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Spanish Research Report for 1996

by

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**Fishing activity**

The Spanish fleet fishing in NAFO Convention area includes three components: pair-trawlers, traditionally fishing for cod and in those previous years also for Greenland halibut, small trawlers fishing for flatfish, and large trawlers fishing for Greenland halibut. In 1996, pair-trawlers activity have been very limited, and all the trawlers were fishing for Greenland halibut in the deep water zones (beyond 700 m.) of Divisions 3LMNO. It is remarkable that the catches of unregulated species, mainly skates and sharks increased notably in 1996, indicating a change of strategy in this fleet.

**- Pair-trawler fishery**

In 1996 only two pair-trawlers have been fishing, one of them for cod in Division 3M and the other for Greenland halibut in Divisions 3LM. Any scientific observer were on board this fleet.

**- Trawler fishery for Greenland halibut**

In 1996, there were 27 trawlers involved in this fishery. A total of 6 scientific observers were on board this fleet, 5 of them in the large trawlers and 1 in the smaller ones. Observers on board those vessels covered mainly the fishing activity in the first half of the year, and the 3LM divisions, as only one of them remained in the second half of the year.

A total of 510 length frequency samples of the hauls have been made by the observers. This includes Greenland halibut and by-catch and discard species. The length distributions of Greenland halibut, roughhead grenadier, witch flounder, American plaice and rock grenadier catches are presented in tables 1 to 5 respectively. A total of 1023 Greenland halibut and 527 roughhead grenadier otoliths have been taken. The Greenland halibut catch at age in Divisions 3LM and 3NO is presented in table 6.

A total of 180 biological samples of Greenland halibut and by-catch species have been taken. This includes recording weight at length, sex-ratio and maturity stages and collecting data and material for feeding studies.

**Research studies**

In April 1996, an EU (Spain and Portugal) longline survey have been carried out in Divisions 3L, 3M and 3N. A total of 64 hauls have been performed at depths from 562 to 3028 meters. During this survey, the bathymetric distribution of the main deep water commercial species in the NAFO

Regulatory Area have been studied, and their bathymetric limits located. Selectivity studies with different kind of baits, tagging on Greenland halibut and biological studies on Greenland halibut and roughead grenadier were also carried out, including growth, sexual maturity and fecundity. The results from this survey are presented in SCR Doc. 96/34.

In May 1996, a bottom trawl survey have been made in Divisions 3NO. A total of 112 valid hauls with an stratified design have been performed, to a depth of 1200 meters. The results of this survey have been presented in SCR 96/49, which includes abundance indices of american plaice, yellowtail flounder, witch flounder and Greenland halibut.

In July 1996, an EU (Spain and Portugal) stratified bottom trawl survey have been made in Flemish Cap (Division 3M). A total of 117 valid hauls have been carried out to a depth of 720 meters. The results of this survey include abundance indices of the main commercial species, and age distributions for cod, the three species of *Sebastes*, american plaice and Greenland halibut and are presented in the SCR 97/XX. Data on length distributions of shrimp from this survey are presented in SCR Doc 96/94. Feeding studies on the main species and collection of material for histological assessment of sexual maturity of cod, redfish, Greenland halibut and roughead grenadier were also carried out.

Table 1.- Length distributions of the Greenland halibut catches from the Spanish trawler fleet by month in Divisions 3L, 3M and 3NO in 1996.

GREENLAND HALIBUT LENGTH DISTRIBUTION OF CATCHES (.000)													
Division 3L													
LENGTH	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	TOTAL
26 - 27	0	0	0	0	1				0	0	0	0	1
28 - 29	0	0	0	1	2				0	0	0	0	4
30 - 31	0	1	1	2	6				0	0	3	1	18
32 - 33	0	5	3	13	8				0	3	6	5	53
34 - 35	2	11	16	22	23				0	8	22	16	143
36 - 37	2	27	37	46	42				4	19	38	35	300
38 - 39	10	55	54	59	52				7	36	62	60	475
40 - 41	20	95	80	74	59				16	43	86	90	676
42 - 43	35	135	83	59	60				24	43	85	95	742
44 - 45	34	137	83	64	50				38	41	73	86	727
46 - 47	44	111	59	31	35				45	36	61	73	595
48 - 49	29	86	41	23	23				30	30	40	48	419
50 - 51	24	61	27	14	15				38	30	23	30	315
52 - 53	20	40	18	8	10				21	23	15	19	208
54 - 55	10	30	13	5	7				19	15	10	12	145
56 - 57	5	23	8	5	4				10	12	8	8	98
58 - 59	5	14	5	2	2				10	7	5	6	67
60 - 61	2	9	5	2	2				4	6	2	4	42
62 - 63	1	7	2	2	1				2	3	1	2	24
64 - 65	1	3	2	0	0				2	2	1	1	14
66 - 67	1	3	2	1	0				2	1	0	0	12
68 - 69	0	2	1	1	0				1	1	0	0	8
70 - 71	1	2	1	1	0				1	1	0	0	8
72 - 73	0	1	0	0	0				1	1	0	0	4
74 - 75	0	0	1	0	0				1	0	0	0	3
76 - 77	0	1	1	0	0				0	1	0	0	3
78 - 79	0	0	0	0	0				0	0	0	0	2
80 - 81	1	1	0	0	0				1	0	0	0	2
82 - 83	0	1	0	0	0				0	1	0	0	2
84 - 85	0	1	0	0	0				0	0	0	0	1
86 - 87	0	1	0	0	0				0	0	0	0	2
88 - 89	0	0	0	0	0				0	0	0	0	1
90 - 91	0	0	0	0	0				0	0	0	0	1
92 - 93	0	0	0	0	0				0	0	0	0	0
94 - 95	0	0	0	0	0				0	0	0	0	0
96 - 97	0	0	0	0	0				0	0	0	0	0
98 - 100	0	0	0	0	0				0	0	0	0	0
TOTAL	246	863	545	434	404				275	363	542	590	5114
Samp. fish	752	7324	7531	1209	2460				569	3018	3028	4370	30261
Samp. catch (t)	16.8	106.4	57.7	8.5	17.4				5.2	20.0	24.8	57.8	314.6
Catch (t)	225.1	755.0	423.1	289.1	269.3	183.0	188.1	303.8	278.2	320.2	387.3	438.5	4060.6

Table 1.- (Cont.)

GREENLAND HALIBUT LENGTH DISTRIBUTION OF CATCHES (.000)													
Division 3 M													
LENGTH	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
26-27	0	0	0	0	0				0	0			0
28-29	0	0	0	0	0				0	0			0
30-31	0	0	1	0	0				0	0			1
32-33	1	1	2	0	1				0	0			4
34-35	2	4	10	2	2				0	0			19
36-37	3	6	19	3	4				0	1			37
38-39	10	13	29	7	8				1	1			67
40-41	20	30	52	18	11				1	3			136
42-43	21	33	57	27	18				3	5			163
44-45	24	39	54	28	20				4	5			175
46-47	12	43	43	30	20				6	7			162
48-49	11	30	27	19	15				5	10			117
50-51	14	40	20	18	11				6	14			122
52-53	8	21	14	9	7				6	10			74
54-55	6	14	11	10	6				5	8			60
56-57	4	8	7	8	5				3	8			43
58-59	4	13	5	7	3				2	4			38
60-61	3	5	4	6	2				1	3			24
62-63	3	7	3	4	1				0	3			21
64-65	1	4	3	2	1				0	1			12
66-67	3	1	1	1	1				1	1			9
68-69	0	1	1	1	0				1	1			5
70-71	0	1	1	0	0				0	0			3
72-73	0	3	0	1	0				0	0			5
74-75	0	1	0	0	0				0	1			3
76-77	0	1	0	0	0				0	0			1
78-79	0	2	0	0	0				0	0			2
80-81	1	0	0	0	0				0	0			2
82-83	0	1	0	0	0				0	0			1
84-85	0	1	0	0	0				0	0			2
86-87	0	0	0	0	0				0	0			0
88-89	0	0	0	0	0				0	0			1
90-91	0	1	0	0	0				0	0			1
92-93	0	0	0	0	0				0	0			0
94-95	0	0	0	0	0				0	0			0
96-97	0	0	0	0	0				0	0			0
98-100	0	0	0	0	0				0	0			0
TOTAL	147	322	364	205	137				47	88			1311
Samp. fish	287	666	4448	467	2028				627	631			9154
Samp. catch (t)	2.6	7.3	38.5	3.4	18.6				5.2	4.6			80.3
Catch (t)	135.2	340.5	301.0	203.1	123.8	48.6	38.0	78.4	58.5	111.1	54.8	71.3	1564.4

Table 1.- (cont.)

GREENLAND HALIBUT LENGTH DISTRIBUTION OF CATCHES (,000)													
Division 3NO													
LENGTH	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
26 - 27		0							0				0
28 - 29		0							0				0
30 - 31		0							2				9
32 - 33		0							8				26
34 - 35		1							17				56
36 - 37		2							34				114
38 - 39		2							37				127
40 - 41		5							38				139
42 - 43		8							41				157
44 - 45		8							49				185
46 - 47		7							40				150
48 - 49		5							25				97
50 - 51		3							20				74
52 - 53		4							10				43
54 - 55		4							6				31
56 - 57		3							5				27
58 - 59		3							6				28
60 - 61		3							4				22
62 - 63		1							1				8
64 - 65		2							1				7
66 - 67		2							1				12
68 - 69		1							2				9
70 - 71		1							0				6
72 - 73		2							1				8
74 - 75		1							0				4
76 - 77		1							0				4
78 - 79		1							1				4
80 - 81		1							0				2
82 - 83		1							0				4
84 - 85		1							0				4
86 - 87		0							0				1
88 - 89		0							0				1
90 - 91		0							0				0
92 - 93		1							0				2
94 - 95		0							0				0
96 - 97		0							0				0
98 - 100		0							0				0
TOTAL		75							350				1360
Samp. fish		483							1008				1491
Samp. catch (t)		1.7							8.4				10.1
Catch (t)	146.3	110.8	84.0	0.0	0.6	77.7	167.7	99.2	269.5	151.8	84.7	24.0	1216.3

Table 2.- Length distributions of the roughead grenadier catches from the Spanish trawler fleet in Divisions 3L and 3M in 1996.

ROUGHEAD GRENAIER ( <i>Macrourus berglax</i> ) LENGTH DISTRIBUTION OF CATCHES (.000)		
LENGTH	Div. 3L	Div. 3M
8 - 9	1256	33
9,5 - 10,5	16538	1146
11 - 12	63013	7567
12,5 - 13,5	125817	18474
14 - 15	90751	21488
15,5 - 16,5	41450	14511
17 - 18	43963	14773
18,5 - 19,5	30878	12775
20 - 21	35170	7632
21,5 - 22,5	17690	3800
23 - 24	8080	1310
24,5 - 25,5	4815	983
26 - 27	4396	786
27,5 - 28,5	4815	721
29 - 30	4606	295
30,5 - 31,5	6385	786
32 - 33	314	197
34	209	33
TOTAL	500127	107307
Samp. fish	2723	1984
Samp. catch (t)	2.0	1.5
Catch (t)	207.8	48.6

Table 3.- Length distributions of the witch flounder catches from the Spanish trawler fleet by month in Divisions 3L and total of the year in 3M, in 1996.

WITCH FLOUNDER LENGTH DISTRIBUTION OF CATCHES													
Division 3L													
LENGTH	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
21 - 22		204	0	0	0							0	279
23 - 24		408	0	0	0							0	408
25 - 26		815	0	0	0							0	815
27 - 28		1630	7276	0	557							3496	12960
29 - 30		3872	14553	2324	650							16042	37441
31 - 32		9171	21829	17428	2135							17667	68251
33 - 34		7541	14553	25560	7148							21369	76191
35 - 36		9375	36382	22656	9375							30028	107816
37 - 38		13248	21829	25560	8726							23240	92604
39 - 40		14674	43659	23237	13274							32084	126928
41 - 42		19973	43659	36017	15409							31879	146937
43 - 44		18547	29106	33112	15316							31879	127960
45 - 46		18751	29106	32532	10582							24886	115856
47 - 48		13248	7276	17428	6126							19538	63617
49 - 50		10598	21829	8133	6776							14191	61528
51 - 52		7745	29106	15685	5755							5347	63638
53 - 54		4260	7276	7552	3806							16042	38956
55 - 56		4076	14553	8133	2785							3702	33249
57 - 58		815	0	1162	928							1851	4756
59 - 60		408	0	0	371							0	779
61 - 62		204	0	581	0							0	785
63 - 64		0	0	0	186							0	186
65 - 66		0	0	0	186							0	186
69 - 70		204	0	0	186							0	389
TOTAL		159787	341994	277099	110277							293282	1182514
Samp. fish		199	39	56	157							30	481
Samp. catch (t)		0.6	0.04	0.4	1.0							1.0	3.1
Catch (t)	16.1	129.0	283.4	214.6	91.4	26.1	16.5	46.4	33.5	39.3	160.1	215.2	1251.6

Table 3. - (cont.)

WITCH FLOUNDER LENGTH DISTRIBUTION OF CATCHES	
LENGTH	Division 3M
21 - 22	0
23 - 24	0
25 - 26	0
27 - 28	5307
29 - 30	10613
31 - 32	15920
33 - 34	31839
35 - 36	15920
37 - 38	37146
39 - 40	53065
41 - 42	31839
43 - 44	26533
45 - 46	26533
47 - 48	26533
49 - 50	5307
51 - 52	10613
53 - 54	0
55 - 56	0
57 - 58	0
59 - 60	5307
61 - 62	0
63 - 64	0
65 - 66	0
69 - 70	0
TOTAL	302471
Samp. fish	40
Samp. catch (t)	0.04
Catch (t)	207.3

Table 4. - Length distributions of the American plaice catches from the Spanish trawler fleet by month in Divisions 3L and total of the year in 3M and 3NO, in 1996.

AMERICAN PLAICE LENGTH DISTRIBUTION OF CATCHES													
Division 3L													
LENGTH	JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
18 - 19	0	162	0	0	0								258
20 - 21	0	836	0	0	0								1333
22 - 23	0	2939	0	0	241								5072
24 - 25	0	8063	1317	0	1227								16914
26 - 27	397	16019	2371	609	5712								40035
28 - 29	1191	27750	9483	3044	6958								77219
30 - 31	1390	30042	17912	8220	11363								109907
32 - 33	2581	26051	26605	10655	14922								128863
34 - 35	4367	19201	25288	16439	13394								125475
36 - 37	3573	15479	19493	14004	12328								103451
38 - 39	2779	9412	16595	7306	7341								69256
40 - 41	1787	5313	8166	9437	4726								46926
42 - 43	1191	2859	5532	2435	2574								23266
44 - 45	397	1861	6849	2131	2031								21158
46 - 47	199	701	2371	913	764								7890
48 - 49	199	81	1317	609	342								4062
50 - 51	199	81	527	609	181								2545
52 - 53	199	54	0	304	181								1177
56 - 57	0	270	0	304	0								915
TOTAL	20446	167172	143823	77020	84286								785722
Samp. fish	114	2176	563	208	485								3546
Samp. catch (t)	0.05	1.9	0.2	0.1	1.6								3.9
Catch (t)	9.3	51.6	60.2	34.4	31.8	17.3	10.9	7.7	5.6	2.2	32.2	35.4	298.8

Table 4.- (cont.)

AMERICAN PLAICE LENGTH DISTRIBUTION OF CATCHES		
LENGTH	Division 3M	Division 3NO
18 - 19	0	0
20 - 21	0	0
22 - 23	0	32601
24 - 25	5613	52933
26 - 27	0	134347
28 - 29	5613	209864
30 - 31	16839	235767
32 - 33	33678	116387
34 - 35	39291	42856
36 - 37	22452	29993
38 - 39	33678	21428
40 - 41	0	6431
42 - 43	16839	10699
44 - 45	0	0
46 - 47	0	4297
48 - 49	0	2134
50 - 51	0	2134
52 - 53	0	0
56 - 57	0	0
TOTAL	174001	901873
Samp. fish	31	438
Samp. catch (t)	0.01	7.6
Catch (t)	69.2	226.2

Table 5.- Length distributions of the rock grenadier (*Coryphaenoides rupestris*) catches from the Spanish trawler fleet by month in Divisions 3M and total of the year in 3L, in 1996.

ROCK GRENADIER ( <i>Coryphaenoides rupestris</i> ) LENGTH DISTRIBUTION OF CATCHES	
LENGTH	Division 3L
5 - 6	31379
6,5 - 7,5	431458
8 - 9	1192394
9,5 - 10,5	988432
11 - 12	345167
12,5 - 13,5	86292
14 - 15	15689
15,5 - 16,5	7845
17 - 18	0
18,5 - 19,5	0
20	0
TOTAL	3098656
Samp. fish	404
Samp. catch (t)	0.2
Catch (t)	1636.1



Table 5.- (cont.)

ROCK GRENADIER ( <i>Coryphaenoides rupestris</i> ) LENGTH DISTRIBUTION OF CATCHES													
Division 3M													
LENGTH	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	JULY	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL
5 - 6			0		587				524	484	284		5261
6,5 - 7,5			0		1565				3295	5395	1846		33878
8 - 9			0		7436				7698	18640	18606		146639
9,5 - 10,5			44404		11153				3804	12761	19743		257182
11 - 12			55505		8610				4058	6398	13067		245349
12,5 - 13,5			44404		5087				1797	3009	7244		172289
14 - 15			11101		2544				958	2628	6249		65736
15,5 - 16,5			0		978				494	899	2415		13399
17 - 18			0		391				0	553	1846		7814
18,5 - 19,5			0		0				30	0	0		84
20			0		0				30	0	0		84
TOTAL			155415		38352				22689	50766	71301		947716
Samp. Fish			14		196				782	870	460		2322
Samp. Catch (t)			0.02		0.2				1.1	1.1	0.5		2.8
Catch (t)	90.8	209.6	174.9	166.3	35.8	36.6	15.7	28.3	16.3	36.6	70.9	54.7	936.4

Table 6.- Greenland halibut catch at age in the Spanish trawler fishery in 1996

GREENLAND HALIBUT CATCH AT AGE			
AGE	Div. 3LM	Div. 3NO	TOTAL
2	790	0	790
3	167899	55730	223629
4	943901	233361	1177262
5	1241830	261298	1503128
6	1715987	326107	2042093
7	1269858	235165	1505023
8	603063	109677	712740
9	258978	52860	311839
10	117250	32902	150152
11	47270	18376	65645
12	24050	11219	35269
13	13468	9587	23056
14	6752	4581	11333
15	6042	4304	10345
16	4110	3079	7189
17	2602	1777	4379