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Groundfish by-catch within the northern shrimp fishery off the eastern coasts of Newfoundland and Labrador over the years 2004 – 2008

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Introduction

Prior to 1997, the shrimp fishery off the northeastern coasts of Newfoundland and Labrador was entirely a large vessel (>500 t) fishery. There were 17 shrimp fishing licences and in any one year approximately 13 vessels. Since 1996, approximately 360 small vessels (≤ 100 t LOA; ≤ 500 t) have been granted temporary shrimp fishing licences. In 2007, the temporary licences were converted to permanent licences. Then in 2000, the NAFO Div. 3LNO shrimp fishery began with a total allowable catch (TAC) of 5000 t, 83% of which was to be fished by Canadian vessels in the Canadian EEZ while 17% could be fished by non-Canadian vessels in the NRA. The TAC for the entire study area (northern Labrador to the northern edge of 3L) has increased from 6650 t in 1980 to 134,496 t by 2007. There is a great deal of potential for capturing non target species, some of the finfish bycatch are listed as being endangered under the Species at Risk Act (SARA) Legislation while others are under moratoria; therefore it is important to minimize bycatch. There are several forms of mitigation used in Canada.

Since 1996, usage of Nordmore Grates has been mandatory, within the Canadian northern shrimp fishery, as a means of reducing finfish by-catch. North of Shrimp Fishing Area (SFA) 6 (Fig. 1), bar spacing within large vessel (>500 t) codends must not exceed 28 mm. South of SFA 5 (Fig. 1), the bar spacing within large vessel codends must not exceed 22 mm. The bar spacing within all small vessel (≤ 500 t; LOA < 100 ') codends must not exceed 22 mm regardless of area fished.

In order to protect groundfish within Div 3LNO (SFA 7), licence conditions include the following stipulation:

“If total by-catches of all regulated groundfish species in any haul exceeds 2.5 percent by weight of the catch of shrimp, the master of the vessel must immediately change fishing area by a minimum of 10 nautical miles from any position of the previous tow in order to seek to avoid further by-catches of all regulated groundfish. If after moving, the next haul exceeds these by-catch limits the vessel must leave the Division and not return for at least 60 hours.”

Small vessel licences have the additional groundfish protection stipulation:

“The trawl shall be configured with toggle and chain lengths set to a minimum of 71.12cm (28 inches), length measured from the centre of the toggle to the fishing line (bolch line).”

Finally, the Hawke Channel (Fig. 1) closed area was to protect Atlantic cod and snow crab.

This report provides a preliminary account of the by-catch taken by Canadian vessels fishing for shrimp off the east coast of Labrador and northeastern Newfoundland. The detailed results are presented by SFA, year and fleet for the following groundfish species: Atlantic cod (*Gadus morhua*), Greenland halibut (*Reinhardtius hippoglossoides*), redfish (*Sebastes* spp.), spotted wolffish (*Anarhichas minor*), striped wolffish (*Anarhichas lupus*), northern wolffish (*Anarhichas denticulatus*) and American Plaice (*Hippoglossoides platessoides*). A summary by SFA and fleet for the year 2007-08 also presents the importance in terms of percent occurrence and weight for each species captured

by the shrimp fishing fleets. Data are also presented from the non-Canadian fleet fishing for shrimp in the NAFO Division 3L, NAFO Regulatory Area (NRA).

Beginning in 2003, industry was granted a change in management year from a calendar (Jan 1 – Dec. 31) year to a fiscal (Apr. 1 – Mar. 31) year for all domestic shrimp fishing areas (SFAs). Therefore, large vessel data is presented by fiscal year for SFAs 4-6. While the small vessel quota is managed by fiscal year, the catch is taken before the end of December; therefore the data are presented by calendar year. The NAFO Division 3L management unit (SFA 7) is managed by calendar year and all by-catch is presented accordingly.

Methods and Materials

Groundfish by-catch within the Canadian northern shrimp fishery

There is mandatory 100% observer deployment on all large Canadian vessels (>500 t) fishing shrimp off the eastern coast of Labrador and northeastern Newfoundland.

However, there is a target of 10% observer coverage among the Canadian small vessel (≤ 500 t; LOA < 100') shrimp fishing fleet. Since 2000, an attempt has been made to ensure that the small vessel observer coverage is representative of the fishery. This is accomplished by dividing the coastal areas of Newfoundland and Labrador into 26 port areas. A month X area matrix was created with the cells containing the percent catch landed in each area by month (Table 1). The number of observers assigned to port areas by month was prorated according to the matrix of catch and the funds available for the observer program. Much of the small vessel fishery takes place between May and October; therefore, the deployment scheme was restricted to that six month period. Please note that areas were eliminated if less than 1% of the average landings were attributed to that area.

This stratified deployment pattern was chosen because the licenses do not restrict fishers to particular NAFO Statistical Units. There is no reason to believe that a fisher from St. Anthony will always fish in St. Anthony Basin. By sampling various locations throughout the year, there is high probability of obtaining representative data. Additionally, the proposed pattern of deployment allows flexibility because each year the matrix is updated from past fishery performance. The continual updates are necessary because it is assumed that the fishery will change over time, as the environment/ distributions of shrimp change.

Upon deployment to a port, the observer is asked to make use of a random number table when choosing a vessel according to vessel side number. If a vessel is chosen during a deployment, it is removed from the next selection process. Deployment by lottery ensures that all vessels have an equal opportunity of being chosen. The only caveat is that the observer is not to choose a vessel that he/ she feels is not safe.

The observer database provides information used to determine the potential impacts that shrimp fishing may have upon groundfish species. Groundfish by-catch is recorded to 1 kg. precision for all observed fishing sets. Length frequencies are recorded to 1 cm. precision from randomly selected samples of commercial groundfish species. Using a ratio of species catch weight versus weight of fish measured, the length frequencies were corrected on a set by set basis. Length frequencies were added together on a species by species basis. An average length frequency distribution per kg. of by-catch was produced and then merged with the catch records. The frequencies were multiplied by the total by-catch weight in an effort to produce length frequency data on a set by set, species by species, basis.

The total catch weight of shrimp by Shrimp Fishing Area (SFA), year and fleet from the Canadian Atlantic Quota Report (CAQR) provided the logbook estimate of shrimp catch that was used as a multiplier (correction factor = logbook catch/ observed catch) to correct by-catch estimates when the observer records indicated that total shrimp catch was less than the logbook catch. In the case, of large vessels, a high proportion of the catch was observed and therefore the correction factor was always close to 1. If the total observed catch was greater than the total CAQR catch, the correction factor was set at 1.

Distributional maps of juvenile Atlantic cod (*Gadus morhua*), American plaice (*Hippoglossoides platessoides*), Greenland halibut (*Rheinhardtius hippoglossoides*) and redfish (*Sebastes mentella*) were overlain with plots of survey shrimp catches to determine the degree of overlap. The term juvenile refers to the modal length of a species

(LC_{50}) passing through a 22 mm Nordmore Grate. The respective LC_{50} values for Atlantic cod, Greenland halibut, redfish and American plaice were: 19 cm (Hickey *et al* 1993), 24 cm (Nicolajsen, 1997), 14-18 cm (Hickey *et al.* 1993, Kulka and Power, 1996, Kulka, 1998, Nicolajsen, 1997 and Skúladóttir, 1997) and 23 cm (Orr *et al.* 2000). L_{50} values for Broadhead (*Anarhichas denticulatus*), striped (*A. lupus*) and spotted (*A. minor*) were not found in the published literature and therefore the default values of 20 cm were used in the overlay plots for all wolfish. The overlay plots are for SFA's 5-7 and do not include SFA 4 because groundfish length frequencies are taken on an opportunistic basis only for that Shrimp Fishing Area. Potential for impact was assessed through observations of these plots and previously discussed by-catch analyses using observer datasets.

All statistical analyses were completed using SAS version 9.01 while all plots were created using Surfer 8.09 (Golden Software, 2008).

Results and Discussion

Tables 2-13 provide the details of the year, fleet and species by-catch. The correction factor (logbook catch/observed catch), percent of by-catch sets with measurements, number of fish measured all provide an indication of whether the length frequency data is representative of the by-catch. For instance, table 2 indicates that redfish measurements were taken from several large vessel fishing sets and thousands of redfish were measured; therefore it is probable that the estimates of number of redfish taken by length class are representative of the by-catch. On the other hand, the estimates of American plaice at length may be more suspect for the 2004 – 05 season because measurements were taken from less than 1% of the sets with by-catch and only 29 animals were measured.

The correction factor provides a measure of observer coverage. As noted above, every large Canadian shrimp fishing vessel has an observer before it leaves port, therefore the observed and logbook total shrimp catch weights are close to each other; subsequently, the correction factors are always close to 1. Alternatively, the Canadian small vessel fleet has a target of only 10% observer coverage. The Canadian small vessel correction factors range from 15.6 – 34.99 meaning that this fleet had an observer coverage that ranged between 6.4% and 2.9% respectively (Tables 8 and 12). Therefore there is less confidence that the small vessel by-catch estimates are representative of the fishery. The small vessel observer coverage is low and does not often meet the 10% target for the following reasons:

1. there are several fisheries, many of which require observer coverage, however, there are only a limited number of observers;
2. there is a high level of turn over among observers;
3. for conservation reasons, priority may be shifted from one fishery to another. For instance, during the spring there may be a disproportionate number of observers assigned to the snow crab fishery due to soft shell concerns;
4. it may be difficult to find observers willing to work in remote locations such as along the coast of Labrador.

Even though the observer coverage is low, a comparison between figures 1 and 2 indicates that the observed sets were from a broad area that is similar in extent to the presentation using logbook data. This is evidence that the small vessel observed sets may be representative of the total area fished by the small vessels. A more detailed analysis would have to be completed to know whether the seasonality of the catch was similar between the two datasets.

Due to the number of tasks undertaken by observers, and because conditions on vessels are not always conducive for detailed sampling of several species, there may be species for which few length measurements were taken. Where there is a high estimated number of fish in the by-catch (>20,000) but only a low number sets sampled (<6) and a low number of measurements taken (<100), the number at length may not be representative of the by-catch.

As noted above, the by-catch is recorded to a 1 kg precision therefore caution should be taken when reading these tables. If a single fish was caught, and it weighed 5 grams; the weight was recorded as 1 kg. Thus if there is a large number of sets with 1 kg of by-catch then the total by-catch of that species is probably inflated.

Tables 2-12 indicate that relatively low numbers of (<145,000 animals) and weights (<20 t) of Atlantic cod (*Gadus morhua*), American plaice (*Hippoglossoides platessoides*), spotted wolffish (*Anarhichas minor*), striped wolffish

(*Anarhichas lupus*), broadhead wolfish (*Anarhichas denticulatus*) had been taken by either large or small shrimp fishing fleets within each year of the 2004 – 2008 study period.

However, Greenland halibut (*Reinhardtius hippoglossoides*) by-catch taken by the large vessel fleet ranged between 6.6 t (75,000 animals) taken in SFA 7 during 2006 and 70 t (1,060,000 animals) taken in SFA 6 during 2004-05. Over the study period the small vessel Greenland halibut by-catch ranged between 5 t (0 animals measured) taken in SFA 7 during 2005 and 121 t (2,864,000 animals) taken in SFA 6 during 2006. It should be noted that even though by-catch, in SFA 6, is higher among the small vessel fleet, total shrimp catch for small vessels is higher than it is for large vessels. In terms of weight of Greenland halibut by-catch (kg) per ton of shrimp taken, the metric ranged between 1.09 kg/t and 2.71 kg/t for the large vessel fleet while it was 0.68 kg/t and 2.37 kg/t for the small vessel fleet.

Over the four year study period, redfish (*Sebastes* spp.) by-catch taken by the large vessel fleet ranged between 2 t (53,000 animals) taken from SFA 7 during 2004 and 69 t (2,906,000 animals) taken from SFA 4 during 2006-07. Over the same period, the small vessel redfish by-catch ranged between 5 t taken from SFA 7 during 2004 (150,000 animals) and 236 t (4,821,000 animals) taken in SFA 6 during 2006. In terms of weight of redfish by-catch (kg) per ton of shrimp taken, the metric ranged between 0.35 kg/t and 10.70 kg/t for the large vessel fleet while it was 0.79 kg/t and 4.65 kg/t for the small vessel fleet.

One should not construe relatively low levels of by-catch as necessarily implying that there may not be a problem. It is possible to have a situation in which there are dangerously low abundances of a groundfish species. In this case, it would not be surprising to have relatively low levels of by-catch. Alternatively relatively high levels of by-catch, in relation to other species, does not necessarily mean that irreparable harm is being done. The by-catch should be described in the context of the groundfish resource.

Distribution of shrimp in relation to various commercially important groundfish species

Greenland halibut

Figures 2-5 indicate that large concentrations of juvenile Greenland halibut (≤ 24 cm total length) are sympatric with large concentrations of shrimp. High spatial overlap with shrimp, fusiform shape and the fact that Greenland halibut swim upright allowing relatively large animals to pass through the Nordmore Gate, result in relatively high Greenland halibut by-catches within the shrimp fishery.

Redfish

Both shrimp and juvenile redfish (≤ 16 cm total length) are commonly found in the channels and along the 2J3KLNO shelf edge in water between 200 and 500 m (Fig. 7-8). Given the high degree of overlap between these species and the fact that redfish are slow growing and hence susceptible to passage through a Nordmore Gate, it is not surprising that redfish bycatch is high relative to many other groundfish species.

Atlantic cod

Relatively few juvenile cod (≤ 19 cm total length) have been caught during recent years, although, young cod were often found within inshore areas (Figs. 9-11). Shrimp and juvenile cod distributions may overlap within certain inshore areas; however, the large and small vessel fisheries occur chiefly in the channels and along the 2GHJ3KLNO shelf edge (Figs. 1 and 2). This may explain the relatively low cod bycatch within the shrimp fishery (Tables 2-12).

American plaice

Figures 12-14 indicates that juvenile American plaice (≤ 23 cm total length) are dispersed throughout SFA 5-7 and that there is overlap between American plaice and large shrimp catches. However, most American plaice were found in water shallower than 200 m with concentrations in Notre Dame and White Bay areas. Thus there was not a complete overlap between American plaice and shrimp and an even lower overlap between American plaice and the shrimp fishery (Figs. 1 and 2). The relatively low bycatch of American plaice (Tables 2-12) may be due to the fact that it swims on its side and is not completely sympatric in distribution with the large and small vessel shrimp fisheries.

Wolfish

There are no figures for the overlap between broadhead wolfish and shrimp because broadhead wolfish (≤ 20 cm total length) were very rare in the catches. Figures 15 and 16 indicate that while spotted wolfish were rare, enough

animals were caught to detect whether there was overlap with shrimp. They were found in the channels and along the shelf break where the shrimp were found. Figures 17 and 18 clearly illustrate the overlap between striped wolfish and shrimp. The most important feature of the spotted and striped wolfish plots is the fact that abundances of these animals are lower much lower than they are for the groundfish species described above.

Information provided by these plots is in agreement with by-catch levels provided in tables 2-12. Levels of by-catch are generally in relation to abundances of juvenile groundfish and degrees of overlap between the species.

In General

Low numbers of wolfish were found in the survey and low numbers were taken as bycatch. Similarly, there were relatively few Atlantic cod and these were for the most part are distributed away from the shrimp fishery; consequently by-catch of Atlantic cod has generally been in the order of a few tons. Juvenile American plaice are more abundant, but concentrations were in shallower water and in the southwest away from the shrimp fishery, therefore the total American plaice bycatch was normally less than 5 t per year. There is more overlap between juvenile redfish, Greenland halibut and the shrimp fishery. By-catch is greatest for these species.

Summary tables for bycatch are presented in tables 3, 5, 7, 9, 11 and 13. These tables provided a detailed analysis of percent occurrence in the fishing sets and percent weight in the total catch. It should be noted that correction factors have not been applied to the numbers in these tables therefore, the weights in these tables may not be the same as the bycatch weights in the detailed groundfish tables that present length frequencies. Additionally, not all observers have the same level of skill in identifying finfish or invertebrates therefore these tables are not meant to give a complete and accurate accounting of all bycatch species. The tables will provide a listing of those that could be identified. Having said that the values of easily identified species (e.g. Capelin, Greenland halibut and grouped species such as skates, lanternfish, eelpouts and redfish) can be used to provide an indicator of relative importance in the bycatch. Capelin, skates, lanternfish, eelpouts, redfish and Greenland halibut appeared most frequently in the catches and were most important in terms of finfish weight.

Bycatch taken by non-Canadian vessels in the NRA

Bycatch data were received from Estonian, Greenland, Norway and Spain and is presented in Tables 14 – 17. Unfortunately by-catch was not always identified to the species level. Regardless redfish appeared to be identified most often in the catches.

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Table 1. The stratified deployment scheme used to assign observers on the Canadian small vessel shrimp fishing fleet during 2007. The numbers represent the requested deployments per area and month.

2007		May	June	July	August	September	October	Grand total/area
Area	Cook's Harbour – Goose Cove (near St. Anthony)	3	8	11	7	3	1	33
	Ireland's Bight – Roddickton (includes Englee)	0	0	0	0	0	0	0
	Great Harbour Deep	0	0	0	0	0	0	0
	Jackson's Arm – Middle Arm	0	1	3	1	1	1	7
	Rattling Brook – Triton	0	0	0	0	0	0	0
	Glover's Harbour – Newstead	0	0	0	0	0	0	0
	Summerford – Carmanville	1	6	8	6	3	1	25
	Aspen Cove – Gambo	0	0	0	0	0	0	0
	Glovertown – Bonavista	0	0	0	0	0	0	0
	Lance Cove – Clarenville	3	6	8	8	3	2	30
	Snook's Harbour – Old Perlican	3	2	3	3	1	1	13
	Grate's Cove – Port de Grave	2	5	6	6	4	2	25
	Hussey's Cove – Quidi vidi	0	0	1	1	0	1	3
	St. John's	1	1	1	1	0	0	4
	Blackhead (Freshwater Bay) – Cape Broyle	0	0	0	0	0	0	0
	Calvert – St. Shotts	0	0	0	0	0	0	0
	St. Stephen's – St. Leonard's	0	0	0	0	0	0	0
	Isle au Valen – English Harbour, Fortune Bay	0	0	0	0	0	0	0
	Femme – St. Alban's	0	0	0	0	0	0	0
	Great Jarvis – Lapoile	0	0	0	0	0	0	0
	West Point – Lewis Brook	0	0	0	0	0	0	0
	Shag Island – River of Ponds	0	0	0	0	0	0	0
	Spirity Cove – L'anse Aux Loop	1	1	2	2	1	0	7
	Red Bay – Murray's Harbour	0	0	0	0	0	0	0
	Port Hope Simpson - Cartwright	0	2	3	4	2	0	11
	Makkovik	0	0	0	0	0	0	0
	Grand Total/month	14	32	46	39	18	9	158

Table 2. NAFO Division 2G (Shrimp Fishing Area 4) Canadian large vessel (>500 t) bycatch over the period 2004 – 05 to 2007-08. Since 2003, the fishery management year changed from Jan. 1 – Dec. 31 to Apr. 1 – Mar. 31 of the next year. During the March 2008 Zonal Assessment Process meeting it was agreed that all catches would be presented according to the management year. All trips on large shrimp fishing vessels must have an observer therefore the correction factor (logbook catch/observer catch) is always close to 1. Please note that if the observer catch is greater than the logbook catch, the correction factor is 1.

Year	Atlantic cod				American plaice			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)	10,388	9,847	9,970	9,961	10,388	9,847	9,970	9,961
Logbook shrimp catch (t)	9,549	10,247	10,084	10,622	9,549	10,247	10,149	10,622
correction factor	1.0000	1.0407	1.0114	1.0664	1.0000	1.0407	1.0180	1.0664
estimated bycatch (kg)	21	75	230	125	638	871	2,073	934
Bycatch (kg)/ (t) shrimp	0.00	0.01	0.02	0.01	0.06	0.09	0.20	0.09
total number of sets observed	2,086	1,812	1,757	1,775	2,086	1,812	1,757	1,775
number of sets with bycatch	14	64	113	69	426	453	728	570
freq. sets with 1Kg recorded	10	56	68	37	313	281	358	382
percent bycatch sets with 1Kg recorded	71.43%	87.50%	60.18%	53.62%	73.47%	62.03%	49.18%	67.02%
number sets with measurements	3	23	26	16	3	6	9	4
percent bycatch sets with measurements	21.43%	35.94%	23.01%	23.19%	0.70%	1.32%	1.24%	0.70%
number of fish measured	4	39	54	30	29	538	273	55
total length								
cm	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	309	0
8	0	0	0	0	0	563	617	234
9	0	0	0	0	0	814	309	0
10	0	0	0	0	0	827	515	234
11	0	0	0	0	0	871	2,161	934
12	0	0	0	0	0	955	4,425	2,335
13	0	0	0	0	0	1,544	6,483	1,168
14	0	0	0	0	0	3,431	6,380	2,802
15	0	0	0	0	80	2,402	2,779	2,335
16	0	3	0	0	0	2,793	2,470	1,635
17	7	0	8	0	80	2,710	4,940	234
18	0	28	8	0	359	1,997	3,808	234
19	0	12	16	0	279	1,628	2,573	0
20	0	19	0	0	199	1,324	1,955	234
21	0	6	25	0	0	453	1,544	234
22	0	6	41	0	518	119	1,029	234
23	7	0	25	10	359	0	617	0
24	0	3	16	14	359	0	103	0
25	0	3	33	0	199	0	720	0
26	0	0	41	14	0	0	515	0
27	7	6	33	0	399	0	103	0
28	0	0	16	0	80	0	206	0
29	0	6	8	0	80	0	0	0
30	0	9	16	0	199	0	103	0
31	0	3	8	5	199	0	0	0
32	0	0	33	0	80	0	103	0
33	0	0	8	0	0	0	617	0
34	0	6	0	10	199	0	103	0
35	0	0	8	0	0	0	206	0
36	0	0	8	0	80	0	206	0
37	0	9	0	14	0	0	0	0
38	0	0	8	14	0	0	103	0
39	0	0	0	0	0	0	0	0
40	0	0	16	10	0	0	0	0
41	0	0	8	0	0	0	0	0
42	0	0	25	0	0	0	0	0
43	0	0	16	19	0	0	0	0
44	7	0	16	10	0	0	0	0
45	0	0	0	10	0	0	0	0
46	0	0	0	5	0	0	0	0
47	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0
49	0	0	0	10	0	0	0	0
50	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0
Total	28	122	443	144	3,748	22,431	46,000	12,845

Table 2. (Continued)

	Year	redfish				Greenland halibut			
		2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)		10,388	9,847	9,970	9,961	10,388	9,847	9,970	9,961
Logbook shrimp catch (t)		9,549	10,247	10,084	10,622	9,549	10,247	10,084	10,622
correction factor		1.0000	1.0407	1.0114	1.0664	1.0000	1.0407	1.0114	1.0664
estimated bycatch (kg)		32,731	87,021	107,905	57,911	13,615	19,990	17,486	16,525
Bycatch (kg)/ (t) shrimp		3.15	8.49	10.70	5.45	1.31	1.95	1.73	1.65
total number of sets observed		2086	1,812	1,757	1,775	2086	1,812	1,757	1,775
number of sets with bycatch		1,557	1,288	1,233	1,169	1,861	1,632	1,703	1,717
freq. sets with 1Kg recorded		80	9	7	68	328	218	214	217
percent bycatch sets with 1Kg recorded		5.14%	0.70%	0.57%	5.82%	17.62%	13.36%	12.57%	12.64%
number sets with measurements		61	44	47	36	14	10	9	14
percent bycatch sets with measurements		3.92%	3.42%	3.81%	3.08%	0.75%	0.61%	0.53%	0.82%
number of fish measured		16,533	11,602	13,598	8,331	2,439	1,843	737	1,985
total length									
	cm	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0	0
2	0	180	0	0	0	0	0	0	0
3	0	1,260	108	0	0	0	0	0	0
4	0	4,461	108	0	0	0	0	0	0
5	884	40,835	15,204	481	0	0	0	0	0
6	16,898	162,136	48,873	71,713	0	0	0	0	0
7	82,723	167,308	107,052	885,144	0	0	0	0	0
8	124,553	224,390	159,894	1,234,879	117	125	352	350	
9	109,574	611,000	385,235	216,283	3,886	3,654	5,767	1,749	
10	423,346	991,648	428,062	379,566	38,332	12,859	4,011	1,792	
11	763,236	974,752	468,979	260,448	69,565	6,419	1,000	2,842	
12	251,679	430,515	833,313	232,407	53,817	1,331	971	12,681	
13	99,675	482,054	1,025,361	267,678	43,182	2,237	1,588	47,060	
14	135,491	375,816	763,826	152,513	22,380	9,199	2,975	106,545	
15	62,544	141,750	181,860	116,963	15,047	9,059	9,432	75,787	
16	33,353	94,939	67,311	106,561	15,689	13,168	19,559	39,495	
17	11,218	80,836	39,404	77,397	20,510	18,423	29,265	25,836	
18	6,517	53,551	20,627	32,539	16,595	21,014	16,741	19,158	
19	939	36,831	8,325	9,408	9,846	30,556	12,362	13,909	
20	391	36,677	7,028	2,009	5,522	30,312	2,159	14,722	
21	1,203	11,029	3,121	901	4,499	15,626	3,738	19,196	
22	86	8,617	2,493	1,234	6,603	12,037	7,465	15,709	
23	89	3,765	1,283	746	7,479	10,634	7,694	10,465	
24	0	2,953	1,445	131	5,785	22,825	12,823	5,080	
25	0	0	181	0	4,733	22,201	8,885	4,812	
26	46	0	2,343	131	4,266	19,564	6,044	1,853	
27	108	0	998	0	3,097	13,734	6,740	2,461	
28	0	0	0	0	3,448	10,895	6,409	2,177	
29	0	0	0	0	1,578	7,729	7,922	2,513	
30	0	0	0	0	1,695	5,941	9,454	947	
31	0	0	0	0	1,286	1,435	4,779	860	
32	0	0	0	0	993	674	2,447	2,608	
33	0	0	0	0	292	66	1,114	1,609	
34	0	0	0	0	409	66	1,357	1,447	
35	0	0	0	0	351	0	2,091	796	
36	0	0	0	0	351	0	2,925	250	
37	0	0	0	0	0	0	474	381	
38	0	0	0	0	58	0	0	0	
39	0	0	0	0	58	0	121	510	
40	0	0	0	0	58	0	0	0	
41	0	0	0	0	0	0	0	0	
42	0	0	0	0	0	0	0	0	
43	0	0	0	0	0	0	0	0	
44	0	0	0	0	0	0	0	0	
45	0	0	0	0	0	0	0	0	
46	0	0	0	0	0	0	0	0	
47	0	0	0	0	0	0	0	0	
48	0	0	0	0	0	0	0	0	
49	0	0	0	0	0	0	0	0	
50	0	0	0	0	0	0	0	0	
51	0	0	0	0	0	0	0	0	
52	0	0	0	0	0	0	0	0	
53	0	0	0	0	0	0	0	0	
54	0	0	0	0	0	0	0	0	
55	0	0	0	0	0	0	0	0	
56	0	0	0	0	0	0	0	0	
57	0	0	0	0	0	0	0	0	
58	0	0	0	0	0	0	0	0	
59	0	0	0	0	0	0	0	0	
60	0	0	0	0	0	0	0	0	
61	0	0	0	0	0	0	0	0	
62	0	0	0	0	0	0	0	0	
63	0	0	0	0	0	0	0	0	
64	0	0	0	0	0	0	0	0	
65	0	0	0	0	0	0	0	0	
66	0	0	0	0	0	0	0	0	
67	0	0	0	0	0	0	0	0	
Total		2,124,553	4,937,303	4,572,432	4,049,130	361,528	301,782	198,666	435,597

Table 2. Continued

Year	Striped Wolfish				Spotted Wolfish				Broadhead Wolfish			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)	10,388	9,847	9,970	9,961	10,388	9,847	9,970	9,961	10,388	9,847	9,970	9,961
Logbook shrimp catch (t)	9,549	10,247	10,084	10,622	9,549	10,247	10,084	10,622	9,549	10,247	10,084	10,622
correction factor	1.0000	1.0407	1.0114	1.0664	1.0000	1.0407	1.0114	1.0664	1.0000	1.0407	1.0114	1.0664
estimated bycatch (kg)	489	794	2,283	599	18	36	14	32	91	2	1	11
Bycatch (kg)/ (t) shrimp	0.05	0.08	0.23	0.06	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
total number of sets observed	2086	1,812	1,757	1,775	2086	1,812	1,757	408	2086	1,812	1,757	408
number of sets with bycatch	366	407	588	380	18	24	12	39	25	2	1	11
freq. sets with 1Kg recorded	288	267	345	293	18	19	10	36	8	2	1	8
percent bycatch sets with 1Kg recorded	78.69%	65.60%	58.67%	77.11%	100.00%	79.17%	83.33%	92.31%	32.00%	100.00%	100.00%	72.73%
number sets with measurements	47	9	39	48	3	1	2	5	0	1	1	0
percent bycatch sets with measurements	12.84%	2.21%	6.63%	12.63%	16.67%	4.17%	16.67%	12.82%	0.00%	50.00%	100.00%	0.00%
number of fish measured	307	497	750	410	5	1	2	7	0	1	1	0
total length	cm estimated number at length				cm estimated number at length				cm estimated number at length			
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	31	0	0	0	0	0	0	0	0	0
7	36	23	39	0	0	0	0	0	0	0	0	0
8	44	0	58	0	0	0	0	0	0	0	0	0
9	62	93	106	20	0	0	0	6	0	0	0	0
10	124	234	193	52	0	0	0	0	0	0	0	0
11	169	210	193	38	6	0	0	0	0	0	0	0
12	116	467	322	10	0	0	0	0	0	0	0	0
13	107	771	838	72	0	0	0	6	0	0	0	0
14	116	841	569	158	0	0	0	6	0	0	0	0
15	116	981	632	131	6	0	0	0	0	0	0	0
16	89	794	687	167	18	0	0	0	0	0	0	0
17	285	794	1,274	235	0	0	0	0	0	0	0	0
18	204	981	1,566	304	0	0	7	0	0	0	0	0
19	169	1,004	1,587	324	0	36	0	0	0	0	0	0
20	160	747	1,304	269	0	0	0	0	0	0	0	0
21	80	817	1,590	248	0	0	0	0	0	0	0	0
22	107	654	1,453	238	0	0	0	6	0	0	0	0
23	80	631	998	260	0	0	7	13	0	0	0	0
24	80	350	1,058	262	0	0	0	0	0	0	0	0
25	116	374	1,001	249	0	0	0	0	0	0	0	0
26	53	187	719	224	0	0	0	0	0	0	0	0
27	62	117	653	183	0	0	0	0	0	0	0	0
28	71	187	654	83	0	0	0	0	0	0	0	0
29	27	47	425	82	0	0	0	0	0	0	0	0
30	44	70	245	183	0	0	0	0	0	0	0	0
31	18	93	255	69	0	0	0	0	0	0	0	0
32	27	23	97	45	0	0	0	0	0	0	0	0
33	36	23	128	0	0	0	0	0	0	0	0	0
34	44	23	177	8	0	0	0	0	0	0	0	0
35	18	23	121	10	0	0	0	0	0	0	0	0
36	9	23	39	0	0	0	0	0	0	0	0	0
37	9	0	0	8	0	0	0	0	0	0	0	0
38	9	0	79	8	0	0	0	0	0	0	0	0
39	0	23	39	8	0	0	0	0	0	0	0	0
40	0	0	81	0	0	0	0	0	0	0	0	0
41	0	0	19	0	0	0	0	0	0	0	0	0
42	0	0	47	8	0	0	0	0	0	2	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0
44	18	0	0	17	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
46	9	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	1	0
48	9	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	8	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0
54	9	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0	0	0	0	0
Total	2,730	11,607	19,252	3,980	30	36	14	45	0	2	1	0

Table 3. A summary of the bycatch species taken by the large vessel fleet fishing for shrimp in NAFO Division 2G (SFA 4), over the management year 2007 – 2008.

number of species in bycatch = 90					
	OCCUR	WEIGHT	WEIGHT		
	(%)	kg	(%)	Common name	
1	0.06	1	0.00	HAGFISH, ATLANTIC	
2	0.11	1700	0.02	SHARK, GREENLAND	
679	38.23	2065	0.02	SKATES (NS)	
289	16.27	544	0.00	HERRING, ATLANTIC	
4	0.23	4	0.00	SMOOTHHEADS (NS)	
3	0.17	3	0.00	SMOOTHHEAD, BAIRD'S	
6	0.34	6	0.00	HERRING, BLACK	
40	2.25	40	0.00	CAPELIN	
2	0.11	2	0.00	BLACKSMELT, GOITRE	
2	0.11	2	0.00	HATCHETFISHES (NS)	
44	2.48	44	0.00	VIPERFISHES (NS)	
29	1.63	29	0.00	DRAGONFISHES, SCALED (N	
629	35.42	5517	0.05	LANTERNFISHES (NS)	
9	0.51	9	0.00	LOOSEJAWS (NS)	
360	20.27	607	0.01	BARRACUDINAS (NS)	
1	0.06	125	0.00	LANCETFISH, LONGNOSE	
20	1.13	20	0.00	SNAKE EELS (NS)	
24	1.35	24	0.00	EELS, SNIPE (NS)	
2	0.11	2	0.00	EELS, CUTTHROAT (NS)	
101	5.69	131	0.00	LONGNOSE EEL	
1	0.06	13	0.00	GADOIDS (NS)	
60	3.38	117	0.00	COD, ATLANTIC	
13	0.73	14	0.00	HAKE, WHITE (COMMON)	
1235	69.54	19152	0.17	COD, ARCTIC	
196	11.04	216	0.00	THREEBEARD ROCKLING (N	
22	1.24	57	0.00	GRENADIERS (NS)	
25	1.41	25	0.00	GRENADIER, ROUGHHEAD	
13	0.73	30	0.00	MACKEREL, ATLANTIC	
3	0.17	3	0.00	BLACK SWALLOWER	
17	0.96	19	0.00	SAND LANCES (NS)	
9	0.51	9	0.00	BLENNIES (NS)	
1	0.06	1	0.00	WOLFFISHES (NS)	
1	0.06	10	0.00	WOLFFISH, BROADHEAD	
372	20.95	562	0.01	WOLFFISH, STRIPED	
29	1.63	30	0.00	WOLFFISH, SPOTTED	
4	0.23	4	0.00	GUNNEL, ROCK	
296	16.67	325	0.00	BLENNIES (NS)	
1115	62.78	5959	0.05	EELPOUT (NS)	
13	0.73	47	0.00	OCEAN POUT, GREEN	
1	0.06	1	0.00	WOLF EEL (NS)	
1675	94.31	70862	0.64	REDFISH (NS) SEB.SP.	
297	16.72	743	0.01	SCULPINS (NS)	
371	20.89	560	0.01	HOOKEAR SCULPIN (NS)	
387	21.79	580	0.01	MAILED SCULPINS (NS)	
131	7.38	314	0.00	SCULPIN, RIBBED (HORNE	
21	1.18	29	0.00	SCULPIN, DEEP SEA	
6	0.34	6	0.00	TWOHORN SCULPIN (NS)	
1184	66.67	2662	0.02	ALLIGATORFISH (NS)	
102	5.74	151	0.00	LUMPFISH (NS) EUM.SP.	

Table 3 (continued)

b	OCCUR		WEIGHT		Common name
	OCCUR (%)	kg	kg	(%)	
23	1.30	25	0.00	LUMPFISH,COMMON	
195	10.98	314	0.00	SEASNAILS (NS)	
563	31.70	876	0.01	AMERICAN PLAICE	
10	0.56	18	0.00	WITCH FLOUNDER	
1716	96.62	15496	0.14	GREENLAND HALIBUT	
1	0.06	1	0.00	HALIBUT (ATLANTIC)	
1	0.06	1	0.00	ANGLERS	
1	0.06	1	0.00	ANGLER,COMMON(MONKFISH	
19	1.07	213	0.00	UNIDENTIFIED FISH	
6	0.34	10	0.00	INVERTEBRATE (NS)	
190	10.70	497	0.00	SPONGE	
10	0.56	12	0.00	CNIDARIAN	
7	0.39	19	0.00	SCYPHOZOAN	
4	0.23	4	0.00	ANTHOZOAN	
2	0.11	2	0.00	WHELK BUCC.	
6	0.34	11	0.00	SCALLOP, ICELANDIC	
1	0.06	1	0.00	SCALLOP, GIANT	
138	7.77	143	0.00	CEPHALOPOD (NS)	
44	2.48	44	0.00	OCTOPUS OCTOPODA	
1	0.06	5	0.00	EUPHAUSIID THYSA.SP.	
12	0.68	12	0.00	SHRIMP NATA.	
10	0.56	10	0.00	SHRIMP PENA.	
17	0.96	24	0.00	SHRIMP SERG.ARC.	
1	0.06	1	0.00	SHRIMP PASIP.MUL.	
2	0.11	2	0.00	SHRIMP EUAL.MAC.	
6	0.34	2029	0.02	SHRIMP PANDALUS SP.	
1740	97.97	9960788	90.28	SHRIMP PAND.BOR.	
391	22.02	938544	8.51	SHRIMP PAND.MON.	
6	0.34	6	0.00	SHRIMP SAB.SP.	
1	0.06	1	0.00	SHRIMP ARG.DEN.	
3	0.17	3	0.00	HERMIT CRAB PAG.	
2	0.11	2	0.00	HERMIT CRAB PAG.SP.	
11	0.62	11	0.00	SPINY CRAB LITH.MAJ.	
1	0.06	1	0.00	CRAB SPIDER	
1	0.06	1	0.00	CRAB, TOAD HYAS.SP.	
9	0.51	9	0.00	SEA CUCUMBER HOL.	
14	0.79	15	0.00	SEA URCHIN ECH.	
68	3.83	73	0.00	SEA STAR	
1	0.06	1	0.00	BRITTLE STAR	
1	0.06	1	0.00	BASKET STAR GORGO.	
10	0.56	13	0.00	CORAL ALCYONACEAN	
		=====	=====		
		11032616	99.98		

Table 4. Hopedale + Cartwright Channels (Shrimp Fishing Area 5) Canadian large vessel (>500 t) bycatch over the period 2004 – 05 to 2007-08. Since 2003, the fishery management year changed from Jan. 1 – Dec. 31 to Apr. 1 – Mar. 31 of the next year. During the March 2008 Zonal Assessment Process meeting it was agreed that all catches would be presented according to the management year. All trips on large shrimp fishing vessels must have an observer therefore the correction factor (logbook catch/observer catch) is always close to 1. Please note that if the observer catch is greater than the logbook catch, the correction factor is 1. There is a small vessel (<= 500 t; LOA <= 100') shrimp quota however, very little shrimp is taken from this quota and it is difficult to receive small vessel observer coverage from this area; therefore, the small vessel bycatch was not analysed for this area.

Year	Atlantic cod				American plaice			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)	21,508	20,878	21,724	23,310	21,508	20,878	21,724	23,310
Logbook shrimp catch (t)	21,043	21,756	22,501	24,615	21,043	21,756	22,501	24,615
correction factor	1.0000	1.0420	1.0358	1.0560	1.0000	1.0420	1.0358	1.0560
estimated bycatch (kg)	315	167	267	321	1,856	2,722	3,629	6,108
Bycatch (kg) (t) shrimp	0.01	0.01	0.01	0.01	0.09	0.13	0.16	0.25
total number of sets observed	3,475	3,257	3,323	3,334	3,475	3,257	3,323	3,334
number of sets with bycatch	206	122	141	291	1,179	1,202	1,445	1,086
freq. sets with 1Kg recorded	141	95	105	247	819	792	893	460
percent bycatch sets with 1Kg recorded	68.45%	77.87%	74.47%	84.88%	69.47%	65.89%	61.80%	42.36%
number sets with measurements	82	59	42	163	23	17	18	15
percent bycatch sets with measurements	39.81%	48.36%	29.79%	56.01%	1.95%	1.41%	1.25%	1.38%
number of fish measured	176	88	94	619	431	696	1,223	1,248
total length	cm				cm			
	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	62
6	0	0	0	0	0	0	0	62
7	0	0	0	0	0	0	0	0
8	0	0	0	0	55	0	0	187
9	0	0	0	0	109	483	0	561
10	0	0	0	0	109	585	202	810
11	0	0	0	0	382	1,637	470	935
12	0	0	0	3	1,528	1,546	2,417	2,368
13	0	0	0	5	2,748	3,936	5,302	5,048
14	0	0	0	8	3,039	6,015	9,611	6,187
15	0	0	0	9	4,003	11,514	15,987	10,904
16	0	0	0	11	6,096	9,013	11,997	14,094
17	0	0	0	13	2,329	12,328	11,167	8,938
18	0	2	0	16	1,165	9,741	8,183	8,696
19	0	0	0	24	1,019	8,110	5,833	5,352
20	7	5	3	24	1,146	3,625	4,129	4,071
21	11	0	9	17	546	2,388	3,896	4,204
22	22	2	11	43	546	707	1,711	4,699
23	44	2	17	54	109	492	1,344	4,087
24	48	5	20	90	237	119	881	3,709
25	59	7	11	93	109	48	538	2,120
26	99	5	23	100	273	48	454	2,433
27	84	5	14	101	273	0	437	1,721
28	33	10	14	103	218	0	353	1,628
29	62	5	6	71	437	24	235	1,337
30	37	15	14	51	218	24	67	817
31	18	15	3	28	109	0	134	322
32	18	2	6	22	0	0	101	535
33	29	25	6	21	55	24	101	426
34	22	15	3	9	55	24	101	468
35	22	15	3	11	55	48	34	249
36	15	22	9	14	0	0	67	193
37	15	17	9	3	0	0	67	125
38	4	12	6	8	0	0	0	193
39	11	2	6	9	109	48	67	125
40	0	0	0	8	0	0	34	62
41	11	7	3	6	0	0	0	193
42	11	2	0	5	0	0	34	0
43	4	5	3	5	0	0	0	0
44	4	2	6	3	0	0	0	0
45	0	2	3	5	0	0	0	0
46	15	0	3	0	0	0	0	0
47	4	0	9	0	0	0	0	0
48	0	0	3	2	0	0	0	0
49	0	2	3	0	0	0	0	0
50	0	0	6	2	0	0	0	0
51	0	0	3	0	0	0	0	0
52	4	2	3	2	0	0	0	0
53	0	0	6	2	0	0	0	0
54	0	0	3	0	0	0	0	0
55	0	0	0	0	0	0	0	0
56	0	0	3	0	0	0	0	0
57	0	2	6	0	0	0	0	0
58	0	0	3	0	0	0	0	0
59	0	0	3	0	0	0	0	0
60	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	0	0	3	0	0	0	0	0
Total	711	219	259	999	27,076	72,523	85,953	97,822

Table 4.

(Continued)

Year	redfish				Greenland halibut			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)	21,508	20,878	21,724	23,310	21,508	20,878	21,724	23,310
Logbook shrimp catch (t)	21,043	21,756	22,501	24,615	21,043	21,756	22,501	24,615
correction factor	1.0000	1.0420	1.0358	1.0560	1.0000	1.0420	1.0358	1.0560
estimated bycatch (kg)	36,586	57,265	68,972	68,956	57,389	42,340	58,776	44,052
Bycatch (kg) / (t) shrimp	1.74	2.63	3.07	2.80	2.67	1.95	2.61	1.79
total number of sets observed	3,475	3,257	3,323	3,334	3,475	3,257	3,323	3,334
number of sets with bycatch	2,529	2,338	2,257	2,277	3,441	3,095	3,238	3,205
freq. sets with 1Kg recorded	209	195	359	365	265	248	200	258
percent bycatch sets with 1Kg recorded	8.26%	8.34%	15.91%	16.03%	7.70%	8.01%	6.18%	8.05%
number sets with measurements	52	86	70	60	70	53	53	51
percent bycatch sets with measurements	2.06%	3.68%	3.10%	2.64%	2.03%	1.71%	1.64%	1.59%
number of fish measured	13,489	22,702	16,834	13,631	13,100	9,945	10,273	9,332
total length	cm							
	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	6,353	3,183	185	500	0	0	0	0
6	23,911	16,952	18,624	12,489	0	0	0	34
7	60,917	45,565	61,661	194,602	0	288	129	0
8	170,400	361,619	108,287	265,573	1,572	897	1,690	385
9	266,322	1,370,603	165,882	171,200	8,671	2,687	21,092	4,051
10	258,875	928,802	207,059	203,927	30,258	7,516	70,185	28,019
11	292,453	397,241	376,748	253,994	79,588	16,048	123,212	126,678
12	298,241	306,349	670,446	254,177	135,811	19,895	210,405	324,732
13	182,574	180,007	675,444	217,156	163,171	31,783	229,801	373,242
14	145,322	111,645	292,480	230,636	124,666	64,550	103,453	151,329
15	194,572	101,176	141,322	323,987	37,264	55,001	63,112	34,699
16	114,857	56,786	74,481	231,373	15,462	44,462	56,261	20,655
17	48,190	28,603	40,336	116,438	17,189	24,219	74,795	32,483
18	35,079	13,544	23,707	36,897	42,581	20,699	93,849	60,407
19	24,976	10,317	15,868	22,794	71,238	34,567	91,566	75,272
20	11,398	10,219	10,686	15,887	80,282	51,294	72,137	61,533
21	4,372	6,755	11,262	12,926	56,795	61,553	42,490	55,321
22	2,476	4,346	5,093	3,494	29,527	38,769	21,951	32,273
23	682	1,698	5,000	3,264	18,260	26,163	22,207	26,637
24	0	855	1,574	1,595	22,444	15,079	22,068	17,715
25	0	130	317	1,217	25,388	22,105	22,634	12,033
26	37	44	91	61	28,534	29,111	27,102	9,898
27	0	0	0	99	20,212	22,816	19,659	5,596
28	0	179	0	69	18,912	13,966	15,353	7,981
29	0	180	0	81	12,098	11,089	11,692	3,693
30	0	118	0	47	9,129	10,373	9,620	4,074
31	0	0	0	47	8,779	7,404	10,251	5,300
32	0	30	0	0	5,027	7,068	5,910	2,956
33	0	0	0	47	4,704	5,187	5,624	3,072
34	0	0	0	0	3,323	3,780	4,415	1,797
35	0	0	0	0	1,398	1,801	2,268	1,455
36	0	0	0	0	1,122	1,798	1,483	813
37	0	30	0	0	797	1,198	1,385	1,298
38	0	0	0	0	596	871	960	830
39	0	0	0	47	278	533	580	865
40	0	0	0	0	295	527	311	276
41	0	0	0	0	260	383	0	153
42	0	0	0	0	45	354	0	34
43	0	0	0	0	47	298	0	0
44	0	0	0	0	115	269	0	0
45	0	0	0	0	34	69	39	113
46	0	0	0	0	47	0	0	0
47	0	0	0	0	22	27	0	34
48	0	0	0	0	0	27	0	34
49	0	0	0	0	0	27	0	0
50	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0
Total	2,142,007	3,956,979	2,906,552	2,574,626	1,075,945	656,570	1,459,692	1,487,772

Table 4. (Continued)

Year	Striped Wolfish				Spotted Wolfish				Broadhead Wolfish			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)	21,508	20,878	21,724	23,310	21,508	20,878	21,724	23,310	21,508	20,878	21,724	23,310
Logbook shrimp catch (t)	21,043	21,756	22,501	24,615	21,043	21,756	22,501	24,615	21,043	21,756	22,501	24,615
correction factor	1.0000	1.0420	1.0358	1.0560	1.0000	1.0420	1.0358	1.0560	1.0000	1.0420	1.0358	1.0560
estimated bycatch (kg)	1,060	2,049	1,544	2,243	50	165	136	118	17	10	61	1
Bycatch (kg) (t) shrimp	0.05	0.09	0.07	0.09	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00
total number of sets observed	3,475	3,257	3,323	3,334	3,475	3,257	3,323	3,334	3,475	3,257	3,323	3,334
number of sets with bycatch	576	639	627	811	29	34	54	119	15	8	42	1
freq. sets with 1 Kg recorded	358	353	372	441	22	27	40	43	13	6	26	1
percent bycatch sets with 1Kg recorded	62.15%	55.24%	59.33%	54.38%	75.86%	79.41%	74.07%	36.13%	86.67%	75.00%	61.90%	100.00%
number sets with measurements	111	79	40	141	7	9	6	21	8	2	1	1
percent bycatch sets with measurements	19.27%	12.36%	6.38%	17.39%	24.14%	26.47%	11.11%	17.65%	53.33%	25.00%	2.38%	100.00%
number of fish measured	3,010	806	664	3,551	6	9	6	29	9	2	1	1
total length	cm estimated number at length				cm estimated number at length				cm estimated number at length			
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	5	0	0	0	0	0	0	0	0
7	110	16	0	71	0	0	0	0	0	0	0	0
8	287	391	202	378	0	0	0	0	2	0	0	0
9	147	858	110	501	0	0	23	0	2	0	0	0
10	264	1,551	147	549	2	0	23	11	0	0	0	0
11	264	1,230	184	594	0	0	0	11	2	0	0	0
12	277	957	165	568	0	0	0	0	0	0	0	0
13	354	769	343	765	0	0	0	6	2	0	0	0
14	444	933	588	924	2	0	0	11	0	0	0	0
15	667	1,397	1,100	1,358	0	0	23	6	0	0	0	0
16	797	850	1,115	1,501	0	18	23	6	0	0	0	0
17	633	834	932	1,661	0	18	23	34	2	0	61	0
18	640	730	1,311	1,416	2	0	0	0	2	0	0	1
19	571	920	1,403	1,411	2	37	0	0	0	0	0	0
20	588	652	1,204	1,285	0	0	0	17	0	0	0	0
21	570	618	843	1,226	2	18	23	6	0	0	0	0
22	610	542	561	985	0	0	0	17	0	0	0	0
23	467	480	622	775	0	37	0	11	0	0	0	0
24	390	646	564	830	0	0	0	0	0	0	0	0
25	332	545	362	795	0	0	0	0	0	0	0	0
26	268	399	325	611	2	0	0	11	2	0	0	0
27	232	177	245	571	0	0	0	0	0	0	0	0
28	179	203	245	357	0	18	0	0	0	0	0	0
29	146	154	264	363	0	0	0	0	0	0	0	0
30	179	47	116	252	0	0	0	0	0	0	0	0
31	194	83	129	241	0	0	0	0	0	0	0	0
32	144	94	86	144	0	18	0	0	0	0	0	0
33	124	94	178	154	0	0	0	0	0	0	0	0
34	76	115	67	110	0	0	0	0	0	0	0	0
35	63	16	55	90	0	0	0	0	0	0	0	0
36	71	31	31	133	0	0	0	0	2	0	0	0
37	80	31	43	98	0	0	0	0	0	0	0	0
38	64	31	18	107	0	0	0	0	0	0	0	0
39	32	16	0	55	0	0	0	0	0	3	0	0
40	41	16	0	55	0	0	0	6	0	0	0	0
41	37	16	0	16	0	0	0	0	0	0	0	0
42	25	31	0	39	0	0	0	0	0	0	0	0
43	6	31	0	62	0	0	0	0	0	0	0	0
44	9	16	0	60	0	0	0	0	0	0	0	0
45	10	16	0	22	0	0	0	0	0	0	0	0
46	9	31	0	22	0	0	0	0	0	0	0	0
47	9	16	0	16	0	0	0	0	0	0	0	0
48	6	31	0	22	0	0	0	0	0	0	0	0
49	0	31	0	0	0	0	0	0	0	0	0	0
50	6	16	0	11	0	0	0	0	0	0	0	0
51	3	0	0	0	0	0	0	0	0	0	0	0
52	0	16	0	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0	0	0	0
55	0	31	0	0	0	0	0	0	0	0	0	0
56	0	47	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	2	0	0	0
61	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	0
Total	10,423	16,751	13,559	21,209	14	165	136	152	17	3	61	1

Table 5. A summary of the bycatch species taken by the large vessel fleet fishing for shrimp in Hopedale + Cartwright Channels (SFA 5), over the management year 2007 – 2008.

number of species in bycatch = 127					
OCCUR	WEIGHT	WEIGHT	Common name		
OCCUR (%)	kg	(%)			
3	0.09	3	0.00	HAGFISHES (NS)	
2	0.06	2	0.00	HAGFISH, ATLANTIC	
2	0.06	350	0.00	SHARK, GREENLAND	
955	28.64	3554	0.02	SKATES (NS)	
363	10.89	676	0.00	HERRING, ATLANTIC	
3	0.09	4	0.00	SHAD, AMERICAN	
16	0.48	23	0.00	SMOOTHHEADS (NS)	
9	0.27	9	0.00	SMOOTHHEAD, BAIRD'S	
10	0.30	10	0.00	HERRING, BLACK	
1	0.03	1	0.00	ATLANTIC GYMNAST	
436	13.08	4492	0.02	CAPELIN	
8	0.24	8	0.00	ARGENTINE, ATLANTIC	
1	0.03	1	0.00	ARGENTINE, LARGE EYED	
8	0.24	8	0.00	BLACKSMELT, GOITRE	
1	0.03	1	0.00	ANGLEMOUTHS (NS)	
1	0.03	1	0.00	ANGLEMOUTH, LONGTOOTH	
1	0.03	8	0.00	ANGLEMOUTH, MUELLER'S	
39	1.17	39	0.00	HATCHETFISHES (NS)	
242	7.26	295	0.00	VIPERFISHES (NS)	
111	3.33	114	0.00	DRAGONFISHES, SCALED (N	
1814	54.41	97083	0.41	LANTERNFISHES (NS)	
110	3.30	150	0.00	LOOSEJAWS (NS)	
1043	31.28	2883	0.01	BARRACUDINAS (NS)	
1	0.03	2	0.00	LANCETFISH, LONGNOSE	
6	0.18	21	0.00	SNUBNOSE EEL	
1	0.03	2	0.00	EELS, LONGNECK (NS)	
135	4.05	170	0.00	EELS, SNIPE (NS)	
7	0.21	7	0.00	EELS, CUTTHROAT (NS)	
47	1.41	73	0.00	LONGNOSE EEL	
1	0.03	1	0.00	SPINY EELS (NS)	
1	0.03	1	0.00	TAPIRFISH, LARGE SCALE	
2	0.06	2	0.00	BILLFISH	
230	6.90	304	0.00	COD, ATLANTIC	
29	0.87	29	0.00	WHITING, BLUE	
52	1.56	58	0.00	HAKE, WHITE (COMMON)	
2	0.06	2	0.00	HAKE, SILVER	
8	0.24	8	0.00	HAKE (NS) MER.SP.	
598	17.94	922	0.00	COD, ARCTIC	
395	11.85	475	0.00	THREEBEARD ROCKLING (N	
9	0.27	9	0.00	FOURBEARD ROCKLING	
12	0.36	16	0.00	GRENADIERS (NS)	
1	0.03	2	0.00	GRENADIERS (NS) MAC.SP	
164	4.92	192	0.00	GRENADIER, ROUGHHEAD	
85	2.55	93	0.00	MARLIN SPIKE (COMMON)	
7	0.21	10	0.00	GRENADIER, ROUNDNOSE	
44	1.32	51	0.00	GRENADIER, ROUGHNOSE	
4	0.12	5	0.00	MACKEREL, ATLANTIC	
13	0.39	13	0.00	BLACK SWALLOWER	
62	1.86	213	0.00	SAND LANCES (NS)	

Table 5 (Continued)

OCCUR	WEIGHT	WEIGHT		
OCCUR (%)	kg	(%)	Common name	
66	1.98	163	0.00	WOLFFISHES (NS)
1	0.03	1	0.00	WOLFFISH,BROADHEAD
772	23.16	2124	0.01	WOLFFISH,STRIPED
85	2.55	112	0.00	WOLFFISH,SPOTTED
10	0.30	10	0.00	BLHENNY (NCN) LEP.MAC.
440	13.20	701	0.00	BLENNIES (NS)
1	0.03	1	0.00	WRYMOUTH
2016	60.47	8838	0.04	EELPOUT (NS)
9	0.27	9	0.00	OCEAN POUT,GREEN
29	0.87	30	0.00	WOLF EEL (NS)
3038	91.12	83389	0.35	REDFISH (NS) SEB.SP.
432	12.96	731	0.00	SCULPINS (NS)
926	27.77	2412	0.01	HOOKEAR SCULPIN (NS)
758	22.74	1429	0.01	MAILED SCULPINS (NS)
202	6.06	293	0.00	SCULPIN, RIBBED (HORNE
144	4.32	287	0.00	SCULPIN,DEEP SEA
17	0.51	17	0.00	TWOHORN SCULPIN (NS)
1992	59.75	5422	0.02	ALLIGATORFISH (NS)
1	0.03	1	0.00	LUMPFISHES (NS)
177	5.31	185	0.00	LUMPFISH (NS) EUM.SP.
23	0.69	32	0.00	LUMPFISH,COMMON
190	5.70	341	0.00	SEASNAILS (NS)
1462	43.85	5784	0.02	AMERICAN PLAICE
6	0.18	8	0.00	WITCH FLOUNDER
3	0.09	3	0.00	YELLOWTAIL FLOUNDER
3199	95.95	41717	0.18	GREENLAND HALIBUT
2	0.06	7	0.00	HALIBUT (ATLANTIC)
1	0.03	1	0.00	SEA DEVILS (NS)
2	0.06	2	0.00	DEEPSEA ANGLER,BIG
3	0.09	3	0.00	SEA DEVIL, WARTED
1	0.03	1	0.00	FOOTBALLFISH,ATLANTIC
50	1.50	1741	0.01	UNIDENTIFIED FISH
2	0.06	2	0.00	DOLPHIN-KILLER WHALE
19	0.57	36	0.00	INVERTEBRATE (NS)
222	6.66	267	0.00	SPONGE
147	4.41	179	0.00	CNIDARIAN
52	1.56	305	0.00	SCYPHOZOAN
96	2.88	107	0.00	ANTHOZOAN
50	1.50	63	0.00	SEA ANEMONE
17	0.51	17	0.00	WHELK BUCC.
1	0.03	1	0.00	WHELK NEPT.SP.
2	0.06	2	0.00	SCALLOP, ICELANDIC
268	8.04	288	0.00	CEPHALOPOD (NS)
106	3.18	108	0.00	OCTOPUS OCTOPODA
4	0.12	6	0.00	CRUSTACEAN
7	0.21	58	0.00	MYSID
3	0.09	5	0.00	EUPHAUSIID EUPH.SP.
24	0.72	73	0.00	DECAPOD, CRUSTACEAN
1	0.03	1	0.00	SHRIMP NATA.
2	0.06	10	0.00	SHRIMP PENA.
54	1.62	1075	0.00	SHRIMP SERG.ARC.

Table 5 (Continued)

OCCUR	OCCUR (%)	WEIGHT kg	WEIGHT (%)	Common name
2	0.06	2	0.00	SHRIMP ACANT.PEL.
8	0.24	9	0.00	SHRIMP PASIP.
41	1.23	403	0.00	SHRIMP PASIP.MUL.
11	0.33	18	0.00	SHRIMP EUAL.MAC.
3300	98.98	23310208	98.60	SHRIMP PAND.BOR.
212	6.36	59736	0.25	SHRIMP PAND.MON.
3	0.09	3	0.00	SHRIMP SCLE.FER.
11	0.33	15	0.00	SHRIMP SAB.SP.
23	0.69	23	0.00	SHRIMP SAB.SAR.
1	0.03	1	0.00	SHRIMP PON.NOR.
9	0.27	9	0.00	SHRIMP ARG.DEN.
1	0.03	1	0.00	MALACOSTRACAN GAL.
1	0.03	1	0.00	HERMIT CRAB PAG.SP.
27	0.81	27	0.00	SPINY CRAB LITH.MAJ.
2	0.06	2	0.00	SPINY CRAB, NEOL.GRI.
1	0.03	1	0.00	CRAB SPIDER
55	1.65	133	0.00	CRAB, SNOW OR QUEEN
5	0.15	5	0.00	CRAB, TOAD HYAS.SP.
8	0.24	8	0.00	ECHINODERM
9	0.27	9	0.00	SEA CUCUMBER HOL.
4	0.12	4	0.00	SEA URCHIN ECH.
96	2.88	107	0.00	SEA STAR
1	0.03	1	0.00	BASKET STAR GORGO. SP.
1	0.03	1	0.00	TUNICATE, SESSILE
2	0.06	2	0.00	CORAL PENNATULID
32	0.96	36	0.00	CORAL ALCYONACEAN
1	0.03	1	0.00	CORAL ALCYONACEAN
1	0.03	1	0.00	STONE
		=====	=====	
		23641561	99.96	

Table 6. Hawke Channel + 3K (Shrimp Fishing Area 5) Canadian large vessel (>500 t) bycatch over the period 2004 – 05 to 2007-08. Since 2003, the fishery management year changed from Jan. 1 – Dec. 31 to Apr. 1 – Mar. 31 of the next year. During the March 2008 Zonal Assessment Process meeting it was agreed that all catches would be presented according to the management year. All trips on large shrimp fishing vessels must have an observer therefore the correction factor (logbook catch/observer catch) is always close to 1. Please note that if the observer catch is greater than the logbook catch, the correction factor is 1.

Year	Atlantic cod				American plaice			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)	25,732	25,480	24,840	25,074	25,732	25,480	24,840	25,074
Logbook shrimp catch (t)	24,504	25,466	24,857	27,505	24,504	25,466	24,857	27,505
correction factor	1.0000	1.0000	1.0007	1.0970	1.0000	1.0000	1.0007	1.0970
estimated bycatch (kg)	3,421	2,099	2,105	1,498	3,714	4,330	3,186	4,436
Bycatch (kg)/ (t) shrimp	0.13	0.08	0.08	0.05	0.14	0.17	0.13	0.16
total number of sets observed	4,160	3,852	3,698	3,684	4,160	3,852	3,698	3,684
number of sets with bycatch	1,265	829	1,021	972	1,992	1,485	1,590	1,899
freq. sets with 1Kg recorded	682	502	611	692	1,183	809	971	1,004
percent bycatch sets with 1Kg recorded	53.91%	60.55%	59.84%	71.19%	59.39%	54.48%	61.07%	52.87%
number sets with measurements	239	414	217	240	40	48	16	25
percent bycatch sets with measurements	18.89%	49.94%	21.25%	24.69%	2.01%	3.23%	1.01%	1.32%
number of fish measured	2,856	4,410	2,220	2,336	1,384	1,971	204	1,466
total length								
cm	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	78	0
7	0	0	0	3	0	0	389	0
8	0	0	0	6	129	0	467	56
9	0	2	0	12	97	0	311	0
10	0	2	0	9	484	104	389	128
11	0	6	21	3	807	128	700	506
12	28	29	11	15	2,745	319	2,177	594
13	70	62	294	58	3,875	296	2,411	698
14	118	137	897	111	3,456	626	2,916	830
15	126	172	1,778	199	3,536	841	1,711	1,034
16	49	164	2,163	269	5,361	1,351	2,274	1,613
17	120	99	2,426	374	4,554	2,753	1,691	2,063
18	614	87	2,089	534	3,520	3,449	544	1,996
19	1,215	129	1,073	518	3,165	3,739	253	2,863
20	2,117	229	1,180	476	2,697	3,055	1,380	3,083
21	2,903	344	842	476	3,924	3,559	3,072	4,753
22	2,752	479	769	452	2,761	2,452	2,333	3,863
23	2,679	698	861	463	1,938	2,435	1,730	3,818
24	2,190	814	559	331	1,760	2,359	2,488	3,146
25	1,961	853	573	325	1,502	2,336	1,283	2,195
26	1,237	895	507	330	1,050	2,406	1,322	1,898
27	1,110	772	365	396	807	1,948	1,050	2,205
28	714	575	283	382	630	1,356	233	1,455
29	373	441	329	443	630	1,287	0	889
30	347	302	124	363	339	887	233	992
31	268	208	59	177	291	835	467	889
32	203	166	65	99	161	435	156	1,003
33	133	147	44	60	226	470	78	535
34	140	153	16	99	404	267	0	248
35	140	138	53	49	339	278	0	315
36	84	106	75	49	129	139	0	64
37	105	142	29	58	226	87	78	226
38	70	118	68	29	129	104	0	56
39	56	71	43	32	65	52	0	28
40	56	90	69	25	0	70	0	0
41	21	72	53	23	0	35	0	28
42	7	44	27	15	32	0	156	0
43	21	61	5	9	0	0	0	89
44	28	32	11	12	0	0	0	0
45	21	37	11	9	0	17	0	0
46	28	38	5	3	0	0	0	0
47	7	33	0	12	0	0	0	0
48	28	24	13	6	0	0	0	0
49	14	14	45	9	0	0	0	0
50	7	13	0	12	0	0	0	0
51	14	10	11	3	0	0	0	0
52	0	10	5	3	0	0	0	0
53	0	8	5	3	0	0	0	0
54	7	8	0	0	0	0	0	0
55	0	5	5	0	0	0	0	0
56	0	4	5	0	0	0	0	0
57	0	6	0	3	0	0	0	0
58	0	4	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0
60	0	2	0	0	0	0	0	0
61	0	2	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0
Total	22,180	9,056	17,868	7,345	51,770	40,471	32,368	44,160

Table 6. (Continued)

Year	redfish				Greenland halibut			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)	25,732	25,480	24,840	25,074	25,732	25,480	24,840	25,074
Logbook shrimp catch (t)	24,504	25,466	24,857	27,505	24,504	25,466	24,857	27,505
correction factor	1.0000	1.0000	1.0007	1.0970	1.0000	1.0000	1.0007	1.0970
estimated bycatch (kg)	35,648	51,868	49,835	55,147	69,769	49,435	54,266	45,045
Bycatch (kg)/ (t) shrimp	1.39	2.04	2.00	2.00	2.71	1.94	2.18	1.64
total number of sets observed	4,160	3,852	3,698	3,684	4,160	3,852	3,698	3,684
number of sets with bycatch	3,513	3,189	3,028	3,011	4,071	3,629	3,656	3,618
freq. sets with 1Kg recorded	533	452	371	551	288	385	287	489
percent bycatch sets with 1Kg recorded	15.17%	14.17%	12.25%	18.30%	7.07%	10.61%	7.85%	13.52%
number sets with measurements	78	76	75	67	101	53	55	69
percent bycatch sets with measurements	2.22%	2.38%	2.48%	2.23%	2.48%	1.46%	1.50%	1.91%
number of fish measured	16,199	16,221	14,919	11,484	20,176	10,563	10,138	9,168
total length								
	cm	estimated number at length			estimated number at length			
1		0	0	0	0	0	0	0
2		0	0	0	0	0	0	0
3		0	0	0	0	0	0	0
4		0	0	1,153	0	0	0	0
5	4,420	4,252	4,593	3,560	0	0	0	0
6	22,484	18,785	21,990	21,687	0	0	0	246
7	8,051	73,166	67,678	34,796	24	0	0	527
8	21,606	103,863	168,280	78,668	620	0	407	1,323
9	67,082	205,534	211,331	159,273	4,976	6,004	1,512	2,963
10	120,999	256,324	163,568	109,434	8,511	33,478	11,179	8,570
11	192,920	248,209	324,871	157,675	33,218	103,816	83,423	18,594
12	190,769	268,983	391,071	157,503	75,981	197,532	183,019	42,304
13	155,033	282,723	177,100	136,004	83,542	212,939	166,743	68,835
14	143,588	159,363	99,838	148,181	49,432	94,179	48,896	59,735
15	116,244	117,412	103,342	123,218	29,003	41,261	15,976	25,647
16	58,329	128,683	59,796	97,924	14,018	24,725	20,355	19,204
17	41,102	86,149	60,684	86,649	20,129	13,534	24,687	27,816
18	28,326	62,153	38,206	68,719	46,748	13,376	45,290	40,335
19	13,687	29,170	30,126	52,663	89,683	34,864	69,351	57,241
20	6,174	14,193	22,235	40,977	131,647	61,361	89,577	68,156
21	4,139	8,140	14,399	28,245	131,432	81,782	99,690	86,465
22	2,393	5,060	8,379	17,962	90,835	60,480	68,248	67,362
23	1,101	4,322	5,180	10,815	49,913	40,757	51,907	46,766
24	871	1,721	1,886	4,762	27,715	27,958	25,485	29,584
25	864	1,120	1,102	5,454	21,692	22,747	15,713	16,351
26	671	460	1,865	2,008	25,493	19,794	16,762	14,309
27	202	209	719	1,455	27,026	16,655	13,386	14,367
28	99	797	623	862	25,183	13,423	12,988	10,403
29	260	342	64	413	20,122	7,500	9,999	7,783
30	19	219	128	324	15,599	5,239	6,792	6,720
31	19	353	64	204	12,387	4,294	7,138	4,792
32	19	0	64	80	9,045	3,328	7,142	4,290
33	0	0	0	80	5,615	2,685	4,419	2,273
34	0	0	128	120	4,245	1,559	3,122	1,712
35	0	0	0	40	3,121	1,515	2,348	2,775
36	19	0	0	80	983	1,119	948	2,145
37	0	0	0	0	1,214	715	1,363	1,098
38	0	0	128	77	518	691	526	1,849
39	0	0	64	0	365	254	469	928
40	0	0	0	0	188	148	641	486
41	0	0	0	0	103	0	237	240
42	0	0	0	0	49	106	197	386
43	0	0	0	0	0	0	113	172
44	0	0	64	0	24	0	197	141
45	0	0	0	0	0	0	99	141
46	0	0	0	0	0	0	0	285
47	0	0	0	0	0	0	66	70
48	0	0	0	0	0	0	0	55
49	0	0	0	0	0	0	0	115
50	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	80
52	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0
57	0	353	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0
Total	1,201,486	2,081,703	1,980,717	1,549,911	1,060,399	1,149,817	1,110,409	765,639

Table 6. (Continued)

Year	Striped Wolfish				Spotted Wolfish				Broadhead Wolfish			
	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08	2004-05	2005-06	2006-07	2007-08
Observed shrimp catch (t)	25,732	25,480	24,840	25,074	25,732	25,480	24,840	25,074	25,732	25,480	24,840	25,074
Logbook shrimp catch (t)	24,504	25,466	24,857	27,505	24,504	25,466	24,857	27,505	24,504	25,466	24,857	27,505
correction factor	1.0000	1.0000	1.0007	1.0970	1.0000	1.0000	1.0007	1.0970	1.0000	1.0000	1.0007	1.0970
estimated bycatch (kg)	445	1,120	723	1,387	100	156	98	158	20	12	38	19
Bycatch (kg)/ (t) shrimp	0.02	0.04	0.03	0.05	0.00	0.01	0.00	0.01	0.00	0.00	0.00	0.00
total number of sets observed	4,160	3,852	3,698	3,684	4,160	3,852	3,698	3,684	4,160	3,852	3,698	3,684
number of sets with bycatch	399	744	545	924	99	151	88	319	15	12	10	2
freq. sets with 1Kg recorded	370	607	421	619	98	149	82	243	13	12	5	1
percent bycatch sets with 1Kg recorded	92.73%	81.59%	77.25%	66.99%	98.99%	98.68%	93.18%	76.18%	86.67%	100.00%	50.00%	50.00%
number sets with measurements	98	127	46	158	35	62	14	50	11	8	4	1
percent bycatch sets with measurements	24.56%	17.07%	8.44%	17.10%	35.35%	41.06%	15.91%	15.67%	73.33%	66.67%	40.00%	0.00%
number of fish measured	1,232	1,384	417	2,178	64	161	26	121	16	13	4	1
total length												
cm	estimated number at length				estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	11	0	0	0	0	0	0	0	0	0	0	0
7	204	153	118	21	0	0	0	0	5	0	0	0
8	368	807	118	351	0	3	0	0	5	2	0	0
9	299	1,236	171	957	3	8	0	14	10	0	0	0
10	449	1,225	283	714	3	30	0	13	8	5	0	0
11	558	1,487	197	501	17	70	0	17	2	5	0	0
12	328	1,385	342	650	23	63	0	27	0	3	0	0
13	383	1,189	434	704	11	45	7	45	0	2	0	0
14	514	887	493	744	9	28	28	48	0	2	0	0
15	347	713	500	648	17	15	7	49	0	3	0	0
16	201	778	546	1,044	29	20	21	38	0	0	0	0
17	171	596	355	1,221	26	25	21	42	0	0	0	0
18	171	513	434	1,072	9	23	35	34	0	0	0	0
19	98	298	395	1,030	6	18	21	20	0	0	0	0
20	73	309	270	851	17	13	7	14	0	0	0	0
21	66	342	263	743	3	5	14	6	0	0	0	0
22	62	222	493	540	9	10	0	3	0	0	0	0
23	51	218	145	505	0	3	7	3	0	0	0	0
24	51	95	92	401	0	3	0	6	0	0	0	0
25	55	65	39	428	0	8	7	0	0	0	0	0
26	36	87	92	310	0	0	0	0	0	0	0	0
27	26	105	72	268	0	5	0	0	0	0	0	0
28	29	11	13	107	0	0	0	0	0	0	0	0
29	18	29	0	79	0	0	0	3	0	0	0	0
30	11	15	39	73	0	3	0	0	0	0	0	0
31	29	0	20	95	0	0	0	0	0	0	0	0
32	18	15	46	89	3	3	0	0	0	0	1	0
33	18	29	33	36	0	0	0	0	0	0	1	0
34	11	7	0	47	0	0	0	0	0	0	0	0
35	26	7	0	30	0	0	0	0	0	0	0	0
36	18	7	0	30	0	0	0	0	0	0	0	0
37	4	0	0	36	0	0	0	0	0	0	0	0
38	11	0	0	6	0	0	0	0	0	0	0	0
39	4	7	0	0	0	0	0	0	0	0	1	0
40	7	0	0	24	0	0	0	0	0	0	0	0
41	0	7	0	6	0	0	0	0	0	0	0	0
42	0	7	0	12	0	0	0	0	0	0	0	0
43	0	0	0	6	0	0	0	0	0	0	0	0
44	0	0	0	12	0	0	0	0	0	0	0	0
45	4	0	0	24	0	0	0	0	0	0	0	0
46	0	7	0	0	0	0	0	0	0	0	0	0
47	0	0	0	6	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
51	4	7	0	0	0	0	0	0	0	0	0	0
52	0	7	0	0	0	0	0	0	0	0	0	0
53	0	7	0	0	0	0	7	0	0	0	0	0
54	0	7	0	0	0	0	0	2	0	0	0	9
55	0	0	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	3	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
61	0	7	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	3	0
64	0	7	0	0	0	0	0	0	0	0	0	0
Total	4,735	12,905	6,005	14,424	183	400	182	381	27	20	7	9

Table 7. A summary of the bycatch species taken by the large vessel fleet fishing for shrimp in Hawke Channel + 3K (SFA 6), over the management year 2007 – 2008.

number of species in bycatch = 113

OCCUR	OCCUR (%)	WEIGHT kg	WEIGHT (%)	Common name
2	0.05	2	0.00	LAMPREY, SEA
1	0.03	5	0.00	DOGFISH, BLACK
894	24.12	1795	0.01	SKATES (NS)
341	9.20	525	0.00	HERRING, ATLANTIC
2	0.05	4	0.00	SMOOTHHEADS (NS)
2034	54.87	165154	0.65	CAPELIN
5	0.13	5	0.00	SMELT
7	0.19	44	0.00	ARGENTINE, ATLANTIC
6	0.16	6	0.00	BLACKSMELT, GOITRE
2	0.05	2	0.00	HATCHETFISHES (NS)
77	2.08	78	0.00	VIPERFISHES (NS)
28	0.76	28	0.00	DRAGONFISHES, SCALED (N
2	0.05	2	0.00	DAGGERTOOTHFISHES (NS)
1676	45.21	83072	0.33	LANTERNFISHES (NS)
7	0.19	13	0.00	LOOSEJAWS (NS)
1495	40.33	5499	0.02	BARRACUDINAS (NS)
124	3.35	125	0.00	EELS, SNIPE (NS)
10	0.27	17	0.00	LONGNOSE EEL
1	0.03	2	0.00	HAKE, BLUE
1	0.03	1	0.00	LEPIDION (NCN)
823	22.20	1366	0.01	COD, ATLANTIC
8	0.22	8	0.00	WHITING, BLUE
1	0.03	1	0.00	HADDOCK
127	3.43	127	0.00	HAKE, LONGFIN
139	3.75	158	0.00	HAKE, WHITE (COMMON)
9	0.24	9	0.00	HAKE, SILVER
338	9.12	573	0.00	COD, ARCTIC
416	11.22	876	0.00	THREEBEARD ROCKLING (N
8	0.22	27	0.00	CUSK
1	0.03	1	0.00	NORWAY POUT
286	7.72	335	0.00	FOURBEARD ROCKLING
30	0.81	31	0.00	GRENADIERS (NS)
2	0.05	2	0.00	GRENADIERS (NS)
330	8.90	480	0.00	GRENADIER, ROUGHHEAD
284	7.66	376	0.00	MARLIN SPIKE (COMMON)
76	2.05	101	0.00	GRENADIER, ROUNDNOSE
11	0.30	11	0.00	MACKEREL, ATLANTIC
3	0.08	3	0.00	BLACK SWALLOWER
119	3.21	460	0.00	SAND LANCES (NS)
1	0.03	1	0.00	WOLFFISHES (NS)
8	0.22	17	0.00	WOLFFISH, BROADHEAD
737	19.88	1264	0.00	WOLFFISH, STRIPED
132	3.56	144	0.00	WOLFFISH, SPOTTED
9	0.24	9	0.00	FOURLINE SNAKEBLENNY
4	0.11	7	0.00	SHANNY, RADIATED
965	26.03	1336	0.01	BLENNIES (NS)
33	0.89	33	0.00	WRYMOUTH
2478	66.85	10516	0.04	EELPOUT (NS)

Table 7 (Continued)

OCCUR	OCCUR (%)	WEIGHT kg	WEIGHT (%)	Common name
15	0.40	43	0.00	OCEAN POUT, GREEN
5	0.13	5	0.00	WOLF EEL (NS)
3583	96.65	66112	0.26	REDFISH (NS) SEB.SP.
330	8.90	590	0.00	SCULPINS (NS)
1011	27.27	1307	0.01	HOOKEAR SCULPIN (NS)
924	24.93	1182	0.00	MAILED SCULPINS (NS)
140	3.78	263	0.00	SCULPIN, RIBBED (HORNE)
2	0.05	2	0.00	SCULPIN, ARCTIC STAGHOR
63	1.70	64	0.00	SCULPIN, DEEP SEA
54	1.46	87	0.00	TWOHORN SCULPIN (NS)
1856	50.07	3429	0.01	ALLIGATORFISH (NS)
18	0.49	18	0.00	LUMPFISH (NS) EUM.SP.
27	0.73	47	0.00	LUMPFISH, COMMON
475	12.81	596	0.00	SEASNAILS (NS)
1768	47.69	4048	0.02	AMERICAN PLAICE
163	4.40	247	0.00	WITCH FLOUNDER
1	0.03	12	0.00	YELLOWTAIL FLOUNDER
3619	97.63	41097	0.16	GREENLAND HALIBUT
3	0.08	16	0.00	HALIBUT (ATLANTIC)
1	0.03	1	0.00	FLOUNDER, SMOOTH
7	0.19	11	0.00	FLOUNDER, WINTER
6	0.16	7	0.00	BATFISH, ATLANTIC
28	0.76	742	0.00	UNIDENTIFIED FISH
1	0.03	1	0.00	INVERTEBRATE (NS)
257	6.93	275	0.00	SPONGE
109	2.94	256	0.00	CNIDARIAN
111	2.99	166	0.00	SCYPHOZOAN
133	3.59	147	0.00	ANTHOZOAN
107	2.89	158	0.00	SEA ANEMONE
37	1.00	39	0.00	WHELK BUCC.
3	0.08	3	0.00	SCALLOP, ICELANDIC
528	14.24	941	0.00	CEPHALOPOD (NS)
36	0.97	36	0.00	OCTOPUS OCTOPODA
157	4.24	6586	0.03	CRUSTACEAN
68	1.83	271	0.00	MYSID
12	0.32	44	0.00	EUPHAUSIID EUPH.SP.
82	2.21	107	0.00	DECAPOD, CRUSTACEAN
21	0.57	21	0.00	SHRIMP NATA.
10	0.27	30	0.00	SHRIMP GENN.ELE.
14	0.38	58	0.00	SHRIMP SERG.ARC.
13	0.35	13	0.00	SHRIMP ACANT.PEL.
1	0.03	1	0.00	SHRIMP PASIP.
167	4.50	703	0.00	SHRIMP PASIP.MUL.
11	0.30	19	0.00	SHRIMP EUAL.MAC.
1	0.03	1	0.00	SHRIMP LEBB.SP.
1	0.03	1	0.00	SHRIMP LEBB.GRO.
2	0.05	2	0.00	SHRIMP LEB.POL.
3685	99.41	25105429	98.40	SHRIMP PAND.BOR.
30	0.81	1851	0.01	SHRIMP PAND.MON.
2	0.05	2	0.00	SHRIMP SCLE.FER.
8	0.22	8	0.00	SHRIMP SAB.SP.

Table 7 (continued)

OCCUR	OCCUR (%)	WEIGHT	WEIGHT	Common name
		kg	(%)	
42	1.13	43	0.00	SHRIMP SAB.SAR.
15	0.40	15	0.00	SHRIMP ARG.DEN.
5	0.13	5	0.00	LOBSTER NEPH.
1	0.03	1	0.00	MALACOSTRACAN MUN.TEN.
3	0.08	3	0.00	HERMIT CRAB PARAP.SP.
1	0.03	1	0.00	SPINY CRAB, NEOL.GRI.
491	13.25	509	0.00	CRAB, SNOW OR QUEEN
98	2.64	99	0.00	CRAB, TOAD HYAS.SP.
31	0.84	31	0.00	SEA CUCUMBER HOL.
1	0.03	1	0.00	SEA URCHIN ECH.
159	4.29	241	0.00	SEA STAR
1	0.03	1	0.00	CORAL GORGONIA
3	0.08	4	0.00	CORAL ALCYONACEAN
2	0.05	2	0.00	CORAL SCLERACTINIAN
		=====	=====	
		25512703	99.97	

Table 8. Hawke Channel + 3K (Shrimp Fishing Area 5) Canadian small vessel (<=500 t; LOA<100') bycatch over the period 2004 – 05 until 2007-08. Since 2003, the fishery management year changed from Jan. 1 – Dec. 31 to Apr. 1 – Mar. 31 of the next year. However, the dates on these tables indicate calendar years because the fishery takes place between April and December of each year. There is a target of 10% observer coverage on these vessels; however, as indicated by the correction factors, this target is not usually met (correction factor = logbook catch/observer catch).

	Year	Atlantic cod				American plaice			
		2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)		1,524	1,613	2,211	2,427	1,524	1,613	2,211	2,427
Logbook shrimp catch (t)		53,316	49,732	50,817	52,599	53,316	49,732	50,817	52,599
correction factor		34.99	30.83	22.98	21.67	34.99	30.83	22.98	21.67
estimated bycatch (kg)		1,574	2,620	6,780	5,418	11,196	12,424	19,720	19,330
Bycatch (kg)/ (t) shrimp		0.03	0.05	0.13	0.10	0.21	0.25	0.39	0.37
total number of sets observed		929	893	1177	1302	929	893	1177	1302
number of sets with bycatch		44	81	209	197	281	303	551	639
freq. sets with 1Kg recorded		43	80	183	181	254	217	372	194
percent bycatch sets with 1Kg recorded		97.73%	98.77%	87.56%	91.88%	90.39%	71.62%	67.51%	30.36%
number sets with measurements		10	16	66	50	1	6	17	9
percent bycatch sets with measurements		22.73%	19.75%	31.58%	25.38%	0.36%	1.98%	3.09%	1.41%
Number of fish measured		16	57	1,811	170	38	38	306	89
total length	cm	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	131	0	0	0	0	0	0	0
9	0	131	103	0	0	0	0	0	0
10	0	0	257	0	0	0	0	0	0
11	0	131	2,003	613	0	0	0	0	0
12	0	393	3,750	204	3,732	0	0	0	1,487
13	0	1,703	3,390	409	0	0	1,834	5,948	1,487
14	0	1,048	2,311	1,022	0	0	2,293	1,487	8,922
15	572	262	3,852	409	0	0	2,293	8,922	1,487
16	143	655	4,520	920	7,464	2,071	1,834	1,487	2,974
17	286	393	11,865	1,533	18,659	2,071	2,752	1,487	2,974
18	429	262	14,896	2,760	26,123	4,141	3,210	2,974	4,461
19	143	524	16,591	2,658	18,659	6,212	4,586	5,948	10,409
20	572	262	14,331	3,067	18,659	6,212	8,713	5,948	4,461
21	0	655	8,372	2,147	11,196	10,353	8,255	10,409	4,461
22	0	262	3,852	1,227	3,732	14,494	13,758	4,461	7,435
23	143	0	1,490	102	7,464	12,424	14,675	7,435	8,922
24	0	131	616	204	3,732	6,212	10,548	8,922	10,409
25	0	0	205	0	11,196	2,071	13,299	10,409	11,006
26	0	0	257	0	7,464	6,212	11,006	10,409	16,356
27	0	131	51	0	3,732	4,141	11,465	16,356	9,630
28	0	0	51	0	0	2,071	9,630	7,435	6,420
29	0	0	103	0	0	0	6,420	4,461	5,045
30	0	0	154	0	0	0	5,045	5,948	5,962
31	0	0	0	0	0	0	5,962	2,974	459
32	0	0	0	0	0	0	459	2,974	917
33	0	0	0	0	0	0	917	1,487	459
34	0	0	0	0	0	0	459	2,974	0
35	0	0	0	0	0	0	0	0	917
36	0	0	0	0	0	0	917	1,487	0
37	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0
44	0	131	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0
53	0	131	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0
55	0	131	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0
63	0	0	0	102	0	0	0	0	0
64	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0	0
Total		2,290	7,468	93,020	17,378	141,810	78,683	140,330	132,339

Table 8. (Continued)

Year	redfish				Greenland halibut			
	2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)	1,524	1,613	2,211	2,427	1,524	1,613	2,211	2,427
Logbook shrimp catch (t)	53,316	49,732	50,817	52,599	53,316	49,732	50,817	52,599
correction factor	34.99	30.83	22.98	21.67	34.99	30.83	22.98	21.67
estimated bycatch (kg)	151,874	190,885	236,198	129,635	72,071	111,997	120,524	94,290
Bycatch (kg)/ (t) shrimp	2.85	3.84	4.65	2.46	1.35	2.25	2.37	1.79
total number of sets observed	929	893	1177	1302	929	893	1177	1302
number of sets with bycatch	861	819	979	1148	794	737	996	1165
freq. sets with 1Kg recorded	264	201	280	435	396	321	381	524
percent bycatch sets with 1Kg recorded	30.66%	24.54%	28.60%	37.89%	49.87%	43.55%	38.25%	44.98%
number sets with measurements	27	28	40	28	20	18	33	29
percent bycatch sets with measurements	3.14%	3.42%	4.09%	2.44%	2.52%	2.44%	3.31%	2.49%
Number of fish measured	4,416	3,499	3,974	2,611	1,210	3,466	2,779	1,613
total length								
cm	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	734	0	0	0	0	0	0	0
4	6,603	0	0	0	0	0	0	0
5	8,071	0	9,219	1,865	0	0	0	0
6	14,674	0	22,415	3,730	0	0	0	0
7	54,817	4,560	36,086	37,305	0	0	0	0
8	188,768	31,706	65,105	125,905	0	0	0	0
9	306,725	93,265	48,498	120,309	2,229	0	0	1,241
10	382,442	150,106	113,123	78,341	11,888	0	3,038	1,241
11	754,822	257,019	252,526	108,558	11,888	377	33,423	17,369
12	779,537	504,048	305,774	146,236	17,832	5,053	130,652	74,439
13	613,849	807,529	544,014	183,541	21,547	45,251	350,430	202,227
14	551,212	1,062,387	807,163	188,950	46,809	141,898	565,144	405,695
15	339,930	765,379	740,575	334,253	75,043	316,075	576,285	416,861
16	244,403	570,136	763,525	440,013	101,048	402,411	415,249	287,832
17	143,385	342,357	523,332	430,873	72,071	265,700	265,354	127,788
18	112,569	171,416	314,185	213,571	39,379	105,597	101,280	43,423
19	41,821	58,486	192,867	122,361	28,234	22,378	38,486	21,091
20	11,006	29,233	46,836	59,315	33,435	23,601	19,243	31,016
21	2,935	9,392	18,709	16,974	53,496	30,973	18,230	29,776
22	0	1,140	8,304	933	75,786	71,764	21,269	40,942
23	734	0	6,597	0	75,786	143,075	36,461	53,348
24	0	1,140	0	2,798	69,842	71,212	49,627	70,717
25	0	0	1,278	2,798	57,954	71,238	49,627	53,348
26	0	0	526	0	44,580	33,246	48,108	53,348
27	0	0	0	0	23,033	21,403	48,615	32,257
28	0	0	0	0	16,346	18,620	35,955	21,091
29	0	0	0	0	5,201	11,256	20,256	7,444
30	0	0	0	0	8,916	6,804	15,192	3,722
31	0	1,140	0	0	2,972	5,581	10,635	1,241
32	0	0	0	0	2,972	377	9,115	2,481
33	0	0	0	0	0	620	1,013	0
34	0	0	0	0	743	0	1,013	0
35	0	0	0	0	0	0	0	1,241
36	0	0	0	0	0	0	1,013	0
37	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0
Total	4,559,035	4,860,440	4,820,656	2,618,628	899,033	1,814,510	2,864,714	2,001,179

Table 8. (continued)

Year	Striped Wolfish				Spotted Wolfish				Broadhead Wolfish			
	2004	2005	2006	2007	2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)	1,524	1,613	2,211	2,427	1,524	1,613	2,211	2,427	1,524	1,613	2,211	2,427
Logbook shrimp catch (t)	53,316	49,732	50,817	52,599	53,316	49,732	50,817	52,599	53,316	49,732	50,817	52,599
correction factor	34.99	30.83	22.98	21.67	34.99	30.83	22.98	21.67	34.99	30.83	22.98	21.67
estimated bycatch (kg)	6,018	9,125	8,573	6,198	805	740	437	1,582	105	308	460	1,062
Bycatch (kg)/ (t) shrimp	0.11	0.18	0.17	0.12	0.02	0.01	0.01	0.03	0.00	0.01	0.01	0.02
total number of sets observed	929	893	1177	1302	929	893	1177	1302	929	893	1177	1302
number of sets with bycatch	145	254	318	221	18	20	19	60	3	10	19	9
freq. sets with 1Kg recorded	127	228	283	187	16	19	19	51	3	10	18	9
percent bycatch sets with 1Kg recorded	87.59%	89.76%	88.99%	84.62%	88.89%	95.00%	100.00%	85.00%	100.00%	100.00%	94.74%	100.00%
number sets with measurements	22	31	36	21	5	3	5	16	0	7	12	0
percent bycatch sets with measurements	15.17%	12.20%	11.32%	9.50%	27.78%	15.00%	26.32%	26.67%	0.00%	70.00%	63.16%	0.00%
Number of fish measured	92	397	709	136	5	3	6	18	0	7	19	0
total length	cm estimated number at length				cm estimated number at length				cm estimated number at length			
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	1,771	0	0	0	0	0	0	0	0
6	0	0	226	2,361	0	0	0	0	44	0	0	0
7	0	261	1,128	2,656	0	0	0	0	0	0	230	0
8	274	3,911	7,896	4,427	0	0	0	99	0	0	153	0
9	4,376	8,082	25,718	2,951	0	0	87	0	0	176	77	0
10	10,941	13,036	31,133	12,101	0	0	0	0	88	77	77	0
11	3,009	12,254	15,341	5,903	0	0	0	99	0	0	115	0
12	2,188	10,429	10,603	1,771	0	0	0	0	0	0	77	0
13	1,368	9,125	11,280	1,181	161	247	0	0	0	0	0	0
14	821	10,429	5,866	295	483	493	87	593	0	0	0	0
15	547	8,604	10,152	590	161	0	0	395	0	0	0	0
16	547	6,518	6,091	885	0	0	175	99	0	0	0	0
17	547	5,475	6,317	0	0	0	0	0	0	0	0	0
18	0	3,389	8,347	590	0	0	0	297	0	0	0	0
19	274	2,868	7,896	295	0	0	0	99	0	0	0	0
20	274	2,607	3,384	590	0	0	0	0	0	0	0	0
21	0	3,650	2,933	295	0	0	175	99	0	0	0	0
22	0	2,086	1,579	295	0	0	0	0	0	0	0	0
23	0	1,043	2,481	295	0	0	0	0	0	0	0	0
24	0	782	677	0	0	0	0	0	0	0	0	0
25	0	521	0	295	0	0	0	0	0	0	0	0
26	0	261	226	590	0	0	0	0	0	0	0	0
27	0	521	226	0	0	0	0	0	0	0	0	0
28	0	261	451	0	0	0	0	0	0	0	0	0
29	0	261	0	0	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0
34	0	521	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	0
64	0	0	0	0	0	0	0	0	0	0	0	0
65	0	0	0	0	0	0	0	0	0	0	0	0
66	0	0	0	0	0	0	0	0	0	0	0	0
67	0	0	0	0	0	0	0	0	0	0	0	0
Total	25,164	106,893	159,949	40,138	805	740	524	1,780	0	308	728	0

Table 9. A summary of the bycatch species taken by the small vessel fleet fishing for shrimp in Hawke Channel + 3K (SFA 6), over the management year 2007 – 2008.

number of species in bycatch = 67				
OCCUR	WEIGHT	WEIGHT		
OCCUR (%)	kg	(%)	Common name	
262	20.12	494	0.02	SKATES (NS)
105	8.06	128	0.01	HERRING,ATLANTIC
669	51.38	3411	0.14	CAPELIN
1	0.08	1	0.00	HATCHETFISHES (NS)
1	0.08	1	0.00	VIPERFISHES (NS)
22	1.69	22	0.00	DAGGERTOOTHFISHES (NS)
418	32.10	1677	0.07	LANTERNFISHES (NS)
141	10.83	167	0.01	BARRACUDINAS (NS)
1	0.08	1	0.00	EELS,CONGER
1	0.08	1	0.00	EELS,SNIFE (NS)
1	0.08	1	0.00	BILLFISH
1	0.08	1	0.00	COD(NS) GADUS SP.
197	15.13	250	0.01	COD,ATLANTIC
2	0.15	2	0.00	HADDOCK
1	0.08	1	0.00	POLLOCK
36	2.76	37	0.00	HAKE,LONGFIN
6	0.46	6	0.00	HAKE,WHITE (COMMON)
1	0.08	1	0.00	HAKE,SILVER
3	0.23	3	0.00	HAKE (NS) MER.SP.
160	12.29	797	0.03	COD,ARCTIC
15	1.15	15	0.00	THREEBEARD ROCKLING (N
7	0.54	7	0.00	CUSK
18	1.38	18	0.00	FOURBEARD ROCKLING
20	1.54	25	0.00	GRENADIERS (NS)
6	0.46	6	0.00	GRENADIERS (NS)
27	2.07	27	0.00	GRENADIER,ROUGHHEAD
24	1.84	24	0.00	MARLIN SPIKE (COMMON)
1	0.08	1	0.00	BLACK SWALLOWER
179	13.75	210	0.01	SAND LANCES (NS)
26	2.00	49	0.00	WOLFFISH,BROADHEAD
221	16.97	286	0.01	WOLFFISH,STRIPED
60	4.61	73	0.00	WOLFFISH,SPOTTED
3	0.23	3	0.00	FOURLINE SNAKEBLENNY
305	23.43	533	0.02	BLENNIES (NS)
41	3.15	54	0.00	WRYMOUTH
868	66.67	1747	0.07	EELPOUT (NS)
1167	89.63	5982	0.24	REDFISH (NS) SEB.SP.
131	10.06	131	0.01	SCULPINS (NS)
110	8.45	123	0.01	HOOKEAR SCULPIN (NS)
175	13.44	283	0.01	MAILED SCULPINS (NS)
58	4.45	58	0.00	SCULPIN, RIBBED (HORNE
6	0.46	6	0.00	SCULPIN,DEEP SEA
509	39.09	657	0.03	ALLIGATORFISH (NS)
13	1.00	13	0.00	SEASNAILS (NS)
639	49.08	892	0.04	AMERICAN PLAICE
92	7.07	96	0.00	WITCH FLOUNDER
29	2.23	37	0.00	YELLOWTAIL FLOUNDER
1183	90.86	4351	0.18	GREENLAND HALIBUT
3	0.23	3	0.00	FLOUNDER,SMOOTH

Table 9 (Continued)

OCCUR	OCCUR (%)	WEIGHT	WEIGHT	Common name
		kg	(%)	
2	0.15	2	0.00	FLOUNDER,WINTER
4	0.31	4	0.00	UNIDENTIFIED FISH
1	0.08	1	0.00	SCALLOP, ICELANDIC
303	23.27	364	0.01	CEPHALOPOD (NS)
2	0.15	2	0.00	OCTOPUS OCTOPODA
31	2.38	31	0.00	SHRIMP NATA.
28	2.15	29	0.00	SHRIMP SERG.ARC.
3	0.23	3	0.00	SHRIMP PASIP.
6	0.46	6	0.00	SHRIMP PASIP.MUL.
1	0.08	1	0.00	SHRIMP SPIRO.SP.
1296	99.54	2427177	99.05	SHRIMP PAND.BOR.
13	1.00	13	0.00	SHRIMP PAND.MON.
32	2.46	32	0.00	SHRIMP SAB.SP.
54	4.15	74	0.00	CRAB, SNOW OR QUEEN
8	0.61	8	0.00	CRAB, TOAD HYAS.SP.
2	0.15	2	0.00	SEA URCHIN ECH.
59	4.53	59	0.00	SEA STAR
1	0.08	1	0.00	CORAL ALCYONACEAN
		2450521	99.98	

Table 10. NAFO Division 3L (Shrimp Fishing Area 7) Canadian large vessel (>500 t) bycatch over the period 2004 - 2007. As with all NAFO straddling shrimp stocks, this unit is managed on a calendar year basis (Jan 1 – Dec. 31). All trips on large shrimp fishing vessels must have an observer therefore the correction factor (logbook catch/observer catch) is always close to 1. Please note that if the observer catch is greater than the logbook catch, the correction factor is 1.

	Year	Atlantic coast				American coast			
		2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)	4,397	4,423	5,968	6,168	4,397	4,423	5,968	6,168	
Logbook shrimp catch (t)	4,036	4,039	6,016	5,743	4,036	4,039	6,016	5,743	
correction factor	1.0000	1.0000	1.0080	1.0000	1.0000	1.0000	1.0080	1.0000	
estimated bycatch (kg)	89	66	90	76	898	768	2,337	2,326	
Bycatch (kg)/ (t) shrimp	0.02	0.01	0.01	0.01	0.20	0.17	0.39	0.41	
total number of sets observed	757	775	960	1,076	757	775	960	1,076	
number of sets with bycatch	83	56	72	74	461	449	643	647	
freq. sets with 1Kg recorded	77	50	62	70	265	275	306	329	
percent bycatch sets with 1Kg recorded	92.77%	89.29%	86.11%	94.59%	57.48%	61.25%	47.59%	50.85%	
number sets with measurements	15	6	40	41	8	2	18	20	
percent bycatch sets with measurements	18.07%	10.71%	55.56%	55.41%	1.74%	0.45%	2.80%	3.09%	
number of fish measured	25	12	102	63	383	87	881	546	
total length									
	cm	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	
3	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	
5	0	0	0	0	0	0	0	0	
6	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	
8	0	0	0	0	0	0	0	0	
9	0	0	0	0	0	0	0	27	
10	0	0	0	0	0	0	48	164	
11	0	0	0	0	28	0	72	27	
12	0	0	2	0	0	0	72	0	
13	0	0	0	0	56	0	72	274	
14	0	0	0	0	112	0	48	376	
15	0	11	0	0	449	77	120	493	
16	0	0	5	3	814	0	367	813	
17	0	0	7	0	1,235	77	578	554	
18	6	0	20	1	1,347	384	921	430	
19	12	11	25	3	1,123	307	1,036	488	
20	0	22	25	7	1,515	922	1,891	1,481	
21	12	11	45	12	1,094	1,382	2,565	1,646	
22	6	11	32	18	870	1,382	2,066	877	
23	24	22	29	3	1,123	1,459	1,512	1,003	
24	12	11	5	4	449	768	1,728	783	
25	30	11	9	10	421	384	1,897	963	
26	12	0	2	3	589	384	1,861	1,042	
27	12	0	7	4	365	384	1,331	1,350	
28	12	11	2	1	309	461	903	892	
29	0	0	2	2	281	77	687	745	
30	6	0	5	0	112	0	578	325	
31	6	11	0	0	112	154	361	342	
32	0	0	0	2	28	0	199	331	
33	0	0	0	0	56	0	169	397	
34	0	0	0	0	56	0	151	137	
35	0	0	0	0	56	0	120	434	
36	0	0	0	2	0	0	24	55	
37	0	0	2	2	0	0	0	55	
38	0	0	0	0	0	0	24	55	
39	0	0	2	0	0	0	0	82	
40	0	0	0	0	0	0	0	27	
41	0	0	0	2	0	0	24	0	
42	0	0	2	2	0	0	0	0	
43	0	0	2	2	0	0	0	0	
44	0	0	0	0	0	0	0	0	
45	0	0	0	0	0	0	0	0	
46	0	0	0	0	0	0	0	0	
47	0	0	0	2	0	0	0	0	
48	0	0	0	0	0	0	0	27	
49	0	0	0	0	0	0	0	0	
50	0	0	0	0	0	0	0	0	
51	0	0	0	0	0	0	0	0	
52	0	0	0	0	0	0	0	0	
53	0	0	0	0	0	0	0	0	
54	0	0	0	0	0	0	0	0	
55	0	0	0	2	0	0	0	0	
56	0	0	0	0	0	0	0	0	
57	0	0	0	0	0	0	0	0	
58	0	0	0	0	0	0	0	0	
59	0	0	0	0	0	0	0	0	
60	0	0	0	0	0	0	0	0	
61	0	0	0	0	0	0	0	0	
62	0	0	0	0	0	0	0	0	
63	0	0	0	0	0	0	0	0	
Total		148	132	231	86	12,600	8,602	21,426	16,694

Table 10.

(Continued)

Year	redfish				Greenland halibut			
	2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)	4,397	4,423	5,968	6,168	4,397	4,423	5,968	6,168
Logbook shrimp catch (t)	4,036	4,039	6,016	5,743	4,036	4,039	6,016	5,743
correction factor	1.0000	1.0000	1.0080	1.0000	1.0000	1.0000	1.0080	1.0000
estimated bycatch (kg)	2,315	3,340	2,075	2,771	9,162	7,094	6,568	9,345
Bycatch (kg) / (t) shrimp	0.53	0.76	0.35	0.48	2.08	1.60	1.09	1.63
total number of sets observed	757	775	960	1,076	757	775	960	1,076
number of sets with bycatch	595	631	768	812	725	764	934	1,047
freq. sets with 1Kg recorded	237	112	329	98	59	46	131	152
percent bycatch sets with 1Kg recorded	39.89%	17.75%	42.84%	12.07%	8.14%	6.02%	14.03%	14.52%
number sets with measurements	3	11	9	20	24	14	24	30
percent bycatch sets with measurements	0.50%	1.74%	1.17%	2.46%	3.31%	1.83%	2.57%	2.87%
number of fish measured	312	1,667	571	1,908	4,014	2,218	2,413	2,739
total length	cm							
	estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	54	0	0	0	0
6	0	0	399	372	0	0	0	0
7	0	0	559	628	0	0	0	0
8	122	173	878	1,679	17	0	0	0
9	244	495	1,118	4,561	31	0	514	548
10	609	891	4,470	7,438	189	0	1,709	204
11	853	2,250	7,610	4,602	1,281	376	3,374	140
12	4,143	3,673	6,359	1,266	1,982	394	5,443	677
13	7,189	6,455	9,100	3,464	1,019	680	5,990	2,632
14	7,798	6,840	10,031	6,091	846	525	3,522	3,157
15	9,747	3,810	9,632	8,028	958	797	1,815	5,455
16	11,209	3,617	6,546	5,083	1,550	613	963	9,127
17	6,336	3,246	2,767	4,257	2,828	1,356	1,774	16,092
18	2,437	4,447	2,102	3,950	7,275	2,594	3,575	17,390
19	1,218	3,680	639	3,135	12,884	3,950	5,430	15,178
20	487	3,820	0	1,549	16,297	6,956	4,518	10,720
21	487	3,159	0	1,782	15,680	8,757	4,486	6,583
22	0	1,941	0	706	9,678	8,148	4,024	4,522
23	0	1,448	80	272	6,809	4,998	6,115	2,758
24	0	378	0	54	4,769	4,198	6,129	1,268
25	0	222	0	82	2,870	2,801	4,257	1,187
26	0	25	0	54	1,978	2,150	3,010	440
27	0	0	0	0	2,598	2,327	1,479	939
28	0	0	0	0	2,345	2,564	663	937
29	0	25	0	0	2,692	2,905	815	1,514
30	0	0	0	0	2,102	2,482	1,041	1,693
31	0	0	0	0	1,417	2,217	760	1,553
32	0	0	0	0	1,139	1,129	994	842
33	0	0	0	0	443	920	516	427
34	0	0	0	0	156	911	551	449
35	0	0	0	0	89	664	242	338
36	0	0	0	0	135	294	140	451
37	0	0	0	0	26	232	314	403
38	0	0	0	0	26	179	186	499
39	0	0	0	0	0	166	56	258
40	0	0	0	0	0	53	168	338
41	0	0	0	0	0	77	56	258
42	0	0	0	0	0	78	196	306
43	0	0	0	0	0	0	56	290
44	0	0	0	0	0	0	56	226
45	0	0	0	0	0	0	0	161
46	0	0	0	0	0	0	0	97
47	0	0	0	0	0	0	28	32
48	0	0	0	0	0	0	0	32
49	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0
53	0	0	0	0	0	0	0	0
54	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0
Total	52,879	50,592	62,291	59,106	102,107	66,494	74,963	110,119

Table 10. (Continued)

Year	Striped Wolfish				Spotted Wolfish			Broadhead Wolfish				
	2004	2005	2006	2007	2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)	4,397	4,423	5,968	6,168	4,397	4,423	5,968	6,168	4,397	4,423	5,968	6,168
Logbook shrimp catch (t)	4,036	4,039	6,016	5,743	4,036	4,039	6,016	5,743	4,036	4,039	6,016	5,743
correction factor	1.0000	1.0000	1.0080	1.0000	1.0000	1.0000	1.0080	1.0000	1.0000	1.0000	1.0080	1.0000
estimated bycatch (kg)	89	119	539	557	4	23	36	58	42	0	0	2
Bycatch (kg) (t) shrimp	0.02	0.03	0.09	0.10	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00
total number of sets observed	757	775	960	1,076	757	775	960	1,076	757	775	960	1,076
number of sets with bycatch	74	107	457	372	4	23	36	33	17	0	0	0
freq. sets with 1Kg recorded	60	97	419	272	4	23	36	28	4	0	0	0
percent bycatch sets with 1Kg recorded	81.08%	90.65%	91.68%	73.12%	100.00%	100.00%	100.00%	84.85%	23.53%	undefined	undefined	undefined
number sets with measurements	21	15	32	29	2	4	9	4	0	0	0	0
percent bycatch sets with measurements	28.38%	14.02%	7.00%	7.80%	50.00%	17.39%	25.00%	12.12%	0.00%	undefined	undefined	undefined
number of fish measured	84	125	343	248	2	11	13	4	0	0	0	0
total length	cm											
	estimated number at length				estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	84	0	0	0	0	0	0	0	0	0
9	0	70	185	0	0	0	0	0	0	0	0	0
10	24	56	337	0	0	0	0	0	0	0	0	0
11	28	49	742	53	0	0	8	0	0	0	0	0
12	20	56	691	93	2	6	4	0	0	0	0	0
13	20	84	506	199	2	12	12	15	0	0	0	0
14	16	84	489	279	0	6	0	0	0	0	0	0
15	16	56	489	279	0	17	12	0	0	0	0	0
16	16	91	253	318	0	0	8	15	0	0	0	0
17	24	28	388	438	0	6	4	15	0	0	0	0
18	32	70	371	398	0	12	4	0	0	0	0	0
19	24	56	270	265	0	0	0	15	0	0	0	0
20	24	56	185	80	0	6	0	0	0	0	0	0
21	4	21	236	27	0	0	0	0	0	0	0	0
22	12	56	169	40	0	0	0	0	0	0	0	0
23	4	7	118	66	0	0	0	0	0	0	0	0
24	28	21	67	53	0	0	0	0	0	0	0	0
25	8	0	51	80	0	0	0	0	0	0	0	0
26	0	7	17	93	0	0	0	0	0	0	0	0
27	0	0	51	93	0	0	0	0	0	0	0	0
28	8	0	0	27	0	0	0	0	0	0	0	0
29	4	0	17	13	0	0	0	0	0	0	0	0
30	4	7	0	40	0	0	0	0	0	0	0	0
31	4	0	0	27	0	0	0	0	0	0	0	0
32	0	0	0	27	0	0	0	0	0	0	0	0
33	0	0	17	27	0	0	0	0	0	0	0	0
34	0	0	17	40	0	0	0	0	0	0	0	0
35	4	0	0	13	0	0	0	0	0	0	0	0
36	0	0	17	27	0	0	0	0	0	0	0	0
37	4	0	0	13	0	0	0	0	0	0	0	0
38	0	0	0	66	0	0	0	0	0	0	0	0
39	0	0	0	27	0	0	0	0	0	0	0	0
40	0	0	17	53	0	0	0	0	0	0	0	0
41	0	0	0	0	0	0	0	0	0	0	0	0
42	0	0	0	0	0	0	0	0	0	0	0	0
43	0	0	0	13	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0	0	0
46	4	0	0	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0
49	0	0	0	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0	0	0
53	4	0	0	0	0	0	0	0	0	0	0	0
54	0	0	0	13	0	0	0	0	0	0	0	0
55	0	0	0	13	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0	0	0
59	0	0	0	0	0	0	0	0	0	0	0	0
60	0	0	0	0	0	0	0	0	0	0	0	0
61	0	0	0	0	0	0	0	0	0	0	0	0
62	0	0	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0	0	0
Total	340	875	5,780	3,289	4	63	52	58	0	0	0	0

Table 11. A summary of the bycatch species taken by the Canadian large vessel fleet fishing for shrimp in NAFO Division 3L (SFA 7), over the management year 2007 – 2008.

number of species in bycatch = 69					
OCCUR	WEIGHT	WEIGHT			
OCCUR (%)	kg	(%)	Common name		
357	33.18	581	0.01	SKATES (NS)	
1	0.09	1	0.00	HERRINGS (NS)	
195	18.12	577	0.01	HERRING,ATLANTIC	
1011	93.96	119082	1.88	CAPELIN	
6	0.56	7	0.00	BLACKSMELT,GOITRE	
2	0.19	2	0.00	HATCHETFISHES (NS)	
74	6.88	119	0.00	VIPERFISHES (NS)	
7	0.65	7	0.00	DRAGONFISHES,SCALED (N	
619	57.53	6127	0.10	LANTERNFISHES (NS)	
1	0.09	1	0.00	LOOSEJAWS (NS)	
367	34.11	895	0.01	BARRACUDINAS (NS)	
21	1.95	21	0.00	EELS,SNIFE (NS)	
72	6.69	76	0.00	COD,ATLANTIC	
1	0.09	1	0.00	HADDOCK	
1	0.09	1	0.00	HAKE,LONGFIN	
53	4.93	54	0.00	HAKE,WHITE (COMMON)	
11	1.02	11	0.00	COD,ARCTIC	
91	8.46	91	0.00	THREEBEARD ROCKLING (N	
26	2.42	26	0.00	CUSK	
11	1.02	11	0.00	FOURBEARD ROCKLING	
1	0.09	1	0.00	GRENADIERS (NS)	
28	2.60	30	0.00	GRENADIER,ROUGHHEAD	
3	0.28	3	0.00	MARLIN SPIKE (COMMON)	
5	0.46	9	0.00	GRENADIER,ROUNDNOSE	
39	3.62	40	0.00	MACKEREL,ATLANTIC	
1	0.09	1	0.00	DOLPHIN	
13	1.21	23	0.00	SAND LANCES (NS)	
2	0.19	2	0.00	WOLFFISH,BROADHEAD	
370	34.39	557	0.01	WOLFFISH,STRIPED	
31	2.88	58	0.00	WOLFFISH,SPOTTED	
103	9.57	132	0.00	FOURLINE SNAKEBLENNY	
17	1.58	18	0.00	SHANNY,RADIATED	
441	40.99	515	0.01	BLENNIES (NS)	
916	85.13	3616	0.06	EELPOUT (NS)	
1	0.09	1	0.00	WOLF EEL (NS)	
914	84.94	3658	0.06	REDFISH (NS) SEB.SP.	
89	8.27	112	0.00	SCULPINS (NS)	
94	8.74	94	0.00	HOOKEAR SCULPIN (NS)	
347	32.25	366	0.01	MAILED SCULPINS (NS)	
22	2.04	24	0.00	SCULPIN, RIBBED (HORNE	
1	0.09	1	0.00	SCULPIN,DEEP SEA	
566	52.60	625	0.01	ALLIGATORFISH (NS)	
4	0.37	13	0.00	LUMPFISH (NS) EUM.SP.	
28	2.60	28	0.00	SEASNAILS (NS)	
673	62.55	2326	0.04	AMERICAN PLAICE	
68	6.32	85	0.00	WITCH FLOUNDER	
1047	97.30	9345	0.15	GREENLAND HALIBUT	
1	0.09	57	0.00	HALIBUT (ATLANTIC)	
16	1.49	560	0.01	UNIDENTIFIED FISH	
42	3.90	83	0.00	SPONGE	

Table 12. NAFO Division 3L (Shrimp Fishing Area 7) Canadian small vessel (<=500 t; LOA<100') bycatch over the period 2004 - 2007. As with all NAFO straddling shrimp stocks, this unit is managed on a calendar year basis (Jan 1 – Dec. 31). There is a target of 10% observer coverage on these vessels; however, as indicated by the correction factors, this target is not usually met (correction factor = logbook catch/observer catch).

	Year	Atlantic cod				American plaice			
		2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)		316	204	723	808	316	204	723	712
Logbook shrimp catch (t)		6,524	7,070	12,112	12,564	6,524	7,070	12,112	12,564
correction factor		20.6772	34.7108	16.7523	15.5505	20.6772	34.7108	16.7523	17.6447
estimated bycatch (kg)		186	0	955	638	2,295	3,228	3,334	4,341
Bycatch (kg) (t) shrimp		0.03	0.00	0.08	0.05	0.35	0.46	0.28	0.35
total number of sets observed		203	99	452	503	203	99	452	503
number of sets with bycatch		9	0	45	30	84	68	164	111
freq. sets with 1Kg recorded		9	0	40	24	63	49	136	62
percent bycatch sets with 1Kg recorded		100.00%	undefined	88.89%	80.00%	75.00%	72.06%	82.93%	55.86%
number sets with measurements		1	0	3	1	3	0	0	0
percent bycatch sets with measurements		11.11%	undefined	6.67%	3.33%	3.57%	0.00%	0.00%	0.00%
number of fish measured		2	0	39	1	35	0	0	0
total length	cm	estimated number at length				estimated number at length			
1		0	0	0	0	0	0	0	0
2		0	0	0	0	0	0	0	0
3		0	0	0	0	0	0	0	0
4		0	0	0	0	0	0	0	0
5		0	0	0	0	0	0	0	0
6		0	0	0	0	0	0	0	0
7		0	0	0	0	0	0	0	0
8		0	0	0	0	0	0	0	0
9		0	0	0	0	0	0	0	0
10		0	0	0	0	0	0	0	0
11		0	0	0	0	0	0	0	0
12		186	0	0	0	0	0	0	0
13		186	0	318	0	0	0	0	0
14		0	0	0	0	0	0	0	0
15		0	0	1,273	638	574	0	0	0
16		0	0	1,591	0	0	0	0	0
17		0	0	1,910	0	1,148	0	0	0
18		0	0	2,546	0	1,913	0	0	0
19		0	0	2,228	0	574	0	0	0
20		0	0	637	0	1,148	0	0	0
21		0	0	1,591	0	1,339	0	0	0
22		0	0	318	0	0	0	0	0
23		0	0	0	0	1,339	0	0	0
24		0	0	0	0	2,104	0	0	0
25		0	0	0	0	1,530	0	0	0
26		0	0	0	0	956	0	0	0
27		0	0	0	0	1,530	0	0	0
28		0	0	0	0	574	0	0	0
29		0	0	0	0	765	0	0	0
30		0	0	0	0	383	0	0	0
31		0	0	0	0	383	0	0	0
32		0	0	0	0	0	0	0	0
33		0	0	0	0	0	0	0	0
34		0	0	0	0	0	0	0	0
35		0	0	0	0	0	0	0	0
36		0	0	0	0	0	0	0	0
37		0	0	0	0	0	0	0	0
38		0	0	0	0	0	0	0	0
39		0	0	0	0	0	0	0	0
40		0	0	0	0	0	0	0	0
41		0	0	0	0	0	0	0	0
42		0	0	0	0	0	0	0	0
43		0	0	0	0	0	0	0	0
44		0	0	0	0	0	0	0	0
45		0	0	0	0	0	0	0	0
46		0	0	0	0	0	0	0	0
47		0	0	0	0	0	0	0	0
48		0	0	0	0	0	0	0	0
49		0	0	0	0	0	0	0	0
50		0	0	0	0	0	0	0	0
51		0	0	0	0	0	0	0	0
52		0	0	0	0	0	0	0	0
53		0	0	0	0	0	0	0	0
54		0	0	0	0	0	0	0	0
55		0	0	0	0	0	0	0	0
56		0	0	0	0	0	0	0	0
57		0	0	0	0	0	0	0	0
58		0	0	0	0	0	0	0	0
59		0	0	0	0	0	0	0	0
60		0	0	0	0	0	0	0	0
61		0	0	0	0	0	0	0	0
62		0	0	0	0	0	0	0	0
63		0	0	0	0	0	0	0	0
Total		372	0	12,413	638	16,257	0	0	0

Table 12.

(Continued)

	Year	redfish				Greenland halibut			
		2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)		316	204	723	712	316	204	723	712
Logbook shrimp catch (t)		6,524	7,070	12,112	12,564	6,524	7,070	12,112	12,564
correction factor		20.6772	34.7108	16.7523	17.6447	20.6772	34.7108	16.7523	17.6447
estimated bycatch (kg)		5,169	7,775	17,774	21,191	5,562	5,172	8,209	14,310
Bycatch (kg/ (t) shrimp		0.79	1.10	1.47	1.69	0.85	0.73	0.68	1.14
total number of sets observed		203	99	452	503	203	99	452	503
number of sets with bycatch		165	87	346	377	163	90	268	329
freq. sets with 1Kg recorded		123	49	159	223	115	59	152	188
percent bycatch sets with 1Kg recorded		74.55%	56.32%	45.95%	59.15%	70.55%	65.56%	56.72%	57.14%
number sets with measurements		9	0	2	1	7	0	18	1
percent bycatch sets with measurements		5.45%	0.00%	0.58%	0.27%	4.29%	0.00%	6.72%	0.30%
number of fish sets with measurements		580	0	383	25	277	0	665	9
total length	cm	estimated number at length				estimated number at length			
1		0	0	0	0	0	0	0	0
2		0	0	0	0	0	0	0	0
3		0	0	0	0	0	0	0	0
4		0	0	0	0	0	0	0	0
5		0	0	0	0	0	0	0	0
6		0	0	0	0	0	0	0	0
7		3,360	0	0	0	0	0	0	0
8		6,720	0	0	0	0	0	0	0
9		17,576	0	7,406	0	242	0	0	0
10		30,757	0	741	0	484	0	724	8,412
11		25,071	0	0	0	1,451	0	1,449	0
12		16,800	0	5,184	56,060	2,177	0	8,691	4,206
13		18,351	0	10,368	18,687	5,320	0	21,970	0
14		13,957	0	11,849	37,373	8,464	0	32,593	4,206
15		8,271	0	23,699	74,746	11,366	0	38,870	0
16		3,619	0	72,578	56,060	7,013	0	27,523	12,618
17		3,619	0	74,059	93,433	2,902	0	11,106	4,206
18		1,292	0	51,841	74,746	1,693	0	3,380	4,206
19		517	0	22,218	37,373	242	0	966	0
20		0	0	1,481	0	242	0	241	0
21		0	0	2,222	18,687	484	0	241	0
22		0	0	0	0	2,177	0	241	0
23		0	0	0	0	1,693	0	241	0
24		0	0	0	0	2,660	0	724	0
25		0	0	0	0	2,660	0	966	0
26		0	0	0	0	2,902	0	1,207	0
27		0	0	0	0	2,660	0	1,449	0
28		0	0	0	0	2,902	0	2,414	0
29		0	0	0	0	2,177	0	2,173	0
30		0	0	0	0	1,693	0	966	0
31		0	0	0	0	1,209	0	241	0
32		0	0	0	0	484	0	241	0
33		0	0	0	0	726	0	241	0
34		0	0	0	0	484	0	241	0
35		0	0	0	0	0	0	241	0
36		0	0	0	0	242	0	0	0
37		0	0	0	0	242	0	241	0
38		0	0	0	0	0	0	0	0
39		0	0	0	0	0	0	241	0
40		0	0	0	0	0	0	0	0
41		0	0	0	0	0	0	0	0
42		0	0	0	0	0	0	241	0
43		0	0	0	0	0	0	0	0
44		0	0	0	0	0	0	241	0
45		0	0	0	0	0	0	0	0
46		0	0	0	0	0	0	241	0
47		0	0	0	0	0	0	0	0
48		0	0	0	0	0	0	0	0
49		0	0	0	0	0	0	0	0
50		0	0	0	0	0	0	0	0
51		0	0	0	0	0	0	0	0
52		0	0	0	0	0	0	0	0
53		0	0	0	0	0	0	0	0
54		0	0	0	0	0	0	0	0
55		0	0	0	0	0	0	0	0
56		0	0	0	0	0	0	0	0
57		0	0	0	0	0	0	0	0
58		0	0	0	0	0	0	0	0
59		0	0	0	0	0	0	0	0
60		0	0	0	0	0	0	0	0
61		0	0	0	0	0	0	0	0
62		0	0	0	0	0	0	0	0
63		0	0	0	0	0	0	0	0
Total		149,910	0	283,647	467,164	66,988	0	160,551	37,855

Table 12. (Continued)

	Striped Wolfish				Spotted Wolfish				Broadhead Wolfish				
	Year	2004	2005	2006	2007	2004	2005	2006	2007	2004	2005	2006	2007
Observed shrimp catch (t)	316	204	723	712	316	204	723	712	316	204	723	712	
Logbook shrimp catch (t)	6,524	7,070	12,112	12,564	6,524	7,070	12,112	12,564	6,524	7,070	12,112	12,564	
correction factor	20.6772	34.7108	16.7523	17.6447	20.6772	34.7108	16.7523	17.6447	20.6772	34.7108	16.7523	17.6447	
estimated bycatch (kg)	806	868	2,714	1,959	0	0	251	335	0	0	34	0	
Bycatch (kg)/ (t) shrimp	0.12	0.12	0.22	0.16	0.00	0.00	0.02	0.03	0.00	0.00	0.00	0.00	
total number of sets observed	203	99	452	503	203	99	452	503	203	99	452	503	
number of sets with bycatch	28	25	95	76	0	0	15	11	0	0	0	0	
freq. sets with 1Kg recorded	17	25	66	57	0	0	15	6	0	0	0	0	
percent bycatch sets with 1Kg recorded	60.71%	100.00%	69.47%	75.00%	undefined	undefined	100.00%	54.55%	undefined	undefined	undefined	undefined	
number sets with measurements	4	0	27	1	0	0	5	0	0	0	0	0	
percent bycatch sets with measurements	14.29%	0.00%	28.42%	1.32%	undefined	undefined	33.33%	0.00%	undefined	undefined	undefined	undefined	
number of fish measured	33	0	470	2	0	0	5	0	0	0	0	0	
total length	cm	estimated number at length				estimated number at length				estimated number at length			
1	0	0	0	0	0	0	0	0	0	0	0	0	
2	0	0	0	0	0	0	0	0	0	0	0	0	
3	0	0	0	0	0	0	0	0	0	0	0	0	
4	0	0	0	0	0	0	0	0	0	0	0	0	
5	0	0	0	0	0	0	0	0	0	0	0	0	
6	0	0	0	0	0	0	0	0	0	0	0	0	
7	0	0	0	0	0	0	0	0	0	0	0	0	
8	0	0	170	0	0	0	0	0	0	0	0	0	
9	269	0	933	0	0	0	0	0	0	0	0	0	
10	0	0	2,544	0	0	0	0	0	0	0	0	0	
11	134	0	3,647	0	0	0	0	0	0	0	0	0	
12	403	0	5,682	0	0	0	0	0	0	0	0	0	
13	403	0	4,410	0	0	0	50	0	0	0	0	0	
14	269	0	3,223	0	0	0	0	0	0	0	0	0	
15	403	0	3,562	0	0	0	50	0	0	0	0	0	
16	1,075	0	2,035	0	0	0	101	0	0	0	0	0	
17	538	0	1,866	0	0	0	0	0	0	0	0	0	
18	134	0	2,290	0	0	0	0	0	0	0	0	0	
19	134	0	1,527	0	0	0	50	0	0	0	0	0	
20	0	0	2,290	0	0	0	0	0	0	0	0	0	
21	403	0	1,527	0	0	0	0	0	0	0	0	0	
22	0	0	1,187	1,727	0	0	0	0	0	0	0	0	
23	269	0	678	0	0	0	0	0	0	0	0	0	
24	134	0	594	0	0	0	0	0	0	0	0	0	
25	403	0	509	0	0	0	0	0	0	0	0	0	
26	538	0	339	0	0	0	0	0	0	0	0	0	
27	0	0	339	1,727	0	0	0	0	0	0	0	0	
28	0	0	254	0	0	0	0	0	0	0	0	0	
29	0	0	85	0	0	0	0	0	0	0	0	0	
30	0	0	0	0	0	0	0	0	0	0	0	0	
31	0	0	0	0	0	0	0	0	0	0	0	0	
32	0	0	0	0	0	0	0	0	0	0	0	0	
33	0	0	0	0	0	0	0	0	0	0	0	0	
34	0	0	0	0	0	0	0	0	0	0	0	0	
35	0	0	0	0	0	0	0	0	0	0	0	0	
36	0	0	0	0	0	0	0	0	0	0	0	0	
37	0	0	0	0	0	0	0	0	0	0	0	0	
38	0	0	0	0	0	0	0	0	0	0	0	0	
39	0	0	0	0	0	0	0	0	0	0	0	0	
40	0	0	0	0	0	0	0	0	0	0	0	0	
41	0	0	0	0	0	0	0	0	0	0	0	0	
42	0	0	0	0	0	0	0	0	0	0	0	0	
43	0	0	0	0	0	0	0	0	0	0	0	0	
44	0	0	0	0	0	0	0	0	0	0	0	0	
45	0	0	85	0	0	0	0	0	0	0	0	0	
46	0	0	0	0	0	0	0	0	0	0	0	0	
47	0	0	0	0	0	0	0	0	0	0	0	0	
48	0	0	0	0	0	0	0	0	0	0	0	0	
49	0	0	0	0	0	0	0	0	0	0	0	0	
50	0	0	0	0	0	0	0	0	0	0	0	0	
51	0	0	0	0	0	0	0	0	0	0	0	0	
52	0	0	0	0	0	0	0	0	0	0	0	0	
53	0	0	85	0	0	0	0	0	0	0	0	0	
54	0	0	0	0	0	0	0	0	0	0	0	0	
55	0	0	0	0	0	0	0	0	0	0	0	0	
56	0	0	0	0	0	0	0	0	0	0	0	0	
57	0	0	0	0	0	0	0	0	0	0	0	0	
58	0	0	0	0	0	0	0	0	0	0	0	0	
59	0	0	0	0	0	0	0	0	0	0	0	0	
60	0	0	0	0	0	0	0	0	0	0	0	0	
61	0	0	0	0	0	0	0	0	0	0	0	0	
62	0	0	0	0	0	0	0	0	0	0	0	0	
63	0	0	0	0	0	0	0	0	0	0	0	0	
Total	5,510	0	39,860	3,454	0	0	251	0	0	0	0	0	

Table 13. A summary of the bycatch species taken by the Canadian small vessel fleet fishing for shrimp in NAFO Division 3L (SFA 7), over the management year 2007 – 2008.
number of species in bycatch = 56

	OCCUR	WEIGHT	WEIGHT	Common name
	(%)	kg	(%)	
46	9.15	136	0.02	SKATES (NS)
30	5.96	37	0.00	HERRINGS (NS)
15	2.98	23	0.00	HERRING,ATLANTIC
317	63.02	5429	0.66	CAPELIN
4	0.80	9	0.00	VIPERFISHES (NS)
59	11.73	84	0.01	LANTERNFISHES (NS)
14	2.78	14	0.00	BARRACUDINAS (NS)
3	0.60	3	0.00	EELS,SNIFE (NS)
1	0.20	1	0.00	EELS, CUTTHROAT (NS)
1	0.20	1	0.00	LONGNOSE EEL
8	1.59	8	0.00	BILLFISH
12	2.39	12	0.00	COD(NS) GADUS SP.
30	5.96	41	0.01	COD,ATLANTIC
3	0.60	3	0.00	HAKE,SILVER
20	3.98	21	0.00	HAKE (NS) MER.SP.
4	0.80	4	0.00	COD,ARCTIC
4	0.80	4	0.00	THREEBEARD ROCKLING (N
27	5.37	55	0.01	CUSK
6	1.19	6	0.00	GRENADIERS (NS)
3	0.60	3	0.00	GRENADIERS (NS)
17	3.38	42	0.01	GRENADIER,ROUGHHEAD
4	0.80	4	0.00	GRENADIER,ROUNDNOSE
2	0.40	2	0.00	MACKEREL,ATLANTIC
20	3.98	46	0.01	SAND LANCES (NS)
8	1.59	21	0.00	WOLFFISH,BROADHEAD
76	15.11	111	0.01	WOLFFISH,STRIPED
11	2.19	19	0.00	WOLFFISH,SPOTTED
9	1.79	10	0.00	FOURLINE SNAKEBLENNY
39	7.75	68	0.01	BLENNIES (NS)
176	34.99	314	0.04	EELPOUT (NS)
377	74.95	1201	0.15	REDFISH (NS) SEB.SP.
46	9.15	74	0.01	SCULPINS (NS)
8	1.59	8	0.00	HOOKEAR SCULPIN (NS)
9	1.79	9	0.00	MAILED SCULPINS (NS)
1	0.20	1	0.00	SCULPIN, RIBBED (HORNE
98	19.48	106	0.01	ALLIGATORFISH (NS)
1	0.20	1	0.00	LUMPFISH (NS) EUM.SP.
2	0.40	2	0.00	SEASNAILS (NS)
111	22.07	246	0.03	AMERICAN PLAICE
4	0.80	4	0.00	WITCH FLOUNDER
23	4.57	46	0.01	YELLOWTAIL FLOUNDER
329	65.41	811	0.10	GREENLAND HALIBUT
3	0.60	3	0.00	ANGLER,COMMON(MONKFISH
3	0.60	68	0.01	UNIDENTIFIED FISH
5	0.99	5	0.00	SPONGE
1	0.20	1	0.00	WHELK BUCC.
152	30.22	408	0.05	CEPHALOPOD (NS)
9	1.79	9	0.00	SHRIMP NATA.
1	0.20	1	0.00	SHRIMP SERG.ARC.

Table 13 (continued)

	OCCUR	WEIGHT	WEIGHT	Common name
	(%)	kg	(%)	
499	99.20	807948	98.83	SHRIMP PAND.BOR.
1	0.20	1	0.00	SPINY CRAB LITH.MAJ.
23	4.57	32	0.00	CRAB, SNOW OR QUEEN
11	2.19	11	0.00	CRAB, TOAD HYAS.SP.
1	0.20	1	0.00	SEA CUCUMBER HOL.
5	0.99	5	0.00	SEA STAR
3	0.60	3	0.00	CORAL ALCYONACEAN
		=====	=====	
		817536	99.99	

Table 14. Bycatch of various groundfish species taken by Estonian vessels fishing for shrimp in the NAFO Division 3L NRA over the period 2006 – 2008.

Scientific name	Common Name	Year		
		2006	2007	2008
		Kg	Kg	Kg
<i>Anarhichas lupus</i>	Atlantic wolffish	82	27.2	16
<i>Mallotus villosus</i>	Capelin	3458	5106	4142
<i>Anarhichas minor</i>	Spotted wolffish		0	20
<i>Anarhichas sp.</i>	Wolffishes (NS)	57		
<i>Lycodes sp.</i>	Eelpouts (NS)	104	75.2	6
<i>Reinhardtius hippoglossoides</i>	Greenland halibut	96	84	192
<i>Urophycis chesteri</i>	Longfin hake			7
<i>Merluccius bilinearis</i>	Silver hake	66	3	
	marine fish not specified	3541	9307	3734
<i>Hippoglossoides platessoides</i>	American plaice	561	7	
<i>Sebastes sp.</i>	Atlantic redfishes	937	629	565
<i>Macrourus berglax</i>	Roughhead grenadier			8
<i>Amblyraja radiata</i>	Thorny skate			5
<i>Coryphaenoides rupestris</i>	Roundnose grenadier	71	0	
<i>Raja sp.</i>	Skates (NS)			30
<i>Glyptocephalus cynoglossus</i>	Witch flounder	11		

Table 15. Bycatch of various groundfish species taken by Spanish vessels fishing for shrimp in the NAFO Division 3L NRA during the first three months of 2008..

discarded catch (kgs.)	January - March
Lanternfish	766
Arctic eelpot	335
American plaice	228
Redfish	73
Greenland halibut	27
Witch flounder	25
Capelan	14
Longfin hake	13
Other pisces	40
Crustacea	3
Other invertebrata	8

Table 16. Bycatch of unidentified finfish and redfish taken by Greenlandic vessels fishing for shrimp in the NAFO Division 3L NRA over the period 2005 – 2008.

Common Name	Year			
	2005	2006	2007	2008
	kg	kg	kg	kg
Redfish	200	1355	75	127
Unidentified finfish	310	3206	2271	1316

Table 17. Bycatch of unidentified finfish and redfish taken by Norwegian vessels fishing for shrimp in the NAFO Division 3L NRA during 2007.

Common Name	kg
Redfish	259
Unidentified finfish	430

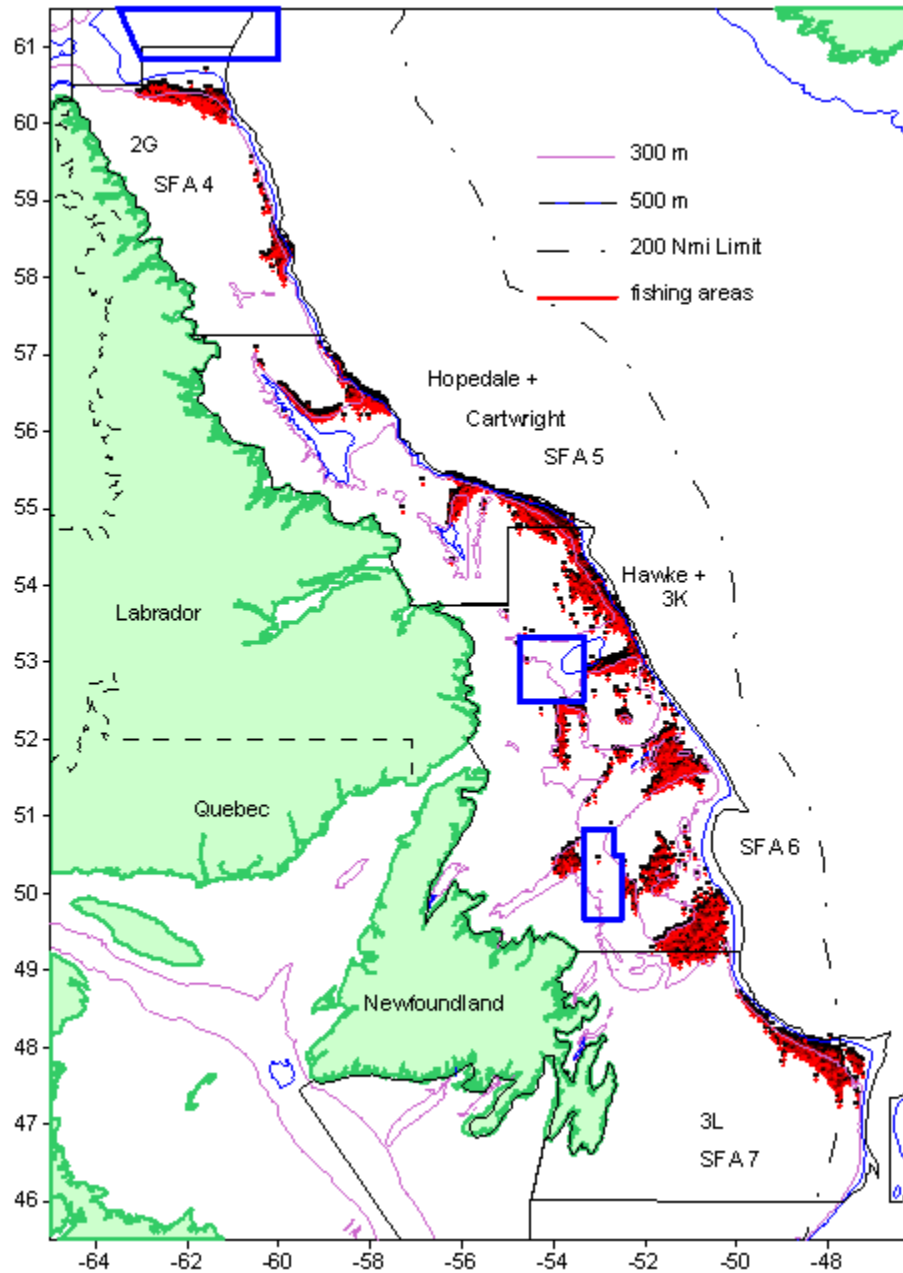


Figure 1. Distribution of observed Canadian large (>500 t) and small (<=500 t; LOA<100') shrimp fishing positions in Shrimp Fishing Areas (SFAs) 4-7 during 2007. The blue boxes indicate the location of areas that are closed to bottom trawling. The northern box was voluntarily closed by the large vessel fleet to protect coral. The middle box is referred to the Hawke Channel box and was closed to all but snow crab pot fishing. The more southern box is referred to as the Funk Island Deep box and is closed to small vessel bottom trawling and voluntarily closed to large vessel bottom trawling.

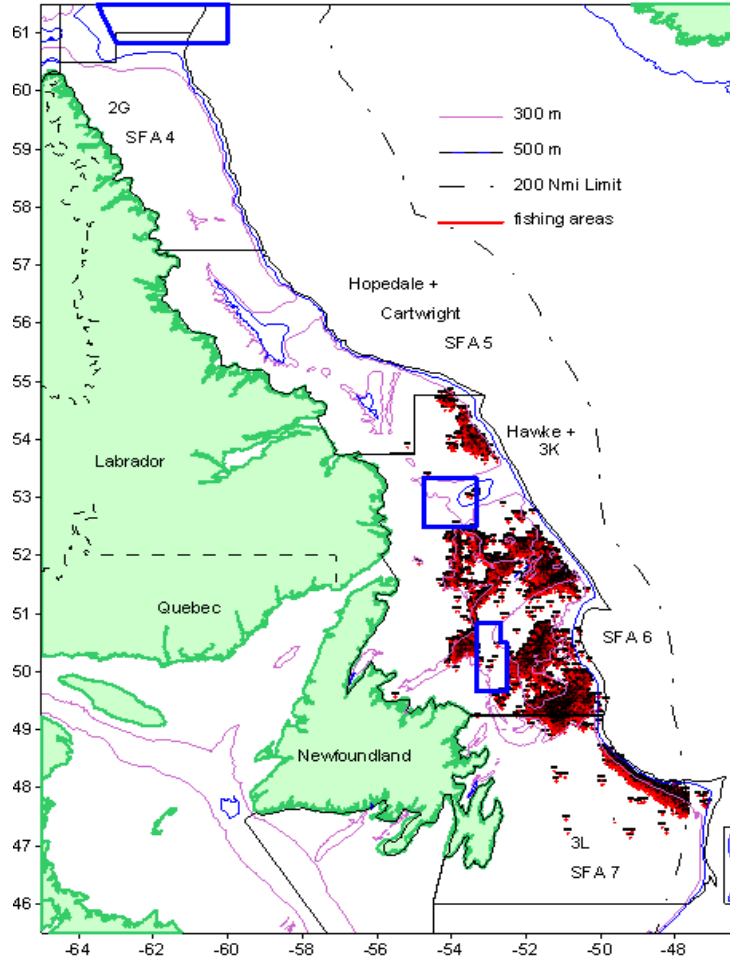


Figure 2. Distribution of logbook Canadian small (≤ 500 t; $LOA < 100'$) shrimp fishing positions in Shrimp Fishing Areas (SFAs) 4-7 during 2007. The blue boxes indicate the location of areas that are closed to bottom trawling. The northern box was voluntarily closed by the large vessel fleet to protect coral. The middle box is referred to the Hawke Channel box and was closed to all but snow crab pot fishing. The more southern box is referred to as the Funk Island Deep box and is closed to small vessel bottom trawling and voluntarily closed to large vessel bottom trawling.

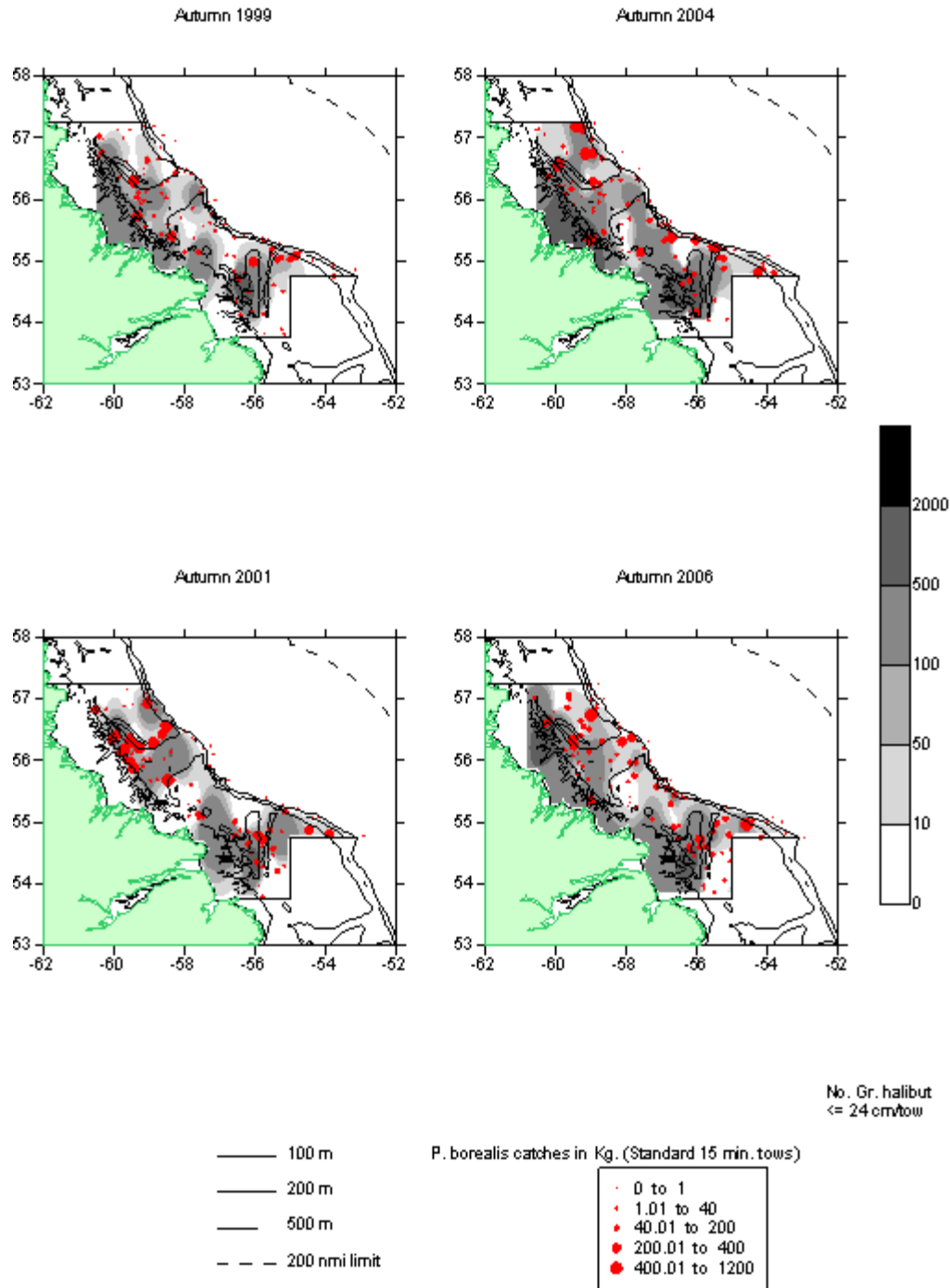


Figure 3. Distribution of northern shrimp in relation to Greenland halibut (TL≤24 cm) collected during Canadian autumn 1999 – autumn 2006 multi-species bottom trawl surveys in FA5 (Hopedale and Cartwright Channels). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

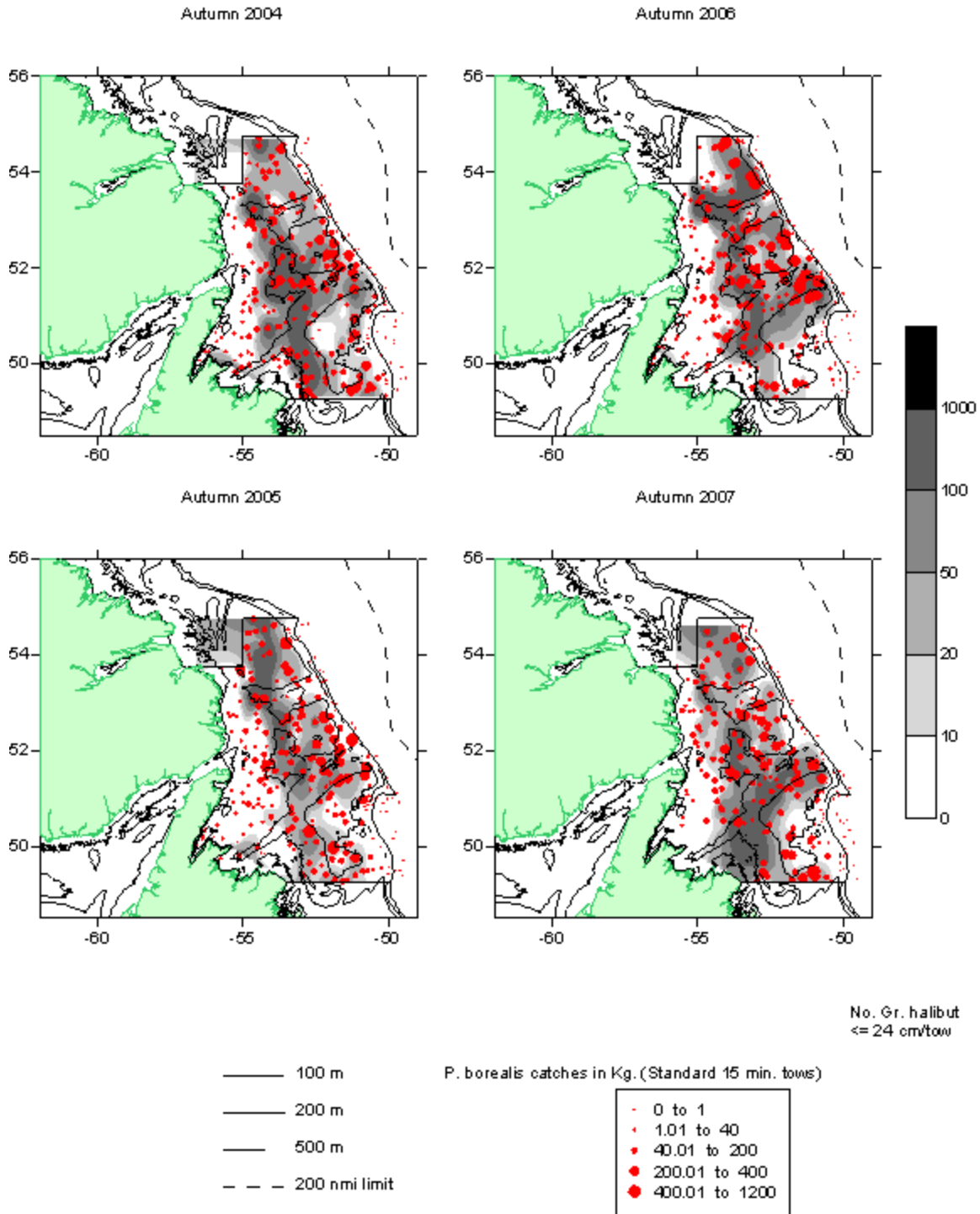


Figure 4. Distribution of northern shrimp in relation to Greenland halibut (TL≤24 cm) collected during Canadian autumn 2004 – autumn 2007 multi-species bottom trawl surveys in FA6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

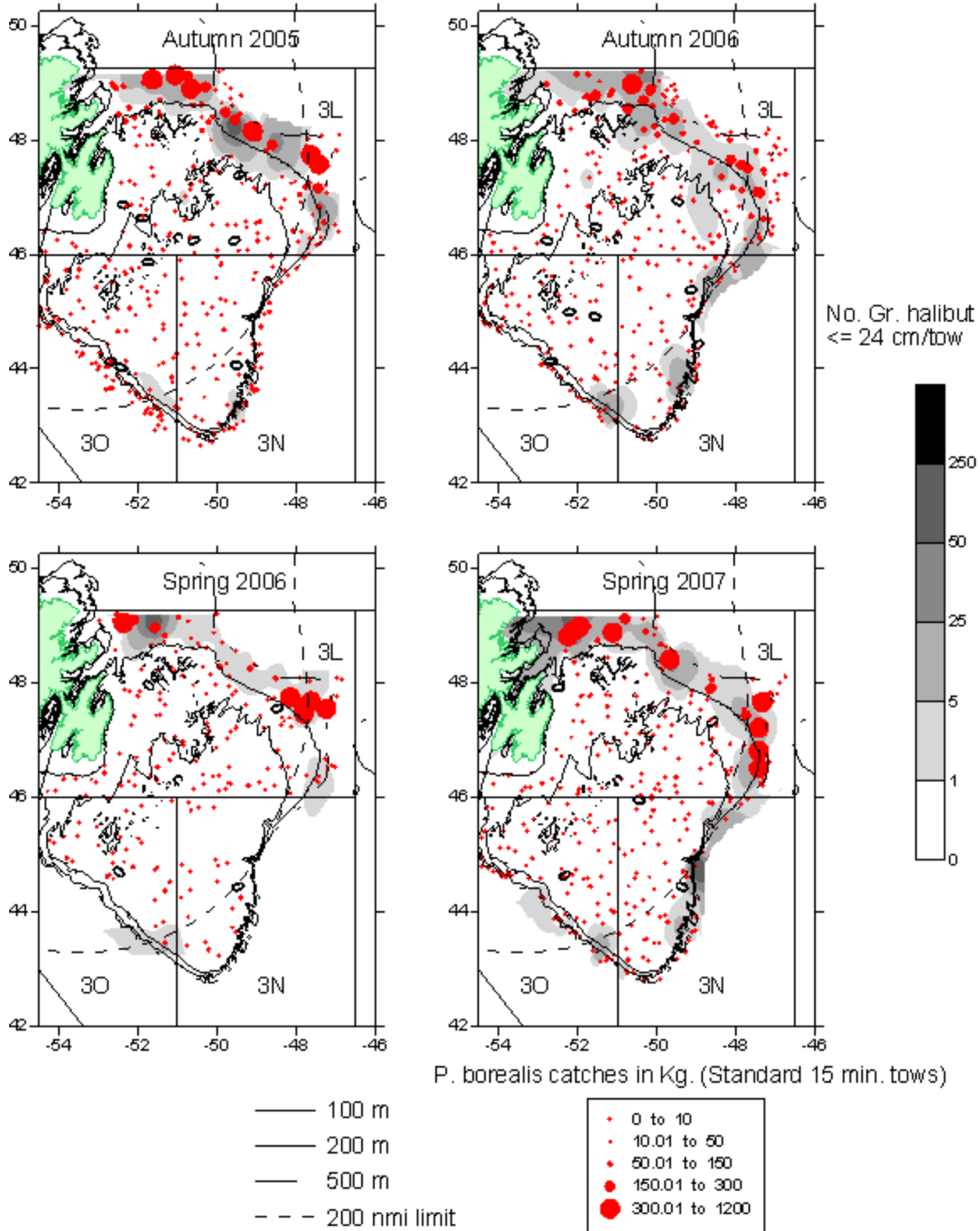


Figure 5. Distribution of northern shrimp in relation to Greenland halibut (TL ≤ 24 cm) collected during Canadian autumn 2005 – spring 2007 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

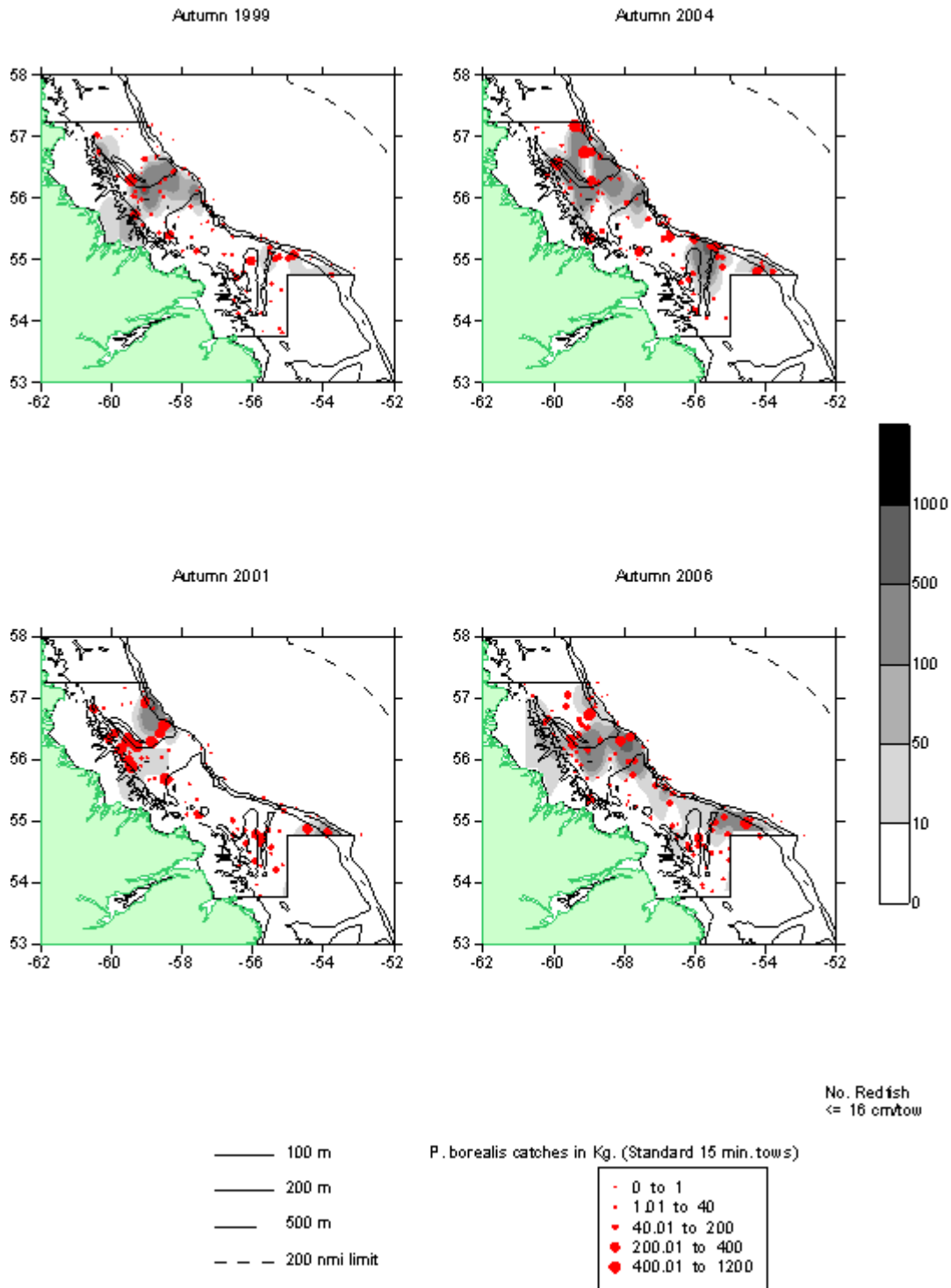


Figure 6. Distribution of northern shrimp in relation to redfish (TL≤16 cm) collected during Canadian autumn 1999 – autumn 2006 multi-species bottom trawl surveys in SFA 5 (Hopedale and Cartwright Channels). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

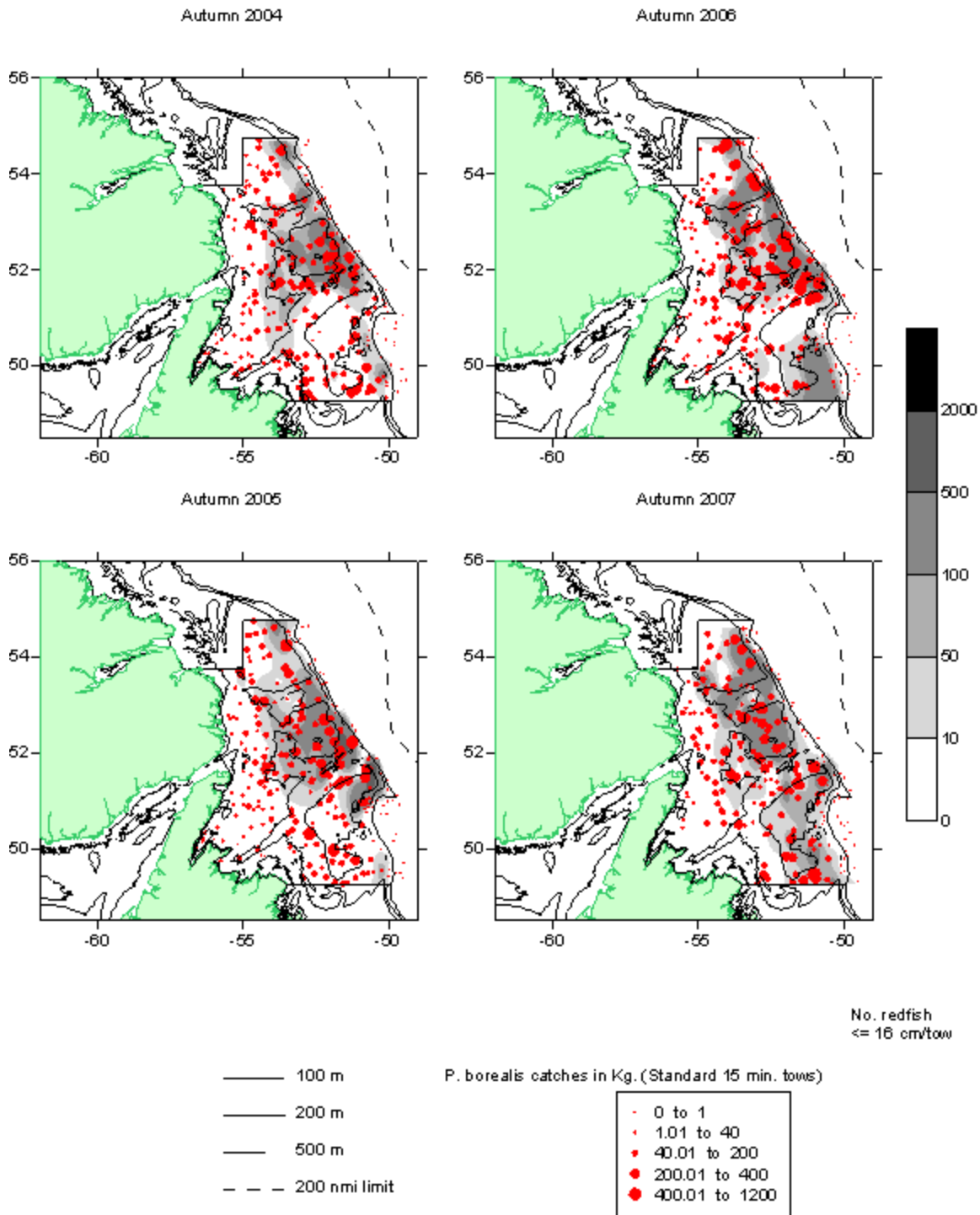


Figure 7. Distribution of northern shrimp in relation to redfish (TL≤16 cm) collected during Canadian autumn 2004 – autumn 2007 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

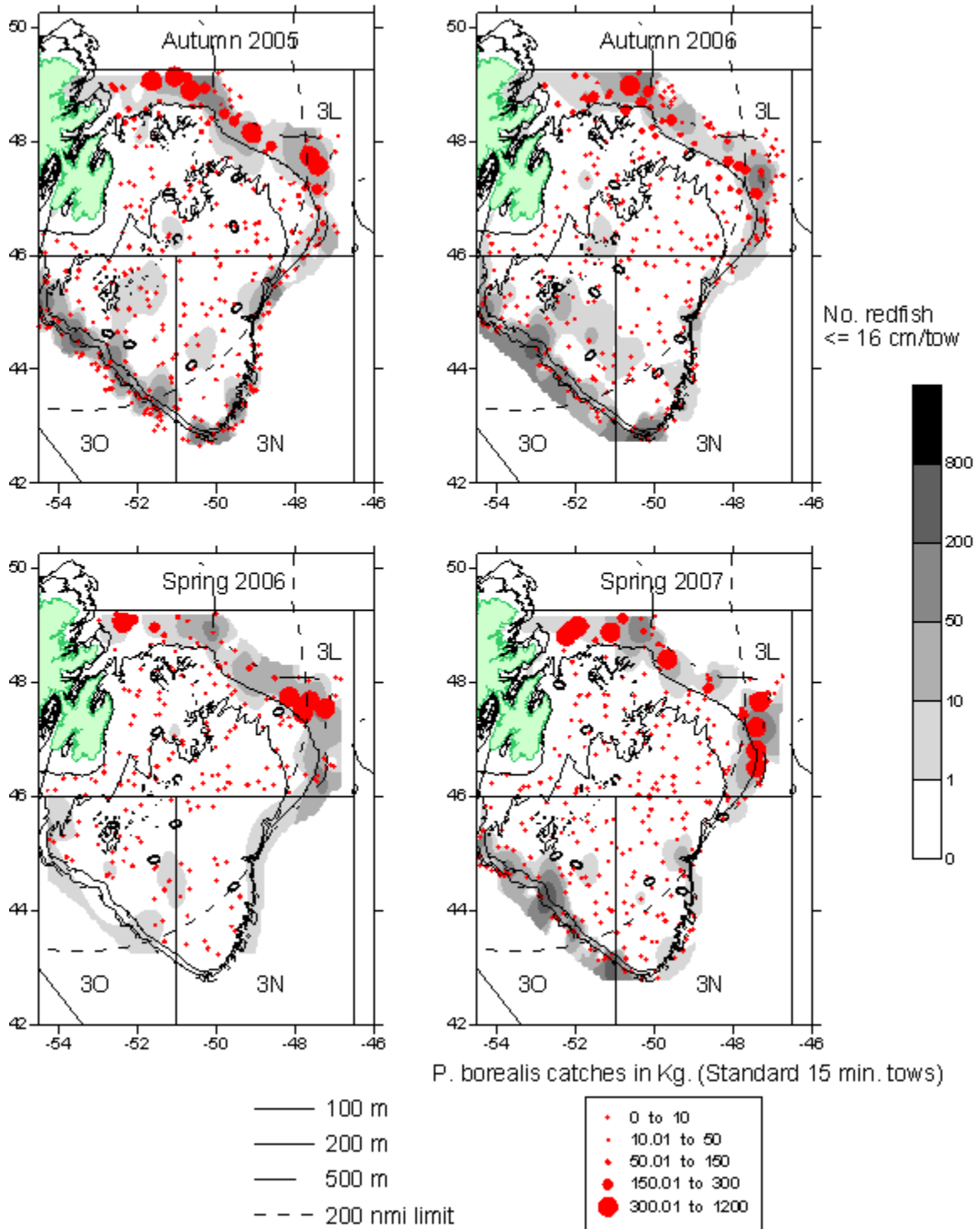


Figure 8. Distribution of northern shrimp in relation to redfish (TL ≤ 16 cm) collected during Canadian autumn 2005 – spring 2007 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

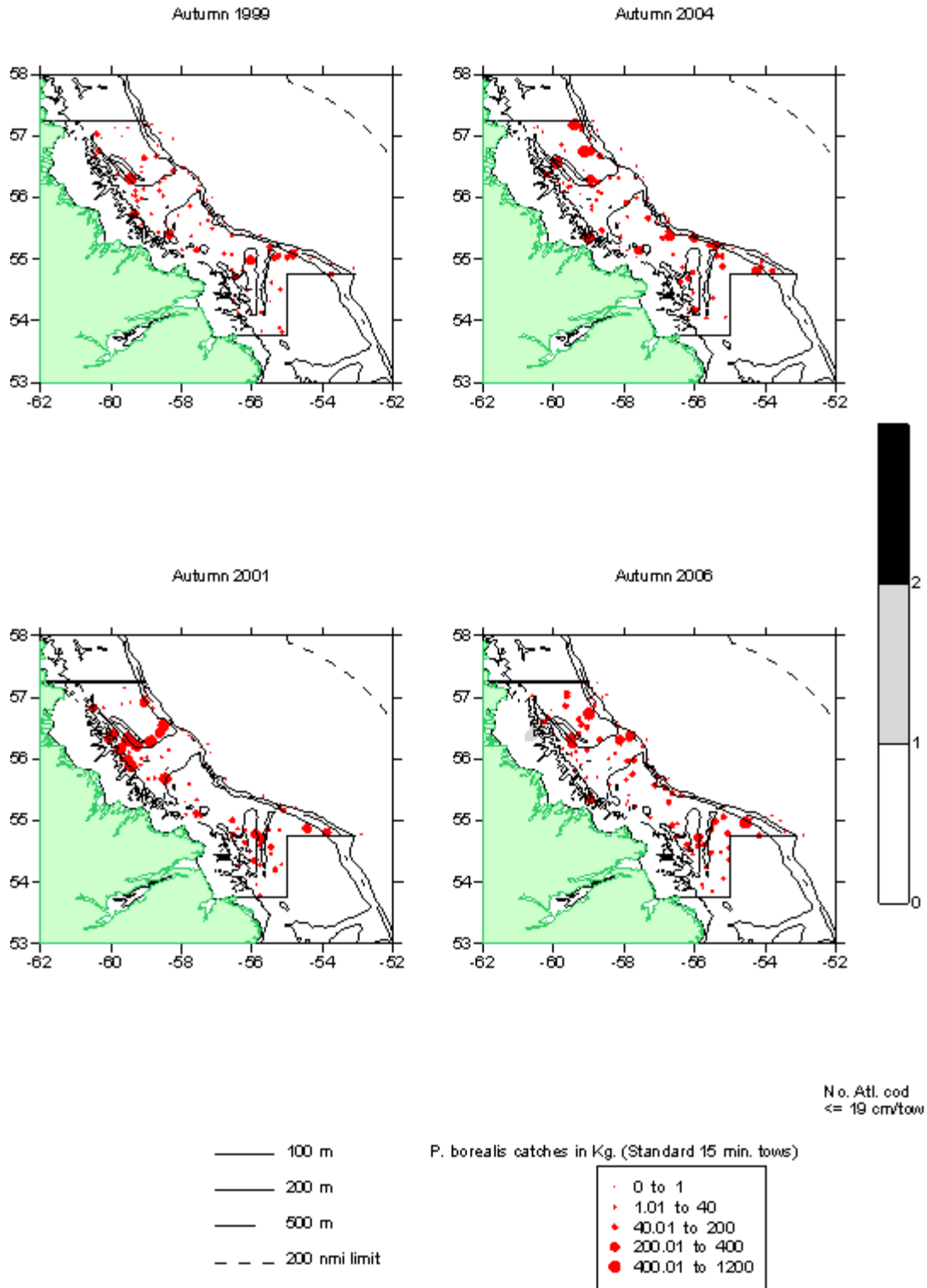


Figure 9. Distribution of northern shrimp in relation to Atlantic cod (TL≤19 cm) collected during Canadian autumn 1999 – autumn 2006 multi-species bottom trawl surveys in SFA 5 (Hopedale and Cartwright Channels). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

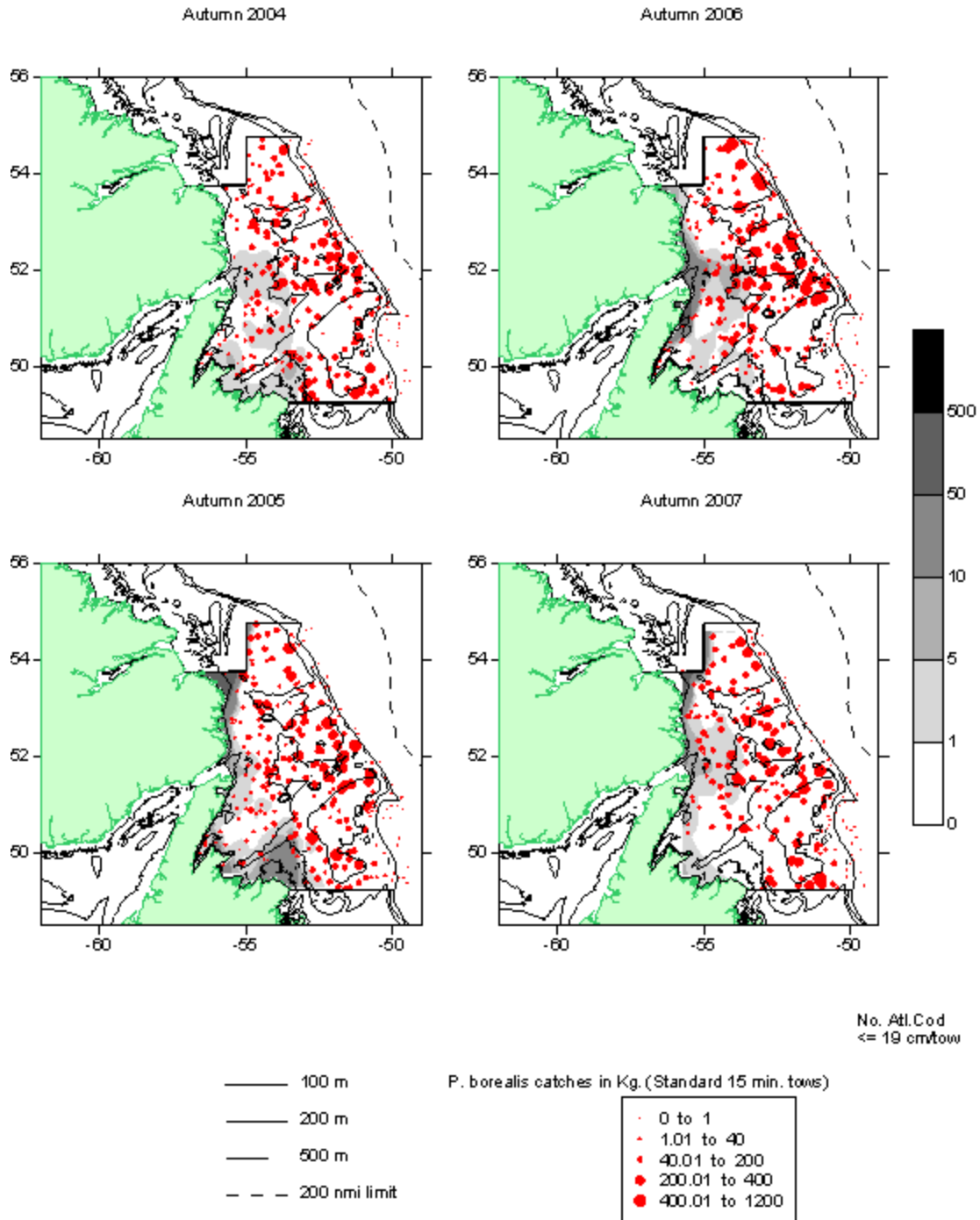


Figure 10. Distribution of northern shrimp in relation to Atlantic cod (TL≤19 cm) collected during Canadian autumn 2004 – autumn 2007 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

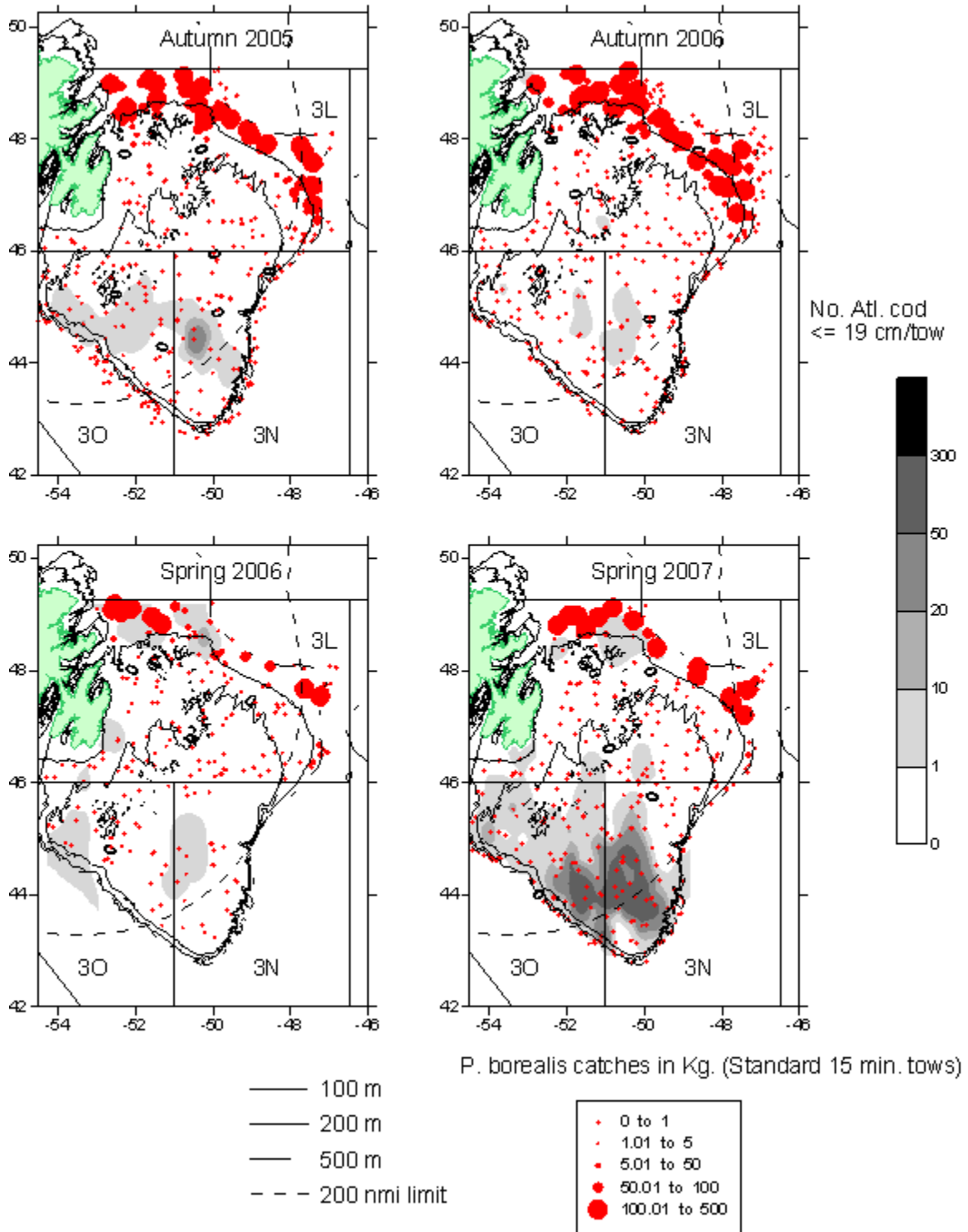


Figure 11. Distribution of northern shrimp in relation to Atlantic cod (TL ≤ 19 cm) collected during Canadian autumn 2005 – spring 2007 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

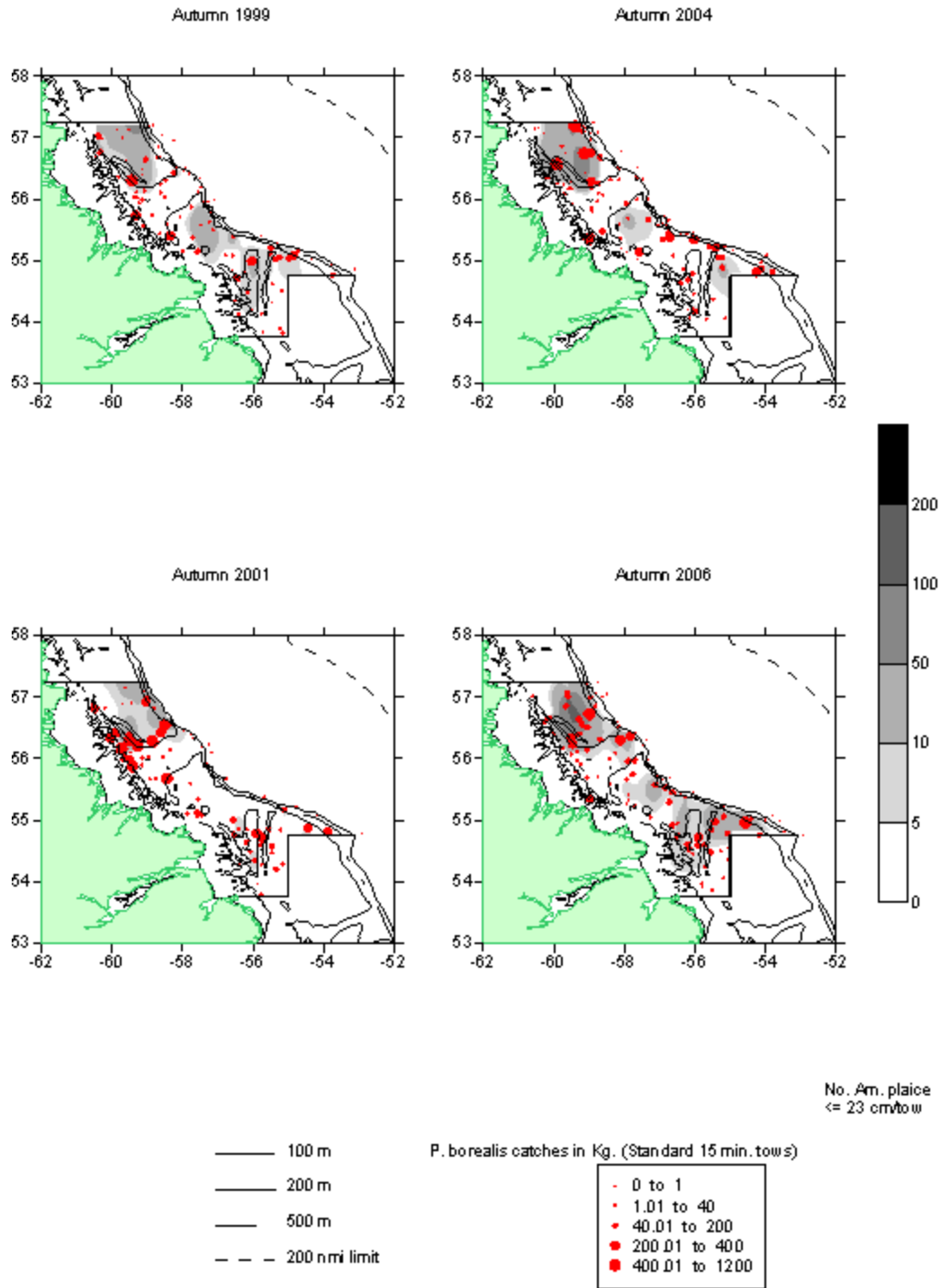


Figure 12. Distribution of northern shrimp in relation to American plaice (TL≤23 cm) collected during Canadian autumn 1999 – autumn 2006 multi-species bottom trawl surveys in SFA 5 (Hopedale and Cartwright Channels). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

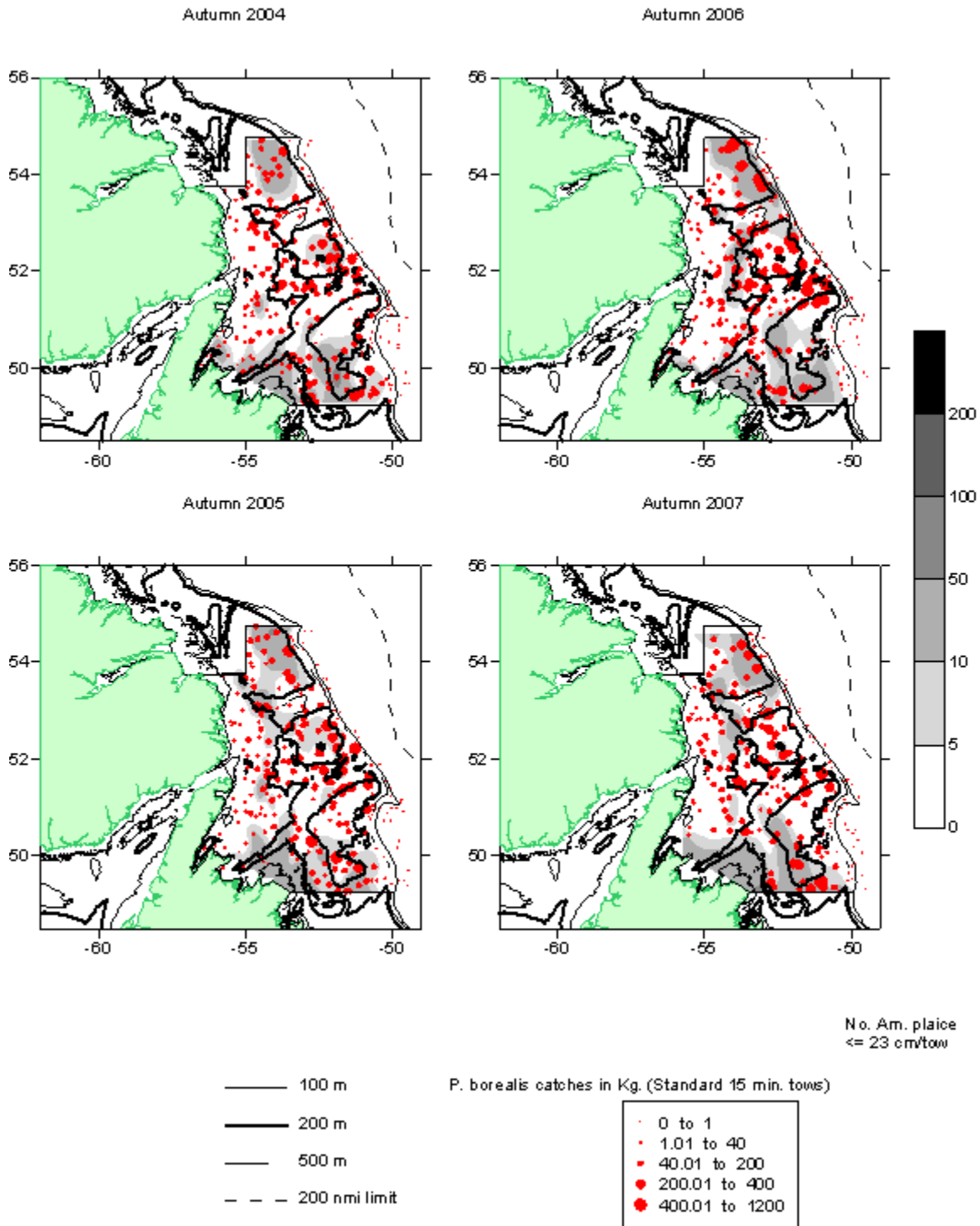


Figure 13. Distribution of northern shrimp in relation to American plaice (TL≤23 cm) collected during Canadian autumn 2004 – autumn 2007 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

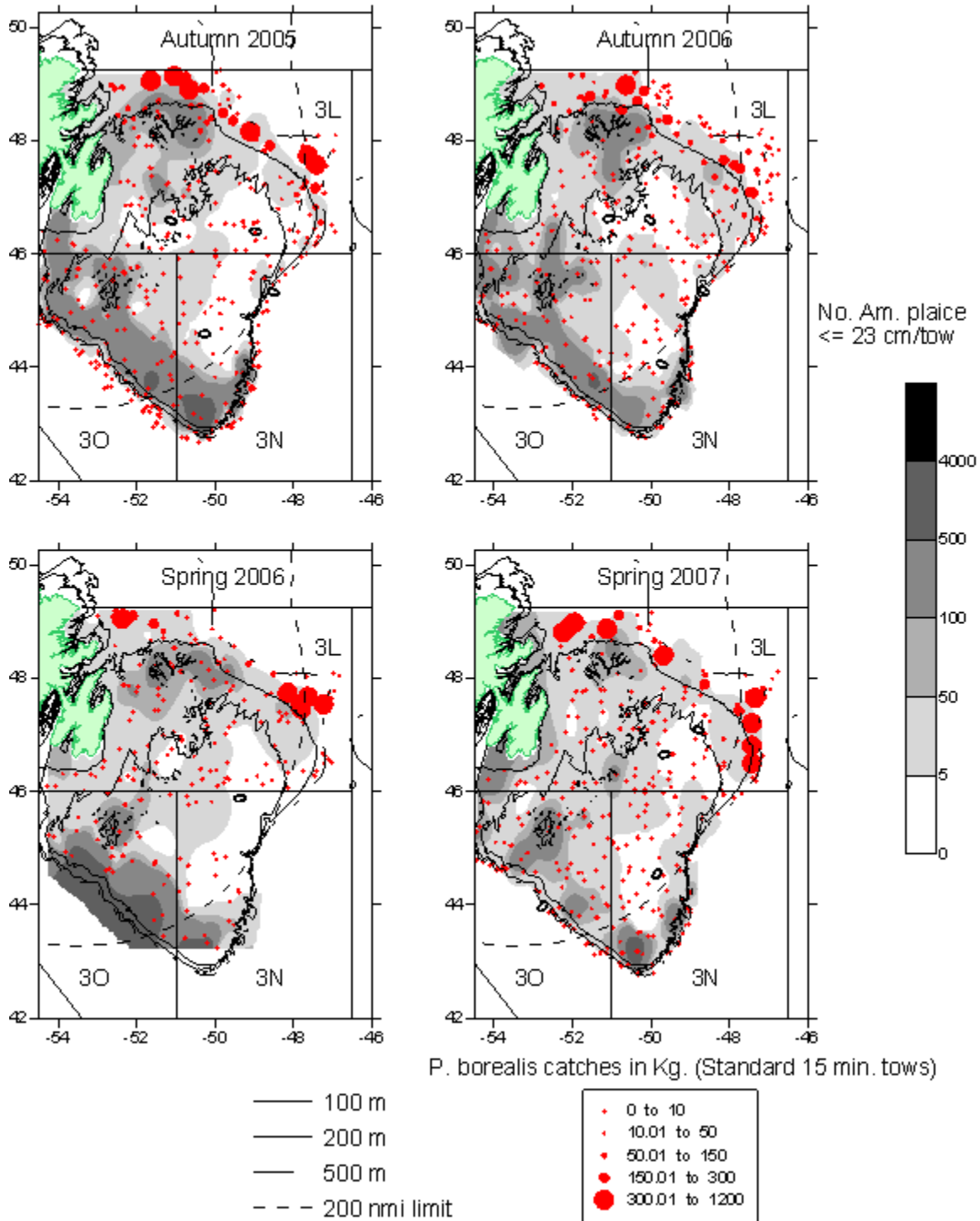


Figure 14. Distribution of northern shrimp in relation to American plaice (TL ≤ 23 cm) collected during Canadian autumn 2005 – spring 2007 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

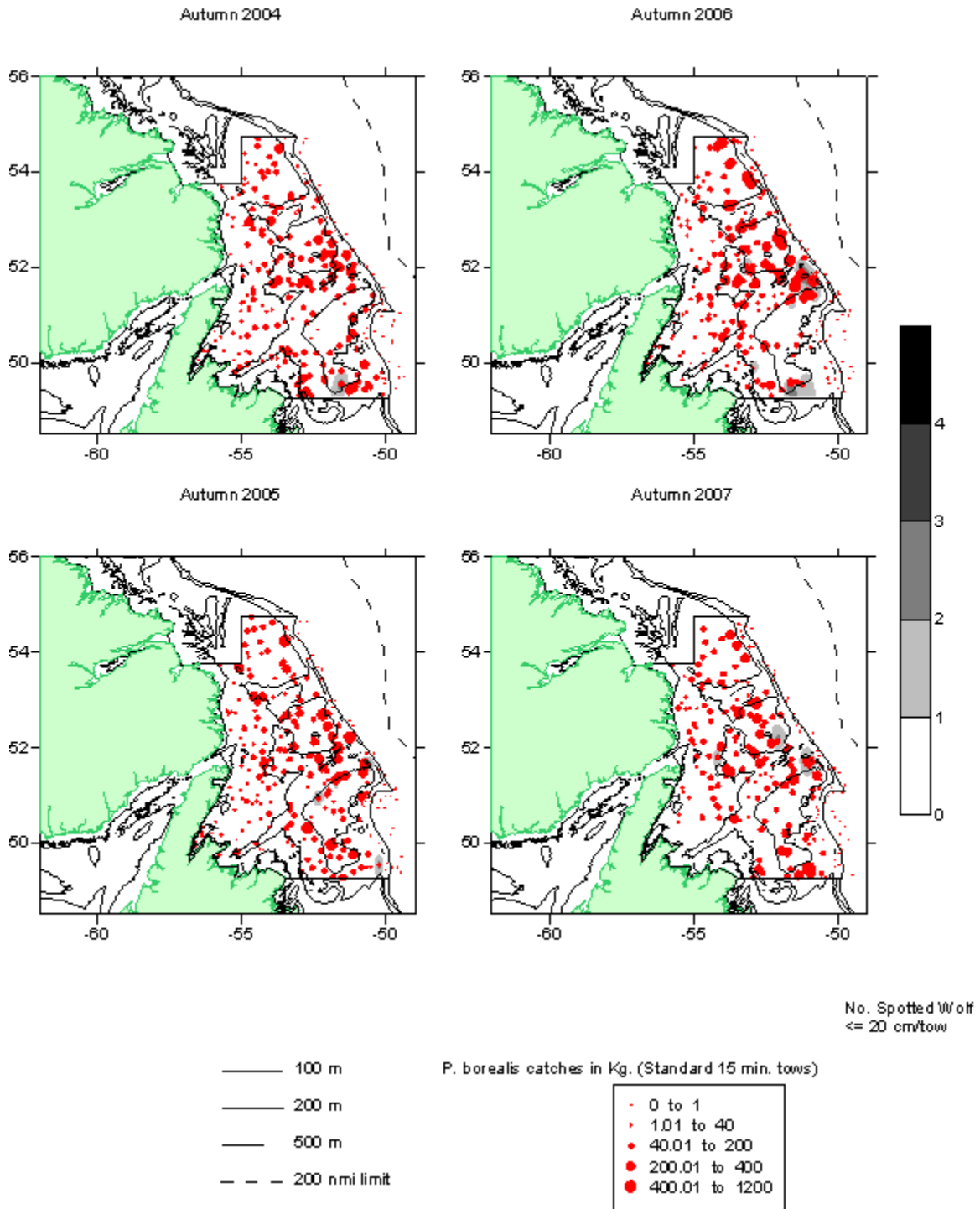


Figure 15. Distribution of northern shrimp in relation to spotted wolffish (TL≤20 cm) collected during Canadian autumn 2004 – autumn 2007 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

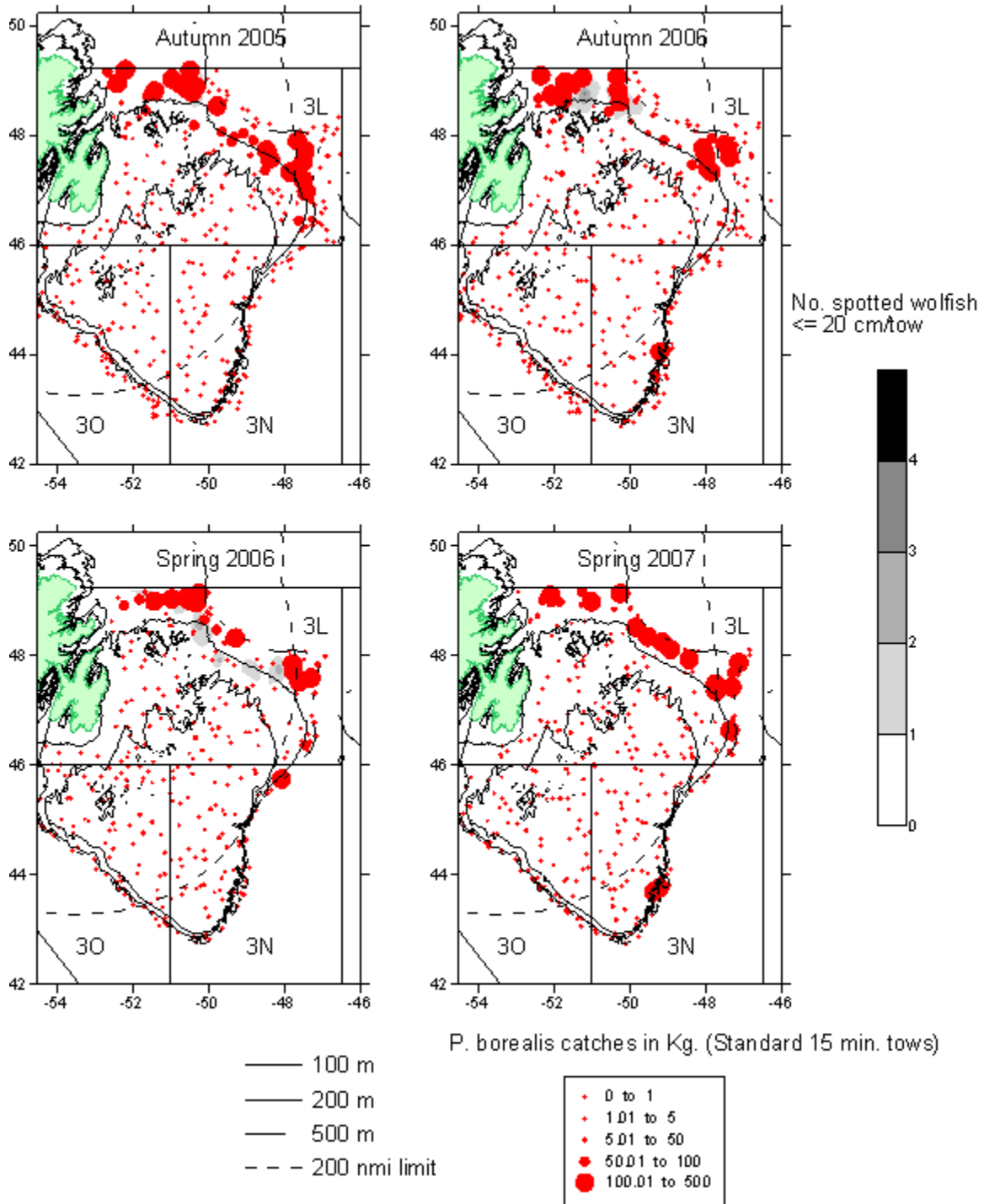


Figure 16. Distribution of northern shrimp in relation to spotted wolffish (TL ≤ 20 cm) collected during Canadian autumn 2005 – spring 2007 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

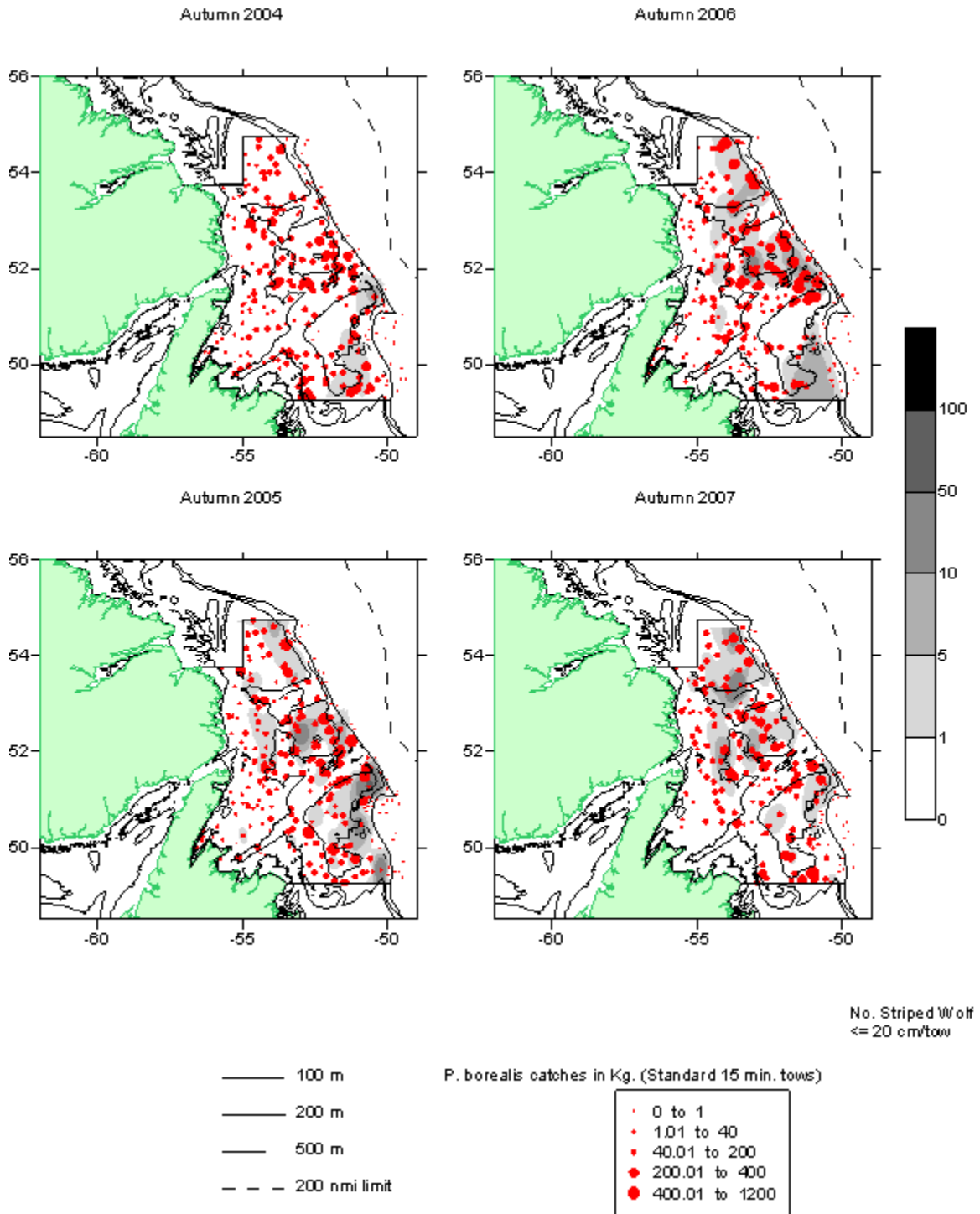


Figure 17. Distribution of northern shrimp in relation to striped wolfish (TL≤20 cm) collected during Canadian autumn 2004 – autumn 2007 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

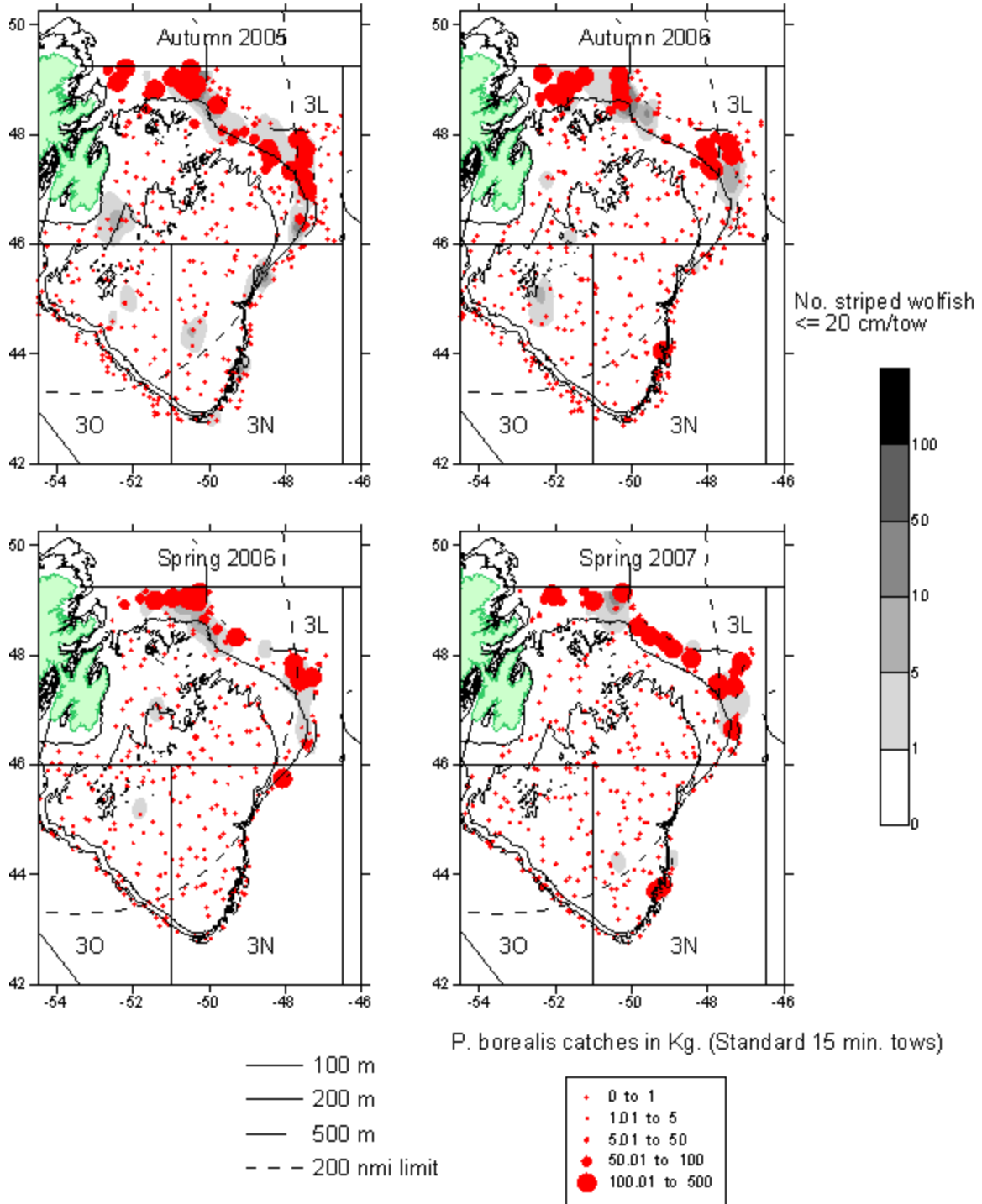


Figure 18. Distribution of northern shrimp in relation to striped wolfish (TL≤20 cm) collected during Canadian autumn 2005 – spring 2007 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).