



SCIENTIFIC COUNCIL MEETING – JUNE 1999

SPANISH RESEARCH REPORT FOR 1998

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 currently fishing for Greenland halibut, small trawlers fishing for flatfish in the past, and large trawlers. Both types of trawlers are now fishing for Greenland halibut.

- Pair – trawler fleet.

Fishing activity of this fleet was very reduced in 1998. Only two pair-trawlers have been fishing for Greenland halibut in 1998, in the deep water zones (beyond 800 m) of Divisions 3LM (mainly 3L), in February and March, but without scientific observer.

- Trawler fleet.

In 1998, 29 trawlers have been involved in the Greenland halibut fishery. A total of 5 scientific observers were on board this fleet.

Sampling includes Greenland halibut and by-catch and discard species. The length distributions of Greenland halibut, roughhead grenadier, witch flounder, American plaice, yellowtail flounder, thorny skate and redfish in the catches are presented in tables 1 to 7 respectively. Otoliths of Greenland halibut and roughhead grenadier have been taken. The Greenland halibut and roughhead grenadier catch at age are presented in table 8 and 9 respectively. 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 and reproductive studies.

Research studies

In May 1998, a bottom trawl survey have been conducted in Divisions 3NO Regulatory Area. A total of 124 hauls with an stratified design have been performed, to a depth of 1520 meters. The results of this survey have been presented in SCR 98/48, which includes abundance indices and length distributions of american plaice, yellowtail flounder, witch flounder and Greenland halibut .

In July 1998, an EU (Spain and Portugal) stratified bottom trawl survey have been made in Flemish Cap (Division 3M). A total of 119 valid hauls have been carried out to a depth of 709 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 99/XX. Data on length distributions of shrimp from this survey are presented in SCR Doc 98/81. Feeding studies on the main species and collection of hydrography 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

Del Río, J. L. (1998).- Northern shrimp (*Pandalus borealis*) on Flemish Cap in July-August 1998. *NAFO SCR Doc. 98/81*.

Durán, P. , X. Paz and E. Cárdenas (1988).- Results from the 98 Spanish bottom trawl survey in the NAFO Regulatory Area for Divisions 3NO. *NAFO SCR Doc. 98/48*.

Vázquez, A. (1999).- Results from the bottom trawl survey of Flemish Cap in 1998. *NAFO SCR Doc. 98/XX*.

Table 1.- Greenland halibut length distributions in the trawl commercial catches in Div. 3L, 3M and 3N in 1998.

Greenland halibut											
Div. 3L											
LENGTH	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Total
24 – 25							83	45			128
26 – 27		2581	493	139	67	319	662	231			4492
28 – 29		8023	2345	391	561	2815	1312	1209			16656
30 – 31	1500	7138	2773	1214	1416	4225	6089	3006			27361
32 – 33	12037	16084	10929	2715	2418	7289	9214	3263			63949
34 – 35	30674	36190	25635	7668	2835	14856	18450	9528			145836
36 – 37	55760	48134	36301	12594	3672	18323	25846	14715	15742		231087
38 – 39	53360	47342	39799	15721	4596	23560	24287	17359	70840		296864
40 – 41	49310	32330	34254	19802	3340	16876	23106	19699	31484	3625	233826
42 – 43	56247	24729	29155	15461	3727	13359	18821	23142	31484	7165	223290
44 – 45	34274	18761	23468	15497	3299	8653	15534	21058	23613	4838	168995
46 – 47	22611	16725	20430	14437	1798	7548	12933	25496	23613	7921	153512
48 – 49	14549	12136	13287	9441	1811	4673	11874	19508	7871	6765	101915
50 – 51	7537	10747	7795	8180	1426	5158	10488	21607	15742	9091	97771
52 – 53	5512	7467	7763	6658	816	2436	9753	16088	31484	6437	94414
54 – 55	5550	6560	5521	4259	553	3550	7449	15807	23613	4710	77572
56 – 57	9037	5280	3889	1744	618	1322	5903	12214	31484	10975	82466
58 – 59	10012	1900	2641	1449	470	957	4281	7093		7036	35839
60 – 61	5025	3746	2699	813	260	1054	2882	6541		4867	27887
62 – 63	4537	1541	1318	633	254	527	1890	3889	7871	3012	25472
64 – 65	2512	1615	1269	75	248		2719	4238		2854	15530
66 – 67	4012	501	1300	225	210		678	2134		2655	11715
68 – 69		272	499	235	67		148	2287		1128	4636
70 – 71	5512	488	687		34		403	1805		400	9329
72 – 73	3525	207	886	75	34		598	1046		442	6813
74 – 75		281	552	75	67		115	2098		1527	4715
76 – 77		185	1184		61		299	442		842	3013
78 – 79		306	563	160	61		299	887		200	2476
80 – 81	1012		510					846			2368
82 – 83	1500		619	75			299	218			2711
84 – 85	1500		613				299	421			2833
86 – 87			183				299	230			712
88 – 89			313	85				146			544
90 – 91		613						108			721
92 – 93								220			220
94 – 95											
96 – 97								146			146
Total	397105	311882	279673	139821	34719	137500	217013	258770	314841	86490	2177814
Fish measured	320	1370	1588	2139	798	375	1901	2846	40	390	11767
Samp. catch (t)	5.3	19.5	25.4	42.6	12.7	1.8	9.2	30.2	0.4	1.3	148.5
Catch (t)	327.5	207.4	212.9	106.6	24.6	85	176.3	280.9	273.6	119.1	

Table 1 (cont.)

Greenland halibut									
Div. 3M									
LENGTH	Jan.	Feb.	March	April	May	July	Aug.	Oct.	Total
26 - 27						20			20
28 - 29		196	472	499		120			1287
30 - 31	405	300	1844	1447	503	60		896	5455
32 - 33	810	3658	4614	3336	1579	279		1215	15491
34 - 35	5262	13323	13778	13159	4846	507		1680	52555
36 - 37	10120	28331	21294	29610	6858	540		4202	100955
38 - 39	10929	33266	23420	38432	11633	964		8589	127233
40 - 41	9310	38822	29554	37318	11130	1248	1585	32384	161351
42 - 43	9310	30588	29215	37594	14471	2451	628	29248	153505
44 - 45	6881	31840	24151	39288	16300	1361	2773	42809	165403
46 - 47	6072	25178	19767	27095	12925	1393	2446	23222	118098
48 - 49	3643	19759	23207	21381	11093	2012	1585	25739	108419
50 - 51	3238	15396	14889	18876	8329	1878	3846	18145	84597
52 - 53	2429	11816	17434	13663	4954	1814	5658	4673	62441
54 - 55	3643	7713	14525	8703	2872	1936	2863	8784	51039
56 - 57	1214	8591	5461	6315	1293	1886	1949	2603	29312
58 - 59		6227	4028	7688	2369	1545	824	4758	27439
60 - 61	1214	4329	2337	1786	503	1088	1785	2984	16026
62 - 63		1495	2123	1599		1255	1748	1610	9830
64 - 65		1898	945	879		831	824	1051	6428
66 - 67	810	730	1204	885		780	856	155	5420
68 - 69		738	925	857	108	545	1320	116	4609
70 - 71		1125	472	287	108	143	1288	2130	5553
72 - 73	405	691		221		108		77	1502
74 - 75			452	411		315	396	39	1613
76 - 77		451	472	249		265	232		1669
78 - 79	405	1012	452	0			196		2065
80 - 81		115		0		149	391		655
82 - 83		267	452	0		149			868
84 - 85		69		0		108			177
86 - 87		69		0		165			234
88 - 89	405			424	108				937
Total	76505	287993	257487	312002	111982	25915	33193	217109	1322186
Fish measured	189	1644	678	1377	341	443	121	1797	6590
Samp. catch (t)	5.4	41.8	11.9	27.3	6.3	9.4	3.1	6.8	111.8
Catch (t)	60.9	242.4	221.3	250.7	88.9	37.1	53.7	174.7	

Table 1 (Cont.)

Greenland halibut						
Div. 3N						
LENGTH	June	July	Aug.	Sept.	Oct.	Total
20 – 21	50					50
24 – 25	228				190	418
26 – 27	583	108		51	1453	2196
28 – 29	817	148		360	5422	6746
30 – 31	2574	1161		370	5278	9382
32 – 33	2756	1247		2732	4929	11665
34 – 35	5205	2019	1284	6873	8097	23478
36 – 37	6582	3374	5444	15394	19420	50214
38 – 39	7375	5314	8650	18284	25457	65081
40 – 41	8902	4440	16993	18616	27323	76274
42 – 43	5670	3040	16759	16989	23265	65723
44 – 45	4732	2269	12580	15350	20502	55432
46 – 47	3837	1489	14949	11610	18325	50210
48 – 49	2866	962	9469	8257	11585	33139
50 – 51	1744	883	11245	7363	6862	28096
52 – 53	1279	876	8799	3350	2224	16529
54 – 55	223	159	4513	3253	3208	11356
56 – 57	573	118	3586	2791	2678	9747
58 – 59	325	27	1088	1311	990	3741
60 – 61	276	64	3110	1261	195	4906
62 – 63	61	64	1818	262	339	2544
64 – 65	92		624	619	272	1607
66 – 67	80			157		238
68 – 69	30		716	615	541	1902
70 – 71	50		358			408
72 – 73		27	825	80		932
74 – 75		27	566			593
76 – 77		27	358			385
78 – 79			208			208
Total	56910	27843	123942	135948	188555	533198
Fish measured	1099	617	320	2279	1428	5743
Samp. catch (t)	4.2	1.9	6.6	12.9	3.7	29.2
Catch (t)	35.1	17	123.3	96.2	106.1	

Table 2.- Roughhead grenadier length distributions in the trawl commercial catches in Div. 3L and 3M in 1998.

Roughhead grenadier															
LENGTH	Div. 3M						Div. 3L								
	Feb.	March	April	May	July	Total	Jan.	Feb.	March	April	May	June	July	Aug.	Total
7 – 8														1438	1438
8.5 - 9.5		949	1845			3301				1165	54		410	3306	4935
10 – 11	6802	15100	13202	514	874	43111		1327	8924	14854	198	382	5943	12761	44389
11.5 - 12.5	13486	19375	28249	514	3935	77451		10613	31236	23354	397	901	11226	13345	91071
13 – 14	56133	45667	54196	2057	2186	189305	6352	38474	89244	41528	731	1678	24372	19550	221931
14.5 - 15.5	144024	144966	138419	11312	10056	530180	41290	143282	227573	89118	1606	4462	46225	26553	580109
16 – 17	112940	131013	120923	21596	12242	471037	89990	133995	87013	64636	1325	4732	64872	31828	478392
17.5 - 18.5	48634	81334	77445	13369	6121	268060	48701	47761	33467	32249	851	2318	27626	25267	218240
19 – 20	35834	56538	53240	17482	6121	199909	28585	19900	17849	22792	755	918	18958	16891	126648
20.5 - 21.5	21428	24666	23248	8227	6558	99387	17998	9287		11078	395	258	5540	14368	58923
22 – 23	14283	7681	19877	6684	3498	61459	4235	1327	4462	7235	891	70	1829	8829	28879
23.5 - 24.5	10112	3200	9477	6684	1312	36369	1059			7831	299	70	2185	5451	16896
25 – 26	2513	1424	8873	5656	437	22332		1327		1272	198		444	3343	6583
26.5 - 27.5	1829	475	1526	2571	874	8595				812	257		854	2345	4268
28 – 29	3487	766	2449	5142	874	15026				2647	36			1197	3880
29.5 - 30.5	915	475	4294	3085	437	10876				599	18			1916	2533
31 – 32	1829	743	1526	4628	437	10826				2259	102			2731	5092
32.5 - 33.5				2571	437	3554	1059			424				2635	4118
34 – 35				1543		1822				424				2635	3059
35.5 - 36.5				1028		1215					18		410	1197	1624
37 – 38				514	437	1124									
38.5 - 39.5					437	517									
Total	474249	534372	558789	115177	57273	2055456	239269	407293	499768	324277	8131	15789	210894	197586	1903010
Fish meas.	713	969	463	224	131	2500	226	307	224	695	304	274	572	332	2934
Samp. catch (t)	0.928	1.005	0.661	0.562	0.435	3.592	0.7	0.5	0.4	0.8	1.4	0.9	2.1	0.2	7.1
Catch (t)	240.7	254.3	296.3	121.1	40.8		130	173.5	184.7	158	5.4	6.7	96.7	135.3	

Table 3.- Witch flounder length distributions in the trawl commercial catches catch in Div. 3L, 3M and 3NO in 1998.

Witch flounder													
	Div. 3L					Div. 3M				Div. 3NO			
LENGTH	Feb.	March	April	May	Total	Jan.	March	June	Total	July	Aug.	Sept.	Total
24 – 25	32				32								
26 – 27	87		173		260			38	38				
28 – 29	1076	772	604		2452	1180	412	38	1630				
30 – 31	1574	1586	2418	9	5587	1180	3297	229	4706		239		239
32 – 33	2842	2428	3627	52	8949	5899	8242	497	14638	3	1609	489	2101
34 – 35	3003	2937	4749	86	10775	3933	9478	956	14367	9	2979	1957	4945
36 – 37	2772	1308	4231	130	8441	1573	9890	268	11731	14	6914	2936	9864
38 – 39	3420	3663	3540	199	10822	5899	11951	382	18232	28	4588	2447	7063
40 – 41	4219	4501	1986	234	10940	5113	14836	650	20599	40	5783	5383	11206
42 – 43	3384	3247	1986	182	8799	6686	11539	1032	19257	17	2653	3915	6585
44 – 45	3381	3216	691	261	7549	5113	12775	459	18347	37	2653	979	3669
46 – 47	1632	2571	691	197	5091	1573	7418	191	9182	40	805	1468	2313
48 – 49	1423	1648	259	169	3499	393	3297	306	3996	14	2262		2276
50 – 51	1217	1398	604	128	3347	1180	3297	153	4630	6	1131		1137
52 – 53	1009	1000	345	117	2471	787	2473		3260	14			14
54 – 55	582	1077	691	105	2455	393	2473	38	2904	3	566		569
56 – 57	394	251	432	32	1109	1180	412		1592	3			3
58 – 59	236	143	345	10	734								
60 – 61	87		86		173								
62 – 63								38	38				
Total	32370	31746	27458	1911	93485	42082	101790	5275	149147	228	32182	19574	51984
Fish meas.	1006	500	318	332	2156	107	247	138	492	80	80	40	200
Samp. catch (t)	2.7	0.6	3.0	1.3	7.5	0.6	0.8	0.1	1.4	0.1	0.3	0.3	0.6
Catch (t)	23.8	24.6	16.9			29.6	74.6	3.6		0.2	16.6	10.1	

Table 4.- American plaice length distributions in the trawl commercial catches catch in Div. 3L and 3NO in 1998.

LENGTH	American plaice									
	Div. 3L					Div. 3NO				
	Jan.	Feb.	March	May	Total	June	Aug.	Sept.	Oct.	Total
20 – 21			192	58	250					
22 – 23	691		852	109	1652					
24 – 25	1037		2352	422	3811					
26 – 27	2419	200	3563	803	6985	16			529	545
28 – 29	5183	2402	7115	627	15327	49		95	2380	2524
30 – 31	9675	4803	8590	1023	24091	49	576	978	2801	4404
32 – 33	7257	6805	7859	986	22907	66	2410	4375	3624	10475
34 – 35	9675	10007	8798	1170	29650	230	1941	9169	2546	13886
36 – 37	6911	7405	8766	925	24007	394	10066	15144	8619	34223
38 – 39	4492	7605	6486	738	19321	509	13522	18710	10362	43103
40 – 41	3801	5604	4677	502	14584	575	7762	13371	4466	26174
42 – 43	2073	2802	3685	302	8862	164	3988	9431	5299	18882
44 – 45	2073	2201	1457	133	5864	82	1258	6298	3046	10684
46 – 47	1728	400	859	103	3090	16	3199	2598	1704	7517
48 – 49	1037	1201	388	44	2670	16	576	2658	2253	5503
50 – 51		200	288	22	510	16	3093	2541	2233	7883
52 – 53						49		899	1185	2133
54 – 55						16	1365	2167	519	4067
56 – 57								612	784	1396
58 – 59		200			200			765	911	1676
60 – 61							576			576
62 – 63										
64 – 65										
66 – 67								800		800
Total	58052	51835	65927	7967	183781	2247	50332	90611	53261	196451
Fish meas.	168	259	903	401	1731	137	80	516	403	1136
Samp. catch (t)	2.9	2.8	12.7	4.0	22.4	0.1	2.2	8.8	1.8	12.9
Catch (t)	24.4	25.2	26.7	3		1.3	39	71.2	30.3	

Table 5.- Yellowtail length distributions in the trawl commercial catch in Div. 3NO in 1998.

LENGTH	Aug.	Sept.	Oct.	Total
26 – 27			2390	2390
28 – 29			9560	9560
30 – 31	682	12139	13544	26365
32 – 33	682	23331	30275	54288
34 – 35	2729	24209	31868	58807
36 – 37	3411	17000	22308	42719
38 – 39	5458	17789	27885	51132
40 – 41	3411	15431	10357	29199
42 – 43	5458	6075	5577	17110
44 – 45	2729	2676	3187	8592
46 – 47	2047	1521	1593	5162
48 – 49	682			682
50 – 51			797	797
Total	27289	120171	159341	306803
Fish meas.	40	119	200	359
Samp. catch (t)	4.7	7.9	2.0	14.6
Catch (t)	19.5	60.4	62.9	

Table 6.- Thorny skate length distribution in the trawl catch (March) in Div. 3NO in 1998.

LENGTH	Div. 3NO
30 – 31	9095
32 – 33	9095
34 – 35	38653
36 – 37	56843
38 – 39	93222
40 – 41	63664
42 – 43	47748
44 – 45	40927
46 – 47	29558
48 – 49	27285
50 – 51	25011
52 – 53	15916
54 – 55	13642
56 – 57	9095
58 – 59	13642
60 – 61	4547
62 – 63	2274
64 – 65	6821
66 – 67	4547
72 – 73	2274
74 – 75	2274
76 – 77	2274
Total	518407
Fish meas.	228
Samp. catch (t)	0.5
Catch (t)	620.4

Table 7.- Redfish length distribution from the trawl commercial catches in Div. 3L and 3NO in 1998.

LENGTH	Redfish									
	Div. 3NO					Div. 3L				
	June	Aug.	Sept.	Oct.	Total	Feb.	March	April	July	Total
18 – 19	4965				4965					
20 – 21	57922		117		58039					
22 – 23	86056		676	232	86964	734	2968	391	0	4093
24 – 25	26479	87950	1289	928	116646	11908	12192	8082	579	32761
26 – 27	3310	264480	3611	2784	274185	34480	35101	20676	1852	92109
28 – 29		159679	5906	5684	171269	24869	23392	11042	3935	63238
30 – 31	1655	115486	6258	5220	128619	8792	9718	4290	3588	26388
32 – 33	1655	181986	8652	4524	196817	7165	6706	1612	2199	17682
34 – 35		75560	8476	3248	87284	3675	1686	1240	926	7527
36 – 37		24806	2389	696	27891	245	1459	234	810	2748
38 – 39		964	623		1587	245	732		579	1556
40 – 41		167	1463		1630	215			116	331
42 – 43			735		735					
46 – 47		335			335			117	116	233
Total	182042	911413	40195	23316	1156966	92328	93954	47684	14700	248666
Fish measured	138	160	360	201	859	402	458	515	127	1502
Samp. catch (t)	2.4	18.7	2.2	0.3	23.7	2.2	3.5	1.7	0.2	7.5
Catch (t)	39.7	296.8	19.9	9.5		31.3	31.6	15.3	6.5	

Table 8.- Greenland halibut catch at age in 1998.

AGE	Div. 3L	Div. 3M	Div. 3N
1			30
2	13400	1466	5470
3	182185	59573	39987
4	338490	143147	73092
5	405101	230597	105918
6	412670	307372	124145
7	364790	286955	103256
8	208609	155415	46812
9	123210	70508	19171
10	45199	27340	6895
11	28182	14601	3524
12	19861	9844	2183
13	17182	7790	1614
14	7933	2977	574
15	5164	2063	290
16	3392	1692	208
17	1669	560	22
18	474	234	9
19	182	50	
20	120		

Table 9.- Roughhead grenadier catch at age in 1998.

AGE	3L	3M
2	730	200
3	10525	8340
4	35872	33204
5	44459	39387
6	178629	155533
7	457761	416870
8	637271	631802
9	174442	194161
10	144682	186149
11	69193	101545
12	64942	114211
13	44113	84425
14	12418	27954
15	8849	24770
16	10914	19988
17	8207	16917