2016 Amendment to the Environmental Assessment of Statoil's Geophysical Program for the Jeanne d'Arc and Central Ridge / Flemish Pass Basins, 2011-2019

May 11, 2016

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1 INTRODUCTION

Statoil Canada Ltd. (Statoil) has proposed, planned and implemented marine geophysical survey programs that includes seismic, and localized geohazard surveys in the Jeanne d'Arc and Flemish Pass Basins from 2011 through 2019 (hereinafter also referred to as the Project). This Project required previous authorizations from the Canada-Newfoundland and Labrador Offshore Petroleum Board (C-NLOPB), pursuant to the relevant provisions of the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* and the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Newfoundland and Labrador Act* (the Accord Acts), as well as requiring environmental assessment (EA) review and approval under the *Canadian Environmental Assessment Act* (CEAA).

1.1 Previous Environmental Assessment Review and Approval

Geophysical activities are included in the scope of Statoil's completed EA entitled "*Environmental Assessment of Statoil's Geophysical Program for the Jeanne d'Arc and Central Ridge / Flemish Pass Basins, 2011-2019"* (LGL Limited 2011; referred to hereinafter as the original EA Report). The original EA received approval under *CEAA* in June 2011. In May 2012, Statoil submitted an Amendment to the original EA to address a planned change in the geographic scope of the Project, where survey lines were extended outside the originally approved Project Area.

Since EA approval for the Project was obtained, and in keeping with standard practice for offshore petroleum projects in the Newfoundland and Labrador Offshore Area, Statoil has submitted a number of subsequent (annual) EA Updates for the Project. These provide an overview of planned Project activities for the upcoming year, update any applicable environmental baseline information for key environmental components that has become available since the EA and previous Updates were produced, describe public and stakeholder consultation activities undertaken, and confirm that the nature and scope of the planned activities are within the scope of the original EA, including the appropriateness and adequacy of the associated environmental effects predictions and mitigation measures.

1.2 Proposed Project Modifications

This EA Amendment identifies, describes and assesses the following proposed modifications to the originally assessed Project.

1. *Project / Study Area Extension*: An expansion of the northwestern, north-central and northeastern portion of the Project and Study Areas assessed in the original EA review.
2. *Change in Streamer Number, Spread and Tow Depth*: An increase in the planned number of streamers (up to 16) and tow depth and a larger fan spread at the rear of this equipment, as compared to the values that were described and assessed in the original EA Report.

A further discussion of the nature of, and rationale for, these proposed Project amendments is provided in Section 2.2.

1.3 Purpose and Structure of the EA Amendment

This EA Amendment provides a description and environmental analysis of these proposed Project modifications to determine if there are any potential environmental effects not addressed in the original EA Report or the 2012 EA Amendment (Statoil 2012).

Following this Introduction (Chapter 1), the remainder of this EA Amendment document is organized as follows:

Chapter 2: Project Description

- A brief overview of the Project as originally proposed and assessed, and a description of the proposed amendments to it

Chapter 3: Mitigations

- A list of mitigation measures to be applied to the Project

Chapter 4: Existing Environment

- The identification, presentation and analysis of any new and relevant information on the existing (baseline) environment of the expanded EA Project / Study Area, with particular reference to the Valued Environmental Components (VECs) that were considered in the original EA and its subsequent Updates

Chapter 5: Environmental Effects Assessment

- An overview of the existing environmental setting of the expanded EA Project / Study Area, with an analysis and discussion of any implications of the updated Project information / proposed modifications referenced above for the original EA's environmental effects analysis and mitigation. This includes a particular focus on associated noise effects and associated interactions with key environmental components in the expanded Project / Study Area (e.g., marine biota, fisheries)

Chapter 6: EA Amendment Summary and Conclusion

2 PROJECT DESCRIPTION

2.1 Scope of the Original Project Description

With the exception of the changes described in Section 2.2, seismic surveys will be carried out by Statoil between 2016 and 2019 as described in the original EA and subsequent Amendment and Updates. Table 1 provides a summary of the typical parameters of a seismic survey addressed in the original EA. A complete description of the Project scope is found in Section 2.3 of the original EA Report and Section 2.2 of this EA Amendment.

Seismic surveys have been, and may be conducted by Statoil on its existing or future licences within the amended Project Area from 2011 to 2019, between April 1 and October 31 in any year. The original Project Area and Study Area are shown on Figure 1 along with the amended Project and Study areas. The typical duration of a 2D or 3D seismic survey, depending on the area to be surveyed, can vary from 40 to more than 100 days.

Table 1 Seismic Survey Parameters Addressed in Original EA Report

Sound	Presence of Vessels	Other
Air Source Array	Seismic	Helicopter
Echosounder	Supply	Shoreline Facilities
Side Scan Sonar	Picket	Vessel Lights
Boomer	Geohazard	Air Emissions
Vessels (seismic, picket, supply, geohazard)		Sanitary/Domestic Waste (and Waste Management)
Helicopter		Logistics and Support
		Accidental Spills

A 3D seismic survey vessel can either tow a single or dual sound source (air source array) and 10 to 14 streamers up to 8 km in length, composed of receiving accelerometers and hydrophones. Survey lines are typically spaced between 500 and 700 m apart. Airguns are typically operated at 2,000 psi.

Statoil contracts seismic vessels that are approved for operation in Canadian waters and are typical of the worldwide seismic fleet. The typical survey speed is 4.5 knots. A seismic vessel can typically accommodate 40 to 60 personnel, which include Proponent's representatives (i.e., Statoil), the vessel owner / operator (ship's officers and marine crew), and technical and scientific personnel from the main seismic contractor.

As stated in the original EA, the seismic vessel will have a Fisheries Liaison Officer (FLO) on board, and marine mammal and seabird observations will be conducted. Project personnel will have the required certifications as specified by relevant Canadian legislation and the C-NLOPB.

Currently no seismic activities are planned for 2016

2.2 Proposed Amendments to the Project Description

This EA Amendment identifies and assesses two proposed amendment to the scope of the Project as compared to that which was originally assessed:

1. Modification to the Project and Study Areas to incorporate new licences acquired by Statoil in 2016; and

2. An increase in streamer number, fan spread and tow depth

2.2.1 Project / Study Area Extension

As discussed previously, Statoil is proposing to expand the Project Area/Study Area for the Original EA Report, to capture recently issued Exploration Licences in this area.

In particular, the northwestern, north-central and northeastern portion of the proposed geophysical survey area will be amended to include marine areas outside of the original Project Area and Study Area (Figure.1). The coordinates for the amended Project and Study Areas are provided in Table 2.

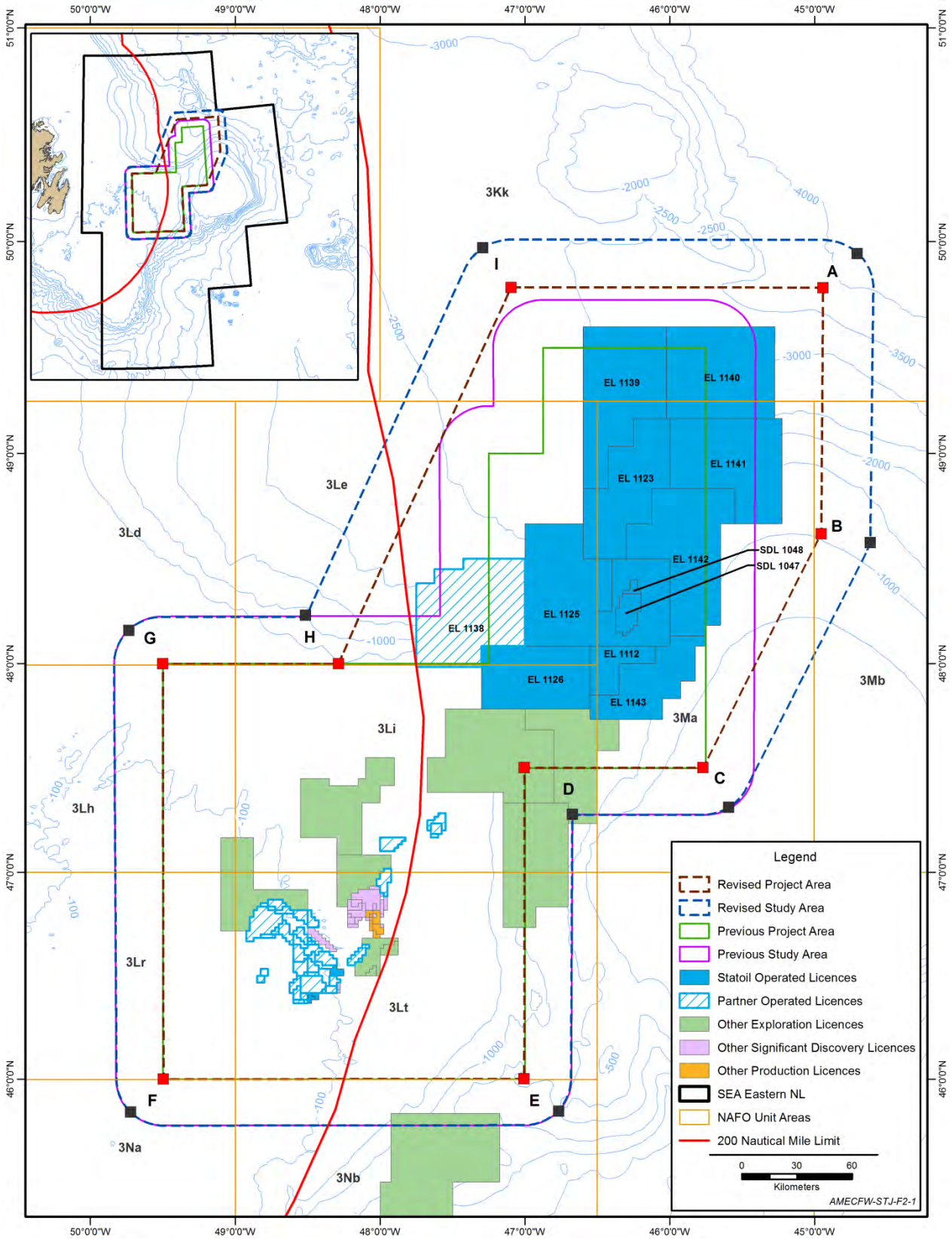

Figure 1: Expanded Project and Study Areas for the Geophysical Survey to 2019

Table 2 Amended Project and Study Area Coordinates

Point / Label	Project Area		Study Area	
	Latitude	Longitude	Latitude	Longitude
A	49° 47' N	44° 56' W	44° 42' W	49° 57' N
B	48° 37' N	44° 57' W	44° 37' W	48° 35' N
C	47° 30' N	45° 46' W	45° 36' W	47° 19' N
D	47° 30' N	47° 0' W	46° 40' W	47° 17' N
E	46° 0' N	47° 0' W	46° 46' W	45° 51' N
F	46° 0' N	49° 30' W	49° 43' W	45° 50' N
G	48° 0' N	49° 30' W	49° 44' W	48° 9' N
H	48° 0' N	48° 17' W	48° 31' W	48° 14' N
I	49° 47' N	47° 6' W	47° 17' W	49° 58' N

Notes:
- Locations are rounded to the nearest minute.
- Geodetic parameters (WGS): NAD 83

As described in the original EA documentation, the proposed Project Area (and associated EA Study Area) for the planned geophysical exploration program was defined by Statoil based on its plans to conduct a variety of survey activities over existing licenses and other areas of interest off Eastern Newfoundland, as these were known and defined as of the time of the initial Project conception and planning. Since that time, Statoil has acquired additional exploration licences through the C-NLOPB Call for Bids process. Exploration Licences (EL) 1139, 1140, 1141, 1142, and 1143 were issued to Statoil effective January 15, 2016. Statoil is partner on Chevron operated EL1138.

Portions or all of these new licences are outside the boundaries of the original EA. As a result Statoil is proposing to modify the Project and Study Areas to incorporate the newly acquired licenses. The proposed modification to the Project Area will see its total size increasing by approximately 30 percent (22,000 km²) over that which was considered and approved in the original EA and its Amendment.

2.2.2 Streamer Number, Fan Spread and Tow Depth

The Project Description that was included and assessed in the original EA Report (Section 2.3.8 – Seismic Streamers) stated that:

> ***Typically 10 to 14 streamers (strings of hydrophone sound receivers), each up to 8 km in length****, are towed behind the seismic vessel to record the airgun pulses during 3D seismic surveys. [Individual stand-alone 2D profiles might be acquired by the 3D vessel without any change of configuration or by a different vessel towing only one streamer.] Once again, the Western Patriot is used as a representative example for the purposes of this EA.* ***The Western Patriot tows eight 5 km streamers and the streamers are Sentry and Guardian Solid Streamers (Thompson Marconi). The streamers are separated by 100 m for a total spread of 700 m and are typically deployed at a depth of 8 to 10 m.*** *(Emphasis added)*

Additional information and operational experience obtained through the design and conduct of the Project since that time suggests that for future seismic survey activity undertaken as part of this Project, it may be necessary to increase the number, fan spread and tow depth of the streamers. Up to 16 streamers at 8 to 10 km in length could be used. The streamers will be either solid core or fluid filled. It is planned that streamer separation will be 100 m between each streamer, for a total spread width of 1,300 to 1,500 m at the front end of the streamers

(14 streamers result in a spread width of 1,300 m and 16 streamers in 1,500 m). Fan-mode is planned to be used in order to minimize infill, and this means that the total spread width at the tail will be between 1,300 to 1,733 m for 14 streamers (0 to 33% fan) and 1,500 to 2,000 m for 16 streamers (0 to 33% fan). The streamers will be towed at 10 to 30 m depth.

3 MITIGATIONS

Mitigation procedures provided for in the Original EA Report (Section 5.8) will continue to the implemented for geophysical programs, including the following:

- timely and clear communications (VHF, HF, Satellite, etc.);
- use of FLO for ongoing communication with active commercial fisheries in the area;
- issuing Notices to Shipping with the Canadian Coast Guard and the CBC Fisheries Broadcast;
- compensation program in the event any project vessels damage fishing gear
- single point of contact
- delay start-up if marine mammals or sea turtles are within 500 m
- ramp-up of airguns over 30 min-period
- shutdown of airgun arrays for endangered or threatened marine mammals and sea turtles within 500 m
- marine mammal and sea turtle and seabird observations during daylight seismic operations (critical habitat has not been identified in or near the Project and Study Areas)
- daily monitoring of vessel for stranded birds
- handling and release protocols of stranded birds

4 EXISTING ENVIRONMENT

This section provides an overview summary of the existing environmental setting in and near the Project Area, as relevant to the proposed Project modifications described in Section 2.2. This includes a specific focus on the existing (baseline) environment within the proposed expansion to the Project Area, with particular reference to the VECs that were considered in the original assessment, namely:

- Fish and Fish Habitat;
- Commercial Fisheries;
- Seabirds;
- Marine Mammals and Sea Turtles; and
- Species at Risk

This section is therefore focussed primarily on identifying and describing any new or different environmental features and characteristics in the expanded area as compared to that which was described and considered in the original EA. This summary draws from existing and available information sources, most notably the Eastern Newfoundland Strategic Environmental Assessment (SEA) (AMEC 2014), which was prepared and released in August 2014 by the C-NLOPB. It does not repeat all of the detailed environmental information and analysis provided in the original EA Report, Amendment and Updates, which should therefore also be referred to as required and relevant. In addition, while the intent is not to re-do or update the existing environment description for the entire Project Area for all aspects of the existing environment, updated baseline information is provided for key environmental components that are typically the main focus of EA Updates for such projects, namely Species at Risk and Commercial Fisheries.

4.1 Fish and Fish Habitat

The original EA Report, EA Amendment and Updates provide a detailed overview of marine fish and fish habitat within the overall Project and Study Areas, including relevant habitats, plankton, benthos, deep-water corals, and fish, based on relevant, existing information, and datasets.

The proposed expansion to the Project Area is located at its northwestern, north-central and northeastern extent, overlapping with or adjacent to eastern portions of the Orphan Basin and the southern part of the Orphan Knoll, while also remaining within the Study Area for the Eastern Newfoundland SEA (AMEC 2014). Although the marine area that is encompassed by the amended Project Area is anticipated to contain fish species and habitats that are characteristic of its relative location within the overall Eastern Newfoundland Offshore Area, in that it is influenced by the cold Labrador Current and deep water areas of the shelf slope and beyond, it does not likely contain new or different species, habitats - and thus, potential environmental issues or interactions – that were not considered and addressed in the original EA.

Deep-sea corals, sea pens, and sponges are a subset of benthic invertebrates that are of particular conservation interest due to their habitat-forming capacity and their sensitivity to anthropogenic stressors. The available information on identified high-density areas and protection zones for corals, seamounts, and sponges in this region (Figure 2, adapted from AMEC 2014) indicates that while portions of the original and expanded Project Area will overlap with several of these areas (including in the northwestern, north-central and northeastern portion of the expanded area), the offshore seismic activities that have been or are planned to be undertaken as part of this Project will not result in any direct contact with the seabed, and will therefore not physically disturb benthic animals or their habitats. Although the modified Project Area is closer to the southeastern portion of a large identified seamount / coral / sponge protection zone that constitutes the "Orphan Knoll Seamount Fisheries Closure Area", it does not overlap directly with this area.

A number of other marine and coastal areas off Eastern Newfoundland have been designated as protected or as otherwise being important or sensitive from an ecological and/or socioeconomic perspective, and are therefore relevant to this VEC and/or the other VECs discussed below. The locations and extents of these areas in relation to the Project and Study Areas are illustrated in Figure 3. The Project occurs in an offshore area that is located approximately 300 kilometres from shore. Project activities will therefore not occur within, or otherwise interact directly with, any of the existing provincial or federal Parks, Ecological Reserves, Wildlife Reserves, Marine Protected Areas, Migratory Birds Sanctuaries, Important Birds Area or other locations that have been designated as protected on or around the Island of Newfoundland. The originally proposed Project and Study Areas do overlap with a number of identified special or sensitive areas in the offshore environment (Fishery Closure Areas, Ecologically and Biologically Significant Area), for which there are no associated prohibitions of marine activities such as that being proposed as part of this Project, and with the Project having little or no potential to result in adverse environmental effects upon these areas and their associated ecological features and processes, as described above.

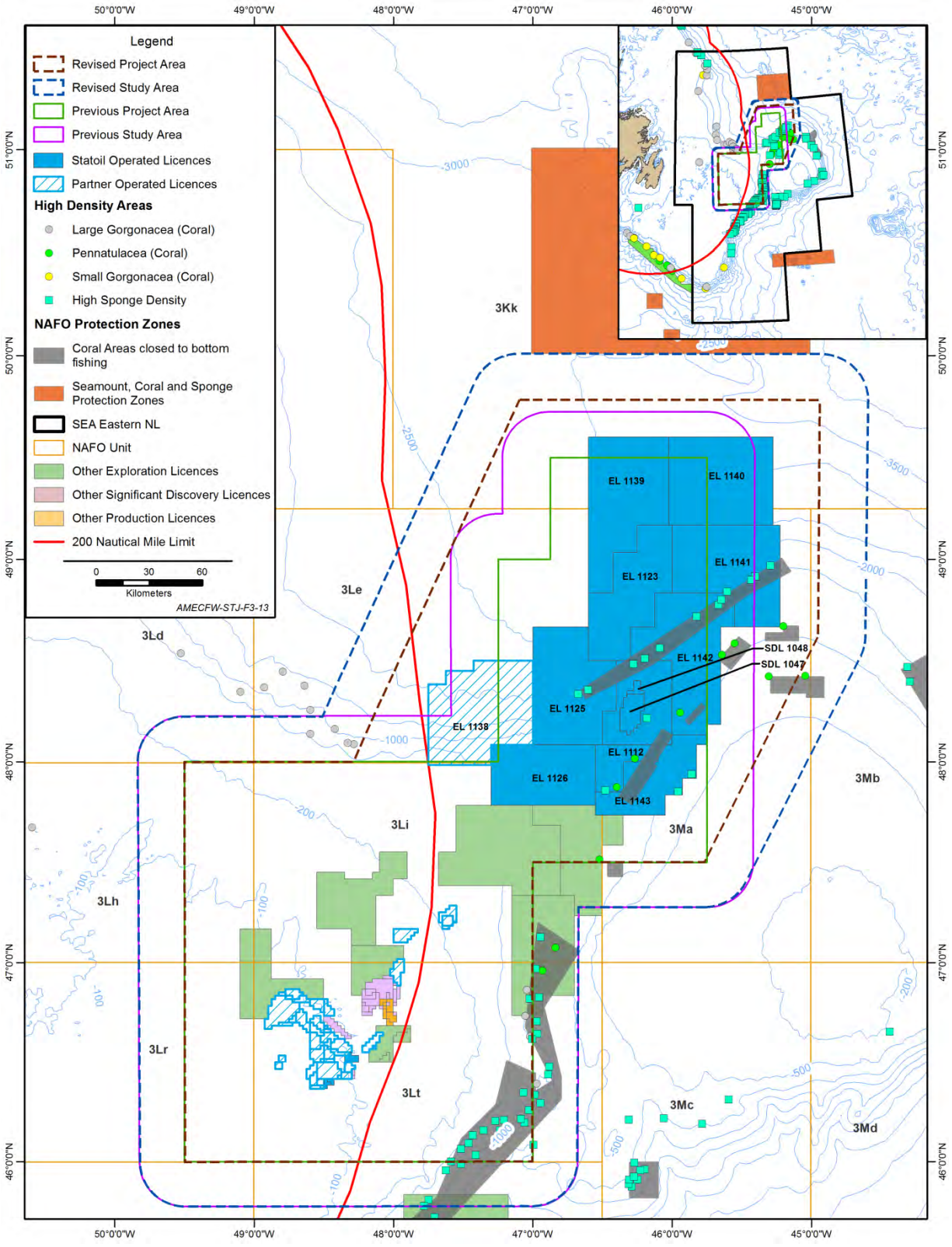

Figure 2: Identified High Density Areas and Protection Zones for Corals, Seamounts and Sponges

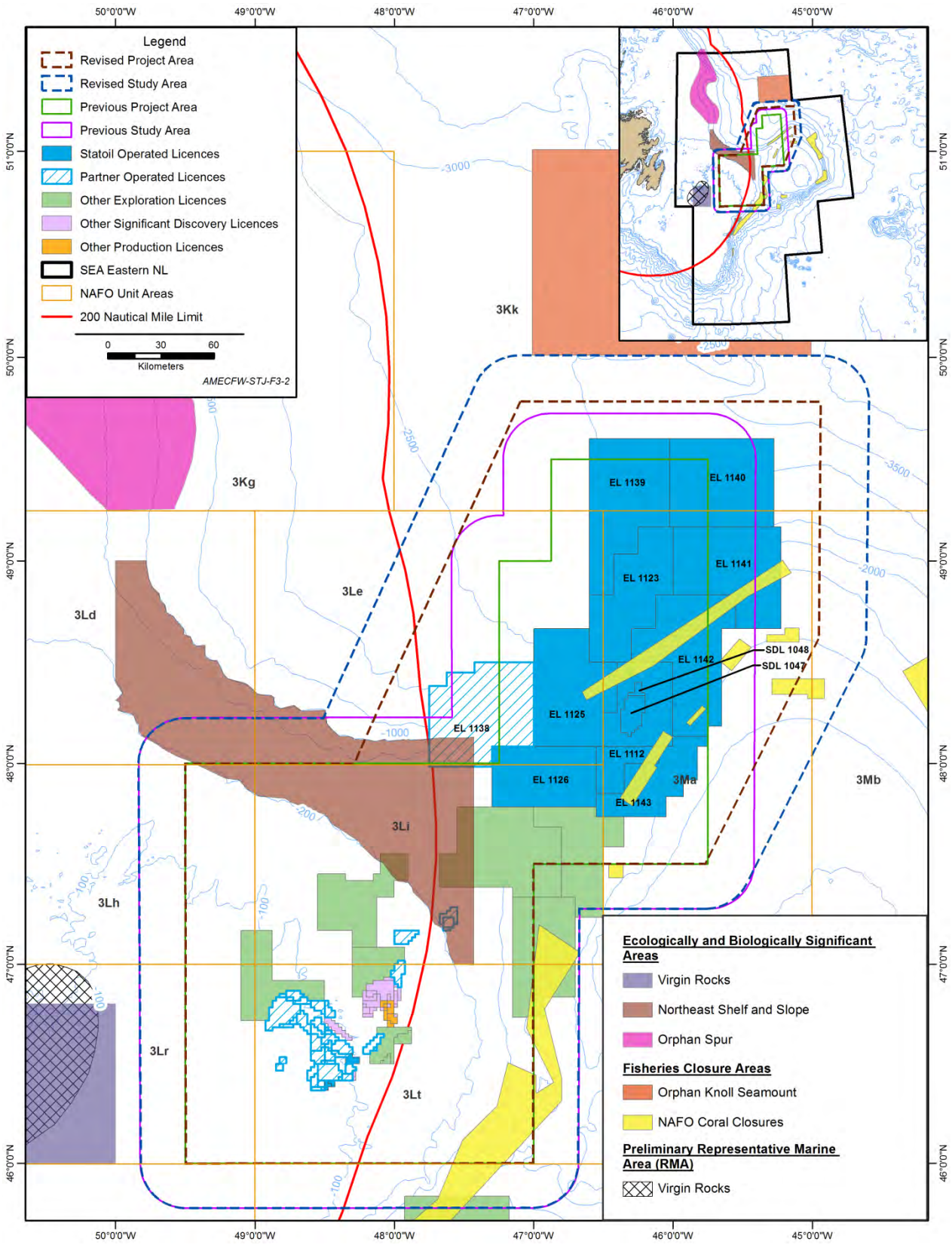

Figure 3: Protected and Sensitive Areas off Eastern Newfoundland

4.2 Commercial Fisheries

The original EA Report, EA Amendment and Updates provided an overview of the existing socioeconomic environment of the Study Area. This included a particular focus on commercial fisheries and related activities within and around the Project and Study Areas, based on existing and available information, and an associated assessment of the potential effects of the Project on these activities.

Commercial fisheries data are provided by Fisheries and Oceans Canada (DFO) Statistical Services including landings (weight and value) statistics and geospatial information illustrating the overall location and timing of fishing activity. The mapping information is provided by DFO as an aggregated data set that gives a general indication of fishing areas (by species, gear types, fleet and other pre-determined categories and data classes) for individual grid "cells" that are approximately 6 x 4 nautical miles in size. The DFO datasets record and report domestic and foreign fish harvests that are landed in Canada.

Figures 4 to 18 (Appendix A) provide annual, locational information for commercial fishing activity in the amended Project Area and surrounding region for the previous five years (2010 to 2014) based on the above described DFO datasets. The data extend from data post-original EA Report (2009) up to the most current year (2014) for which such data are available from DFO. The figures include relevant and representative maps showing overall fishing activity by year, as well as for key species and gear types. Figure 19 (Appendix A) also shows the identified NAFO Fisheries Footprint in the region. As illustrated in the mapping, compared to the Project and Study Areas as a whole, the proposed expanded area is located well outside the more intensive commercial fishing areas in other parts of the region, particularly those located on the Banks and along the shelf. It therefore does not increase or otherwise change the nature or intensity of the Project's potential interaction with key fishing activities, locations, and times.

A number of fisheries survey programs by government and/or industry also occur in parts of the Eastern Newfoundland Offshore Area, including DFO Multispecies Research Vessel (RV) Trawl Surveys, which comprise annual (spring and fall) standardized bottom-trawl surveys to collect information for managing and monitoring fish resources in the Newfoundland and Labrador Region. Table 3 shows the 2016 schedule for DFO's surveys as recently obtained from DFO representatives (G. Sheppard, DFO – NL Region, personal communication). Statoil will continue to consult with DFO regarding timing of trawl surveys.

There is also an annual Industry - DFO Collaborative Post-season Trap Survey for snow crab in NAFO Divisions 2J3KLOPs4R, which is conducted using commercial and modified snow crab traps at established trap stations starting in late August or early September after the commercial snow crab season has ended. The proposed expanded area does not increase proximity to the established survey locations for the Industry-DFO collaborative post-season snow crab survey (Figure 20, Appendix A).

Table 3 Planned Timing of DFO RV Surveys Offshore Eastern Newfoundland (2016)

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

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

4.3 Seabirds

The original EA Report, EA Amendment and Updates summarized the distribution and abundance of seabirds in the Project and Study Areas, and describe relevant life history characteristics and areas and times of particular significance to birds that are found within or in proximity to this region.

The proposed extension to the Project and Study Areas is again located in the northwestern, north-central and northeastern portion of the area, beyond Canada's 200 nautical mile EEZ and hundreds of kilometres from any coastline. Although, as indicated in the original EA, a number of marine avifauna have been observed to occur in this portion of the Study Area at least seasonally (such as large gulls, kittiwakes, dovekies, fulmar, storm-petrels, and others), this extended area is not known or likely to be used by new or different species or to contain particularly important or sensitive habitats that were not described and addressed in the original EA. Many seabird groups such as cormorants and terns tend to have a more coastal distribution, and are therefore rarely observed this far offshore. Waterfowl occur in large numbers in marine habitats off eastern Newfoundland, especially during the winter months, but they prefer open water in coastal areas and are thus not likely to frequent the northwestern, north-central and northeastern portion of the Study Area.

4.4 Marine Mammals and Sea Turtles

The EA Report, EA Amendment and Updates summarized the distribution and abundance of marine mammals and sea turtles in the overall Study Area, and describe these species' relevant life history characteristics. As indicated in the available DFO sightings database (Figures 21 to 23, Appendix B; adapted from AMEC 2014), it is likely that this general region is used by some marine mammals and/or sea turtles during parts of the year. However, this extended area is not known or likely to be used by species or contain particularly important or sensitive habitats that were not considered and addressed in the original EA, nor to increase the potential for or degree of any such environmental interactions and effects. . It will therefore not result in any new or different interactions with, or increase the proximity of planned Project activities to, identified important areas and times for these species off Eastern Newfoundland.

4.5 Species at Risk

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

Table 4 provides an updated listing of identified species at risk and species of conservation concern, indicating their current designations under applicable legislation and by COSEWIC (last assessment meeting November 2015). There have been no changes in the statuses or designations of these species since the last EA Update for the Project was submitted in May 2015. There have likewise been no finalized Action Plans, Management Plans, Recovery Strategies or associated critical habitat designations for these species since that time[1], although draft plans or strategies for several species (e.g., northern wolfish, leatherback sea turtle) were developed and released in 2015 (DFO 2015a, 2015b, 2015c).

Table 4 Current Listing of SARA and COSEWIC Listed Species in the Area Relevant to the Amendment

Family	Species		Federal	
	Common Name	**Scientific Name**	***SARA* Status (Schedule 1, unless otherwise noted)**	**COSEWIC Designation**
MARINE FISH				
Lamnidae	White shark - Atlantic population	*Carcharodon carcharias*	Endangered	Endangered
Anarhichadidae	Atlantic wolffish	*Anarhichas lupus*	Special Concern	Special Concern
Anarhichadidae	Northern wolffish	*Anarhichas denticulatus*	Threatened	Threatened
Anarhichadidae	Spotted wolffish	*Anarhichas minor*	Threatened	Threatened
Anguillidae	American eel	*Anguilla rostrata*		Threatened
Carcharhinidae	Blue shark - Atlantic population	*Prionace glauca*		Special Concern
Cetorhinidae	Basking shark - Atlantic population	*Cetorhinus maximus*		Special Concern
Gadidae	Atlantic cod - Newfoundland and Labrador population	*Gadus morhua*		Endangered

[1] Based on a temporal search query undertaken at: *http://www.registrelep-sararegistry.gc.ca/search/DocSearch_e.cfm*

Family	Species		Federal	
	Common Name	Scientific Name	*SARA* Status (Schedule 1, unless otherwise noted)	COSEWIC Designation
Gadidae	Cusk	*Brosme*		Endangered
Lamnidae	Porbeagle	*Lamna nasus*		Endangered
Lamnidae	Shortfin mako - Atlantic population	*Isurus oxyrinchus*		Threatened
Macrouridae	Roughhead grenadier	*Macrourus berglax*		Special Concern
Macrouridae	Roundnose grenadier	*Coryphaenoides rupestris*		Endangered
Phycidae	White hake - Atlantic and Northern Gulf of St. Lawrence population	*Urophycis tenuis*		Threatened
Pleuronectidae	American plaice - Newfoundland and Labrador population	*Hippoglossoides platessoides*		Threatened
Rajidae	Smooth skate - Funk Island Deep population	*Malacoraja senta*		Endangered
Rajidae	Thorny skate	*Amblyraja radiata*		Special Concern
Rajiidae	Winter skate - Eastern Scotian Shelf-Newfoundland population	*Leucoraja ocellata*		Endangered
Salmonidae	Atlantic salmon – Newfoundland population	*Salmo salar*		Threatened
Scombridae	Atlantic bluefin tuna	*Thunnus thynnus*		Endangered
Scorpaenidae	Acadian redfish - Atlantic population	*Sebastes fasciatus*		Threatened
Scorpaenidae	Deepwater redfish - Northern population	*Sebastes mentella*		Threatened
Squalidae	Spiny dogfish - Atlantic population	*Squalus acanthias*		Special Concern
MARINE BIRDS				
Laridae	Ivory Gull	*Pagophila eburnea*	Endangered	Endangered
Scolopacidae	Red-necked Phalarope	*Phalaropus lobatus*		Special Concern
MARINE MAMMALS AND SEA TURTLES				
Balaenopteridae	Blue Whale - Atlantic Population	*Balaenoptera musculus*	Endangered	Endangered
Balaenopteridae	Fin Whale - Atlantic Population	*Balaenoptera physalus*	Special Concern	Special Concern
Balaenidae	North Atlantic Right Whale	*Eubalaena glacialis*	Endangered	Endangered
Ziphiidae	Northern Bottlenose Whale - Davis Strait, Baffin Bay, Labrador Sea population; Scotian Shelf population	*Hyperoodon ampullatus*	Endangered (Scotian Shelf population)	Special Concern (Davis Strait, Baffin Bay, Labrador Sea population); Endangered (Scotian Shelf population)
Ziphiidae	Sowerby's Beaked Whale	*Mesoplodon bidens*	Special Concern	Special Concern
Delphinidae	Killer Whale - Northwest Atlantic / Eastern Arctic population	*Orcinus orca*		Special Concern

Family	Species		Federal	
	Common Name	**Scientific Name**	***SARA* Status (Schedule 1, unless otherwise noted)**	**COSEWIC Designation**
Phocoenidae	Harbour Porpoise (Northwest Atlantic population)	*Phocoena phocoena*	Schedule 2, Threatened	Special Concern
Balaenopteridae	Humpback Whale - Western North Atlantic population	*Megaptera novaeangliae*	Schedule 3, Special Concern	Not at Risk
Dermochelyidae	Leatherback Sea Turtle - Atlantic population	*Dermochelys coriacea*	Endangered	Endangered
Cheloniidae	Loggerhead Sea Turtle	*Caretta*		Endangered

The proposed expansion of the northwestern, north-central and northeastern portion of the Project Area does not likely contain new or different species and habitats – including designated species at risk or their habitats – that were not considered and addressed in the original EA analyses for this Project.

5 ENVIRONMENTAL EFFECTS ASSESSMENT

The environmental effects assessment addresses an increase in the size of the original Project and Study Areas and the streamer fan spread as compared to that which was described in the original EA Report. The environmental effects assessment focuses on:

- potential interaction with fishing gear and/or DFO research surveys in the expanded Project and Study Areas outside the 2011 Project and Study Areas in the original EA Report
- potential interaction with fishing gear and/or DFO research surveys with the expanded (up to 700 m wider than that previously assessed) streamer fan spread

With the exception of expanded Project and Study Areas and streamer fan spread, all other survey equipment and activities assessed in the original EA remain the same; therefore, the assessment of those activities remains unchanged from the original EA. The potential for and consequence of accidental events such as release of fluid from streamers remains the same as that assessed in the original EA Report, which determined the effect of an accidental event to be not significant for all VECs (fish and fish habitat, commercial fisheries, seabirds, marine mammals and sea turtles, and species at risk).

5.1 Consultation

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 Fish Food and Allied Workers-Unifor (FFAW), Association of Seafood Producers (ASP) and Ocean Choice International (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.

Consultations relevant to this Update were held in February 2016 with the FFAW, the ASP, and OCI and One Ocean.

The discussion with the FFAW, held on February 24, 2016, indicated that there were no concerns arising from the proposed amendments to the environmental assessment. Statoil provided an overview of fisheries activity via maps showing 2013 Canadian commercial fishing activity.

During SCL's meeting on February 26, 2016, with OCI, they advised that its vessels would be fishing primarily within the 200 nm limit, but may go outside to pursue commercial fishing operations. Fishing would be concentrated to the west of Statoil licences within the 200 nm limit; there is likely to be little overlap between their commercial operations and Statoil operations.

SCL provided ASP a copy of the consultation material. Upon review of the information, ASP indicated they had no concerns and did not require a follow-up meeting.

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 DFO data. This means that that SCL will 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. In addition, as indicated in its environmental assessments, SCL will continue to engage with stakeholders as circumstances require.

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, through DFO.

5.2 Expanded Project and Study Areas

5.2.1 Fish and Fish Habitat

As per the original EA Report, the key aspects of the survey program with respect to the Fish and Fish Habitat VEC (including corals and sponges) is potential interaction with the seismic sound source.

Proposed mitigations for Fish and Fish Habitat include:

- ramp-up of array
- spatial and temporal avoidance

Because the expanded Project and Study Area does not likely contain new or different fish species or habitats (including corals and sponges) (see Section 4.1), the potential effect of the Project is expected to be the same as that assessed in Section 5.6 of the original EA Report. As the survey does not involve equipment being on or near the sea floor and there is no indication in the literature of damage to corals or sponges arising from seismic survey activities, the environmental effects of the expanded Project and Study Areas to Fish and Fish Habitat are likely to be **not significant**. This conclusion is consistent with that reached in the context of the seismic program assessed in the original EA Report.

5.2.2 Commercial Fisheries

As per the original EA Report, the potential effects of the geophysical program for Commercial Fisheries focus on the potential interactions between the seismic survey vessel and its array and fishing vessels and their towed gear.

Proposed mitigations for Commercial Fisheries include:

- Ongoing communications with commercial fish harvesters

- FLO/Single Point of Contact and communication procedures with other marine users
- gear and vessel compensation program
- Notice to Shipping regarding survey location and duration will be issued for all marine users

The potential issues pertaining to lost or damaged fishing gear associated with seismic activity are described in Section 5.6.2 of the original EA Report. Because there are no new fisheries and it is not in an area of high intensity in the expanded Project and Study Areas (see Section 3.2), the potential effect of the Project is likely to be the same as that assessed in Section 5.6.2 of the original EA Report. With the implementation of the mitigation measures described in the original EA Report and those listed above, the environmental effects of the Project on Commercial Fisheries within the expanded Project and Study Areas are likely to be **not significant**. This conclusion is consistent with that reached in the context of the seismic program assessed in the original EA Report.

During the survey season, there may be instances during weather events where the seismic vessel will have to travel outside the Project and/or Study Areas for reasons of safety for the crew and vessel. In these instances, the air sources will not be firing; however, the streamers will remain in-tow. Mitigation measures, such as communication with fishers, presence of an FLO and issuance of a Notice to Mariners / Shipping will be implemented to reduce the potential effect on commercial fishing activities that may be in the area at the time.

5.2.3 Seabirds

As per the original EA Report, the key aspect of the survey program with respect to Seabirds is interaction with the seismic sound source and attraction to vessel lights.

Proposed mitigations for Seabirds include:

- seabird observations in accordance with CWS protocols
- handling and release of stranded birds

The potential issues and effects pertaining to sound, attraction to vessel lights and other activities on seabirds associated with a seismic program are assessed in Sections 5.6.3.1 to 5.6.3.4 of the original EA Report. Because there are no seabird species that are resident or unique to the expanded Project and Study Areas (see Section 3.3), the potential effect of the Project is likely to be the same as that assessed in Section 5.6.3 of the original EA Report). With the implementation of the mitigation measures described in the original EA Report and those listed above, the environmental effects of the Project on Seabirds within the expanded Project and Study Areas are likely to be **not significant**. This conclusion is consistent with that reached in the context of the seismic program assessed in the original EA Report.

5.2.4 Marine Mammals and Sea Turtles

The environmental effects of seismic sound on Marine Mammals (and Sea Turtles) have been well studied, as they are often the key species of concern associated with seismic programs. As described in detail in the original EA Report, seismic air source arrays have the potential to affect hearing abilities, mask other sounds (i.e., communication), cause behavioural changes, impair hearing (either temporarily or permanently), or cause physical and non-auditory physiological changes. The presence of vessel and other project activities can also affect Marine Mammals and Sea Turtles.

As per the original EA Report, the key aspect of the survey program with respect to Marine Mammals and Sea Turtles is interaction with the seismic sound source.

Proposed mitigations for Marine Mammals and Sea Turtles include:

- those defined in Appendix 2 of the Geophysical, Geological, Environmental and Geotechnical Program Guidelines (C-NLOPB 2012)
- ramp-up of array
- marine mammal observations

The environmental effects of noise from seismic activities (physical / physiological) on Marine Mammals and Sea Turtles were assessed in Sections 5.6.4.1 and 5.6.4.2 of the original EA Report. Because none of the marine mammal and sea turtle species are resident or unique to the expanded Project and Study Areas (see Section 3.4), the potential effect of the Project is likely to be the same as that assessed in Sections 5.6.4.3 and 5.6.4.4 of the original EA Report. With the implementation of the mitigation measures listed above, as well as those described in the original EA Report), the environmental effects of the Project on Marine Mammals and Sea Turtles within the expanded Project and Study Areas are likely to be **not significant**. This conclusion is consistent with that reached in the context of the seismic program assessed in the original EA Report.

5.2.5 Species at Risk

Species at Risk (both *SARA*-listed and COSEWIC-assessed) of relevance in the Project and Study Areas are listed in Table 2. Of these, the formally protected (*SARA*-listed) species are:

- northern, spotted, and Atlantic wolffish;
- white shark (Atlantic population);
- Ivory Gull;
- blue (Atlantic population) whale and North Atlantic right whale; and
- leatherback sea turtle.

Final recovery strategies (Beauchamp et al. 2009; DFO 2013, 2014, 2015a, 2015b, 2015c; Environment Canada 2014)) exist for all but Atlantic wolffish (which has a management plan (DFO 2015c)) and white shark. No designated critical habitat for these *SARA*-listed species occurs in the Project and Study Areas.

As per the original EA Report, the key aspect of the survey program with respect to Species at Risk (both *SARA*-listed and COSEWIC-assessed) is likewise their potential interaction with the seismic sound source. Attraction to vessel lights is also an important interaction for seabird Species at Risk; however, Ivory Gulls have seldom been recorded as stranded on vessels. Because the distribution of Species at Risk is not restricted to or greater within the expanded Project and Study Areas and because there is no designated critical habitat within the expanded Project and Study Areas (see Section 3.5), the potential effect of the Project is likely to be the same as that assessed in Sections 5.6.5 of the original EA Report. Many of the issues of concern (including noise) with respect to environmental effects from seismic activities for marine fish, marine mammal, sea turtle, and seabird Species at Risk, as well as mitigation measures and management strategies, are similar to those presented for non-listed species. Proposed mitigations for species at risk include those identified for Fish and Fish Habitat (Section 6.1.1), Seabirds (Section 6.1.3), and Marine Mammals and Sea Turtles (Section 6.1.4) of this EA Amendment.

With the implementation of the mitigation measures described in the original EA Report and those listed in Sections 4 and 6.1.1 to 6.1.4 (especially the *Statement of Canadian Practice with Respect to the Mitigation of*

Sound in the Marine Environment, provided as Appendix 2 Section 1 in the *Geophysical, Geological, Environmental and Geotechnical Program Guidelines* (C-NLOPB 2012)), the environmental effects of the Project on Species at Risk within the expanded Project and Study Areas are likely to be **not significant**. This conclusion is consistent with that reached in the context of the seismic program assessed in the original EA Report.

5.3 Increased Streamer Spread

As described previously, the streamer fan spread will be up to 700 m wider than that described in the 2012 EA Update (Statoil 2012) and up to 20 m deeper than that which was proposed and considered in the original EA Report. As was assessed in the original EA Report, the only potential interaction of streamer deployment with the VECs is possible interference with Commercial Fisheries (and other ocean users). The same mitigation measures as those proposed in Section 5.6 of the original EA Report (and subsequent EA Updates) will be implemented to avoid interference with fishing activity and other ocean users (e.g., FLO / Single Point of Contact and communication procedures with other marine users, communication and notice to shipping with fishing and other vessels, gear and vessel compensation program, avoidance). Therefore, the effect of increased streamer fan spread on Commercial Fisheries will remain the same as that assessed in Section 5.6 of the original EA Report, and are likely to be **not significant**. This conclusion is consistent with that reached in the context of the seismic program assessed in the original EA Report.

6 CONCLUSION

Statoil has proposed, developed and implemented a marine geophysical survey program that includes completed and planned seismic, electromagnetic and localized geohazard surveys in the Jeanne d'Arc and Flemish Pass Basins from 2011 through 2019. This Project required previous authorizations from the C-NLOPB, pursuant to the relevant provisions of the *Accord Acts*, as well as requiring EA review and approval under *CEAA*. EA approval for the Project was received in June 2011, followed by an associated EA Amendment and EA Updates.

This EA Amendment provides an overview and analysis of proposed modifications to the Project as compared to that which was described and assessed in the original EA Report. These include a planned expansion of the northwestern, north-central and northeastern portion of the proposed Project and Study Areas, as well as an increase in the streamer fan spread for future geophysical survey activities.

As noted in the original EA Report, each of the potential environmental issues and effects that could be associated with the proposed Project can be avoided or otherwise mitigated through the use of good planning and proven operational practices and procedures, supported by Project-specific and industry standard mitigations that are outlined in relevant regulatory procedures and guidelines, and which have been identified, committed to, and implemented by Statoil as part of the Project and its EA. Overall, the proposed Project will entail a very localized, short-term and transient disturbance in the marine environment at any one location and time throughout the operational life of the exploration program. The proposed Project modifications described and assessed herein do not result in any changes in the original environmental effects predictions, required mitigation or effects significance evaluations for any component of the environment. The proposed changes to the Project are therefore not likely to result in significant adverse environmental effects.

7 REFERENCES

1. 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 pp. + Appendices.
2. Statoil Canada Limited. 2012. Statoil Canada Ltd. - East Coast Operations Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2012 Seismic Survey Operations. 24 pp.
3. AMEC Environment & Infrastructure. 2014. Eastern Newfoundland Strategic Environmental Assessment. xx+ 527 pp. + Appendices.
4. C-NLOPB (Canada-Newfoundland and Labrador Offshore Petroleum Board). 2012. Geophysical, Geological, Environmental and Geotechnical Program Guidelines. v + 51 pp.
5. Fisheries and Oceans Canada. 2015a. Recovery Strategy for the Leatherback Sea Turtle (*Dermochelys coriacea*) in Atlantic Canada [Draft]. Species at Risk Act Recovery Strategy Series. Fisheries and Oceans Canada Ottawa. vii + 48 pp.
6. Fisheries and Oceans Canada. 2015b. Action Plan for the Northern Wolffish (*Anarhichas denticulatus*) and Spotted Wolffish (*Anarhichas minor*) in Canada [Draft]. Species at Risk Act Action Plan Series. Fisheries and Oceans Canada, Ottawa. vi + 23 pp.
7. Fisheries and Oceans Canada. 2015c. Recovery Strategy for Northern Wolffish (*Anarhichas denticulatus*) and Spotted Wolffish (*Anarhichas minor*), and Management Plan for Atlantic Wolffish (*Anarhichas lupus*) in Canada [Draft]. Fisheries and Oceans Canada: Newfoundland and Labrador Region. St. John's, NL. viii + 81 pp.
8. Statoil Canada Ltd. - East Coast Operations. 2012. Newfoundland & Labrador Offshore Area Environmental Assessment Review for 2012: Seismic Survey Operations
9. 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, ON. vi + 59 pp.
10. DFO (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, ON. v + 15 pp.
11. DFO (Fisheries and Oceans Canada). 2014. 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, Ottawa, ON. vii + 68 pp.
12. Environment Canada. 2014. Recovery Strategy for the Ivory Gull (*Pagophila eburnea*) in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa, ON. iv+ 21 pp.

APPENDICES

App A Fishing Activity Maps

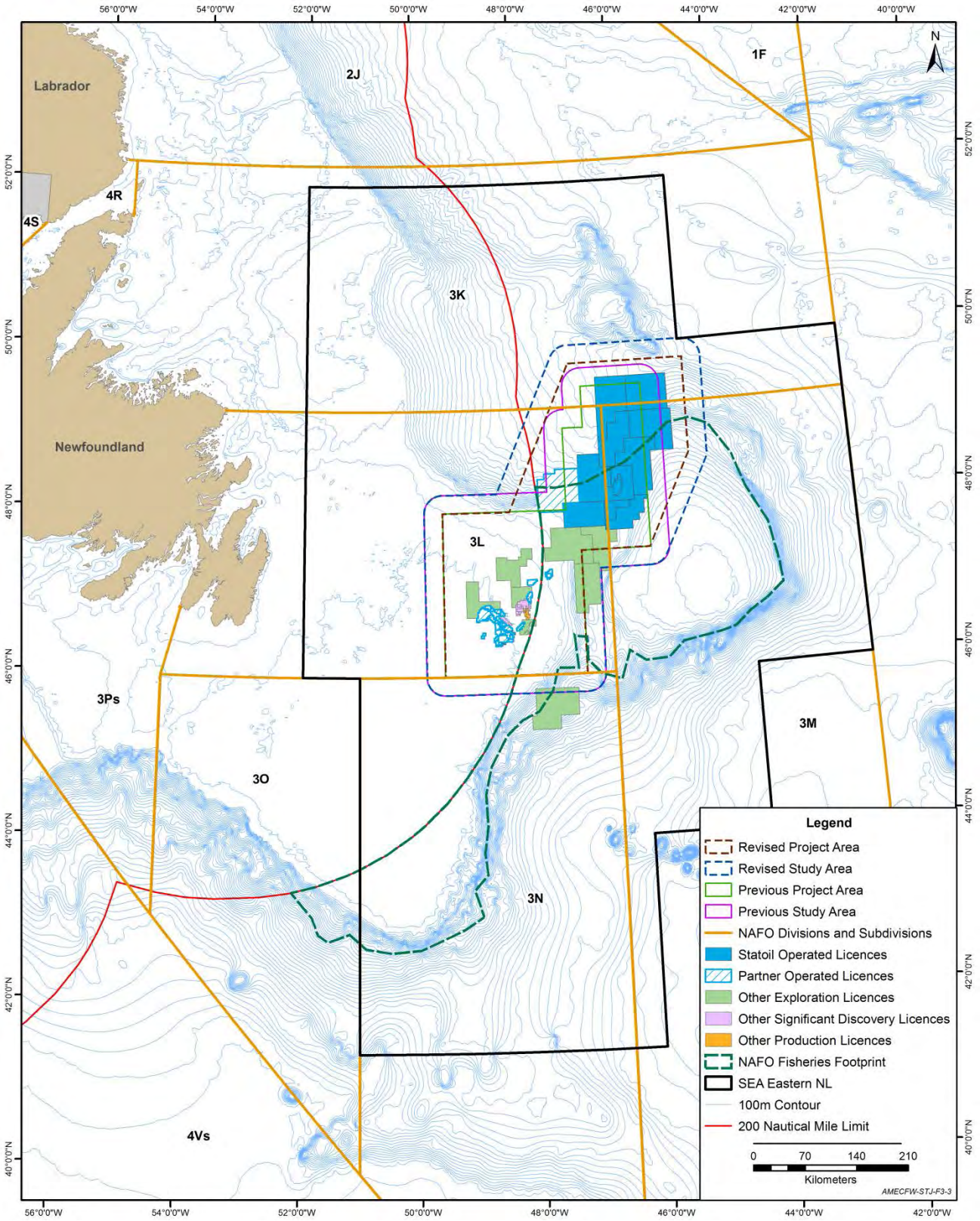

Figure 4: NAFO Divisions and Subdivisions

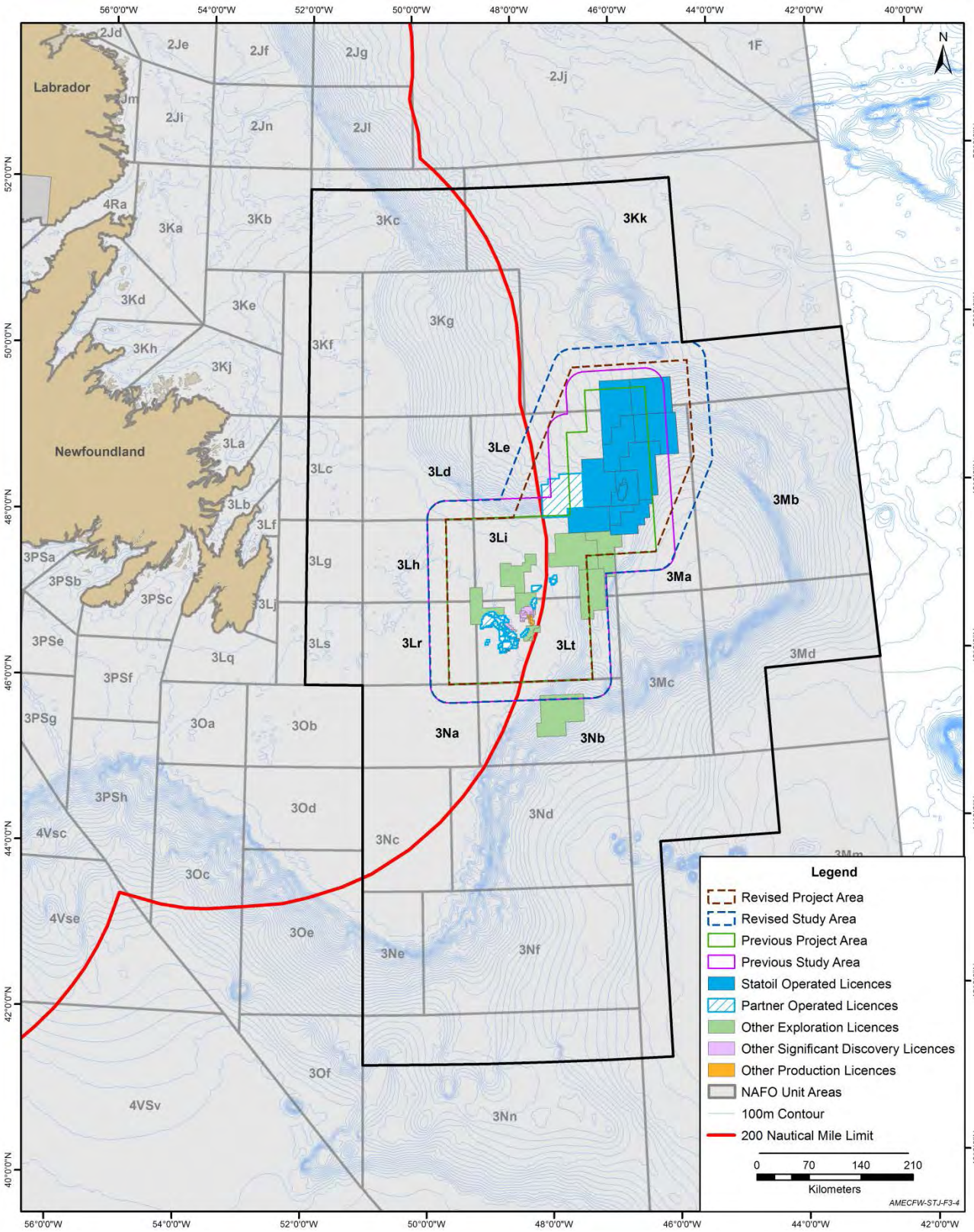

Figure 5: NAFO Unit Areas

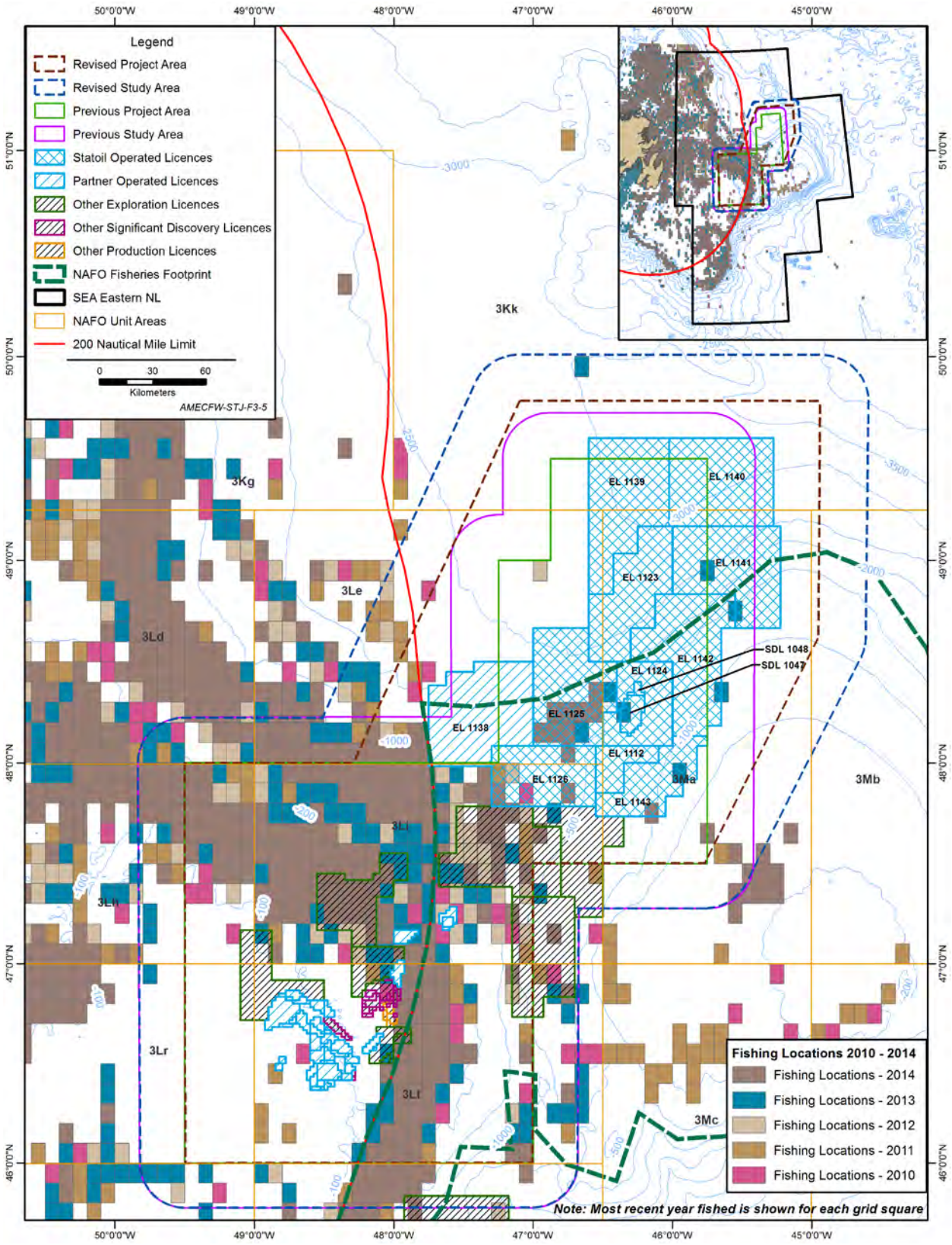

Figure 6: Commercial Fisheries Locations: All Species (2010-2014)

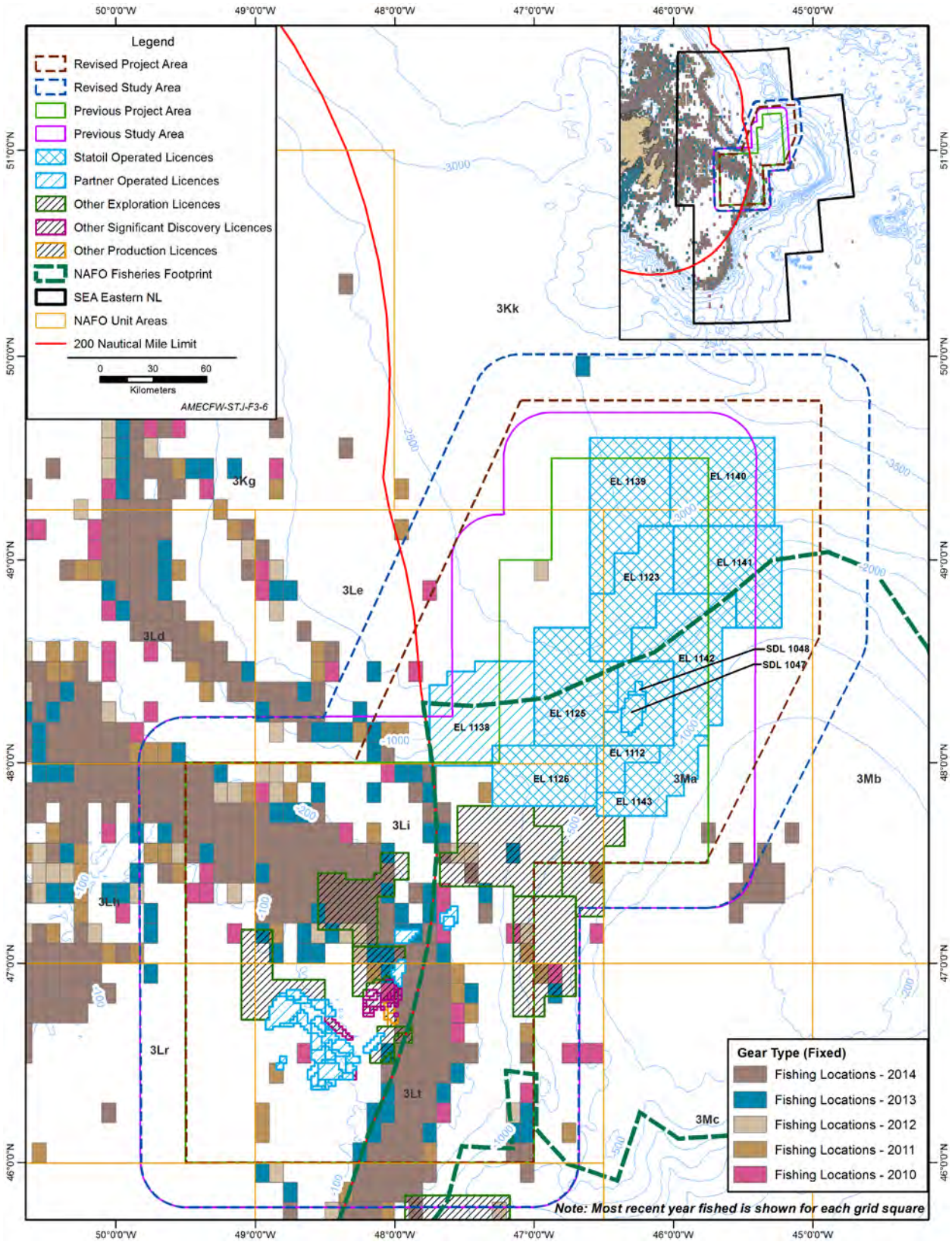

Figure 7: Commercial Fisheries Locations: Fixed Gear (2010-2014)

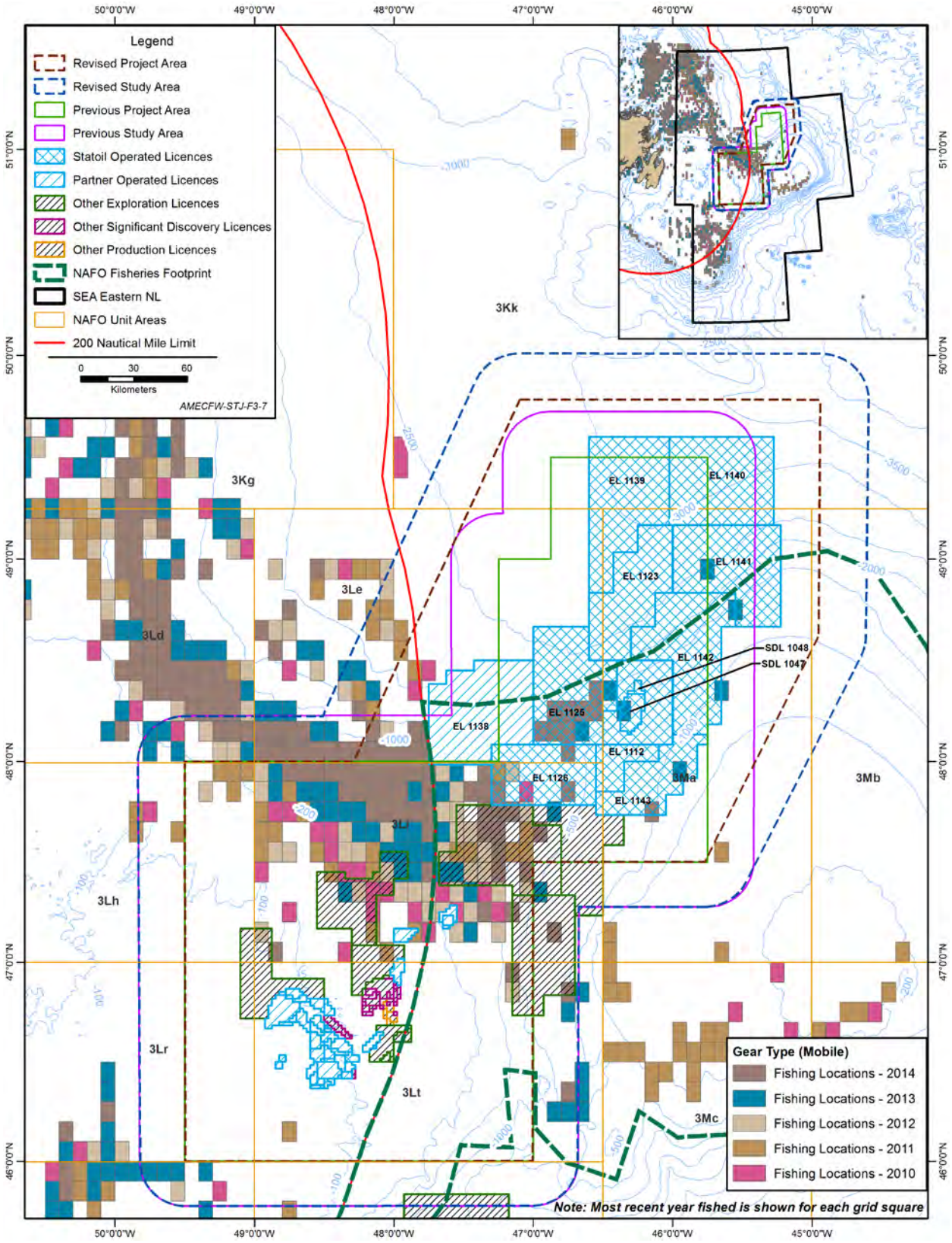

Figure 8: Commercial Fisheries Locations: Mobile Gear (2010-2014)

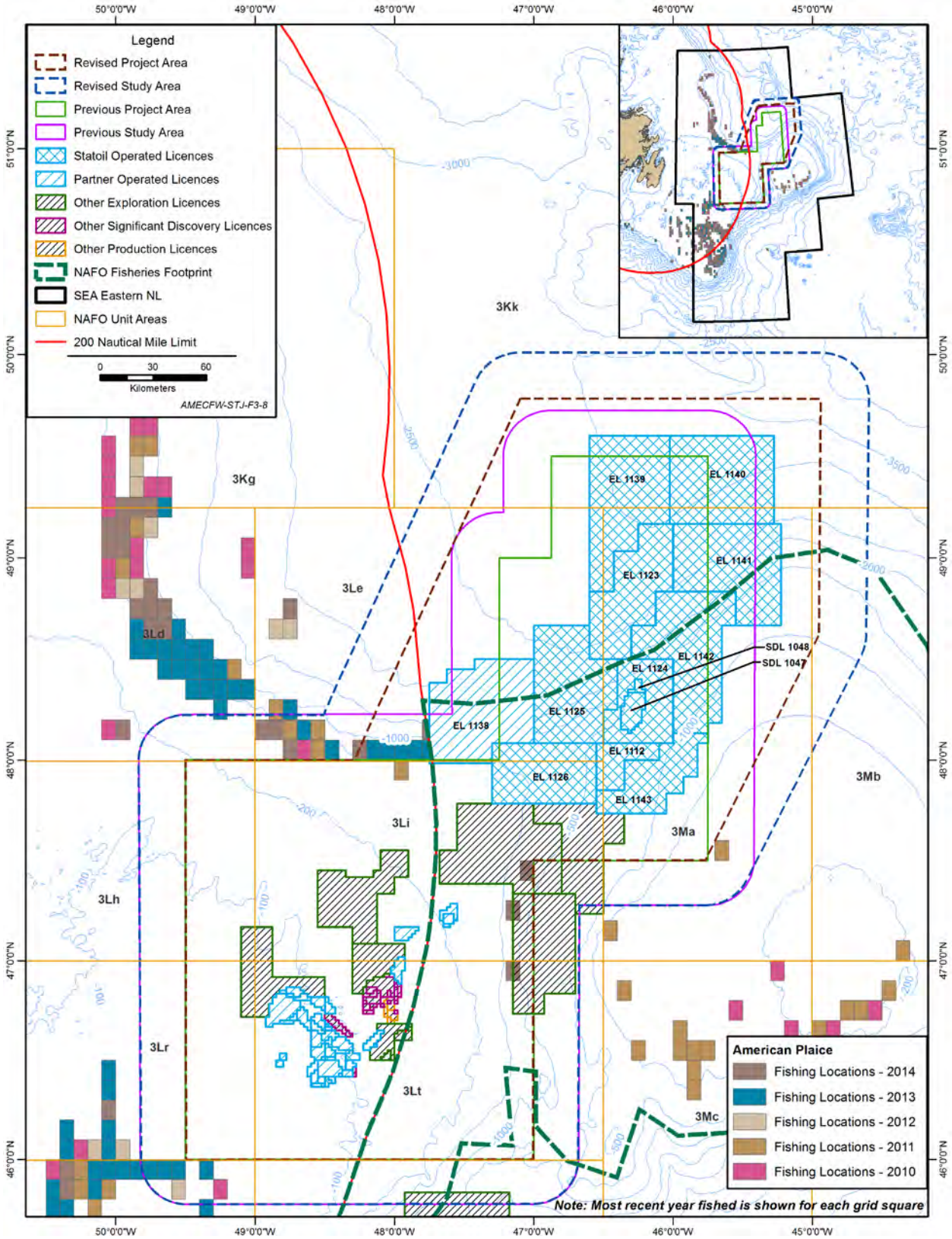

Figure 9: Commercial Fisheries Locations: American Plaice (2010-2014)

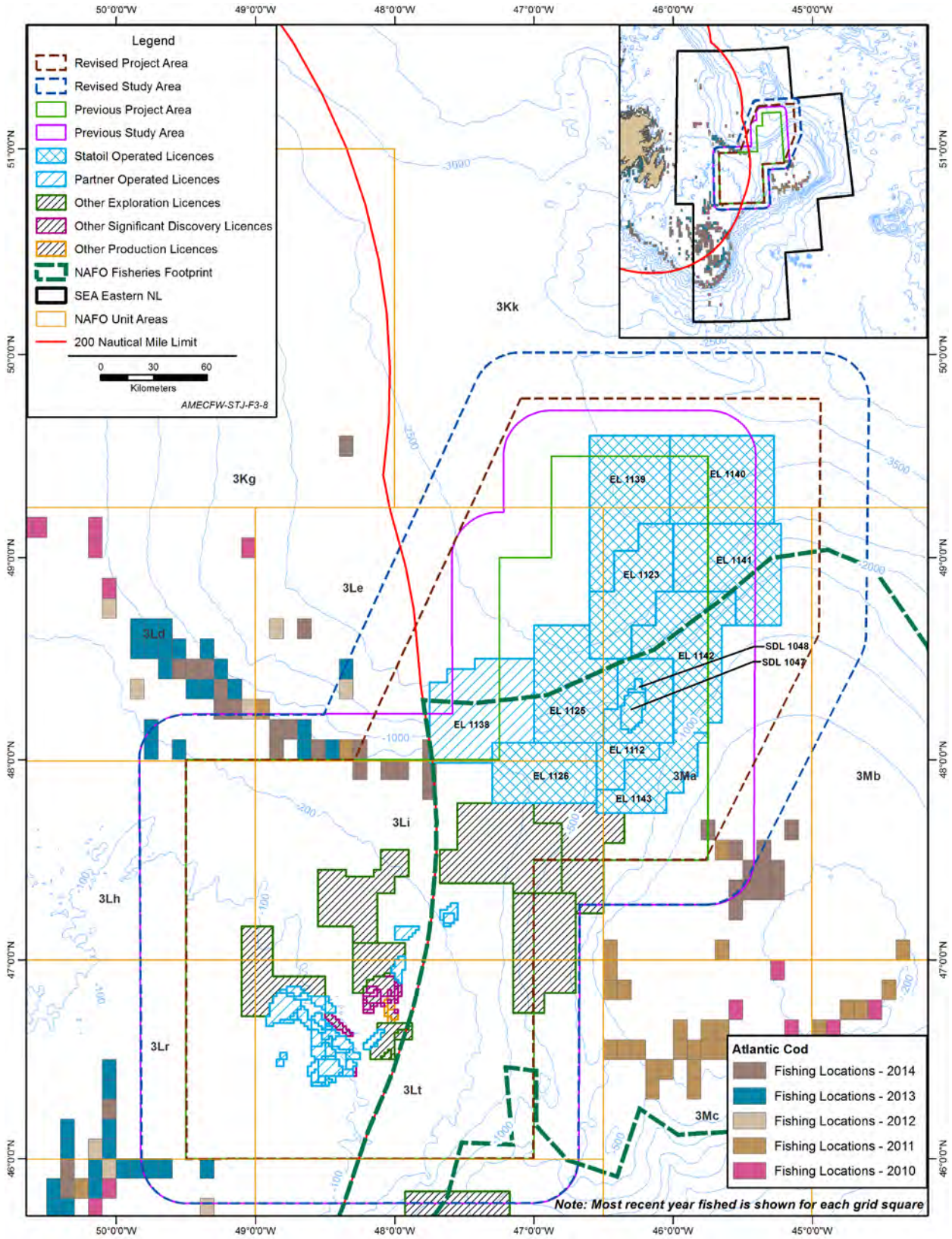

Figure 10: Commercial Fisheries Locations: Atlantic Cod (2010-2014)

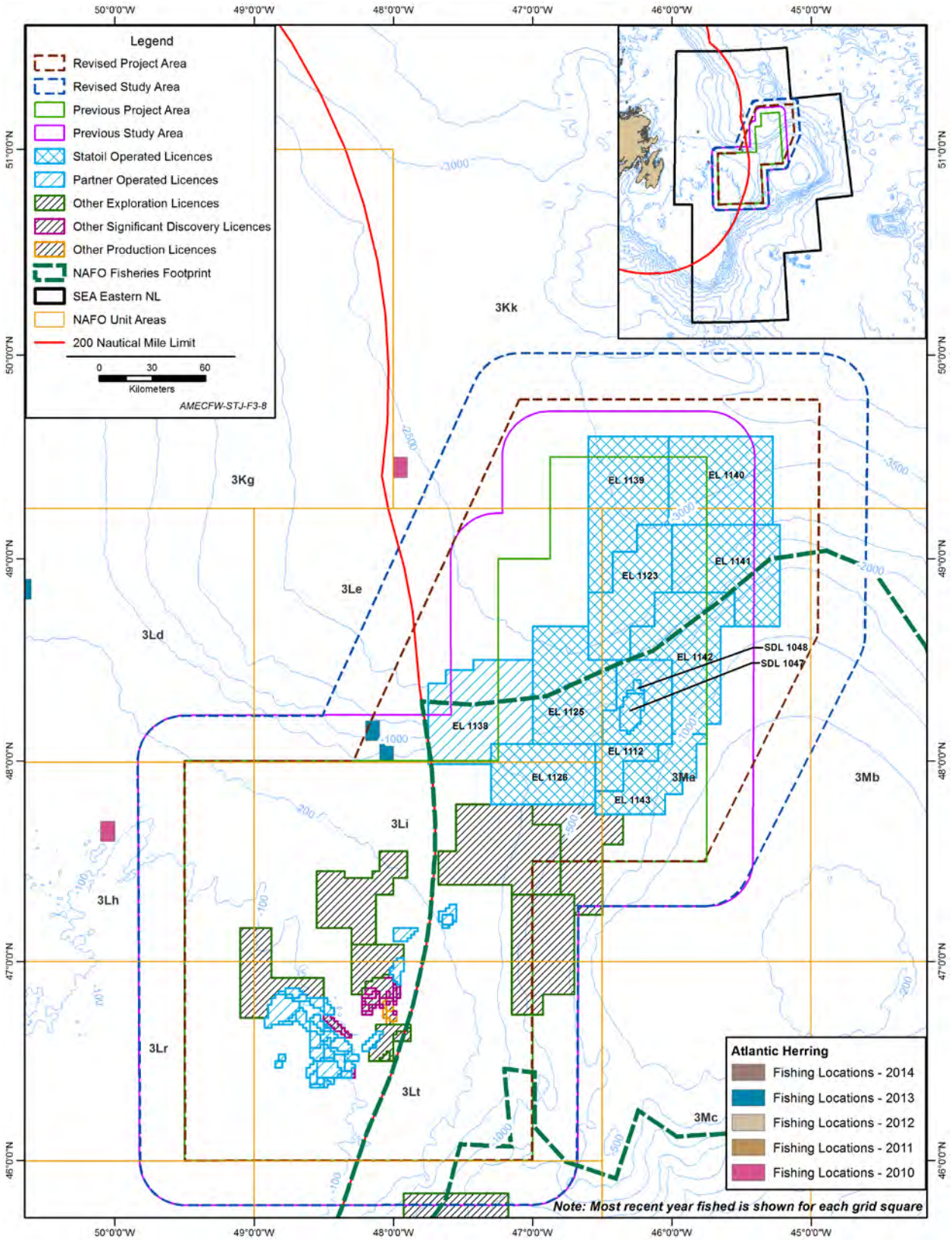

Figure 11: Commercial Fisheries Locations: Atlantic Herring (2010-2014)

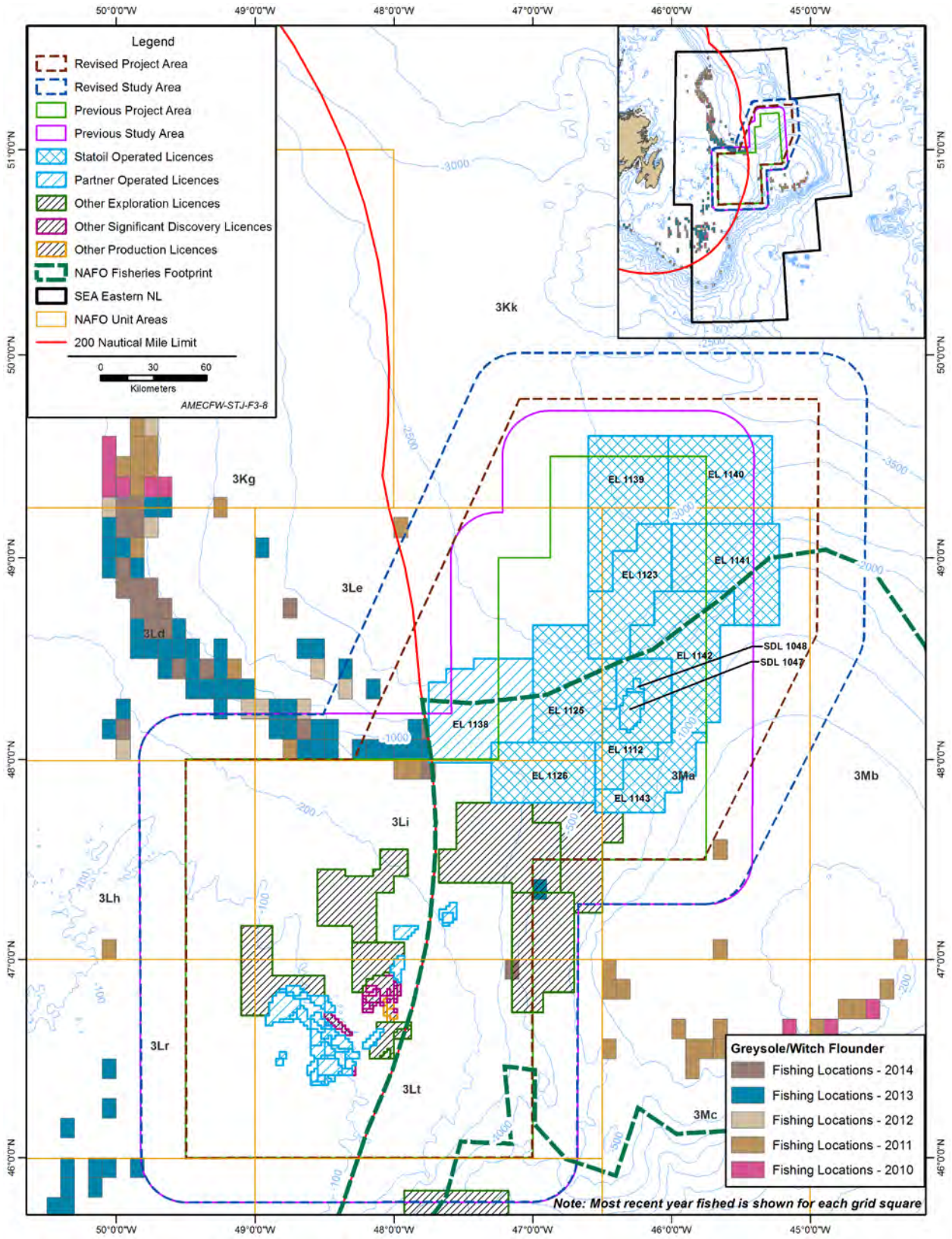

Figure 12: Commercial Fisheries Locations: Greysole / Witch Flounder (2010-2014)

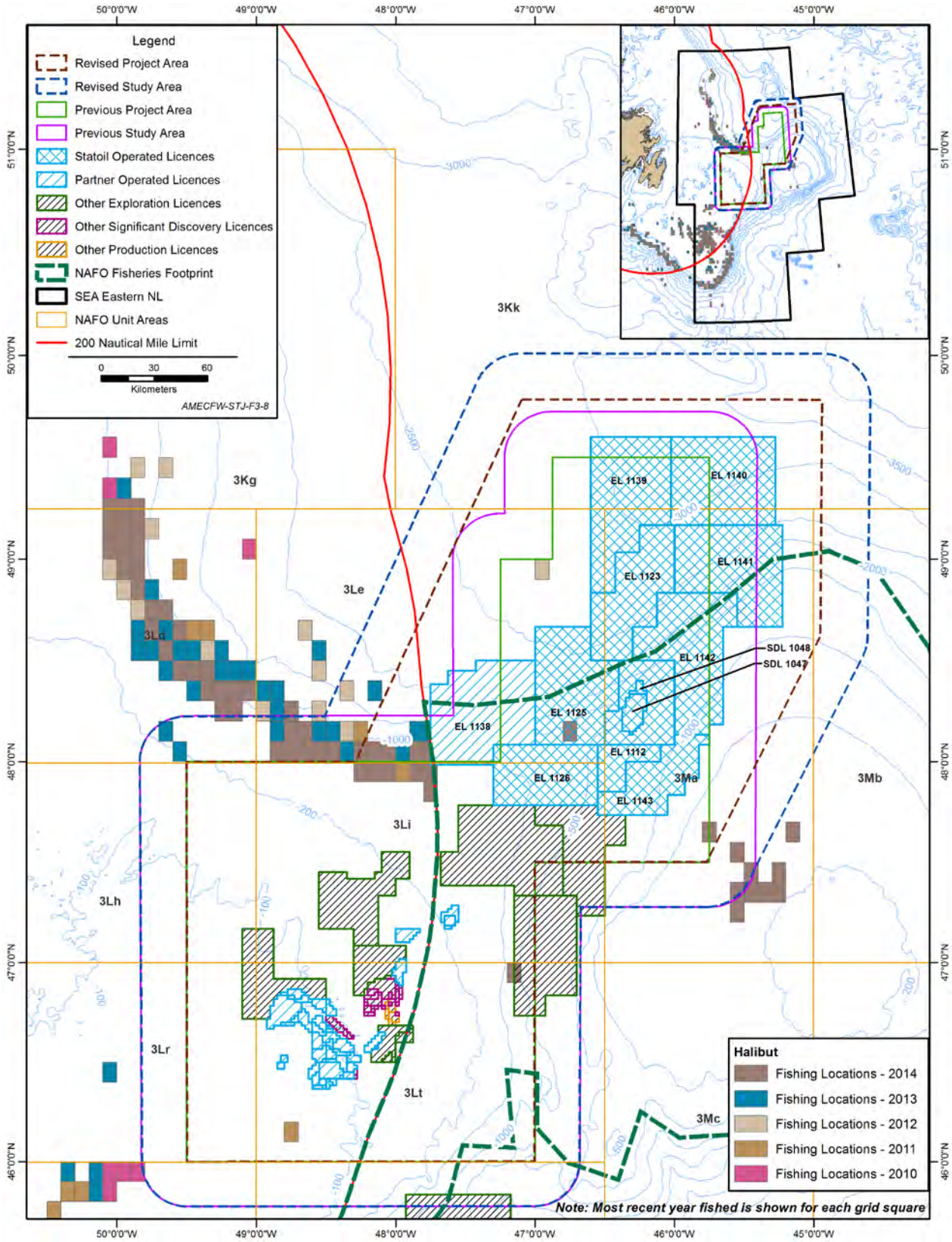

Figure 13: Commercial Fisheries Locations: Halibut (2010-2014)

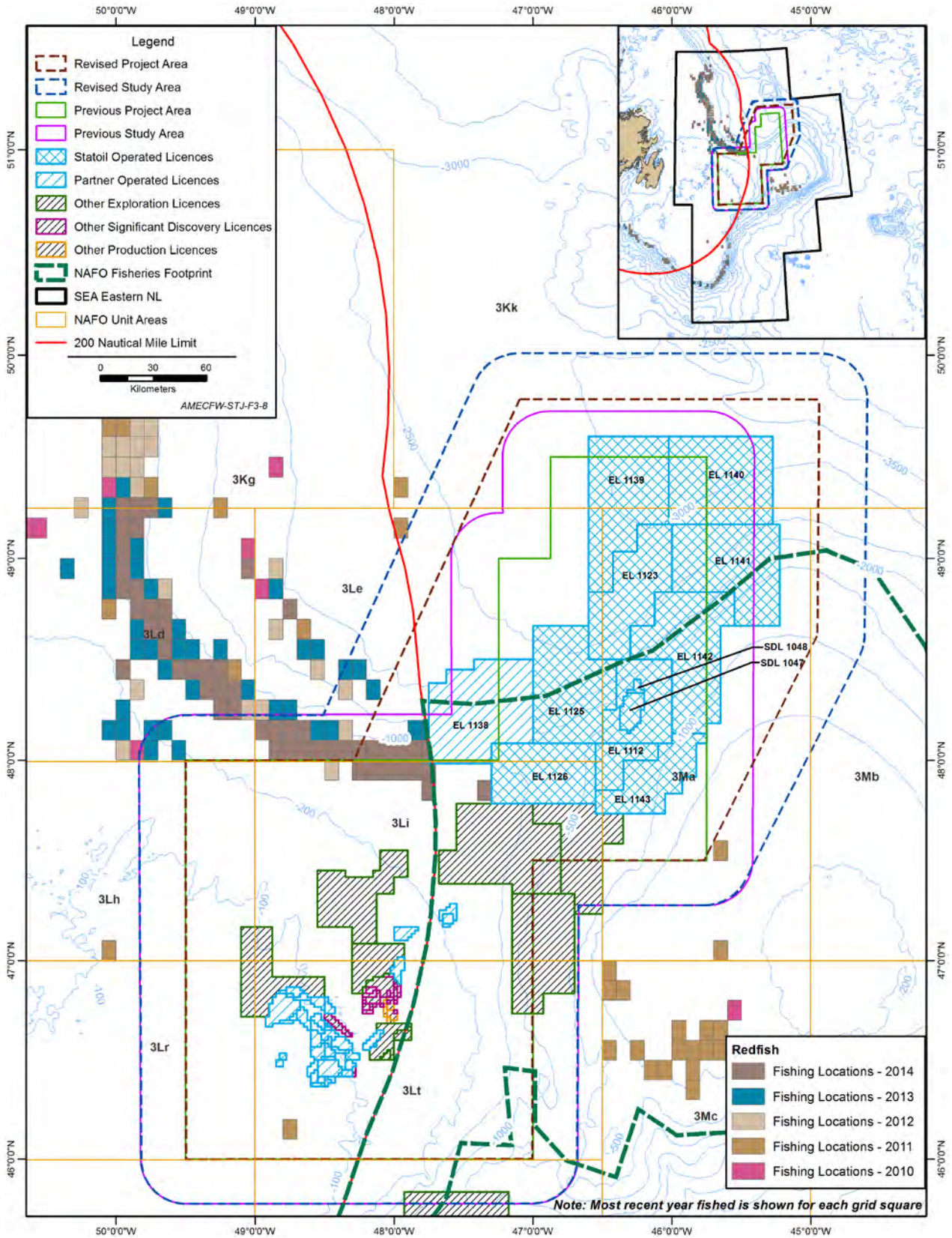

Figure 14: Commercial Fisheries Locations: Redfish (2010-2014)

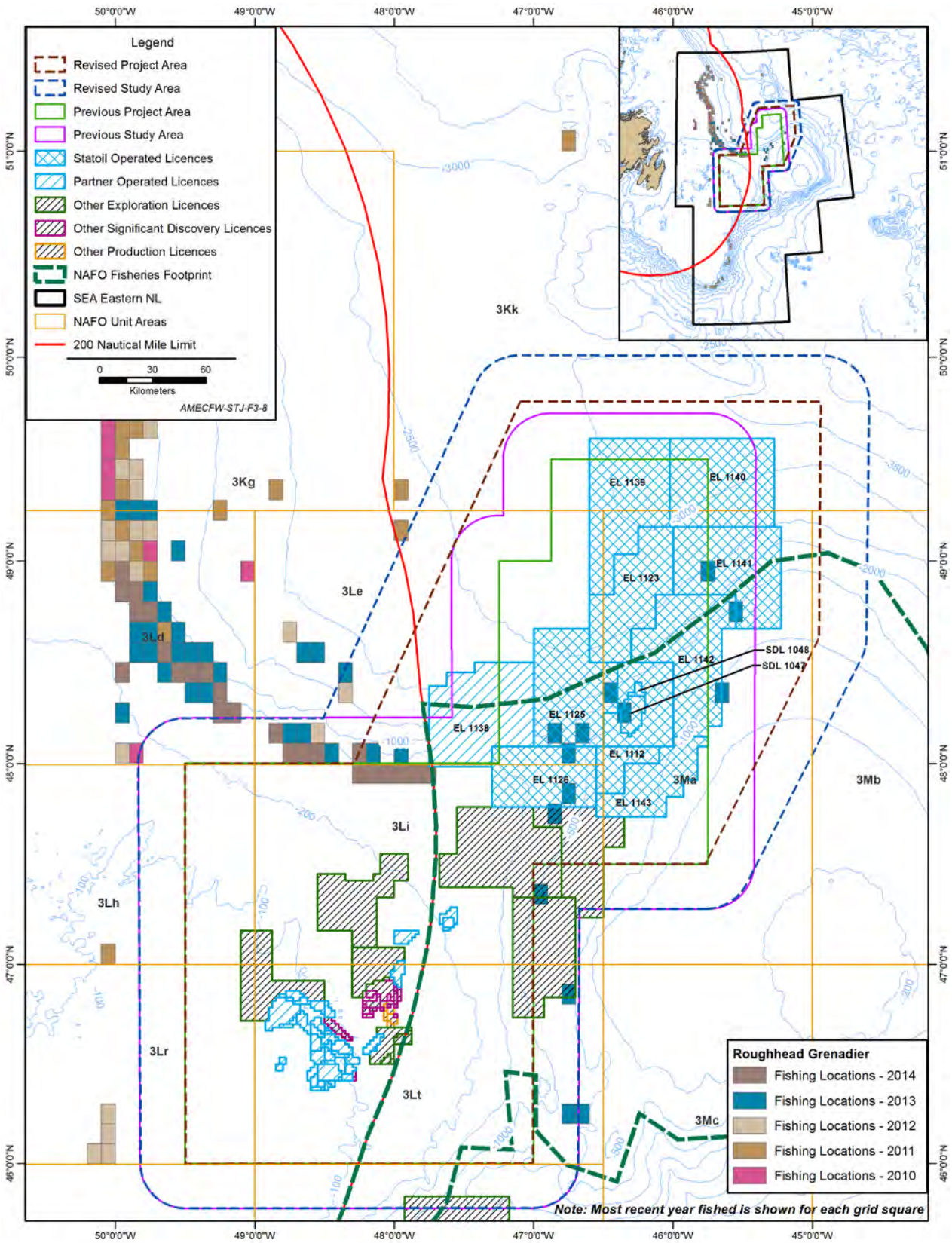

Figure 15: Commercial Fisheries Locations: Roughhead Grenadier (2010-2014)

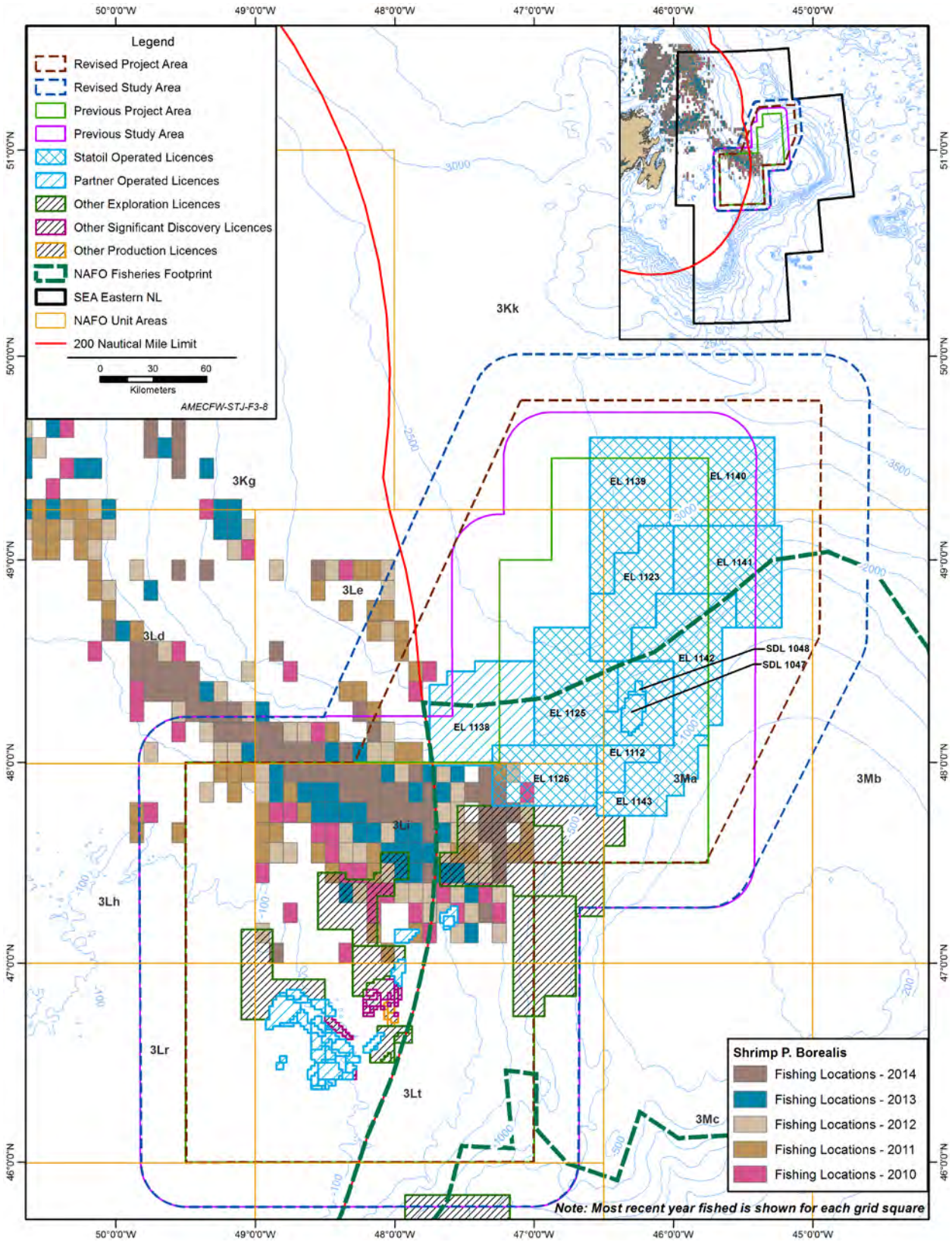

Figure 16: Commercial Fisheries Locations: *Pandalus borealis* Shrimp (2010-2014)

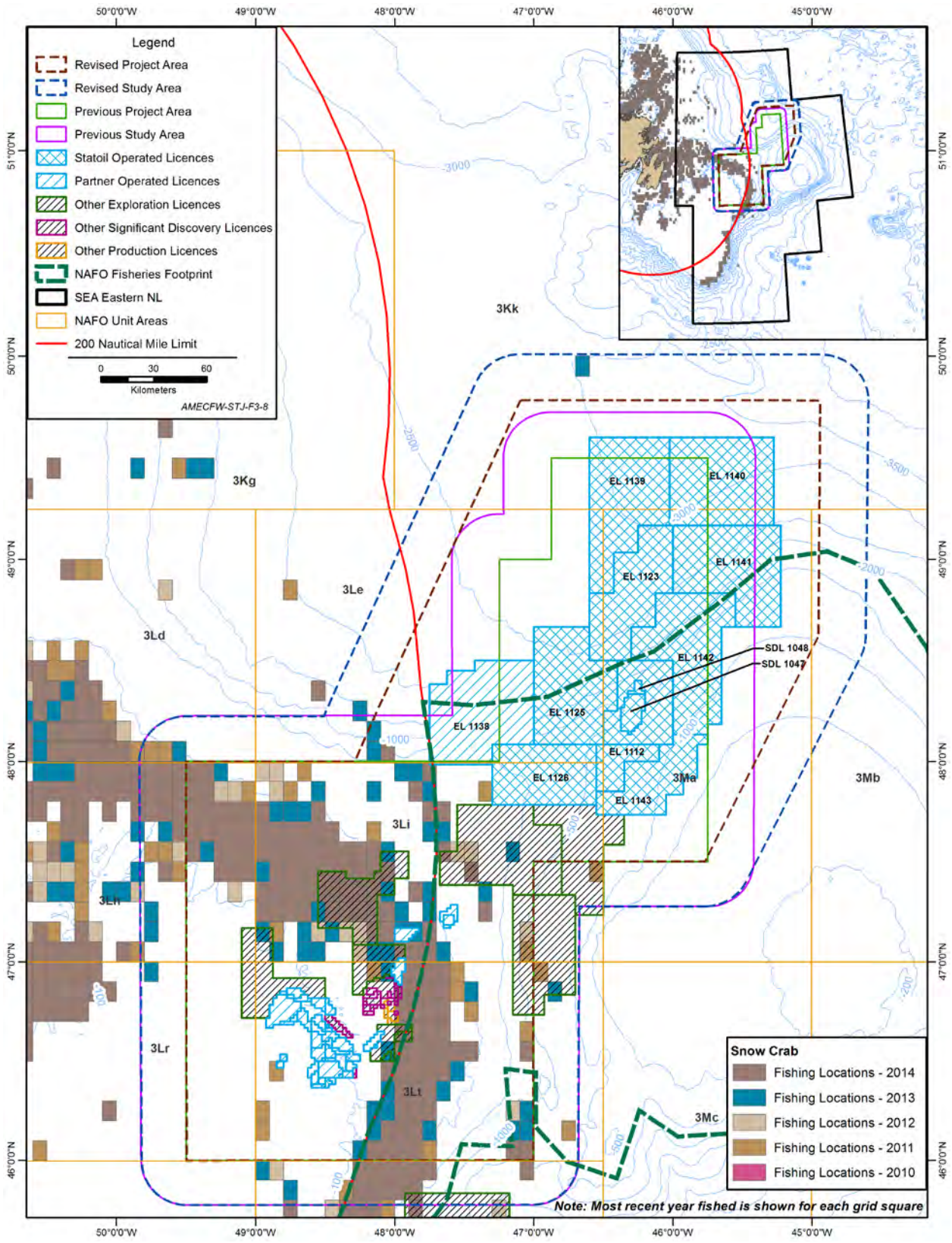

Figure 17: Commercial Fisheries Locations: Snow Crab (2010-2014)

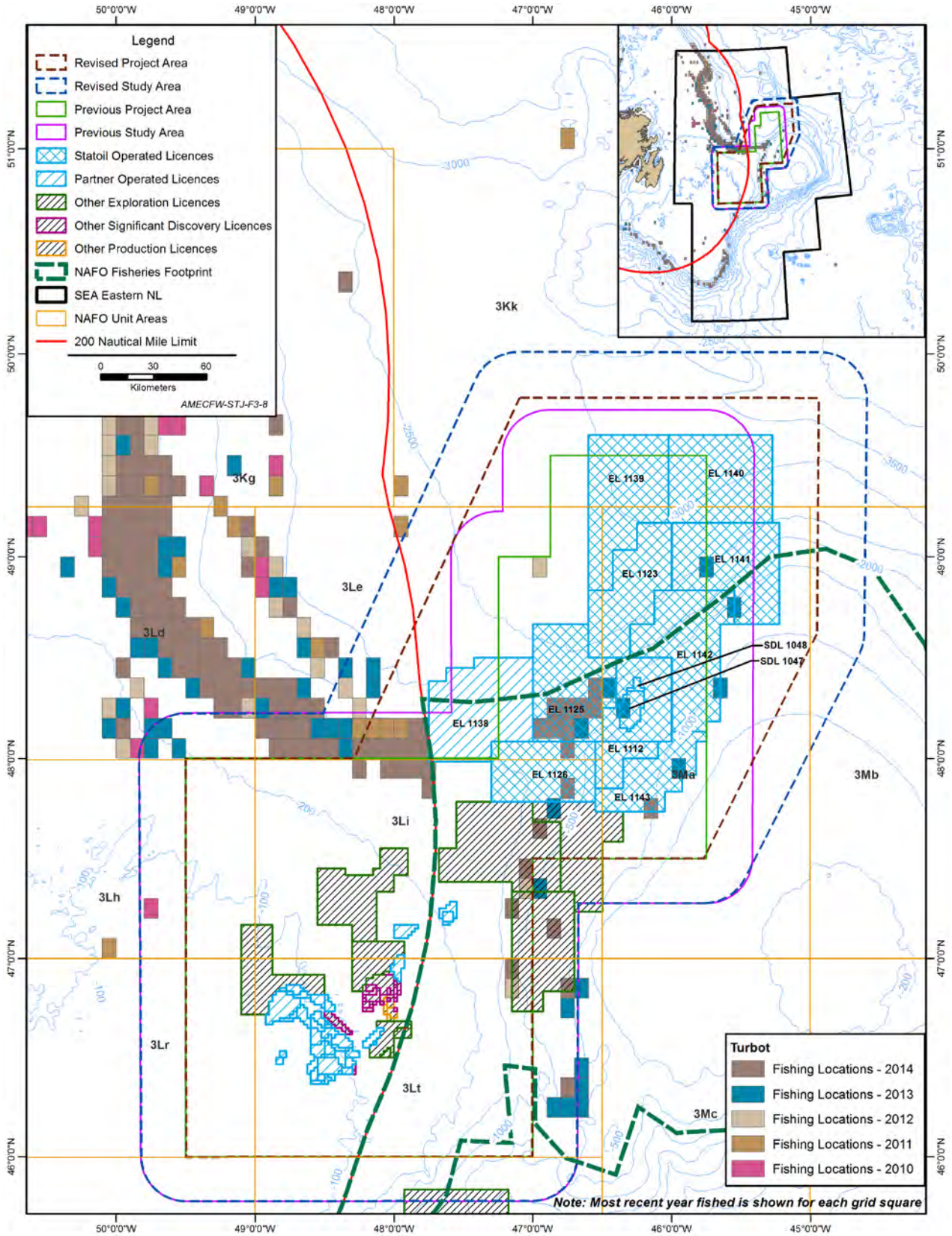

Figure 18: Commercial Fisheries Locations: Turbot (2010-2014)

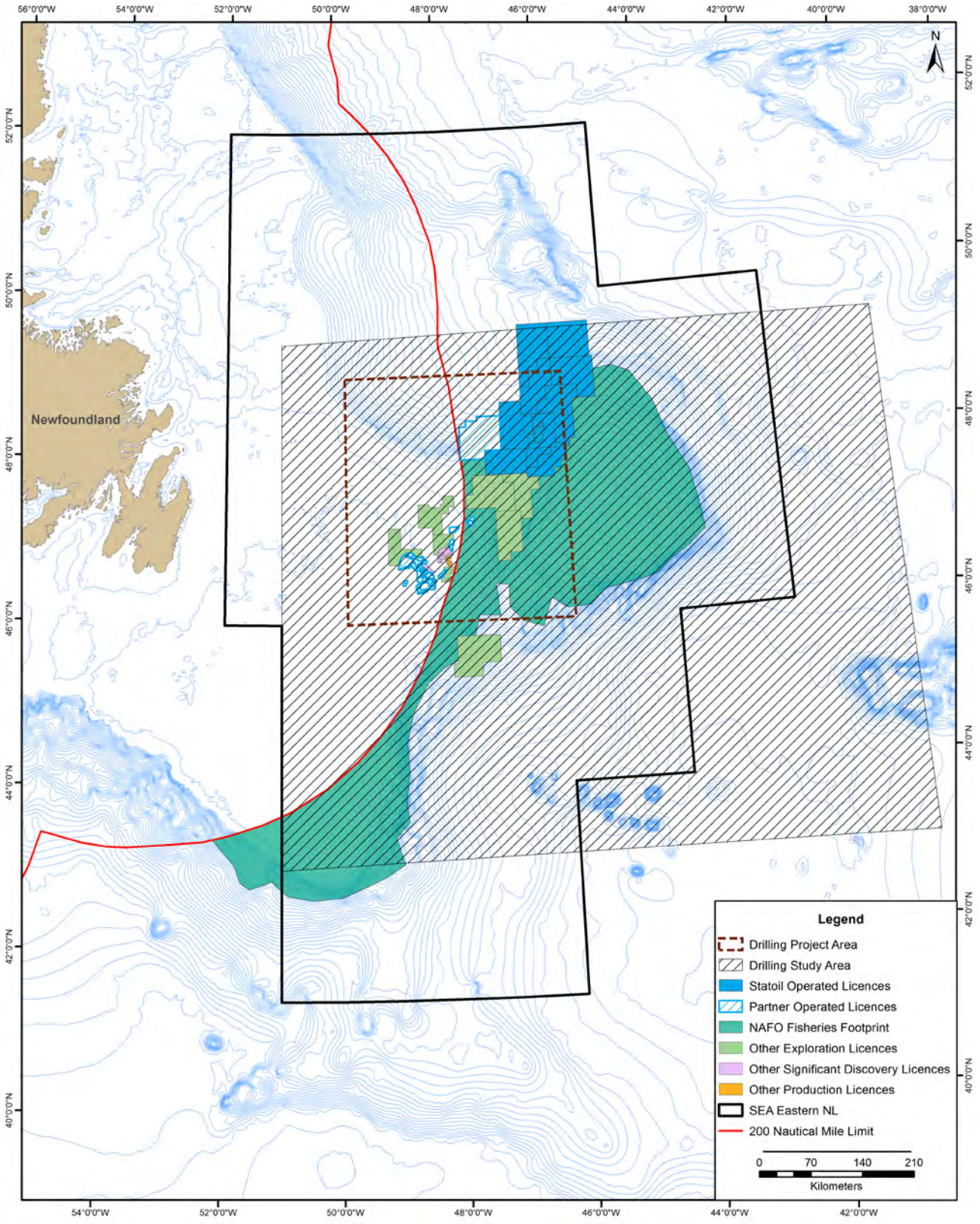

Figure 19: NAFO Fisheries "Footprint"

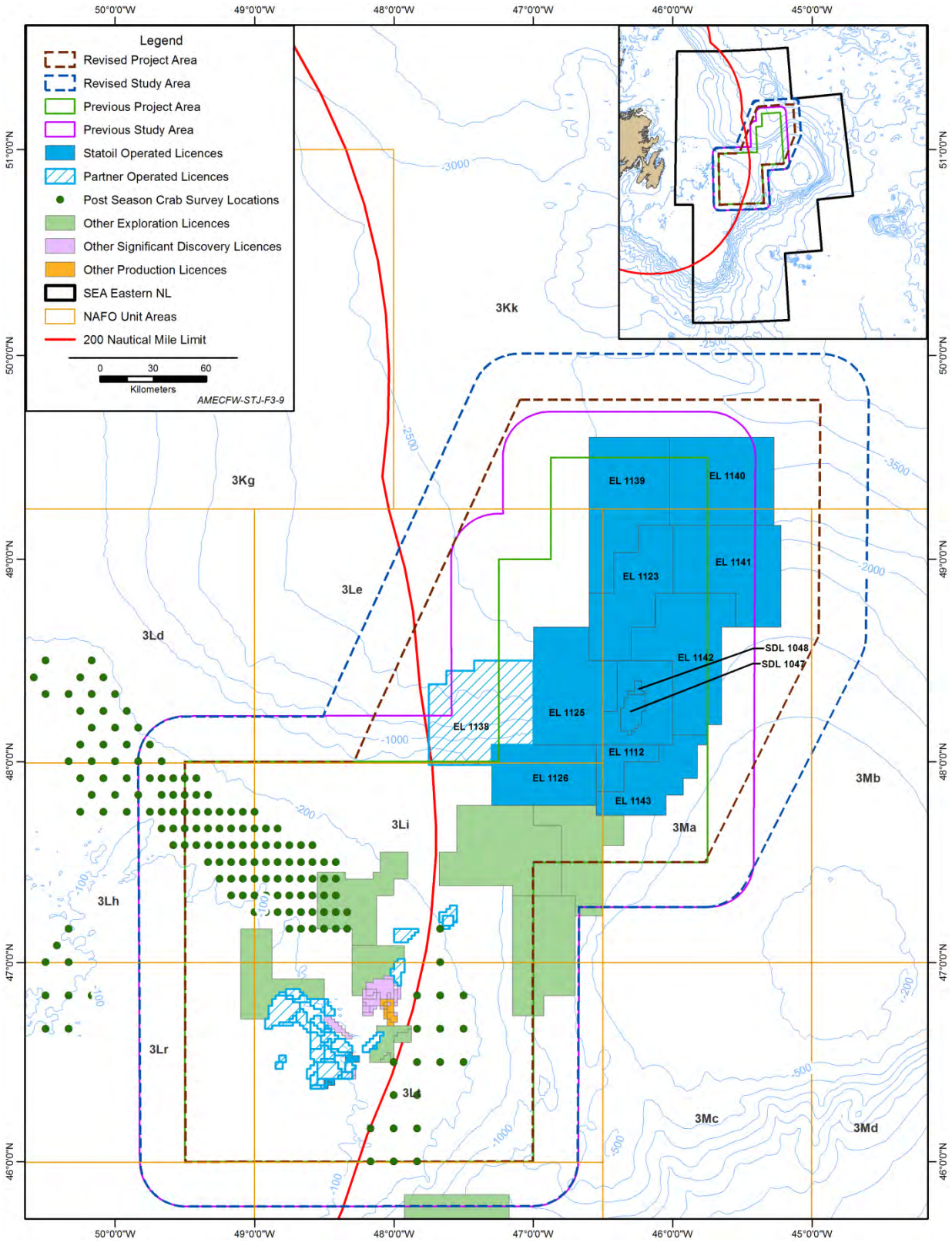

Figure 20: Location of Industry-DFO Collaborative Post-Season Snow Crab Survey Stations

App B Whale Sighting Maps

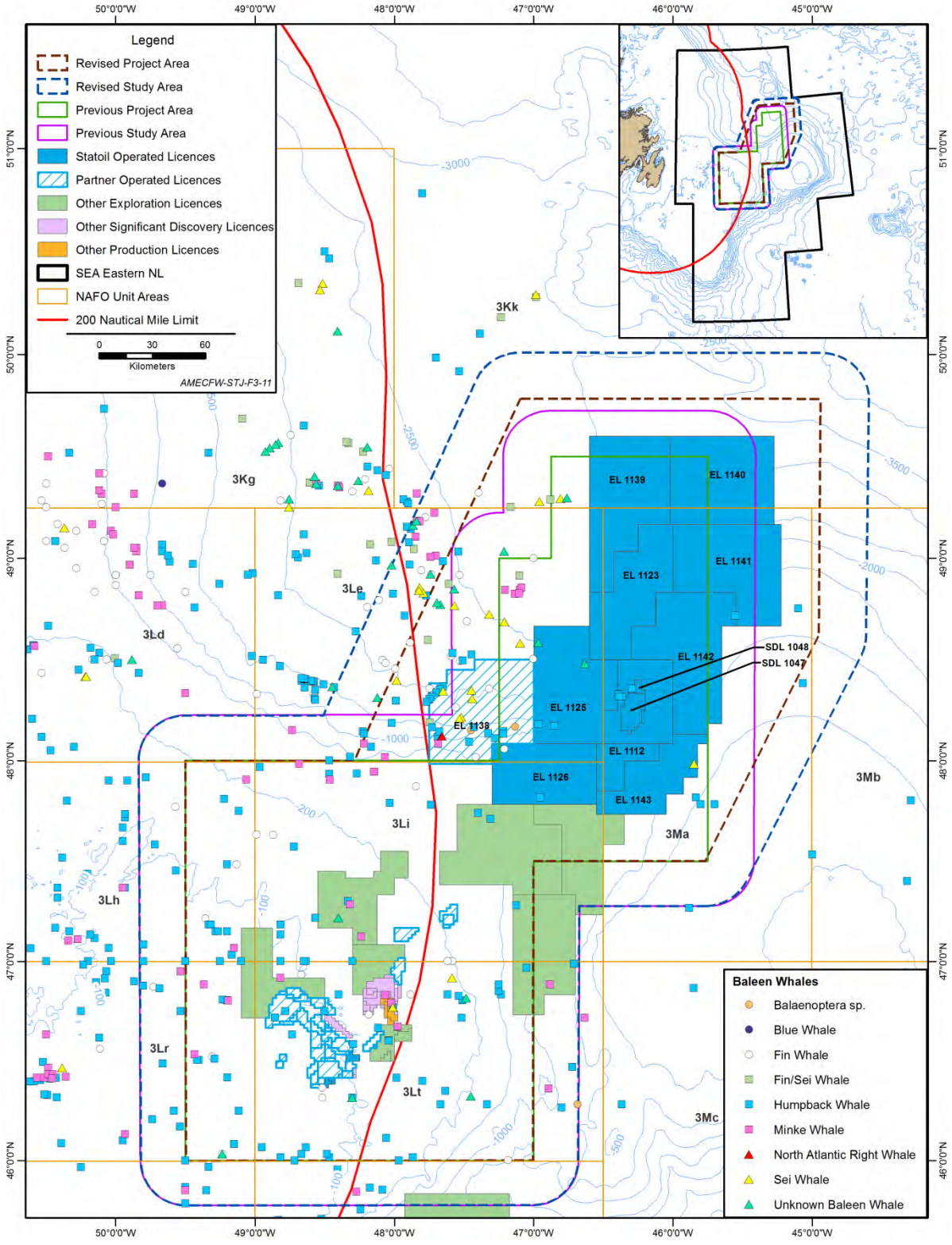

Figure 21: Baleen Whale Sightings off Eastern Newfoundland

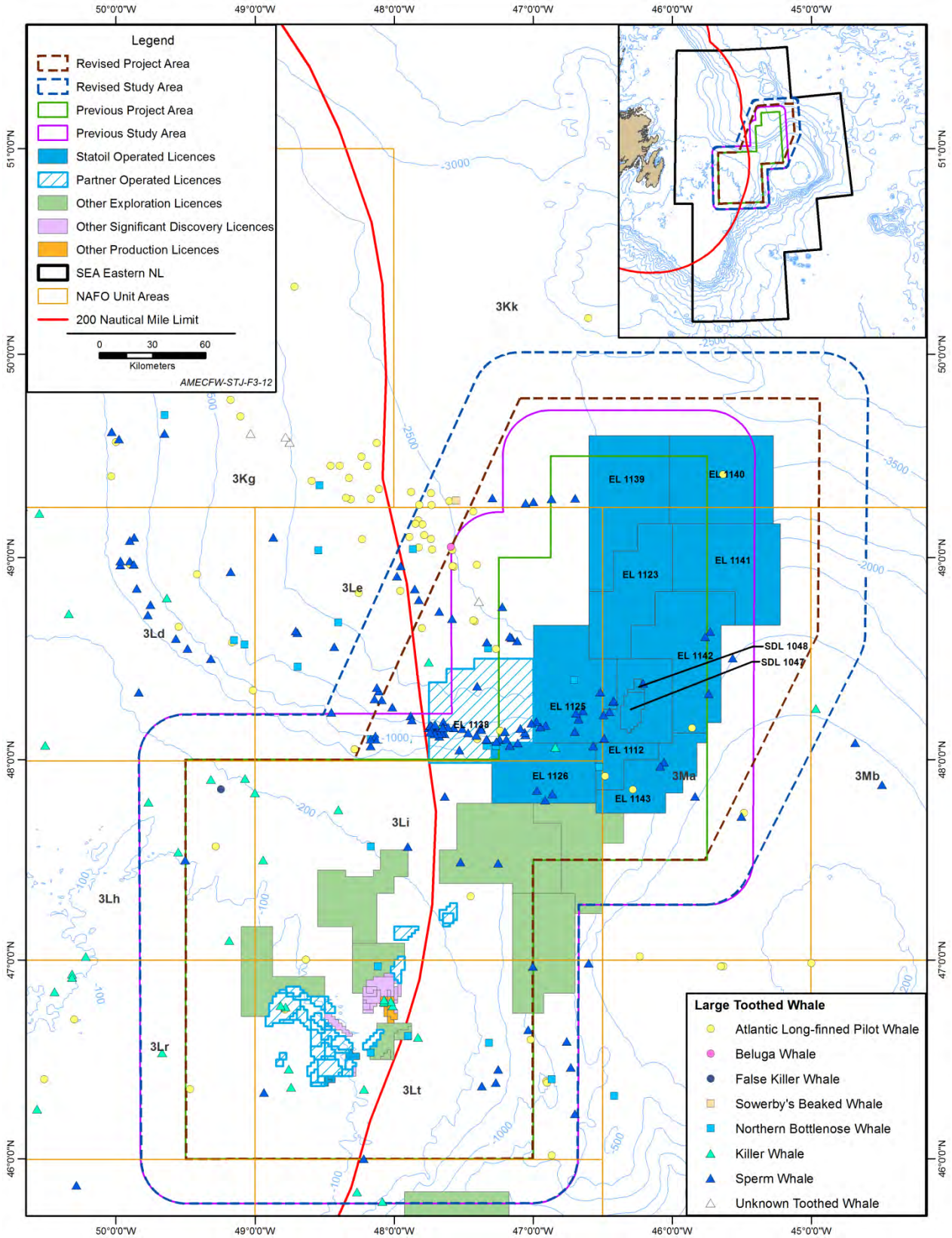

Figure 22: Large Toothed Whale Sightings off Eastern Newfoundland

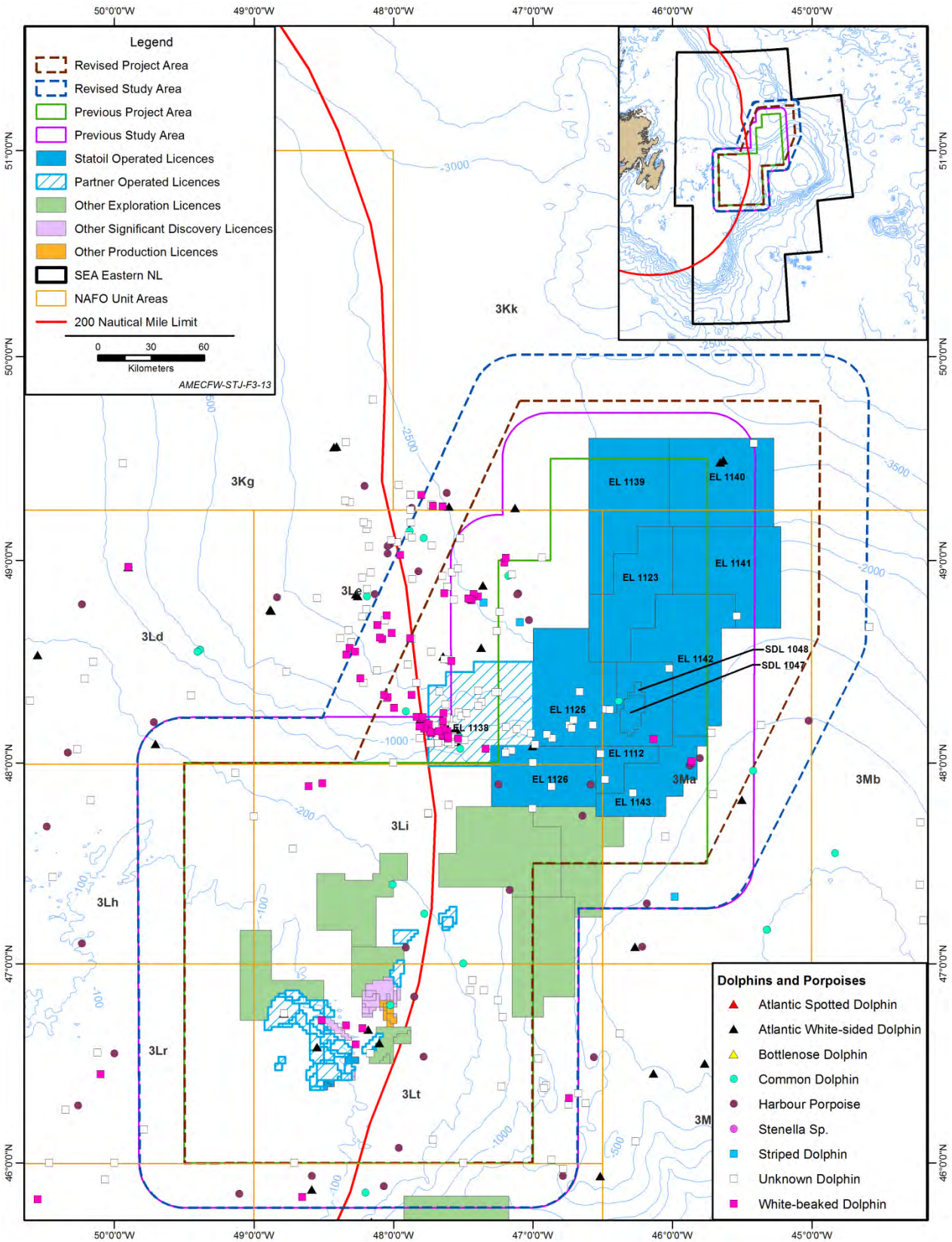

Figure 23: Dolphin and Porpoise Sightings off Eastern Newfoundland