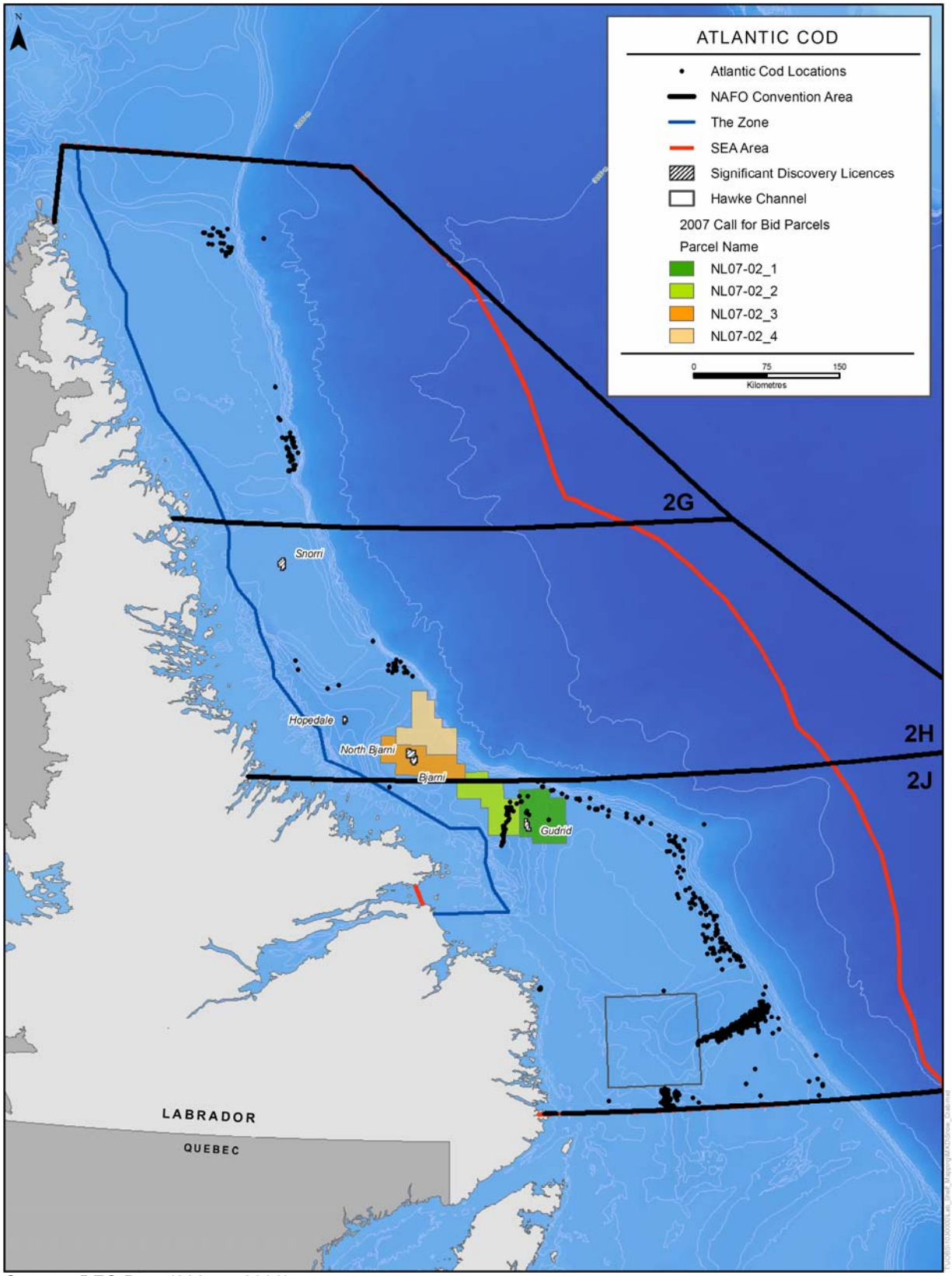
Figure 4.44 Georeferenced Atlantic Cod Harvesting Locations, 2004 to 2006



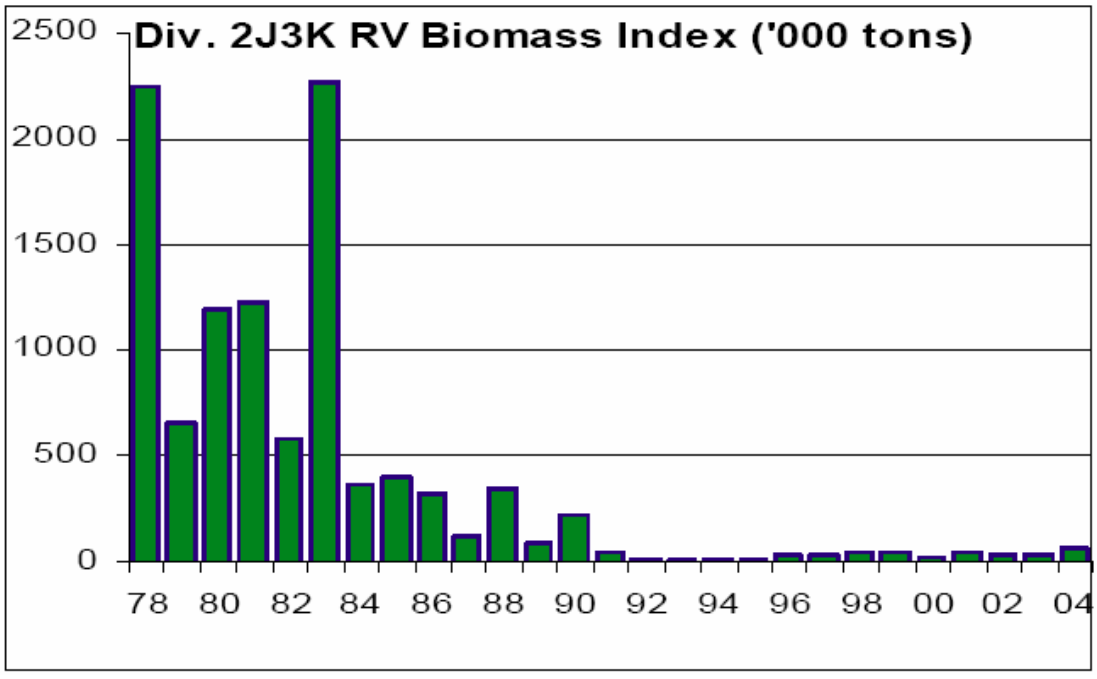
Source: DFO Data (2004 to 2006).

During collection of traditional knowledge (Postville 2007: Makkovik 2007; Rigolet 2007), public consultations (Postville 2007; Mary's Harbour 2007; Cartwright 20070 and from information contained in Our footprints Are Everywhere (Brice-Bennett 1977) indicate that cod were fished within the Labrador Shelf SEA Area. Areas of importance for cod in Labrador Shelf SEA Area included Hopedale; Shoal Tickle; Windy Tickle; Multa; Big Bay; Flowers Bay; Turnavik Islands; Islands around South Aulatsivik; Paul's Island; Cuttroat; Moores Harbour; Okak Harbour; Mugford Tickle; Napartok Bay; Hebron Fjord; Saglek Fjord; Cape Makkovik; Stag Bay; Grapelin Island; Can Islands; Cape Ailik; Wild Bight Point; Ironbounds Islands; Cape Harrison; Jigger island; Ragged Islands; and Groswater Bay (Brice-Bennett 1977).

4.10.3.2 Redfish

Canadian landings of redfish result as a by-catch in the Greenland Halibut fishery and have been under 40 t except in 2004, when 170 t were landed (DFO 2005b). There is limited information available for redfish in the Labrador SEA as it is not a directed fishery. Recent estimates of redfish by-catch in the shrimp fisheries in SA2 + Division 3K have increased from 60 t in 2000 to 252 t in 2004 (DFO 2005b). DFO RV surveys (Figure 4.45) in Division 2J and 3K indicate that stocks were historically low in 1994 and increased by a factor of six from 1994 to 1998 and averaged about 34,000 t to 2003. In 2004, the survey estimate was 63,000 t (DFO 2005c). The average of the index from 2001 to 2004 was only 7 percent of 1981 to 1990 (DFO 2005c). While redfish stocks remain low, recruitment, has improved since 2001 (DFO 2005c).

Figure 4.45 Research Vessel Biomass Index for Redfish in Divisions 2J3K



Source: DFO 2005c.

The redfish landings in the Labrador Shelf SEA Area are the result of by-catches within other directed fisheries particularly the northern shrimp fishery. Most landings (Figure 4.46) occur in NAFO Division 2G with landings peaking in February before declining to a low in April and peaking again in August (Figure 4.47).

Figure 4.46 Percentage of Redfish Landings for Northwest Atlantic Fisheries Organization Divisions 2GHJ

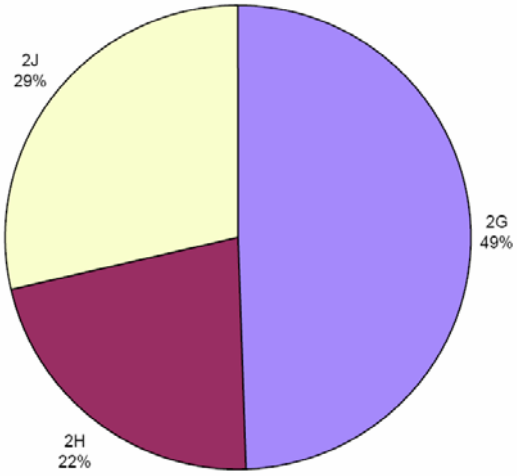
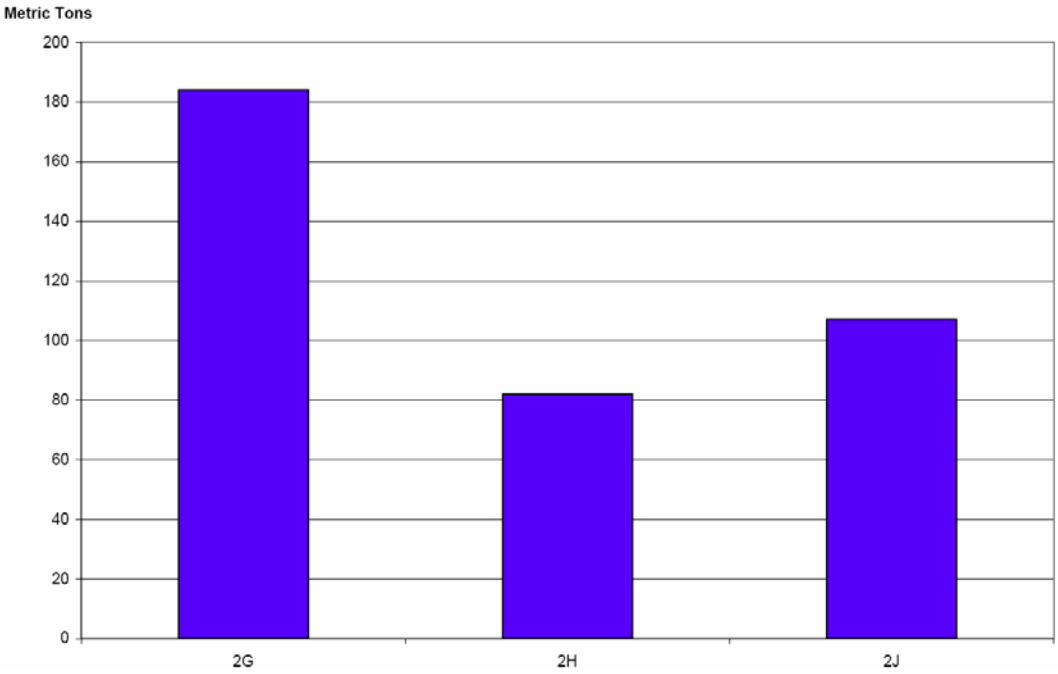
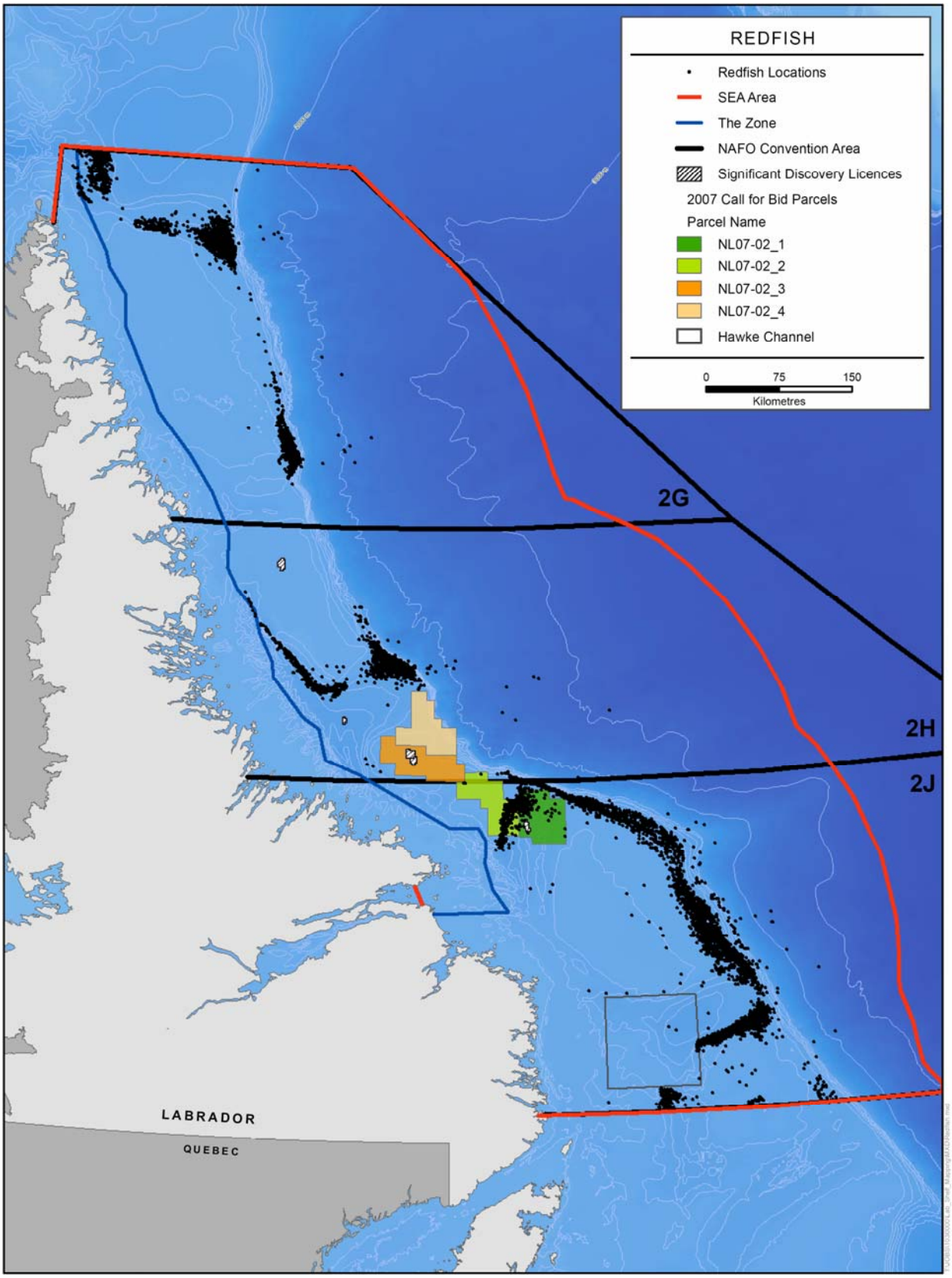


Figure 4.47 Strategic Environmental Assessment Area Unit Areas Redfish Harvest by NAFO Division, 2003 to 2006 Average Including Discards



Reported redfish harvesting locations, based on the DFO georeferenced data in relation to the Labrador Shelf SEA Area and the relevant Unit Areas, are shown in Figure 4.48. This map shows three years (2004 to 2006) of aggregated data to better represent harvesting patterns, though the harvesting locations tend to be consistent from year to year.

Figure 4.48 Georeferenced Redfish Harvesting Locations, 2004 to 2006



Source: DFO data (2004 to 2006).

4.10.3.3 Herring

Historically, herring resources have supported both commercial food and bait fisheries; most of the herring harvested in the bait fisheries is not recorded in the landings data (DFO 2003c). The present (2007) herring quota for Division 2J is provided in Table 4.17. This quota has not been harvested over 2002-2006.

Table 4-17 2J Atlantic Herring Quotas, 2007

Area	Quota Definition	Quota (Metric Tonnes)
2J	Labrador - Gillnets/Traps	50
	Total 2J	50
Source: NL Region Statistical Reports, Herring, Atlantic (DFO 2007f).		

4.10.3.4 Iceland Scallop

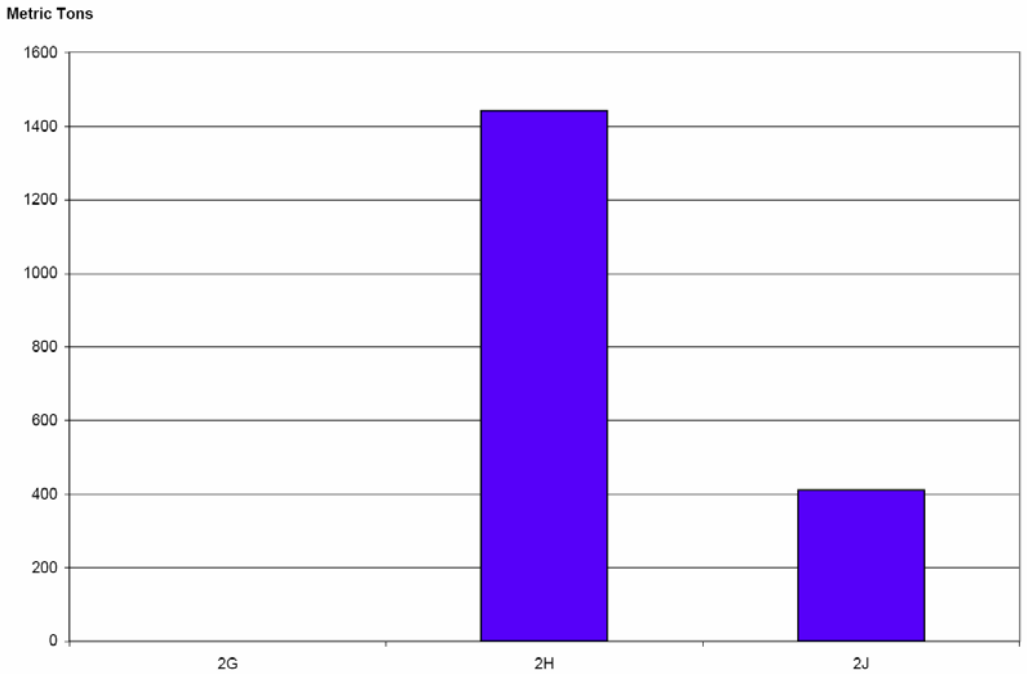
The harvest of Iceland scallops make up approximately 1 percent of the Labrador Shelf SEA Area harvest. DFO 2001b (2001/C2-07) notes that "[c]umulative removals from Newfoundland and Labrador have declined considerably and are now only about one quarter of what it was in 1996". This is due in part to the greater relative availability of other species, notably crabs and shrimp, as well as declines in scallop abundance throughout areas that once supported lucrative fisheries. In 2000, the number of vessels participating remained unchanged (35 versus 34), but well below the 171 recorded in 1996.

In addition, Newfoundland and Labrador-based vessels fishing for Iceland scallop may catch and retain sea scallop. Current fisheries regulations allow a 10 percent by-catch of sea scallop (DFO 2001b). However, it is noted that, "[A]s scallops are shucked at sea and only 'meats' landed, species discrimination for monitoring purposes is fraught with difficulty".

Within the Labrador Shelf SEA Area as a whole, Iceland Scallops accounts for approximately 1 percent of the total harvest. The majority of the harvest occurs in NAFO Division 2H (Figure 4.49) at 78 percent of catch with landing peaking in August. During the public consultations in Nain (October 29, 2007), it was stated that Iceland scallop are harvested within the region and are the main species processed at the plant in Nain. Torngat Fish Producers Co-operative (Happy Valley-Goose Bay Consolations November 5, 2007) stated that the Plant in Nain processed approximately 1.2 million pounds of shell stock scallop but that had been substantially reduced in 2007 due to low market prices. Torngat Fish Producers Co-operative had announced in May 2008 that it would not open its money-losing plants in Nain and Postville this year. This announcement would have resulted in approximately 200 plant workers unemployed for the fishing season, and fishers from the area unable to sell their catches in the area (CBC 2008a). The Nunatsiavut government in Labrador decided to assist the Torngat Fish Producers Co-operative to assist the fish processing plant in Nain through a transfer of about $300,000 in revenues from the Voisey's Bay nickel mine. However, the assistance was not enough to keep a smaller facility in Postville in operation (CBC 2008b).

Iceland scallops are also harvested by divers for personal use in Cartwright (Public Consultations November 15, 2007). An active scallop fishery is conducted in Gilbert Bay (Morris and Green 2002) within Zone 2 (serves only as a migratory route for the Gilbert Bay cod population (Government of Canada 2005).

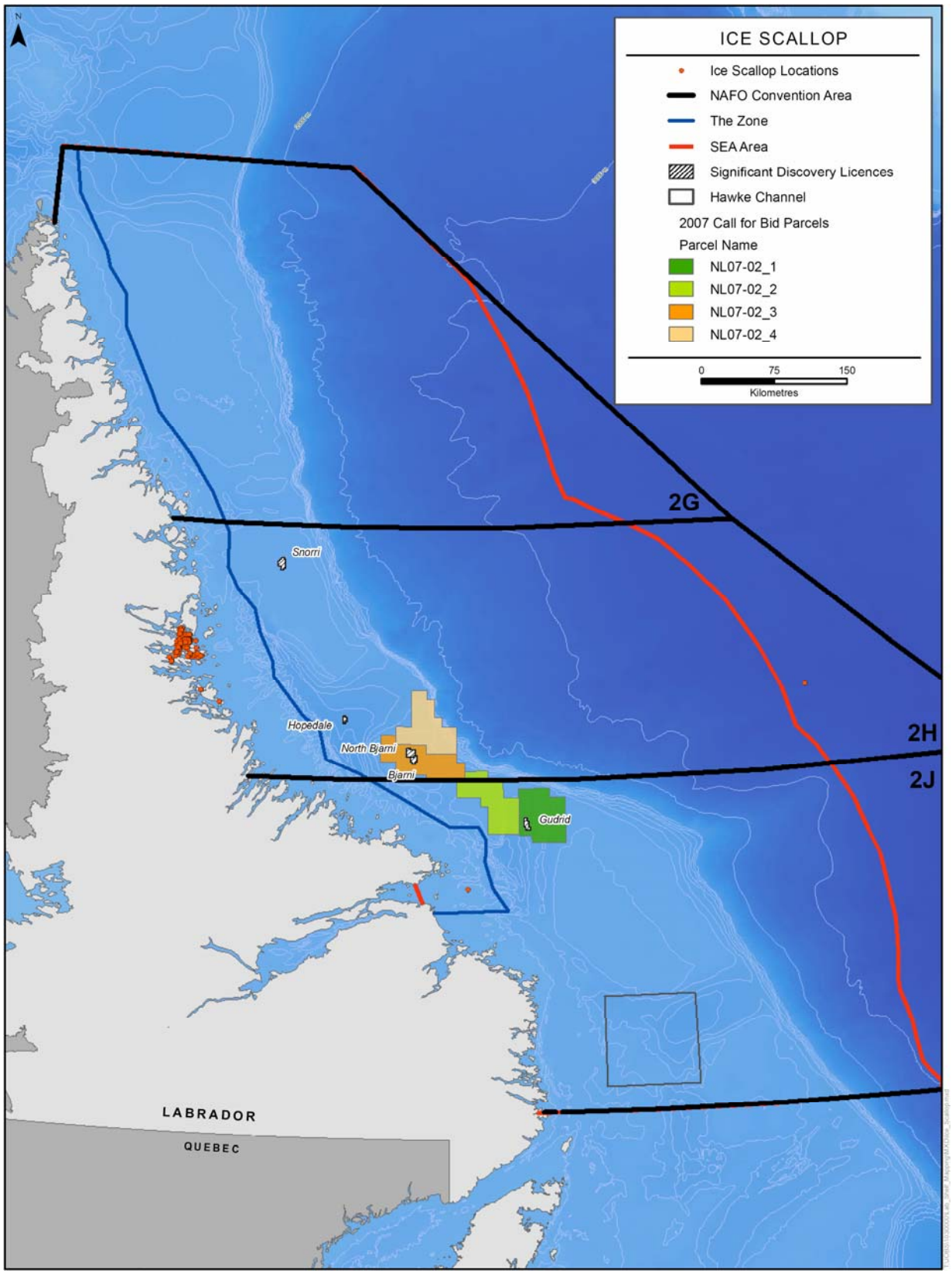
Figure 4.49 Strategic Environmental Assessment Area Unit Areas Scallop Harvest by NAFO Division, (2004 to 2006)



Reported Iceland scallop harvesting locations, based on the DFO georeferenced data in relation to the Labrador Shelf SEA Area and the relevant Unit Areas, are shown in Figure 4.50. This map shows three years (2004 to 2006) of aggregated data to better represent harvesting patterns, though the harvesting locations tend to be consistent from year to year.

During collection of traditional knowledge (Nain 2007: Rigolet 2007) and at public consultations (Port Hope Simpson 2007; Cartwright 2007) it was indicate that Iceland scallops were fished within the Labrador Shelf SEA Area. The areas in which scallops may be fished included areas from Big Bay to Saglek Bay and Shoal Tickle (Nain 2007; Rigolet 2007).

Figure 4.50 Georeferenced Iceland Scallop Harvesting Locations, (2004 to 2006)

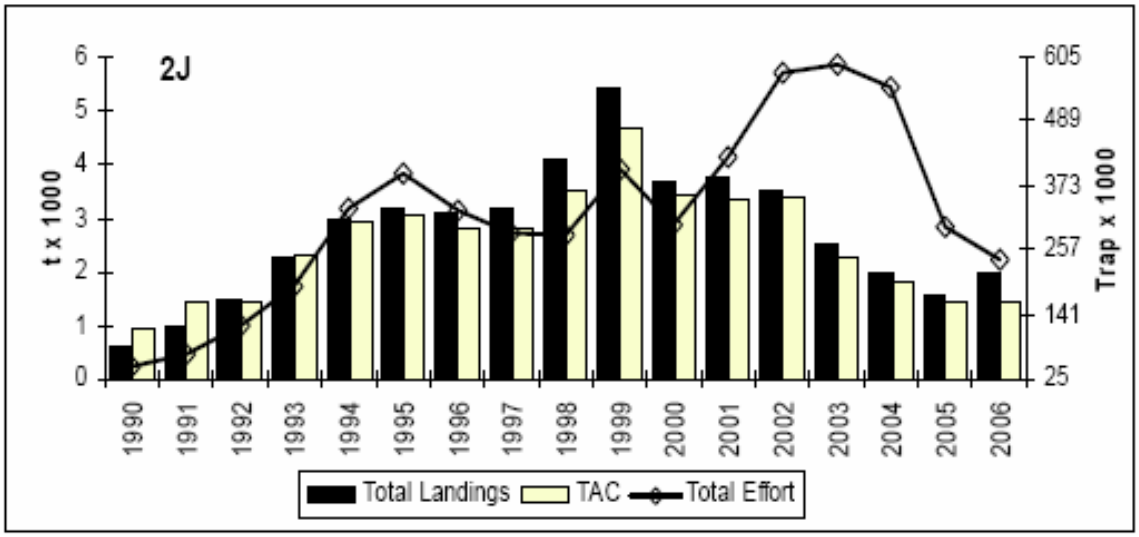


Source: DFO data (2004 to 2006).

4.10.3.5 Snow Crab

The snow crab fishery is an important fishery in 2J waters. During 2004 to 2006, snow crab comprised approximately 4 percent (Table 4.11) of the Labrador Shelf SEA Area harvest. In 2J, it was the second largest fishery and accounting for approximately 7 percent of the harvest (Table 4.12). In Division 2J, the commercial snow crab fishery landings increase from 330 t in 1985 to 600 t in 1990 (DFO 2007g). Landings (Figure 4.51) continued to increase from 1995 to 1997 to approximately 3,200 t, peaking in 1999 at 5,400 t (DFO 2007g). In 2005, landings declined by 70 percent to 1660 t (DFO 2007g) because of a reduction in the TAC. Landings increased again in 2006 by 25 percent to 2,000 t (DFO 2007g).

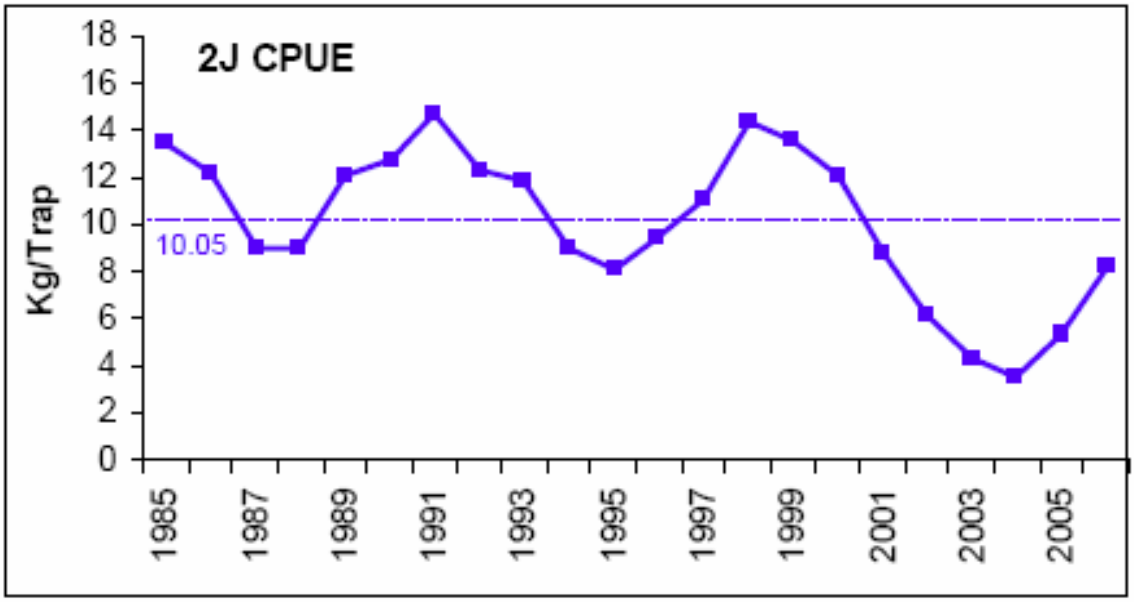
Figure 4.51 Snow Crab Total Allowable Catch, Landings, and Fishing Effort Trends in Division 2J



Source: DFO 2007g.

The snow crab catch per unit effort (CPUE) (Figure 4.52) has varied over time. For the periods of 1985 to 1987, 1991 to 1995, and 1998 to 2004 CPUE has declined, with the 1998 to 2004 period reaching record lows. Conversely, from 1987 to 1991, 1995 to 1998 and 2004 to 2006 the CPUE increased (DFO 2007g). In 2006, the CPUE had nearly doubled to approximately the long term average (DFO 2007g).

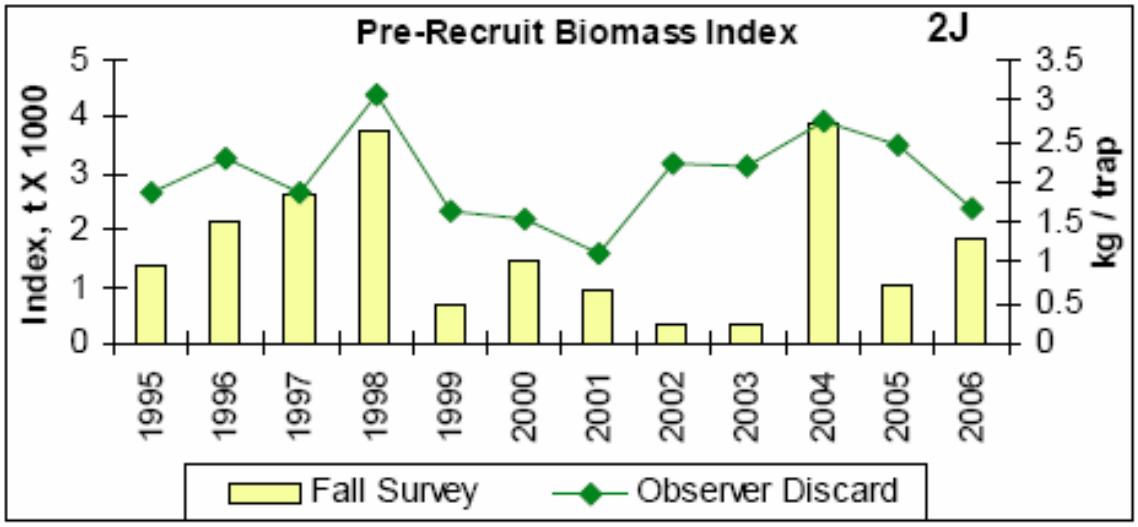
Figure 4.52 Snow Crab Commercial Catch per Unit Area Trends in Relation to the Long-term Average (dotted line) for Division 2J



Source: DFO 2007g.

The fall exploitable biomass index survey from 1998 to 2002 has decreased by 94 percent. Although it increased over the past few years, the exploitable biomass remains lower than previous 2002 levels (DFO 2007g). Fall surveys of the pre-recruit index and the observer discard pre-recruit index (Figure 4.53) have decreased from 1998 to 2003. Both indices (biomass and pre-recruitment) peaked in 2004 before decreasing in 2005 (DFO 2007g). In 2006, the observer index (Figure 4.53) declined further, while the survey index increased nearly two-fold (DFO 2007g). The decrease in the observer discard survey may be the result of harvesting commencing earlier in the season, thereby resulting in reduced catches of new-shelled immediate pre-recruits (DFO 2007g). In early 2004, at-sea sampling indicated an increase in the catch rate of small new-shelled crabs followed by an increase in recruitment, which was reflected in the increased CPUE for 2004-2006 (DFO 2007g). Although catch rate of small new-shelled crabs decreased in 2005, it increased in 2006, suggesting an increase in short term recruitment (DFO 2007g).

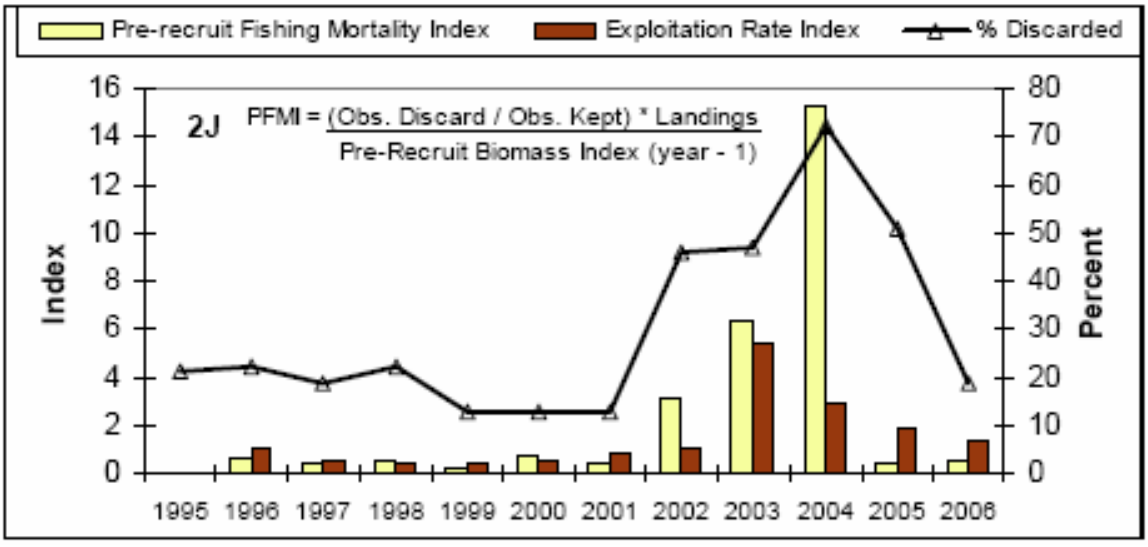
Figure 4.53 Snow Crab 2J Pre-recruit Indices Trends



Source: DFO 2007g.

Recruitment has increased since 2004 and prospects are promising for 2007 (DFO 2007g). The exploitation rate index (Figure 4.54) was generally low from 1996 to 2002 before increasing sharply in 2003 but has since declined in 2006 (DFO 2007g). The pre-recruit fishing mortality index (Figure 4.54) was also low from 1996 to 2001. It increased sharply in 2001 to 2004, followed by a decline to low levels in 2005-2006 (DFO 2007g). The percentage of total catch discarded (Figure 4.54) increased rapidly for 2002 to 2003 and increased in 2004 to a record high level, before decreasing in 2005 to 2006 to below 2002 levels (DFO 2007g). Both multi-species and fishery data on snow crab suggest that exploitable biomass has become increasingly dependent on immediate recruitment. This suggests a short-term increase in the exploitation rate that results in increased pre-recruit mortality could further impair recovery of stocks (DFO 2007g).

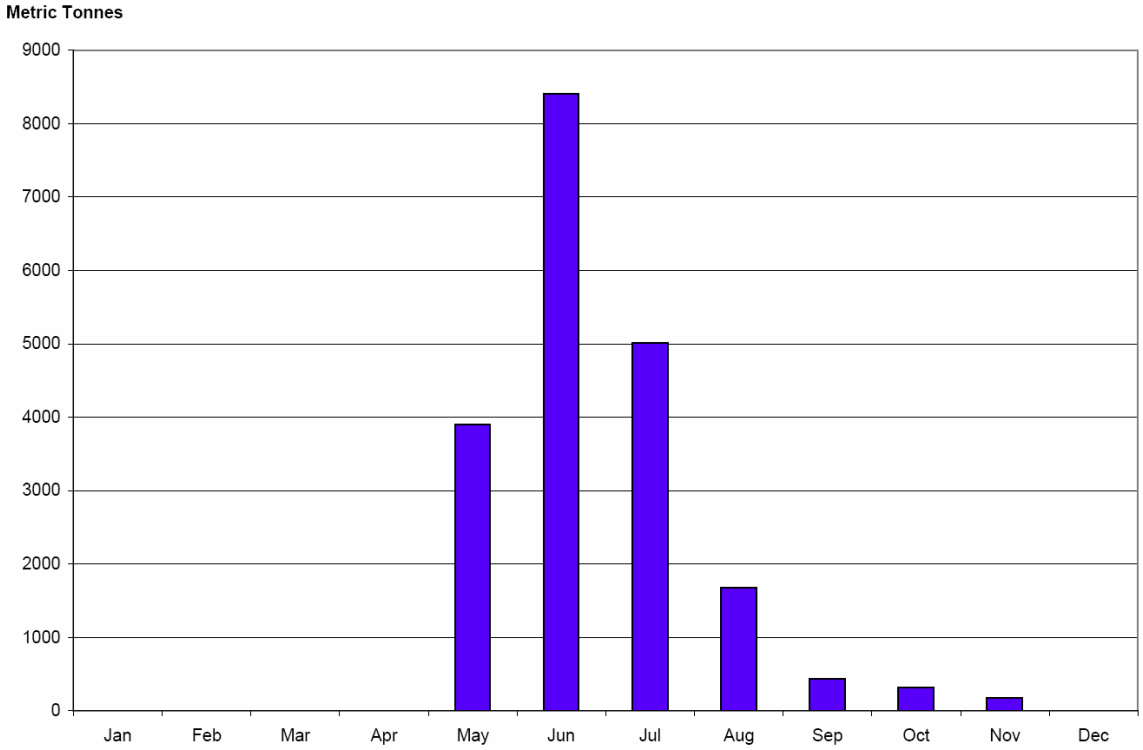
Figure 4.54 Trends in Mortality Indices and in the Percentage of the Catch Discarded in the Fishery for Division 2J Snow Crab.



Source: DFO 2007g.

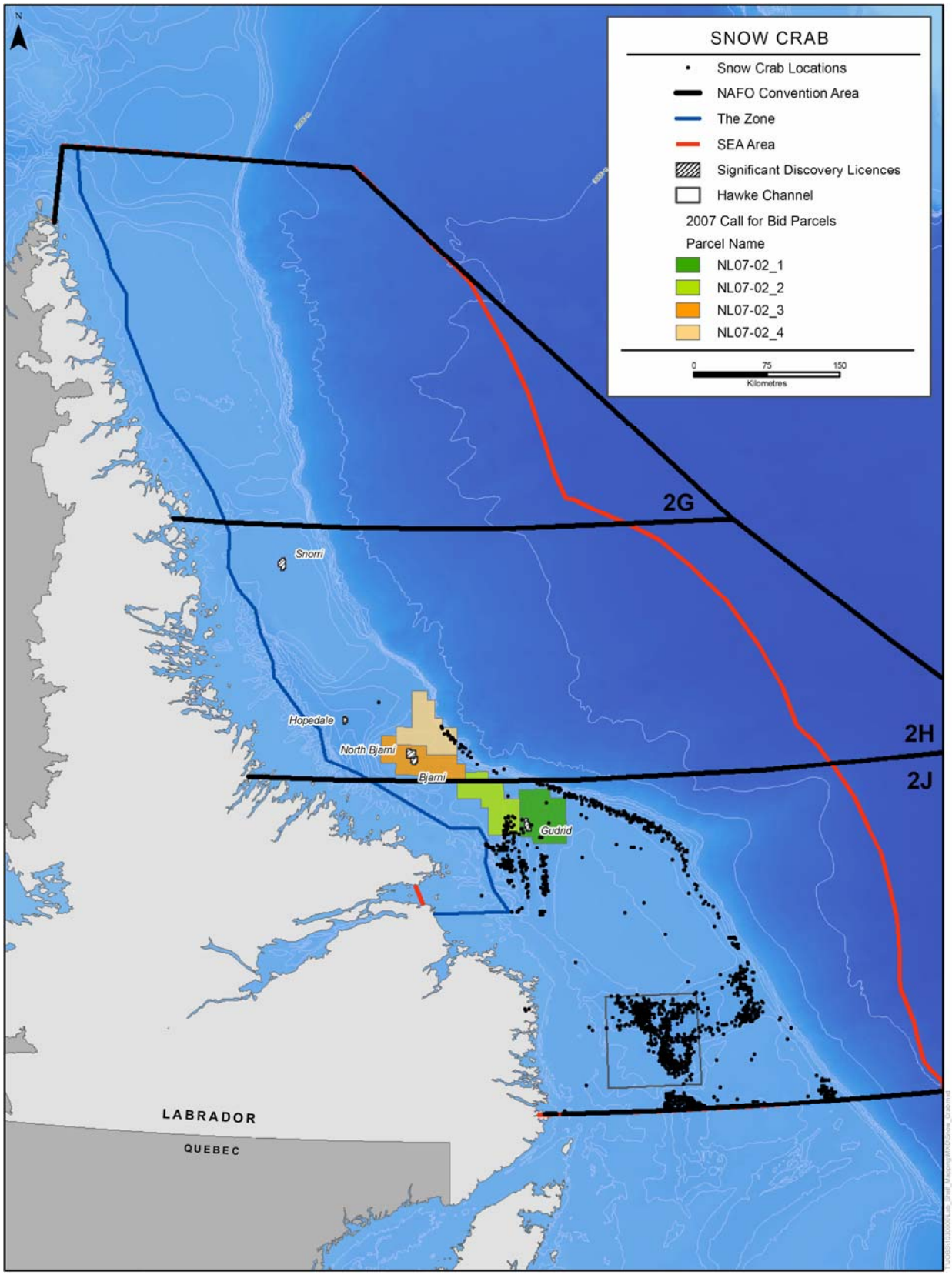
In the Labrador Shelf SEA Area the snow crab fishery takes place in the late spring and early summer with June (Figure 4.55) having the highest landings. Approximately 96 percent of the snow crab harvest for the Labrador Shelf SEA Area occurs in Division 2J.

Figure 4.55 Strategic Environmental Assessment Area Unit Areas Snow Crab Harvest by Month, 2004 to 2006 Average



Reported snow crab harvesting locations, based on the DFO georeferenced data in relation to the Labrador Shelf SEA Area and the relevant Unit Areas, are shown in Figure 4.56. This map shows three years (2004 to 2006) of aggregated data to better represent harvesting patterns, though the harvesting locations tend to be consistent from year to year.

Figure 4.56 Georeferenced Snow Crab Harvesting Locations, 2004 to 2006



Source: DFO data (2004 to 2006).

During public consolations (October 29 to November 15, 2007) in the Labrador Shelf SEA Area, fishers indicate area parceled for gas and oil exploration lie within crab fishing grounds (Parcel NL07-02_2). Fishers in Nain, Happy Valley-Goose Bay, Port Hope Simpson and Hopedale all raised concerns about the effect of exploration on crab fishing grounds. Fishers in Mary's Harbour are adamant about maintaining protection zone in Hawke Channel, which is exclusive to crab pot fishing only. Other areas (Happy Valley-Goose Bay and Cartwright) are concern about effects of seismic activities on crab and moulting crab in particular. Torngat Fish Producers Co-operative Society Ltd. in Happy Valley-Goose Bay (November 5, 2007) confirmed that discovery parcels outline by C-NLOPB track over crab fishing ground. The crab fishery specific to this area lasts between four to six weeks for the main quota of 317,500 kg. There is an additional 181,500 kg exploratory quota in NAFO Area 2H. During the Happy Valley-Goose Bay public consultations, a fisher person suggested that crab populations are changing in the area. He stated that 25 years ago, there were no crab in that area but now they seem to be moving north. This past year they found good fishing about 28 miles off Makkovik and he felt this northward movement could be due to ocean warming.

During collection of traditional knowledge (Nain 2007; Rigolet 2007) and at public consultations (Hopedale 2007; Happy Valley-Goose Bay 2007; Mary's Harbour 2007; Port Hope Simpson 2007; Cartwright 2007) it was indicated that snow crab were fished within the Labrador Shelf SEA Area. The areas in which snow crab may be fished included Cartwright Channel; off Cartwright and Black Tickle; and areas between Makkovik and Hopedale (Nain 2007; Rigolet 2007; Hopedale 2007; Happy Valley-Goose Bay 2007; Mary's Harbour 2007; Port Hope Simpson 2007; Cartwright 2007).

4.10.3.6 Northern Shrimp

Within the Labrador Shelf SEA Area, northern shrimp is the single most important fishery accounting for approximately 85 percent of the total harvest. Fifty-nine percent of the harvest is landed in 2J, while 22 percent and 19 percent is landed in 2G and 2H, respectively (Figure 4.57). Landings (Figure 4.59) occur year round peaking in February before declining to a low in April, followed by a second peak in July.

Figure 4.57 Percentage of Northern Shrimp Landings for Northwest Atlantic Fisheries Organization Divisions 2GHJ, 2004 to 2006.

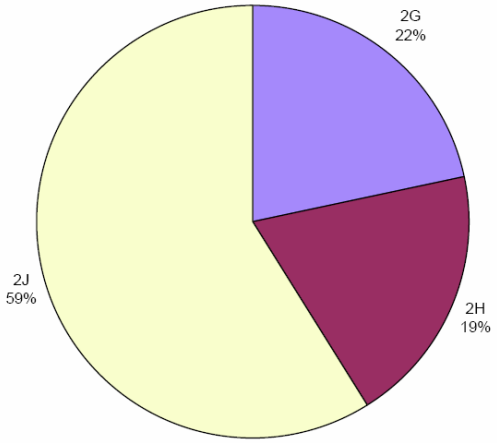
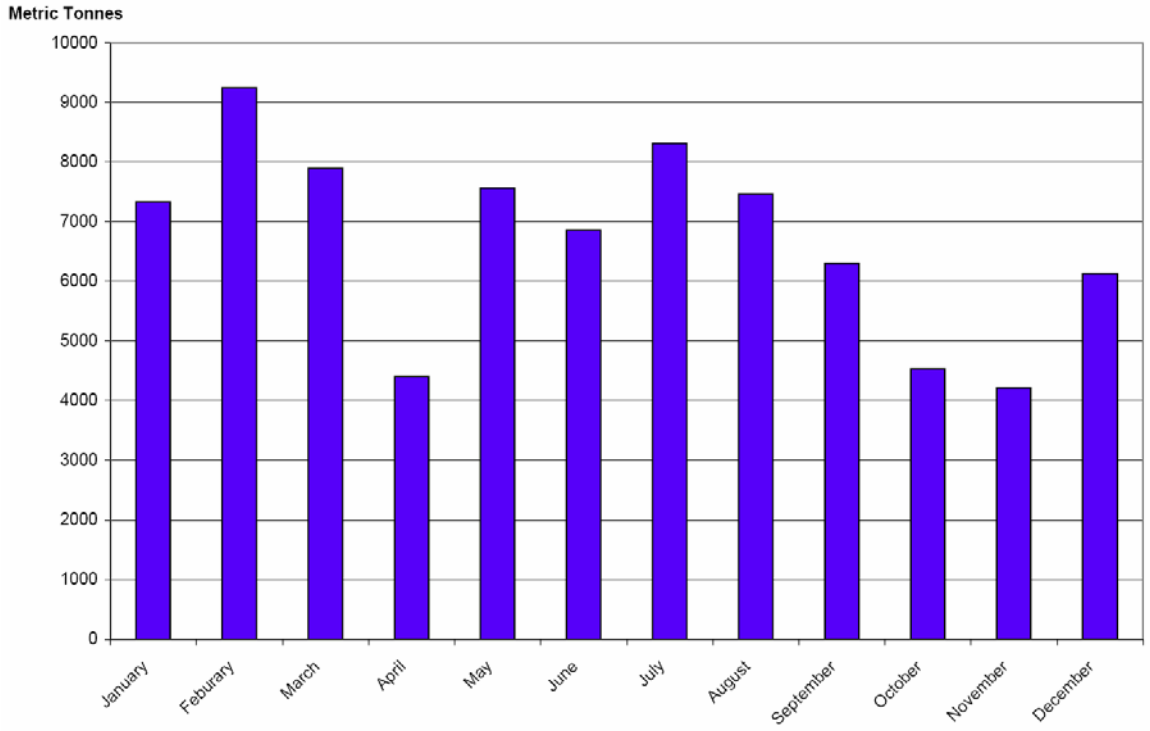


Figure 4.58 Strategic Environmental Assessment Area Unit Areas Northern Shrimp Harvest by Month, 2004 to 2006 Average

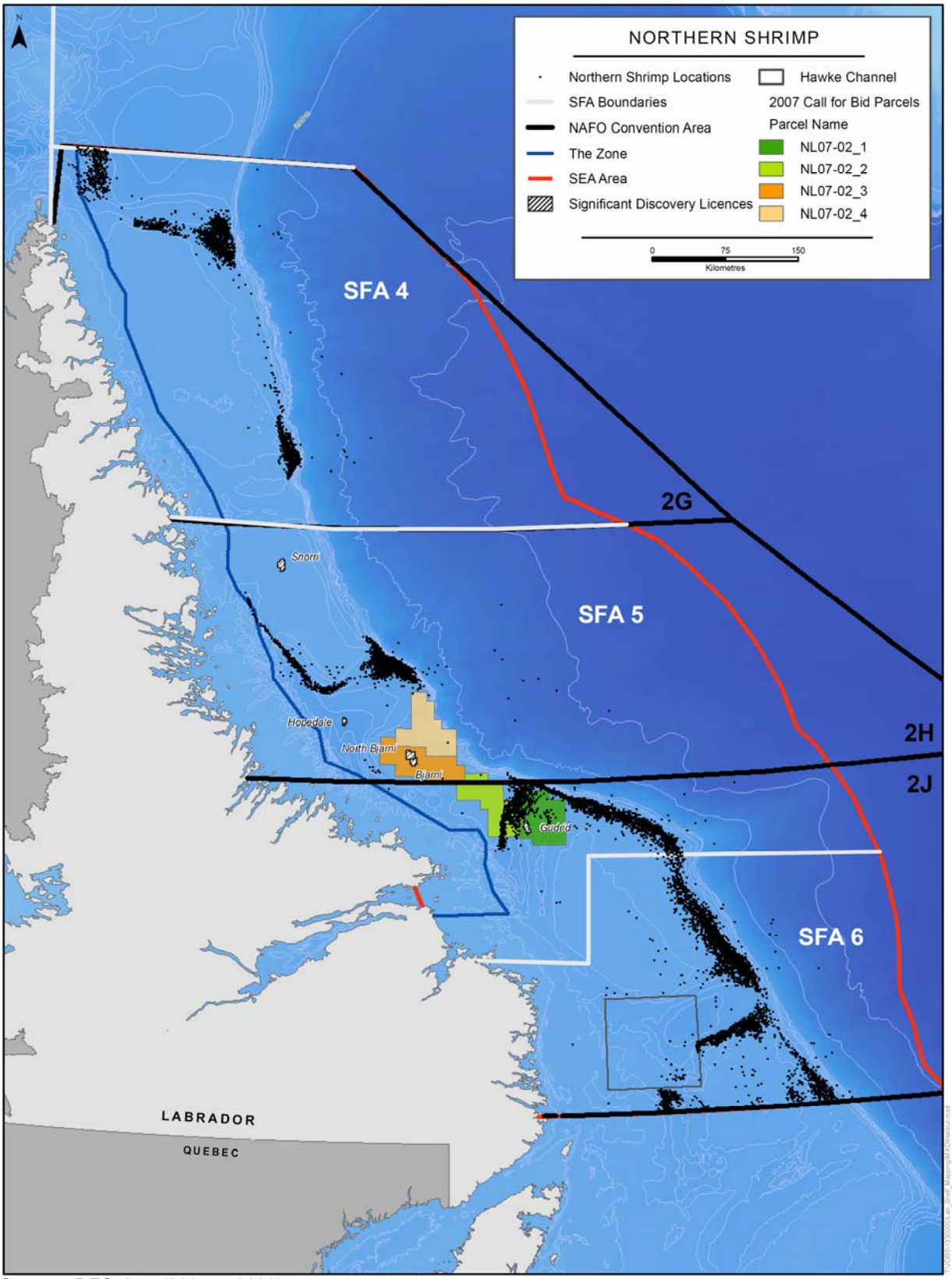


Reported northern shrimp harvesting locations, based on the DFO georeferenced data in relation to the Labrador Shelf SEA Area and the relevant Unit Areas, are shown in Figure 4.59. This map shows three years (2004 to 2006) of aggregated data to better represent harvesting patterns, though the harvesting locations tend to be consistent from year to year. During public consultations with communities in the Labrador Shelf SEA Area, northern shrimp are pointed out as an important commercial species. Specifically, Nain, Natuashish, Hopedale, Happy Valley-Goose Bay and Port Hope Simpson all have commercial fisheries for shrimp. Innu Nation is involved in the commercial fishery in partnership with Ocean Choice International (Natuashish October 30, 2007).

In 2003, the northern shrimp fishing industry was granted a fishing season change from a calendar year (January 1 to December 31) to a fiscal year (April 1 to March 31). To facilitate this, an additional 20,229 t interim quota was allocated to the large vessel fleet and as a result, the 2003 to 2004 season was 15 months long (DFO 2006m).

In shrimp fishing area (SFA) 4, within NAFO division 2G, the TAC increased from 2,580 t in 1989 to 5,200 t in 1995 and to 8,320 t in 1998, of which 2,184 t was allocated to the area south of 60°N to promote spatial expansion of the fishery (DFO 2006m). In 2003 to 2006, the TAC (Figure 4.60) was increased and maintained at 10,320 (DFO 2006m). The CPUE (Figure 4.61) has declined after 2001 and remains near the long-term average CPUE of 2,000 kg/hr for 2004 and 2005 (DFO 2006m). Biomass and abundance are not available for this area. DFO, in partnership with the Northern Shrimp Research Foundation, have commenced a shrimp based research survey in 2005 and once there is an established time series (of at least five consecutive summers), biomass and abundance for SFA 4 will be more easily determined (DFO 2006m).

Figure 4.59 Georeferenced Northern Shrimp Harvesting Locations, 2004 to 2006



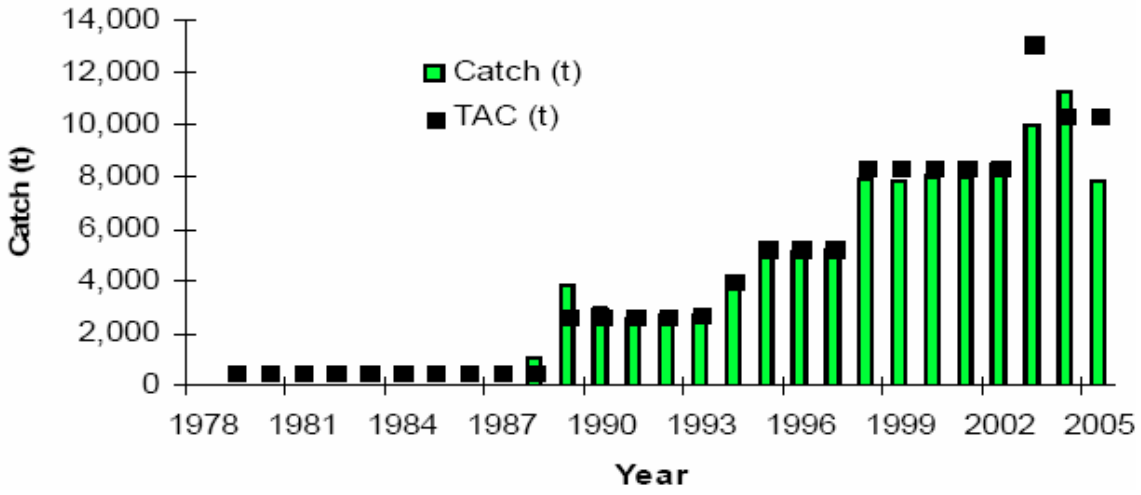
Source: DFO data (2004 to 2006).

In SFA 5 (NAFO Division 2H), the TAC (Figure 4.62) doubled from 7,650 t during 1994 to 1996 to over 15,300 t in the period from 1997 to 2002 (DFO 2006m). In 2003, TAC increased by 52 percent to 23,300 t (including a 2,500 t allocation for research). This TAC was maintained from 2004 to 2006 (DFO 2006m). Since 1996, the CPUE (Figure 4.63) has remained above the long-term average. Biomass and abundance indices from the autumn multi-species surveys have increased since 1998 (DFO 2006m). Short-term recruitment prospects (Figure 4.64) for 2H northern shrimp appear average, while longer term prospects are unknown (DFO 2006m). Northern shrimp continues to be distributed over a broad area and the exploitation rate index has remained low (Figure 4.65) recent catches have no observable impact on biomass or abundance (DFO 2006m).

In SFA 6 (NAFO Divisions 2L and 3K), the TAC (4.66) increased in 1997 to 23,000 t from the 1994 to 1996 level of 11,050 t. From 1997 to 1999, the TAC more than doubled, with most of the increase being reserved for the development of the small vessel fishery (DFO 2006m). The TAC continued to increase up to 2002 and increased by 23 percent to 77,932 t in 2003 (DFO 2006m). In 2005, CPUE (Figure 4.67) remained high for large vessels (>500 t). For small vessels (<65 feet) it increased considerably in 2004 and remained high for 2005 (DFO 2006m). The fall multi-species surveys (Figure 4.68) show increased biomass and abundance indices from 1997 to 2001. Both indices decreased slightly during the 2002 surveys. Since 2002, abundance has remained high while biomass has increased to record levels (DFO 2006m). The resource continues to be distributed over a board area and exploitation rate index (Figure 4.69) has remained low (DFO 2006m).

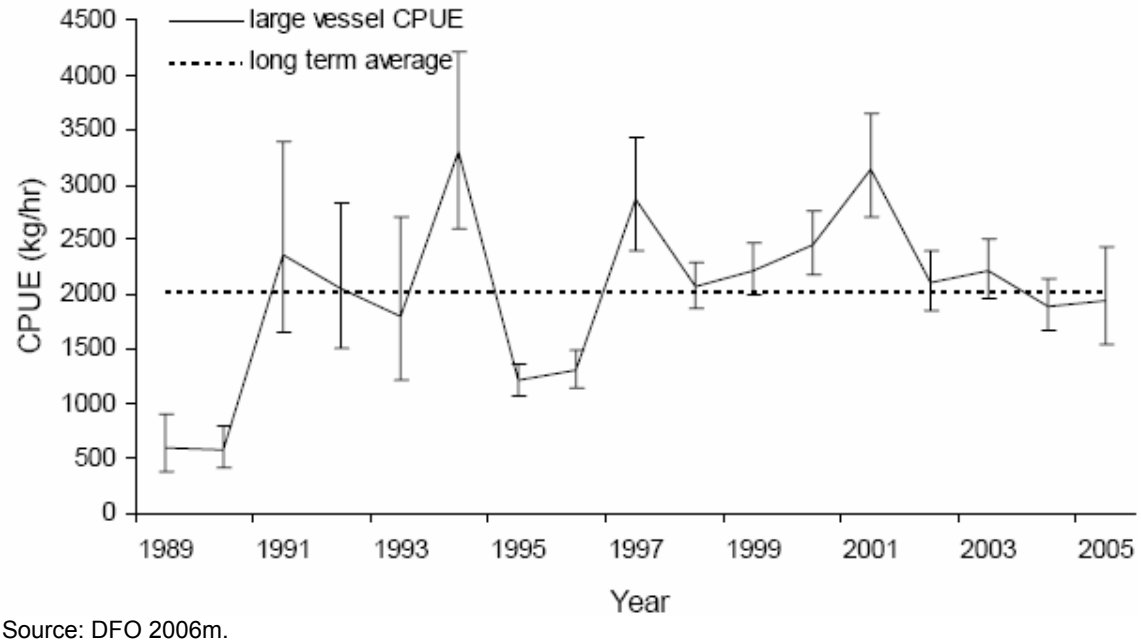
During collection of traditional knowledge (Nain 2007; Makkovik 2007) and at public consultations (Nain 2007; Natuashish 2007; Hopedale 2007; Happy Valley-Goose Bay 2007; Mary's Harbour 2007; Port Hope Simpson 2007) it was indicated that northern shrimp were fished within the Labrador Shelf SEA Area. The areas in which northern fish may be fished included areas between Makkovik and Hopedale (Nain 2007; Natuashish 2007; Hopedale 2007; Happy Valley-Goose Bay 2007; Mary's Harbour 2007; Port Hope Simpson 2007).

Figure 4.60 Shrimp Fishing Area 4 (Northwest Atlantic Fisheries Organization Unit Area 2G) Northern Shrimp Catches (t)



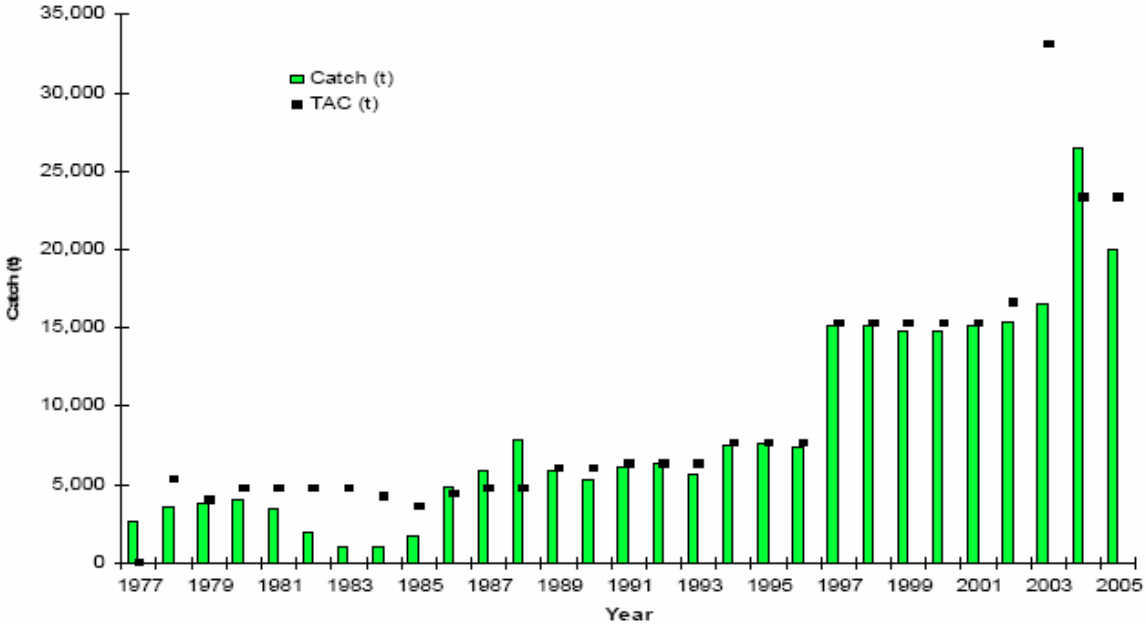
Source: DFO 2006m.

Figure 4.61 Shrimp Fishing Area 4 Large Vessel Catch per Unit Area



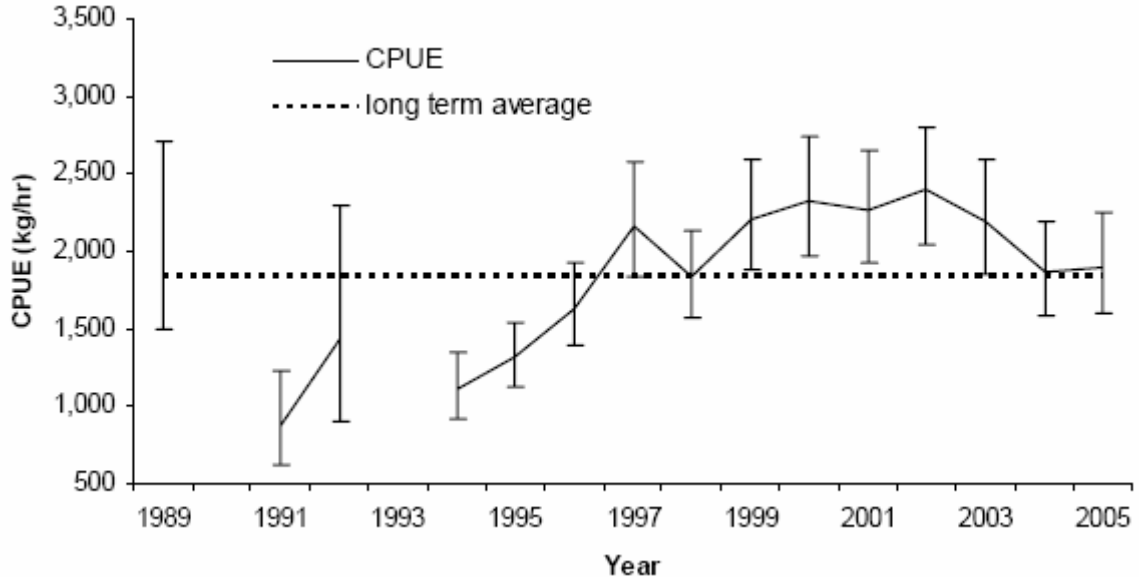
Source: DFO 2006m.

Figure 4.62 Shrimp Fishing Area 5 (Northwest Atlantic Fisheries Organization Unit Area 2H) Northern Shrimp Catches (t)



Source: DFO 2006m.

Figure 4.63 Shrimp Fishing Area 5 Large Vessel catch per Unit Area



Source: DFO 2006m.

Figure 4.64 Shrimp Recruitment Index for the Period 1997 to 2005 (Cartwright Channel research survey data)

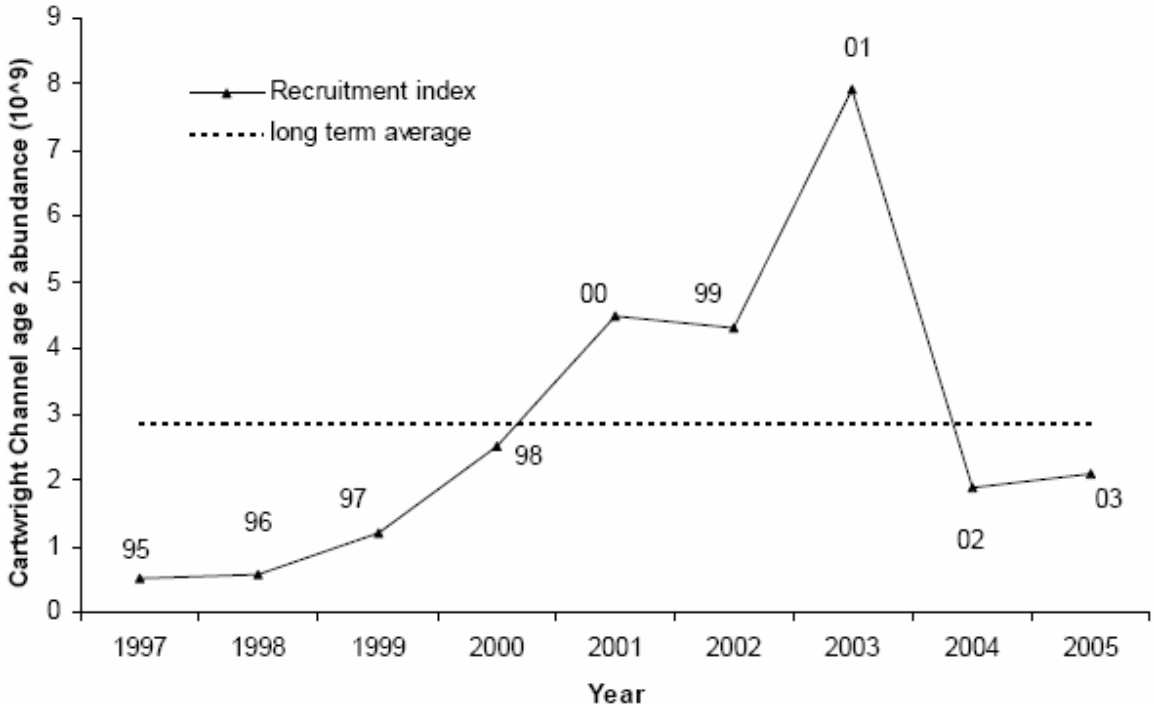
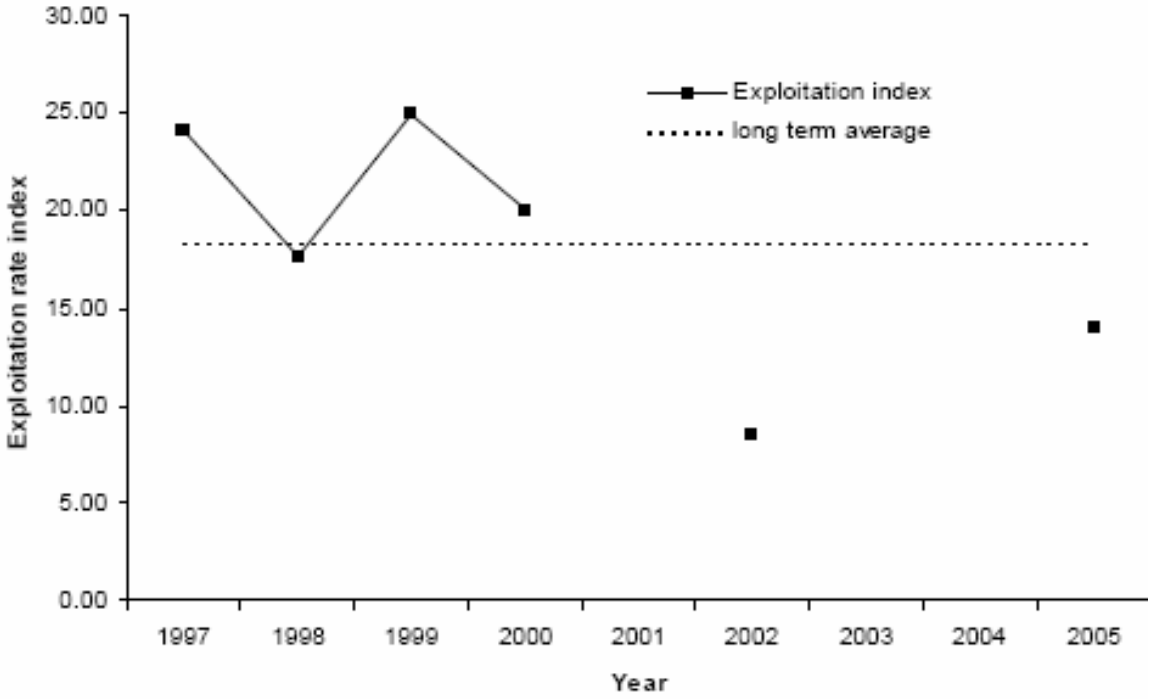
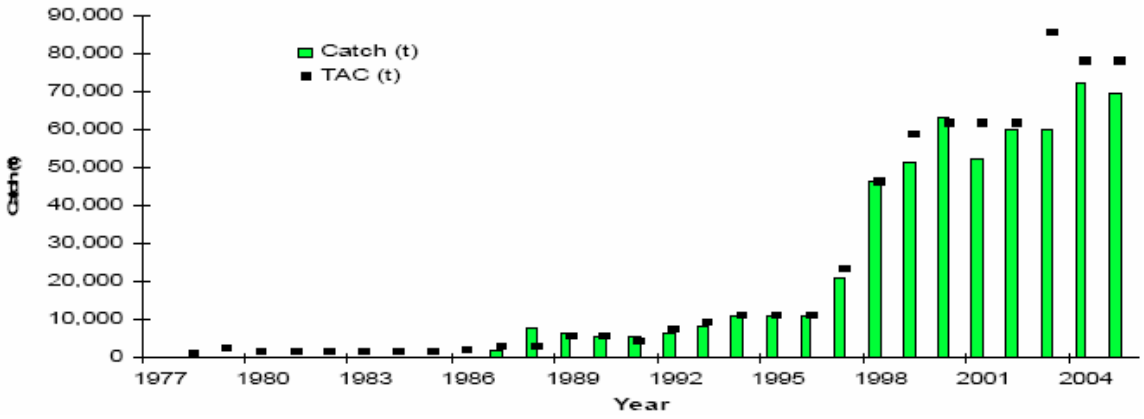


Figure 4.65 Shrimp Fishing Area 5 Exploitation Rate Indices Over the Period 1996 to 2005



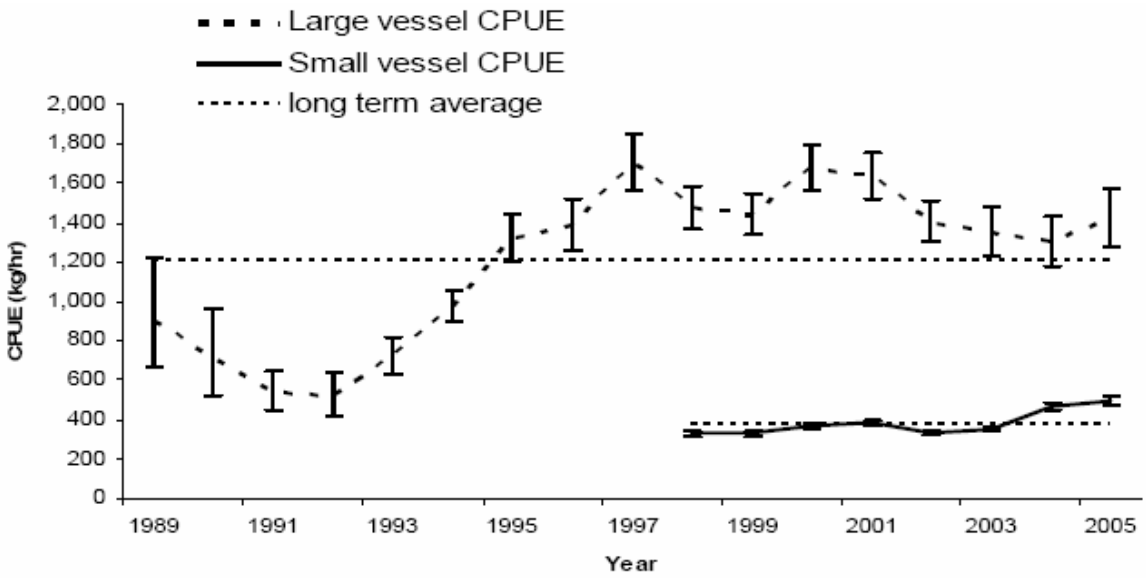
Source: DFO 2006m.

Figure 4.66 Shrimp Fishing Area 6 (Northwest Atlantic Fisheries Organization Unit Area 2J) Northern Shrimp Catches (t)



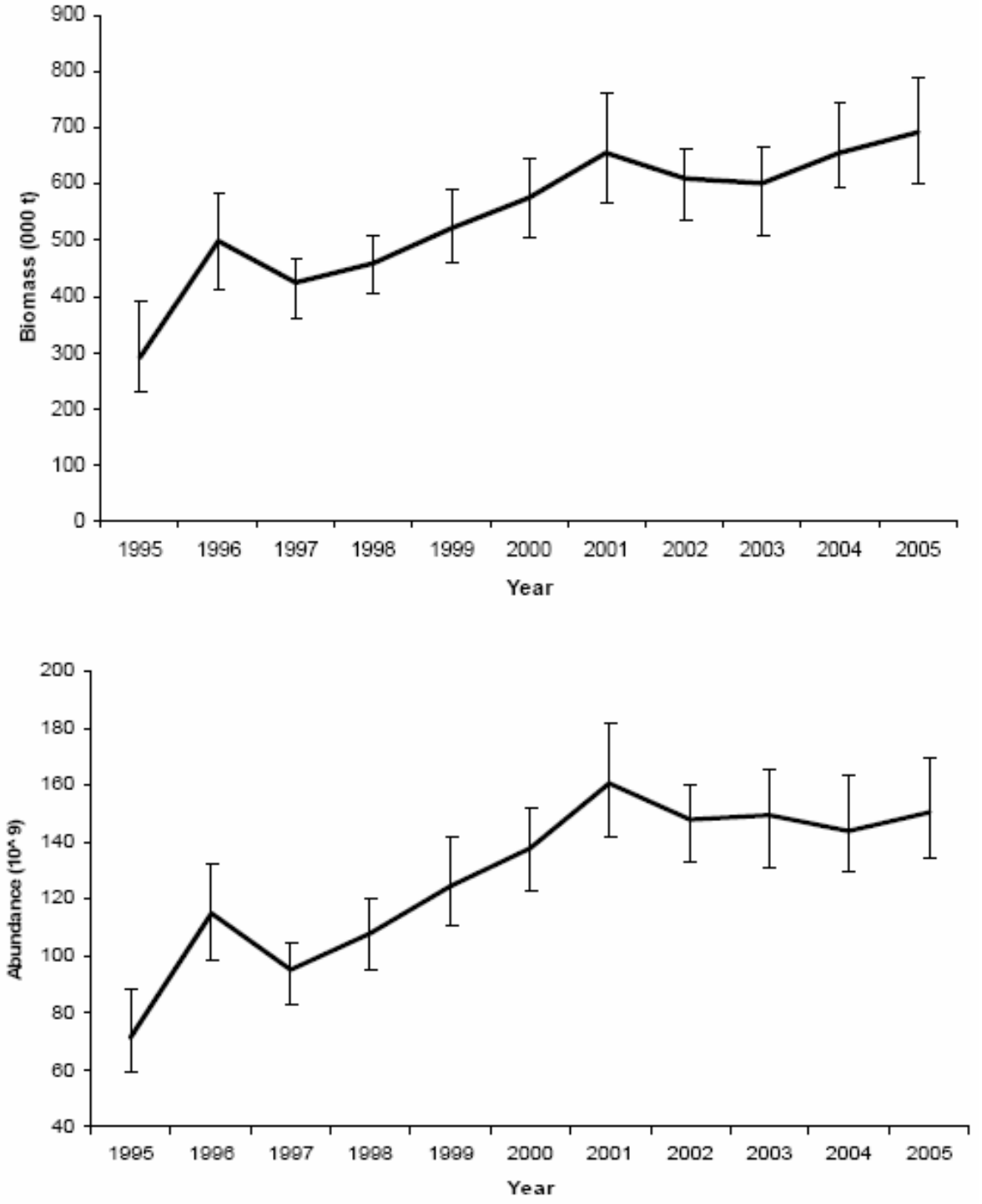
Source: DFO 2006m.

Figure 4.67 Shrimp Fishing Area 6 Large and Small Vessel Catch per Unit Area



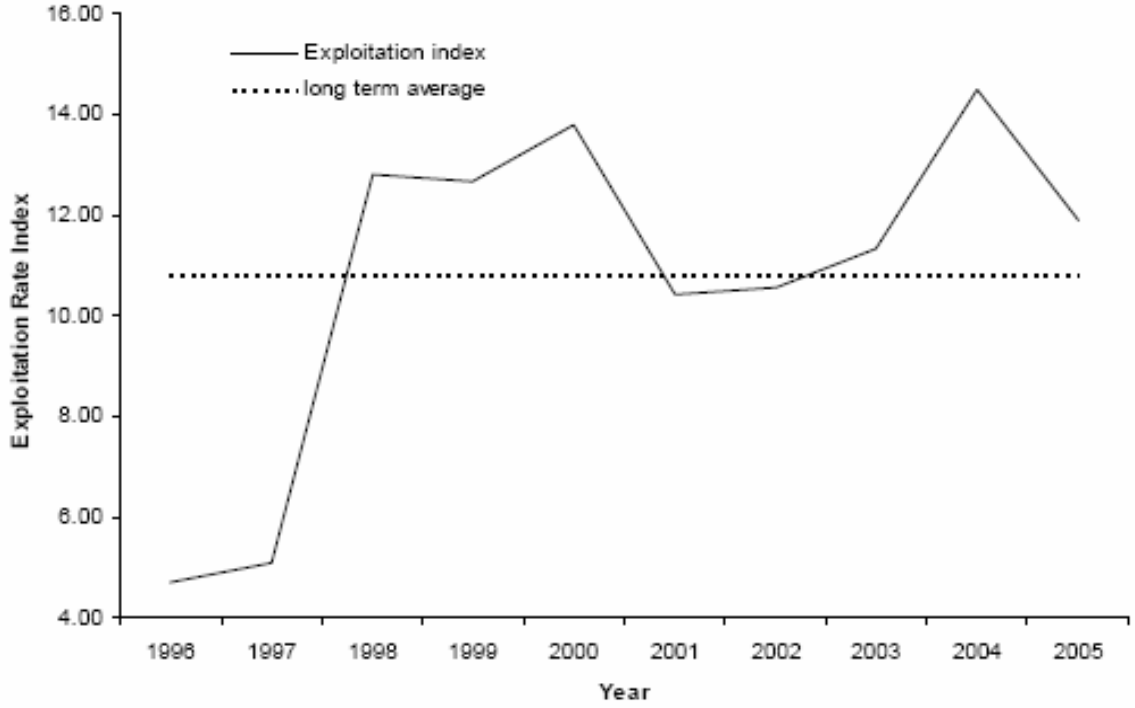
Source: DFO 2006m.

Figure 4.68 Shrimp Fishing Area 6 Biomass and Abundance Indices



Source: DFO 2006m.

Figure 4.69 Shrimp Fishing Area 6 Exploitation Rate Indices Over the Period 1996 to 2005



Source: DFO 2006m.

4.10.3.7 Greenland Halibut

Within the Labrador Shelf SEA Area as a whole, Greenland halibut is the most important ground fishery making up approximately 4 percent of the total harvest. A total of 62 percent of the harvest (Figure 4.70) is landed in 2J, while 32 percent and 6 percent is landed in 2H and 2G, respectively. Harvest occurs mainly in the summer with landings peaking in August (Figure 4.71).

Reported Greenland halibut harvesting locations, based on the DFO georeferenced data in relation to the Labrador Shelf SEA Area and the relevant Unit Areas, are shown in Figure 4.72. This map shows three years (2004 to 2006) of aggregated data to better represent harvesting patterns, though the harvesting locations tend to be consistent from year to year. During pubic consultations (October 29 to November 15, 2007) in the Labrador Shelf SEA Area, Greenland halibut (turbot) were listed as one of the main commercial species harvested. Most turbot landed are on the south coast, with a little harvested in Makkovik (Happy Valley-Goose Bay Public Consultation November 5, 2007).

Greenland halibut are distributed throughout the Labrador-eastern Newfoundland area, but abundances have changed since the 1970s (Healey 2007). In the 1970s and 1980s, there was a relatively high abundance of Greenland halibut along deep slopes of the Continental Shelf, particularly in Division 2G (Healey 2007). They were also plentiful in the deep channels running between fishing banks, especially in Divisions 2H, 2J and 3K (Healey 2007). However, by 1991, the northern distribution was greatly reduced and most of their source was located in Division 3K (Healey 2007).

Figure 4.70 Percentage of Greenland Halibut Landings for Northwest Atlantic Fisheries Organization Divisions 2GHJ, 2004 to 2006.

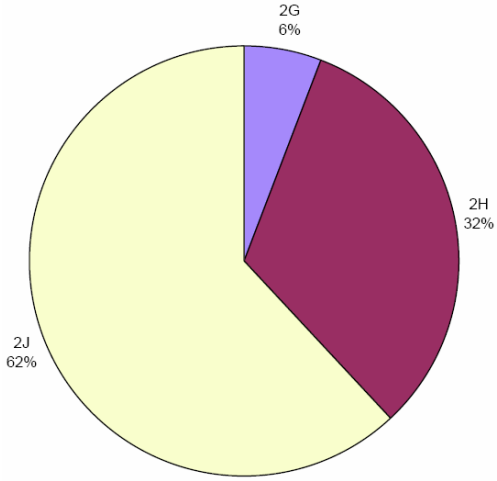


Figure 4.71 Strategic Environmental Assessment Area Unit Areas Greenland Halibut Harvest by Month, 2004 to 2006 Average

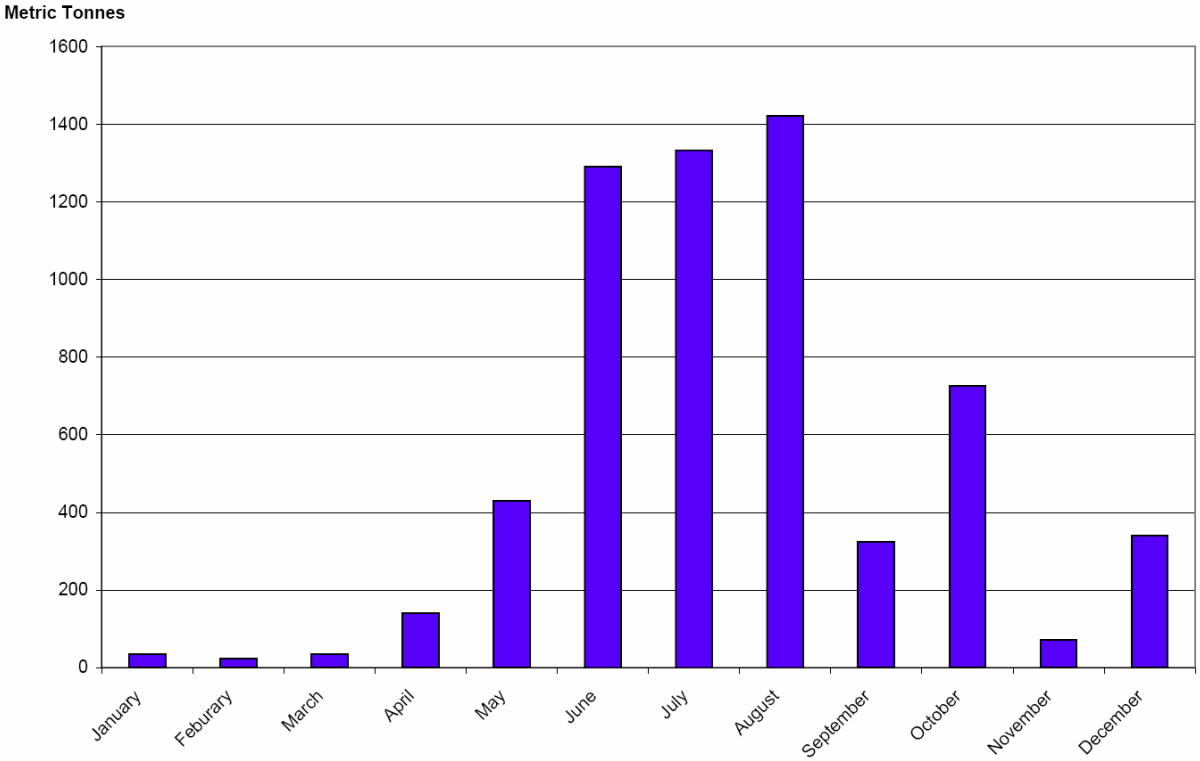
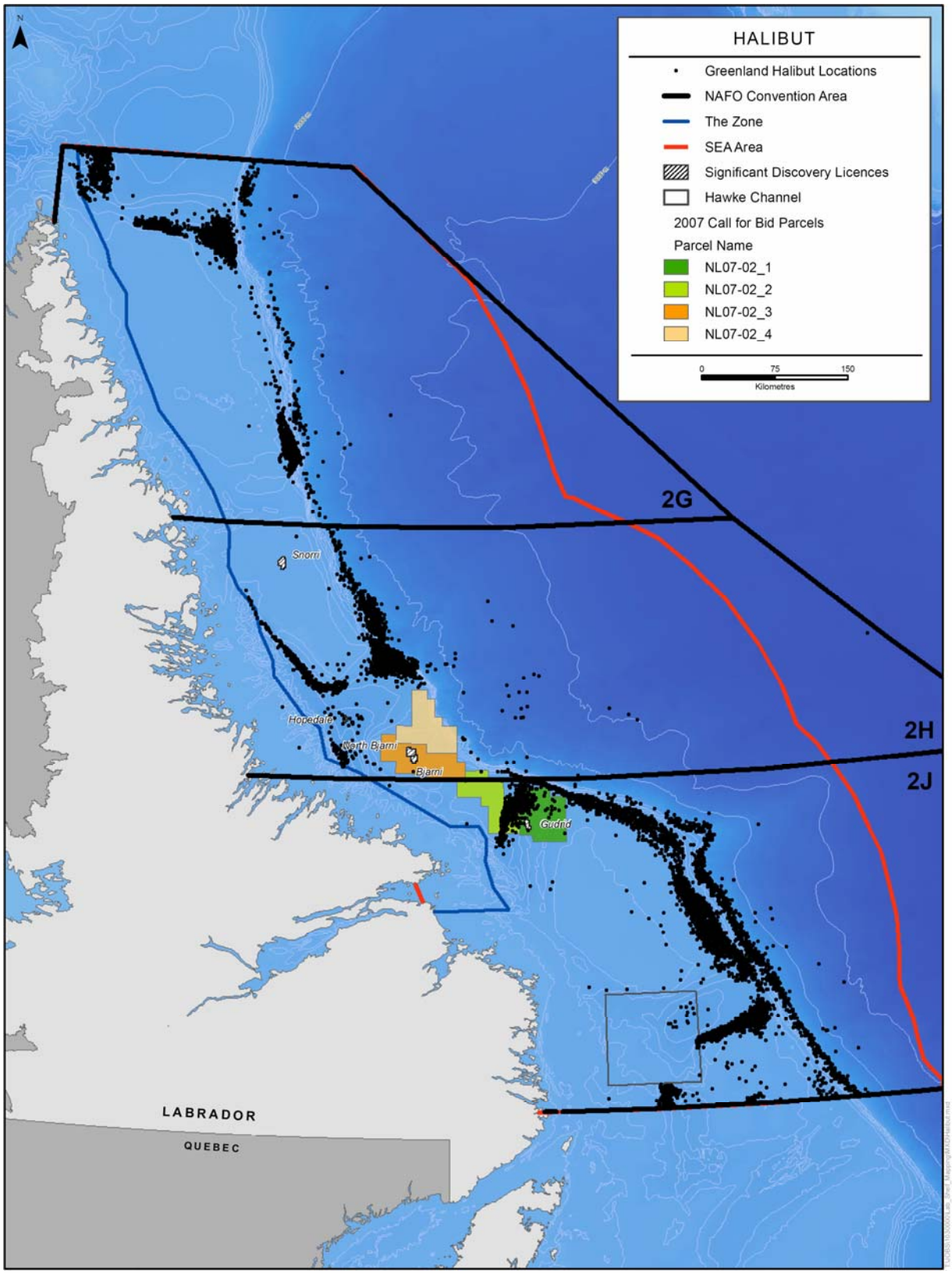


Figure 4.72 Georeferenced Greenland Halibut Harvesting Locations, 2004 to 2006



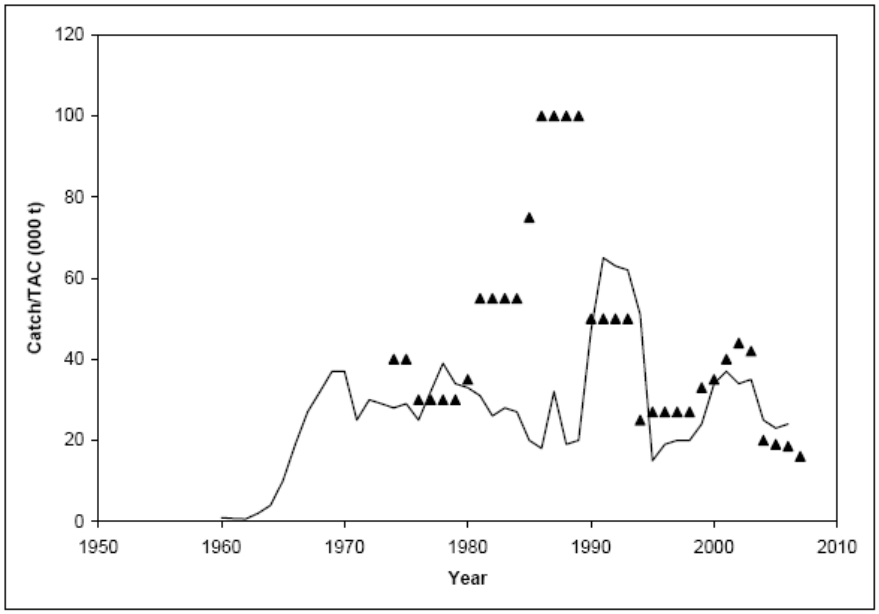
Source: DFO Data (2004 to 2006).

The Canadian fishery for Greenland halibut in NAFO Subarea 2 and 3 has been in decline since 1996 (Brodie et al. 2007; Healey 2007). It began in the 1960s as a gillnet fishery in deepwater bays of eastern Newfoundland, and moved progressively northward (Brodie et al. 2007). Eventually, the fishery moved further offshore to the continental slopes (Brodie et al. 2007). Most of the resource resides in Divisions 2J and 3K (Healey 2007).

In 2003, the Fisheries Commission established a 15 year rebuilding plan for Greenland halibut stocks. The goal was to measure stocks, to stop the decline of the exploitable biomass and ensure the rebuilding of biomass to a level allows a long term fishery (NAFO 2003). The plan allows rebuilding the stock by lowering TAC gradually from 2004 to 2007 from 20,000 to 16,000 t (Healey and Mahé 2007).

In general, for the Subarea 2 and Divisions 3KLMNO catches of Greenland halibut (Figure 4.73) increased from the 1960s to over 36,000 t in 1969 and ranged from 18,000 to 39,000 t until 1990 (Healey and Mahé 2007). From 1990 to 1994, the catch rates increased further to between 47,000 to 63,000 t, with some estimates of certain years being as high as 75,000 t (Healey 2007). In 1995, catch rates declined to approximately 15,000 t but increased again in the late 1990s. In the early 2000s, landings have decreased because of the Fishery Commission's rebuilding plan (Healey and Mahé 2007). Although a TAC (Figure 4.73) is established for this resource, estimated catches have exceeded the TAC by 27 percent, 22 percent and 27 percent respectively for the first three years of the rebuilding plan (Healey and Mahé 2007).

Figure 4.73 Catches (line) and Total Allowable Catch (triangle) of Greenland Halibut in Sub-Area 2 and Divisions 3KLMNO



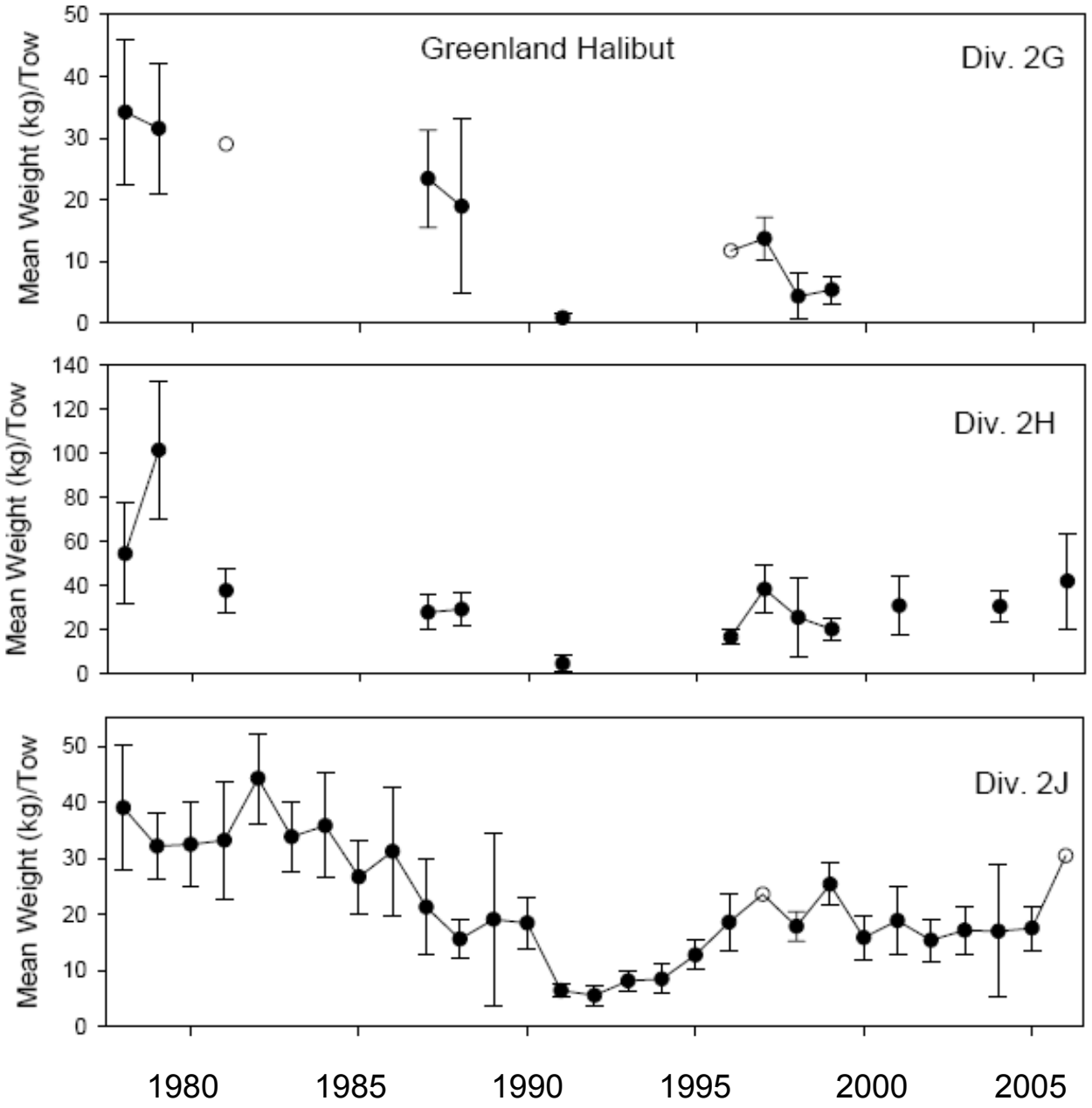
Source: Healey and Mahé 2007.

Divisions 2GH

Temporal coverage of research surveys have been irregular, with no surveys being conducted in 2G since 1999 (Healey 2007). The biomass index for 2H has shown a decline from 130,030 t in1979 to 4,946 t in 1991. It has generally increased since 1991 to 65,849 t for 2006, the second highest recorded value for the time series. The abundance index for 2H is not consistent with trends in the

biomass index (Healey 2007). Stratified mean weights per tow (Figure 4.76) in Divisions 2GH were highest in the late 1970s but declined through the 1980s to the record low in 1991 (Healey 2007). In 2H (Figure 4.74), it has increased, with 2006 being third highest in the time series (Healey 2007).

Figure 4.74 Greenland Halibut Stratified Mean Weight per Tow Estimates (1978 to 2006)



Source: Healey 2007.

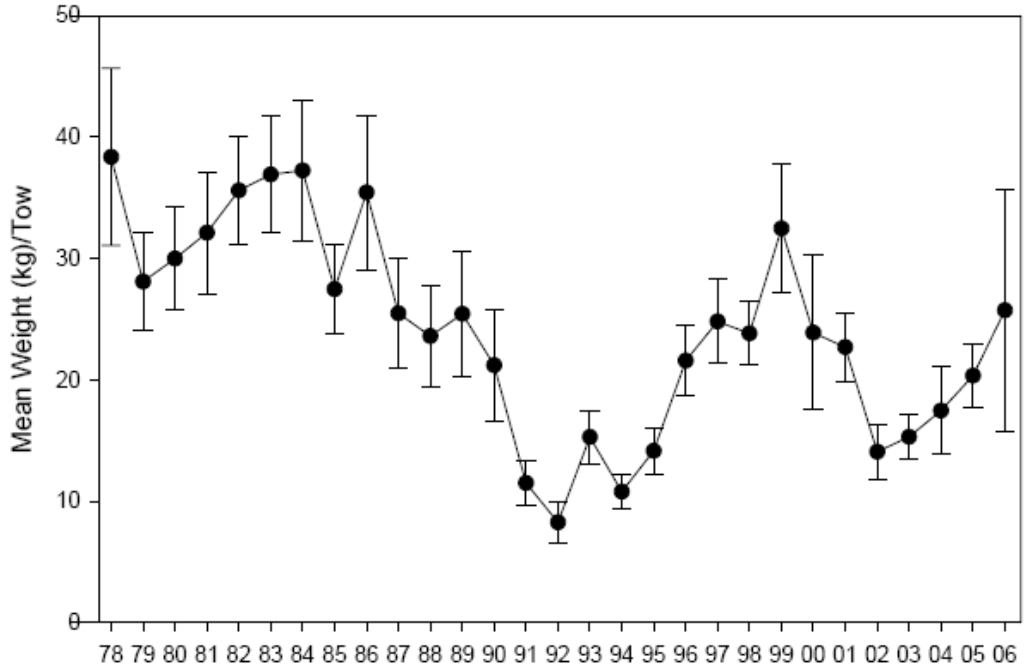
Divisions 2J 3K

Division 2J has been surveyed annually from 1978 to 2006 (Healey 2007). The biomass index was stable between 129,294 and 112,208 t from 1978 to 1984, before declining to a low of 18,121 t in 1992 (Healey 2007). From 1992 to 1995, it increased marginally to 35,591 t, followed by a large increase to

87,147 t in 1999. After 1999, the biomass index decreased remaining stable, between 53,591 and 65,777 t from 2000 to 2005 (Healey 2007). In 2006, the index increased to 105,925 t, nearly twice the levels seen in 2005. This marked increase is a result of substantial increase for strata 208 and 207 in Hawke Channel. In the previous five years, strata 208 and 207 accounted for 16 percent of 2J's biomass. In 2006, strata 208 and 207 accounted almost 50 percent of the biomass (Healey 2007). Abundance indices for Greenland halibut in 2J were variable through the late 1970s and 1980s, ranging from a low of 104,242 to a high of 332,313 (Healey 2007).

The abundance indices increased to 678,016 in 1995 and have maintained a relatively high level through to 2005. In 2006, the abundance index reached the second highest recorded level of 533,728. The abundance index for 2J suggests current estimates are much higher than earlier (1978 to 1990) observations, while the biomass index suggests the opposite. This is indicative of a substantial change in both the size and age composition of the survey catches (Healey 2007). The stratified mean weights per tow index in Division 2J has declined since the early 1980s to a record low in 1992 (Figure 4.75), then increased to a peak in 1999 (Healey 2007). The index remained stable from 2000 to 2005, increasing substantially in 2006 (Healey 2007). The stratified mean number per tow index has been consistent over the time series. In 2006, the index was approximately 80 percent of the 1996 peak value (Healey 2007).

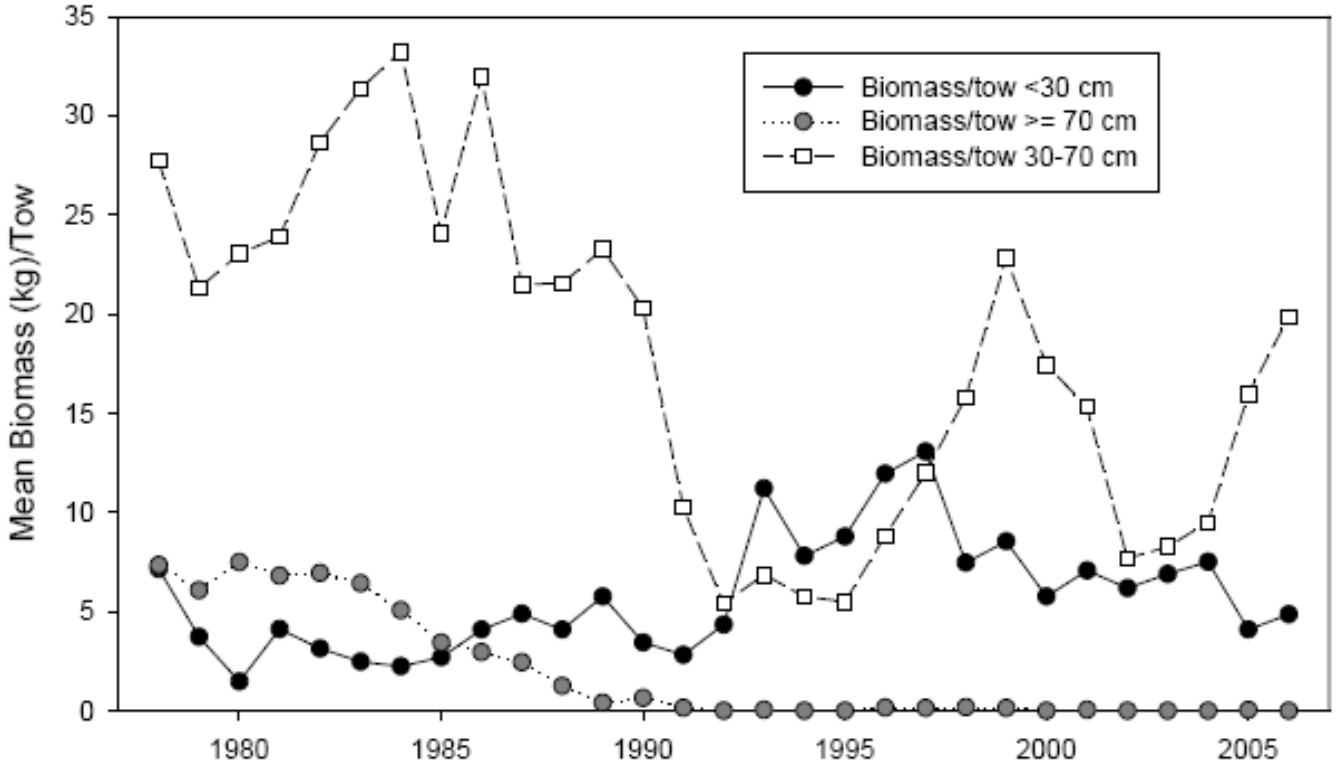
Figure 4.75 Campelen Stratified Mean Number and Weight (kg) per Tow of Greenland Halibut (1978 to 2006)



Source: Healey 2007.

The mean biomass per tow index (Figure 4.76) for important size categories is obtained by combining data from 2J and 3K (Healey 2007). Greenland halibut catches were broken into <30 cm, between 31 to 69 cm and ≥70 cm size classes. The 30-cm size category was used, as it represents the average length at age four, which represents recruitment into next year's fishery. The size category 70 cm was chosen because it represents the length at which approximately 50 percent of the females reach maturity (Healey 2007). The total stock for 2J3K declined from the mid 1980s to the mid 1990s, with 1995 marking rebuilding (Healey 2007). In 1999, the stock approached highs seen in the 1980s and has since declined reaching near the lows of the early 1990s (Healey 2007).

Figure 4.76 Mean Biomass (kg) per Tow of Greenland halibut (1978 to 2006)



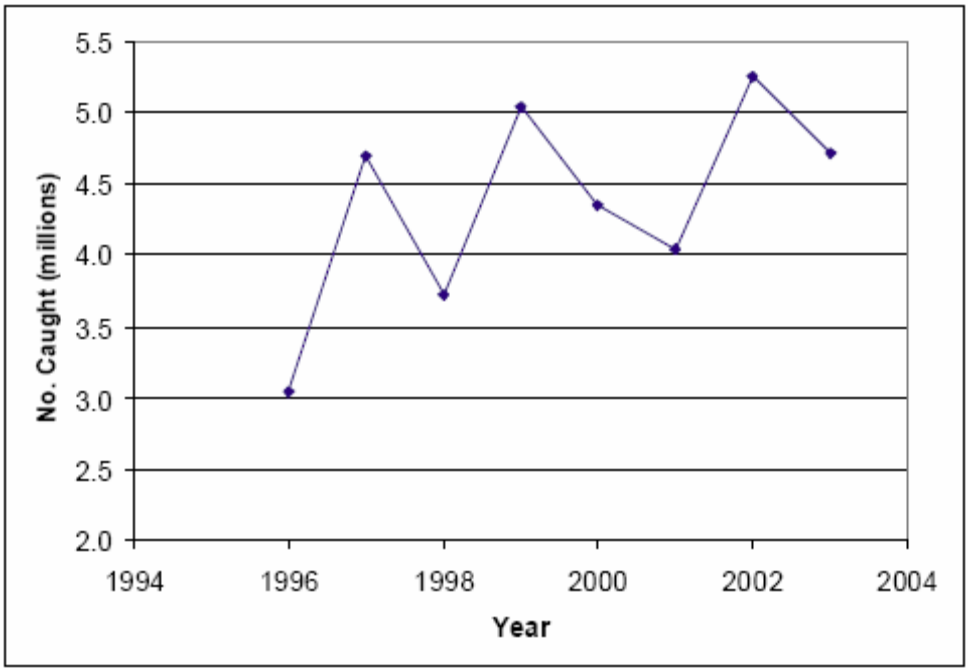
Source: Healey 2007.

Improvement in the stock since 2003 is not the result of the spawning stock biomass. The strong cohorts of 1993 to 1995 improved biomass trends in the <30-cm class for 1995 to 1998, which translated to substantial increase in the 30- to 70-cm class in the late 1990s (Healey 2007). This increase was not sustained and by 2002, the 30- to 70-cm class was near the levels of the early 1990s. It was thought that normal recruitment would result in the stock biomass shifting back to the traditional size. This was not the case, suggesting that the strong recruitment was overestimated, overexploited or both (Healey 2007). The 2006 biomass for the 30- to 70-cm class more than doubled the 2002 to 2004 average. This large increase was not predicted from any evidence of recruitment in the <30-cm class (Healey 2007). Overall, recent recruitment results suggest poor prospects for stock rebuilding at this time (Healey 2007).

Young Greenland halibut distribution overlaps with the northern shrimp fishery in Divisions 2GHJ and as such, is one of the most important species taken as a by-catch in the shrimp fishery (Bowering and Orr 2004). It is estimated that from 1996 to 2003, anywhere between 3.0 to 5.2 million Greenland

halibut were caught as a by-catch in the shrimp fishery (Figure 4.77) in Subarea 2 and 3KL (Bowring and Orr 2004).

Figure 4.77 Greenland Halibut By-catch for Northern Shrimp Fishery in Northwest Atlantic Fisheries organization Subarea 2 and Division 3KL during 1996 to 2003



Source: Bowering and Orr 2004.

In 2004, the Greenland halibut resource estimate of average recruitment (age 1) was approximately 119 million fish. Using this figure as a basis, the Canadian shrimp fishery is removing on average less than 5 percent of any one year-class of Greenland halibut as by-catch (Bowering and Orr 2004). The potential loss in yield to the Greenland halibut fishery as the result of by-catches from the northern shrimp fishery was estimated range from 900 to 1,400 t annually from 1996 to 2003 (Bowering and Orr 2004).

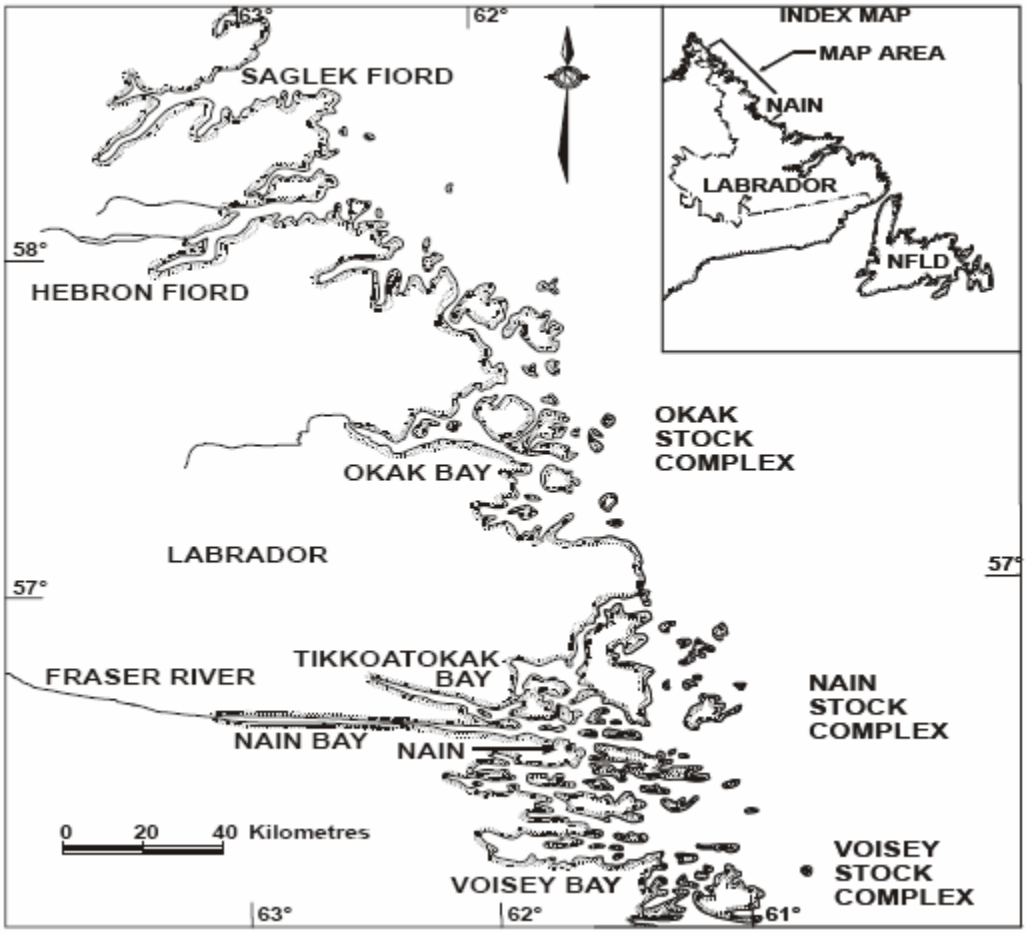
During collection of traditional knowledge (Nain 2007) and at public consultations (Hopedale 2007; Happy Valley-Goose Bay 2007; Mary's Harbour 2007; Port Hope Simpson 2007), it was indicated that Greenland halibut (commonly referred to as turbot) were fished within the Labrador Shelf SEA Area. No specific locations (except Hawke Channel) were identified as fishing areas for Greenland Halibut. Its importance as a commercial fishery was noted by various participants.

4.10.3.8 Arctic char

Northern Labrador Arctic char have been the target of a commercial and Traditional fisheries for over a century (DFO 2001a). Commercial landings data has been recorded since 1974 from various bays and fiords along the Labrador coast and quotas have been in place since 1979 (DFO 2001a). While commercial harvesting of Arctic char occurs in 2H, Arctic char is harvested for subsistent purposes along the entire Labrador coast. For example, there are significant harvests of Arctic char in the Sandwich Bay and Black Tickle areas.

There are three primary stock complexes (Figure 4.78) of Arctic char in northern Labrador. Voisey's, Nain and Okak stock complexes form approximately 80 percent of the Arctic char in the region.

Figure 4.78 Arctic char Complexes in Labrador Shelf SEA Area



Voisey's Stock Complex

The Voisey's stock complex consists of Voisey's Bay and the Anton's Subarea (DFO 2001a). From 1974 to 2000, approximately 415 t of charr has been harvested from this area, with an average of 15 t per year over the same period (DFO 2001a). Harvests of Arctic char in the Voisey's area was highest during the late 1970s but have fell because of decreased commercial effort through the 1990s (DFO 2001a). In 2000, a TAC of 14 t was established and a total harvest of 10.5 t taken. This accounts for approximately 22 percent of the total landings for the north Labrador charr fishing region (DFO 2001a).

Nain Stock Complex

The Nain stock complex consist of the inshore zone made up of Anaktalik Bay, Nain Bay, Tikoatokak Bay and Webb Bay subareas, and an offshore zone consisting of the Dog Island and Black Island Subareas (DFO 2001a). From 1974 to 2000, approximately 1,001 t of charr has been harvested, with an average or 37.1 t per year (DFO 2001a). Harvest was highest in the late 1970s and early 1980s but has decreased due to a reduction in commercial effort through the 1990s. In 2000, a TAC of 32 t was implemented with a total of 12.2 t being landed (DFO 2001a). The majority of landings occur from the

inshore subarea, which accounts for approximately 61 percent of the total harvest with the complex. The Nain stock complex accounts for approximately 26 percent of the total Arctic char harvest in northern Labrador (DFO 2001a).

Okak Stock Complex

The Okak stock complex is comprised of an inshore zone that includes Okak Bay and an offshore island zone made up of the Cutthroat Subarea (DFO 2001a). From 1974 to 2000, 637 t of Arctic char has been landed from the Okak complex, with an average 23.6 t of fish harvested per year (DFO 2001a). The highest catch rates for in the Okak region were in the late 1970s but declined in the 1990s due to a reduction in commercial effort in the area. In 2000, a TAC of 31 t was maintained from the previous year, with total landings of 14 t. The Okak stock complex represents 30 percent of the total Arctic char harvest for northern Labrador (DFO 2001a).

Traditional and Recreational Fisheries

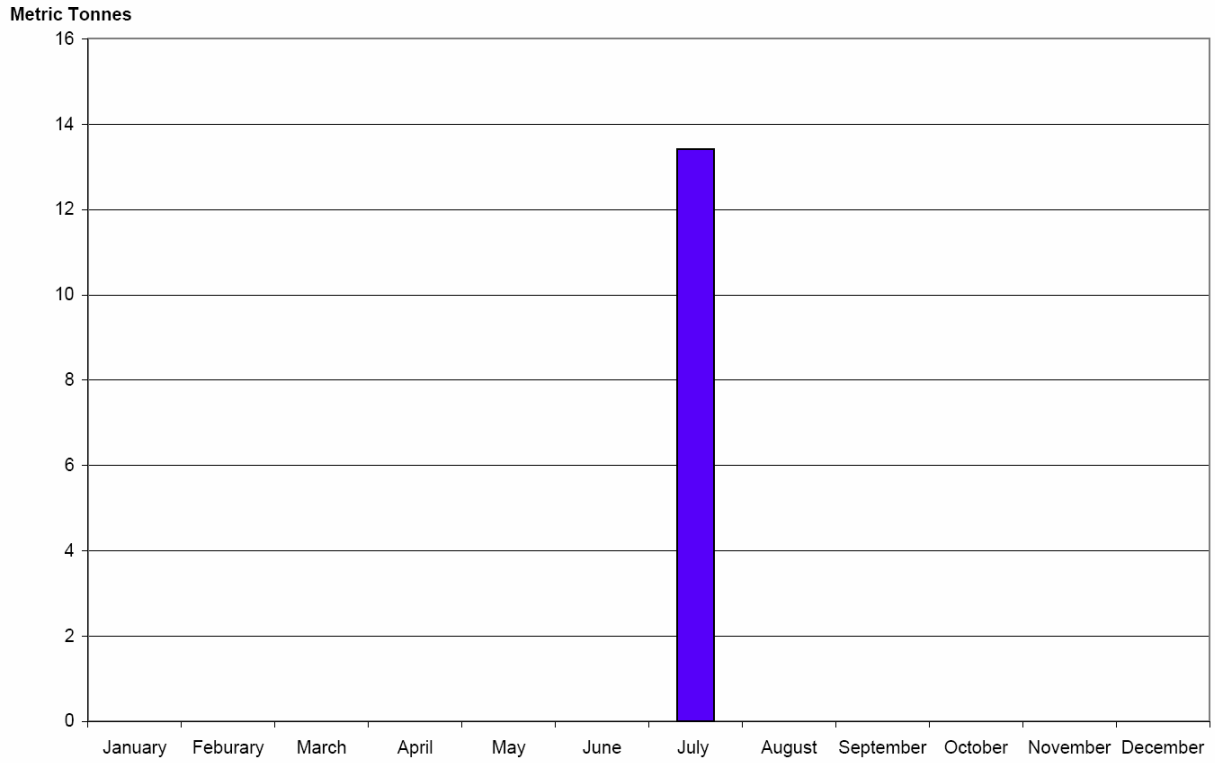
Traditional and recreational fisheries directed at Arctic char in northern Labrador also exist. Arctic char harvested in the straditional and recreational fisheries is not quantified or applied to resource outlooks. It is thought that these landing could be of considerable quantity and should be quantified in the future to make accurate predictions for the stock (DFO 2001a). During public consultations (October 29 to November 15, 2007) in the Labrador Shelf SEA Area, Arctic char was suggested to be an important non-commercial species targeted in both traditional and recreational fisheries. In Nain, Arctic char are processed along with scallop.

Within the Labrador Shelf SEA Area, Arctic char has been harvested from exclusively NAFO Unit Area 2H. The fishery currently takes place in July (Figure 4.79).

4.10.3.9 Atlantic Salmon

The commercial fishing of Atlantic salmon in the SEA Area waters was placed under moratorium in 1997 (for the Straits area of Labrador) and 1998 for the rest of Labrador (DFO 2006l), in an effort to increase the number of salmon spawning in freshwater, resulting in higher production in future years. Prior to the closure of the commercial fishery in Labrador in 1998, total landings (both large and small salmon) averaged 369 t annually from 1984 to 1986 and 111 t annually from 1990 to 1997 (DFO 2006l). Despite the commercial fishery being closed in Labrador, there is still an Aboriginal traditional fishery for Atlantic salmon, as well as charr and trout (DFO 2006l). During 2005, 32 t of salmon were harvested in the traditional fishery, with large salmon representing 34 percent of the catch by weight and 21 percent by number (DFO 2006l). Although commercial exploitation of the stock ended in 1998, overall abundance (Figure 4.80) remains relatively low when compared with levels when commercial fishing was occurring (DFO 2006l).

Figure 4.79 Strategic Environmental Assessment Area Unit Areas Arctic char Harvest by Month, 2004 to 2006 Average

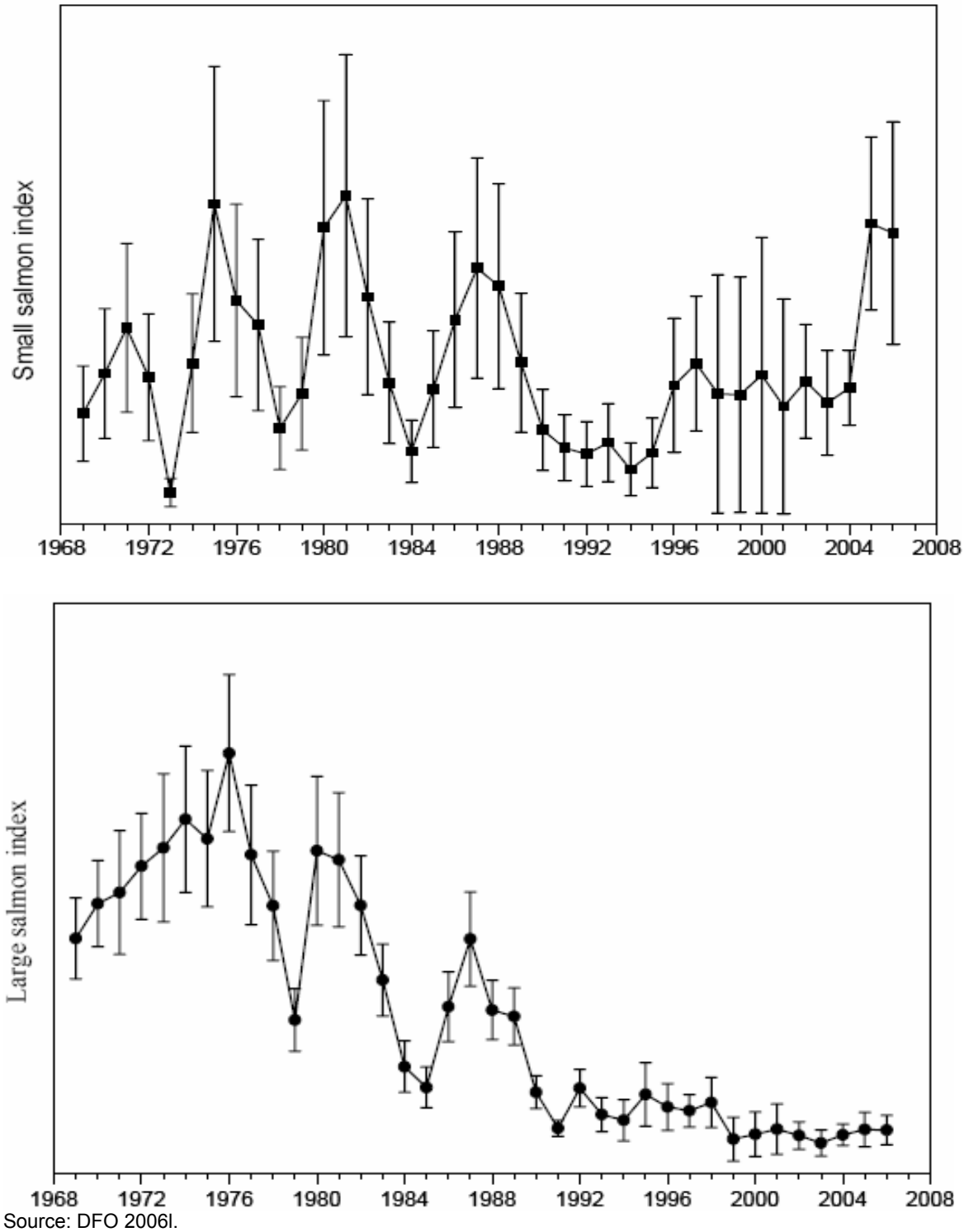


In 2006, the status of English River (Salmon Fishing Area 1), Southwest Brook (a tributary of Paradise River), Muddy Bay Brook and Sand Hill River (Salmon Fishing Area 2) was assessed for adult salmon via fish counting facilities; however, no other facilities exist on Labrador rivers to assist in understanding the status of Labrador salmons (DFO 2006l). Small salmon returns to the English River increased by 44 percent in 2006 compared to 2005, while large salmon returns increased by 57 percent over the same time frame. These are the highest number of returns since monitoring began for the English River in the late 1990s (DFO 2006l). Southwest Brook (DFO 2006l) showed a decrease in both small and large salmon returns in 2006 by 62 percent and 35 percent respectively, over 2005 (which had the highest returns on record). Similarly, Muddy Bay Brook showed a decrease in small salmon of 14 percent a decrease in large salmon returns of 15 percent when compared to 2005 salmon returns (DFO 2006l). The Sand Hill River also showed a decrease in returning small salmon by 30 percent and a decline in large salmon returns by 38 percent when compared to 2005 returns, which marked the highest return rates on record (DFO 2006l).

Interim conservation spawning requirements for Salmon Fishing Areas 1 and 2 are defined by Reddin et al. (2006) as 1.9 eggs per m^2 of fluvial habitat, which assumes the inclusion of pond habitat. A management target of 240 eggs per m^2 of fluvial habitat should be set (DFO 2006l). Conservation requirement for English River, Sand Hill River, Muddy Bay and Southwest Brook all exceeded the required level in 2006; despite this, all showed decreases in the percent of conservation requirements meet (DFO 2006l). The two Atlantic salmon management areas (salmon fishing areas or SFAs) in the Labrador Shelf SEA Area are SFA1 and SFA 2 (Figure 4.81). There are 91 salmon rivers in these two SFAs.

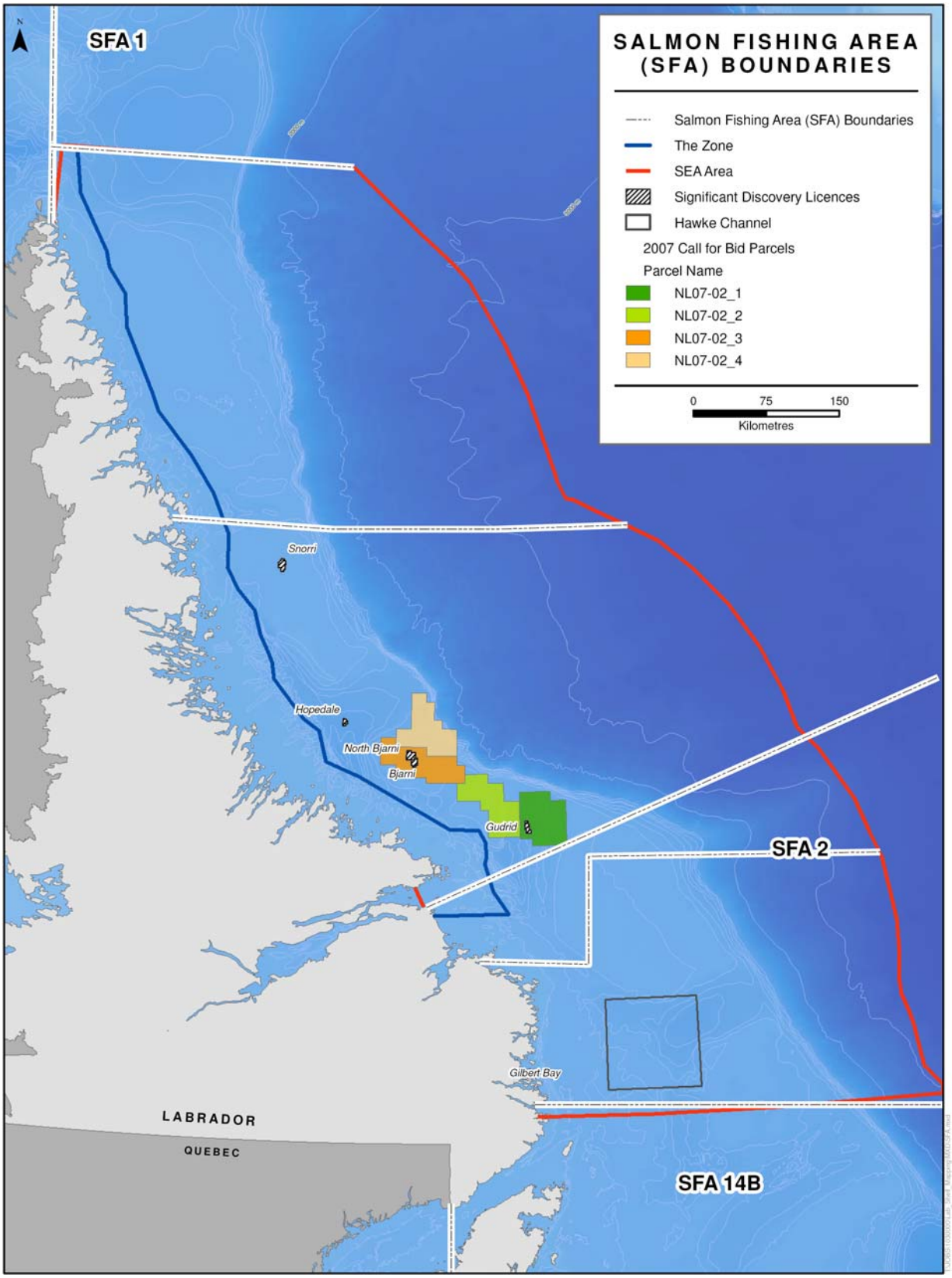
During public consultations (October 29 to November 15, 2007) in the Labrador Shelf SEA Area, Atlantic salmon was suggested to be an important non commercial species targeted in both traditional and recreational fisheries.

Figure 4.80 Trends in Abundance of Small and Large Atlantic Salmon in Labrador, 1969 to 2006



Source: DFO 2006l.

Figure 4.81 Salmon Fishing Areas of Labrador



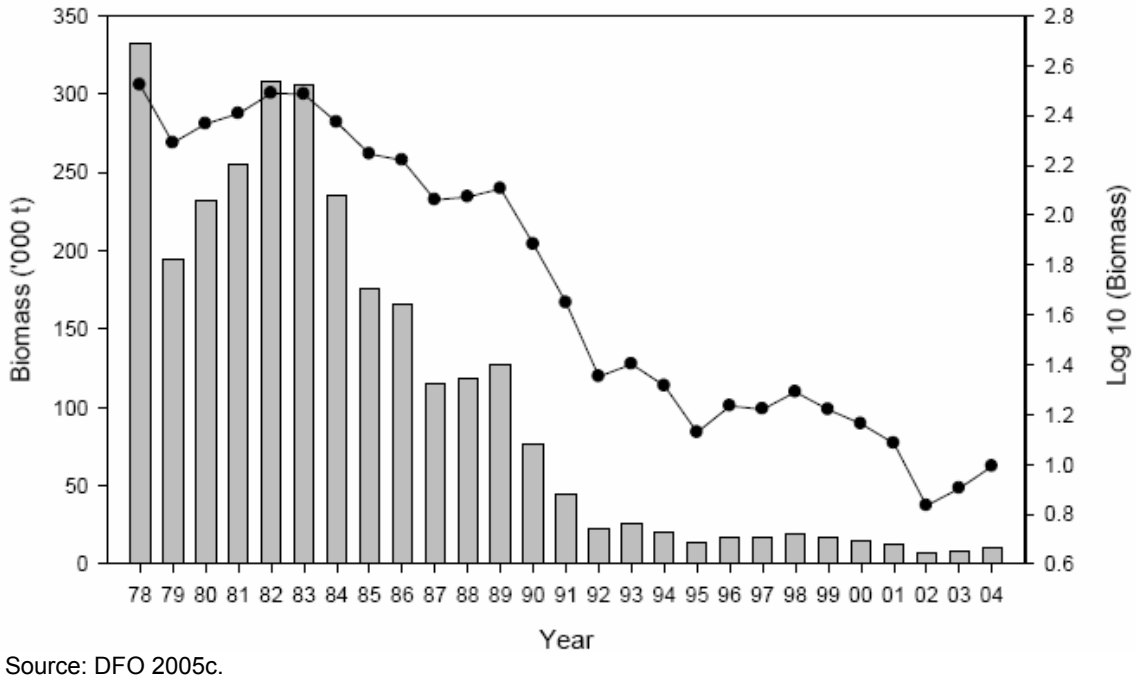
Source: DFO 2006l.

During collection of traditional knowledge (Nain 2007; Postville 2007; Rigolet 2007), public consultations (Postville 2007; Makkovik 2007; Natuashis 2007; Cartwright 2007) and from information contained in Our footprints, Are Everywhere (Brice-Bennett 1977) indicates that salmon were fished within the Labrador Shelf SEA Area. Areas of importance for salmon in Labrador Shelf SEA Area included Hopedale north to Shoal Tickle; Kingitok Islands; South Aulatsivik Island; Mugford Tickle to Cape Kiglapait; Cutthroat area; Turnavik Island; Black Islands; Long Island; Napartok Bay; Kaipokok Bay; Broomfields Cove to Ailik; Cape Makkovik to Tom's Cove; White Point to Ford's Bight; Dunn's Islands, Ironbound Island's; Adlivik Islands; Manak Island; Big Bight to Adlavik Bay Stag Bay; from Pomialuk to Tessialik; the narrows; and Groswater Bay (Brice-Bennet 1977).

American Plaice

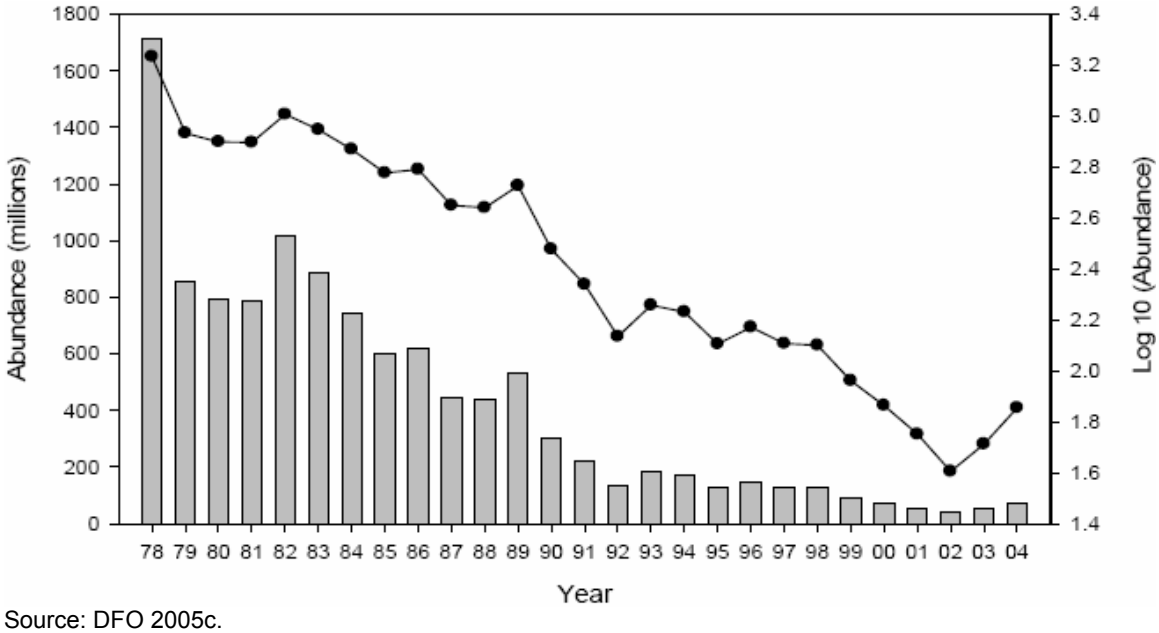
American plaice (*Hippoglossoides platessoides*) has been under moratorium since 1994 and fish captured are mainly as a by-catch or the Greenland halibut (otter trawl) fishery, gillnet fisheries, and shrimp fishery (DFO 2005c). By-catches across Subarea 2 + 3K are generally low with only 34 and 17 t taken in 2003 and 2004. The shrimp fishery discarded 15 t of American plaice as by-catch (DFO 2005c). DFO RV surveys have indicated that the stock has remained at low levels since 1991. In 2004, NAFO Division 2H showed a slight increase from the 1990s in the biomass index to 1,500 t. Biomass and abundance levels (Figures 4.82 and 4.83) indicate that the stock has not improved within 2J3K (DFO 2005c). In 2004, the biomass index (estimated at 10,000 t) was approximately 4 percent for the 1980 to 1985 average. Similarly, the 2004 biomass index (estimated at 71 million fish) was approximately 9 percent of the 1980 to 1985 average (DFO 2006f). Overall, the prospects for rebuilding of the American plaice stocks continue to be poor (DFO 2005c).

Figure 4.82 Research Survey Biomass Index for Divisions 2J3K American Plaice (bars), 1978 to 2004, Log Scale (line) Shown on the Right



Source: DFO 2005c.

Figure 4.83 Research Survey Abundance Estimates for Divisions 2J3K American Plaice, 1978 to 2004 (bars), Log Scale (line) Shown on the Right



Source: DFO 2005c.

Within the Labrador Shelf SEA Area as a whole, American plaice is a by-catch in the northern shrimp fishery. A total of 56 percent of the harvest (Figure.4.84) is landed in 2J, while 26 percent and 18 percent is landed in 2H and 2G, respectively. Landings occur year round peaking in March before declining to a low in June, followed by a second peak in August (Figure 4.85).

Figure 4.84 Percentage of American Plaice Landings for Northwest Atlantic Fisheries Organization Divisions 2GHJ, 2004 to 2006.

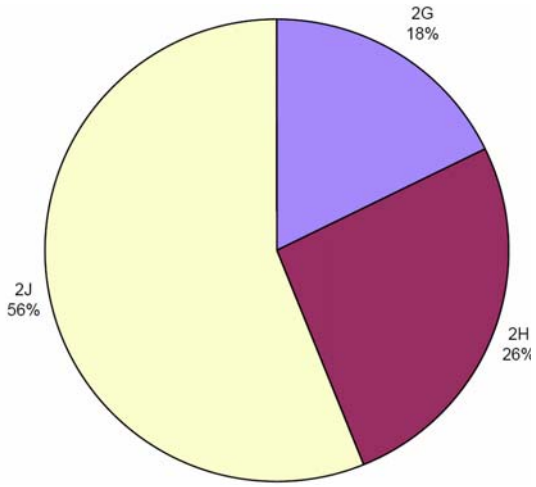
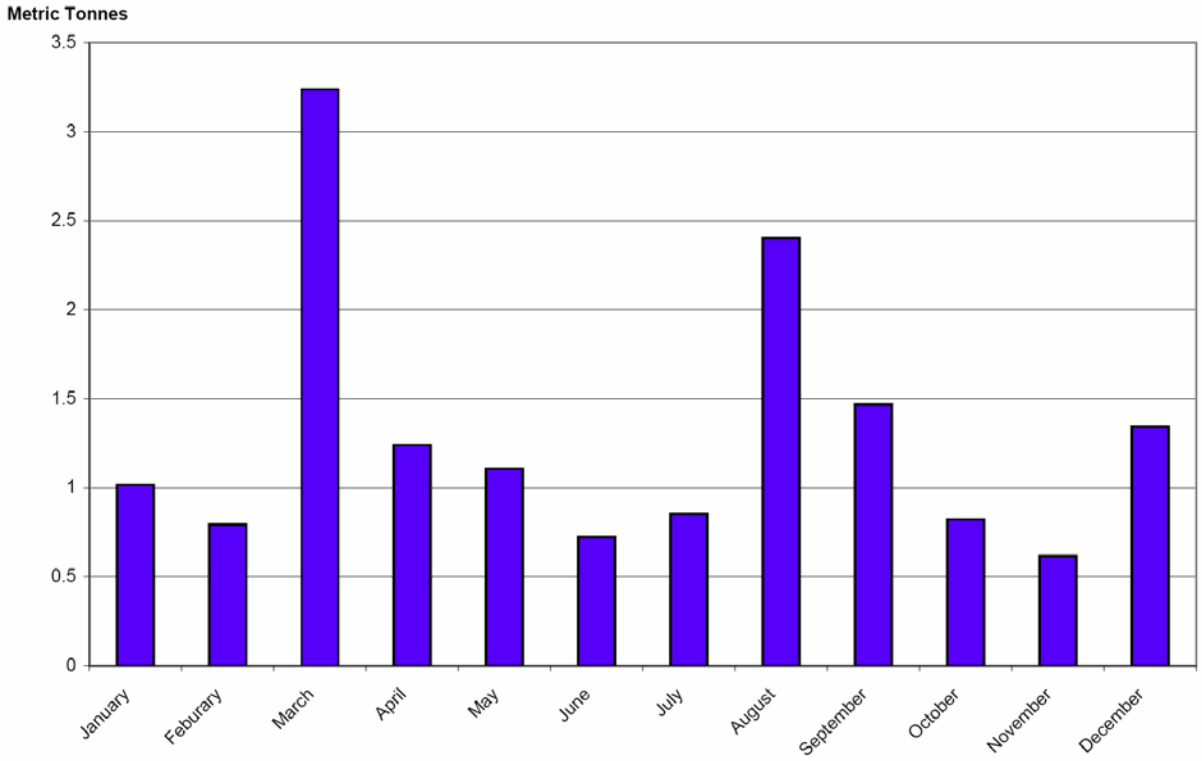
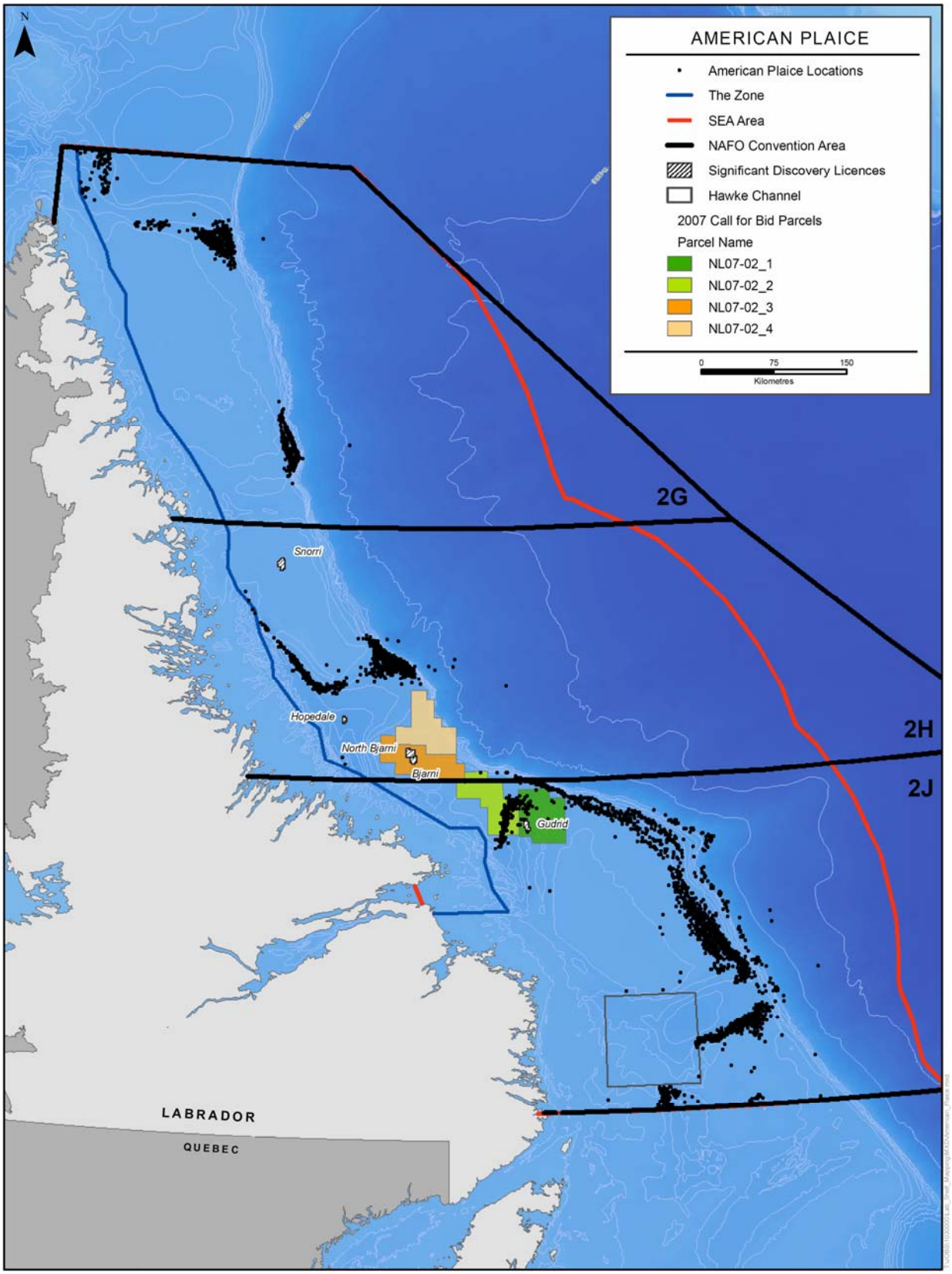


Figure 4.85 Strategic Environmental Assessment Area Unit Areas American Plaice Harvest by Month, 2004 to 2006 Average



Reported American plaice harvesting locations, based on the DFO georeferenced data in relation to the Labrador Shelf SEA Area and the relevant Unit Areas, are shown in Figure 4.86. This map shows three years (2004 to 2006) of aggregated data to better represent harvesting patterns, though the harvesting locations tend to be consistent from year to year.

Figure 4.86 Georeferenced American Plaice Harvesting Locations, 2004 to 2006

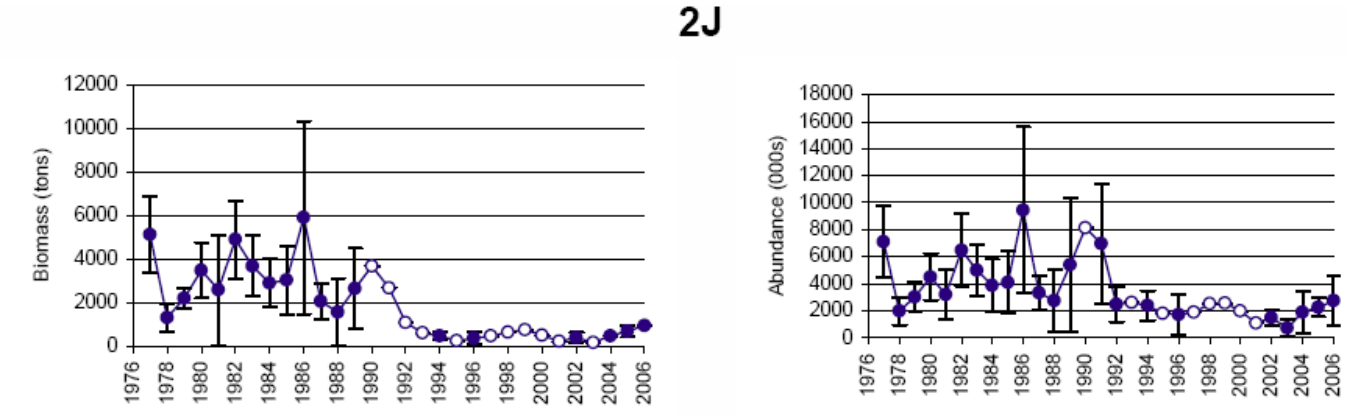


Source: DFO data (2004 to 2006).

4.10.3.10 Witch Flounder

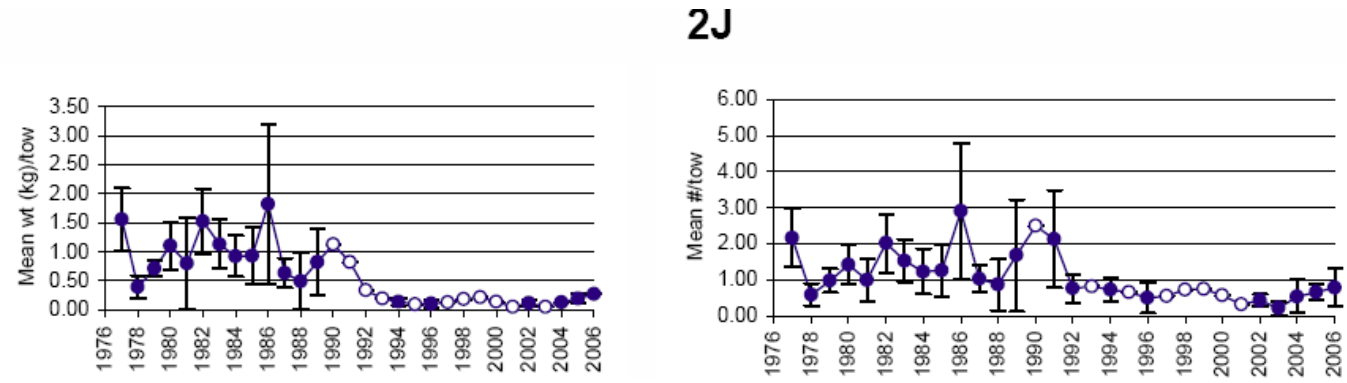
In Division 2J, witch flounder biomass estimates (Figure 4.87) have varied over time (Maddock-Parsons 2007). The biomass has ranged from a high of 5,900 t in 1986 to a low of 200 t in 2003. In 2006, biomass estimates were approximately 900 t. The mean weight per tow (Figure 4.88) has followed a similar pattern, peaking at 1.82 kg/tow in 1986. In 2003, it was at an all time low at 0.05 kg/tow (Maddock-Parsons 2007). In 2006, the mean weight per tow of witch flounder was 0.28 kg/tow (Maddock-Parsons 2007).

Figure 4.87 Witch Flounder Biomass (tons) and Abundance (000's) for 2J, Fall Surveys



Source: Maddock-Parsons 2007.

Figure 4.88 Witch Flounder Mean Numbers and Weights (kg) per Tow for 2J Fall Surveys



Source: Maddox-Parsons 2007.

4.10.3.11 Roughhead Grenadier

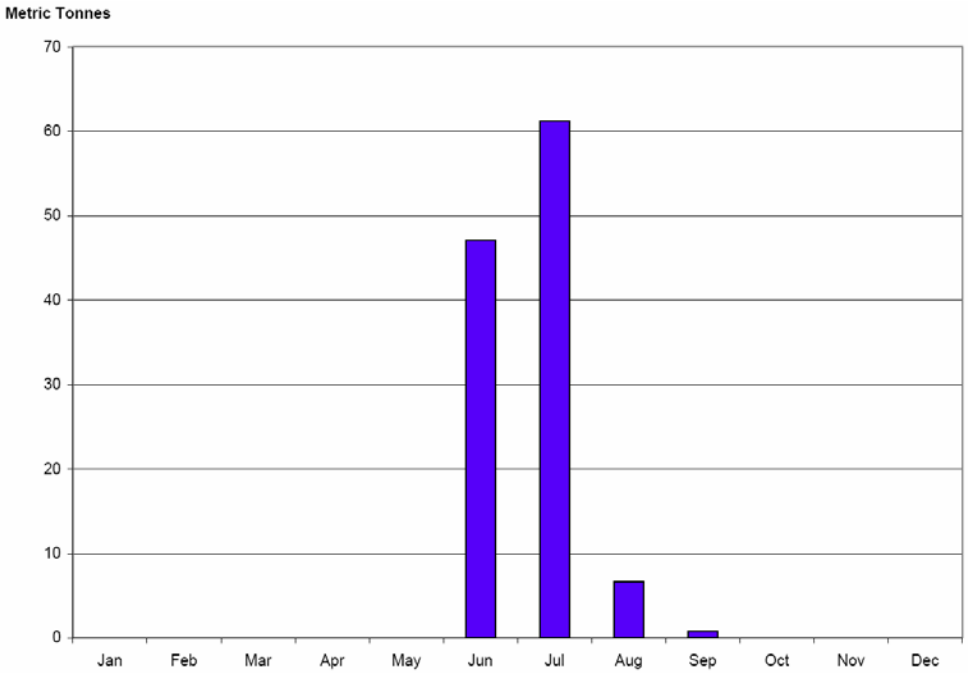
In the NAFO Subareas 2 and 3, the roughhead grenadier fishery is currently unregulated and individuals are taken as a by-catch in Greenland Halibut fishery (González-Costas and Murua 2007). Between 1989 and 1990, landings of roughhead grenadier have increased sharply from 333 t to 3,244 t, with further increases to 6,700 t in 1992 (González-Costas and Murua 2007). From 1992 to 1997, catches varied from 4000 to 4,500 t, before peaking in 1999 at 7,200 t then decreasing to 3,118 t in 2001 (González-Costas and Murua 2007). From 2001 to 2003, landings increased to 4,000 t and decreased to 3,000 and 1,500 t in 2004 and 2005, respectively (González-Costas and Murua 2007).

Despite lower landings in 2006, assessments of current stock of roughhead grenadier in Subarea 2 and 3 are good, with biomass doubling from 1992 to 2005, as well as reductions in fishing mortality as the result of reductions to the Greenland halibut fishery (González-Costas and Murua 2007).

4.10.3.12 Rock Cod

Within the Labrador Shelf SEA Area rock, cod is not currently commercially harvested. All recorded landings occur within NAFO unit area 2J. Landings occur from June-September peaking in July (Figure 4.89). During public consultations in Postville (November 1, 2007), rock cod were identified as local commercial fishery with harvesting taking place within Kaipikok Bay. Rock cod are processed at a plant in Postville, which produces approximately 635,500 kg of salted rock cod annually (K. Watts and R. Johnson pers. comm.). Other than the commercial fishery in Kapipikok Bay, rock cod is harvested for food (both human and dog) in other areas of Labrador including Postville, Hopedale and Cartwright (Public Consolations October 29 to November 15). Rock cod is mentioned as being plentiful in the Natuashish Area (Public Consulting October 30).

Figure 4.89 Strategic Environmental Assessment Area Unit Areas Rock Cod Harvest by Month, 2004 to 2006 Average



During collection of traditional knowledge (Nain 2007; Rigolet 2007), public consultations (K. Watts and R. Johnson pers. comm.; Postville 2007) and from information contained in Our footprints Are Everywhere (Brice-Bennett 1977), indicate that rock cod were fished within the Labrador Shelf SEA Area. Areas of importance for Rock Cod in Labrador Shelf SEA Area indentified included Rigolet and Postville areas (Brice-Bennet 1977).

4.10.3.13 Emerging Fisheries

A fishery for toad crab (*Hyas* spp., locally referred to as spider crab) and whelks is emerging, or potentially developing, within parts of the Labrador Shelf SEA Area in recent years.

Toad Crab

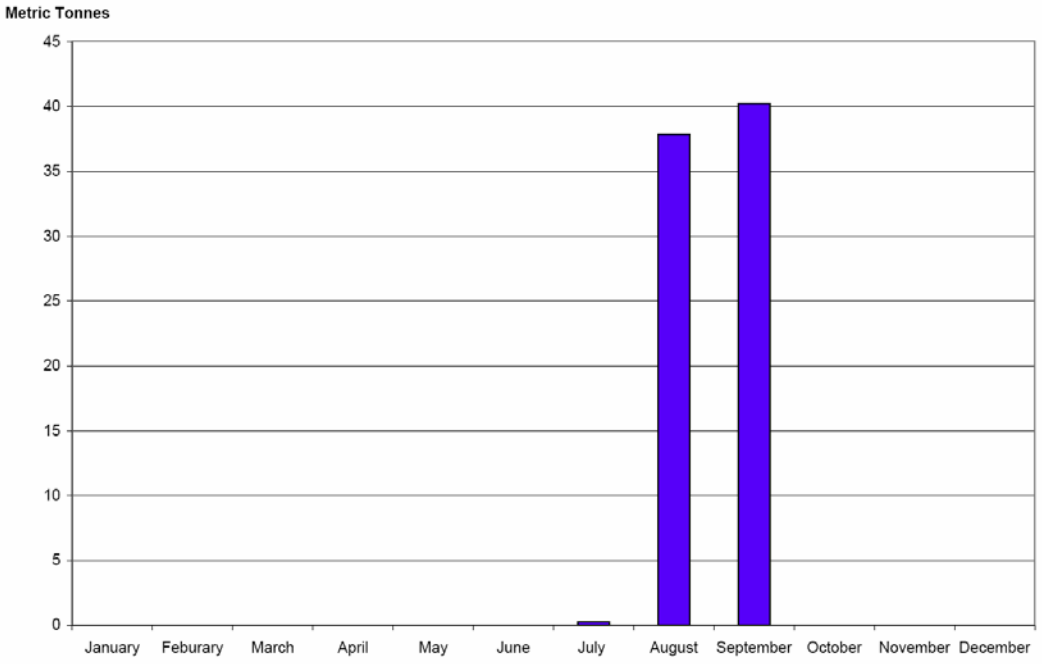
An experimental fishery for spider crab for Newfoundland and Labrador began in the mid-1990s and has been managed pursuant to the Emerging Fisheries Policy since 1998 (DFO 2007h). The experimental fishery is designed to obtain scientific data on the species and to investigate its potential in a commercial fishery.

Catch and effort data have been collected since 1997 (via mandatory logbooks). In many areas, effort and landings have stabilized since 2000 and over the past six years, annual landings have exceeded 1,000 t (DFO 2007h). Based on the catch and effort data, this level of harvest is expected to continue into the future.

In Newfoundland and Labrador waters, 170 toad crab licenses have been issued. The majority of these went to fishers in NAFO Divisions 3KL, southern 2J and 4R straights (DFO 2007h).

Within the Labrador Shelf SEA Area, toad crabs are harvested exclusively in Division 2J with crab pots. In the past three years, landings have averaged 155 t (Table 4.10) Toad crab harvest occurs from August to September (Figure 4.90).

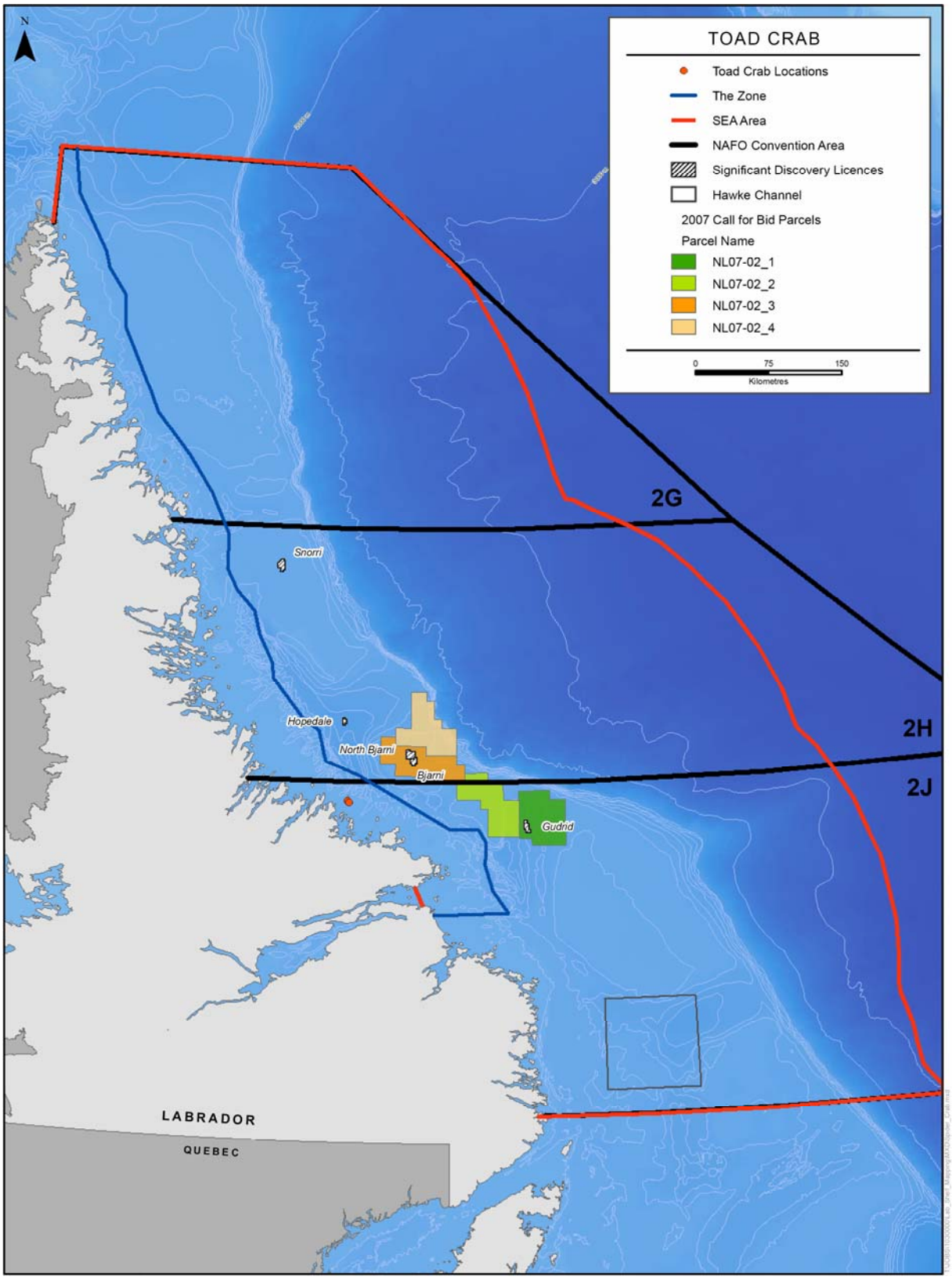
Figure 4.90 Strategic Environmental Assessment Area Unit Areas Toad Crab Harvest by Month, 2004 to 2006 Average



On August 30, 2007, the Honourable Loyola Hearn, Minister of Fisheries and Oceans announced the conversion of the exploratory toad crab fishery to a commercial fishery (DFO 2007i). As part of this, the 170 fishers licensed to harvest toad crab during 2006 who meet license renewal criteria will be issued a commercial license for 2007 (DFO 2007i).

Reported toad crab harvesting locations, based on the DFO georeferenced data in relation to the Labrador Shelf SEA Area and the relevant Unit Areas, are shown in Figure 4.91 This map shows three years (2004 to 2006) of aggregated data to better represent harvesting patterns, though the harvesting locations tend to be consistent from year to year.

Figure 4.91 Georeferenced Toad Crab Harvesting Locations, 2004 to 2006



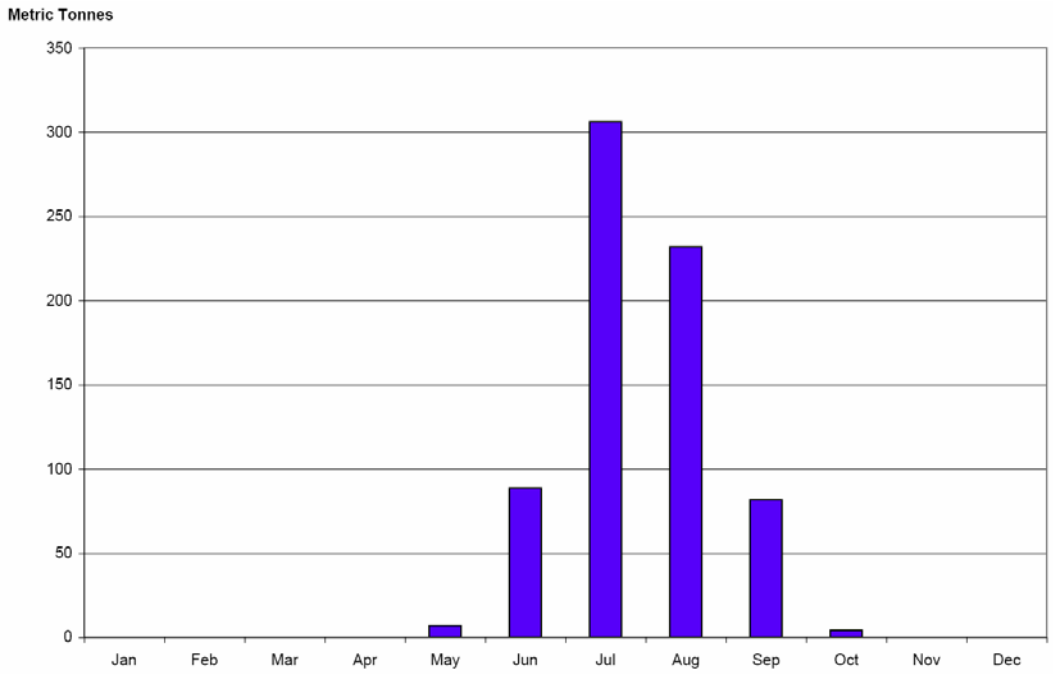
Source: DFO data (2004 to 2006).

Whelks

There has been an ongoing, inshore whelk fishery along the Labrador coast since the early 1990's. The inshore fishing fleet (20'-30' boats) has landed between 300,000 and 400,000 pounds of whelk in most years, contributing significantly to the incomes of fishers and plant workers in the region. Whelks in the 2J area have been increasing in importance since early 2000. While it currently only accounts for 0.87 percent of the total harvest (Table 4.12), it is thought to be a possible diversification species for crab harvesters. It is currently harvested with pots, mainly during June to September (Figure 4.92).

During collection of traditional knowledge (Nain 2007) and public consultations (Cartwright 2007; Hopedale 2007), it was indicated that whelks were fished within the Labrador Shelf SEA Area. No area information was provided.

Figure 4.92 Strategic Environmental Assessment Area Unit Areas Whelk Harvest by Month, 2004 to 2006 Average



4.10.3.14 Fisheries and Oceans Canada Science Surveys

Fisheries research surveys conducted by DFO, and sometimes by the fishing industry, are important to the commercial fisheries to determine stock status, as well as for scientific investigation. The Canadian Association of Prawn Producers in conjunction with DFO survey shrimp from water depths between 100 to 750 m in 2G. Since 2005, this annual survey runs from July 15 through the first week of September and will continue for a minimum of five consecutive years (Anthony pers. comm.). Similarly, the multi-species survey is conducted between October and December annually. NAFO Area 2J currently is the only portion of the Labrador Shelf SEA area surveyed with no surveys conducted since 1999 (R. Anthony, pers. comm.).

4.10.4 Aquaculture

At present, there is no approved aquaculture site in the Labrador Shelf SEA Area (Newfoundland and Labrador Department of Fisheries and Aquaculture (NFDLA) review comment, pers. comm.).

4.10.5 Underused Fish and Shellfish Species

Underused/emerging fish and shellfish species in Subdivisions 2GHJ identified by NLDFA and DFO include toad crab, sea urchin and sea cucumber. Northern shrimp are currently under developed in the Hopedale region. There are shrimp concentrations in the in-shore that are not currently harvested. Surveys have been conducted in recent years using beam trawls but the fishery remains undeveloped due to lack of processing facilities (Hopedale Public Consultations November 1, 2007).

4.10.6 Country Food Harvesting

For generations the people of the Labrador Shelf SEA Area have relied upon the harvesting of wildlife on the land and in the sea for much of their food supply. Each season brings a variety of animal species to the region to feed, breed or rest while on migration, and the people orient their traditional harvesting activities and consumption to these seasonal changes. The relative abundance or scarcity of country or wild food may affect the overall economic well-being of the community. Access to country food- or wild food, (the term use for food that is utilized by traditional harvesting) continues to be important not only to the economy but also to the health and social well-being of families (Alton Mackey and Orr 1987).

In 1980-81, an evaluation of country food us was conducted in Makkovik (Alton Mackey and Orr 1987). During the study year, it was found that the harvest of country food (or wild food) accounted for 28, 738 pounds. It was found that Atlantic cod (2864 kg) and arctic char include trout (2830 kg) were the main traditional fish species harvested. Rock cod (1530 kg), salmon (1030 kg) and other fish species including herring, capelin, smelts, flounder, turbot, halibut, whitefish, redfish and sculpin (320 kg for all others combined) were also harvested for a total of 8754 kg or 30 percent of country food harvested (Alton Mackey and Orr 1987). Seals contributed 3170 kg or 11 percent of the country food harvested in this study but may be under reported as a result of the cultural practice of food sharing (Alton Mackey and Orr 1987). Bird species including non marine birds accounted for 19 percent (5334 kg) of the country food harvest to the Makkovik traditional economy. The various species harvested were eider ducks (1896 kg), ptarmigan/grouse (1433 kg), Canada geese (754 kg) and black duck (527 kg).

Harvest practices and activities required substantial investment in equipment, repairs, maintenance, fuel, weapons, ammunitions and other gear including fish nets, camping supplies and sleds (Alton Mackey and Orr 1987). This study clear demonstrates the importance of country harvesting within the Labrador Shelf SEA Area.

Country food harvesting can take many forms and today has incorporated many modern methods. The use of traditional ecological knowledge derived from generations of country food harvesting helps identify the locale and timing of harvest activities that are tied to a particular target species migrations and resource use. A variety of nets, traps and jigs are used to harvest fish including the use of motor boats. Marine mammals are hunted with the assistance of boat and snowmobile. Birds are hunted with rifles from land and water with the use of snowmobiles and boats.

Traditionally, the outer edge of the landfast ice, the "sina", was usually the most productive zone accessible to Inuit hunters. In the Nain and Hopedale areas, coastal islands shield the landfast ice from environmental impacts and the ice is subsequently locked in place, providing an extension of hunting and trapping areas up to 30 km from the coast (VBNC, 1997). For residents of Postville, smelt and capelin were caught only during spawning time. Smelt are only caught near the head of the Bays. Bay capelin spawn on the sandy beaches, while outside capelin spawn on the beaches along the coast (Our Footprints are Everywhere, 1977). Salmon arrived on the coast in late June/ early July and are caught using traps, nets, or jigged. The importance of cod varied along the cost (Brice-Bennett 1977).

Ringed seals are hunted near their breathing holes or in open water. After the break-up of ice in mid June, harp seals are hunted or netted as they enter the bays (VBNC, 1997). Traditionally, charr were speared as they migrated up the rivers. Charr and salmon were also caught by net along the coast. In the spring, ice fishing camps can be found at the head of Anaktalak Bay.

The following information on country harvesting was collected from traditional knowledge interviews (Nain 2007; Postville 2007; Rigolet 2007; Makkovik 2007), public consultations (Hopedale 2007; Mary's Harbour 2007; Natuashish 2007; Postville 2007; Makkovik 2007) and from information contained in Brice-Bennett (1977). Country food and harvest areas are identified when provided. During the public consultations, participants identified areas of interest on a map and Figure 4.93 is a compilation of that traditional knowledge.

Areas of importance for capelin harvesting in Labrador Shelf SEA Area included coastal waters around Hopedale; Postville; Sandy Beach; and Rapid Point area (Brice-Bennett 1977).

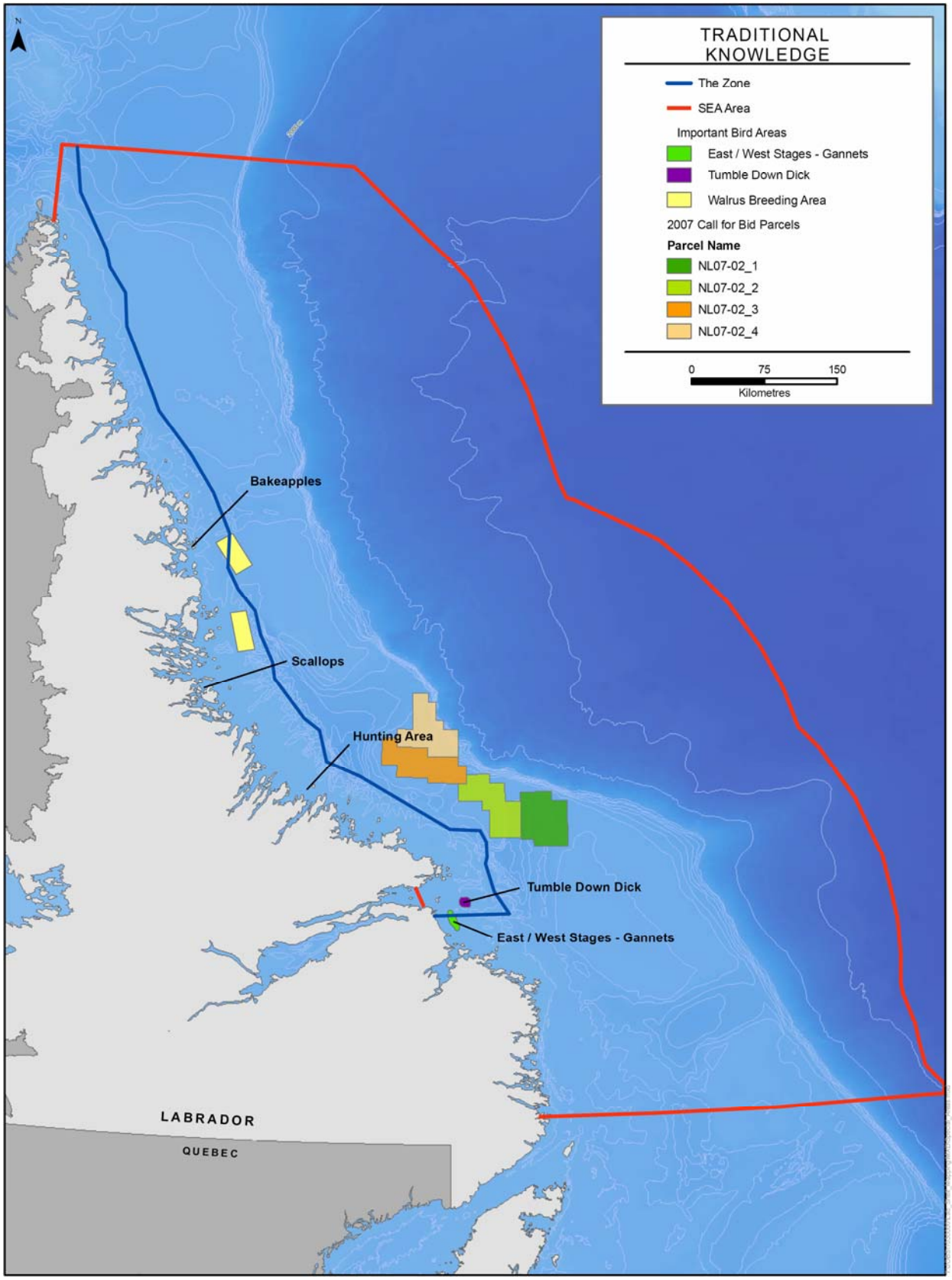
Areas of importance for the harp seals in Labrador Shelf SEA Area included Back Bay; Head of Groswater Bay; Black Island; Island Harbour Bay; Jako's Bight; Makkovik Bay; Adlavik Bay; Saglek Fjord; and Kanairiktok Bay (Brice-Bennett 1977). Aboriginal and non-Aboriginal coastal residents who reside north of 53°N latitude can continue to hunt seals for traditional purposes or as determined by specific treaty rights. To facilitate access to the commercial fishery, as an interim measure, a one-year harp seal allocation of 6,000 seals is identified for new Aboriginal initiatives (DFO 2006k).

Harbor porpoise are hunted within the Labrador Shelf SEA Area as a country food source. They areas they may be hunted include Long Island to Turnavik (Brice-Bennett 1997).

Areas of importance for the harbor seals in Labrador Shelf SEA Area include Tunungayualok Island and area; Shoal Tickle; Big Bay; Flowers Bay; Kikkektak and Ivjogiktok Islands; Okak Bay; Tasiuyak Bay; Amitok Island; Illuviktalik Island; Iglusuaktaliak Island; Tikkigaksuk Peninsula; Napartok Bay; Seal Bight; Cod Bag Harbour; Shark Gut Harbour; Saglek Fjord; Kaipokok Bay; Big Brook; Jeanette Bay (including Sandy Cove); and Jako's Bight (Brice-Bennett 1977).

Areas of importance for the ringed seals in Labrador Shelf SEA Area included areas from Hare's Ears and The Highlands to Back Bay; Groswater Bay in The Channel area; Double Mer; area around Drunken Harbour Point and the Advalik Islands; Napartok Bay; Hebron Fjord; Saglek Fjord; Kangalaksiorvik Fjord; Okak Bay; Tasiuyak Bay; Mugford Bay; Anchorstock Bight; Aulatsivik Island area; Tunungayualok Island; Nain Bay; Voisey's Bay; Tikkoatokak Bay; Webb Bay; Anaktalak Bay; Areas around Hopedale; Flowers Bay to Island Harbour Bay; and the Turnavik Islands (Brice-Bennett 1977).

Figure 4.93 Areas Identified as used for Country Food Harvesting Locales



Areas of importance for Atlantic white-sided dolphin in Labrador Shelf SEA Area included Big Bay; Double islands; Kingitok Islands; Hare Islands; Windy Tickle; Napatalik Islands; Aulatsivik Island; Kikkertavak Island; Kiglapai shore; Cutthroat; Mugford Bay; Napartok Bay; Hebron Fjord; Saglek Fjord; and Long Island to East Turnavik (Brice-Bennett 1977).

Areas in which hunting may occur for grey seal included areas around Tunungayualok Island and near Tasiuyak Bay (Brice-Bennet 1977).

Areas of importance for the polar bears in Labrador Shelf SEA Area included areas around Aulatsivik Island; Village Bay; Kiglapait shore; areas between the mouth of Napartok Bay and Saglek Fjord; and Nachvak Fjord (Brice-Bennett 1977).

The types of migratory birds that are hunted include geese, eider ducks, Black ducks, mergansers, loons, turrs, and scoters. In addition to hunting of birds, the collection of eggs is practiced when in season. Areas of importance for the migratory birds in Labrador Shelf SEA Area included areas north of Hopedale to Davis Inlet; Island Harbour Bay; Tunungayualok Island; Areas from Mugford tickle to Cape Kiglapait; Okak Bay; Tasiuyuk Bay; Napartok Bay to Kangalaksiorvik Fjord; Kaipokok Bay; White Bear Island; Hare Islands; Windsor Harbour south the Byron's Bay; Turnavik Islands area; Ailik Islands; Cape Makkovik; Island Harbour Bay; Dunn's Island; Adlavik and Ironbound Islands; Jako's Bight; Makkovik Bay; Jeanette Bay; Groswater Bay; and Back Bay (Brice-Bennett 1997). Harlequin Ducks are hunted on the seaward islands and the shores of many coastal bays. Areas of importance for Harlequin Duck in Labrador Shelf SEA Area include White Bear Islands; Hare Islands; Winsor Harbour; Big River, Byron's Bay; Hopedale to Davis Inlet; Island Harbour Bay; Tunungayualok Island; Mugford Bay to Cape Kiglapait; Okak Bay; Tasiuyak Bay; and Napartok Bay to Kangalaksiorvik Fjord (Brice-Bennet 1977). Common Eider, like the murres of the seabird group, has been identified by Aboriginal peoples as a food source and concern was expressed with respect to the future of the species.

4.10.6.1 Fisheries Management with "The Zone"

Within the Labrador Shelf SEA area lies an area known as "The Zone" that encompasses 48,690 km^2 (18,800 square miles) of ocean extending to the limit of Canada's territorial sea (Government of Newfoundland and Labrador 2008). The Zone was established under the *Labrador Inuit Land Claims Agreement* (2005). A co-management board (The Torngat Joint Fisheries Board) appointed by the Government of Canada, Government of Newfoundland and Labrador, and the Nunatsiavut Government will be established as the primary body for making recommendations to governments on the conservation and management of fish in "The Zone". The provincial and federal governments will retain the overall responsibility for the conservation and management of the fishery in "The Zone".

Within "The Zone" Labrador Inuit will have the right to harvest fish and marine mammals for Inuit food, social and ceremonial purposes. If conservation requires that fishing by Inuit be limited, the limits will be set by the federal minister based on a recommendation of the Nunatsiavut Government. Inuit will be guaranteed a percentage of new or additional commercial fishing licences for specified species within and in waters adjacent to "The Zone".

4.10.7 Data Constraints for Commercial Fisheries

There are a variety of uncertainties related to commercial fisheries that may affect the information provided on certain species and resource exploitation in the Labrador Shelf SEA Area. Description and details on a variety of fish species may be limited due in part to existing data constraints, including miminal of information with respect to some species life history and catch history. The effect of environmental variations (in particular temperature variations) on natural mortality, production and recruitment is poorly understood.

Inconsistent multispecies surveys within the Labrador Shelf SEA Area from 1995 onwards results in major sources of uncertainty. These include gaps in coverage (ranging from missed strata, reduced numbers of sets), changes in timing (survey coverage extended later, coverage of some strata/Divisions spread out over a longer period than planned) and vessel effects (incomplete comparisons among the three vessels used, using vessels in areas where they have little or no coverage in previous years) (Brodie et al. 2007).

Vessel effects are particularly problematic. Estimates of abundance and biomass in the survey are calculated to assume that there are no vessel effects; however, due to break downs and other technical problems, it is often necessary for one vessel to cover an area normally covered by another (Brodie et al. 2007) while controls are in place to reduce the inevitable vessel effects they are not eliminated. McCallum and Walsh (2002) found differences in trawl performance between different vessels and even between surveys of the same vessels. The effects of these differences on estimates of abundance and biomass are unknown (Brodie et al. 2007).

There is limited information on underutilized species or emerging fisheries, making fisheries descriptions of these species challenging.

The effects of climate change is an evolving area of focus. At current time there is some but limited information available often at an ecosystem level and not necessarily species level. Much of the current research is from the western arctic and data from the Labrador Shelf SEA Area is limited. It is recognized as an area of focus, new knowledge will address data gaps as well as provide new information.

While there are data gaps/constraints, their relation to offshore oil and gas is dependent on the nature and timing of the particular activity, and the need to collect additional data will be determined at the project-specific environmental assessment stage.

Addition information with respect to data constraints is identified for selected species in subsequent sections when these data constraints were specifically highlighted in the literature. Project-specific environmental assessments should confirm that data constraints are still relevant and have not been addressed or new data constraints identified.

4.10.7.1 Atlantic Cod

A major source of uncertainty with respect to Atlantic cod in Divisions 2GH is that since the early 1970s, there has not been an attempt to use landings data to estimate biomass (Canada-Newfoundland and Labrador Action Team for Cod Recovery 2005). Research surveys also provide very little information for this area, as their coverage has been infrequent, sporadic and, when they are completed, they are

generally not at the appropriate season or depth (Canada-Newfoundland and Labrador Action team for Cod Recovery 2005).

4.10.7.2 Iceland Scallop

There are data constraints associated with Iceland scallop available on mortality, growth and maturity rates, which are necessary for stock assessments.

4.10.7.3 Skate

There are data constraints for skate associated with respect to growth rates, age of maturity, population age structure and migration mechanisms (Kulka and Mowbray 1998).

4.10.7.4 Witch Founder

Age data from fishery and DFO surveys have not be analyzed since 1994 due to a lack of technical expertise; therefore, information is not available on mortality, growth and maturity rates which are necessary for stock assessments (Maddock-Parsons 2005b).

4.10.7.5 Greenland Halibut

Abundance and biomass estimates carried out in both spring and autumn multi-species surveys have been sporadic in Divisions 2GH, especially in Division 2G.These deficiencies in coverage are particularly important in assessing stock status (Healey 2007).

4.10.7.6 Arctic char

Due to the absence of fish counting facilities for Arctic char in northern Labrador, the status of the resources is largely unknown. Minimal commercial effort in recent years with respect to both spatial and temporal coverage and interpretation of catch rates as indices of abundance is questionable (DFO 2001). Traditional catches are not quantified (DFO 2001a).

4.10.8 Planning Implications for Commercial and Traditional Fisheries

Events have shown over several years that gillnets and crab gear are the ones most often involved in a gear conflict in the Newfoundland and Labrador sector (even with chase boats and Fisheries Liaison Officers). At night, in rough weather and with sea clutter (affecting radar), the buoys (even those using highflyers) are hard to see by anyone. Operators should understand the need for special precautions in fixed gear areas and the potential requirement for using a guard boat. Operators may need to employ planning and mitigation measures with respect to program scheduling to avoid concentrated fisheries areas in order to avoid conflicts, especially with the timing of sensitive life stages for fish species (i.e., spawning or migration).

As more information becomes available or as the fisheries progress, this information should be included in any project-specific environmental assessments.

4.11 Sensitive Areas

A number of areas and places located within the Labrador Shelf SEA Area are identified as **sensitive areas**. For the purposes of the Labrador Shelf SEA, the term **sensitive area** is defined as:

- an area that is afforded some level of protection under federal or provincial legislation (i.e., National Parks, ecological reserves, Oceans Act Marine Protected Areas (MPAs), National Marine Conservation Areas (NMCAs), National Historic Sites, fishery management areas)
- an area that may be under consideration for such legislative protection,
- an area that is known to have particular ecological or cultural importance and is not captured under federal or provincial regulatory framework (e.g., corals; spawning, nursery, rearing, or migratory areas; areas of high productivity, IBAs, areas of traditional harvesting activities).

The description of an area as a sensitive area within the Labrador Shelf SEA Area, in itself, does not automatically imply that this area will require the application of non-typical mitigations or restrictions on activities. The timing, spatial extent and native of proposed oil and gas activities, in addition to mitigations prescribed by legislation will determine the level of restriction mitigation that will be required.

While there are no sensitive areas for marine mammals identified, this is as a result of lack of information. Evidence is available that suggests areas that are important for seabirds may also be important for marine mammals as well.

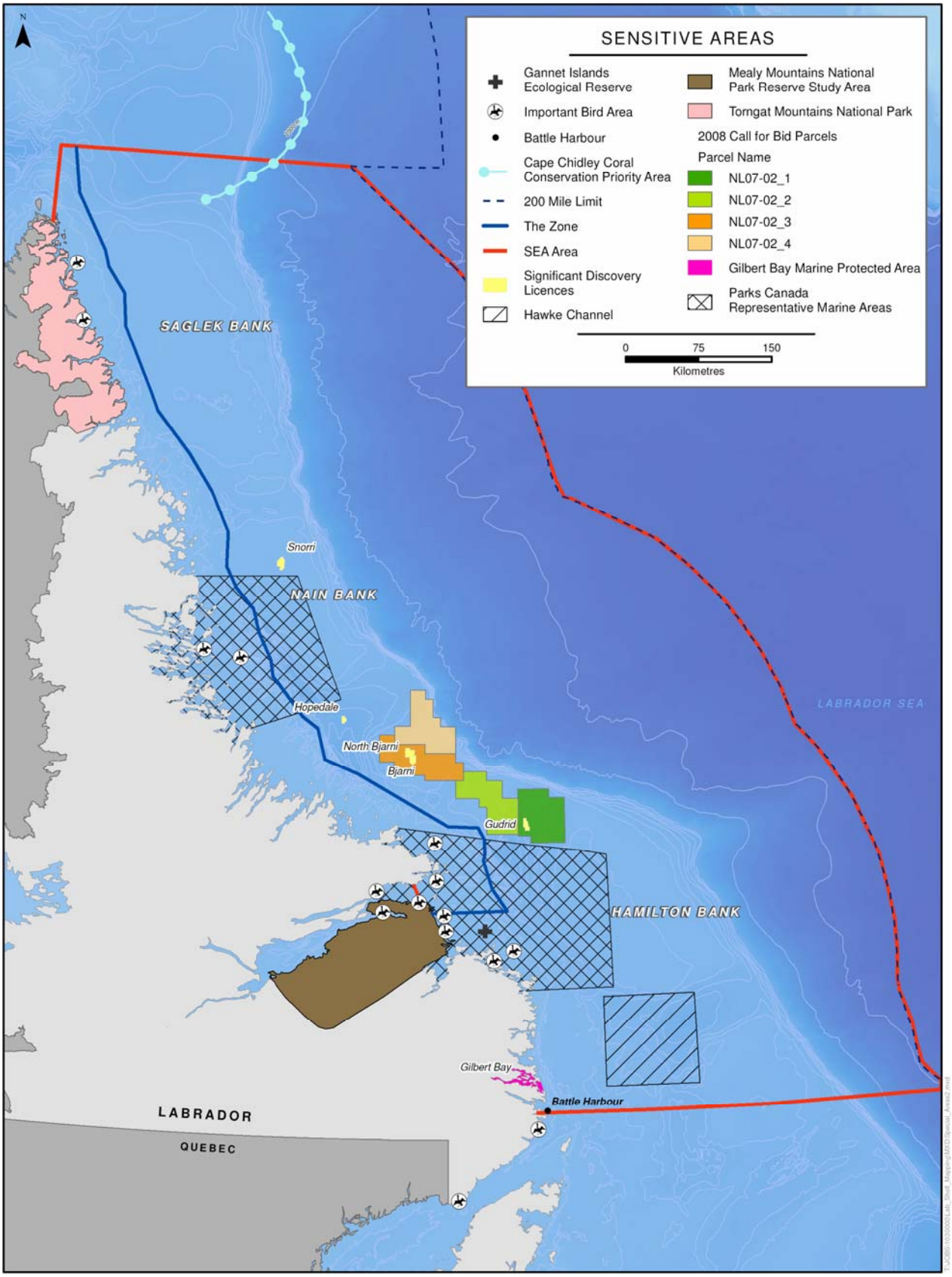
4.11.1 Regulatory Framework

There are a variety of regulatory frameworks that deal directly or indirectly with sensitive areas in Newfoundland and Labrador. Marine fisheries are administered by DFO through the federal *Fisheries Act*. Management of marine mammals, including species at risk, is controlled by DFO under the *Marine Mammals Regulations* of the *Fisheries Act*. All species at risk are administered under the *Species At Risk Act* (2002) which lists the species and provides measures to protect Listed Species. Further details regarding species at risk are presented in section 4.1. Migratory birds, including species at risk, are solely or jointly managed (depending on the species) between Canada and the US through Environment Canada (CWS). Current legislation and agreements regarding migratory birds include the Convention for the Protection of Migratory Birds (1916), *Migratory Birds Convention Act* and the North American Waterfowl Management Plan (CWS and United States Fish and Wildlife Services (USFWS) 1986; CWS, United States Fish and Wildlife Service (USFWS) and SEMARNAP 1998). Waterfowl are managed according to "flyways" denoting wintering and summering habitat connected by international migration corridors. The Labrador region falls within the Atlantic Flyway. Wildlife will be co-managed with the Nunatsiavut Government according to their recent agreement.

Provincial parks are administered under the *Provincial Parks Act* (1970), while sensitive areas such as ecological reserves are administered under the provincial *Wilderness and Ecological Reserves Act* (1980). National parks are administered under the *National Parks Act* (2000) and National Marine Conservation Areas (NCMAs) is established under the *Canada National Marine Conservation Areas Act (2002)*. Marine Protected Areas (MPAs) are administered under the *Oceans Act* (1996) which includes *Gilbert Bay Marine Protected Regulations* (2005) outlining the regulations applicable to Gilbert Bay, a marine protected area within the Labrador Shelf SEA Area.

Figure 4.94 illustrates the sensitive areas that are located within the Labrador Shelf SEA Area.

Figure 4.94 Sensitive Areas within the Labrador Shelf SEA Area



4.11.2 National Marine Conservation Areas

The National Marine Conservation Areas (NMCA) program was initiated in 1986 and is administered by Parks Canada. NMCAs are established and managed under the *Canada National Marine Conservation Areas Act* for the purpose of protecting and conserving marine areas representative of each of the 29 marine regions in the Atlantic, Pacific and Arctic Oceans and the Great Lakes, for the benefit, education and enjoyment of Canadians.

The NMCAs are designed to represent the physical and biological features of a marine region. They also help to maintain ecological processes, provide a model for stainable use of marine species, encourage marine and ecological research and monitoring, protect depleted, vulnerable, threatened or endangered marine species and their habitat, provide for marine interpretation and recreation as well as contribute to the worldwide network of marine protected areas. NMCAs include the seabed, subsoil and water column and may include estuaries, islands and other coastal lands.

NMCAs are managed for sustainable use and contain zones that are highly protected. They are intended to demonstrate how protection and conservation practices can be harmonized with resource use in the marine environment (Parks Canada 2003). Ocean dumping and exploration and development of non-renewable resources are prohibited within NMCAs. Other activities, such as fishing, are permitted. There are five steps in the NMCA establishment process:

1. identification of representative marine areas;
2. selection of preferred NMCA candidate from among the identified representative marine areas;
3. assessment of the feasibility of a new NMCA;
4. negotiation of any agreements; and
5. establishment in legislation.

NMCAs are established in a manner set out in the National Marine Conservation Areas Policy and guided by the national system plan. In addition, the potential for non-renewable resources is an important consideration in determining boundary options for an NMCA during a feasibility study. Parks Canada's goal is to represent each of the 29 marine regions; therefore, the establishment of new NMCAs is focused on the unrepresented regions. Representative marine areas will be identified for those marine regions that are not represented in the system (Parks Canada 2006). In correspondence between Parks Canada and the C-NLOPB, it was indicated that Hamilton Inlet is the preferred candidate area (although Parks Canada has not made a final decision rearding this). The following information is provided in detail at http://www.pc.gc.ca/docs/pc/poli/princip/index_E.asp, the Parks Canada website (Parks Canada 2006). The area must portray the geological, oceanographic, and biological and ecosystem diversity that is characteristic of the marine region; and the area's ecosystems must be in a healthy, natural state, or, if they are stressed or significant environmental degradation has taken place, restoration and maintenance of their essential structure and function must be considered feasible. Representative marine areas will be identified in consultation with provincial and territorial governments, other federal agencies and with the interested public.

Potential new NMCAs (Parks Canada 2006) are established by identifying representative marine areas (candidate sites) by taking into consideration geologic features (such as cliffs, beaches, and islands on

the coast; and shoals, basins, troughs and shelves on the seabed); marine features (tides, ice, water masses, currents, salinity, freshwater influences); marine and coastal habitats (wetlands, tidal flats, estuaries, high current areas, protected areas, inshore and offshore areas, shallow and deep water areas); biology species; as well as archaeological and historic features. In selecting potential national marine conservation areas, consideration will be given to a wide range of factors including (Parks Canada 2006):

- the extent to which the area represents the ecosystem diversity of the marine region;
- the degree to which the area contributes to the maintenance of essential ecological processes and life support systems for downstream areas (e.g., the protection of nursery or juvenile rearing areas);
- the importance of the area in maintaining biodiversity and protecting critical habitats of rare, threatened or endangered species; the occurrence of exceptional natural phenomena and cultural resources;
- the existing or potential value of the area for ecological research and monitoring; opportunities for public understanding; education and enjoyment;
- possible threats to the long-term sustainability of the area's marine ecosystems as well as those of the surrounding lands;
- minimizing conflict with existing or probable marine resource uses such as significant commercial fishing areas, mineral or energy resources, navigation routes or defense exercise areas;
- complementarily with the objectives of existing or planned protected marine or coastal areas of other jurisdictions in the marine region;
- the potential of establishing an adjacent national park or national park reserve representative of its natural region;
- the potential to cooperatively manage existing and potential uses of the marine resources within and adjacent to the potential marine conservation area on a sustainable basis, compatible with the objective of protecting its biotic resources and other park values; and
- the implications of comprehensive land claims and treaties with Aboriginal peoples.

When assessing the feasibility of a potential NMCA (Parks Canada 2006), Parks Canada will first consult with other federal departments and agencies, provincial and territorial governments and seek their cooperation and support. Discussions with local communities and affected user groups will be initiated by Parks Canada to seek their cooperation in conducting a feasibility study, to determine the best timing and process for their active participation, and how to incorporate the knowledge of individuals living and working in the area. The feasibility study should include recommendations on the conservation and management objectives of the area, its boundaries, a draft zoning plan with a description of the purpose and objectives of each zone and the uses that will be permitted, including fishing. It should also identify specific issues of concern to local communities and affected user groups and, when possible, recommend how they could be addressed.

The boundaries of a potential national marine conservation area (parks Canada 2006) should be such that it protects a wide diversity of marine ecosystems representative of the marine region; accommodates the habitat requirements of viable populations of marine species; does not fragment sensitive, highly diverse or productive marine communities; protects exceptional marine phenomena, and rare, threatened or endangered marine wildlife and plants; includes important sites for ecological

research and monitoring; offers opportunities for public understanding and enjoyment; results in minimum long-term disruption of the social and economic life in the surrounding region; and does not encompass permanent communities.

If the feasibility studies (Parks Canada 2006) for a proposed NMCA demonstrates support for the initiative, a federal/provincial or federal/territorial agreement will be negotiated to set out the terms and conditions under which the NMCA will be established and managed. Marine conservation areas are formally established by the Parliament of Canada through amendment to the National Parks Act. National marine conservation areas that are established in conjunction with the settlement of land claims of Aboriginal peoples will incorporate boundaries, harvesting rights and involvement of Aboriginal peoples in the planning and management and be included in the legislation according to the terms of the land claim agreement.

The Labrador Shelf marine region is not currently represented in the NCMA system, but two areas have been identified as representative marine areas: Nain Bight, offshore the community of Nain extends seaward to include representation of the Nain Bank; and Hamilton Inlet, east of Lake Melville, extends offshore to include representation of the Hamilton bank (Figure 4.94). Further studies are needed to select one of the areas as the preferred NMCA candidate and to refine study area boundaries. It should be noted that as all NMCA lands, including the seabed, must be unencumbered by third party interests, due consideration should be given to ensuring these general areas remain free of exploration leases or licences until decisions have been made about which area warrants protection in an MCA. Traditional fishing activities are permitted in NMCA lands, but are managed for ecosystem conservation.

4.11.2.1 Data Constraints for National Marine Conservation Areas

The data constraints for the National Marine Conservation Areas would encompass all data constraints identified in section for the biological environment with respect to knowledge gaps associated with species such as species distributions, life histories, migrations, habitat preference, and critical habitats. The effects of climate change as with species in an emerging area of study and would be considered a data gap.

While there are data gaps/constraints, their relation to offshore oil and gas is dependent on the nature and timing of the particular activity, and the need to collect additional data will be determined at the project-specific environmental assessment stage.

4.11.2.2 Planning implications for National Marine Conservation Areas

Operators should be aware that there are two potential national Marine Conservation Areas within the Labrador Shelf SEA Area under consideration. These areas must portray the geological, oceanographic, and biological and ecosystem diversity that is characteristic of the representative marine region and the area's ecosystems must be in a healthy and natural state. In the future, should Nain Bight and/or Hamilton Inlet become NMCAs, then oil and gas development would be prohibited within these areas.

4.11.3 Battle Harbour

Battle Harbour (Figure 4.94) is a sensitive area as the result of its historic importance in the Labrador fishery and its designation as one of Canada's National Historic Districts. Battle Harbour is managed under the National Historic Site program that is administered by Parks Canada as legislated by the *Parks Canada Agency Act* (1998).

In the past, Battle Harbour was a rich seasonal fishing area and was for two centuries the economic and social centre of the southeastern Labrador coast. Mercantile saltfish premises was first established by John Slade & Company of Poole, England in Battle Harbour in the 1770s (http://www.battleharbour.com). Battle Harbour's location led to the Slade premises becoming the major base for the region's cod and seal fisheries and for the commercial trade that led to the formation of a permanent community. The local population increased rapidly after 1820 when Newfoundland fishing schooners adopted Battle Harbour as their primary port of call. In 1871, the Slades sold Battle Harbour to Baine, Johnston & Co., Ltd. who operated the site in much the same manner until 1955. In 1955, Baine, Johnston & Co., Ltd. sold the premises to the Earle Brothers Freighting Services who continued the site's operation until the decline in the inshore fishery at the start of the 1990s. At that time, the site was turned over to the Battle Harbour Historic Trust.

The salmon fishery began in June while the cod fishery ran from late June to July or mid-August. Conversely, in the spring and fall, harp seals and waterfowl were hunted (Sanger 1996). The fishery peaked between 1894 and 1908 at over 1,400 vessels. However, by 1954, only five vessels remained (Sanger 1996). There has been no fishery in Battle Harbour since the early 1970s due to lack of a commercial fishery (Sanger 1996). The community's permanent residents had been relocated under a government-sponsored resettlement program from 1965 to 1970, although a number of families still use the site as a seasonal home (Sanger 1996).

As Battle Harbour is a historic district and is provided for completeness, there are no applicable data gaps. As part of Parks Canada's mandate (under the *Parks Canada Agency Act*) is to maintain ecological and commemorative integrity as a prerequisite to the use of national parks and national historic sites, it is unlikely that exploration and production activities would be permitted near Battle Harbour.

4.11.4 Gilbert Bay

Gilbert Bay (Figure 4.94) is considered a sensitive area because it is classified as Marine Protected Area (MPA) under Canada's *Oceans Act* since October 2005 (DFO 2005e) because of its genetically and geographically distinct population of Atlantic cod (DFO 2007j). It is the first MPA in eastern Canada's subarctic coastal zone established and managed under the *Oceans Act* (Wroblewski et al. 2007). Gilbert Bay is 28 km long, but relatively shallow, with two narrow openings to the Labrador Sea near the community of Williams Harbour (Government of Canada 2005).

There are a number of coralline algae beds (sensitive habitat) present within Gilbert Bay (Government of Canada 2005) that support a wide variety of marine organisms and plants. The waters of Gilbert Bay also support a wide range of marine species, including shellfish, demersal fish, pelagic fish, and anadromous fish as well as aquatic plants. The area is frequented by several species of marine mammals, including minke whales, harbour porpoise and harp seals, and is inhabited seasonally by

several species of waterfowl, including common loons, Canada geese, and common mergansers. A standardized survey using beach seines and gill nets identified 25 fish species (Table 4.19).

A number of sills created during the spring run-off separate Gilbert Bay, causing water flowing over these sills to have low salinity surface waters. This restricts the inflow of subsurface saline water and impedes the development of a full estuarine circulation (DFO 2007j). These hydrographic and geomorphological features may contribute to the maintenance of the discrete cod population within Gilbert Bay by retaining their eggs and larvae (DFO 2007j). Tagging and tracking of the Gilbert Bay cod have confirmed they remain in the bay year-round (DFO 2005e). Individuals are reddish or golden-brown in colour, due to their carotenoid-rich diet of invertebrates (DFO 2007j). The timing and length of spawning differs from that of offshore cod populations, as Gilbert Bay cod spawn within the bay between the end of May and early June, whereas other stocks spawn offshore between January and March (DFO 2007j).

Table 4-18 Marine Life Found in the Gilbert Bay Area

Marine-Related Birds	Marine Mammals	Invertebrates	Marine Fish
American Black Duck	Atlantic White-Sided Dolphin	Blue Mussel	Atlantic Sturgeon
Atlantic Puffin	Bearded Seal	Clam	Atlantic Herring
Bald Eagle	Fin Whale	Cockle	Atlantic Salmon
Black Guillemot	Grey Seal	Duck Foot Whelk	Arctic char
Black Scooter	Harbour Porpoise	Green Sea Urchin	Brook Trout
Black-Legged Kittiwake	Harbour Seal	Iceland Scallop	Capelin
Canada Goose	Harp Seal	Northern Whelk	Rainbow Smelt
Common Eider	Hooded Seal	Jellyfish	Atlantic Cod
Common Goldeneye	Humpback Whale		Rock Cod
Common Loon	Killer Whale		White Hake
Common Merganser	Long-Finned Pilot Whale		Threespine Stickleback
Common Murre	Minke Whale		Blackspotted Stickleback
Common Tern	Ringed Seal		Fourspine Stickleback
Great Black-Backed Gull	Sei Whale		Ninespine Stickleback
Green-Winged Teal	White-Beaked Dolphin		Ocean Pout
Herring Gull			Daubled Shanny
Hudsonian Godwit			Rock Gunnel
Osprey			American Sand Lance
Plover			Atlantic Mackerel
Razorbill			Sea Raven*
Red-Breasted Merganser			Short Horn Sculpin*
Rough-Legged Hawk			Moustache Sculpin
Sandpiper			Alligatorfish*
			Lumpfish*
			Winter flounder*

* collected in 2005.
Source: DFO 2007j; Wroblewski et al. 2007.

Gilbert Bay cod is known to grow slower and exhibit lower reproductive potential than other populations of cod, resulting in a low production and recruitment capacity. This may be a consequence of a combination of low water temperatures and limited food availability. The annual surface water temperature ranges from -1.8°C to 15°C and for six months (November to May) the waters may remain at subzero temperatures and are ice-covered. Water temperatures at depths greater than 50 m remain below 0°C throughout the year (DFO 2007j).

The MPA includes all waters of Gilbert Bay, for a total area of approximately 60 km². Prohibitions are placed on fishing activity within various zones of the MPA to ensure the health of the cod population

and its key habitats. Other activities consistent with the conservation objectives of the MPA may be exempted (Wroblewski et al. 2007).

4.11.4.1 Data Constraints for Gilbert Bay

While Gilbert Bay has more information that most other areas within the Labrador Shelf SEA area, key data constraints with respect to spawning, nursery areas, migrations and species distribution within Gilbert Bay is limited. The effect of global warming on the distribution and ecosystems is evolving but still is limited and poorly understood. This even more important as the cod in Gilbert Bay are unique. The understand of which species are resident, migratory or occasional visitors is important to the overall understanding of the ecology of Gilbert Bay.

4.11.4.2 Planning Consideration for Gilbert Bay

Offshore oil and gas activities in or adjacent to the Gilbert Bay Marine Protected Area will be bound by the protection measures defined in the appropriate legislative framework for these areas. Operators should be aware that additional mitigation, may be required and will be determined at the project-specific EA stage.

The unique characteristics and rich diversity of marine life within Gilbert Bay, an MPA, may result in restrictions of activities within or near Gilbert Bay if such activities are not consistent with conservation objectives of an MPA.

While there are data gaps/constraints, their relation to offshore oil and gas is dependent on the nature and timing of the particular activity, and the need to collect additional data will be determined at the project-specific environmental assessment stage.

4.11.5 Hawke Channel – Hamilton Bank

Hawke Channel (Figures 4.94) coupled with the Hamilton Bank forms a sensitive area because of its productivity and species diversity (Table 4.20). The high productivity of the Hamilton Bank is related to regional upwelling processes at the shelf break and in the marginal trough of Hamilton Bank (Drinkwater and Harding 2001). The circulation on the Labrador shelf is dominated by bathymetry (Bueher et al. 1997) and has a strong current that flows along the southern border of the Hawke Saddle (located west of the Hawke Channel area – see figure 4.94). The Hawke Saddle is a deep trough that intersects the offshore bank, extends to the shelf, and is characterized by strong gradients in water depth. The Hamilton Bank has a mean depth of 200 meters and is surrounded by deep channels and troughs on the north and south (i.e., Hawke Channel and Hawke Saddle) that provide Nutrients input into the Hawke Channel-Hamilton Bank area via regional upwelling processes (Brown 1999).

Table 4-19 Fish Species in the Hawke Channel Region

Common Name	Scientific Name
Black Dogfish	*Centroscyllium fabrici*
Spiny Dogfish	*Squalis acanthias*
Greenland Shark	*Somniosus microcephalus*
Thorny Skate	*Raja radiata*
Atlantic Salmon	*Salmo salar*
Arctic char	*Salvelinus alpinus*
American Shad	*Alosa sapidissima*
Atlantic Herring	*Clupea harengus harengus*
Capelin	*Mallotus villosus*
Atlantic Argentine	*Argentina silus*
Glacier Lanternfish	*Benthosema glaciale*
Spotted Lanternfish	*Myctophum puntatum*
Arctic Cod	*Boreogadus saida*
Alantic Cod	*Gadus morhua*
Greenland Cod	*Gadus ogac*
Atlantic Tomcod	*Microgadus tomcod*
Pollock	*Pollachius virens*
Longfin Hake	*Urophycis chesteri*
White Hake	*Urophycis tenuis*
Red Hake	*Urophycis chuss*
Threebeard Rockling	*Gadropsarus ensis*
Roughead Grenadier	*Macrourus bergalax*
Rock Grenadier	*Coryphaenoides rupestris*
Common Marlin Spike	*Nezumia bairdi*
Laval's Eelpout	*Lycodes lavalaei*
Fourline snakeblenny	*Chirolophus ascani*
Green Ocean Pout	*Gymnelis viridis*
Striped Wolffish	*Anarhichas lupis*
Fourline snakeblenny	*Eumesogrammus praecisus*
Snakeblenny	*Lumpenus lumpretaeformis*
Daubed Shanny	*Lumpenus maculatus*
Wrymouth	*Cryptacanthodes maculatus*
Atlantic Mackerel	*Scomber scombrus*
Bluefin Tuna	*Thunnus thynnus*
Deepwater Redfish	*Sebastes mantella*
Acadian Redfish	*Sebastes fasciatus*
Shorthorn Sculpin	*Myoxocephalus scorpius*
Arctic Deepsea Sculpin	*Cottunculus microps*
Spatulate Sculpin	*Icelus spatula*
Mailed Sculpin	*Triglops nybelini*
Atlantic Hookear Sculpin	*Artediellus atlanticus*
Common Alligatorfish	*Aspidophoroides Monopterygius*
Common Lumpfish	*Cyclopterus lumpus*
Sea Tadpole	*Careproctus ranulus*
Sea Snails	Liparidae
Witch Flounder	*Glyptocephalus cynoglossus*
American Plaice	*Hippoglossoides platessoides*
Atlantic Halibut	*Hippoglossus hippoglossus*
Winter Flounder	*Pseudopleuronectes americanus*
Greenland Halibut	*Reinhardtius hippoglossoides*
Source: Brown 1999.	

The Hawke Channel-Hamilton Bank areas is host to several major commercial fish species, including redfish, Atlantic cod, and capelin, shrimp and snow crab (Brown 1999). In addition to the 51 varieties of fish species, the Hawke Channel-Hamilton Bank is also important to marine mammals and seabirds

and is considered unrivalled in its overall importance to the Newfoundland and Labrador marine ecosystem (Brown 1999).

The area of the Hawke Channel-Hamilton Bank are home to the northern spawning grounds of the Atlantic Cod (Rose and O'Driscoll 2002). The importance of the Hawke Channel-Hamilton Bank spawning ground is critical to the success and well-being of Atlantic cod because its location allows for increased probability of drift by eggs and larvae to juvenile habitats along the northeastern coast of Newfoundland and Labrador (Rose and O'Driscoll 2002) via the Labrador Current. Forty-three percent of Canadian cod landings form 1973 to 1997 was harvested from Hawke Channel.

In order to reduce by-catch mortality and disturbance to spawning and juvenile cod, a 20 by 20 nm area was closed to shrimp trawling in September 2002 (DFO 2006m). The FRCC recommended the establishment of an experimental cod box (Thibault 2003) (Figure 4.95), expanding the closed area to 50 by 50 nm by July 2003 (DFO 2006m). Restrictions have also been placed on fishing gear to reduce by-catch such as regulated mesh sizes and Nordmore grates on shrimp trawls (Brown 1999). Harvesters had been fighting for to have the Hawke Channel closure established for several years but only actually got it starting in 2003 (Neis et al. 2006). In union-DFO crab meetings, it was indicated that harvesters had asked DFO to close the Cartwright Channel to shrimp trawling but without success. Many crab fishermen remain convinced that shrimp trawlers damage crab (Neis et al. 2006).

4.11.5.1 Other Labrador Shelf SEA Area Banks

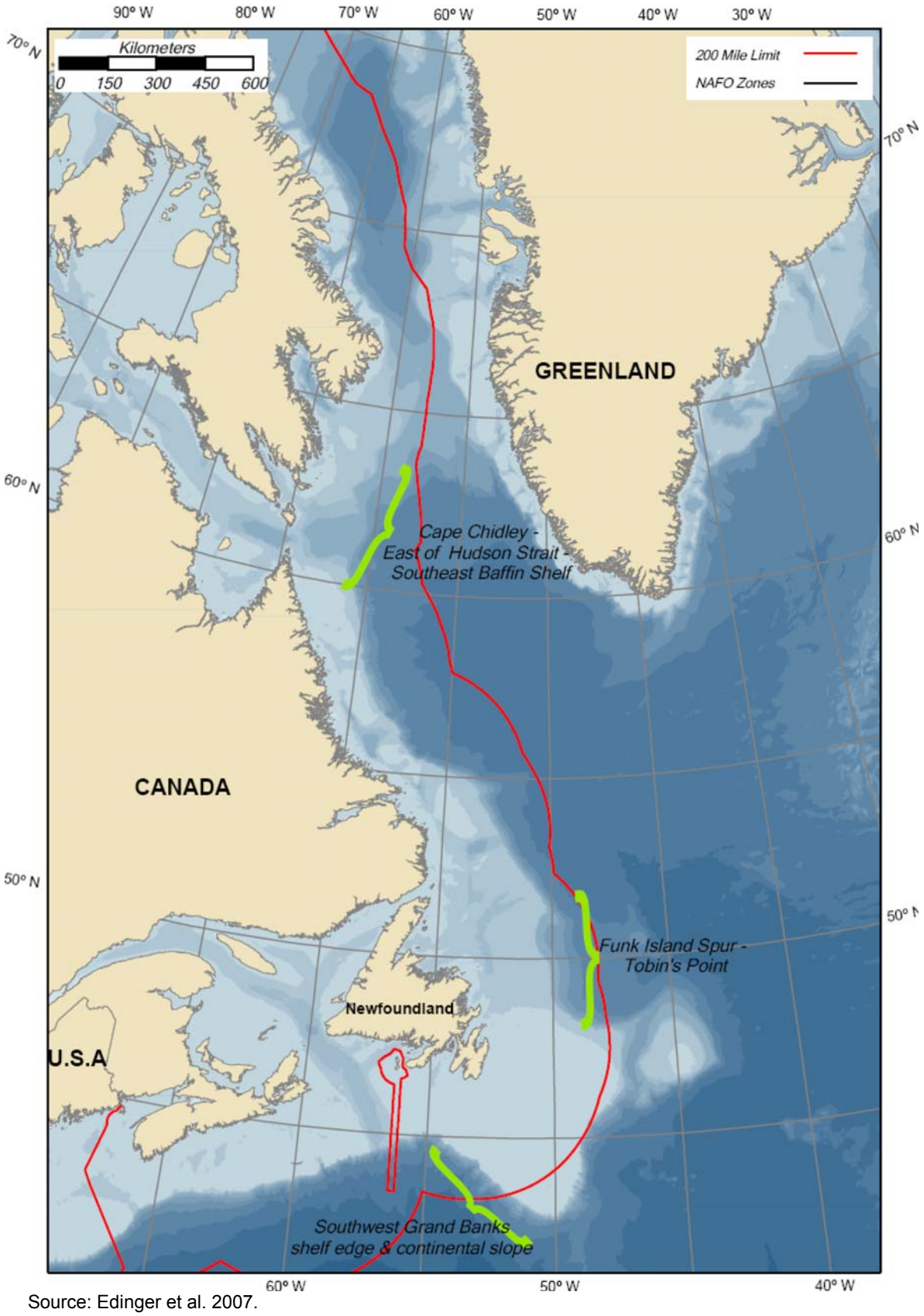
Although the Hawke Channel-Hamilton Bank is the most productive bank in the Labrador Shelf area, other banks within the Labrador Shelf SEA area, specifically Saglek and Nain Banks Figure 4.94, are also productive. The Hudson Strait outflow results from mixing of several water masses including those from the Baffin Island shelf and west Greenland. Various water masses and currents converge in the Hudson Strait, where strong tidal currents lead to intense vertical mixing (Drinkwater and Harding 2001) and the residual current transports this mixture of nutrient rich water onto the northern Labrador shelf. As a result of the nutrient laden waters, the highest concentration of near-surface phytoplankton biomass tends to be on the Northern Labrador shelf encompassing the Saglek Bank Area (Drinkwater and Harding 2001). Saglek Bank also benefits from direct advection of zooplankton from the Hudson Strait and as such has a significant number of deep-water zooplankton species that are not found elsewhere on the Labrador Shelf. Thus nutrient enriched waters from the Hudson Strait results in a sustained phytoplankton production and high standing stocks through the summer period in the Northern Labrador Shelf SEA area (Saglek Bank and to a certain extent Nain Bank).

Nain Bank enjoys some benefit from the Hudson Strait water but also benefits from local induced upwelling (Drinkwater and Harding 2001) from the shelf break and deep-water troughs that border it.

4.11.5.2 Data Constraints for Labrador Shelf Banks Including Hawke Channel-Hamilton Bank

While the Hawke Channel-Hamilton Bank has more information that most other areas within the Labrador Shelf SEA area, there are key data constraints with respect to sensitive areas that are locations of enhanced areas of production and/or concentrations of feeding seabirds and marine mammals (also for other banks within the Labrador Shelf SEA Area).

Figure 4.95 Coral Conservation Priority Areas in Newfoundland and Labrador



Source: Edinger et al. 2007.

Research on spawning, nursery areas, migrations and species distribution on various fishing banks (i.e., Hamilton Bank, Nain Bank, Saglek Bank, etc) within the Labrador Shelf SEA is limited. This information will need to be considered in any future project-specific environmental assessment. The effect of global warming on the distribution and ecosystem of the banks is evolving but still is limited and poorly understood. Understanding of the interactions between the ecosystems in the Labrador Shelf SEA Areas and other areas such as the Grand Banks is limited.

While there are data gaps/constraints, their relation to offshore oil and gas is dependent on the nature and timing of the particular activity, and the need to collect additional data will be determined at the project-specific environmental assessment stage.

4.11.5.3 Planning Implications for Labrador Shelf Banks Including Hawke Channel-Hamilton Bank

Hawke Channel supports rich and diverse fish populations, with the largest known concentrations of northern cod residing within the channel. The importance and productivity of the Hamilton Bank to the Labrador Shelf SEA Area may result in special mitigations depending upon the spatial and temporal schedule of planned activities. Offshore oil and gas activities, in or adjacent to any of the sensitive areas, may be subject to various mitigations to minimize potential effects to these areas. These mitigations may be in additional to those discussed in this report and would depend on the timing and nature of the offshore petroleum activity in or adjacent to these areas. These same mitigation measures may also be applied to the Nain and specifically Saglek Banks.

4.11.6 National Parks

National parks are administered by the federal government under the *National Parks Act*. The process to identify, select and establish new national parks is long and complex. Although regulations governing national parks do not extend to the coastal waters abutting its boundaries, the waters adjacent to them are often sites of recreational and tourism activities.

4.11.6.1 Torngat Mountains

The Torngat Mountains National Park extends from Saglek Bay to Killinek Island near Cape Chidley at the northern tip of Labrador (Figure 4.94) and comprises 9,700 km^2. Traditional activities such as fishing and hunting will still be allowed within its boundaries. The Torngat is the region's first national protected area and is free from commercial, industrial and mineral development. These are the highest and most rugged mountains in eastern Canada, with its highest point at 1,652 m in Mount Caubvick (Nature Canada 2007).

Two ecosystems, Low Arctic Tundra and Low Arctic Alpine, are prominent in the Torngat Mountains. Vegetation in upland surfaces of the Torngats is limited consisting of bare rock and tundra. Valleys have rocky terrain with a sparse cover of low-lying Arctic sedges, lichens, mosses, grasses, flowers, mixed evergreens and deciduous shrubs. White birch and willow thickets grow in less stable areas and mark the transition zone between tundra and open stands of black spruce and tamarack in the south. Bogs in the lowland areas contain black spruce with mixed evergreen and deciduous shrubs, underlain by mosses (Nature Canada 2007).

Many species have low populations because of the climactic conditions. Species that inhabited the region include the George River Caribou herd (700,000 animals) and Torngat Caribou herd (10,000

animals), black bears, polar bears, red fox, Arctic foxes, snowshoe hares, wolves and muskrat. The Torngats contain known populations of Harlequin Duck and species at risk in the area include Barrow's Goldeneye and Peregrine Falcon. Puffins, murres and razorbills also inhabit the coastal region. Common marine life includes whales, seals, Arctic char and Atlantic salmon (Nature Canada 2007).

4.11.6.2 Mealy Mountains

The proposed Mealy Mountains National Park is located in central Labrador, south of Lake Melville (Figure 4.94). This is an area of Arctic tundra surrounded by boreal forests and coastal seascapes and is within the home range of the threatened Mealy Mountain caribou herd. The next step in the national parks process is the completion of a Park Feasibility Assessment that includes public consultations. Waters adjacent to portions of the proposed park are part of a proposed Hamilton Inlet Marine Conservation Area.

The Mealy Mountains are approximately 21,000 km² and includes portions of half of Labrador's 10 ecoregions, specifically the High Subarctic Tundra, High Boreal Forest, Mid Boreal Forest, Coastal Barren and String Bog/Eagle River Plateau ecoregions (PAA 2007). The area has distinct natural components (marine, estuarine, lake, island, coastal plain, river, plateau, mountain, forest and bog) and a rugged topography. Its summits are in a state of permafrost, with annual mean temperatures between -4°C and -7°C (Jacobs n.d). The highest mountain within the range is approximately 3,700 ft (Parks Canada 1976).

Wildlife in the area include moose, black bear, red fox, lynx, snowshoe hare, wolves, ravens, spruce grouse and the Mealy Mountains caribou herd (PAA 2007). Seabirds and waterfowl in the area include Atlantic Puffins, murres, petrels, gannets, Canada Geese, Eider Ducks, Black Ducks (Parks Canada 2005), Osprey and Bald Eagles (Parks Canada 1976). Seals, whales and the occasional polar bears also frequent the coast (Parks Canada 2005). The upper portion of the Eagle River in the Mealy Mountains is a productive salmon river (Parks Canada 1976).

The Mealy Mountains are characterized by boreal forest and arctic tundra ecosystems. Vegetation included stunted black spruce, dwarf birch, Labrador tea, lichen and moss. There are also large areas without trees (Parks Canada 2005).

4.11.6.3 Planning Implications For National Parks

As the Torngat National Park is the region's first national protected area and is free from commercial, industrial and mineral development (although traditional activities such as fishing and hunting will still be allowed within its boundaries), no exploration or production activities would be allowed within its boundaries (which includes Saglek Bay to Killinek Island near Cape Chidley in the marine environment).

4.11.7 Coral Conservation Priority Area

Corals are widely distributed within the Labrador Shelf SEA Area (refer to Section 4.7) and provide habitat on an often barren seafloor. There is one coral conservation priority area identified near Cape Chidley (Figure 4.95), which overlaps with the northeastern edge of the Labrador Shelf SEA Area (Edinger et al. 2007). Data constraints and planning implications are provided in sections 4.7.1 and 4.7.2, respectively.

4.11.8 The Gannet Islands Ecological Reserve

The Gannet Islands Ecological Reserve (established 1983) is an archipelago of seven islands and surrounding marine component at the mouth of Sandwich Bay (Figure 4.96). It is the largest seabird colony in Labrador and has the largest Razorbill colony in North America. It also hosts important breeding populations of Atlantic Puffins and Common Murres. It is the largest known moult site for Harlequin Ducks in eastern North America.

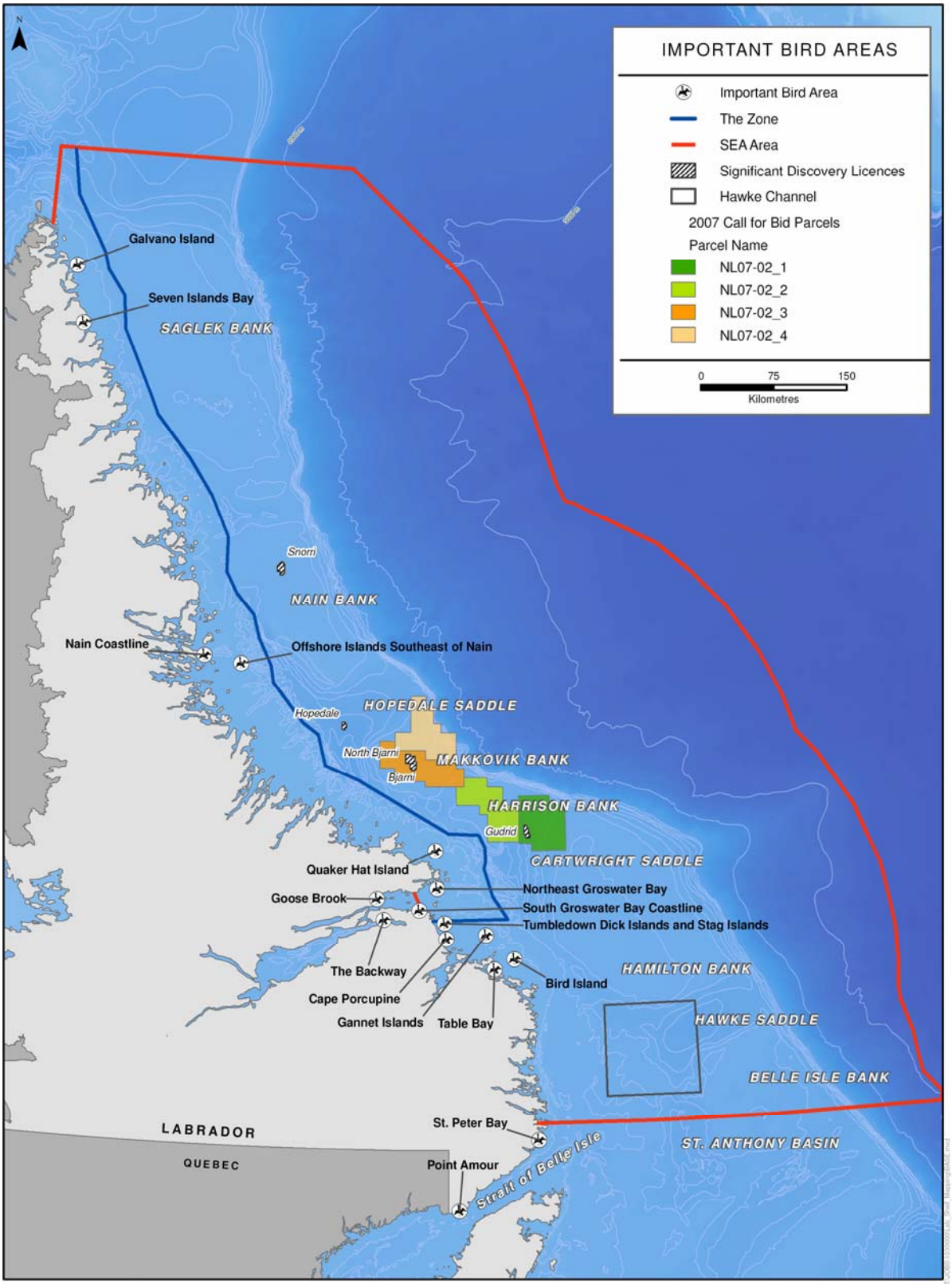
Ecological reserves have strict regulations regarding access and permitted activities. Motorized vehicles and land aircraft are prohibited, as is fishing, hunting, trapping, and removal of biotic entities, building structures, or logging (*Wilderness and Ecological Reserves Act* 1980).

More recent estimates are available for the Gannett Islands for all species from Robertson and Elliot (2002). In 1983, Common Murre populations were estimated at 37,155 pairs in the Gannet Clusters and 23, 734 on Outer Gannet Island. In 1998, those estimates were 19,360 and 17,342, respectively, corresponding to declines of 47.9 and 26.9 percent. Thick-billed Murres were estimated to have increased from 946 to 1337 pairs on the Gannet Clusters (increase of 41.3 percent0 and from 471 to 560 pairs on Outer Gannet Island (+18.9 percent). The puffin breeding population on the Gannet Clusters has remained fairly stable over the past twenty years at 33,000 to 42,000 pairs, making it the second largest colony in eastern North America. Razorbills were estimated at 6497 pairs in 1978 and at 9808 in 1999. These results confrum that the Gannet Islands is the most important Razorbill colony in North America (Robertson and Elliot 2002). Other species that may be breeding on the Gannet Islands are the Black Guillemot, which has not been recently confirmed as breeding, the Black-legged Kittiwake, which was confirmed as having 20 nests in 1999, Great Black-backed Gull which had 25 nests in the Gannet Cluster in 1999 and an estimated 5 on the Outer Gannet Island. Leach's Storm Petrel was known to be present in 1998-1999 and perhaps be breeding in very low numbers. Northern Fulmar is thought to still breed on the Gannet Islands in very low numbers although the number of occupied sites may have decreased since the 1980s. Field crews documented about 60 pairs of Common Eiders nesting on the Gannet Islands (Robertson and Elliot 2002).

4.11.9 Important Bird Areas

The IBA program is an international conservation initiative coordinated by Birdlife International and its co-partners Bird Studies Canada and Nature Canada. An IBA is a site providing essential habitat for one or more species of breeding or non-breeding birds. These sites may contain threatened species, endemic species, species representative of a biome, or highly exceptional concentrations of birds. Sites are identified using a set of standardized and internationally agreed upon criteria. IBAs can be identified under four main categories: sites regularly holding large numbers of threatened species; sites regularly holding endemic species or species with restricted ranges; sites regularly holding an assemblage of species largely restricted to a biome or a unique or threatened community type; and sites where birds congregate in large numbers when breeding, in winter, or during migration. IBAs are identified according to their importance (based on specific bird population thresholds) as either globally, continentally, or nationally important (IBA website). There are a total of 14 IBAs within the Labrador Shelf SEA Area, including the Gannett Islands. The IBAs of Canada data were compiled for all 14 IBAs that are found throughout the Labrador Shelf SEA Area (Figure 4.96) and are shown in Table 4.21.

Figure 4.96 Important Bird Areas within the Labrador Shelf Strategic Environmental Assessment Area



Source: . IBA of Canada 2004

Table 4-20 Bird Species Known from the Important Bird Areas of Labrador

Important Bird Area	Species	Season	Number	Extent	Unit	Date
Bird Island	Atlantic Puffin	BR	8,070	G	P	1978
	Common Murre (Atlantic)	BR	3,100	N/A	P	1978
	Great Black-backed Gull	BR	20	N/A	P	1978
	Razorbill	BR	1,530	G	P	1978
Cape Porcupine	Scoters	OT	4,674	N/A	I	1998
	Surf Scoter	SU	1,000 - 10,422	G	I	1980 - 1998
	Common Eider (NE Arctic)	BR	1,604	C	N	1986
	Common Eider (NE Arctic)	SU	560	N/A	I	1994
Gannet Islands	Atlantic Puffin	BR	39,350 - 49,705	G	P	1975 - 1983
	Black Guillemot	BR	40 - 110	N/A	P	1975 - 1983
	Black-legged Kittiwake (W. Atlantic)	BR	50 - 113	N/A	P	1975 - 1983
	Common Murre (Atlantic)	BR	11,650 - 63,087	G	P	1952 - 1983
	Great Black-backed Gull	BR	110 - 120	N/A	P	1975 - 1983
	Harlequin Duck (Eastern)	SU	70	C	I	1995
	Leach's Storm-Petrel (W. Atlantic)	BR	14 - 20	N/A	P	1975 - 1983
	Northern Fulmar	BR	16	N/A	P	1983
	Razorbill	BR	5,400 - 6,420	G	P	1975 - 1983
	Thick-billed Murre (Atlantic)	BR	315 - 1,405	N/A	P	1952 - 1983
Goose Brook	Canada Goose (North Atlantic)	FM	158 - 6,146	C	I	1987
	Canada Goose (North Atlantic)	SM	555 - 704	N/A	I	1988 - 1989
Nain Coastline	Harlequin Duck (Eastern)	SU	20	C	I	1994
	Peregrine Falcon (anatum)	BR	4	N/A	P	1998
	Scoters	SU	16,804 - 19,370	N/A	I	1998 - 1999
	Surf Scoter	SU	12,500	G	I	1998
Northeast Groswater Bay	Atlantic Puffin	BR	21,450	G	P	1978
	Common Murre (Atlantic)	BR	4,300	N/A	P	1978
	Great Black-backed Gull	BR	100	N/A	P	1978
	Leach's Storm-Petrel (W. Atlantic)	BR	10	N/A	P	1978
	Razorbill	BR	1,831	G	P	1978
	Thick-billed Murre (Atlantic)	BR	220	N/A	P	1978
Offshore Islands SE Nain	Atlantic Puffin	BR	12,240	G	P	1978
	Black Guillemot	BR	341	N/A	P	1978
	Common Murre (Atlantic)	BR	2,260	N/A	P	1978
	Glaucous Gull	BR	350	G	P	1978
	Razorbill	BR	815	G	P	1978
	Thick-billed Murre (Atlantic)	BR	8,000	N/A	P	1978
Point Amour	Black Guillemot	SM	1,350 - 5,465	G	I	1996
	Common Eider	SM	62,275	G	I	1996
	Common Loon	SM	195	N/A	I	1996
	Harlequin Duck (Eastern)	SM	7	N/A	I	1996
Quaker Hat Island	Atlantic Puffin	BR	2,100	N/A	P	1978
	Common Murre (Atlantic)	BR	650	N/A	P	1978
	Razorbill	BR	460	G	P	1978
	Thick-billed Murre (Atlantic)	BR	650	N/A	P	1978
Seven Islands Bay	Common Eider (Atlantic)	BR	775	N/A	I	1994
	Common Eider (Atlantic)	BR	365	N/A	P	1980
	Harlequin Duck (Eastern)	SU	327	C	I	1994
South Groswater Bay Coastline	Black Scoter (Northeast)	FM	1,300 - 1,547	C	I	1980
	Common Eider (Atlantic)	BR	1,000	C	P	1995
	Surf Scoter	SU	519	N/A	I	1980
St. Peter Bay	Common Eider (Atlantic)	SU	1,303 - 5,077	C	I	1980 - 1998
	Harlequin Duck (Eastern)	SU	n/a - 50	C	I	1994 - 1998
	Common Eider (Atlantic)	BR	2,459	C	P	1986
	Peregrine Falcon (anatum)	BR	1	N/A	P	1998
	Scoters	SU	1,375	N/A	I	1998
	Surf Scoter	SU	10,000 - 34,740	G	I	1998 - 1999
The Backway	Surf Scoter	SU	10,000 - 34,740	N/A	I	1998-1999
Tumbledown Dick Islands and Stag Islands	Common Eider (Atlantic)	SU	975	N/A	I	1998
	Harlequin Duck (Eastern)	SU	162	C	I	1998

Season:
BR = Breeding
SU = Summer
FM = Fall Migrant
SM = Spring Migrant
OT = Other

Unit:
I = Individuals
N = Nests
P = Pairs

Extent:
N = National Importance
C - Continental Importance
G = Global Importance
N/A = No designation

Source: adapted from Important Bird Areas of Canada 2004.

The IBAs of Canada organization considers several populations found in the Labrador IBAs to be of global or continental significance (Table 4.8). The Harlequin Duck, which is listed as a Species of Special Concern under the SARA, is known to occur at several of the IBAs during summer–the Gannet Islands, Nain Coastline, Point Amour, Seven Islands Bay, St. Peter Bay and Tumbledown Dick Islands and Stag Islands. These birds were thought to be part of pre-moult flocks. In consultation meetings regarding the Project, the Harlequin Duck was raised as an issue of concern. These populations are considered to be of global importance and are discussed further under Species at Risk (Section 4.2).

The Razorbill, Atlantic Puffin, Common Murre, Surf Scoter, Black Guillemot and Common Eider populations are also considered to be of global significance in several of the Labrador IBAs. Several species' populations in the IBAs are considered of continental significance, including Canada Goose, Black Scoter, and Common Eider. Several of the IBA sites are prominent moult sites including the Gannet Islands, St. Peter's Bay, Tumbledown Dick Islands, and Stag Islands (IBA 2001b).

Threats to the IBAs within the Labrador Shelf SEA Area include oil pollution and over-harvesting of certain species like eiders, guillemots, and murres (IBA 2001a, IBA 2001b). Egg collecting may also be a stressor on certain species. Increases in shipping traffic could also lead to avoidance behavior in some of the IBAs.

4.11.9.1 Data Constraints for Gannett Islands and Other Important Bird Areas

Other seabird colonies in Labrador may warrant Ecological Reserve status or other protective legislation in the future. Herring Islands may be the next candidate site. Data for various important bird areas are dated. Bird populations can change drastically over time as a result of perturbations, natural cycles and in response to ecosystem changes. While data does exist, there are gaps on the distribution and abundance for certain important bird areas. There is limited data of the effects of climate change on the important bird areas.

While there are data gaps/constraints, their relation to offshore oil and gas is dependent on the nature and timing of the particular activity, and the need to collect additional data will be determined at the project-specific environmental assessment stage.

4.11.9.2 Planning Implications for Gannett Islands and Other Important Bird Areas

There are 14 IBAs including the Gannett Islands within the Labrador Shelf SEA Area that are home to a variety of bird species including SAR-Listed and COSEWIC species. Depending upon the schedule and locale of potential exploration and production activities, special mitigations may be required to protect birds during vulnerable life history activities periods such as breeding. Future planning will need to consider the possibility of the establishment of new seabird reserves. Offshore oil and gas activities in or adjacent to the Gannet Island Ecological Reserve, and future protected areas will be bound by the protection measures defined in the appropriate legislative framework for these areas. Additional mitigations, if required will be determine in project specific environmental assessments in consultation with regulatory agencies and stakeholders.

Although designation as an official IBA of Canada does not bring legal protection, it does signify that an area may be of continental or global importance to the conservation of bird species and therefore should be considered in planning. The Gannet Islands IBA is protected because it is inside the boundaries of the provincial designation as an Ecological Reserve (Seabird Sanctuary). Damage to an Ecological Reserve warrants fines for individuals or corporations. The protection of bird sanctuaries

includes the land and the water around the sanctuaries that is the jurisdiction of the Province (*Wilderness and Ecological Reserves Act* 2007). Protection of the Ecological Reserves (including the Gannet Islands) includes prohibitions against using motorized vehicles or aircraft, hunting, fishing, logging, and development.