Northwest Atlantic Fisheries Organization

Serial No. N2196 NAFO SCR DOC.93/19

SCIENTIFIC COUNCIL MEETING - JUNE 1993

Results From Bottom Trawl Survey of Flemish Cap in July 1992

by

A. Vázquez
Instituto de Investigaciones Marinas
Muelle de Bouzas, Vigo, Spain

The survey of Flemish Cap was carried out in 1992 on board R/V Cornide de Saavedra. A total of 117 valid bottom trawls were made up to a depth of 720 metres (400 f.). A synoptic sheet of the survey with ship and gear characteristics is shown in Table 1. This was the fifth survey of the series (Vazquez, 1989, 1990, 1991, 1992); their dates were:

year	vessel	valid tows	dates
1988	Cornide de Saavedra	115	8/7 -22/7
1989	Cryos	116	12/7 - 1/8
1990	Ignat Pavlyuchenkov	113	18/7 - 6/8
1991	Cornide de Saavedra	117	24/6 -11/7
1992	Cornide de Saavedra	117	29/6 -18/7

All surveys had a stratified random design following NAFO specifications (Doubleday, 1981).

Total biomass of all species was calculated by swept area method and is presented in Table 2, where some species are grouped to balance possible identification errors. Species were clustered according to a common tendency as observed in previous surveys (Vazquez, 1991) but the tendency was not continued. The first group (Rajidae ... Notacanthus) contain species that were designated by "permanent decrease" when only three survey had been made. Since then, most of them have recovered. Witch flounder and Greenland halibut can also be included in this group. On the contrary, squid sharply increased up to 1990 and has decreased since then.

Dimensions of the gear during trawling were systematically measured with a SCANMAR equipment. The time elapsed between the moment all trawling wire is deployed and the moment the gear touches the bottom increased with depth at a rate of:

$$t(\text{minutes}) = 2 + 1.25 * \text{depth(metres)} / 100$$

The time elapsed between the start of recovering the wire and the moment the gear separates from the bottom also increased with depth at a rate of, approximately, 5 minutes every 200 metres. During recovery of the wire, the gear speed is slower than during trawling, and it is believed that catches of actively swimming fish should be minimized. Accepting that the gear does not catch fish before the gear touches the bottom, and also assuming that the gear does not catch fish after the start of recovering the wire, the 30 minutes trawling time should be counted between the moment the gear touches the bottom and the start of recovering the wire. It is a common practice during the survey that the moment when all trawling wire is deployed is the reference point for starting to record trawling time. From then a time period of

$$t(\text{minutes}) = 2 + \text{depth(metres)} / 100$$

is discounted. This time is shorter than that in previous analogous expressions. The difference was introduced to compensate for the

largest lateral opening at greatest depth with shorter trawling time. These observed changes were in the range of 5 % between 200 and 500 metres depth.

RESULTS

Weighted (by stratum area) mean catches in half-hour tows of the main species on the bank were:

	1988	1989	1990	1991	1992
cod	46.74	146.04	70.81	47.06	30.30
American plaice	15.01	14.25	11.64	9.69	7.98
redfish	207.50	194.40	133.26	81.46	126.92
shrimp	2.50	2.71	2.71	10.17	20.28

Kg

Cod

Mean catch by strata and whole bank data and their standard error are presented in Table 3. Cod stock biomass, estimated by swept area method, has decreased since 1989, and in comparison with Russian survey results is:

year	EEC(1)	Russia:(2)	(3)
1983		23,070	
1984		31,210	
1985		28,070	
1986		26,060	
1987		10,150	(21,600)
1988	37,127	7,720	(34,200)
1989	103,644	36,520	(78,300)
1990	55,360	3,920	(17,300)
1991	36,597	6,740	(8,200)
1992	24,295		

(tons)

1) Biomass estimated from bottom trawl survey.
2) Biomass estimates from bottom trawl survey (Kuzmin, 1992).
3) USSR's estimates of bottom trawlable plus pelagic biomass (Kuzmin, 1992).

The abundances by age-groups were calculated as follows:

age	year: 1988	1989	1990	1991	1992	
1 -	458	2085	237	13780	7118	
2 -	7196	1100	1179	2560	3706	
3 -	4037	8422	467	1548	475	
4 -	1085	4922	1588	192	203	
5 -	128	1858	1453	622	33	
6 -	22	127	394	173	127	
7 -	28	15	32	25	21	
8 -	11	12	13	1	1	
9 -			8	4		
10 -		1	3			
11 -				1	1	
12 -						
						x 10000
total	12965	18542	5374	18906	11685	
biomass	37127	103644	55360	36597	24295	t
SOP *)	33474	100217	51388	37231	22734	t

*) SOP = Sum of products; back calculation of biomass as sum of products of frequencies and mean weight at age.

With 35 mm mesh size used in the cod end, recruitment is believed to be completed before age 2.

The abundant 1986 year-class was still noticeable in 1992 as 6 year old cod. The 1990 year class produced the largest recruitment in the last year, but its abundance seems to be less than that of the 1986 year-class.

Tables 4, 5 and 6 show length frequency, age-length key and estimated age composition of the stock respectively.

American plaice

Mean catch by strata and whole bank data and its standard error are presented in Table 7.

Total biomass, calculated by swept area method, and in comparison with USSR's survey results is:

year	EEC	Russia(1)
1983	-	8,900
1984	-	7,500
1985	-	7,800
1986	-	20,200
1987	-	9,300
1988	11,868	6,500
1989	10,533	5,000
1990	9,101	1,200
1991	7,565	14,400
1992	6,492	

tons

1) Rikhter et al., 1991; Borovkov et al., 1992.

The abundances by age-groups were calculated as follows:

age	year: 1988	1989	1990	1991	1992
2 -	2284	454	359	309	736
3 -	625	6847	775	911	679
4 -	3034	1500	7083	1877	910
5 -	1975	3238	897	4461	1471
6 -	3020	3006	2475	1836	3423
7 -	4154	2868	1717	2009	913
8 -	4258	1691	1657	1566	1090
9 -	1492	587	1030	675	624
10 -	207	261	485	232	289
11 -	109	34	90	8	138
12 -	61	14	15	48	74
13 -	-	-	31	-	16
14 -	-	-	17	-	-
total	21219	20500	16631	13932	10363
biomass	11868	10533	9101	7565	6492
SOP		9726	8827	7682	6111
N 6+	13301	8461	7517	6374	6567

(x 1000)

Tables 8, 9 and 10 show length frequency, age-length key and estimated age composition of the stock respectively.

Redfish

Experience acquired in redfish species identification allowed redfish catches to be classified by species before sampling for the firt time on this survey. As in previous surveys, all individuals of less than 15 cm length or those of species difficult to classify were separated in an independent group called "juvenile".

Mean catch by strata and whole bank data and its standard error are presented in Tables 11, 15, 19 and 23 for Sebastes marinus, S. mentella, S. fasciatus and "juvenile", respectively. Total biomass values estimated by swept area method are summarized in the next table:

year	Sebastes: marinus	spp. mentella	spp. fasciatus	spp. juvenile	EEC total	Russia bottom(1)	Russia total(2)
1983						154,900	
1984						132,300	
1985						51,900	
1986						309,500	
1987						106,400	
1988	15,289		142,933		158,222	47,000	379,000
1989	22,958		113,675		136,633	83,300	365,900
1990	14,699		72,893	16,601	104,193	17,700	246,400
1991	4,093	50,071	5,680	4,001	63,846	45,400	107,700
1992	4,130	71,810	5,308	23,229	104,477		

1) Trawlable biomass (t) from these surveys.
2) Trawlable plus pelagic biomass (t) from Russian surveys (Vaskov y Oganin, 1992)

The increase observed in redfish biomass is not explainable by vegetative growth of the stock. The biomass variability observed during the survey series must be partially attributed to changes in the accesibility of the stock to bottom-trawls due to the pelagic character of these species.

Sharp changes in juvenile biomass are easily explained by incoming recruitment, and by a change in their status when the species can be identified, which removes them from the combined group.

Age compositions of the three species are given together in the following table. The species that supports the highest commercial catches is S. mentella which is distributed in a wide depth range. On this species, a sharp decrease of abundance with age as a consequence of fishing is not observed. But such a decrease with age is quite apparent in S. fasciatus. This species is preferentially distributed in a narrow depth range where fishing activity for redfish is concentrated, and could be more affected than S. mentella in spite of its smaller catches.

age	S. marinus freq.	S. marinus m.w.	S. mentella freq.	S. mentella m.w.	S. fasciatus freq.	S. fasciatus m.w.	*)
4 :	11	91	132	80	5	84	
5 :	74	133	2673	122	469	125	
6 :	234	199	9884	161	1131	170	
7 :	197	271	3829	209	417	222	
8 :	149	363	3048	294	140	322	
9 :	100	430	2181	354	83	398	
10 :	65	528	1361	400	54	459	
11 :	56	591	862	465	16	527	
12 :	56	653	631	541	19	610	
13 :	35	758	465	574	13	661	
14 :	32	771	446	636	3	680	
15 :	14	788	321	687	9	770	
16 :	14	1088	274	695		893	
17 :	2	1106	172	797		893	
18 :	1	1054	107	750		829	
19 :	3	1361	69	863	2	959	
20 :	3	1234	72	831	2	959	
21 :	1	1429	19	1013			
22 :	2	1976	13	936			
23 :	1	1286					
24 :			5	1012			
25+:	1	1653	16	1079			

*) frequencies x 10000 and mean weight en gr.

Tables 12, 16, 20 and 24 show length frequencies for the four groups. Age-length keys were made for three species (Tables 13,17 and 21). Age compositions for each of the three species are presented in tables 14, 18 and 22.

Greenland halibut (Reinhardtius hippoglossoides)

Total biomass calculated by swept area method was:

1988 - 6,818
1989 - 4,391
1990 - 5,649
1991 - 8,038
1992 - 8,588 tons

Mean catch by strata and whole bank estimates are presented in table 25. Length frequencies, age-length key and age composition of the population were calculated (Tables 26, 27 and 28).

Shrimp (Pandalus borealis)

In Table 29 mean catch by strata and whole bank data are presented. Swept area method total biomass estimates in these five years are:

1988 - 2,164
1989 - 1,865
1990 - 2,140
1991 - 8,203
1992 - 15,886 tons

Shrimp biomass increased sharply in the last two years. Its possible relationship with cod biomass decrease is not a consequence of predation by cod. Shrimp is only occasionally met in cod stomachs.

REFERENCES

Borovkov, V., S. Kovalev, P. Savvatimsky, V.A. Rikhter e I.K. Sigaev - 1992. Russian research report for 1991. NAFO SCS Doc. 92/12.

Doubleday, W.G.- 1981. Manual of Groundfish Surveys in the Northwest Atlantic. NAFO Sci. Counc. Stud. 2, 55pp.

Kuzmin, S.A.- 1992. Stock assessment of cod from NAFO Subarea 3 by the data from 1991 trawl-acoustic survey. NAFO SCR Doc. 92/13.

Rikhter, V.A., I.K. Sigaev, V. Borovkov, S. Kovalev y P. Savvatimsky - 1991. USSR research report for 1990. NAFO SCS Doc. 91/5.

Vaskov, A.A. y I.A. Oganin - 1992. Evaluation of redfish stocks in Divisions 3LN and 3M by the trawl-acoustic survey in 1991. NAFO CR Doc. 92/12.

Vazquez, A.- 1989. Results from bottom-trawl survey of Flemish Cap in July 1988. NAFO SCR Doc. 89/60, 15 pp.

Vazquez, A.- 1990. Results from bottom-trawl survey of Flemish Cap in July 1989. NAFO SCR Doc. 90/68, 25 pp.

Vazquez, A.- 1991. Results from bottom-trawl survey of Flemish Cap in July-August 1990. NAFO SCR Doc. 91/28, 25 pp.

Vazquez, A.- 1992. Results from bottom-trawl survey of Flemish Cap in July 1991. NAFO SCR Doc. 92/27, 17 pp.

Table 1 - Technical data of the survey.

Procedure	specification
Vessel	R/V CORNIDE DE SAAVEDRA
GT	1,200 t
power	1,500 + 750 HP
Trawling speed	3.45 knots
Trawling time	30 minutes
Trawl gear	type "Lofoten"
footrope / handrope	31.20 / 17.70 m
footgear	27 steel bobbins of 35 cm
vertical opening	2.5 - 2.8 m
warps	100 meters
trawl doors	polivalent, 850 Kg
wire length	3 times the depth
mesh size in codend	35 mm
Type of survey	stratified sampling
Station selection procedure	random
Criterion to change position of a selected tow:	- unsuitable bottom for trawling according to ecosoneder register. - information on from previous surveys.
Criterion to reject data from tow	- severe tears or in codend - less than 20 minutes tow - bad behaviour of the gear
Daily period for fishing	6.00 to 22.00 hours
Species for sampling	all fishes, squid and shrimp
Species for age determination	cod, American plaice, redfish (Sebastes marinus, S. mentella and S. fasciatus) and Greenland halibut

Table 2 - Total biomass swept area method estimates for several species or groups of species in 1988-1992 surveys.

species	surveys: 1988	1989	1990	1991	1992
Rajidae	4495	1908	2824	4064	3765
Synaphobranchus sp.	219	88	42	77	70
Urophycis sp.	654	167	169	261	69
Antimora sp.	392	302	284	560	720
Macrouridae	3088	1438	1223	2249	2592
Notacanthus sp.	501	408	65	478	449
Illex sp.	5	8	1647	1159	66
Anarhichadidae	7973	7478	8120	10097	9095
witch flounder	909	335	420	769	823
Greenland halibut	6818	4391	5649	8038	8588
Zoarcidae	559	923	1202	1978	1356
cod	37127	103644	55360	36597	24295
American plaice	11886	10533	9101	7565	6492
Sebastes sp.	158417	136658	104194	63845	104477
shrimp	2164	1923	2139	8211	16531
others	624	206	1138	664	439
Total	235833	270410	193575	146611	179828

Table 3 - Cod catches (Kg) by strata.

stratum	area squa. miles	tow number	catch per tow mean	catch per tow s.deviat.	catch per mile towed mean	catch per mile towed s.deviat.
1 -	342	4	2.53	1.75	1.51	1.03
2 -	838	10	69.55	121.83	41.92	74.96
3 -	628	7	170.94	219.69	92.00	116.59
4 -	348	4	119.16	61.10	67.48	35.13
5 -	703	8	76.22	112.60	44.33	67.72
6 -	496	6	22.82	16.82	13.10	9.55
7 -	822	9	13.04	23.11	7.84	14.33
8 -	646	7	42.35	65.10	24.79	37.34
9 -	314	2	5.11	7.23	3.11	4.39
10 -	951	11	4.07	5.62	2.34	3.23
11 -	806	9	3.20	4.91	1.90	2.94
12 -	670	8	-	-	-	-
13 -	249	2	-	-	-	-
14 -	602	8	1.37	2.02	0.76	1.13
15 -	666	6	-	-	-	-
16 -	634	7	-	-	-	-
17 -	216	2	-	-	-	-
18 -	210	2	-	-	-	-
19 -	414	5	-	-	-	-
total	10555	117				

	catch per tow	catch per mile towed
mean	30.30	17.26
standard error	6.68	3.77

(Kg)

Table 4 - Cod length frequency by strata (x 10000).

length (cm)	estratum 1	2	3	4	5	6	7	8	9	10	11	14	total
9-11					1								1
12-14	3	11	14	6	139	29		4		5	2		213
15-17	11	313	332	454	937	483	20	206		26	29		2812
18-20	9	576	629	1304	511	327	36	505		14	24		3934
21-23	1	78	72	179	58	22	1	66		4	1		484
24-26	3	105	110	142	149	48	5	72		3	2		638
27-29	6	217	221	183	227	42	4	94	1	2	12		1009
30-32	5	298	285	123	224	11	3	97		1	5		1052
33-35	3	207	221	88	152	3	1	60		1	5		739
36-38	1	76	40	33	57	1	1	17			2		228
39-41		26	34	8	20		1	5					92
42-44		16	25	8	18	2	1	5	1				76
45-47		7	9	3	8	1		3		1			33
48-50		6	25	3	3		1	2	2				43
51-53	1	5	43	5	10	2	2	5	1	1	1		77
54-56		9	51	5	11	1	1	1			2		81
57-59		3	33	3	3	1	1	2		1			47
60-62		3	26	1	2		1	1	1	1	1		37
63-65		3	7	2	5	2	1	1		2	1	1	25
66-68		2	10	1	4	1		2	1	1			22
69-71		1	7		1		1	12		1			24
72-74			4		1		1			1			7
75-77		1	1				2					1	4
78-80			1		1			1		1			3
81-83							1						1
84-86						1	1						3
87-89													
90-92							1						1
93-95							1						1
96-98													
99- 1													
102- 4													
105- 7													
108-10													
111-13													
114-16							1						1

Table 5 - Cod age-length key.

length (cm)	age 1	2	3	4	5	6	7	8	9	10	11	12	no id	tot n.
0- 2														
3- 5														
6- 8														
9-11														
12-14	37													37
15-17	163	1											3	167
18-20	152	2											2	156
21-23	16	18											5	39
24-26		93											2	95
27-29		176	5										1	182
30-32		172	13										16	201
33-35		131	27										27	185
36-38		61	32										29	122
39-41		10	43	1									21	75
42-44		3	49	6									2	60
45-47			17	5		1							2	25
48-50			3	16	1								1	21
51-53				43	3								2	48
54-56				50	7	4	1						4	66
57-59				10	11	18							1	40
60-62				3	3	29	2							37
63-65				1		27	8							36
66-68					1	24	2							27
69-71						13	6							19
72-74						9	3							12
75-77						7		1						8
78-80						3	1						1	5
81-83							2						1	3
84-86						2	1							3
87-89														
90-92						1								1
93-95								1						1
96-98														
99- 1														
102- 4														
105- 7														
108-10														
111-13														
114-16											1			1
total:	368	667	189	135	26	138	26	2			1		120	1672

Table 6 - Cod age composition by strata (x 10000).

age	stratum 1	2	3	4	5	6	7	8	9	10	11	14	total	mean weight (gr)
1 :	23	927	999	1829	1602	842	56	738		47	55		7118	54
2 :	17	871	855	645	789	121	15	358	1	9	25		3706	246
3 :	1	129	136	56	105	5	3	36	1	1	2		475	490
4 :	1	21	117	14	26	3	4	9	3	2	3		203	1377
5 :		3	22	2	3	1	1	1					33	1702
6 :		10	63	5	13	4	7	13	2	6	2	2	127	2633
7 :		1	8	1	3	1	2	4		1			21	3133
8 :							1						1	6685
9 :														
10 :														
11 :							1						1	14577
12 :														
13 :														
14 :														
15 :														
16+:														

Table 7 - American plaice catch (Kg) by strata.

stratum	area squa. miles	tow number	catch per tow mean	catch per tow s.deviat.	catch per mile towed mean	catch per mile towed s.deviat.
1 -	342	4	20,22	16,86	11,68	9,19
2 -	838	10	19,65	19,32	11,50	11,29
3 -	628	7	10,37	2,15	5,65	1,11
4 -	348	4	16,22	13,85	9,00	7,71
5 -	703	8	11,35	10,60	6,70	6,77
6 -	496	6	11,75	9,80	6,82	5,66
7 -	822	9	7,39	7,14	4,37	4,43
8 -	646	7	10,78	5,14	6,33	3,17
9 -	314	2	11,00	15,56	6,68	9,45
10 -	951	11	14,66	13,98	8,31	7,66
11 -	806	9	4,37	3,63	2,60	2,12
12 -	670	8	0,15	0,21	0,09	0,13
13 -	249	2	-	-	-	-
14 -	602	8	0,49	0,59	0,27	0,33
15 -	666	6	0,58	1,43	0,32	0,78
16 -	634	7	0,11	0,30	0,08	0,21
17 -	216	2	-	-	-	-
18 -	210	2	-	-	-	-
19 -	414	5	0,09	0,21	0,05	0,11
total	10555	117				

	catch per tow	catch per mile towed
mean	7.98	4.61
standard error	0.88	0.51

(Kg)

Table 8 - American plaice length frequency by strata (x 1000).

length (cm)	stratum 1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	19	total
14-15					14		14	7		7							41
16-17	7	21	7	40	28	6	7	43		34	8						196
18-19		33	33	91	35	83	14	36		13	32				7		376
20-21		7		117	14	51	7			20							215
22-23	7	7		7	28	12	21	14			16						111
24-25		42	33	26	14	44	21	7		20	24						231
26-27	20	71	59	46		31	7	50		14	8						306
28-29	13	156	59	39	7	25	7	7	12	7							333
30-31	20	134	20	26	48	70	27	14		13		7	6				384
32-33	54	138	33		75	45	7	14	24	94							483
34-35	155	166	98	20	54	70	69		72	174	41	13	6				939
36-37	202	266	79	7	109	69	90	89	181	390	41		28	8			1557
38-39	148	228	144	39	143	95	55	57	96	295	107					6	1413
40-41	142	205	59	59	143	70	75	64	24	195	56			8			1100
42-43	68	166	46	65	102	50	48	21	24	277	16		6		7		897
44-45	20	68	26	26	34	32	41	50	12	80	66						456
46-47	13	97	26	46	27	25	21	50	24	80	32			8			450
48-49	27	119	26	65	54	38	68	36		13	8			8			463
50-51	13	55	13	39	7	32	34	57		13							264
52-53	7	46	13	7	7			21									100
54-55			7		7		7	14									35
56-57		7															7
58-59																	
60-61																	
62-63																	
64-65																	
66-67					7												7

Table 9 - American plaice age-length key.

MALE

length (cm)	age 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	no id	tot n.
12-13																		
14-15		1																1
16-17		3																3
18-19		12	1															13
20-21		7	2														1	10
22-23			3															3
24-25			12	4														16
26-27			11	11														22
28-29			5	19	1													25
30-31				11	6	1											2	20
32-33				9	18	11		1									2	41
34-35				5	38	43	7	2		1							4	100
36-37				1	39	63	23	8	4			1					6	145
38-39					15	53	20	16	2	1							5	112
40-41					1	18	12	16	6	1							1	55
42-43					1	7	2	10	2	2	1						4	29
44-45						1	1		1	1	1							5
46-47									1			1						2
48-49										1							1	2
50-51									1									1
52-53																		
total:		23	34	60	119	197	65	53	17	7	2	2					26	605

FEMALE

length (cm)	age 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16+	no id	tot n.
12-13																		
14-15		2																2
16-17		5																5
18-19		22	1															23
20-21		9	5	2													3	19
22-23			10															10
24-25			10														1	11
26-27			13	3														16
28-29			4	6	1												4	15
30-31				20	2	1												23
32-33				14	6													20
34-35				3	11	4		1										19
36-37					17	20	1										1	39
38-39				1	13	39	1	2										56
40-41					2	71	6	4	1								6	90
42-43					1	49	10	10	3								4	77
44-45						18	15	11	6	2	2						3	57
46-47						2	9	27	12	5	1						3	59
48-49						1		19	18	12	4	2					2	58
50-51								4	18	9	4	2						37
52-53								1	6	1	3	1	1				2	15
54-55											2	3					1	6
56-57													1					1
58-59																		
total:		38	43	49	53	205	42	79	64	29	16	8	2				30	658

Table 10 - American plaice age composition by strata (x 1000).

age	stratum 1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	19	total	mean weight (gr)
1 :																		0
2 :	7	56	38	201	84	118	38	84		65	38				7		736	49
3 :	20	117	87	108	46	102	50	62	2	39	46						679	139
4 :	58	313	105	75	91	100	34	34	20	63	8	5	4				910	258
5 :	175	295	123	31	126	108	81	52	106	301	51	7	12	2		1	1471	441
6 :	333	601	241	137	357	220	212	164	188	770	162	6	17	7	5	3	3423	592
7 :	113	165	52	31	74	56	51	46	66	193	53	1	6	4	1	1	913	660
8 :	122	217	65	73	88	68	68	71	52	194	57		4	9	1	1	1090	842
9 :	52	138	37	60	45	44	55	70	21	72	24		1	5			624	1073
10 :	23	75	15	30	19	21	28	30	6	28	10		1	3			289	1121
11 :	10	29	11	13	11	8	14	22	2	12	5			1			138	1263
12 :	4	11	7	5	8	4	9	15	7	3	1						74	1324
13 :	1	10	1	1	1			2									16	1763
14 :																		
15 :																		
16+:																		

Table 11 - Redfish (Sebastes marinus) catch (Kg) by strata.

stratum	area squa. miles	tow number	catch per tow mean	catch per tow s.deviat.	catch per mile towed mean	catch per mile towed s.deviat.
1 -	342	4	0.25	0.30	0.15	0.18
2 -	838	10	1.40	2.17	0.84	1.33
3 -	628	7	2.80	2.22	1.51	1.16
4 -	348	4	0.29	0.38	0.15	0.20
5 -	703	8	6.87	4.85	3.90	2.58
6 -	496	6	4.59	4.24	2.65	2.45
7 -	822	9	1.91	2.31	1.08	1.30
8 -	646	7	6.11	9.50	3.63	5.86
9 -	314	2	1.35	1.29	0.81	0.80
10 -	951	11	18.97	35.92	10.92	20.23
11 -	806	9	23.64	34.45	13.98	20.28
12 -	670	8	-	-	-	-
13 -	249	2	-	-	-	-
14 -	602	8	0.08	0.23	0.05	0.13
15 -	666	6	-	-	-	-
16 -	634	7	-	-	-	-
17 -	216	2	-	-	-	-
18 -	210	2	-	-	-	-
19 -	414	5	-	-	-	-
total	10555	117				

	catch per tow	catch per mile towed
mean	5.05	2.93
standard error	1.34	0.77

(Kg)

Table 12 - Redfish (Sebastes marinus) length frequency by strata.
(x 1000)

length (cm)	stratum 1	2	3	4	5	6	7	8	9	10	11	14	total
14-													
15-					7	6							13
16-	7	14			21	13							53
17-	14	13	7		68	70				14			185
18-		33	13	7	14	44		7		31	25		173
19-		27	26		75	44	14			38	43		266
20-	7	20	26		102	120	42	7		89	90		503
21-		46	20		75	70	7	14		103	108		442
22-		33	33		102	76	28	14		222	222		731
23-	7	39	72		61	32	42	7		222	147		628
24-		20	60	7	96	57	28	7		188	269		731
25-		27	7		34	50	49	43		166	207		583
26-		39	33		47	51		42	12	238	211		675
27-		14	47		41	19	7	50	24	209	226		635
28-		7	7		14	6	7	29		304	247		620
29-		20			41	12	21	36	12	264	272		678
30-	7		34		54	32	7	86	12	209	225	6	671
31-			14		34	6	14	43		105	215		430
32-		20	20		20	6		50		218	137		471
33-		7	7		27	6	14	58		177	162		456
34-			13		47	6		14		130	147		359
35-		7			7	6	7	14		127	158		326
36-			7		14	13	7	29		81	57		206
37-			7					7		58	77		150
38-				7	7		28	7		26	69		143
39-			13		14			28		31	57		143
40-					7		7		12	20	58		105
41-					7		7			55	33	6	107
42-					14								14
43-					14					7			21
44-					14					14	7		35
45-			7										7
46-					14					12			26
47-											7		7
48-										7			7
49-													
50-													
51-											7		7
52-										14			14
53-											15		15

Table 13 - Redfish (Sebastes marinus) age-length key.

MALE

length (cm)	age 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	no id	tot n.
14-																								
15-																								
16-	3	1																						4
17-	1	7																					1	9
18-		6																						6
19-		5	6																					11
20-			15	2																			3	20
21-			16	6																			2	24
22-			16	8	1																			25
23-			9	13	1	1																	2	26
24-			8	17	1																		3	29
25-			1	12	5																		3	21
26-				8	14	2																	3	27
27-			1	1	12	2																	5	21
28-			1		4	6																	2	13
29-					9	7	3																5	24
30-					2	9	7	6															4	28
31-						1	5	4	1			1											3	15
32-							4	2	2	2													3	13
33-						1		2	3		1	1											3	11
34-							1	5	3	5	1	1											2	18
35-							1	1	4	3	5												6	20
36-								1	1	1	1		1										2	7
37-									1		2	1											1	5
38-										2	3	2	1										5	13
39-										1	1		2	1									2	7
40-													1											1
41-										1			2	1										4
42-														2								1		3
43-																	1							1
44-															1								1	2
45-																		1					1	2
46-																			1					1
47-																							1	1
total:	4	19	73	67	49	29	21	21	15	15	14	6	7	4	1		1	1	1			1	63	412

FEMALE

length (cm)	age 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	no id	tot n.
14-																								
15-																								
16-																							1	1
17-	1	3	1																				1	6
18-		6	1																					7
19-		5	8																					13
20-		5	16	1																				22
21-		2	17																					19
22-		1	11	4																			1	17
23-			10	8	1																		3	22
24-		1	4	9																			4	18
25-			3	11	3																		3	20
26-				6	5	1																	4	16
27-			1	7	6	1																	3	18
28-					5	4	1																5	15
29-				2	4	5	2																1	14
30-					1	4	3	5	1														4	18
31-						3	1	1	2															7
32-							5	3	4		1												3	16
33-							4	2	4		1												2	13
34-								2	2	3	1												2	10
35-							1		4	2	2	1	2										2	14
36-									1	2	2													5
37-							1	1	1	1	2		2										1	9
38-									1	1	1													3
39-								1		2		1											2	6
40-								1	1			3			1	1	1						2	10
41-								1		1				1									4	7
42-																								
43-																				1				1
44-										1								1					1	3
45-																1								1
46-																								
47-																								
48-																	1							1
49-																								
50-																						1		1
51-													1										1	2
52-																			1					1
53-														1									1	2
54-																							1	1
total:	1	23	72	48	25	18	18	17	21	13	10	5	5	2	1	2	2	1	1	1		1	52	339

Table 14 - Redfish (Sebastes marinus) age composition (x 1000).

age	stratum 1	2	3	4	5	6	7	8	9	10	11	14	total	mean weight (gr)
1 :														
2 :														
3 :														
4 :	5	15	8	1	27	35		1		14	4		110	91
5 :	5	70	49	6	143	153	37	13		130	130		736	133
6 :	8	128	144	3	309	257	110	54	2	662	664		2341	199
7 :	3	79	107	4	168	127	66	91	18	641	661		1965	271
8 :	2	33	54		87	52	24	114	25	555	538	2	1486	363
9 :	3	20	32		65	24	19	87	13	353	379	2	997	430
10 :	1	7	17		47	16	13	63	2	237	241	1	645	528
11 :		8	14		35	9	9	46	3	206	233	1	564	591
12 :		8	16	2	37	9	14	50		208	219	1	564	653
13 :		3	11		19	6	6	27	6	117	159		354	758
14 :		1	11	4	21	6	19	32		100	125		319	771
15 :		1	5	2	7	1	7	10	3	43	55	2	136	788
16 :			2		17		10	3		55	48	1	136	1088
17 :					10		1			9	1		21	1106
18 :										5	1	1	7	1054
19 :					7					17	1	1	26	1361
20 :					14					5	8	1	28	1234
21 :			4		7								11	1429
22 :											22		22	1976
23 :										14			14	1286
24 :														
25+:					2					2	7		11	1653

Table 15 - Redfish (Sebastes mentella) catch (Kg) by strata.

stratum	area squa. miles	tow number	catch per tow mean	catch per tow s.deviat.	catch per mile towed mean	catch per mile towed s.deviat.
1 -	342	4	-	-	-	-
2 -	838	10	-	-	-	-
3 -	628	7	-	-	-	-
4 -	348	4	0.20	0.25	0.11	0.14
5 -	703	8	0.04	0.12	0.02	0.06
6 -	496	6	-	-	-	-
7 -	822	9	34.71	49.93	20.52	30.77
8 -	646	7	133.03	236.02	74.10	132.85
9 -	314	2	92.40	20.93	53.74	16.08
10 -	951	11	268.29	357.46	160.91	217.76
11 -	806	9	148.54	208.72	88.41	121.70
12 -	670	8	149.64	58.27	89.85	36.43
13 -	249	2	134.20	24.04	83.98	10.80
14 -	602	8	98.48	62.77	55.36	35.54
15 -	666	6	155.08	121.84	85.64	66.05
16 -	634	7	85.78	86.00	50.70	49.60
17 -	216	2	100.72	66.93	73.32	57.52
18 -	210	2	36.28	44.99	20.42	25.61
19 -	414	5	37.58	57.92	21.47	32.33
total	10555	117				

	catch per tow	catch per mile towed
mean	86.60	51.03
standard error	13.18	7.83

(Kg)

Table 16 - Redfish (Sebastes mentella) length frequency by strata (x 10000).

length (cm)	stratum 4	5	7	8	9	10	11	12	13	14	15	16	17	18	19	total
11-																
12-			6													6
13-																
14-																
15-							17	3		1						21
16-			9			10	47			7						71
17-			25	6		8	49			6	2				1	96
18-			10		3	124	74			3						214
19-			40	18	3	348	248	6		6	6				1	676
20-			68	33	3	533	458	16		19	98				1	1229
21-			150	216	40	914	879	166	4	53	353				2	2774
22-			213	547	39	1628	1046	340		95	724	6		1	1	4642
23-			166	376	55	1390	731	271	20	86	551	15	7	1	2	3671
24-			66	234	72	683	227	193	33	59	179	30	9		5	1790
25-			10	33	70	184	75	200	34	55	47	39	14	2	6	768
26-	1		9	36	89	426	118	135	51	74	56	46	13	1	5	1061
27-			13	36	66	763	121	164	21	139	151	28	14	3	9	1527
28-		1	5	101	73	878	162	150	7	156	146	13	25	4	15	1735
29-			10	71	107	468	99	126	38	143	142	27	33	7	9	1284
30-			3	102	44	424	109	133	31	104	123	31	43	6	12	1166
31-			14	128	35	178	62	93	33	80	84	35	56	12	14	824
32-			21	96	17	66	38	63	37	59	63	46	32	8	19	564
33-	1		10	62	15	80	52	68	27	41	62	62	35	11	16	544
34-			39	74	10	46	43	85	36	33	60	64	26	7	21	542
35-			7	77	8	9	40	74	35	32	42	89	20	10	25	464
36-			12	24	4	33	20	69	31	27	27	78	12	11	14	362
37-			7	22	3	8	19	60	29	10	28	70	16	5	12	290
38-			8	22	2	1	10	37	35	13	20	68	10	6	15	246
39-			8	9	2	1	12	34	28	8	12	40	9	7	7	178
40-			9	1	2	15	1	15	14	2	20	21	10	1	4	115
41-			1	1			2	8	6	7	6	12	4	1	3	49
42-			1			1		5	5	1	8	7	2	1	4	35
43-				3					6	2	1	3				14
44-				3				3	2			6				14
45-												3			1	4
46-												2				2

Table 17 - Redfish (Sebastes mentella) age-length key.

MALE

length (cm)	age 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	no id	tot n.
14-																								
15-																								
16-	1																							1
17-	1	1																						2
18-		1																						1
19-		5	2																					7
20-		3	10																					13
21-		1	14	4																			1	20
22-			23	5																				28
23-			16	14																				30
24-			1	9	3																			13
25-				5	3																		8	16
26-				4	15																		2	21
27-					17	7	1	1															2	28
28-					4	13	5																1	23
29-					2	14	10	1															1	28
30-						12	13	6	2														2	35
31-						1	11	13	3	1	1												8	38
32-								12	10	8			1										6	37
33-							1	3	10	7	3	4											4	32
34-							1	2	6	4	5	1	3		1								8	31
35-									1	6	3	4	3	2	1								7	27
36-										2	7	4	5	4	3								14	39
37-											4	2	4	3	1		1						7	22
38-											1	1	2	1	2	1	1						2	11
39-										1	3		4	1				1					2	12
40-												2	1				2					1	1	7
41-														2									1	3
42-																								
43-														1										1
44-																			1					1
45-																							1	1
total:	2	11	66	41	44	47	42	38	32	29	27	18	23	14	8	1	4	1	1			1	78	528

FEMALE

length (cm)	age 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25+	no id	tot n.
14-																								
15-																								
16-																								
17-		1																						1
18-																								
19-		2																						2
20-		4	6																					10
21-		1	17	1																				19
22-			25	6																			1	32
23-			11	12																				23
24-			4	16	2																		2	24
25-				12	8																			20
26-				8	9	1																	1	19
27-					10	8																	1	19
28-					4	8	2																	14
29-					1	12	11	1																25
30-					1	5	16	10															2	34
31-						2	5	9	4	1													2	23
32-							3	8	7	4	1												1	24
33-								3	4	3	3												4	17
34-								1	4	4	6	4	4										2	25
35-									6	2	3	3	1	1	2		1						1	20
36-								1		1	9	5	3	1	1	1							2	24
37-										2	5	9	9	3		1	1						3	33
38-							1		1	1	1	5	4	7	1	2	4		1				7	35
39-										1		1		5	4	4	1	1					10	27
40-												2	1	2	2	6	5	2	3				9	32
41-												1		3		2	1	2			2	2	1	14
42-													1	2	1	2			1			1	1	9
43-																	1	1				2	1	5
44-															1			1				2	3	7
45-																		1					1	2
46-																	1			1				2
total:		8	63	55	35	36	38	33	26	19	28	30	23	24	12	18	15	8	5	1	2	7	55	541

Table 18 - Redfish (**Sebastes mentella**) age composition (x 10000).

age	stratum 4	5	7	8	9	10	11	12	13	14	15	16	17	18	19	total	mean weight (gr)
1 :																	
2 :																	
3 :																	
4 :			20	6		52	48			6						132	80
5 :			138	120	21	1118	909	89	2	43	231				2	2673	122
6 :			463	1030	151	3538	2249	734	41	223	1398	36	12	2	7	9884	161
7 :	1		109	316	179	1414	561	465	82	181	394	82	29	3	13	3829	209
8 :		1	20	133	163	1416	265	327	53	272	266	61	43	7	21	3048	294
9 :			14	164	119	836	190	220	51	217	222	48	65	13	22	2181	354
10 :			19	150	60	396	110	150	50	130	143	55	63	13	22	1361	400
11 :			22	120	29	153	67	105	44	74	92	71	49	12	24	862	465
12 :			24	82	13	64	52	92	42	47	65	82	33	12	23	631	541
13 :			18	57	9	37	35	73	34	31	46	75	23	9	18	465	574
14 :			14	52	7	24	32	74	37	27	44	85	20	9	21	446	636
15 :			13	31	4	10	22	56	35	19	28	68	14	7	14	321	687
16 :			7	27	4	6	16	48	29	17	25	62	12	7	14	274	695
17 :			8	8	1	7	7	28	23	8	18	43	10	4	7	172	797
18 :			4	5	1	7	4	19	11	6	11	24	7	3	5	107	750
19 :			3	4	1	4	2	11	10	3	7	15	5	1	3	69	863
20 :			3	4	1	3	4	12	10	4	7	16	3	2	3	72	831
21 :			1	1		1		3	2		3	6	1		1	19	1013
22 :				1			1	2	2	1	1	4	1			13	936
23 :																	
24 :								1	1		1	1			1	5	1012
25+:				2				2	3	1	2	5			1	16	1079

Table 19 - Redfish (**Sebastes fasciatus**) catch (Kg) by strata.

stratum	area squa. miles	tow number	catch per tow mean	catch per tow s.deviat.	catch per mile towed mean	catch per mile towed s.deviat.
1 -	342	4	-	-	-	-
2 -	838	10	1.72	5.23	1.06	3.23
3 -	628	7	2.73	5.98	1.48	3.28
4 -	348	4	0.61	1.23	0.33	0.66
5 -	703	8	5.47	13.51	2.71	6.54
6 -	496	6	2.43	2.26	1.38	1.29
7 -	822	9	6.52	6.26	3.71	3.50
8 -	646	7	12.07	16.59	6.85	9.37
9 -	314	2	5.21	6.07	3.13	3.73
10 -	951	11	21.29	26.69	12.86	16.70
11 -	806	9	20.89	32.25	12.44	19.23
12 -	670	8	3.74	5.62	2.24	3.35
13 -	249	2	-	-	-	-
14 -	602	8	5.13	5.45	2.89	3.09
15 -	666	6	3.02	4.61	1.76	2.77
16 -	634	7	-	-	-	-
17 -	216	2	-	-	-	-
18 -	210	2	1.11	1.57	0.63	0.89
19 -	414	5	0.06	0.09	0.04	0.06
total	10555	117				

	catch per tow	catch per mile towed
mean	6.46	3.77
standard error	1.25	0.75

(Kg)

Table 20 - Redfish (Sebastes fasciatus) length frequency by strata (x 1000).

length (cm)	stratum 2	3	4	5	6	7	8	9	10	11	12	14	15	18	19	total
14-																
15-					6	4			7		2					18
16-					12	78			27	10						128
17-	7	7		14	38	83			107	118						373
18-	33	20		27	63	56	98		347	149		6				798
19-	40	78		21	95	255	98	12	520	587	4	27			6	1743
20-	33	46		82	89	473	169	36	1528	863	10	138	20	15		3501
21-	65	78		54	114	289	299	72	1690	847	120	293	51			3975
22-	72	117		74	76	397	216	132	1425	1176	216	324	102	31	6	4365
23-	46	92	7	95	57	237	255	60	613	801	143	207	161	23		2796
24-	14	53		68	25	69	83	36	329	464	58	102	122	15		1440
25-	13	14		34		25	139	24	319	196	32	83	72	8		958
26-	20	33		48		11	82	48	166	106	25	17	24			580
27-	20	59		47		8	56	12	233	104	53	28	36			657
28-	20	52		68		12	112	24	204	168	49	6	7			722
29-	13	53		62		9	15	12	120	117	35		24			458
30-	13		7	41		4	56	12	128	82	33		4			380
31-	20			34		16	124		136	68	21		3			422
32-	20	7		27		29		24	13	45	10		2			178
33-	13			20		21	15		13	34	9		4			130
34-	7	20		28		22	15			58	15		3			167
35-	7			20		13				44	4		3			92
36-		7	7	7		10	41		7	17	5		3			103
37-		7		14		18			7	24	4		2			76
38-				7		2				7	3		2			21
39-			7			7			7	10	2		1			35
40-				7		16				17			1			40
41-																
42-						4							1			5

Table 21 - Redfish (**Sebastes fasciatus**) age-length key.

MALE

length (cm)	age 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21+	no id	tot n.
14-																				
15-																				
16-																			1	1
17-		9	1																1	11
18-		10	1																1	12
19-		8	8	1															1	18
20-		3	35	3															6	47
21-			44	7															4	55
22-			36	19	1														3	59
23-			20	24	1														3	48
24-			2	25	2														2	31
25-			3	16	6	1													8	34
26-				3	13														3	19
27-				2	10	3													5	20
28-					2	9	2												1	14
29-					2	9	6												1	18
30-							7													7
31-							1	2	1	1										5
32-								1	1	1	1									4
33-																				
34-									1											1
35-																				
36-									1			1								2
37-									1											1
total:		30	150	100	37	22	16	3	5	2	1	1							40	407

FEMALE

length (cm)	age 4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21+	no id	tot n.
14-																				
15-																				
16-	1	1																		2
17-		3	1																	4
18-		16																		16
19-		11	11																1	23
20-		8	31	5																44
21-		2	35	8															3	48
22-		1	39	15															6	61
23-			20	22	4	1													1	48
24-			6	28	2														1	37
25-			1	10	3															14
26-				4	7														1	12
27-				2	7	2														11
28-					2	5	1													8
29-					1	3	1													5
30-						5	4	2												11
31-						2	4	1	1											8
32-							2	2	2											6
33-								2	3	3										8
34-									4		1	1								6
35-										1	1	1								3
36-										1		1								2
37-									1	1		1			2					5
38-												1	1	1					1	4
39-				1												1	1			3
40-																				
41-												1							1	2
42-																	1			1
total:	1	42	144	95	26	18	12	7	11	6	2	6	1	1	2	1	2		15	392

Table 22 - Redfish (Sebastes fasciatus) age composition (x 10000).

age	stratum 2	3	4	5	6	7	8	9	10	11	12	14	15	18	19	total	mean weight (gr)
1 :																	
2 :																	
3 :																	
4 :					1				1	3						5	84
5 :	10	13		9	22	59	29	4	177	125	3	14	2	1	1	469	125
6 :	17	28		25	26	99	76	25	394	290	40	76	30	5		1131	170
7 :	7	13		17	5	24	38	12	125	105	18	28	22	3		417	222
8 :	4	10		11		3	16	5	43	28	10	4	6			140	322
9 :	4	5		10		2	11	2	21	20	6		2			83	398
10 :	3	1		6		2	9	1	19	9	3		1			54	459
11 :	1	1		2		2	2	1	1	5	1					16	527
12 :	1	1		3		3	1		1	7	1		1			19	610
13 :		1		2		2	2		1	4	1					13	661
14 :				1			1			1						3	680
15 :		1		1		2	1		1	3						9	770
16 :																	893
17 :																	893
18 :																	829
19 :						1				1						2	959
20 :						1				1						2	959
21+:																	

Table 23 - Juvenile redfish (*Sebastes* sp.) catch (Kg) by strata.

stratum	area squa. miles	tow number	catch per tow mean	catch per tow s.deviat.	catch per mile towed mean	catch per mile towed s.deviat.
1 -	342	4	0.29	0.30	0.17	0.18
2 -	838	10	0.46	0.81	0.28	0.50
3 -	628	7	1.46	2.05	0.80	1.12
4 -	348	4	0.08	0.13	0.05	0.07
5 -	703	8	4.33	2.26	2.57	1.36
6 -	496	6	12.93	16.83	7.35	9.58
7 -	822	9	128.21	170.22	70.86	91.50
8 -	646	7	43.19	71.18	24.07	40.03
9 -	314	2	39.00	55.15	23.69	33.50
10 -	951	11	74.73	86.49	43.25	49.31
11 -	806	9	89.71	52.05	53.55	30.46
12 -	670	8	0.92	1.24	0.55	0.74
13 -	249	2	-	-	-	-
14 -	602	8	3.86	5.19	2.12	2.84
15 -	666	6	1.87	3.32	1.05	1.82
16 -	634	7	0.01	0.03	0.01	0.02
17 -	216	2	-	-	-	-
18 -	210	2	0.08	0.12	0.05	0.07
19 -	414	5	0.29	0.59	0.16	0.33
total	10555	117				

	catch per tow	catch per mile towed
mean	28.81	16.51
standard error	5.57	3.07

(Kg)

Table 24 - Juvenile redfish (*Sebastes* sp.) length frequency by strata (x 100000).

length (cm)	stratum 1	2	3	4	5	6	7	8	9	10	11	12	14	15	16	18	19	total
6-																		
7-					1		2	1		3	2							10
8-	1		2		14	9	149	29		27	98							329
9-	1		2		16	13	128	28		25	75							287
10-	1				7	9	132	22		33	80		1				1	286
11-	1	1	2		20	30	1065	246	31	240	523	1	12	4			2	2177
12-	1	1	4		23	73	1494	344	105	437	706	2	31	5			1	3227
13-		1	2		15	26	271	109	124	179	225	1	19	2				974
14-		1	2		5	5	30	11	24	86	52	1	2	3				222
15-		1	2		2	8	72	12	9	241	108	4	1	6				466
16-		1	1		2	5	28	28	15	214	127	2	2	3				428
17-		1	1		1	1	4	11	4	36	28			1				87
18-							2	3		11	14							31
19-											7							8
20-											2							2
21-											2							2

Table 25 - Greenland halibut (Reinhardtius hippoglossoides) catch (Kg) by strata.

stratum	area squa. miles	tow number	catch per tow mean	catch per tow s.deviat.	catch per mile towed mean	catch per mile towed s.deviat.
1 -	342	4	-	-	-	-
2 -	838	10	-	-	-	-
3 -	628	7	0.37	0.51	0.21	0.30
4 -	348	4	1.07	2.15	0.58	1.17
5 -	703	8	0.77	1.02	0.43	0.59
6 -	496	6	0.23	0.26	0.13	0.14
7 -	822	9	3.94	3.09	2.20	1.66
8 -	646	7	7.63	9.23	4.33	5.20
9 -	314	2	12.84	8.36	7.58	5.38
10 -	951	11	4.81	5.74	2.80	3.35
11 -	806	9	3.45	2.74	2.09	1.72
12 -	670	8	11.43	3.70	6.82	2.14
13 -	249	2	1.11	0.65	0.71	0.44
14 -	602	8	18.38	25.12	10.39	14.15
15 -	666	6	12.82	7.22	7.12	4.03
16 -	634	7	34.34	20.20	21.27	12.46
17 -	216	2	1.78	2.52	1.37	1.94
18 -	210	2	3.72	2.23	2.05	1.34
19 -	414	5	90.63	82.09	54.13	48.82
total	10555	117				

	catch per tow	catch per mile towed
mean	10.31	6.10
standard error	1.64	0.97

(Kg)

Table 26 - Greenland halibut (Reinhardtius hippoglossoides) length frequency (x 1000).

length (cm)	stratum 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	total
10-11																		
12-13	7				21	7		21	29				24					109
14-15	13				48			20	79	20		17	24					222
16-17	20			25	76	36		114	145			22	8					446
18-19	7			13		7		21	52	7		11						117
20-21					7													7
22-23					21			14	7	14			24					79
24-25				6	215	14		7	57	47		12	16					374
26-27				12	312	7		7	65	34								435
28-29	7		7		69				7								6	95
30-31				6	14								8					28
32-33						24		7	14				16					61
34-35					21				29	7				7			32	96
36-37						7		35		26		11	24	44			66	215
38-39				6	7			7		20		6	57	82			38	222
40-41					14	136	12	27	43	80		28	48	60			256	705
42-43					49	55	24	69	36	133		12	106	192		8	446	1131
44-45			7		14	35	60	35	14	106	10	28	65	169			362	906
46-47					14	67	24	41	51	67		62	89	251		16	475	1155
48-49	7	7	7		21	31	24	67	7	47		34	73	192	10		339	866
50-51	7	7	7		14	31	72	13	7	53		45	65	303	10	8	374	1014
52-53		7	7		14	14	36	77	21	33		57	8	229		15	368	885
54-55			7			14		14	7	20		51	8	81		8	168	377
56-57						7			7	27	10	11	16	59	10		58	207
58-59					7	7	12			13		34	8	59			71	211
60-61						7	12					56	16	30			49	170
62-63						7						22					24	54
64-65												28		15				43
66-67												6						6
68-69																		
70-71												11						11
72-73												6						6
74-75												6						6
76-77												6						6
78-79																		

Table 27 - Greenland halibut (Reinhardtius hippoglossoides) age-length key.

MALE

length (cm)	age 1	2	3	4	5	6	7	8	9	10	11	12	13	14	no id	tot n.
22-23		1														1
24-25		5	2													7
26-27		6	1	1											1	9
28-29		1														1
30-31																
32-33			2	1												3
34-35				1		1										2
36-37			2	6	4	1										13
38-39				5	6	5	1									17
40-41			1	10	6	4	3								1	25
42-43			1	9	17	12	13								1	53
44-45			1	3	7	8	6	3	2							30
46-47			1	2	9	13	11	10	1						2	49
48-49			1	4	5	7	6	4								27
50-51				2	9	11	9	7	1	1	1	1			4	46
52-53					2	6	6	5	4						2	25
54-55				2		1		2		1						6
56-57							2	2	1							5
58-59						1			1						1	3
60-61										1			1			2
total:		13	12	46	65	70	57	33	10	3	1	1	1		12	324

FEMALE

length (cm)	age 1	2	3	4	5	6	7	8	9	10	11	12	13	14	no id	tot n.
22-23	1	3														4
24-25	1	9	3													13
26-27	1	10	2													13
28-29	1	5														6
30-31																
32-33				3												3
34-35				2	1		1		1							5
36-37			1	1	3	3										8
38-39			1	4	3	3									1	12
40-41		1	1	1	10	13	5	2								33
42-43			1	6	17	9	9	3							1	46
44-45				3	13	17	8	5	1	1					4	52
46-47				4	9	23	18	8	4	1					5	72
48-49				2	9	13	19	4	2	1		1			5	56
50-51				3	7	10	9	9	3	3	3		1		7	55
52-53				1	4	8	11	6	6	6	3				6	51
54-55					2	6	5	7	1	3		1		1	4	30
56-57						1	6	3	2	1					6	19
58-59							5	3	4	2	2	1				17
60-61						1	3	3	5	2	1	1			1	17
62-63							1	2	1		1	1				6
64-65						1		1		1	2				2	7
66-67							1									1
68-69																
70-71								1	1							2
72-73							1									1
74-75													1			1
76-77												1				1
total:	4	28	9	30	78	108	102	57	31	21	12	6	2	1	42	531

Table 28 - Greenland halibut (Reinhardtius hippoglossoides) age composition (x 1000).

age	stratum 3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	total	mean weight (gr)
1 :	44		1	38	181	48		170	301	33		49	56				1	922	37
2 :	10		6	14	475	21		31	114	73		10	37	1			8	800	130
3 :				4	102	12	2	12	31	31		6	20	23			43	286	324
4 :	1	2	2	3	43	69	15	43	45	72	1	23	84	160	2	3	293	861	626
5 :	2	3	5	2	39	92	51	82	46	144	3	57	133	321	4	9	607	1600	748
6 :	3	5	8	2	37	110	66	98	53	160	4	98	143	419	6	13	771	1996	853
7 :	4	5	8		36	87	61	85	47	130	6	114	122	384	9	12	683	1793	970
8 :	2	3	5		14	41	37	35	24	64	3	83	56	230	5	9	380	991	1101
9 :	1	1	2		9	16	19	17	14	23	2	54	23	110	2	3	177	473	1265
10 :	1	1	2		4	8	13	14	2	16	1	35	11	69	1	4	84	266	1297
11 :		1	1		2	5	9	6		7		28	5	38		1	35	138	1446
12 :			1		1	3	2	2		2		18	4	12			22	67	1647
13 :						1	1			1		7	1	4			3	18	1909
14 :						1		1		1		2		2			6	13	1349
15 :																			
16+:																			

Table 29 - Shrimp catch (Kg) by strata.

stratum	area squa. miles	tow number	catch per tow mean	catch per tow s.deviat.	catch per mile towed mean	catch per mile towed s.deviat.
1 -	342	4	-	-	-	-
2 -	838	10	-	-	-	-
3 -	628	7	-	-	-	-
4 -	348	4	-	-	-	-
5 -	703	8	0.14	0.18	0.08	0.11
6 -	496	6	0.08	0.13	0.05	0.07
7 -	822	9	33.96	37.76	19.47	22.60
8 -	646	7	23.06	58.83	13.12	33.56
9 -	314	2	3.84	5.10	2.11	2.77
10 -	951	11	31.22	48.62	17.96	27.89
11 -	806	9	41.71	46.20	25.26	28.20
12 -	670	8	62.03	70.74	37.27	42.28
13 -	249	2	1.38	1.95	0.84	1.18
14 -	602	8	36.89	48.67	20.43	27.06
15 -	666	6	51.55	30.54	28.40	16.31
16 -	634	7	5.97	10.24	3.58	6.13
17 -	216	2	-	-	-	-
18 -	210	2	-	-	-	-
19 -	414	5	10.59	10.19	6.41	6.40
total	10555	117				

	catch per tow	catch per mile towed
mean	20.28	11.75
standard error	3.18	1.86