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Groundfish by-catch within the northern shrimp fishery off the eastern coasts of Newfoundland and Labrador over the years 2007 – 2009

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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 ' length overall (LOA); <=500 t) have been granted temporary shrimp fishing licences. 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. Then in 2007, the temporary licences were converted to permanent licences. The TAC for the entire study area (northern Labrador to the southern border of 3L) has increased from 6650 t in 1980 to 150,345 t by 2009. 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. The following lists some of the 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), Canadian fishing vessel 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 hole to the fishing line (bolch line)." During September 2002, a 400 square Nmi area within Hawke Channel was closed to all but snow crab fishing. The next year, the closed area was expanded to 2500 square Nmi. Then during 2005, the Funk Island Deep box was closed to bottom trawling. These closures were to protect both Atlantic cod and juvenile snow crab.

In 2007, the offshore shrimp and groundfish sectors introduced a 12,500 square kilometre Coral Protection Zone in the northern Labrador Sea to protect coral concentrations in that area (Fig. 1). This is part of an industry-led initiative, sponsored by the Canadian Association of Prawn Producers (CAPP), the Groundfish Enterprise Allocation Council (GEAC), and the Northern Coalition (NC), which also includes other conservation measures designed to promote marine stewardship and the preservation of sensitive marine ecological features. For example, fishing captains are to collect data on all cold-water coral they encounter and communicate this information to the fleets so

that gear can be removed and/or fishing activity halted in those regions. Information gathered will also be used by industry in their research surveys so that research survey sets avoid critical coral habitat (IFMP 2010).

The Hawke Channel closure is a mandatory closure for all fisheries other than the snow crab pot fishery. The Funk Island Deep fishery is a mandatory closure for the small vessel shrimp fishing fleet but a voluntary closure for the large vessel fleet.

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 wolfish (*Anarhichas denticulatus*) and American Plaice (*Hippoglossoides* platessoides). A summary by SFA and fleet for the year 2008-09 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, attempts have 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 observer sassigned 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 April and October; therefore, the deployment scheme was restricted to that seven month period.

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. A species specific length weight relationship was applied to the bycatch length frequencies. The resultant weights were added together on a species by species and set by set basis. A ratio of observed weight to modeled weight was used to correct for the 1 kg precision. Using a ratio of corrected species catch weight versus weight of fish measured, the length frequencies were adjusted on a set by set basis. Adjusted 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 average frequency per kg was multiplied by the total by-catch weight in an effort to produce total 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 and therefore potential for impact by the shrimp fishery. 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 within that Shrimp Fishing Area.

All statistical analyses were completed using SAS version 9.01 while all plots were created using Surfer 9.11 (Golden Software, 2010).

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 2007 - 08 season because measurements were taken from less than 1% of the sets with by-catch and only 142 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 10.5 - 25.4 meaning that this fleet had an observer coverage that ranged between 9.5% and 3.9% 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 the logbook and observed positions (Fig. 2) indicates that the observed sets were spatially and temporally similar to the logbook sets. This is evidence that the small vessel observed sets may be representative of the small vessel shrimp fishery.

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.

Tables 2-12 indicate that relatively low numbers of (<400,000 animals) and weights (<20 t) of Atlantic cod (*Gadus morhua*), American plaice (*Hippoglossoides platessoides*), spotted wolffish (*Anarhichas minor*), striped wolffish (*Anarhichas lupus*), broadhead wolffish (*Anarhichas denticulatus*) had been taken by either large or small shrimp fishing fleets within each year of the 2006-07 to 2008-09 study period.

However, Greenland halibut (*Reinhardtius hippoglossoides*) by-catch taken by the large vessel fleet ranged between 2.8 t (77,000 animals) taken in SFA 4 during 2008-09 and 28 t (550,000 animals) taken in SFA 5 during 2008-09. Over the study period the small vessel Greenland halibut by-catch ranged between 0.9 t (38,000 animals) taken in SFA 7 during 2007 and 117 t (1,125,000 animals) taken in SFA 6 during 2008. 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 0.27 kg/t and 1.16 kg/t for the large vessel fleet while it was 0.07 kg/t and 2.03 kg/t for the small vessel fleet.

Over the three year study period, redfish (*Sebastes* spp.) by-catch taken by the large vessel fleet ranged between 2.5 t (25,000 animals) taken from SFA 4 during 2007-08 and 14 t (174,000 animals) taken from SFA 5 during 2008-09. Over the same period, the small vessel redfish by-catch ranged between 28 t taken from SFA 7 during 2008 (1,040,000 animals) and 212 t (5,011,000 animals) taken in SFA 6 during 2008. In terms of weight of redfish by-catch (kg) per ton of shrimp taken, the metric ranged between 0.15 kg/t and 0.75 kg/t for the large vessel fleet while it was 1.53 kg/t and 3.68 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 3-5 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, relatively high abundances of Greenland halibut and the fact that they swim upright allowing relatively large animals to pass through the Nordmore Grate, result in relatively high Greenland halibut by-catchs within the shrimp fishery.

Redfish

Both shrimp and juvenile redfish (≤ 16 cm total length) are commonly found in the channels and along the 2J3KL shelf edge in water between 200 and 500 m (Figs. 6-8). 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 Grate, 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 2GHJ3KL 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 also be due to the fact that it swims on its side.

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. Similarly, 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 much lower than they are for the groundfish species described above. Broadhead and spotted wolfish (COSEWIC, 2001 a and b) are presently listed as threatened while striped wolfish are of special concern (COSEWIC, 2000).

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 20 t per year. There is more overlap between juvenile redfish, Greenland halibut and the shrimp fishery. By-catch is greatest among these groundfish.

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 accounting of all bycatch species. Some species such as skates which are very hard to identify when small, and therefore have been grouped. Having said that the values of easily identified species (e.g. Capelin, Greenland halibut 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 commonly in the list from all nations. Capelin, Greenland halibut, lanternfish, redfish, American plaice were the most common by-catch species found in the Estonian and Spanish shrimp catches.

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Table 1. The stratified deployment scheme used to assign observers on the
vessel shrimp fishing fleet during 2009. The
area and month.Canadian small
numbers represent the requested days per

Port Area	Month									
Fort Alea	April	May	June	July	August	September	October	Total		
Cook's Harbour – Goose Cove (near St. Anthony)	2	9	35	43	39	18	4	150		
Ireland's Bight – Roddickton (includes Englee)	0	0	0	0	0	0	0	1		
Great Harbour Deep	0	0	0	0	0	0	0	0		
Jackson's Arm – Middle Arm	0	0	5	7	6	2	1	21		
Rattling Brook – Triton	0	0	0	0	0	0	0	0		
Glover's Harbour – Newstead	0	0	0	0	0	0	0	0		
Summerford – Carmanville	0	5	25	29	24	12	2	97		
Aspen Cove – Gambo	0	0	1	1	1	0	0	4		
Glovertown – Bonavista	0	0	0	0	0	0	0	1		
Lance Cove – Clarenville	1	15	23	31	34	14	4	122		
Snook's Harbour – Old Perlican	1	6	9	12	15	6	2	50		
Grate's Cove – Port de Grave	2	11	14	25	31	15	4	102		
Hussey's Cove – Quidi vidi	0	0	1	2	3	1	0	7		
St. John's	3	5	4	3	1	1	0	17		
Blackhead (Freshwater Bay) – Cape Broyle	0	0	0	0	0	0	0	0		
Calvert – St. Shotts	0	0	0	0	0	0	0	0		
St. Stephen's – St. Leonard's	0	0	0	0	0	0	0	0		
Isle au Valen – English Harbour, Fortune Bay	0	0	0	0	0	0	0	0		
Femme – St. Alban's	0	0	0	0	0	0	0	0		
Great Jarvis – Lapoile	0	0	0	0	0	0	0	0		
West Point – Lewis Brook	0	0	0	0	0	0	0	0		
Shag Island – River of Ponds	0	0	0	0	0	0	0	0		
Spirity Cove – L'anse Aux Loop	0	2	2	7	7	2	0	19		
Red Bay – Murray's Harbour	0	0	0	0	0	0	0	0		
Port Hope Simpson - Cartwright	0	0	6	15	15	10	1	46		
Grand Total								639		

Number of observer days per area and month assuming approximately 640 sea days.

Table 2. NAFO Division 2G (Shrimp Fishing Area 4) Canadian large vessel (>500 t) bycatch over the period 2006 - 07 to 2008-09. 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.

an the logbook catch,	the	correc	tion fa	ctor is	1.		
			1	Atlantic Cod			ican Plaio
	Year	2006-07	2007-08	2008-09	2006-07	2007-08	2008-0
Observed shrimp catch (t)		9,890	10,642	6,632	9,890	10,642	6,63
ogbook shrimp catch (t)		10,009	9,682	10,654	10,009	9,682	10,65
orrection factor		1.0120	1.0000	1.6065	1.0120	1.0000	1.606
stimated bycatch (kg)		62	122	4,966	2,318	1,086	2,74
sycatch (kg)/ (t) shrimp		0.01	0.01	0.47	0.23	0.10	0.2
otal number of sets observed		1668	1622	866	1,668	1,622	86
umber of sets with bycatch		60	110	142	673	800	27
eq. sets with 1Kg recorded		31	70	12	328	431	4
ercent bycatch sets with 1Kg recorded		51.67%	63.64%	8.45%	48.74%	53.88%	17.88
umber sets with measurements		15	1	0	22	5	
ercent bycatch sets with measurements		25.00%	0.91%	0.00%	3.27%	0.63%	0.00
umber of fish measured		26	1	0	991	142	
otal length							
	cm	estimated nu				number at le	ngth
	1	0	0	0	0	0	
	2	0	0	0	0	0	
	4	0	0	0	0	0	
	5	0	0	0	0	0	
		0	0	0	0	0	
	6 7	0	0		0	0	
	8	0	0	0	0	0	
	8	0	0	0	22	0	
	10	0	0	0	22 90	0	
	11	0	0	0	90	115	
	12	0	0	0	0	121	
	12	0	0	0	142	0	
	13	0	0	0	246	724	
	15	0	0	0	699	1,074	
	16	0	0	0	660	1,304	
	17	0	0	0	533	1,201	
	18	0	0	0	721	2,040	
	19	0	0	0	1,176	1,931	
	20	0	0	0	1,880	2,988	
	21	0	0	0	2,377	1,649	
	22	0	0	0	1,441	833	
	23	11	0	0	1,266	724	
	24	16	0	0	886	712	
	25	0	0	0	1,061	350	
	26	16	0	0	1,037	471	
	27	0	0	0	1,289	362	
	28	0	0	0	703	115	
	29	0	0	0	753	115	
	30	0	0	0	327	0	
	31	5	0	0	242	0	
	32	0	0	0	190	0	
	33	0	0	0	305	0	
	34	11	0	0	102	0	
	35	0	0	0	305	0	
	36	0	0	0	22	0	
	37	16	283	0	22	0	
	38	16	0	0	37	0	
	39	0	0	0	65	0	
	40	5	0	0	22	121	
	41	0	0	0	0	0	
	42	0	0	0	0	0	
	43	11	0	0	0	0	
	44	11	0	0	0	0	
	45	5	0	0	0	0	
	46	5	0	0	0	0	
	47	0	0	0	0	0	
	48	0	0	0	0	0	
	49	11	0	0	0	0	
	50	0	0	0	0	0	
	51	0	0	0	0	0	
	52	0	0	0	0	0	
	53	0	0	0	0	0	
	54	0	0	0	0	0	
	55	0	0	0	0	0	
	56	0	0	0	0	0	
	57	0	0	0	0	0	
		0	0	0	0	0	
	58					0	
	59	0	0	0	0	0	
	59 60	0 0	0 0	0	0	0	
	59 60 61	0 0 0	0 0 0	0	0 0	0	
	59 60 61 62	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	
	59 60 61	0 0 0	0 0 0	0	0 0	0	

Table 2.

(Continued)

tinued)				Dadfah		Crear	and Halib
	Year	2006-07	2007-08	Redfish 2008-09	2006-07	2007-08	and Halib 2008-0
Observed shrimp catch (t)	i cai	9,890	10,642	6,632	9,890	10,642	6,63
Logbook shrimp catch (t)		10,009	9,682	10,654	10,009	9,682	10,65
correction factor		1.0120	1.0000	1.6065	1.0120	1.0000	1.606
stimated bycatch (kg)		3,422	2,506	5,063	6,916	5,664	2,83
Bycatch (kg)/ (t) shrimp		0.35	0.24	0.48	0.70	0.53	0.2
		4 000	4 000	000	4 000	1 000	
otal number of sets observed number of sets with bycatch		1,668 1,116	1,622 1,196	866 854	1,668 1,610	1,622 1,555	86 77
req. sets with 1Kg recorded		44	1,130	2	1,010	287	19
ercent bycatch sets with 1Kg recorded		3.94%	1.51%	0.23%	12.11%	18.46%	25.32
umber sets with measurements		36	42	31	13	23	
ercent bycatch sets with measurements		3.23%	3.51%	3.63%	0.81%	1.48%	1.29
umber of fish measured otal length		8,331	7,650	7,181	1,857	3,540	90
Jan Kingtii	cm	estimated nun	nber at lengt	h	estimated n	umber at le	ngth
	1 2	0	0 0	0	0 0	0	
	3	0	0	0	0	0	
	4	0	0	0	0	0	
	5	90	0	0	0	0	
	6	1,822	127	32	0	108	
	7	4,901	135	1,364	0	1,502	3
	8	3,670	2,151	9,727	336	4,627	1:
	9	3,844	8,131	7,531	1,678	1,719	9 [.]
	10 11	4,011	8,999 3,356	2,004	1,548 596	664 461	3,0
	11	3,257 3,888	3,356	7,593 11,222	596 1,643	2,923	9,72 16,4
	12	3,301	367	4,093	5,854	8,988	18,9
	14	1,614	298	696	13,365	13,126	7,5
	15	1,141	210	25	10,535	13,612	7
	16	1,633	103	38	10,243	8,031	6
	17	692	89	2	12,188	4,207	8
	18	174	44	1	9,333	1,183	3,6
	19	57	3	0	4,160	975	4,93
	20	14	2	0	1,902	2,643	3,43
	21	7	0	1	3,131	4,680	1,8
	22	7	0	0	2,451	6,285	1,4
	23 24	5 1	0 0	0	2,298	6,045	20
	24 25	0	0	1 0	1,718 1,763	4,333 3,048	1,0 24
	25	1	0	0	718	1,298	3
	27	0	0	0	619	1,003	3
	28	0	Ő	0	588	758	3
	29	0	0	0	504	814	1:
	30	0	0	0	237	733	:
	31	0	0	0	191	491	
	32	0	0	0	420	244	
	33	0	0	0	267	55	
	34	0	0	0	267	110	
	35	0	0	0	153	0	
	36 37	0	0 0	0 0	38 76	81 26	
	37	0	0	0	76 0	26 55	
	39	0	0	0	38	0	
	40	0	0	0	0	0	
	41	0	0	0	0	0	
	42	0	0	0	0	0	
	43	0	0	0	0	0	
	44	0	0	0	0	0	
	45	0	0	0	0	0	
	46	0	0	0	0	0 0	
		~	~			0	
	47 48	0	0	0	0		
	48	0	0	0	0	0	
	48 49	0 0	0 0	0 0	0 0	0 0	
	48	0	0	0 0 0	0	0	
	48 49 50	0 0 0	0 0 0	0 0	0 0 0	0 0 0	
	48 49 50 51	0 0 0	0 0 0	0 0 0 0	0 0 0 0	0 0 0	
	48 49 50 51 52	0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0	0 0 0 0 0 0	
	48 49 50 51 52 53 54 55	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0	
	48 49 50 51 52 53 54 55 56	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0	
	48 49 50 51 52 53 54 55 56 57	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	
	48 49 50 51 52 53 54 55 56 57 58	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	
	48 49 50 51 52 53 54 55 56 57 58 59	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	
	48 49 50 51 52 53 54 55 56 57 58 59 60	0 0 0 0 0 0 0 0 0 0 0 0 0 0		0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	
	48 49 50 51 52 53 54 55 56 57 58 59 60 61			0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
	48 49 50 51 52 53 54 55 56 57 58 59 60	0 0 0 0 0 0 0 0 0 0 0 0 0 0		0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0	

Table 2. Continued

		Striped Wo	olfish		Spotted W	olfish		Broadhead	Wolfish	
	Year	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Observed shrimp catch (t)		9,890	10,642	6,632	9,890	10,642	6,632	9,890	10,642	6,632
Logbook shrimp catch (t) correction factor		10,009 1.0120	9,682 1.0000	10,654 1,6065	10,009 1.0120	9,682 1.0000	10,654 1.6065	10,009 1.0120	9,682 1.0000	10,654 1.6065
estimated bycatch (kg)		580	425	1.6063	45	76	27	25	44	1.0003
Bycatch (kg)/ (t) shrimp		0.06	0.04	0.01	0.00	0.01	0.00	0.00	0.00	0.00
Byouton (ng), (t) similip		0.00	0.01	0.01	0.00	0.01	0.00	0.00	0.00	0.00
total number of sets observed		1,668	1,622	866	1,668	1,622	866	1,668	1,622	866
number of sets with bycatch		374	293	55	36	64	17	9	43	8
freq. sets with 1Kg recorded		287	222	55	33	63	17	6	42	8
percent bycatch sets with 1Kg recorded		76.74%	75.77%	100.00%	91.67%	98.44%	100.00%	66.67%	97.67%	100.00%
number sets with measurements		48	0	2	5	0	0	0	0	0
percent bycatch sets with measurements		12.83%	0.00%	3.64%	13.89%	0.00%	0.00%	0.00%	0.00%	0.00%
number of fish measured		820	0	0	14	0	0	0	0	0
total length	cm	estimated n	umbar at la	noth	actimated r	number at le	math	actimated a	number at lens	rth
	1	0		11gui 0	0	0	ngui 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 0 0
	6	0	0	0	0	0	0	0		0
	7	0	0	0	0	0	0	0	0	0
	8 9	0 19	0	0	0 9	0	0	0	0	0 0
	9 10	19 50	0	0	9	0	0	0	0	0
	10	37	0	0	0	0	0	0		0 0
	12	10	0	0	0	0	0	0	0	0
1	12	69	0	0	9	0	0	0		0
1	14	152	0	0	9	0	0	0	0	0 0
	15	127	0	0	0	0	0	0	0	0
	16	162	0	0	9	0	0	0		0
	17	227	0	0	0	0	0	0	0	0
	18	294	0	0	0	0	0	0		0 0
	19	313	0	0	0	0	0	0	0	0
	20 21	260 240	0	0	0	0	0	0	0	0
	21	240	0	0	9	0	0	0	0	0
	23	252	0	0	18	0	0	0	0	0
	24	253	0	0	0	0	0	0	0	0
	25	241	0	0	0	0	0	0	0	0
	26	216	0	0	0	0	0	0		0
	27	177	0	0	0	0	0	0	0	0
	28	80	0	0	0	0	0	0	0	0
	29	79	0	0	0	0	0	0		0
	30	177	0	0	0	0	0	0	0	0
	31 32	67 44	0	0	0	0	0	0	0	0
	33	44	0	0	0	0	0	0	0	0
	34	8	0	0	0	0	0	0		0
	35	10	0	0	0	0	0	0	0	0
	36	0	0	0	0	0	0	0	0	0 0
	37	8	0	0	0	0	0	0	0	0
	38	8	0	0	0	0	0	0	0	0
1	39	8 0	0	0	0	0	0	0		0
	40 41	0	0	0	0	0	0	0	0	0
	41	8	0	0	0	0	0	0	0	0 0
	43	0	0	0	0	0	0	0	0	0
1	44	16	0	0	0	0	0	0	0	0
1	45	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 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	0
	51 52	0	0	0	0 0 0	0	0	0	0	
	52 53	8	0 0 0	0 0	0	0	0	0	0	0
	53 54	0	0	0	0	0	0	0	0	0
	55	0	0	0	0	0	0	0	0	0
	56	0	0	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	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	0	0 0	0	0
	62	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0	0	0	0	0	0	0
Tetel	63		0	0	0	0	0	0	0	0
Total		3,851	0	0	62	0	0	0	0	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 2008 – 09.

number of fishing number of species			1052 95		
		OCCUR	WEIGHT	WEIGHT	
	OCCUR	(%)	kq	(%)	Common name
	525	49.90	788	0.01	SKATES (NS)
	169	16.06	356	0.00	HERRING, ATLANTIC
	917	87.17	134017	1.85	CAPELIN
	917 4	0.38	7	0.00	BLACKSMELT, GOITRE
	1	0.38	1	0.00	ANGLEMOUTH, LONGTOOTH
	49	4.66	70	0.00	VIPERFISH
	49 26	2.47	31	0.00	DRAGONFISH, BOA
	376	35.74	2063	0.03	LANTERNFISHES (NS)
	256	24.33	507		
	256			0.01	BARRACUDINAS (NS)
		0.86	39	0.00	EELS, FRESHWATER (NS)
	37	3.52	45	0.00	EELS, SNIPE (NS)
	19	1.81	19	0.00	SNIPE EEL, ATLANTIC
	8	0.76	9	0.00	SNIPE EEL, SHORTNOSE
	145	13.78	169	0.00	COD, ATLANTIC
	6	0.57	8	0.00	HAKE, LONGFIN
	9	0.86	12	0.00	HAKE, RED (SQUIRREL)
	19	1.81	20	0.00	HAKE, WHITE (COMMON)
	75	7.13	92	0.00	COD, ARCTIC
	28	2.66	28	0.00	THREEBEARD ROCKLING
	19	1.81	19	0.00	THREEBEARD RKLG,SILVER
	1	0.10	1	0.00	CUSK
	24	2.28	24	0.00	FOURBEARD ROCKLING
	11	1.05	11	0.00	GRENADIERS (NS)
	6	0.57	6	0.00	GRENADIER, ROUGHHEAD
	4	0.38	4	0.00	MARLIN SPIKE (COMMON)
	1	0.10	1	0.00	GRENADIER, ROUNDNOSE
	10	0.95	109	0.00	SAND LANCES (NS)
	74	7.03	141	0.00	SAND LANCES (NS)
	1	0.10	1	0.00	WOLFFISH, BROADHEAD
	149	14.16	192	0.00	WOLFFISH,STRIPED
	14	1.33	14	0.00	WOLFFISH, SPOTTED
	3	0.29	4	0.00	SHANNY, ARCTIC
	223	21.20	362	0.00	FOURLINE SNAKEBLENNY
	1	0.10	1	0.00	SHANNY, RADIATED
	354	33.65	569	0.01	BLENNIES (NS)
	609	57.89	2474	0.03	EELPOUTS (NS)
	133	12.64	541	0.01	EELPOUT (NS)
	1	0.10	1	0.00	POUT, OCEAN (COMMON)
	1	0.10	1	0.00	OCEAN POUT, GREEN
	753	71.58	6937	0.10	REDFISH (NS) SEB.SP.
	60	5.70	77	0.00	SCULPINS (NS)
	1	0.10	1	0.00	SEA RAVEN
	140	13.31	142	0.00	HOOKEAR SCULPIN (NS)
	335	31.84	714	0.01	MAILED SCULPINS (NS)
	4	0.38	4	0.00	SCULPIN, RIBBED (HORNE
	7	0.67	9	0.00	SCULPIN, ARCTIC STAGHOR
	1	0.10	3	0.00	MUDDLER (NS)
	1	0.10	1	0.00	SCULPIN, DEEP SEA

Table 3 (Continued)

	OCCUR	WEIGHT	WEIGHT	
OCCUR	(%)	kg	(%)	Common name
1	0.10	3	0.00	TWOHORN SCULPIN (NS)
92	8.75	107	0.00	ALLIGATORFISH (NS)
106	10.08	144	0.00	ALLIGATORFISH, NORTHERN
288	27.38	294	0.00	ALLIGATORFISH, COMMON
28	2.66	28	0.00	LUMPFISH (NS) EUM.SP.
5	0.48	5	0.00	LUMPFISH, COMMON
27	2.57	28	0.00	SEASNAILS (NS)
769	73.10	4945	0.07	AMERICAN PLAICE
8	0.76	16	0.00	WITCH FLOUNDER
2	0.19	26	0.00	YELLOWTAIL FLOUNDER
1014	96.39	10000	0.14	GREENLAND HALIBUT
1	0.10	3	0.00	FLOUNDER, WINTER
145	13.78	2385	0.03	REDFISH, LARGE
28	2.66	366	0.01	UNIDENTIFIED FISH
29	2.76	29	0.00	SPONGE
25	2.38	30	0.00	CNIDARIAN
1	0.10	1	0.00	SCYPHOZOAN
23	2.19	23	0.00	ANTHOZOAN
13	1.24	13	0.00	SEA ANEMONE
1	0.10	1	0.00	WHELK BUCC.
75	7.13	84	0.00	CEPHALOPOD (NS)
8	0.76	8	0.00	OCTOPUS OCTOPODA
1	0.10	5	0.00	MYSID
1	0.10	3	0.00	EUPHAUSIID EUPH.SP.
3	0.29	3	0.00	DECAPOD, CRUSTACEAN
90	8.56	97	0.00	SHRIMP NATA.
50	4.75	1033	0.01	SHRIMP SERG.ARC.
2	0.19	575	0.01	SHRIMP PASIP.MUL.
б	0.57	б	0.00	SHRIMP EUAL.GAI.GAI.
2	0.19	2	0.00	SHRIMP LEB.POL.
1047	99.52	7089598	97.63	SHRIMP PAND.BOR.
117	11.12	1006	0.01	SHRIMP PAND.MON.
16	1.52	83	0.00	SHRIMP SCLE.FER.
27	2.57	27	0.00	SHRIMP SAB.SAR.
58	5.51	104	0.00	SHRIMP ARG.DEN.
2	0.19	2	0.00	CRAB SPIDER
62	5.89	66	0.00	CRAB, SNOW OR QUEEN
25	2.38	25	0.00	CRAB, TOAD HYAS.SP.
б	0.57	б	0.00	CRAB, TOAD HYAS ARA.
2	0.19	2	0.00	CRAB, TOAD HYAS COAR
7	0.67	7	0.00	SEA CUCUMBER HOL.
2	0.19	2	0.00	SEA URCHIN ECH.
4	0.38	4	0.00	SAND DOLLAR CYLP.
14	1.33	14	0.00	SEA STAR
1	0.10	1	0.00	CORAL GORGONIA
2	0.19	2	0.00	CORAL ALCY0NACEAN
13	1.24	13	0.00	CORAL ALYCONACEAN
		======	======	
		7261870	99.97	

Table 4. Hopedale + Cartwright Channels (Shrimp Fishing Area 5) Canadian large vessel (>500 t) bycatch over the period 2006 – 07 to 2008-09. 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.

nis area.							
			А	Atlantic Cod		Amer	ican Plaice
	Year	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Observed shrimp catch (t)		23,988	20,350	7,373	23,988	20,350	7,373
ogbook shrimp catch (t)		23,747	20,409	24,869	23,747	20,409	24,869
correction factor		1.0000	1.0029	3.3729	1.0000	1.0029	3.3729
estimated bycatch (kg)		282	496	179	5,315	1,573	2,747
Bycatch (kg)/ (t) shrimp		0.01	0.02	0.01	0.22	0.08	0.11
otal number of sets observed		3,464	3,148	1,145	3,464	3,148	1,145
umber of sets with bycatch		291	296	125	1,598	1,500	578
req. sets with 1Kg recorded		247	197	98	797	956	287
ercent bycatch sets with 1Kg recorded		84.88%	66.55%	78.40%	49.87%	63.73%	49.65%
umber sets with measurements		177	67	30	15	13	11
ercent bycatch sets with measurements		60.82%	22.64%	24.00%	0.94%	0.87%	1.90%
umber of fish measured		667	264	24.0070	1,248	727	217
otal length		007	204	15	1,240	121	217
our engu	cm	estimated nu	mber at leng	th	estimated n	umber at le	ngth
	1	0	0	0	0	0	0
	2 3	0 0	0 0	0 0	0 0	0	0
	4	0	0	0	0	0	0
		0	0		0 54	0	0
	5			0			
	6	0	0	0	62	0	(
	7	0	0	0	0	0	(
	8	0	0	0	185	0	(
	9	0	0	0	547	65	(
	10	0	0	0	793	317	(
	11	0	0	0	902	386	0
	12	3	0	0	2,237	905	423
	13	15	0	0	4,496	2,372	2,769
	14	29	0	0	5,195	2,135	2,943
	15	15	0	0	7,158	2,053	5,000
	16	18	0	16	9,117	3,013	5,049
	17	21	0	16	5,868	2,987	2,557
	18	24	0	64	5,661	2,601	2,030
	19	38	9	32	3,992	2,668	1,433
	20	50	9	64	3,171	1,003	1,846
	20	35	26	64	3,267	1,005	3,230
	21	69	20 49	145	3,742	903	1,732
	23	88	59	81	3,112	660	1,732
	24	134	92	81	2,905	253	1,645
	25	126	86	145	1,878	159	798
	26	139	39	113	1,994	227	375
	27	140	17	48	1,422	159	847
	28	136	3	48	1,415	90	885
	29	98	5	16	1,074	129	(
	30	69	0	64	633	43	423
	31	42	17	32	286	65	423
	32	31	19	81	394	90	(
	33	26	46	16	286	22	(
	34	14	19	16	387	0	423
	35	15	45	32	239	0	(
	36	16	85	0	177	0	(
	37	5	91	32	123	0	(
	38	11	51	0	177	0	Ċ
	39	11	43	0	123	0	(
	40	9	43	0	62	0	(
	40	10	38	0	177	0	(
	41	5	30	0	0	0	(
	43	7	21	0	0	0	(
	44	5	25	0	0	0	(
	45	4	30	0	0	0	(
	46	0	32	0	0	0	(
	47	0	8	0	0	0	(
	48	2	21	0	0	0	0
	49	0	16	0	0	0	(
	50	1	3	0	0	0	(
	51	0	5	0	0	0	(
	52	1	5	0	0	0	Ċ
	53	2		0	0	0	Ċ
	54	0	0	0	0	0	(
			0	0	0	0	(
	55	0	5				
	55 56	0 0	5 5	0	0	0	(
	55 56 57	0 0 0	5 5 5	0 0	0 0	0 0	(
	55 56 57 58	0 0 0 0	5 0 5 5 5 0	0 0 0	0 0 0	0 0 0	(
	55 56 57 58 59	0 0 0 0	0	0 0 0	0 0 0	0 0 0	
	55 56 57 58 59 60	0 0 0 0 0	0	0 0 0 0	0 0 0 0	0 0 0 0	
	55 56 57 58 59 60 61	0 0 0 0	0 0 0	0 0 0	0 0 0 0 0	0 0 0 0 0	
	55 56 57 58 59 60 61	0 0 0 0 0	0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	
	55 56 57 58 59 60	0 0 0 0 0 0	0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	

Table 4.

(Continued)

ontinued)							
				Redfish		Greenl	and Halibu
	Year	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Observed shrimp catch (t)		23,988	20,350	7,373	23,988	20,350	7,373
Logbook shrimp catch (t)		23,747	20,409	24,869	23,747	20,409	24,869
correction factor		1.0000	1.0029	3.3729	1.0000	1.0029	3.3729
estimated bycatch (kg)		9,736	6,498	14,239	16,145	6,709	28,394
Bycatch (kg)/ (t) shrimp		0.41	0.32	0.57	0.67	0.33	1.14
total number of sets observed		3.464	3,148	1,145	3,464	3,148	1,145
number of sets with bycatch		2.392	2333	1,089	3,315	2975	1116
freq. sets with 1Kg recorded		371	162	17	345	331	137
percent bycatch sets with 1Kg recorded		15.51%	6.94%	1.56%	10.41%	11.13%	12.28%
number sets with measurements		68	47	44	54	31	20
percent bycatch sets with measurements		2.84%	2.01%	4.04%	1.63%	1.04%	1.79%
number of fish measured		15,882	9,897	9,812	9,795	4,144	2,876
otal length		15,002	9,097	9,012	9,795	4,144	2,070
iotai iengin		estimated nur		d.	estimated n	unde en et la	
	1 2	0	0	0	0	0	0
	2	0	0	0	0	0	
	3	0	0	0	0	0	0
	4	0	0	0	0	0	C
	5	47	1	275	0	0	C
	6	1,117	31	2,123	12	0	C
	7	4,858	175	8,889	0	0	C
	8	6,045	1,052	12,468	110	6	1,490
	9	5,365	7,292	13,315	922	41	7,66
	10	7,708	3,890	14,584	5,087	199	46,94
	11	8,609	1,903	34,670	16,333	922	87,42
	12	8,234	2,858	41,949	29,846	4,235	99,12
	12	8,630	1,356	31,651	26,878	7,155	66,54
	13	10,077	307	10,927	10,792	6,910	24,69
	14	11,168	188	2,136	4,074	2,774	24,69
	15		126				
		6,443		624	4,212	1,799	13,13
	17	3,134	57	228	7,881	2,614	17,90
	18	1,470	40	76	11,781	4,060	30,09
	19	1,019	29	126	13,079	4,661	32,18
	20	556	18	13	9,912	3,288	25,45
	21	367	11	58	6,731	2,054	23,45
	22	178	5	174	4,297	2,316	10,66
	23	122	5	150	3,692	2,119	9,96
	24	107	2	8	3,579	1,472	12,04
	25	55	3	0	3,136	1,474	7,99
	26	13	0	0	2,565	743	7,95
	27	34	0	0	1,786	467	6,93
	28	44	0	0	1,481	484	3,40
	29	5	0	0	1,363	485	1,19
	30	3	0	0	1,444	245	96
	31	3	0	0	1,327	217	96
	32	0	0	0	945	44	29
	33	3	0	0	1,116	93	
	34	0	0	0	617	47	
	35	0	0	0	511	52	16
	36	0	0	0	341	22	16
	37	0	0	0	487	22	
	38	0	0	0	243	11	
	39	3	0	0	166	17	
	40	0	0	0	126	0	
	41	0	0	0	69	0	
	42	0	0	0	12	0	
	43	0	0	0	0	0	
	44	0	0	0	0	6	
	45	0	0	0	24	0	
	46	0	0	0	0	0	
	47	Ő	0 0	0	12	0	
	48	0	0	0	12	0	
	40	0	0	0	0	0	
	49 50	0	0	0	0	0	
		0	0	0	0	0	
	51	0	0	0	0	0	
	52	0	0	0	0	0	
	53	0	0	0	0	0	
	54	0	0	0	0	0	
	55	0	0	0	0	0	
	56	0	0	0	0	0	
	57	0	0	Ō	0	0	
	58	Ő	0 0	0	0	Ő	
	59	0	0	0	0	0	
	60 61	0	0	0	0	0	
	61	0	0	0	0	0	
	62	0	0	0	0	0	
	63	0	0	0	0	0	
otal		85,414	19,347	174,441	177,002	51,051	549,290
	_						

Table 4.

(Continued)										
		Striped Wo		0.0	Spotted We			Broadhead		
	Year	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Observed shrimp catch (t)		23,988	20,350	7,373	23,988	20,350 20,409	7,373	23,988	20,350	7,373
Logbook shrimp catch (t) correction factor		23,747 1.0000	20,409 1.0029	24,869 3.3729	23,747 1.0000	1.0029	24,869 3.3729	23,747 1.0000	20,409 1.0029	24,869 3.3729
estimated bycatch (kg)		2,316	1,562	691	304	1.0029	223	1.0000	1.0029	229
Bycatch (kg)/ (t) shrimp		0.10	0.08	0.03	0.01	0.01	0.01	0.01	0.01	0.01
,										
otal number of sets observed		3,464	3,148	1,145	3,464	3,148	1,145	3,464	3,148	1,145
number of sets with bycatch		811	651	265	149	79	52	67	10	118
req. sets with 1Kg recorded		441	393	235	119	70	46	58	9	105
bercent bycatch sets with 1Kg recorded		54.38%	60.37%	88.68%	79.87%	88.61%	88.46%	86.57%	90.00%	88.98%
number sets with measurements		145	0	2	23	0	0	0	0	0
bercent bycatch sets with measurements number of fish measured		17.88%	0.00%	0.75% 0	15.44% 80	0.00%	0.00% 0	0.00%	0.00%	0.00% 0
otal length		7,116	0	0	80	0	0	0	0	0
sui lengui	cm	estimated n	umber at le	ngth	estimated r	umber at le	ngth	estimated r	number at leng	th
	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	6	0	0	0	0	0	0	0	C
	7	73	0	0	0	0	0	0		0
	8	390	0	0	0	0	0	0	0	
	9	517	0	0	0	0	0	0	0	C
	10	567	0	0	29	0	0	0		C
	11	613	0	0	29	0	0	0	0	C
	12	586	0	0	0	0	0	0		C
	13	790	0	0	14	0	0	0		0
	14	954	0	0	29	0	0	0	0	0
	15	1,402	0	0	14	0	0	0		C
	16	1,550	0	0	14 87	0	0	0		0
	17	1,715 1,462	0	0	87	0	0	0	0	
	18 19		0	0	0	0	0	0	0	C
	20	1,457	0	0	43	0	0	0	0	0
	20	1,327 1,266	0	0	43 14	0	0	0		0
	22	1,200	0	0	43	0	0	0	0	0
	22	801	0	0	43	0	0	0		0
	23	857	0	0	29	0	0	0		0
	24	820	0	0	0	0	0	0	0	0
	26	631	0	0	29	0	0	0		0
	27	589	0	0	0	0	0	0		0
	28	369	0	0	0	0	0	0	0	C
	29	375	0	0	0	0	0	0		
	30	261	0	0	0	0	0	0	0	0
	31	249	0	0	0	0	0	0	0	(
	32	148	0	0	0	0	0	0	0	(
	33	159	0	0	0	0	0	0	0	0
	34	113	0	0	0	0	0	0	0	0
	35	93	0	0	0	0	0	0		C
	36	137	0	0	0	0	0	0	0	C
	37	102	0	0	0	0	0	0		C
	38	110	0	0	0	0	0	0		C
	39	56	0	0	0	0	0	0	0	0
	40	56 17	0	0	14	0	0	0	0	0
	41	40	0	0	0	0	0	0	0	(
	42 43	40 64	0	0	0	0	0	0	0	(
	43		0	0	0	0	0	0	0	
	44 45	62 23	0	0	0	0	0	0	0	
	45	23	0	0	0 0	0	0	0 0	0	
	40	23 17	0	0	0	0	0	0	0	(
	47	23	0	0	0	0	0	0	0	
	49	20	0	0	0		0	0		
	50	11	0	0	0	0	0	0		,
	51	0	0 0	0	0	0	0	0	0	Č
	52	0	0	0	0 0 0	Ő	0	0	0	,
	53	0 11 0 0 0	0	0	0	0 0 0 0	0	0		(
	54	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	0	0		(
	U	0	0	0	0	0	0	0	0	(
	58				0					
	58 59	0	n n		0	0	0	0	0	(
	59	0	0	0	0	0	0	0		((
	59 60	0	0	0 0	0	0	0	0	0	(((
	59 60 61	0 0 0	0	0 0 0	0	0	0 0	0 0	0	((((
	59 60	0	0	0 0	0		0	0	0	

number of fishing		twingin Cl	2262	x 5), over the	e management year 2008 – 09.
number of species		tch =	136		
number of species	in byea	OCCUR	WEIGHT	WEIGHT	
	OCCUR	(%)	kg	(%)	Common name
	4	0.18	4	0.00	HAGFISH, ATLANTIC
	9	0.40	2570	0.02	SHARK , GREENLAND
	1	0.04	800	0.00	SHARK, BASKING
	843	37.27	2735	0.02	SKATES (NS)
	162	7.16	242	0.00	HERRING, ATLANTIC
	1	0.04	1	0.00	HERRING, BLUEBACK
	1	0.04	1	0.00	SMOOTHHEADS (NS)
	6	0.27	б	0.00	SMOOTHHEAD, AGASSIZ'S
	23	1.02	23	0.00	HERRING, BLACK
	6 256	0.27 11.32	6 2401	0.00	ATLANTIC GYMNAST
	250	0.04	1	0.01 0.00	CAPELIN SMELT
	2	0.04	2	0.00	ARGENTINE, ATLANTIC
	3	0.13	3	0.00	HATCHETFISHES (NS)
	1	0.04	1	0.00	HATCHETFISH, SILVER (NC
	91	4.02	98	0.00	VIPERFISH
	71	3.14	75	0.00	DRAGONFISH, BOA
	3	0.13	3	0.00	DAGGERTOOTHFISHES (NS)
	1282	56.68	54873	0.34	LANTERNFISHES (NS)
	18	0.80	24	0.00	LOOSEJAWS (NS)
	749	33.11	1439	0.01	BARRACUDINAS (NS)
	19	0.84	187	0.00	CONGER, AMERICAN
	33	1.46	37	0.00	EELS, SNIPE (NS)
	17	0.75	17	0.00	SNIPE EEL, ATLANTIC
	18	0.80	20	0.00	SNIPE EEL, SHORTNOSE
	29	1.28	48	0.00	LONGNOSE EEL
	2	0.09	2	0.00	HAKE, BLUE
	121 1	5.35	164	0.00	COD, ATLANTIC
	24	0.04 1.06	1 24	0.00 0.00	COD,GREENLAND (ROCK) WHITING,BLUE
	24	0.09	24	0.00	HADDOCK
	2	0.09	2	0.00	HAKE, LONGFIN
	1	0.04	1	0.00	HAKE, RED (SQUIRREL)
	22	0.97	22	0.00	HAKE, WHITE (COMMON)
	27	1.19	27	0.00	HAKE, SILVER
	7	0.31	7	0.00	HAKE (NS) MER.SP.
	612	27.06	5010	0.03	COD, ARCTIC
	22	0.97	28	0.00	THREEBEARD ROCKLING (N
	139	6.15	146	0.00	THREEBEARD ROCKLING
	124	5.48	205	0.00	THREEBEARD RKLG, SILVER
	3	0.13	3	0.00	FOURBEARD ROCKLING
	12	0.53	14	0.00	GRENADIERS (NS)
	67 17	2.96	137 18	0.00	GRENADIER, ROUGHHEAD
	17	0.75 0.75	18	0.00 0.00	MARLIN SPIKE (COMMON) GRENADIER,ROUNDNOSE
	15	0.75	24	0.00	GRENADIER, ROUNDNOSE GRENADIER, ROUGHNOSE
	15	0.00	90	0.00	WRECKFISH
	1	0.04	1	0.00	BLACK SWALLOWER
	3	0.13	17	0.00	SAND LANCES (NS)
	24	1.06	28	0.00	SAND LANCES (NS)
	4	0.18	4	0.00	WOLFFISH, BROADHEAD
	211	9.33	272	0.00	WOLFFISH, STRIPED
	22	0.97	23	0.00	WOLFFISH, SPOTTED
	3	0.13	3	0.00	GUNNEL, ROCK
	1	0.04	1	0.00	FOURLINE SNAKEBLENNY
	4	0.18	4	0.00	SHANNY, RADIATED
	295	13.04	408	0.00	BLENNIES (NS)
	1020	45.09	3807	0.02	EELPOUTS (NS)
	494	21.84	1438	0.01	EELPOUT (NS)
	54 12	2.39	792	0.00	POUT, OCEAN (COMMON)
	13 1	0.57 0.04	13 1	0.00 0.00	WOLF EEL (NS) BUTTERFISH
	1420	62.78	100310	0.00	REDFISH (NS) SEB.SP.
	- 120	52.70	100010	0.04	

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 2008 – 09.

Table 5 (Continued)

	OCCUR	WEIGHT	WEIGHT	
OCCUR	(왕)	kg	(응)	Common name
315	13.93	776	0.00	SCULPINS (NS)
562	24.85	729	0.00	HOOKEAR SCULPIN (NS)
442 115	19.54	653	0.00	MAILED SCULPINS (NS)
115	5.08 0.04	265 1	0.00 0.00	SCULPIN, RIBBED (HORNE SCULPIN, ARCTIC STAGHOR
19	0.04	67	0.00	SCULPIN, ARCIIC STAGHOR SCULPIN, DEEP SEA
1	0.04	1	0.00	TWOHORN SCULPIN (NS)
532	23.52	754	0.00	ALLIGATORFISH (NS)
357	15.78	562	0.00	ALLIGATORFISH, NORTHERN
762	33.69	1016	0.01	ALLIGATORFISH, COMMON
5	0.22	5	0.00	LUMPFISHES (NS)
13	0.57	13	0.00	LUMPFISH (NS) EUM.SP.
7	0.31	12	0.00	LUMPFISH, COMMON
121	5.35	202	0.00	SEASNAILS (NS)
11	0.49	11	0.00	SEA TADPOLE
991 10	43.81 0.44	2457 11	0.02 0.00	AMERICAN PLAICE WITCH FLOUNDER
2175	96.15	37690	0.00	GREENLAND HALIBUT
1	0.04	40	0.00	HALIBUT (ATLANTIC)
1	0.04	10	0.00	DEEPSEA ANGLER, BIG
1	0.04	1	0.00	SEA DEVIL, WARTED
807	35.68	117360	0.73	REDFISH, LARGE
30	1.33	401	0.00	UNIDENTIFIED FISH
24	1.06	34	0.00	INVERTEBRATE (NS)
121	5.35	183	0.00	SPONGE
93	4.11	140	0.00	CNIDARIAN
1	0.04	1	0.00	CONDUCTORN
24 47	1.06 2.08	44 48	0.00 0.00	SCYPHOZOAN ANTHOZOAN
2	0.09	48	0.00	GASTROPOD GAST.
7	0.31	7	0.00	WHELK BUCC.
1	0.04	1	0.00	BIVALVE
1	0.04	1	0.00	SCALLOP, ICELANDIC
273	12.07	311	0.00	CEPHALOPOD (NS)
44	1.95	44	0.00	OCTOPUS OCTOPODA
2	0.09	2	0.00	POLYCHAETE
15	0.66	661	0.00	CRUSTACEAN
14 7	0.62	14 7	0.00	MYSID DECADOD CRUCTACEAN
36	0.31 1.59	51	0.00 0.00	DECAPOD, CRUSTACEAN SHRIMP NATA.
30	1.33	236	0.00	SHRIMP PENA.
139	6.15	4721	0.03	SHRIMP SERG.ARC.
1	0.04	1	0.00	SHRIMP SERG.ROB.
2	0.09	2	0.00	SHRIMP PASIP.TAR.
9	0.40	11	0.00	SHRIMP PASIP.MUL.
18	0.80	94	0.00	SHRIMP EUAL.MAC.
2	0.09	2	0.00	SHRIMP SPIRO.LIL.
1	0.04	1	0.00	SHRIMP LEB.POL.
1 2250	0.04 99.47	18 15686884	0.00 97.63	SHRIMP PANDALUS SP. SHRIMP PAND.BOR.
147	6.50	32406	0.20	SHRIMP PAND.BOR. SHRIMP PAND.MON.
10	0.44	10	0.00	SHRIMP SCLE.BOR.
6	0.27	7	0.00	SHRIMP SAB.SP.
1	0.04	1	0.00	SHRIMP SAB.SEP.
45	1.99	45	0.00	SHRIMP SAB.SAR.
12	0.53	12	0.00	SHRIMP ARG.DEN.
1	0.04	1	0.00	MALACOSTRACAN STE.SCU.
1	0.04	1	0.00	HERMIT CRAB PAG.
3 32	0.13 1.41	3 32	0.00 0.00	SPINY CRAB LITH.MAJ. CRAB, SNOW OR OUEEN
32	0.04	32	0.00	CRAB, SNOW OR QUEEN CRAB, TOAD HYAS.SP.
8	0.35	8	0.00	SEA CUCUMBER HOL.
15	0.66	15	0.00	SEA URCHIN ECH.
47	2.08	55	0.00	SEA STAR

Table 5 (Continued)

	OCCUR	WEIGHT	WEIGHT	
OCCUR	(%)	kg	(%)	
1	0.04	1	0.00	BASKET STAR GORGO. SP.
5	0.22	5	0.00	CORAL PENNATULID
2	0.09	2	0.00	CORAL GORGONIAN
1	0.04	1	0.00	CORAL GORGONIA
4	0.18	4	0.00	CORAL ALCYONACEAN
13	0.57	13	0.00	CORAL ALYCONACEAN
1	0.04	1	0.00	CORAL GORGONIA
2	0.09	2	0.00	CORAL GORGONIA
43	1.90	185	0.00	
		=======	======	
		16068044	99.93	

Table 6. Hawke Channel + 3K (Shrimp Fishing Area 6) Canadian large vessel (>500 t) bycatch over the period 2006 - 07 to 2008-09. 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.

			1	Atlantic Cod		Amer	ican Plaice
0	Year	2006-07	2007-08	2008-09	2006-07	2007-08	2008-09
Observed shrimp catch (t) Logbook shrimp catch (t)		29,592 27,507	20,316 16,741	12,985 18,199	29,592 27,507	20,316 16,741	12,985 18,199
correction factor estimated bycatch (kg)		1.0000 1,350	1.0000 732	1.4015 246	1.0000 4,894	1.0000 944	1.4015 1,342
Bycatch (kg)/ (t) shrimp		0.05	0.04	0.01	0.17	0.05	0.07
total number of sets observed		4,234	3,159	1,923	4,234	3,159	1,923
number of sets with bycatch		1066	631	264	1,983	1,334	608
freq. sets with 1Kg recorded percent bycatch sets with 1Kg recorded		780 73.17%	486 77.02%	202 76.52%	1,083 54.61%	834 62.52%	332 54.61%
number sets with measurements		332	271	95	27	18	17
percent bycatch sets with measurements number of fish measured		31.14% 2,336	42.95% 2,416	35.98% 596	1.36% 1,549	1.35% 239	2.80% 558
total length	cm	estimated nu		el.		umber at le	m oth
	1	o o	0	0	0	0	0
	2	0	0	0	0	0	0
	3	0	0	0	0	0	0
	4	0	0	0	0	0	0
	5	0	0	0	0	0	0
	6 7	0 4	0	0	0	0	0 31
	8	* 8	0	0	29	0	0
	9	17	0	0	0	0	62
	10	13	0	0	113	133	93
	11	4	5	0	429	267	124
	12	18	64	0	574	67	57
	13	83	119	0	683	200	176
	14 15	153 244	218 263	4 18	769 966	427 1,001	197 668
	15 16	244 326	263 224	18 18	966 1,508	1,001	668 1,118
	17	458	114	33	1,985	1,709	2,579
	18	601	68	146	1,902	887	2,800
	19	564	132	172	2,602	471	1,510
	20	536	301	357	2,998	295	1,045
	21	535	511	426	4,490	362	641
	22	500 547	541	487	3,648	214	926
	23 24	383	586 501	239 250	3,822 3,249	187 508	579 502
	25	366	326	69	2,584	320	574
	26	386	217	46	2,328	227	642
	27	462	120	15	2,319	148	347
	28	425	51	22	1,557	335	347
	29	531	67	4	995	121	310
	30 31	426 224	48 40	4	1,018 876	121	275 114
	31	224	40 45	4	933	0	31
	33	68	20	0	507	0	52
	34	102	62	9	226	0	26
	35	56	53	0	312	67	0
	36	54	51	13	56	0	31
	37	65	30	9	197	0	26
	38	31	55	4	56	0	93
	39 40	36 31	35 23	4	28 0	0	26 0
	40	23	23 19	4	28	0	0
	42	19	25	4	0	0	0
	43	11	5	0	84	0	0
	44	14	9	0	0	0	26
	45	9	5	0	0	0	0
	46 47	3 15	8 5	0	0	0	0
	47	15 5	5	0	0	0	0
	40	9	2	0	0	0	0
	50	9	2	0	0	0	0
	51	3	0	0	0	0	0
	52	3	0	0	0	0	0
	53	3	0	4	0	0	0
	54	0	0	0	0	0	0
	55 56	0	2 0	0	0	0	0 0
	56 57	0 4	2	0	0	0	0
	58	4	0	0	0	0	0
	59	0	2	0	0	0	0
	60	0	0	0	0	0	0
	61	0	0	0	0	0	0
	62	0	0	0	0	0	0
Total	63	0	4 077	2 202	42 972	0 291	16.025
Total		8,498	4,977	2,393	43,873	9,381	16,025

Table 6.

(Continued)

Year 2006-07 2	ntinued)		 					
Observed sharing catch () 29:92 20:14 12.985 29:22 20:14 12.985 29:22 20:14 12.985 29:22 20:14 12.985 29:25 20:14 12.985 29:25 20:14 12.985 29:25 20:14 12.985 29:25 20:15 11 29:35 10:35 <t< td=""><td></td><td>Voor</td><td>2006-07</td><td>2007.08</td><td>Redfish</td><td>2006.07</td><td></td><td></td></t<>		Voor	2006-07	2007.08	Redfish	2006.07		
Lagbox 1 27.971 16.741 18.199 27.971 16.741 18.199 retardio figura 1 22.03 2.03	Observed shrimp catch (t)	rear						2008-09
administry in the sector of secto	Logbook shrimp catch (t)		27,507	16,741	18,199	27,507	16,741	18,199
By and kig (1) shimp 0.75 0.15 0.27 0.44 0.55 1.02 anable of cas with by cond 3.356 2.056 1.02 1.02 0.28 1.02 marke of cas with by cond 3.356 2.055 1.02 1.02 1.02 1.02 1.02 1.02 1.02 1.02 1.02 1.02 2.252 1.02 1.02 2.252 1.02 1.02 2.02 2.252 1.02 1.02 1.02 2.02 1.02 1.02 2.02 1.02 1.02 1.02 2.252 1.02 1.02 1.02 2.252 2.252 1.02 1.02 1.02 2.02 1.02 1.02 2.02 1.02 1.02 1.02 2.02 1.								1.4015
bala maker of sets observed make of sets with bycach ing ears with generations with began observed precess with back method precess with back method maker of sets observed maker observed maker of sets observed maker of sets obser								
amber of sets with bycath ingurs with Kyr crowdad marbe set with measurements anabe set with measurements anaber of measurements anaber of measurements 3.850 2.157 4.705 12.595 6.407 1 16.22% 7.275 4.705 12.595 6.407 14.22 2.151 2.727 3.010 1.447 1.77 2.252 anabe of measurements anaber of measurements 1 0	Bycatch (kg)/ (t) shrimp		0.75	0.15	0.27	0.84	0.55	0.51
amber orse with yeach preat: with Kgreended amber set: with measurements 3.359 2.059 6.977 4.77 5.97 4.77 preat: byoch with Kgreended amber set: with ameanurements 1 15.252 7.278 1.910 1.927 2.252 using - otrauted zwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwwww	total number of sets observed		4,234	3,159	1,923	4,234	3,159	1,923
pscont byoach arts with IKg recorded mathes at with measurements mather of a measurement mather o								1,020
pscont byoach arts with IKg recorded mathes at with measurements mather of a measurement mather o	freq. sets with 1Kg recorded		555	162	47	501	155	143
111% 2.27% 3.10% 1.57% 2.25% indents of film measured entimated member at length continued member at length continued member at length 1 0 0 0 0 0 0 3 0 0 0 0 0 0 0 4 146 0 0 0 0 0 0 5 574 770 64 0 0 2.255 6 6.044 37 2.215 1.50% 2.255 1.20% 1.20% 2.256 5.20% 1.20% 1.20% 2.255 1.20% 1.20% 2.25 1.20% 2.25 1.20% 2.25 1.20% 1.21% 1.20% 2.25 1.20% 2.25 1.20% 2.25 1.20% 2.25 1.20% 2.25% 1.20% 2.25% 1.20% 2.25% 1.20% 2.25% 1.20% 2.25% 1.20% 2.25% 1.20% 1.20% 1.20% 1.20%								14.02%
namber of the measured is al length cel cel statuted marker at length celfinated contret at length <thcli> celfinated contret at length</thcli>								23
bank bergin cininated number at legal. cininated number at legal. 1 0 0 0 0 0 0 3 0 0 0 0 0 0 3 0 0 0 0 0 0 4 116 0 0 0 0 0 6 6.044 37 244 198 0 0 7 9.053 403 963 212 216 550 9 22.284 3.764 4.074 1.027 2016 550 10 23.596 6.347 11.483 7.102 12.48 19.42 11 25.396 6.347 11.483 7.102 12.48 19.42 11 21.628 3.87 7.103 5.381 1.117 6.41 12.818 1.631 12.81 1.546 1.228 1.54 1.228 11 11.027 12.83							1.57%	2.25%
cm Stringed marker at length Stringed marker at length 1 0 0 0 0 0 0 2 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 4 16 0 0 0 0 0 0 6 6.0.44 37 71 199 2.23 1.08 1.1.02 1.2.01 5.03 6.33 1.2.2.01 1.2.04 1.2.2.1 1.2.04 1.2.2.1 1.2.04 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.04 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.2.2.1 1.1.2.1 1.1.2.1 <td< td=""><td></td><td></td><td>12,162</td><td>9,723</td><td>6,916</td><td>10,373</td><td>5,925</td><td>2,529</td></td<>			12,162	9,723	6,916	10,373	5,925	2,529
1 0 0 0 0 0 0 2 0 0 0 0 0 0 0 4 16 0 3 0 0 0 0 4 16 3 214 198 0 0 223 1.08 1 4.538 1.931 2.077 61 1.99 2.47 9 22.81 3.754 4.074 1.021 2.105 7.022 12.03 10 23.526 4.546 5.433 3.752 1.067 2.28 2.90 11 25.39 6.347 1.146 7.022 12.03 1.121 15.53 5.83 1.99 1.121 15.53 5.83 1.99 1.93 1.147 6.41 1.128 1.80 1.021 1.128 1.80 1.128 1.80 1.223 1.122 1.86 1.93 1.123 1.86 1.92 1.93 1.43 1.93	iotai tengui	cm	estimated nur	nber at lengt	h	estimated n	umber at le	ngth
2 0 0 0 0 0 0 3 0 0 0 0 0 0 5 574 70 64 0 0 7 9.532 403 933 214 198 0 7 9.532 403 953 215 223 1.08 9 2.281 3.76 4.074 1.024 1.42 2.04 10 2.328 6.347 1.143 7.102 1.24 1.24 11 2.233 6.347 1.143 7.102 1.28 1.89 11 1.169 1.248 1.44 1.146 6.263 1.268 1.43 11 11.069 2.18 2.27 1.12 1.84 1.126 1.84 1.126 1.84 1.122 1.64 1.24 1.84 1.22 1.44 1.22 1.44 1.22 1.44 1.22 1.44 1.22 1.44 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>0</td></td<>								0
1 0 0 0 0 4 16 0 0 0 5 74 70 64 0 0 7 9,532 4073 923 223 1.08 9 22.89 3.754 4.074 1.021 2.016 10 23.256 4.564 5.543 3.782 7.023 12.23 11 25.39 6.347 11.463 7.102 12.048 19.40 1.538 1.528 1.558 1.1.528 1.5528 1.538 1.538 1.528 1.558 1.1.228 1.654 1.628 1.628 1.628 1.628 1.628 1.628 1.628 1.628 1.628 1.628 1.628 1.628 1.628 1.628 1.6		2						0
1 574 70 66 0 0 6 6.044 37 214 18 3 7 9.323 4.074 1.021 2.015 2.77 9 2.2381 3.75 4.074 1.021 2.015 10 2.3256 4.546 5.543 3.782 7.023 12.024 11 2.5.999 4.750 1.8.06 1.1.07 10.77 12.028 12 2.1.979 4.750 1.8.06 1.1.07 1.0.77 12.228 14 20.758 68.3 6.63 1.0.98 2.77 1.1.28 1.8.19 15 16.353 4.01 1.9.00 2.5.28 1.9.00 1.1.28 1.5.28 1.4.17 16 12.28 3.07 7.74 1.6.23 1.9.28 1.6.23 1.1.28 1.5.28 1.6.12 10 0.28 1.0.01 5.52 1.9.08 5.62 1.9.13 1.9.12 1.6.12 11 10.05 2.0 1.9.13 5.56 1.9.12 1.6.12 1		3						0
6 6.044 37 214 198 0 7 9.353 4.03 983 2.13 2.23 1.007 9 22.86 4.074 1.021 2.016 5.90 10 22.86 4.564 3.782 7.02 12.02 12 21.97 4.750 13.06 11.007 10.077 20.33 13 19.662 1.894 1.900 6.271 1.128 10.077 20.33 14 20.768 6635 6.03 11.067 25.39 1.417 16.41 15 16.035 1.284 1271 1.625 10.068 17.74 16.24 10 10.075 283 1.017 16.4 10.068 17.74 16.24 10 10.075 18 10.068 17.74 16.24 10.85 11.28 10.85 11 10.077 12 10.08 17.74 16.24 10.85 11.28 10.25 11 10.077 14 30.40 10.0 10.52 14.8 <		4	16	0	3	0	0	0
9 9.532 40.33 9.23 2.23 3.76 14.353 1.937 2.077 611 593 12 2.2841 3.764 4.074 1.083 7.02 12.02 13 2.2539 6.345 11.80 7.02 12.02 14 2.059 6.347 11.80 7.02 12.03 15 2.159 4.76 11.80 7.07 12.83 16 2.283 3.67 7.18 5.38 8.99 16 12.282 3.67 7.13 5.38 1.437 6.41 11 11.069 2.27 1.68 1.623 1.623 1.623 16 12.28 3.67 7.14 3.62 1.623 1.12 17 11.60 2.27 1.64 2.625 1.024 18 10.675 2.83 1.02 1.68 1.63 19 10.264 8.03 1.62 1.531 1.417 14 10.675 2.83 1.02 1.68 1.12 21 7.70 1.4 3.042 3.35 2.02 22 3.066 1.80 1.68 1.40 23		5	574	70	64	0	0	0
1 14.533 1.207 6.11 5.99 2.284 0 22.364 4.564 5.43 3.782 7.02 1.945 1 25.39 6.347 11.463 7.102 1.946 1 20.59 4.760 11.463 7.102 1.946 1 20.59 4.760 11.463 7.102 1.946 1 20.786 663 6.63 12.08 5.39 1.417 6.41 1 10.662 1.863 7.74 1.43 6.27 7.12 1.88 1 10.675 2.83 1.031 6.297 7.17 6.41 6.28 1.028 1 10.675 2.83 1.021 1.028 1.028 1.028 1.022 1.023 1.028 <t< td=""><td></td><td>6</td><td>6,044</td><td>37</td><td>214</td><td>198</td><td>0</td><td>0</td></t<>		6	6,044	37	214	198	0	0
1 14.533 1.207 6.11 5.99 2.284 0 22.364 4.564 5.43 3.782 7.02 1.945 1 25.39 6.347 11.463 7.102 1.946 1 20.59 4.760 11.463 7.102 1.946 1 20.59 4.760 11.463 7.102 1.946 1 20.786 663 6.63 12.08 5.39 1.417 6.41 1 10.662 1.863 7.74 1.43 6.27 7.12 1.88 1 10.675 2.83 1.031 6.297 7.17 6.41 6.28 1.028 1 10.675 2.83 1.021 1.028 1.028 1.028 1.022 1.023 1.028 <t< td=""><td></td><td>7</td><td>9 532</td><td>403</td><td>953</td><td>213</td><td>223</td><td>1 087</td></t<>		7	9 532	403	953	213	223	1 087
9 22,88 3,75 4,07 1,02 2,08 5,90 10 23,26 4,54 5,543 3,782 7,703 12,20 11 21,597 4,750 13,608 11,607 12,335 6,53 15,33 8,90 11 21,597 4,750 13,608 6,563 12,308 2,528 2,90 15 16,635 401 1,940 6,271 1,128 1,63 16 12,282 3,87 7,18 5,981 1,141 6,41 17 11,000 228 11 20 9,88 10 16,92 15,52 19,58 11,12 16 10,675 283 3,066 1 6 13,918 5,365 11,12 21 7,77 14 30 4,525 19,80 6,72 13,69 5,525 19,86 6,72 22 4,610 5 0 5,525 19,86 6,72 2,355 5,525 1,525 1,628 4,50 5,52 1,525 1,628 4,50								
10 23,256 4,546 5,543 3,762 7,223 722 11 25,399 6,347 11,463 7,102 12,046 19,424 12 21,597 4,750 13,066 2,285 8,293 12,018 15,236 5,803 8,993 16 20,785 683 6,636 12,046 2,745 13,806 1,717 1,805 11,817 3,662 100,75 13,805 11,928 16,235 11,928 16,235 11,928 16,255 11,928 16,255 11,928 16,255 11,928 16,554 11,128 10,663 7,757 14 30 2,562 11,908 2,85 11,12 2,936 12,118 6,364 13,942 3,355 5,02 2,11 11,12 2,24 1,864 4 3,942 3,355 5,02 2,11 11,12 2,118 5,533 11,12 2,118 5,533 11,12 2,11 1,12 2,118 5,53 1,635 1,12 2,118 5,53 1,635 1,12 2,118 5,53 1,635 2,201								
11 25,399 6,347 11,463 7,102 12,067 10,607 10,607 20,303 13 19,662 1,549 15,261 5,503 1,504 12,112 11,805 11,94 12,112 11,805 11,94 12,112 11,805 11,94 12,112 11,805 11,94 12,112 11,81 11,805 11,91 11,121 11,805 11,91 11,121 11,805 11,91 11,805 11,91 10,675 12,82 30,805 11,91 10,635 11,92 16,64 10 0,154 11,91 10,675 12,83 11,12 11 10,675 12,82 30,805 11,92 11,836 11,92 10,856 11,92 12,82 11,83 11,93 5,865 5,92 11,82 13,85 5,92 11,92 3,945 5,92 12,94 14,94 14 10 10 12,918 5,86 11,92 3,945 5,92 14,94 14 14 14 10 10 14,91 14 14 10 14,91 14 14 14 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>5,905</td>								5,905
11 21,597 4,750 13,806 11,607 20,935 13 19,662 1,944 12,118 15,226 5,203 2,903 15 16,935 481 1,940 6,271 1,128 1,893 16 12,228 367 719 5,301 1,417 6,411 11 10,675 283 120 10,663 7,75 16,293 19 10,254 60 100 16,365 11,12 16,853 1,12 16,853 1,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12		10	23,256	4,546	5,543	3,782	7,023	12,208
11 21,597 4,750 13,806 11,607 20,935 13 19,662 1,944 12,118 15,226 5,203 2,903 15 16,935 481 1,940 6,271 1,128 1,893 16 12,228 367 719 5,301 1,417 6,411 11 10,675 283 120 10,663 7,75 16,293 19 10,254 60 100 16,365 11,12 16,853 1,12 16,853 1,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12 16,853 11,12		11	25,399	6,347	11,463	7,102	12,048	19,429
13 19.662 1.894 12.118 15.236 5.803 8.99 15 16.785 643 16.635 12.066 2.28 12 16 12.828 387 719 5.391 1.417 6.41 17 11.000 218 237 8.174 3.62 10.254 19 10.254 80 100 16.395 11.928 15.26 16.936 11.928 15.26 16.936 11.928 15.26 16.936 11.928 16.93 11.928 16.93 11.928 16.93 11.928 16.93 11.928 16.93 11.928 16.93 11.928 16.93 11.928 16.93 11.928 16.93 11.928 16.93 11.928 16.93 15.93 14.14 16.93 19.945 5.93 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>20,938</td></td<>								20,938
14 20,785 683 6,636 12,096 2,285 2,900 15 16,353 441 1,940 6,271 1,128 1,89 16 12,228 367 719 6,41 6,636 1,724 6,636 17 11,800 237 8,174 3,662 10,235 19 10,254 80 100 19,395 11,22 16,54 19 10,254 80 100 16,395 12,253 11,12 21 7,779 14 30 25,62 19,966 6,720 22 4,610 5 61 20,118 8,046 6,89 3,055 5,260 1,85 3,40 3,355 5,260 1,85 3,40 3,355 5,260 1,85 3,40 3,355 5,260 3,40 3,31 1,112 2,18 3,355 5,260 1,85 3,41 4,33 9,462 3,355 5,260 3,40 3,31 3,41 3,31 3,41 3,31 3,41 3,31 3,41 3,31 3,41 3,31 3,41 3,31								
15 16,935 481 1,940 6,271 1,128 1,89 16 12,228 397 719 5,391 1,417 6,64 17 18,09 218 227 8,74 3,662 10,235 19 10,675 283 120 10,663 7,754 16,23 20 9,719 14 30 25,622 10,966 6,72 21 7,779 14 30 2,625 11,12 2,1331 5,366 7,20 22 4,610 5 61 2,0118 8,046 6,89 7,20 24 1,864 16 3 9,662 7,20 3,395 5,20 7,03 2,48 4,14 26 881 0 0 5,86 2,93 1,65 3,965 2,00 3,95 5,20 1,65 3,96 2,01 3,96 2,01 3,96 2,01 3,96 2,01 3,96 2,01 3,96 2,01 3,96 2,01 3,96 2,01 3,96 2,01 3,96								
16 12.828 387 719 5.39 1.47 6.41 17 11.809 248 297 8.174 3.662 10.23 18 10.075 80 100 16.385 11.92 16.54 20 9.189 17 64 19.62 12.553 11.12 21 7.179 14 30 25.625 10.86 6.83 22 4.610 5 1.64 4 3 9.462 3.96 22 1.864 4 3 9.462 3.96 5.02 1.69 3.40 25 1.803 2 0 0 5.52 1.65 3.40 26 881 0 0 5.52 1.69 3.40 27 761 0 0 2.87 3.40 3.63 3.40 28 465 0 0 1.88 3.78 3.78 3.78 3.78 3.78 3.78 3.78 3.78 3.78 3.78 3.78 3.78 3.79 3.78								2,900
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18 10,675 283 120 1,0685 7,74 16,28 19 10,254 80 100 16,395 11,928 16,54 20 9,719 14 30 25,625 10,986 6,77 22 4,610 5 61 20,116 8,046 6,89 23 3,066 1 6 13,916 5,366 7,20 24 1,864 4 3 9,462 3,335 5,20 1,659 3,40 25 1,803 22 0 6,537 2,458 4,14 26 881 0 0 5,262 1,659 3,40 27 761 0 0 5,262 1,659 3,40 28 465 0 0 1,272 462 70 30 208 80 0 0 1,462 14 8 31 147 0 0 1,178 233 8 5 33 54 0 0 1,182 51 </td <td></td> <td>16</td> <td>12,828</td> <td>387</td> <td>719</td> <td>5,391</td> <td>1,417</td> <td>6,419</td>		16	12,828	387	719	5,391	1,417	6,419
18 10,675 283 120 1,0685 7,74 16,28 19 10,254 80 100 16,395 11,928 16,54 20 9,719 14 30 25,625 10,986 6,77 22 4,610 5 61 20,116 8,046 6,89 23 3,066 1 6 13,916 5,366 7,20 24 1,864 4 3 9,462 3,335 5,20 1,659 3,40 25 1,803 22 0 6,537 2,458 4,14 26 881 0 0 5,262 1,659 3,40 27 761 0 0 5,262 1,659 3,40 28 465 0 0 1,272 462 70 30 208 80 0 0 1,462 14 8 31 147 0 0 1,178 233 8 5 33 54 0 0 1,182 51 </td <td></td> <td>17</td> <td>11,809</td> <td>218</td> <td>297</td> <td>8,174</td> <td>3,662</td> <td>10,239</td>		17	11,809	218	297	8,174	3,662	10,239
19 10.254 80 100 16,385 11,22 20 9,189 17 64 19,262 12,553 11,12 21 7,179 14 30 25,253 10,986 6,873 22 4,610 5 61 3,115 5,366 7,20 24 1,864 4 3 9,462 3,395 5,02 25 1,803 2 0 0 5,522 1,863 3,40 25 1,803 2 0 0 5,522 1,863 3,40 26 881 0 0 3,58 683 1,65 3,40 27 761 0 0 3,68 3,40 8,33 3,40 3,33 54 0 0 1,178 233 8 30 2,282 3,23 0 0 1,165 1 48 3 3 54 1,128 140 8 33 54 0 1,171 10 1,175 14 8 36 77 <								
20 9,189 17 64 19,626 12,553 11,12 21 7,173 14 30 25,625 10,986 6,77 22 4,610 5 61 13,914 5,366 7,225 24 1,864 44 3 9,462 3,395 5,02 24 1,864 4 3 9,462 3,395 5,02 25 1,803 2 0 6,537 2,458 4,44 26 881 0 0 5,503 9,262 2,01 28 465 0 0 2,872 4,56 378 50 30 208 0 0 2,872 456 378 50 31 147 0 0 1,885 1,65 34 70 0 1,845 38 32 32 32 32 140 88 38 30 1,44 88 33 54 0 0 1,865 1,44 88 60 1,44 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>								
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22 4.610 5 61 2.01.8 8,046 6.89 23 3,066 1 6 13,918 5,366 7.20 24 1,863 2 0 6,57 2,48 4,14 26 881 0 0 5,520 1,659 3,40 27 761 0 5,620 1,659 3,40 28 465 0 0 2,872 462 70 30 208 0 1,829 140 8 33 54 0 1,829 140 8 31 1447 0 1,829 140 8 33 54 0 1,718 233 8 33 54 0 0 1,718 233 8 36 77 0 845 5 5 5 5 35 14 8 8 8 6 0 1,85 14 8 8 5 5 5 5 5 5 5 5 5 5 5		20	9,189	17	64	19,626	12,553	11,124
23 3.066 1 6 13.918 5,366 7.20 24 1,864 4 3 9,462 3,395 5,02 25 1,803 2 0 6,537 2,485 4,14 26 881 0 5,502 2,485 4,14 26 881 0 5,502 2,682 2,01 28 4465 0 0 2,872 462 70 30 208 0 0 2,872 462 70 30 208 0 0 1,718 233 8 31 1447 0 0 1,818 1,81 8 32 32 32 0 0 1,818 1,81 8 33 54 0 0 1,818 1,81 8 8 8 8 8 8 8 8 8 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 <td></td> <td>21</td> <td>7,179</td> <td>14</td> <td>30</td> <td>25,625</td> <td>10,986</td> <td>6,977</td>		21	7,179	14	30	25,625	10,986	6,977
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1.864 4 3 9.462 3.385 5.02 25 1.803 2 0 6.537 2.465 4.14 26 881 0 0 5.520 1.656 3.40 27 761 0 0 5.680 9.261 3.395 1.65 28 294 0 0 2.872 462 70 30 208 0 0 1.823 3.83 31 147 0 0 1.823 3.83 32 32 0 0 1.718 233 8 33 54 0 0 1.651 1.4 8 34 70 0 0 861 1.4 8 35 16 0 0 1.051 1.4 8 36 377 0 0 0 333 0 1.651 1.4 8 36 378 38 38 0 0 0.333 0 1.651 1.6 41 </td <td></td> <td>23</td> <td>3.066</td> <td>1</td> <td>6</td> <td>13 918</td> <td>5 366</td> <td>7 202</td>		23	3.066	1	6	13 918	5 366	7 202
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175 A		63	0	0	0	0	0	0
207,041 20,000 00,000 220,404 113,930 175,64	Total	1	257,641	25,909	60,093	223,484	113,930	175,647

(Continued)

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$ \begin{array}{c c} Logbook shrimp catch (i) & 27,507 & 16,741 & 18,199 & 17,507 & 16,741 & 18,199 & 17,507 & 10,000 & 1,0015 & 10,000 & 1,0000 & 1,0015 & 10,000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,0000 & 1,$	16,741 14 1.0000 1. 7 0.00 3,159 1 7 7 0.00% 96. 0	18,19 1.401 8 0.0 1,92 5 4
correction factor 1.0000 1.0015 1.0000 1.0010 1.0000	7 0.00 3,159 1 7 7 0.00% 96. 0	8 0.0 1,92 5 4
Bycatch (kg) (1) shrimp 0.07 0.02 0.03 0.03 0.01 0.01 0.03 total number of sets observed 4234 3,159 1,923 4234 3,159 1,923 4234 3,159 1,923 4234 3,159 1,923 4234 3,159 1,923 4234 3,159 1,923 4234 3,159 1,923 4234 3,159 1,923 4234 3,159 1,923 4234 3,159 1,923 4234 655 215 frag 650 300 227 210 225 53 138 98,15% 98,15% 98,15% 98,15% 98,15% 98,15% 98,15% 98,15% 98,15% 98,15% 98,15% 98,15% 91,00% 00 0 <td>0.00 3,159 1 7 7 0.00% 96. 0</td> <td>0.0 1,92 5 4</td>	0.00 3,159 1 7 7 0.00% 96. 0	0.0 1,92 5 4
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number of sets with bycatch 941 332 274 281 234 55 215 freq. sets with Kg recorded 650 300 227 210 225 55 138 percent bycatch sets with Kg recorded 69.08% 90.36% 82.85% 74.73% 96.15% 96.19% 0 <t< td=""><td>7 7 0.00% 96. 0</td><td>5 4</td></t<>	7 7 0.00% 96. 0	5 4
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8 600 52 0 0 0 0	0	
9 1,519 0 0 0 0 0	0	
10 1,117 52 0 58 0 0 0	0	
11 816 105 0 116 0 0 0	0	
12 1,140 262 0 145 0 0 0	0	
	0	
14 1,273 52 0 203 0 0 0	0	
15 1,119 629 69 174 0 0 0	0	
16 1,732 472 0 87 0 0 0	0	
17 1,862 629 69 87 0 0 0	0	
18 1,702 629 0 87 0 0 0	0	
19 1,610 105 0 87 0 0 0	0	
20 1,352 0 69 87 0 0 0	0	
21 1,171 105 0 29 0 0 0	0	
22 903 210 0 29 0 0 0	0	
23 804 105 0 0 0 0	0	
24 612 0 0 29 0 0 0	0	
25 642 0 69 0 0 0	0	
26 448 0 0 0 0 0 0	0	
27 393 0 0 0 0 0	0	
28 170 0 0 0 0 0	0	
29 110 0 0 0 0 0	0	
30 110 0 0 0 0 0 0	0	
31 143 0 0 0 0 0	0	
32 143 0 0 0 0 0	0	
33 64 0 0 0 0 0	0	
	0	
35 46 0 0 0 0 0 0	0	
36 46 0 0 0 0 0	0	
37 55 0 0 0 0 0	0	
38 9 0 0 0 0 0	0	
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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 2008 – 09.number of fishing sets =1645

		- 2V (2L		manageme	ent year 2008 – 09.
number of fishing number of species		ch -	1645 115		
number of species	III Dycat	OCCUR		WEIGHT	
	OCCUR		WEIGHT kg		Common name
	3	(%) 0.18	1000	(%) 0.01	SHARK, GREENLAND
	350	21.28	591	0.01	SKATES (NS)
	71	4.32	101	0.01	HERRING, ATLANTIC
	15	0.91	15	0.00	SMOOTHHEAD, BAIRD'S
	21	1.28	21	0.00	HERRING, BLACK
	399	24.26	19931	0.00	CAPELIN
	3	0.18	3	0.00	ARGENTINES (NS)
	1	0.06	1	0.00	ANGLEMOUTH, LONGTOOTH
	1	0.06	1	0.00	HATCHETFISHES (NS)
	1	0.06	1	0.00	HATCHETFISH, ATL. SILVE
	1	0.06	1	0.00	HATCHETFISH, SILVER (NC
	2	0.12	2	0.00	HATCHETFISH, TRANSPAREN
	84	5.11	84	0.00	VIPERFISH
	41	2.49	41	0.00	DRAGONFISH, BOA
	8	0.49	8	0.00	DRAGONFISHES, SMOOTH
	1	0.06	1	0.00	DAGGERTOOTHFISHES (NS)
	606	36.84	9435	0.10	LANTERNFISHES (NS)
	16	0.97	16	0.00	LOOSEJAWS (NS)
	547	33.25	1311	0.01	BARRACUDINAS (NS)
	37	2.25	38	0.00	EELS, SNIPE (NS)
	14	0.85	14	0.00	SNIPE EEL, ATLANTIC
	32	1.95	32	0.00	SNIPE EEL, SHORTNOSE
	13	0.79	15	0.00	LONGNOSE EEL
	1	0.06	1	0.00	GULPER, PELICAN
	322	19.57	492	0.01	COD, ATLANTIC
	13	0.79	13	0.00	WHITING, BLUE
	18	1.09	18	0.00	HAKE, LONGFIN
	4	0.24	4	0.00	HAKE, WHITE (COMMON)
	3	0.18	3	0.00	HAKE, SILVER
	167	10.15	208	0.00	COD, ARCTIC
	15	0.91	15	0.00	THREEBEARD ROCKLING (N
	132	8.02	134	0.00	THREEBEARD ROCKLING
	49	2.98	49	0.00	THREEBEARD RKLG, SILVER
	2	0.12	2	0.00	CUSK
	18	1.09	22	0.00	FOURBEARD ROCKLING
	18	1.09	18	0.00	GRENADIERS (NS)
	1	0.06	1	0.00	GRENADIERS (NS) MAC.SP
	84	5.11	106	0.00	GRENADIER, ROUGHHEAD
	30	1.82	48	0.00	MARLIN SPIKE (COMMON)
	23 1	1.40 0.06	28 1	0.00	GRENADIER, ROUGHNOSE
	1	0.08	3	0.00 0.00	MACKEREL,ATLANTIC SAND LANCES (NS)
	38	2.31	48	0.00	SAND LANCES (NS) SAND LANCES (NS)
	30	1.82	30	0.00	BLENNIES (NS)
	5	0.30	5	0.00	WOLFFISH, BROADHEAD
	205	12.46	266	0.00	WOLFFISH, STRIPED
	8	0.49	8	0.00	WOLFFISH, SPOTTED
	7	0.43	7	0.00	FOURLINE SNAKEBLENNY
	2	0.12	2	0.00	SHANNY, RADIATED
	344	20.91	719	0.01	BLENNIES (NS)
	2	0.12	2	0.00	WRYMOUTH
	705	42.86	1994	0.02	EELPOUTS (NS)
	279	16.96	634	0.01	EELPOUT (NS)
	23	1.40	225	0.00	POUT, OCEAN (COMMON)
	3	0.18	3	0.00	EELPOUT, SOFT
	2	0.12	2	0.00	WOLF EEL (NS)
	7	0.43	7	0.00	BUTTERFISH
	1004	61.03	29606	0.31	REDFISH (NS) SEB.SP.

Table 7 (Continued)

	OCCUR	WEIGHT	WEIGHT	
OCCUR	(%)	kg	(%)	Common name
232	14.10	318	0.00	SCULPINS (NS)
239	14.53	282	0.00	HOOKEAR SCULPIN (NS)
157	9.54	210	0.00	MAILED SCULPINS (NS)
58	3.53	126	0.00	SCULPIN, RIBBED (HORNE
1	0.06	1	0.00	SCULPIN, ARCTIC STAGHOR
8	0.00	8	0.00	SCULPIN, DEEP SEA
183	11.12	249	0.00	ALLIGATORFISH (NS)
391	23.77	536	0.01	ALLIGATORFISH, NORTHERN
486	29.54	607	0.01	ALLIGATORFISH, COMMON
100	0.06	1	0.00	LUMPFISH (NS) EUM.SP.
105	6.38	113	0.00	SEASNAILS (NS)
729	44.32	1501	0.02	AMERICAN PLAICE
34	2.07	45	0.00	WITCH FLOUNDER
1563	95.02	17509	0.18	GREENLAND HALIBUT
1303	0.06	1	0.00	FILEFISH, ORANGE
1	0.06	3	0.00	TRIGGERFISH, GREY
1	0.06	1	0.00	SEA DEVILS (NS)
4	0.24	4	0.00	DEEPSEA ANGLER, BIG
552	33.56	20015	0.21	REDFISH, LARGE
20	1.22	79	0.00	UNIDENTIFIED FISH
18	1.09	24	0.00	INVERTEBRATE (NS)
34	2.07	43	0.00	SPONGE
36	2.19	69	0.00	CNIDARIAN
18	1.09	68	0.00	SCYPHOZOAN
12	0.73	12	0.00	ANTHOZOAN
125	7.60	142	0.00	CEPHALOPOD (NS)
14	0.85	14	0.00	OCTOPUS OCTOPODA
59	3.59	441	0.00	CRUSTACEAN
14	0.85	1097	0.01	EUPHAUSIID EUPH.SP.
35	2.13	168	0.00	SHRIMP NATA.
60	3.65	1293	0.01	SHRIMP PENA.
112	6.81	1889	0.02	SHRIMP SERG.ARC.
11	0.67	11	0.00	SHRIMP SERG.ROB.
4	0.24	4	0.00	SHRIMP ACANT.PEL.
2	0.12	2	0.00	SHRIMP NOTO.STOM.
1	0.06	100	0.00	SHRIMP PASIP.
8	0.49	8	0.00	SHRIMP PASIP.MUL.
3	0.18	3	0.00	SHRIMP EUAL.MAC.
2	0.12	2	0.00	SHRIMP LEB.POL.
1	0.06	1	0.00	SHRIMP PANDALUS SP.
1623	98.66	9471355	98.78	SHRIMP PAND.BOR.
60	3.65	2677	0.03	SHRIMP PAND.MON.
13	0.79	15	0.00	SHRIMP SAB.SP.
б	0.36	б	0.00	SHRIMP SAB.SEP.
38	2.31	38	0.00	SHRIMP SAB.SAR.
б	0.36	б	0.00	SHRIMP ARG.DEN.
2	0.12	2	0.00	MALACOSTRACAN STE.SCU.
2	0.12	2	0.00	SPINY CRAB LITH.MAJ.
137	8.33	141	0.00	CRAB, SNOW OR QUEEN
15	0.91	15	0.00	CRAB, TOAD HYAS.SP.
1	0.06	1	0.00	SEA CUCUMBER HOL.
19	1.16	19	0.00	SEA STAR
1	0.06	1	0.00	CORAL GORGONIA
9	0.55	9	0.00	CORAL ALCYONACEAN
18	1.09	18	0.00	CORAL ALYCONACEAN
2	0.12	2	0.00	CORAL GORGONIA
18	1.09	43	0.00	
		======	=====	
		9588737	99.98	

Table 8. Hawke Channel + 3K (Shrimp Fishing Area 6) Canadian small vessel (<=500 t; LOA<100') bycatch over the period 2007 - 2009. 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).

is not usually met	(co)	rrecti			= logi		catch
	Year	2007	2008	Atlantic Cod 2009	2007	Amer 2008	ican Plaice 2009
Observed shrimp catch (t)	rea	2,427	2,493	1,061	2,427	2,493	1,061
Logbook shrimp catch (t)		53,218	57,764	26,912	53,218	57,764	26,912
correction factor estimated bycatch (kg)		21.9313 1,142	23.1678 506	25.3577 14,115	21.9313 16,961	23.1678 23,677	25.3577 9,059
Bycatch (kg)/ (t) shrimp		0.02	0.01	0.52	0.32	0.41	0.34
total number of sets observed		1301	1262	713	1301	1262	713
number of sets with bycatch		197	264	106	638	509	268
freq. sets with 1Kg recorded		181	199	70	503	331	145
percent bycatch sets with 1Kg recorded		91.88%	75.38%	66.04%	78.84%	65.03%	54.10%
number sets with measurements percent bycatch sets with measurements		50 25.38%	1 0.38%	1 0.94%	9 1.41%	1 0.20%	1 0.37%
number of fish measured		170	0.0070	28	89	14	4
total length							
	cm 1	estimated ni 0	imber at leng 0	n 0	estimated r	umber at le	ength 0
	2	0	0	0	0	0	0
	3	0	0	0	0	0	0
	4	0	0	0	0	0	0
	5	0	0	0	0	0	0
	6	0	0	0	0	0	0
	7	0	0	0	0	0	0
	8	0	0	0	0	0	0
	9	0	0	0	0	0	0
	10	0	0	0	0	0	0
	11	621	0	0	0	0	0
	12	207	0	0	1,503	23,677	0
	13	414	0	Ō	6,013	0	0
	14	1,034	9,638	0	1,503	0	0
	15	414	0	0	9,019	23,677	0
	16	931	9,638	0	1,503	0	0
	17	1,552	0	0	1,503	47,355	0
	18	2,793	0	0	3,006	71,032	0
	19	2,690	0	141,145	4.509	0	0
	20	3,103	0	0	5,814	47,355	0
	21	2,172	0	112,916	10,522	23,677	0
	21	1,241	0	56,458	4,311		ō
						0	0
	23	103	0	84,687	7,516	23,677	
	24	207	0	0	8,820	0	0
	25	0	0	0	10,522	23,677	0
	26	0	0	0	9,927	23,677	29,618
	27	0	0	0	15,741	0	29,618
	28	0	0	0	6,920	0	0
	29	0	0	0	4,509	0	0
	30	0	0	0	5,814	0	0
	31	0	0	0	3,006	0	0
	32	0	0	0	3,006	23,677	0
	33	0	0	0	1,305	0	0
	34	0	0	0	3,006	0	0
	35	0	0	0	0	0	0
	36	0	0	0	1,305	0	0
	37	0	0	0	0	0	0
	38	0	0	ō	0	0	0
	39	0	0	0	0	0	0
	40	0	0	0	0	0	0
	41	0	0	0	0	0	0
	42	0	0	0	0	0	0
	43	0	0	0	0	0	0
	44	0	0	0	0	0	0
	44	0	0	0	0	0	0
	45 46	0	0	0	0	0	0
	47	0	0	0	0	0	0
	48	0	0	0	0	0	0
	49	0	0	0	0	0	0
	50	0	0	0	0	0	0
	51	0	0	0	0	0	0
	52	0	0	0	0	0	0
	53	0	0	0	0	0	0
	54	0	0	0	0	0	0
	55	0	0	0	0	0	0
	56	0	0	0	0	0	0
	57	0	0	0	0	0	0
	58	0	0	ō	0	0	o
	59	0	0	0	0	0	0
	60	0	0	0	0	0	0
	61	0	0	0	0	0	0
	62	0	0	0	0	0	0
	63	103	0	0	0	0	ō
Total	03	17,586	19,276	395,207	130,604	331,485	59,236
		.7,500	. 3,210	000,207		001,700	00,200

Table 8.

(Continued)

Year 2007 2008 2007 2008 2007 2008 Logbook shrimp catch (i) 53,218 57,764 26,912 53,218 57,764 26,912 53,218 57,764 22,203 21,226 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,236 21,330 126 20,336 21,335 26,358 28,998 46 29,356 45,356 45,369 29,998 46 29,356 45,369 29,36 46,369 12,398 10,31 123,368 20,369 10,31 123,368 20,369 10,31 123,368 20,368	uea)							
Observed at lamp cath (1) 2,272 2,473 1,061 2,275 2,493 carraction face 21,913 21,1678 25,377 21,913 21,1678 25,377 21,913 21,1678 25,377 21,913 21,1678 25,377 21,913 21,1678 25,377 21,913 21,1678 25,377 21,913 21,1678 25,377 21,913 21,1678 25,377 21,913 21,178 25,978 1,281 1,753 26,978 42,978<		V····	2007	Redfish	2000			2000
Laglook atms catch (t) 57,181 57,164 26,912 51,218 57,764 26,912 51,218 51,716 25,257 crimated (kg) 12,228 12,228 12,238 11,51 152 120 tail aumder of ests observed 1301 1262 17,152 173 1301 1262 preact by 20,10 weight 435 426 278 53,28 329 46 preact by 20,10 weight 24,057 0,554 45,207 1,282 1,286 preact by 20,10 weight 24,079 0,435 0,289,97 6 9,299 4 preact by 20,40 weight 1,00 0 <td>Observed shrimp catch (t)</td> <td>Year</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>2009 1,061</td>	Observed shrimp catch (t)	Year						2009 1,061
correction factor cimited by action (here) 21.913 23.1678 25.577 21.931 23.1678 25.577 21.931 23.1678 25.457 11.985 6 By acht (Ag) (h) shring 22.30 3.68 1.135 1.265 1.35 1.265 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285 1.285								26,912
By cach. (a) (1) shimp 2.30 3.60 1.53 1.55 2.03 total number of sks with by cach 1106 1.155 6.02 273 3.23 3.23 fra, sets with likg corded 2.37 3.85 4.535 6.433 3.245 4.535 6.433 3.245 4.535 6.453 3.245 4.535 6.453 3.245 4.535 6.453 5.55 4.535 6.453 6.433 3.245 4.535 4.555 4.535 6.453 6.633 6.0 0 <td>correction factor</td> <td></td> <td></td> <td></td> <td>25.3577</td> <td></td> <td></td> <td>25.3577</td>	correction factor				25.3577			25.3577
tail number of sets observed number of sets with bycath 1301 1262 773 1301 1262 fer, sets with lig recorded amber sets with numeramenters or all regula 435 625 52 324 45 precent bycath sets with reguramenters or all regula 0<			122,268		41,133			62,827 2.33
number of sats with lysach 11166 1.152 0.133 95.95 45.80% 44.335 28.99% percent bysach sets with leg recorded number of inh measurements 2.40% 0.43% 0.99% 2.45% 1.23% 0 number of inh measurements 2.40% 0.3% 0.90% 0.45% 1.23% 0 1 0 0 0 0 0 0 0 0 2 0.0 0	Bycatch (kg)/ (t) shrimp		2.30	3.08	1.55	1.55	2.03	2.33
number of sets with by carbot 41166 1.153 607 1.182 1.135 precent by carbot 4337 128 12	total number of sets observed		1301	1262	713	1301	1262	713
psecent by such as with 1kg recorded percent by such as with measurements anabe of fah measurements mathes of fah measurements anabe of fah measurement			1166	1,153	607	1,182	1,135	230
number of bith measurements number of fish measured 2.48 2.011 0.43 0.43 0.43 0.96 0.43 2.45 0.43 1.04 0.43 1.04	freq. sets with 1Kg recorded		435	426	278	524	329	108
precent byzach sets with messared insol of all messared insol of a length 2.40% 2.40% 2.40% 2.40% 2.40% 2.40% 2.40% 1.42% 1.46% 1.23% 0 i 0					45.80%			46.96%
number of tich measured (ual hergeh) c.final control of a lengeh) c.final number al lengeh) 1 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 4 0 0 0 0 0 0 0 6 3.706 5.888 0 0 0 0 0 10 7.5830 25.521 9.043 11.085 576 3 11 10.75.830 255.21 9.043 11.086 677 3 12 137.210 420.340 90.360 69.833 11.515 191 13 164.341 432.748 75.331 391.943 10.441 10 14 167.442 15.056 23.858 89.463 29.997 53.290 13 13 84.544 43.274 57.313								15
omat omat omat omat omat omat 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 7 35.00 63.71 0 0 0 0 0 1 17.042 17.056 72.587 0 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1								6.52% 3,256
cm cimulat number at length cimulate number at length 1 0 0 0 0 0 0 2 0 0 0 0 0 0 0 3 0 0 0 0 0 0 0 0 4 0 0 0 0 0 0 0 5 1,885 0 0 0 0 0 0 6 3,706 23,881 1,085 57.5 3 0 0 0 0 10 76,850 233,891 1,085 57.6 3 1 <t< td=""><td></td><td></td><td>2,011</td><td>420</td><td>1,305</td><td>1,015</td><td>1,900</td><td>3,230</td></t<>			2,011	420	1,305	1,015	1,900	3,230
1 0 0 0 0 0 3 0 0 0 0 0 4 0 0 0 0 0 5 1.885 0 0 0 0 6 3.765 23.589 0 0 0 7 36.500 58.971 0 0 0 9 177.042 25.82 90.433 1.086 577 33.11.519 91.12 11 107.753 257.247 30.346 69.333 91.444 71.444 12 137.21 42.037.43 91.513 91.443 91.433 91.543 91.443 16 382.92 22.568 89.463 299.975 33.026 13.1519 91.50.53 91.443 91.55.55 91.53.53 91.443 91.55.55 91.53.53 91.45.53 93.55.55 93.53 93.55.55 93.53 93.55.55 93.55.55 93.55.55 93.55.55 93.55.55 93.55	Ť	cm	estimated nu	mber at leng	gth	estimated nur	nber at length	
3 0 0 0 0 0 4 00 00 00 00 6 3.706 2.589 00 00 00 7 36.500 58.971 00 00 00 8 12.2131 70.765 72.587 00 00 11.065 10 75.800 255.821 90.443< 11.685 80.686 11.11 11 10.2783 271.267 37.191 16.204 80.686 11.11 12 137.270 42.0440 90.364 99.331 31.151 15.11 11 10.2783 271.267 77.128 34.524 10.11 11.11 13 167.33 391.43 31.544 10.11 11.728 22.73 39.33 10.364 10 17.757 55.52 22.858 90.53.83 13.53.63 33.23 13.53.63 33.23 13.53.63 33.23 13.53.63 33.23 13.53.63 3		1	0	0	0	0	0	0
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50 0 0 0 1,146 51 0 0 0 0 52 0 0 0 0 53 0 0 0 0 54 0 0 0 0 55 0 0 0 0 56 0 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0		48	0	0	0	0	576	0
50 0 0 0 1,146 51 0 0 0 0 52 0 0 0 0 53 0 0 0 0 54 0 0 0 0 55 0 0 0 0 56 0 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0		49	0	0	0	0	0	0
51 0 0 0 0 52 0 0 0 0 53 0 0 0 0 54 0 0 0 0 55 0 0 0 0 56 0 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0 62 0 0 0 0						0		0
52 0 0 0 0 53 0 0 0 576 55 0 0 0 0 56 0 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0 62 0 0 0 0								0
53 0 0 0 0 54 0 0 0 576 55 0 0 0 0 56 0 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 61 0 0 0 0 62 0 0 0 0						-		
54 0 0 0 576 55 0 0 0 0 56 0 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0 62 0 0 0 0								0
55 0 0 0 0 56 0 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0 62 0 0 0 0		53	0	0	0	0	0	0
56 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0 62 0 0 0 0		54	0	0	0	0	576	0
56 0 0 0 57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0 62 0 0 0 0		55	0	0	0	0	0	0
57 0 0 0 0 58 0 0 0 0 59 0 0 0 0 60 0 0 0 0 61 0 0 0 0 62 0 0 0 0								0
58 0 0 0 59 0 0 0 60 0 0 0 61 0 0 0 62 0 0 0						-		
59 0 0 0 0 60 0 0 0 0 61 0 0 0 0 62 0 0 0 0								0
60 0 0 0 0 61 0 0 0 0 62 0 0 0 0						0	0	0
61 0 0 0 0 62 0 0 0 0		59	0	0	0	0	0	0
61 0 0 0 0 62 0 0 0 0		60	0	0	0	0	0	0
62 0 0 0 0								0
								0
63 0 0 0 0 0								
		63				-		0
Total 2,357,392 5,011,404 1,178,887 1,885,502 1,125,471 1,322	Total		2,357,392	5,011,404	1,178,887	1,885,502	1,125,471	1,322,301

Table 8.

(continued)

(continued)										
	Year	Striped Wo 2007	lffish 2008	2009	Spotted Wolf 2007	fish 2008	2009	Broadhead W 2007	olffish 2008	2009
Observed shrimp catch (t)	i cai	2,427	2,493	1,061	2,427	2,493	1,061	2,427	2,493	1,061
Logbook shrimp catch (t) correction factor		53,218 21.9313	57,764 23.1678	26,912 25.3577	53,218 21.9313	57,764 23.1678	26,912 25.3577	53,218 21.9313	57,764 23.1678	26,912 25.3577
estimated bycatch (kg)		6,272	8,572	2,409	1,579	1,112	558	1,075	70	101
Bycatch (kg)/ (t) shrimp		0.12	0.15	0.09	0.03	0.02	0.02	0.02	0.00	0.00
total number of sets observed		1301	1262	713	1301	1262	713	1301	1262	713
number of sets with bycatch		221	207	56	59	41	13	26	3	3
freq. sets with 1Kg recorded		187	141	35	50	35	9	14	3	2
percent bycatch sets with 1Kg recorded number sets with measurements		84.62% 21	68.12% 0	62.50% 0	84.75% 16	85.37% 0	69.23% 0	53.85% 0	100.00% 0	66.67% 0
percent bycatch sets with measurements		9.50%	0.00%	0.00%	27.12%	0.00%	0.00%	0.00%	0.00%	0.00%
number of fish measured		272	0	0	36	0	0	0	0	0
total length	cm	estimated n	umber at le	neth	estimated nun	nber at length		estimated nur	nber 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	1,792	0	0	0	0	0	0	0	0
	6	2,389	0	0	0	0	0	0	0	0
	7	2,688	0	0	0	0	0	0	0	0
	8	4,480	0	0	99	0	0	0	0	0
	8 9	2,987	0	0	99	0	0	0	0	0
	10	12,246	0	0	0	0	0	0	0	0
	11	5,974	0	0	99	0	0	0	0	0
	12	1,792	0	0	0	0	0	0	0	0
	13	1,195	0	0	0	0	0	0	0	0
	14	299	0	0	592	0	0	0	0	0
	15	597	0	0	395	0	0	0	0	0
	16	896	0	0	99	0	0	0	0	0
	17	0	0	0	0	0	0	0	0	0
	18	597	0	0	296	0	0	0	0	0
	19	299	0	0	0	0	0	0	0	0
	20	597	0	0	0	0	0	0	0	0
	21	299	0	0	99	0	0	0	0	0
	22	299	0	0	0	0	0	0	0	0
	23	299	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0	0
	25	299	0	0	0	0	0	0	0	0
	26	597	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0	0
	20	0	0				0	0	0	0
				0	0	0				
	30	0	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0	0
	32	0	0	0	0	0	0	0	0	0
	33	0	0	0	0	0	0	0	0	0
	34	0	0	0	0	0	0	0	0	0
	35	0	0	0	0	0	0	0	0	0
	36	0	0	0	0	0	0	0	0	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	0	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
	40	0	0	0	0	0	0	0	0	0
	47	0	0	0	0	0	0	0	0	0
	40 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	0	0	0	0	0	0	0	0
	54	0	0	0	0	0	0	0	0	0
	55	0	0	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	0	0	0	0	0	0
Total	03	40,621	0	0	0 1,678	0	0	0	0	0
10101		4 0,021	U	U	1,078	0	U	0	0	0

		+ 3K (SFA	(4.6), during 2	.009.	
number of fishing		1-	713		
number of species	in bycat		51 WRTCHWR	METOUR	
	OCCUT	OCCUR	WEIGHT	WEIGHT	Common nome
	OCCUR	(%) 27 07	kg	(%)	Common name
	193	27.07	262	0.02	SKATES (NS)
	88	12.34	153	0.01	HERRING, ATLANTIC
	391	54.84	3553	0.33	CAPELIN
	1	0.14	1	0.00	VIPERFISHES (NS)
	77	10.80	201	0.02	LANTERNFISHES (NS)
	52	7.29	74	0.01	BARRACUDINAS (NS)
	29	4.07	29	0.00	BILLFISH
	106	14.87	270	0.03	COD, ATLANTIC
	2	0.28	2	0.00	TOMCOD
	1	0.14	1	0.00	POLLOCK
	318	44.60	1307	0.12	COD, ARCTIC
	1	0.14	1	0.00	THREEBEARD ROCKLING
	2	0.28	2	0.00	CUSK
	6	0.84	15	0.00	FOURBEARD ROCKLING
	7	0.98	7	0.00	GRENADIERS (NS)
	10	1.40	17	0.00	MACKEREL, ATLANTIC
	13	1.82	49	0.00	SAND LANCES (NS)
	95	13.32	126	0.01	SAND LANCES (NS)
	3	0.42	4	0.00	WOLFFISH, BROADHEAD
	65	9.12	113	0.01	WOLFFISH, STRIPED
	4	0.56	4	0.00	WOLFFISH, SPOTTED
	71	9.96	80	0.01	BLENNIES (NS)
	1	0.14	1	0.00	WRYMOUTH
	364	51.05	773	0.07	EELPOUTS (NS)
	42	5.89	65	0.01	EELPOUT (NS)
	607	85.13	1880	0.17	REDFISH (NS) SEB.SP.
	170	23.84	198	0.02	SCULPINS (NS)
	3	0.42	3	0.00	MAILED SCULPINS (NS)
	110	15.43	129	0.01	ALLIGATORFISH (NS)
	50	7.01	59	0.01	ALLIGATORFISH, NORTHERN
	306	42.92	336	0.03	ALLIGATORFISH, COMMON
	2	0.28	2	0.00	SEASNAILS (NS)
	283	39.69	616	0.06	AMERICAN PLAICE
	77	10.80	104	0.01	WITCH FLOUNDER
	682	95.65	4691	0.44	GREENLAND HALIBUT
	1	0.14	1	0.00	FLOUNDERS (NS) PAR.SP.
	44	6.17	281	0.03	UNIDENTIFIED FISH
	5	0.70	5	0.00	SPONGE
	1	0.14	1	0.00	SCYPHOZOAN
	3	0.42	3	0.00	SEA ANEMONE
	2	0.28	2	0.00	WHELK BUCC.
	110	15.43	122	0.01	CEPHALOPOD (NS)
	3	0.42	3	0.00	OCTOPUS OCTOPODA
	1	0.14	1	0.00	SHRIMP SERG.ARC.
	8	1.12	8	0.00	SHRIMP PASIP.TAR.
	5	0.70	5	0.00	SHRIMP PASIP.MUL.
	705	98.88	1061294	98.55	SHRIMP PAND.BOR.
	34	4.77	38	0.00	CRAB, SNOW OR QUEEN
	4	0.56	4	0.00	CRAB, TOAD HYAS.SP.
	9	1.26	14	0.00	SEA CUCUMBER HOL.
	7	0.98	9	0.00	SEA STAR
			======	======	
			1076919	99.99	

Table 9.A summary of the bycatch species taken by the small vessel fleet fishing for shrimp in
Hawke Channel + 3K (SFA 6), during 2009.

Table 10. NAFO Division 3L (Shrimp Fishing Area 7) Canadian large vessel (>500 t) bycatch over the period 2007 - 2009. 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.

-0	ise note that if the	00.	501 001			cate		i uie	logu	JOK Ca				uon	
	Observed shrimp catch (t) Logbook shrimp catch (t) correction factor	Year	2007 6,168 5,743 1.0000	2008 7,284 6,314 1.0000	tlantic cod 2009 3,964 6,550 1.6524	2007 6,168 5,743 1.0000	2008 7,284 6,314 1.0000	2009 3,964 6,550 1.6524	2007 6,168 5,743 1.0000	2008 7,284 6,314 1.0000	redfish 2009 3,964 6,550 1.6524	2007 6,168 5,743 1.0000	2008 7,284 6,314 1.0000	2009 3,964 6,550 1.6524	
	estimated bycatch (kg) Bycatch (kg)/ (t) shrimp		20 0.00	35 0.00	151 0.02	1,968 0.32	1,056 0.15	3,334 0.51	2,546 0.41	2,183 0.30	3,539 0.54	7,153 1.16	4,869 0.67	3,104 0.47	
	total number of sets observed number of sets with bycatch		1076 74	1,179 155	612 140	1076 673	1,179 800	612 425	1076 812	1,179 709	612 491	1076 1,047	1,179 1,093	612 594	
	freq. sets with 1Kg recorded percent bycatch sets with 1Kg recorded		70 94.59%	99 63.87%	114 81.43%	328 48.74%	431 53.88%	155 36.47%	312 38.42%	175 24.68%	105 21.38%	152 14.52%	185 16.93%	52 8.75%	
	number sets with measurements percent bycatch sets with measurements number of fish measured		40 54.05% 62	42 27.10% 106	17 12.14% 108	20 2.97% 546	6 0.75% 464	5 1.18% 142	20 2.46% 1,908	9 1.27% 651	6 1.22% 610	30 2.87% 2,739	12 1.10% 682	13 2.19% 1,670	
		cm 1	estimated nur 0	nber at lengt 0		estimated n 0	umber at ler 0	ngth 0	estimated nu 0	mber at lengt 0		estimated n 0	umber at le 0	ngth 0	
		2	0	0	0	0 0	0 0	0	0	0 0	0	0	0	0	
		4	0	0	0	0	0	0 0	0 54	0 136	0	0	0	0	
		6	0	0	0	0	0	0	319 551	91 388	56 112	0	0	0	
		8	0	0	0	0	0	0	1,557	321	56	0	0	101	
		9 10	0	0	0 0	27 139	0	0 0	4,075 6,115	2,684 2,891	463 2,183	129 178	191 95	323 393	
		11 12	0	0	0	23 0	0 0	353 370	3,585 1,023	3,340 1,991	3,834 5,645	114 358	382 95	121 323	
		13 14	0	10 20	0	185 255	27 95	0 2,223	2,515 4,198	3,592 2,607	7,569 5,912	1,260 1,658	0	958 1,876	
		15 16	0	25 30	0	387 615	491 286	3,299 4,004	5,944 4,346	3,482 2,213	3,827 730	2,818 5,564	382 798	3,279 6,051	
		17	0	46	69 181	452 366	259	3,687	3,865	4,338	955	10,026	3,704	8,812 7,256	
		18 19	4	56 91	191	381	523 987	6,262 5,927	3,706 2,999	2,028 1,091	1,067 843	12,900 12,699	4,857 9,501	2,716	
		20 21	10 17	51 61	276 216	1,164 1,324	1,114 1,570	9,172 5,062	1,522 1,742	546 273	281 112	8,566 5,302	12,159 12,502	1,362 344	
		22 23	25 4	56 20	157 139	720 829	1,090 778	2,558 2,223	702 269	546 91	225 281	3,597 2,257	5,736 2,933	414 172	
		24 25	8 13	25 15	78 95	640 798	441 532	2,187 1,076	54 79	0 136	393 393	967 901	989 286	253 202	
		26 27	4	20 5	9 34	916 1,244	410 436	1,446 1,111	54 0	91 45	225 344	339 832	286 768	666 787	
		28 29	4	0	17 34	836 703	136 244	353 353	0	45 0	225 0	810 1,176	1,592 1,466	888 565	
		30	0	0	17	293	122	0	0	0	0	1,543	1,627	545	
		31 32	0 2	0	0	312 284	28 0	0	0	0 0	0 56	1,392 718	577 286	677 595	
		33 34	0	0	0	375 133	14 0	0 0	0	0 0	56 0	379 339	95 286	242 81	
		35 36	0 2	0	0	398 55	0 0	0	0	0 0	0	267 372	0	272 60	
		37 38	2 0	0	0	55 51	0 0	0 0	0 0	0 0	0 0	307 444	0 0	51 60	
		39 40	0	0	0	82 27	0 0	0 370	0	0	0	235 322	0	30 71	
		41 42	2	0	0	0	0	0	0	0	0	226 275	0	40 10	
		43	2	0	0	0	0	0	0	0	0	290	0	0	
		44 45	0	0	0	0	0	0	0	0	0	226 154	0	0	
		46 47	0 1	0	0	0 0	0	0 0	0	0 0	0	97 32	0	0	
		48 49	0	0	0	27 0	0 0	0 0	0	0 0	0	32 0	0	0	
		50 51	0	0	0	0 0	0 0	0 0	0 0	0 0	0 0	0	0 0	0	
		52 53	0	0	0	0	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 56	1	0	0	0	0	0	0	0	0	0	0	0	
		57 58	0	0	0	0	0	0 0	0	0 0	0	0	0 0	0	
		59 60	0	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0	0	0	
		61 62	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0	0	0 0	
	Total	63	0 115	0 538	0 1,516	0 14,094	0 9,584	0 52,036	0 49,274	0 32,967	0 35,843	0 80,100	0 61,596	0 40,597	
															•

Table 10.

(Continued)

(Continued	9	Carling 1 M	16-1		C	-16-1		Deres "	W-16 1	
	Year	Striped Wo 2007	lfish 2008	2009	Spotted W 2007	2008	2009	Broadhead 2007	Wolfish 2008	2009
Observed shrimp catch (t)		6,168	7,284	3,964	6,168	7,284	3,964	6,168	7,284	3,964
Logbook shrimp catch (t) correction factor		5,743 1.0000	6,314 1.0000	6,550 1.6524	5,743 1.0000	6,314 1.0000	6,550 1.6524	5,743 1.0000	6,314 1.0000	6,550 1.6524
estimated bycatch (kg)		560	367	266	61	23	25	5	12	8
Bycatch (kg)/ (t) shrimp		0.09	0.05	0.04	0.01	0.00	0.00	0.00	0.00	0.00
total number of sets observed		1076	1,179	612	1076	1,179	254	1076	1,179	254
number of sets with bycatch		372	281	114	33	22	15	5	11	5
freq. sets with 1Kg recorded		272	211	80	28	22	15	5	10	5
percent bycatch sets with 1Kg recorded number sets with measurements		73.12% 29	75.09% 0	70.18% 0	84.85% 4	100.00% 0	100.00% 0	100.00% 0	90.91% 0	100.00% 0
percent bycatch sets with measurements		7.80%	0.00%	0.00%	12.12%	0.00%	0.00%	0.00%	undefined	undefined
number of fish measured		496	0	0	8	0	0	0	0	0
	cm	estimated n 0	umber at le	ngtn 0	estimated i	umber at le	ngtn 0	estimated i 0	umber at len 0	gtn O
	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	0	0	0	0	0	0	0	0
	9	0				0				
		0	0	0	0	0	0	0	0	0
	10	0 53	0	0	0	0	0	0	0	0
	11									
	12	93	0	0	0	0	0	0	0	0
	13	200	0	0	15	0	0	0	0	0
	14	280	0	0	0	0	0	0	0	0
	15	280	0	0	0	0	0	0	0	0
	16	320	0	0	15	0	0	0	0	0
	17	440	0	0	15	0	0	0	0	0
	18	400	0	0	0	0	0	0	0	0
	19	267	0	0	15	0	0	0	0	0
	20	80	0	0	0	0	0	0	0	0
	21	27	0	0	0	0	0	0	0	0
	22	40	0	0	0	0	0	0	0	0
	23	67	0	0	0	0	0	0	0	0
	24	53	0	0	0	0	0	0	0	0
	25	80	0	0	0	0	0	0	0	0
	26	93	0	0	0	0	0	0	0	0
	27	93	0	0	0	0	0	0	0	0
	28	27	0	0	0	0	0	0	0	0
	29	13	0	0	0	0	0	0	0	0
	30	40	0	0	0	0	0	0	0	0
	31	27	0	0	0	0	0	0	0	0
	32	27	0	0	0	0	0	0	0	0
	33	27	0	0	0	0	0	0	0	0
	34	40	0	0	0	0	0	0	0	0
	35	13	0	0	0	0	0	0	0	0
	36	27	0	0	0	0	0	0	0	0
	37	13	0	0	0	0	0	0	0	0
	38	67	0	0	0	0	0	0	0	0
	39	27	0	0	0	0	0	0	0	0
	40	53	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	13	0	0	0	0	0	0	0	0
	44	0	0	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	0	0	0	0	0	0	0	0
	54	13	0	0	0	0	0	0	0	0
	55	13	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	0
	58	0	0	0	0	0	0	0	0	0
	59	0	0	0	0	0	0	0	0	0
	59 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
	62 63	0	0			0				
Tatal	63		0	0	0 61	0	0	0	0	0
Total		3,307	0	0	61	0	0	0	0	0

number of fishing sets = 1052 number of species in bycatch = 95 OCCUR WEIGHT WEIGHT OCCUR (응) kg (응) Common name 49.90 0.01 525 788 SKATES (NS) 169 16.06 356 0.00 HERRING, ATLANTIC 917 87.17 134017 1.85 CAPELIN 4 0.38 7 0.00 BLACKSMELT, GOITRE 1 0.10 1 0.00 ANGLEMOUTH, LONGTOOTH 70 49 4.66 0.00 VIPERFISH 26 2.47 31 0.00 DRAGONFISH, BOA 376 35.74 2063 0.03 LANTERNFISHES (NS) 256 24.33 507 0.01 BARRACUDINAS (NS) 9 0.86 0.00 EELS, FRESHWATER (NS) 39 37 3.52 45 0.00 EELS, SNIPE (NS) 19 1.81 19 0.00 SNIPE EEL, ATLANTIC 0.00 0.76 8 9 SNIPE EEL, SHORTNOSE 169 145 13.78 0.00 COD, ATLANTIC 0.00 HAKE, LONGFIN 6 0.57 8 9 0.86 12 0.00 HAKE, RED (SQUIRREL) 19 20 0.00 HAKE, WHITE (COMMON) 1.81 75 7.13 92 0.00 COD, ARCTIC 28 2.66 28 0.00 THREEBEARD ROCKLING 19 1.81 19 0.00 THREEBEARD RKLG, SILVER 1 0.10 1 0.00 CUSK 24 24 2.28 0.00 FOURBEARD ROCKLING 11 1.05 11 0.00 GRENADIERS (NS) 0.00 6 0.57 6 GRENADIER, ROUGHHEAD 4 0.38 4 0.00 MARLIN SPIKE (COMMON) 0.10 0.00 GRENADIER, ROUNDNOSE 1 1 10 0.95 109 0.00 SAND LANCES (NS) 74 7.03 141 0.00 SAND LANCES (NS) WOLFFISH, BROADHEAD 1 0.10 1 0.00 149 14.16 192 0.00 WOLFFISH, STRIPED WOLFFISH, SPOTTED 14 1.33 14 0.00 3 0.29 4 0.00 SHANNY, ARCTIC 223 21.20 362 0.00 FOURLINE SNAKEBLENNY 1 0.10 1 0.00 SHANNY, RADIATED 354 33.65 569 0.01 BLENNIES (NS) 609 57.89 2474 0.03 EELPOUTS (NS) 133 12.64 541 0.01 EELPOUT (NS) 1 0.10 1 0.00 POUT, OCEAN (COMMON) 0.10 1 0.00 OCEAN POUT, GREEN 1 753 71.58 6937 0.10 REDFISH (NS) SEB.SP. 60 5.70 77 0.00 SCULPINS (NS) 0.10 1 0.00 SEA RAVEN 1 140 13.31 142 0.00 HOOKEAR SCULPIN (NS) 335 31.84 714 0.01 MAILED SCULPINS (NS) 4 0.38 4 0.00 SCULPIN, RIBBED (HORNE 7 0.67 9 0.00 SCULPIN, ARCTIC STAGHOR 0.10 3 0.00 1 MUDDLER (NS) 1 0.10 1 0.00 SCULPIN, DEEP SEA 1 0.10 3 0.00 TWOHORN SCULPIN (NS) 92 8.75 107 0.00 ALLIGATORFISH (NS)

Table 11.A summary of the bycatch species taken by the Canadian large vessel fleet fishing for
shrimp in NAFO Division 3L (SFA 7), during 2009.

Table 11 (Continued)

	OCCUR	WEIGHT	WEIGHT	
OCCUR	(%)	kq	(%)	Common name
106	10.08	144	0.00	ALLIGATORFISH, NORTHERN
288	27.38	294	0.00	ALLIGATORFISH, COMMON
28	2.66	28	0.00	LUMPFISH (NS) EUM.SP.
5	0.48	5	0.00	LUMPFISH, COMMON
27	2.57	28	0.00	SEASNAILS (NS)
769	73.10	4945	0.07	AMERICAN PLAICE
8	0.76	16	0.00	WITCH FLOUNDER
2	0.19	26	0.00	YELLOWTAIL FLOUNDER
1014	96.39	10000	0.14	GREENLAND HALIBUT
1	0.10	3	0.00	FLOUNDER, WINTER
145	13.78	2385	0.03	REDFISH, LARGE
28	2.66	366	0.01	UNIDENTIFIED FISH
29	2.76	29	0.00	SPONGE
25	2.38	30	0.00	CNIDARIAN
1	0.10	1	0.00	SCYPHOZOAN
23	2.19	23	0.00	ANTHOZOAN
13	1.24	13	0.00	SEA ANEMONE
1	0.10	1	0.00	WHELK BUCC.
75	7.13	84	0.00	CEPHALOPOD (NS)
8	0.76	8	0.00	OCTOPUS OCTOPODA
1	0.10	5	0.00	MYSID
1	0.10	3	0.00	EUPHAUSIID EUPH.SP.
3	0.29	3	0.00	DECAPOD, CRUSTACEAN
90	8.56	97	0.00	SHRIMP NATA.
50	4.75	1033	0.01	SHRIMP SERG.ARC.
2	0.19	575	0.01	SHRIMP PASIP.MUL.
6	0.57	6	0.00	SHRIMP EUAL.GAI.GAI.
2	0.19	2	0.00	SHRIMP LEB.POL.
1047	99.52	7089598	97.63	SHRIMP PAND.BOR.
117	11.12	1006	0.01	SHRIMP PAND.MON.
16	1.52	83	0.00	SHRIMP SCLE.FER.
27	2.57	27	0.00	SHRIMP SAB.SAR.
58	5.51	104	0.00	SHRIMP ARG.DEN.
2	0.19	2	0.00	CRAB SPIDER
62	5.89	66	0.00	CRAB, SNOW OR QUEEN
25	2.38	25	0.00	CRAB, TOAD HYAS.SP.
6	0.57	6	0.00	CRAB, TOAD HYAS ARA.
2	0.19	2	0.00	CRAB, TOAD HYAS COAR
7	0.67	7	0.00	SEA CUCUMBER HOL.
2	0.19	2	0.00	SEA URCHIN ECH.
4	0.38	4	0.00	SAND DOLLAR CYLP.
14	1.33	14	0.00	SEA STAR
14	0.10	1	0.00	CORAL GORGONIA
2	0.10	2	0.00	CORAL GORGONIA CORAL ALCYONACEAN
13	1.24	13	0.00	CORAL ALYCONACEAN
10	1.71	=======	======	CONTE ALICONACEAN
		7261870	99.97	
		,2010/0	22.21	

Table 12.NAFO Division 3L (Shrimp Fishing Area 7) Canadian small vessel (<=500 t;
LOA<100') bycatch over the period 2007 - 2009. 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).

				Atlantic cod		Amer	ican plaice		redfish		Greenla	nd halibut	
Observed shrimp catch (t)	Year	2007 808	2008 1,417	2009 1,082	2007 808	2008 1,417	2009 1,082	2007 808	2008 1,417	2009 1,082	2007 808	2008 1,417	2009 1,082
Logbook shrimp catch (t)		12,573	14,873	13,944	12,573	14,873	13,944	12,573	14,873	13,944	12,573	14,873	13,944
correction factor		15.5616	10.4962	12.8912	15.5616	10.4962	12.8912	15.5616	10.4962	12.8912	15.5616	10.4962	12.8912
estimated bycatch (kg) Bycatch (kg)/ (t) shrimp		16 0.00	147 0.01	1,571 0.11	3,828 0.30	6,382 0.43	10,915 0.78	28,609 2.28	27,671 1.86	27,948 2.00	865 0.07	24,302 1.63	18,243 1.31
total number of sets observed number of sets with bycatch		503 30	734 95	721 115	503 111	734 391	721 352	503 377	734 666	721 594	503 329	734 630	721 612
freq. sets with 1Kg recorded		24	95 86	96	62	263	155	223	251	260	205	283	268
percent bycatch sets with 1Kg recorded		80.00%	90.53%	83.48%	55.86%	67.26%	44.03%	59.15%	37.69%	43.77%	62.31%	44.92%	43.79%
number sets with measurements percent bycatch sets with measurements		3.33%	4 4.21%	2 1.74%	0 0.00%	0 0.00%	4 1.14%	1 0.27%	4 0.60%	18 3.03%	0.30%	ر 1.11%	14 2.29%
number of fish measured		1	7	66	0	0	303	25	375	1,634	9	225	2,074
total length	cm	estimated nur	nher at lengt	h	estimated r	umber at le	neth	estimated nu	mber at lengt	h	estimated n	umber at k	neth
	1	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	1,629	0	0	0
	7	0	0	0	0	0	0	0	5,534	15,947	0	0	0
	8	Ō	0	0	0	Ō	5,953	0	31,498	28,538	0	2,648	325
	9	0	0	17,655	0	0	15,876	0	97,202	61,735	0	2,648	257
	10	0	0	36,914	0	0	18,852	0	213,773	98,130	8,414	2,843	2,205
	11	0	0	24,074	0	0	6,946	0	282,597	139,718	0	8,918	15,567
	12	0	286	1,605	0	0	9,922	85,827	194,403	124,692	4,207	18,226	66,136
	13	0	286	3,210	0	0	28,775	28,609	96,848	129,927	0	11,956	134,987
	14	0	0	0	0	0	41,674	57,218	24,904	92,458	4,207	11,761	146,437
	15	638	286	4,815	0	0	40,696	114,436	16,603	76,108	0	15,189	73,988
	16	0	286	9,630	0	0	29,767	85,827	41,506	50,140	12,620	14,994	42,478
	17	0	0	1,605	0	0	19,845	143,045	13,835	30,418	4,207	6,075	15,552
	18	0	0	0	0	0	18,867	114,436	8,301	15,506	4,207	13,670	6,045
	19	0	0	1,605	0	0	18,852	57,218	11,068	10,848	0	16,707	1,866
	20	0	0	3,210	0	0	9,922	0	2,767	4,408	0	15,189	4,057
	21	0	0	1,605	0	0	9,922	28,609	0	556	0	33,220	6,816
	22	0	0	0	0	0	6,946	0	0	0	0	16,707	7,790
	23	0	286	0	0	0	6,946	0	0	0	0	24,302	8,182
	24	0	0	0	0	0	1,999	0	0	0	0	41,009	6,816
	25	Ö	286	0	0	Ö	1,984	0	0	0	0	25,821	3,597
	26	0	0	0	0	0	0	0	0	0	0	19,745	4,436
	27	0	0	0	0	0	2,977	0	0	0	0	18,226	4,950
	28	0	0	0	0	0	992	0	0	0	0	3,038	1,609
	29	0	286	0	0	0	0	0	0	0	0	3,038	771
	30	0	0	0	0	0	992	0	0	0	0	3,038	649
	31	0	0	0	0	0	0	0	0	0	0	4,557	325
	32	0	0	0	0	0	0	0	0	0	0	1,519	649
	33	0	0	0	0	0	992	0	0	0	0	0	0
	34	0	0	0	0	0	0	0	0	0	0	3,038	325
	35	0	0	0	0	0	992	0	0	0	0	0	325
	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	1,519	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 54	0	0	0	0	0	0	0	0	0	0	0	0
		0	0	0	0	0	0	0	0		0	0	0
	55 56	0	0		0	0	0		0	0			0
	56		0	0	0			0			0	0	0
	57 58	0	0	0	0	0	0	0	0	0	0	0	0
	58 59	0	0	0	0	0	0	0	0	0	0	0	0
	59 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
	61 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		638	2,002	105,927	0	0	300,688	715,224	1,040,840	880,759	37,861	339,600	557,140
L		505	2,002		0	0	,000		,	5,1 55	2.,001	,000	

Table 12.

(Continued)

(Continu										
	Year	Striped Wo 2007	lffish 2008	2009	Spotted Woli 2007	ffish 2008	2009	Broadhead W 2007	olffish 2008	20
Observed shrimp catch (t)	. cui	808	1,417	1,082	808	1,417	1,082	808	1,417	1,0
Logbook shrimp catch (t) correction factor		12,573 15.5616	14,873 10,4962	13,944 12.8912	12,573 15.5616	14,873 10.4962	13,944 12.8912	12,573 15.5616	14,873 10.4962	13,9 12.89
estimated bycatch (kg)		1,727	3,002	657	296	31	39	327	147	
Bycatch (kg)/ (t) shrimp		0.14	0.20	0.05	0.02	0.00	0.00	0.03	0.01	0.
otal number of sets observed		503	734	291	503	734	291	503	734	2
number of sets with bycatch		76	198	41	11	3	3	8	12	
freq. sets with 1Kg recorded percent bycatch sets with 1Kg recorded		57 75.00%	162 81.82%	36 87.80%	6 54.55%	3 100.00%	3 100.00%	2 25.00%	10 83.33%	100.00
number sets with measurements		1	8	1	0	0	0	0	0	
percent bycatch sets with measurements		1.32%	4.04%	2.44%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00
number of fish measured otal length		2	64	19	0	0	0	0	0	
	cm	estimated n	umber at le	ngth	estimated nu	mber at length	h	estimated nu	mber at length	1
	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	375	0	0	0	0	0	0	
	10	0	1,126	0	0	0	0	0	0	
	11	0	1,501	0	0	0	0	0	0	
	12	0	2,251	0	0	0	0	0	0	[
	12	0	3,002	1,315	0	0	0	0	0	[
										[
	14	0	3,752	657	0	0	0	0	0	[
	15	0	1,876	657	0	0	0	0	0	
	16	0	2,251	657	0	0	0	0	0	
	17	0	1,501	0	0	0	0	0	0	
	18	0	750	0	0	0	0	0	0	
	19	0	2,251	1,972	0	0	0	0	0	
	20	0	1,501	1,972	0	0	0	0	0	
	21	0	1,126	657	0	0	0	0	0	
	22	1,727	375	1,972	0	0	0	0	0	
	23	0	375	0	0	0	0	0	0	
	24	0	0	1,972	0	0	0	0	0	
	25	0	0	657	0	0	0	0	0	
	26	0	0	0	0	0	0	0	0	
	27	1,727	0	0	0	0	0	0	0	
	28	0	0	0	0	0	0	0	0	
									0	
	29	0	0	0	0	0	0	0		
	30	0	0	0	0	0	0	0	0	
	31	0	0	0	0	0	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	
	44 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	
			0					0	0	
	58	0	0	0	0	0	0			
			0	0	0	0	0	0	0	[
	59	0								
	60	0	0	0	0	0	0	0	0	
		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 0	
	60 61	0 0	0 0	0	0	0	0	0	0	

		Division	3L (SFA 7),	during 2009.	
number of fishing		- ala	721		
number of species	In bycat		51 WRIGUE	METOUR	
		OCCUR	WEIGHT	WEIGHT	Common name
	OCCUR	(%)	kg	(%)	Common name
	107	14.84	160	0.01	SKATES (NS)
	1	0.14	1	0.00	HERRINGS (NS)
	34	4.72	35	0.00	HERRING, ATLANTIC
	483	66.99	8554	0.78	CAPELIN
	12	1.66	12	0.00	DAGGERTOOTHFISHES (NS)
	64	8.88	65	0.01	LANTERNFISHES (NS)
	7	0.97	7	0.00	BARRACUDINAS (NS)
	2	0.28	2	0.00	COD(NS) GADUS SP.
	115	15.95	249	0.02	COD, ATLANTIC
	86	11.93	94	0.01	COD, ARCTIC
	1	0.14	1	0.00	THREEBEARD ROCKLING
	6	0.83	7	0.00	CUSK
	4	0.55	4	0.00	FOURBEARD ROCKLING
	1	0.14	1	0.00	GRENADIERS (NS)
	11	1.53	13	0.00	GRENADIERS (NS) GRENADIERS (NS)
	1	0.14	1	0.00	GRENADIER, ROUGHHEAD
	15	2.08	19	0.00	SAND LANCES (NS)
	1	0.14	1	0.00	SAND LANCES (NS)
	4	0.55	5	0.00	WOLFFISHES (NS)
	2	0.28	2	0.00	WOLFFISH, BROADHEAD
	113	15.67	127	0.00	WOLFFISH, STRIPED
	6	0.83	23	0.00	WOLFFISH, SPOTTED
	42	5.83	42	0.00	FOURLINE SNAKEBLENNY
	79	10.96	81	0.01	BLENNIES (NS)
	368	51.04	822	0.07	EELPOUTS (NS)
	22	3.05	27	0.00	EELPOUT (NS)
	594	82.39	2328	0.21	REDFISH (NS) SEB.SP.
	52	7.21	78	0.01	SCULPINS (NS)
	10	1.39	10	0.00	HOOKEAR SCULPIN (NS)
	84	11.65	84	0.01	MAILED SCULPINS (NS)
	1	0.14	1	0.00	TWOHORN SCULPIN (NS)
	35	4.85	35	0.00	ALLIGATORFISH (NS)
	3	0.42	3	0.00	ALLIGATORFISH, NORTHERN
	218	30.24	227	0.02	ALLIGATORFISH, COMMON
	6	0.83	6	0.00	LUMPFISH (NS) EUM.SP.
	352	48.82	859	0.08	AMERICAN PLAICE
	62	8.60	69	0.01	WITCH FLOUNDER
	612	84.88	1788	0.16	GREENLAND HALIBUT
	2	0.28	4	0.00	HALIBUT (ATLANTIC)
	19	2.64	35	0.00	FLOUNDERS (NS) PAR.SP.
	28	3.88	165	0.02	UNIDENTIFIED FISH
	1	0.14	1	0.00	WHELK BUCC.
	151	20.94	255	0.02	CEPHALOPOD (NS)
	1	0.14	1	0.00	SHRIMP PASIP.TAR.
	714	99.03	1081665	98.51	SHRIMP PAND.BOR.
	1	0.14	1	0.00	SHRIMP PAND.MON.
	3	0.42	3	0.00	SHRIMP ARG.DEN.
	40	5.55	84	0.01	CRAB, SNOW OR QUEEN
	9	1.25	15	0.00	SEA CUCUMBER HOL.
	2	0.28	2	0.00	CORAL ALCYONACEAN
	5	0.69	5	0.00	CORAL ALYCONACEAN
	-		======	======	-
			1098079	99.98	

Table 13.A summary of the bycatch species taken by the Canadian small vessel fleet fishing for
shrimp in NAFO Division 3L (SFA 7), during 2009.

Bycatch (kg) in Estonian shrimp	fishery in 3L		Year	
Latin name	English name	2007	2008	2009
Anarhichas lupus	Atlantic wolffish	27	16	30
Mallotus villosus	Capelin	5,106	5,245	7,417
Anarhichas minor	Spotted wolffish	0	24	157
Anarhichas sp.	Wolffishes (NS)			
Lycodes sp.	Eelpouts (NS)	75	9	
Reinhardtius hippoglossoides	Greenland halibut	84	247	246
Urophycis chesteri	Longfin hake		7	99
Merluccius bilinearis	Silver hake	3		
Notoscopelus sp.	Lanternfish			138
	marine fish not specified	9,307	5,866	4,296
Hippoglossoides platessoides	American plaice	7	30	93
Sebastes sp.	Atlantic redfishes	629	1,321	3,274
Macrourus berglax	Roughhead grenadier		10	102
Amblyraja radiata	Thorny skate		5	
Coryphaenoides rupestris	Roundnose grenadier	0		
Raja sp.	Skates (NS)		33	
Glyptocephalus cynoglossus	Witch flounder			
Pandalus borealis catch	shrimp catch	1,453,018	1,458,097	1,659,034

Table 14.	Bycatch of various groundfish species taken by Estonian vessels fishing
	for shrimp in the NAFO Division 3L NRA over the period 2007 – 2009.

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	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
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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

	2007	2008	2009	2010
Shrimp catch (t)	455	648	488	741
Bycatch (kg)				
Redfish	65	127	410	355
Other	2,261	1,316	990	7,560
Total	2326	1443	1400	7915
Percent bycatch	.51%	.22%	.29%	1.07%

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.

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

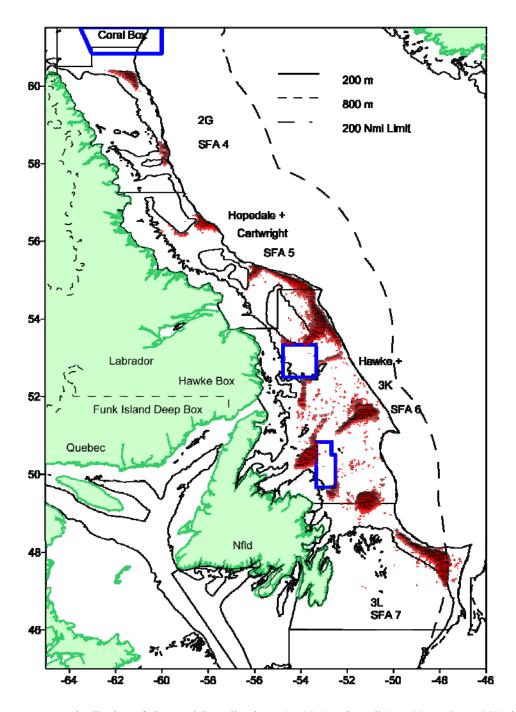
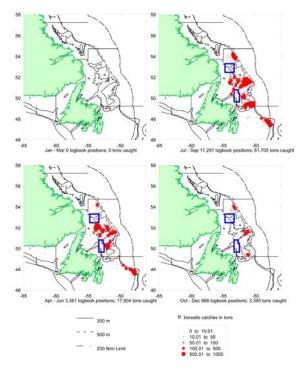
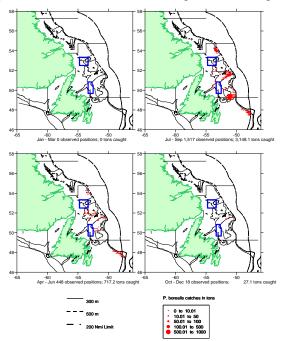


Figure 1. Distribution of observed Canadian large (>500 t) and small (<=500 t; LOA<100') shrimp fishing positions in Shrimp Fishing Areas (SFA's) 4-7 during 2009. The blue boxes indicate the location of areas that are closed to bottom trawling. The northern box was voluntarily closed by the large vessel 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.



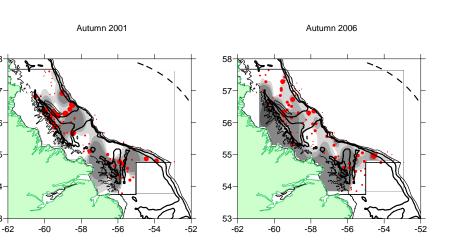
A) Distribution of logbook Canadian small vessel shrimp catches during 2008.



b) Distribution of observed Canadian small vessel shrimp catches during 2008.

Figure 2.

Comparison of logbook (a) and observed (b) small vessel shrimp catches during 2008.



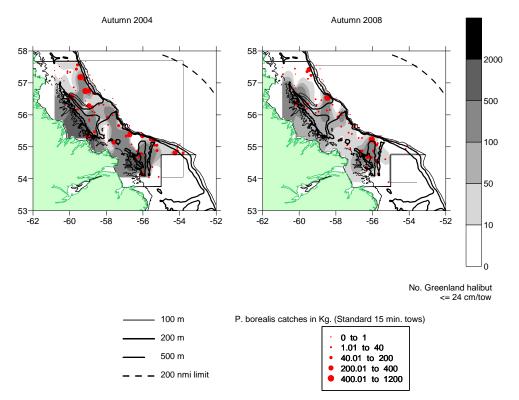


Figure 3. Distribution of northern shrimp in relation to Greenland halibut ($TL \le 24$ cm) collected during Canadian autumn 2001 – autumn 2008 multi-species bottom trawl surveys in SFA 5 (Hopedale and Cartwright Channels). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows). Please note that these were the only years over the period 2001 – 2009 for which the entire of SFA 5 was surveyed.

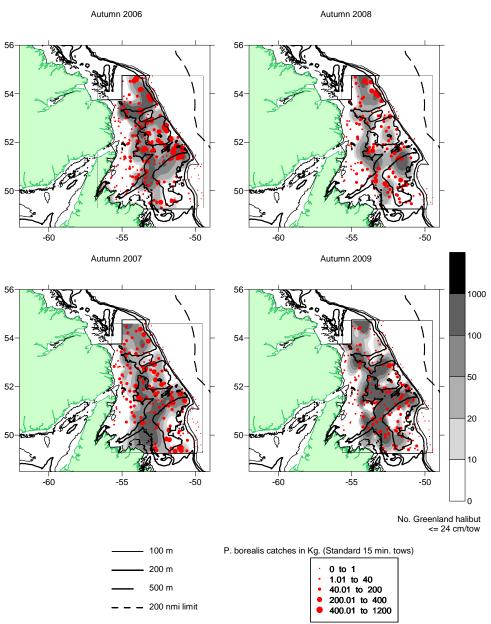


Figure 4. Distribution of northern shrimp in relation to Greenland halibut (TL<=24 cm) collected during Canadian autumn 2006 – autumn 2009 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

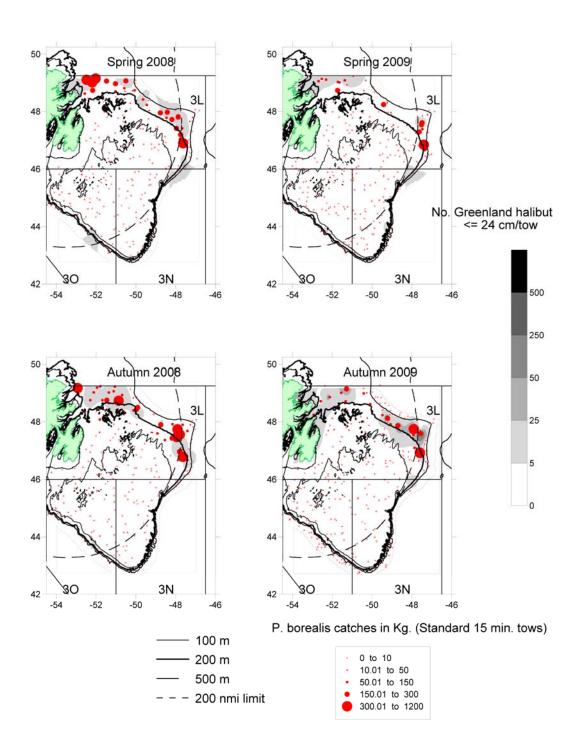


Figure 5. Distribution of northern shrimp in relation to Greenland halibut (TL<=24 cm) collected during Canadian spring 2008 – autumn 2009 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

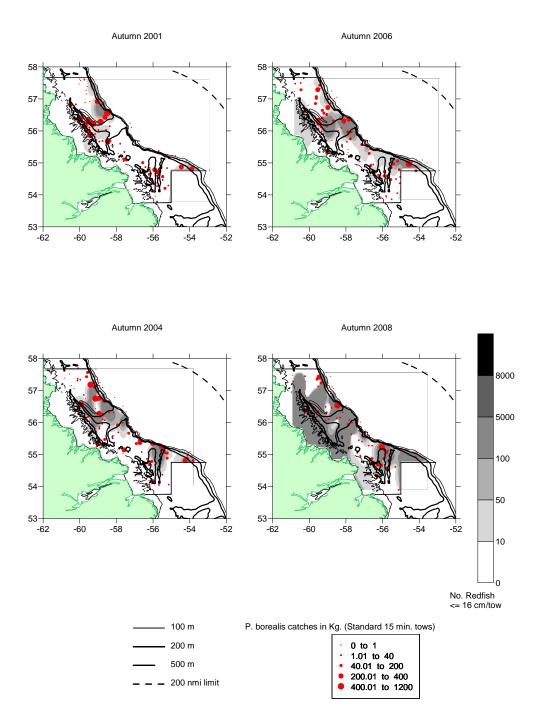


Figure 6. Distribution of northern shrimp in relation to redfish (TL<=16 cm) collected during Canadian autumn 2001 – autumn 2008 multi-species bottom trawl surveys in SFA 5 (Hopedale and Cartwright Channels). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows). Please note that these were the only years over the period 2001 - 2009 for which the entire of SFA 5 was surveyed.

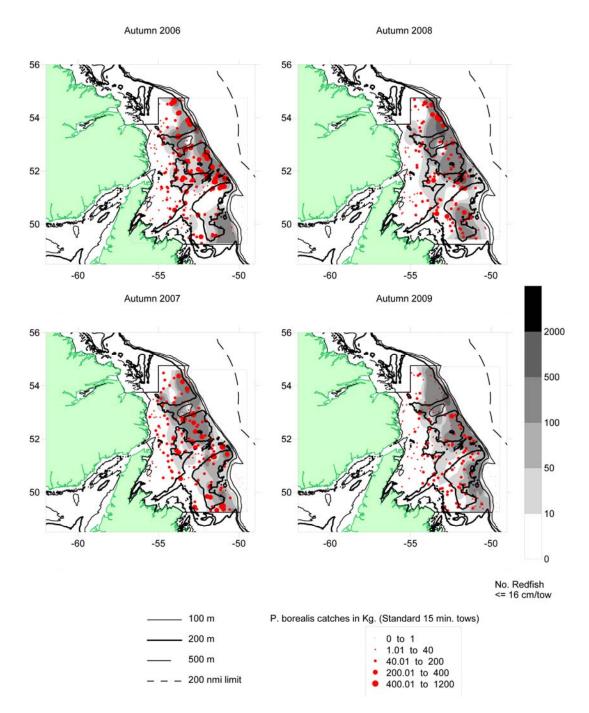


Figure 7. Distribution of northern shrimp in relation to redfish (TL<=16 cm) collected during Canadian autumn 2006 – autumn 2009 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

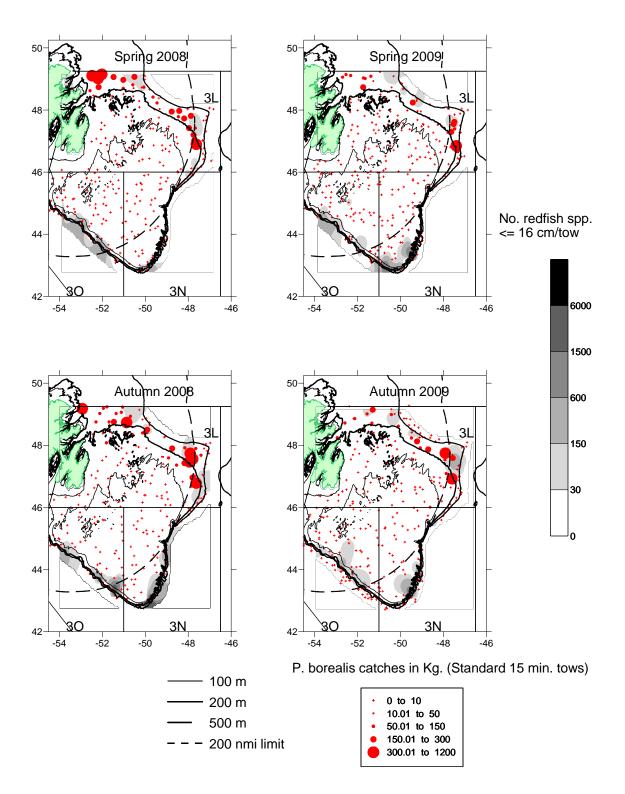


Figure 8. Distribution of northern shrimp in relation to redfish (TL<=16 cm) collected during Canadian spring 2008 – autumn 2009 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

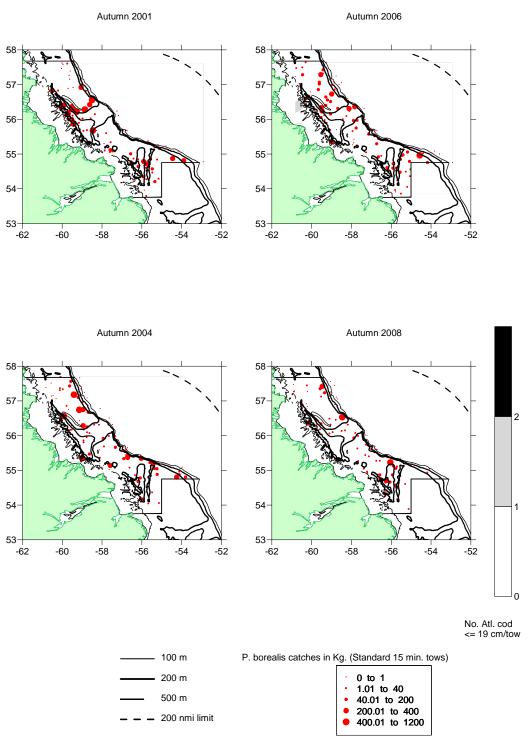


Figure 9. Distribution of northern shrimp in relation to Atlantic cod (TL<=19 cm) collected during Canadian autumn 2001 – autumn 2008 multi-species bottom trawl surveys in SFA 5 (Hopedale and Cartwright Channels). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows). Please note that these were the only years over the period 2001 - 2009 for which the entire of SFA 5 was surveyed.

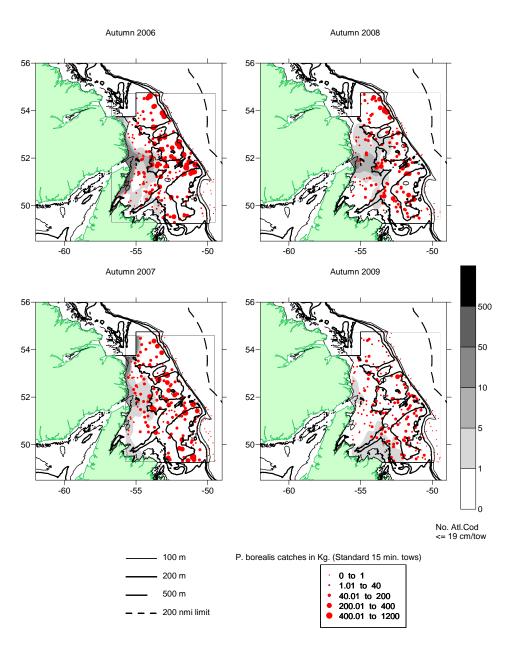


Figure 10. Distribution of northern shrimp in relation to Atlantic cod (TL<=19 cm) collected during Canadian autumn 2006 – autumn 2009 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

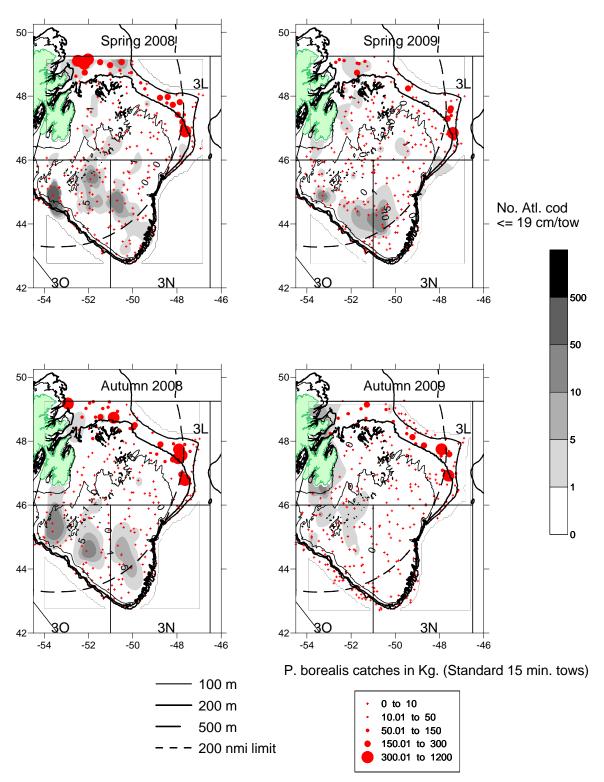


Figure 11. Distribution of northern shrimp in relation to Atlantic cod (TL<=19 cm) collected during Canadian spring 2008 – autumn 2009 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

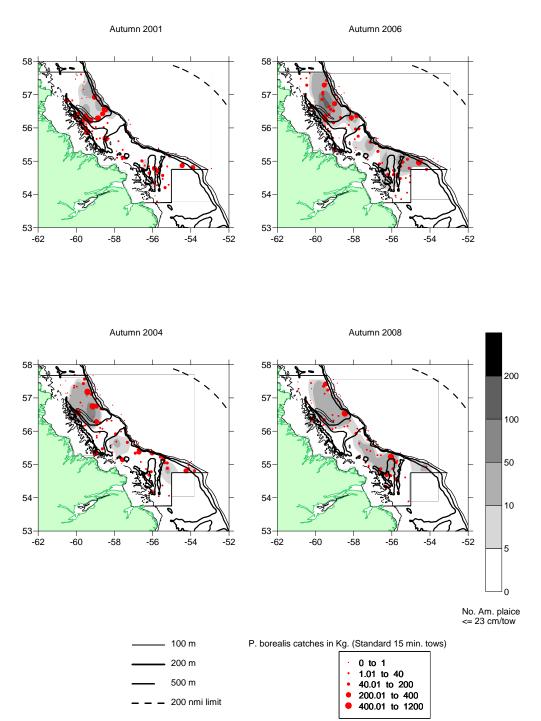


Figure 12. Distribution of northern shrimp in relation to American plaice ($TL \le 23$ cm) collected during Canadian autumn 2001 – autumn 2008 multi-species bottom trawl surveys in SFA 5 (Hopedale and Cartwright Channels). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows). Please note that these were the only years over the period 2001 – 2009 for which the entire of SFA 5 was surveyed.

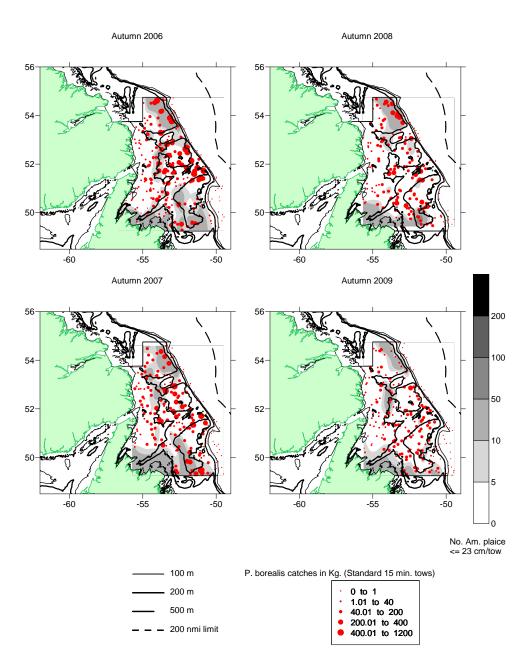


Figure 13. Distribution of northern shrimp in relation to American plaice (TL<=23 cm) collected during Canadian autumn 2006 – autumn 2009 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

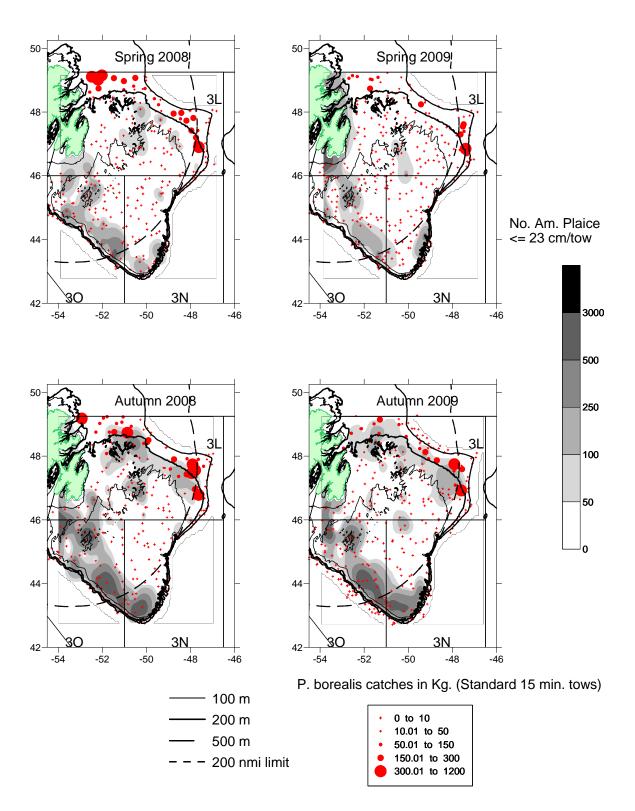


Figure 14. Distribution of northern shrimp in relation to American plaice (TL<=23 cm) collected during Canadian spring 2008 – autumn 2009 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

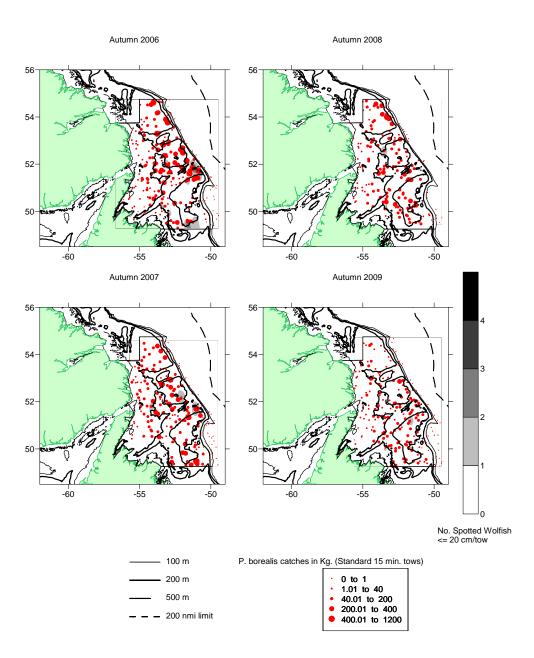


Figure 15. Distribution of northern shrimp in relation to spotted wolfish (TL<=20 cm) collected during Canadian autumn 2006 – autumn 2009 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

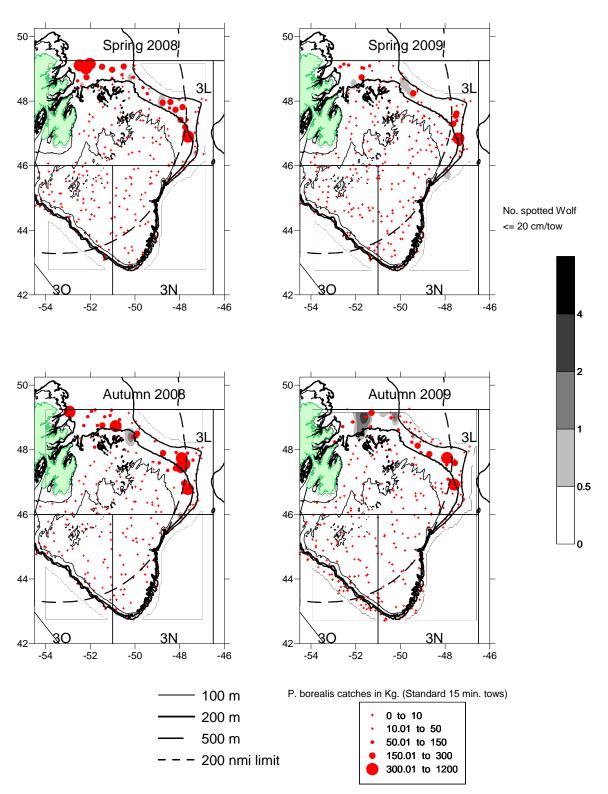


Figure 16. Distribution of northern shrimp in relation to spotted wolfish (TL<=20 cm) collected during Canadian spring 2008 – autumn 2009 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

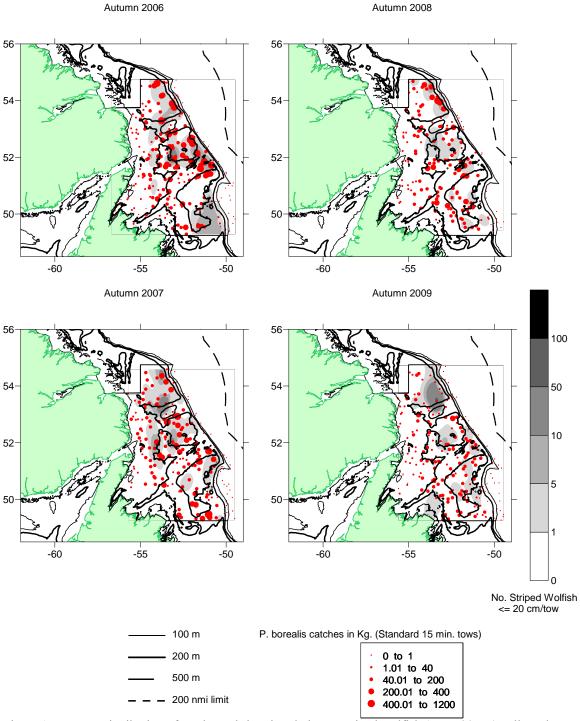


Figure 17. Distribution of northern shrimp in relation to striped wolfish ($TL \le 20$ cm) collected during Canadian autumn 2006 – autumn 2009 multi-species bottom trawl surveys in SFA 6 (Hawke Channel + NAFO Div. 3K). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).

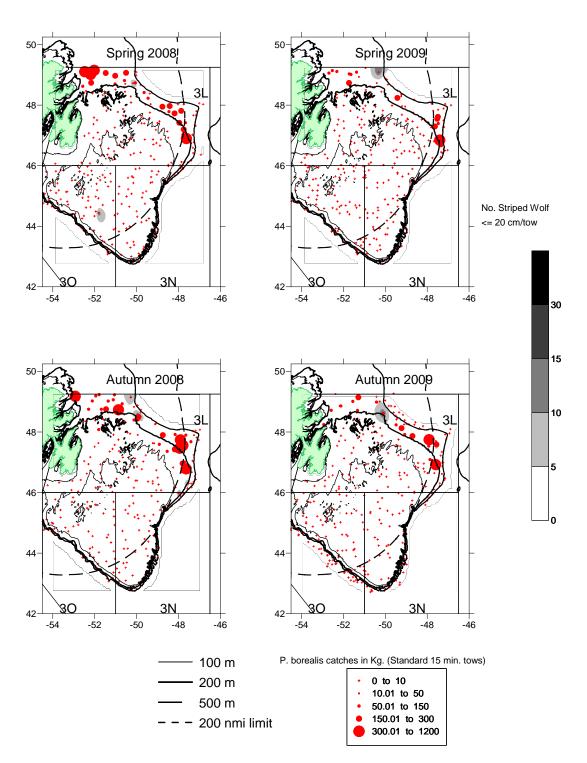


Figure 18. Distribution of northern shrimp in relation to striped wolfish (TL<=20 cm) collected during Canadian spring 2008 – autumn 2009 multi-species bottom trawl surveys in SFA 7 (NAFO Divs. 3LNO). Catches were made using a Campelen 1800 shrimp trawl; standard 15 min. tows).