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Spanish Research Report for 1999

by

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### SUBAREA 3

#### A. Status of the fisheries

The Spanish fleet fishing in NAFO Regulatory Area includes two components: the pair-trawlers, formerly fishing for cod and currently fishing for Greenland halibut, and the trawlers.

##### - **Pair – trawler fleet.**

In 1999 the activity of this fleet was very limited. Only two pair-trawlers have been fishing for Greenland halibut in the deep water zones (beyond 700 m) of Divisions 3LM, one in February-March and the other from April to June. One scientific observer was on board this fleet, sampling Greenland halibut and by-catch and discard species. The length distributions of Greenland halibut (May and June in Div. 3M; April to June in Div. 3L), roughhead grenadier (May and June in Div. 3M; April to June in Div. 3L), redfish (May in Div. 3L) and American plaice (April and May in Div. 3L) and an estimate of the total catch for the months with sampling in the pair-trawler fleet, are presented in tables 1 to 4 respectively. The Greenland halibut and roughhead grenadier pair-trawler catch at age for those months are presented in tables 5 and 6. Biological sampling of Greenland halibut and roughhead grenadier have been carried out by the scientific observer. This includes recording weight at length, sex-ratio and maturity stages and collecting material for reproductive studies.

##### - **Trawler fleet.**

In 1999, 31 trawlers have been involved in the Greenland halibut fishery, alternating with the skate fishery in the second half of the year. Four scientific observers were on board this fleet. Sampling includes Greenland halibut, thorny skate and the respective by-catch and discard species.

(1) Greenland halibut fishery.

It is performed at depths beyond 700 m. and the main by-catches were roughhead and roundnose grenadiers and *Antimora rostrata*. The unstandardized CPUEs for Greenland halibut in the period 1991 – 1999 are presented in table 7.

There are no discards of Greenland halibut, while roundnose grenadier (*Coryphaenoides rupestris*) is almost totally discarded. The estimated discard proportions of the other by-catch species were 28 % in roughhead grenadier (*Macrourus berglax*) and 10 % in *Antimora rostrata* of their respective catches. The redfish catches have been

taken at intermediate depths, mainly between 350 – 600 m. and exclusively in Div. 3N and O. The redfish catches do not overlap significantly with any other species, and the level of redfish discards is uncertain. The length distributions of the Greenland halibut, roughhead and roundnose grenadiers and redfish, and an estimate of the total catch of this fleet for the months with sampling are presented in tables 8 to 11 respectively. Those length distributions belong to the retained plus discarded catch. The parameters of the species length-weight relationships used are shown in table 12. The Greenland halibut and roughhead grenadier catches at age, referred to the estimated total catch in the months with length sampling, are presented in table 13 and 14 respectively.

(2) Skate fishery

The thorny skate fishery is performed at depths between 40 to 200 m. between September and December in Div. 3N, and the main by-catches are American plaice and yellowtail flounder. The discarding rate of skate, American plaice and yellowtail flounder was respectively 4 %, 8 % and 44 % of the total catch. The length distributions of the thorny skate, American plaice, yellowtail flounder and cod in the catches (retained catch plus discards), and an estimate of the total catch of this fleet for the months with sampling are presented in tables 15 to 18 respectively.

**(B) Research studies**

In April 1999 a selectivity survey using sorting grates have been conducted. The results with sorting grates of 35 and 55 mm were compared in the following species: Greenland halibut, cod, American plaice, witch flounder, yellowtail flounder, roughhead grenadier and redfish. A total of 54 hauls have been made, divided in two parts: one of deepwater hauls (800 – 1000 m.) in Div. 3LM (Flemish Pass), and the other in shallower waters (70 – 250 m.) in Div. 3N (Grand Bank).

In May 1999, a bottom trawl survey have been conducted in Divisions 3NO Regulatory Area. A total of 134 hauls with an stratified design have been performed, to a depth of 1450 meters. The results of this survey have been presented in SCR 99/57, which includes abundance indices and length distributions of American plaice, yellowtail flounder, witch flounder and Greenland halibut, and a comparison of the results obtained with the ‘Pedreira’ and the ‘Campelen’ gears.

In July 1999, an EU (Spain and Portugal) stratified bottom trawl survey have been made in Flemish Cap (Division 3M). A total of 117 valid hauls with the ‘Lofoten’ gear, and 17 with the ‘Campelen’ have been carried out to a depth of 711 meters. The results of this survey including abundance indices of the main commercial species and age distributions for cod, the three species of *Sebastes*, American plaice, Greenland halibut and roughhead grenadier, are presented in the SCR 00/9. Data on shrimp from this survey are presented in SCR 99/106. The results regarding the hydrographic conditions during the survey are presented in SCR 00/8. Feeding studies on the main species and collection of data and material for histological assessment of sexual maturity of cod, redfish, Greenland halibut and roughhead grenadier have also been carried out in this survey.

**References**

- Garabana, D. (1999).- Northern shrimp (*Pandalus borealis*) on Flemish Cap in July 1999. NAFO SCR Doc. 99/106.
- Garabana, D. , J. Gil and R. Sánchez (2000).- Hydrographic conditions on Flemish Cap in July 1999 and comparison with the previous years water masses. NAFO SCR Doc. 00/8.
- Paz, X. and P. Durán (1999).- Results from the 99 Spanish bottom trawl survey in the NAFO Regulatory Area for Divisions 3NO. NAFO SCR Doc. 99/57.
- Vázquez, A. (2000).- Results from the bottom trawl survey of Flemish Cap in 1999. NAFO SCR Doc. 00/9.

Table 1. Greenland halibut length distributions in the pair-trawler commercial catches in Div. 3M and 3L in 1999.

LENGTH (cm.)	Div. 3M			Div. 3L			
	May	June	TOTAL	April	May	June	TOTAL
28 - 29				66			66
30 - 31	49		49	391	1050	1220	2661
32 - 33	315	100	415	3964	3967	3388	11319
34 - 35	1776	1455	3231	8459	11326	14976	34761
36 - 37	2617	3547	6164	9012	22190	18009	49211
38 - 39	3766	6743	10509	11311	22219	18478	52008
40 - 41	6281	9095	15376	10087	24481	17210	51778
42 - 43	5038	9355	14393	8753	25827	10601	45181
44 - 45	6425	7008	13432	5752	18040	6950	30742
46 - 47	3276	3647	6923	2440	11940	5056	19437
48 - 49	3344	2928	6272	1581	7068	2605	11253
50 - 51	2502	2058	4559	875	6214	3109	10198
52 - 53	1980	1301	3280	226	3049	1917	5192
54 - 55	934	732	1665	483	3278	936	4696
56 - 57	516	1031	1547	75	1687	739	2501
58 - 59	531	720	1251		1233	388	1621
60 - 61	270	105	375		890	178	1067
62 - 63	408	210	619		713	117	830
64 - 65	254	53	307		273	472	745
66 - 67	392		392		275	178	452
68 - 69	112	105	217		150	178	328
70 - 71	137		137		177		177
72 - 73	42	105	147		268		268
74 - 75	89		89		58		58
76 - 77	63		63		68		68
78 - 79	43		43		15	178	192
80 - 81	133		133		44		44
82 - 83	56		56		15		15
84 - 85					15		15
86 - 87							
88 - 89					15		15
90 - 91							
92 - 93					15		15
Total	41348	50298	91646	91646	166557	106882	365086
Fish measured	2019	591	2610	587	4371	613	5571
Samp. Catch (t.)	1.8	0.4	2.2	0.3	3.2	0.4	3.9
Total catch (t.)*	35.8	37.1		34.2	114.7	63.8	
Depth range (m.)	700 – 1100			700 – 1100			

\*Nominal catch

Table 2. Roughhead grenadier length distributions in the pair - trawl commercial catches in Div. 3M and 3L in 1999.

Length (cm.)	3M			3L			
	May	June	TOTAL	April	May	June	TOTAL
8.5-10					21		21
10.5-12	86	43	129	5	928	50	983
12.5-14	959	72	1031	140	1335	99	1574
14.5-16	1561	144	1705	450	3113	165	3728
16.5-18	1844	274	2117	749	2573	223	3545
18.5-20	810	202	1012	328	1689	74	2092
20.5-22	243	72	315	159	780	21	959
22.5-24	58	58	116	29	534	17	579
24.5-26	52	144	196	17	680	8	706
26.5-28	43	43	86	13	270	4	287
28.5-30	21	29	50		7		7
30.5-32					25		25
32.5-34					14		14
34.5-36		14	14		14		14
Total	5677	1095	6772	1890	11983	660	14533
Fish measured	402	76	478	189	726	480	1395
Samp. Catch (t.)	0.2	0.1	0.2	0.1	0.3	0.1	0.5
Total catch (t.)*	2.3	0.8		0.9	5.9	0.3	
Depth range (m.)	700 – 1100			700 – 1100			

\*Nominal catch

Table 3. Redfish length distribution in the pair - trawlers commercial catch in Div. 3L in 1999.

Length (cm.)	3L
	May
22 - 23	796
24 - 25	4684
26 - 27	6987
28 - 29	6126
30 - 31	2465
32 - 33	1013
34 - 35	699
36 - 37	38
38 - 39	0
40 - 41	19
Total	22828
Fish measured	531
Samp. Catch (t.)	0.2
Total catch (t.)*	7.2
Depth range (m.)	700 – 1100 m.

\*Nominal catch

Table 4. American plaice length distributions in the pair – trawlers commercial catch in Div. 3L in 1999.

Length (cm.)	3L		
	April	May	TOTAL
22 – 23		115	115
24 – 25		409	409
26 – 27	59	655	714
28 – 29	88	998	1086
30 – 31	323	1677	2000
32 – 33	441	1830	2271
34 – 35	764	2812	3576
36 – 37	941	2524	3465
38 – 39	764	2079	2844
40 – 41	647	1306	1952
42 – 43	323	1226	1549
44 – 45	206	468	674
46 – 47	59	287	346
48 – 49		142	142
50 – 51	29	96	126
52 – 53	59	54	113
54 – 55			
56 – 57	29		29
Total	4734	16678	21411
Fish measured	161	528	689
Samp. Catch (t.)	0.1	0.2	0.3
Total catch (t.)*	2.4	7.4	9.8
Depth range (m.)		745 - 982	

\*Nominal catch

Table 5. Greenland halibut pair-trawlers catch at age (months with sampling) in 1999.

AGE	3M			3L			
	May	June	TOTAL	April	May	June	TOTAL
2				6			
3	321	229	550	2471	3167	3524	9163
4	3247	4051	7298	12948	22238	21358	56544
5	7405	11122	18527	18406	40194	30567	89167
6	10752	15434	26186	17487	46113	26997	90597
7	9498	10992	20490	8801	30967	14188	53956
8	5569	5227	10796	2617	14365	6206	23189
9	2270	2113	4384	628	5611	2311	8550
10	774	680	1454	95	1909	713	2717
11	460	201	662	15	839	387	1241
12	399	99	497		485	294	779
13	295	81	376		293	180	473
14	181	52	233		214	84	298
15	109	10	119		107	41	149
16	58	7	64		45	32	77
17	11		11		10		10
Total	41348	50298	91646	63474	166557	106882	336914
Total catch (t)*	34.2	37.1	71.3	34.2	114.6	63.8	212.6

\*Nominal catch

Table 6. Roughhead grenadier pair-trawlers catch at age (months with sampling) in 1999.

AGE	3M			3L			
	May	June	TOTAL	April	May	June	TOTAL
2					10		10
3	20	10	30	1	214	11	227
4	33	17	50	2	367	19	388
5	322	37	359	44	728	47	819
6	678	56	734	126	1093	72	1291
7	985	93	1078	274	1825	105	2203
8	1467	185	1652	516	2420	167	3103
9	918	155	1072	369	1434	105	1908
10	473	100	573	201	898	49	1148
11	403	102	505	183	922	39	1144
12	155	54	209	83	503	16	602
13	70	60	131	39	451	11	501
14	83	101	184	36	608	12	656
15	37	63	100	11	322	5	338
16	16	24	40	4	104	1	109
17	9	10	19	1	28		30
18	5	7	12		14		14
19	5	6	11		8		8
20		5	5		18		18
21		3	3		9		9
22			0		3		3
23		5	5		5		5
Total	5677	1094	6771	1890	11983	660	14532
Total catch (t)*	2.3	0.7	3	0.9	5.9	0.2	7

\*Nominal catch

Table 7. Spanish trawlers unstandardized CPUE (tons/hour) of the sampled hauls targeting Greenland halibut and hours sampled.

	3L		3M	
	CPUE	hours	CPUE	hours
1991	0.26	11174	0.17	20549
1992	0.36	32402	0.27	19970
1993	0.31	12352	0.23	3911
1994	0.24	11767	0.21	7568
1995	0.23	475	-	-
1996	0.37	3152	0.27	1026
1997	0.39	2500	0.22	1058
1998	0.25	2242	0.32	1137
1999	0.30	1845	0.22	2812

Table 8a. Greenland halibut length distributions in the trawlers catch in Div. 3L in 1999.

LENGTH (cm.)	Div. 3L							Total
	Feb.	March	Aug.	Sept.	Oct	Nov.	Dec.	
30 – 31				117		487		604
32 – 33	351		315	617		253		1536
34 – 35	1870	1873	1346	2613	518	1600	1354	11174
36 – 37	6612	2544	6690	6815	5002	11125	9947	48735
38 – 39	11696	6822	10995	13957	17124	23469	64635	148698
40 – 41	17568	8332	19569	23802	26612	52551	122505	270939
42 – 43	20702	12777	23173	26852	33314	81478	207832	406128
44 – 45	24096	11548	24040	29353	47832	98473	246822	482164
46 – 47	19957	15294	19145	23086	38126	84515	219922	420045
48 – 49	19001	14372	16693	18160	30920	72314	165658	337118
50 – 51	18299	11911	12644	12741	21940	53273	125429	256237
52 – 53	13659	11548	9618	8863	18162	42760	124022	228632
54 – 55	13381	11436	6674	8171	13408	30802	93849	177721
56 – 57	8579	9926	4923	5795	9555	22904	73404	135086
58 – 59	7492	5480	3922	4237	6987	14499	44538	87155
60 – 61	4371	6095	2078	1890	3586	13064	30427	61511
62 – 63	3355	2349	1126	1333	2113	6261	26295	42832
64 – 65	2325	1873	650	944	1393	2960	10643	20788
66 – 67	1993	3858	730	896	787	2254	15082	25600
68 – 69	454	2041		117	784	1054	2744	7194
70 – 71	554	1985	228	269	738	1394	10836	16004
72 – 73	488	2293		117	210	759		3867
74 – 75	775	2293		48	210	337	2702	6365
76 – 77	316	2293		48	172		1651	4480
78 – 79	153	1258	153			253		1817
80 – 81	394	419	122		210		1051	2196
82 – 83	87	1202			105			1394
84 – 85	72							72
86 – 87		419			105			524
88 – 89	158							158
Total	198758	152241	164834	190841	279913	618839	1601348	3206774
Fish measured	1721	389	2001	2617	2507	3441	1255	13931
N° of samples	9	2	12	15	13	19	7	77
Samp. Catch (t.)	29.6	4.1	19.0	34.0	30.1	34.0	12.7	163.4
Total catch (t)*	207.8	204.8	147.9	167.9	261.0	599.5	1636.8	3225.7
Depth range (m.)	700 – 1700							

\*Nominal catch

Table 8b. Greenland halibut length distributions in the trawlers catch in Div. 3M and 3NO in 1999.

LENGTH (cm.)	Div. 3M									Div. 3NO				
	Jan.	Feb.	March	April	Aug.	Sept.	Oct	Nov.	TOTAL	Feb.	Sept.	Oct	Nov.	TOTAL
26 - 27										307				307
28 - 29										613				613
30 - 31		82						244		1533	682			2215
32 - 33	613		120			369	475	209	1786	2759	182	316		3257
34 - 35	907	723	1068		1712	369	1221	465	6465	7702	557	1108	556	9923
36 - 37	1096	2283	2937	618	2079	2623	3081	5301	20018	8480	1394	2594	2780	15248
38 - 39	3043	5239	7313	2158	6962	4170	7099	13324	49308	9539	3203	6324	9176	28242
40 - 41	8342	12216	13588	5368	12962	10251	10933	28047	101707	13753	6352	9758	13584	43447
42 - 43	13204	16767	19840	7913	20792	15676	21142	46529	161863	9954	7549	17714	24906	60123
44 - 45	18217	20368	21885	11132	26898	18512	19648	61332	197992	7247	11530	12825	25264	56866
46 - 47	16570	25186	25199	12333	16753	18313	20883	54883	190120	3568	12950	14740	29078	60336
48 - 49	18552	27939	24136	13515	15885	17574	16411	38282	172294	4407	10171	11447	21096	47121
50 - 51	18927	28059	21428	11727	12838	14704	16546	41287	165516	5198	9670	11316	23160	49344
52 - 53	17515	23980	20739	14136	8928	11672	11169	28552	136691	3475	12114	6020	16170	37779
54 - 55	12889	19445	19215	12541	8568	5682	8781	16756	103877	3656	5791	4364	8421	22232
56 - 57	13990	13865	14372	10674	5391	5759	5890	14866	84807	2240	3574	4357	5840	16011
58 - 59	9276	9883	9186	6845	3183	2513	6137	7935	54958	2088	2455	2382	3655	10580
60 - 61	7260	7650	7089	5282	1836	1195	5641	4157	40110	900	2221	2400	1827	7348
62 - 63	3835	4736	4499	3703	1470	543	4656	2482	25924	1287	1817	1901	1271	6276
64 - 65	1752	3257	3783	2501	1960	356	1471	1523	16603	749	614	143	2383	3889
66 - 67	2181	2458	2269	1921	1960	652	1227	2639	15307	266	196	601	1788	2851
68 - 69	1978	1613	1650	1753	490		729	1599	9812	101	627	800	358	1886
70 - 71	1355	700	1069	2049	490	178	735	473	7049	216	1493	871	914	3494
72 - 73	428	1316	1154	1677			729	1023	6327	432	627	576	556	2191
74 - 75	802	903	1576	1792			356	1464	288	7181	266	377	364	1365
76 - 77	726	297	1192	1431		178	729		4553	230		823	2026	3079
78 - 79	540	845	1447	641			243	225	3941	165	196	619	914	1894
80 - 81	933	530	832	843				288	3426		196	459	358	1013
82 - 83	319	355	848	908			729	72	3231	50		222		272
84 - 85	269	117	491	224		178		225	1504	115		364		479
86 - 87		381	480	190				72	1123	50	196			246
88 - 89	422	173	124	328			243		1290			94		94
90 - 91	319		54	311				72	756					
92 - 93														
94 - 95														
96 - 97				121					121					
Total	176260	231366	229583	134635	151157	131823	168256	372906	2E+06	91346	96734	115502	196439	500021
Fish measured	1104	3027	4569	1196	358	740	697	1933	13624	589	592	773	430	2384
N° of samples	8	20	27	6	2	5	4	11	83	3	3	4	2	12
Samp. Catch (t.)	12.1	37.5	55.7	18.0	1.8	8.7	5.4	18.6	157.9	9.0	5.0	3.9	3.2	21.1
Total catch (t)	222.8	278.1	282.3	193.2	147.2	128.9	188.0	368.2	1808.7	74.6	111.9	128.1	206.4	521.0
Depth range (m.)					700 - 1700							700 - 1700		

Nominal catch



Table 9. Roughhead grenadier length distributions in the trawlers catch in Div. 3L and 3M in 1999.

LENGTH (cm.)	Div. 3L						Div. 3M							
	Aug.	Sept.	Oct.	Nov.	Dec.	TOTAL	Jan.	Feb.	March	Aug.	Sept.	Oct.	Nov.	TOTAL
5.5 - 6.5			141			141								
7 - 8				932		932								
8.5 - 9.5	1109	687	222	466		2483								
10 - 11	6165	2270	3096	1891	12508	25929	992		950	14933			431	17306
11.5 - 12.5	15974	10419	11313	19583	40026	97316	1985	54400	5542	24122	6138	1277	2613	96077
13 - 14	17694	15896	19261	35766	67545	156161	3525	87295	16682	19528	10522	2235	3786	143573
14.5 - 15.5	18888	19495	21605	35618	70046	165652	15094	92600	23016	42501	18416	5110	4516	201253
16 - 17	26471	27449	33954	47374	105069	240317	31180	134338	35403	44799	39461	7665	15603	308449
17.5 - 18.5	20074	16237	30451	34060	62541	163364	31832	91321	34196	20676	18416	5429	14640	216510
19 - 20	8468	8326	12452	27707	47531	104484	40424	58407	43759	17230	10522	7665	11008	189015
20.5 - 21.5	5966	4102	4014	11950	20013	46046	55933	25740	34844	10338	4384	3832	4942	140012
22 - 23	3421	2416	3482	6969	12508	28796	20812	16097	26894	12636	3507	1597	2191	83733
23.5 - 24.5	1479	883	2129	5236	2502	12228	17834	6836	20893	10338	1754	1277	676	59607
25 - 26	370	881	1227	3893	2502	8871	10236	4959	17321	8041	1754	1916	1231	45457
26.5 - 27.5		869	312	1715	5003	7899	7051	4416	13901	4595	1754		618	32334
28 - 29	2450	958	1323	2401	2502	9634	7155	5385	6750	2297		639	161	22388
29.5 - 30.5	1479	224	312	2625		4640	2533	2594	6207			639	296	12269
31 - 32		197	420	1201	5003	6822	4074	3813	6116		877	319	46	15245
32.5 - 33.5		197	420	1272		1890	3081	1056	4085		877	1277	69	10445
34 - 35		541	420	2159		3121		1745	1175		877	958	46	4800
35.5 - 34.5							2533	275	377				69	3254
37 - 38			491			491	992	261				319		1572
38.5 - 39.5												319		319
40 - 41				466		466								
Total	130006	112048	147045	243283	455300	1087683	257266	591537	298109	232034	119259	42473	62941	1620102
Fish measured	422	879	717	660	182	2860	204	354	888	202	136	133	623	2540
N° of samples	2	5	4	4	1	16	2	3	7	1	1	1	3	18
Samp. Catch (t.)	0.1	1.0	1.1	0.7	0.1	3.0	0.3	0.3	3.9	0.2	0.2	0.2	0.9	6.1
Total catch (t)*	61.9	54.4	75.7	143.5	224.6	560.0	239.6	313.1	273.6	126.7	67.4	37.3	133.6	1191.3
Depth range (m.)			700 - 1700							700 - 1700				

\*Nominal catch

Table 10. Roundnose grenadier length distributions in the trawlers catch in Div. 3L and 3M in 1999.

LENGTH (cm.)	Div. 3L			Div. 3M			
	Sept.	Oct.	TOTAL	Jan.	Feb.	March	TOTAL
4 - 5	92	60	152		330	235	565
5.5 - 6.5	2401	898	3299	4207	2824	2089	9120
7 - 8	5817	2754	8571	12384	8980	6037	27401
8.5 - 9.5	6186	4191	10377	19337	7575	6430	33342
10 - 11	554	1617	2171	13996	5471	4265	23732
11.5 - 12.5	462	539	1001	6459	2206	3021	11686
13 - 14	185	120	305	2401	803	1098	4302
14.5 - 15.5		239	239		51	424	475
16 - 17	185		185			47	47
17.5 - 18.5	92		92			9	9
19 - 20							
20.5 - 21.5							
Total	15974	10418	26392	58784	28240	23655	110679
Fish measured	173	174	347	405	801	1156	2362
N° of samples	1	1	2	4	7	8	19
Samp. Catch (t.)	0.1	0.1	0.2	5.8	3.5	3.5	12.8
Total catch (t)*	7.0	5.6	12.6	85.2	36.1	35.2	156.6
Depth range (m.)	700 – 1700 m.			700 – 1700 m.			

\*Own estimates

Table 11. Redfish length distributions in the trawlers catch in Div. 3N and 3O in 1999.

LENGTH (cm.)	Div. 3N				Div. 3O
	Feb.	Sept.	Oct.	TOTAL	Sept.
18 - 19					34302
20 - 21					720343
22 - 23			1958	1958	1629347
24 - 25	460	965	2937	4362	1029061
26 - 27	3217		24472	27689	325869
28 - 29	7239	9653	57754	74646	
30 - 31	4481	37648	45029	87158	
32 - 33	2298	83018	22514	107830	
34 - 35	1149	57920	12726	71795	
36 - 37	460	10619	6852	17931	
38 - 39	460		1958	2418	
40 - 41		965	979	1944	
42 - 43		1931		1931	
Total	19764	202719	177179	399662	3738922
Fish measured	172	210	181	563	218
N° of samples	1	1	1	3	1
Samp. Catch (t.)	1.0	0.7	5.5	7.1	2.7
Total catch (t)*	3.8	1.3	34.0	42.9	857.6
Depth range (m.)	350 - 600				350 - 600

\*Nominal catch

Table 12. Parameters of the species length – weight relationship.

Species	a	b
<i>Greenland halibut</i>	0.007	3.031
<i>Roughhead grenadier</i>	0.150	2.840
<i>American plaice</i>	0.004	3.186
<i>Yellowtail flounder</i>	0.007	3.090
<i>Cod</i>	0.008	3.040
<i>Thorny skate</i>	0.011	2.947

Table 13. Greenland halibut trawlers catch-at-age in 1999.

AGE	3L	3M	3NO	TOTAL
2			197	197
3	2928	1777	4237	8942
4	74110	29234	22121	125465
5	319904	122396	57072	499372
6	702692	286399	102459	1091550
7	869466	411463	125231	1406160
8	657064	365510	98521	1121095
9	326650	196019	46098	568767
10	126095	78982	16729	221806
11	56005	36362	8225	100592
12	33241	24593	6235	64069
13	20837	17158	5055	43050
14	10241	12491	4030	26762
15	5367	8025	2523	15915
16	1806	4052	1043	6901
17	367	1523	245	2135
Total	3206774	1595986	500021	5302781
Total catch (t)*	3226	1809	521.0	5555.4

\*Nominal catch

Table 14. Roughhead grenadier trawlers catch-at-age in 1999.

AGE	3L	3M	TOTAL
2	304		304
3	16972	17346	34317
4	36054	37431	73484
5	88866	86237	175103
6	130010	128904	258914
7	158963	187709	346672
8	230129	290499	520628
9	149011	205515	354526
10	84470	141102	225571
11	77357	155514	232871
12	35989	95340	131330
13	22110	77375	99486
14	21349	84136	105485
15	10681	39291	49972
16	4834	15793	20627
17	3550	9405	12956
18	5507	13330	18838
19	3284	9676	12960
20	4358	11261	15619
21	1835	6276	8112
22	652	2246	2898
23	747	2633	3380
24	61	278	339
25	356	556	912
26	233		233
Total	1087683	1617853	2705536
Total catch (t)*	560.0	1191.3	1751.3

Table 15. Thorny skate length distributions in the trawlers catches in 1999.

LENGTH (cm.)	Div. 3N			Total
	Sept.	Oct	Nov.	
28 - 29	2500			2500
30 - 31			1672	1672
32 - 33	7501	726	3344	11571
34 - 35	15003	5021	1672	21696
36 - 37	10002	4880	9222	24104
38 - 39	12502	17167	8355	38024
40 - 41	22504	35209	36049	93762
42 - 43	40007	61168	77256	178431
44 - 45	42507	109332	72726	224565
46 - 47	25004	87542	85640	198186
48 - 49	57510	82154	77008	216672
50 - 51	50009	72005	78935	200949
52 - 53	35006	82704	72446	190156
54 - 55	27505	79848	49560	156913
56 - 57	22504	61725	50471	134700
58 - 59	15003	64225	42022	121250
60 - 61	17503	40715	38769	96987
62 - 63	35006	47822	43252	126080
64 - 65	27505	37762	19715	84982
66 - 67	27505	24257	23452	75214
68 - 69	22504	34653	35373	92530
70 - 71	12502	27314	24211	64027
72 - 73	15003	25158	8852	49013
74 - 75	15003	16167	15521	46691
76 - 77	5001	15514	15120	35635
78 - 79	7501	6730	9269	23500
80 - 81	5001	15960	8622	29583
82 - 83	5001	7980	4069	17050
84 - 85	2500	6912	4179	13591
86 - 87		1451	599	2050
88 - 89		2959	2316	5275
90 - 91				
92 - 93			644	644
94 - 95		726		726
Total	582602	1075786	920341	2578729
Fish measured	233	895	949	2077
N° of samples	1	4	5	10
Samp. Catch (t.)	2.7	12.3	16.6	31.6
Total catch (t)*	1150.2	1714.3	1838.9	4703.4
Depth range (m.)		40 - 200		

\*Nominal catch

Table 16. American plaice length distributions in the trawlers catches in 1999.

LENGTH (cm.)	Div. 3N				Total	Div. 3O	
	Feb.	Sept.	Oct.	Nov.		Oct.	
12-13			105		105		
14-15							
16-17							
18-19							
20-21							
22-23			110		110		
24-25			562		562		
26-27			710	96	806	313	
28-29	262		1828	724	2813	950	
30-31	1104	155	9170	3182	13610	3811	
32-33	5340	387	14285	5253	25265	8235	
34-35	7161	1544	25587	9627	43918	8247	
36-37	8366	1389	33419	11905	55079	6973	
38-39	8509	3010	49615	18836	79971	5386	
40-41	5890	3937	61995	26959	98781	8559	
42-43	6006	3782	55730	26616	92134	4436	
44-45	2806	3010	32683	15691	54190	6973	
46-47	1097	1852	24391	10646	37986	1900	
48-49	515	772	11590	5205	18081	637	
50-51	101	232	9921	2061	12315	1575	
52-53	152	232	6757	1645	8786	1274	
54-55	262	155	4512	990	5918	313	
56-57	101	77	1949	648	2775		
58-59		309	872	79	1260	625	
60-61		77	769	266	1112		
62-63			346	59	405		
64-65			283	96	378		
66-67			124	20	143		
68-69				231	231		
70-71			39	246	285		
72-73				20	20		
Total	47671	20920	347352	141099	557041	60206	
Fish measured	373	271	2159	809	3612	190	
Samp. Catch (t.)	5.3	4.5	38.0	24.8	72.6	1.6	
Total catch (t)*	19.2	94.7	107.1	148.8	369.7	34.5	
Depth range (m.)		40 – 200					40 – 200

\*Nominal catch

Table 17. Yellowtail flounder length distribution in the trawlers catch in 1999.

LENGTH (cm)	Div. 3N		Total
	Oct	Nov	
14 - 15	279		279
16 - 17	503		503
18 - 19	6641		6641
20 - 21	10937		10937
22 - 23	10671		10671
24 - 25	24189	52	24241
26 - 27	58787	64	58850
28 - 29	89007	1606	90613
30 - 31	123427	1668	125095
32 - 33	108794	10129	118924
34 - 35	61968	11211	73179
36 - 37	21382	18664	40046
38 - 39	17752	18622	36374
40 - 41	9376	13771	23147
42 - 43	7591	9080	16671
44 - 45	5359	7154	12513
46 - 47	3348	1039	4387
48 - 49	671	523	1194
50 - 51	224	20	244
52 - 53	224	22	246
54 - 55		10	10
Total	561131	93636	654767
Fish measured	1088	403	1491
Nº of samples	6	2	8
Samp. Catch (t.)	7,5	8,5	15,9
Total catch (t)*	82,9	141,9	224,7
Depth range (m.)	40 - 200		

\*Nominal catch

Table 18. Cod length distribution in the trawlers catch in 1999.

LENGTH (cm)	Div. 3N
	Total
54 - 56	95
57 - 59	
60 - 62	
63 - 65	
66 - 68	501
69 - 71	203
72 - 74	1205
75 - 77	2085
78 - 80	1597
81 - 83	2098
84 - 86	2085
87 - 89	4088
90 - 92	3587
93 - 95	1692
96 - 98	5577
99 - 101	2301
102 - 104	2504
105 - 107	3790
108 - 110	2301
111 - 113	1597
114 - 116	1706
117 - 119	1002
120 - 122	907
123 - 125	907
126 - 128	95
129 - 131	406
132 - 134	95
135 - 137	95
Total	42521
Fish measured	190
Samp. Catch (t.)	3,0
Total catch (t)*	398,0
Depth range (m.)	40 - 200

\*Own estimates