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by

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SUBAREAS 2 AND 3A. Status of the Fisheries

The Portuguese fishing fleet operated in Divisions 3L, 3M, 3N and 3O of Subarea 3 in 1986, and the overall nominal catch was 98,135 mt. According to official data, the nominal catches of the main species by division are presented in Table 1.

B. Special Research Studies1. Biological studies

Biological samples were taken on board of a commercial side-trawler in Div. 3L, 3M and 3N, as indicated in Table 2.

a) Cod in Div. 3M and 3N

Biological samples were taken for length composition, ageing, length-weight relationship and maturity. Length measurements were recorded as fork length (cm). The results are presented in Tables 3, 4, 5, 6 and 7. Maturity stages are defined as follows:

Stage 1	-	Immature
Stage 2	-	Developing (eggs visible to naked eye; all eggs opaque)
Stage 3	-	Mixture of opaque and clear eggs
Stage 4	-	Ripe
Stage 5	-	After spawning
Stage 6	-	Spent

Age-length key for cod in Div. 3M is available in the NAFO Secretariat.

b) Redfish in Div. 3L, 3M and 3N

Biological sampling involved the collection of length compositions (Table 8), with measurements recorded as fork length (cm).

c) Yellowtail flounder in Div. 3L and 3M

Length compositions of catches in Div. 3L and 3M by month are presented in Table 9. Length measurements were recorded as total length (cm).

Table 1. Portuguese nominal catches (mt) in the NAFO area, 1986.

Species	3L	3M	3N	3O
Cod	29,903	6,350	6,033	857
Redfish	13,469	10,783	8,273	-
American plaice	1,796	1,741	7,444	-
Witch flounder	2,475	-	1,755	-
Yellowtail flounder	120	-	5,401	-
White hake	-	-	-	993
Skates	-	-	742	-
Total	47,763	18,874	29,648	1,850

Table 2. Summary of intensity of sampling, 1986.

Species	Div.	Month	No. of samples	Number measured	Number aged
Cod	3M	Jun	15	1,687	264
		Jul	1	32	32
		Aug	8	932	225
	3N	May	2	210	123*
		Jul	28	3,112	216*
Redfish	3M	Jun	2	227	-
		Jul	1	105	-
	3N	May	1	111	-
		Jul	6	726	-
	3L	May	6	615	-
		Jun	7	728	-
		Jul	8	867	-
		Aug	36	3,887	-
		Sep	11	1,202	-
Yellowtail	3M	Jun	3	320	-
	3L	Jun	13	1,450	-
		Jul	2	217	-

* Ageing not yet available.

Table 3. Length frequency and mean length of cod catches in Div. 3M and 3N by month in 1986.

Length (cm)	Div. 3M			Div. 3N	
	Jun	Jul	Aug	May	Jul
21-	10				3
24-	93		9	1	34
27-	202		136	2	78
30-	103		222	22	104
33-	92		78	49	157
36-	209		86	43	301
39-	180	1	143	38	449
42-	180	3	87	22	488
45-	162	1	47	10	458
48-	113	5	30	2	342
51-	97	3	12	8	230
54-	64	2	8	3	148
57-	60	5	10	3	94
60-	41	3	3	1	79
63-	28	3	6	-	50
66-	23	2	11	1	27
69-	12	1	9	1	28
72-	11	-	9	1	15
75-	4	2	6	2	11
78-	1	-	3	-	9
81-	1	-	2	-	1
84-	-	-	3	-	3
87-	-	1	3	-	-
90-	-		2	1	2
93-	-		1		-
96-	-		2		-
99-	-		1		-
102-	1		-		-
105-			-		-
108-			1		-
111-			-		-
114-			-		-
117-			1		-
120-			1		-
123-					-
126-					-
129-					1
Total	1687	32	932	210	3112
Mean length (cm)	40.7	56.3	38.0	38.6	44.1

Table 4. Age compositions (N, %), mean lengths (cm) and mean weights (g) by age-group of cod from catches in Div. 3M, June-August 1986. (Quantities in parentheses are numbers of fish weighed and aged.)

Year-class	Age (yr)	Div. 3M (June)			Div. 3M (July)			Div. 3M (August)		
		N (%)	Mean length	Mean weight	N (%)	Mean length	Mean weight	N (%)	Mean length	Mean weight
1984	2	206	27.5	101.1 (45)	-	-	-	290	29.4	245.2 (31)
1983	3	137	34.5	323.2 (28)	17	40.9	-	313	34.8	470.0 (40)
1982	4	380	42.0	710.3 (58)	217	46.3	766.7 (6)	264	42.1	918.0 (50)
1981	5	214	52.0	1,461.4 (66)	441	55.1	1,486.7 (15)	67	51.5	1,574.4 (41)
1980	6	55	64.4	2,613.0 (54)	213	63.7	2,775.0 (10)	26	66.9	2,884.1 (22)
1979	7	6	74.0	3,660.0 (10)	34	71.8	-	13	72.1	3,445.8 (12)
1978	8	1	82.0	5,000.0 (1)	24	76.0	5,400.0 (1)	11	77.9	4,609.1 (11)
1977	9	1	103.0	11,500.0 (1)	31	81.8	-	8	84.6	5,950.0 (8)
1976	10	-	-	-	23	83.8	-	3	94.0	7,766.7 (3)
1975	11	-	-	-	-	-	-	1	97.0	7,800.0 (1)
1974	12	-	-	-	-	-	-	-	-	-
1973	13	-	-	-	-	-	-	2	107.5	14,750.0 (2)
1972	14	-	-	-	-	-	-	2	115.0	17,500.0 (2)
Mean age (yr)			3.8			5.3			3.4	
Mean length (cm)			40.7			56.3			38.0	
Number aged			263			32			223	

Table 5. Mean weight (g) by length-group of cod from Div. 3M and 3N, 1986. (Number of fish weighted in parentheses.)

Length (cm)	Div. 3M (June)		Div. 3M (July)		Div. 3M (August)		Div. 3N (May)		Div. 3N (July)	
	$\bar{W}$ (male)	$\bar{W}$ (female)	$\bar{W}$ (male)	$\bar{W}$ (female)	$\bar{W}$ (male)	$\bar{W}$ (female)	$\bar{W}$ (male)	$\bar{W}$ (female)	$\bar{W}$ (male)	$\bar{W}$ (female)
21-	50 (7)	50 (3)	-	-	-	-	-	-	50 (2)	50 (1)
24-	102 (29)	111 (28)	-	-	188 (4)	180 (5)	100 (1)	-	121 (14)	106 (17)
27-	178 (30)	172 (30)	-	-	242 (37)	237 (38)	-	-	191 (28)	187 (30)
30-	240 (30)	227 (22)	-	-	332 (39)	329 (41)	255 (10)	229 (12)	268 (30)	268 (30)
33-	369 (29)	353 (25)	-	-	427 (35)	419 (27)	337 (23)	335 (26)	372 (30)	365 (30)
36-	523 (30)	492 (30)	-	-	519 (37)	531 (32)	441 (23)	425 (20)	480 (30)	497 (30)
39-	613 (30)	608 (30)	-	650 (1)	657 (38)	651 (37)	545 (21)	519 (16)	622 (30)	615 (30)
42-	795 (30)	750 (30)	650 (3)	-	818 (31)	837 (35)	710 (10)	708 (12)	753 (30)	745 (30)
45-	958 (30)	940 (30)	950 (1)	-	998 (20)	977 (22)	788 (4)	850 (6)	902 (30)	957 (30)
48-	1100 (30)	1105 (30)	1025 (2)	967 (3)	1196 (14)	1213 (15)	1050 (2)	-	1125 (30)	1045 (30)
51-	1275 (30)	1254 (24)	1150 (2)	1050 (1)	1336 (7)	1417 (6)	1400 (2)	1190 (5)	1358 (30)	1253 (30)
54-	1439 (24)	1508 (24)	-	1550 (2)	1610 (5)	1567 (3)	1450 (1)	1650 (2)	1592 (30)	1533 (30)
57-	1752 (28)	1723 (20)	1550 (2)	1767 (3)	1783 (3)	2043 (7)	1625 (2)	1950 (1)	1790 (21)	1779 (29)
60-	2004 (14)	2182 (14)	1967 (3)	-	2300 (1)	2500 (2)	-	1250 (1)	2110 (29)	2092 (30)
63-	2357 (15)	2214 (11)	2650 (2)	2300 (1)	2450 (3)	2447 (3)	-	-	2448 (21)	2374 (23)
66-	2692 (18)	2680 (5)	3000 (1)	3000 (1)	2950 (6)	2830 (5)	-	1800 (1)	2619 (8)	2533 (18)
69-	2825 (4)	2963 (8)	-	3500 (1)	3193 (7)	3275 (2)	3000 (1)	-	3125 (14)	3179 (14)
72-	3350 (3)	3500 (7)	-	-	3375 (2)	3843 (7)	-	3300 (1)	3517 (6)	3472 (9)
75-	3800 (1)	4067 (3)	4000 (1)	4300 (1)	3900 (2)	4075 (4)	4250 (2)	-	3950 (2)	3900 (9)
78-	4100 (2)	-	-	-	5033 (3)	-	-	-	4200 (4)	4580 (5)
81-	5000 (1)	-	-	-	5000 (1)	5400 (1)	-	-	-	4500 (1)
84-	-	-	-	-	5300 (1)	5650 (2)	-	-	-	6000 (3)
87-	-	-	5400 (1)	-	6200 (1)	7200 (2)	-	-	-	-
90-	-	-	-	-	6800 (1)	6500 (1)	7300 (1)	-	-	7250 (2)
93-	-	-	-	-	-	7300 (1)	-	-	-	-
96-	-	-	-	-	9500 (1)	7800 (1)	-	-	-	-
99-	-	-	-	-	-	10000 (1)	-	-	-	-
102-	-	11500 (1)	-	-	-	-	-	-	-	-
105-	-	-	-	-	-	-	-	-	-	-
108-	-	-	-	-	17000 (1)	-	-	-	-	-
117-	-	-	-	-	20000 (1)	-	-	-	-	-
120-	-	-	-	-	18000 (1)	18000 (1)	-	-	-	-
129	-	-	-	-	-	-	-	-	-	22000 (1)

Table 6. Numbers of cod in maturity stage 1 and 2, by length, sex and month, Div. 3M, 1986.

Length (cm)	Stage 1				Stage 2					
	Jun		Aug		Jun		Jul		Aug	
	M	F	M	F	M	F	M	F	M	F
21-	7	3								
24-	48	45	4	5						
27-	99	100	66	66		3				4
30-	56	35	80	51	3	9			35	56
33-	10	7	6	-	34	41			44	28
36-	16	1	-	1	92	100			48	37
39-	3		1		90	87		1	72	70
42-	2				85	93	3	-	34	53
45-					84	77	1	-	20	27
48-					65	47	2	3	15	15
51-					63	34	2	1	7	5
54-					34	30	-	2	5	3
57-					32	28	2	3	3	7
60-					13	28	3		1	2
63-					16	12	2		3	3
66-					16	7	1		6	5
69-					4	8			7	2
72-					2	9			2	7
75-					1	3			2	4
78-					1	-			3	-
81-					1	-			1	1
84-						-			1	2
87-						-			1	2
90-						-			1	1
93-						-			-	1
96-						-			1	1
99-						-			-	1
102-						1			-	-
105-									-	-
108-									1	-
111-										-
114-										-
117-										-
120-										1
Total	241	191	157	123	636	617	18	14	313	338

TABLE 7. Numbers of cod in maturity stage 1 to 6, by length, sex and month in Div. 3N, 1986.

Length (cm)	Stage 1				Stage 2				Stage 3				Stage 4		Stage 5		Stage 6	
	May		Jul		May		Jul		May		Jul		Jul		Jul		Jul	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
21-	-	-	2	1														
24-	1	-	15	19														
27-	-	2	34	44														
30-	10	11	53	26	-	1	8	17										
33-	13	6	27	2	10	20	54	74										
36-	4	-	3	2	19	20	126	170										
39-	2	-	-	-	19	17	238	211										
42-	-	-	-	-	10	12	241	246			-	1						
45-	-	-	-	-	4	6	221	233			-	1	1	-	2	-		
48-	-	-	-	-	2	-	162	179			-	-	-	-	1	-		
51-	-	-	-	-	2	6	109	120			-	1	-	-	-	-		
54-	-	-	-	-	1	2	64	81			-	2	-	-	-	-	1	
57-	-	-	-	-	2	1	30	56			2	5	-	1	-	-	-	
60-	-	-	-	-	-	1	32	43			-	1	-	1	2	-	-	
63-	-	-	-	-	-	-	21	27			-	1	-	-	-	-	1	
66-	-	-	-	-	-	1	8	19			-	-	-	-	-	-	-	
69-	-	-	-	-	1	-	13	13			1	-	-	-	1	-	-	
72-	-	-	-	-	-	1	6	8			-	-	-	-	-	-	-	
75-					1	-	1	8	1	-	-	-	1	-	-	-	-	1
78-							1	5	-	-	-	1	-	-	1	-	1	-
81-							-	1	-	-	-	-	-	-	-	-	-	-
84-							-	3	-	-	-	-	-	-	-	-	-	-
87-							-	-	-	-	-	-	-	-	-	-	-	-
90-							-	2	1	-	-	-	-	-	-	-	-	-
93-																	-	-
96-																	-	-
99-																	-	-
102-																	-	-
105-																	-	-
108-																	-	-
111-																	-	-
114-																	-	-
117-																	-	-
120-																	-	-
123-																	-	-
126-																	-	-
129																	-	1
TOTAL	30	19	134	94	71	88	1335	1516	2	-	3	13	2	2	7	-	1	5

Table 8. Length frequency and mean length of redfish by month in Div. 3L, 3M and 3N, 1986.

Length (cm)	Div. 3L					Div. 3M		Div. 3N	
	May	Jun	Jul	Aug	Sep	Jun	Jul	May	Jul
16-						2	1		
17-				3	1	-	-		2
18-				1	2	2	3	2	11
19-			4	6	1	3	2	2	40
20-			6	13	1	11	9	-	54
21-			4	21	3	23	11	5	41
22-			8	26	6	20	11	1	22
23-	1	1	4	45	7	27	6	7	23
24-	2	-	11	71	12	13	5	18	23
25-	2	6	25	134	24	7	2	25	32
26-	8	9	20	219	45	15	4	24	27
27-	9	18	19	325	56	10	4	15	29
28-	11	18	26	303	72	4	3	3	7
29-	20	21	28	253	61	10	3	6	8
30-	10	35	22	164	59	6	9	3	3
31-	30	32	19	127	56	13	8		1
32-	33	60	13	104	53	10	8		1
33-	68	73	30	86	43	5	3		-
34-	101	84	34	69	40	4	2		1
35-	101	92	42	58	33	5	2		-
36-	85	76	40	38	25	2	1		1
37-	68	41	32	21	16	5	3		
38-	37	31	29	23	10	2	1		
39-	14	11	16	22	2	7	-		
40-	5	9	8	18	-	5	1		
41-	4	2	1	23	-	5	-		
42-	2	-		15	1	2	-		
43-	2	1		17	-	1	-		
44-	1	-		11	-	1	-		
45-	1	1		3	1	1	-		
46-				1		2	-		
47-						1	-		
48-						1	3		
49-						1			
50-						-			
51-						-			
52-						-			
53-						1			
54-									
Total	615	621	441	2220	630	227	105	111	326
Length	34.3	33.6	31.8	29.2	30.1	27.9	27.0	25.2	22.8

Table 9. Length frequencies of yellowtail flounder catches from Div. 3L and 3M by month, 1986.

Length (cm)	Div. 3L		Div. 3M
	Jun	Jul	Jun
12-	1	-	-
14-	5	2	-
16-	13	2	-
18-	33	2	-
20-	33	-	-
22-	32	8	-
24-	49	8	1
26-	66	5	2
28-	116	13	2
30-	116	8	2
32-	136	13	10
34-	145	28	14
36-	123	12	24
38-	129	18	24
40-	110	25	53
42-	111	17	46
44-	64	16	32
46-	49	11	18
48-	28	12	31
50-	26	5	21
52-	19	3	18
54-	15	5	17
56-	12	3	4
58-	11	-	1
60-	4	1	-
62-	3	-	-
64-	1	-	-
Total	1,450	217	320
Av. length	35.1	37.3	42.9