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Spanish Research Report for 1989

by

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Subarea 3

Status of the Fisheries

Pair trawl fishery of cod

Cod catches and effort data are presented in Table 1. The derived catch-rate indices are presented in Table 2. Overall fishing effort had an intermediate value between those of 1987 and 1988. In Division 3L the catch has been reduced in a 31 % since 1988 with a fishing effort slightly lower than that applied then. In Division 3N the approximately same catch as in 1988 was achieved with a 41 % greater fishing effort.

By-catches are presented in Table 3. During 1989 there were three observers on board pair trawlers for periods of two months each. Sampling intensity of catch was:

	Div. 3L	Div. 3N
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Samples	17	30
Fish measured	4738	8041
Otoliths aged	630	1216
Cod catches (t)	11783	17430
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Estimates of the length and age composition of the catch in those months with samplings are presented in Tables 4 and 5. Figure 1 shows the age composition of the catch from 1985 to 1988.

Groundfish fishery of freezers

Catch and effort data are presented in table 6. Catch sampling was made on board by four observers during 1989. American plaice length and age composition of the catch estimated in months with samplings are presented in table 7 and 8. Length frequencies of yellowtail flounder, Greenland halibut, witch flounder, redfish and skates are presented in tables 9 to 13. Cod length and age composition of the catch in the last quarter are presented in table 14.

Special Research Studies

A fishing survey of Flemish Cap was carried out in July 1989. The survey had a bottom trawl stratified random design and 129 tows were made up to a depth of 720 meters (400 f.). Results of the survey are presented in the report (SCR Doc. 90/68) and it includes age composition for cod, American plaice and redfish (Sebastes spp and S. marinus) stocks.

Table 1. Cod nominal catches (t) and fishing effort (hours) of pair trawlers in 1989.

Month	3L				3N			
	PTB-4		PTB-5		PTB-4		PTB-5	
	catch	f	catch	f	catch	f	catch	f
JAN -	116	1378	599	1727	61	223	104	692
FEB -	318	1841	1050	2619	45	152	-	-
MAR -	658	1789	503	2065	30	225	6	140
APR -	113	811	69	514	157	619	90	136
MAY -	142	288	21	115	760	2916	233	703
JUN -	364	834	587	480	1555	4936	839	1983
JUL -	1274	1998	844	753	1898	2497	474	600
AUG -	615	748	27	55	1239	716	200	410
SEP -	346	584	277	267	1122	2449	461	528
OCT -	796	988	308	287	2026	2418	464	763
NOV -	529	491	963	853	1563	1553	86	209
DEC -	460	399	804	619	1045	190	345	378
Total	5731	12149	6052	10354	11501	18894	3302	6542

Table 2. Catch rate indices for cod derived from pair trawl catches.

	1982	1983	1984	1985	1986	1987	1988	1989
3L -		1.680	1.052	1.049	1.125	0.831	0.819	0.628
3M -		0.789	1.302	1.169	0.796	0.413		
3N -	0.520	0.698	1.053	0.576	0.467	0.510	0.626	0.480

Table 3. By-catches of the pair trawl cod fishery (tons).

	Div.:	3L	3NO	total
Haddock		-	12	12
Redfish		37	25	62
American plaice		86	226	312
Yellowtail flounder		-	-	-
Atlantic halibut		4	10	14
Wolffish		-	4	4
Skates		72	70	142
Cod catches		11783	14803	26586

Table 4. Length composition of pair trawler cod catches (x 10E-2).

Div. Month	3L				3N					
	MAR	APR	JUN	NOV	MAR	APR	MAY	JUN	OCT	NOV
24-26	24	4							90	
27-29	150	20		5	4			16	97	26
30-32	319	41		48	14		22	563	194	87
33-35	307	51		116	8	17	87	1850	333	315
36-38	343	39	654	261	8	33	195	1075	472	455
39-41	367	28	2550	411	7	50	298	566	673	857
42-44	325	14	3046	464	2	67	374	693	305	805
45-47	241	11	2640	396		175	505	544	305	700
48-50	181	10	1151	203		167	581	612	382	805
51-53	265	10	169	188		171	532	501	194	814
54-56	331	22	327	135		134	570	355	174	682
57-59	415	32	327	121	2	104	472	297	222	586
60-62	524	58	169	116	2	63	264	292	250	324
63-65	530	56	169	82	2	46	184	375	194	262
66-68	439	53		164	2	58	244	525	180	359
69-71	313	67	79	174	3	54	228	655	160	254
72-74	307	39		348	2	42	250	552	180	324
75-77	253	41		290	6	42	163	560	187	324
78-80	84	25		232	4	13	139	428	201	271
81-83	60	27		184	3	25	87	494	167	157
84-86	72	21		213	4	13	65	356	215	96
87-89	60	15		179	4	21	49	120	250	35
90-92	54	9		135	7	8	27	121	180	44
93-95	12	10		82	4		5	137	187	9
96-98	18	3		82	3	8	5	37	167	17
99-101		5		48	3	4		20	174	17
102-104	6			29	2			17	111	17
105-107	6			24	1				111	
108-110		2		43	1				76	
111-113				14	1				56	
114-116	6			29	1			9	42	
117-119				14	1				42	
120+				10					180	
total	6012	713	11281	4840	101	1315	5346	11770	6751	8642
fish meas.	2100	1175	394	1059	423	315	2914	2788	1002	1194
Catch (t)	1161	182	942	1492	36	247	993	2394	2490	1649

Table 5. Age composition of pair trawler cod catches (x 10E-2).

Div. Month	3L				3N					
	MAR	APR	JUN	NOV	MAR	APR	MAY	JUN	OCT	NOV
age										
2	247	46		24	8			61	430	79
3	1300	139	5336	812	33	99	570	3684	1666	2047
4	963	14	3012	966	3	481	1725	2362	1062	2598
5	1312	48	609	488		346	1432	1137	673	1645
6	1312	163	463	478	13	124	553	760	451	761
7	578			812		134	624	1675	639	997
8	211	24		701		104	461	1740	659	341
9	30	6		203		22	49	270	618	105
10	18			145		3	5	55	104	26
11				58						
12								9	42	
13									42	17
14										
15										
16+										
total	5971	440	9420	4687	57	1313	5419	11753	6386	8616
Catch (t)	1161	182	942	1492	36	247	993	2394	2490	1649

Table 6. Catches (t) and fishing effort of freezers in 1989.

	Div.:	3L	3M	3NO	total
Cod		196	378	474	1048
Redfish		75	211	199	485
American plaice		2837	2166	7746	12749
Yellowtail flounder		-	-	1126	1126
Atlantic halibut		17	3	32	52
Witch flounder		135	544	1985	2664
Skates		3206	396	9432	13034
Silver hake		-	-	10	10
White hake		-	-	239	239
Haddock		54	-	310	364
Squid (Illex)		-	-	1490	1490
Angler		-	-	96	96
hours fishing		11650	10799	41526	63975

Table 8. American plaice catch at age frequency (x 10E-3).

Div. Month	3L MAR		3M APR		APR		MAY		JUN		JUL		AUG		SEP		DEC				
	M	F	M	F	M	F	M	F	I	M	F	I	M	F	M	F	M	F			
	age		age		age		age		age		age		age		age		age				
2			1		67	58	130	105	1	3	1	14	1	5	32	13					
3			25	20	364	639	731	1130	1	74	165	67	26	16	314	213	82	48			
4	34	30	17	5					1	89	267	34	248	201	7	832	1223	159	197		
5	81	48	61	16	254	780	377	1002	1	219	342	8	368	226	1	678	900	106	117		
6	80	69	118	40	432	772	540	947	1	130	121	1	172	122	277	381	52	47			
7	91	57	109	30	132	161	206	231	1	219	342	96	51	150	129	35	24				
8	55	83	32	10	58	258	105	445	82	273	49	63	79	155	27	48	1	2			
9	26	103	9	83	21	42	49	119	48	84	35	27	46	45	16	25	1	1			
10	25	45	1	33	1	26	10	95	7	68	9	17	10	29	4	13					
11	9	32	42		12	12	59	45	45		19	14	19	12	12	12					
12			10		4	4	30	23	23		19	19	2	26	15	15					
13	1		5		4		20	16	16		13	13		16	10	10					
14			2				14	8	8		11	11		26	6	6					
15							6	2	2		2	2		3	1	1					
16+																					
total	402	467	372	297	1329	2756	2148	4203	4	652	1415	124	1003	791	29	2388	3197	481	576	168	231
Otoliths	195		213					498									648			168	
Catch (t)	286		354					1581		874				531		1424			443	88	

Table 9. Yellowtail flounder length frequency in samples. Division 3NO.

Month	APR		JUN		JUL			AGO			SEP			DEC	
Sex	M	F	M	F	I	M	F	I	M	F	I	M	F	M	F
length															
10-11	1	1			1			4		1	2	4	2		
12-13	1	1			2			8	10	17	3	15	18		
14-15	9	6	1		5	2		4	38	30	1	32	28		
16-17	38	39	2	3	4	7	2	6	67	77		50	59		
18-19	90	99	8	7		16	15	3	154	171		92	85	1	1
20-21	148	140	19	18		26	60	1	214	242		79	101	2	6
22-23	136	134	27	32		36	52		232	289		77	85	22	14
24-25	134	116	13	30		52	41	1	196	246		40	58	17	22
26-27	107	126	2	9		65	54		147	239		21	28	18	18
28-29	80	108	6	10		50	68		102	169		4	13	10	10
30-31	27	45	3	9		17	49		52	157		6	10	4	11
32-33	4	14	1	8		4	11		24	97		2	6	7	9
34-35	4	1				1	3		8	27			4		2
36-37	3	8					2		5	8		1	1	1	3
38-39		3					1		2	9					2
40-41		2					1		5	11					1
42-43		1					1		1	10					
44-45		1								4					1
46-47										6					2
48-49										5					1
50-51										1					
52-53										1					
54-55															
56-57															
58-59															
60-61															
62-63															
64-65															
total	782	845	82	126	12	276	360	27	1257	1817	6	423	502	82	99
samples		7		1		5			18			4			1
fish meas.	1627		208			648			3103			935		181	

Table 10. Greenland halibut length frequency in samples. Division 3L.

	SEP		
<u>length</u>	-----		
10-11			
12-13	7		1
14-15	9		
16-17	7	1	1
18-19	2	11	15
20-21	4	30	41
22-23		40	28
24-25		31	39
26-27		35	38
28-29		51	54
30-31		46	51
32-33		44	44
34-35		26	45
36-37		40	36
38-39		39	46
40-41		31	41
42-43		27	43
44-45		19	27
46-47		22	22
48-49		8	22
50-51		5	9
52-53		1	8
54-55		2	3
56-57			6
58-59		1	5
60-61			1
62-63		1	
64-65			2
total	29	511	628
samples		15	
fish meas.		1169	

Table 11. Witch flounder length frequency in samples.

Div.	3NO														Div. 3L	
Month	APR		JUN		JUL		AUG			SEP			DEC		SEP	
Sex	M	F	M	F	M	F	I	M	F	I	M	F	M	F	M	F
length																
18-19												1				
20-21				1							1	4				
22-23			1	2				1		2	3	5				
24-25			2	4					4	1	10	9		1		
26-27			1	1			1	2	6		8	23	2	1		
28-29				1			3		3	4	13	15		1		
30-31				6			1	3	2	3	15	23	4	3		
32-33	4		3	7				18	15	3	7	37	6	9		
34-35	9	2	7	15	2			20	19		7	26	6	10		
36-37	4	2	16	6	7		1	45	29		2	11	5	3		
38-39	14	5	12	21	6	2		71	25		2	16	4	6	2	
40-41	14	19	44	19	16	4	1	114	40		1	7	13	2	17	
42-43	14	22	67	23	14	2		121	98		1	7	6	8	42	1
44-45	6	9	47	38	8	6		82	96		1	6	6	8	38	3
46-47	10	8	15	40	4	18		36	137		1	4	1	3	29	2
48-49	2	11	12	23		5		25	122			2	1	1	29	7
40-51		8	10	21	1	2		12	84			4	1	1	12	7
52-53		9		29		2		9	94					2	11	12
54-55		4		8				5	62					1	5	4
56-57		2		10		1			45							7
58-59				2					22							2
60-61				2					13							2
62-63									3							
64-65																
66-67																
68-69																1
total	77	101	237	279	58	42	7	564	919	13	72	200	55	60	185	48
samples		1		5		1		11			1			1		3
fish meas.		168		516		100		1490			285			115		233

Table 12. Redfish length frequency in samples. Div. 3M

Month	DEC	
Sex	M	F
<u>length</u>		
13	2	
14	5	1
15	4	3
16	12	3
17	15	7
18	7	5
19	5	1
20	8	8
21	5	2
22	8	6
23	6	8
24	5	8
25	7	7
26	11	4
27	10	5
28	6	4
29	3	4
30	3	1
31	2	1
32	3	
33	2	
34	4	
35		
36	1	
37		
38	1	
39		
40		
total	135	78
samples	2	
fish meas.	213	

Table 13. Skates length frequency in samples. Div. 3NO.

Month	JUN	JUL	AUG	DEC		JUN	JUL	AUG	DEC
length				5	length				
15 -		4		8	61 -	1	1		2
16 -		4		15	62 -	3	3		2
17 -		2		18	63 -	1			
18 -		7		15	64 -	1	1		
19 -		7		15	65 -				3
20 -	2	3	1	12	66 -	2	3		1
21 -		5		10	67 -	1			1
22 -	2	1		7	68 -	4			3
23 -	4	3		10	69 -	1	1		1
24 -		4		8	70 -	2	1		
25 -		2	1	15	71 -	1	2		1
26 -			2	7	72 -	4	2		
27 -	2	3	3	14	73 -	1	2		3
28 -	1	3	5	3	74 -	1			4
29 -	2	3	1	8	75 -	1	1		1
30 -		4	2	5	76 -		2		2
31 -		1	2	3	77 -				1
32 -	1	2	5	4	78 -		1		4
33 -		1	1	5	79 -				2
34 -	1	2	6	4	80 -	1	2		3
35 -	1	5	4	7	81 -		1		1
36 -	3	1	6	2	82 -	2			5
37 -	4	4	6	1	83 -	1			4
38 -	1	4	6	1	84 -				2
39 -	3	6	3	4	85 -				3
40 -	3	2	5	1	86 -				4
41 -	4	2	8	2	87 -				4
42 -	4	1	7	1	88 -				1
43 -	6	1	4	3	89 -				1
44 -	3	3	1	1	90 -		1		2
45 -	5	4	6	2	91 -				
46 -	4	1	7	1	92 -				
47 -	2	2	7	2	93 -				
48 -	2	3	2	1	94 -				
49 -	4	4	2		95 -				
50 -	9	1	1	2					
51 -	7			2					
52 -	2				samples	2	1	1	2
53 -	3	3		2	meas.	143	146	104	294
54 -	9	3		2					
55 -	6	1							
56 -	1	1							
57 -	5	2							
58 -	4	2		1					
59 -	3	4		1					
60 -	1	1		1					

Table 14. Length and age composition of freezer cod catches (x 10E-2).

Div. Month	----- 3M ----- OCT NOV DEC			Div. Month	----- 3M ----- OCT NOV DEC		
length				age			
27-29				2 :			
30-32	1	1	1	3 :	56	20	109
33-35	4	2	9	4 :	52	26	132
36-38	10	4	24	5 :	14	15	59
39-41	19	5	37	6 :	1	2	9
42-44	24	8	42	7 :		1	3
45-47	22	10	46	8 :			3
48-50	16	8	48	9 :			1
51-53	12	8	35	10 :			
54-56	8	6	26				
57-59	4	5	19	total	123	64	316
60-62	1	4	11	Otoliths		630	
63-65		2	6	Catch (t)	11	8	37
66-68		1	3				
69-71			2				
72-74		1					
75-77			2				
78-80			1				
81-83			1				
84-86			1				
87-89			1				
90-92			1				
93-95							
96-98							
total	121	65	316				
samples	10	7	4				
fish meas.	3077	2064	1413				
Catch (t)	11	8	37				

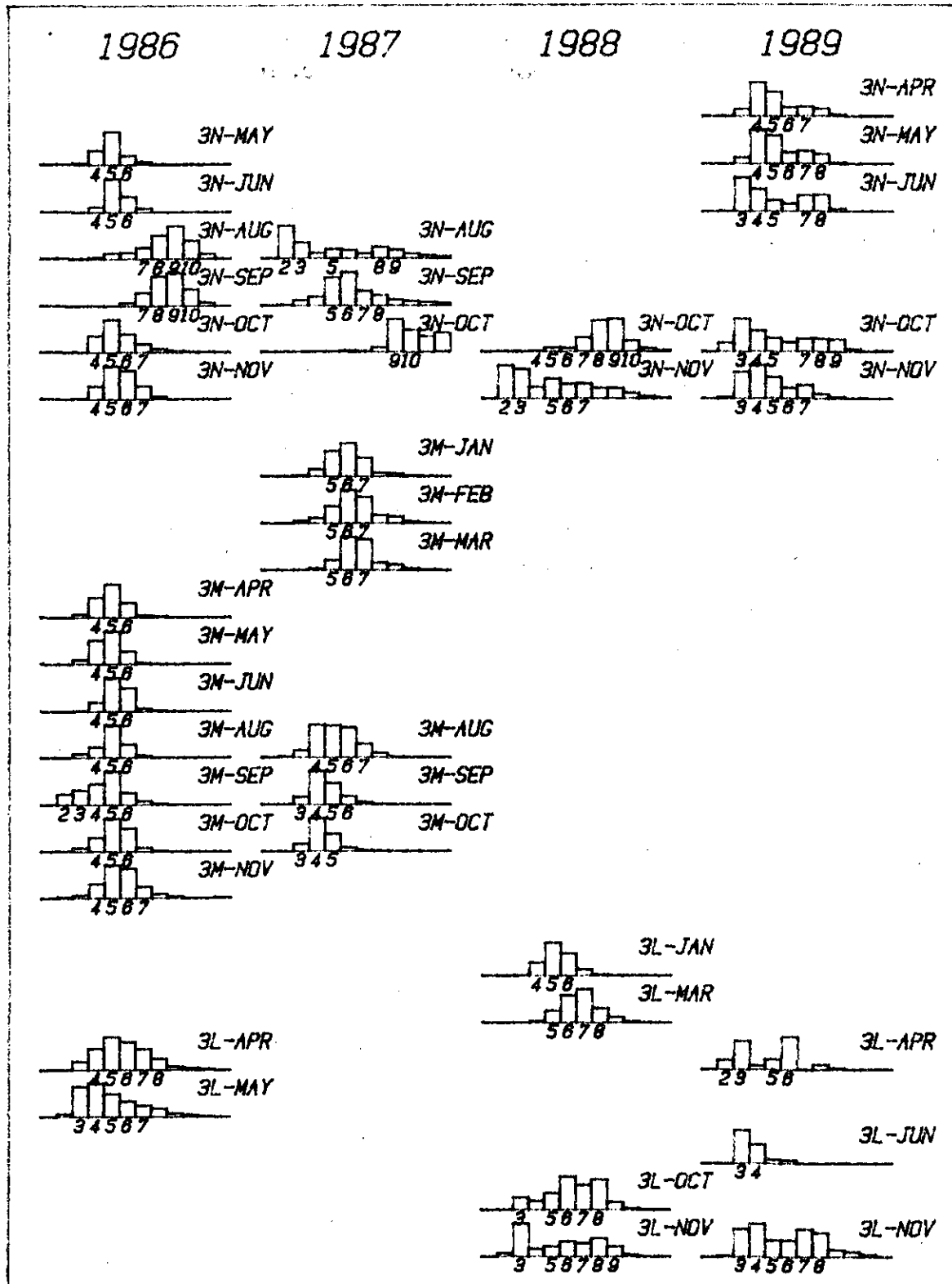


Figure 1. Age distribution of pair trawl cod catches.