FINAL

ENVIRONMENTAL ASSESSMENT UPDATE:
Hibernia Project Operations 2019

Submitted to:

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1.0 INTRODUCTION

The Hibernia oil field is located offshore Newfoundland and Labrador, Canada in the Jeanne d'Arc Basin which underlies the northwestern portion of the Grand Banks, approximately 315 kilometres east-southeast of St. John's (Figure 1.1). The oil field was first discovered in 1979 and consists of two principal reservoirs - Hibernia and Ben Nevis-Avalon – and is located in water depths of approximately 80 metres. The Hibernia development was subject to a detailed and comprehensive Environmental Assessment (EA) review in the mid-1980s, pursuant to the requirements of the EA review processes in place at that time. The development phase of the overall Hibernia Project commenced in late 1990 and continued until the eventual mating of the Project's gravity based structure (GBS) and its topsides at Bull Arm NL in 1997, after which the platform was towed to and installed at its site on the Grand Banks in June of that year. Commercial production from the Hibernia oil field commenced in November 1997 and is on-going, along with associated environmental management and regular environmental effects monitoring (EEM) and reporting activities.

In recent years, the Hibernia development has been further expanded to include the Hibernia Southern Extension (HSE), a subsea development consisting of various water injection wells connected to the Hibernia platform by subsea flowlines. As part of planned future extensions to the Hibernia development, a separate and subsequent EA review for the Hibernia Drill Centres Construction and Operations Program (CEAR No. 08-01-42279) was completed pursuant to the requirements of the Canadian Environmental Assessment Act (CEAA). That EA review commenced with the Proponent's submission of a Project Description to the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) in August 2008, which was followed by determinations by relevant government departments and agencies regarding their respective regulatory interests in the Project, associated EA track decisions, and the eventual issuance of an EA Scoping Document by the C-NLOPB for the required Screening-level EA review of the Project. The Proponent subsequently prepared and submitted an EA Report for the Project in December 2008, which was subject to review and comment by relevant agencies and organizations, followed by subsequent requests for, and the submission and review of, additional information which continued to September 2009. On September 21, 2009 the relevant EA regulators issued the EA determination for the Project, which stated that the EA documentation "describes the Project in sufficient detail and provides an acceptable assessment of the potential environmental effects of the Project" and that "the proposed project, following the application of mitigation measures, is not likely to cause significant adverse environmental effects". Associated development (drilling) activities at HSE subsequently commenced in 2013.

Since the above described EA process was completed and associated regulatory approvals for the Project were obtained, the Proponent has subsequently prepared and submitted a number of annual EA Updates for the Project. This includes previous EA Updates, which provided an overview of planned Project activities for the upcoming year, updated any applicable environmental baseline information for key environmental components that had become available since the original EA 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 Hibernia Project Operations.

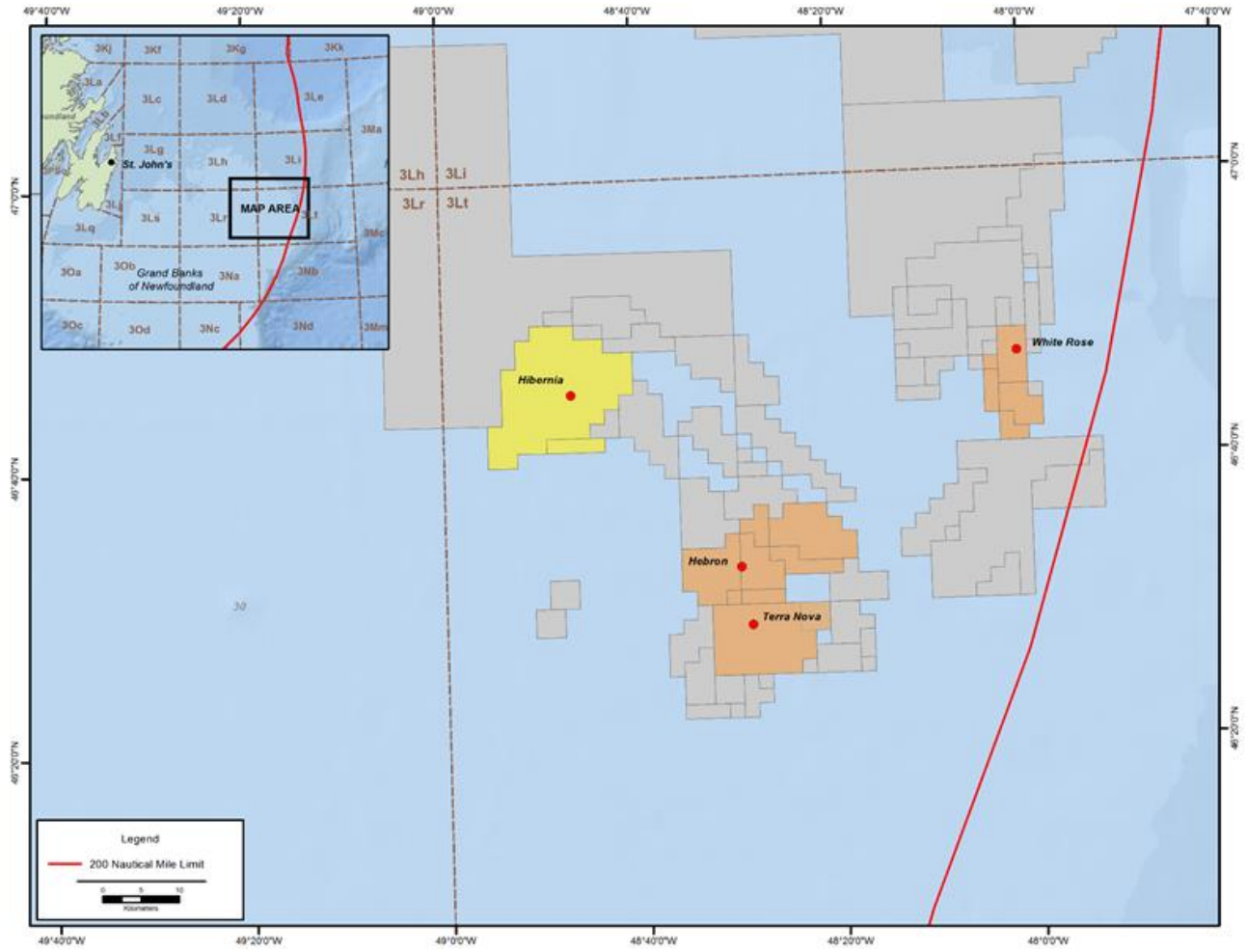

Figure 1-1: Hibernia Project Area

2.0 PROJECT DESCRIPTION

This section provides an overview of the various Project components and activities that are planned to occur in 2019. Standard routine production activities with associated inspection and maintenance activities are planned for 2019 and not discussed further. In addition, several non-standard activities are planned and include:

- Movement of cuttings pile
- Upgrade and maintenance activities related to the offshore loading system.
- Drilling Activities

Note that the development of the future tieback is not covered in this document but rather will be provided in a future EA Amendment. Activities that relate to the preparation works related to this development that are to occur in 2019, however, are included and discussed below.

2.1 Movement of Cuttings Pile

Due to previous and ongoing drilling activities conducted from the Hibernia GBS, two (2) piles of drill cuttings have formed along the base slab perimeter of the platform. The cuttings now partially or fully cover all the remaining J-tubes necessary for any subsea tie-back (Figure 2-1 and Figure 2-2). As such, it is necessary to relocate the cuttings from the nominated J-tubes and flowline corridors for inspection in advance of the next subsea tie-back development.

Figure 2-1: Photo showing how the cuttings pile is covering the J-tubes that are required to be exposed along the GBS base.

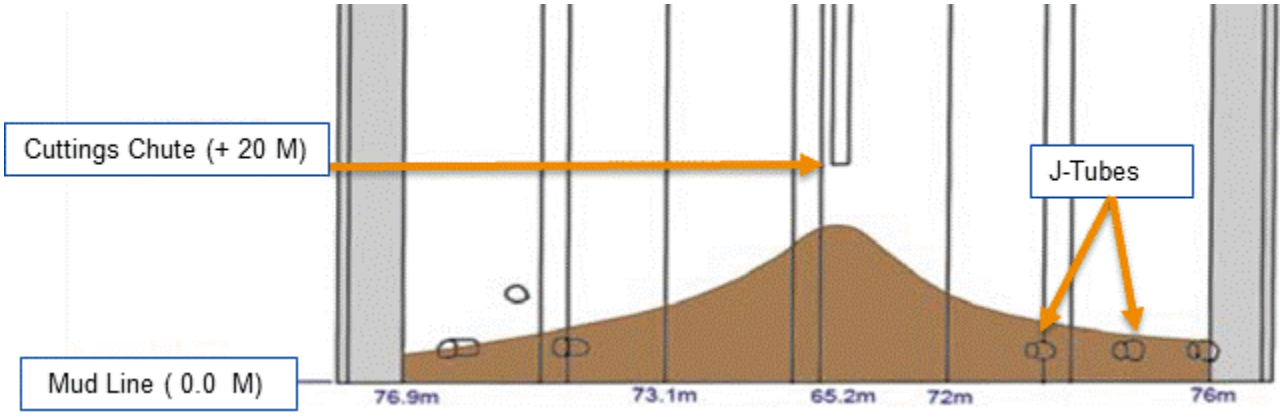

Figure 2-2: Schematic showing how the cuttings pile is covering the J-tubes that are required to be exposed along the GBS base. Water depths shown in meters.

Methods and Mitigations

It is planned to complete the cuttings relocation in 2019 using ROV which is equipped with a suction hose, pump and discharge hose. A support vessel will be used without the use of divers or a dive support vessel.

Mitigations have been put in place to reduce the amount of dispersion as well as keep the cuttings within the current cuttings pile footprint as much as possible. To reduce or eliminate potential adverse effects of material relocation, the drill cuttings pile was selected as the relocation site as it is a previously impacted area. The discharge hose outlet will be fixed in position with a clump weight to direct cuttings on top of the existing piles (Figure 2-3). The discharge hose will be positioned at the edge of the GBS on top of the existing cuttings pile by the ROV. The relocation site will be monitored by ROV. The pump will be started slowly and the rate increased or decreased as required to safely relocate material. Any secondary dispersion of fines in the surrounding area is expected to be minimal and within the existing footprint (largely delineated by the EEM sediment program).

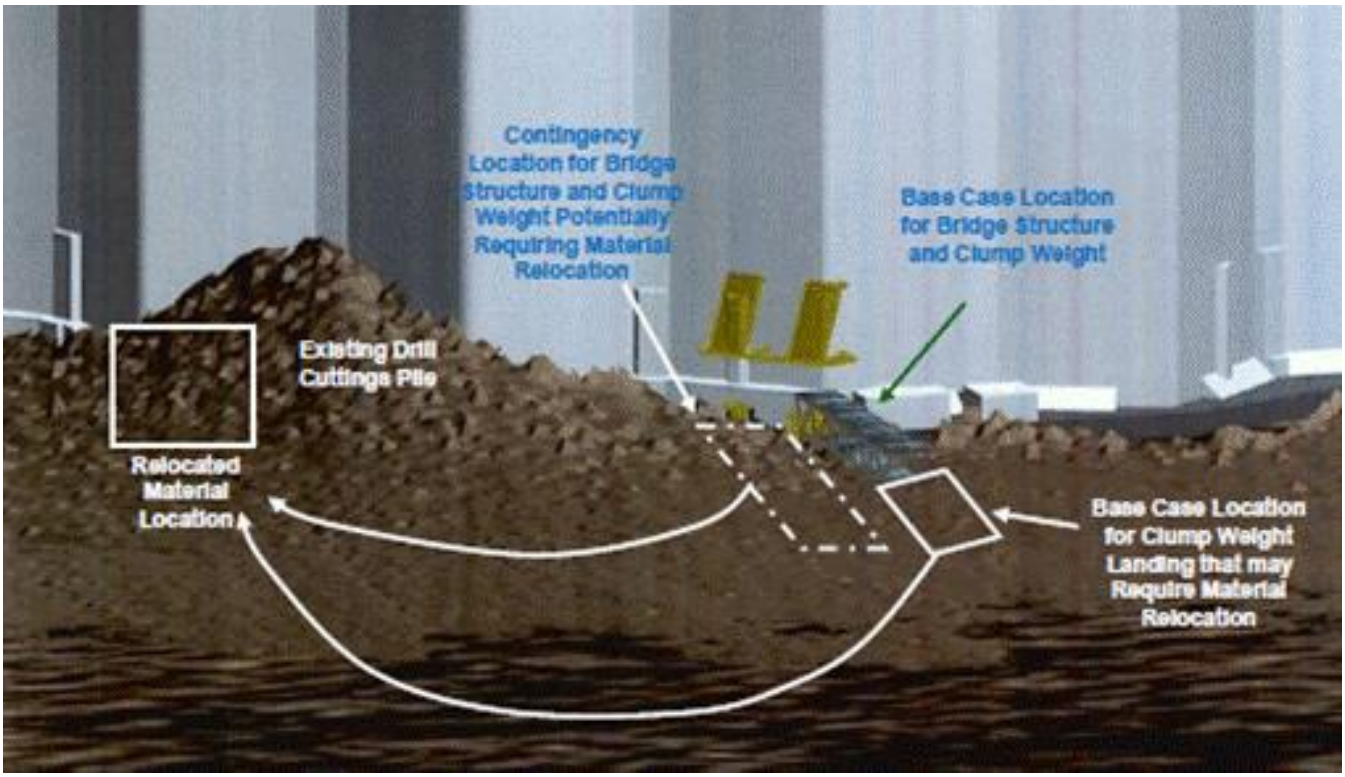

Figure 2-3: Schematic of the cuttings relocation operations

Potential Effects

With the mitigations in place, the effects are considered negligible. The majority of cuttings are expected to settle in the immediate area on top of the existing pile which presently extends out to 50-60 m from the GBS. Some dispersion of finer materials may occur beyond the existing footprint of the cuttings pile however the associated effect, if any, is predicted to be minor. The 1985 EIS, Vol IIIB predicted cuttings occurrence out to 200m and chemical detection of cuttings out to 500 m from the GBS. It also predicted the primary cuttings pile to extend 55-80 from the GBS. These predictions are aligned with anticipated dispersion of cuttings as a result of this activity. The handling of the cuttings has the potential to increase aeration and stimulate biodegradation. There is a low potential of sheen formation.

Environmental Monitoring Activities

Several real-time and follow-up monitoring activities are planned to confirm the effectiveness of mitigations that that the effects are as described above.

During the relocation of the cuttings, observations will be conducted at the onset of the work to detect sheens. If sheens are observed, they will be dispersed via mechanical dispersion by a second available vessel and reported to the CNLOPB. Also, during operations and immediately after, a ROV will monitor the entire cutting pile and perform a post cutting relocation survey. In addition, HMDC will be undertaking its EEM program in 2020 to help further assess effects that might be associated with the material relocation. The majority of the cuttings is expected to remain in the current cuttings pile footprint. However, any dispersion of fines in the surrounding area and outside of the current cuttings pile footprint is expected to be minimal and will be largely delineated by the EEM sediment program. Specifically, there are four EEM sediment sampling stations that are 250m from the base of the GBS.

2.2 Upgrades and Maintenance of the Offshore Loading System (OLS)

The Single Anchor Loading (SAL) Bases are the primary pieces of equipment for the Hibernia Offshore Loading System and are critical to the successful offloading of oil from the Hibernia GBS. The SAL bases are connected to marine hoses used for offloading oil from the platform to oil tankers.

Two important upgrades are planned for both the Northern and Southern SAL Bases. There will be an Acoustic Control System (ACS) basket replacement of the Northern SAL which will improve design and allow for in-situ hose replacement. In addition, the current Hose End Valve (HEV) will be replaced on the Southern SAL Base with a version that has a double seal reducing the possibilities of leaks and spills. There will be no additional discharges associated with these upgrades and maintenance to the OLS.

2.3 Drilling

In 2019, normal drilling and production operations will continue as usual on the Hibernia platform. There will be no drilling activity in the HSE drill center area in 2019. Drilling planned for 2019 will utilize water based mud (WBM) for upper well sections and synthetic based mud (SBM) with the drilled cuttings processed and injected using the platform cuttings re-injection system.

In addition, the West Aquarius will drill the NW Wedge appraisal well in 2019. The proposed location is Lat: 46°48'39.5441"N Long: 48°50'25.9372"W and the estimated bathymetry depth of the location is approximately 80 m. This well will consist of two riserless sections drilled with water-based fluids (1,067 mm and 660 mm) and two sections drilled with SBMs. SBM cuttings will be discharged per regulatory synthetic on cuttings (SOC) limit after processing through a cuttings dryer per the MODU Environmental Compliance Monitoring Plan (ECMP).

After evaluation, the well will be plugged and abandoned and all wellhead equipment recovered from the seafloor.

2.4 Consultations on 2019 Project Activities

As part of its on-going operations and activities associated with the Hibernia Operations,HMDC consults regularly with relevant individuals and stakeholders through existing and relevant forums (such as the One Ocean initiative) and conducts additional and specific engagements with applicable persons and groups if and as particular issues and requirements arise. Details on the various planned 2019 activities that are described in this EA Update will be further communicated to and discussed with these groups through the above described forums.

3.0 ENVIRONMENTAL SETTING, POTENTIAL INTERACITIONS AND MITIGATIONS

The original EA and subsequent EA Updates for the Project provided a detailed overview of the existing (baseline) environment within and around the proposed Project Area, including relevant aspects of the existing physical, biological and socioeconomic environments.

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

- Commercial Fisheries
- Species at Risk

3.1 Commercial Species

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 previous EA documentation 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, EA Report Section 4.2 and elsewhere). This included fisheries statistics and geospatial data up to 2007, with subsequent EA submissions and updates providing fisheries information up to 2013. 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. Fisheries mapping data for up to 2016 has recently been provided by DFO.

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 years 2012 to 2016 (i.e., the most recent 4 years for which data are available) within the grid square system described above. This includes Figures that show all recorded commercial fishing activity, followed by gear types (fixed or mobile gear) and fishing areas for key species that were fished near the Project Area within that five year period, and which have been considered and mapped in previous EA Updates.

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

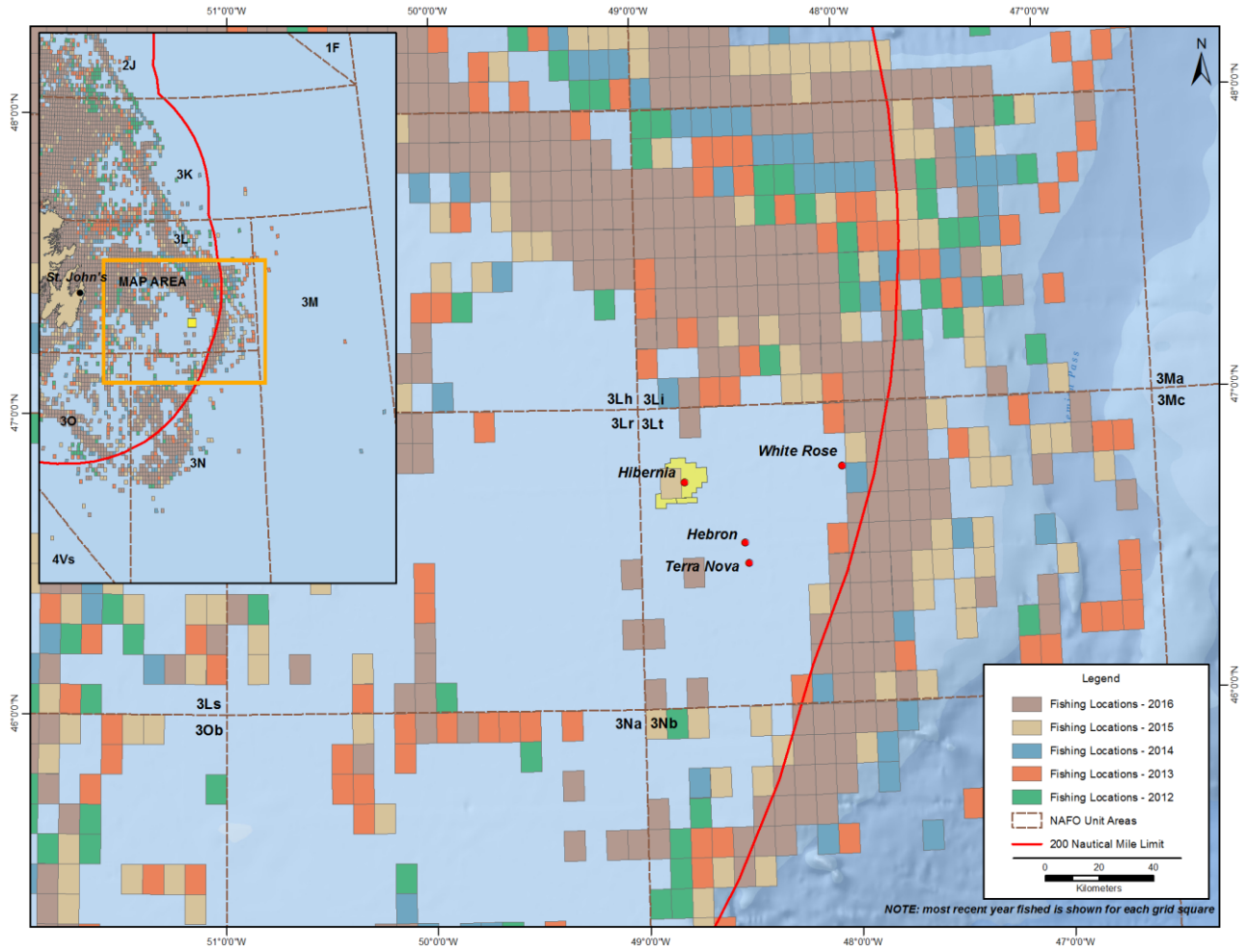

Figure 3-1: Commercial Fishing Locations, All Species (2012-2016)

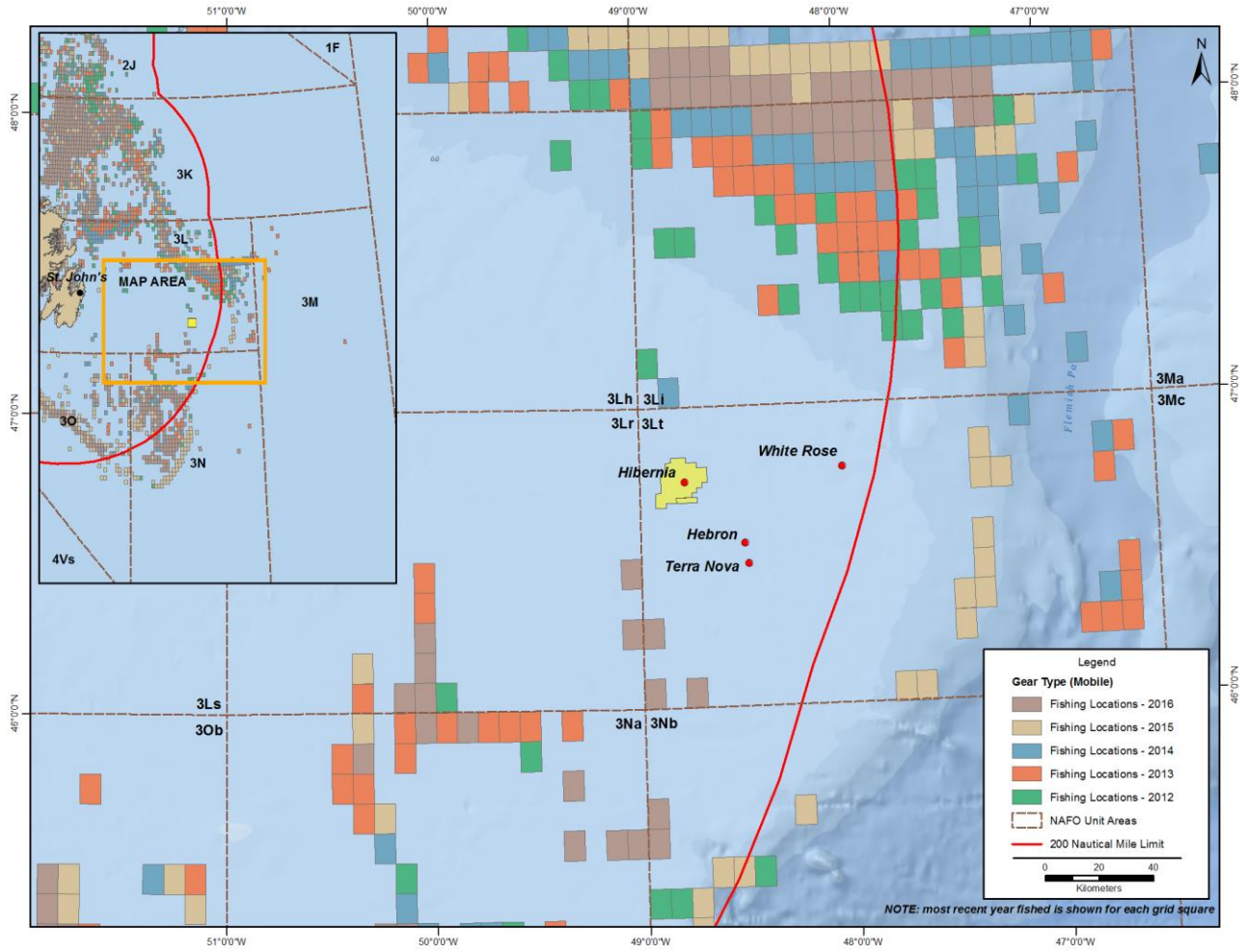

Figure 3-2: Commercial Fishing Locations, Mobile Gear Types (2012-2016)

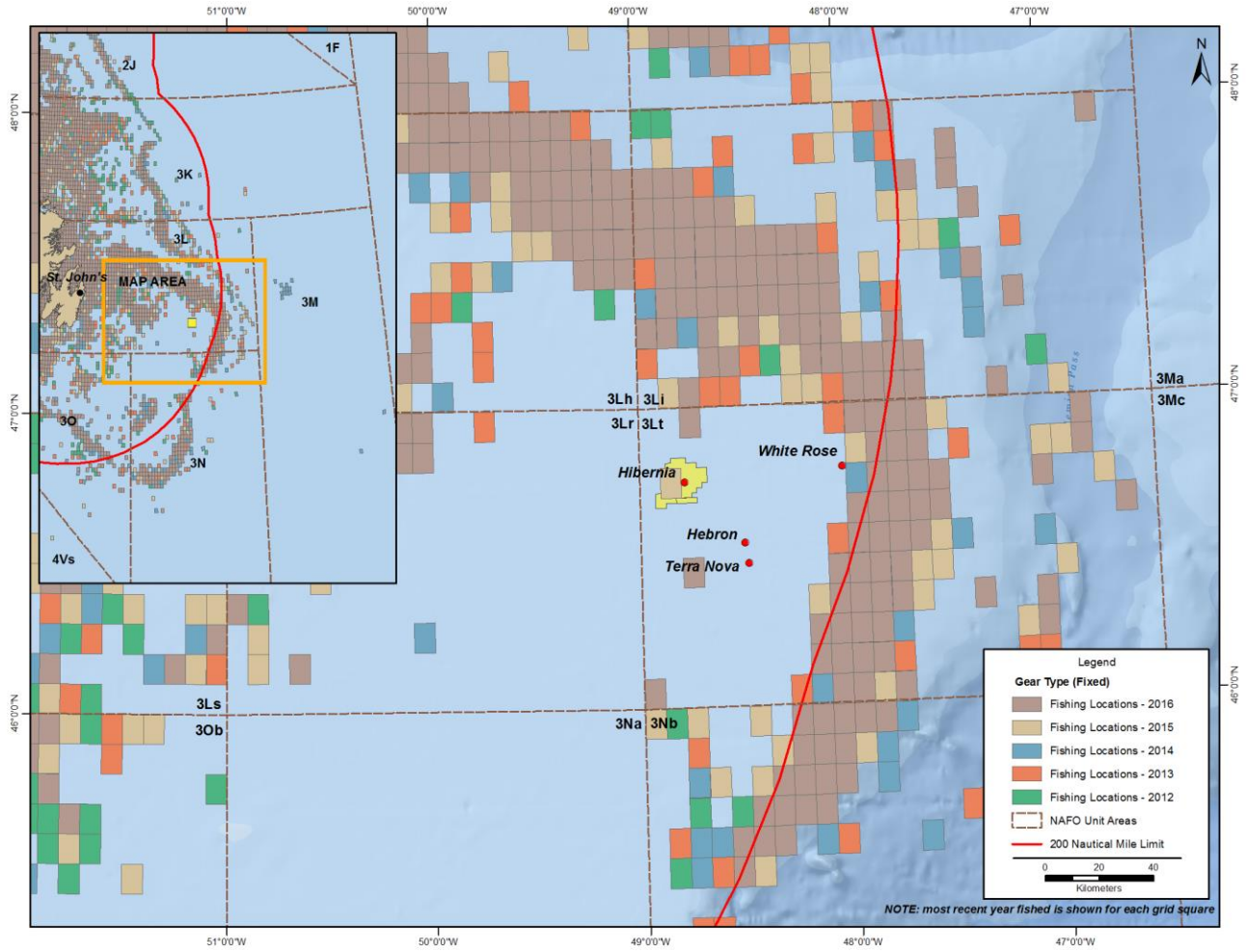

Figure 3-3: Commercial Fishing Locations, Fixed Gear Types (2012-2016)

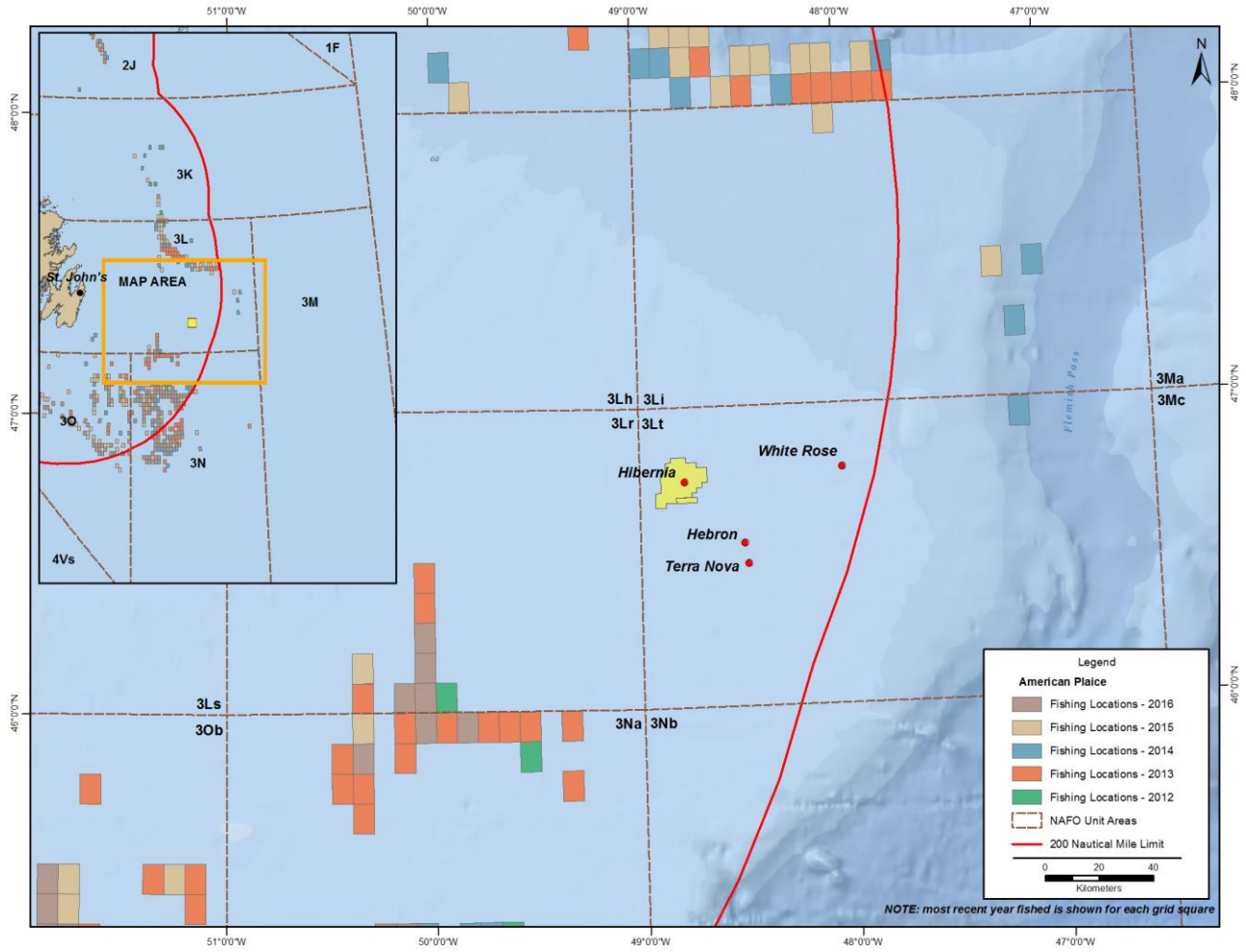

Figure 3-4: Commercial Fishing Locations, American Plaice (2012-2016)

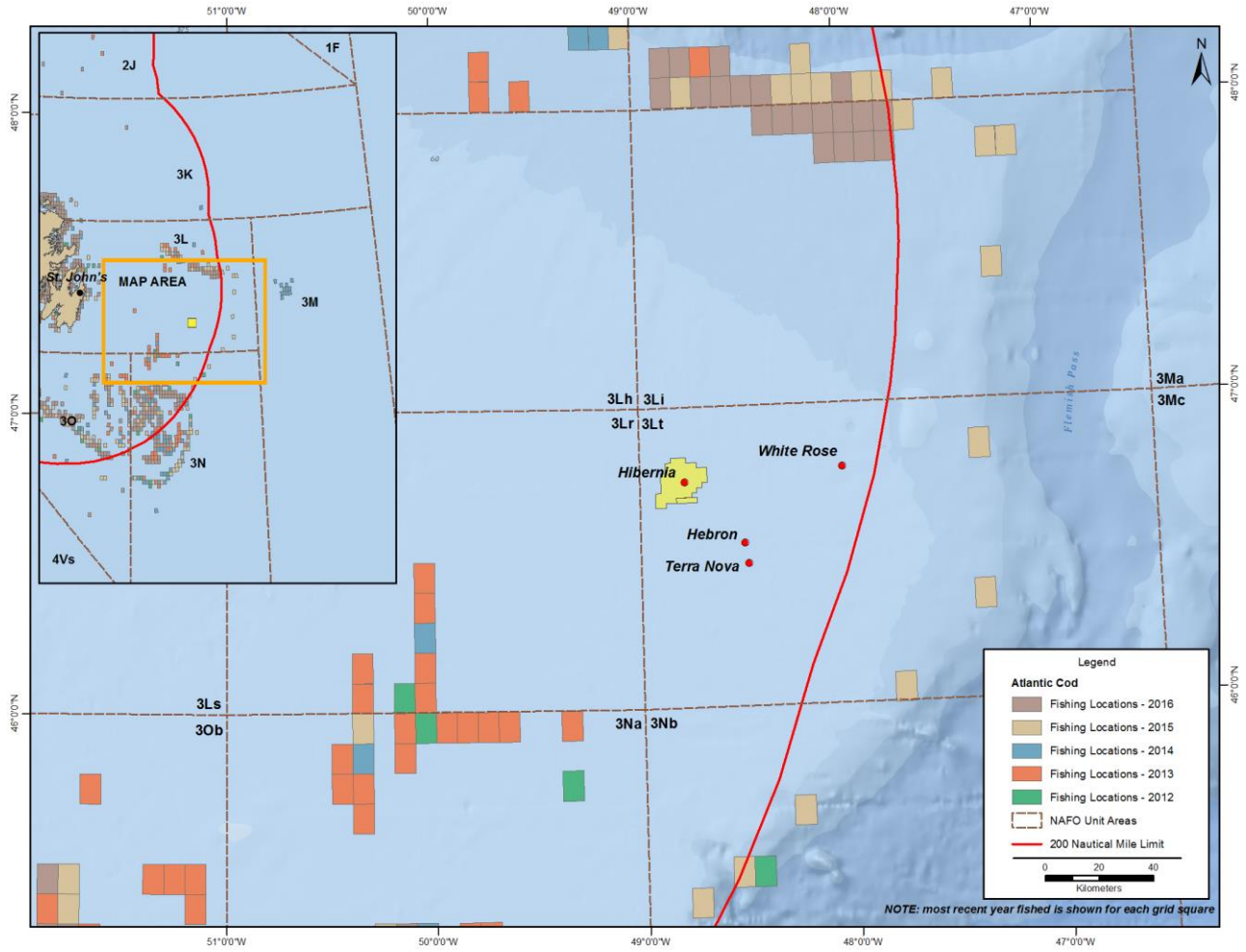

Figure 3-5: Commercial Fishing Locations, Atlantic Cod (2012-2016)

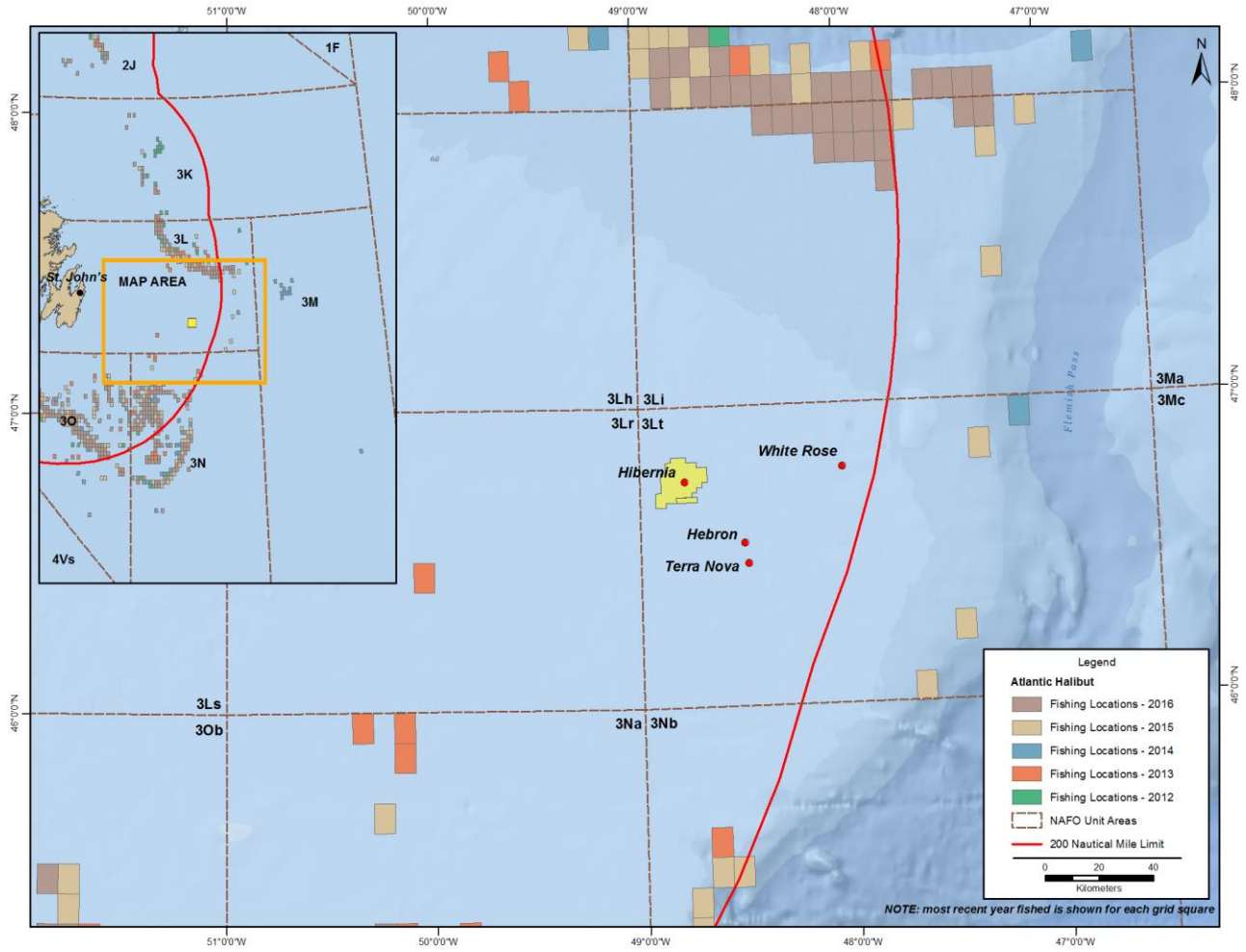

Figure 3-6: Commercial Fishing Locations, Atlantic Halibut (2012-2016)

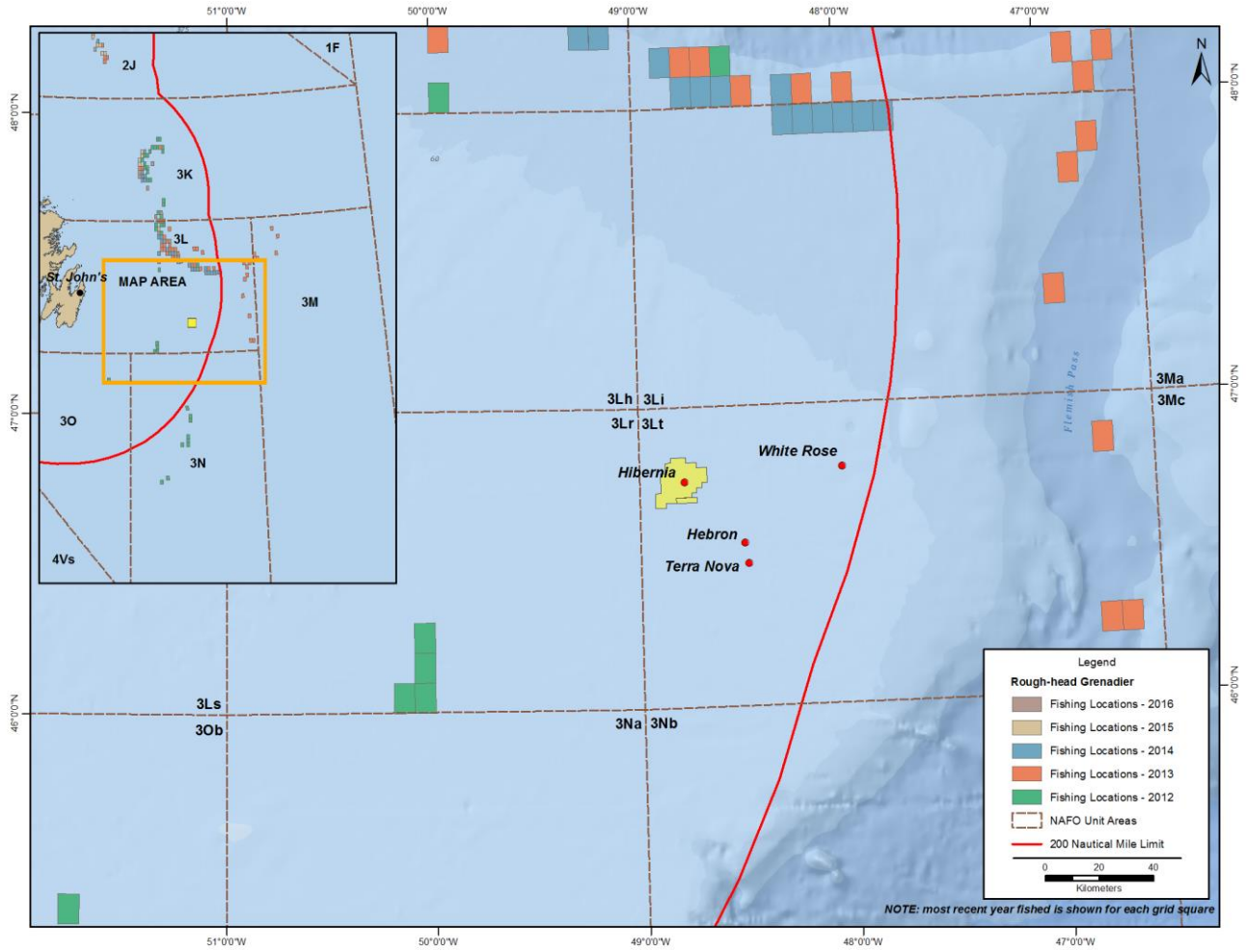

Figure 3-7: Commercial Fishing Locations, Rough-head Grenadier (2012-2016)

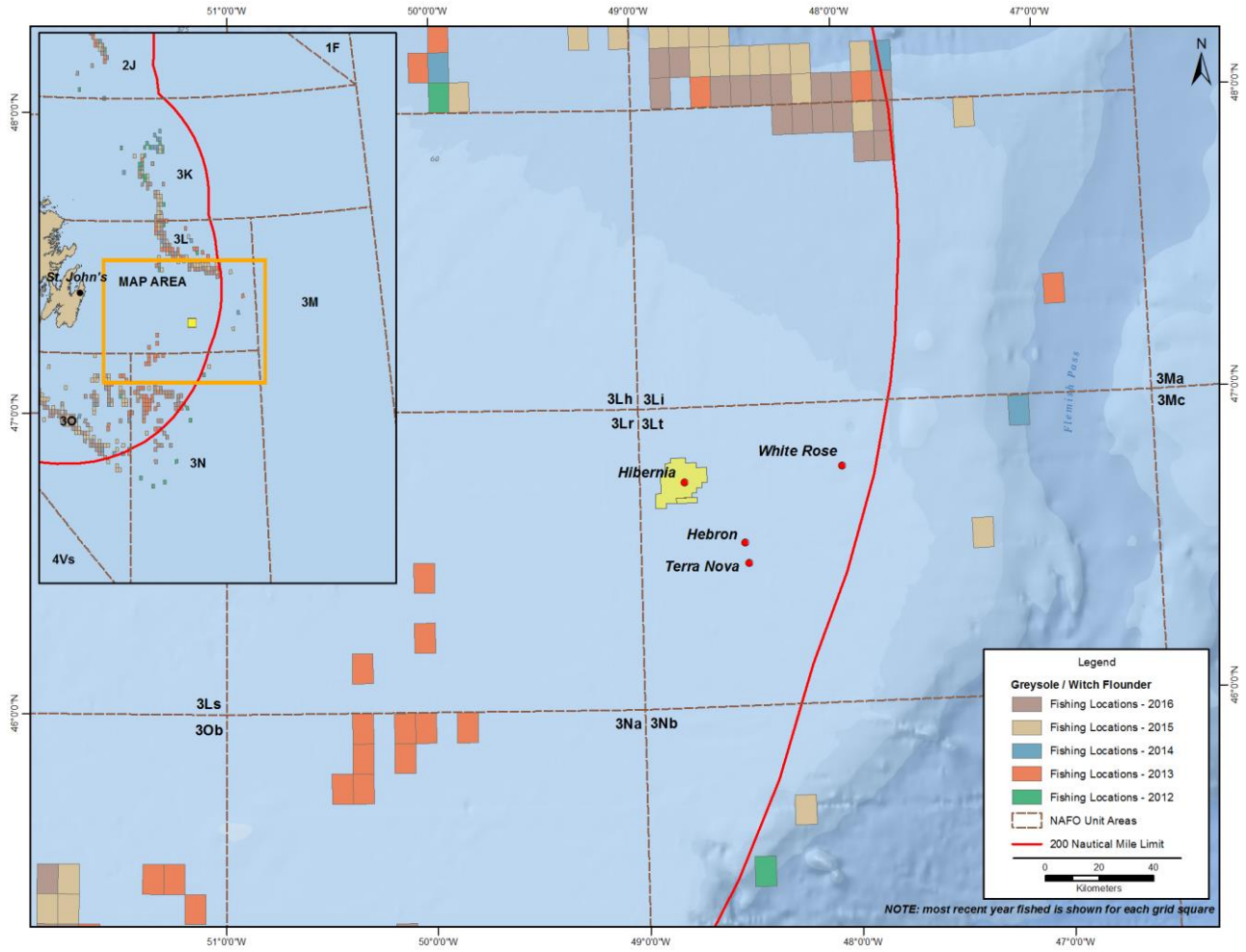

Figure 3-8: Commercial Fishing Locations, Grey Sole/Witch Flounder (2012-2016)

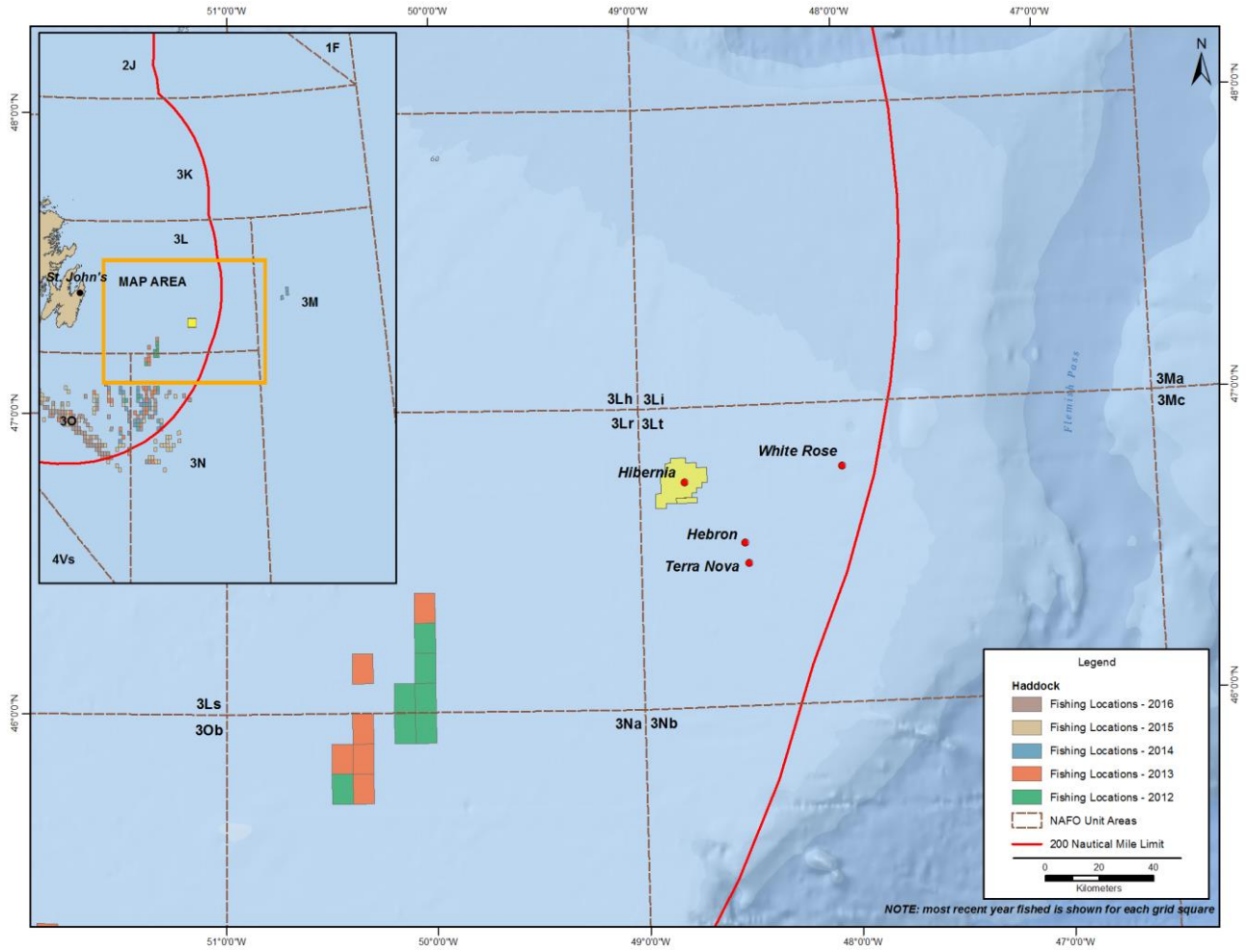

Figure 3-9: Commercial Fishing Locations, Haddock (2012-2016)

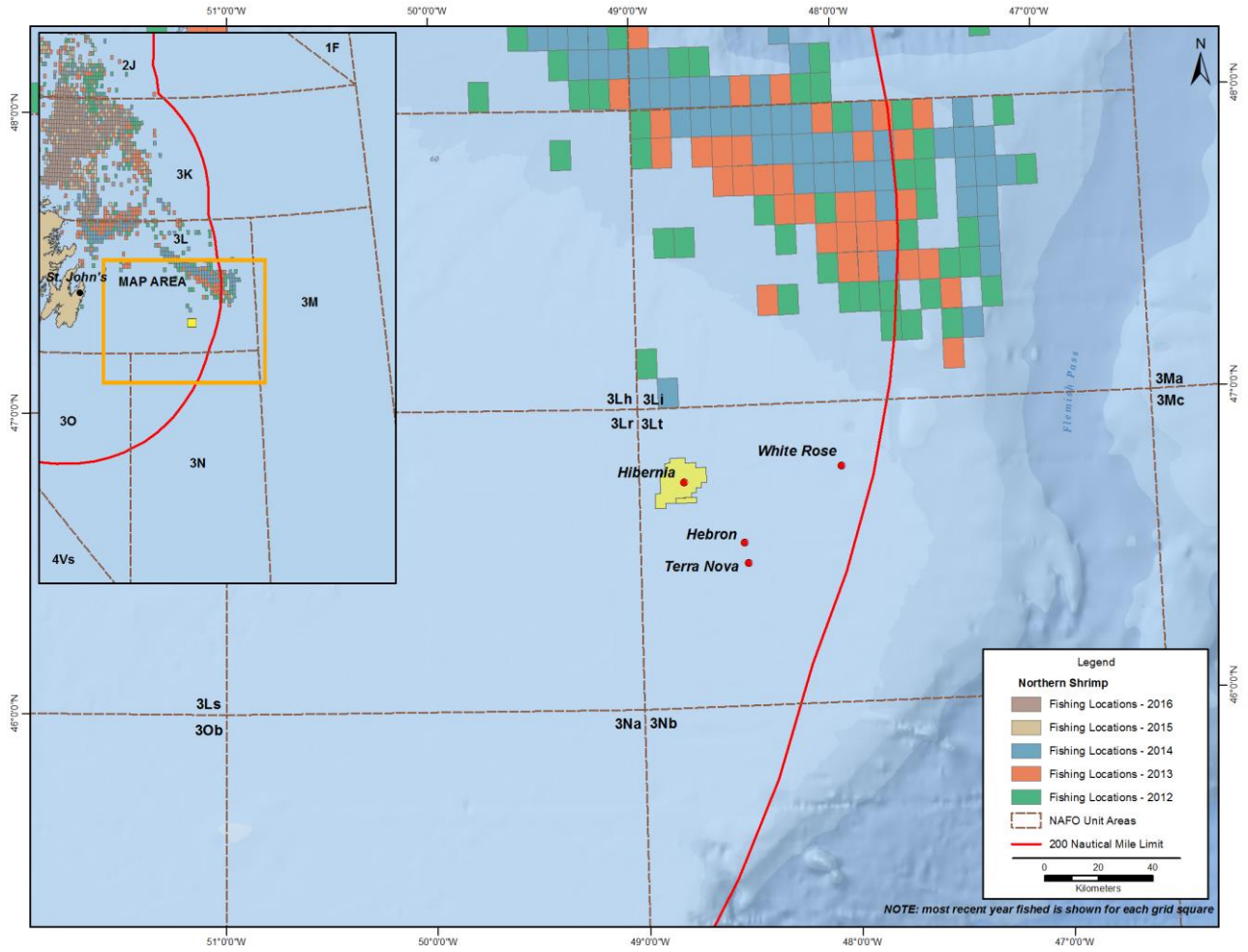

Figure 3-10: Commercial Fishing Locations, Northern Shrimp (2012-2016)

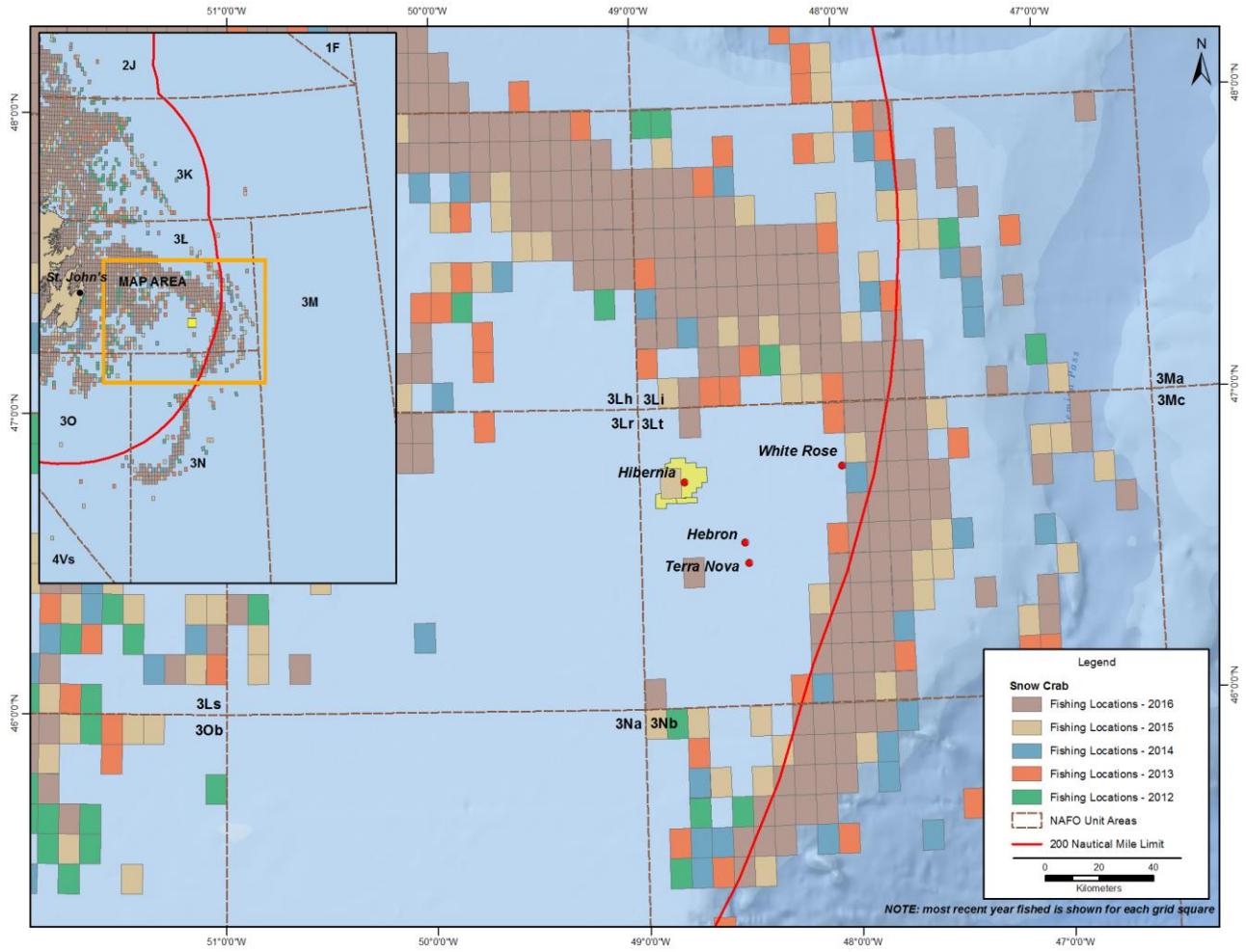

Figure 3-11: Commercial Fishing Locations, Snow Crab (2012-2016)

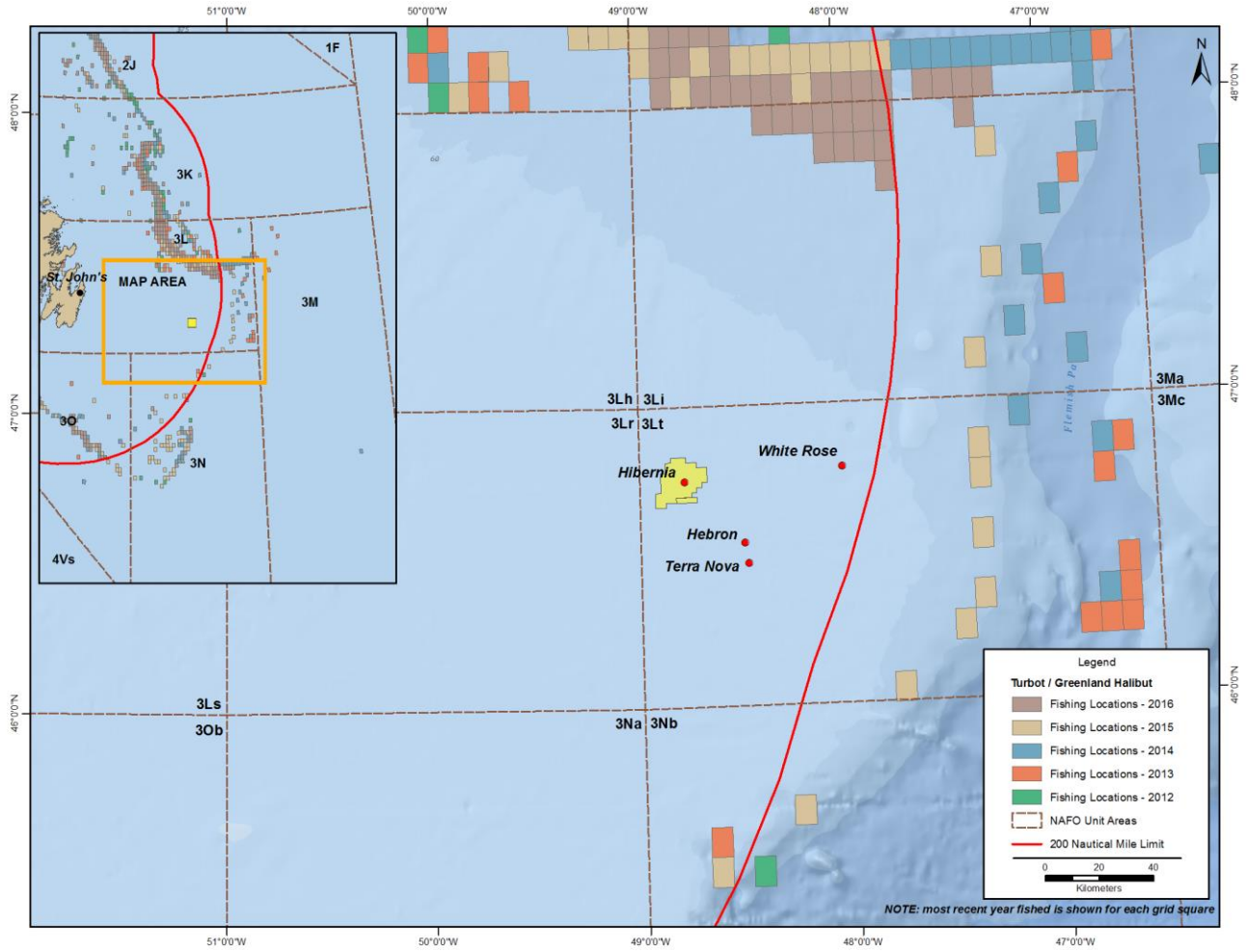

Figure 3-12: Commercial Fishing Locations, Turbot/Greenland Halibut (2012-2016)

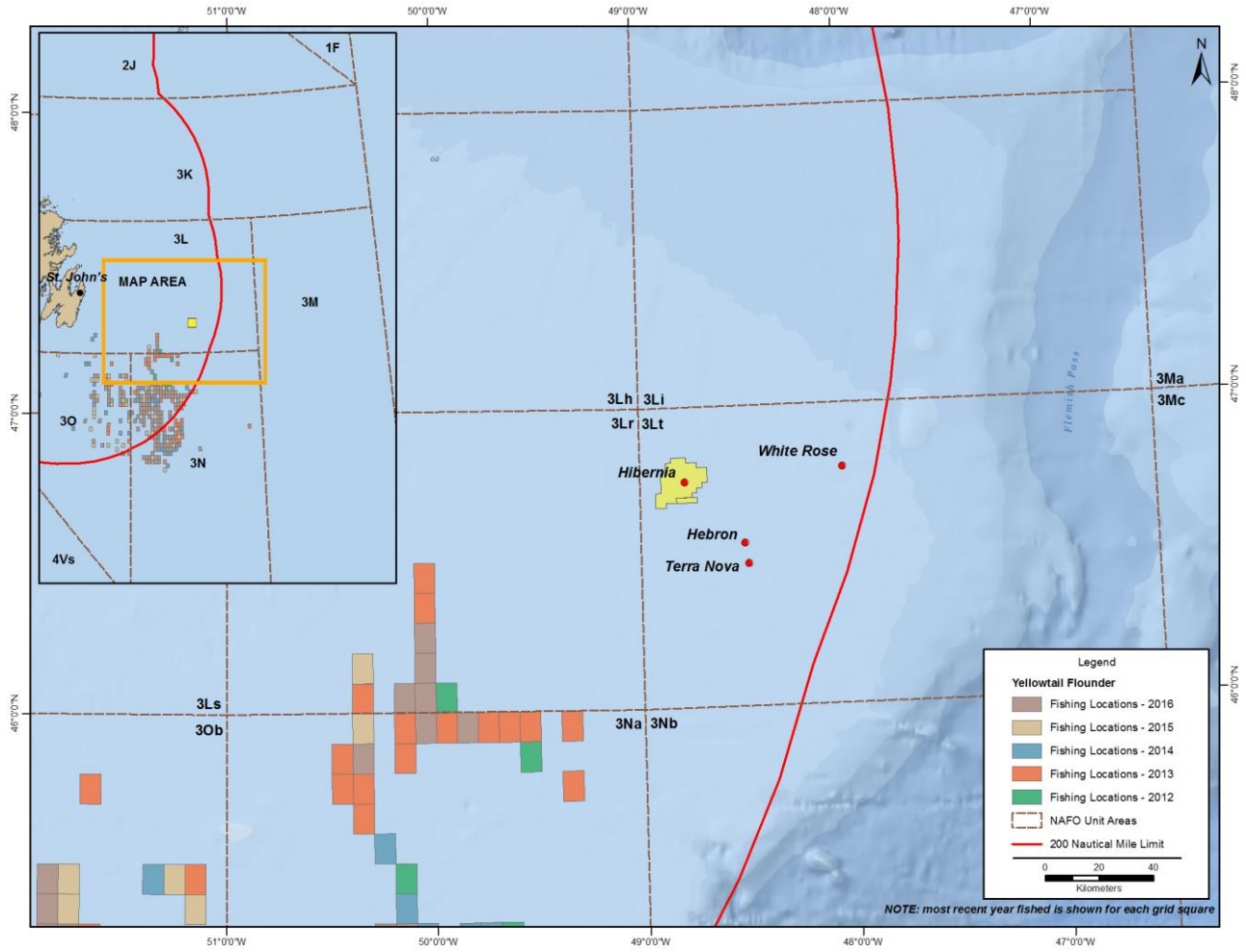

Figure 3-13: Commercial Fishing Locations, Yellowtail Flounder (2012-2016)

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. HMDC 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 3-14). HMDC will again consider these in consultation via One Ocean in planning and undertaking its activities.

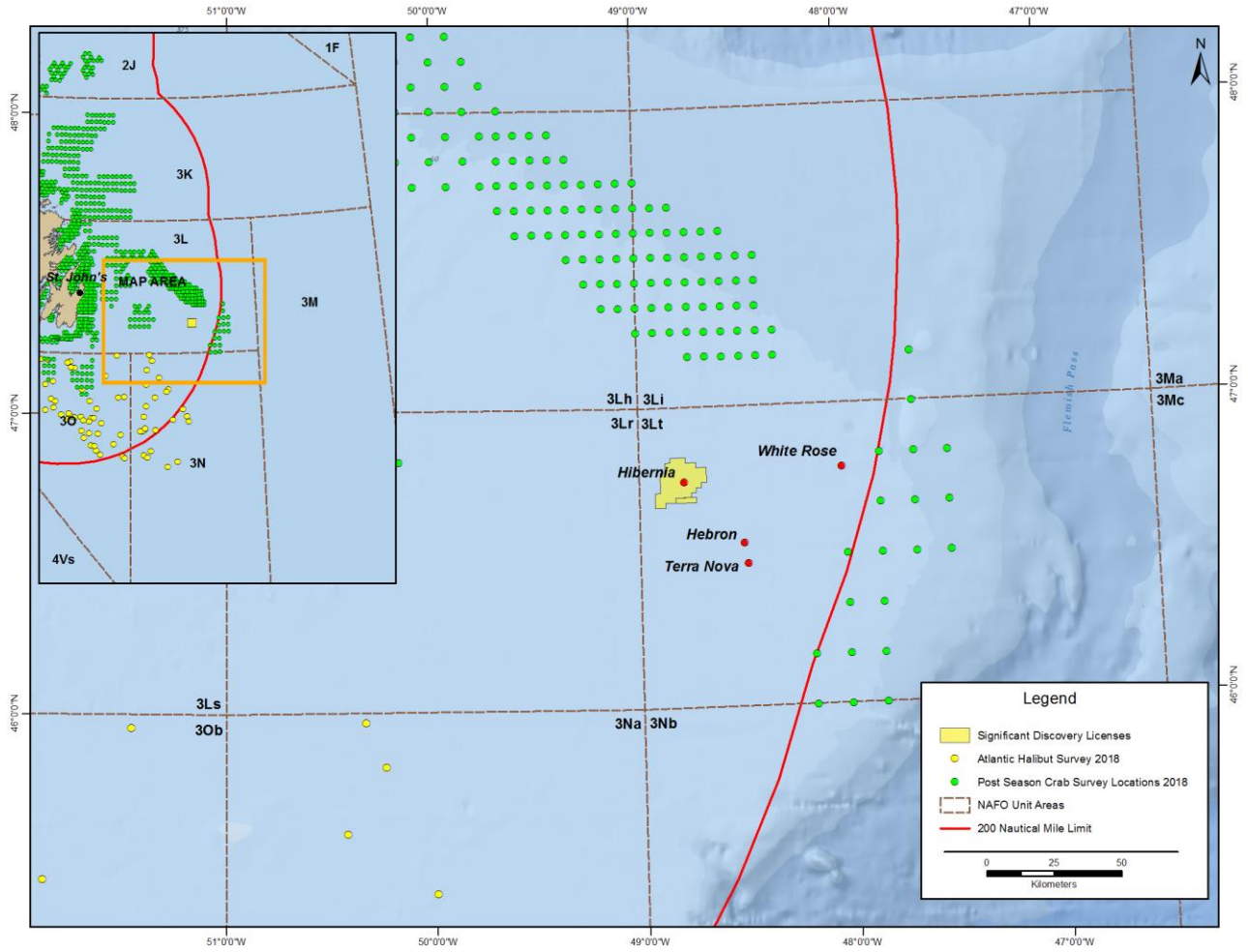

Figure 3-14: Location of Industry – 2018 DFO Atlantic Halibut and Post-Season Snow Crab Survey Locations

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	

Species		Status / Designation [1,2]			Relevant Population (Where Applicable)
Common Name	**Scientific Name**	**NL ESA**	**SARA**	**COSEWIC**	
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	
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	

Species		Status / Designation [1,2]			Relevant Population (Where Applicable)
Common Name	**Scientific Name**	**NL ESA**	**SARA**	**COSEWIC**	
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)
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 3-15). No overlap exists between the Hibernia Project Area and the established critical habitats (Figure 3-15).

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.

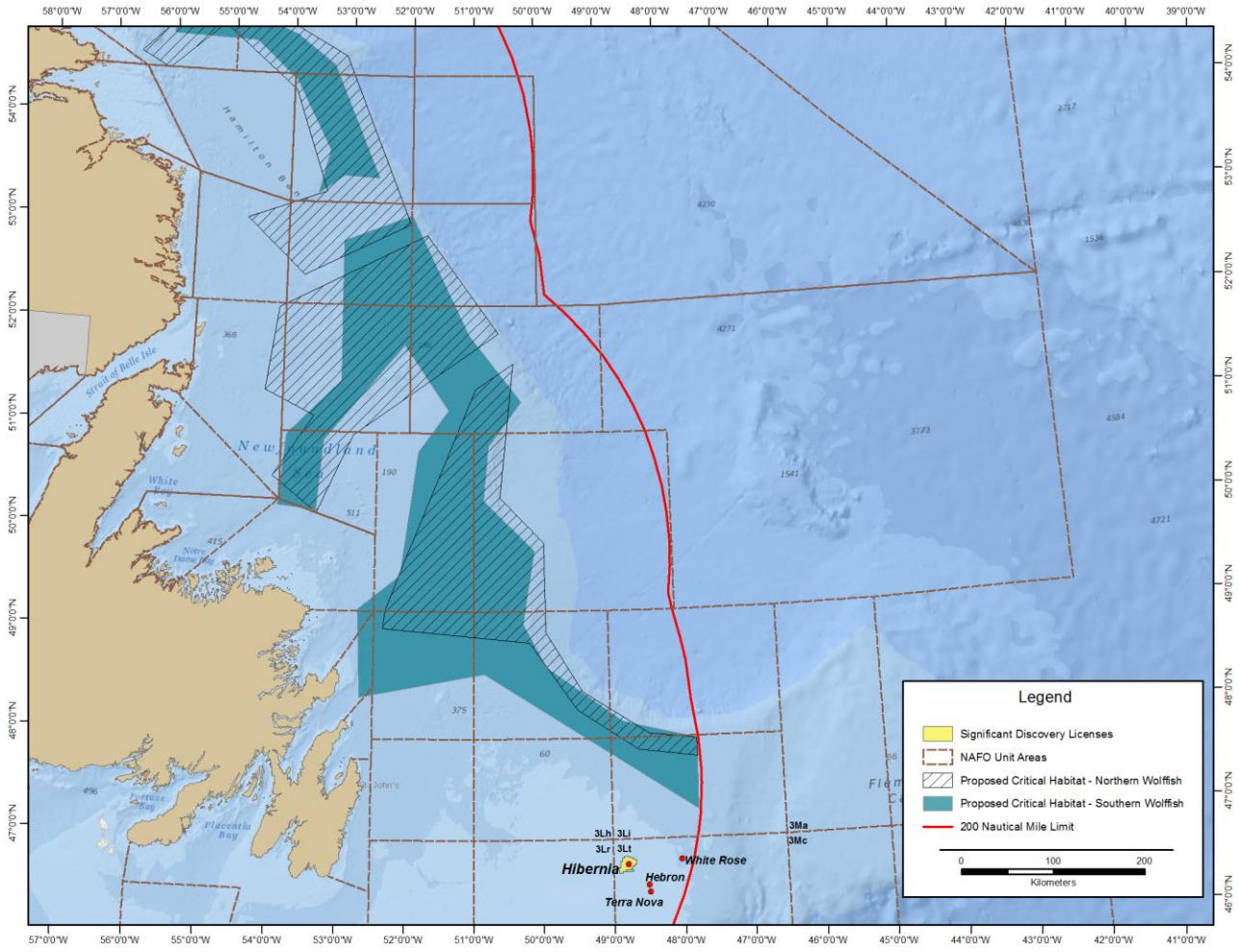

Figure 3-15: Proposed critical habitat for both the spotted and northern wolfish in relation to Hibernia project area.

3.3 Applicability of Associated Environmental Effects Analysis and Identified Mitigations

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

Each of the environmental issues, potential effects and associated mitigations measures (as reflected in the EA Report and subsequent EA submissions) therefore remain applicable to the nature and scope of the planned 2019 Project activities, including with regard to addressing any potential effects on species at risk and other marine biota and marine activities (including fisheries). In addition, several monitoring activities (ROV surveys, ongoing EEM program) will be used to validate those conclusions.

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