

2013 Environmental Assessment Update: Hebron Project Comprehensive Study Report

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1.0 INTRODUCTION

This is an environmental assessment update for the Hebron Comprehensive Study Report (CSR) (EMCP 2011). This environmental assessment update document includes updated project descriptions for a 2013 geotechnical survey, a geophysical survey of a potential subsea tie-back location and a 3D / 4D baseline seismic survey of the Project Area (as defined in the Hebron CSR (EMPC 2011), as well as updated sections on commercial fisheries and species at risk to reflect the most current information (as of April 5, 2013).

2.0 PROJECT DESCRIPTION

2.1 Geotechnical Survey

The 2013 Hebron Project geotechnical survey is being conducted from mid-July to early August 2013 using the geotechnical vessel *DS Bucentaur* to satisfy the data requirements for the Hebron Drilling Program. The survey will involve the drilling of one to two boreholes at or near the proposed Hebron Gravity Based Structure (GBS) location, and will target depths to 200 m below mudline. Depending upon results obtained from testing of these boreholes, deeper depths may need to be investigated. Due to variability of the sediment in the region, drilling requires an assessment of sediment type and soil strength. Pending results, additional boreholes may be required in order to satisfy the data requirements for the Hebron Drilling Program. All boreholes will be located within 150 m of the Hebron GBS footprint.

To take additional soil strength measurements, the boreholes will be re-entered to a specified depth, and single or double packer assemblies (tool) will be deployed to generate hydrostatic pressure. The packer tool will generate hydrostatic pressure that is sufficient to exceed the failure point of the soils (*i.e.*, leak off test) in a controlled manner.

2.2 Potential Subsea Tie-back Location Geophysical Survey

EMCP will potentially be surveying a pipeline corridor and an area where an excavated drill centre (EDC) may be located. An approximately 1,000 m wide pipeline corridor survey will be acquired using multibeam echosounder (MBES ≥100 kHz), sidescan sonar (SSS (100/500 kHz)), sub-bottom profiler (SBP (3 to 20 kHz)) and magnetometer and seabed physical properties sampling. For the potential EDC location, the same suite of geophysical equipment as indicated for the pipeline corridor will be used. Additionally, 2D high-resolution (2DHR) seismic data will be acquired using an 80/160 in^3 air source and 600/1,200 m streamer for shallow drilling hazard determination.

The potential pipeline corridor and geohazard surveys (duration approximately three to four weeks) will be conducted in the late June to early September 2013 timeframe. These surveys will fall within the 8 km x13 km block corners indicated below, which falls within the Hebron SDL area:

- NW 5,165,000N/691,000E
- NE 5,165,000N/704,000E
- SE 5,157,000N/704,000E
- SW 5,157,000N/691,000E

In addition, there is the possibility that EMCP will complete a high-definition boulder survey.

2.3 Project Area 3D / 4D Baseline Seismic Survey

The 3D / 4D baseline seismic survey area includes the seismic acquisition program area (Figure 2-1 grey area) plus a 20 km vessel and streamer array turning area (Figure 2-1 green area); coordinates are provided in Table 2-1.

The 3D / 4D baseline seismic acquisition program of approximately 475 km² is shown in Figure 2-1 (grey area). In this area, the seismic line heading will be north-northeast to south-southwest. The average line length will be approximately 22 km.

The 20 km vessel and streamer array turning area extends beyond the Offshore Project Area defined in the Hebron CSR. No seismic data will be collected in this area. The components of a 3D / 4D baseline seismic survey include a seismic vessel, an air source towed array, 12-streamer array, two chase / picket vessels and shorebase support.

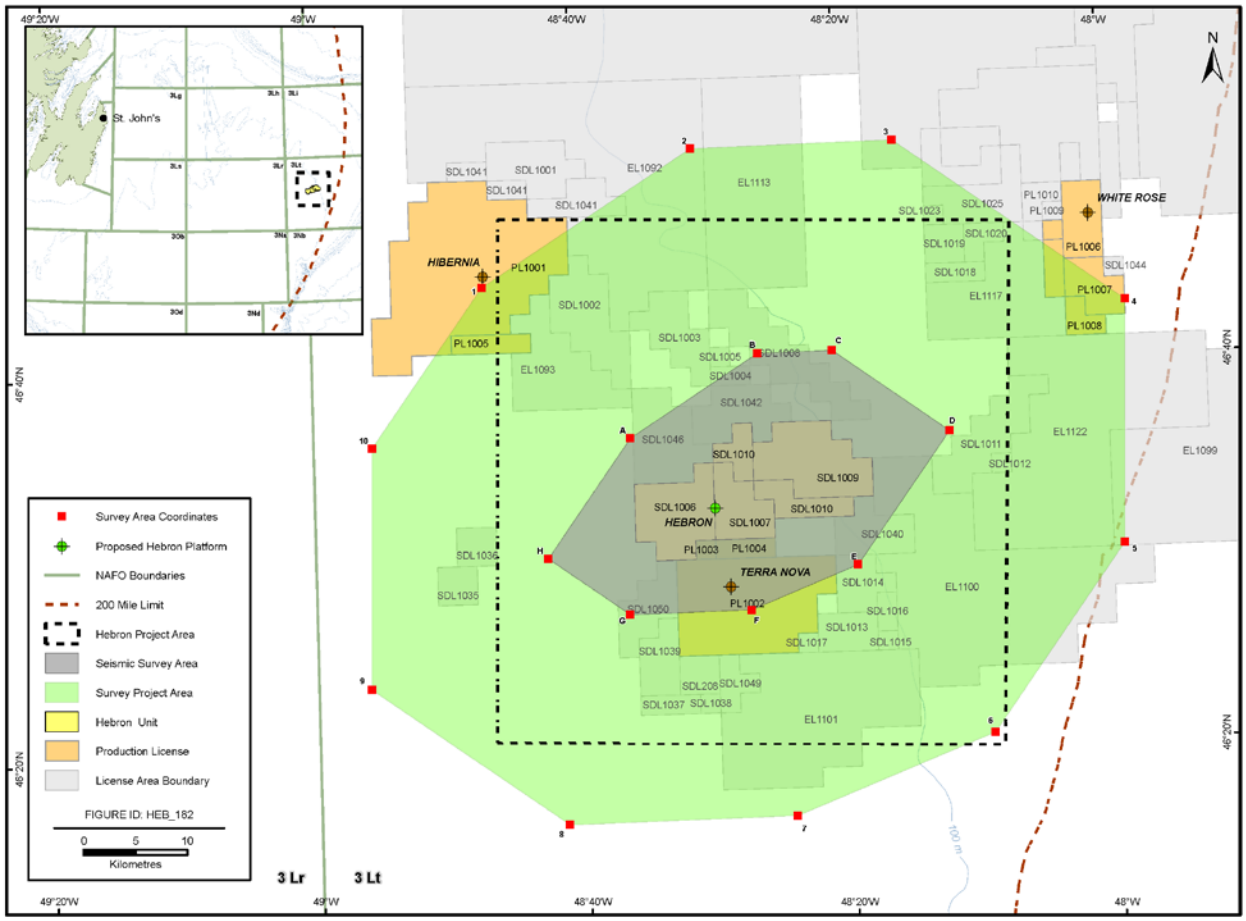


Figure 2-1 Proposed 3D Survey Area

Table 2-1 Seismic Survey Area and Survey Project Area Coordinates

Area	Point	Longitude	Latitude
Seismic Survey Area	A	-48.60179	46.60681
Seismic Survey Area	B	-48.43904	46.67661
Seismic Survey Area	C	-48.34486	46.67740
Seismic Survey Area	D	-48.20025	46.60434
Seismic Survey Area	E	-48.32062	46.49114
Seismic Survey Area	F	-48.45618	46.45497
Seismic Survey Area	G	-48.60881	46.45389
Seismic Survey Area	H	-48.70955	46.50441
Survey Project Area	1	-48.78352	46.74078
Survey Project Area	2	-48.51538	46.85583
Survey Project Area	3	-48.26047	46.85793
Survey Project Area	4	-47.97379	46.71297
Survey Project Area	5	-47.98496	46.50267
Survey Project Area	6	-48.15611	46.34213
Survey Project Area	7	-48.40654	46.27536
Survey Project Area	8	-48.69184	46.27328
Survey Project Area	9	-48.93517	46.39511
Survey Project Area	10	-48.92725	46.60378

2.3.1 Seismic Vessel

3D / 4D baseline survey data will be acquired by the *WG Vespucci*. The vessel will tow two air source arrays (3,000 to 6,000 in^3). The source will operate at a towed depth of 6 m. The air source array will be operated with compressed air at a pressure of 2,000 psi. While sailing the survey lines, the two air source arrays are discharged alternately, one each 25 m down the line or approximately every 10 to 15 seconds.

The 3D / 4D baseline seismic survey will use 12 towed streamers with a length of 6,000 m and deployed at a depth of 7 to 24 m. The streamers will be separated by 50 m. The streamers will be solid to minimize the environmental impact in the case of breaks or tears.

The known seismic survey parameters are summarized in Table 2-2.

Table 2-2 Known Seismic Survey Parameters

General Information	
Operating Company:	ExxonMobil Canada Properties, a partnership (EMCP)
Vessel Name(s):	*WG Vespucci*
Location:	Hebron field
Type of Survey:	3D / 4D Baseline Survey
Area (full-fold)	475 km^2
Average line length (including 3 km run-out):	22 km
Line direction:	36° / 216°
Source Parameters	
Source type	Bolt Sodera G or sleeve type air source arrays (steerable source preferred)
Number of sources	2 (flip-flop)
Source separation	25 m
Shot to shot interval	25 m (50 m per source)
No. of sub-arrays per source	3
Total volume per source	3,000 to 6,000 in^3
Source operating pressure	2,000 psi
Source depth	6 m
Streamer Parameters	
Streamer type	solid streamers
Number of active streamers	12 streamers
Streamer separation	50 m
Active streamer length (each nominal)	6,000 m
Streamer depth	7 to 24 m

2.3.2 Logistics / Support

The seismic vessel will use existing shore-based facilities in St. John's, NL, for initial clearance into Canadian waters and exit from Canadian waters at the end of the survey. Resupply of the seismic vessel during the survey will be accomplished with a chartered supply vessel from the port of St. John's.

A standby or picket vessel will be used to scout ahead for hazards and notify potential other users of the area about the survey and associated trailing gear. The standby vessel will also provide a means for towing the seismic vessel in the case of a loss of propulsion. This will avoid a major loss of equipment and potential environmental damage.

Due to weather conditions that may change quickly, the contractor will likely use a supply vessel for crew changes. Helicopters can also be used in case of medical and other emergencies.

2.3.3 Personnel

The *WG Vespucci* can accommodate 60 personnel. The crew is made up of seismic crew (technical and scientific personnel from the seismic contractor) and maritime crew (ship's officers and marine crew from the vessel owner / operator). Additionally, there will be a Fisheries Liaison Officer (FLO), marine mammal observers (MMOs), and client representatives. All on-board personnel will have all of the required certifications specified by Canadian legislation and the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB).

2.3.4 Schedule

The proposed program is scheduled to occur between June and November 2013. Specific timing of the program will depend on a variety of factors, including ice conditions, weather conditions, and timing and sensitivities associated with biological and socio-economic constraints. The 3D survey has the longest window, but can start no earlier than June 15.

2.4 Consultation

EMCP met with the Fish, Food and Allied Workers (FFAW) Petroleum Industry Liaison, offshore fishers and One Ocean to provide an overview of the 2013 survey (planned geotechnical, geophysical, and 3D seismic) programs and to discuss any questions or concerns that these organizations may have with the upcoming program.

Key discussions included identification of crab fishing along the 60-fathom contour on the eastern side of the turn buffer. EMCP indicated that the lines would be run in a SSW-NNE direction, and the vessel will try to optimize a western turn in the northern portion of the study area, when feasible, reducing potential for interaction with fishing gear. In addition, the timing of the 3D / 4D baseline seismic (beginning June 15 at the earliest) could mean the majority of the crab quota will likely already be harvested, further reducing the potential for interaction. There were no concerns voiced about either the geotechnical survey at the GBS location or the geohazard wellsite and pipeline survey (within the Hebron licenses). A summary of the meeting is located in Appendix A.

EMCP has also contacted the Groundfish Enterprise Allocation Council, Association of Seafood Producers, Clearwater Seafoods, Ocean Choice International and Icewater Seafoods to provide an overview of the planned survey programs and to discuss any questions or concerns and determine whether any fishing would be occurring within the vicinity of the survey No specific concerns have been expressed by members of the Groundfish Enterprise Allocation Council (B. Chapman, pers. comm.). EMCP will notify processors of the survey start date, once determined.

2.5 Mitigations

2.5.1 Geotechnical Survey

The primary effect of this undertaking on the environment would relate to the drilling of boreholes and disposal of the sediment from the drilling activity. The borehole(s) will be drilled with a water-based mud. These activities were previously assessed under the Hebron CSR. The mitigations proposed in the Hebron CSR remain unchanged.

2.5.2 2D and 3D / 4D Baseline Surveys

The primary effect of these surveys is noise and potential interference with fishing activity / gear. These activities were previously assessed under the Hebron CSR. The mitigations proposed in the Hebron CSR remain unchanged and include:

- FLO
- Marine mammal observers(s)
- Single point of contact
- Use of Vessel Movement System data
- Ongoing communications with FFAW and fishers throughout seismic survey program (may include daily updated and 48-hour forecasts)
- Smallest single element air source will continue producing pulses during the turn to ensure marine mammals remain at distance from the vessel during the turns
- Adhere to the Statement of *Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment*, as referenced in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012).
- Additional mitigations to be implemented, following consultations with fishers include
  - Vessel will try to optimize western turns in northern extent of survey area
  - Avoid the eastern side of the turn buffer (from 60-fathom mark), to the extent possible.

3.0 BIOLOGICAL ENVIRONMENT UPDATES

As noted in Section 1.0, in addition to updates to Section 2.9.6 of the Hebron Project CSR (EMPC 2011), the commercial fisheries and species at risk information has been updated to reflect the most current information (as of April 19, 2013).

3.1 Commercial Fisheries

Fisheries activities within the Study Area were reported for 2007, 2008, 2009, and 2010 in the original CSR (Section 7.3.2.5) and graphically depicted up to 2008. Commonly occurring fish and shellfish species within the Hebron Offshore Study Area included northern shrimp, snow crab, sand lance, Greenland halibut, yellowtail flounder, witch flounder, thorny skate, lumpfish, redfish, grenadier, sculpin, capelin and Arctic cod.

Data for commercial groundfish, shellfish and pelagic fisheries harvested in 2010 are illustrated in Appendix B, as are historical data for all species harvested from 2005 to 2010. DFO research vessel locations are also illustrated in Appendix B. These data are available for 2010, 2011 and 2012 (D. Power, pers. comm.).

DFO Ottawa Statistical Division has advised that there is a new policy that prohibits release of data that can be mapped due to privacy concerns. Therefore, spatial data are now released at an aggregated 1/10th degree 'cell' level only. No absolute values of weight and value are provided given; the actual weight and value of a catch within each box will be given as a range and actual catch will be restricted to portions caught within a given cell.

Therefore, the figures for 2011 data for snow crab, northern shrimp and groundfish (see Figures B-2, B-4 and B-6; Appendix B) illustrate an average percentage of the weight percentage data provided by DFO. The weight percent for a specific cell has been summed and divided by the number of months that specific cell was fished (*i.e.*, when the cell was fished, x% of species A was caught in the boundaries).

Commercial fisheries data for 2012 for NAFO Division 3L from 2012 was requested from DFO, but validated data are not available at this time.

The 2012 post-season crab survey ran from August 29 to November 17. The 2013 post-season crab survey will collect samples from the same locations as the 2012 survey. As far as the DFO scientists are aware, the timing will also be similar to last year (D. Power, pers. comm.).

3.2 Species at Risk Updates

Since the 2011 Hebron Project CSR (EMCP 2011) was completed, there have been seven additions or changes to the list of species included under the *Species at Risk Act* (SARA) or assessed as at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (SARA 2012). The white shark (*Carcharodon carcharias*) (included in the 2011 Hebron Project CSR (EMCP 2011)) was assessed as endangered and included under Schedule 1 of SARA. American eel (*Anguilla rostrata*) (included in the 2011 Hebron Project CSR (EMCP 2011)) was upgraded to threatened. Cusk (*Brosme brosme*) (included in the 2011 Hebron Project CSR (EMCP 2011)) was upgraded to endangered. COSEWIC assessed spiny dogfish (*Squalus acanthias*) as a species of special concern, smooth skate (*Malacoraja senta*) (Funk Island Deep population) as endangered, thorny skate (*Amblyraja radiata*) (included in the 2011 Hebron Project CSR (EMCP 2011)) as a species of special concern and Atlantic bluefin tuna (*Thunnus thynnus*) as endangered.

None of these added species have final recovery strategies, actions plans or associated critical habitat identified as of yet. These additions will not alter mitigation measures committed to by the Hebron Project CSR, or conclusions regarding adverse effects (EMPC 2011).

Updates to the Species at Risk chapter (Section 11.3) of the Hebron Project CSR (EMPC 2011) are provided in Appendix C.

4.0 ENVIRONMENTAL EFFECTS ASSESSMENT

A review of the environmental effects assessment (Chapter 16) predictions and mitigations that were assessed as part of the Hebron Project CSR (EMCP 2011) was conducted as a result of updated commercial fisheries data and SARA / COSEWIC species additions.

With the exception of the turn radius for the 3D vessel, the proposed activities fall within the scope of the Hebron Project CSR (EMCP 2011). The only potential effect would be interference with commercial fishing activities; these have been addressed through 'mitigations' (Section 2.5) and consultations with fishers (Section 2.4). The vessel will turn off the sound source array while the vessel is within the turn buffer (*i.e.*, no data will be gathered) except for the smallest single element air source, which will deter the approach of any marine mammals, including species at risk. In addition, the survey lines will run in a south-southwest to north-northeast direction and the vessel will try to optimize western turns in northern extent of survey area, thereby reducing the potential interference with commercial fishing vessels that may be on the eastern side of the proposed Project area. Thus, the environmental effects predictions and significance determinations for commercial fisheries cited in the Hebron Project CSR (EMCP 2011) remain valid.

Four new at risk species could potentially be affected by the proposed activities (see Appendix C). Smooth skate, thorny skate and spiny dogfish occur and Atlantic bluefin tuna may occur in the Hebron CSR Study Area (see Table C.1). Atlantic bluefin tuna has a low to moderate potential for occurrence within the Offshore Study Area, as it is a seasonal visitor to Canadian waters, highly migratory and does not concentrate on the northeastern Grand Banks. Smooth skate occurs at 200 to 300 m in intermediate waters (NAFO Division 3LM), which is deeper than the Hebron Platform location. Survey data suggest thorny skate are most common at 200 to 600 m depth in NAFO Divisions 2HJ3KLMN), deeper than the Hebron Platform location. The distribution of spiny dogfish is patchy. There is no identified critical habitat for any of these species. The potential Project-related interactions with these four marine fish Species at Risk with proposed project activities is limited. Thus, the environmental effects predictions and significance determinations for Species at Risk cited in the Hebron Project CSR (EMCP 2011) remain valid.

The mitigations for the activities planned to be carried out under the scope assessed in the Hebron Project CSR (EMCP 2011) are still appropriate, and EMCP reaffirms its commitment to the mitigation measures cited in this environmental assessment update, the Hebron Project CSR (EMCP 2011), and the Scoping Document (C-NLOPB 2009).

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APPENDIX A

FFAW/One Ocean Consultation Meeting Notes Summary

Meeting Notes Summary

On March 28, 2013 representatives of EMCP and their environmental consultant met with Fish Food and Allied Workers (FFAW) Union representatives and One Ocean. The purpose of the consultation session was to inform the fishers of upcoming planned 2013 activities in the Hebron Field. In attendance were fishers representing the offshore crab harvesting fleet, the Petroleum Industry Liaison of the FFAW, and the Executive Director of One Ocean.

The following is a summary of the consultation session and focuses on concerns, issues and discussion relevant to Hebron 2013 activities.

Introductions were made around the table. EMCP provided an overview of the purpose of the meeting (to provide information on Hebron's proposed activities in their respective fields in 2013.

A hard copy of the presentation was provided to all attendees.

EMCP provided an overview of the 2013 Hebron field activities. Questions were asked throughout the presentation, as well as discussion on certain aspects raised during the presentation. In addition to the presentation slide deck, a nautical chart (8012) was used to provide additional information regarding the project area in relation to the bathymetric contours. Fishers requested the chart be used, as they can better associate the location of project activities to their fishing areas based on the bathymetric contours. Overall, the discussion that followed with the use of the nautical chart provided valuable information regarding fishing activity in relation to proposed project activities.

It was noted that fishers will be steaming through the identified area to reach their fishing areas. Providing location of the seismic vessel in advance of a fishing vessel leaving port will provide information that can reduce transit route / fuel costs.

Fishers indicated that crab is fished along the 60 fathom line along the eastern side of the turn buffer in May, June and July (until July 31). The vessel turning could interfere with the gear at this location. There was a discussion on the planned orientation of the survey. The lines are in a SSW-NNE direction only; there are no cross grids. EMCP indicated that to the extent possible, the vessel will try to optimize western turns in the northern extent of the survey area, thereby reducing the potential interference with commercial fishing vessels that may be on the eastern side of the proposed Project area. So rather than elongated along the E-W, the actual turn radius will be an ellipse along the SW-NE axis. It was noted that there will likely be a lot less vessels in the 60-fathom eastern areas of the turn buffer during the proposed survey time (starting mid-June at the earliest), as a majority of the quota is often harvested by end May. The FFAW indicated that it will be able to provide an indication of the percent quota harvested.

The fishers and FLO will work closely together to provide position of gear to the FLO to facilitate vessel movement. Hebron will use VMS data to get an idea of location of vessels on a daily basis as they are likely the best data to use.

There will be no refueling offshore for the smaller vessels, but the seismic vessel will be re-fuelled offshore. The picket vessels will transit to and from shore as per other vessels (E-W).

The route for deployment of the seismic vessel will be part of the Communication Plan. Information will be provided for its steam out.

Both the borehole program and well-site survey are within the Hebron Licences. Fishers indicated that there did not appear to be any concerns with either of those activities given their location close to the Hebron GBS location and the fact that they are within the Terra Nova Safety Zone.

Fishers indicated that all Canadian vessels will be allowed to fish for shrimp outside the 200 nm EEZ, provided they meet certain conditions/criteria (such as carrying an observer). As a result, you will see a gradual dispersal eastward from the 'Shrimp Triangle'. In the shrimp harvesting area, it was pointed out that if seismic were to be acquired in this area fishers would have a lot of concern. Shrimp are usually harvested from June 1 to September (although the quota is usually taken by August). However, Hebron has no planned seismic surveys for 2013 in the shrimp fishing area.

The FFAW indicated that once commercial fishing is completed, DFO and the FFAW conduct the Post-Season Crab Survey (usually starts in September). There would likely be less than 30 vessels involved in 3L. It was noted that a fisher must have completed their commercial harvest before they can obtain a scientific permit to participate in the post-season survey.

One Ocean has prepared a Protocol for Seismic Survey Programs in Newfoundland and Labrador (available on their website) with recommended practice in communications, gear compensations, etc. (http://www.oneocean.ca/pdf/2013%20Seismic%20Protocol%20Document.pdf)

There was a short discussion on the revised format of data that DFO will provide. Data will be aggregated in 6° by 6° cells, with value/weights provided as ranges. In the future, the best way to visually display the data will be a mosaic illustrating hot spots.

The following is a summary of the questions and discussion points raised during the consultation.

QUESTION: What would the picket vessels be used for?

ANSWER: Refuelling, re-provisioning, personnel transfer, travelling ahead of the seismic vessel to identify vessels and gear and any hazards.

QUESTION: How will the survey affect the steam direction / time? How deep are the streamers?

ANSWER: The streamers will be 6 km long and 8 to 24 m below the surface (15 to 17 m on average). It will take up to 2.5 hours to shoot a line and 3.5 hours to turn. Hebron will develop a Communication Plan that will include a data acquisition plan that can be provided to the FFAW (timing to be determined in consultation with FFAW).

QUESTION: How will crew changes occur?

ANSWER: Crew changes will be vessel to vessel using picket vessels.

QUESTION: What is the planned deployment route for the seismic vessel?

ANSWER: The route for Hebron depends upon the vessel selected. It is not currently in Canadian waters, so do not know its current configuration.

QUESTION: Do you have an estimate of when the seismic vessel will be in the field?

ANSWER: The earliest it would be in St. John's is June 5. Therefore, the earliest it would be at Hebron would be June 15.

The following is a summary of action items / consensus items.

ACTION ITEM: Provide name of vessel (and date) once vessel is procured

ACTION ITEM: Provide total area covered by turning buffer (roughly estimated at the meeting to be 4,000 km^2),

CONSENSUS: The proposed activities can occur in harmony with the local fishing activity provided that there is good communication between fish harvesters and the seismic vessel.

APPENDIX B

2010 / 2011 Commercial Fish Harvesting

2010 / 2011 / 2012 RV Survey Locations

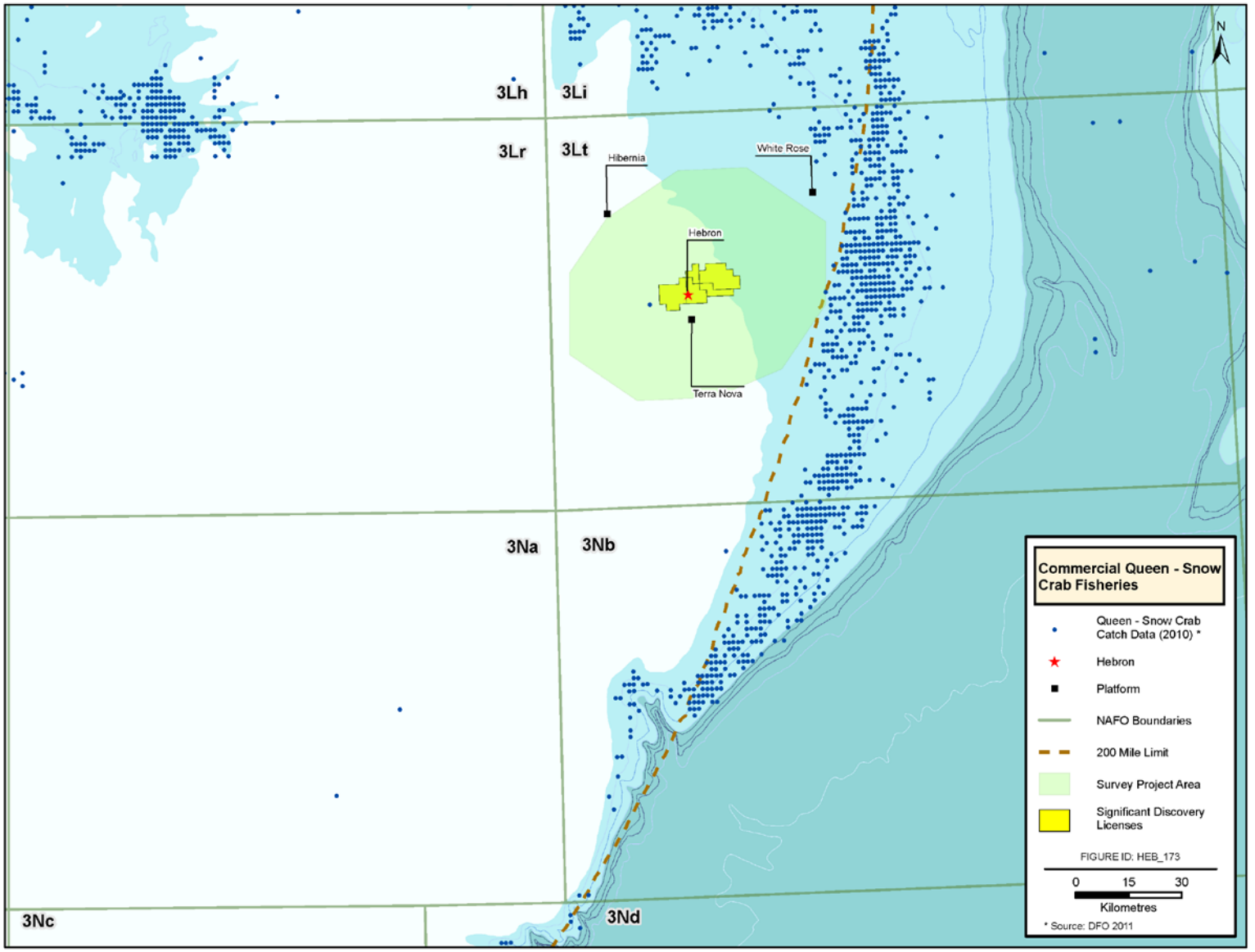


Figure B-1 2010 Commercial Snow Crab Harvest Locations

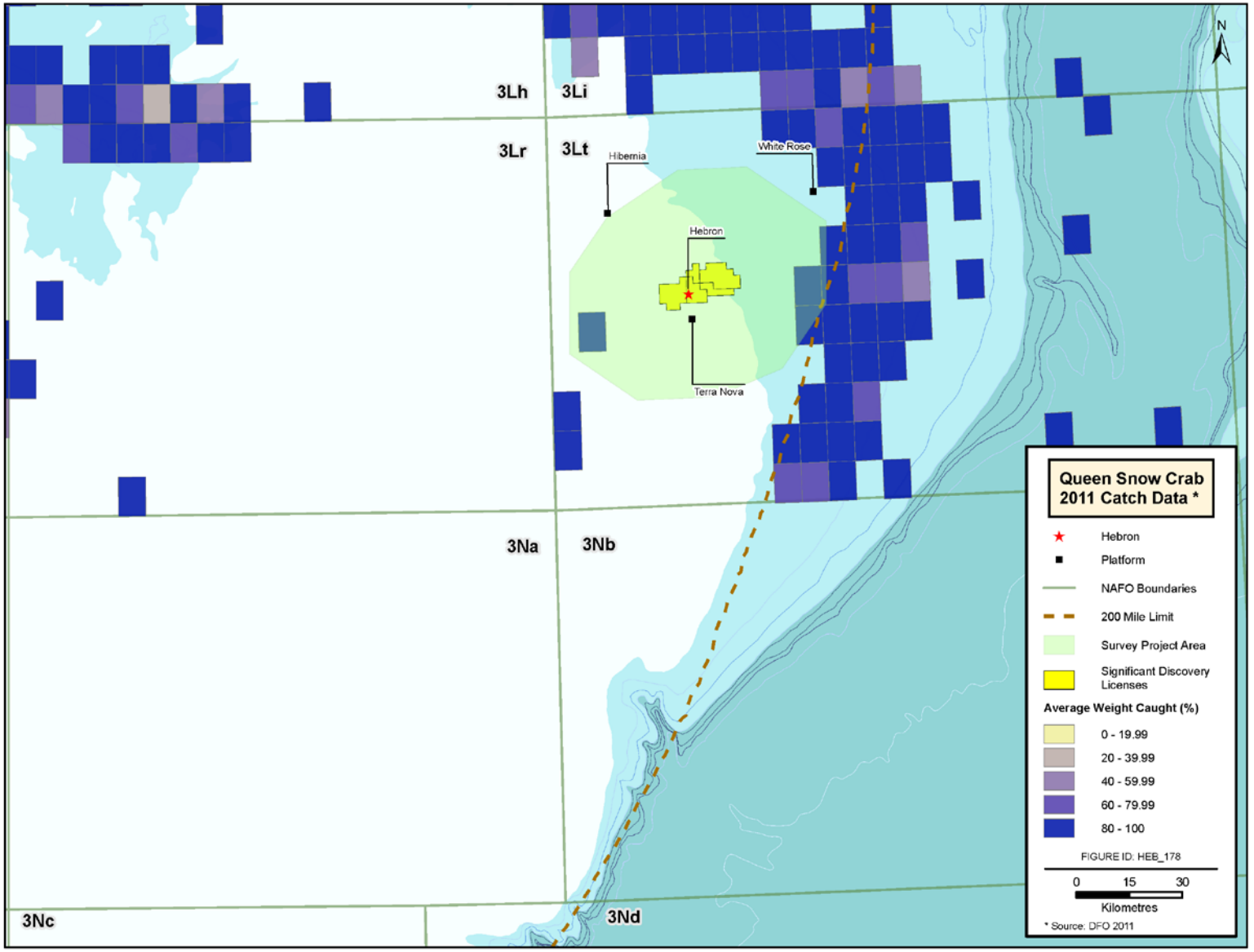


Figure B-2 2011 Commercial Snow Crab Harvest Locations

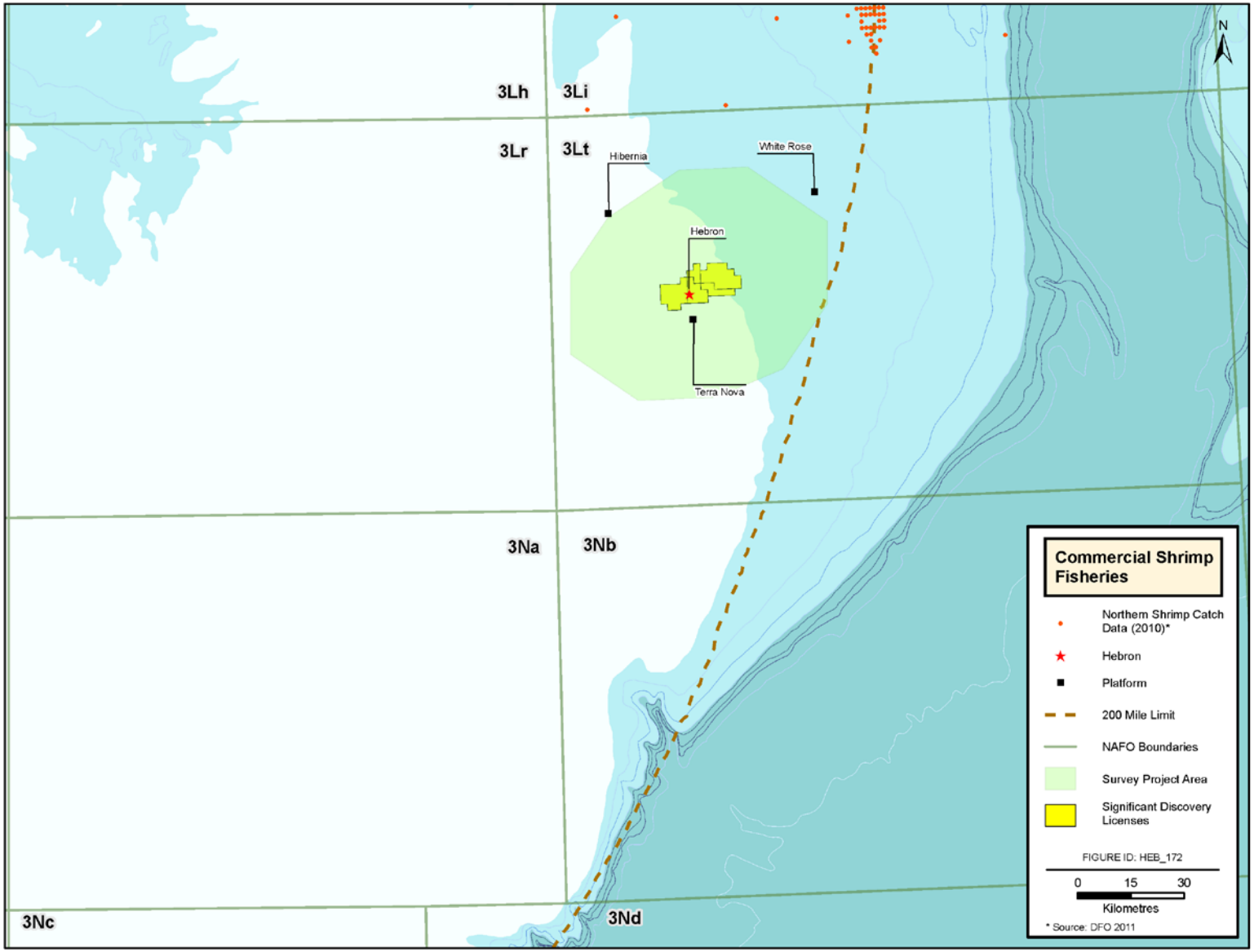


Figure B-3 2010 Commercial Northern Shrimp Harvest Locations

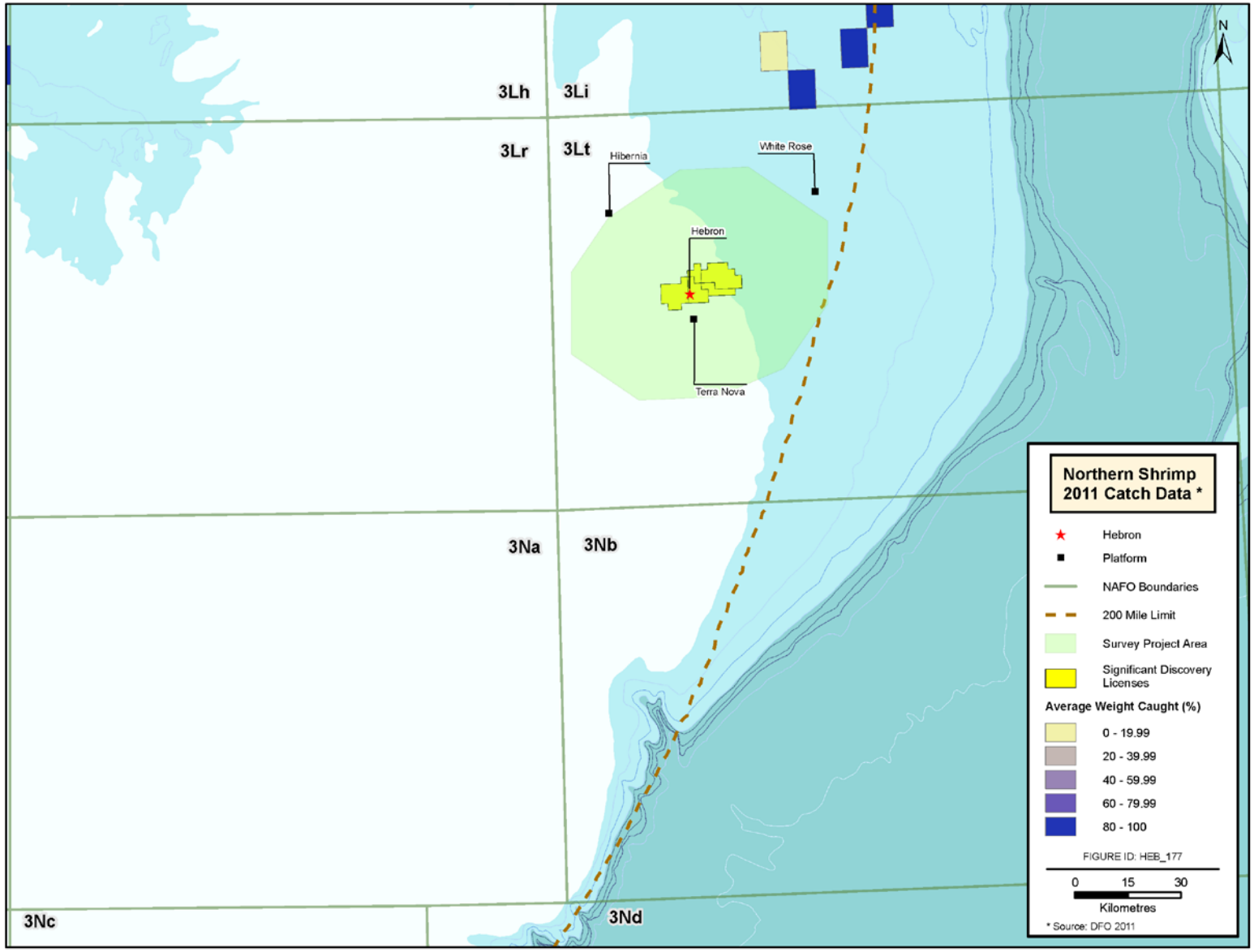


Figure B-4 2011 Commercial Northern Shrimp Harvest Locations

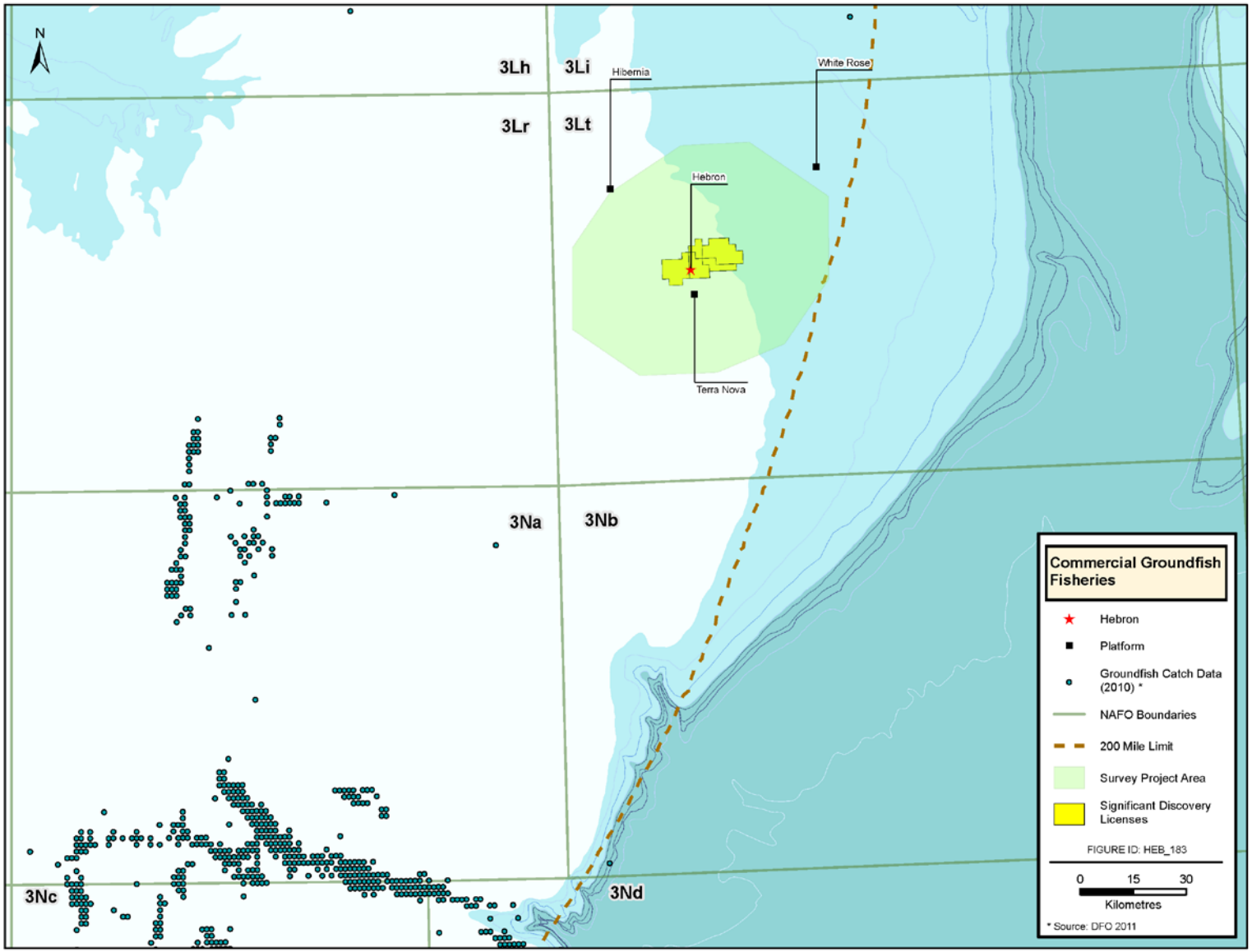


Figure B-5 2010 Commercial Groundfish Harvest Locations

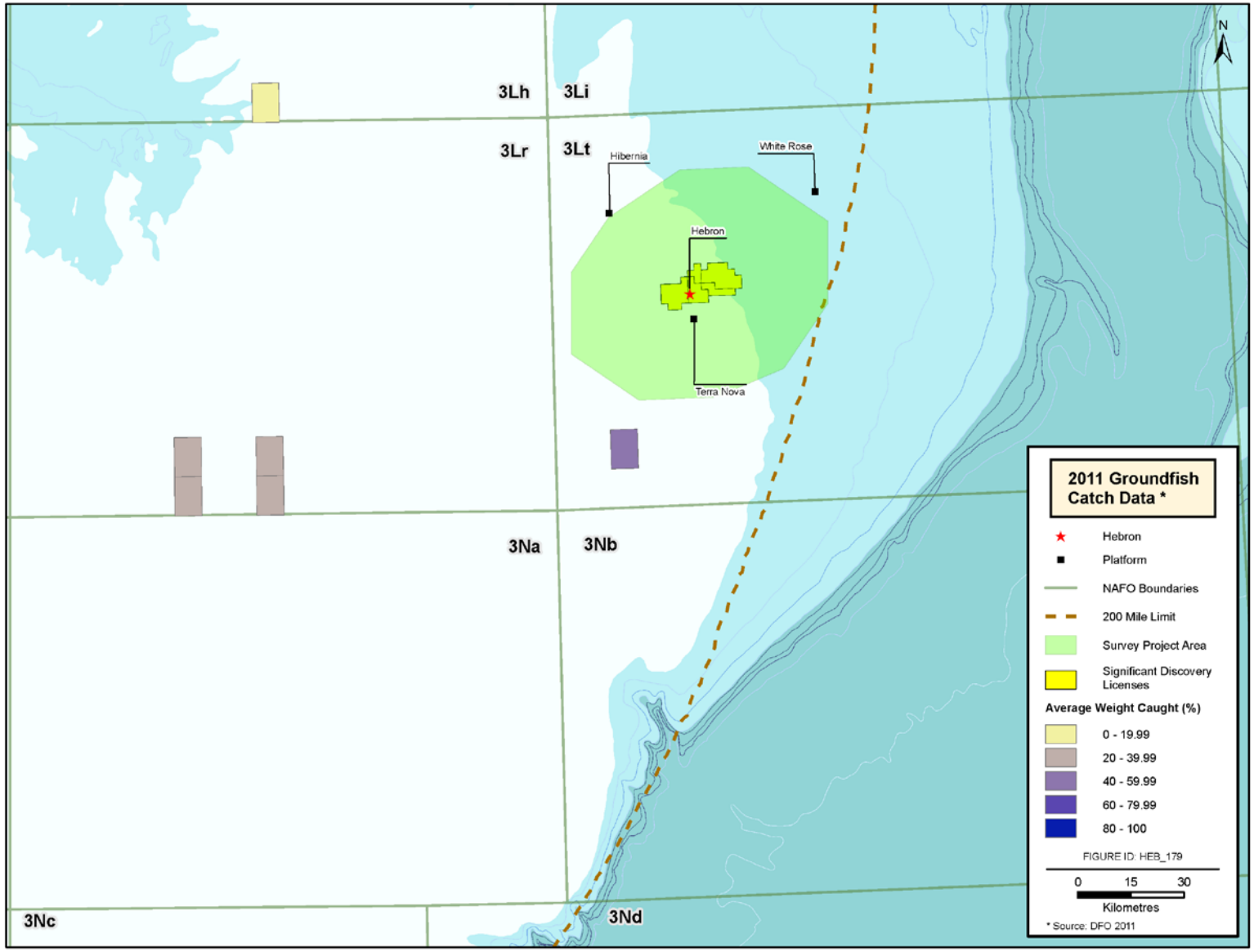


Figure B-6 2011 Commercial Groundfish Harvest Locations

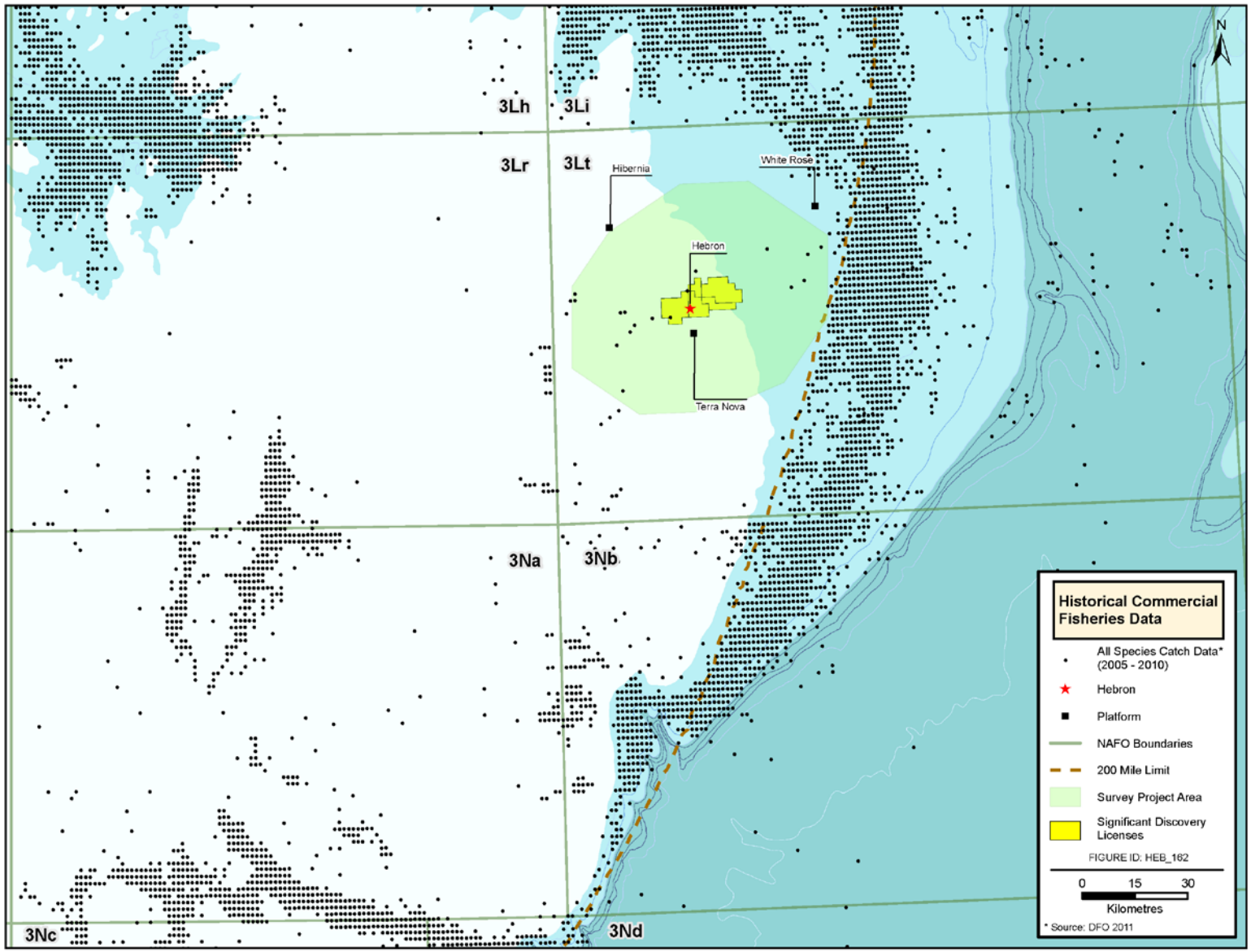


Figure B-7 2005 to 2010 All Species Historical Commercial Fisheries Harvest Locations

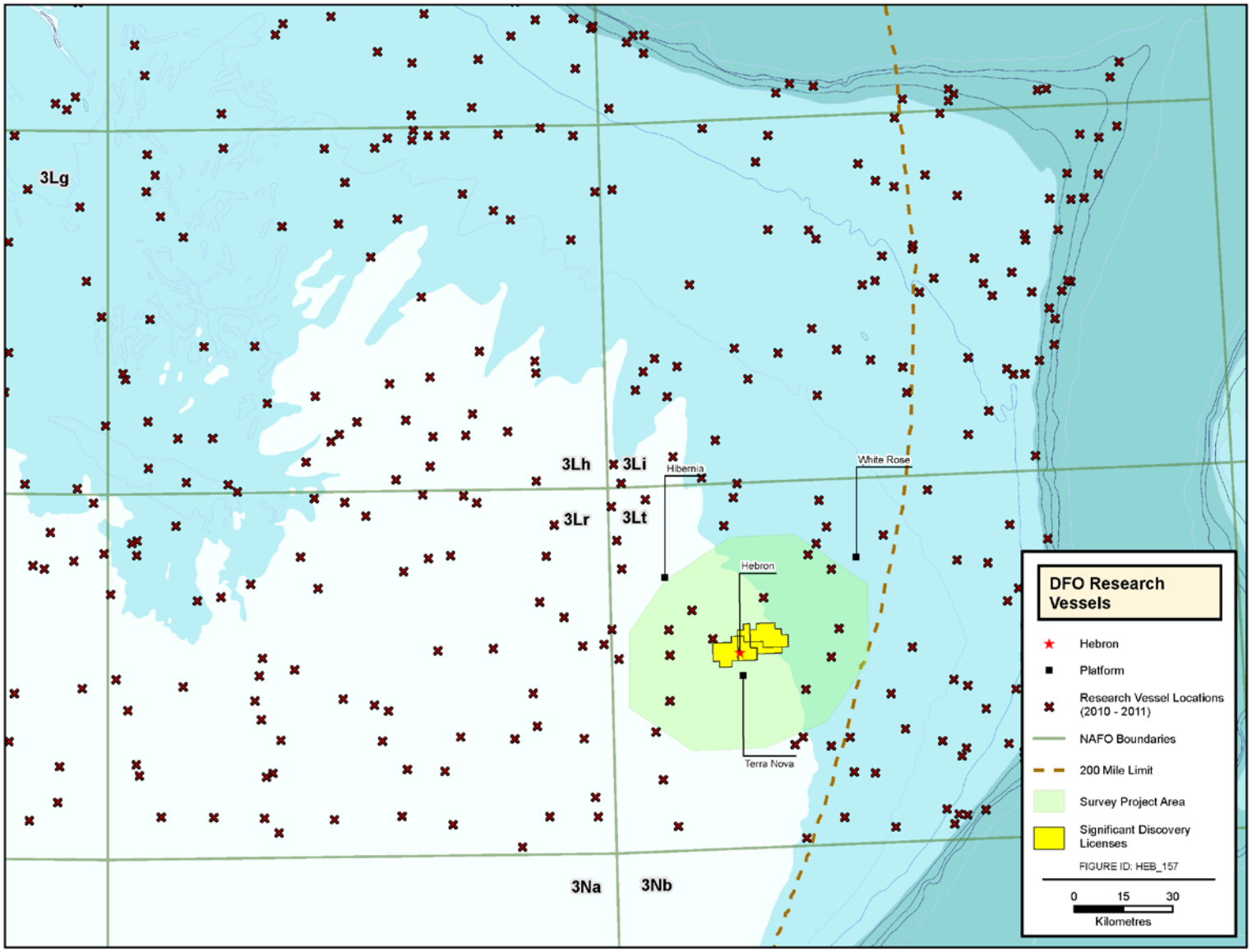


Figure B-8 Research Vessel Locations, 2010 and 2011

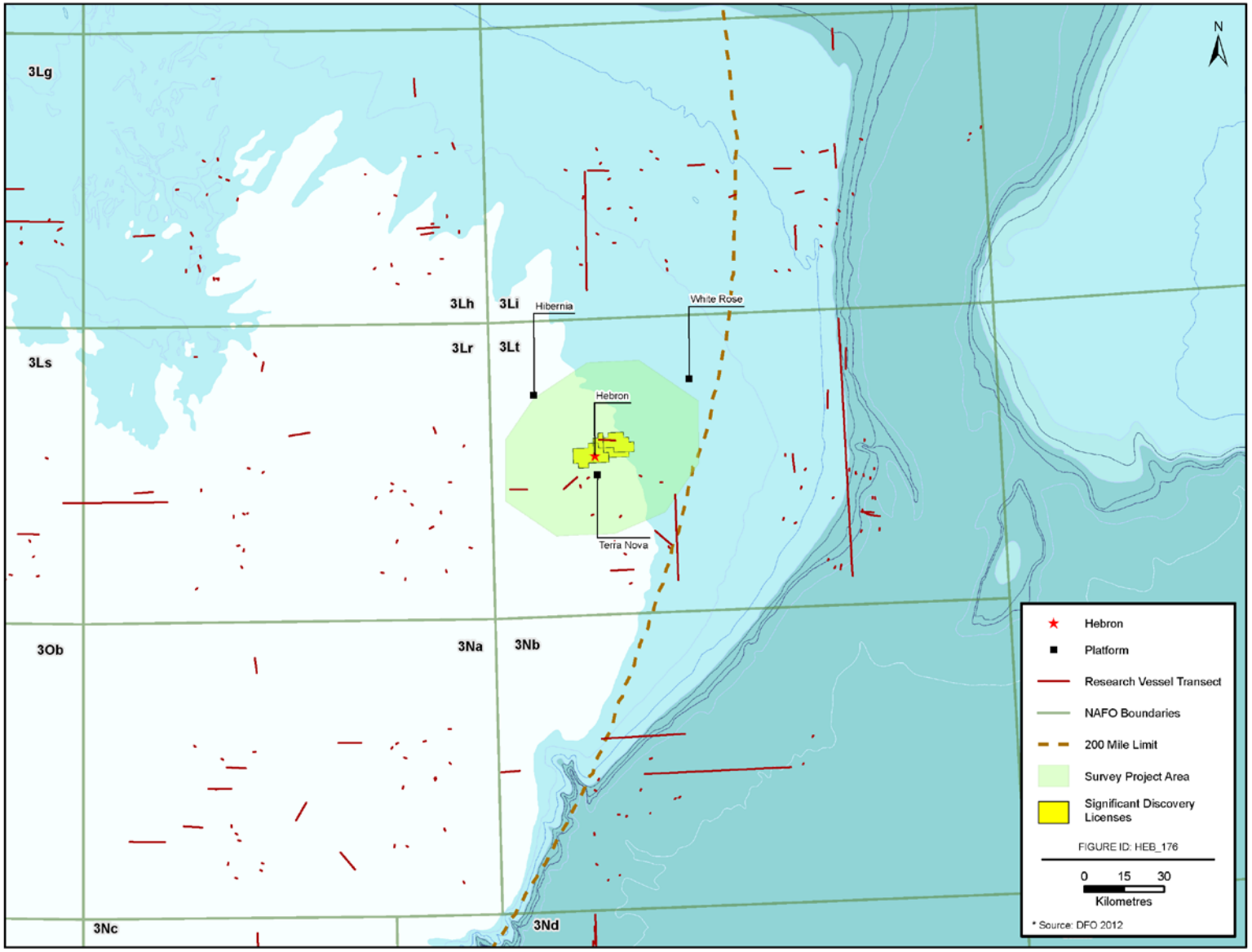


Figure B-9 Research Vessel Transects, 2012

APPENDIX C

Species at Risk

C Species at Risk

The following information is provided as an update to Section 11.3 of the Hebron Project CSR (EMPC 2011). The information contained within this section is current as of April 5, 2013. Table C-1 is an updated Table 11-2 (EMCP 2011) and has an additional four new species that have been assessed as at risk by COSEWIC: smooth skate (Funk Island population), thorny skate, spiny dogfish and Atlantic bluefin tuna. In addition, the white shark was added to SARA and designated as endangered under Schedule 1, the American eel's COSEWIC status was reassessed as threatened and cusk was upgraded to endangered status. A brief description of each of the **added** species **not** previously described in EMCP (2011) is provided after Table C-1. Although thorny skate have been designated as at risk by COSEWIC since the Hebron Project CSR was submitted, they were described in the Hebron Project CSR (under Fish and Fish Habitat, not Species at Risk) and are therefore not described in this update.

Table C-1 Occurrence of Species at Risk within the Study Area

SPECIES		SARA Status	COSEWIC Status	Expected Use of Hebron Study Areas	
Common Name	**Scientific Name**			**Nearshore**	**Offshore**
Fish					
Atlantic Wolffish	*Anarhichas lupus*	Schedule 1 Special Concern	Special Concern	May occur	Occurs
Northern Wolffish	*Anarhichas denticulatus*	Schedule 1 Threatened	Threatened	May occur	Occurs
Spotted Wolffish	*Anarhichas minor*	Schedule 1 Threatened	Threatened	May occur	Occurs
White Shark	*Carcharodon carcharias*	**Schedule 1 Endangered**	Endangered	May occur	May occur
Atlantic Cod (NL population)	*Gadus morhua*	No Status	Endangered	Occurs	Occurs
Smooth Skate (Funk Island Deep, NL population)	***Malacoraja senta***	**No status**	**Endangered**	**May occur**	**Occurs**
American Plaice (NL population)	*Hippoglossoides platessoides*	No Status	Threatened	Occurs	Occurs
American Eel	*Anguilla rostrata*	No Status	**Threatened**	Occurs	Not likely to occur
Cusk	*Brosme brosme*	No Status	**Endangered**	Not likely to occur	Not likely to occur
Roughead Grenadier	*Macrourus berglax*	No Status	Special Concern	Not likely to occur	May occur
Roundnose Grenadier	*Coryphaenoides rupestris*	No Status	Endangered	Not likely to occur	May occur
Porbeagle Shark	*Lamna nasus*	No Status	Endangered	Not likely to occur	May occur

SPECIES		SARA Status	COSEWIC Status	Expected Use of Hebron Study Areas	
Common Name	**Scientific Name**			**Nearshore**	**Offshore**
Blue Shark	*Prionace glauca*	No Status	Special Concern	Not likely to occur	Not likely to occur
Shortfin Mako	*Isurus oxyrinchus*	No Status	Threatened	Not likely to occur	Not likely to occur
Basking Shark	*Cetorhinus maximus*	No Status	Special Concern	Not likely to occur	Not likely to occur
Spiny Dogfish	***Squalus acanthias***	**No Status**	**Special Concern**	**Occurs**	**Occurs**
Thorny Skate	***Amblyraja radiata***	**No Status**	**Special Concern**	**May Occur**	**Occurs**
Deepwater Redfish (northern population)	*Sebastes mentella*	No Status	Threatened	Not likely to occur	May occur
Acadian Redfish (Atlantic population)	*Sebastes fasciatus*	No Status	Threatened	Not likely to occur	May occur
Atlantic Bluefin Tuna	***Thunnus thynnus***	**No status**	**Endangered**	**Not likely to occur**	**May occur**
Marine Mammals					
Blue Whale	*Balaenoptera musculus*	Schedule 1 - Endangered	Endangered	May occur in small numbers	Likely to occur in small numbers.
North Atlantic Right Whale	*Eubalaena glacialis*	Schedule 1 - Endangered	Endangered	Not likely to occur	Unknown
Fin Whale	*Balaenoptera physalus*	Schedule 1 – Special Concern	Special Concern	Occurs	Occurs
Sowerby's Beaked Whale	*Mesoplodon bidens*	Schedule 1 – Special Concern	Special Concern	Not likely to occur	Likely to occur in small numbers
Killer Whale	*Orcinus orca*	No Status	Special Concern	May occur in small numbers	Likely to occur in small numbers
Harbour Porpoise	*Phocoena phocoena*	Schedule 2 - Threatened	Special Concern	Likely to occur in small numbers	Likely to occur in small numbers
Northern Bottlenose Whale	*Hyperoodon ampullatus*	No Status	Special Concern	Not likely to occur	Not likely to occur
Birds					
Red Knot (*rufa*)	*Calidris canutus*	No Status	Endangered	Occurs	Does not occur offshore.

SPECIES		SARA Status	COSEWIC Status	Expected Use of Hebron Study Areas	
Common Name	**Scientific Name**			**Nearshore**	**Offshore**
Ivory Gull	*Pagophila eburnea*	Schedule 1 - Endangered	Endangered	May occur	May occur
Reptiles					
Leatherback Sea Turtle (Atlantic population)	*Dermochelys coriacea*	Schedule 1 - Endangered	Endangered	May occur	Likely to occur in small numbers
Loggerhead Sea Turtle	*Caretta caretta*	No Status	Endangered	Not likely to occur	May occur

Update to Table 11-2 (EMPC 2011)
Note: Species listed on Schedule 1 of SARA are officially listed as Species at Risk and federally protected, while the species listed on Schedules 2 and 3 are species subject to reassessment by COSEWIC. The tables and document are dated as designations may change at any time
Bolded species are new to the table

Atlantic Bluefin Tuna

Atlantic bluefin tuna is a large, highly-migratory pelagic fish that occurs on both sides of the Atlantic, distributed from Newfoundland as far south as the coastal waters of Venezuela and Brazil In the western Atlantic (COSEWIC 2011; DFO 2011). The species has a very high market value in recent years, owing to its decline in abundance combined with demand in food markets, and are highly exploited by fisheries.

Adult bluefin tuna have few predators (orca, mako shark) and prey on both pelagic and demersal fishes. Bluefin tuna were assessed as Endangered by COSEWIC in 2011 but have not received federal protection under SARA at this time.

There are two recognized stocks of bluefin tuna (the eastern population, which spawns in the Mediterranean Sea, and the western population, which spawns in the Gulf of Mexico) and movement does occur between the two stocks. Both stocks occur seasonally within Atlantic Canada (*e.g.*, Gulf of St. Lawrence, Grand Banks, Scotian Shelf) (Walli *et al.* 2009), although the Canadian fishery relies almost entirely on individuals from the western stock. The western Atlantic bluefin tuna spawn between mid-January and late March, the eastern population in late May, with sexual maturity thought to occur around age eight (DFO 2009).

Atlantic bluefin tuna migrate seasonally to Atlantic Canadian waters, feeding in schools of less than 50 individuals. The occurrence and abundance of Atlantic bluefin tuna in Canadian waters has considerable inter-annual variation (COSEWIC 2011). The Canadian fishery is conducted by rod and reel, tended line and harpoon and offshore longline and is conducted from July to December in four main areas (in the Bay of Fundy, over the Scotian Shelf, in the Gulf of St. Lawrence and southern Newfoundland (COSEWIC 2011; Neilson *et al.* 2012)).

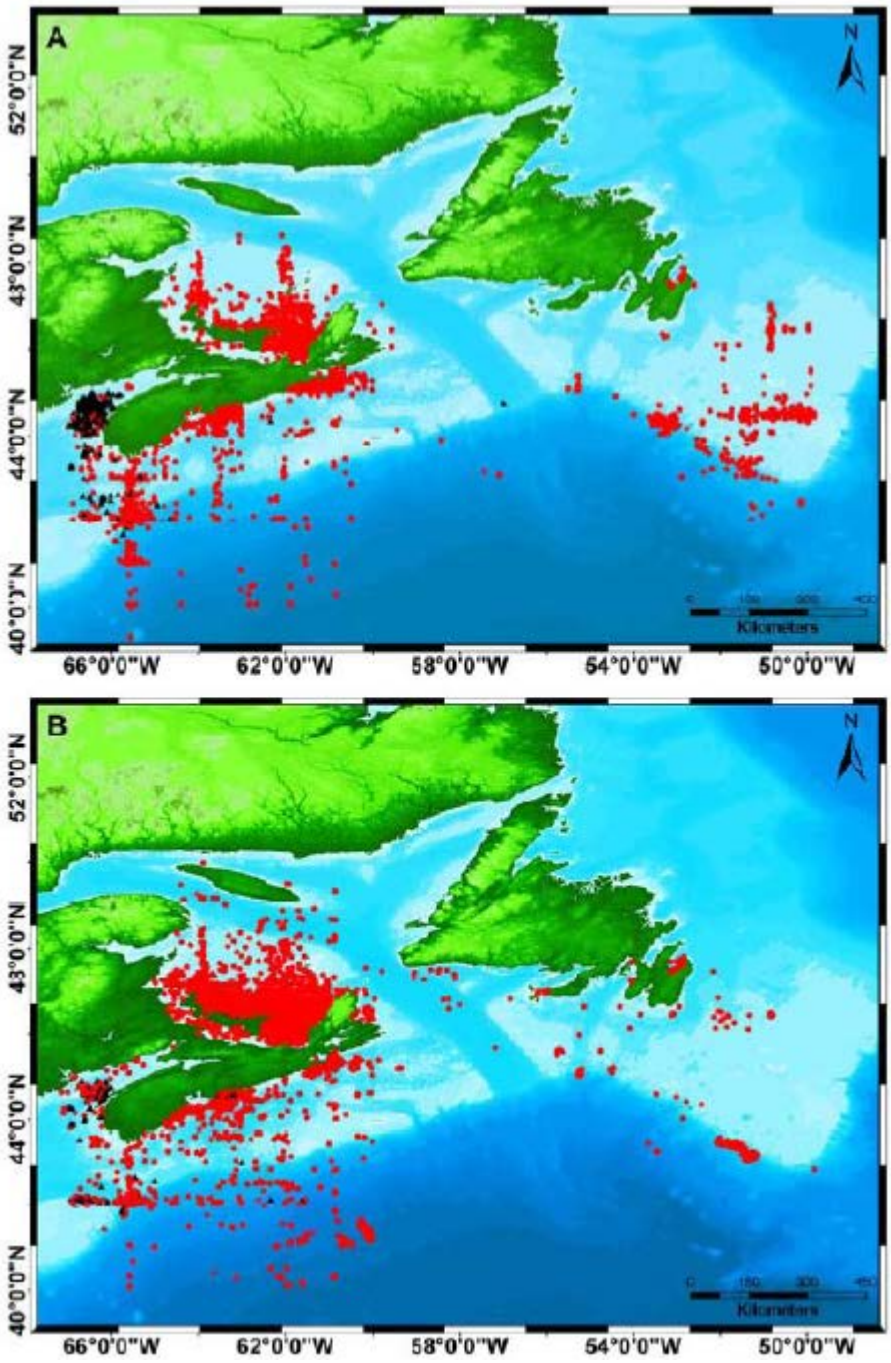
Atlantic bluefin tuna are highly migratory and both stocks straddle several international boundaries, making them difficult to manage and monitor (COSEWIC 2011). Declines in abundance are largely due to overfishing, bycatch and possibly due to shifts in their pelagic prey. Additionally, the oil spill caused by the April 2010 *Deepwater Horizon* explosion overlapped with the only known spawning area of the western stock, and this may have consequences for present and future year-classes (Bjorndal *et al.* 2011; Campagna *et al.* 2011; Muhling *et al.* 2012).

This species has a low to moderate potential for occurrence within the Offshore Study Area, as it is a seasonal visitor to Canadian waters, highly migratory and does not concentrate on the northeastern Grand Banks. However, this species does occur elsewhere around the Avalon Peninsula and on the southern Grand Banks and is capable of travelling great distances while pursuing pelagic prey. Adults follow Atlantic herring and Atlantic mackerel stocks (Walli *et al.* 2009). The location of Canadian Atlantic bluefin tuna catches is presented in Figure C-1.

Smooth Skate

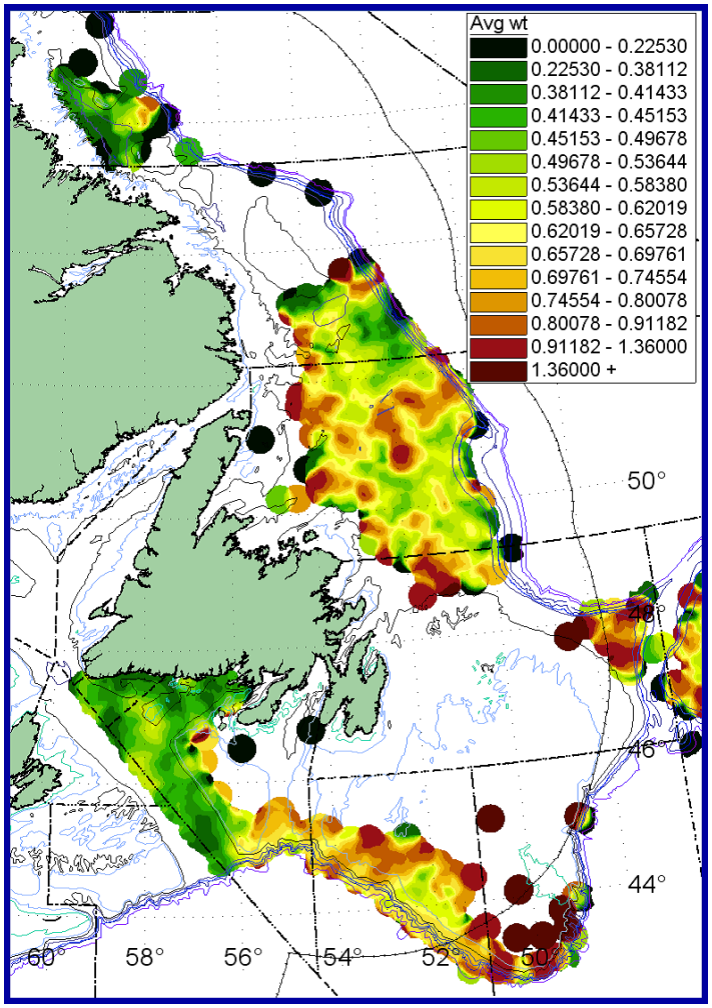
Smooth skate is a small elasmobranch that occurs from the Labrador Shelf and Gulf of St. Lawrence as far south as South Carolina (Kulka *et al.* 1996, 2006a; Simpson *et al.* 2011) (Figure C-2). Data from Atlantic Canadian waters indicate smooth skate occurs as several geographically distinct and persistent concentrations (Designatable Units) and is concentrated around Funk Island Deep, NL. This population was abundant until the early 1980s (NAFO Division 2J3K), but has shown declines since the 1990s (Simpson et al. 2011). Kulka *et al.* (1996) noted a southerly shift in distribution: it appeared to be more common on the southern Grand Bank during 1991 to 994 (collected during 1981 to 1994). This species occurs in 200 to 600 m water in the northern part of its range (NAFO Division 2HJ3K) and in shallower (50 to 500 m) in the southern part of its range (NAFO Division 3NOPs) and at 200 to 300 m in intermediate waters (NAFO Division 3LM (Simpson et al. 2011). McPhie and Campana (2009) reported length at 50 percent maturity was 10 years for females and 12 years for males.

Smooth skate (Funk Island Deep, NL population) was assessed by COSEWIC as endangered in May 2012 (COSEWIC website) due to steep declines in the abundance of juveniles and adults since the early 1980s. Mean catch rates for the Funk Island Deep Designatable Units peaked in 1978 / 1979 and then declined for both juveniles and adults until 1994. Catch rates remained consistently low but stable through to 2005. Slight increases have been observed since 2005 (Simpson et al. 2011); however, the overall abundance remains very low. Smooth skate will be considered for listing under SARA, but does not have any status at this time. It is vulnerable to increased mortality as it is long-lived, slow-growing and late maturing (Simpson *et al.* 2011). Smooth skate is taken as bycatch in other fisheries and this may be a factor in declines; however, the period of decline also corresponds with the coldest water temperatures reported (Colbourne *et al.* 2006), and other factors may also be driving declines (Simpson *et al.* 2011).



Source: Maguire *et al.* 2012

Figure C-1 Location of Canadian Atlantic Bluefin tuna catches from logbook records from 1990-1999 (A) and 2000-2009 (B)

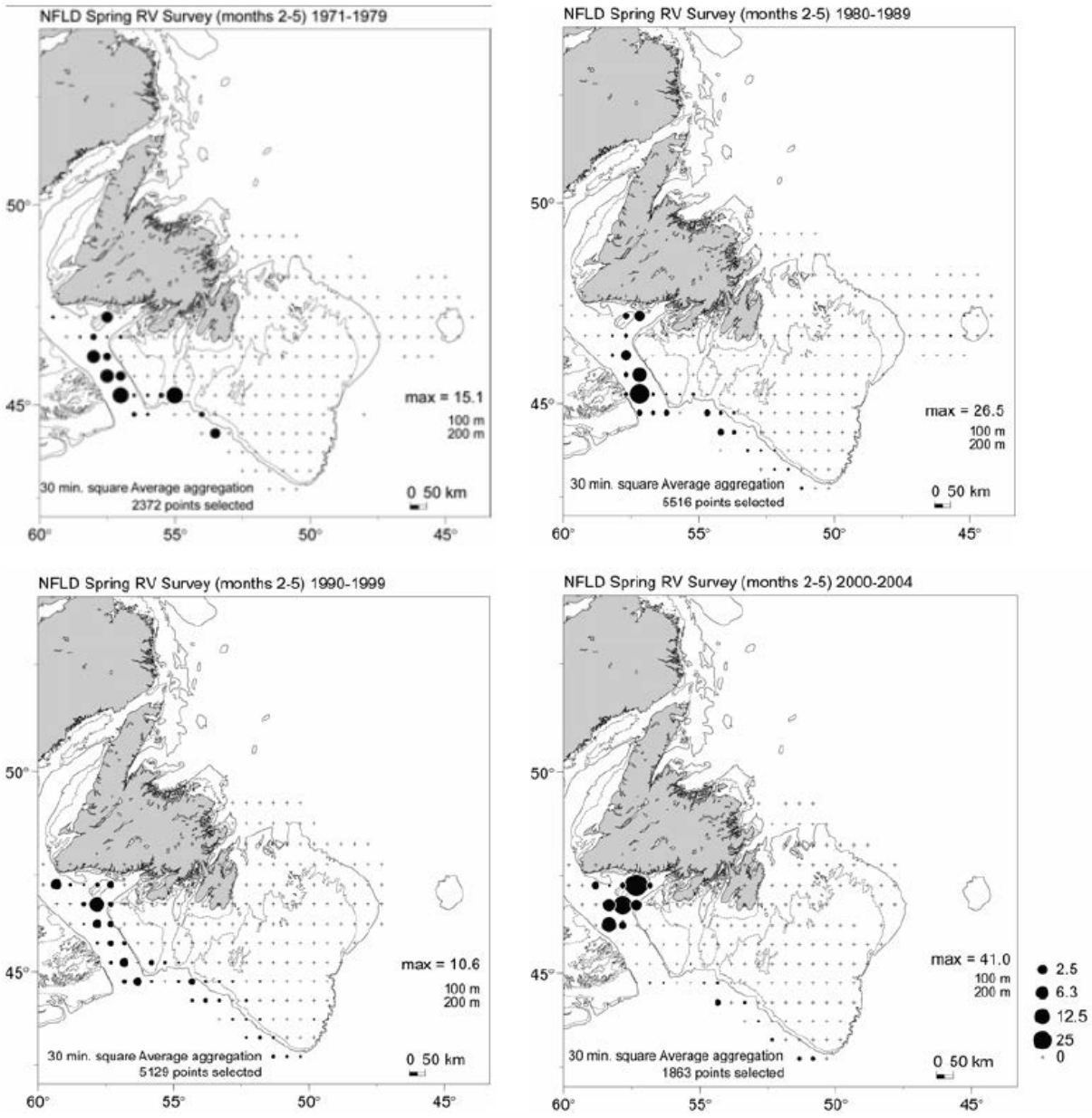


Source: Simpson *et al.* 2011
Note: Mean size distribution based on catch weight per tow/catch number per tow

Figure C-2 Mean Size Distribution of Smooth Skate from DFO Surveys (1971 to 2009)

Spiny Dogfish

The spiny dogfish (Atlantic population), was recently assessed as special concern by COSEWIC (2010), but is not yet listed under SARA. This small shark is widely distributed over the continental shelf of temperate and boreal regions, preferring waters 5°C to 15°C. The Atlantic population extends from Labrador to Cape Hatteras (TRAC 2010). The population remains relatively abundant in Canadian waters, and is most abundant in southwest Nova Scotia (COSEWIC 2010), with areas of concentration around Newfoundland and Labrador as well (Figure C-3).



Source: Campana *et al.* 2007

Figure C-3 Distribution of Spiny Dogfish in the Spring Research Vessel Surveys of Southern Newfoundland, 1972 to 2005

Like other elasmobranchs, dogfish are vulnerable to increased rates of mortality as it has an extremely long gestation period (18 to 24 months), long generation time (23 years), and low fecundity (average of six pups every two years), and is vulnerable to exploitation. Additionally, there is uncertainty about long-term trends in abundance, and particularly the abundance of mature females. This population is known to be broken into several well-defined 'groups', with concentrations in the southern Gulf of St. Lawrence, around Newfoundland, on the eastern and central Scotian Shelf, the Bay of Fundy, an southwest Nova Scotia, as well as in Massachusetts and North Carolina (COSEWIC 2010). These groups undertake seasonal migrations and it is

not well understood how much mixing of these groups occurs. The distribution of spiny dogfish is patchy. Dogfish can form dense aggregations, causing high variability in survey indices. The absence of young juveniles, as well as high variability in abundance estimates from surveys suggests that the early life history stages (pupping and juveniles) occur elsewhere.

Spiny dogfish are threatened by overfishing, as well as high discard rates. Large, sexually mature females are often targeted in commercial fisheries (COSEWIC 2010). Historically, the species has been caught for varied purposes including for its meat, for use as fertilizer, vitamins, fishmeal, and in the shark fin trade, as well as killed for being a ‘pest’ in commercial fisheries.