

4.3 Socioeconomic Environment

The following sections provide an overview of the existing socioeconomic environment of the Study Area, including a number of anthropogenic components and activities that occur in the region and which may potentially interact with the proposed Project.

4.3.1 Marine Fisheries

Fisheries are an important and integral component of the socioeconomic environment of Newfoundland and Labrador and other parts of Canada, including the various communities and regions that extend along the coastline adjacent to the Study Area and elsewhere. The following sections give an overview of marine fisheries and related activities within and around the Study Area, with a key focus on commercial fisheries, as well as describing any aquaculture and Aboriginal and recreational fishing activity in or near the region.

4.3.1.1 Administrative Areas and Key Information Sources

There are several regulatory jurisdictions associated with marine fisheries within the Study Area. The Government of Canada has jurisdiction over fish stocks and fishing activities within a 200 nautical mile limit (the EEZ) and for benthic invertebrates across the continental shelf. Beyond that 200 mile limit, the North Atlantic Fisheries Organization (NAFO) manages groundfish and other resources and activities.

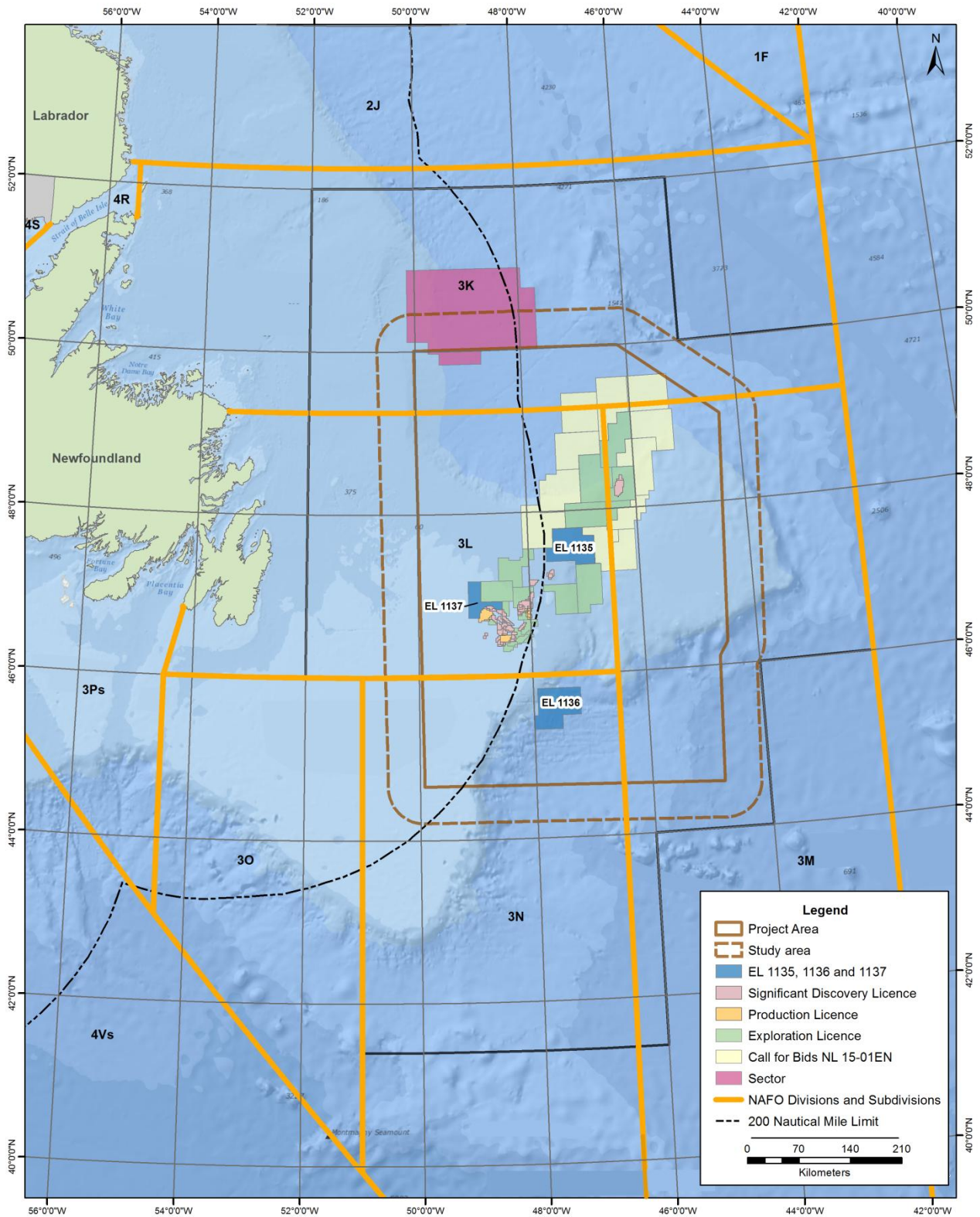
For administrative purposes, the Northwest Atlantic is divided into a series of NAFO Divisions, Subdivisions and Unit Areas (Figures 4.69 and 4.70), and although fish harvesting activities and fisheries management responsibilities do extend across these areas and their boundaries, they are generally used to regulate and manage fishing activity. The Study Area overlaps with a number of NAFO Divisions and Unit Areas, which are listed below, and are used in this section to describe fishing activity in and around the region:

- *NAFO Division 3k*: Unit Areas 3Kg and 3Kk
- *NAFO Division 3L*: Unit Areas 3Ld, 3Le, 3Lh, 3Li, 3Lr, 3Lt
- *NAFO Division 3M*: Unit Areas 3Ma, 3Mb, 3Mc, 3Md, 3Mm
- *NAFO Division 3N*: Unit Areas 3Na, 3Nb, 3Nc, 3Nd

Commercial fish landings (recorded weight and landed value) information for each of these NAFO Unit Areas is presented in the following sections for the years 2009 – 2013. These data were provided by Fisheries and Oceans Canada (DFO) Statistical Services in Ottawa, ON, as was geospatial information on the location and timing of fishing activity. The mapping information was provided by DFO as an aggregated data set which give a general indication of fishing areas (by species, gear types, fleet and other pre-determined categories and data classes) for a series of “cells” that are approximately 6 x 4 nautical miles in size that together comprise a map grid that covers the Study Area.

The DFO datasets record reported domestic and foreign fish harvests that are landed in Canada. It should also be noted that reporting of fishing information by NAFO Unit Areas in the DFO datasets used herein indicates the area in which fish is caught, rather than where it was landed.

Figure 4.69 NAFO Divisions and Subdivisions



4.3.1.2 Commercial Fisheries

The following sections include an overview of past and current commercial fishing activity in the Study Area (and particularly, for the NAFO Unit Areas described previously). This begins with a brief overview of past fisheries and the general evolution of fishing activity in the region in the past few decades. This is followed by a description of the current commercial fishery, as reflected in the available fisheries data sets covering the period 2009 – 2013, for which both annual and multi-year (cumulative) information is provided in the text, tables and figures that follow. Additional information on key fisheries (time, quota, gear, etc) by species is also provided.

Overview of Past Fisheries

In terms of key characteristics and developments in the region's fishery over the past two decades, the cod fishery was halted in 1992 by a moratorium in most areas of the east coast of Canada as fish stocks had reached dangerously low levels. This moratorium for cod and some other groundfish species fisheries is still substantially in place, although cod stocks have reportedly seen some improvement in certain locations, and small-scale directed fisheries do take place in some areas.

Notwithstanding the decline of traditional groundfish harvests and their dominant position in the province's fishing industry, the overall landed value of seafood products in Newfoundland and Labrador has, however, remained steady (and in fact, has increased somewhat) since the closures. Commercial fisheries have refocused on other species, such as snow crab and Northern shrimp (DFO 2013d). The landed value of snow crab in Newfoundland and Labrador, for example, has increased from \$13 million in 1992 to nearly \$253 million in 2014 (DFO 2014d). The landed value of Northern shrimp has increased from \$230 million in 1997 to \$350 million in 2005 (DFO 2010e). However, the Northern shrimp fishery has been recently experiencing a downward trend (\$230 million in 2014, DFO 2014d) which could possibly be a result of the fisheries closure in Division 3M in 2010.

For the period of 2004 to 2013, fishing activity shows an overall declining trend from 134 active vessels in 2004 to 64 vessels in 2013 (within NAFO Regulatory Areas), which accounts for a 53 percent decline (NAFO 2013). Groundfish fishery accounted for 94% of the total fishing effort, shrimp for four percent and pelagic redfish fishery accounted for around two percent. In addition, there was a decrease of 71 percent in overall fishing days from 2004 to 2013 (16,480 days in 2004 to 4,779 days in 2013). The average vessel in 2013 operated for 75 days as opposed to 123 days in 2004. The trend indicating that revenues have increased over the years with an associated decrease in total effort shows that species of higher value are being targeted with fewer boats required to do so. Over the decades, modifications to fishing gear types and technologies could also be a factor in the reduction of fishing effort while still experiencing increased revenues.

Commercial Fish Harvests (Weight and Value)

The 2013 commercial fish harvest (which includes both finfish and shellfish) within the Study Area (namely, all of the NAFO Unit Areas referenced above) totalled approximately 27,000 tonnes and had a landed value of almost \$88.2 million. Fish landings in that area over the past five years, 2009 to 2013 were at their lowest quantities in 2012 and 2013, peaked at nearly 39,000 tonnes in 2009, and totalled almost 158,000 tonnes over the entire period from 2009 to 2013. The landed value of fish harvested in the region during that period ranged from approximately \$70.3 million (in 2010) to over \$100.7 million (in 2011) and totalled almost \$408.5 million over the 2009 – 2013 period.

Table 4.22 Fish Harvests by Weight and Value (2009-2013, All Study Area NAFO Unit Areas)

Year	Weight (kg)	Value (\$)
2009	38,450,458	71,809,735
2010	35,560,925	70,256,608
2011	33,715,105	100,778,977
2012	22,522,287	77,447,067
2013	27,183,399	88,194,827
Total	157,432,174	408,487,214
Average	31,486,435	81,697,443

Figure 4.71 Fish Harvests by Weight (2009-2013, All Species, All Study Area NAFO Unit Areas)

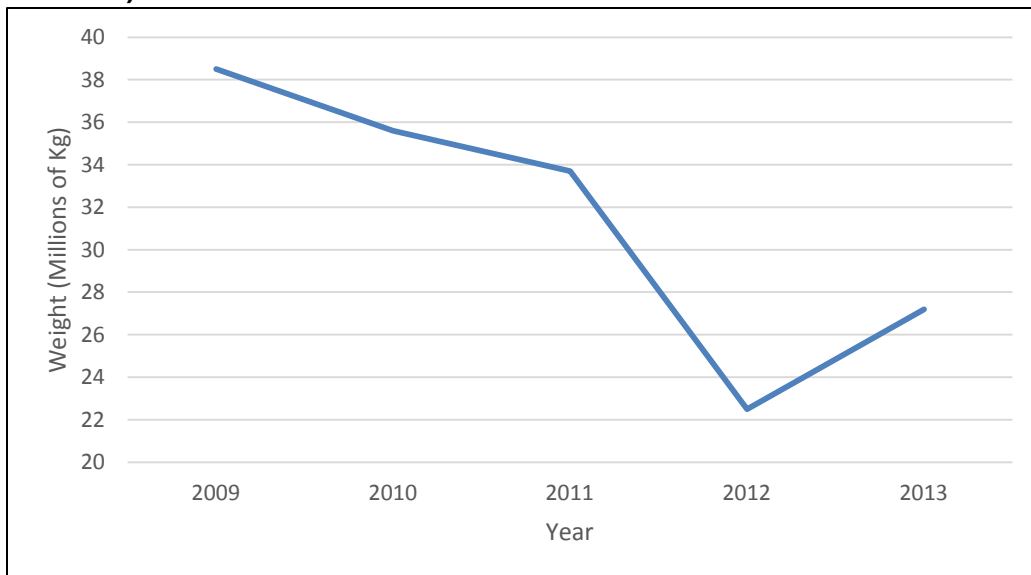


Figure 4.72 Fish Harvests by Value (2009-2013, All Species, All Study Area NAFO Unit Areas)

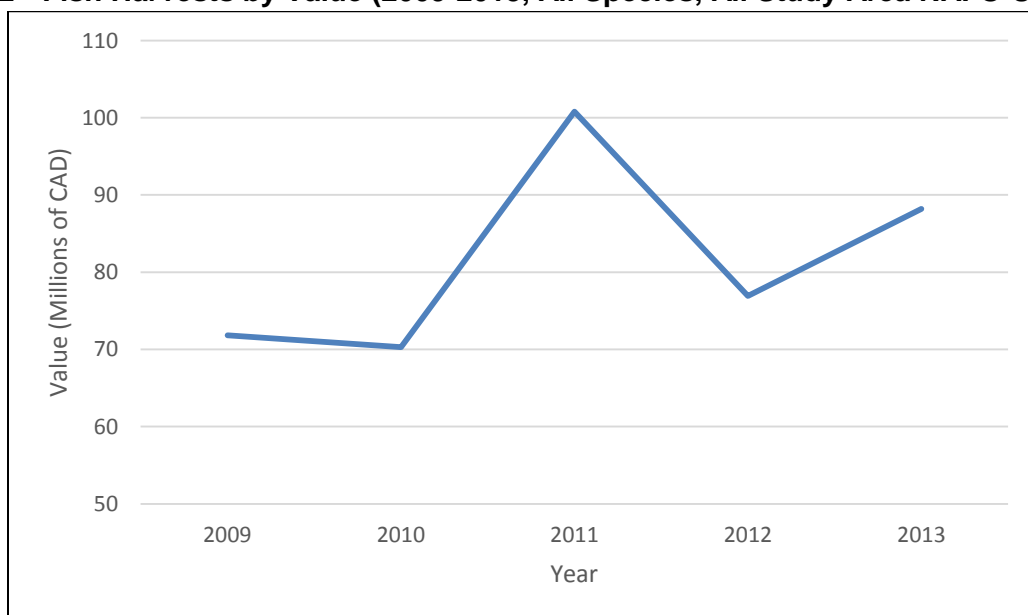


Table 4.23 Fish Harvests (all Species) by Weight and Value by NAFO Unit Area (2013 and 2009-2013)

Unit Area	2013 Weight	2013 Value	Average Weight 2009-2013	Average Value 2009-2013	% Weight	% Value
3Kg	1,572,079	3,556,063.34	3,074,998	8,229,332.75	5.8	4.0
3Kk	851	3,688.22	12,655	9,182.20	0.003	0.004
3Ld	5,143,872	17,013,476.94	3,910,231	10,747,894.70	18.9	19.3
3Le	1,495,969	3,405,340.60	1,042,787	1,963,531.69	5.5	3.9
3Lh	2,912,302	12,622,201.36	2,972,228	11,685,466.65	10.7	14.3
3Li	3,631,087	15,180,906.33	10,015,016	22,474,993.74	13.4	17.2
3Lr	763,543	3,049,566.16	695,044	2,161,781.66	2.8	3.5
3Lt	2,120,981	9,243,715.32	2,011,089	7,893,022.69	7.8	10.5
3Ma	13,062	76,983.93	3,281	16,144.13	0.05	0.09
3Mb	0	0	100	110.06	0	0
3Mc	0	0	39,618	47,658.33	0	0
3Md	0	0	3,219	3,423.51	0	0
3Mm	0	0	1,436	5,594.08	0	0
3Na	3,126,054	5,104,973.25	2,214,657	2,271,327.56	11.5	5.8
3Nb	1,681,834	7,304,975.38	1,530,144	5,388,482.00	6.2	8.3
3Nc	2,337,955	4,792,786.61	1,625,490	2,079,027.25	8.6	5.4
3Nd	2,383,810	6,840,149.27	2,334,504	6,607,866.83	8.8	7.8
Total	27,183,399	88,194,826.71	31,486,498	81,584,839	100	100

Commercial Fish Harvests (Overall Geographic Distribution: 2009-2013)

The following Figures provide a general indication of the overall geographic distribution of commercial fishing activity within and adjacent to the Study Area for the May to December period. This includes, initially, data for the year 2013 and then from 2009 to 2013 overall (rolled-up), for all species.

As indicated previously, the information provided in these maps is based on the geospatial data received from DFO, and shows the general presence of recorded fishing activity for a series of 6 x 4 nautical mile “cells” that together comprise a map grid that covers the region. For the multi-year fishing maps, where fishing activity occurred within a single cell in two or more years, the Figure indicates only the most recent year in which fishing activity occurred within that cell (i.e. the later year’s data overlays that from earlier years).

Further information on commercial fishing activity by month / season, gear type, fleet, species and other parameters is also provided in later sections.

Figure 4.73 Commercial Fishing Locations, All Species: 2013 (May to November)

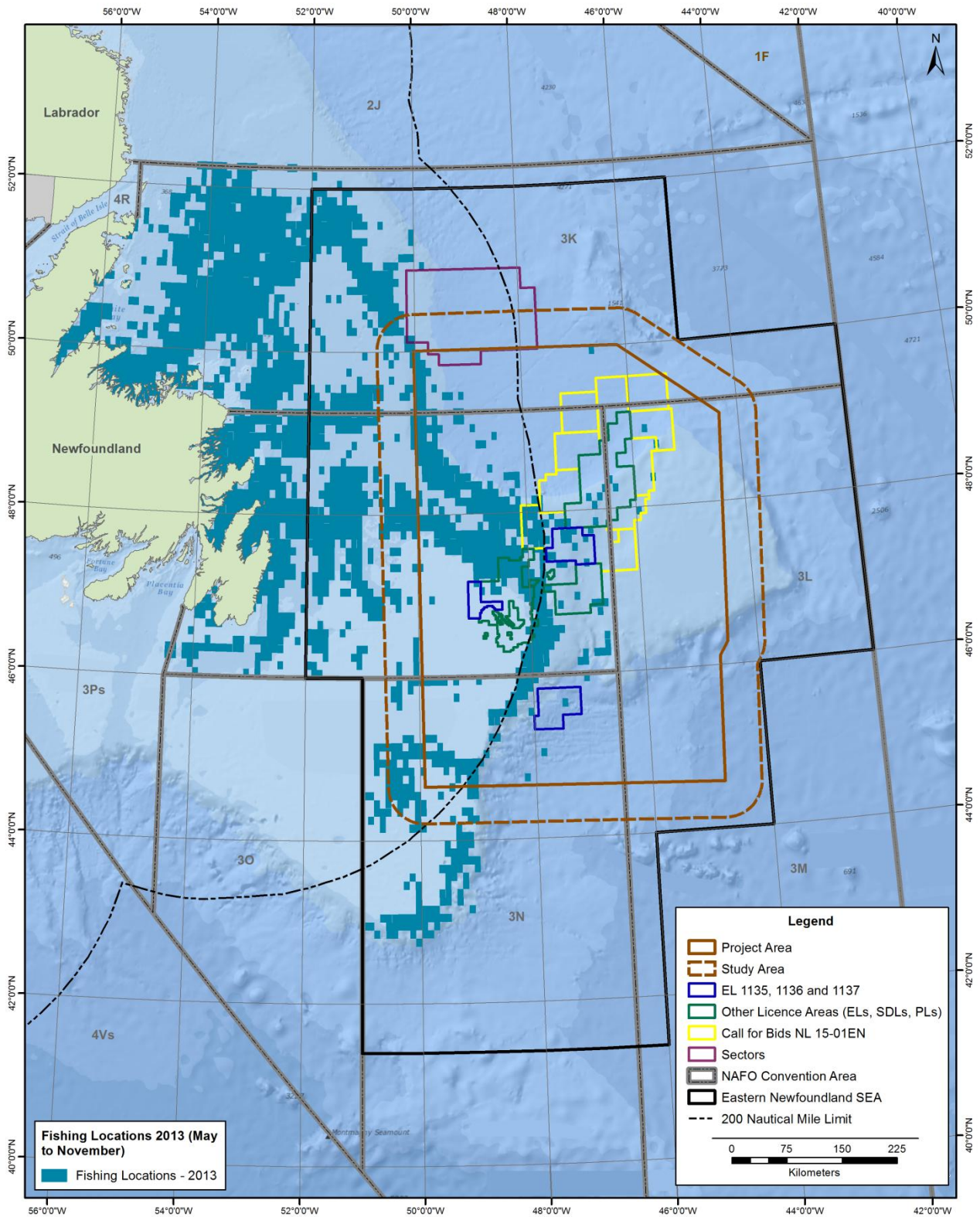
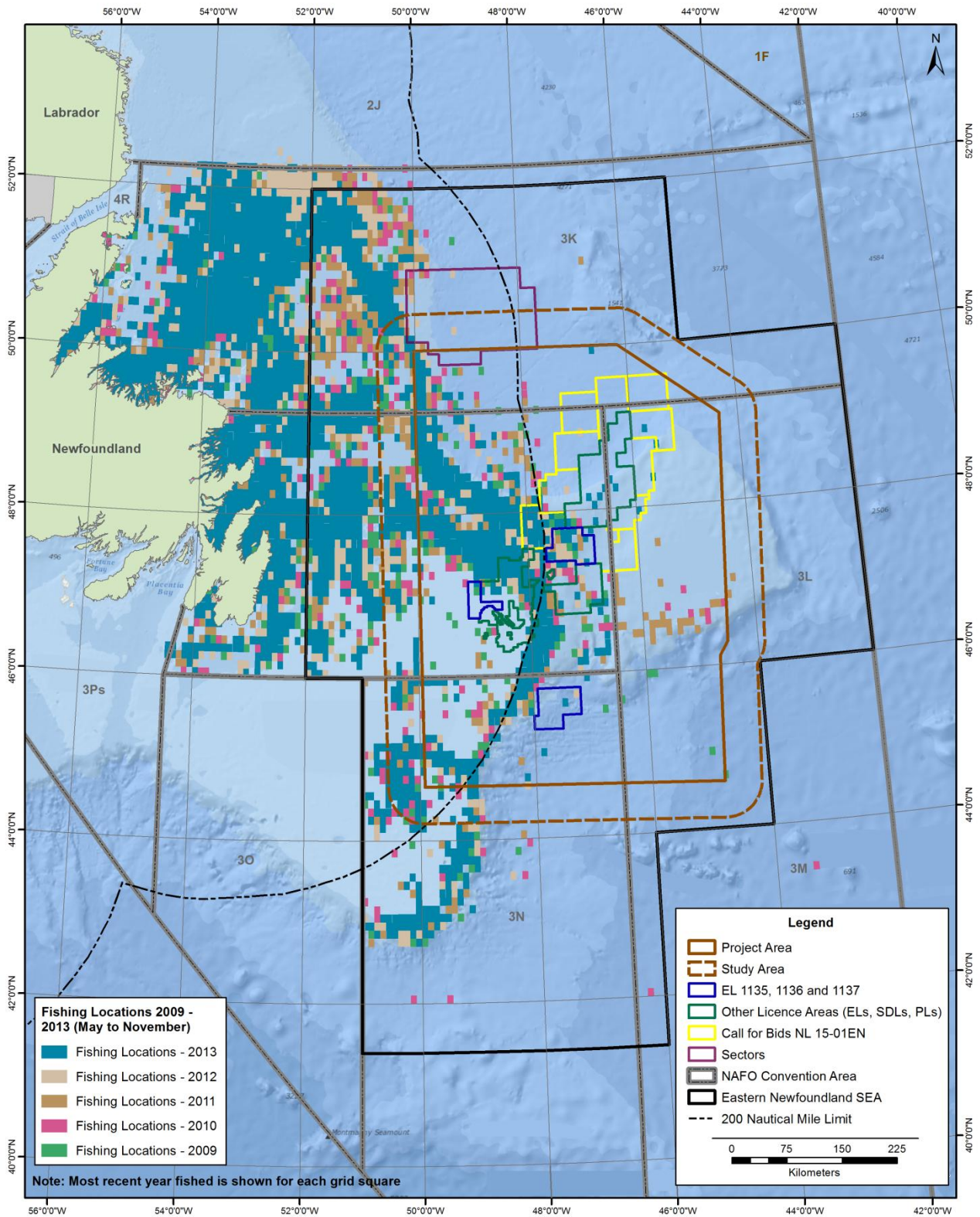


Figure 4.74 Commercial Fishing Locations, All Species: 2009-2013 (May to November)



Commercial Fish Harvests by Species

Over recent years, the Study Area's fishery has been strongly dominated by queen / snow crab, in terms of both landed weight and value (Figures 4.75 and 4.76). This is well reflected in the DFO fish landings statistics for the most recent year available (2013), as summarized below.

Queen / snow crab comprised approximately 47 percent of the total fish landings by weight in this region in that year, followed by yellowtail flounder (19 percent), Redfish (10 percent), turbot (9 percent) and Northern shrimp (also referred herein as *Pandalus borealis* shrimp, seven percent), with no other species accounting for greater than five percent of total landings by weight (Figure 4.75). Shrimp harvesting has been closed in 2015 for areas south of 49°15' N (SFA 7).

In terms of landed value (Figure 4.76), queen / snow crab accounted for over half (63 percent) of the area's fishery overall, followed by turbot and yellowtail flounder (eleven and ten percent, respectively), and other species.

Figures 4.77 and 4.78 show the annual (2009-2013) landed weights and values for those fish species that comprised the highest proportion of the area's fishery over that five-year period.

Figure 4.75 Fish Harvests by Weight by Species (2013, All Study Area NAFO Unit Areas)

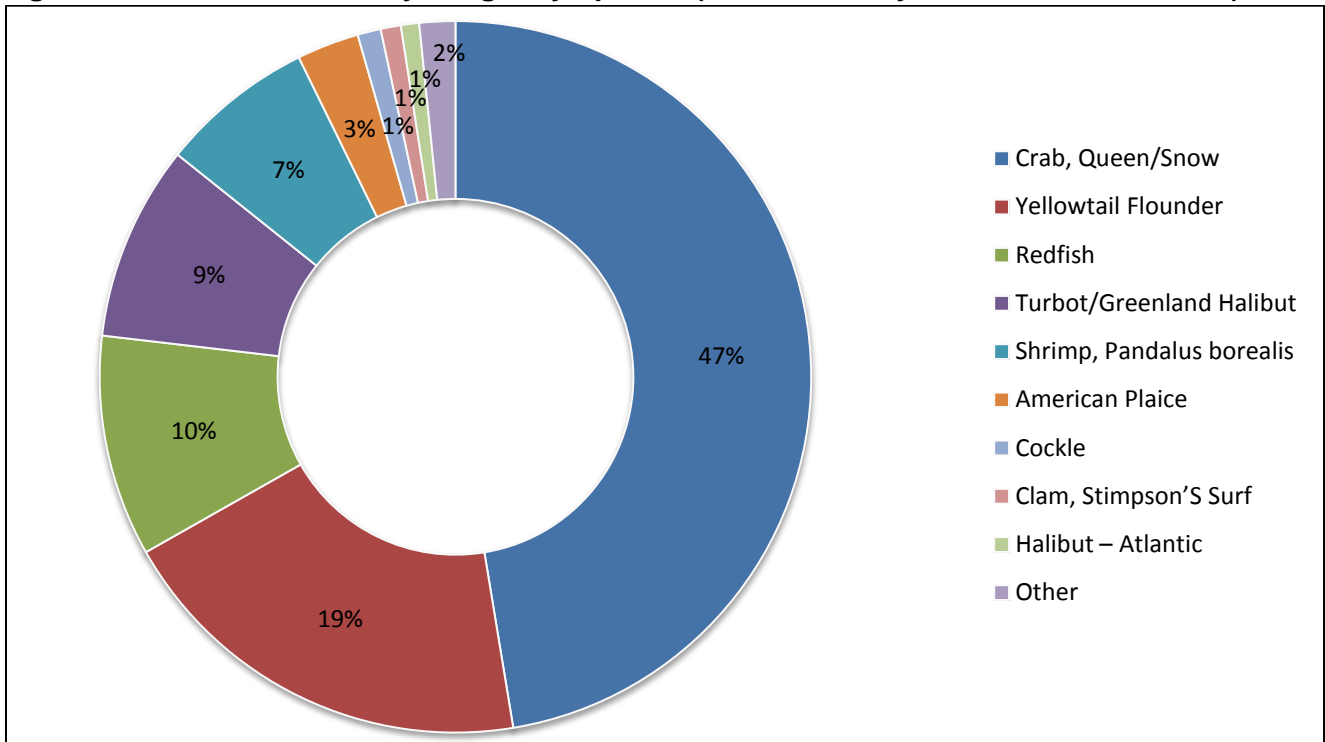


Figure 4.76 Fish Harvests by Value by Species (2013, All Study Area NAFO Unit Areas)

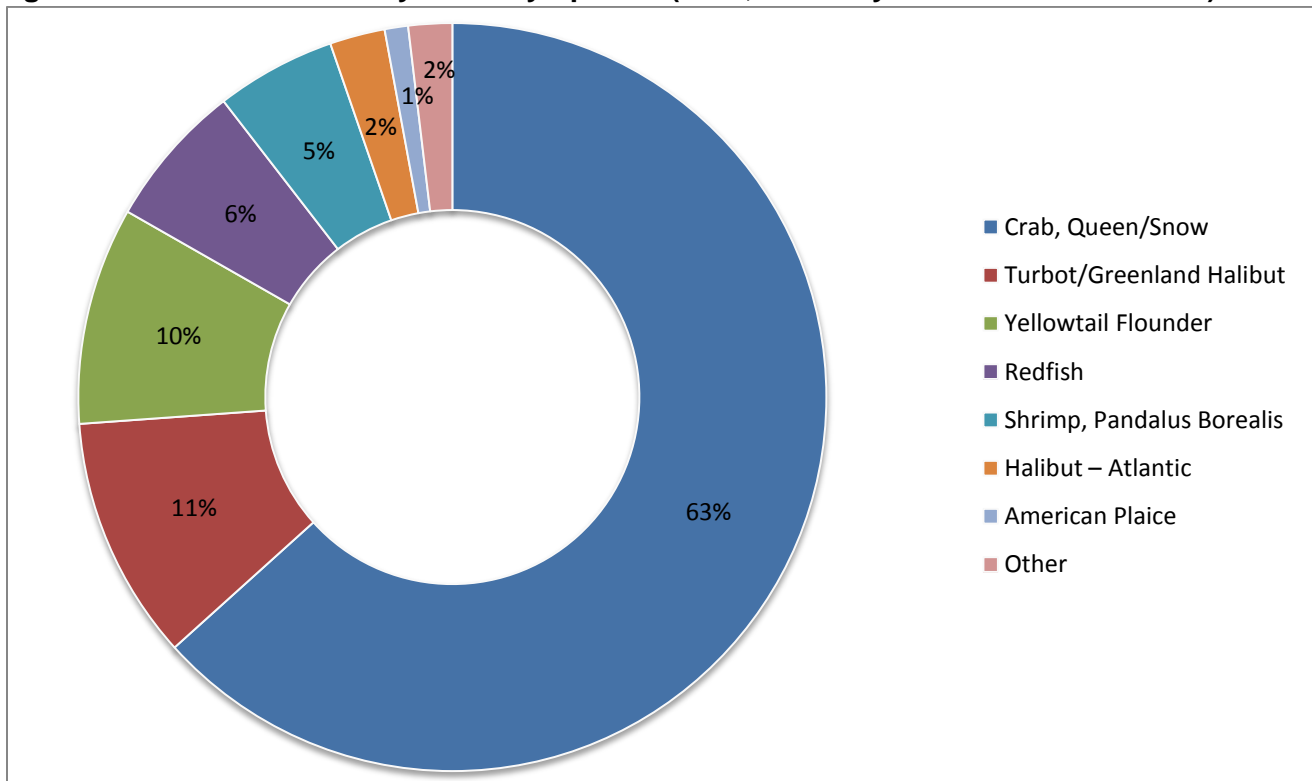


Figure 4.77 Fish Harvests by Weight for Key Species (2009-2013)

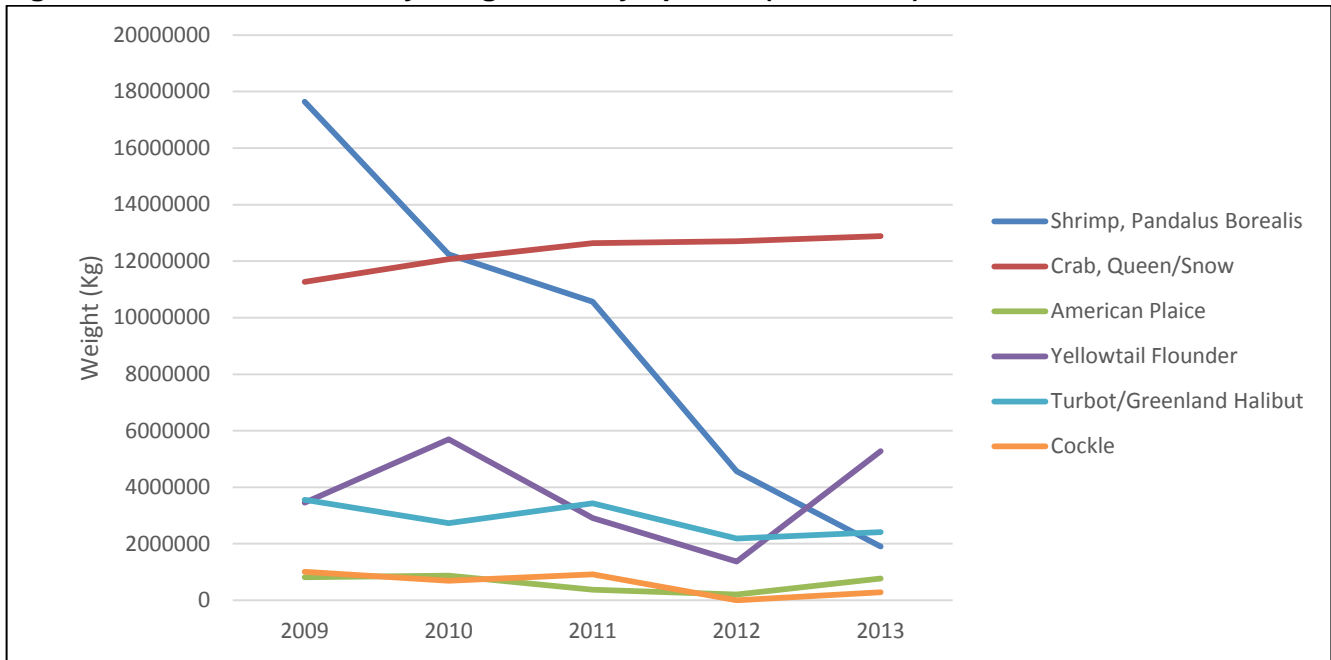


Figure 4.78 Fish Harvests by Value for Key Species (2009-2013)

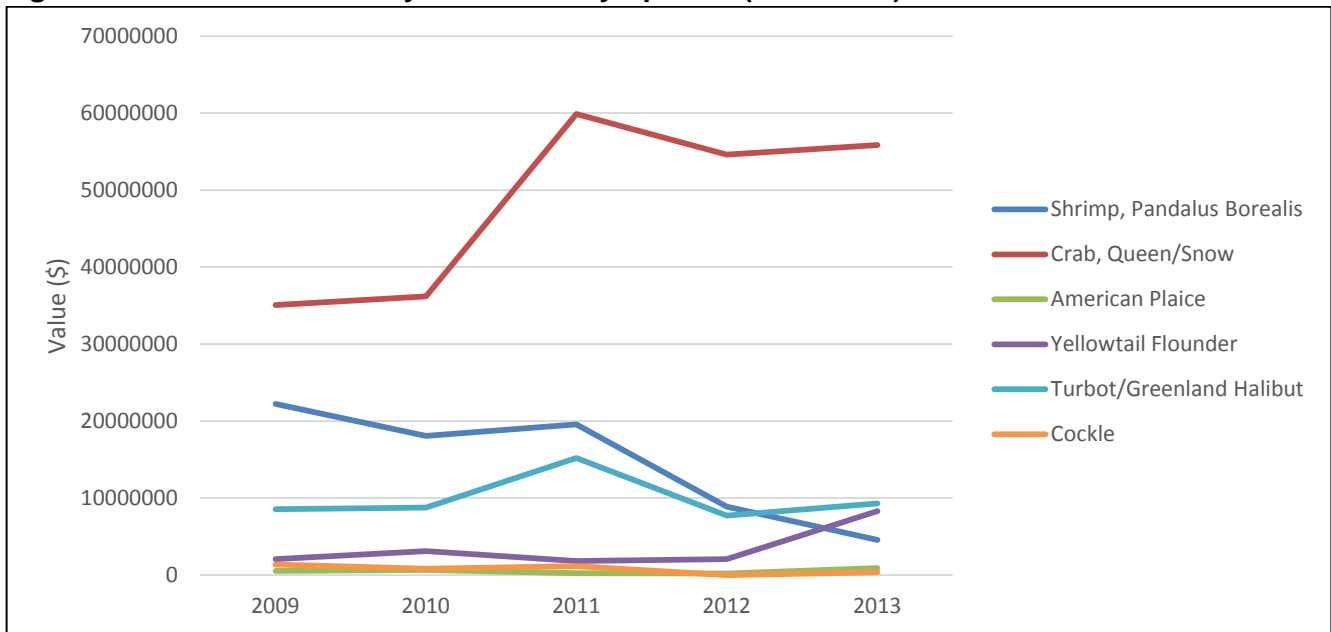


Table 4.24 Fish Harvests by Species by Weight and Value (2009-2013, All Study Area NAFO Unit Areas)

Species (by Year, 2009-2013)	Weight (kg)	Value (\$)
2009	38,450,458	71,809,735
American Plaice	815,546	527,114
Clam, Stimpson's Surf	126,663	228,610
Clam, Stimpson's Surf, Mantle	39,172	172,754
Cockle	1,006,459	1,359,599
Cod, Atlantic	26,951	28,540
Crab, Queen/Snow	11,268,995	35,059,227
Grenadier, Rough-Head	11,041	7,267
Greyscale/Witch	43,974	38,079
Halibut, Atlantic	31,215	221,034
Heads, Groundfish	319,808	1,233,840
Redfish	26,759	19,630
Shrimp, <i>Pandalus borealis</i>	17,641,741	22,214,238
Turbot/Greenland Halibut	3,560,375	8,567,241
Yellowtail Flounder	3,455,366	2,079,143
Other	76,393	53,419
2010	35,560,925	70,256,608
American Plaice	875,583	640,296
Clam, Stimpson's Surf	287,038	440,925
Clam, Stimpson's Surf, Mantle	1,981	7,429
Cockle	687,442	818,693
Cod, Atlantic	76,612	77,971
Crab, Queen/Snow	12,068,060	36,185,104
Grenadier, Rough-Head	34,959	22,321
Greyscale/Witch	124,176	88,343
Halibut, Atlantic	64,150	518,715
Heads, Groundfish	388,414	1,333,575
Redfish	149,366	97,752
Shrimp, <i>Pandalus borealis</i>	12,239,396	18,080,249
Turbot/Greenland Halibut	2,727,828	8,773,718
Yellowtail Flounder	5,697,276	3,105,969
Other	139,644	65,548
2011	33,715,105	100,778,977
American Plaice	371,831	252,620
Clam, Stimpson's Surf	75,831	123,697
Clam, Stimpson's Surf, Mantle	2,757	10,981
Cockle	919,777	1,163,182
Cod, Atlantic	235,312	272,091
Crab, Queen/Snow	12,637,553	59,901,224
Grenadier, Rough-Head	103,321	30,456

Species (by Year, 2009-2013)	Weight (kg)	Value (\$)
Greyscale/Witch	104,968	92,285
Halibut, Atlantic	34,091	273,996
Heads, Groundfish	274,240	1,061,471
Redfish	2,000,232	961,962
Shrimp, <i>Pandalus borealis</i>	10,567,738	19,552,141
Turbot/Greenland Halibut	3,427,959	15,211,640
Yellowtail Flounder	2,915,361	1,836,399
Other	44,134	34,832
2012	22,522,287	77,447,067
American Plaice	210,360	202,991
Clam, Stimpson's Surf	0	0
Clam, Stimpson's Surf, Mantle	0	0
Cockle	0	0
Cod, Atlantic	21,326	29,666
Crab, Queen/Snow	12,704,500	54,616,948
Grenadier, Rough-Head	19,559	5,314
Greyscale/Witch	21,281	31,535
Halibut, Atlantic	126,405	1,092,990
Heads, Groundfish	263,512	1,005,031
Redfish	926,018	1,725,251
Shrimp, <i>Pandalus borealis</i>	4,565,846	8,905,139
Turbot/Greenland Halibut	2,186,197	7,725,102
Yellowtail Flounder	1,370,388	2,063,048
Other	106,895	44,052
2013	27,183,399	88,194,827
American Plaice	768,005	893,147
Clam, Stimpson's Surf	249,515	417,419
Clam, Stimpson's Surf, Mantle	6,344	26,006
Cockle	287,182	372,967
Cod, Atlantic	98,801	188,404
Crab, Queen/Snow	12,885,185	55,848,098
Grenadier, Rough-Head	10,032	1,481
Greyscale/Witch	106,592	160,339
Halibut, Atlantic	225,257	2,105,268
Heads, Groundfish	109,054	454,366
Redfish	2,733,139	5,530,185
Shrimp, <i>Pandalus borealis</i>	1,905,063	4,572,497
Turbot/Greenland Halibut	2,414,945	9,289,446
Yellowtail Flounder	5,272,463	8,288,927
Other	111,822	49,276
Total (2009-2013)	157,432,174	408,487,214

Overview of Key Species Fisheries

The preceding provides an overview of recent (2009-2013) fisheries for species with the various NAFO Unit Areas that overlap with the Study Area for this EA, which covers portions of NAFO Divisions 3KLMN. In some cases, these include important species that currently dominate the commercial fishery (key species) in the offshore areas that comprise the Study Area (such as crab, flounder, halibut, redfish, turbot, shrimp and plaice). In some cases, certain species are fished primarily in more inshore locations or to a lesser degree within these NAFO Unit Areas and would, therefore, not be considered key species in the context of this EA.

In general, species targeted within the Study Area were very consistent across years with only few “other” species adding to the total fishery. The weight and value for all those species combined were so small compared to the key species, as a result, they were represented in the table above as a combined value for logistical and reviewing purposes. Although not an exhaustive list, species included in the “other” category consist of species like: Atlantic cod, cockle, mackerel, Stimpson’s surf clam, greyscale, grenadier, capelin, haddock, white hake etc. The total weight and value of these species combine make up a total of four and three percent, respectively of the total catch within the Study Area for 2013.

Summary information for key fisheries that take place within the Study Area is provided below for the species of greatest commercial importance (by weight or value) and for other, select fisheries in the region.

Figure 4.79 Fishing Locations –Snow Crab (May - November, 2009-2013)

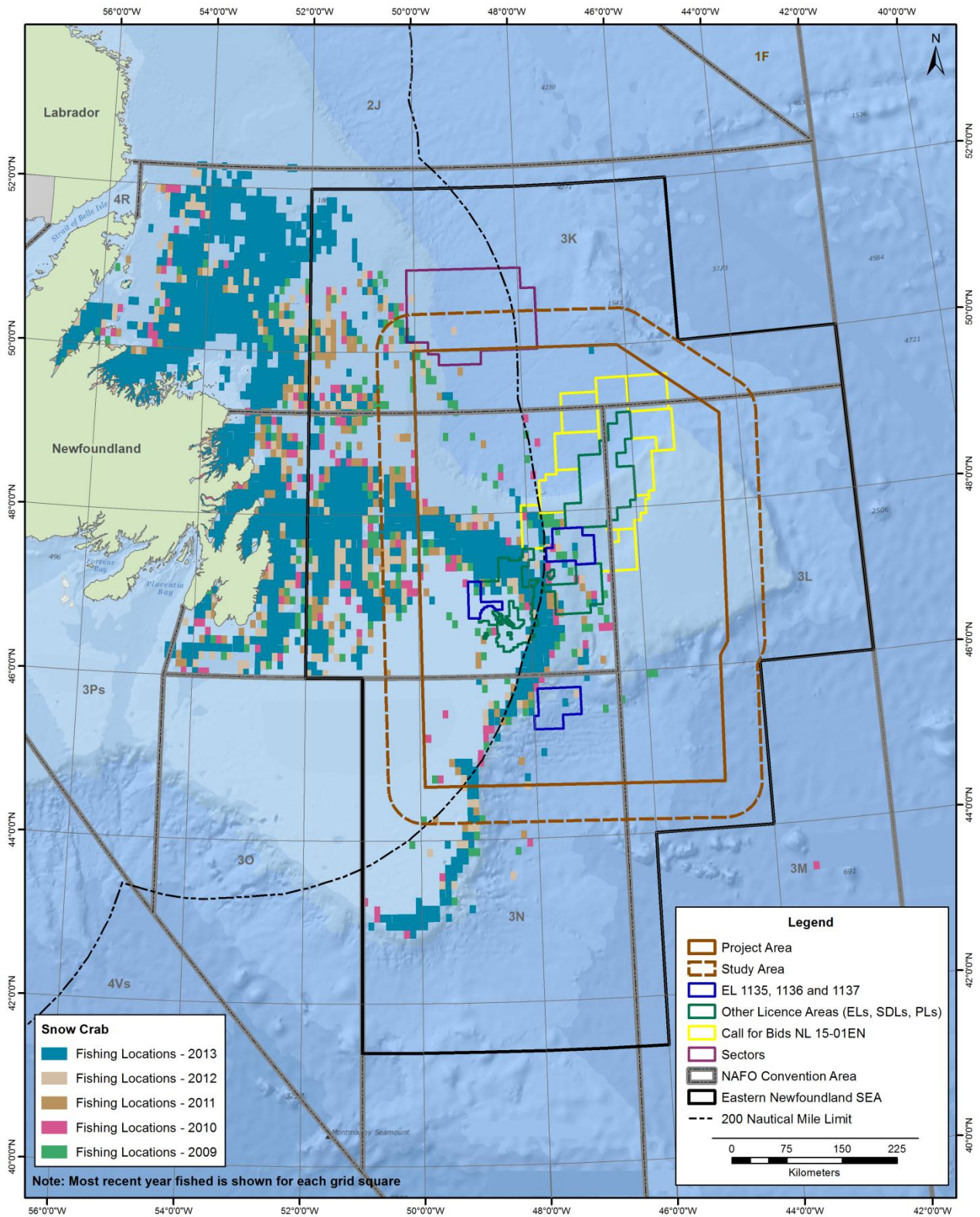


Figure 4.80 Fishing Locations – Yellowtail Flounder (May - November, 2009-2013)

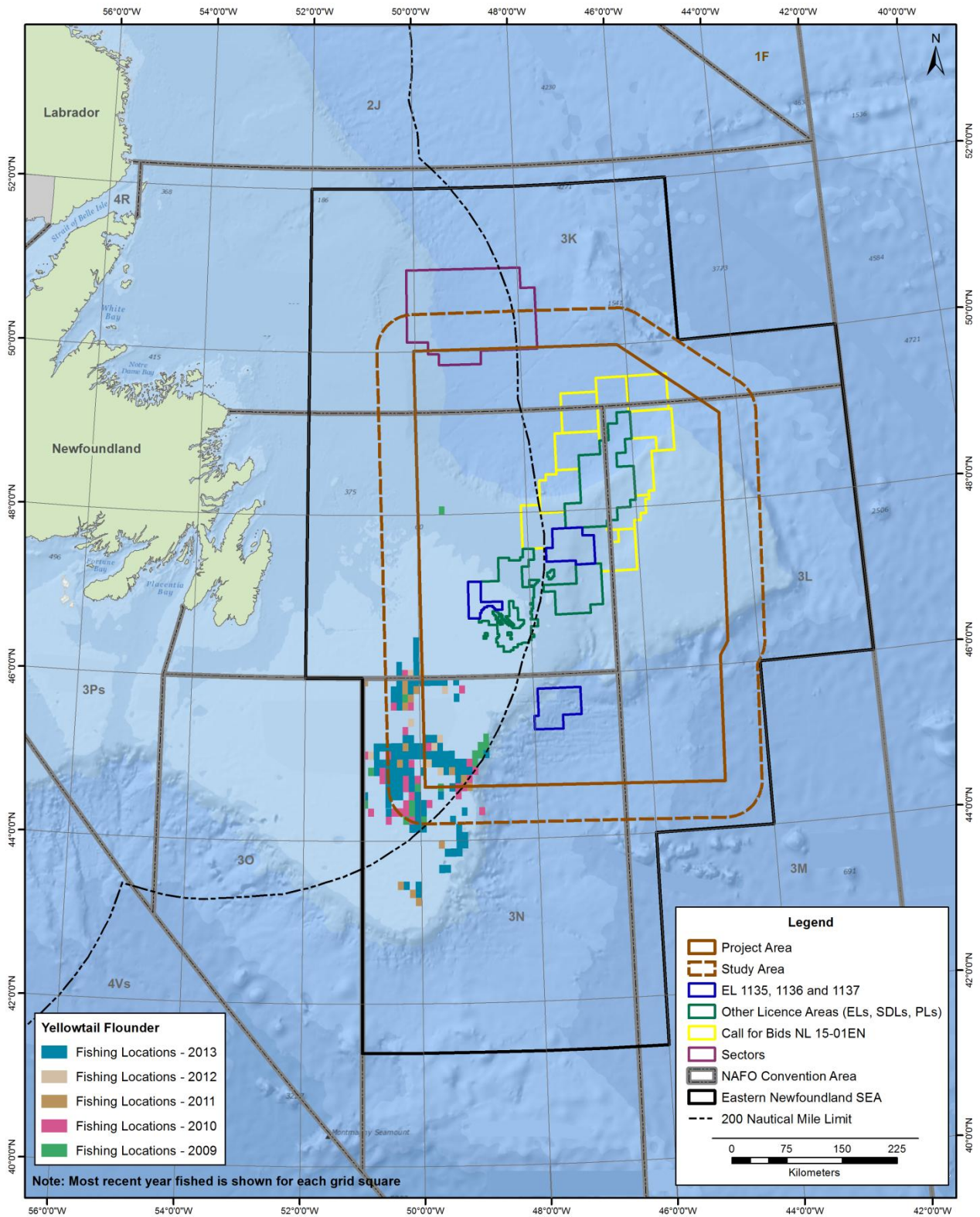


Figure 4.81 Fishing Locations – Redfish (May - November, 2009-2013)

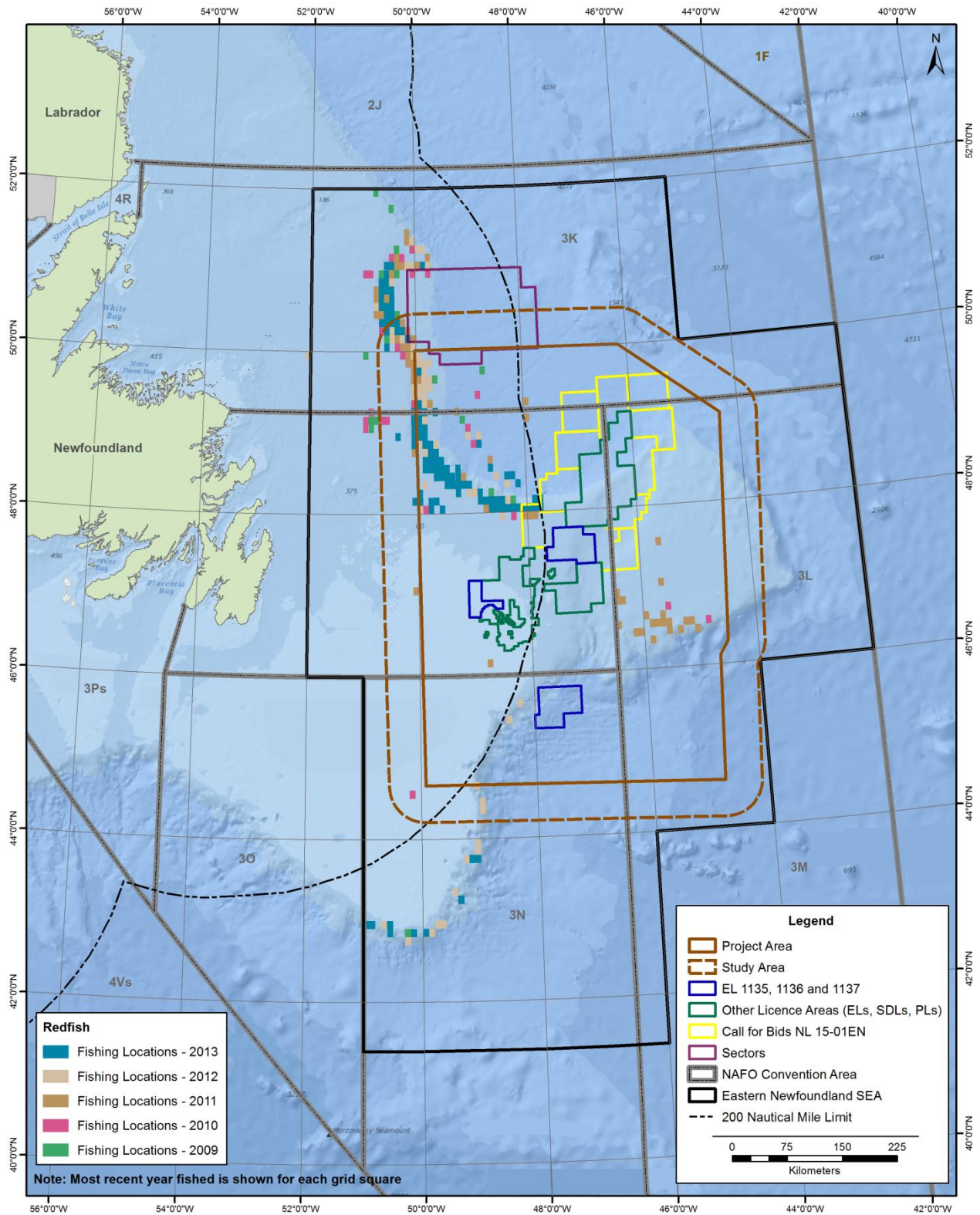


Figure 4.82 Fishing Locations – Turbot (May - November, 2009-2013)

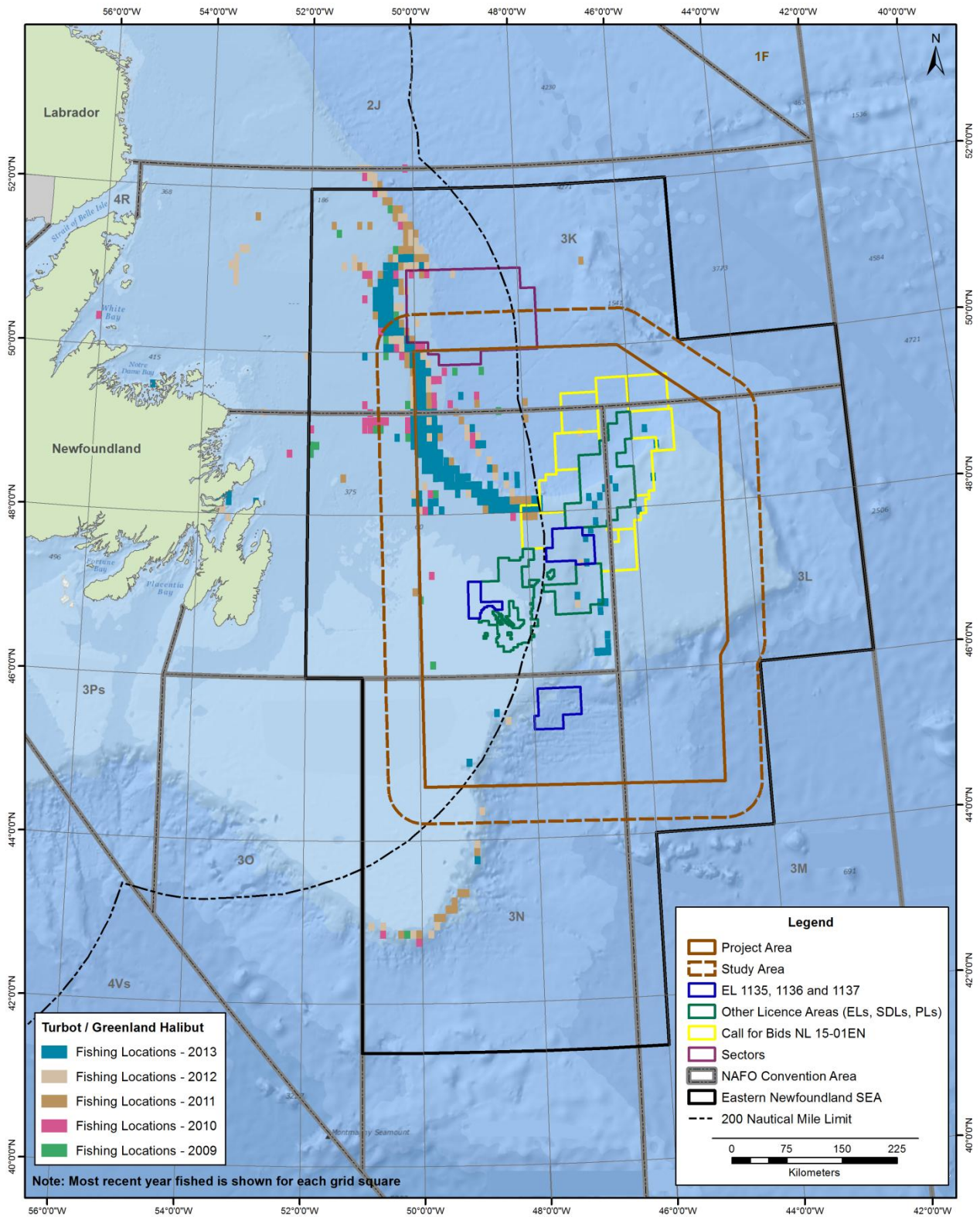


Figure 4.83 Fishing Locations – Northern Shrimp (May - November, 2009-2013)

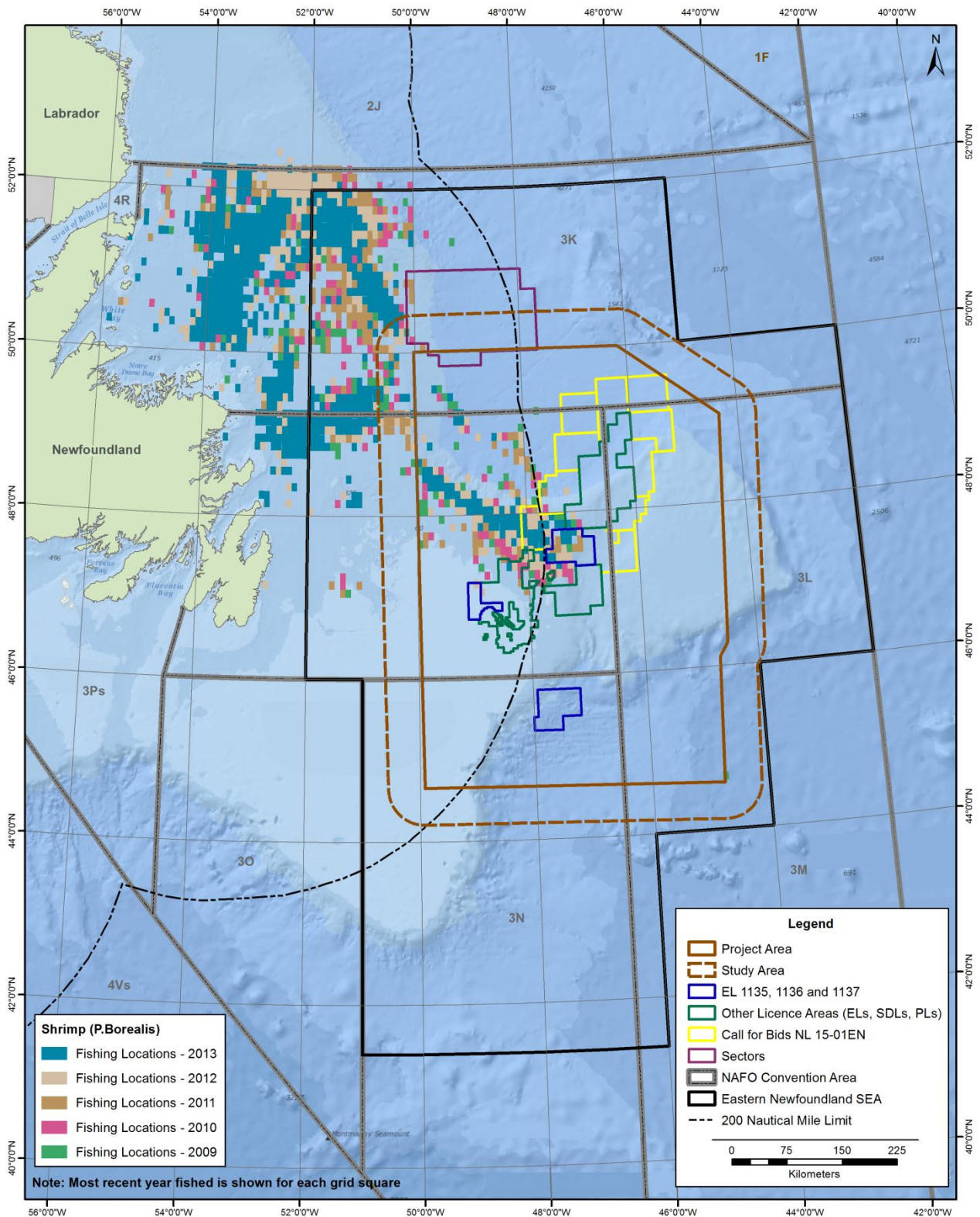


Figure 4.84 Fishing Locations – American Plaice (May - November, 2009-2013)

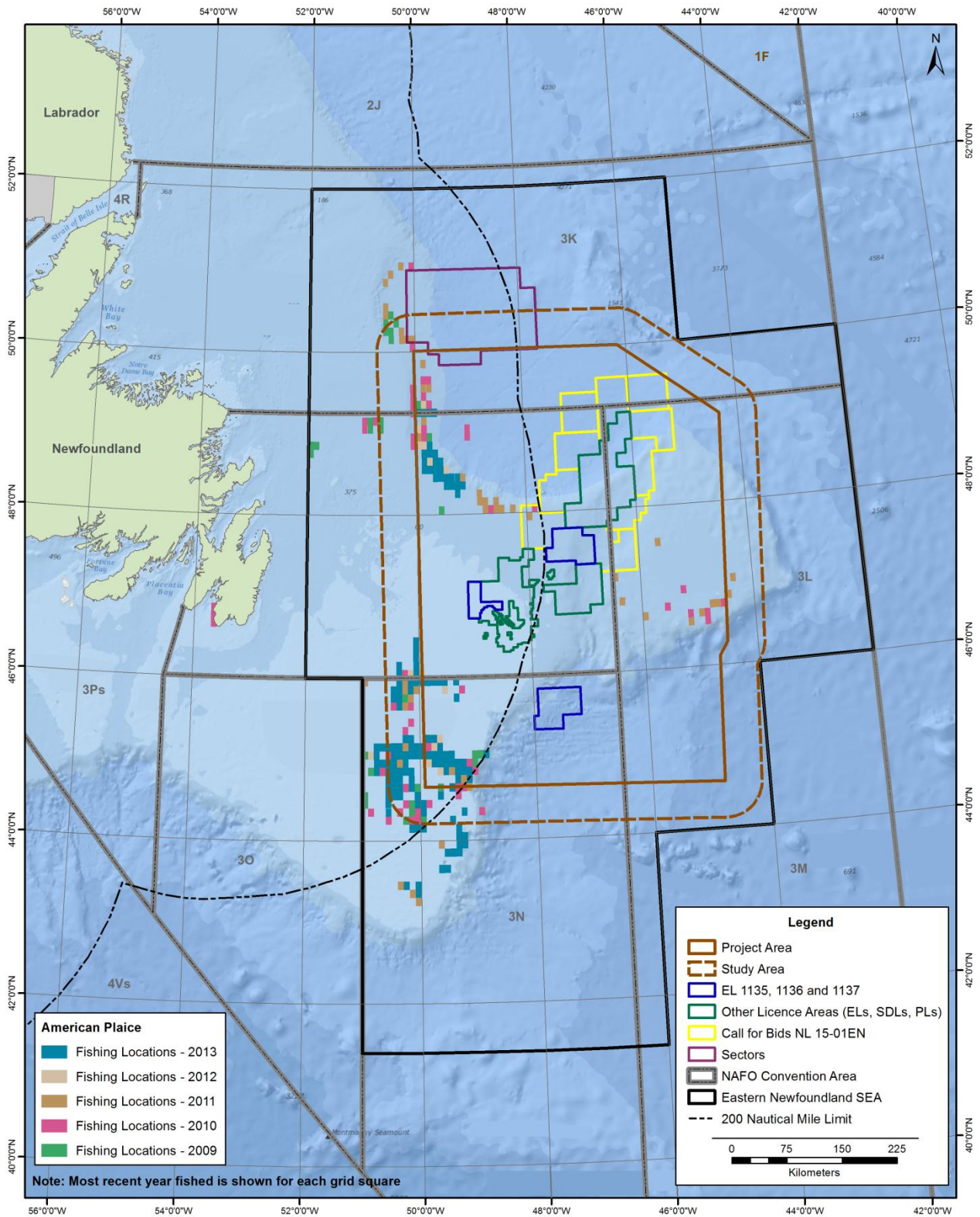


Figure 4.85 Fishing Locations – Atlantic Halibut (May - November, 2009-2013)

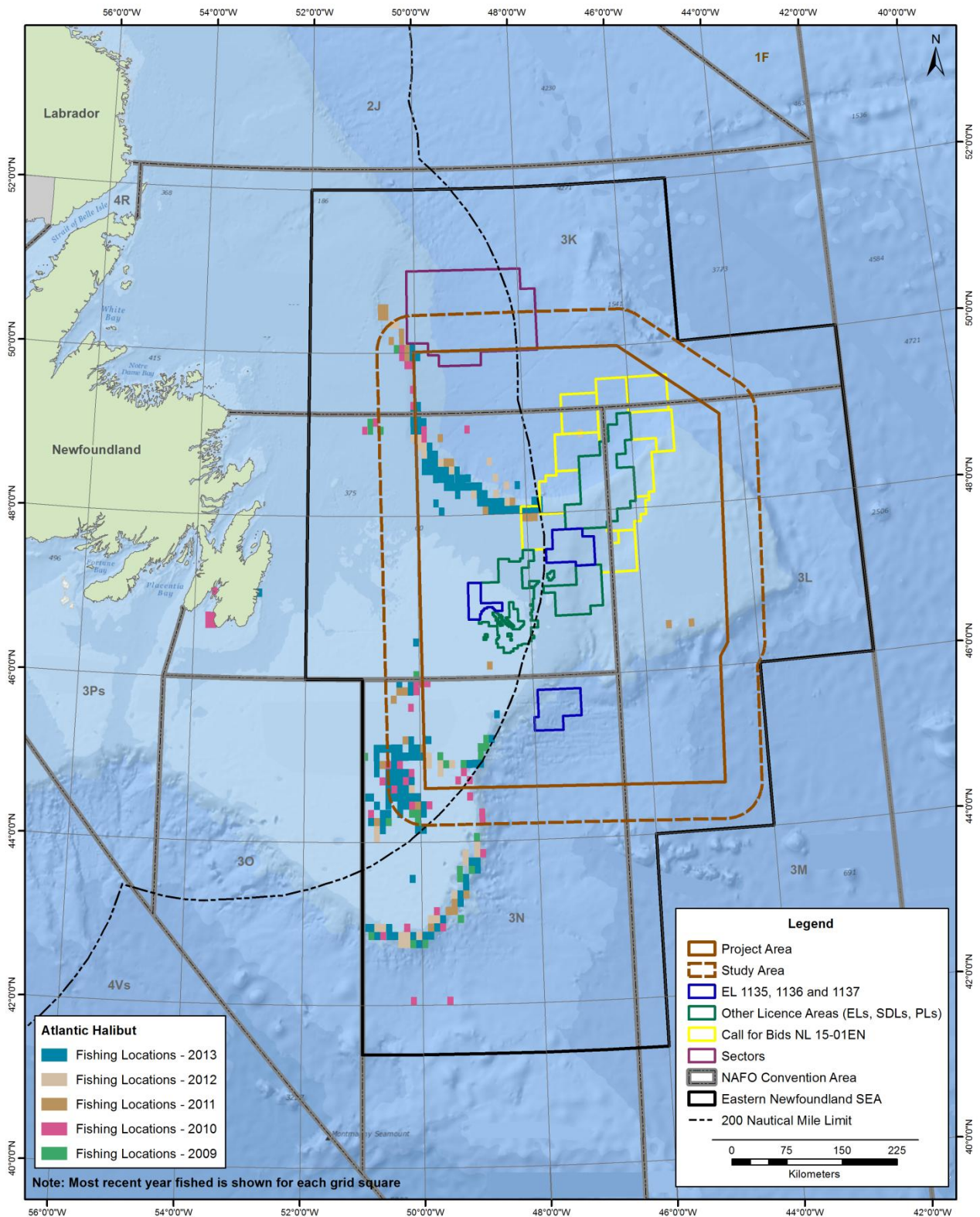
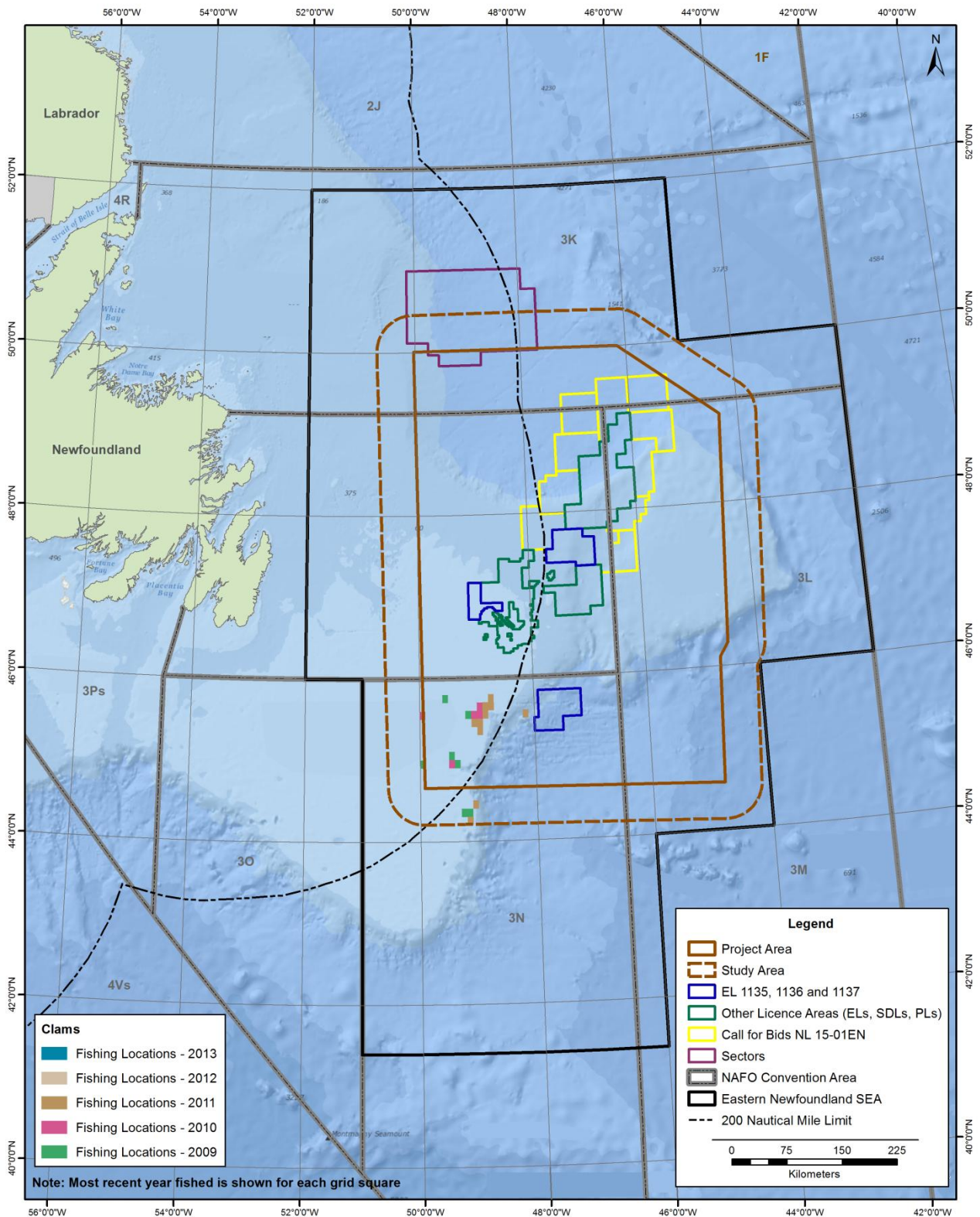


Figure 4.86 Fishing Locations – Clams and Cockles (May - November, 2009-2013)



Commercial Fish Harvests - Seasonality

Fishing activity in the Study Area during the 2009 to 2013 period occurred throughout the year, with the highest landings by weight occurring in the May – July period, which also accounted for the majority of the total value of fish harvested (Figures 4.87 and 4.88, Table 4.25).

Figure 4.87 Total Monthly Fish Harvests, All Species, by Weight (2009-2013, All Study Area NAFO Unit Areas)

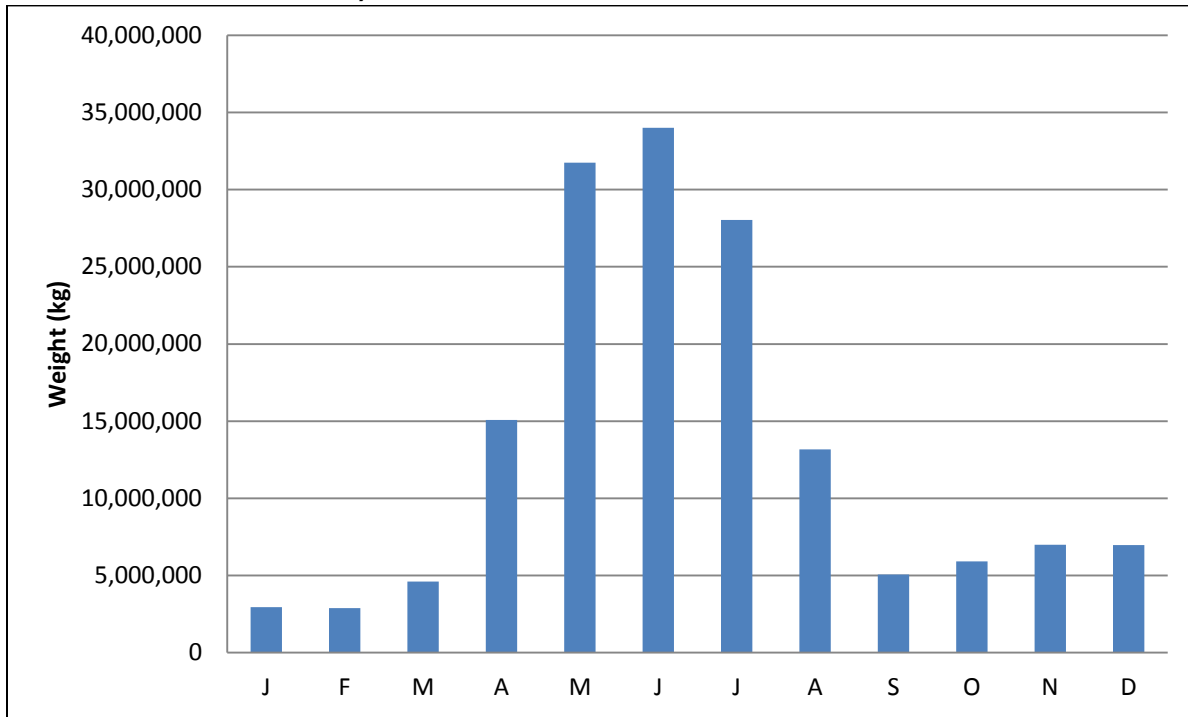


Figure 4.88 Total Monthly Fish Harvests, All Species, by Value (2009-2013, All Study Area NAFO Unit Areas)

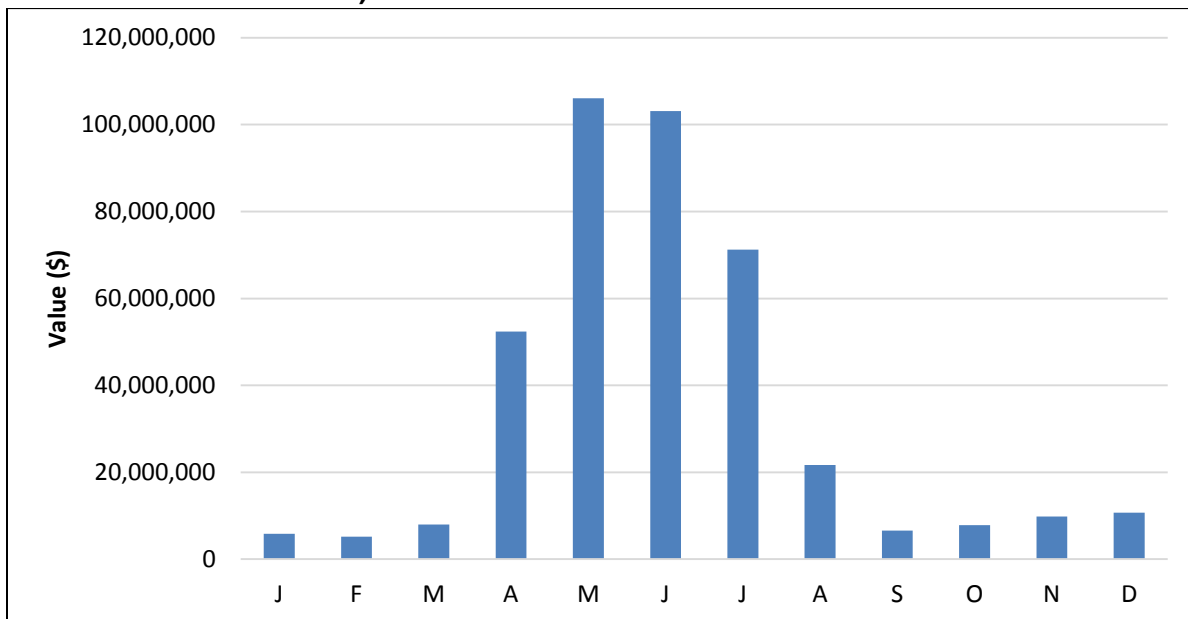


Table 4.25 Fish Harvests by Month by Weight and Value (2009-2013, All Study Area NAFO Unit Areas)

Month	2009	2010	2011	2012	2013	Total (2009-2013)
Weight (kg)						
January	337,942	703,219	538,458	347,201	1,022,950	2,949,770
February	764,285	1,164,425	475,702	1,047	493,472	2,898,931
March	607,267	1,453,932	1,335,836	7,457	1,199,516	4,604,008
April	3,607,081	1,819,696	3,378,071	4,262,418	2,015,324	15,082,590
May	6,845,405	6,627,255	6,413,827	5,540,043	6,310,743	31,737,273
June	5,231,800	7,997,530	7,335,266	6,678,859	6,752,327	33,995,782
July	6,086,324	6,811,336	7,646,670	3,745,628	3,735,796	28,025,754
August	4,276,937	3,661,446	3,145,286	1,042,578	1,046,132	13,172,379
September	2,105,345	1,217,128	448,311	213,969	1,082,540	5,067,293
October	1,604,376	2,056,617	1,060,702	145,801	1,053,174	5,920,670
November	4,059,243	1,069,409	900,850	243,939	728,117	7,001,558
December	2,924,453	978,932	1,036,126	293,347	1,743,308	6,976,166
Total	38,450,458	35,560,925	33,715,105	22,522,287	27,183,399	157,432,174
Value (\$)						
January	204,234	1,534,356	728,186	1,358,485	2,020,508	5,848,768
February	1,022,898	1,804,185	1,398,606	2,201	987,874	5,215,764
March	852,765	1,404,646	3,577,536	25,354	2,144,186	8,004,486
April	10,748,529	3,820,576	12,126,652	17,150,563	8,514,503	52,360,822
May	14,709,332	15,268,069	26,803,409	22,577,615	26,714,633	106,073,058
June	13,587,411	19,707,890	23,800,432	22,258,886	23,767,676	103,122,296
July	11,790,098	15,182,103	21,791,598	9,650,523	12,818,238	71,232,560
August	4,457,727	5,523,802	3,637,013	2,457,520	2,899,401	21,705,463
September	1,940,335	1,406,210	536,266	534,615	2,143,252	6,560,677
October	1,421,939	2,665,040	1,473,591	354,856	1,959,446	7,874,873
November	5,951,748	1,009,709	1,039,196	554,583	1,236,683	9,791,919
December	5,122,718	930,023	1,136,493	521,867	2,988,429	10,699,530
Total	71,809,735	70,256,608	100,778,977	77,447,067	88,194,827	408,487,214

The Figures that follow also show the monthly distribution of recorded fishing activity (all species) for 2009 – 2013 (May to December period).

Figure 4.89 Commercial Fishing Locations, All Species: May (2009 - 2013)

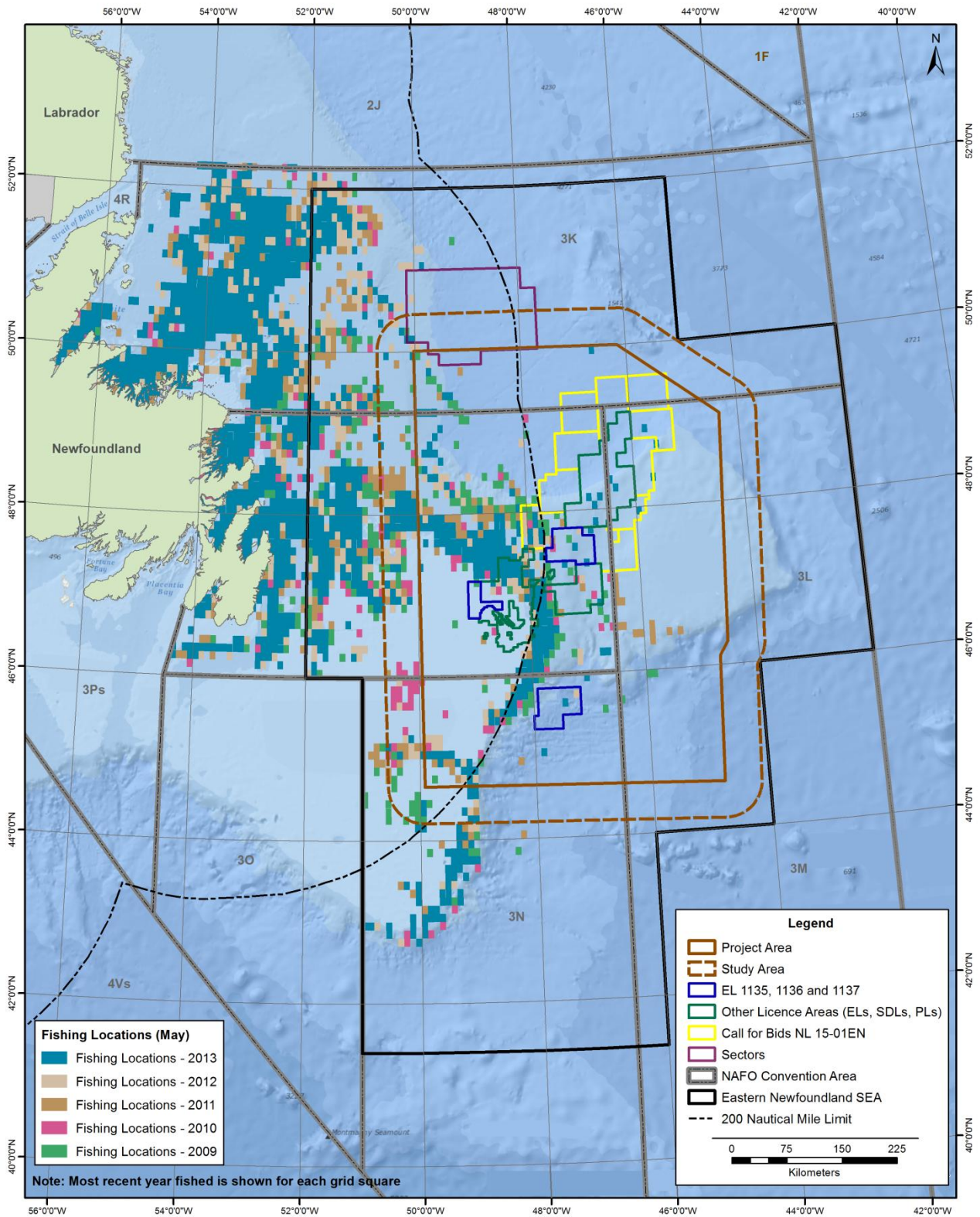


Figure 4.90 Commercial Fishing Locations, All Species: June (2009 - 2013)

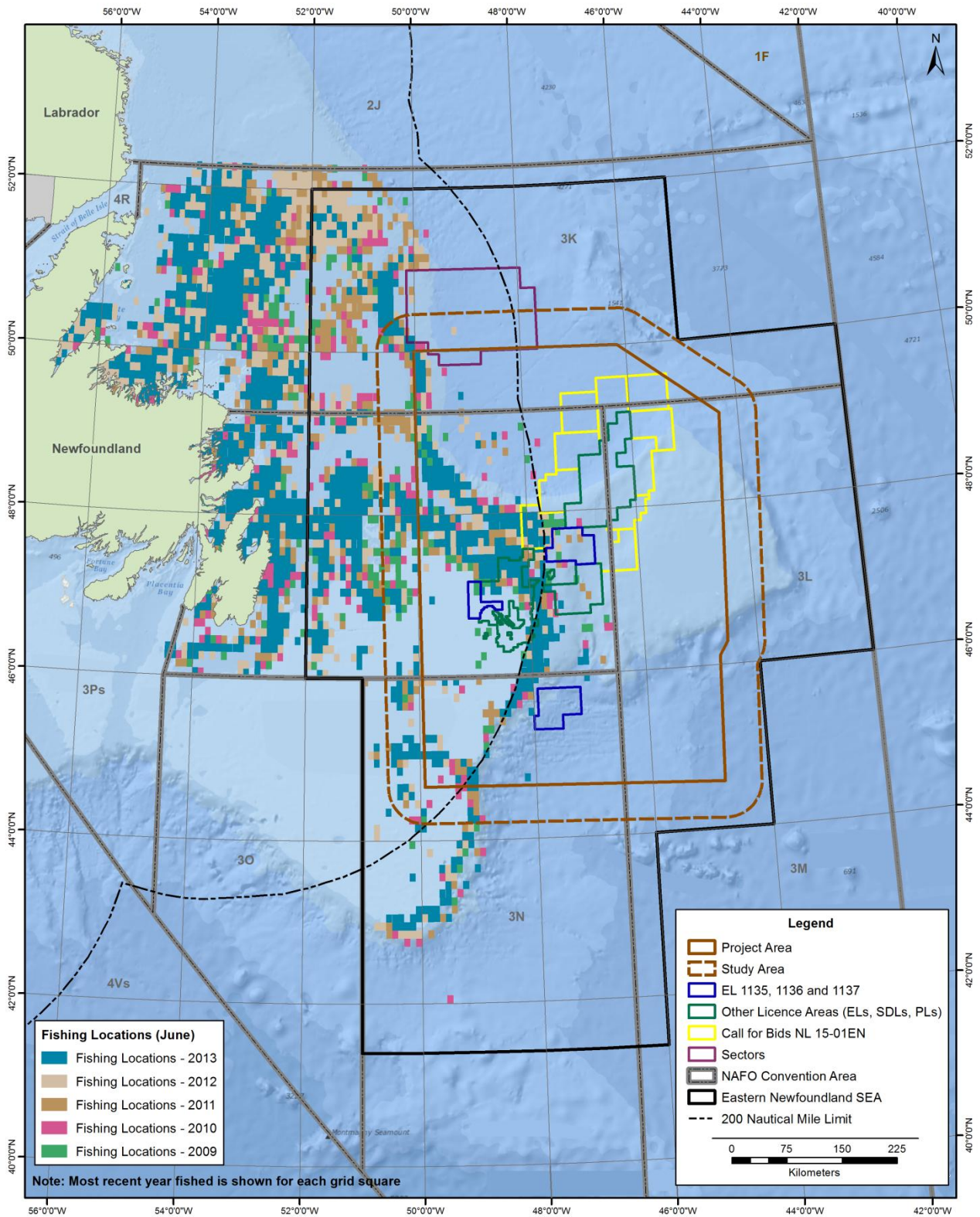


Figure 4.91 Commercial Fishing Locations, All Species: July (2009 - 2013)

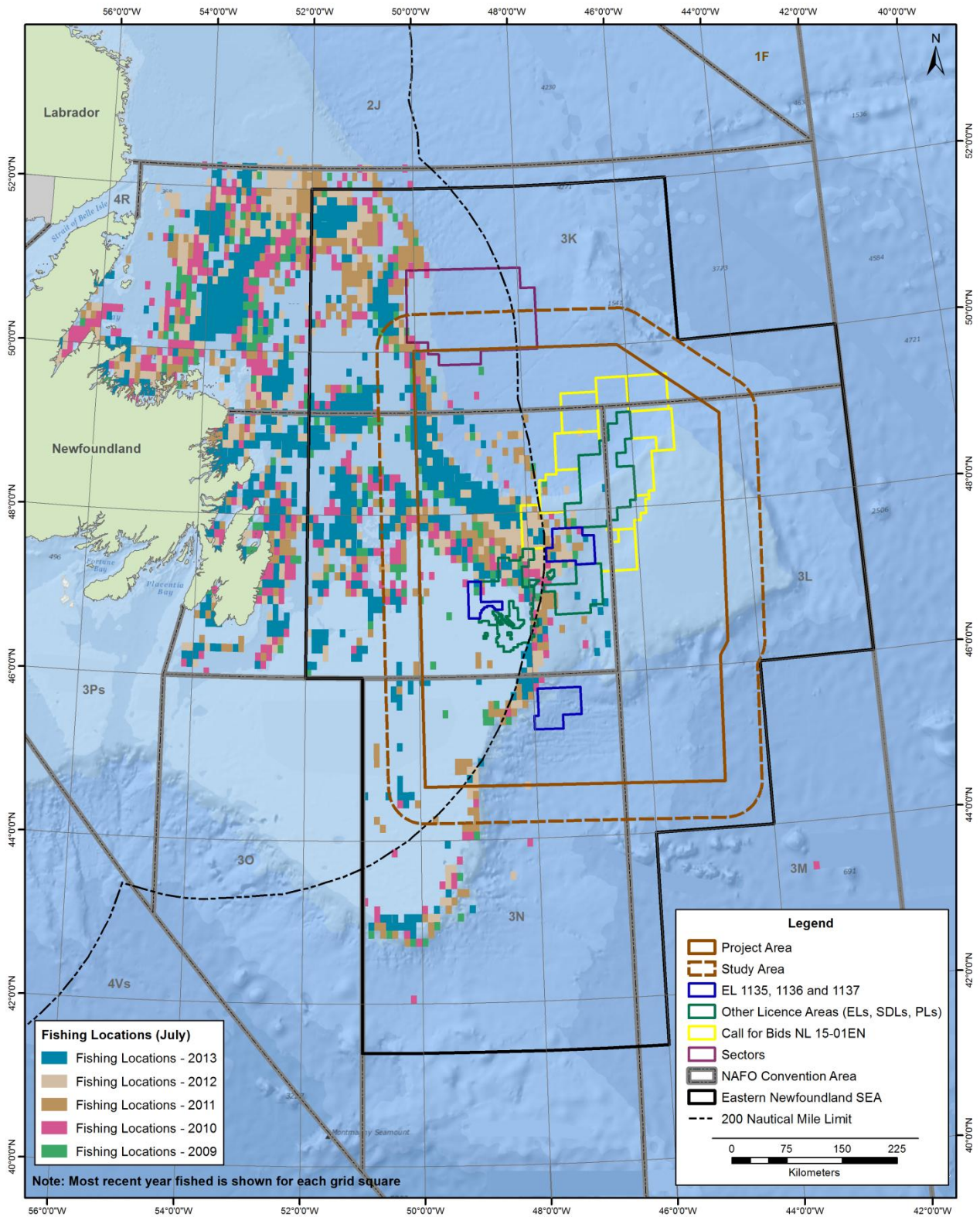


Figure 4.92 Commercial Fishing Locations, All Species: August (2009 - 2013)

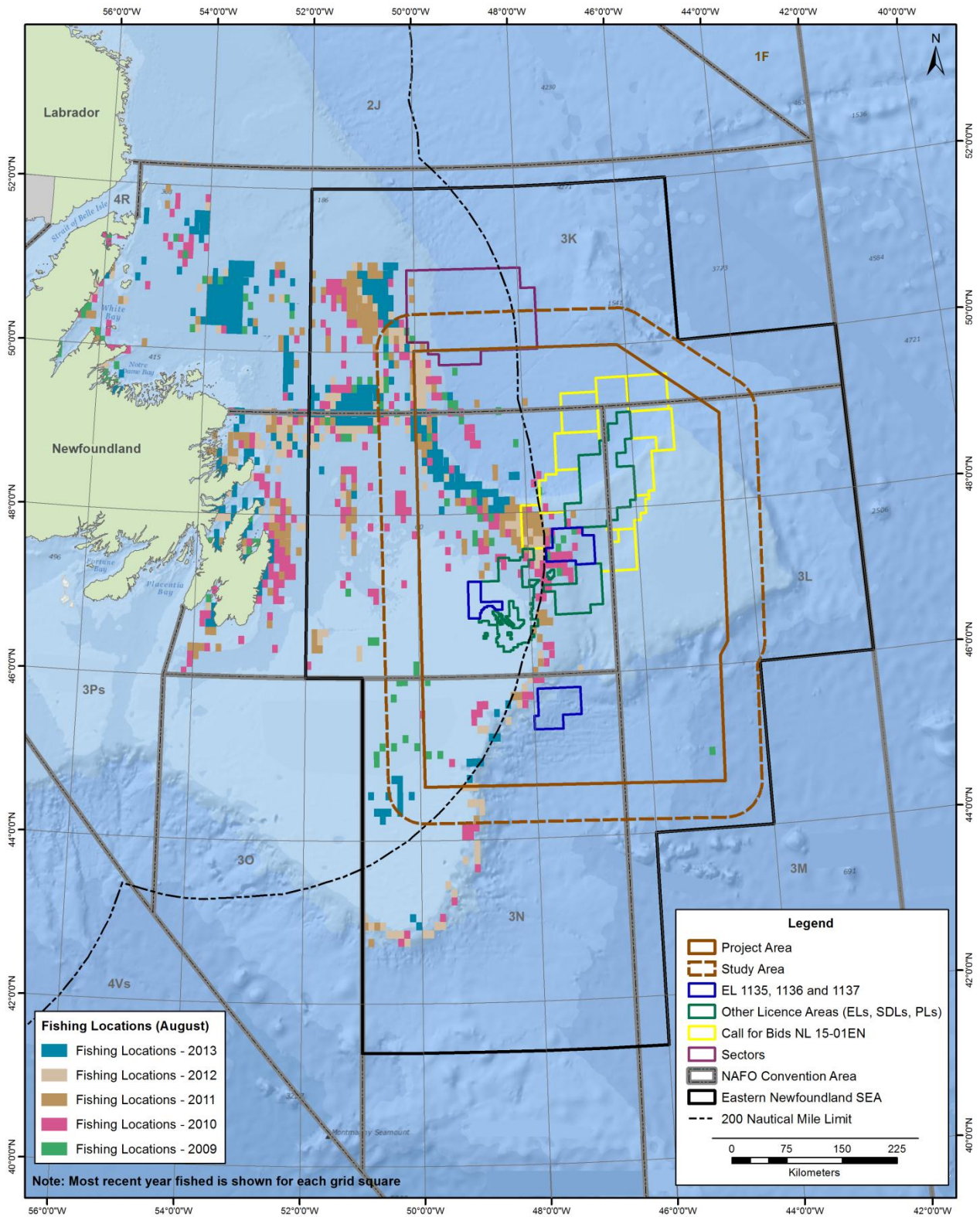


Figure 4.93 Commercial Fishing Locations, All Species: September (2009 - 2013)

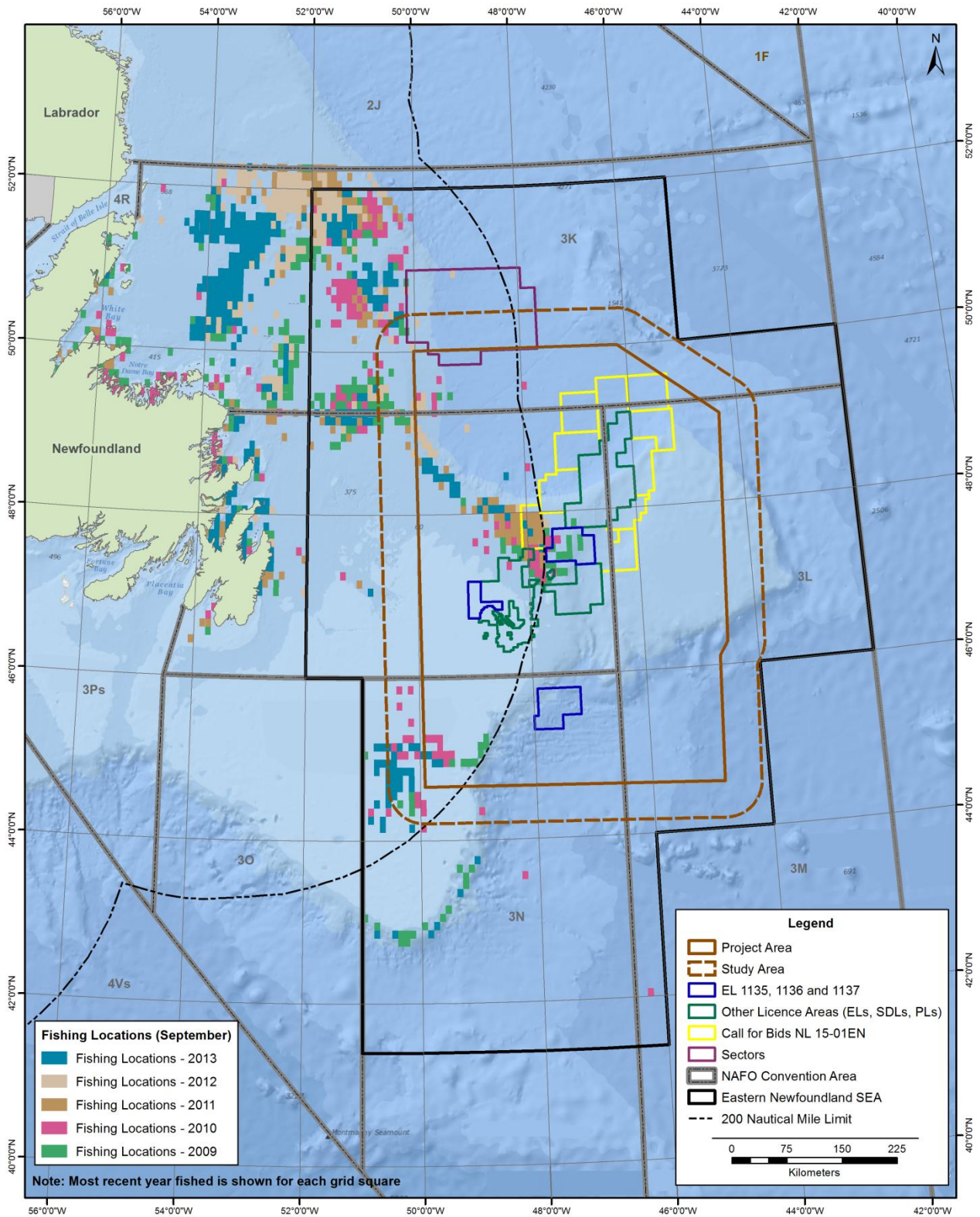


Figure 4.94 Commercial Fishing Locations, All Species: October (2009 - 2013)

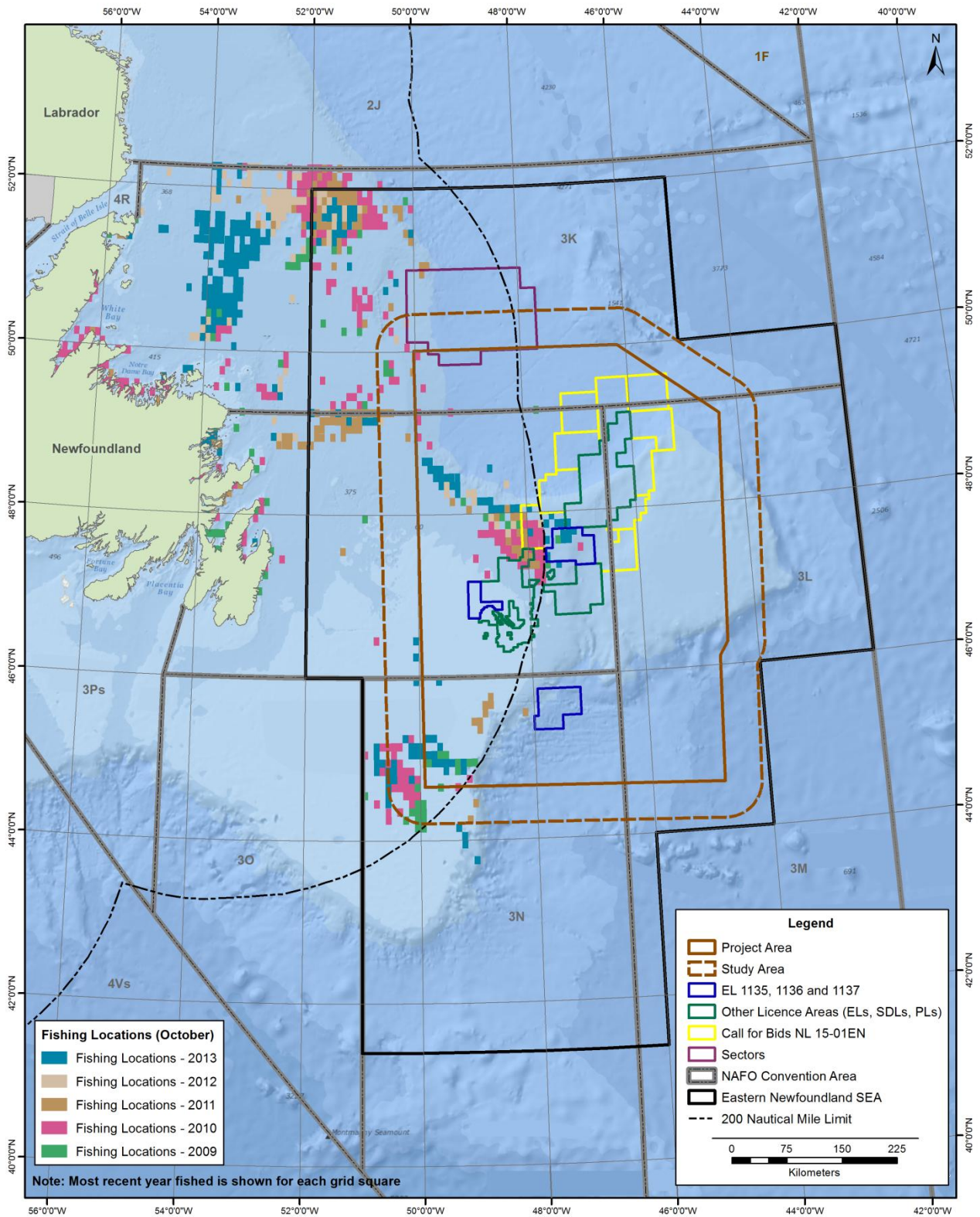
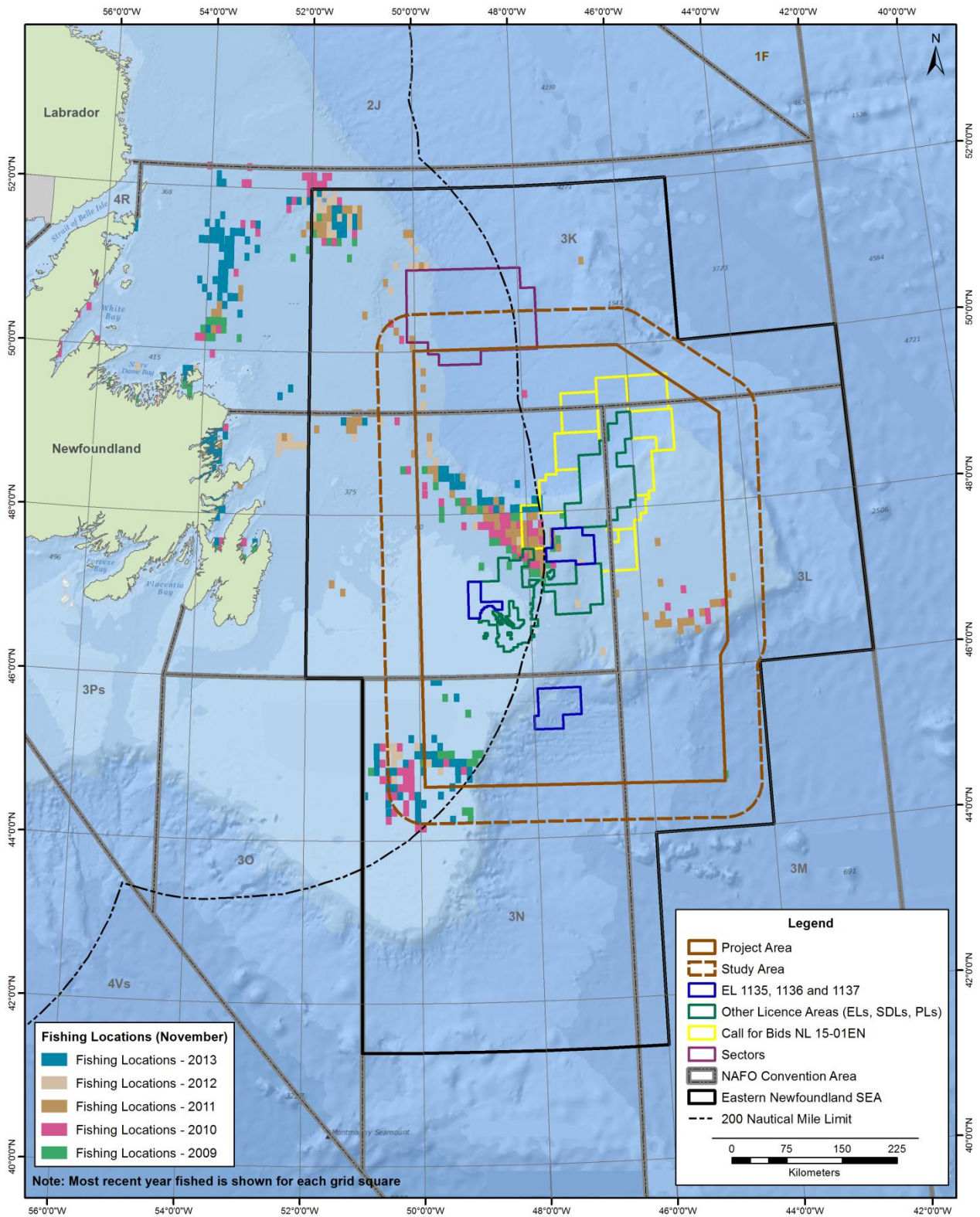


Figure 4.95 Commercial Fishing Locations, All Species: November (2009 - 2013)



Commercial Fish Harvests – Gear Types

The available DFO data reflect that a range of fishing gear types were used as part of the commercial fishery within the Study Area from 2009 to 2013 (Table 4.26). Of these, pots (unspecified) accounted for approximately 39 percent of the total fish landings over that period by weight, followed by shrimp trawls (30 percent), bottom otter trawl (21 percent) and others.

In terms of landed value, pots used in the shellfish (especially crab) fisheries accounted for the large majority (71 percent) of the total value of the fishery in that area over that time period, followed by bottom otter trawl (16 percent), gillnets (8 percent), and others.

Table 4.26 Fish Harvests by Gear Type by Weight and Value (2009-2013, All Study Area NAFO Unit Areas)

Gear Type	Weight (kg)	Value (\$)
Mobile Gear Types		
Bottom Otter Trawl (Stern)	33,644,261	56,279,085
Shrimp Trawl	46,919,862	73,324,558
Beach and Bar Seine	33,242	7,109
Tuck Seine	55,159	10,481
Purse Seine	205,585	56,587
Troller Lines	3,328	30,994
Dredge (Boat)	3,701,719	5,161,773
Other Gear, Unspecified	2,987	23,211
Fixed Gear Types		
Gillnet (set of fixed)	10,765,325	28,157,975
Longline	479,793	3,813,409
Trap Net	56,460	11,203
Pot (Unspecified)	61,564,453	241,610,828
Total	157,432,174	408,487,214

The Figures that follow also show the distribution of recorded fishing activity by gear type (fixed and mobile gear categories) for 2009 – 2013 overall (May to December period), and by general season (Spring: May-June; Summer: July-August; Fall: September-October; Winter: November).

Figure 4.96 Fish Harvests by Gear Type by Weight of Catch (2009-2013, All Study Area NAFO Unit Areas)

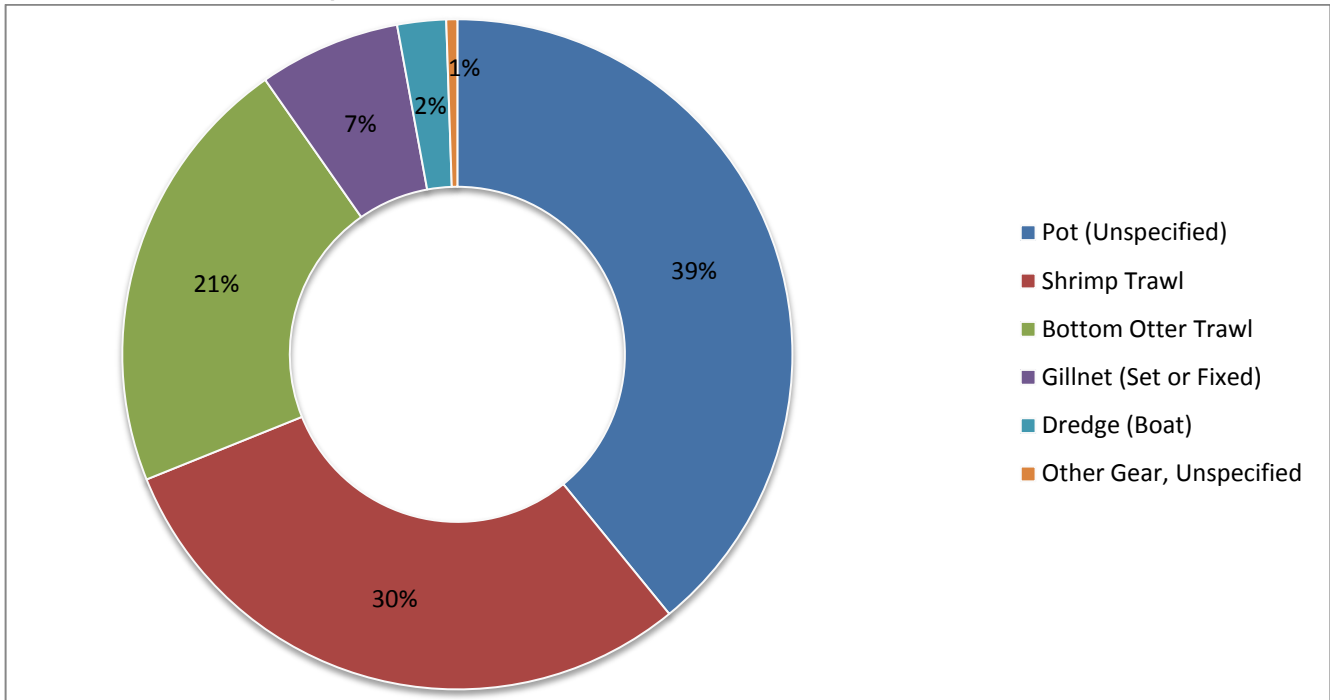


Figure 4.97 Fish Harvests by Gear Type by Value of Catch (2009-2013, All Study Area NAFO Unit Areas)

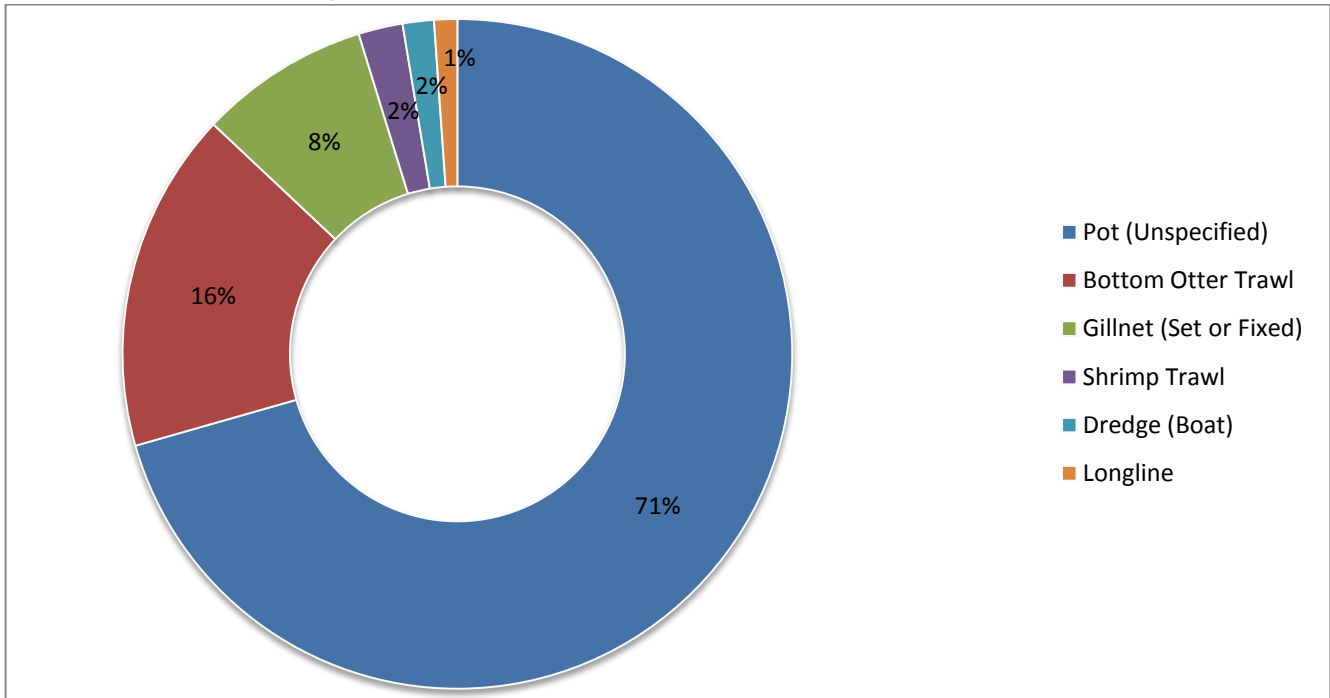


Figure 4.98 Fish Harvests Using Fixed Gear Types (May to November, 2009-2013)

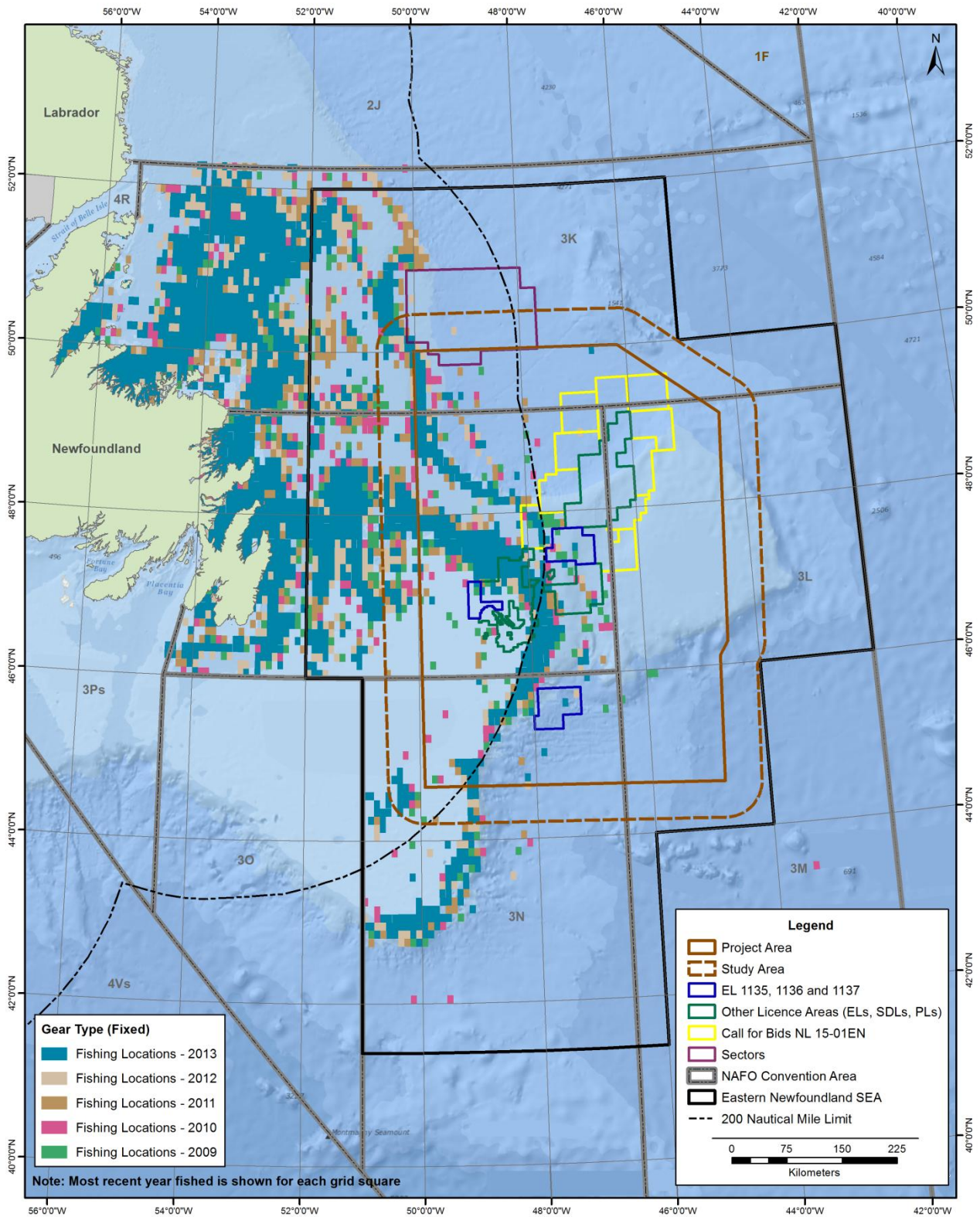


Figure 4.99 Fish Harvests Using Fixed Gear Types (By Season – May to Nov, 2009-2013)

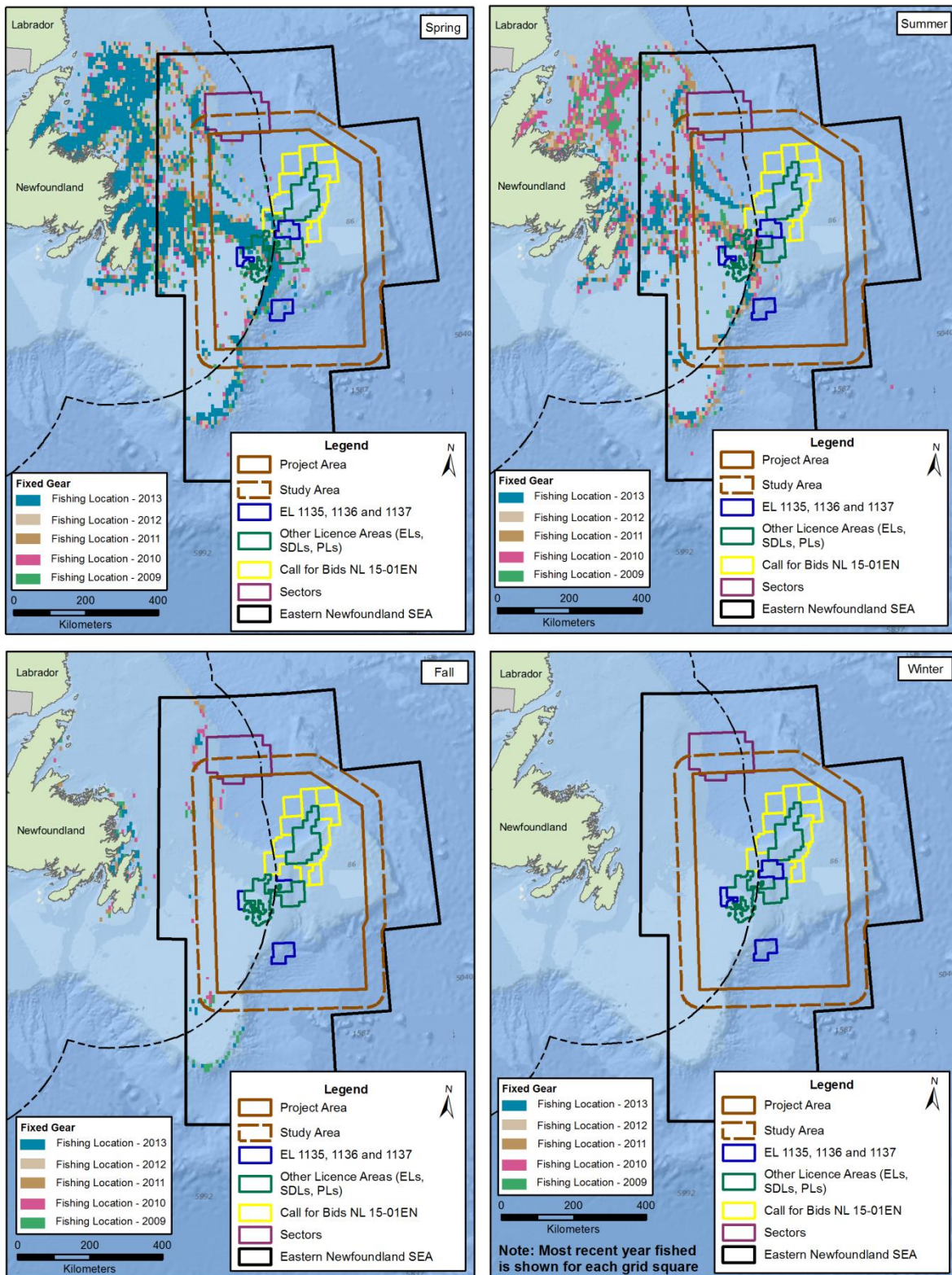


Figure 4.100 Fish Harvests Using Mobile Gear Types (May to November, 2009-2013)

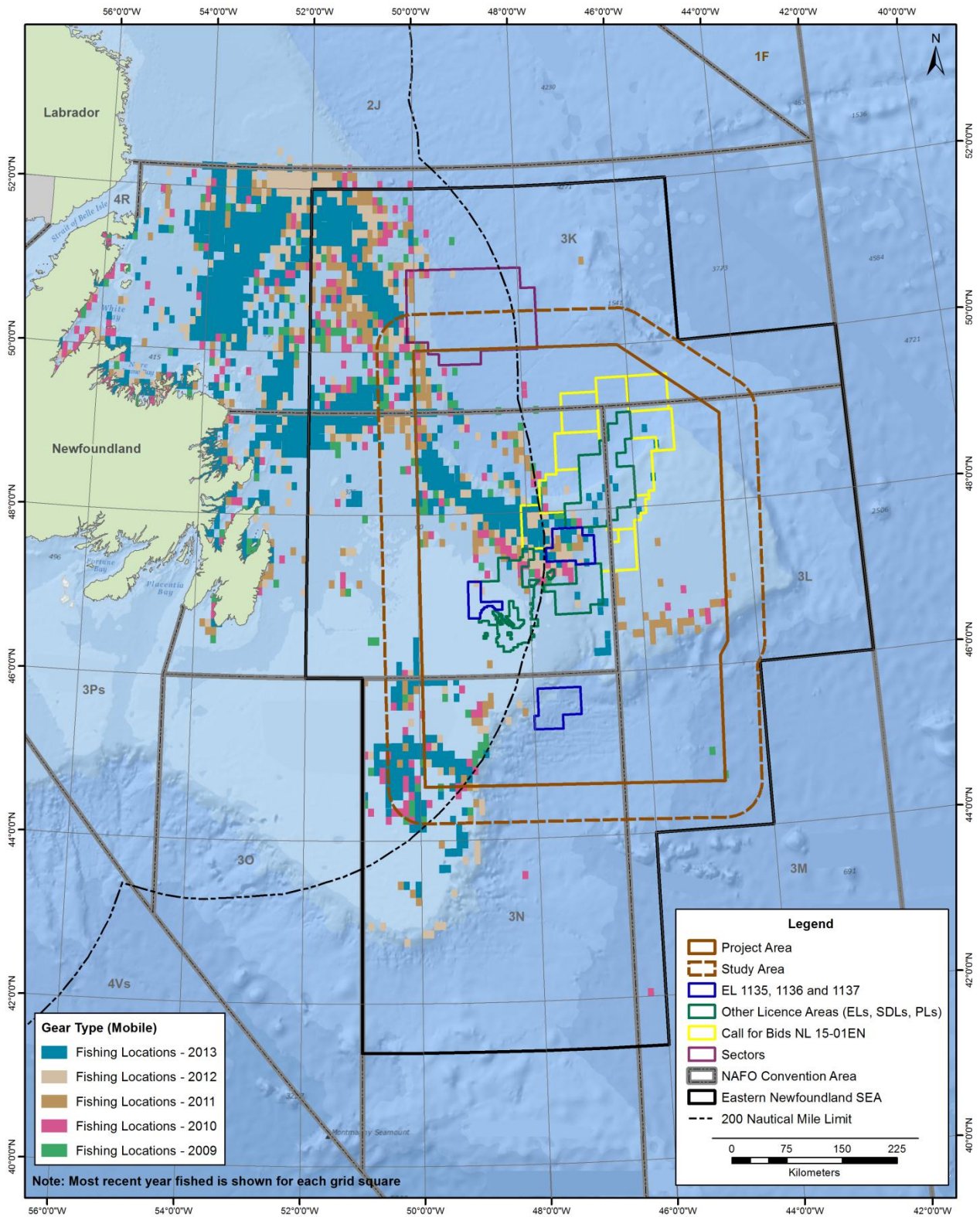
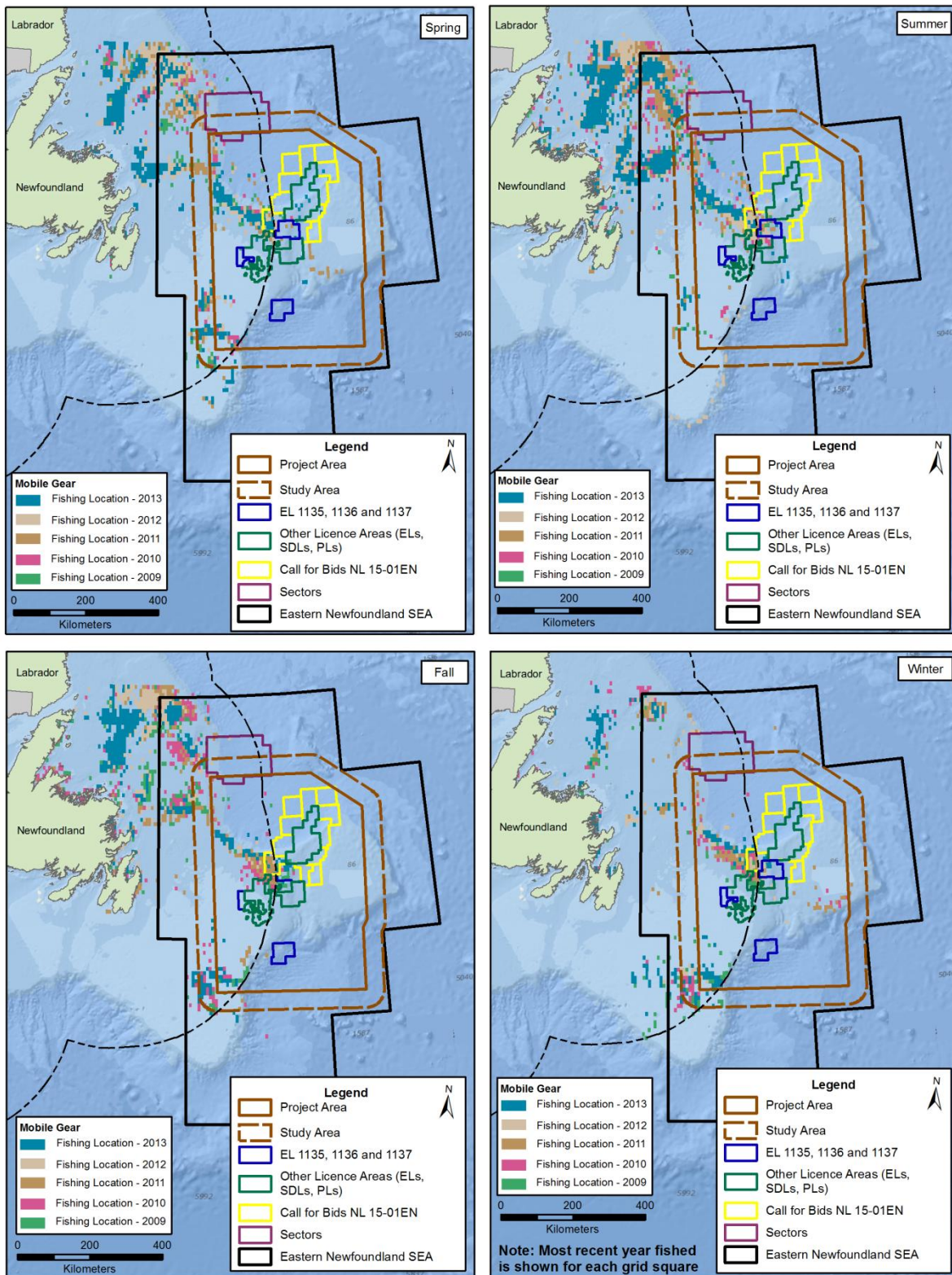


Figure 4.101 Fish Harvests Using Mobile Gear Types (By Season – May to Nov, 2009-2013)



Potential Future Commercial Fisheries

Identifying and evaluating the potential for future fisheries requires the consideration of biophysical and socioeconomic factors. These include, for example, resource availability and distribution, equipment and technology requirements and availability, potential market demand and associated prices, and other factors. Oceans are predicted to continue to warm over the decades and as a result, some fishers are predicting that the groundfish fishery will become similar to the pre-moratoria times (Amec 2014).

The above sections provide an overview of recent fishing activity in and near the Study Area, based on existing and available information. ExxonMobil is not aware of any upcoming changes to the fishery during the time span of the Project. Should, however, a new fishery or a currently closed fishery become active within the Study Area during the temporal scope of this Project, this will be identified in the on-going fishery information updates and analysis and considered in the annual EA Update that will be filed before ExxonMobil's application for a GPA in any Project year (see Chapter 5).

Commercial Fishing Activity by Foreign Countries

There are several regulatory jurisdictions that pertain to marine fish and fisheries within the Study Area. The Government of Canada has jurisdiction over fish stocks and fishing activities within the 200 nautical mile limit and for benthic invertebrates (such as crab) across the entire continental shelf, with NAFO managing groundfish activities and other resources beyond that 200 mile limit (NAFO 2013). NAFO currently manages 19 commercial stocks consisting of 11 species, and reports that in 2011 there were vessels from 13 flag states fishing in the Northwest Atlantic (NAFO 2013). Other international agreements and conventions also apply to fishing and other human activities in international waters (Amec 2014).

The preceding discussion has focussed upon recent (2009 to 2013) and on-going commercial fishing activity within the NAFO Unit Areas that occur completely or partially within the Study Area. The datasets used to conduct these analyses were obtained through DFO which record only the domestic and foreign harvests that are landed in Canada. For many years, the waters off the coast of Newfoundland and Labrador have been subject to commercial fishing activity by fleets from a number of foreign countries (Amec 2014).

The following Tables and Figures provide summaries of the foreign fishing activity in various NAFO Divisions that overlap the Study Area (3KLMN) for the period 2009 to 2013. The division level is the highest resolution that the data is available for. As indicated, Atlantic cod is the most commonly caught species of fish by foreign fishing vessels in this region, representing 31 percent of the total landed catch in 2013 (Figure 4.102). Spain and Portugal were the two non-Canadian countries that carried out most fishing activity fished in the area, representing 36 and 23 percent of the total catch, respectively (Figure 4.103). The total landed catch from non-Canadian vessels has increased by over 16,000 tonnes from 2009 to 2013 within the NAFO Divisions that overlap with the Study Area.

Table 4.27 Foreign (non-Canadian) Fishing Activity by NAFO Division (tonnes) (2009 – 2013)

NAFO Division	2009	2010	2011	2012	2013	Total
3K	1	1	208	0	0	210
3L	14,822	9,442	12,949	11,902	11,514	60,629
3M	18,132	20,514	24,732	26,583	30,863	120,824
3N	6,996	12,424	11,467	12,753	13,709	57,349
Total	39,950	42,380	49,356	51,238	56,086	239,012

Source: NAFO Data Extraction Tool (Statlant 21A)

Table 4.28 Foreign (non-Canadian) Fishing Activity by Species (2013)

Species	Total Catch (tonnes)
American Plaice	1,213
Atlantic Cod	17,011
Atlantic Halibut	171
Atlantic Redfishes	10,343
Great Blue Shark	6,161
Greenland Halibut	9,169
Northern Shrimp	2,405
Rough Grenadier	625
Other Species	8,988
Total	56,086

Source: NAFO Data Extraction Tool (Statlant 21A)

Figure 4.102 Foreign (non-Canadian) Fishing Activity by Species (2013)

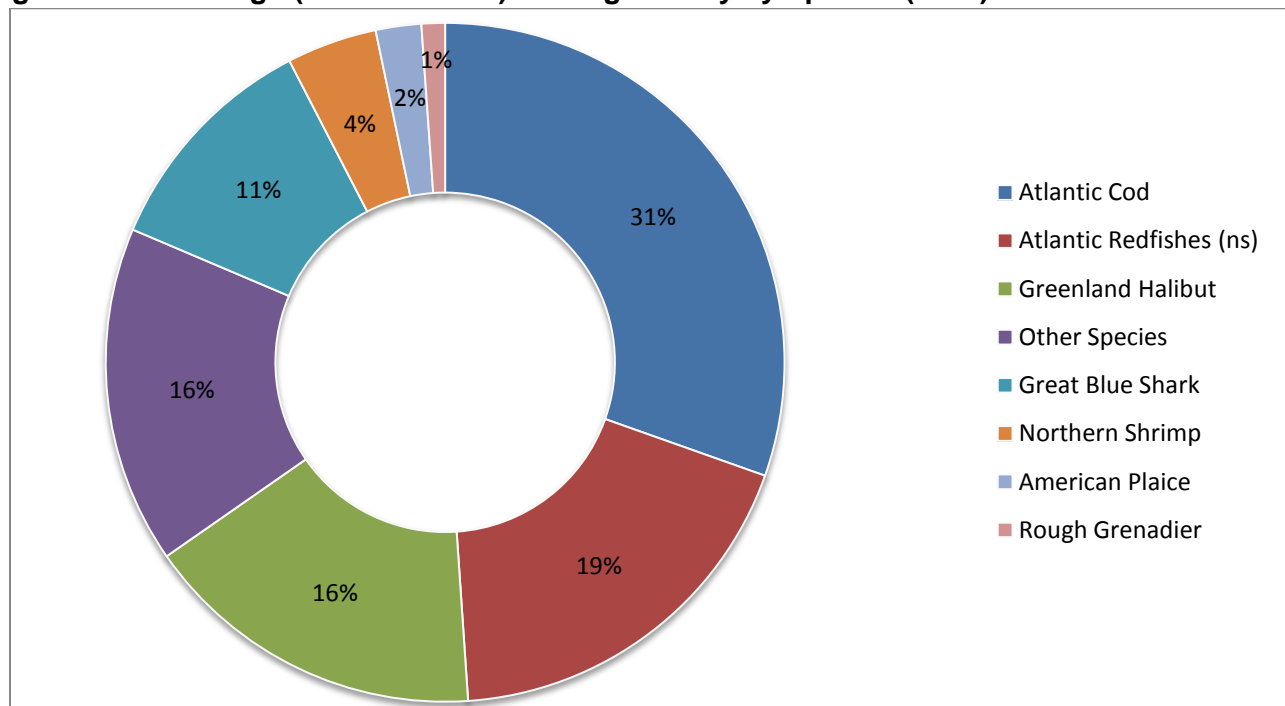
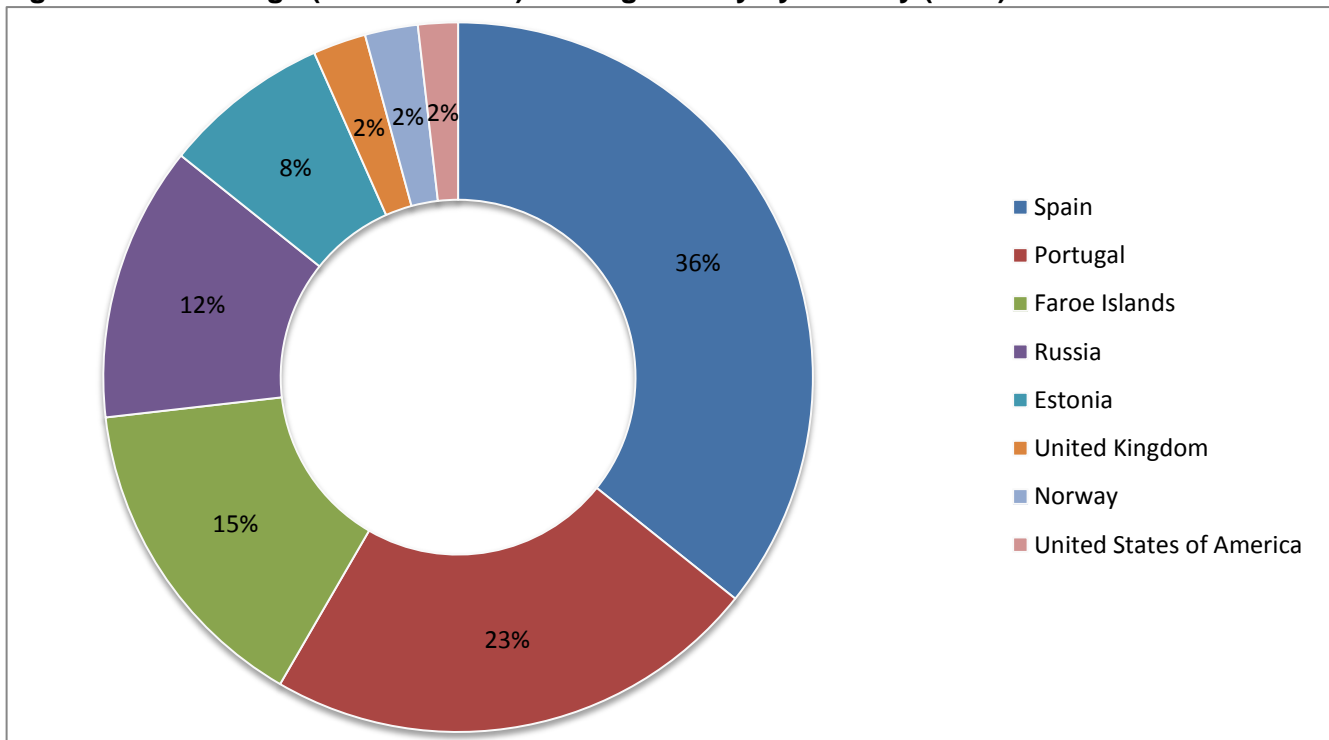


Table 4.29 Foreign (non-Canadian) Fishing Activity by Country (2013)

Country	Total Catch (tonnes)
Estonia	4,242
Faroe Islands	8,254
France (St. Pierre et Miquelon)	316
Iceland	92
Norway	1,343
Portugal	12,602
Russia	6,987
Spain	19,894
United Kingdom	1,346
United States of America	1,010
Total	56,086

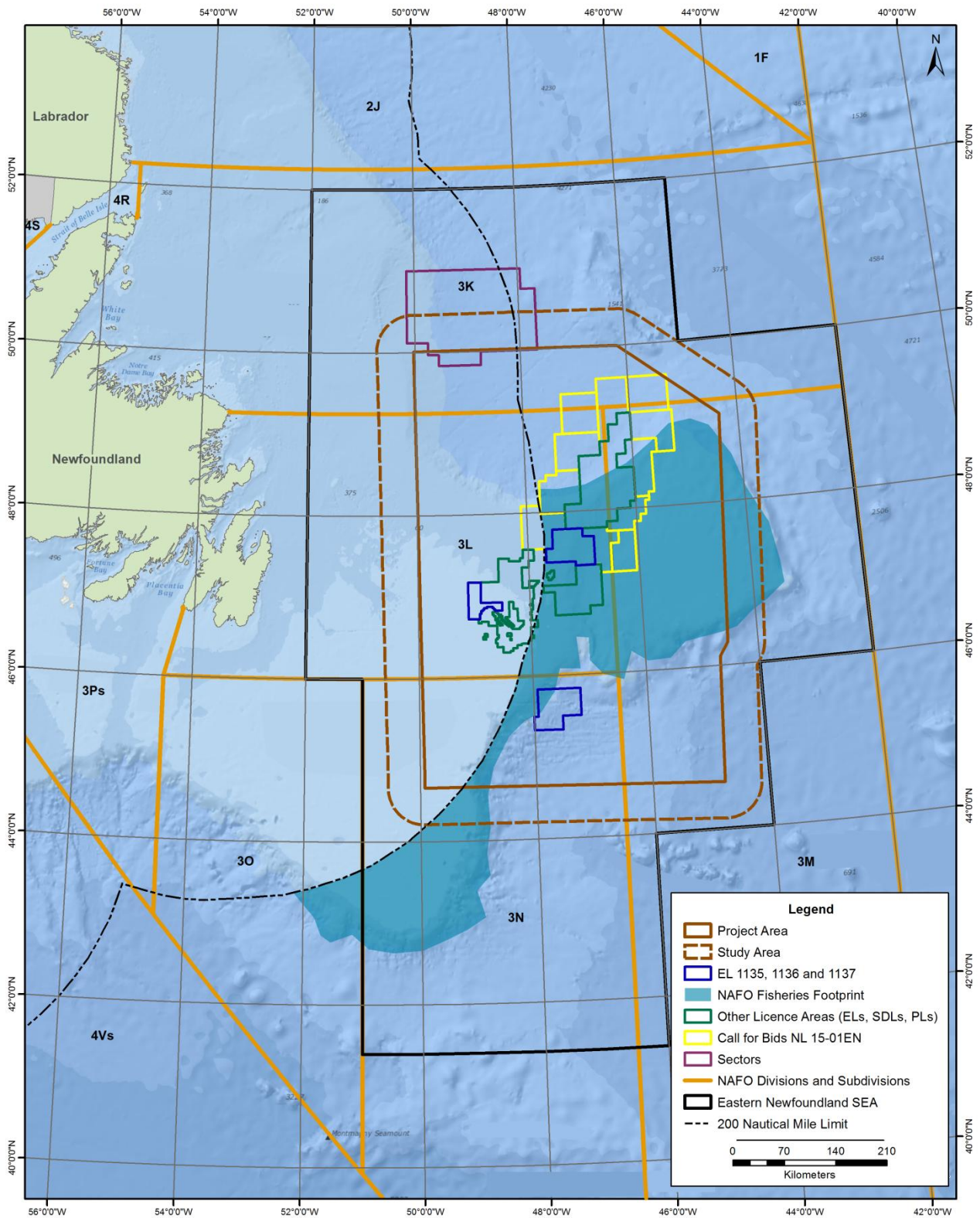
Source: NAFO Data Extraction Tool (Statlant 21A)

Figure 4.103 Foreign (non-Canadian) Fishing Activity by Country (2013)



The NAFO Regulatory Area (NRA) is some 2,707,895 km² in size (or 41 percent of the total NAFO Convention Area) and comprises that part of the Northwest Atlantic high seas located adjacent to Canada’s 200 mile EEZ. Fishing activity in the NRA targets a range of species, including cod, redfish, Greenland halibut, shrimp, skates, and other finfish, and has an approximate landed value of \$200 million annually across all members. There are currently 160 fishing vessels that are authorized to fish in the NRA, which are primarily large vessels (30-100 m), and in 2013 a total of 64 vessels fished in the region (NAFO 2014). As a result of the 2007 United Nations General Assembly (UNGA Res. 61/105, paragraph 83) request that Regional Fisheries Management Organizations regulate bottom fisheries that cause a significant adverse impact on VMEs, NAFO undertook an exercise to identify bottom fishing areas in the NRA, and in doing so, to identify and map NAFO’s bottom fishing footprint in the area (NAFO 2009). The NAFO fisheries footprint is 120,048 km² in size, and its location and relationship to the Study Area is illustrated in Figure 4.104 (NAFO 2014).

Figure 4.104 NAFO Fisheries “Footprint” and its Proximity to the Study Area



4.3.1.3 Government and Industry Research Vessel Surveys

A number of fisheries survey programs by government and/or industry also occur in the Study Area.

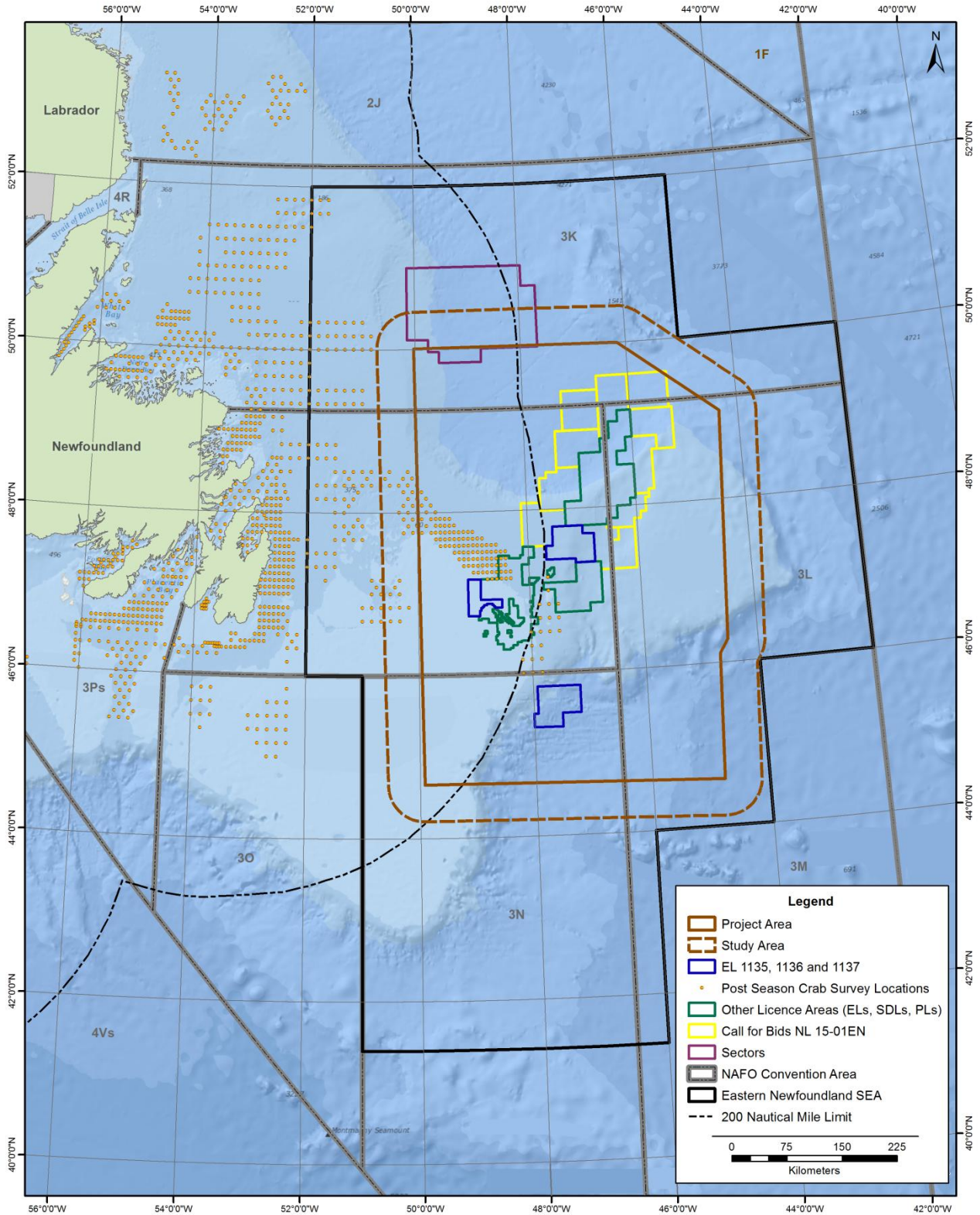
DFO conducts annual standardized bottom-trawl surveys to collect information for managing and monitoring fish resources in the Newfoundland and Labrador Region. Spring surveys have been conducted in NAFO Divisions 3LNOPs since 1975, while fall surveys commenced in NAFO Divisions 2HJ3KLMNO in 1977. The spring and fall surveys take place in different but overlapping areas. While the survey design has remained somewhat consistent, additional bottom types have been surveyed in recent decades (Bishop 1994). Since 1995, government surveys have been conducted by Canadian Coast Guard research vessels using a Campelen 1800 shrimp trawl. The tentative 2015 schedule for these DFO multispecies research vessel (RV) surveys in the Study Area is indicated in Table 4.30.

Table 4.30 Tentative Timing of DFO RV Surveys in the Study Area (2015)

Vessel	Activity	NAFO Division	Tentative Start Date	Tentative End Date
CCGS Needler	NL Spring Survey	3P	March 31	April 14
		3P	April 14	April 28
		3P + 3O	April 29	May 12
		3O + 3N	May 12	May 16
		3L + 3N	May 27	June 13
	NL Fall Survey	3O	September 16	September 29
		3O + 3N	September 29	October 13
		3N + 3L	October 14	October 27
		3L	October 28	November 10
		3K + 3L	November 11	November 24
CCGS Teleost	NL Spring AZMP ¹	3P + 3KLMNO	April 7	April 28
	Comparative Fishing Redfish	2J + 3KL	April 26	May 6
	Capelin Survey	3KL	May 12	May 26
	Shellfish Survey		September 4	September 15
	NL Fall Survey	2J + 3K	October 27	November 10
		3K	November 11	November 24
		3K + 3L Deep	November 24	December 8
¹ Atlantic Zone Monitoring Program Source: G. Sheppard, pers. comm (2015)				

In 2003, an Industry - DFO Collaborative Post-season Trap Survey was developed and implemented for snow crab in NAFO Divisions 2J, 3KLOPs, and 4R, in order to more accurately assess and manage that resource. The annual survey is conducted using commercial and modified snow crab traps. The 1,500 trap stations (Figure 4.105) across all management areas are determined by DFO and do not change from year to year. The survey usually starts in late August or early September after the commercial snow crab season has ended. It continues until all the stations are finished, sometimes into late November.

Figure 4.105 Locations of Industry - DFO Collaborative Post-Season Snow Crab Trap Survey Stations



4.3.1.4 Sealing

Within Atlantic Canada, DFO issues an average of 16,000 seal harvester licenses annually with approximately 12,500 licensed harvesters (78 percent) residing in Newfoundland and Labrador. Hunters in this province mainly harvest harp seals for which the season is November 15 to June 14 annually, and therefore, occur primarily outside the timing of proposed Project activities. Approximately 70 percent of the Canadian seal harvest occurs off Eastern Newfoundland and Labrador, beginning around the second week of April and ending when individual quotas are achieved or ice conditions become unfavourable (DFO 2011).

The seal harvest occurs in an area known as “The Front” which is the seasonal formation of sea ice off southern Labrador and northeastern Newfoundland which moves away from the land toward the south and southeast. Its movement and direction is in response to the general southward flow of the Labrador Current and the prevalence of offshore westerly winds (Sanger 1998). Within the Study Area, the harvest occurs at The Front in Sealing Areas 5, 6, 7 and 8 off the Newfoundland coastline (Figure 4.106).

4.3.1.5 Aquaculture

More than 120 licensed aquaculture sites exist along the coastlines of Newfoundland. These sites include: 68 Atlantic salmon spawning facilities, 23 steelhead trout farms, 12 Atlantic cod grow-out facilities, 11 blue mussel farms, three rainbow trout farms, two Arctic char facilities, one oyster farm, one cunner farm and one eel facility (Budgell 2014). Aquaculture is mainly clustered in two areas of Newfoundland: the Connaigre Peninsula on the south coast for finfish farming and Notre Dame Bay for blue mussel farming. Aquaculture sites are located in sheltered areas that are located quite far away from the deep sea environment that comprises the Study Area.

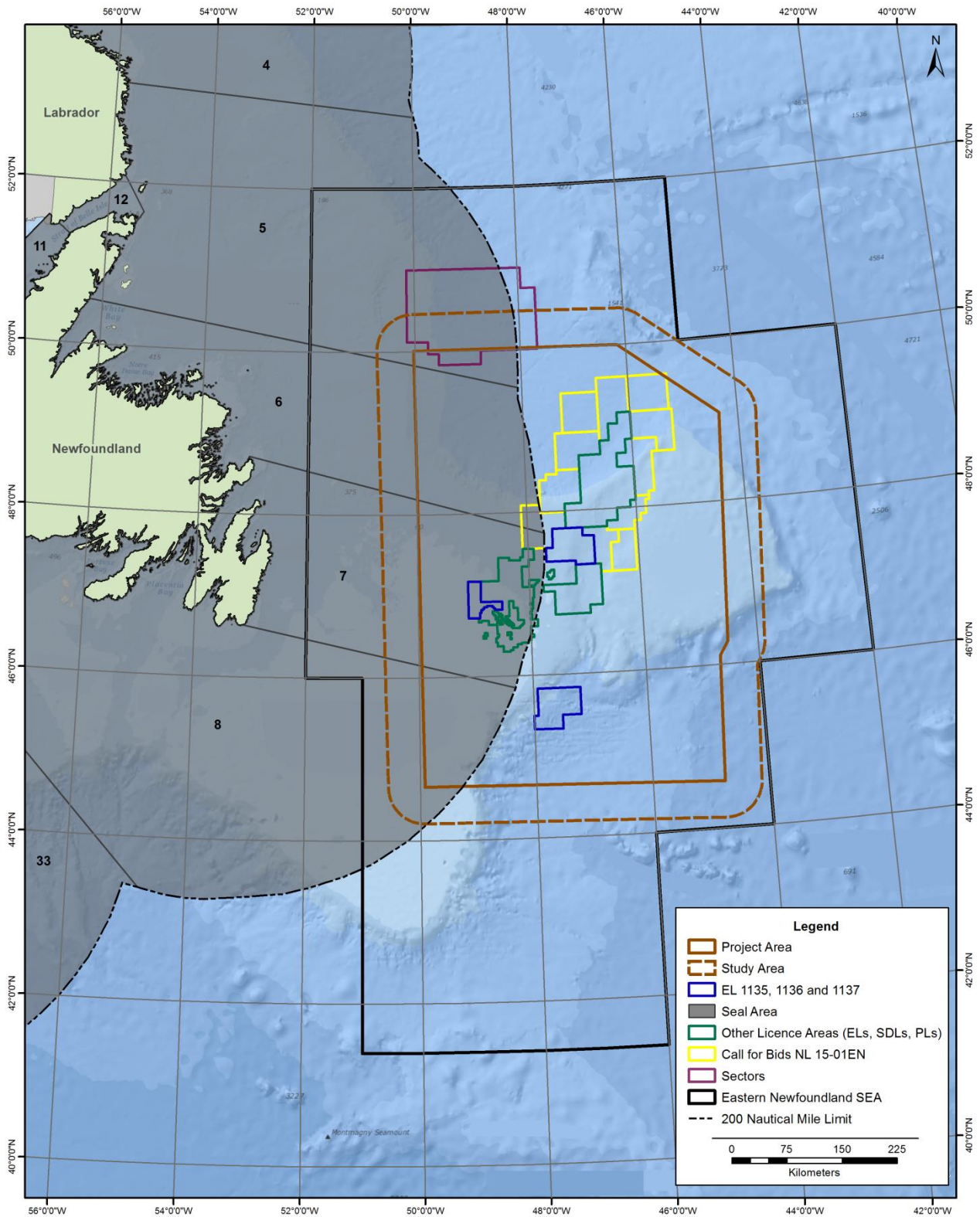
4.3.1.6 Recreational Fishing and Other Activities

In Newfoundland and Labrador, recreational fishing takes place in both coastal and inland waters. Newfoundland and Labrador has nearly 200 scheduled salmon rivers that are subject to specific angling (fly fishing) regulations. Requirements vary depending on the river and special management measures are applied to particular rivers or sections of rivers. Smelt angling in coastal waters is permitted throughout the year, with no bag or possession limit for this species (DFO 2014).

For specified periods during the summer and fall, residents and non-residents are permitted to participate (with licences or tags not being required) in a recreational / food fishery for groundfish species. Commercial fishing and sale of catch from the recreational fishery are not permitted (DFO 2014). This fishery occurs in nearshore areas, and is therefore again quite far away from the deep sea environment that comprises the Study Area.

There are no known Aboriginal interests or associated resource use activities that occur within the Study Area.

Figure 4.106 Seal Harvesting Areas



4.3.2 Other Marine Components and Activities

A number of other human activities occur within or near the marine environment of the Study Area, as summarized below.

4.3.2.1 Marine Transportation and Shipping

The Eastern Newfoundland region is host to a wide variety of transportation activities including small boat movements, ferry services, marine shipping and other general vessel traffic, most of which occur in nearshore areas and to much a lesser extent in the offshore.

In Newfoundland and Labrador, 203 Harbour Authorities operate a total of 251 harbours, a number of which are located along the east coast of Newfoundland (Boutilier 2015). This includes “core fishing harbours” which are managed by local Harbour Authorities and are central to the fishing and aquaculture industries, as well as non-core harbours (DFO 2015). All harbours may also be used for recreational boating and marine tourism activities. In Newfoundland and Labrador, a number of ports ship goods to and from domestic destinations. This includes St. John’s harbour, where general shipping and service to the offshore oil and gas industry together account for more than 55 percent of total domestic shipping movements (ballast and cargo) in the province (Statistics Canada 2013). Ships travelling between St. John’s and existing oil and gas installations are active year round and may traverse through the Study Area. Other Newfoundland and Labrador ports also engage in international shipping, including Fortune (the port of entry / exit for St. Pierre and Miquelon) and Come By Chance in Placentia Bay (associated with the shipping of petroleum products).

Some ships moving in the Atlantic Ocean to and from Newfoundland and Labrador ports, as well as those from other locations in Atlantic Canada and Quebec may take routes through the Study Area. In 2011, nearly 67 percent of import cargo (by tonnage) to Newfoundland and Labrador came from the Middle East. Nearly 62 percent of Nova Scotia imports came from Africa and 36 percent of goods arriving in New Brunswick came from the Middle East. In Quebec, 40 percent of exports and 33 percent of imports in 2011 were to and from Europe (Statistics Canada 2012).

As ocean shipping is the most energy efficient means of long-distance transport for large quantities of goods, it is used widely throughout the world. It is estimated that as much as 90 percent of world trade is moved by ships, and that volume is growing at a faster rate than the overall world economy. Efforts to map shipping movements show a complex network of routes with thousands of annual journeys crossing the Atlantic Ocean between ports in Eastern Canada and United States to the United Kingdom and Europe, some of which may cross the Study Area. Shipping lanes are not delineated and it is typically assumed that the shortest routes are taken (Kaluza et al 2010; NCEAS 2013).

Marine Communications and Traffic Service (MCTS) Centres are located throughout the province of Newfoundland and Labrador, including in Placentia Bay, St. John’s, Argentia, Port aux Basques and Labrador. MCTS centres are responsible for ensuring safe marine navigation, optimizing traffic movement and facilitating ship to shore communications. These centres provide distress communications / coordination and maritime safety information broadcasts (CCG 2015). In Eastern Newfoundland, vessel traffic separation zones are maintained in Placentia Bay and around St. John’s Harbour. Shipping lanes are not delineated outside of vessel traffic separation zones, and thus, the Canadian Coast Guard does not regulate vessel traffic in the Study Area itself.

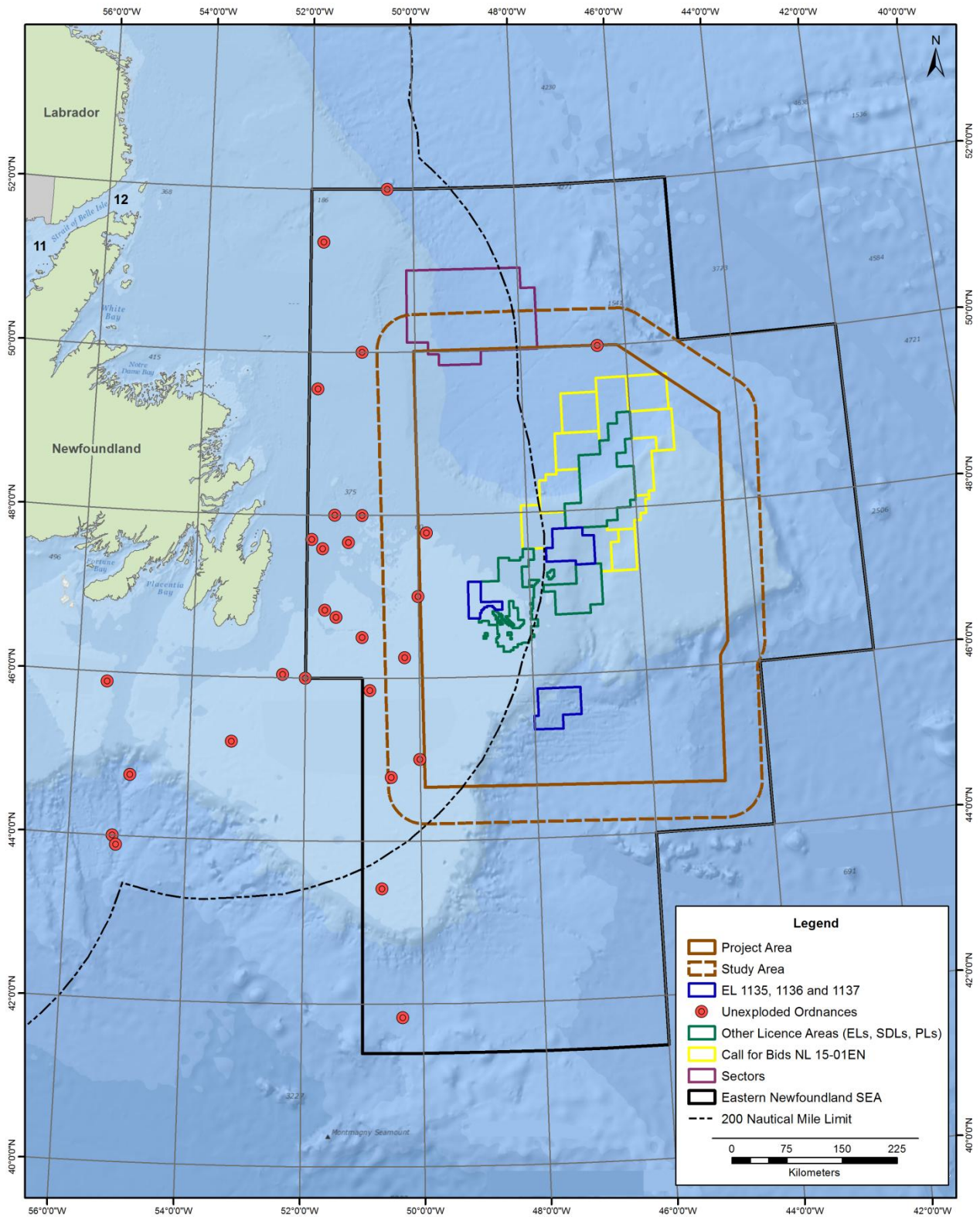
4.3.2.2 Unexploded Ordnances and Legacy Sites

Unexploded ordnance (UXO) are explosives that were intentionally left undetonated or did not explode as intended. Potential UXO sites in the Atlantic Ocean include sunken ships and submarines as well as munitions dump sites. A Department of National Defence (DND) UXO legacy site is any property that was formerly owned, leased or used by DND, which has an ongoing associated UXO risk. DND's UXO and Legacy Sites Program was established in 2005 to manage safety risks posed by Canadian UXOs (DND 2013). Based on the most recent information available from DND, there are eight known UXO sites identified within the Study Area (Table 4.31, Figure 4.107) (Amec 2014, Giffin 2014, 2015; Kearney 2014).

Table 4.31 Unexploded Ordnances Sites

Site Name	Type
U-658 Submarine	Shipwreck
U-520 Submarine	Shipwreck
Edward A. Cohan	Shipwreck
Jean M. Madelin	Shipwreck
Magnhild	Shipwreck
Nokomis	Shipwreck
R. Bowers	Shipwreck
Rosland	Shipwreck
Sources: Giffin (2014, 2015); Amec (2014); Kearney (2014); LGL (2010)	
Note: Several of these are in very close proximity to one another, and therefore show as a single "dot" on the accompanying Figure	

Figure 4.107 Unexploded Ordnances and Legacy Sites



4.3.2.3 Marine Cables

A number of existing marine cable networks cross through the Study Area (Table 4.32). The 4,600 km Hibernia Express cable (with one line) from the United States to the United Kingdom is scheduled to be installed and operational in 2015 (Hibernia Networks 2014; Mahlknecht 2014; HSN 2015; TeleGeography 2015).

Table 4.32 Marine Cables

Cables	Landings	Cable Length	In Service	# of Lines in System	Lines in Study Area
Apollo	USA, UK, France	13,000 km	2003	2	2
Atlantic Crossing-1 (AC-1)	USA, UK, Netherlands, Germany	14,301 km	1998	2	1
Atlantic Crossing-2 (AC-2) (aka Yellow)	USA, UK	7,001 km	2000	1	1
Flag Atlantic (FA-1)	USA, UK, France	14,400 km	2001	2	1
Hibernia Atlantic	Canada, USA, Ireland, UK	12,200 km	2001	2	2
TAT-14	USA, UK, France, Netherlands, Germany, Denmark	15,295 km	2001	2	1
Tata TGN-Atlantic	USA, UK	13,000 km	2001	2	2

Source: Hibernia Networks (2014); Mahlknecht (2014); TeleGeography(2015)

4.3.2.4 Marine Tourism and Recreation

Operators in Newfoundland and Labrador offer a variety of marine-based tourism activities, which are widespread throughout coastal areas. Boat tours and sea kayaking are among the most commonly offered activities and hiking trails located all along the coastlines are used on a more non-commercial basis (NLT 2015). These activities mainly occur at or near the coast rather than in the open ocean.

From May and October 2014, cruise ships visited various ports in Newfoundland and Labrador (Cruise NL 2014), and those that visit the province offer a variety of itineraries. Some circumnavigate Newfoundland and may also visit Labrador while others include Newfoundland and Labrador as a portion of an ocean tour of Atlantic Canada and / or New England. Cruise ships of various sizes cross the Atlantic Ocean between points in Newfoundland and Labrador (usually St. John's, Labrador, L'Anse aux Meadows, St. Anthony or the west coast of the Island) and Greenland, Iceland, Ireland, England or Europe. While some of these ships, particularly those travelling between St. John's and Ireland or England, may travel through the Study Area, most often these ships take a northerly route through Greenland or Iceland (Cruise NL 2014).

Newfoundland and Labrador has regulated hunting zones for waterfowl, snipe and murre species. Birds are generally hunted in fall and winter, from September to March, with no spring / summer bird hunting season (NLDEC-WD 2014; Environment Canada 2014). Migratory game bird hunting takes place in coastal areas of Newfoundland and Labrador and not in the Study Area.