

**SCIENTIFIC COUNCIL MEETING – JUNE 2006**

Portuguese Research Report for 2005

by

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Av. Brasília 1449-006, Lisboa, Portugal**A. Status of the fisheries**

In 2005 the Portuguese nominal catches proceeding from NAFO Regulatory Sub Area 3 recorded the lowest value since 1999. Over recent years nominal catches increased continuously from 2000 to 2003, when they peak at 21 300 ton, but declined sharply afterwards, to 12 800 ton and 11 500 ton in 2004-2005 (Table I).

A general decline in fishing effort is observed as well (16.5% less from 2004). In Div. 3N fishing effort fell by half (-46%) while in Div. 3M and Div. 3O was reduced by 25%. Div. 3L was the only division where fishing effort increased, both in fishing days (+13%) and fishing hours (+18%). Twelve Portuguese stern trawlers have been recorded fishing in the NRA in 2005.

The reduction in total catch (Table I-A) is mainly due to reduction on skates (-62%) and white hake (-87%). Important declines are also observed in the by-catches of witch flounder (-72%), cod (-58%), roughhead grenadier (-27%), and American plaice (-23%).

Redfish continues to be by far the most important species in the Portuguese commercial catches from Sub Area 3, representing on recent years 50% or more of the overall catch. Div. 3O continues to be the most important ground for this fishery, but pelagic catch on Div. 1F more than doubled and almost reached 1 500 ton in 2005. As for Div. 3M, 2005 EU survey data suggest that about 37% of the Portuguese redfish catch is from *Sebastes marinus* due to an important increase on the bottom availability of this species observed in the Flemish Cap bank at least during the second half of 2005.

The Greenland halibut catches decreased in Div. 3M (-60%) and 3N (-15%). However catches increased by 50% in Div. 3L, a Division where Greenland halibut and roughhead grenadier continued to represent the bulk of the catches (92% in 2005). In Div. 3N the relative weight of these two species has been declining from 76% in 1998 to 35% in 2004-2005.

B. Portuguese Annual Sampling Program

In 2005, the Portuguese Annual Sampling Program was carried out only by one vessel. Sampling effort fell to a low level due to the abatement of one otter trawl regularly monitored since 1994. This otter trawl had supplied more than 50% of the commercial data in recent years and has been replaced by a new multi-rig otter-trawl that only start fishing in 2006.

Data from the Div. 1F redfish fishery was reported to the ICES North Western Working Group (NWWG).

1. Catch and effort sampling

Effort and CPUE data for 2005 Portuguese trawl fishery on the NAFO Regulatory Area were obtained through the revision of the skipper logbook from only one trawler. All the information (round weight of the catch by species, fishing effort, positions and depths) has been recorded on a tow-by-tow basis. The vessel conversion factors were used to convert its processed landings in catches. Effort data obtained through the revision of the 2004 logbooks available were processed in order to convert the 2005 Portuguese effort, reported in fishing days on the 2005 Portuguese ST ATLANT 21-B, into fishing hours (Table II-A/B).

The daily catch and effort data from the logbooks were used to estimate the directed effort and CPUE for each of the target species/stock, as well as the main by-catch species and depth range of the different fisheries, on a monthly basis. The majority of the observed fishing effort was directed towards Greenland halibut.

Following the September 1996 recommendation of the NAFO Scientific Council as regards the availability of witch flounder fishery data, a column with the by-catch of this species on the Greenland halibut fishery is included in Table III. Data regarding directed effort and catch rates are presented in Table III to IV-B and Fig. 1.

The Greenland halibut cpue series was updated with the 2005 observed CPUEs. The additive model (Ávila de Melo and Alpoim, 1995), was upgraded in 1998 (Alpoim *et al.*, 1998), and used like in previous years to standardise the observed CPUEs. From January 1988 till April 1995 each monthly observed CPUE of this series was previously corrected for 130 mm mesh size (Ávila de Melo and Alpoim, 1996). In this analysis, any observation corresponding to a month and a trawler with less than 10 hours of directed effort was rejected. The CPUEs are presented in Tables IV and Fig. 1, with the associated standard errors (± 2 standard errors in the Figures) and coefficients of variation.

1.1. Comments on catch and effort data (based on the vessel sampled)

1.1.1. Greenland halibut in Div. 3L, 3M, 3N and 3O

In Div. 3L catch rates declined prior to the boom of the deep-water fishery (Table IV-A, Fig. 1). However, it is from 1990 to 1991, *i.e.* from the first to the second year of this new fishery in the Regulatory Area, that CPUEs fell by half. Between 1991 and 1994 catch rates remained stable at a low level. Since then catch rates gradually increased, reaching an upper level in 1999-2000. Catch rate declined in 2001 and remained stable at that lower level in 2002 and 2003. In 2004 the catch rate decline again, reaching the lowest value since 1994. However in 2005 the Greenland halibut catch rate in Div. 3L recovered to just above the former 2001-2003 level.

For all Div.3LMNO combined (Table IV-A, Fig. 1) the observed catch rates series follows the Div. 3L pattern, since this is the division of Sub Area 3 with the highest concentration of Greenland halibut fishing effort.

2. Biological Sampling

In 2005 biological sampling was obtained from one only stern trawler fishing in Div. 3L and 3M during the last quarter of the year. Apart from species under moratoria, a priority to be sampled whenever they appear in the hauls, biological sampling was conducted for the two most abundant species in each haul, following the NAFO sampling recommendations.

Since 1996, all commercial information is representative of the catch as a whole, although sampling continues to be carried out by sex with the exception of cod, white hake, Atlantic halibut and monkfish. Mean length and weight at age are the mean of mean lengths and weights at age by sex, weighted by the abundance in the sampled catches of males and females at each age. For all species sampled this year, mean weight at age and mean weights in the catch are derived from the length-weight relationships calculated from the commercial sampling in 2005 (Table VI).

Greenland halibut and roughhead grenadier were sampled in Div. 3L and 3M (Table V). Redfish were sampled only in Div. 3M, where the catches of *Sebastes* spp are mentioned as "redfish". However, because of the lower depth of the hauls, we suppose that all the sampled catch will be of *Sebastes marinus*.

2.3. Length composition of the 2005 trawl fishery (130 mm codend mesh size).

2.3.1. Redfish Div. 3M

Information on length composition of the redfish trawl catch in Div. 3M is available for September to November (Table VII, Fig. 3), from 219 m to 324 m depth.

Lengths between 23 cm and 31 cm dominated catches, with a mode at 26 cm (mean length and weight of 30 cm and 432 g).

2.3.2. Greenland halibut Div. 3L

Information on length composition of the Greenland halibut in Div. 3L is available for October and November (Table VIII, Fig. 3), from 752 m to 970 m depth.

Lengths between 40 cm and 50 cm dominated catches, with two modal classes at 42 cm and 44 cm (mean length and weight of 46 cm and 874 g).

2.3.3. Greenland halibut Div. 3M

Information on length composition of the Greenland halibut in Div. 3M is available for October and November (Table IX, Fig. 4), from 766 m to 996 m depth.

Lengths between 40 cm and 50 cm dominated catches, with two modal classes at 42 cm and 46 cm (mean length and weight of 47 cm and 888 g).

2.3.4. Roughhead grenadier Div. 3L

Information on length composition of the roughhead grenadier catches in Div. 3L is available for October and November (Table X, Fig. 5), from 752 m to 970 m depth.

Anal lengths between 14 cm and 20 cm dominated catches, with modal classes between 16 cm and 19 cm (mean length and weight of 18 cm and 646 g).

2.3.5. Roughhead grenadier Div. 3M

Information on length composition of the roughhead grenadier catches in Div. 3M is available for October and November (Table XI, Fig. 6), from 865 m to 996 m depth.

Anal lengths between 13 cm and 18 cm dominated catches, with a mode at 18 cm (mean length and weight of 17 cm and 539 g).

3. Acknowledgements

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4. References

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TABLE I-A: PORTUGUESE NOMINAL TRAWL CATCHES (mt) IN NAFO AREA, 2005.

SPECIES	DIVISION						SUBAREA 3	TOTAL
	1F	2J	3L	3M	3N	3O	2005	2005
Cod			1.4	16.0	34.5	52.5	104.4	104.4
Redfish	1485.3		39.5	2695.5	47.1	4555.3	7337.4	8822.7
American plaice			30.0	11.4	112.3	217.9	371.6	371.6
Yellowtail flounder					99.9	87.8	187.7	187.7
Witch flounder			16.5	33.2	28.8	71.3	149.8	149.8
Greenland halibut			1684.9	162.1	322.9	86.1	2256.0	2256.0
Atlantic halibut			1.0	4.3	5.6	8.5	19.4	19.4
Roughhead grenadier			131.4	30.7	96.4	4.0	262.5	262.5
Anarhichas spp.			5.5	12.1	6.8	6.6	31.0	31.0
Haddock					0.9	4.9	5.8	5.8
Pollock								
White hake			0.1		1.6	154.5	156.2	156.2
Red hake			9.6	1.1	2.2	5.3	18.2	18.2
Capelin								
Skates			44.8	36.5	444.6	49.1	575.0	575.0
Monkfish					0.1	5.1	5.2	5.2
Squid								
Shrimp								
Unidentified			0.4	0.1	1.2	1.5	3.2	3.2
TOTAL	1485.3		1965.1	3003	1204.9	5310.4	11483.4	12968.7

TABLE I - B: PORTUGUESE NOMINAL TRAWL CATCHES (mt) IN NAFO SUBAREA 3.

SPECIES / YEAR	2005	2004	2003	2002	2001	2000	1999	1998	1997
Cod	104	280	677	488	357	193	327	549	1546
Redfish	7337	5969	7710	6344	5324	5743	6081	2368	1125
American plaice	372	512	901	631	633	402	719	357	389
Yellowtail flounder	188	69	287	122	351	153	426	85	
Witch flounder	150	588	501	433	579	228	508	381	347
Greenland halibut	2256	1881	461.1	4319	5026	4769	3995	3242	3343
Atlantic halibut	19	60	89	46	44	29	51	30	17
Roughhead grenadier(1)	263	380	292	508	610	396	1299	1089	762
Anarhichas spp.	31	46	106	87	141	61	549	140	185
Haddock	6	23	131	78	23	13	10	6	39
Pollock		4	115						
White hake (2)	156	1265	3919	1969	273	41	77	18	56
Red hake	18	12	2						
Capelin									
Skates	575	1543	1816	1361	880	666	2168	1105	904
Monkfish	5	74	156						
Squid		11						1	
Shrimp		50		15	420	289	227	203	170
Unidentified	3	11	13	43	41	3	117	40	116
TOTAL	11483	12776	21324	16443	14701	12985	16554	9614	9000

TABLE I - B: cont.

SPECIES / YEAR	1996	1995	1994	1993	1992	1991	1990	1989	1988
Cod	1318	1353	2636	3651	5984	13357	15138	24129	12931
Redfish	2152	2590	8609	9828	6581	12163	17810	18870	17072
American plaice	298	175	344	347	451	1288	714	1821	1791
Yellowtail flounder					1	10	11	5	
Witch flounder	236	375	573	289	849	1982	2254	16	12
Greenland halibut	3308	1814	5967	8805	10539	13961	11170	3614	4194
Atlantic halibut	12	18	45	53	81	228	91		
Roughhead grenadier(1)	784	1402	2223	1969	2000	4486	3211	290	914
Anarhichas spp.	122	1401	3219	2302	1696	2843	1940		
Haddock		2	10	10	166	83	17		
Pollock			13	41	28	421	11		
White hake (2)	124	230	267	366	466	1009	467		
Red hake									
Capelin							77		
Skates	788	2068	6238	7626	7017	23301	13569	663	1097
Monkfish		2		8	37	10	2		
Squid	3								
Shrimp									
Unidentified	22	14	12	238	325	174	852		
TOTAL	9167	11441	30156	35532	36220	75314	67334	49408	38011

(1) Reported as Roundnose grenadier in years before.

(2) Reported as Red hake in years before.

TABLE II - A : PORTUGUESE TRAWL EFFORT IN FISHING DAYS AND FISHING HOURS IN NAFO AREA IN 2005.

DIVISION														TOTAL		MONTH
MONTH	1F	2J	3L		3M		3N		3O		SUBAREA 3					
	DAYS	DAYS	DAYS	HOURS	DAYS	HOURS	DAYS	HOURS	DAYS	HOURS	DAYS	HOURS				
JAN.			14	167	4	50	56	463	12	137	86	817	JAN.			
FEB.			54	644	23	290	29	240	1	11	107	1185	FEB.			
MAR.			83	990	3	38	26	215	44	501	156	1744	MAR.			
APR.			80	954	1	13	7	58	2	23	90	1047	APR.			
MAY			55	656	20	252	6	50			81	958	MAY			
JUN.			19	227	17	214	24	198	13	148	73	788	JUN.			
JUL.	29		4	48	6	76	5	41	56	638	71	803	JUL.			
AUG.	70				4	50	14	116	42	479	60	645	AUG.			
SEP.	64		16	191	119	973	5	41	21	239	161	1444	SEP.			
OCT.			74	1018	94	867	13	107	27	308	208	2300	OCT.			
NOV.			48	711	104	737	21	174	36	410	209	2031	NOV.			
DEC.			45	537	12	151	12	99	105	1196	174	1984	DEC.			
TOTAL	163		492	6139	407	3712	218	1803	359	4090	1476	15744	TOTAL			

Note: Fishing hours and number of nets estimated from their monthly rates to fishing days observed in the trawlers and gillnetters sampled by the IPIMAR.

Monthly effort of gillnetters is given by the sum of nets per fishing day

TABLE II - B: PORTUGUESE TRAWL EFFORT IN FISHING DAYS AND FISHING HOURS IN NAFO SUBAREA 3.

AND FISHING HOURS BY YEAR AND GEAR					
YEAR	GEAR				YEAR
	OT		GNS		
	DAYS	HOURS	DAYS	NETS	
2005	1476	15744			2005
2004	1705	18856			2004
2003	2312	25175			2003
2002	1882	19902			2002
2001	1870	24979			2001
2000	1411	14588			2000
1999	1631	19234			1999
1998	1172	16517			1998
1997	1428				1997
1996	1912	27206	166		1996
1995	1425	19083	612	173833	1995
1994	1553	22065	676	166735	1994
1993	2496	32481	731	209536	1993
1992	2670	32662	672	266141	1992
1991	5297	74829	712	302407	1991
1990	5026	72536	714	238732	1990
1989	3850	54833	692	268885	1989

TABLE III: Portuguese trawl fishery cpue's and bycatch by month and division for 2005.

DIVISION	TARGET SPECIES	MONTH	DEPTH RANGE (m)		CPUE (ton/hour)	MAIN BYCATCH		WITCH FLOUNDER BYCATCH (%)	TOTAL BYCATCH (%)
			MIN.	MAX.		SPECIES	%		
3M	RED	SEP	219	570	0.602	CAT	3.0	0.4	8.7
3M	RED	OCT	244	296	1.401	CAT	1.6	0.1	2.4
3M	RED	NOV	272	322	2.063	CAT	0.6	0.1	1.6
3L	GHL	OCT	752	970	0.169	RHG	31.3	0.2	39.9
3L	GHL	NOV	789	935	0.240	RHG	24.7	0.1	28.3
3M	GHL	OCT	912	1020	0.160	RHG	29.6	0.2	35.8
3M	GHL	NOV	766	996	0.294	RHG	16.0	0.1	20.3
3L	RHG	OCT	752	950	0.097	GHL	53.2	0.1	61.9
3L	RHG	NOV	815	871	0.100	GHL	57.0	0.0	57.5

TABLE IV - A: GREENLAND HALIBUT TRAWL CATCH RATES, 1988-2005: mean annual cpue's corrected for the month, division and vessel of each observation.

	3L			3M			3N			3LMN			
	CPUE	ST.ERROR	C.V.	CPUE	ST.ERROR	C.V.	CPUE	ST.ERROR	C.V.	CPUE	ST.ERROR	C.V.	
1988	0.389	0.080	41.4							0.402	0.094	46.8	1988
1989	0.365	0.047	38.8							0.362	0.057	47.0	1989
1990	0.327	0.035	36.9	0.234			0.175			0.320	0.035	40.5	1990
1991	0.170	0.026	33.9				0.168	0.030	31.3	0.167	0.018	31.0	1991
1992	0.102	0.032	99.5				0.213	0.025	40.4	0.165	0.023	66.3	1992
1993	0.078	0.043	77.2				0.170	0.018	36.8	0.140	0.019	50.1	1993
1994	0.093	0.033	50.0				0.144	0.021	34.9	0.128	0.016	34.6	1994
1995	0.155	0.025	44.8	0.167	0.010	13.9	0.148	0.021	38.1	0.159	0.014	40.0	1995
1996	0.209	0.022	38.1	0.200	0.017	25.2	0.182	0.018	26.4	0.190	0.009	26.4	1996
1997	0.221	0.019	28.5	0.262	0.029	31.2	0.164	0.009	7.3	0.213	0.017	35.5	1997
1998	0.257	0.020	28.5	0.192	0.028	50.5	0.181	0.014	25.5	0.221	0.010	29.8	1998
1999	0.296	0.024	25.5	0.305	0.025	24.6	0.228	0.019	25.1	0.277	0.018	34.9	1999
2000	0.298	0.023	20.5	0.303	0.022	16.5	0.309	0.042	27.3	0.296	0.019	25.5	2000
2001	0.241	0.029	32.0	0.229	0.010	11.7	0.213	0.013	14.1	0.224	0.012	23.9	2001
2002	0.247	0.015	20.3	0.213	0.019	29.4	0.277	0.034	24.2	0.234	0.013	28.8	2002
2003	0.249	0.026	33.0	0.207	0.025	34.4	0.221	0.024	26.4	0.227	0.015	33.0	2003
2004	0.149	0.011	22.3	0.108	0.020	55.7	0.154	0.011	19.5	0.140	0.010	37.3	2004
2005	0.259	0.018	9.9	0.237	0.060	35.6				0.248	0.021	17.1	2005

TABLE IV - B: GREENLAND HALIBUT TRAWL CATCH RATES,
1988-2005: mean cpue's by division corrected for the year, month
and vessel of each observation.

	CPUE	ST.ERROR	C.V.	
3L	0.238	0.007	37.3	3L
3M	0.216	0.008	33.6	3M
3N	0.194	0.006	32.3	3N
3LMN	0.217	0.004	38.2	3LMN

TABLE V: Intensity of the trawl sampling during 2005, by species, division and month.

SPECIES	DIV.	MONTH	N° OF SAMPLES	N° FISH MEASURED	SAMPLING WEIGHT(Kg)	OTOLITHS	
						N°	LENGTH RANGE (cm)
REDFISH	3M	SEP	20	1600	690.6	201	18-50
REDFISH	3M	OCT	4	320	112.9	130	20-50
REDFISH	3M	NOV	27	2160	968.3	277	19-55
GREENLAND HALIBUT	3L	OCT	23	1840	1711.7	153	32-73
GREENLAND HALIBUT	3L	NOV	14	1120	897.0	122	27-75
GREENLAND HALIBUT	3M	OCT	1	80	57.9	54	37-56
GREENLAND HALIBUT	3M	NOV	5	400	384.7	116	36-63
ROUGHHEAD GRENADIER	3L	OCT	23	1840	1265.2	156	12-28
ROUGHHEAD GRENADIER	3L	NOV	13	1040	593.6	126	12-26
ROUGHHEAD GRENADIER	3M	OCT	1	80	44.2	46	13-22
ROUGHHEAD GRENADIER	3M	NOV	4	320	177.3	83	12.5-24.5

TABLE VI: Length-weight relationship by species, stock and sex in 2005.

Species	Stock	Sex	a	b	n	r^2	Length interval (cm)
RED	3M	F	0.0108	3.0862	1968	0.9898	18-55
RED	3M	M	0.0078	3.1750	2109	0.9902	19-53
RED	3M	Total	0.0099	3.1105	4077	0.9910	18-55
GHL	2J3KLMNO	F	0.0022	3.3556	1693	0.9808	32-73
GHL	2J3KLMNO	M	0.0033	3.2479	1743	0.9845	27-75
GHL	2J3KLMNO	Total	0.0021	3.3629	3436	0.9836	27-75
RHG	3LMNO	F	0.4201	2.5194	1614	0.9924	12-26
RHG	3LMNO	M	0.4116	2.5316	1663	0.9871	12-28
RHG	3LMNO	Total	0.4072	2.5330	3277	0.9901	12-28

TABLE VII: REDEFISH_DIV_3M_2005: length composition (0/000) of the 130mm trawl catches

LENGTH GROUP	SEP	OCT	NOV	3rd Q.	4th Q.	YEAR	LENGTH GROUP
18	0.5			0.5		0.1	18
19			0.2		0.2	0.2	19
20	4.0	3.3	4.1	4.0	4.0	4.0	20
21	1.0	3.3	7.5	1.0	7.1	5.9	21
22	16.2	12.0	40.5	16.2	38.1	33.6	22
23	78.4	74.6	72.8	78.4	73.0	74.1	23
24	76.8	170.2	71.4	76.8	79.8	79.2	24
25	67.8	152.8	68.8	67.8	75.9	74.2	25
26	115.6	170.7	86.1	115.6	93.3	97.9	26
27	44.3	101.0	68.1	44.3	70.9	65.4	27
28	35.2	71.8	76.0	35.2	75.7	67.3	28
29	2.3	59.1	86.6	2.3	84.3	67.2	29
30	57.5	25.6	82.3	57.5	77.5	73.3	30
31	61.6	29.1	67.7	61.6	64.4	63.8	31
32	53.6	12.5	17.7	53.6	17.3	24.8	32
33	7.0	10.4	37.5	7.0	35.2	29.3	33
34	74.0	14.0	9.1	74.0	9.5	22.9	34
35	93.3	3.8	48.9	93.3	45.1	55.1	35
36	70.5	14.6	21.8	70.5	21.2	31.4	36
37	49.0	8.0	49.8	49.0	46.2	46.8	37
38	65.6	26.3	10.5	65.6	11.9	23.0	38
39	6.3	11.0	11.0	6.3	11.0	10.0	39
40	7.7	6.5	6.9	7.7	6.9	7.1	40
41		3.3	11.7		11.0	8.7	41
42	4.4	2.7	13.7	4.4	12.8	11.0	42
43	0.6		6.2	0.6	5.6	4.6	43
44	1.5	5.4	3.6	1.5	3.7	3.3	44
45	2.9	5.4	10.1	2.9	9.7	8.3	45
46	1.9		1.2	1.9	1.1	1.3	46
47			2.0		1.9	1.5	47
48			2.0		1.8	1.4	48
49			0.7		0.6	0.5	49
50	0.5	2.7	1.4	0.5	1.5	1.3	50
51			0.7		0.7	0.5	51
52							52
53			1.2		1.1	0.9	53
54							54
55			0.2		0.2	0.2	55
TOTAL	1000	1000	1000	1000	1000	1000	
No. SAMPLES	20	4	27	20	31	51	
SAMPLING WEIGHT(kg)	691	113	968	691	1081	1772	
No. F.MEASURED	1600	320	2160	1600	2480	4080	
MEAN LENGTH(cm)	30.8	27.8	30.0	30.8	29.8	30.0	
MEAN WEIGHT (g)	463	334	433	463	424	432	
DEPTH RANGE (m)	219/324	244/296	279/322	219/324	244/322	219/324	

TABLE VIII: GREENLAND HALIBUT, DIV. 3L, 2005:
length composition (0/000) of the 130mm trawl catches.

LENGTH GROUP	OCT	NOV	4th Q. =YEAR	LENGTH GROUP
26		0.2	0.1	26
28				28
30				30
32	0.7		0.3	32
34	0.9	2.2	1.6	34
36	13.4	79.9	48.6	36
38	55.7	92.4	75.2	38
40	91.1	128.0	110.6	40
42	132.2	144.2	138.6	42
44	132.4	146.7	140.0	44
46	113.2	139.0	126.9	46
48	124.8	119.3	121.9	48
50	106.1	101.7	103.8	50
52	80.2	23.0	49.9	52
54	71.2	19.1	43.6	54
56	62.4		29.4	56
58	11.3	1.1	5.9	58
60	0.7	1.1	0.9	60
62	0.9	1.7	1.3	62
64	1.9		0.9	64
66				66
68	0.3		0.2	68
70				70
72	0.4		0.2	72
74		0.5	0.3	74
TOTAL	1000	1000	1000	
No. SAMPLES	23	14	37	
SAMPLING WEIGHT(kg)	1712	897	2609	
No. F.MEASURED	1840	1120	2960	
MEAN LENGTH(cm)	47.6	44.8	46.1	
MEAN WEIGHT (g)	971	788	874	
DEPTH RANGE (m)	752/970	789/920	752/970	

TABLE IX: GREENLAND HALIBUT , DIV. 3M, 2005:
length composition (0/000) of the 130mm trawl catches.

LENGTH GROUP	OCT	NOV	4th Q. =YEAR	LENGTH GROUP
36	12.5	5.4	7.5	36
38	112.5	54.7	71.4	38
40	125.0	101.1	108.0	40
42	312.5	104.3	164.3	42
44	87.5	127.9	116.3	44
46	212.5	148.5	166.9	46
48	50.0	152.0	122.6	48
50	25.0	148.4	112.9	50
52	37.5	87.8	73.3	52
54	12.5	37.0	30.0	54
56	12.5	19.7	17.7	56
58		8.6	6.1	58
60		3.1	2.2	60
62		1.4	1.0	62
TOTAL	1000	1000	1000	
No. SAMPLES	1	5	6	
SAMPLING WEIGHT(kg)	58	385	443	
No. F.MEASURED	80	400	480	
MEAN LENGTH(cm)	44.5	47.3	46.5	
MEAN WEIGHT (g)	760	940	888	
DEPTH RANGE (m)	912/995	766/996	766/996	

TABLE X: ROUGHHEAD GRENADIER, DIV. 3L, 2005:
length composition (0/000) of the 130mm trawl catches.

LENGTH GROUP	OCT	NOV	4th Q. =YEAR	LENGTH GROUP
12	21.7	13.7	18.2	12
13	36.4	108.5	67.8	13
14	40.7	144.0	85.6	14
15	64.6	104.8	82.1	15
16	115.2	123.8	118.9	16
17	129.8	118.6	124.9	17
18	137.6	133.8	136.0	18
19	137.4	119.4	129.6	19
20	111.3	72.9	94.6	20
21	64.3	29.5	49.1	21
22	70.7	5.9	42.5	22
23	35.6	20.0	28.8	23
24	31.6	2.5	19.0	24
25	1.1	1.3	1.2	25
26	1.5	1.3	1.4	26
27	0.1		0.1	27
28	0.4		0.2	28
TOTAL	1000	1000	1000	
No. SAMPLES	23	13	36	
SAMPLING WEIGHT(kg)	1265	594	1859	
No. F.MEASURED	1840	1040	2880	
MEAN LENGTH(cm)	18.7	17.1	18.0	
MEAN WEIGHT (g)	707	567	646	
DEPTH RANGE (m)	752/970	791/935	752/970	

TABLE XI: ROUGHHEAD GRENADIER, DIV. 3M, 2005:
length composition (0/000) of the 130mm trawl catches.

LENGTH GROUP	OCT	NOV	4th Q. =YEAR	LENGTH GROUP
12		2.2	1.3	12
13	12.5	136.7	86.7	13
14	50.0	173.7	123.9	14
15	275.0	77.7	157.1	15
16	37.5	199.9	134.5	16
17	150.0	184.8	170.8	17
18	312.5	149.4	215.0	18
19	75.0	29.8	48.0	19
20	37.5	19.9	27.0	20
21	12.5	11.8	12.1	21
22	37.5	6.2	18.8	22
23		4.0	2.4	23
24		4.0	2.4	24
TOTAL	1000	1000	1000	
No. SAMPLES	1	4	5	
SAMPLING WEIGHT(kg)	44	177	222	
No. F.MEASURED	80	320	400	
MEAN LENGTH(cm)	17.5	16.5	16.9	
MEAN WEIGHT (g)	588	507	539	
DEPTH RANGE (m)	912/995	865/996	865/996	

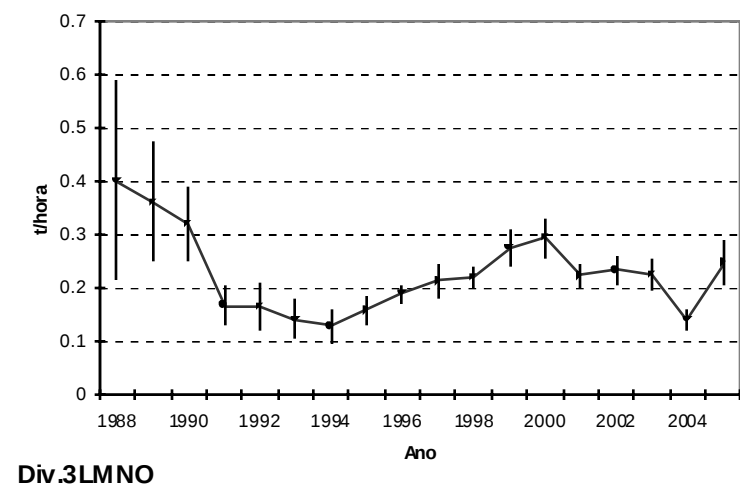
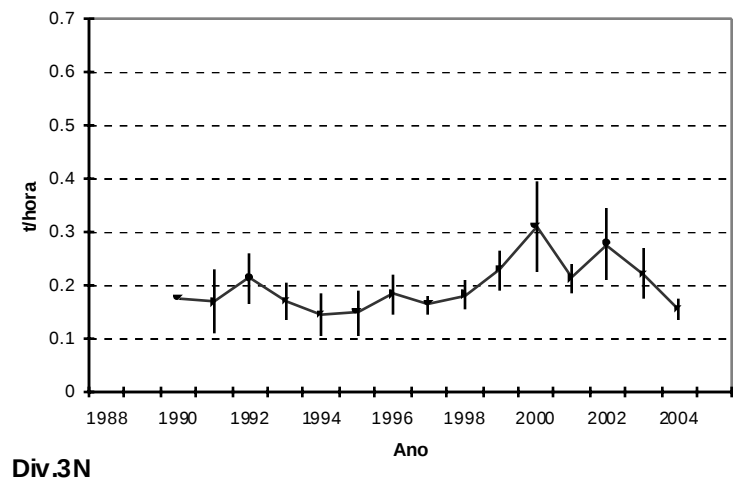
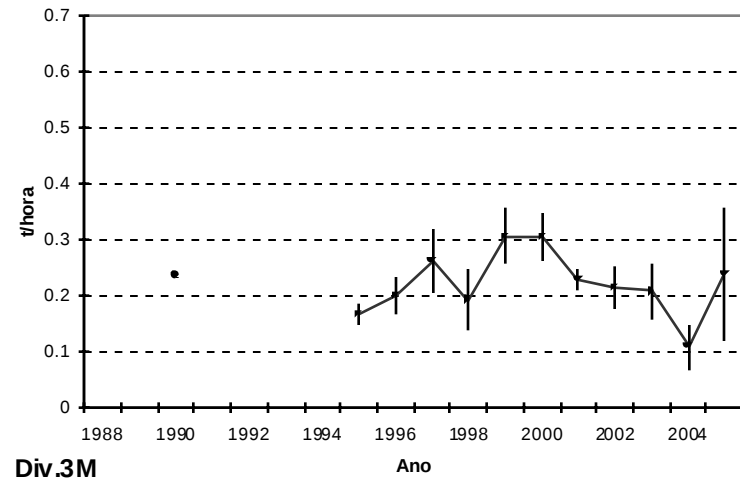
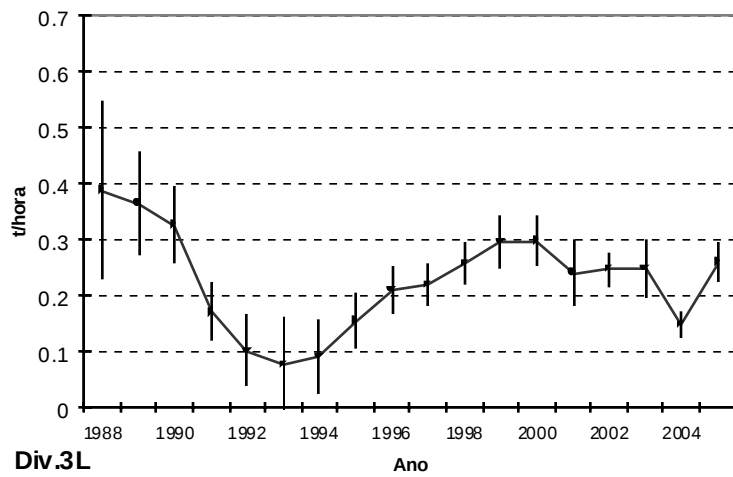


Fig. 1: Greenland halibut trawl catch rates by division, 1988 - 2005.

