2016 ENVIRONMENTAL ASSESSMENT UPDATE

Hebron Project Comprehensive Study Report

FINAL 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.

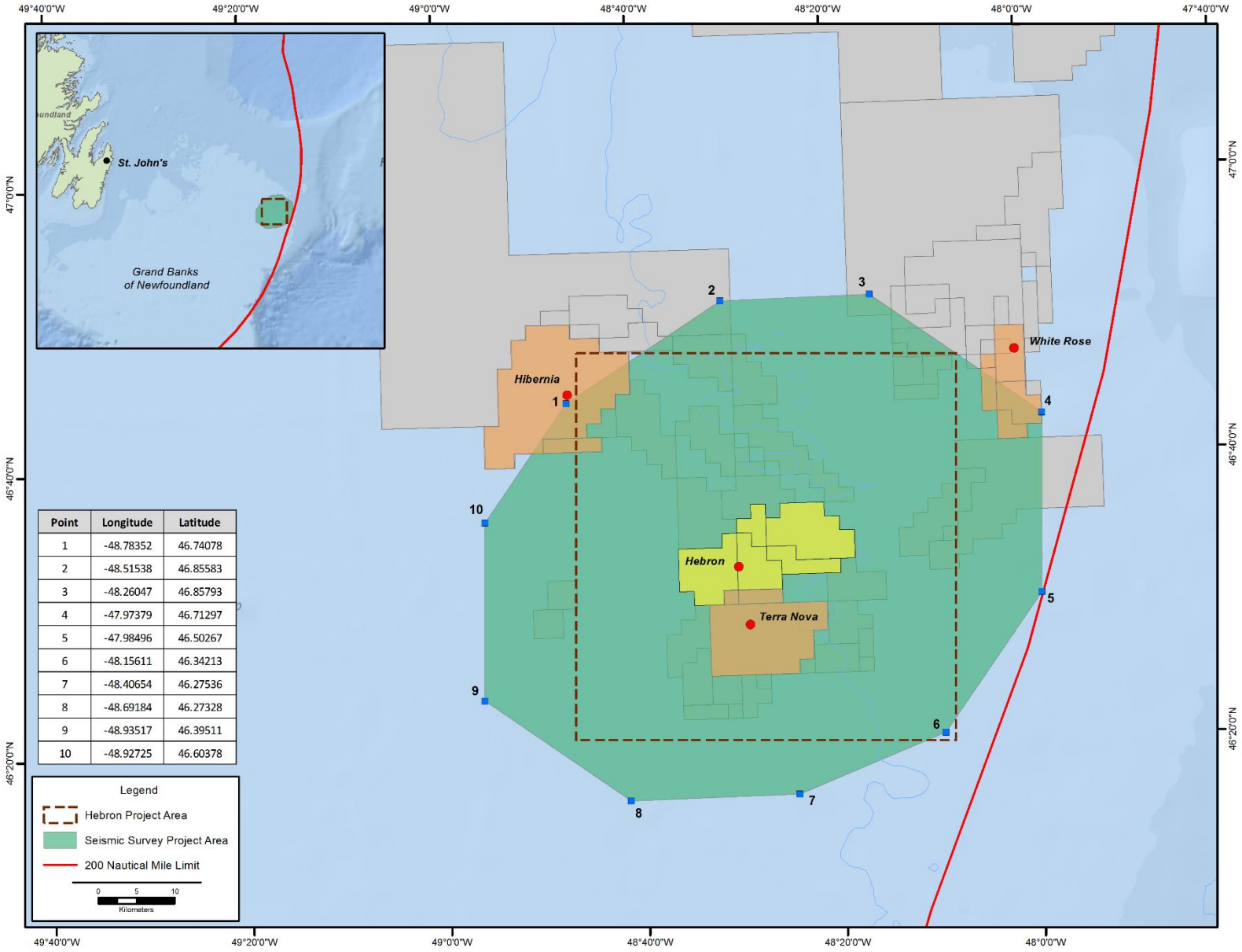
The Hebron field will be developed using a stand-alone concrete gravity based structure (GBS), which is being designed and constructed to store approximately 1.2 million barrels of crude oil. The GBS is currently under construction at Bull Arm, Newfoundland, with hook-up and commissioning activities planned to occur in 2016 and first oil currently being planned for 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). That process commenced with the Proponent's submission of a Project Description to the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB) in March 2009, 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. The Proponent subsequently prepared and submitted a Draft Comprehensive Study Report (CSR) for the Project in June 2010, 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 late 2011. 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 Comprehensive Study Report, 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 a number of 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, and in keeping with standard practice for offshore petroleum projects in the Newfoundland and Labrador Offshore Area, the Proponent has subsequently prepared and submitted a number of EA Updates for the Project. This includes previous EA Updates for the 2013 (filed in May 2013), 2014 (filed in April 2014) and 2015 (filed in March 2015) periods. 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 2016 EA Update for the Hebron Project. The EA Update was originally completed and submitted to the C-NLOPB in February 2016, and was reviewed by various government departments and agencies and other organizations. A revised document (July 2016) included responses to the various questions and associated requests for information and clarification that were submitted as part of that review process, as consolidated and provided to ExxonMobil by the C-NLOPB in April 2016. That document was subject to additional discussion with and commentary by the C-NLOPB, which is addressed in this final (December 2016) version of the EA Update.

Figure 1.1 Hebron Project Area



2 PROJECT DESCRIPTION (2016 ACTIVITIES)

This section provides an overview of Project components and activities planned to occur in 2016. These will take place within the Hebron Project's Project Area, as illustrated previously in Figure 1.1.

2.1 Installation, Hook-Up and Commissioning Activities

There are several Installation, Hook-Up and Commissioning Activities that will be initiated in 2016. Installation and integration activities in 2016 include the integration of the Living Quarters, West Life Boat Station and Helideck. Once these three components are integrated, they will be installed onto the Utilities Process Module (UPM). In addition, the Drilling Equipment Set (DES), Drilling Support Module (DSM), flare boom and East Life Boat Station will also be installed onto the UPM. Subsequent to installation and integration, commissioning will occur for a number of systems to enable requirements for safety, environmental, operability and habitability to be satisfied. Safety and utilities systems shall have been commissioned and left in an operable state, which comprise of but are not limited to; lifeboats and escape chutes, temporary firewater and seawater pumps, portable and auxiliary fire-fighting equipment, standby power generation, helideck and jet fuel, pertinent telecoms, pedestal cranes and bulk loading stations, air compression, potable water, sewage and open drains systems. The current plan is for most of these commissioning activities be initiated in 2016 and finalized in 2017.

ExxonMobil Update: As of December 2016, all of the topsides modules have been integrated at the topsides pier with other commissioning ongoing.

2.2 Offshore Loading System

As described in the Hebron Project's EA, the Offshore Loading System (OLS) will be installed in several offshore campaigns, with two such campaigns planned for 2016:

1) OLS Pipelay Program

2) Single Anchor Loading (SAL) Base / Hose Program

The activities planned for 2016 relate only to these two activities and excludes the installation of tie-in spools. These future installations will be subject to separate updates for the completion of the Hebron OLS Project.

2.2.1 OLS Pipelay Program

The OLS pipeline will be placed on the seafloor at its operational location in 2016 (i.e., wet storage). As it will be connected to the GBS at a later date, an environmentally friendly preservation fluid will be injected into the pipeline until connection occurs.

The scope of the planned activities includes the installation of: three subsea 610-mm (24-inch) outer diameter pipeline segments; two pipelines (each approximately 2 km long) that will connect the future Hebron GBS Production Platform to two subsea bases; and one pipeline (approximately 1.85 km) to interconnect the two subsea bases and form a looped piggable pipeline. Associated testing and preserving for wet storage is also included in the scope of activities. On-bottom stability of the OLS

pipeline will be achieved by the application of concrete weight coating. Trenching and burial of the OLS pipeline will not be required.

The OLS Pipelay Program consists of the following activities:

- initiate dead man anchor start-up;
- install anode joints;
- perform field joint coating of 24-inch pipelines;
- laydown on the seafloor;
- execute surveys (pre-lay survey, as-laid survey, lay support);
- flooding, cleaning, gauging, hydro-testing and depressurization; and
- preserve pipeline by filling the capped lines with preservation fluid in compliance with *Offshore Chemical Selection Guideline*s.

The chemicals used for testing and preservation have been selected in accordance with the *Offshore Chemical Selection Guidelines* and any discharges will be in compliance with the *Operations Authorization.* The amount of chemicals anticipated to be released subsea during the OLS Pipelay Program is 120 L (mixed with approximately 85 m^3 of seawater). The estimated amount of chemical use is based upon the design pipeline lengths and concentrations of the given chemical. This is in addition to approximately 8 m^3 of treated seawater released at the surface during depressurization. If the initial pressure tests fail, it is possible that further releases of treated seawater above the estimated 120 L (mixed with approximately 85 m^3 of seawater) may occur.

The chemicals to be used are CRW 9820 (a corrosion inhibitor), X-CIDE 450 (a registered biocide) and Roemex RX9022 (a dye). These three chemicals have been assessed as GOLD Standard under the *Offshore Chemical Selection Guidelines*. CRW 9820 is a water-based low-toxicity solvent formulation that is considered highly dispersible in produced waters / brines. X-CIDE 450 is a water-soluble, aldehyde-based liquid formulation. Any unused product will comply with the requirements of applicable environmental protection and waste disposal legislation and any regional local authority requirements. A licensed waste disposal contractor will be used for product disposal.

ExxonMobil has contracted Allseas Canada Limited to perform this scope of work, which will include the use of a dynamic positioning pipelay vessel to load out and install approximately 6,000 m of pipe at the Hebron Field. The contractor may use a second vessel to perform other activities currently planned for execution. It is anticipated that this OLS Pipelay Program will have an approximate duration of four weeks and will be carried out between April and June 2016.

ExxonMobil Update: The OLS Pipeline Program is complete and occurred from mid-April to mid-May 2016.

2.2.2 OLS SAL Base / Hose Installation Program

The Single Anchor Loading (SAL) Bases are the primary pieces of equipment for the Hebron Offshore Loading System and are critical to the successful offloading of oil from the Hebron GBS.

Each SAL Base is secured to the seabed by first installing a 16-m long, 72-inch diameter pile. The pile is excavated to a depth of approximately six metres using a soil plug removal tool, and high pressure water jetting within the pile may be used to ensure a clean interior surface. The SAL Base is then lowered to the seabed with its stabbing cone entering the excavated pile. The annulus between the SAL Base stabbing cone and the pile is then pumped with grout, which provides the primary anchor point for the system.

ExxonMobil has contracted Subsea 7 Canada Inc. to install the two SAL Bases and Hoses. The Contractor plans to utilize a dynamic positioning (DP) construction support vessel (CSV) for completion of this work. The SAL Base / Hose Program will have an approximate working duration of five weeks and will be executed within the June-August 2016 timeframe. The CSV plans to perform two mobilizations to the Hebron Field from a designated Newfoundland onshore site.

The 2016 SAL Base / Hose Program will consist of the following activities:

Mobilization #1

- Wet storage of one pile hammer frame

Mobilization #2

- Installation of one 16-m long, 72-inch diameter pile;
- Excavation of one pile to a depth of 6 m;
- Installation of one SAL Base into pile;
- Grouting of one SAL Base; and
- Perform metrology between SAL Base and pipeline for future tie-in spools.

Mobilization #3

- Installation of one 16-m long, 72-inch diameter pile;
- Excavation of one pile to a depth of 6 m;
- Installation of one SAL Base into pile;
- Grouting of one SAL Base; and
- Perform metrology between SAL Base and pipeline for future tie-in spools.

Mobilization #4

- Installation of two Lower Hose Segments (LHS) and Midline Clump Weights (MLCW);
- Connection of two Upper Hose Segments (UHS);
- Attachment of two Lower Polyester Segments (LPS);
- Installation of two Hose pick-up assemblies;
- Functioning of SAL Base valves, installing gyros and transponders;
- Leak tests of SAL Base / Hose Systems; and
- Injection of preservation fluid into SAL Base and Hoses.

The chemicals used for testing and preservation have again been selected in accordance with the *Offshore Chemical Selection Guidelines* and any discharges will be in compliance with the Operations Authorization.

The Single Anchor Loading (SAL) Bases are the primary pieces of equipment for the Hebron Offshore Loading System and are critical to the successful offloading of oil from the Hebron GBS. Each SAL

Base is secured to the seabed by first installing a 16-m long, 72-inch diameter pile. The pile is excavated to a depth of approximately six metres using a soil plug removal tool (SPRT). For each pile, there will be approximately 16 m^3 of fluidized sediment which will exit the SPRT's exhaust hose (approximately 10 m in length) on the seafloor. The location will be selected downstream of the pile to avoid blowback onto the working area. Sediments are not expected to settle in a concentrated area around the pile and should disperse over a wider area. No sediment will be brought to the surface for disposal.

During the grouting of the piles, approximately 16,000 kg of grout (Masterflow 9500) and grout lubricant (Masterflow 9500 LUB) will be discharged. More will be discharged if additional grouting lines are required. Chemical discharges will occur subsea during from the SAL bases / hose Installation and will be composed of discharges from the contents during shipping and transport (diluted with freshwater) and then discharges from the wet storage chemicals to ensure complete flushing (diluted with seawater). The chemicals contained in the SAL during shipping and placement on the seafloor include 10 L of CRW 9820 (corrosion inhibitor), X-CIDE 450 (biocide) and RX9022 (dye) with an additional 15 m^3 of 50:50 mix (MEG: freshwater) monoethlylene glycol (MEG). These volumes will be discharged and displaced with a seawater dilution once the SAL Bases are on the seafloor and hose system is installed. The seawater dilution includes a similar set of chemicals (CRW 920, Xcide 450, RX 9022) of which 26 L (diluted with 10-20 m^3 of seawater) is expected to be discharged to ensure complete flushing. If the initial leak tests fail, it is possible that further releases of treated seawater above the estimated 26 L (diluted with 10-20 m^3 of seawater) may occur. All volume estimates included both SAL bases.

ExxonMobil Update: The OLS SAL Base/Hose Installation was completed in October 2016.

2.3 GBS Tow Route Survey Bathymetric Survey

As described in Section 2.8.6 of the CSR, several ship-based environmental and engineering surveys will be required prior to tow out of the GBS. One of those surveys is currently scheduled to take place in 2016, and would comprise a bathymetric survey that includes sidescan sonar and multibeam bathymetry.

If the opportunity arises, an EMCP contractor would conduct a bathymetric survey of the Hebron GBS tow out route that lies within the Hebron Project Area. It is anticipated that this bathymetric program will have an approximate duration of three weeks and will be executed between June and August 2016.

ExxonMobil Update: The GBS Tow Route Survey was completed in July 2016.

2.4 Potential Wellsite Geohazard Survey

There is a potential requirement to complete a wellsite geohazard survey in 2016 for a Hebron area potential appraisal well. If this survey does occur, it will take place at some time within the May to September period. Although the specific characteristics of this survey have not yet been finalized, the survey equipment and activities would be the same or very similar to that described in the "2014 Environmental Assessment Update", as summarized below.

The 2016 wellsite geohazard survey equipment suite to acquire potential appraisal wellsite location (approximately 5 km x 5 km site) would be similar to the 2014 equipment suite which consisted of:

- high resolution multichannel (2DHR): 160 cubic inch source, 600 to 1,200 m streamer;

- Huntec Deep Tow System (DTS) (0.5 to 15 kHz) sub-bottom profiler (SBP1) or equivalent;
- hull-mounted sub-bottom profiler (SBP2);
- side scan sonar: dual frequency: 100 / 500 kHz;
- multibeam echosounder: 200 to 450 kHz;
- magnetometer;
- towed seabed camera / video; and
- Shipek and VanVeen seabed sediment grab samplers.

In 2014, 2DHR seismic data was acquired with a suite of a four-sleeve air source array (40 in^3 capacity each, 160 in^3 total capacity), a 96 channel streamer (6.25 m group and 12.5 m shot interval, 600 m / 1,200 m active length), and an HTI NTRSII digital recording system. Data was acquired to two seconds depth, sampled at 1 millisecond. The air source array was deployed within a box frame, approximately 60 to 80 m off the stern of the vessel, and at a depth of 3 m. The compressed air was provided by an electric-powered (spared by diesel) compressor on deck. The maximum output from this array had a peak to peak value of 17.0 Bar-metres. This equates with decibel notation of 244.6 dB (peak to peak)//1uPa@1m, or 238 dB (zero to peak)//1uPa@1m. The operating pressure of the air source array is a maximum of 2000 psi. The air source array can be ramped up in output prior to start of line.

One 600 m / 1,200 m long gel filled streamer was towed from middle of the stern of the vessel (slightly offset to port). A tail buoy was used, equipped with a radar reflector and strobe light, as well as a separate GPS tracking system. Total streamer lengths were approximately 750 m / 1,350 m.

A Huntec SBP1 was deployed from the stern of the survey vessel, through an “A” frame. The system was towed within the water column between 30 and 50 m off the seabed. The system was approximately 75 m behind the survey vessel (dependent on cable deployed, water depth and vessel speed). The Huntec DTS SBP1 uses a “broad band” boomer acoustic source, with frequency bandwidth from 500 Hz to 6 kHz. Power output is typically 500 Joules, but may be increased to 1 kJ if necessary. Maximum peak to peak amplitude is 221 dB relative to 1 microPa at 1 m. The system uses an internal and external hydrophone to record the return signal. Vertical resolution is approximately 10 cm, with penetration of 10 to 20 m in gravels, 40 m in sands, and 100 m in soft sediment.

Seabed imagery was acquired with a digital, dual-frequency side scan sonar system. Data was logged for on-board assessment. Georeferenced data will be used to create a digital side scan sonar mosaic for inclusion in survey reports. Output power of this system is extremely low, equivalent to an echosounder in magnitude.

A multibeam echosounder was also deployed. Power output levels are similar to a standard echosounder. The system operates at a frequency of 240 kHz. In the event that potential debris was identified by the side scan or multibeam systems, a proton magnetometer was deployed. This system was towed behind the vessel, 5 to 10 m above the seabed, and emits a low-power electromagnetic field.

ExxonMobil Update: It is now known that this Wellsite Geohazard survey will not occur in 2016.

2.5 Consultations on 2016 Project Activities

As part of its on-going stakeholder engagement program for the Project and as part of the preparation of this EA Update, ExxonMobil representatives held a number of meetings with key groups in late October 2015, as follows:

1) Fisheries, Food and Allied Workers (FFAW) – Unifor: October 28, 2015; and

2) Association of Seafood Producers (ASP), Ocean Choice International (OCI) and One Ocean: October 29, 2015

The purpose of these meetings was to provide these organizations with an overview of the planned 2016 activities for the Hebron Project as well as to identify and discuss any associated questions or concerns that should be considered as the planning and implementation of these activities proceed.

The meetings included a short presentation by ExxonMobil outlining the nature, location and timing of its planned 2016 activities (as described herein), key environmental considerations and planned mitigations, and the purpose and content of the 2016 EA Update. This was followed by a general discussion and question / answer session.

In addition, subsequent email and phone call correspondence took place between the relevant parties in February 2016 to give further updates on planned Project activities.

Questions and items that were raised and discussed through these consultation initiatives included those related to:

- The potential for equipment associated with the tow out survey to interact with fixed gear fisheries (especially, crab, turbot, cod).

- The need for additional details and communications related to the bathymetric tow out survey when it becomes available in 2016, and prior to the survey initiation and associated Notices to Mariners being issued.

- A request for preliminary mapping and associated coordinates for the safety zone, and for photos and other information related to the vessel(s) and equipment to be used.

- A suggestion that the August timeframe would be an ideal time for the tow-out survey to help minimize the potential for fisheries-interactions, and an associated request that this be considered in on-going planning and scheduling.

Each of these issues has been considered as part of the planning and conduct of this EA Update.

2.6 Other Project Updates and Definitions

As described in the Introduction (Section 1), the CSR (2011) together with the EA Amendment (2013) fully assessed the construction, installation and operation of the Hebron facility. However, in addition to the above described activities planned for 2016, we also want to provide an update on some operational aspects even though it does not change the conclusions of previous assessments.

One of those Project updates includes further details on some of the temporary equipment that will be left in the centre shaft. That equipment may include two Alimak elevator carts (steel, plastic and aluminum) and four submersible ballast pumps. The four submersible pumps are installed in individual caissons in the lower GBS shaft. The pump motors each contain 70 L of 70 / 30 water / monoethlyene glycol mix (MEG). The water / glycol mix is enclosed in the pump motor, and the motors are totally isolated from the seawater in the shaft by the caissons, which further reduces any potential for leakage. In the very unlikely event that this product did leak, the volume of seawater in the shaft (approximately 70,000 m^3) would cause the 280 L of glycol to be diluted to approximately 2.8 ppm. Considering the slow exchange of centre shaft seawater with the open sea (via the passive seawater circulation system); the immediate factors of dispersion in the open ocean and the fact that the OSPAR Commission has listed monoethylene glycol as PLONOR (pose little or no risk to the environment), it is not likely that this release will have any adverse environmental implications.

As noted above, the CSR (2011) together with the EA Amendment (2013) fully assessed the construction, installation and operation of the Hebron Project, including each of its associated components and activities as known and defined at that relatively early (EA) stage of Project planning and design. It is understood that one of the key purposes of EA Updates such as this is to report on planned Project elements in the coming year and confirm that they are in keeping with those described and assessed in the EA, and thus, that the overall findings and conclusions of the EA remain valid. As is typically the case for any such development, however, particular aspects of the Project have continued to become further defined as its planning and implementation have progressed. As a result, additional and more specific details related to these activities have since become known or further defined since the completion of the EA, and are therefore reported in the EA Update.

Firstly, as update to the previously described activity, please note that the Alimak elevator carts were subsequently removed, and so these will not be left in the centre shaft.

The purpose of the pumps are to exchange water (used as ballast) from the ocean to the various GBS compartments (cells) in order to control the height of the GBS in the water column. The pumps will be required until the final placement of the platform on the Grand Banks as they will be used to lower the GBS for final placement.

The primary rationale for leaving the submersible ballast pumps in the centre shaft is for safety reasons. Each of the four pumps weighs approximately 4,000 kg and is about six metres in height. Removing the pumps offshore will require this equipment to be lifted out of the caissons and rotated from vertical to horizontal position while hanging in the winch hook before they can be laid down in a suitable area at the mezzanine deck for dismantling. The grating on the mezzanine deck is not designed to take the load of a pump, and a purpose-built cradle would therefore have to be built to distribute the load into the deck structure, meaning additional manual handling and guiding of the pumps when lifting them out of their caissons. Moreover, the pumps will have to be spilt in two, and each piece will have to be rotated

back to vertical position before lifting it out of the shaft. This will require a total of eight lifts, to move them from platform to cargo vessel and then from the cargo vessel to onshore.

Each required lift would carry with it a certain amount of risk in terms of dropped objects and line-of-fire issues. The space in the lower shaft is very limited for handling large units such as the temporary water ballast pumps, and there is a risk of people being caught between a suspended load and other permanent equipment / structures. In addition, the required "hot work" (welding, cutting) and material handling in such a restricted space also has a certain amount of risk related to combustion and air quality concerns. The first priority in the hierarchy of risk management controls is to "eliminate the risk" wherever feasible. Every lift carries with it a certain amount of residual risk of a dropped or swinging load, which can lead to serious injury and equipment damage potential. The same line of reasoning would also be applicable for placing personnel in the center shaft to cut up the equipment. Leaving the pumps in the shaft is therefore an inherently safer option.

From an environmental perspective, there is again no planned release of the MEG into the shaft or to the environment. Given the isolation of the MEG / water mix and the resulting low potential for leakage into the marine environment, along with the rather environmentally benign nature of this material and its rapid dilution in the event that it did leak, it is not likely that this planned activity will have any adverse environmental implications.

One of the Project updates and refinements that was identified and discussed in the previous (July 2016) version of the EA Update involved a potential change in the Project's residual chlorine discharge concentrations, which was described and assessed in some detail in Section 2.5 of that submission. ExxonMobil does not seek a change to the chlorine concentration of discharge cooling water at this time and will stay consistent with the CSR text and maintain a limit < 0.5 ppm. The details of how this will be measured (and any exceedances reported) will be outlined in Hebron's Environmental Compliance Monitoring Plan. The Operator is therefore not seeking regulatory approval for such a change through an amendment of the original EA analysis and approval at this time. The information and analysis related to this issue has therefore been removed from the 2016 EA Update reported herein.

2.7 Potential Environmental Interactions and Associated Mitigations

The nature and scope of the planned 2016 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 (see Chapter 1).

Chapter 2 (Project Description) of the CSR, for example, included and described the equipment and associated construction and installation activities that would be associated with the OLS and its related pipelaying and base installation activities (see for example, CSR Section 2.8.8). This included listing and describing the following potential activities and environmental interactions:

a) Potential Activities (see CSR, Table 2-8)

- Clearance Surveys (e.g., sidescan sonar, diving, ROV) prior to Installation of Platform, OLS;
- Operation of Helicopters, Supply, Support, Standby and Tow Vessels / Barges or Specialized Pipe-lay Vessel;

- Anchor OLS Bases to Seabed by Piles;
- Installation of OLS (may be trenched to protect offloading flowlines; may be installed using diving vessels);
- Placement of Insulation / Stabilization (rock or concrete mattress pads) on the Seafloor over the OLS Offloading Lines;
- Install OLS Riser;
- Install Tie-ins to Platform;
- Integration Testing Programs between the OLS;
- Risers and OLS Bases and between the OLS Risers and Tanker Loading Equipment;
- Hydrostatic Testing (OLS and pipelines);
- Possible Use of Corrosion Inhibitors or Biocides (OLS or flowlines);
- Lighting;
- Air Emissions; and
- Safety Zone

The CSR similarly states that the Project's offshore activities will include the following (see Section 2.8.6 – Offshore Site Preparation, and elsewhere):

> Ship-based environmental and engineering surveys may be required prior to offshore installation of the platform. Geophysical, geological and geotechnical surveys may require the use of seismic, multibeam, echosounder, sidescan sonar, and or subbottom profiler techniques and equipment. Pending further engineering and design, all of these surveys may not be required and some may occur during other Project stages.

The associated tables summarizing the various potential activities associated with these aspects of the Project similar include "Clearance Surveys (e.g., geohazard, sidescan sonar, diving, ROV, prior to installation of platform, OLS, potential excavated drill centres in the future)" as a type of planned activity that is considered and assessed as part of the EA (see for example CSR Tables 2-7, 2-8 and others). Similarly, Section 2.9.6.2 of the CSR (Geohazard Surveys) states that:

> Well site or geohazard surveys may be used to identify and avoid unstable areas (e.g., shallow gas deposits) or hazards (e.g., shipwrecks) prior to drilling. The well site survey may use a combination of video and a small acoustic array and/or sonar over the well location. Although a variety of seismic sources may be used for such a wellsite / geohazard survey, a typical source is a 160 cu. in. four-gun ladder array of sleeveguns with an estimated source level of 238 dB re 1µPa @ 1m (zero to peak) towed at a depth of 3 m. This equates to 244 dB re 1µPa @ 1m (peak to peak).

The planned use and discharge of cooling water (including the associated use of biocides) was also included as part of the Project description and scope that was addressed in the Project's EA review (see, for example, CSR Sections 2.6.2, 2.6.3, 2.6.4.2, and Tables 2-7, 2-9), as was the use of chemicals such as glycol (e..g, CSR Section 2.6.4.2).

b) Potential Environmental Interactions / Discharges / Emissions / Wastes (see CSR, Tables 2-6 to 2-8, summarized below)

- Air emissions;
- Bilge / ballast water;
- Deck drainage;
- Elevated suspended solids;
- Marine / underwater noise;
- Potential loss of benthic habitat and organisms;
- Potential substrate disturbance;
- Potential water column effects;
- Sedimentation;
- Solid, construction, hazardous, domestic and sanitary waste disposal; and
- Light

Each of these proposed activities and potential environmental interactions were then addressed in the environmental effects analysis for each VEC in the relevant chapters of the CSR (see CSR Chapters 6-17), including the associated assessment and evaluation of potential environmental effects and the identification of mitigation (see, for example, the associated environmental effects summary tables, which include: *Offshore Construction / Installation – OLS Installation and Testing*).

The planned use and discharge of cooling water (including the associated use of biocides) was also included and considered as one of the "Project Activities, Physical Works, Discharges and Emissions" for which the potential environmental effects were assessed and evaluated in the EA (see for example, CSR Sections 7.4.2.2, 9.5.2.2, 10.4.2.2, 11.4.1.2, 15.2.2, and Tables 7.9, 7.12), as was the use of chemicals such as glycol (e..g, CSR Section 15.2.2).

The CSR also identifies and commits to a number of mitigation measures related to Offshore Construction and Installation (including for the OLS), which are summarized in Chapter 17 and include those listed below. The list below also includes reference to relevant mitigations communicated by the Department of National Defence (DND, MARLANT Safety and Environment) as part of the 2015 EA Update for the Project:

- Ensure the use of properly maintained and functioning equipment;
- Limited periods when vessels and helicopters are idling;
- Vessel and helicopter maintenance;
- Use of best practices, continuous improvement programs and best available technology;
- Survey vessels and equipment will only use the power required to attain the data, thereby minimizing noise;
- Proper release of stranded birds per CWS protocol;
- Helicopters to avoid active marine bird colonies, including Witless Bay Ecological Reserve, and to avoid flying at low altitudes, where possible;
- 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;
- Adherence to the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines*;
- Adherence to the Section 35(2) *Fisheries Act* and completion of associated fish habitat compensation and related monitoring (if required);
- Notification and communication (e.g, Notices to Mariners and/or to Airmen as applicable);
- Consultation with DND representatives to ensure avoidance of conflicts with planned military activity in the region, as well as measures to avoid and report on any possible Unexploded Explosive Ordnance (UXO) in the area;
- Fisheries Liaison Officer (FLO) (as per requirements of the Geological, Geophysical,. Environmental and Geotechnical Program Guidelines);
- Identification of a Single Point of Contact (SPOC) for associated issues, communications and inquiries;
- Safety Zone;
- Operational Protocols;
- Fishing Gear Compensation Program; and
- Compliance with *Navigable Waters Protection Act* – Conditions of Approval.

The CSR (eg, Section 15.2.2) also references planned adherence to the applicable requirements of the *Offshore Waste Treatment Guidelines* regarding the use, treatment, disposal and monitoring of waste streams, including cooling water, MEG and others.

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 2016 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 to be 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 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.

As of the time of the original (February 2016) submission of this EA Update, the 2013 fisheries statistics and associated mapping (which were also summarized in the 2015 EA Update for this Project) remained the most current available from DFO (J. Hosein, DFO Statistical Services, pers. comm.). Since that time, the 2014 fisheries data have since become available from DFO, and so the various fisheries related Figures that follow have been updated to include the 2014 data. The maps that follow provide an indication of the overall geographic distribution of commercial fishing activity within and adjacent to the Project Area (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 are fished within or near the Hebron Project Area[1].

The 2014 fisheries data remain the most recent that are available from DFO as of the date of submission of the Final EA Update Report.

[1] Although the 2014 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 (2014)

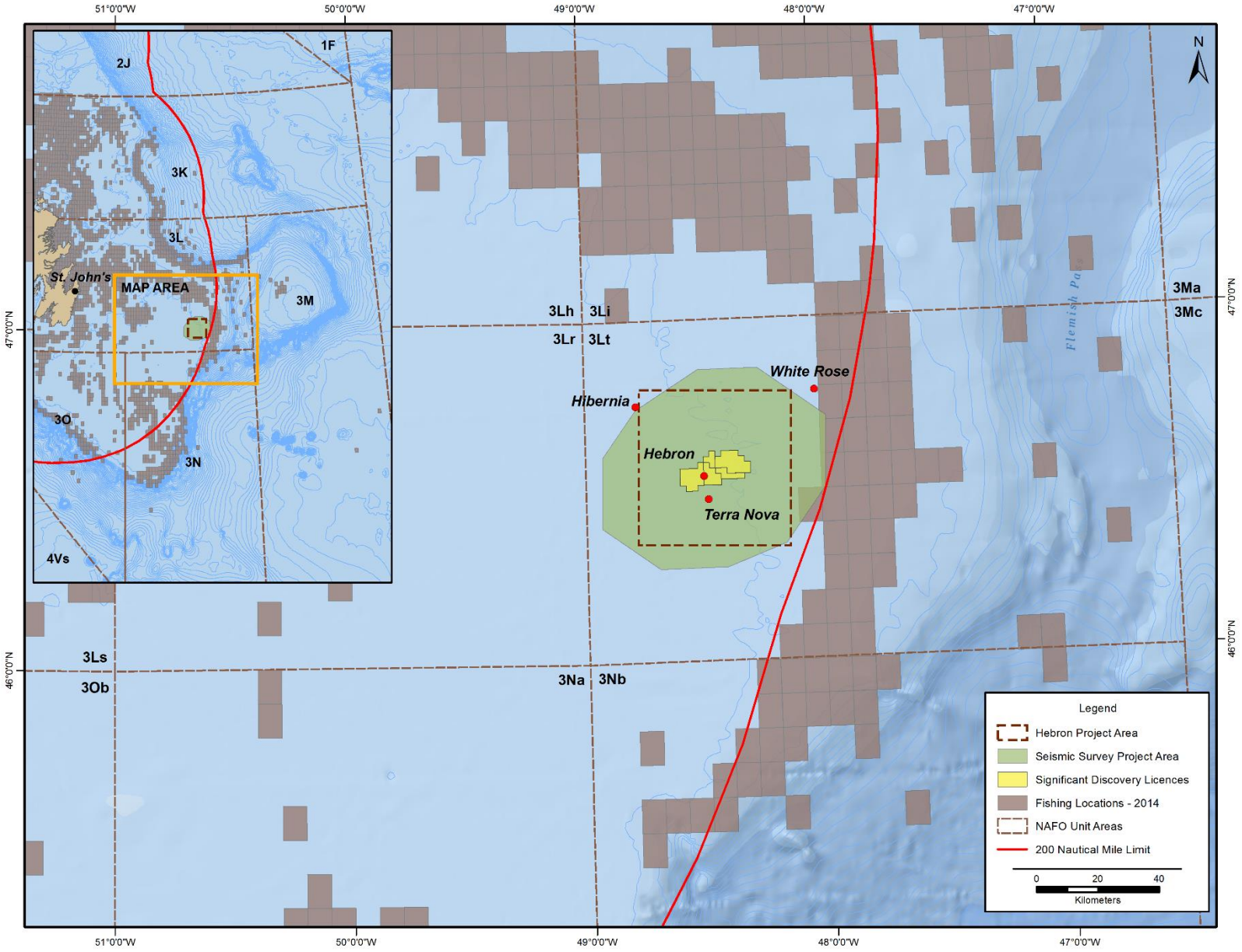


Figure 3.2 Commercial Fishing Locations, Mobile Gear Types (2014)

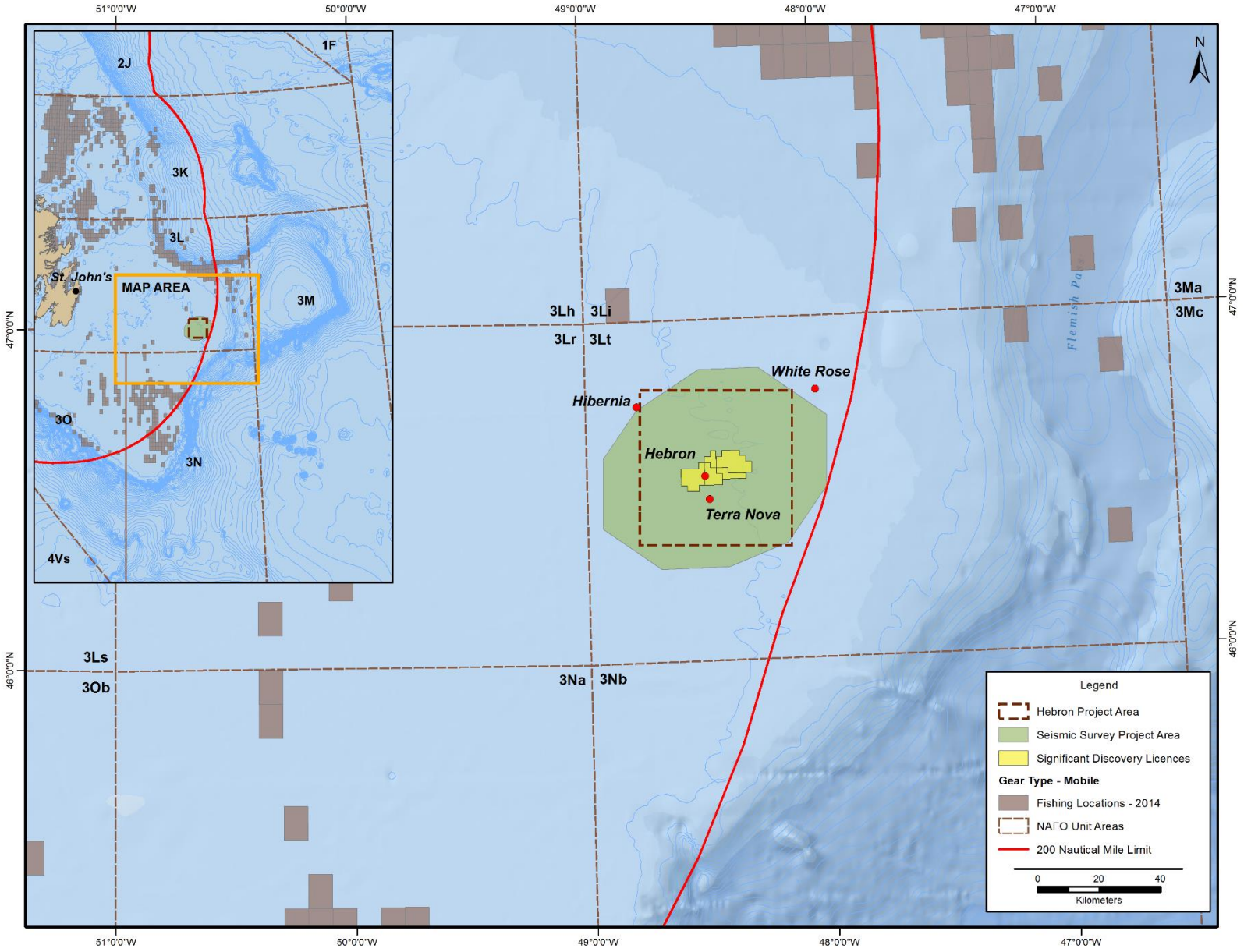


Figure 3.3 Commercial Fishing Locations, Fixed Gear Types (2014)

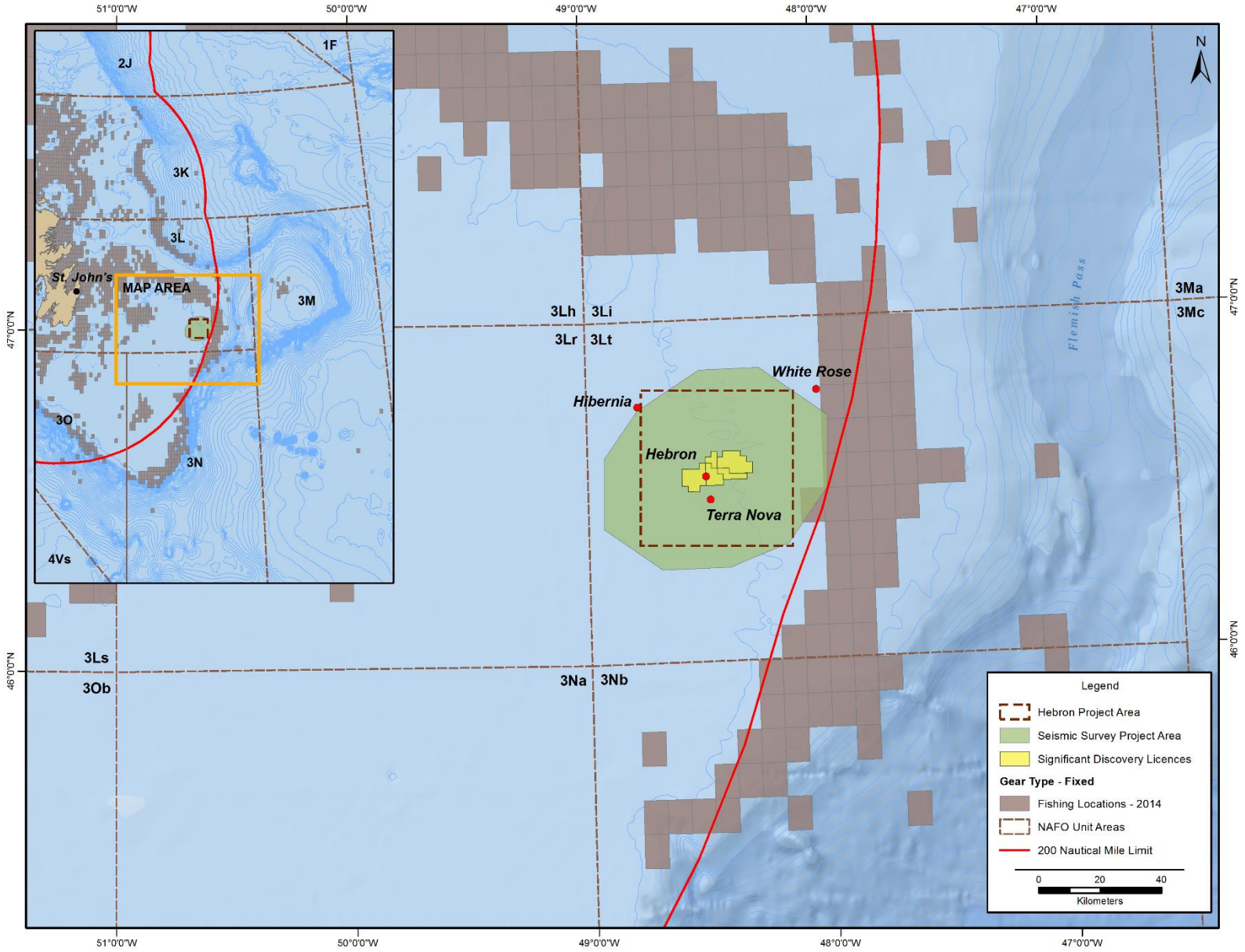


Figure 3.4 Commercial Fishing Locations, American Plaice (2014)

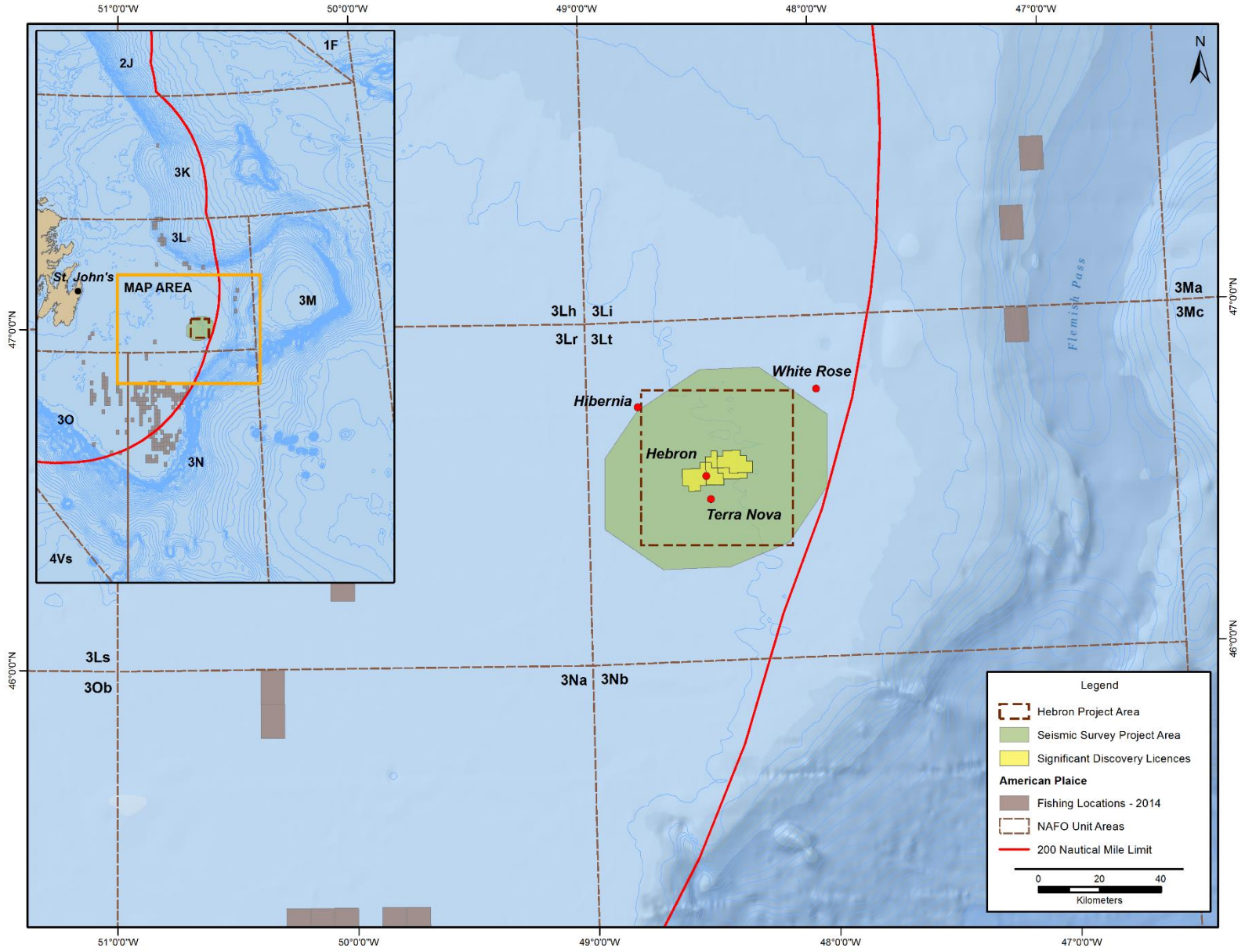


Figure 3.5 Commercial Fishing Locations, Atlantic Cod (2014)

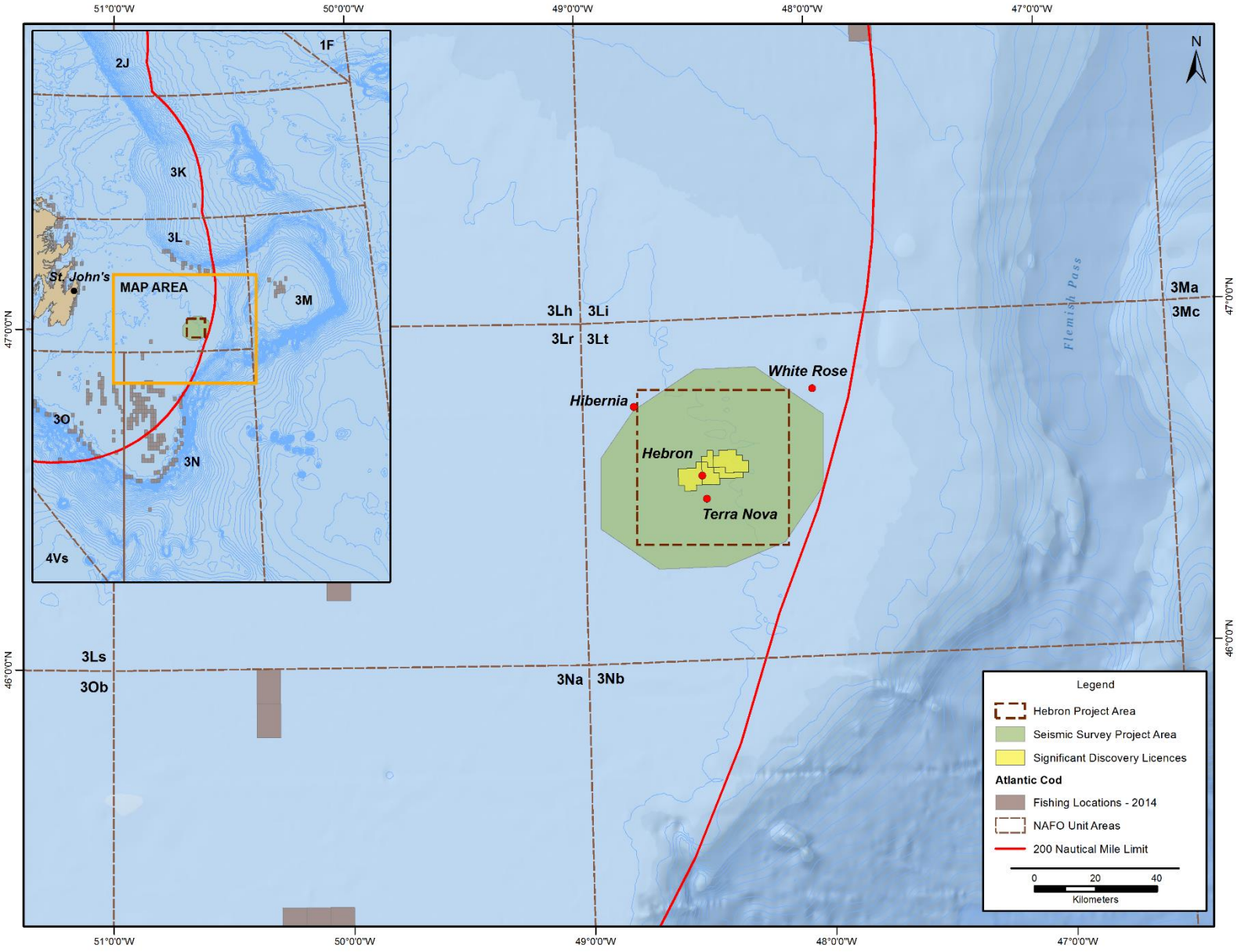


Figure 3.6 Commercial Fishing Locations, Atlantic Halibut (2014)

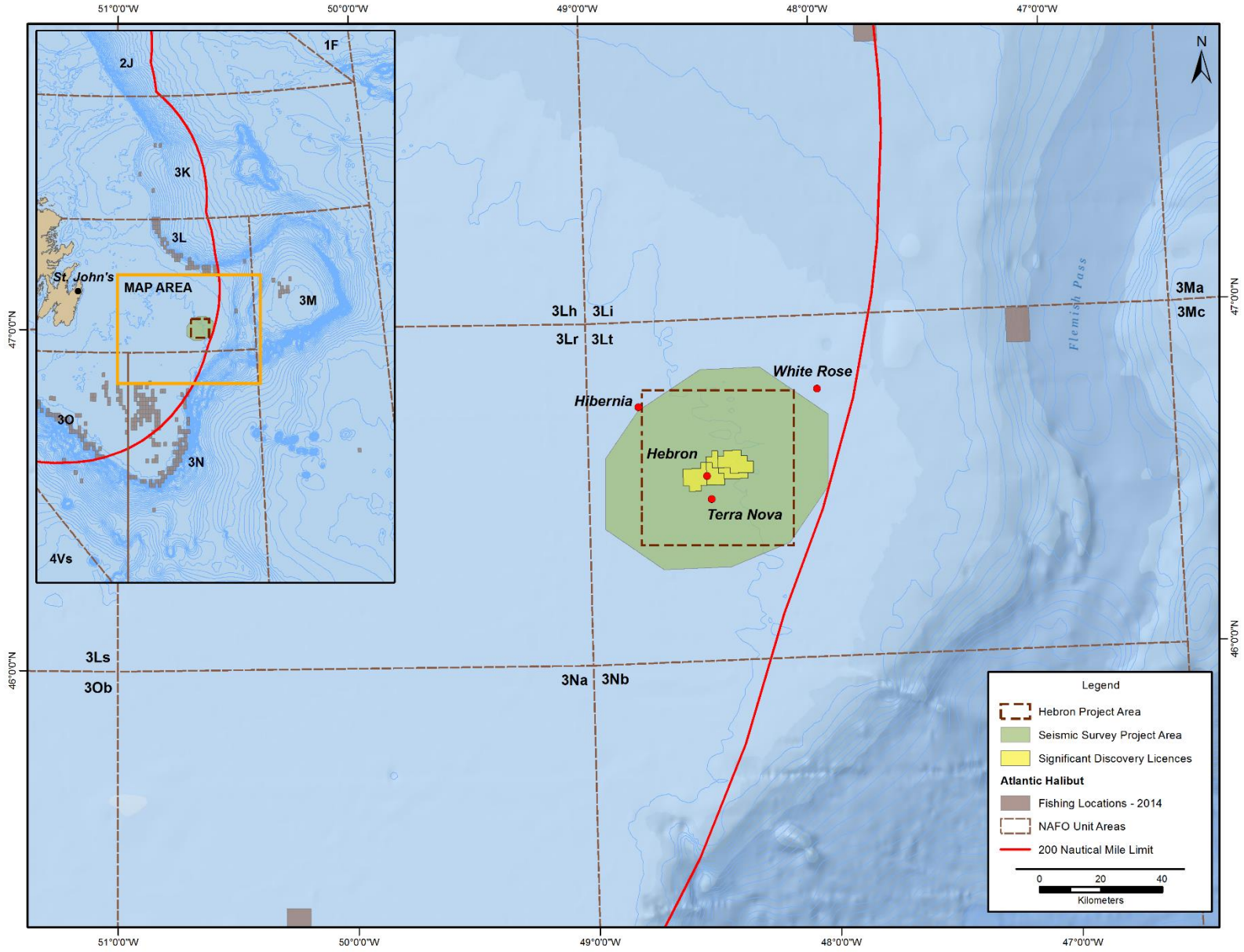


Figure 3.7 Commercial Fishing Locations, Rough-head Grenadier (2014)

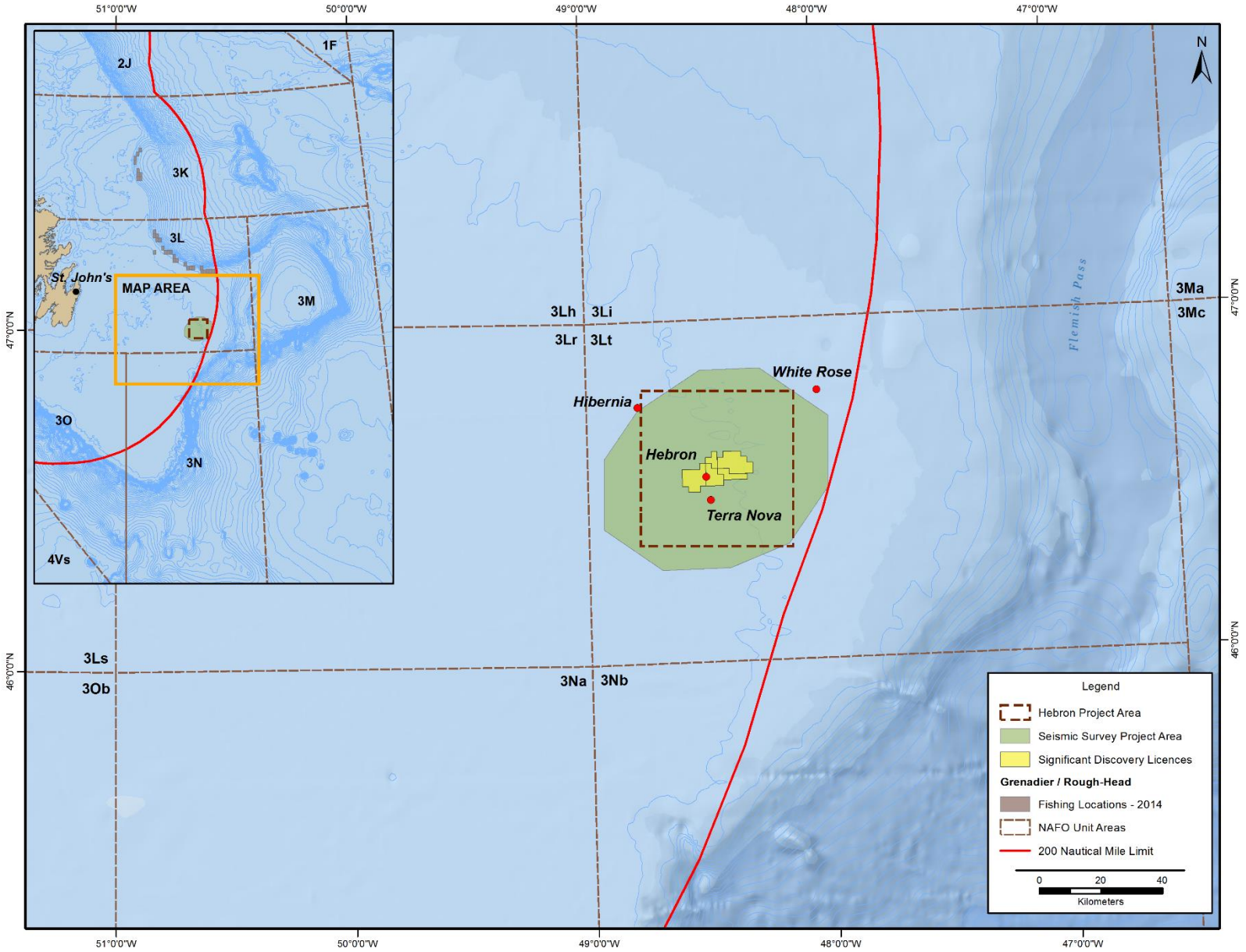


Figure 3.8 Commercial Fishing Locations, Greysole / Witch Flounder (2014)

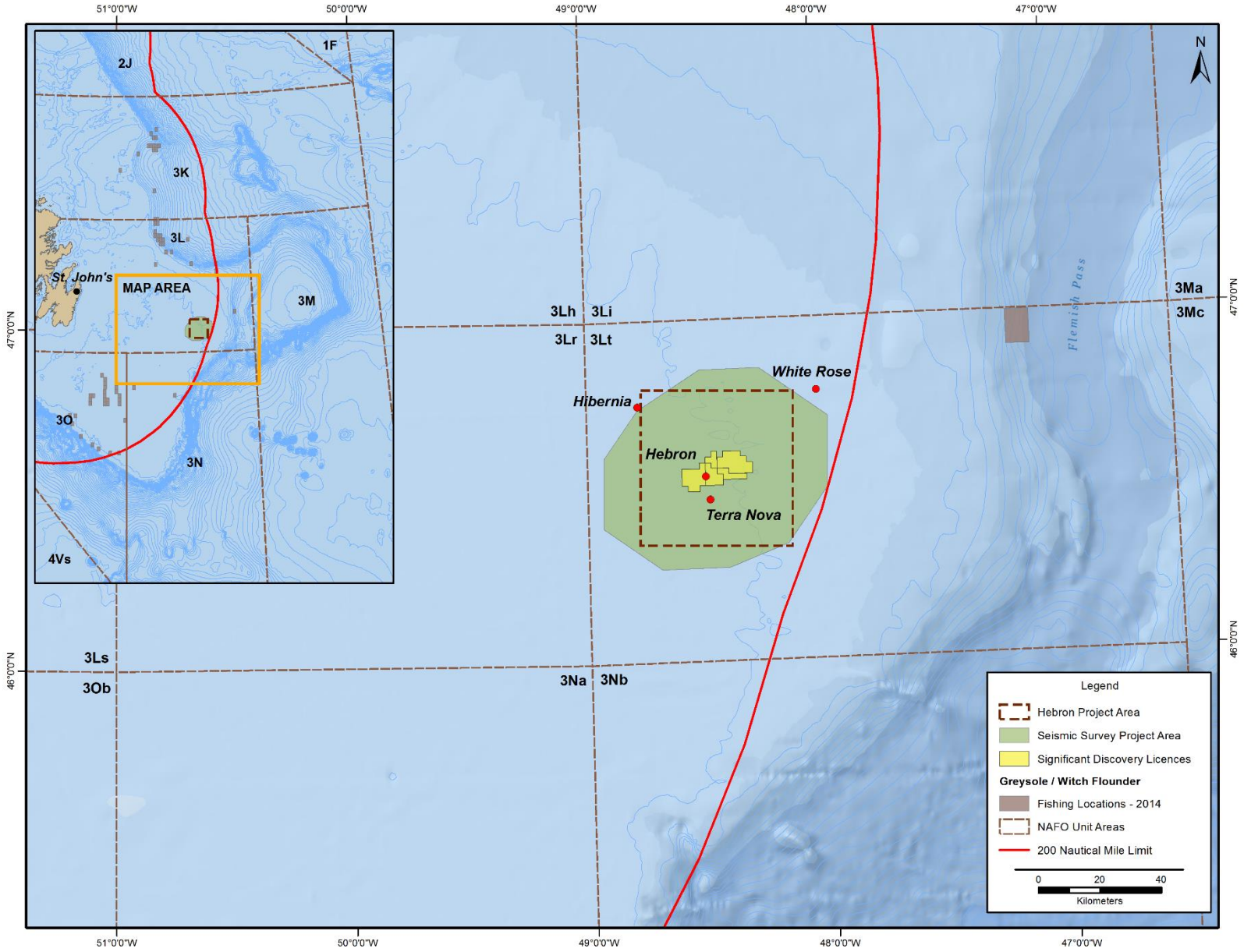


Figure 3.9 Commercial Fishing Locations, Haddock (2014)

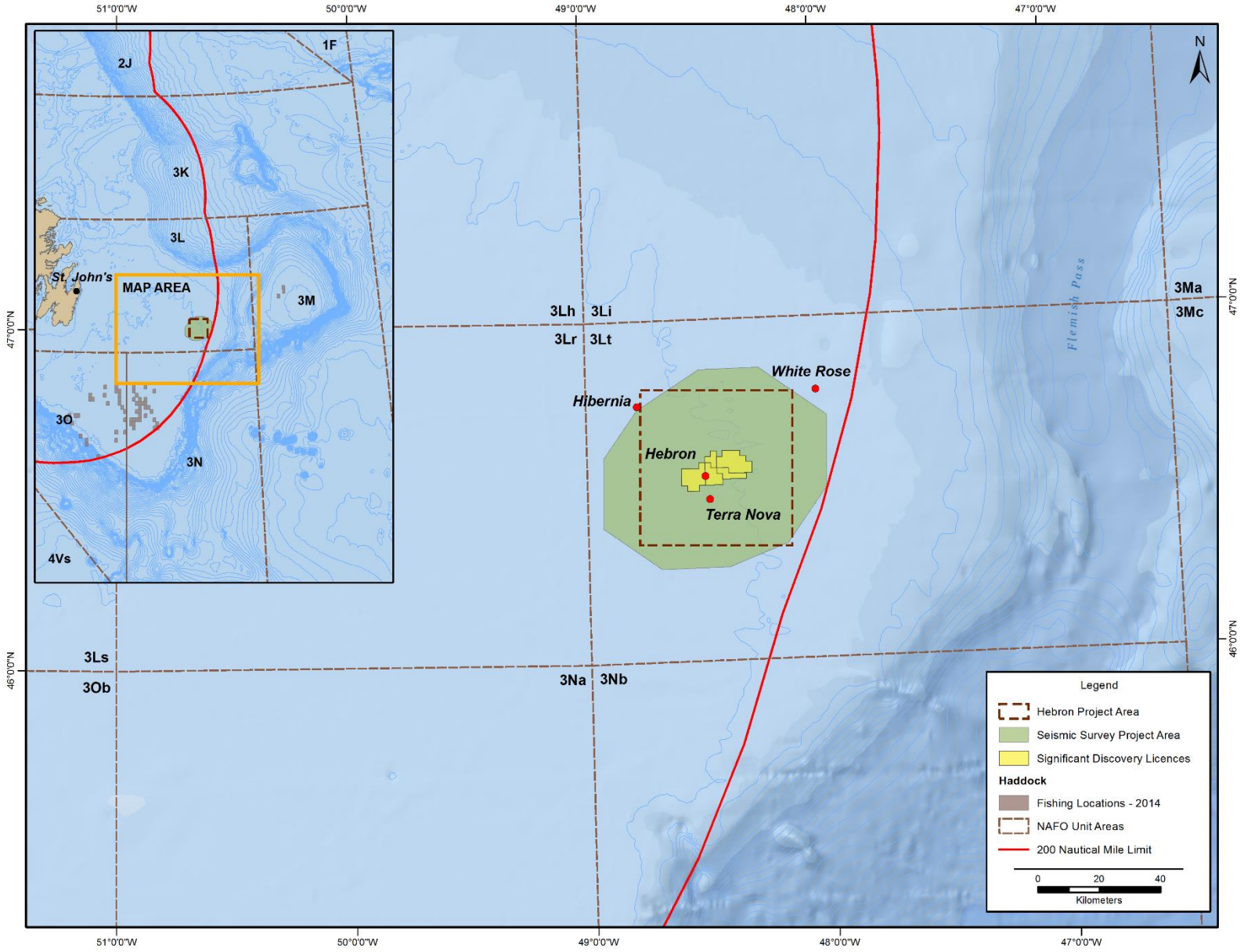


Figure 3.10 Commercial Fishing Locations, Northern Shrimp (2014)

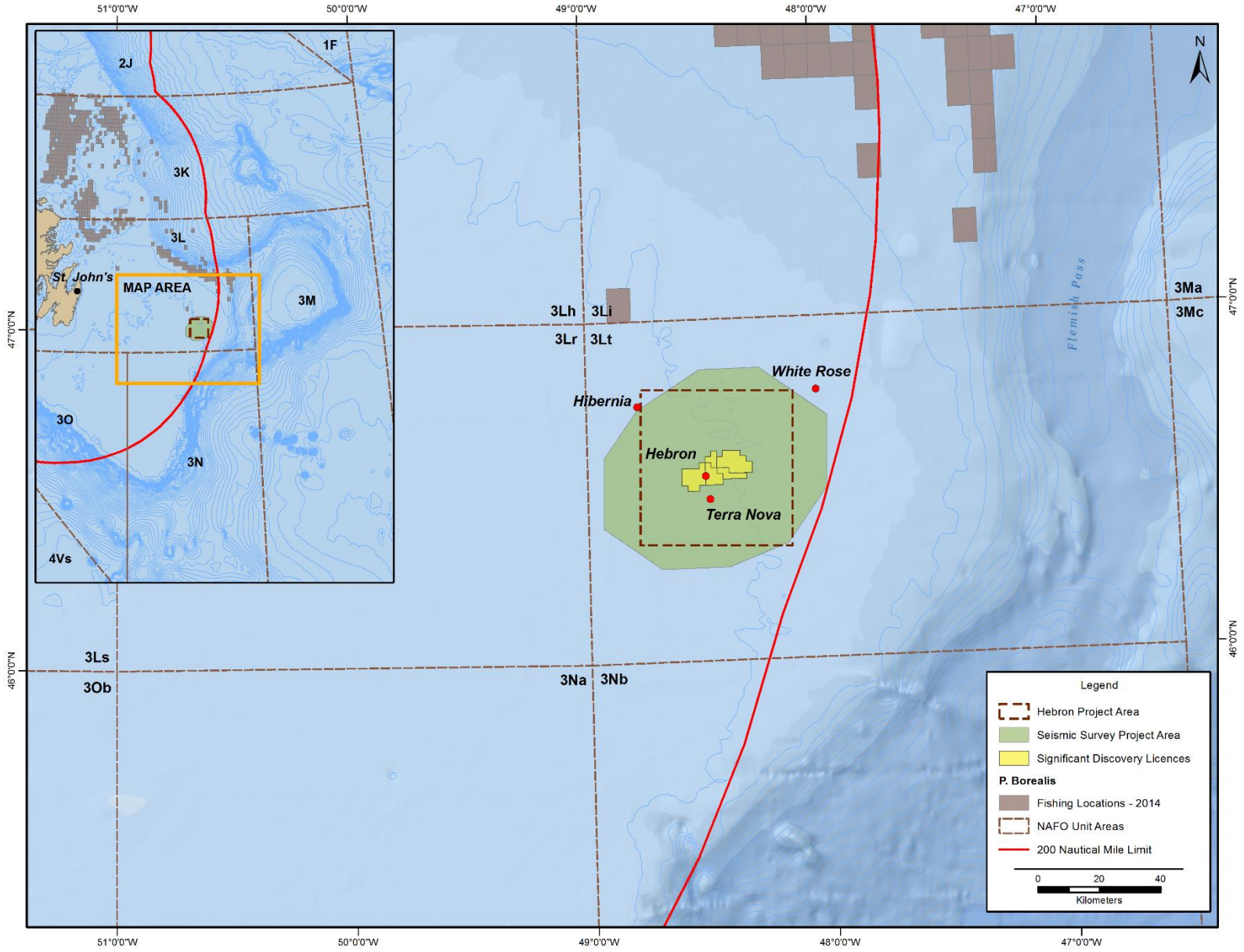


Figure 3.11 Commercial Fishing Locations, Snow Crab (2014)

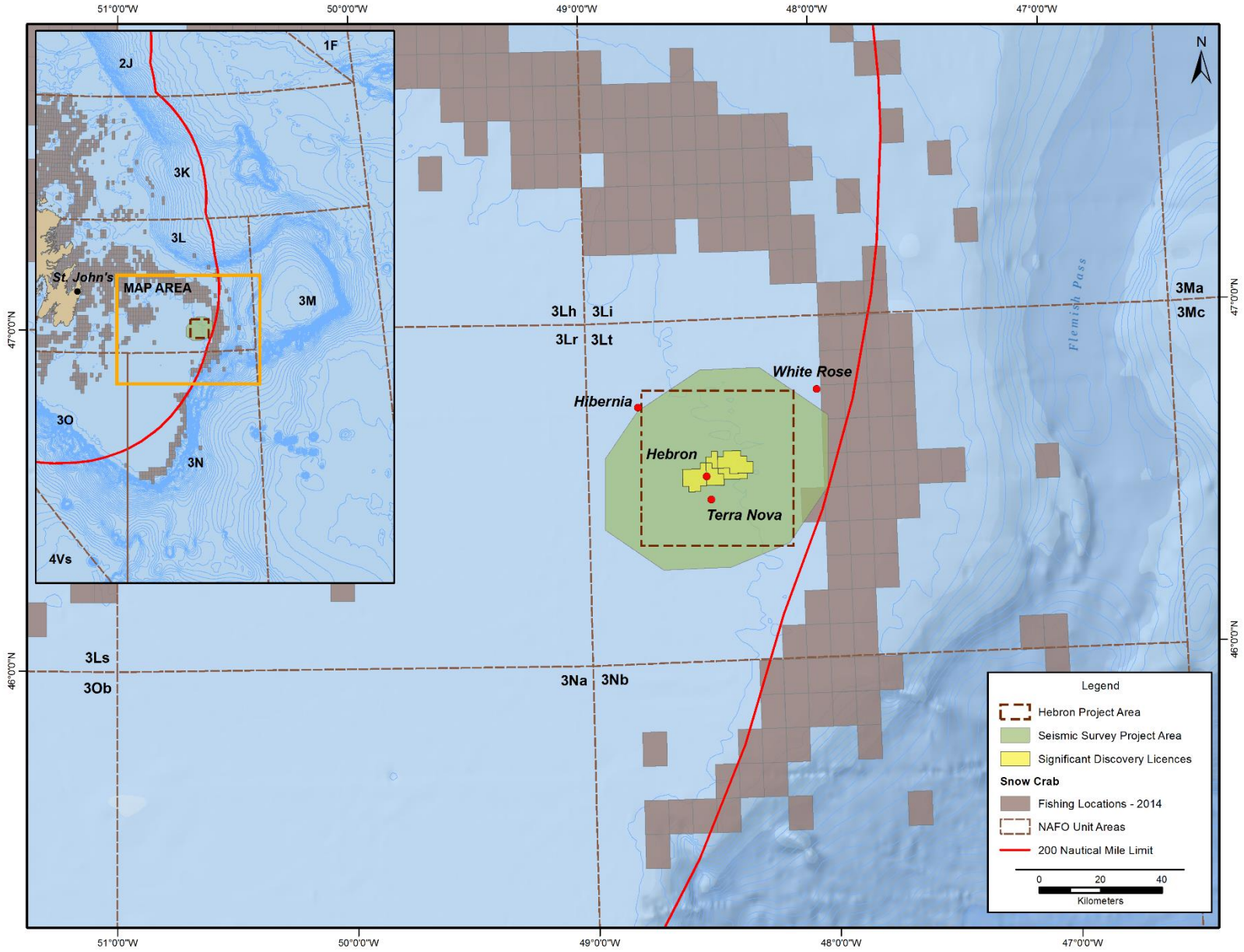


Figure 3.12 Commercial Fishing Locations, Turbot / Greenland Halibut (2014)

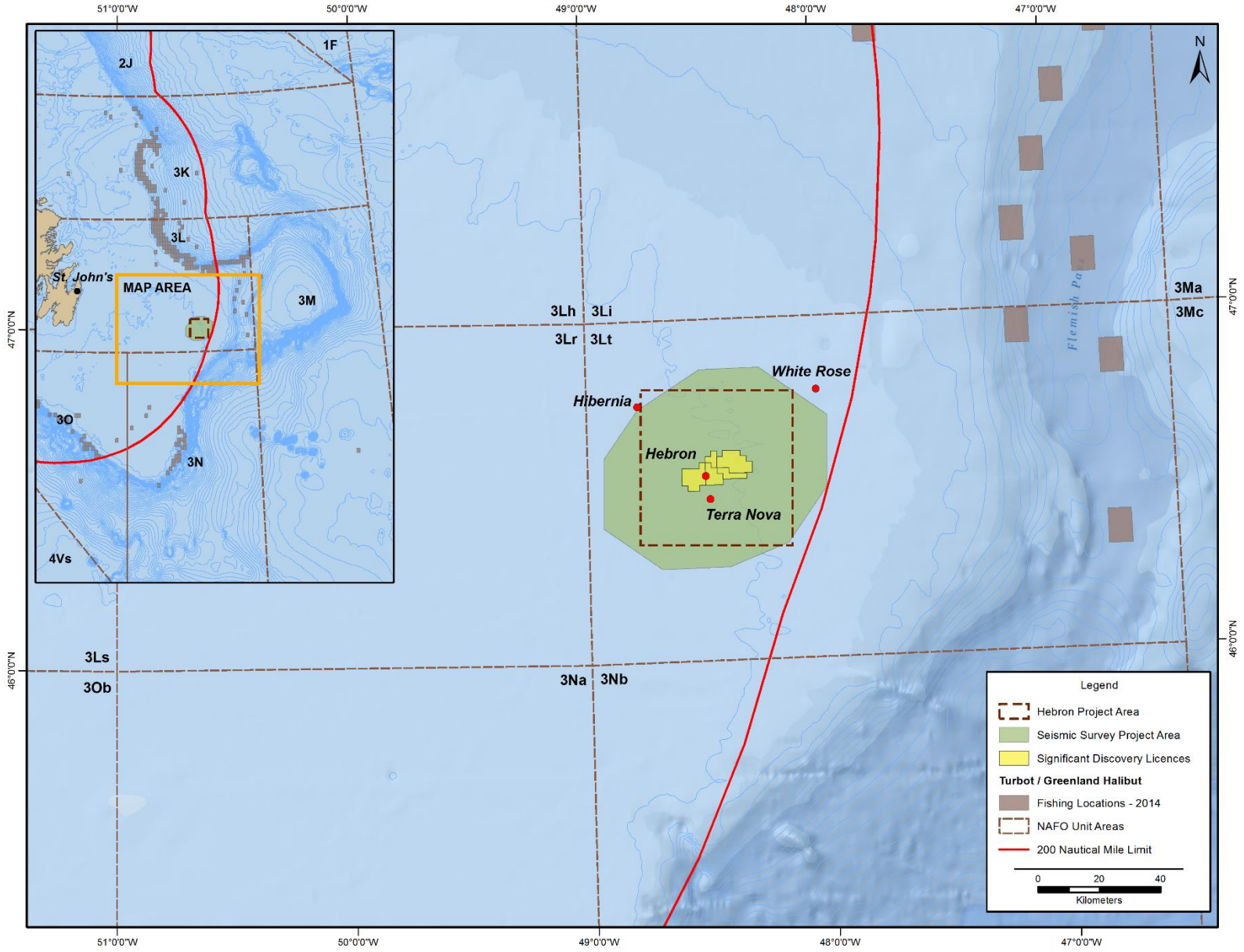
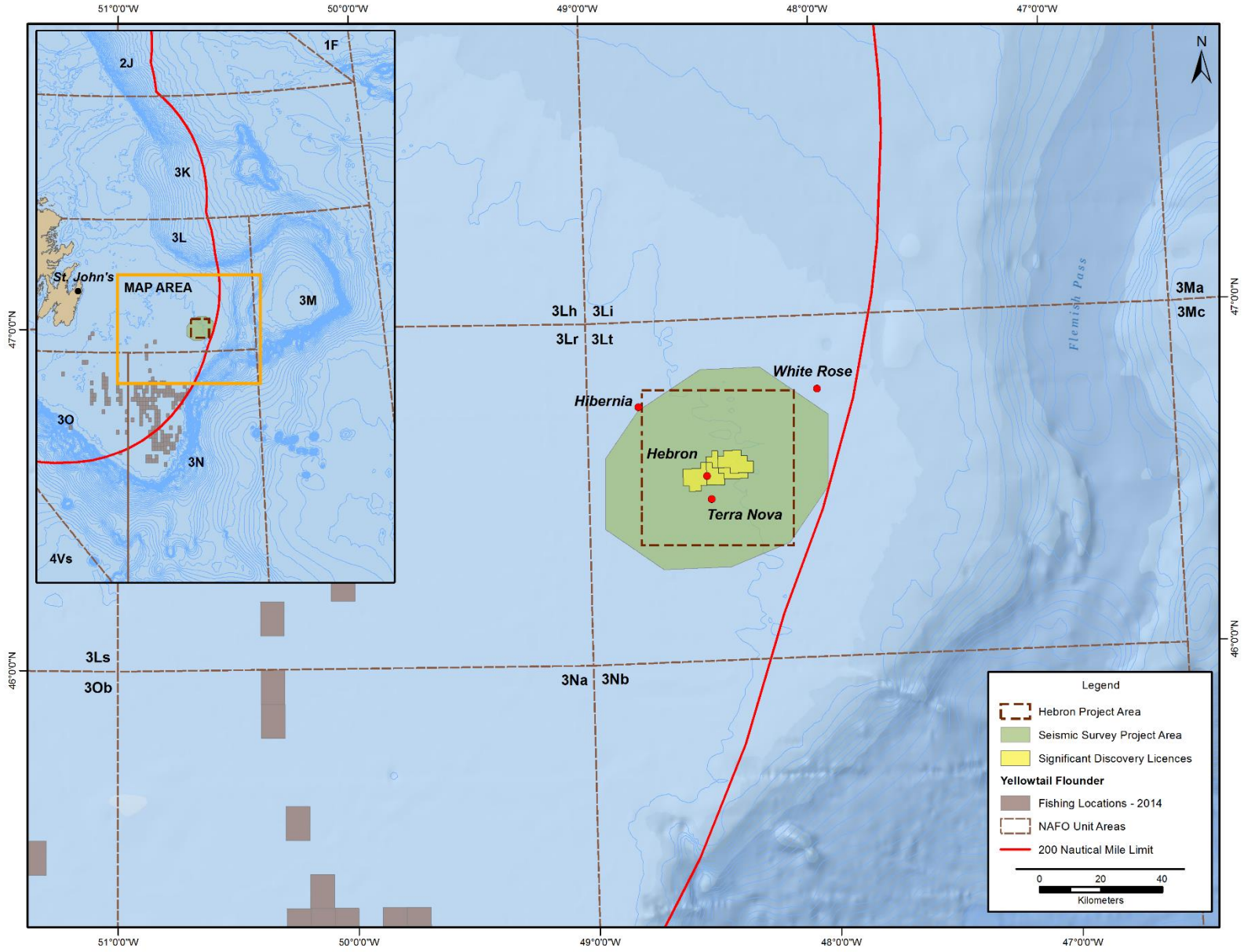


Figure 3.13 Commercial Fishing Locations, Yellowtail Flounder (2014)



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. The following table shows the 2016 schedule for DFO's surveys as obtained from DFO representatives (G. Sheppard, DFO – NL Region, personal communication). ExxonMobil will verify survey plans with DFO when they are available in the relevant year, and will consider these and undertake associated consultations and communications with DFO in planning and undertaking its activities.

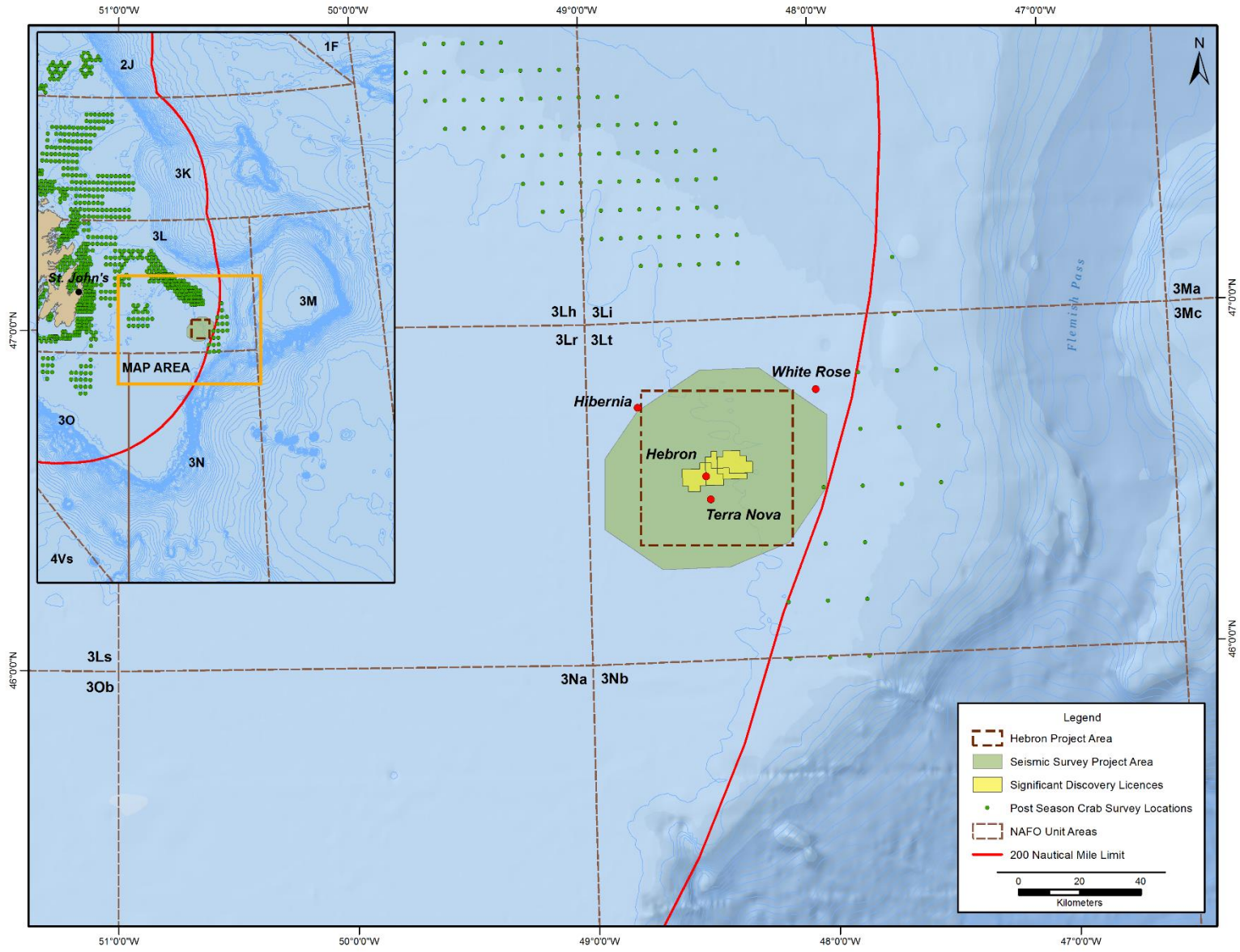
Table 3.1 Planned Timing of DFO RV Surveys off Eastern Newfoundland (2016)

Vessel	Activity	NAFO Division	Tentative Start Date	Tentative End Date
CCGS Needler	NL Spring Survey	3P	March 29	April 12
		3P	April 12	April 26
		3P + 3O	April 27	May 10
		3O + 3N	May 10	May 21
		3L + 3N	May 24	June 10
			March 31	April 3
	Shellfish Survey		September 1	September 13
	NL Fall Survey	3O	September 14	September 27
		3O + 3N	September 27	October 8
		3N + 3L	October 11	October 25
		3L	October 25	November 8
		3K + 3L	November 9	November 19
			November 22	December 2
CCGS Teleost	NL Spring AZMP[1]	3L	April 5	April 26
	Capelin Survey	3P + 3KLMNO	April 27	May 2
	NL Spring AZMP[1]		July 8	July 28
	NL Fall Survey	2H	October 4	October 8
		2H+2J	October 11	October 25
		2J+3K	October 25	November 8
		3K	November 9	November 22
		3L+3L Deep	November 22	December 6
			December 7	December 20

[1] Atlantic Zone Monitoring Program
Source: G. Sheppard, DFO-NL (2016)

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). Previous discussions with DFO representatives indicate that there are no plans for any changes to the survey protocol for this year (D. Stansbury, DFO – NL, Shellfish Section, personal communication). Again, ExxonMobil will verify survey plans with the relevant authorities when they are available each year.

Figure 3.14 Locations of Industry - DFO 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 provides a listing of identified species at risk, as identified and considered in the Hebron CSR and subsequent EA Updates, indicating their current designations under applicable legislation and by COSEWIC.

Table 3.2 Species at Risk or Otherwise of Special Conservation Concern (Current Designations)

Family	Species		Federal		Provincial
	Common Name	**Scientific Name**	***SARA* Status (Schedule 1)**	**COSEWIC Designation**	***NL ESA***
MARINE FISH					
Anarhichadidae	Atlantic wolffish	*Anarhichas lupus*	Special Concern	Special Concern	
Anarhichadidae	Northern wolffish	*Anarhichas denticulatus*	Threatened	Threatened	
Anarhichadidae	Spotted wolffish	*Anarhichas minor*	Threatened	Threatened	
Anguillidae	American eel	*Anguilla rostrata*		Threatened	Vulnerable
Carcharhinidae	Blue shark	*Prionace glauca*		Special Concern	
Cetorhinidae	Basking shark	*Cetorhinus maximus*		Special Concern	
Gadidae	Atlantic cod	*Gadus morhua*		Endangered	
Gadidae	Cusk	*Brosme*		Endangered	
Lamnidae	Porbeagle	*Lamna nasus*		Endangered	
Lamnidae	Shortfin mako	*Isurus oxyrinchus*		Threatened	
Lamnidae	White shark	*Carcharodon carcharias*	Endangered	Endangered	
Macrouridae	Roughhead grenadier	*Macrourus berglax*		Special Concern	
Macrouridae	Roundnose grenadier	*Coryphaenoides rupestris*		Endangered	
Phycidae	White hake	*Urophycis tenuis*		Threatened	
Pleuronectidae	American plaice	*Hippoglossoides platessoides*		Threatened	
Rajidae	Smooth skate	*Malacoraja senta*		Endangered	
Rajidae	Thorny skate	*Amblyraja radiata*		Special Concern	
Salmonidae	Atlantic salmon – Newfoundland population	*Salmo salar*		Threatened	
Scombridae	Atlantic bluefin tuna	*Thunnus thynnus*		Endangered	
Scorpaenidae	Acadian redfish	*Sebastes fasciatus*		Threatened	
Scorpaenidae	Deepwater redfish	*Sebastes mentella*		Threatened	
Squalidae	Spiny dogfish	*Squalus acanthias*		Special Concern	
MARINE BIRDS					
Laridae	Ivory Gull	*Pagophila eburnea*	Endangered	Endangered	Endangered
Scolopacidae	Red-necked Phalarope	*Phalaropus lobatus*		Special Concern	

Family	Species		Federal		Provincial
	Common Name	**Scientific Name**	***SARA* Status (Schedule 1)**	**COSEWIC Designation**	***NL ESA***
MARINE MAMMALS AND SEA TURTLES					
Balaenopteridae	Blue Whale - Atlantic Population	*Balaenoptera musculus*	Endangered	Endangered	
Balaenopteridae	Fin Whale - Atlantic Population	*Balaenoptera physalus*	Special Concern	Special Concern	
Balaenidae	North Atlantic Right Whale	*Eubalaena glacialis*	Endangered	Endangered	
Ziphiidae	Northern Bottlenose Whale - Davis Strait, Baffin Bay, Labrador Sea population; Scotian Shelf population	*Hyperoodon ampullatus*	Endangered (Scotian Shelf population)	Special Concern (Davis Strait, Baffin Bay, Labrador Sea population); Endangered (Scotian Shelf population)	
Ziphiidae	Sowerby's Beaked Whale	*Mesoplodon bidens*	Special Concern	Special Concern	
Delphinidae	Killer Whale(Northwest Atlantic / Eastern Arctic population)	*Orcinus orca*		Special Concern	
Phocoenidae	Harbour Porpoise (Northwest Atlantic population)	*Phocoena phocoena*		Special Concern	
Dermochelyidae	Leatherback Sea Turtle	*Dermochelys coriacea*	Endangered	Endangered	
Cheloniidae	Loggerhead Sea Turtle	*Caretta caretta*		Endangered	

3.3 Applicability of Associated Environmental Effects Analysis and Identified Mitigation

The nature and scope of the planned 2016 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 2016 Project activities, including with regard to addressing any potential effects on species at risk and other marine biota.

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.