

**Statoil Canada Ltd. - East Coast Operations  
Newfoundland and Labrador Offshore Area  
2015 Environmental Assessment Review**

**Flemish Pass Geophysical Survey**

**May 13, 2015**

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# 1 Introduction

Environmental assessments for offshore oil and gas exploration and production activities are scoped for multiple activities that are typically carried out over multiple years. The Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), in its environmental assessment decisions requires that operators, when applying for an operations authorization submit information confirming that the proposed activities fall within the scope of the previously approved environmental assessment, indicate if the EA predictions remain valid, and provide an update on species at risk. The information provided herein provides the information to support the above requirements and notes any changes that need to be addressed.

In support of ongoing exploration activity in the Flemish Pass area, Statoil Canada Limited (SCL) proposes to undertake geophysical and environmental surveys in 2015. In addition, throughout 2015 Statoil will be continuing its exploration drilling program in the Flemish Pass area as authorized under the Operations Authorization issued by the C-NLOPB in September 2014.

The scope of the geophysical and environmental survey activities planned for 2015 were assessed under the approved environmental assessments and amendments listed in Table 1.

This document provides the necessary update to the existing environmental assessments for these activities and intended to support the regulatory approval process for Statoil's 2015 activities by ensuring that the scope of the assessment and the mitigations committed to in the environmental assessments remain valid.

**Table 1 - Existing Environmental Assessment Approvals for Statoil 2015 Survey Activities**

| EA Report Title  | Temporal Scope                         | C-NLOPB EA reference no. |
|--|--|--------------------------|
| Environmental Assessment of Statoil's Geophysical Program for Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019, and associated EA amendments and updates                      | April 1 – Oct. 31 of 2011 through 2019 | CEAR No. 11-01-60411     |
| Environmental Assessment of StatoilHydro Canada Ltd. Exploration and Appraisal/Delineation Drilling Program for Offshore Newfoundland, 2008-2016, and associated EA amendments and updates | Year-round, 2008-2016 inclusive        | CEAR No. 07-01-32083     |

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## 2 Environmental Assessment Update

### 2.1 Environmental Assessment of Statoil's Geophysical Program for Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019 (CEAR No. 11-01-60411)

#### 2.1.1 *Project Description and Scope*

This environmental assessment encompasses the conduct of 2D, 3D, 4D and electromagnetic seismic surveys in the Jeanne d'Arc Basin and Flemish Pass area. In addition, geophysical site surveys (geo-hazard surveys) that are needed prior to the start of individual drilling operations to help ensure the safety of those operations are addressed.

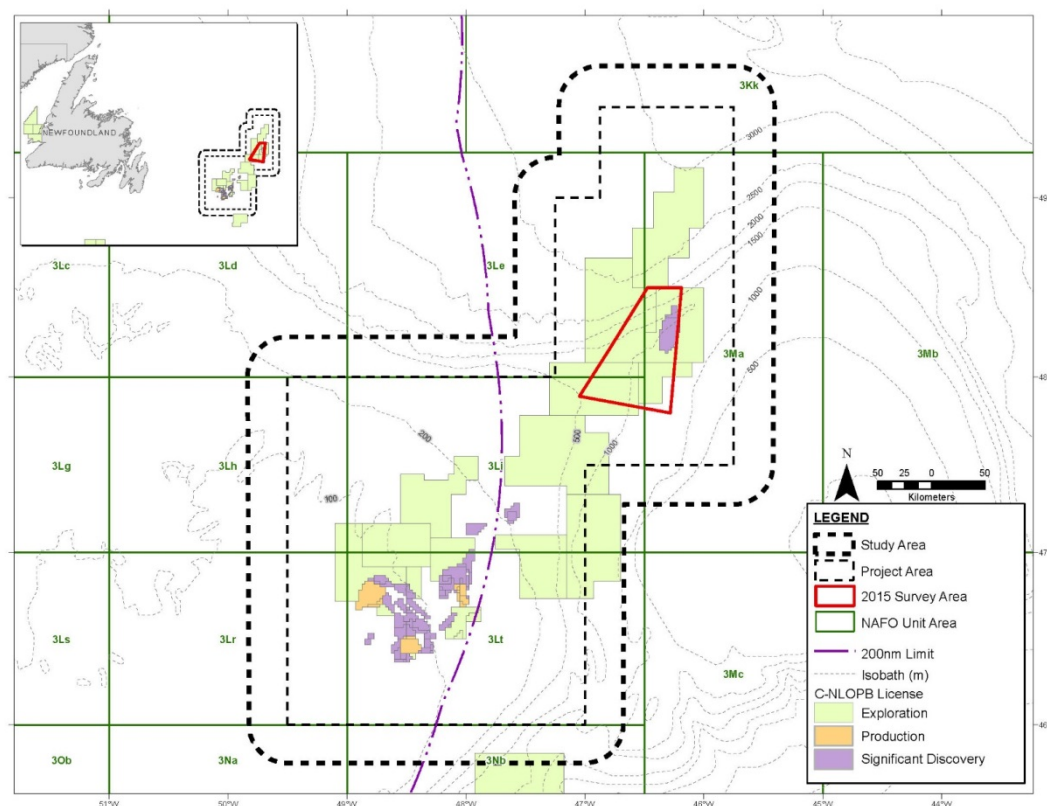
Geophysical site surveys (i.e., geo-hazard surveys using smaller sound sources and other necessary survey equipment) are needed to conduct a site survey for a drilling location. These type of surveys typically can involve a small airgun array of approximately 160 cu.in total volume operating at 2000 psi, a multibeam echo sounder (MBES), side scan sonar, sub-bottom profiler, and /or a magnetometer.

#### 2.1.2 *Geographic Scope*

The geographic scope of the environmental assessment, designed to encompass sufficient area to conduct seismic surveys over SCL's current land interests in the Jeanne d'Arc Basin and Flemish Pass, is shown in Figure 1. The Project Area, within which survey activities are planned to take place, is encompassed by Study Area.

#### 2.1.3 *Temporal Scope*

The temporal scope in the original environmental assessment was for activities from 2011 through 2019. Within any one year, large area 3D seismic surveys were anticipated to occur from April through the end of October inclusive. Geohazard surveys could occur at any time during the year.



**Figure 1: Geographic scope of Statoil's geophysical program environmental assessment (CEAR No. 11-01-60411) with 2015/16 geophysical/geotechnical survey area**

## 2.2 Environmental Assessment of StatoilHydro Canada Ltd. Exploration and Appraisal/Delineation Drilling Program for Offshore Newfoundland, 2008-2016 (CEAR No. 07-01-32083)

### 2.2.1 Project Description and Scope

This environmental assessment addressed the potential for drilling up to 27 delineation and/or exploration wells from semi-submersible or jack-up mobile drilling units or drill ships. To date eight (8) wells (including side-tracks) have been drilled within the Project Area of the assessment. It also assessed the effects of geophysical (well site surveys) and geotechnical (borehole drilling and/or sediment sampling) surveys, and remotely operated vehicle (ROV) surveys and vertical seismic profiles (VSP) surveys.

## 2.2.2 *Geographic Scope*

The geographic scope of the original drilling program EA is depicted in Figure 2. The coordinates of the Project Area from the original EA are as follows and is illustrated in Figure 2.

- 49° North & 49.5° West
- 49° North & 45.5° West
- 46° North & 49.5° West
- 46° North & 45.5° West

The Study Area encompasses an area potentially affected by an oil spill based on spill trajectory modelling undertaken for the original environmental assessment.

## 2.3 **Planned 2015 Surveys Pursuant to Approvals CEAR No. 11-01-60411 and CEAR No. 07-01-32083**

### 2.3.1 *Geophysical Surveys*

The first survey campaign is planned to commence as early as April 2015 and is estimated to take approximately 21 days to complete, allowing for weather and technical downtime. The survey may take place anytime between May 2015 and November 2015. Seabed survey and geohazard data will be collected using both deep tow and hull-mounted sensors. The following sensors are planned to be used: sub-bottom profiler (SBP), side-scan sonar (SSS), multi-beam echo sounder (MBES), and magnetometer (mag). The 2015 geophysical work will take place over an area of approximately 30 by 50 kilometres within the overall survey area. The 2015 survey area which is shown in Figure 1 falls within the Project Areas for the above referenced environmental assessment.

The coordinates of the 2015 Survey Area are provided in the Table 2.

**Table 2 - 2015 Survey Area Coordinates (NAD 83)**

| Corner Point     | Latitude           | Longitude         |
|------------------|--------------------|-------------------|
| Northwest corner | -46 28 27.29101772 | 48 30 00.30134710 |
| Northeast corner | -46 11 12.81370586 | 48 29 59.99999974 |
| Southeast corner | -46 16 57.60535558 | 47 47 46.72249555 |
| Southwest corner | -47 02 43.43144647 | 47 53 22.74992333 |

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Depending on the vessel used, the sub-bottom profiler could be a hull mounted or towed sensor. The hull mounted sensor operates between 2 - 6.5 kHz and maximum source level of 230 dB with maximum peak to peak amplitude of 22 dB //1uPa@1m. The towed SBP unit operates in the 2-16 kHz frequency with a maximum acoustic power of 212 dB //1uPa@1M.

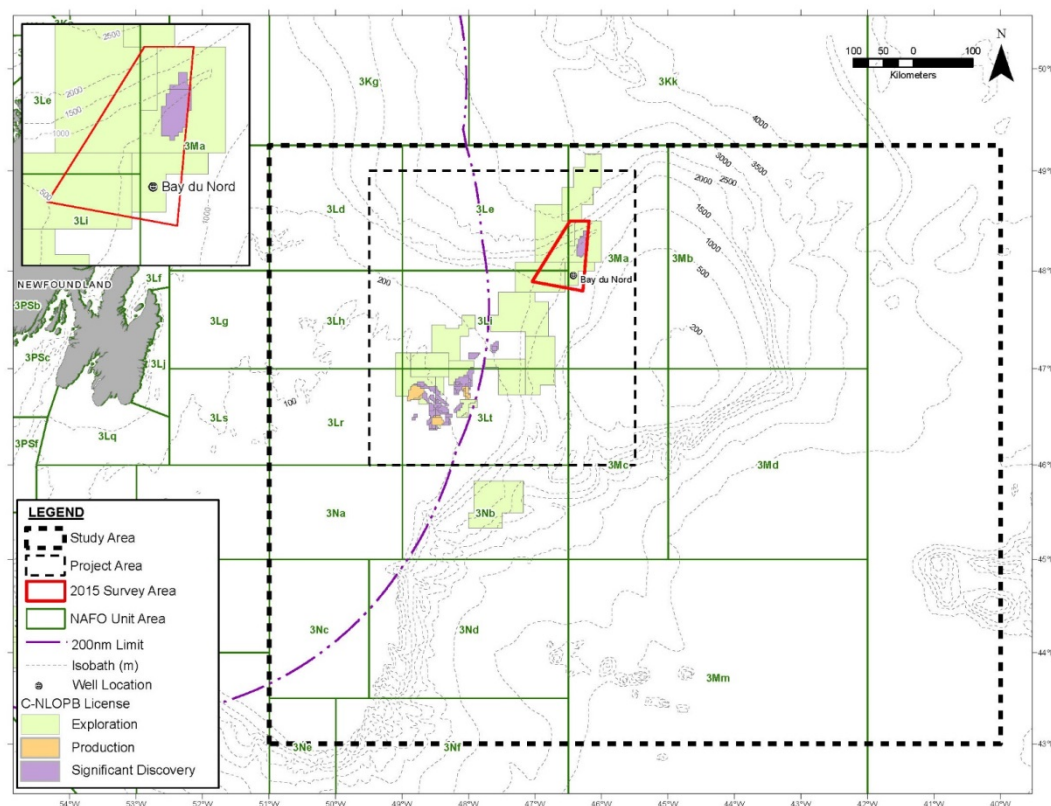
A sparker / boomer SBP system may also be used to gain deeper soil penetration. This system is towed directly behind the vessel on the water surface. The system operates in the 300 Hz to 1.2 kHz range with a maximum energy of 2500 J / shot.

The bathymetry data will be acquired using a hull-mounted multi-beam echo sounder. The system operates at 30 kHz with a maximum source level of 241dB.

Seabed imagery will be acquired with a digital, dual-frequency (100kHz/400kHz) side scan sonar system towed at depth ~ 20 meters above the seafloor using a 3500 meter cable. Output power of this system is extremely low - in the order of 4 joules.

In addition, environmental data may be collected either during the same campaign or with a vessel of opportunity at a later date. Data will be collected using a frame mounted video camera; video data of possible coral/sponge areas at selected sites will be collected. The work scope may be done from one or more vessels (i.e., the ROV video surveys may be acquired from one of the supply vessels supporting the ongoing drilling campaign).





**Figure 2: Geographic scope of Statoil's exploration/delineation drilling program environmental assessment (CEAR No. 07-01-32083) and the location of the proposed survey area for 2015/16.**

### 2.3.2 Drilling Activities

As stated above, under the 2014 Operations Authorization issued to SCL by the C-NLOPB, SCL will continue its drilling operations in the Flemish Pass area. The drilling operations were addressed in the environmental assessment update, submitted to the C-NLOPB on June 10, 2014.

In 2014, under the Operations Authorization No. 25020-020-0A02, SCL drilled the Bay de Verde well (F-67) and a commenced drilling a sidetrack (F-67Z) in mid-December 2014. In 2015, it is planned to drill up to 10 wells on ELs 1112, 1123, and 1126, depending on the availability of the drilling unit West Aquarius.

The plans for these wells include provision for Vertical Seismic Profile (VSP) surveys. SCL will also conduct an ROV surveys at any or all of these locations prior to spud for seabed obstructions and nearby presence of corals in accordance with the conditions of approval of the original environmental assessment. SCL may also conduct geo-hazard site surveys as necessary at these well site locations during this exploration drilling program in 2015 and in coming years through 2016. These surveys, if conducted, will likely occur during the months of May – October of any one year. In preparation for MODU arrival at each of the drilling locations, transponders will be laid on the seabed and metocean equipment will be deployed. As the MODU West Hercules is a dynamically positioned rig there is no requirement for anchoring and therefore, no requirement for ROV surveys at anchor locations.

### **2.3.3 Temporal Scope**

All activities scoped in the environmental assessment could be carried out year round from 2008 through 2016.

## **2.4 Environmental Aspects**

This section addresses the environmental aspects of the conduct of the geophysical, geotechnical and environmental survey activities described in Sections 2.3 and 2.4 within the survey area shown in Figures 1 and 2. As in previous updates this section considers commercial fisheries, species at risk and corals and sponges.

### **2.4.1 Commercial Fisheries**

Figures 3 and 4 illustrate the pattern of fishing activity in 2013 for all commercial species, based on Canadian catch data as obtained from DFO with respect to the Study and Project Areas defined for the two environmental assessments relevant to this update. Fishing activities in the either of the Study Areas of the Drilling EA or the Seismic EA have not changed significantly since the environmental assessment reports were accepted and the overall program approved.

The information portrayed in these figures is based on data derived from Fisheries and Oceans databases including research vessel and underutilized species information. This pattern of activity is consistent with that documented in the original environmental assessments and subsequent updates and recent environmental assessments by other

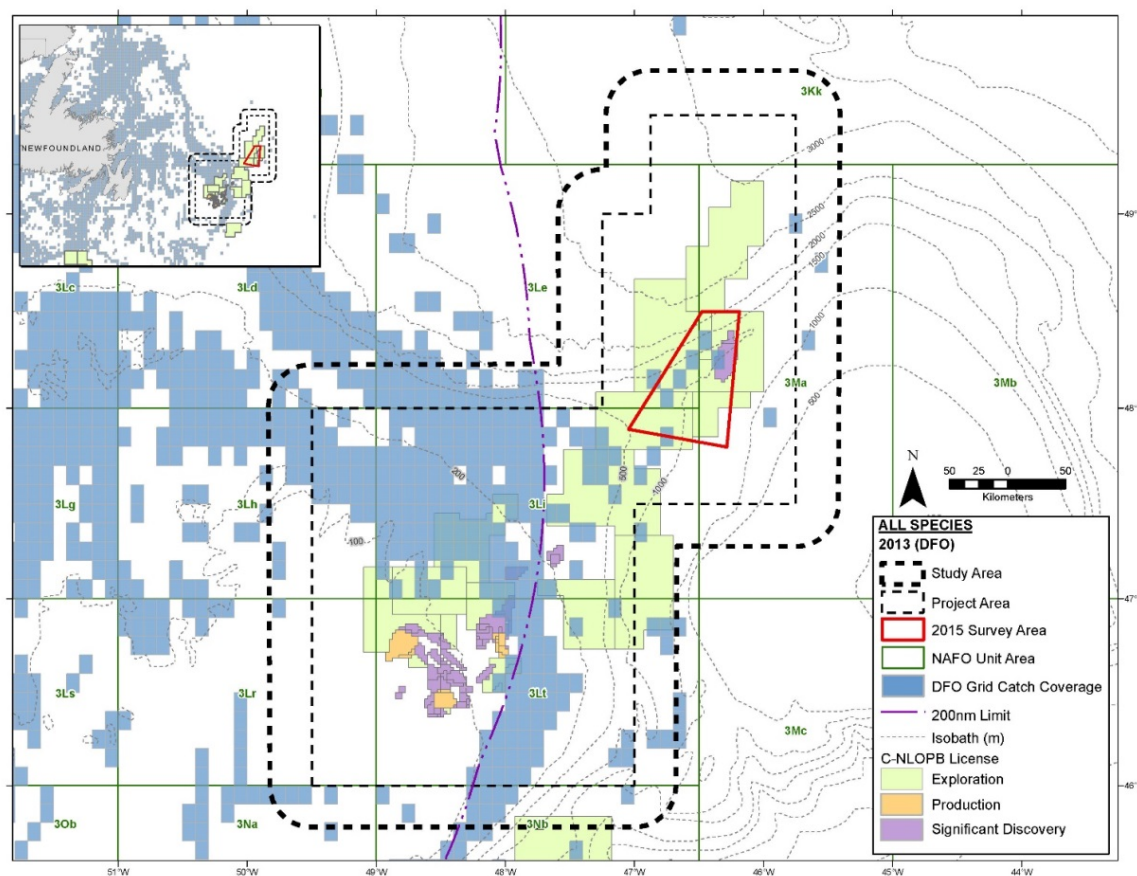
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offshore operators that have geographic and temporal scopes for their operations that overlap SCL's.

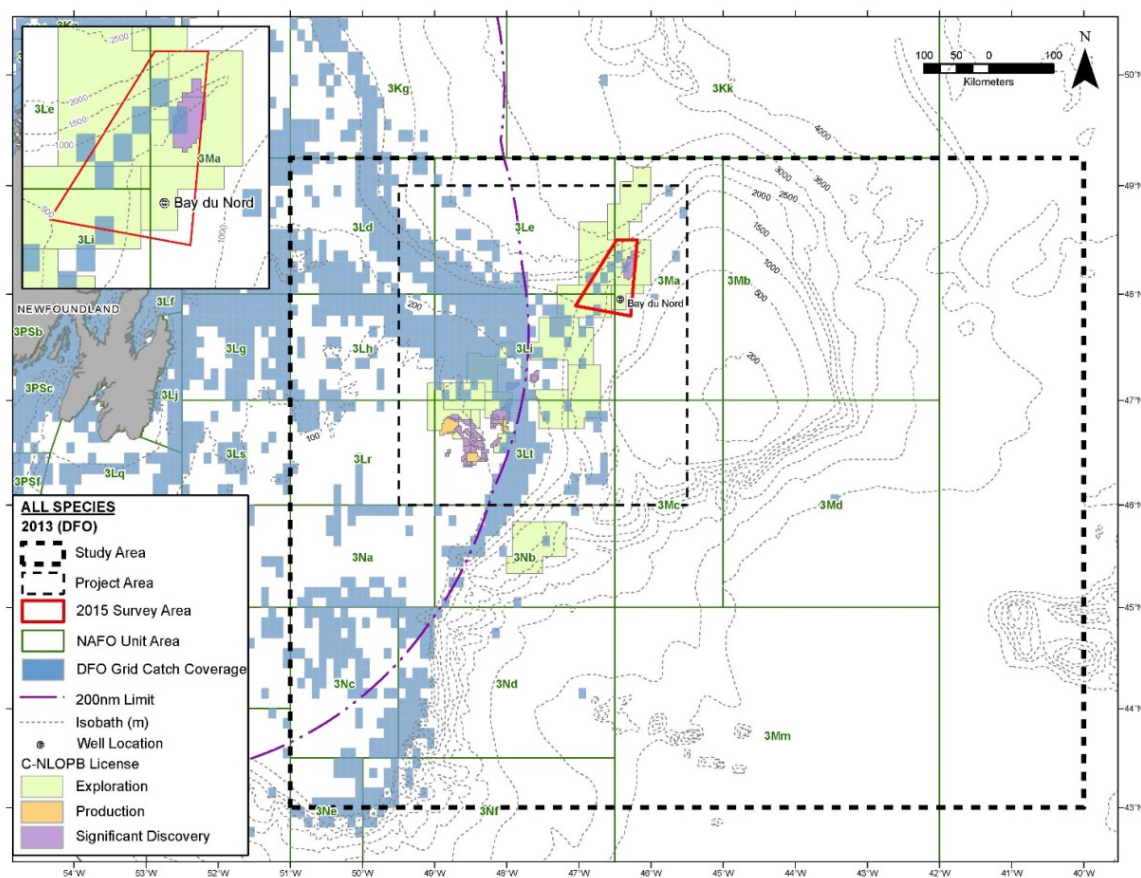
As is evident from Figures 3 and 4, the vast majority of Canadian commercial fishing activity occurs well away from Statoil's proposed survey area in the Flemish Pass. The shaded (blue) fishing activity blocks that appear in and near the proposed survey area record Greenland halibut fishing activity in DFO's 2013 data set; the most recent one available. Figure 5 provides the fishing activity information for Greenland halibut during 2013.

SCL reviewed DFO's fishing activity information for other commercial species of interest some of which might be fished in its area of interest, specifically Cod, Redfish and American Plaice and Yellowtail Flounder. While none of these species maps displayed patterns of fishing activity in or anywhere near the proposed survey area (Appendix 2) SCL is aware that at least Redfish and Yellowtail Flounder will be fished by NAFO fishing vessels in the area of the Flemish Pass as part of their activities within the NAFO "footprint" outside Canada's 200 nautical mile Exclusive Economic Zone (EEZ). The "footprint" is an area outside the EEZ defined by the fishing activity of NAFO vessels over a 20 year period (NAFO 2009). That part of the "footprint" overlapping the area of SCL's proposed activities is shown in Figure 8.

The fisheries quota's allocated to NAFO vessels for 2015 are described in NAFO/FCDoc.15/01 (NAFO 2015). This document indicates total allowable catches of 11,543 MT for Greenland halibut and 26,700 MT for species of redfish and 17,000 MT allocated to NAFO vessels outside the 200 mile EEZ in 2015. While this does not supply definitive information as to what extent these example quotas will be taken in SCL's survey area, it does indicate that there will be a need to tactically coordinate SCL's offshore operations with foreign fishing vessels in the Flemish Pass area using the measures committed to in the environmental assessments that govern its activities.

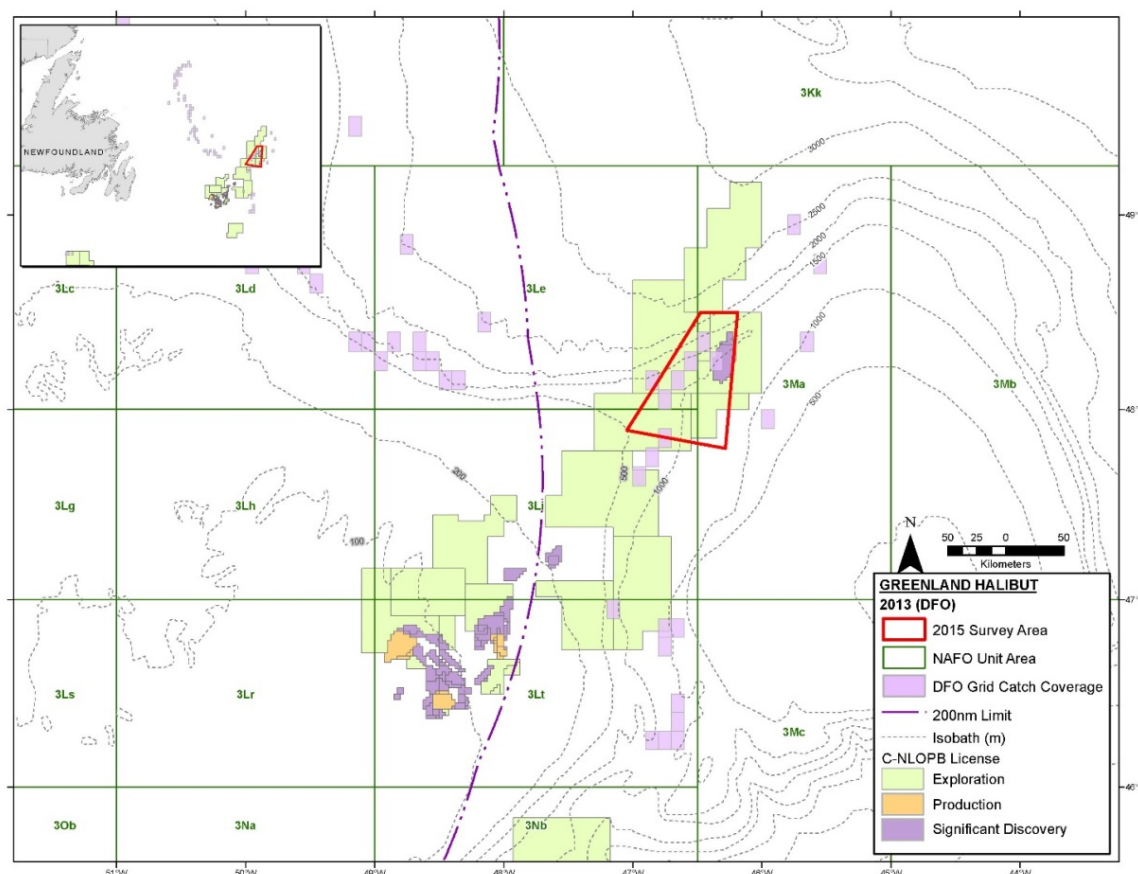


**Figure 3: Pattern of fishing activity for all commercial species in relation to the proposed geophysical survey area for 2015 for the April-October temporal scope of the Seismic EA.**



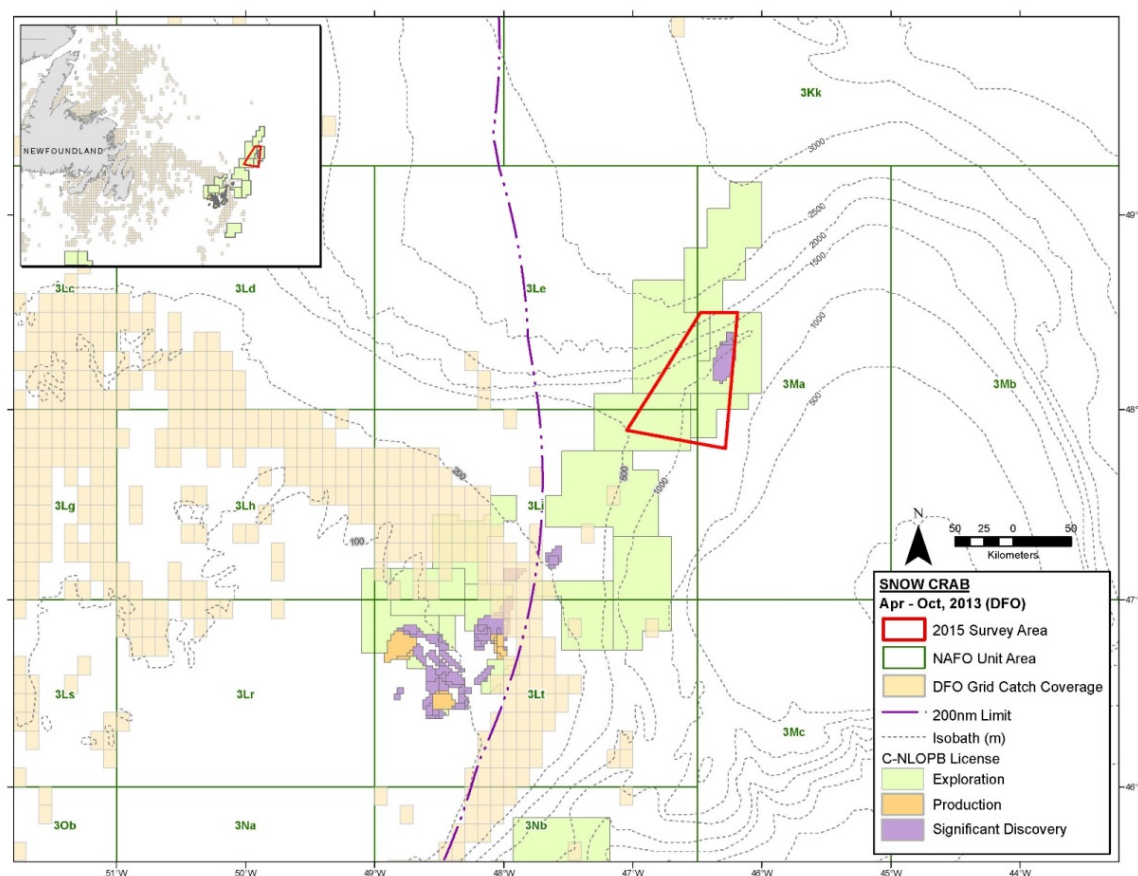
**Figure 4: Pattern of fishing activity for all commercial species in relation to the proposed geotechnical and environmental survey area for 2015 for the year round temporal scope of the Drilling EA.**





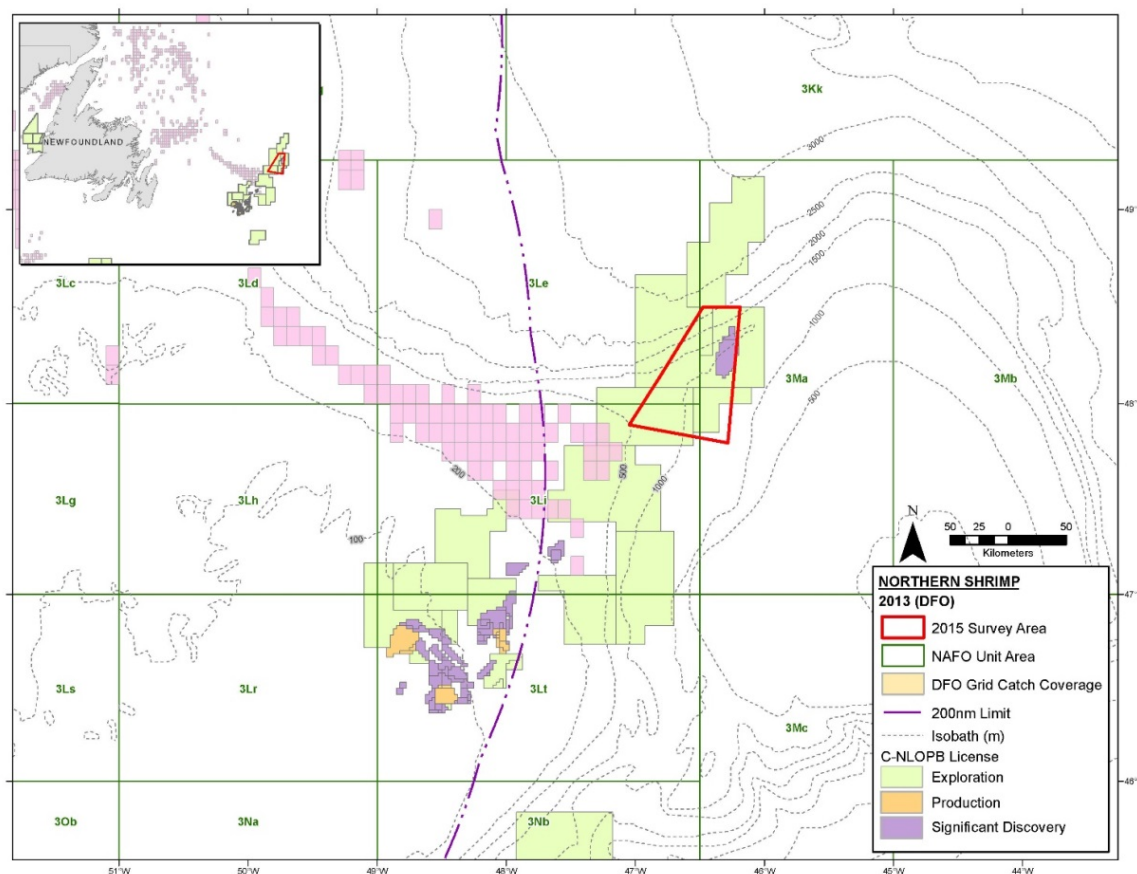
**Figure 5: Pattern of Greenland halibut fishing activity within and outside SCL's proposed 2015 survey area. EA areas are not shown.**

From the perspective of the current high value domestic fisheries – snow crab and shrimp – neither of the patterns of fishing activity for these species impinged on the proposed 2015 survey area. Figures 6 and 7 show the 2013 patterns of fishing activity for Snow Crab and Northern Shrimp. The pattern of activity shown for these species is consistent with the long term fishing patterns for both these species as documented in the original environmental assessments and updates and other environmental assessments for this area.



**Figure 6: Pattern of snow crab fishery in 2013. EA areas are not shown.**

The closest sampling location for the annual post-season crab survey, which takes place at the same sampling locations each year from September through November, is over 90 kilometers distant from the most westerly extent of the proposed 2015 survey operations (Figure 8).



**Figure 7: Pattern of northern shrimp fishery in 2013. EA areas are not shown.**

SCL recognizes that communication and coordination between oil and gas industry activities and fishing interests are critical to avoid or minimize interference with either industries' offshore operations. Key to achieving this from SCL's perspective is:

- clear instruction to its contractors with regard to fishing activities and practice in the survey area
- briefing sessions for the main survey contractor and the subcontracted picket vessel personnel
- ensuring clear understanding among survey personnel of the role of the Fisheries Liaison Officer as the sole tactical point of contact between the survey and fishing vessels
- ensuring clear protocols for reporting with respect to any fisheries issues that may arise to SCL, FFAW, and the C-NLOPB as well as routine operational reporting



- 
- enhanced frequency of Notices to Shipping to ensure that tactical survey planning is communicated to fishers and other marine interests

## **2.4.2 Consultations**

Consultations relevant to this update took place in February 2015 with Fish Food and Allied Workers Union (FFAW), the Association of Seafood Producers and Ocean Choice International (OCI) to discuss fishing activities in the survey area(s). A One Ocean representative participated in SCL's discussions with each of these stakeholder organizations. A consultation with Nature NL representatives was also held in February 2015.

### **2.4.2.1 Outcome of Discussions with Fishing Industry**

The discussion with the FFAW indicated that there were no concerns arising from the proposed survey activities within the survey area. Information was exchanged on participants' current understandings of others' planned activities in the NL Offshore in 2015 (e.g. seismic surveys, cable laying operations, etc.). Statoil provided fisheries activity maps showing 2013 Canadian commercial fishing activity.

OCI advised that its vessels would be fishing north of the area of SCL's 2015 operations till the end of March but as of April would be moving south to bottom trawl for Greenland halibut during April, May and June of 2015 in the vicinity of SCL's 2015 survey area. They will also be prosecuting a redfish fishery along the 200 mile limit starting in April and lasting for about eight months. If catches are not good along the EEZ line, then they will move further east towards SCL's 2015 survey area.

OCI raised the concern that with the increasing number of marine activities in the area of the Flemish Pass, both oil and gas related and others, the probability of interference with fishing operations has increased significantly. SCL reviewed its plans to issue notice to shipping at the outset of its activities and committed to provide more detailed information on the locations and timing of these activities to OCI.

SCL's discussion with the Association of Seafood Producers (ASP) indicated that ASP had no issues with the SCL's proposed activities in 2015.

The primary domestic fishery stakeholders potentially affected by SCL's operations participate with SCL on the One Ocean Executive and its Technical Working Group – including the FFAW, ASP and OCI as well as other fishing interests. This means that

SCL benefits from direct and regular engagement with representatives from the FFAW and seafood producer/processors sectors.

In addition, as indicated in its environmental assessments, SCL will continue to engage with stakeholders as circumstances require, particularly with respect to tactical planning before and during these surveys.

SCL also understands that it is important to recognize that harvesters fish a resource, and not fixed points from year to year. Fishing licenses are issued for large areas (e.g. NAFO subdivisions 3K or 3L) and fishing activity could take place anywhere within these areas and not just at the pattern of locations fished in recent years indicated by Fisheries and Oceans data. This means that the operator should continue to consult with the fishing industry on a regular basis to keep up to date with trends in fishing from year to year through mechanisms noted above.

SCL also recognizes that other countries fish outside Canada's 200 nm Exclusive Economic Zone. In an attempt to minimize potential conflict, SCL will communicate all Notices to Shipping to the NAFO Secretariat in Halifax, Nova Scotia.

With regards to the conduct of any future geo-hazard or ROV surveys, SCL will continue to keep fishing interests informed of these activities during the operational planning and execution phases. This will be done through the established One Ocean and FFAW contacts and others as deemed necessary or as advised.

#### ***2.4.2.2 Outcome of Discussion with Nature Newfoundland & Labrador***

SCL reviewed its proposed 2015 activities in the Flemish Pass area with Nature Newfoundland and Labrador (Nature NL) representatives. Nature NL questioned the practicability of the coral survey required of SCL in the context of the borehole program. It was recommended that the results of the coral survey should be made available for use by researchers.

#### ***2.4.3 Research Vessel Surveys by Fisheries and Oceans Canada***

Fisheries and Oceans Canada (DFO) undertakes annual fisheries research surveys in the Newfoundland and Labrador Offshore area. Table 3 documents the timing of DFO research surveys that may overlap the 2015 Statoil seismic survey area. SCL will coordinate with DFO on an ongoing basis to determine if overlaps in time and space are likely and what measures are required to manage any potential interactions.

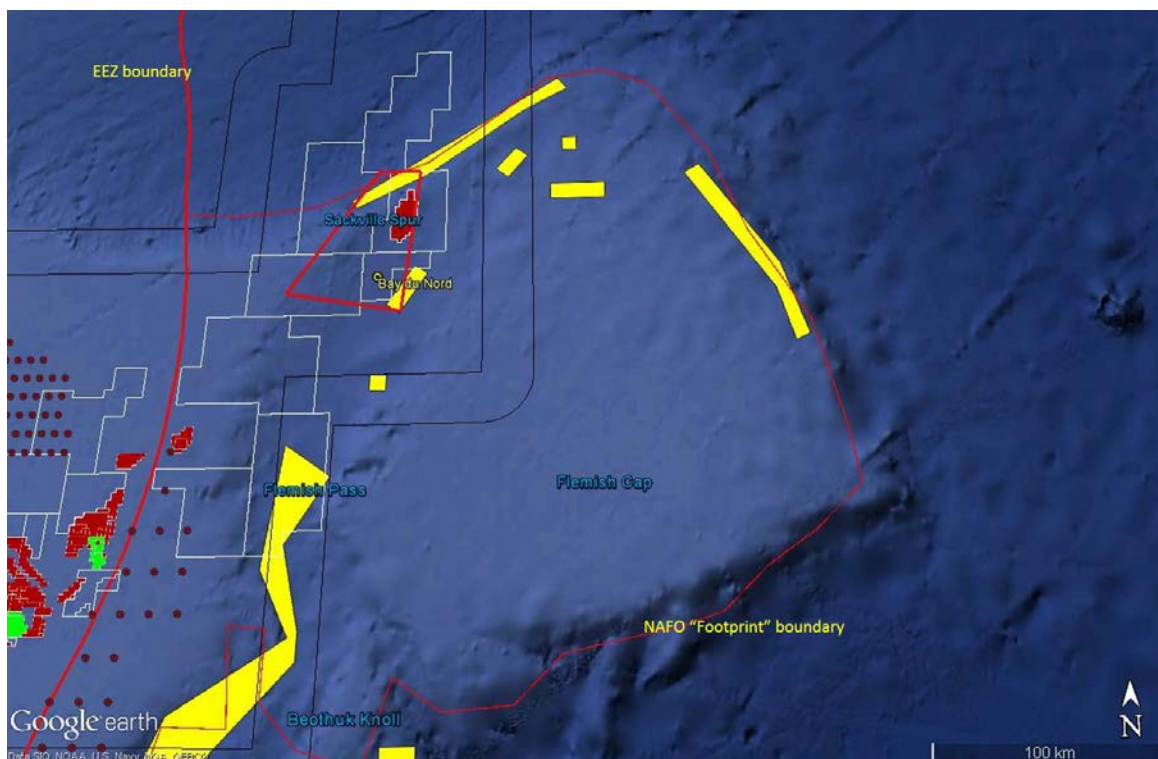
**Table 3: DFO Research Vessel Schedule for NAFO Areas Adjacent to or Encompassing Statoil Canada 2015 Survey Areas**

| Research Vessel | NAFO Area  | 2015 Start Date (est.)    | 2015 End Date             |
|-----------------|------------|---------------------------|---------------------------|
| Needler         | 3L+3N      | May 27 <sup>th</sup>      | June 13 <sup>th</sup>     |
|                 | 3N+3L      | October 14 <sup>th</sup>  | October 27 <sup>th</sup>  |
|                 | 3L         | October 28 <sup>th</sup>  | November 10 <sup>th</sup> |
|                 | 3K+3L      | November 11 <sup>th</sup> | November 24 <sup>th</sup> |
| Teleost         | 3P+3KLMNO  | April 7 <sup>th</sup>     | April 28 <sup>th</sup>    |
|                 | 3L         | April 29 <sup>th</sup>    | May 6 <sup>th</sup>       |
|                 | 3KL        | May 12 <sup>th</sup>      | May 26 <sup>th</sup>      |
|                 | 2J+3K      | October 27 <sup>th</sup>  | November 10 <sup>th</sup> |
|                 | 3K         | November 11 <sup>th</sup> | November 24 <sup>th</sup> |
|                 | 3K+3L deep | November 24 <sup>th</sup> | December 8 <sup>th</sup>  |

#### **2.4.4 Corals and Sponges**

Potential effects on corals and sponges from geophysical surveys were assessed in the above referenced environmental assessments. Information on these species was provided in the assessment as well as the understanding of their distribution in the project and study areas (c.f. Campbell et al, 2009; DFO, 2010; Kenchington et al, 2010 and NAFO/FC Doc. 11/1). Since that time, additional descriptive information on the Flemish Pass area has been published relevant to corals and sponges (c.f. Froja'n et al 2013 and Beazley et al 2011).

Notwithstanding the fact that the survey area overlaps very small portions of two of these NAFO bottom trawling closure areas, Area 6 Sackville Spur and Area 10 (Figure 8), during the geophysical survey there will be no bottom contact or seabed disturbance. The areas where the survey area overlaps NAFO's bottom trawling closures may be subject to an ROV survey of the corals in these areas to provide a reference for recognizing coral occurrences elsewhere in the survey area. The conclusions of the current environmental assessment on this issue remain valid.



**Figure 8: NAFO Bottom Fishing Closure Areas (yellow polygons) for Corals & Sponges near and overlapping 2015/16 seismic survey area (red outlined polygon). Array of red dots are post season crab survey sample sites. NL Offshore exploration (white outline), significant discovery (red) and production (green) licenses.**

## 2.4.5 Species at Risk

An updated listing of Species at Risk Act (SARA) and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed species for the Grand Banks area of relevance to this assessment is provided in Appendix 1. Appendix 1 also provides a listing of COSEWIC candidate species under consideration. SARA listed species with final recovery strategies in place are noted.

None of the SARA listed species relevant to the geographic scope of this assessment have an associated critical habitat description or an action or management plan in place. It is noted however that the North Atlantic Right Whale does have a critical habitat statement pursuant to SARA. However, based on sightings to date, it is an infrequent visitor to the Study Area. Furthermore, the critical habitat designated for this

species is located in the Grand Manan Basin in the Bay of Fundy. Similarly, the Leatherback Sea Turtle, which can occur in the Study Area, has had potential but not formally designated critical habitat areas identified in recent years (DFO, 2012). Again, these areas do not occur within the Study Area.

Since the last environmental assessment update, no new species were added to the SARA Schedule 1 listing nor were any species added to the COSEWIC listings, however, COSEWIC has identified two new species as candidate species to be evaluated on a high priority basis, i.e., Mackerel (*Scomber scombrus*) and Bearded Seal (*Erignathus barbatus*).

A review of the SARA species-specific recovery plans and the one critical habitat statement in place, as noted in Appendix 1, does not indicate that any new or modified mitigation measures are required beyond those already committed to by SCL for the scope of the operations addressed by the environmental assessments relevant to the activities described in this update.

## 2.4.6 Mitigations

Statoil regards the environmental predictions and consequent mitigations cited in the environmental assessment and subsequent significance determination that relates to CEAR No. 11-01-60411 and CEAR No. 07-01-32083 as valid and re-commits to implementing these mitigation measures for the activities to be carried out under the scope of this assessment this year.

Mitigations to be implemented, as stated in the previous environmental assessments include the following:

### **Geophysical / Wellsite surveys and Geotechnical Borehole drilling program:**

- Mitigations will follow those defined in Appendix 2 of Geophysical, Geological, Environmental and Geotechnical Program Guidelines (GGEG) (CNLOPB 2012) respecting wellsite surveys
- Ramp-up (i.e., soft start) if airgun array is used
- For geophysical programs - use of qualified, dedicated Marine Mammal Observer (MMOs) / Seabird Observer to monitor marine mammals and turtles and carry out seabird observations; protocols will follow those outlined in the GGEG
- Fisheries Liaison Officer (FLO) and communication procedures to avoid conflicts with fishery
- Gear and Vessel compensation program

- Handling and release of stranded seabirds
- Notice to Shipping regarding the survey location and duration will be issued for communication to all marine users

### 3 Concluding Statement

The activities SCL plans to carry out in 2015 have been reviewed and assessed to be within the scope of the environmental assessments currently in place to address those activities, specifically:

- The scope and nature of activities planned and addressed under the approved environmental assessments have not changed
- The nature of the species at risk in the Project and Study areas have been validated and no new species has been added to Schedule 1 of SARA nor to COSEWIC listings, however, two species have been added to the COSEWIC candidate species listings – mackerel and bearded seal.
- As noted previously in this update, no critical habitats for any of these species defined pursuant to the Species at Risk legislation occur in the Study Area
- The nature and extent of the fishing activities being undertaken in the Project Area have been validated and have not changed such that project activities pose any potential effects not previously assessed
- The mitigation measures defined and committed to in the environmental assessment are still valid and will continue to be implemented
- Statoil continues to consult with stakeholders directly affected by the activities planned under the approved environmental assessment.

The environmental effects predicted in the previously approved environmental assessments remain valid. Statoil reaffirms its commitment to implement the mitigation measures proposed in these assessments and in the Screening Decisions made by the C-NLOPB.



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## 4 References

### 4.1 Original Statoil Canada Ltd. Environmental Assessments<sup>1</sup>

1. Statoil Canada Ltd., 2012, Amendment to the Environmental Assessment of Statoil's Geophysical Program for the Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019
2. LGL Limited. 2011. Environmental assessment of Statoil's Geophysical Program for Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019. LGL Rep. SA1121. Rep. by LGL Limited, in association with Canning & Pitt Associates Inc., and Oceans Ltd., St. John's, NL, for Statoil Canada Ltd., St. John's, NL. 227 p. + appendices.
3. LGL Limited. 2008. Environmental Assessment of StatoilHydro Canada Ltd. Exploration and Appraisal/Delineation Drilling Program for Offshore Newfoundland, 2008-2016. LGL Rep. SA947b. Rep. by LGL Limited, Canning & Pitt Associates Inc., and Oceans Ltd., St. John's, NL, for StatoilHydro Canada Ltd., St. John's, NL. 292 p. + appendices

### 4.2 Previous Environmental Assessment Updates

1. Statoil Canada Limited East Coast Operations. Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2013 Drilling Operations
2. Statoil Canada Limited East Coast Operations. Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2012 – Seismic Survey Operations
3. Statoil Canada Limited East Coast Operations. Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2012 – Drilling Operations
4. Statoil Canada Limited East Coast Operations. Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2011 (Drilling Operations)
5. Statoil Canada Limited East Coast Operations. Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2010 (Drilling and Seismic Operations)

### 4.3 Recent & Relevant Environmental Assessments Reviewed for this Update

1. LGL Limited. 2005. Orphan Basin Exploration Drilling Program Environmental Assessment. LGL Rep. SA825. Rep. by LGL Limited, St. John's, NL, Canning & Pitt Associates, Inc., St. John's, NL, SL Ross Environmental Research Limited, Ottawa, ON,

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<sup>1</sup> Documents referenced in Sections 4.1, 4.2, 4.3 are accessible on the Canada-Newfoundland & Labrador Offshore Petroleum Board [website](#)

Oceans Limited, St. John's, NL, Lorax Environmental, Vancouver, BC, and PAL Environmental Services, St. John's, NL, for Chevron Canada Limited, Calgary, AB, ExxonMobil Canada Ltd., St. John's, NL, Imperial Oil Resources Ventures Limited, Calgary, AB and Shell Canada Limited. 353 p.

2. LGL Limited. 2006. Orphan Basin Exploration Drilling Program Environmental Assessment Addendum. LGL Rep. SA825. Rep. by LGL Limited, St. John's, NL, Canning & Pitt Associates, Inc., St. John's, NL, SL Ross Environmental Research Limited, Ottawa, ON, Oceans Limited, St. John's, NL, Lorax Environmental, Vancouver, BC, and PAL Environmental Services, St. John's, NL, for Chevron Canada Limited, Calgary, AB, ExxonMobil Canada Ltd., St. John's, NL, Imperial Oil Resources Ventures Limited, Calgary, AB and Shell Canada Limited. 142 p. + Appendices
3. LGL Limited. 2009. Orphan Basin exploration drilling program environmental assessment: Validation 2010. LGL Rep. SA1012. Rep. by LGL Limited, St. John's, NL, for Chevron Canada Resources., Calgary, AB. 63 p. + appendix.
4. LGL Limited. 2011. Environmental assessment of Statoil's Geophysical Program for Jeanne d'Arc and Central Ridge/Flemish Pass Basins, 2011-2019. LGL Rep. SA1121. Rep. by LGL Limited, in association with Canning & Pitt Associates Inc., and Oceans Ltd., St. John's, NL, for Statoil Canada Ltd., St. John's, NL. 227 p. + appendices.
5. Husky Energy Atlantic Region. 2014. Newfoundland and Labrador Offshore Area Environmental Assessment Review for 2014. Doc No. AR-HSE-RP-0331 Rev 4.

#### **4.4 Relevant Species at Risk Recovery Strategies Reviewed for this Update<sup>2</sup>**

1. Atlantic Leatherback Turtle Recovery Team 2006. Recovery Strategy for Leatherback Turtle (*Dermochelys coriacea*) in Atlantic Canada. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa, vi + 45 pp.
2. Kulka, D., C. Hood and J. Huntington. 2007. Recovery Strategy for Northern Wolffish (*Anarhichas denticulatus*) and Spotted Wolffish (*Anarhichas minor*), and Management Plan for Atlantic Wolffish (*Anarhichas lupus*) in Canada. [Final Version] Fisheries and Oceans Canada: Newfoundland and Labrador Region. St. John's, NL. x + 103 pp.
3. DFO (Fisheries and Oceans Canada). 2008. *Recovery Strategy for the Atlantic walrus (Odobenus rosmarus rosmarus), Northwest Atlantic population, in Canada. Species at Risk Act Recovery Strategy Series.* Fisheries and Oceans Canada, Ottawa, ON. x + 11 pp.

<sup>2</sup> Documents referenced in Section 4.4 are available on the Environment Canada Species at Risk [website](#)



4. Beauchamp, J., Bouchard, H., de Margerie, P., Otis, N., Savaria, J.-Y., 2009. Recovery Strategy for the blue whale (*Balaenoptera musculus*), Northwest Atlantic population, in Canada [FINAL]. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada, Ottawa. 62 pp.
5. Brown, M.W., Fenton, D., Smedbol, K., Merriman, C., Robichaud-Leblanc, K., and Conway, J.D. 2009. Recovery Strategy for the North Atlantic Right Whale (*Eubalaena glacialis*) in Atlantic Canadian Waters [Final]. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada. vi + 66p.
6. Department of Fisheries and Oceans Canada. 2010. Recovery Strategy for the Northern Bottlenose Whale, Scotian Shelf population, in Atlantic Canadian Waters. .Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada. vi + 61p.
7. DFO. 2011. Using Satellite Tracking Data to Define Important Habitat for Leatherback Turtles in Atlantic Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2012/036.
8. O'Boyle, R. 2012. Assessment of Leatherback Turtle (*Dermochelys coriacea*) Fisheries and Non-Fisheries Related Interactions in Atlantic Canadian Waters. DFO Can. Sci. Advis. Sec. Res. Doc. 2012/063. iii + 99 p.
9. Fisheries and Oceans Canada. 2013. Report on the Progress of Recovery Strategy Implementation for the Leatherback Sea Turtle (*Dermochelys coriacea*) in Canada for the Period 2007-2012. Species at Risk Act Recovery Strategy Report Series. Fisheries and Oceans Canada, Ottawa.

## 4.5 Other References

1. Northwest Atlantic Fisheries Organization Conservation and Enforcement Measures NAFO/FCDoc. 15/01 Serial No. N6409
2. Northwest Atlantic Fisheries Organization, 2009. Delineation of Existing Bottom Fishing Areas in the NAFO Regulatory Area Serial No. N5676 NAFO SCS Doc. 09/21
3. Northwest Atlantic Fisheries Organization Conservation and Enforcement Measures NAFO/FC Doc. 11/1 Serial No. N5867 – Article 16 “Coral and Sponge Protection Zones” (updated 29 July 2011) <http://www.nafo.int/fisheries/frames/regulations.html>
4. Kenchington, E., Lirette, C., Cogswell, A., Archambault, D., Archambault, P., Benoit, H., Bernier, D., Brodie, B., Fuller, S., Gilkinson, K., Lévesque, M., Power, D., Siferd, T., Treble, M., and Wareham, V. 2010. Delineating Coral and Sponge Concentrations in the Biogeographic Regions of the East Coast of Canada Using Spatial Analyses. DFO Can.Sci. Advis. Sec. Res. Doc. 2010/041. vi + 202 pp..

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5. Campbell, J.S. and Simms, J.M. 2009. Status Report on Coral and Sponge Conservation in Canada. Fisheries and Oceans Canada: vii + 87 p. <http://www.dfo-mpo.gc.ca/library/340259E.pdf>
  6. DFO. 2010. Occurrence, susceptibility to fishing, and ecological function of corals, sponges, and hydrothermal vents in Canadian waters. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2010/041. [http://www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010\\_041\\_e.pdf](http://www.dfo-mpo.gc.ca/CSAS/Csas/publications/sar-as/2010/2010_041_e.pdf)
  7. Christopher R. S. Barrio Froja'n, Kevin G. MacIsaac, Andrew K. McMillan, Mari'a del Mar Sacau Cuadrado, Philip A. Large, Andrew J. Kenny, Ellen Kenchington, and Enrique de Ca'rdenas Gonza'lez. 2013. An evaluation of benthic community structure in and around the Sackville Spur closed area (Northwest Atlantic) in relation to the protection of vulnerable marine ecosystems. ICES Journal of Marine Science (2012), 69(2), 213–222.
  8. Beazley, L. I., Kenchington E. L., Murillo, F. J., and Sacau, M. Deep-sea sponge grounds enhance diversity and abundance of epibenthic megafauna in the Northwest Atlantic. ICES J. Mar. Sci. (2011) 68 (2): 319-332.
  9. National Energy Board, CNSOPB and C-NLOPB. 2009. Offshore Chemical Selection Guidelines for Drilling and Production Activities on Frontier Lands. 8 pp + appendices.

# APPENDICES

## Appendix 1 - Current Listing<sup>3</sup> of **SARA** and **COSEWIC** Listed Species in the Statoil Project Area(s)<sup>4</sup>

| Species   |                                     | New since last update | SARA Status noted as Schedules 1, 2 or 3 |            |            | COSEWIC Status  |            |            |                 |
|---|-------------------------------------|-----------------------|--|------------|------------|-----------------|------------|------------|-----------------|
| Common Name   | Scientific Name                     |                       | ■  | Endangered | Threatened | Special Concern | Endangered | Threatened | Special Concern |
| Birds   |                                     |                       |  |            |            |                 |            |            |                 |
| Ivory Gull  | <i>Pagophila eburnean</i>           |                       | 1  |            |            | X               |            |            |                 |
| Marine Fish   |                                     |                       |  |            |            |                 |            |            |                 |
| Acadian Redfish<br>(Atlantic Population)                | <i>Sebastes fasciatus</i>           |                       |  |            |            |                 | X          |            |                 |
| Alewife   | <i>Alosa pseudoharengus</i>         |                       |  |            |            |                 |            |            | MPC             |
| American Eel  | <i>Anguilla rostrata</i>            |                       |  |            |            |                 | X          |            |                 |
| American Plaice<br>(Newfoundland & Labrador Population) | <i>Hippoglossoides platessoides</i> |                       |  |            |            |                 | X          |            |                 |
| American Shad   | <i>Alosa sapidissima</i>            |                       |  |            |            |                 |            |            | MPC             |
| Atlantic Bluefin Tuna                                   | <i>Thunnus thynnus</i>              |                       |  |            |            | X               |            |            |                 |
| Atlantic cod<br>(Newfoundland & Labrador population)    | <i>Gadus morhua</i>                 |                       |  |            |            | X               |            |            |                 |
| Atlantic Salmon (south Newfoundland population)         | <i>Salmo salar</i>                  |                       |  |            |            |                 | X          |            |                 |
| Atlantic wolffish                                       | <i>Anarhichas lupus</i>             |                       |  |            | 1          |                 |            | X          |                 |
| Basking Shark   | <i>Cetorhinus maximus</i>           |                       |  |            |            |                 |            | X          |                 |
| Blue shark  | <i>Prionace glauca</i>              |                       |  |            |            |                 |            | X          |                 |
| Capelin   | <i>Mallotus villosus</i>            |                       |  |            |            |                 |            |            | MPC             |
| Cusk  | <i>Brosme brosme</i>                |                       |  |            |            | X               |            |            |                 |
| Deepwater Redfish ( Northern Population)                | <i>Sebastes mentella</i>            |                       |  |            |            |                 | X          |            |                 |
| Greenland Shark   | <i>Somniosus microcephalus</i>      |                       |  |            |            |                 |            |            | MPC             |

<sup>3</sup> January 2015

<sup>4</sup> Green Shade means a final Recovery Strategy is in place but no Critical Habitat has been identified nor have Action or Management plans been finalized for these species with the exception of the North Atlantic Right Whale (see footnote 8). Note that two other species that have recovery strategies, the Atlantic Walrus and Grey Whale, have been extirpated from Eastern Canadian waters and therefore are not listed in the above table.

<sup>5</sup> Candidate COSEWIC species are classified as High (H), Medium (M) or Low (L) Priority Candidate (PC) species

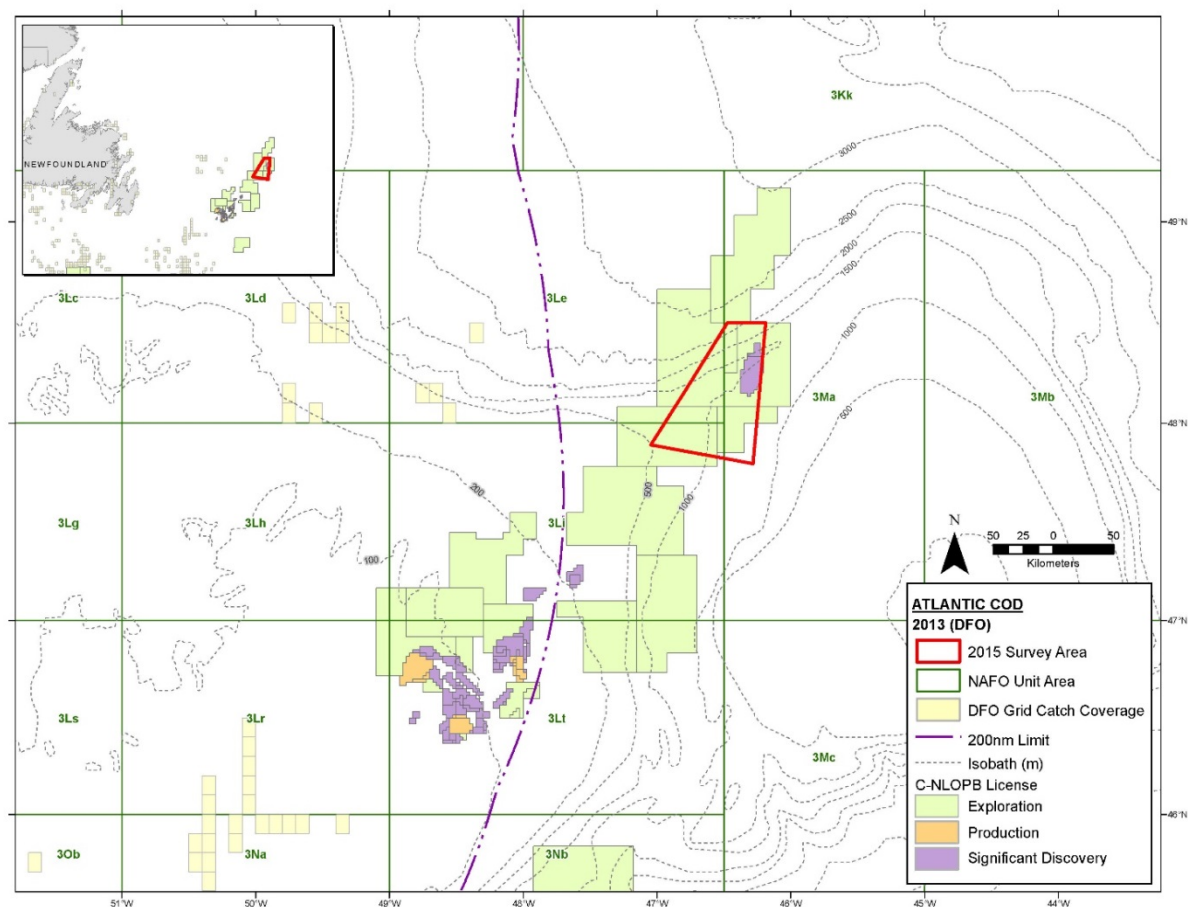
| Species  |                                 | New since last update | SARA Status noted as Schedules 1, 2 or 3 |            |                 | COSEWIC Status |            |                 |                        |
|--|---------------------------------|-----------------------|--|------------|-----------------|----------------|------------|-----------------|------------------------|
| Common Name  | Scientific Name                 |                       | Endangered                               | Threatened | Special Concern | Endangered     | Threatened | Special Concern | Candidate <sup>5</sup> |
| Haddock  | <i>Melanogrammus aeglefinus</i> |                       |  |            |                 |                |            |                 | MPC                    |
| Lumpfish   | <i>Cyclopterus lumpus</i>       |                       |  |            |                 |                |            |                 | HPC                    |
| Northern wolffish  | <i>Anarhichas denticulatus</i>  |                       |  | 1          |                 |                | X          |                 |                        |
| Ocean pout   | <i>Zoarces americanus</i>       |                       |  |            |                 |                |            |                 | MPC                    |
| Pollock  | <i>Pollachius</i>               |                       |  |            |                 |                |            |                 | MPC                    |
| Porbeagle shark  | <i>Lamna nasus</i>              |                       |  |            |                 | X              |            |                 |                        |
| Roughhead grenadier  | <i>Macrourus bergs</i>          |                       |  |            |                 |                |            | X               |                        |
| Roundnose Grenadier  | <i>Coryphaenoides rupestris</i> |                       |  |            |                 | X              |            |                 |                        |
| Shortfin mako shark  | <i>Isurus</i>                   |                       |  |            |                 |                | X          |                 |                        |
| Spiny Dogfish  | <i>Squalus acanthias</i>        |                       |  |            |                 |                |            | X               |                        |
| Spiny eel  | <i>Notacanthus chemnitzii</i>   |                       |  |            |                 |                |            |                 | MPC                    |
| Spinytail Skate  | <i>Bathyraja spinicauda</i>     |                       |  |            |                 |                |            |                 | MPC                    |
| Spotted wolffish   | <i>Anarhichas</i>               |                       |  | 1          |                 |                | X          |                 |                        |
| Thorny Skate   | <i>Amblyraja</i>                |                       |  |            |                 |                |            | X               |                        |
| Mackerel   | <i>Scomber scombrus</i>         | ■                     |  |            |                 |                |            |                 | HPC                    |
| White Hake (Atlantic and Northern Gulf of St. Lawrence population) | <i>Urophycis tenuis</i>         |                       |  |            |                 |                | X          |                 |                        |
| White shark  | <i>Carcharodon carcharias</i>   |                       | 1  |            |                 | X              |            |                 |                        |
| <b>Marine Mammals</b>  |                                 |                       |  |            |                 |                |            |                 |                        |
| Blue whale   | <i>Balaenoptera musculus</i>    |                       | 1  |            |                 | X              |            |                 |                        |
| Cuvier's Beaked Whale  | <i>Ziphius cavirostris</i>      |                       |  |            |                 |                |            |                 | MPC                    |
| Fin whale (Atlantic population)                                    | <i>Balaenoptera physalus</i>    |                       |  |            | 1               |                |            | X               |                        |
| Harbour porpoise   | <i>Phocoena phocoena</i>        |                       |  | 2          |                 |                |            | X               |                        |

| Species  |                               | New since last update | SARA Status noted as Schedules 1, 2 or 3 |            |                 | COSEWIC Status |            |                 |                        |
|--|-------------------------------|-----------------------|--|------------|-----------------|----------------|------------|-----------------|------------------------|
| Common Name  | Scientific Name               |                       | Endangered                               | Threatened | Special Concern | Endangered     | Threatened | Special Concern | Candidate <sup>5</sup> |
| Humpbacked whale   | <i>Megaptera novaeanglia</i>  |                       |  |            | 3               |                |            |                 |                        |
| Killer Whale (NW Atlantic & Eastern Arctic)                  | <i>Orcinus orca</i>           |                       |  |            |                 |                |            | X               |                        |
| North Atlantic right whale <sup>6</sup>                      | <i>Eubalaena glacialis</i>    |                       | 1  |            |                 | X              |            |                 |                        |
| Northern Bottlenose whale <sup>7</sup> ( Davis Strait/Baffin | <i>Hyperoodon ampullatus</i>  |                       |  |            |                 |                |            | X               |                        |
| Sowerby's beaked whale                                       | <i>Mesoplodon bidens</i>      |                       |  |            | 1               |                |            | X               |                        |
| Sperm whale  | <i>Physeter macrocephalus</i> |                       |  |            |                 |                |            |                 | LPC                    |
| Hooded seal  | <i>Cystophora cristata</i>    |                       |  |            |                 |                |            |                 | LPC                    |
| Harp seal  | <i>Phoca groenlandica</i>     |                       |  |            |                 |                |            |                 | LPC                    |
| Ringed seal  | <i>Pusa hispida</i>           |                       |  |            |                 |                |            |                 | HPC                    |
| Bearded seal   | <i>Erignathus barbatus</i>    | ■                     |  |            |                 |                |            |                 | HPC                    |
| <b>Reptiles</b>  |                               |                       |  |            |                 |                |            |                 |                        |
| Leatherback sea turtle                                       | <i>Dermochelys coriacea</i>   |                       | 1  |            |                 | X              |            |                 |                        |
| Loggerhead sea turtle  | <i>Caretta caretta</i>        |                       |  |            |                 | X              |            |                 |                        |
| Kemp Ridely's sea turtle                                     | <i>Lepidochelys kempii</i>    |                       |  |            |                 |                |            |                 | LPC                    |

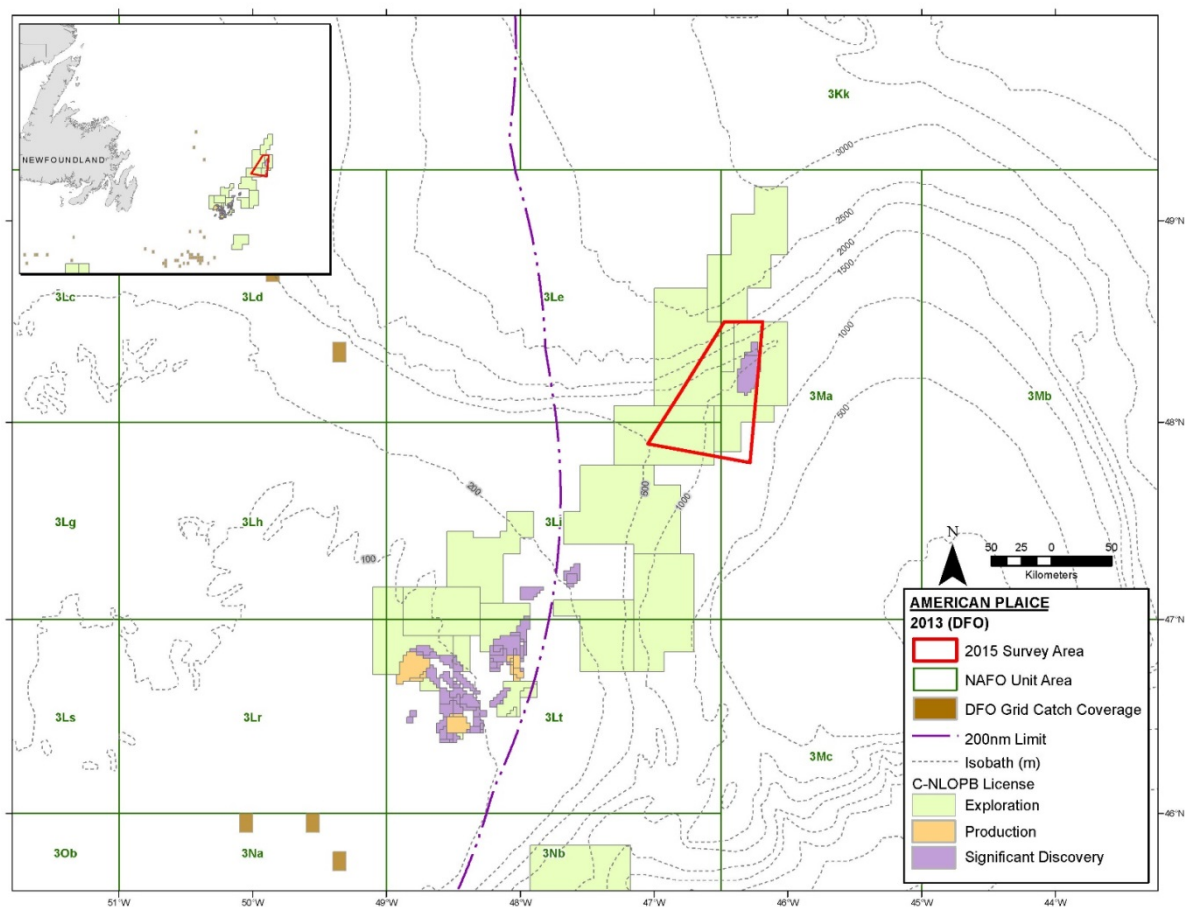
<sup>6</sup> A critical habitat statement exists for this species however it is rare in the study area considered in this assessment with one sighting of two individuals recorded in the DFO cetacean database.

<sup>7</sup> This species added at DFO's suggestion given that its general distribution encompasses the North-west Atlantic however apart from a localized population on the edge of the Scotian Shelf the nearest known population is along the northern coast of Labrador and into the Davis Strait.

## Appendix 2: Fishing Activity Maps for Cod, Redfish, American Plaice and Yellowtail Flounder

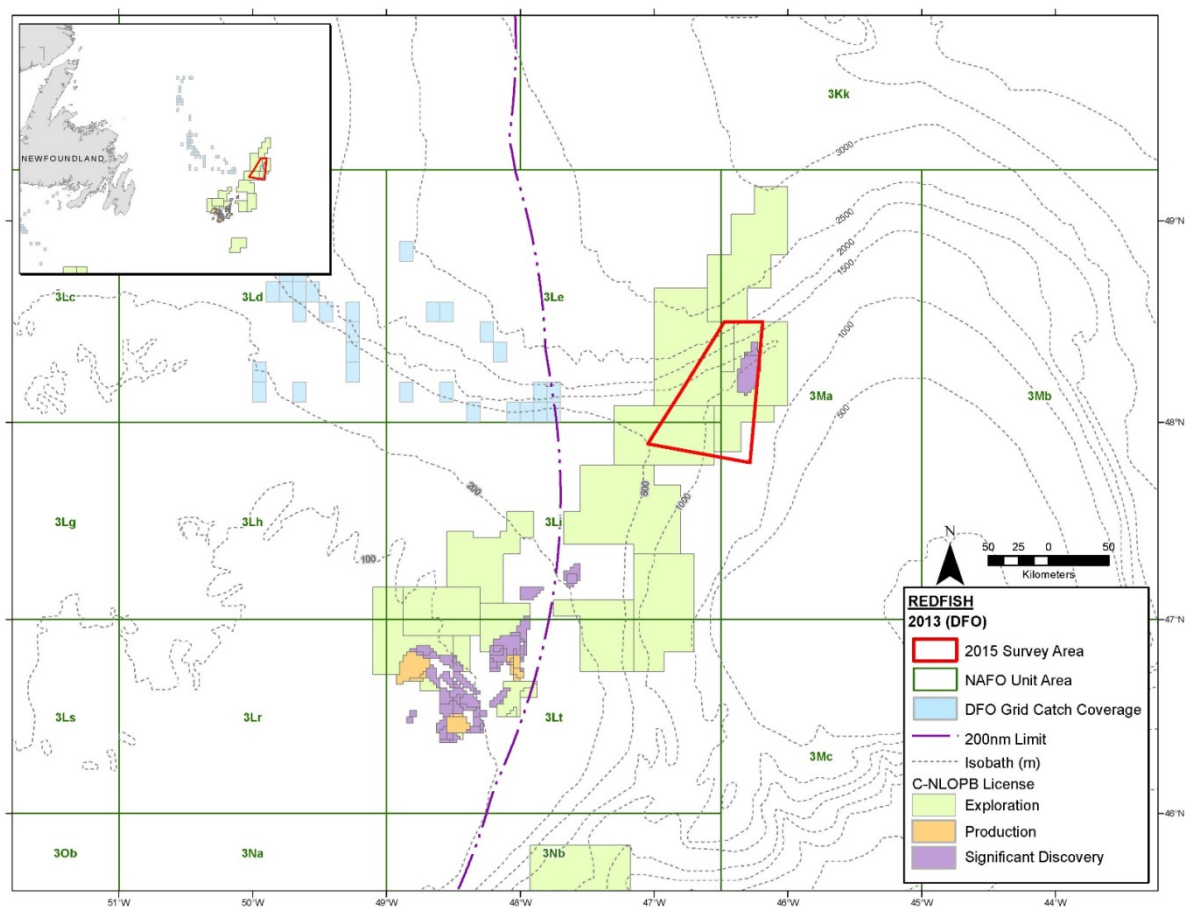


**Figure 9: Canadian domestic fishing activity for Atlantic Cod in 2013 from DFO data**

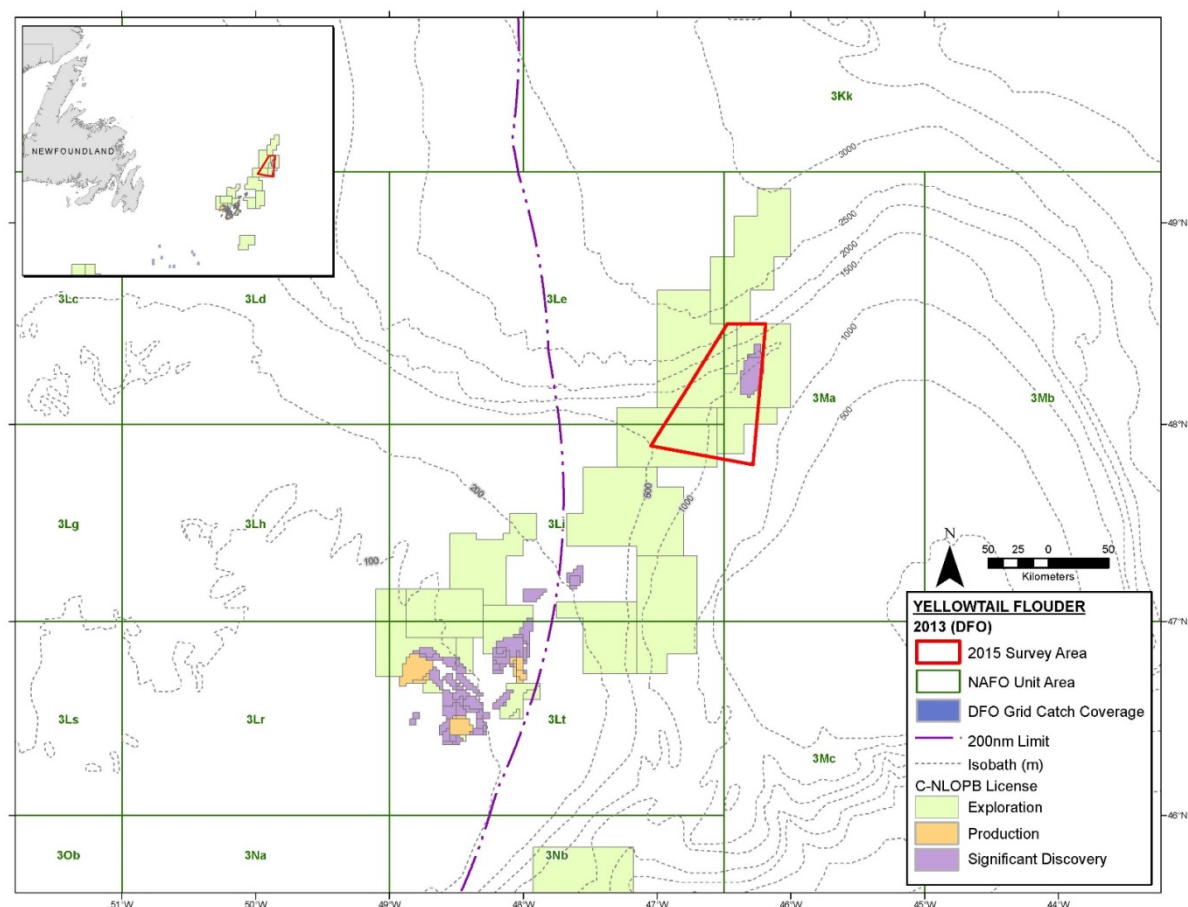


**Figure 10: Canadian domestic fishing activity for American Plaice in 2013 from DFO data**





**Figure 11: Canadian domestic fishing activity for Redfish in 2013 from DFO data**



**Figure 12: Canadian domestic fishing activity for Yellowtail Flounder in 2013 from DFO data.** (Note that there is a moratorium on this fishery in Canadian waters)