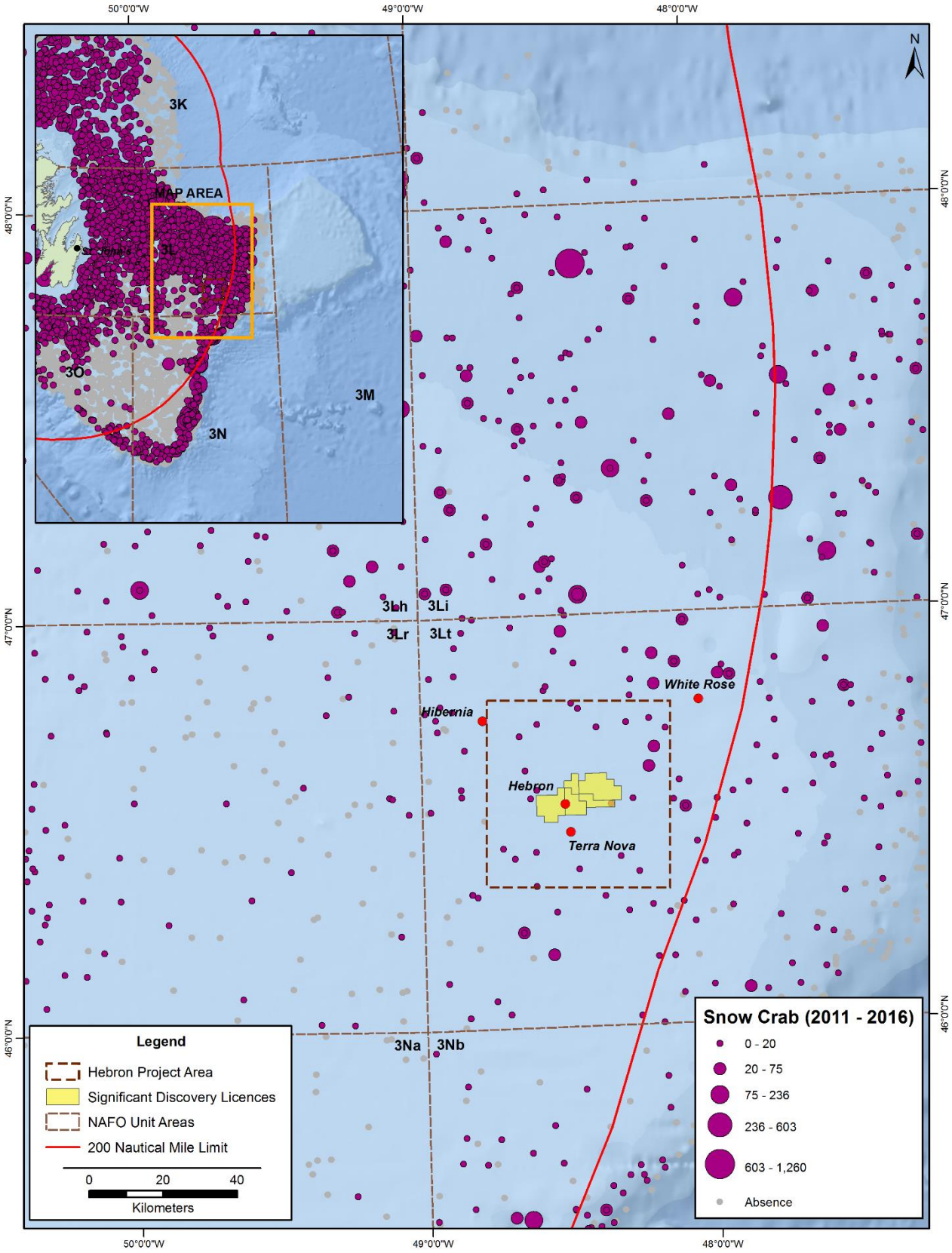


Figure 3-5 Abundance Map, Snow Crab Counts(2011-2016)

A number of fisheries survey programs by government and/or industry also occur in parts of the Eastern Newfoundland Offshore Area, including DFO Multispecies Research Vessel (RV) Trawl Surveys, which comprise annual (spring and fall) standardized bottom-trawl surveys to collect information for managing and monitoring fish resources in the Newfoundland and Labrador Region. Table 3.1 shows the typical schedule for DFO's surveys. ExxonMobil will discuss the outlined project component planned for 2019 through existing and relevant forums (such as the One Ocean initiative) as discussed in Section 2.2.

Table 3.1 DFO RV Surveys off Eastern Newfoundland

Vessel	Activity	NAFO Division	Time Frame
CCGS Needler	NL Spring Survey	3P	March-June
		3P	
		3P+3O	
		3O+3N	
		3L+3N	
	Shellfish Survey	2J+4R	August-September
	NL Fall Survey	3O	September-December
		3O+3N	
		3N+3L	
		3L	
		3K+3L	
CCGS Teleost	NL Spring AZMP[1]	3L	April
	Capelin Survey	3KL	May
	NL Summer AZMP[1]		July
	NL Fall Survey	2H	October-December
		2H+2J	
		2J+3K	
		3K	
		3K+3L Deep	

[1] Atlantic Zone Monitoring Program

There is also an annual Industry - DFO Collaborative Post-season Trap Survey for snow crab in NAFO Divisions 2J3KLOPs4R, which is conducted using commercial and modified snow crab traps at established trap stations starting in late August or early September after the commercial snow crab season has ended (Figure 3.14). For 2018, no halibut survey locations were within the Project Area but several of the crab survey locations were within the Project Area (Figure 3-6). ExxonMobil will again consider these in consultation via One Ocean in planning and undertaking its activities.

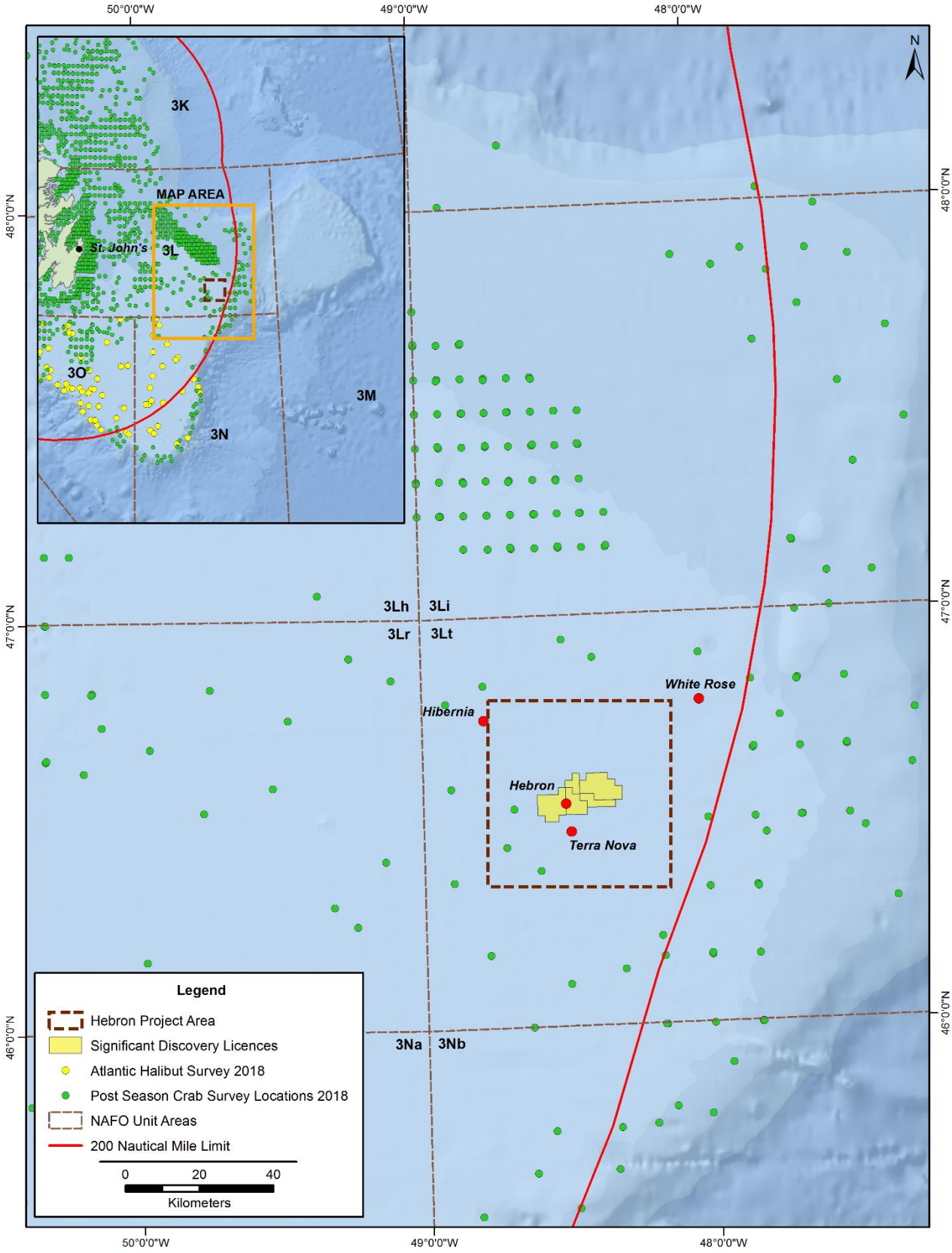


Figure 3-6 Locations of Industry – 2018 DFO Atlantic Halibut and Post-Season Snow Crab Survey Stations

3.2 Species at Risk

The Canadian *Species at Risk Act* (SARA) provides for the protection of species at the national level to prevent extinction and extirpation, facilitate the recovery of endangered and threatened species, and to promote the management of other species to prevent them from becoming at risk in the future. Designations under the *Act* follow the recommendations and advice provided by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

There are currently a number of schedules associated with the *SARA*. Species that have formal protection are listed on Schedule 1, which includes the following potential designations:

- *Extirpated*: A species that no longer exists in the wild in Canada, but exists elsewhere;
- *Endangered*: A species that is facing imminent extirpation or extinction;
- *Threatened*: A species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction; and
- *Special Concern*: A species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

Schedule 1 of *SARA* is the official federal list of species at risk in Canada. Once a species is listed, measures to protect and recover a listed species are established and implemented, including the development of a Recovery Strategy. Action Plans summarize the activities required to meet recovery strategy objectives and goals, and Management Plans set goals and objectives for maintaining sustainable population levels of one or more species that are particularly sensitive to environmental factors.

At the provincial level, the Newfoundland and Labrador *Endangered Species Act* (*NL ESA*) provides protection for indigenous species, sub-species and populations considered to be endangered, threatened, or vulnerable within the province. These potential designations under the legislation are defined as follows:

- *Endangered*: A species that is facing imminent extirpation or extinction;
- *Threatened*: A species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction; and
- *Vulnerable*: A species that has characteristics which make it particularly sensitive to human activities or natural events.

Designations are based on recommendations from COSEWIC and/or the provincial Species Status Advisory Committee (SSAC). Habitat that is important to the recovery and survival of endangered or threatened species can also be designated as critical habitat or recovery habitat and protected under the *NL ESA*.

The following Table (Table 3.2) provides a listing of identified species at risk, as identified and

considered in the original EA and subsequent EA Updates, indicating their current designations under applicable legislation and by COSEWIC. As of November 2016, blue shark is no longer designated by COSEWIC. Species that are not included below but that may rarely occur in the Project Area are the red knot, harlequin duck, and short-eared owl. These are largely shore-bound species but have been seen very rarely by surveys in offshore Newfoundland. Cells shaded in grey are species that have been added since the previous EA amendment.

Table 3.2 Species at Risk or Otherwise of Special Conservation Concern (Current Designations - updated January 2019)

Species		Status / Designation [1,2]			Relevant Population (Where Applicable)
Common Name	Scientific Name	NL ESA	SARA	COSEWIC	
Fish					
Acadian redfish	*Sebastes fasciatus*			T	Atlantic (COSEWIC)
American eel	*Anguilla rostrata*	V		T	
American plaice	*Hippoglossoides platessoides*			T	NL (COSEWIC)
Atlantic bluefin tuna	*Thunnus thynnus*			E	
Atlantic cod	*Gadus morhua*			E	NL (COSEWIC)
Atlantic halibut	*Hippoglossus hippoglossus*			NR	
Atlantic salmon	*Salmo salar*			T, SC, E	South Newfoundland, Quebec Eastern North Shore, Quebec Western North Shore, Anicosti Island, Inner St. Lawrence, Gaspe-Southern Gulf of St. Lawrence, Eastern Cape Breton, Nova Scotia Southern Upland (COSEWIC)
Barndoor skate	*Dipturus laevis*			NR	
Basking shark	*Cetorhinus maximus*			SC	Atlantic (COSEWIC)
Blue shark	*Prionace glauca*			NR	Atlantic (COSEWIC)
Common lumpfish	*Cyclopterus lumpus*			T	Atlantic (COSEWIC)
Cusk	*Brosme brosme*			E	
Deepwater redfish	*Sebastes mentella*			T	Northern (COSEWIC)
Northern wolffish	*Anarhichas denticulatus*		T	T	
Porbeagle	*Lamna nasus*			E	
Roughhead grenadier	*Macrourus berglax*			SC	

Species		Status / Designation [1,2]			Relevant Population (Where Applicable)
Common Name	**Scientific Name**	**NL ESA**	**SARA**	**COSEWIC**	
Roundnose grenadier	*Coryphaenoides rupestris*			E	
Shortfin mako	*Isurus oxyrinchus*			SC	Atlantic (COSEWIC)
Smooth skate	*Malacoraja senta*			E	Funk Island Deep (COSEWIC)
Spiny dogfish	*Squalus acanthias*			SC	Atlantic (COSEWIC)
Spotted wolffish	*Anarhichas minor*		T	T	
Striped wolffish	*Anarhichas lupus*		SC	SC	
Thorny skate	*Amblyraja radiata*			SC	Canada
White hake	*Urophycis tenuis*			T	Atlantic and Northern Gulf of St. Lawrence (COSEWIC)
White shark	*Carcharodon carcharias*		E	E	Atlantic (COSEWIC/SARA)
Winter skate	*Leucoraja ocellata*			E	Eastern Scotian Shelf – Newfoundland (COSEWIC)
Birds					
Ivory gull	*Pagophila eburnea*	E	E	E	
Ross's gull	*Rhodostethia rosea*		T	T	
Red-necked phalarope	*Phalaropus lobatus*			SC	
Marine Mammals					
Blue whale	*Balaenoptera musculus*		E	E	Atlantic (COSEWIC)
North Atlantic right whale	*Eubalaena glacialis*		E	E	
Bowhead whale	*Balaena mysticetus*			SC	Eastern Canada-West Greenland (COSEWIC)
Fin whale	*Balaenoptera physalus*		SC	SC	Atlantic (COSEWIC)
Northern bottlenose whale	*Hyperoodon ampullatus*		E	E, SC	Scotian Shelf, Davis Strait-Baffin Bay-Labrador Sea (COSEWIC)
Sowerby's beaked whale	*Mesoplodon bidens*		SC	SC	
Killer whale	*Orcinus orca*			SC	Northwest Atlantic-Eastern Arctic (COSEWIC)
Beluga whale	*Delphinapterus leucas*		E	E	St. Lawrence Estuary (COSEWIC)

Species		Status / Designation [1,2]			Relevant Population (Where Applicable)
Common Name	**Scientific Name**	**NL ESA**	**SARA**	**COSEWIC**	
Harbour porpoise	*Phocoena phocoena*		T	SC	Northwest Atlantic (COSEWIC)
Sea Turtles					
Leatherback sea turtle	*Dermochelys coriacea*		E	E	Atlantic (COSEWIC)
Loggerhead sea turtle	*Caretta caretta*		E	E	

[1] Not at Risk (NR), Least Concern (LC), Vulnerable (V), Near Threatened (NT), Special Concern (SC), Threatened (T), Endangered (E), Critically Endangered (CE)

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

Grey-shaded cells indicated additions to this list since the 2018 EA report.

New proposed critical habitat for spotted and northern wolffish was set out in 2018 (DFO 2018), primarily along the northeast shelf and slopes of the Grand Banks (Figure 3-7). No overlap exists between the Hebron Project Area and the established critical habitats (Figure 3-7).

The planned 2019 activities associated with the Project will not result in any increases or other changes in the Project's potential to interact with, or have negative effects upon, key or particularly sensitive species (including any that are designated as being species at risk) or habitats.

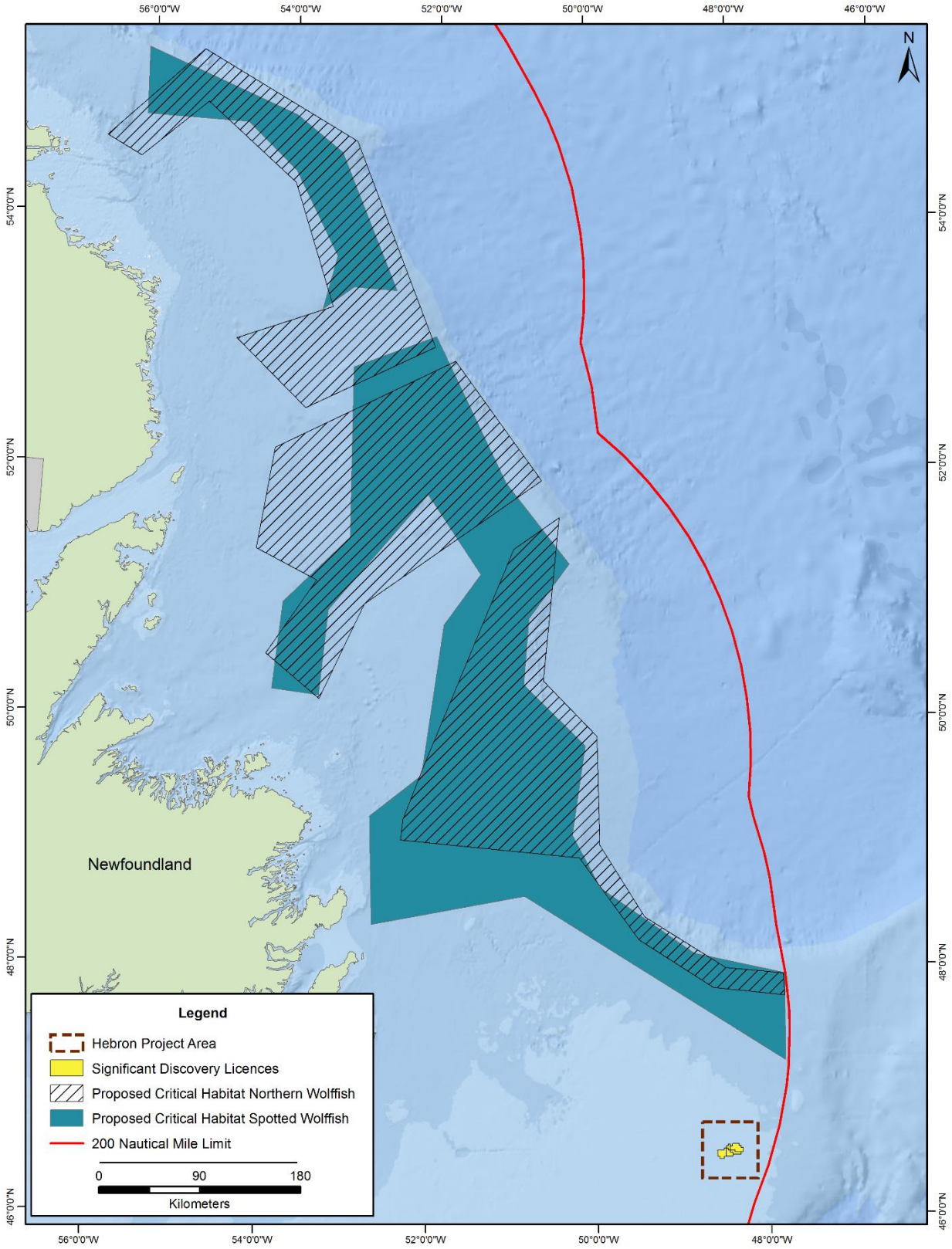


Figure 3-7 Proposed critical habitat for both the spotted and northern wolffish in relation to the Hebron project area

3.3 Applicability of Associated Environmental Effects Analysis and Identified Mitigation

The nature and scope of the planned 2019 activities associated with the Hebron Project and those which have been updated and further defined since the original CSR (as described earlier in this document) are again in keeping with the scope of the Project as described, assessed and approved under the EA process for the Project and/or with the effects predictions and mitigations outlined in the CSR.

Each of the environmental issues, potential effects and associated mitigations measures (as reflected in the CSR and subsequent EA submissions) therefore remain applicable to the nature and scope of the planned 2019 Project activities.

These mitigations will continue to be implemented in accordance with ExxonMobil's commitments and obligations pursuant to the Project's EA approval and other applicable legislative and regulatory requirements.

4 REFERENCES

DFO. 2018. Recovery Strategy for Northern Wolffish (*Anarhichas denticulatus*) and Spotted Wolffish (*Anarhichas minor*), and Management Plan for Atlantic Wolffish (*Anarhichas lupus*) in Canada [proposed]. Fisheries and Oceans Canada, Ottawa, ON, vii + 82 pp.

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