

7. Commercial Fisheries

The dominant human activity in the marine environment off Labrador is the commercial fisheries. It is also one of the most important elements of the environment which might impact seismic surveys. Over many years of planning and conducting seismic surveys in Atlantic Canada, a detailed understanding of commercial fisheries activities has proven essential in order to prevent impacts on the fisheries as well as to avoid impacts on the conduct of the survey. This section describes the commercial fisheries in the area of the proposed survey in recent years and anticipated fisheries during the assessment period. Section 11.4 and 11.10 describe mitigations related to the fisheries.

7.1. Study Area Overview

In recent decades, there have been environmental and human-induced changes that have affected the northern Grand Banks and Labrador Shelf ecosystem. These changes have - at least in part - led to the collapse of several fish populations, and the closing or severe limiting of major groundfisheries. In addition there has been an increase in the harvests of species, such as crab and shrimp, that had been less important previously. In April 2003, all the northern cod stock fisheries were closed completely.

7.1.1. Historical Context

This section provides NAFO convention historical statistics (1995-2004) and DFO historical statistics (1987-2006) for the Study Area (NAFO Subdivision 2).

Two of the principal Study Area commercial species (turbot and shrimp) are managed under NAFO. The following graphs show the harvest (Canadian and foreign) over the decade 1992 – 2001. The foreign harvest of turbot was taken by Japan, France, Russia, the Faeroes and Norway over these years; The shrimp harvest in the area is now virtually all domestic, though up to 1993 there were harvests by Europe and the Faeroes.

Figure 7.4 present a 20-year (1987-2006) synopsis of the domestic harvest of all species from the Study Area (NAFO Divisions 2J, 2H and 2G). Figure 7.4 illustrates the change in harvesting largely brought about by the collapse of the groundfisheries in the area. It shows the decline in groundfish harvesting and the rise in other species catches (mainly shrimp and snow crab) over this period.

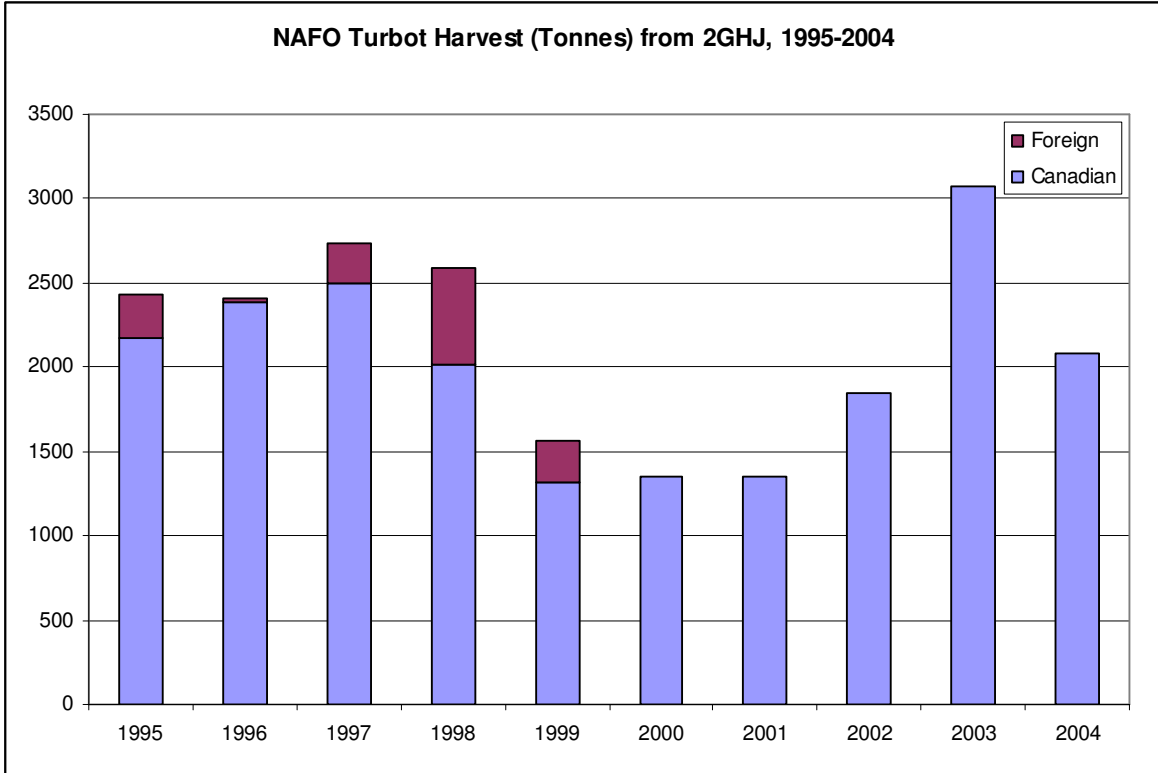


Figure 7.1: NAFO Turbot (Greenland Halibut) Harvest 1995-2004

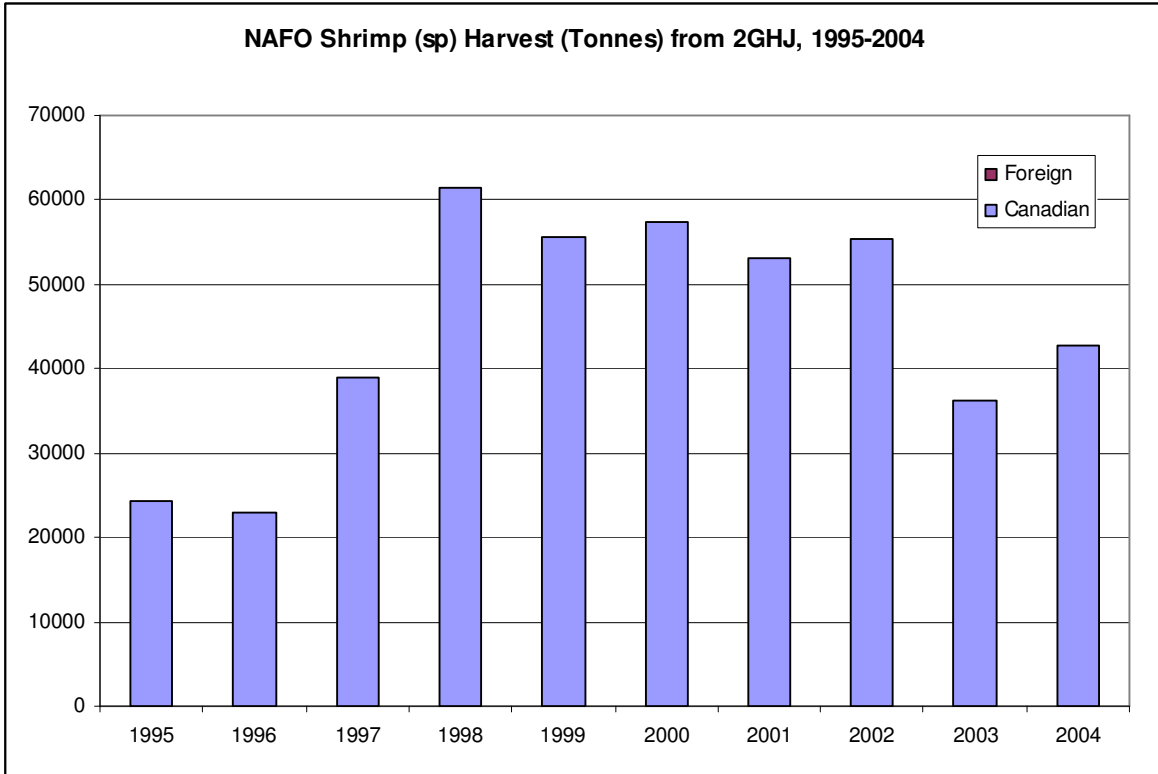


Figure 7.2: NAFO Shrimp (sp.) Harvest 1995-2004

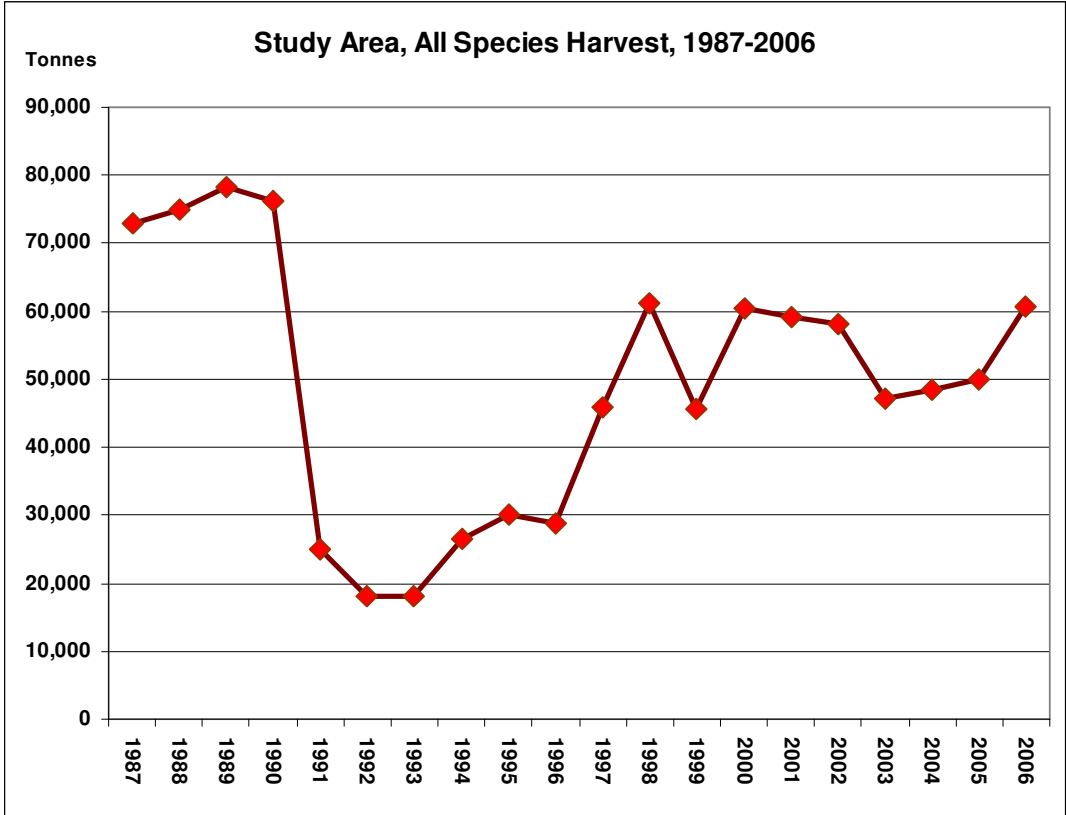


Figure 7.3: Study Area Domestic Harvest, All Species, 1987-2006

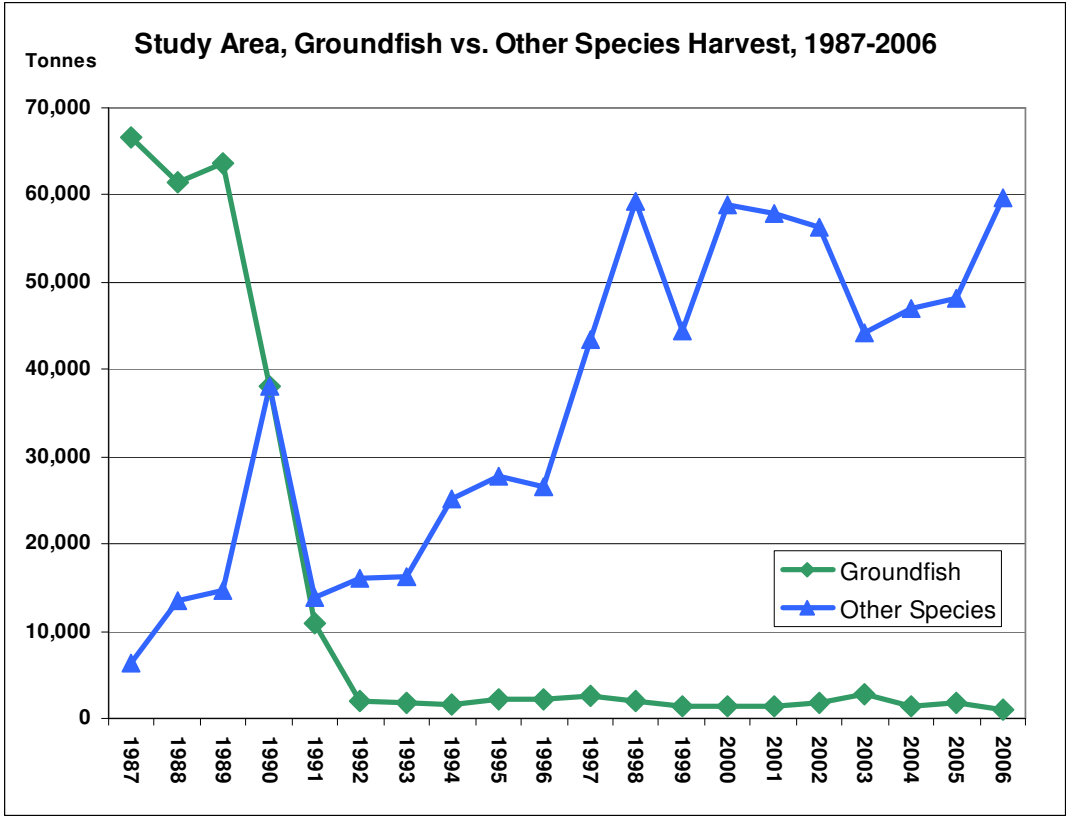


Figure 7.4: Study Area Domestic Harvest, Groundfish vs. Other Species, 1987-2006

7.1.2. Study Area Fisheries

Table 7.1 quantifies the domestic harvest from within all of NAFO Divisions 2J, 2H and 2G, the fisheries management areas from Battle Harbour to north beyond Cape Chidley (61 00° N), by species, for the proposed survey period, June – November, based on 2004 – 2006 catch data. As this table shows, the principal fishery (by quantity of harvest) within the survey window is for shrimp (nearly 93% over the 3 years). The shrimp harvest is primarily (98% over the 2004-2006 period) northern shrimp (*Pandalus borealis*) with lesser quantities (2%) of striped shrimp (*Pandalus montagui*).

Much smaller - though important - quantities of snow crab (3.5%) are harvested in the south, and turbot (2.5%) throughout the area. All other species combined made up just 1.3% of the total harvest in these years. The same is true throughout the full year, except that shrimp makes up an even larger proportion of the annual harvest.

**Table 7.1: Quantity of Harvest by Species, Study Area
June - November, 2003 – 2005**

Species	Tonnes	% of Total
2004		
Turbot (Greenland halibut)	1,407.1	2.9%
Grenadier, rough-head	26.9	0.1%
Scallop, Iceland	384.0	0.8%
Shrimp, northern	44,209.7	91.4%
Crab, snow	1,923.7	4.0%
Shrimp, striped	283.0	0.6%
Seal meat	6.8	0.0%
Seal fat	15.2	0.0%
Seal livers	94.9	0.2%
Other	17.3	0.0%
Total	48,351.4	100.0%
2005		
Flounder, greyscale	10.7	0.0%
Turbot (Greenland halibut)	1,736.7	3.5%
Grenadier, rough-head	12.0	0.0%
Whelks	38.3	0.1%
Scallop, Iceland	101.7	0.2%
Shrimp, northern	45,482.2	91.0%
Crab, snow	1,581.9	3.2%
Shrimp, striped	749.6	1.5%
Seal fat	9.6	0.0%
Seal livers	261.8	0.5%
Other	8.5	0.0%
Total	49,984.4	100.0%

2006		
Cod, Atlantic	43.6	0.1%
Cod, rock	27.8	0.0%
Turbot (Greenland halibut)	832.3	1.4%
Grenadier, rough-head	21.9	0.0%
Whelks	211.5	0.3%
Scallop, Iceland	683.3	1.1%
Shrimp, northern	54,632.3	90.0%
Crab, snow	2,044.1	3.4%
Shrimp, striped	2,134.6	3.5%
Seal meat	6.0	0.0%
Seal fat	54.0	0.1%
Other	3.1	0.0%
Total	60,691.2	100.0%

Source: DFO Maritimes and Newfoundland Regions, 2004-2006 catch and effort data. All data tables and graphs include both Newfoundland and Labrador and Maritimes Region DFO data.

Fisheries in the Study Area use both fixed gear (crab pots for snow crab, and gill nets and longlines for groundfish) and mobile gear (shrimp trawl for shrimp, and stern otter trawl for groundfish). Because mobile gears are towed behind a vessel they pose less risk of conflict with seismic surveys since the activity can be more easily observed at sea, while fixed gear must be located, identified and carefully avoided by the survey vessel and its streamer. More information on fishing gear is provided below with the key species fisheries.

7.1.3. Harvesting Locations

Figure 7.5 - Figure 7.7 indicate domestic fishing locations in relation to the Study Area during June through November (aggregated) for 2004, 2005 and 2006. These maps indicate that fishing is concentrated primarily in depths between 200 m and 1000 m. There is very little recorded activity in waters greater than 1000 m depth in those years, or in waters shallower than 200 m (e.g. the banks). As the maps indicate, the locations of activities from year to year have been generally concentrated in fairly specific or localized areas, and there are several areas within this region that are not normally heavily fished at any time during the 6 month survey window.

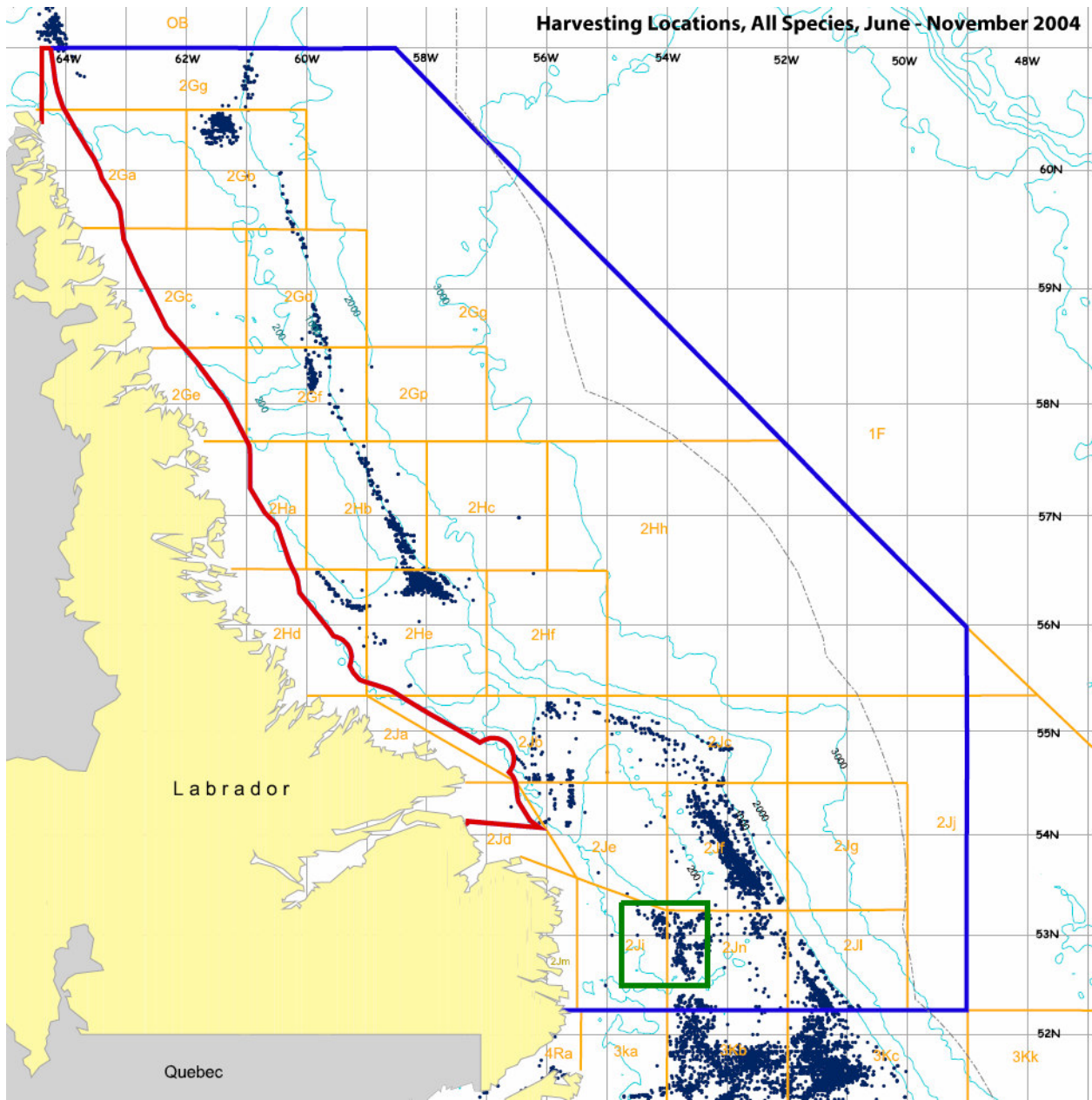


Figure 7.5: Harvesting, June - November 2004

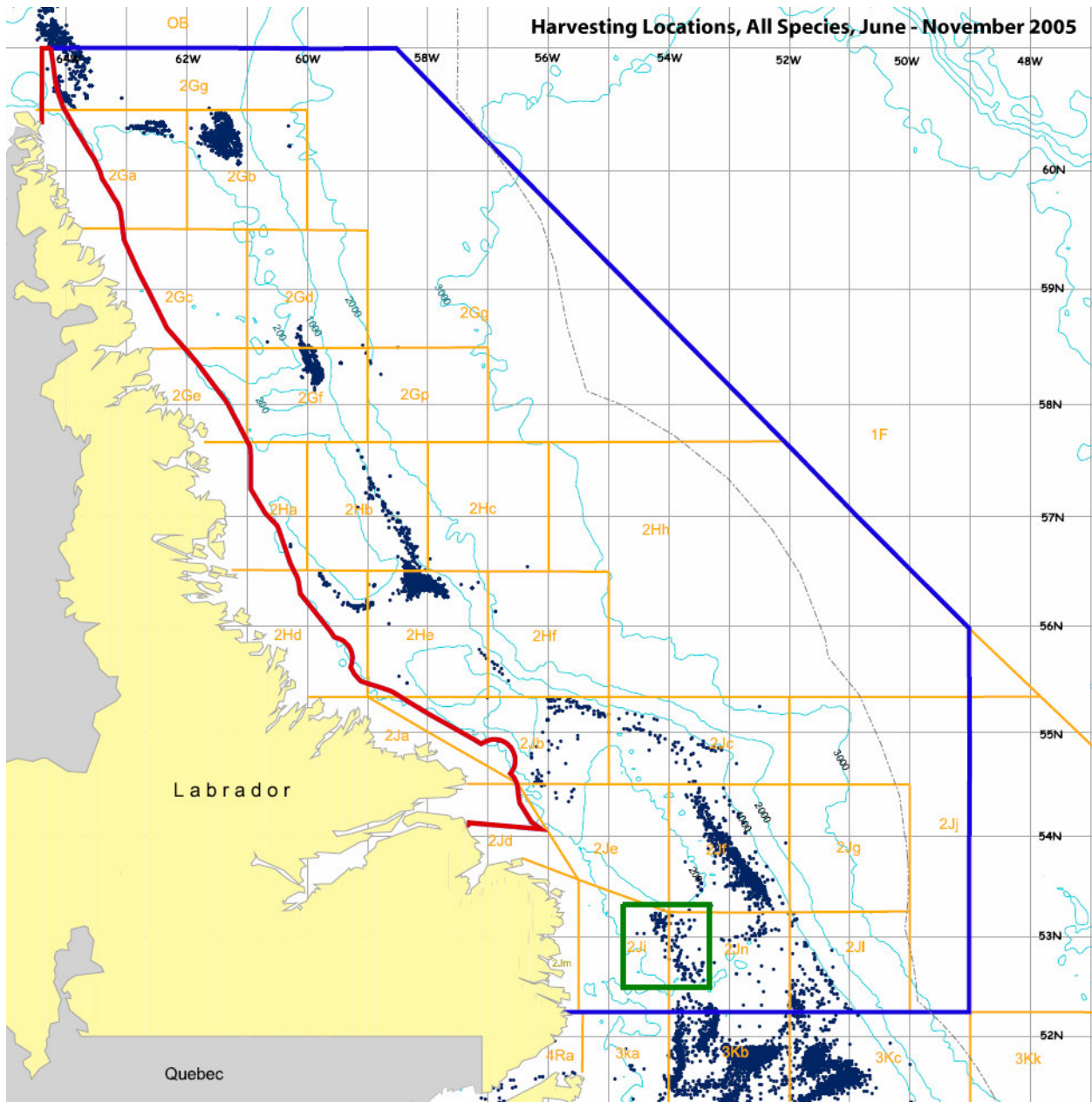


Figure 7.6: Harvesting, June - November 2005

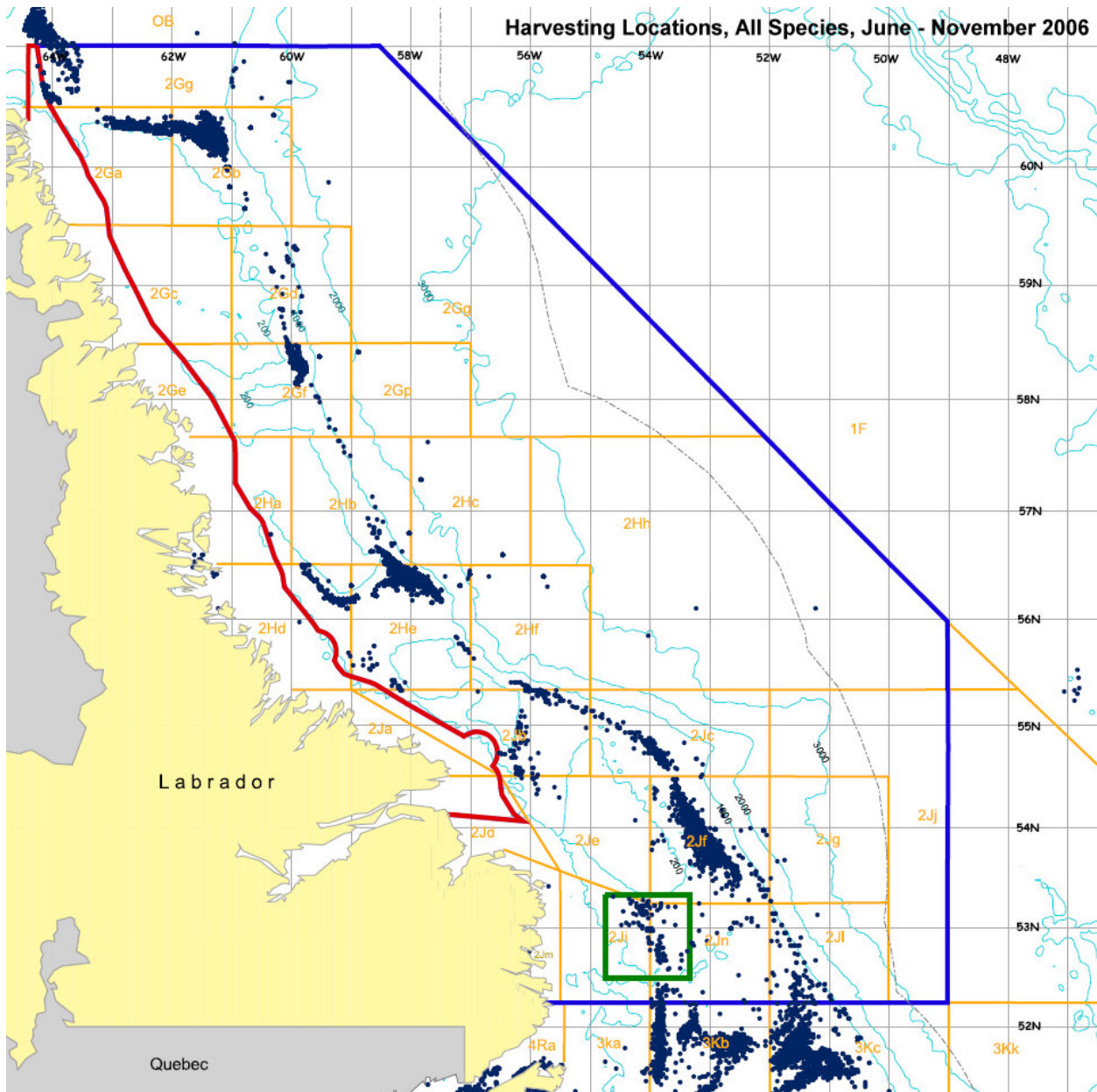


Figure 7.7: Harvesting, June - November 2006

7.1.4. Seasonal Distribution

As Figure 7.8 indicates, harvesting effort within the Study Area (2G,2G,2J) was spread quite broadly over the 12 months in the years indicated. Harvesting times may change, depending on the resource itself, the harvesting strategies of fishing enterprises, or on the seasons and regulations set by DFO. As the data indicate (Figure 7.8), the last three months of the year tend – on average - to be the least productive overall, in terms of quantity of harvest within the area.

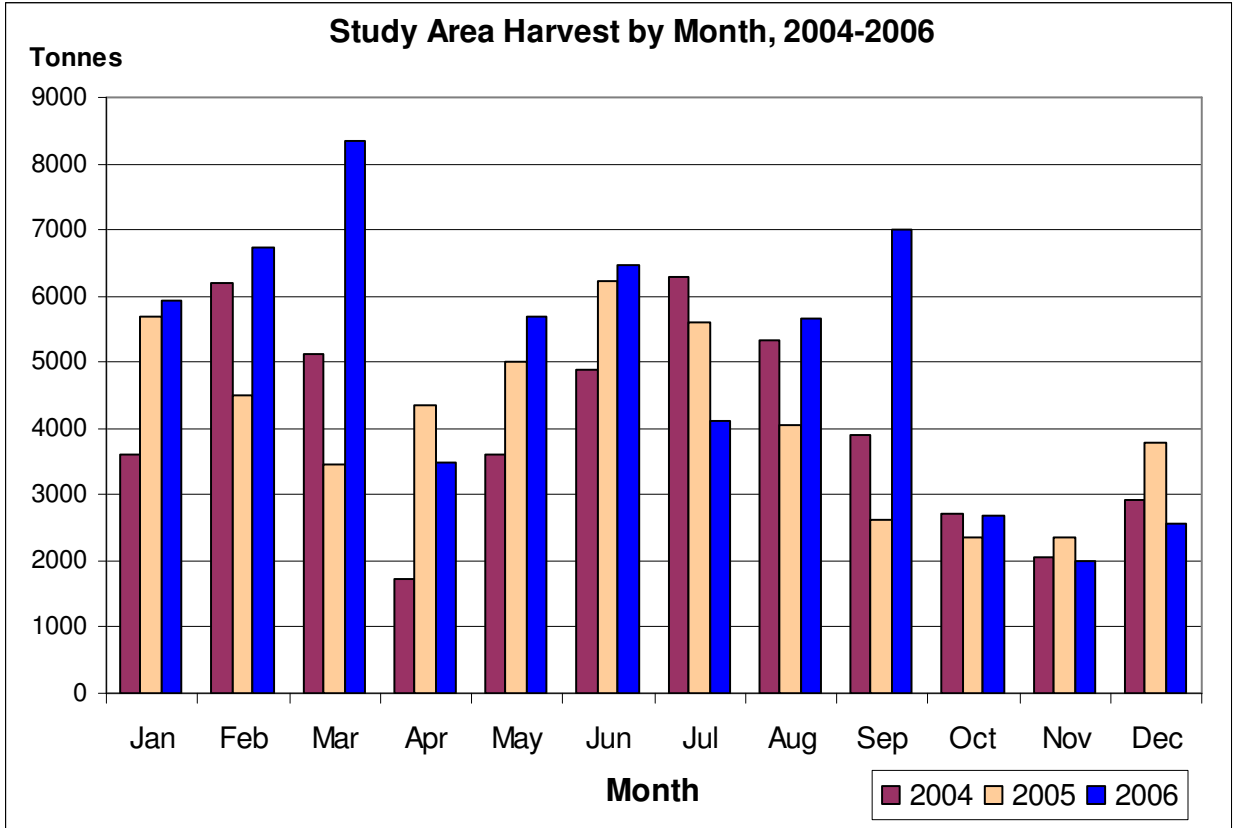


Figure 7.8: Study Area Harvest, All Species, by Month, 2004-2006

The following maps (Figure 7.9 - Figure 7.14) show the reported domestic harvesting locations, all species, by month for June to November 2004 – 2006 (aggregated for all three years). The sections on the individual species fisheries, below, provide more detail on seasonal harvesting patterns.

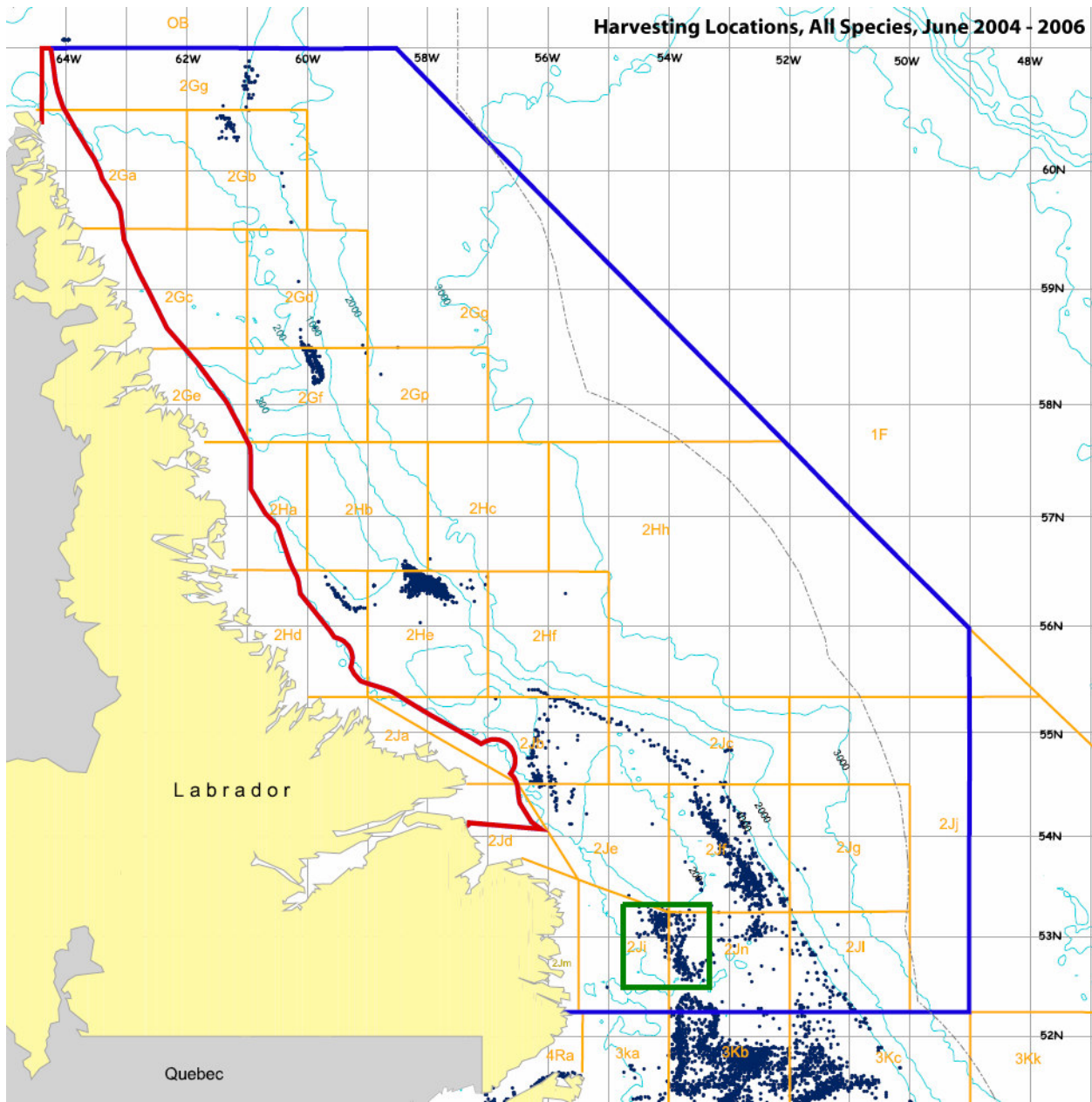


Figure 7.9: All Species Harvesting, June 2004, 2005 and 2006 (Aggregated)

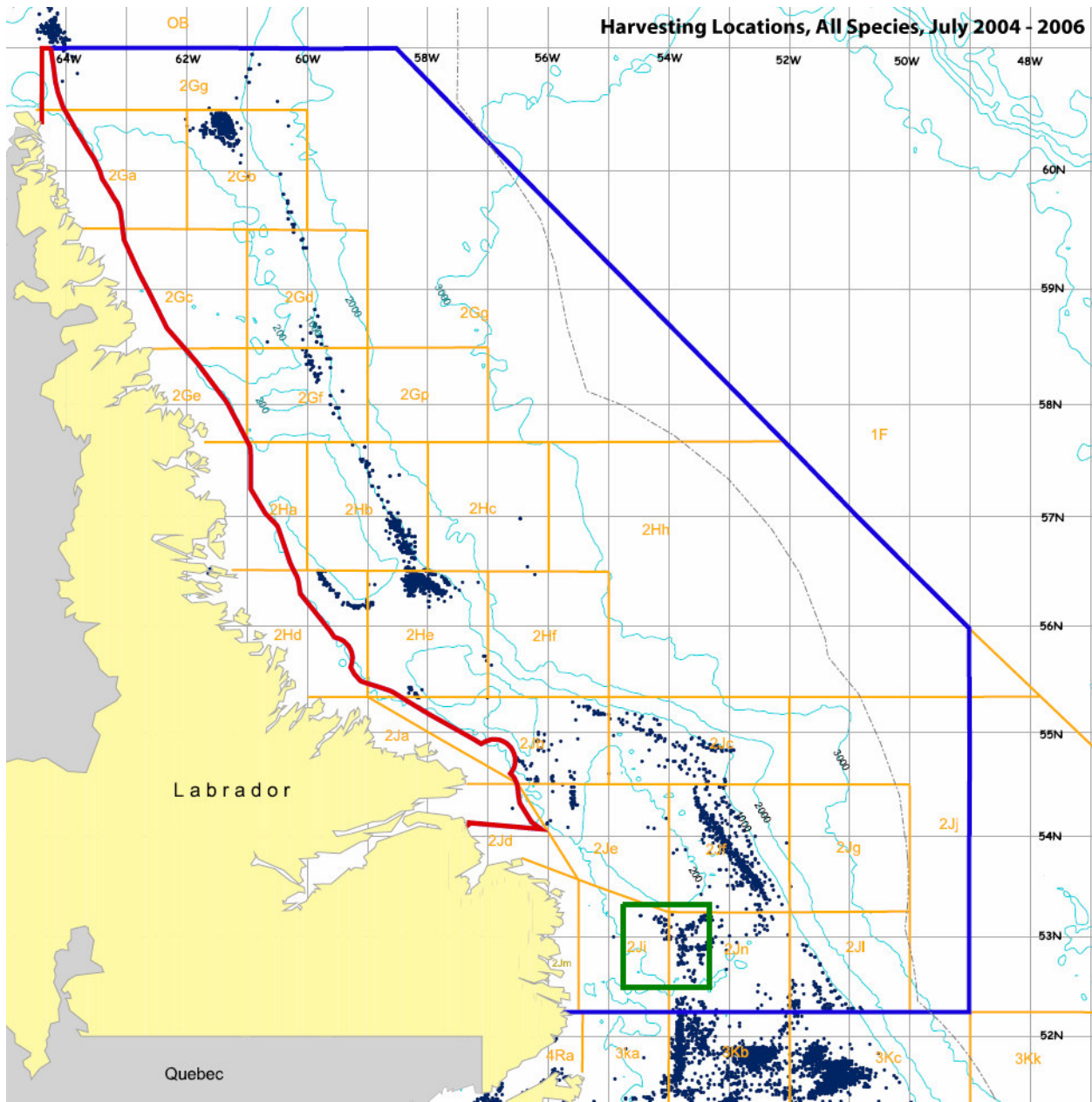


Figure 7.10: All Species Harvesting, July 2004, 2005 and 2006 (Aggregated)

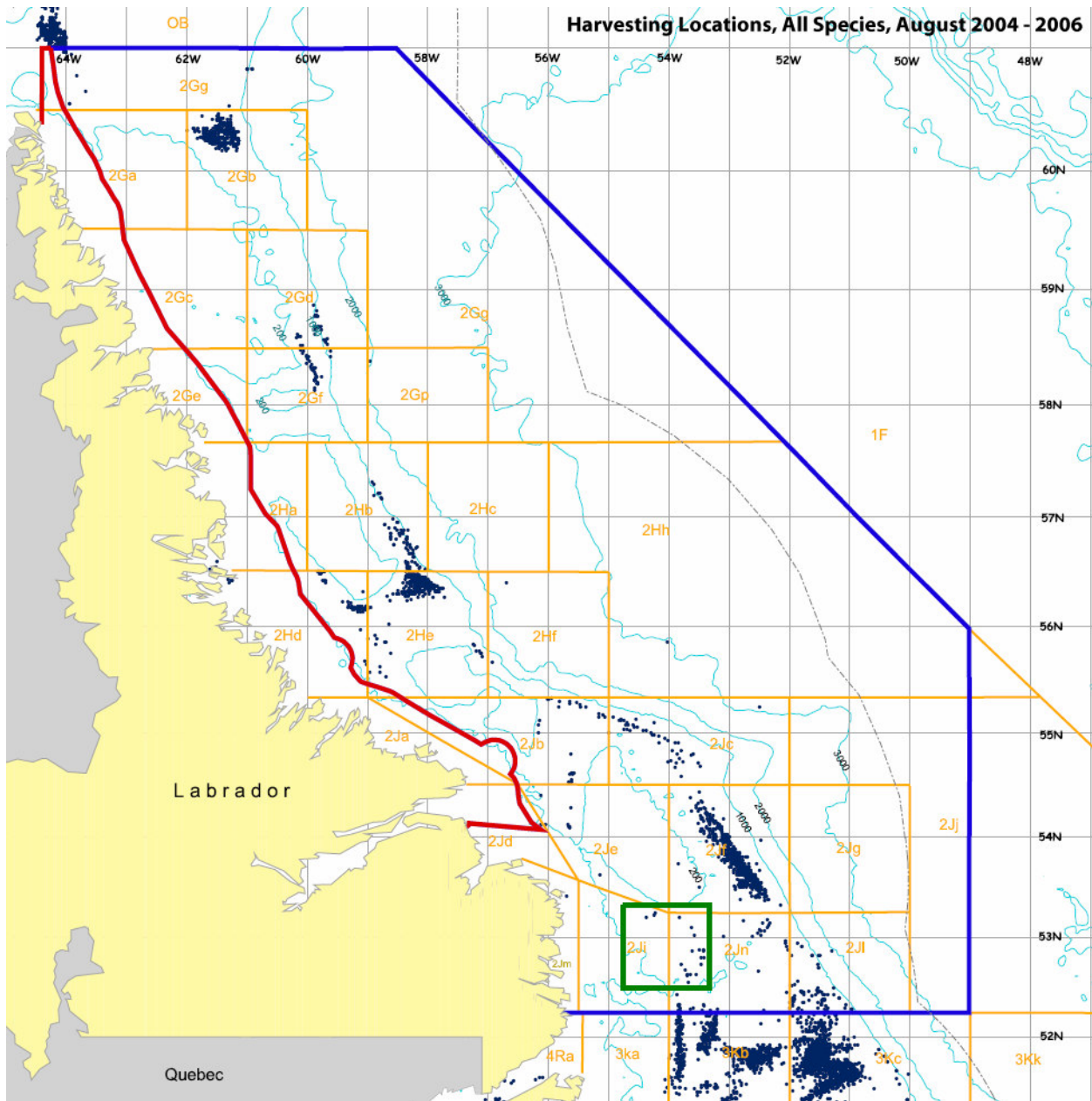


Figure 7.11: All Species Harvesting, August 2004, 2005 and 2006 (Aggregated)

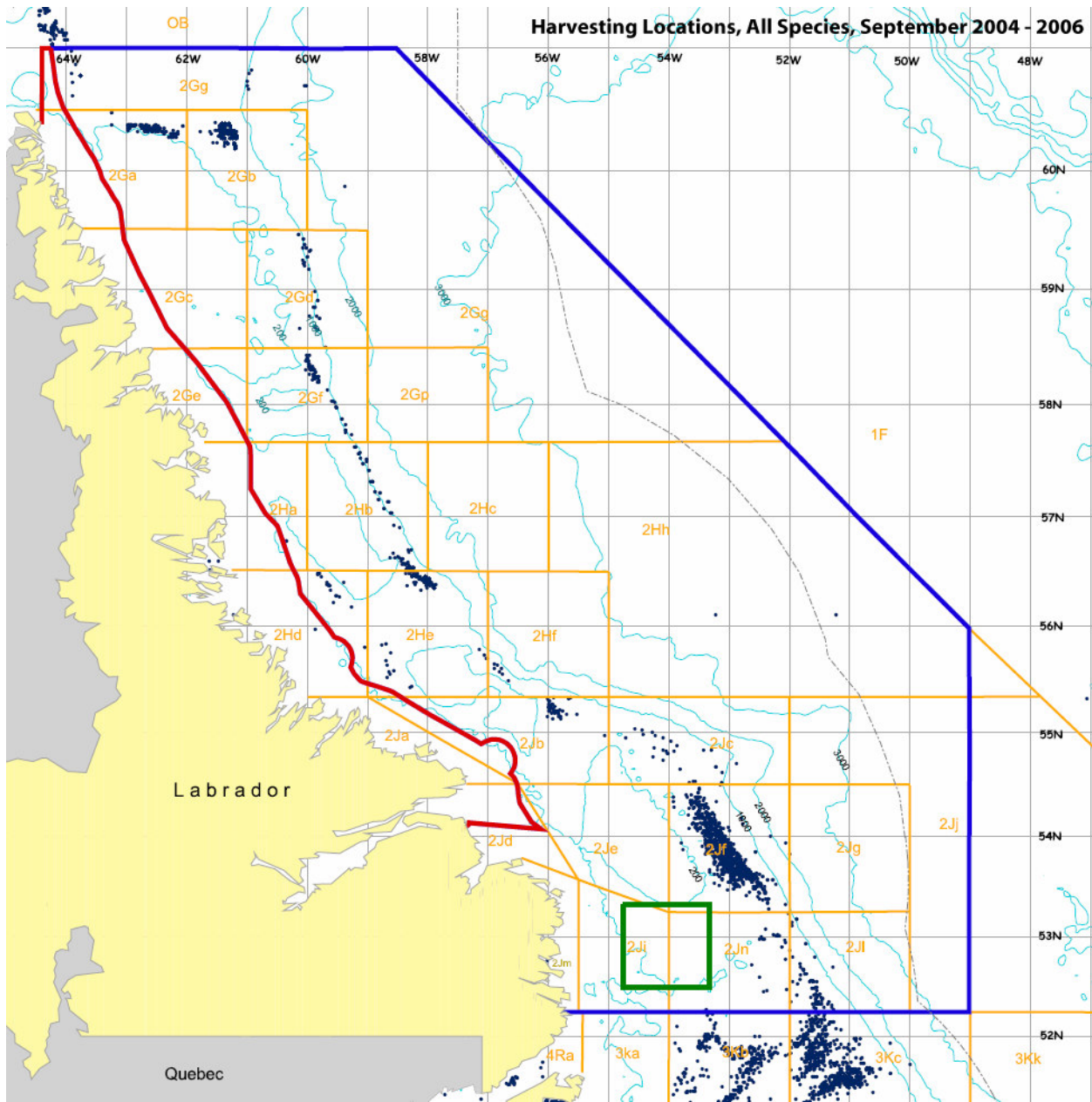


Figure 7.12: All Species Harvesting, September 2004, 2005 and 2006 (Aggregated)

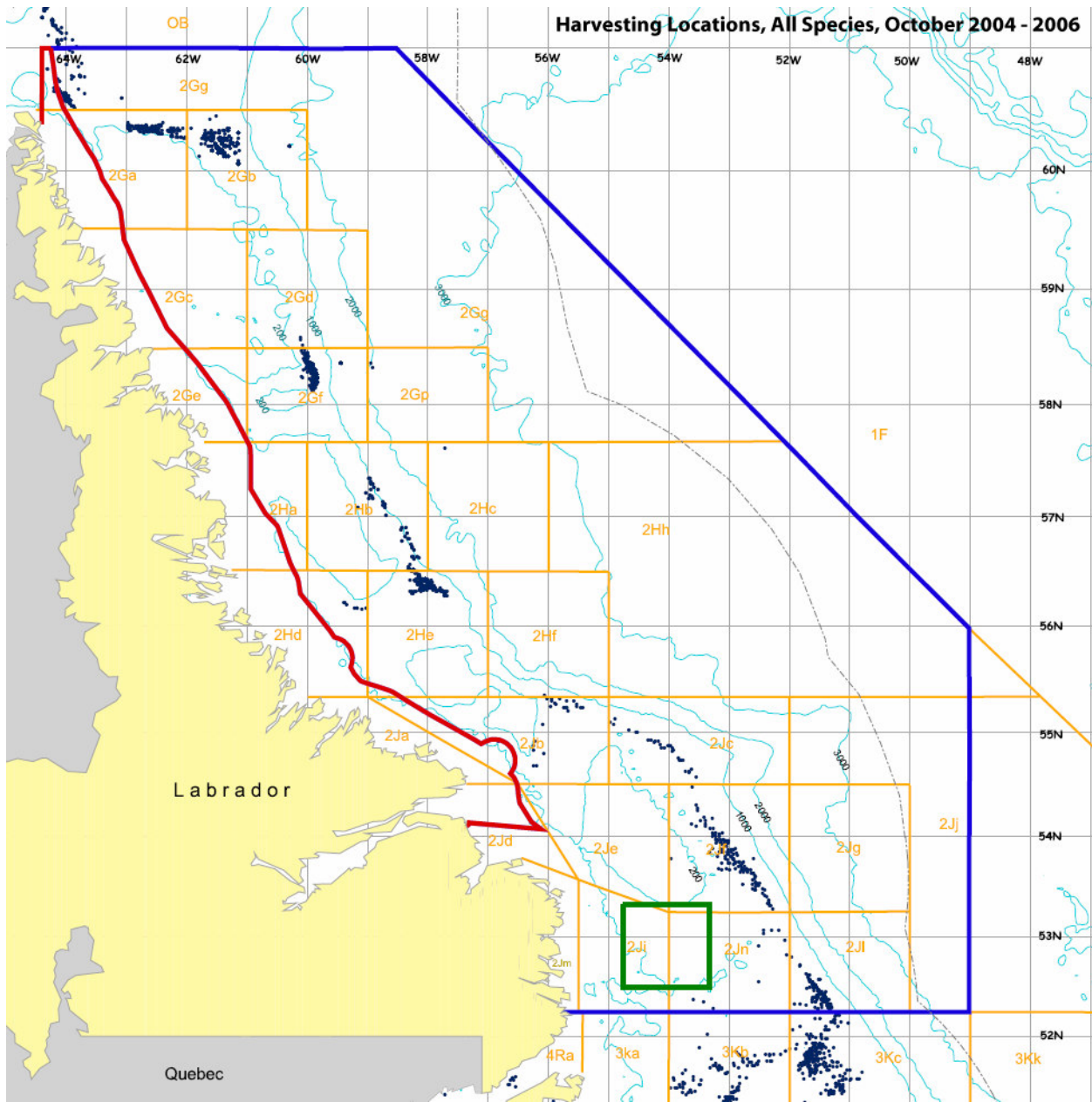


Figure 7.13: All Species Harvesting, October 2004, 2005 and 2006 (Aggregated)

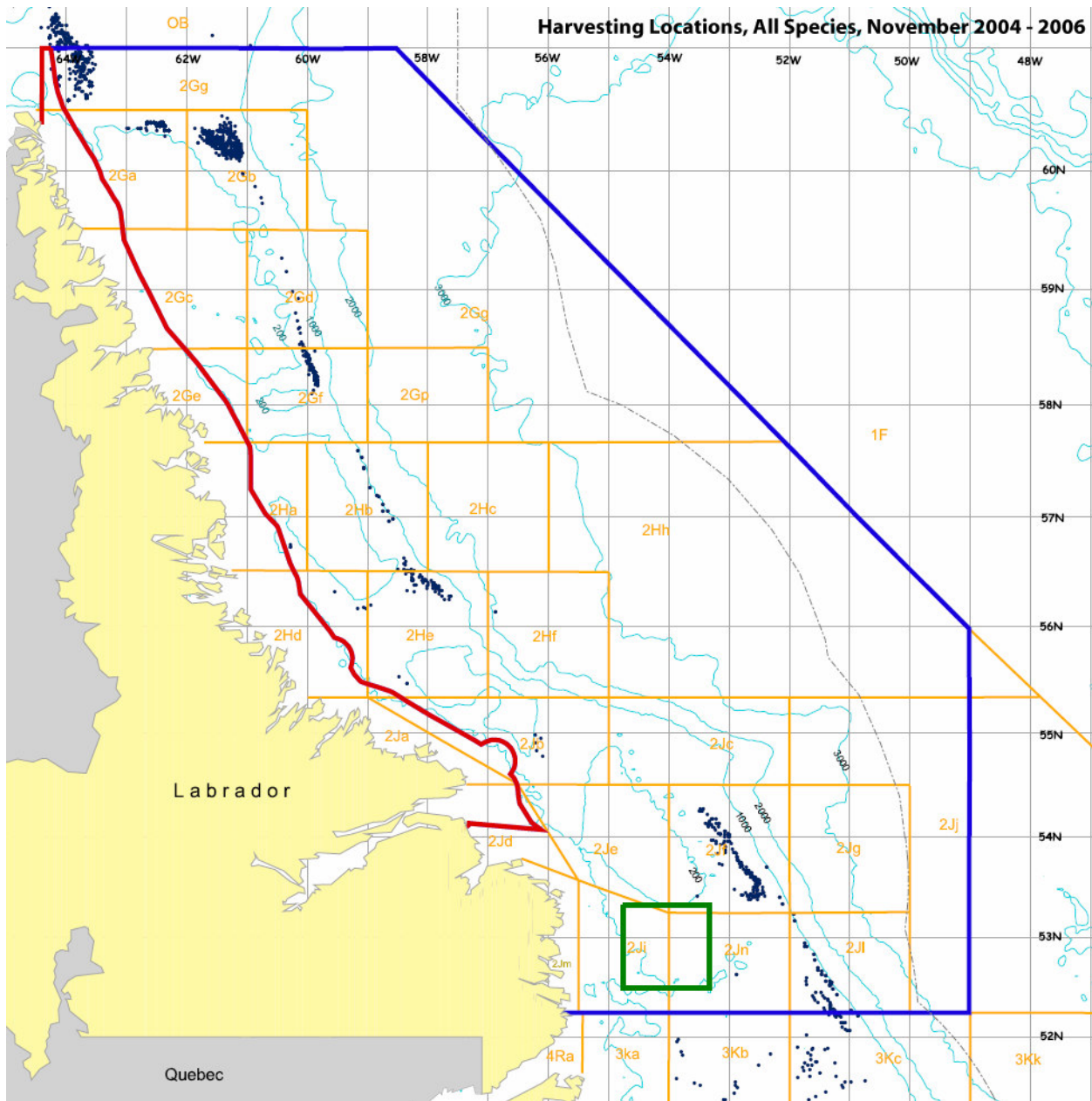


Figure 7.14: All Species Harvesting, November 2004, 2005 and 2006 (Aggregated)

7.2. Principal Species Fisheries

In the Study Area, just one fishery - shrimp (mainly northern shrimp) - made up nearly 93% of the catch by quantity in 2004 - 2006 during the assessment period. Nearly all the balance of the harvest was snow crab and turbot (Greenland halibut). The next largest harvest, by quantity, was Icelandic scallops (0.7%) within the 2G,2G,2J Study Area, but this was taken nearshore, mainly in Unit Areas 2Ha and 2Jm, outside the area of GSI's proposed seismic surveys.

This section describes the three chief fisheries in detail. Information about these key species and stock status information for other species harvested or found in these areas is provided in Section 6, above.

DFO managers consulted expect the main fisheries in these areas will continue to be similar to those of the past few years or so, considering the changes related to the cod closure that occurred in 2003. Other changes, discussed below in more detail, are related to quota changes in key fishery management plans.

7.2.1. Turbot (*Greenland Halibut*)

Three years ago (2003) within the Study Area, the turbot fishery made up more than 20% of the June - November harvest, by quantity. In 2004 this dropped to 2.9%, and in 2006 it made up less than 2%. This decline reflects a drastic cut in TAC for this fishery after 2003, as indicated in the following table from DFO Newfoundland Region. It shows the quotas for the 2003-2007 turbot fishery in 2G, 2H, 2J and 3K. (Turbot in Subareas 0+1 are managed bilaterally by Denmark, on behalf of Greenland and Canada) (DFO 2005, SSR2004/047).

Table 7.2: 2H, 2G, 2J and 3K Turbot Quotas, 2003 - 2007

	Share	2003	2004	2005	2006	2007
TAC		10,878	5,180	4,921	4,792	4,144
Canadian Quota	97.0%	10,552	5,025	4,773	4,648	4,020
French Quota	3.0%	326	155	148	144	124
All <100ft Vessels	61.0%	6,437	3,065	2,912	2,835	2,452
- FG <65ft	53.8%	5,678	2,704	2,568	2,501	2,163
- MG <65ft	1.9%	200	95	91	88	76
- FG 65-100ft	5.1%	538	256	243	237	205
- MG 65-100ft	0.2%	19	9	9	8	7
All >100ft Vessels	39.0%	4,115	1,960	1,861	1,813	1,568
- EA Holders	32.0%	3,377	1,608	1,528	1,488	1,287
- Galtois	1.9%	200	95	90	88	76
- Scandinavian long liners	5.1%	538	256	243	237	205

Sources: J. Perry, DFO, February 2005; D. Tobin, DFO, April 2006; March 2007.

The following graph shows the changes in harvesting levels for turbot over the last 20 years.

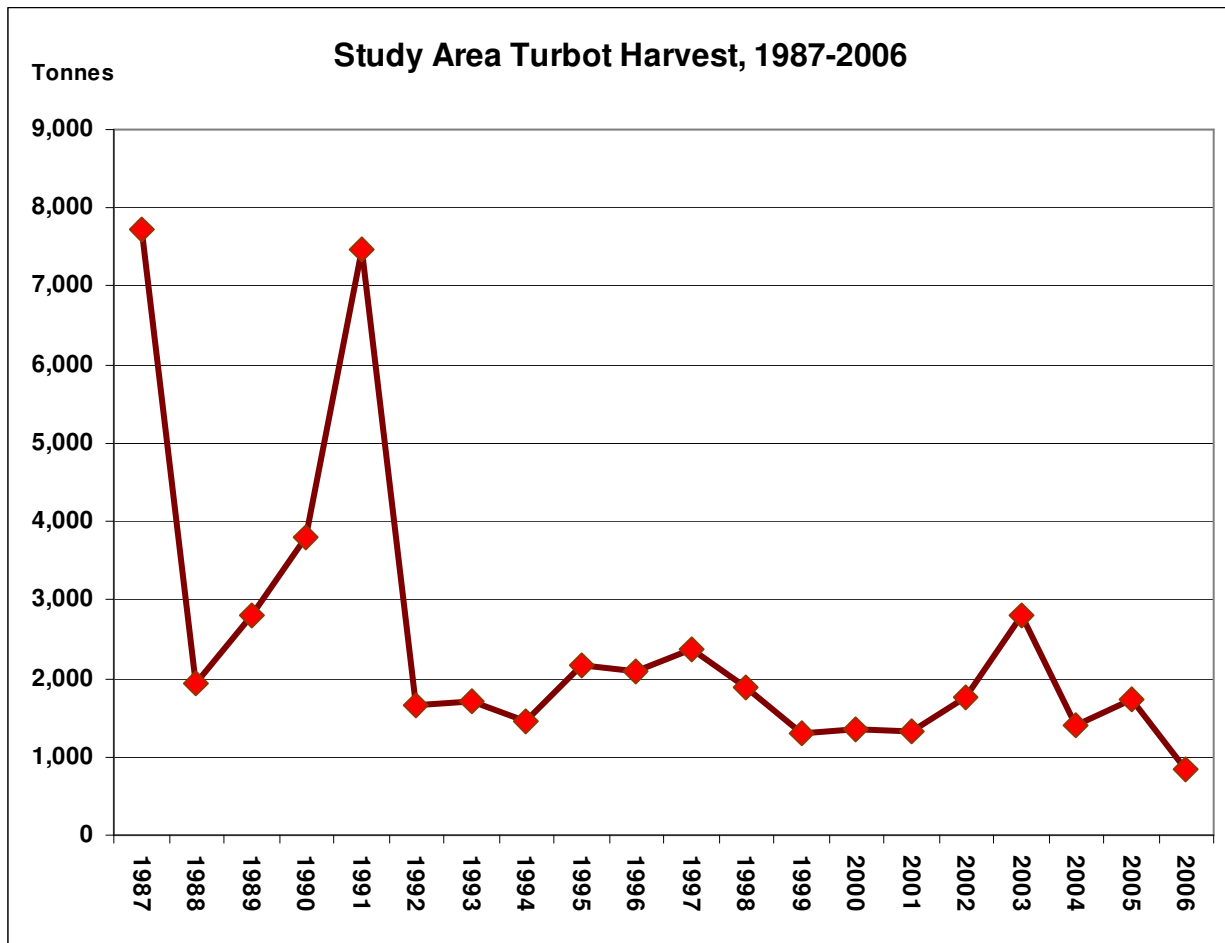


Figure 7.15: Study Area Domestic Turbot (Greenland Halibut) Harvest, 1987-2006

Nevertheless, turbot was by far the most important groundfish species harvested in 2004 - 2006, making up more than 99% of the groundfish catch in the Study Area. The following site contains the current (near real-time) 2007 landings to date:

http://www.nfl.dfo-mpo.gc.ca/publications/reports_rapports/Halibut_2007.htm.

The timing of the fishery varied somewhat during 2004 to 2006, though June to September accounted for the greatest part of the harvest in all these years. (Figure 7.16).

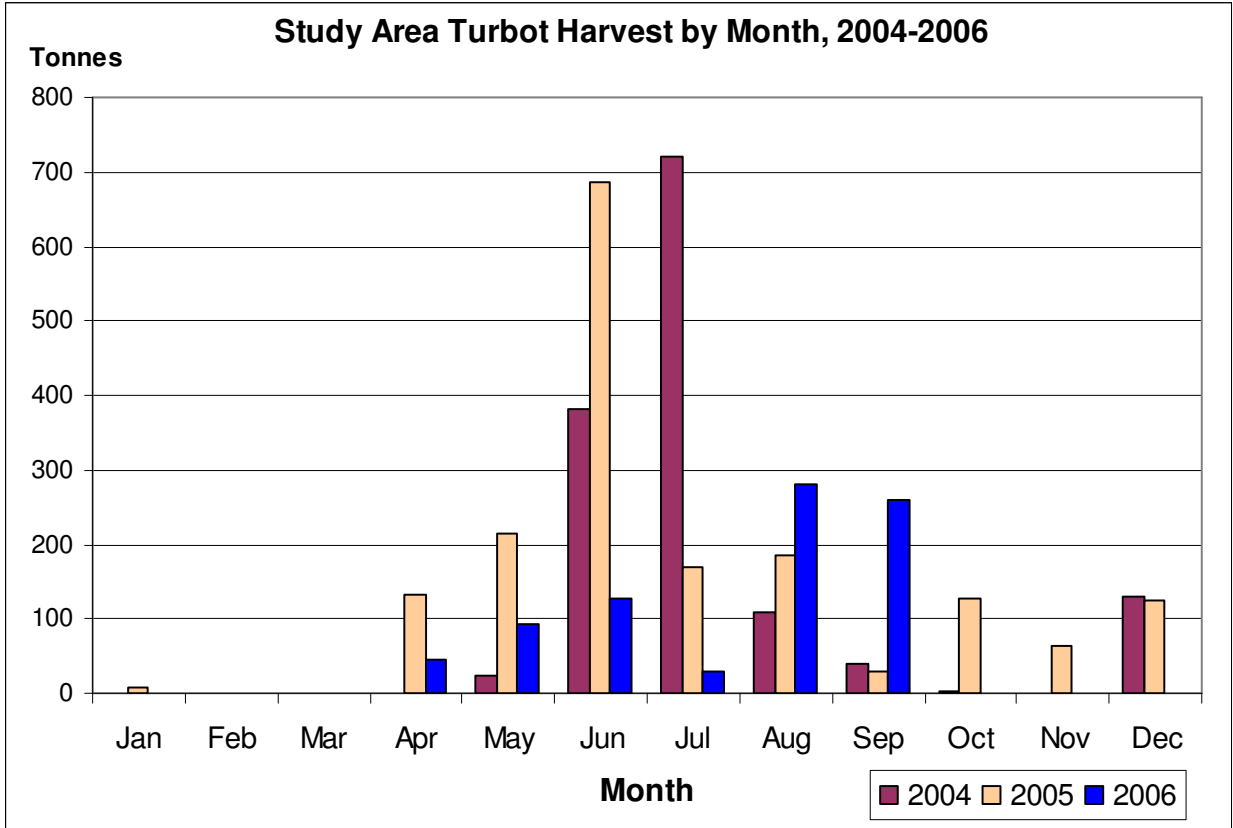


Figure 7.16: Study Area Turbot (Greenland Halibut) Harvest by Month, 2004 – 2006

Figure 7.17 - Figure 7.19 show reported turbot locations for June - November (aggregated) 2004, 2005 and 2006. As these maps indicate, the main concentration of fishing activity tends to be in relatively deep water near the 1,000 m contour.

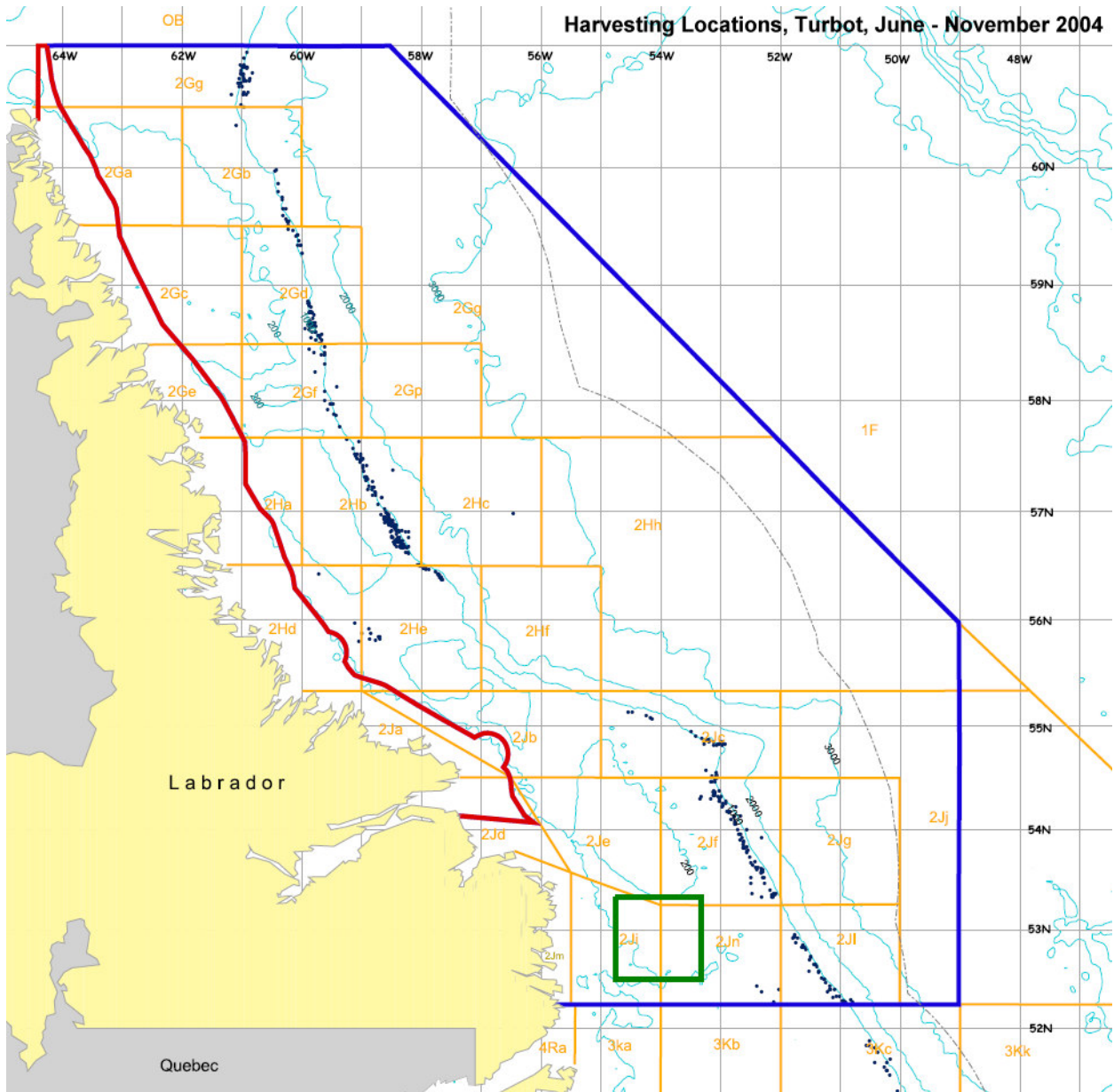


Figure 7.17: Turbot (Greenland Halibut) Harvesting, June - November 2004

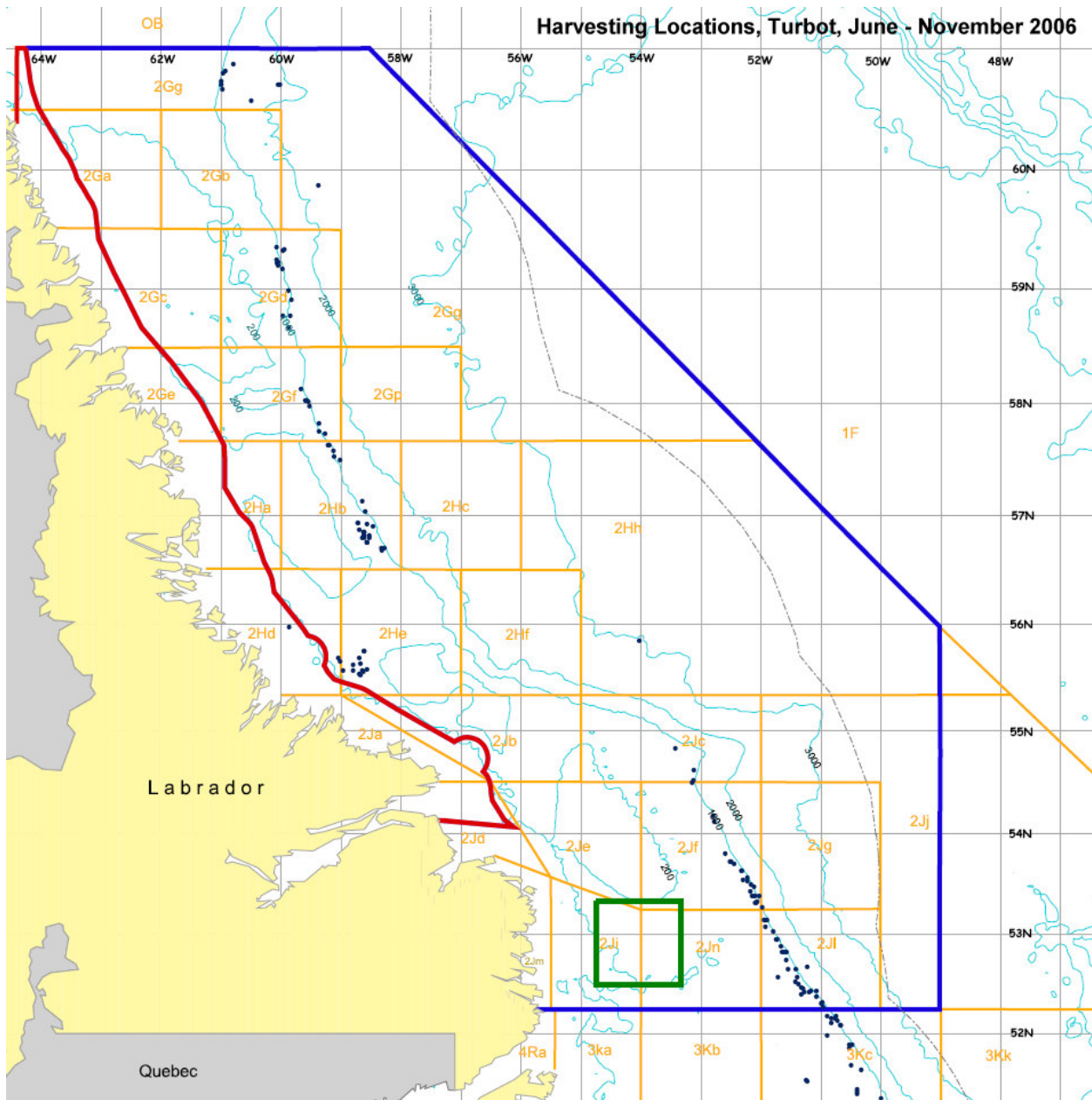


Figure 7.19: Turbot (Greenland Halibut) Harvesting, June - November 2006

In 2002, the Study Area turbot harvest was caught equally using fixed (set) gill nets and longlines. In 2003 and 2004, however, a large part of the turbot harvest was taken using large mobile stern otter trawlers (>150'), particularly in July and August 2003. In 2004 the split was 63% fixed gear (gill nets and longlines) and the remainder mobile trawlers. In 2006, though, the Study Area turbot harvest was 73% with gillnets, 17% with longlines and just 10% with stern otter trawls.

Consultations (2004-2007). DFO. In 2002 and 2003, DFO imposed several management provisions to the turbot fisheries. These included a variety of licence conditions pertaining to the

number of nets which fishers were permitted to deploy in different water depths.¹⁹ In 2004 DFO made several further changes in the 2+3K management plan for turbot primarily designed to protect and conserve crab resources. DFO announced that, in 2J, turbot gillnets would not be permitted in water depths less than 400 fathoms (727m). With respect to any turbot harvested with longlines, this gear would not be permitted in water depths less than 160 fathoms (290 m) (J. Perry, pers. comm. April 2004).

In addition, DFO announced a substantial reduction in the 2004 TAC for this species, as well as more gradual reductions for the 2005-2007 period, as shown in Table 7.2. The Canadian, all-fleet, quota (for 2+3K) was reduced by more than 50% - from 10,878 tonnes in 2003 to just over 5,000 tonnes in 2004. The 2004 quota for all Canadian vessels was about 5,000 tonnes, with 1,960 tonnes allocated to vessels > 100', and just over 3,000 tonnes for < 100' vessels. As the above table shows, fleet allocations in 2006 are somewhat less than they were last year. The previous management plan was continued for the 2006 season as well (D. Tobin, pers. comm. April 2006).

DFO reports that the 2007 groundfish management plan (which deals with turbot, among other species) is still being finalized for 2007, but managers indicate that there will likely be little change in regulatory conditions and measures for turbot. The department notes that it is still finalizing the 2007 Commercial Harvesting Plan for <65' turbot fishing vessels and suggests that it might include a reduced amount of gear for that fleet (D. Tobin, pers comm., April 2007).

Labrador Inuit Development Corporation (LIDC). In 2004, managers of the LIDC indicated that their vessels would be harvesting turbot in the survey area in 2004 (in NAFO 2G) as well as in fishing grounds (NAFO OB/Davis Strait area) well north of the proposed survey area. These turbot catches were landed for processing in Makkovik (F. Hall, pers. comm. April 2004).

Fisher Food and Allied Workers Union (FFAWU)/One Ocean. During the 2007 meetings, FFAW and One Ocean were given maps of the turbot harvesting areas (Maureen Murphy, Jamie Coady). At that time, there were no specific issues raised about the turbot fishery. General comments about seismic surveys in the Newfoundland and Labrador offshore are discussed in the issues section of this report (Section 9.2).

Fishery Products International (FPI). GSI's proposed 2006 survey activities in the offshore Labrador area were discussed with FPI managers with respect to the company's established turbot (and shrimp) fisheries in this region (FPI meeting January 2005). In the 2005 season, FPI planned to harvest turbot using otter trawls during June and July but managers noted that these harvesting activities might also continue into November of that year. FPI indicated that much of its 2005 fishery would be concentrated throughout the Cartwright Channel area within 2GH though some was in NAFO 0B. In 2005, FPI also harvested redfish in July and August off Labrador, but company managers noted that these activities would take place outside 200 miles.

¹⁹ In addition to the fact that turbot could not be fished in water depths less than 160 fathoms (290 m), the following restrictions were also applied to all 2003 turbot activities in NAFO 2G,H,J and 3KL: in water depths deeper than 400 fathoms (727 m), fishers were allowed to use 500 nets each; in water depths between 300-400 fathoms (545-727 m), they were permitted to set 200 nets each; and in water depths between 160 - 300 fathoms (290-545 m), they were permitted to set only 125 nets each. In addition, the Hawke Channel area was to be closed to these fisheries. As a result, considering these gear limits, DFO expected that most of the turbot gear would be concentrated in the deeper water.

Relevant project information for the 2007 survey along with maps of 2006 turbot harvesting areas were sent to FPI managers for their review and comment. FPI managers did not report any specific concerns or issues with respect to FPI planned 2007 turbot fisheries within the area. With respect to its planned 2007 fisheries, managers noted that, barring any unforeseen circumstances, FPI vessels expect to complete their 2007 turbot harvest before 30 April, 2007. Managers noted that catch rates for this species have been very good during the first months of the 2007 season (D. Fudge, pers comm., April 2007).

Icewater Harvesting. In 2005, company representatives indicated that they would be harvesting most of its 2005 turbot allocation in 3Ld and 3Ka, south of the Study Area (M. O'Connor, pers. comm. February 2005), and company representatives reported that they had no plans to harvest turbot anywhere within the survey area during 2006 (M. O'Connor, pers. comm., April 2006). Information on the planned surveys was also sent to Icewater in 2007.

Association of Seafood Producers (ASP). Information about the proposed 2007 survey, including fisheries activity maps, was provided to representatives of the Association. ASP managers did not raise any specific concerns or additional comments about the proposed survey (E. Derek Butler, pers comm. April 2007).

7.2.2. Shrimp

In the Study Area, shrimp made up the great majority of the harvest, accounting for 93% by quantity during 2004 – 2006 during the survey window. The most recent DFO Integrated Fisheries Management Plan for northern shrimp, northeast Newfoundland, Labrador Coast and Davis Strait notes that “The fishery is based primarily on a single species, *Pandalus borealis* (northern or pink shrimp), one of several cold water species of shrimp found north of latitude 40° N in the Atlantic, Pacific and Arctic oceans. A second species, *Pandalus montagui* (striped shrimp), is commercially less important, but is fished exclusively in shrimp fishing areas (SFAs) 2, 3 and 4 (as defined in the fishing licence) and occurs as by-catch elsewhere in the *P. borealis* fishery. Increased commercial interest in the *P. montagui* species began in 2002 with a 2,500 t exploratory quota being allocated to the NWMB [Nunavut Wildlife Management Board] across SFAs 2 and 3 inside the Nunavut Settlement Area (NSA)” (DFO 2003c).

The following figure shows the change in the level of shrimp harvesting in the Study Area over the last 20 years.

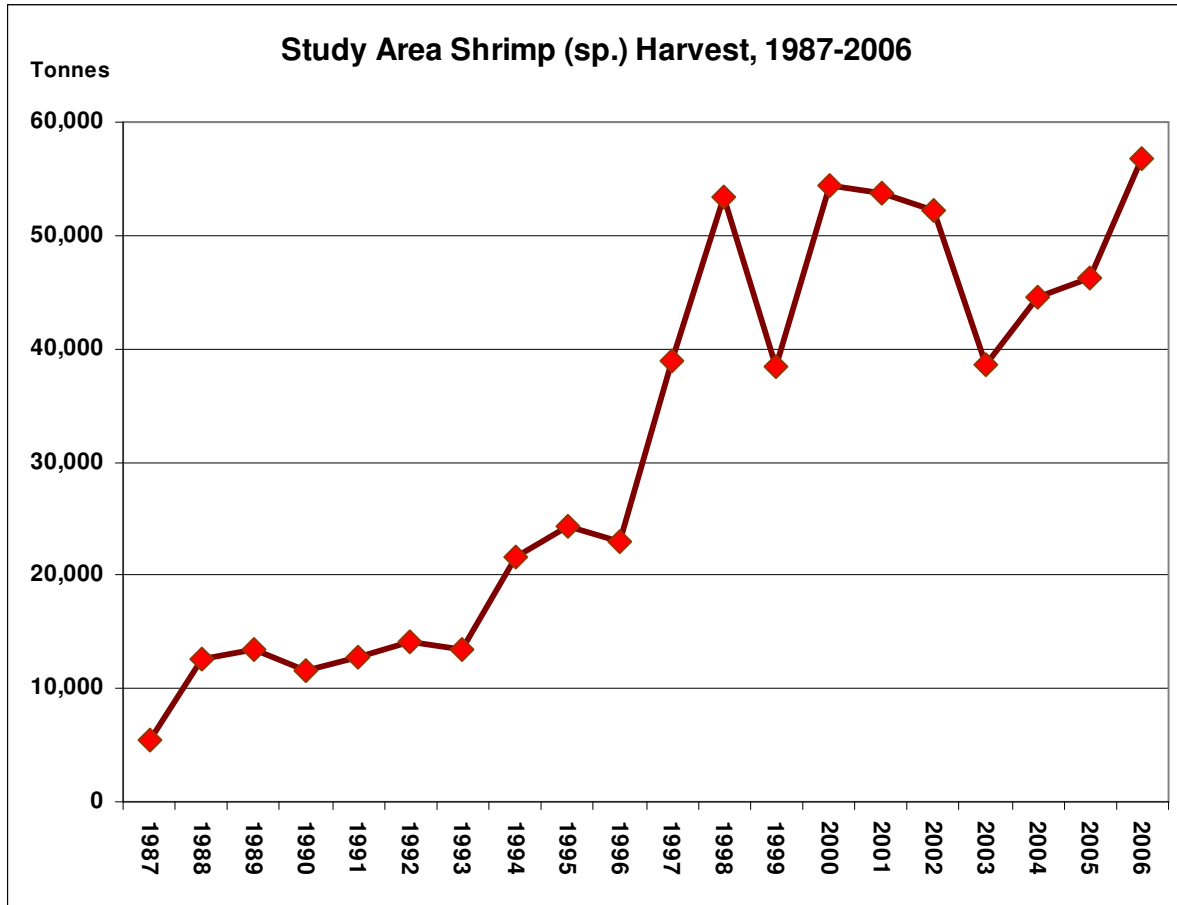


Figure 7.20: Study Area Domestic Shrimp (sp.) Harvest, 1987-2006

Figure 7.21 shows the Shrimp Fishing Areas (SFAs) for eastern Newfoundland and Labrador. The GSI Study Area overlaps with Area 4, Area 5 and northern Area 6.

DFO (2003) states, "The offshore fishery is a year-round one which begins in SFAs 5 and 6 in January and moves north as the ice permits throughout the year. During mid-summer, the offshore fleet concentrates its fishing in the northern areas (SFAs 1 and 2) and finishes the year in SFA 4. This year-round fishing pattern was essential in order to maintain a financially viable operation and to provide a continuous supply of shrimp to the fiercely competitive international market."

DFO (SAR 2006/007) reports that the fishery for northern shrimp off the coast of Labrador began in the mid 1970s, primarily in the Hopedale and Cartwright (SFA 5) Channels. Annual catches increased steadily from less than 3000 t in 1977 to about 4100 t in 1981 but then declined to 1000 t in 1983 and 1984 because of poor markets and high operating costs.

After economic conditions improved, catches from SFAs 5 and 6 increased to about 7800 t in 1987. In 1988, fishing effort became more widespread with an expansion into Divisions 0B (SFA 2) and 2G (SFA 4) where both catch rates and sizes of shrimp were good. Further commercial concentrations of shrimp were found in SFA 6 east of St. Anthony Basin and in the Funk Island Deep. Catches in both 1988 and 1989 approached 20,000 t and remained in the 15,000 to 17,000 t range from 1990 to 1993.

Catches from 1994 to 1996 ranged between 24,000 and 27,000 t in response to increased TACs for several SFAs. DFO notes, “Catches more than tripled to 94,000 t in 2000, mainly due to progressive increases in TAC within SFA 6 where the resource was considered to be healthy and exploitation low. The increases after 1996 were primarily reserved for the development of a small vessel (< 65’) fleet which has since grown to include more than 300 vessels.

In 2003, TAC’s increased by 25,000 t and included a 3625 t allocation to fund northern shrimp research in SFA’s 2 and 4. During that year industry was granted a change in fishing season from a calendar (Jan 1 – Dec. 31) year to a fiscal (Apr. 1 – Mar. 31) year. To facilitate this change, an additional 20,229 t interim quota was allocated to the large vessel fleet and the 2003 – 2004 fishing season became 15 months in length. The 2004 – 2005 the fishing season was 12 months in duration and total allocations, within SFAs 2 and 4-6, equalled 120,302 t. This TAC was maintained throughout the 2005 – 2006 fiscal year.

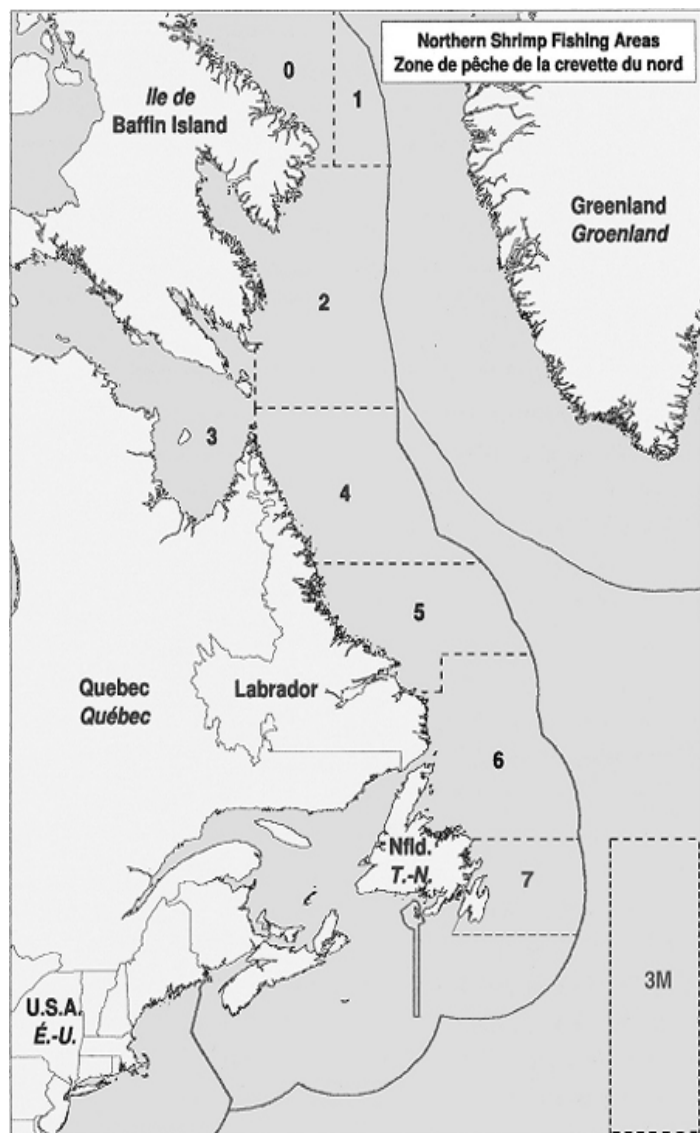


Figure 7.21: Shrimp Fishing Areas

All northern shrimp fisheries in eastern Canada are subject to the Atlantic Fisheries Regulations regarding territorial waters, bycatches, discarding, vessel logs, etc. The regulations for shrimp refer to the minimum mesh size of 40 mm and that no fishing is permitted in any defined area, after it has been closed. Also, to minimize bycatch of non-target species, large and small vessels must use sorting grates with a maximum bar spacing of 28 mm and 22 mm respectively. Observers are required on all trips by the large vessel fleet and a target of 10% coverage has been established for the small vessel fleet.”

DFO (2003c) notes, "Vessel size and environmental conditions such as ice and weather, restrict operations for the inshore fleet in the spring and fall, however the quality of shrimp is reported to be significantly better in the spring and fall as compared to the summer."

Shrimp harvesting in the Study Area took place throughout the year in 2004, 2005 and 2006 (Figure 7.22), but there was somewhat less during April and October - December.

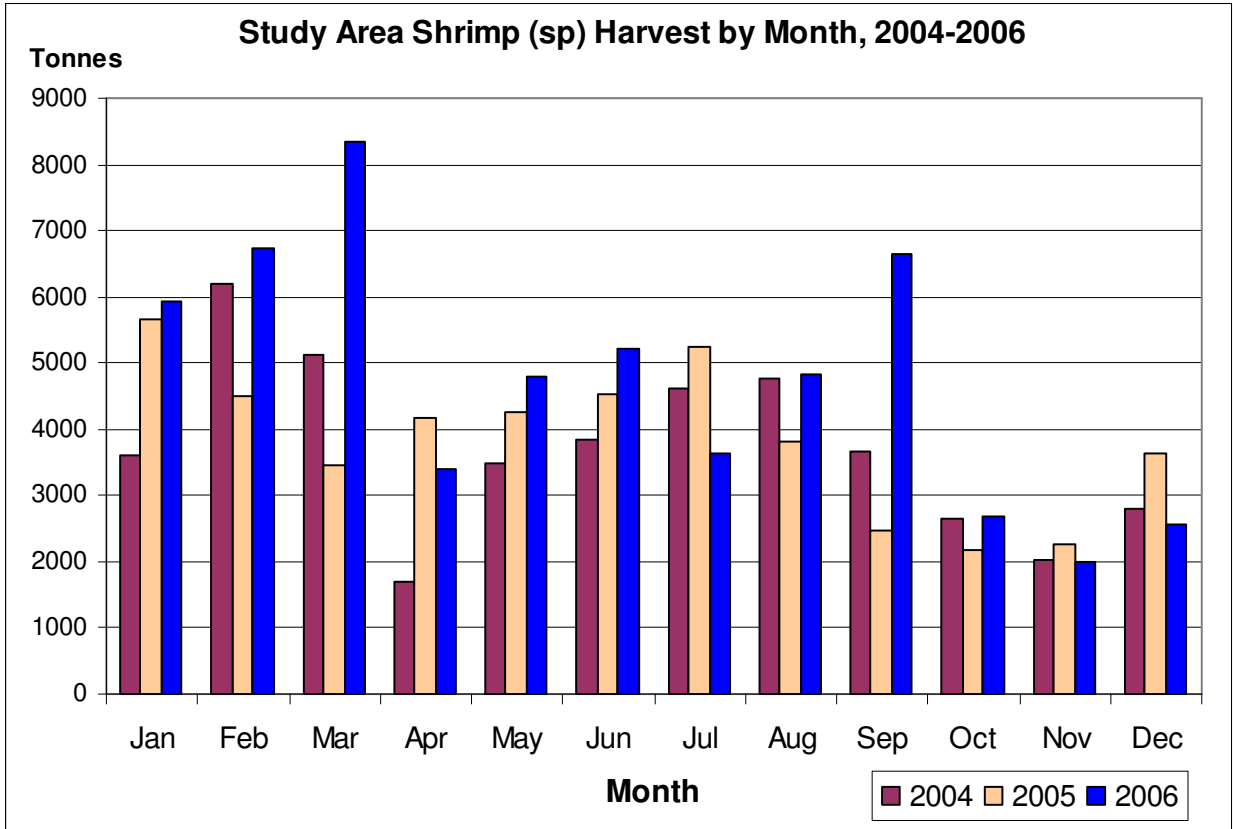


Figure 7.22: Study Area Shrimp Harvest by Month, 2004 – 2006

Figure 7.23 - Figure 7.25 show domestic shrimp harvesting locations in relation to the survey, for 2004, 2005 and 2006, June - November, based on Maritimes and Newfoundland Region DFO data. As the maps indicate, the effort tends to be focused on specific areas between the 200 m - 1000 m contours. All catches in the Study Area are taken using mobile shrimp trawls.

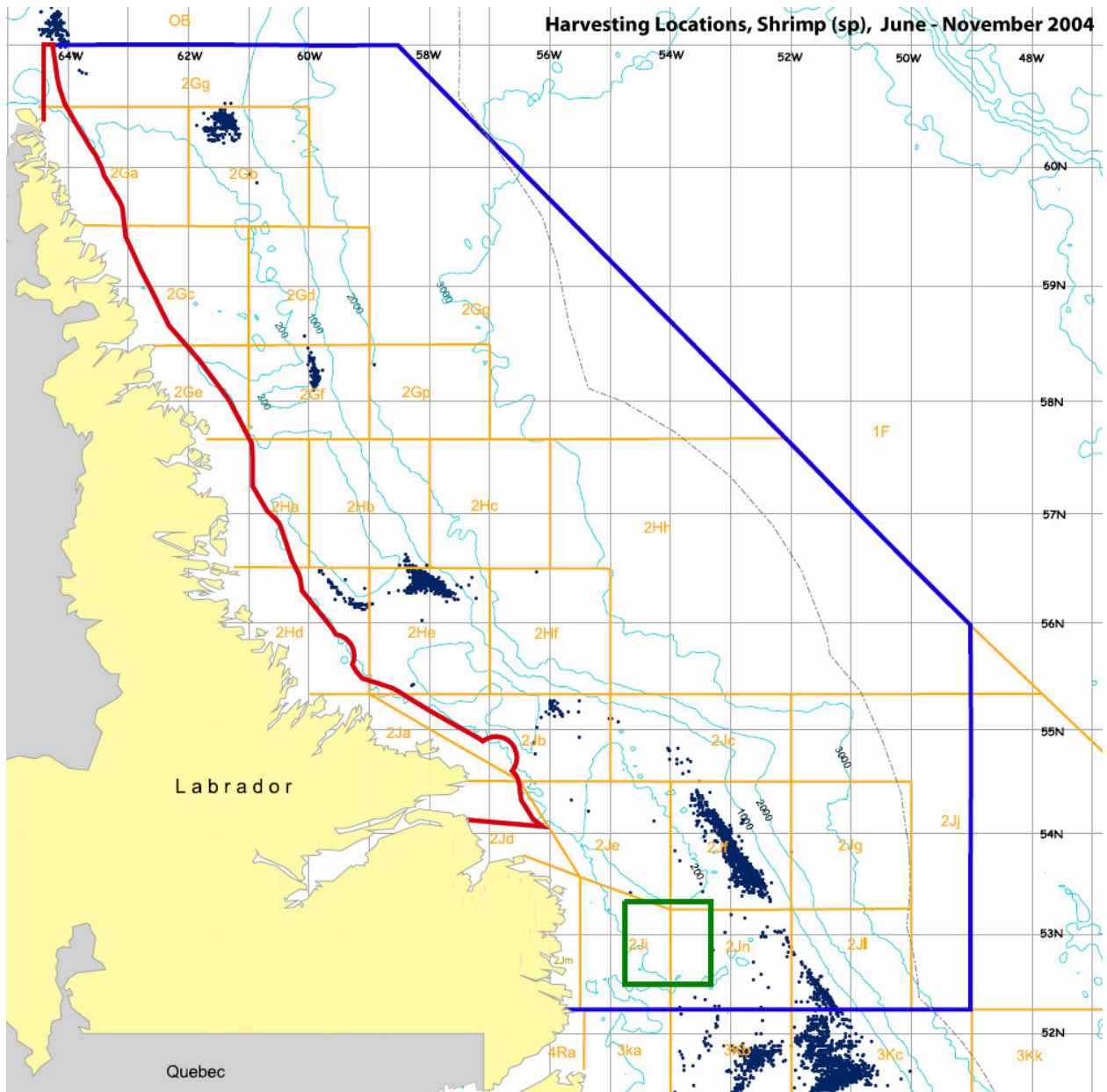


Figure 7.23: Shrimp Harvesting, June - November 2004

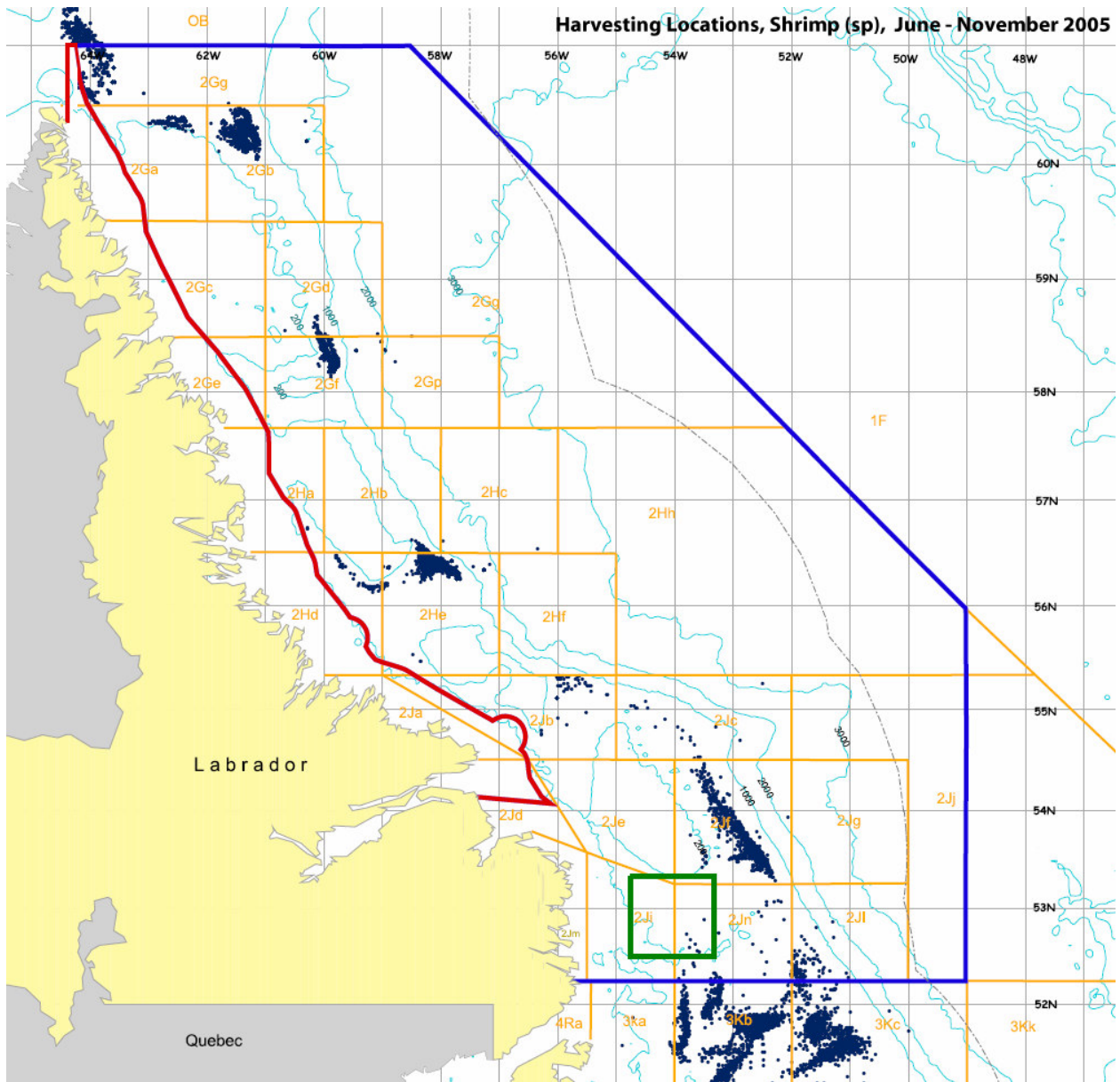


Figure 7.24: Shrimp Harvesting, June - November 2005

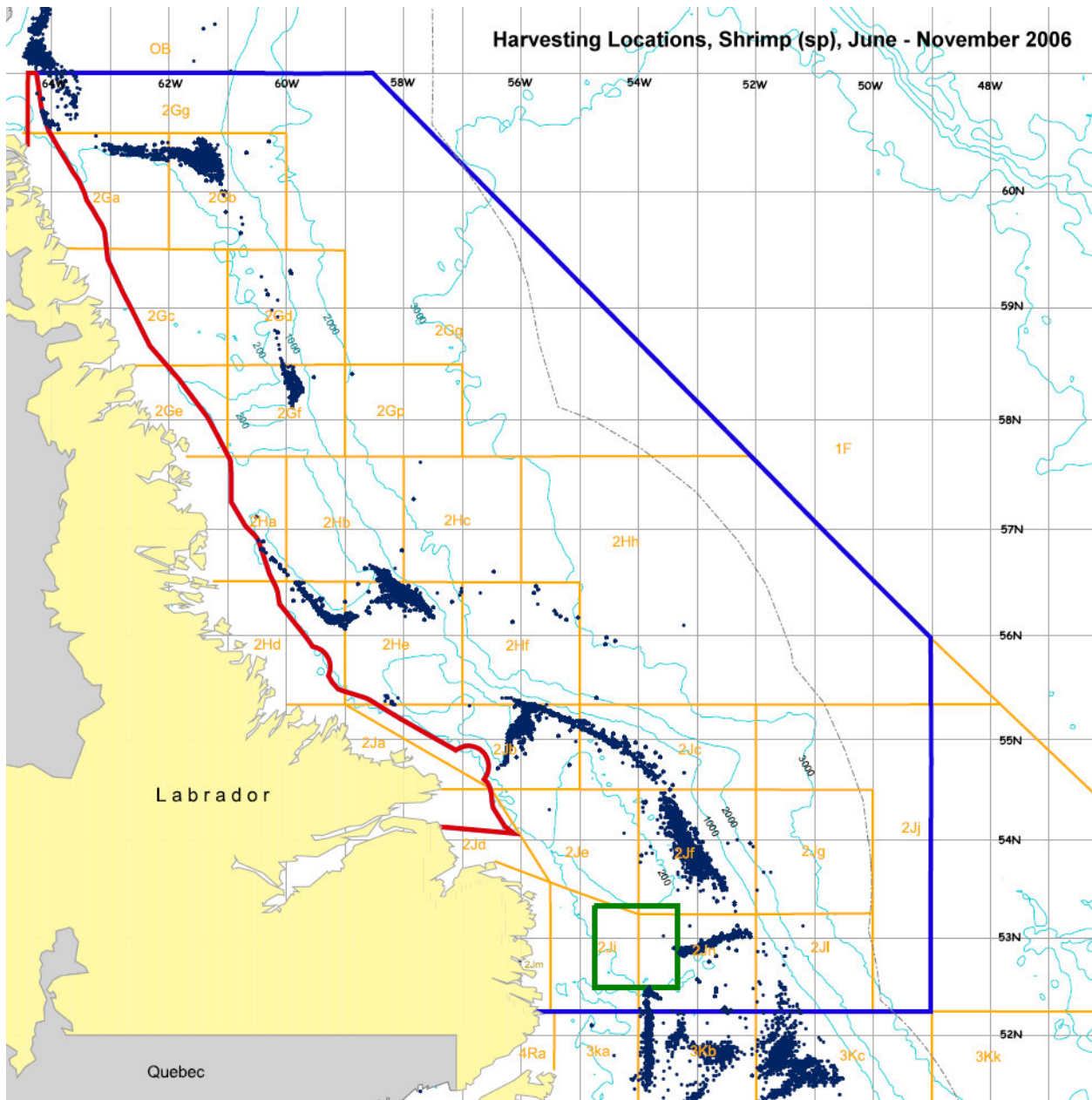


Figure 7.25: Shrimp Harvesting, June - November 2006

The current shrimp Management Plan notes that “The current offshore fleet is comprised of twelve to thirteen factory freezer trawlers. All are purpose-built for shrimp trawling and processing; though some are also able to process and freeze groundfish. They range in length from 49 m to 75 m, with hold capacities ranging from 400 to 1,960 m³. These vessels operate out of ports in Newfoundland and Nova Scotia, with occasional landings in Greenland when fishing in far northern waters (SFA 1). Fishing trips generally last until the hold is full, a period ranging from 20 to 75 days, depending on catch rates and hold capacity. The larger, more modern vessels may make more than six to eight fishing trips per year, averaging 270-320 days annually. The smaller offshore vessels fish for 200-250 days, making eight to ten trips per year.

The inshore fleet is mainly composed of vessels less than 65 ft. operated by either adjacent fishers or core fishers who geared up to fish in SFA 6. Vessels fish using otter trawls, with a few

using beam trawls. Some experimental work is ongoing with shrimp pots in Nunavut. The inshore fishery is conducted on a competitive basis with trip limits and harvesting caps determined and enforced by the industry itself" (DFO 2003c).

The 17 traditional offshore licence holders are represented by four organizations: the Canadian Association of Prawn Producers (CAPP), 9 licence holders, and the Northern Coalition 6 licence holders and the Labrador Inuit Development Corporation. The other two licence holders (Harbour Grace Shrimp Company Ltd. and Pikalujak Fisheries Ltd.) are not members of either of these organizations (DFO 2003c). Appendix 8 lists the participants in the offshore northern shrimp fishery, from the current DFO plan. In areas outside 200 miles, foreign vessels also have allocations and may be active in these waters near the survey during the survey window, though they usually focus on the Flemish Cap area well to the south of the project.

The following table shows the relevant quotas for 2006 and the previous two years. Details for 2007 are not available but DFO notes that there will be no significant changes in the 2007 quotas or the management plan (D. Orr, pers. comm. March 2007).

Table 7.3: Labrador Northern Shrimp Quotas (Tonnes), 2004-2006

Area	Quota Definition	2004	2005	2006
0B	Area 2 - (East of 63°00'W) >100'	1,750	1,750	1,750
	Area 2 - (West of 63°00'W) >100'	5,250	5,250	5,250
Total		7,000	7,000	7,000
2G	Area 4 - 2G North of 60° N >100'	6,136	6,136	6,136
	Area 4 - 2G South of 60° N >100'	1,872	1,872	1,872
	Area 4 - NSRF - 2G South OF 60°N >100'	0	0	0
	Area 4 - 2G North 60° N <65'	219	219	219
	Area 4 - 2G South 60° N <65'	219	219	219
	Area 4 - Scientific	1,125	1,125	1,125
Total		9,571	9,571	9,571
2H	Area 5 - Hopedale & Cartwright Channels >100'	13,770	17,415	17,415
	Area 5 - NSRF >100	0	0	0
	Area 5 - Labrador Metis Nation	0	750	750
	Area 5 - LIA Fishers <65'	1,260	870	870
	Area 5 - Cartwright Fishers <65'	710	127	127
	Area 5 - Inshore Fishers - Labrador	3,400	1,028	1,028
	Area 5 - Inshore Fishers - Northern Peninsula	400	0	0
	Area 5 - Scientific	2,500	2,500	2,500
Total		22,040	22,690	22,690
2J	Area 6 - Hawke Channel, 3K & Special Allocation >100'	15,833	15,833	15,833
Total		15,833	15,833	15,833

DFO's most recent status report on northern shrimp, released in July 2006 covering 2005, provides industry perspectives on the fishery. Small vessel shrimp fleet perspective: In 2005 the inshore shrimp fleet landed almost 109 millions pounds of shrimp from Area 6, representing 93.8% of the available quota. Industry is positive about Area 6 shrimp as numerous factors point to a healthy resource. Harvesters have experienced high catch rates and broad distribution of the resource throughout the Area. The size of shrimp has also increased, decreasing the count per

pound. In 2005 harvesters reported a lower incidence of shrimp affected by yellow liver, or blackberry. Large vessel shrimp fleet perspective: Conditions are similar to last year, with higher abundances in SFA 5 (DFO SAR 2006/007).

Consultations (2004 – 2007). Consultations were undertaken with DFO managers, representatives of the Canadian Association of Prawn Producers (CAPP), the Northern Shrimp Research Foundation, Fishery Products International (FPI), Clearwater Seafood Limited Partnership, the Association of Seafood Producers and the LIA. Information about those surveys was also supplied to the Seafood Producers Association of Nova Scotia (SPANS). Representatives of the FFAWU and One Ocean were also consulted for each of these survey years.

DFO. DFO reported that there had not been any major changes in the shrimp management plan since 2003. Although (as noted above) details for 2007 are not yet available, there will be no significant changes in the 2007 quotas or the management plan (D. Orr, pers. comm. March 2007).

Fisher Food and Allied Workers Union (FFAWU)/One Ocean. For the 2007 survey consultations, FFAWU and One Ocean were given maps of the shrimp and these were reviewed/discussed at a meeting in April 2007 (Maureen Murphy, Jamie Coady). There were no specific issues raised about the shrimp fishery. More general comments about seismic surveys are discussed in the issues section of this report.

Clearwater Seafoods. Company managers were sent relevant information about the proposed 2006 survey activities and about the 2007 – 2009 plans, but did not respond with any new comments or concerns. In the past, Clearwater has noted that good communication at sea is the best way to manage potential interactions between its fishing boats and seismic survey vessels and this has worked well during previous surveys (C. Penney, pers comm. 2004). Clearwater is also represented by SPANS (see below).

FPI. In 2004, FPI's manager responsible for offshore shrimp harvesting operations indicated that FPI vessels did not experience any negative effects on catch rates from seismic activities during the 2003 fishery, though some concern was expressed at that time about potential impacts of seismic operations on shrimp (and other species), particularly on eggs and larvae, and what is known, or not known, about any such impacts. During consultations for GSI's 2005 survey program, FPI managers did not expect GSI's survey operations to interfere with their 2005 shrimp harvesting activities. They indicated that, in the past, their vessels had not experienced any problems when operating in the vicinity of survey vessels, and company vessel captains had never reported any negative effects on catches.

During the 2005 meeting with FPI managers, the Director of Fleet Operations said that he would ask his captains to note when they were fishing near a seismic survey vessel and record any noticeable effects. FPI pointed out that these captains have a great deal of historical knowledge about their harvesting patterns, and would be able to determine whether or not there were any perceptible effects on their usual, historical catch rates. Following the 2005 survey, FPI did not report any further information concerning possible contacts and interactions between 2005 survey activities and its shrimp vessels.

With respect to GSI's 2006 survey, FPI's Director of Fleet Operations also indicated that the company did not expect survey operations to affect its harvesting operations any more or less than in past years (D. Fudge, pers comm., April 2006).

Relevant project information for the 2007 survey along with maps of 2006 shrimp harvesting areas were sent to FPI managers for their review and comment. FPI did not raise any further issues with respect to its 2007 offshore Labrador shrimp fisheries and planned survey operations, and did not express any concerns about potential negative effects from the GSI survey vessel and planned industry shrimp research operations by the FPI vessel the *Cape Ballard* scheduled for July-September 2007 (D. Fudge, pers comm., April 2007).

Labrador Inuit Development Corporation (LIDC/LIA). In 2004, the LIDC reported that it would also be harvesting offshore shrimp in the GSI Study Area via its arrangement between Pikalujak Fisheries Ltd. in Nain and Ocean Prawns Canada Ltd. based in Nova Scotia. Consultations with the LIDC's Managing Director at that time did not anticipate any problems between their shrimp harvesting activities and 2004 survey operations (F. Hall, pers. comm. April 2004).

Labrador Fishermen's Union Shrimp Company Ltd and Osprey Ltd. Information on the 2006 survey was provided to the Labrador Fishermen's Union Shrimp Company Ltd. with respect to the company's offshore shrimp harvesting activities planned for the 2006 season. The company's operation (in L'anse au Loup), subsequently advised the consultants to speak to representatives of M.V. Osprey Ltd. based in Sydney, NS. It was noted that, in addition to its own two shrimp quotas, M.V. Osprey Ltd. harvests the shrimp resources allocated to the Union's operation using its own vessels, the *Northern Osprey* and the *Northern Eagle*.

Osprey Ltd.'s manager later reported that the company's shrimp trawlers would be departing for their established fishing grounds as soon as these waters were ice-free. He noted that, in recent years, their vessels have been taking most of their shrimp in the offshore area adjacent to Hopedale to Nain, within SFA 5, on shrimp grounds between 56 N to 57 N. In 2006, the company expected to harvest shrimp in the same locations fished in the last few years.

Osprey Ltd. was pleased to receive information about the 2006 GSI survey, and noted managers would pass this information along to their vessel captains so that they will be informed of the proposed 2006 survey activities (B. MacInnis, pers. comm. May 2006). In 2007, contact was also made with Osprey Ltd. and information sent.

Canadian Association of Prawn Producers (CAPP). In 2004, the Executive Director of the CAPP noted that the Association had no specific concerns about the proposed survey, but stated that various fishing industry groups, such as the CAPP and the Groundfish Enterprise Allocation Council (GEAC), continued to be generally apprehensive about potential effects (including possible cumulative effects) on fisheries resources from offshore seismic operations, even though it appears that, to date, the scientific data did not appear indicate any significant effects. CAPP noted that, in the absence of such knowledge, the fishing industry would continue to seek "peaceful co-existence" with all sectors of the offshore petroleum sector (B. Chapman, pers. comm. April 2004).

Northern Shrimp Research Foundation (NSRF). In 2006, the Administrator of the Foundation reports that the NSRF conducted its first annual stratified random shrimp science survey in 2005,

and that it planned to conduct this research again in 2006 between mid-July and mid-November (B. Chapman, pers. comm. April 2006). This is described in more detail in Section 8.3 (Fisheries Research). NSRF managers were sent relevant information on GSI's proposed 2007 survey activities. Foundation representatives noted some concerns about potential disruption of established shrimp harvesting activities and survey operations and asked that relevant fishing vessels receive advance notice of the location of planned seismic activities. Mention was also made of possible interference with the Cape Ballard's NSRF/industry research survey planned for July-September and requested that appropriate protocols be in place to ensure this did not occur (B. Chapman, pers comm. March 2007).

Seafood Producers Association of Nova Scotia (SPANS). SPANS represents fisheries companies active in Nova Scotia with interests in the Labrador shrimp and groundfish fishery. Information and maps were provided to this group for earlier GSI survey years. Their interest is to ensure that seismic surveys maintain good communications, exercise caution and operate appropriately to ensure no economic impact on the fisheries. They also remain concerned that there could be immediate or longer term harm or effects on the health of commercial fish stocks (and other marine life that affects the health of the stocks) in the area (Jay Lugar, SPANS O&G Consultant, pers comm. 2007).

Association of Seafood Producers (ASP). Previous (2004, 2005) consultations with the Association did raise any specific concerns or comments regarding potential effects on or interference with established shrimp fisheries by GSI survey operations (ASP meeting, January 2005). Information on the 2006 and 2007 survey plans was sent to the Association, and no additional issues were noted.

7.2.3. Snow Crab

Like turbot, shrimp has declined in both absolute and relative quantity within the Study Area during the past three years. In 2003 it made up 5.4% of the area harvest, 2.2% in 2004 and 2% in 2005, during the June - November timeframe. (See discussion of snow crab resource issues in Section 6.3.6.)

The following figure shows the annual harvest of snow crab shrimp in the Study Area over the last 20 years. After reaching a high point in 1999, the harvest is currently at levels close to those of the early 1990s.

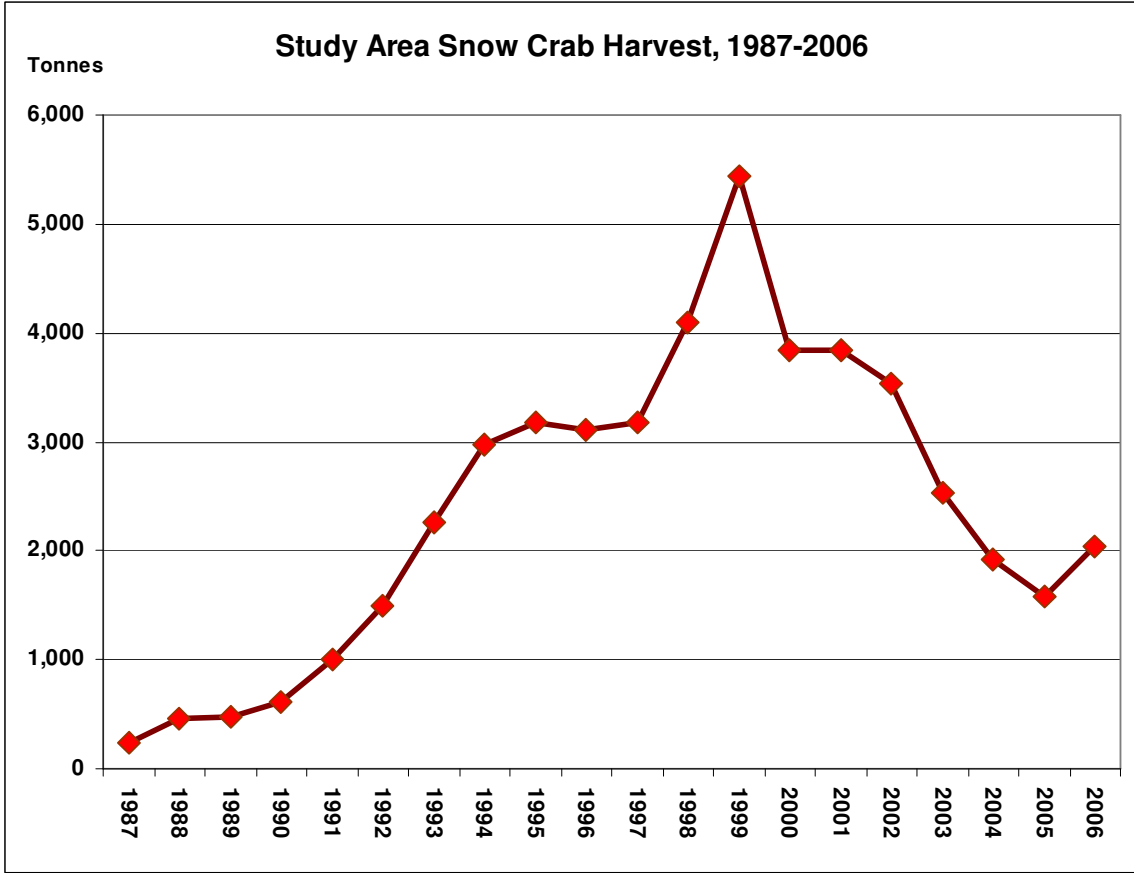


Figure 7.26: Study Area Domestic Snow Crab Harvest, 1987-2006

As Figure 7.27 shows, the fishery in the survey area for the last three years has occurred primarily in the July - September period, with much less activity in the months before and after this time.

Figure 7.28 - Figure 7.30 indicate that snow crab harvesting is concentrated in the south within the Study Area, mainly in NAFO 2J, and is focused within fairly specific areas, which are crossed by several of the survey lines. Harvesting occurs mainly in water depths between 200 m and 1000 m.

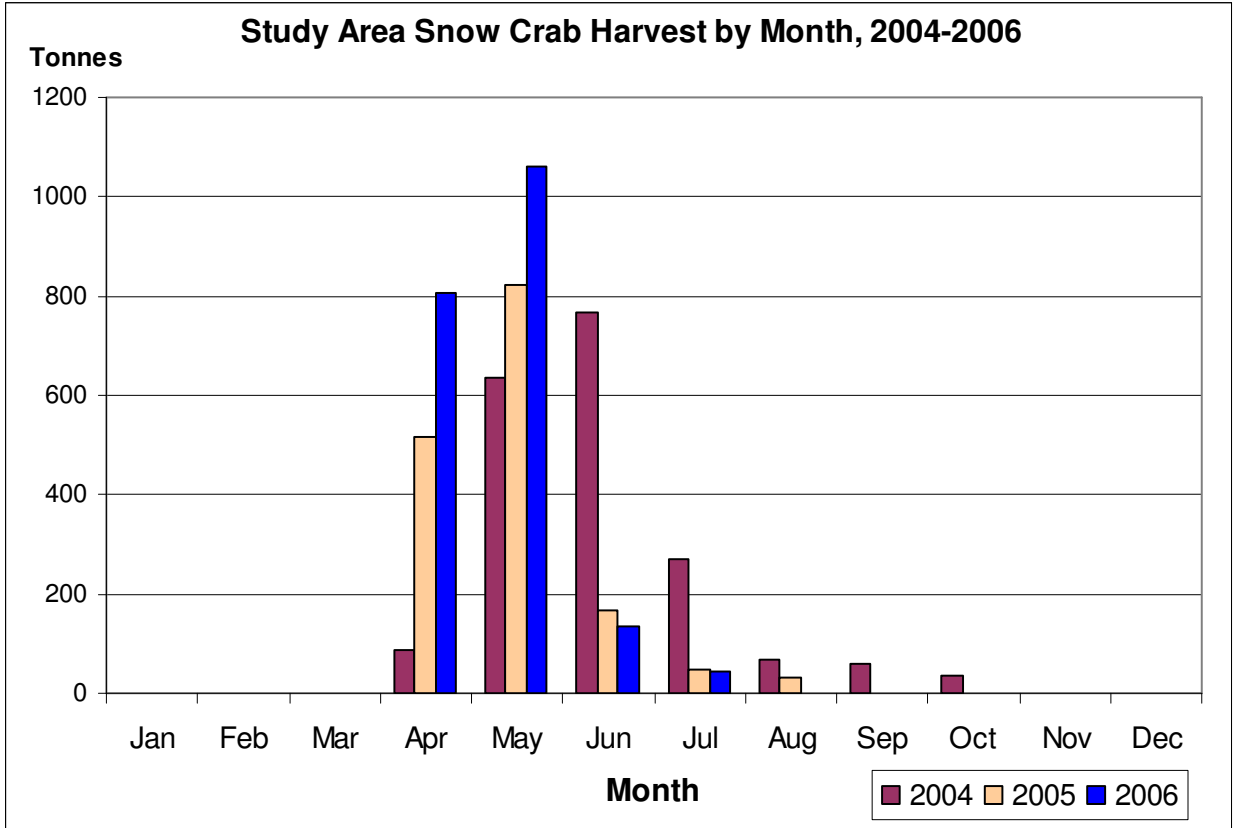


Figure 7.27: Study Area Snow Crab Harvest by Month, 2004 - 2006

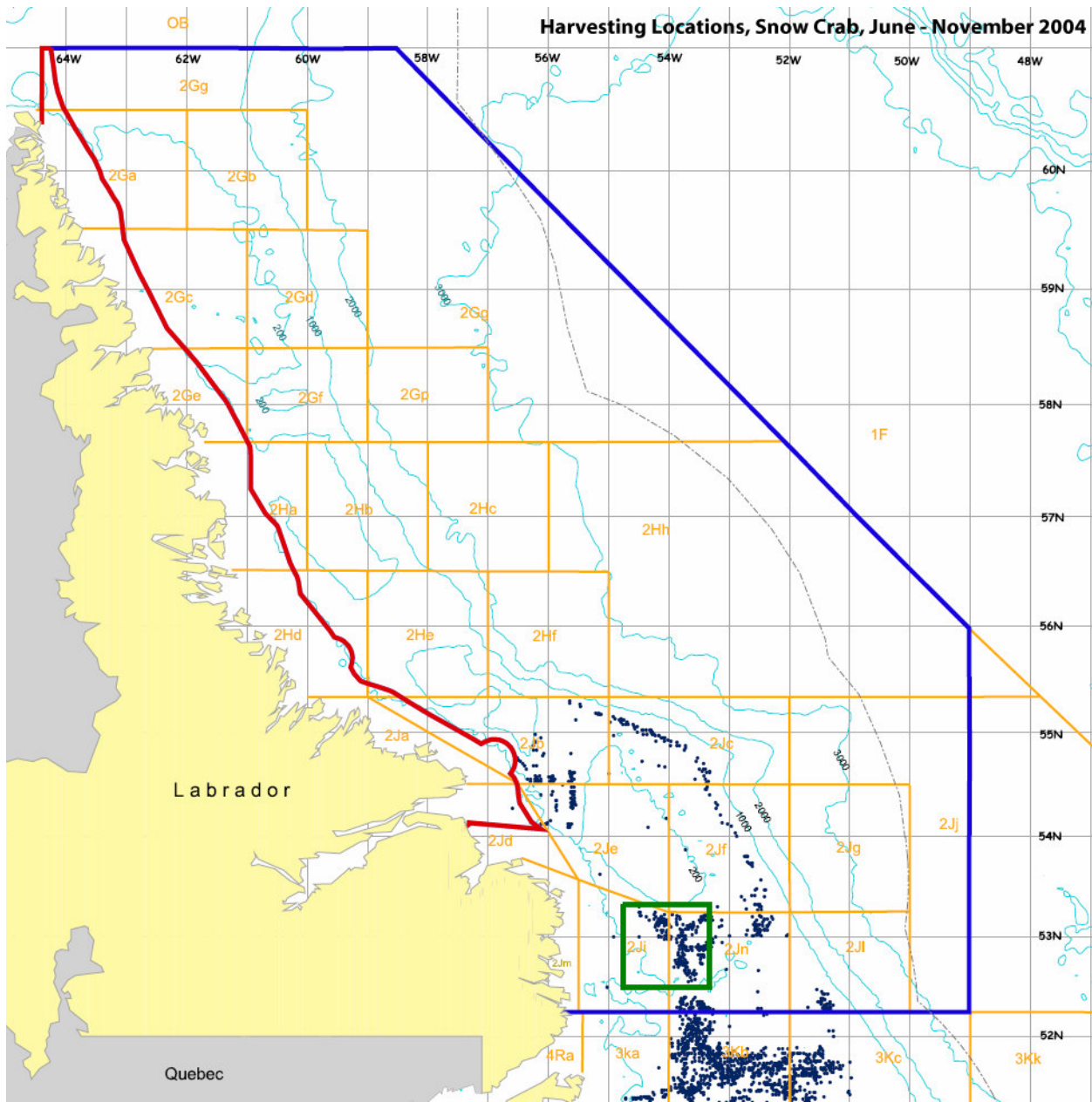


Figure 7.28: Snow Crab Harvesting, June - November 2004

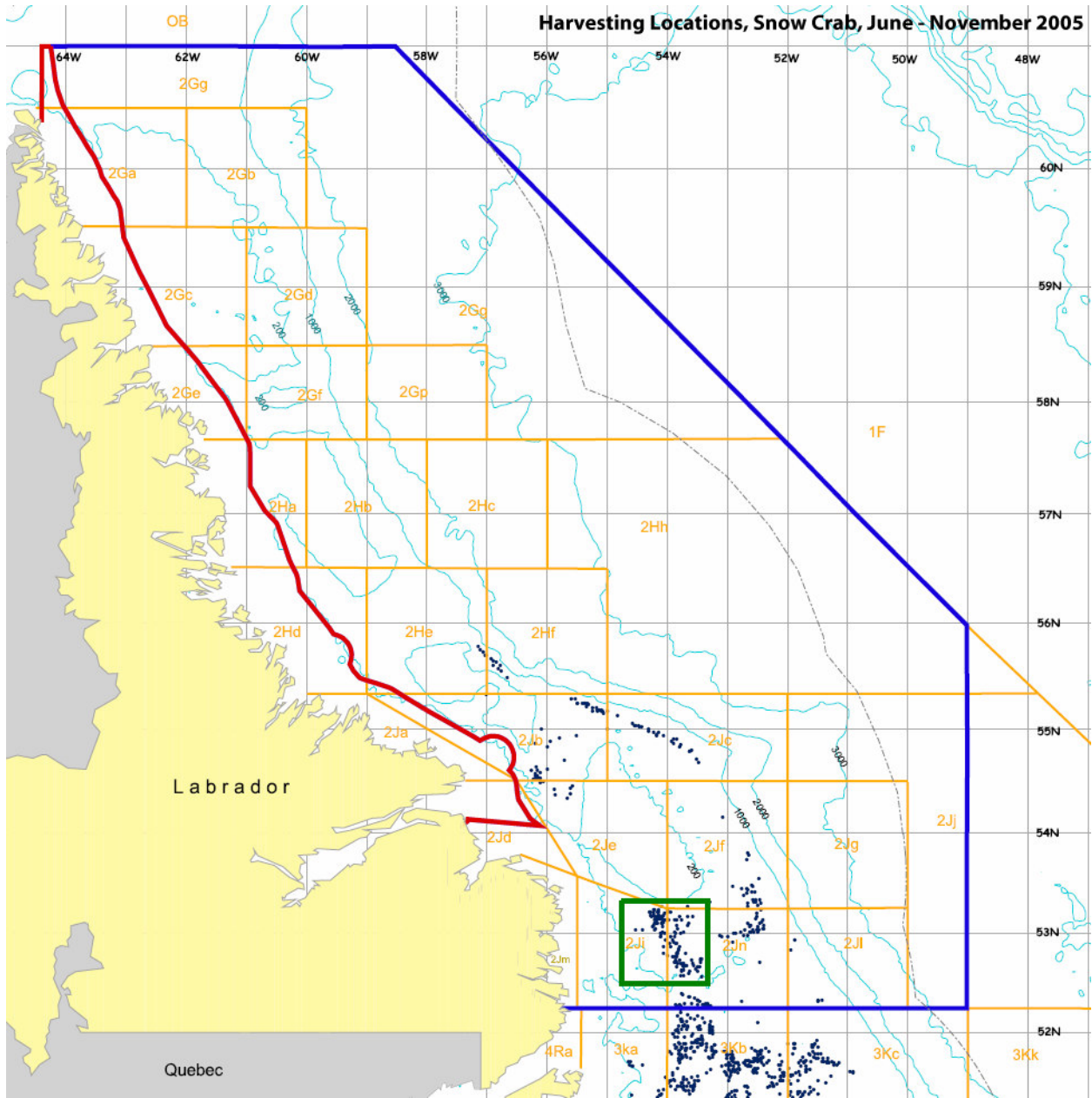


Figure 7.29: Snow Crab Harvesting, June - November 2005

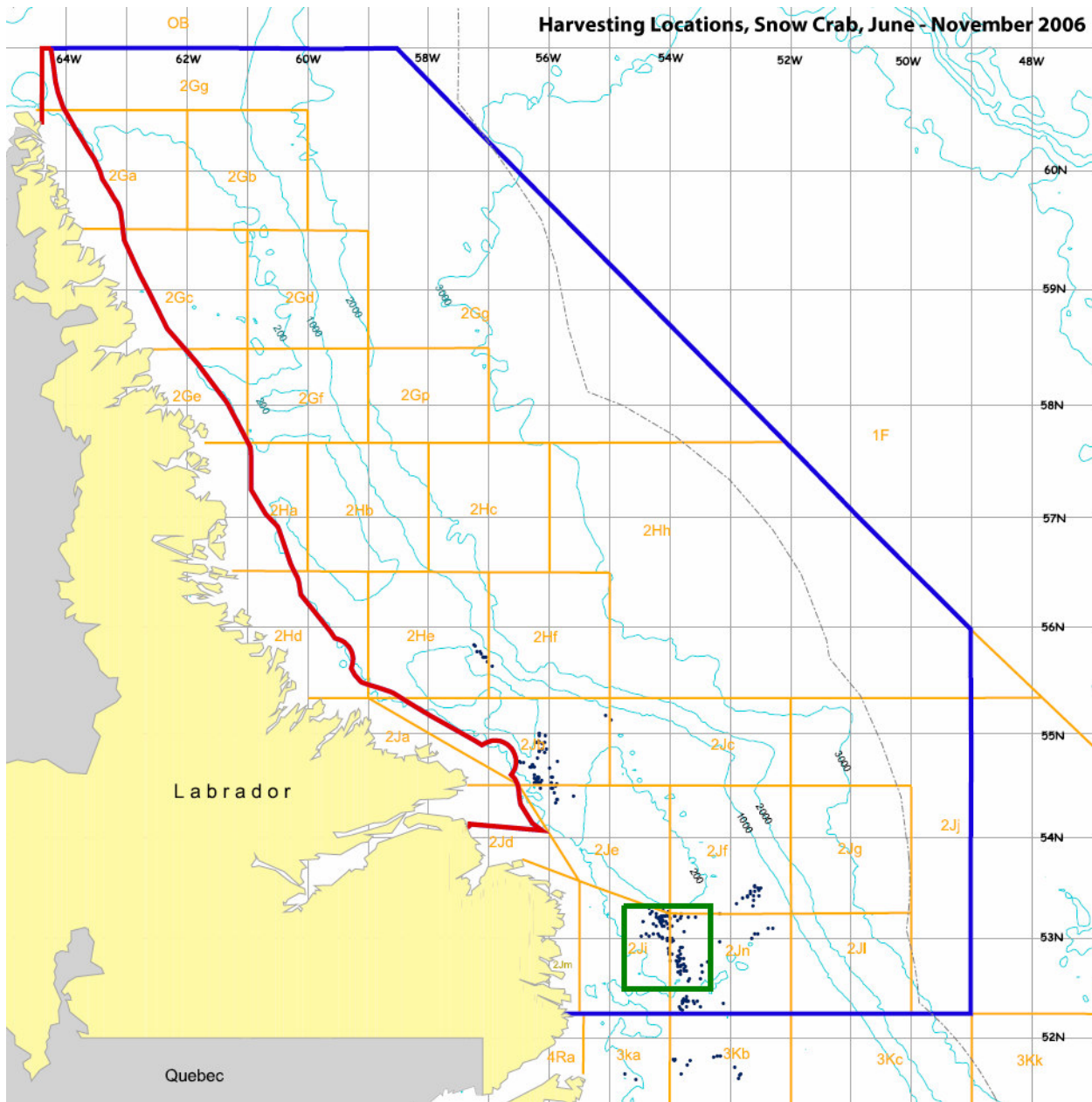


Figure 7.30: Snow Crab Harvesting, June - November 2006

The 1999 snow crab management plan describes the basic structure of the Newfoundland and Labrador snow crab fishery: “During the 1970’s directed snow crab fisheries developed along the Northeast Coast of the Island, primarily in Division 3L. The fishery in 3K began to develop in the mid-1970’s. Crab fishing occurred sporadically in Subdivision 3Ps in the 1970’s but did not occur on a regular basis until the mid-1980’s. The fishery in Division 2J also began in the mid-1980’s while the first substantial landings in 4R occurred in the early 1990’s.

Individuals who originally harvested snow crab in the Newfoundland Region eventually had their licences designated as fulltime. Virtually all these licence holders currently operate vessels that are generally in the 50’ to 64’ 11” range. Fishers with fulltime licences used to operate in areas fairly close to shore, but in recent years most crab harvested by this fleet is taken in areas

outside 50 miles. Supplementary fisheries were implemented in Divisions 2J, 3K and 3Ps in 1985 and in Division 3L in 1987” (DFO 1999).

DFO (SAR 2006/006) adds, “It has since expanded throughout Divisions 2J3KLNOP4R and is prosecuted by several fleet sectors. Management of the fishery led to the development of multiple quota-controlled management areas ... with over 3300 licence holders under enterprise allocation in 2005. Stock status is assessed at the NAFO Division scale. A vessel monitoring system (VMS) was fully implemented in the offshore fleets in 2004.”

The FRCC’s recent *Strategic Conservation Framework for Atlantic Snow Crab* (FRCC 2005) observed that “the fishery in the 1980s and 1990s spread from its original concentration on the east coast to areas around Newfoundland, off the coast of Labrador, and in offshore waters, even outside the 200-mile limit. The entrance of thousands of new licences in the coastal areas pushed the larger inshore vessels to concentrate fishing effort on grounds further offshore. The movement of the larger vessels to the offshore areas was promoted by DFO through the incentive of increased individual quotas. Beyond the increase in the number of harvesters, there was also a huge investment in vessels, gear, and technology.

Atlantic-wide, new investment in processing plants, vessels and traps in the 1990s reached hundreds of millions of dollars. More than 60 plants were now operating, producing mainly frozen sections rather than extracting meat to satisfy international market demand. Dependence on snow crab, especially in Newfoundland, reached far greater heights. By the late 1990s early 2000s, several snow crab stocks were showing signs of decline and concerns about major downturns continue to prevail in a number of areas. Snow crab off Canada’s Atlantic coast no longer had any refuge from fishing.” In Quebec and the Maritimes, licences increased from 507 to 1072 between 1992 and 2004, and in Newfoundland and Labrador they jumped from 750 to 3,411.

That FRCC report also describes the general conduct of the Newfoundland and Labrador fishery: “Snow crab harvesting activity is conducted almost exclusively by the inshore fleet (vessels less than 65 feet). The annual snow crab harvest is managed on the basis of TACs established each spring for about 40 designated snow crab fishing areas. Many of the snow crab fishing areas were created to control fishing effort and have little to do with the biological characteristics of the resource. The area TACs are allocated to a varying number of fishing enterprises that are licenced to harvest snow crab. Each licenced fishing enterprise is allocated a specific tonnage of snow crab to be harvested. The individual allocation generally depends on the size of vessel operated, its history of participation in the fishery, and the number of licences participating in the fishing area.

Harvesting commences in the early spring depending on the area and fishing season. Fishing can continue through to late summer and early fall. ... Snow crab fishing voyages are generally of short duration. Vessels operating in the bays and coastal regions return to port daily and generally leave their traps to fish for longer periods of time. Vessels fishing up to and beyond 200 miles from the coast conduct voyages up to four and five days and greater depending on the vessel’s holding system. Typically these vessels leave the traps for shorter periods, sometimes only a few hours, prior to retrieving the catch. Given that snow crab must be live at the time of landing and processing, the duration of fishing trips is limited, although some vessels are now able to keep crab

live on board in tanks permitting them to extend the length of their trips. Upon landing the live catch, it is weighted at dockside and transferred to shore-based processing facilities where the catch is processed into market ready products on a timely basis. All snow crab catches are independently monitored.”

The snow crab fishery area most relevant to the proposed GSI survey is NAFO Division 2J which is divided into a northern and a southern section at the 54° 40' N line. The Labrador Inuit Association pursues a communal fishery north of 54 40' N.

In April 2003, the federal fisheries Minister announced a decrease in 2J snow crab quotas because of concerns about the status of the resource in southern 2J. In both the inshore and offshore areas of Division 2J, south of 54° 40' N, quotas were reduced by 40%, though harvest levels north of 54° 40' N (Cape Harrison) were to be maintained at current levels. That year, a 2J DFO/industry working group was established, including fishers, processors and aboriginal groups, as well as provincial representatives and DFO science and management personnel.

In June 2005, the FRCC's Strategic Conservation Framework recommended to the Minister of Fisheries and Oceans a variety of conservation measures as well as changes to the fishery's management structure. In March 2006, the Minister announced that new management measures would be introduced and others continued for the Newfoundland and Labrador snow crab fishery owing to the uncertainty about future recruitment and the amount of exploitable biomass, as well as concerns about soft-shelled crab (DFO, BG-NL-06-01 and BG-NL-06-02, March 30, 2006). General measures applied for the 2006 season included:

- Shortened fishing seasons in areas to provide additional protection during periods when the incidence of soft-shell crab is high;
- There will be no season extensions; Individual Quotas (IQs) are not a guarantee that the fisher will land that amount of crab;
- Enhanced soft-shell protocols;
- When areas are closed because of a high incidence of soft-shell crab, those areas will remain closed for the remainder of the year;
- Continue with increased observer coverage from 2005;
- In an effort to decrease the levels of wastage of soft-shell and undersized crabs being returned to the water, DFO will shorten fishing seasons and continue education programs with fishers on handling and discard practices;
- The Total Allowable Catch (TAC) for 2006 is 46,233t, reduced from 49,943t in 2005.

For Division 2J, the 2006 snow crab season was restricted to 4 weeks in the southern portion and 6 weeks in the northern. While this was similar to the 2005 season, it was much shorter than past fishing seasons. Although the 2006 overall quota in 2J remained at 1,425t (as in 2005), the 2006 quota was a 70% reduction compared to 1999.

It was also decided that the 2J DFO/industry working group would remain in place in 2006. The 2006 release also noted that “The group is supportive of the measures being taken to protect the short term recruitment” (DFO, BG-NL-06-02, March 30, 2006).

The following tables shows the starting quotas for the 2004, 2005 and 2006 snow crab fishery in 2J, and north, for various licence categories, and the 2005 and 2006 seasons. On 30 March 2007, DFO announced the overall quota for 2J/2GH would increase by 10%, to a total of 1,570 tonnes (DFO 2007a).

Table 7.4: 2J and 2H Communal 2004 - 2006 Snow Crab Quotas

Licence Category	Tonnes		
	2004	2005	2006
Full-Time South of 53'30"N	225	180	180
Supplementary South of 54'40"	970	777	777
Inshore South of 54'40"N	315	252	252
Communal North of 54'40"N (2GHJ)	270	216	216
Total	1,780	1,425	1,425

Source: DFO, NL Region

The season for the Study Area CFAs are shown in the following table.

Table: 2007 Snow Crab Seasons

CFA	Area	2007 Season
2J (+2GH)	Southern	1 May – 15 July
	Northern	15 June – 30 August

Source: DFO (2007a)

Consultations (2003 – 2007). Previous discussions with 2J fishers (in 2003) indicated that snow crab grounds in 2J were not large or extensive, and there were very few good crab fishing areas in the zone from the coast out to 40 miles. In that year (for all fleets) most of the quota was taken in grounds between 40-150 miles from shore. Fishers noted that, although the overall crab area (i.e. 2J North and South out to 200 miles) appeared to be large, effectively crab grounds comprised only about one quarter of this area.

The 2002 Management Plan included a 500 tonne communal allocation for the Labrador Inuit Association, as well as a 100 tonne exploratory allocation for the Torngat Fisheries Co-operative. Both of these allocations were for the area north of 54 40' N.

Consultations with the LIA in 2003 indicated that their snow crab fishery was typically concentrated 80 km - 90 km off Cape Harrison, north of 54 40'N (Toby Anderson, pers comm. June 2003).

Most of the 2J south crab vessels tend to fish the same grounds (if they are equipped to do so). Essentially, there are no lines between the quota areas of the three crab fleets, other than 54 40' N latitude line above which the LIA and Torngat may take their quota. This means that even the smaller (< 35') vessels may travel 60-65 miles from shore to take their quotas; however, in

previous consultations, fishers have noted that there were still good signs of crab in some of the deeper trenches found about 30 miles offshore.

In 2002, 2J crab fishers recommended a number of initiatives to improve their crab resources. This included the creation of a conservation zone in the vicinity of the Hawke Channel. This is a relatively good crab fishing area, but it is also an area where many vessels - including a large number on non-Labrador boats – previously harvested shrimp and turbot. Labrador fishers have stated that shrimp trawls, and turbot gill nets, have a significant negative impact on crab and crab habitat.

In 2002, DFO established a closed area in 2J at the request of Labrador-based fishers who were concerned that fixed gear turbot and mobile gear shrimp fisheries were damaging crab habitat in their area. In 2003 this area was closed again to all fisheries except for snow crab, and in July that year it was increased in size, which still applies in 2007. This area, around the Hawke Channel, is described in Section 6.7 of this report. None of the proposed survey lines cross this area. In 2004, there was a 20% overall cut in the snow crab quota for NAFO 2J, a 15% reduction for the 2J South area and a 40% reduction for the 2J North area (i.e. the crab quota area north of 54 40N). DFO indicated that, although quotas were also reduced in 2003, there was a noticeable increase in fishing effort as crab fishers attempted to take their individual quotas in an even more unfavourable resource situation (T. Blanchard, pers comm. April 2004).

During consultations for the 2006 survey, Union representatives asked if DFO scientists have done any research on the potential effects of seismic noise on soft-shell crab. This point was noted in connection with ongoing concerns of Labrador fishers about the high incidence of soft-shell crab, and their efforts in the last few years to avoid fishing this species in areas where there are significant amounts of soft-shell animals. It was suggested that, since fishers are advised to avoid such areas, seismic vessels should also be required to do the same. With respect to crab fishing in the Hawke Channel “box”, DFO managers noted that the department recommended this area be closed to seismic operations. It was pointed out that none of 2006 GSI the survey lines fell within that area (FFAW/One Ocean/DFO Meeting, April 2006). It was also observed at the meeting, in response to the question about effects on soft shell, that any potential seismic effects on snow crab in that state might in fact be less, since their shells are closer in density to the sea water (J. Christian of LGL Ltd., FFAW/One Ocean/DFO Meeting, April 2006).

During the 2007 meeting with the Fisher Food and Allied Workers Union (FFAWU) and One Ocean were no specific issues raised about the snow crab fishery. General comments about seismic surveys in the Newfoundland and Labrador offshore are discussed in the issues section of this report (Section 9.2).

Consultations with DFO managers (T. Blanchard email, April 2007) for the 2007 survey did not indicate any significant changes in snow crab harvesting patterns or vessel activities within the survey area. As indicated in Table 7.44 above, DFO has announced a small increase – from 1,425 tonnes in 2006 to 1,520 tonnes for 2007 - in this year’s snow crab quota for 2J (+2GH).

7.3. Fishing Gear

Table 7.5 shows the domestic catch by gear type in the Study Area for 2004-2006.

Table 7.5: Harvest by Gear Type (Tonnes), Study Area, June - November, 2004 – 2006

Gear	Tonnes	% of Total
2004		
Otter Trawl, Stern	408.8	0.8%
Shrimp Trawl	44,492.8	92.0%
Gillnet*	910.6	1.9%
Longline*	222.2	0.5%
Pot*	1,928.3	4.0%
Dredge	384.0	0.8%
Seal Hunting	22.0	0.0%
Total	48,368.7	100.0%
2005		
Otter Trawl, Stern	1,147.5	2.3%
Shrimp Trawl	46,231.8	92.5%
Gillnet*	796.2	1.6%
Longline*	85.9	0.2%
Handline*	0.2	0.0%
Pot*	1,620.1	3.2%
Dredge	101.7	0.2%
Seal Hunting	9.6	0.0%
Total	49,992.9	100.0%
2006		
Otter Trawl, Stern	89.5	0.1%
Shrimp Trawl	56,766.9	93.5%
Gillnet*	680.1	1.1%
Longline*	142.7	0.2%
Handline*	16.4	0.0%
Pot*	2,255.6	3.7%
Dredge	683.3	1.1%
Seal Hunting	59.9	0.1%
Total	60,694.3	100.0%

* Fixed gear

The main gears used reflect the species targeted: shrimp trawl for the dominant shrimp fishery, pots for crab and gillnets, longlines and stern otter trawl for groundfish, mainly turbot. The fixed gear - which is the main concern for seismic survey interactions - nearest the survey lines will be crab pots and to a somewhat lesser extent, gillnets and longlines.

Figure 7.31 and Figure 7.32 show the location of fixed and mobile gear fisheries during June - November 2006, in relation to the Study Area.

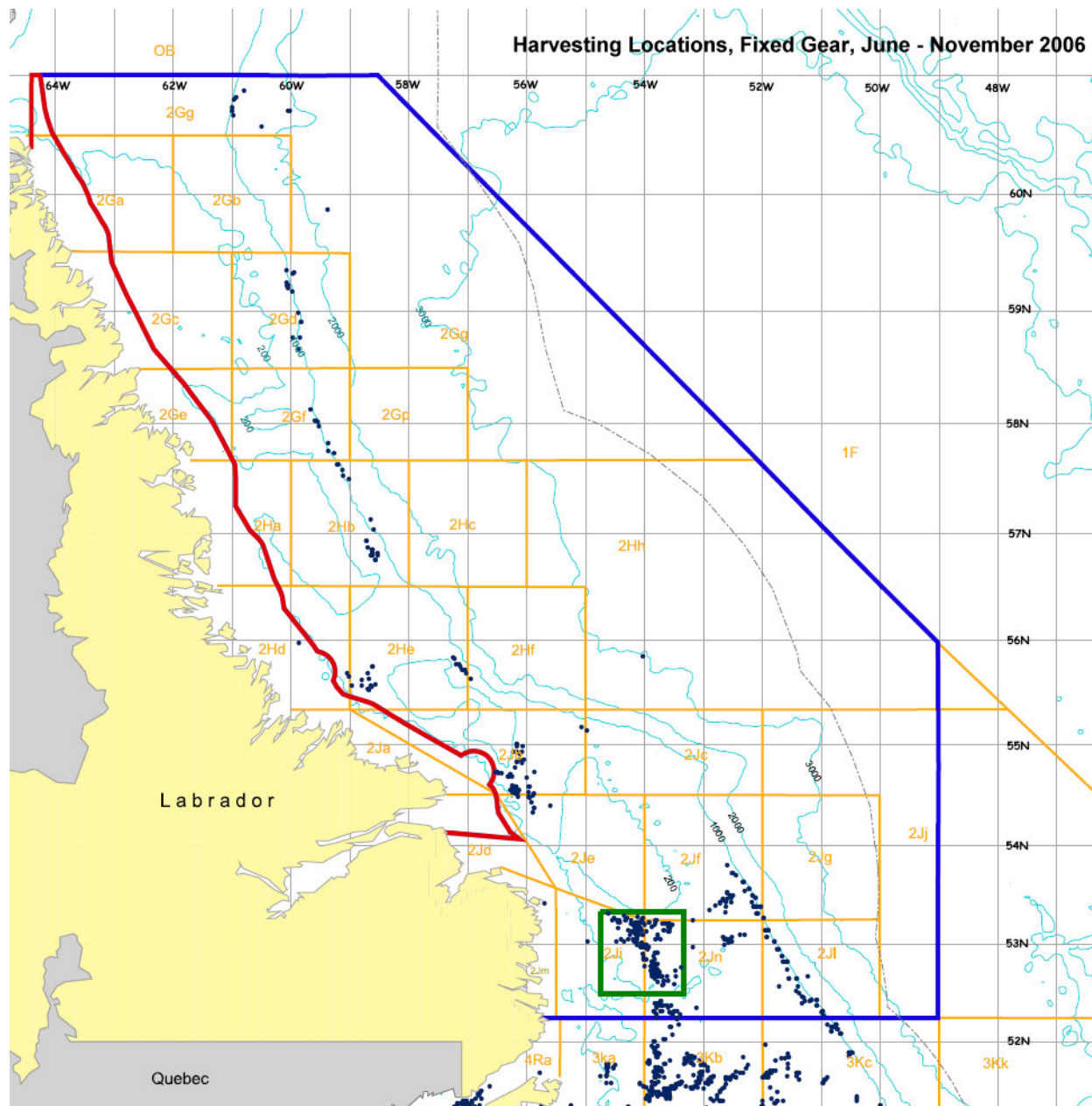


Figure 7.31: Fixed Gear Harvesting, June - November 2006

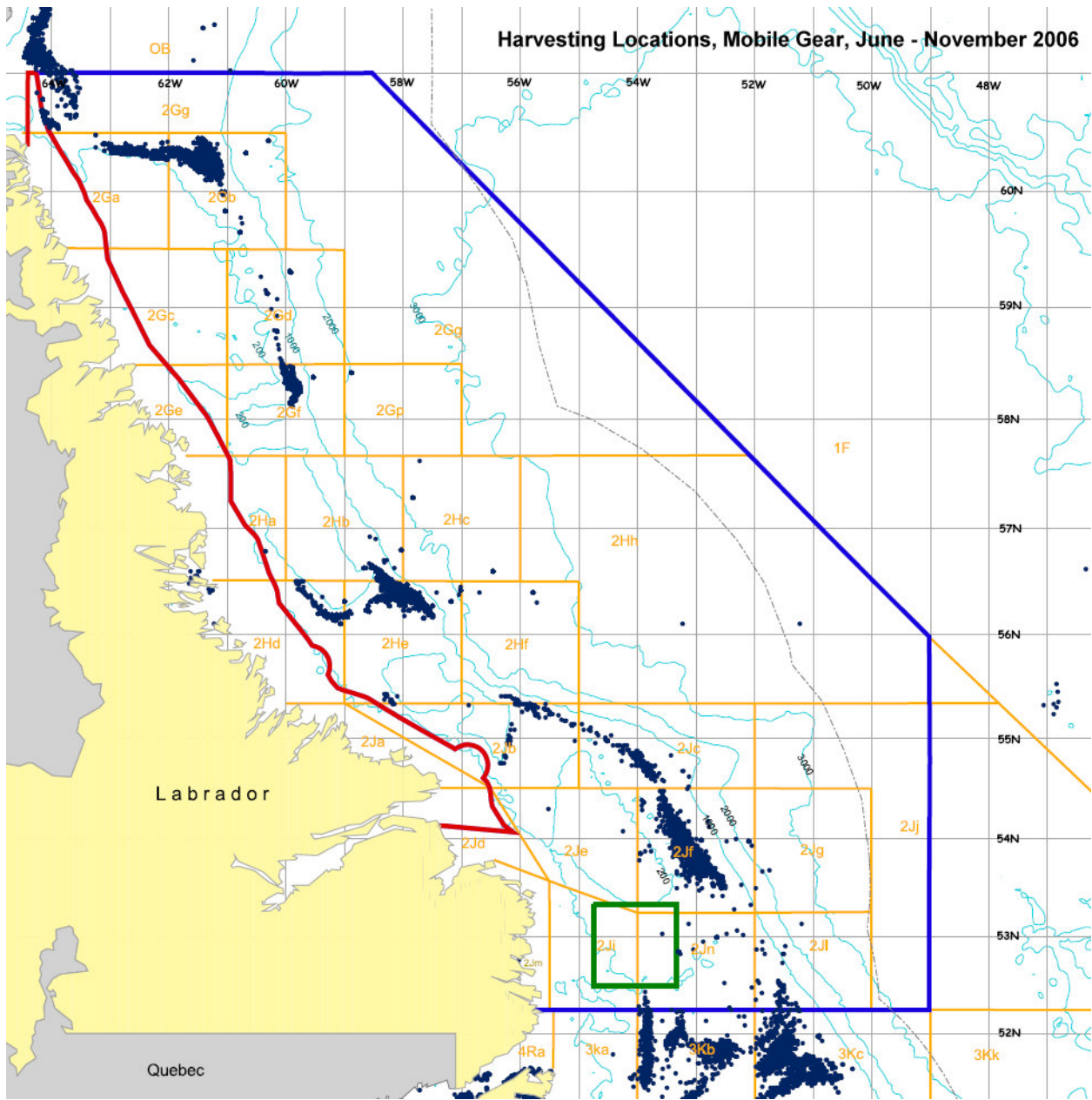


Figure 7.32: Mobile Gear Harvesting, June - November 2006

7.3.1. Fixed Gear

In general, fixed gear - primarily crab pots and gillnets in these areas - poses a much greater potential for conflicts with survey activities than mobile gear since it is hard to detect when there is no fishing vessel near by, and it may be set out over long distances in the water.

Crab Pots. Because it is a fixed gear, crab pots pose a significant potential for conflict if the survey vessel encounters them. FRCC (2005) reports, “Snow crab fishing is conducted with single conical shaped traps (pots) although some harvesters use rectangular shaped traps. Traps are attached to a retrieval rope and marker buoy. In some areas, harvesters deploy several traps attached in series to a main fishing line otherwise known as a fleet of gear. Twine mesh is used to enclose the traps that have an open cone at the top to provide an entrance for the snow crab. ... Snow crab harvesters are licenced to deploy a specific maximum number of traps to harvest their allocations. These trap limits vary by area and by the size and nature of the fishing enterprise”.

Pots set in fleets may consist of 50-60 pots buoyed at the surface. Crab gear generally has a highflyer (radar reflector) at one end and a large buoy at the other. Some fishers use highflyers at both ends. Depending on weather, they may be left unattended several days at a time. Fishers in the area generally try to leave about 20 fathoms (120 feet) on the seabed between each pot. Thus, allowing slack for the anchor ropes on either end of the string to extend upwards at an angle, the distance between the typical highflyer and end-buoy of a 50-60 pot string of crab gear would be 6,000 feet to 7,500 feet, or approximately 1.8km to 2.3km.

Gillnets. This fishing gear is used for turbot in the survey area. The gear poses a high risk of conflict with seismic survey gear since in deeper water the nets are left set, and may be hard to detect, especially if there is no fishing vessel nearby. Fixed or set gillnets are anchored to the seabed to keep the gear stationary, and have buoys on each end which float on the surface. The net itself is kept open or full through the use of weights attached to the bottom of the net. A highflyer buoy usually marks one end of the set gillnet (typically the north end), though not always. There are typically 50 nets in a fleet; each net is 300' long, for a length of 15,000' per fleet. Fishers may fish 8 to 10 fleets at once. The nets are constructed of monofilament netting.

Longlines. Although used less in the Study Area this gear poses a high risk of interaction with the survey vessel. Groundfish longlines (also known as baited trawls) consist of a buoyed line from which are suspended a series of fishhooks. Larger buoys are generally attached to each end of the longline. Longlines may be anchored and buoyed. The gear is set out behind the vessel and left to fish. It is then hauled in to retrieve the catch, re-baited and set again. However, in some cases, longlines are not anchored but simply set to drift for a time and are suspended by buoys at either end. (When longlines are set in this way, it is referred to by some fishers as "fly and set".) The length of a longline will vary according to the fisher's preference or other factors.

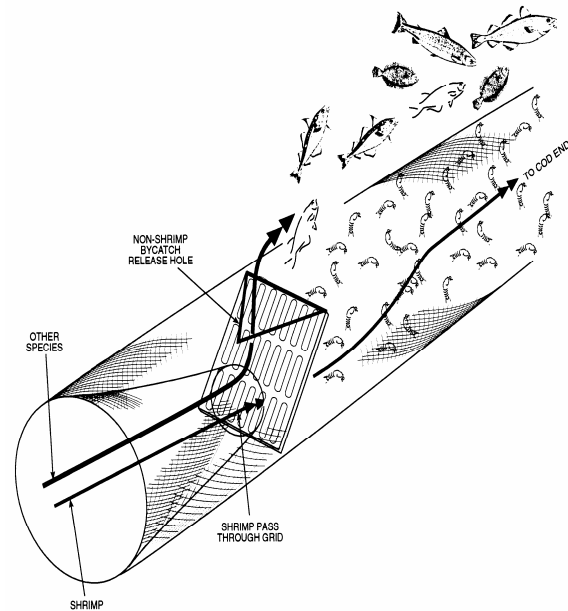
7.3.2. Mobile Gear

Because mobile gears are towed behind a vessel they pose less risk of conflict since the activity can be more easily observed and located on the water. The survey ship and the fishing vessels should be able to communicate with each other and exchange information about their operating areas and activities.

Shrimp Trawls. The traditional shrimp gear in Newfoundland and Labrador is shrimp trawl, a modified stern otter trawl, for both inshore and offshore vessels, though some use beam trawls. Experimental fishing using shrimp pots has also been conducted in Nunavut. Fishers are licenced to fish only one gear type (DFO 2003c).

Since 1997, it has been mandatory to use a device called a Nordmore grate in shrimp trawls to reduce by-catch of other species. The Nordmore grate is now required in shrimp trawls in all SFAs at all times (DFO 2003c).

Consultations with the Canadian Association of Prawn Producers have indicated that, for the larger ships, tows are typically about 3 hours at speeds of 3-4kts, but the length of the tow will depend on the rate of the on-board processing plant. In general, the aim is to catch just enough at a time to keep the ship's factory supplied.



Stern Otter Trawls. As described above, in 2004 large stern otter trawlers also harvested groundfish within the survey area. This mobile gear is used for a variety of groundfish species. It consists of a large cone-shaped net towed along the ocean bottom. Large rectangular "doors" (otterboards) are attached to cables between the ship and the net to keep the net open (horizontally) while being towed. Floats on top and weights at the bottom maintain the vertical opening in the otter trawl. The net is pulled along the sea bed on wheel-like "bobbins". Fish enter through the large opening and are funneled to the end of the net, a bag-like section called the "cod end". The size of the mesh in the net allows smaller fish to escape.