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Russian Research Report for 2005

by

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SUBAREAS 1+2

A. Status of the fisheries

Greenland halibut

In the area to the north of 68°N (Div. 1AB), four vessels carried out fishing during 63 fishing days. Fishery was executed in a comparatively small area between 69°00'N-70°00'N and 59°00'W-60°00'W, at the depth of 900-1 300 m. 500 tons of halibut were caught. Mean daily fishing efficiency was 7.9 tons.

In the area to the south of 68°N (Div. 1CD), 4 trawlers took part in fishery during 152 fishing days. The trawl fishery took place from July to November, in the area between 63°30'N-64°30'N, 55°30'W-58°00'W, at the depth of 950-1 500 m. The catch was estimated at 1227 tons including 2 tons of roughhead grenadier and 1 ton of skates. Mean daily fishing efficiency was 7.8 tons and it was maximal (12.9 tons) in August.

In the trawl catches the Greenland halibut portion was close to 100%. The main object of by-catch was roughheaded grenadier (0.2%), as well as skates and threebeard rockling.

In accordance with the preliminary data, in 2005, off the West Greenland, 1 727 tons were caught by Russian fleet (Table 1).

Pelagic deep-water redfish

Pelagic Russian fishing of deep-water red fish in Div. 1F, 2J was executed at 200-380 m depths in July-September. Participating were 1-21 vessels of STM, RTMS, BMRTIB, BATM-types. The highest vessel efficiency was in July when the mean catch equaled to 19.2-36.4 tons per a fishing day. In September, trawl efficiency was somewhat lower amounting to 16.0-18.0 tons per a fishing day. According to the preliminary data, the total catch of pelagic red fish equaled to 12 362 tons. About 68% of total redfish catch were taken in Div. 1F.

Other fish species

There was no directed fishery of the other fish species. The by-catch of grenadier, skate, wolffishes and the other species amounted to about 2%.

B. Special research studies

In June-July 2005, Russia, Germany and Island conducted the International Trawl-Acoustic Survey (MTAS) for estimation of deep-water redfish stock in the Irminger Sea and the adjacent Labrador Sea. As a result of the survey, the total redfish biomass was estimated at 1.2×10^6 t. At that, the acoustic estimation of redfish biomass above the border of sound scattering layer (SSL) was 0.55×10^6 t, that one by the trawl method inside and under SSL – 0.67 x 10^6 t and 56% of pelagic deep-water redfish total biomass estimated by acoustic method in the layer above the SSL border were distributed within NAFO Regulatory Area. Redfish biomass estimated by trawl method in NAFO Regulatory Area inside and under SSL accounted for 3 % of total deep-water redfish biomass all over the surveyed area.

In Div. 1F, 2J of NAFO Regulatory Area, biological data on pelagic deep-water redfish were collected during the fishery by scientists from PINRO working aboard research vessels as NAFO observers.

Greenland halibut

In Div. 1D, halibut 30-108 cm in length were recorded, fish as long as 46-52 cm prevailed (Table 2). The average length of males was 49.3 cm, of females – 58.0 cm. Males prevailed with sex ratio 1.6.1.

Most studied fish were mature by the late August; about 66% of males were presp awning.

Main food items were squid, roughhead grenadier, blue hake and shrimp. Mean index of stomach fullness equaled to 0.5.

In Div.1D, halibut age varied from 4 to 16 years, predominating were fish aged 6-7 (Table 3).

Deep-water redfish

98 247 fish were measured, the analysis of feeding and maturity was made for 17 654 individuals, the age of 1217 ones was analyzed. In Div.1F, in the catches the length of deep-water redfish varied from 22 to 47 cm, the mean length was 34.6 cm (Table 4). Fish 35-36 cm in length aged 13-15 made up the bulk of catches (Table 5). Sex ratio was 1.5:1. About 10% of fish were immature. Redfish feeding was moderate. Zooplankton *Calanus* and *Themisto* made up the bulk of food diet.

In Div. 2J, the mean length of red fish was 34.6 cm. Fish with the length of 34-35 cm at the age of 13-14 years old prevailed in catches. Sex ratio was 1.5:1. The portion of immature fish amounted to 9%. Redfish fed intensively. *Calanus* and *Themisto* predominated in feeding.

SUBAREA 3

A. Status of the fisheries

Greenland halibut

Russian quota for 2005 in Div. 3LMNO amounted to 1 796 tons. Directed fishery was conducted by 5 medium and large size trawlers during the year. According to the preliminary data, the catch was equal to 1 590 tons.

The vessels operated on the continental slope areas which were adjacent to the deepwater Flemish Pass Deep (Div. 3L and adjacent areas of Div. 3M) at 500-1 450 m depth. Mean fishing efficiency was 250 kg of halibut per fishing hour. In that area, 94% of the total halibut catch were taken. By-catch contained grenadiers (1%), redfish species (1%), American plaice (1%), the other fish species (Atlantic halibut, witch flounder, dab, skates, wolffishes, hakes and sharks) amounted to 2%.

Two medium size trawlers periodically conducted fishery in Div. 3N, at 760-1 200 meters. Mean efficiency amounted to 220 kg of halibut per fishing hour. The by-catch of the other species was significantly larger: grenadiers -9%, skates -3%, red fish species -2%, American plaice -2%, witch flounder -1%, Atlantic halibut -1%, hakes -1% and sharks -1%.

Redfish

In 2005, two vessels of SRTMK-type (1 000-2 000 kW) conducted directed fishery of redfish on the Flemish Cap. In September-November, the vessels operated at 230-440 m depths. On the whole, in the period of fishing the efficiency of those vessels equaled to 22.1 tons. Most Russian catch was taken due to golden redfish (more than 50%). According to the preliminary data, the total catch equaled to 1 023 tons.

In Div. 3O, redfish sometimes was fished in October-November. One vessel of SRTMK-type (1 000-2 000 kW) operated at 200-500 m depths. Witch flounder, hakes, American plaice and cod made up the bulk of by-catches in redfish fishery. As a whole, in the period of fishing, the efficiency of vessels of STM-type was 23.1 tons. By preliminary data, in this area the total catch of redfish amounted to 170 tons.

Skate

In Div. 3N, the directed fishery of skates was conducted by the two vessels of SRTMK-type (1 000-2 000 kW) at 40-140 m depth from August to November. The main fishing object was thorny skate (*Amblyraja radiata*). As a whole, during directed fishery the efficiency of SRTMK-type vessels was 23.8 t/fishing day. By the preliminary data, in Div. 3N, in the directed fishery, the catch of skates equaled to 70 tons.

In Div. 3LMO, different skate species occurred only as by-catch in halibut fishery.

By the preliminary data, the total catch of all skate species in Div. 3LMNO made up 79 tons.

Other species

No directed fishery for other fish species was carried out. The by-catch of the other fish species in the directed fisheries accounted for 1-10%.

B. Special research studies

Greenland halibut (Reinhardtius hippoglossoides)

There were no special surveys to estimate the stock of Greenland halibut. Aboard fishing vessels biological data were collected by the observers from PINRO.

In Div. 3LMN, halibut 20-103 cm in length occurred in the catches of fishing vessels (Table 6). The mean length was 44.1 cm. The modal group had the length of 40-41 cm. Individuals from 38-44 cm length groups predominated in catches, their portion was 48.9%. The by-catch of juveniles with the length of less than 30 cm did not exceed 0.3 %. The age of fish determined by scale varied from 2 to 17 years (Table 7). Fish aged 5 (the year-class of 2000) made up the bulk of fishing catches (Table 8).

Roughhead grenadier (Macrourus berglax)

It is one of abundant by-catch species in the fishery of Greenland halibut. In Div. 3L, the total length of roughhead grenadier varied from 27 to 90 cm, the mean length was 48.2 cm (Table 9). Fish as long as 42-45 cm prevailed.

In Div. 3M, the fish length distribution varied from 24 to 84 cm. Grenadier as long as 42-48 cm made up the bulk of catches.

In Div. 3N, the length of roughhead grenadier varied from 24 cm to 87 cm, the mean length was 52.9 cm.

On the whole, in Div. 3LMN, the roughhead grenadier with 24-90 cm length occurred, the mean one amounted to 48.2 cm

Acadian red fish (Sebastes fasciatus)

In 2005, observers on Russian vessels separated deep-water redfish from Acadian redfish *S. fasciatus* in catches and biological data on those species were collected.

In Div. 3M, the length of red fish *S. fasciatus* varied from 15 to 35 cm, the average one was equal to 22.5 cm. In the catches, fish as long as 21 cm predominated (Table 10).

In Div. 3N, the redfish length varied from 19 to 31 cm, the mean one amounted to 24.8 cm. Fish as long as 23-25 cm prevailed.

In Div. 3O, the Acadian red fish as long as 13-38 cm were found, the mean length was 23.2 cm. Individuals from 20-22 cm size group were predominating.

Deep-water redfish (Sebastes mentella)

In Div. 3L, the length of deep-water red fish in by-catch in the Greenland halibut fishery ranged from 21 to 48 cm with the mean length of 30.5 cm (Table 11). Prevalent were fish of 28-30 cm length.

In Div. 3M, redfish length distribution fluctuated from 15 to 37 cm. Fish with length of 22-24 cm made up the bulk of catches.

In Div. 3N, redfish length was equal to 20-40 cm with the average one of 31.3 cm. In the catches, fish 28-30 cm in length were predominating.

In Div. 3O, redfish length ranged from 22 to 41 cm with the mean one of 33.3 cm.

Golden redfish (Sebastes marinus)

In Div. 3M, the length of golden redfish males was 15-45 cm, the mean one amounted to 25.9 cm (Table 12). Females as long as 15-52 cm occurred in catches.

In the length group, fish as long as 23-26 cm predominated, the mean length equaled to 26.9 cm.

American plaice (Hippoglossoides platessoides)

In Div. 3L, the length distribution of American plaice in the by-catches during the Greenland halibut fishery was characterized by 20-60 cm fish (Table 13).

In Div. 3N, the by-catch during the fishery of sk ate the length of American plaice varied from 24 to 68 cm with the mean one of 40.3 cm. Predominating were fish 34-37 cm in length.

Yellowtail flounder (Limanda ferruginea)

In Div.3M, only single fish occurred in catches.

In Div. 3N, in the by-catches from skate directed fishery fish length fluctuated from 16 to 50 cm, the mean length amounted to 33.6 cm (Table 14). Fish 32-35 cm in length predominated in catches.

In Div. 3O, the fish were found as single individuals.

Witch flounder (Glyptocephalus cynoglossus)

In Div. 3L, the length distribution of witch flounder in by-catches in the fishery of Greenland halibut was characterized by fish as long as 10-52 cm with the average length of 34.2 cm (Table 15).

In Div. 3N, minor amounts of fish were found in by-catch. The length varied from 36 to 50 cm, the mean one was 42.8 cm.

Cod (Gadus morhua)

In Div. 3M, that species occurred as single fish.

The largest cod was registered in Div. 3N, in the catches during the directed fishery of skates. Length distribution varied from 36 to 138 cm, with the mean length of 82.5 cm (Table 16).

Threebeard rockling (Gaidropsarus ensis)

In Div. 3L, the length of studied fish varied from 21 to 50 cm with the average one of 37.6 cm (Table 17). Fish with the size of 36-38 cm made up the bulk of catches.

In Div. 3M, the length of fish was from 12 to 48 cm, the average one equal ed to 38.4 cm. In the catches prevailing were specimens 36-43 cm in length.

In Div. 3N, the length of threebeard rockling varied from 18 to 48 cm.

White hake (Urophycis tenius)

In Div. 3N, this species length varied from 30 to 49 cm with the mean one of 39.9 cm (Table 18).

Thorny skate (Amblyraja radiata)

In Div. 3L, in the fishery of Greenland halibut, the species occurred as single individuals.

In Div. 3M, the length of thorny skate varied from 9 to 60 cm, the mean length amounted to 35.4 cm (Table 19).

In Div. 3N, the length of caught individuals varied from 27 to 87 cm with the mean one of 60.6 cm. The catches were predominated by fish with 54-59 cm length.

Black dogfish (Centroscyllium fabricii)

They were mainly recorded in by-catches in the fishery of halibut, at 750-1 450 m depths. The length of fish from Div. 3LMNO varied from 45 to 77 cm, the mean one was 60.58 cm (Table 20). In the catches predominating were fish 54-63 cm in length.

Northern wolfish (Anarhichas denticulatus)

They were registered in the by-catches in the fishery of halibut. In Div. 3LMN, the length of northern wolfish varied from 30 to 122 cm, the mean one amounted to 55.6 cm (Table 21). The catches were predominated by individuals 45-50 cm in length.

Blue hake (Antimora rostrata)

The fish continuously occurred in the by-catches in Div. 3LMNO, at 750-1 500 m depths. Blue hake were as long as 18-66 cm with the mean length of 34.3 cm (Table 22). Specimens with 33-35 cm length predominated in catches.

Common grenadier (Nezumia bairdii)

It is one of the abundant species in by-catches in Greenland halibut fishery. The fish were recorded in the catches all over Div. 3LMNO. The total length of the fish varied from 21 to 43 cm, the mean one was 31.6 cm (Table 23).

Other fish species

In the period of fishery, occurring as by-catch were Atlantic halibut, Atlantic and spotted wolffishes, roundnose grenadier, chimaeras, longfinned hake, *Notacanthidae* and other fish species.

SUBAREA 4

A. Status of the fisheries

In 2005 no fishing activities were carried out in the Scotia shelf area by Russian vessels.

In 2007 the commercial stock of silver hake will be represented mainly with year-classes of 2003, 2004 and 2005. According to the Canadian trawl survey data (DFO, 2005) and oceanographic research by AtlantNIRO, the first of them belongs to poor year-classes, while the next year-class considerably exceeds the mean long-term level. No information on 2005 year-class is available yet. If its abundance appears at least at the mean level, the fishing

biomass in 2007 will most probably increase as compared to 2006, taking in account low fishing mortality. However, at present it is not possible to assess this increase.

B. Special research studies

- 1. Environmental researches
- a) Hydrographic studies

In 2005 the monitoring of sea-surface temperature (SST) and latitudinal fluctuations of hydrological fronts in the Labrador and Gulf Stream currents systems was continued. As before, the mean monthly SST anomalies at 13 points located in NAFO Subdiv. 2J, 3KLMN, 4VWX and adjacent open-sea area were used, as well as the anomalies of the surface localization indices of three water masses boundaries: the boundary of the Cool shelf water mass, the boundary of the Slope water mass and the northern boundary of the Gulf Stream front in the area between 55°W and 70°W. The monitoring scheme is shown in Fig. 1. In 2005, similar to 2004, the positive SST anomalies retained on the shelf of the Northwestern Atlantic Ocean and adjacent open sea areas.

In the Labrador current from 55°N to 49°N (points 1, 4, 6) positive anomalies of SST were observed during 10-11 months. In January and February SST were slightly lower than the norm. The highest exceeding of the normal SST values was observed in spring-summer, when the anomalies attained 2.0-2.9°C. The positive anomalies with maximum values 2.8-3.1°C in May prevailed also off this current in the Labrador Sea (point 2).

In the North Atlantic current branch to the north of the Flemish Cap (point 3 and 5) SST values were in 0.3-2.6°C below the norm in January-April, while from May the warming began and continued to the end of the year. During 2005 on the eastern slope and shelf of the Grand Bank (points 8, 9) the positive SST anomalies also prevailed, mostly exceeding the values in 2004. In the eastern shelf of New Scotland (point 10) SST was close to the norm in winter-spring and exceeded the norm in 0.9-1.3°C in summer-autumn. The analysis of the current temperatures showed that there in the shallow-water spawning grounds of silver hake the optimal conditions (SST>10°C) formed by the end of June. On the shelf slope (point 11) SST exceeded the mean long-term level during all months of 2005. Outside the Scotian shelf area, in the Slope water mass and at the Gulf Stream front (points 12, 13) the positive SST anomalies prevailed as well.

Analysis of hydrological front fluctuations in 2005 demonstrated that in the areas of New England and New Scotia the Cold water mass boundary was still southwards of its mean long-term position, similar to two previous years, indicating the increased advection of cold water to the shelf. During 2005 the Slope water mass boundary and the northern edge of the Gulf Stream front in these areas slightly shifted. Considerable variability of all three boundaries were observed in the Laurentian Channel area (55-58°W), where they mostly shifted to the north, evidencing increase of the warm water advection into the Laurentian Channel.

C. Miscellaneous studies

The possibility of revealing the indications of stock-recruitment relationship and evaluating (at least qualitative) its impact on year-classes abundance formation was studied in 12 fish stock units in NAFO area. For this purpose a special methodical approach was used. The indications of the density relationship effect were observed in all species studied. The obtained results allowed to distinguish two fish groups, distinctly different in the degree and pattern of its manifestation. For each of these groups the recommendations of fishery management were proposed on the basis of qualitative assessment of limit reference points and optimal ranges of spawning biomass. The detailed description of the research fulfilled is presented in SCR Doc, submitted to this meeting of the Scientific Council.

References

DFO. 2005. Silver hake on the Scotian Shelf (Div. 4VWX). DFO Can. Advis. Sec. Sci. Advis. Rep., 2005/059.

Species	Division	Catch, t
Greenland halibut	1A	421
	1B	79
	1C	281
	1D	943
	1AB CD	1724
	3L	1412
	3 MI 2 NI	83
	51N 20	95
	30 31 MNO	+ 1 5 9 0
A tlantic halibut		1370
A merican plaice	31	10
American plaree	3M	+
	3N	8
	30	3
	3LMNO	21
Yellowtail flounder	3N	8
Witch flounder	3L	2
	3N	2
	30	6
	3LMNO	10
Roughhead grenadier	3L	23
	3M	7
	3N	21
		51
Deep-sea redfish		8238
	2n 2I	3085
	2J 1F2HI	12362
Redfish snn	31	19
Ketti ish spp.	3M	1023
	3N	2
	30	170
	3LMNO	1214
Skate	3L	5
	3M	2
	3N	70
	30	1
	3LMNO	79
Atlantic cod	3N	2
	30	3
XX/a LCC als area	<u>3NU</u>	5
womisn spp.	3L 2M	3
		4
		1 Q
Threeheard rockling	31	5
in cocara rocking	3M	1
	3LMN	6
White hake	3N	 1
·······	30	2
	3NO	3

TABLE 1. Preliminary catches taken by Russian trawlers in NAFO SA 1-3 in 2005.

Length, cm	Males	Females	Total
30	2		2
32	1		1
34	1	3	4
36	12	2	14
38	59	11	70
40	207	67	274
42	351	95	446
44	572	205	777
46	726	220	946
48	754	293	1047
50	672	306	978
52	590	361	951
54	397	291	688
50	270	221	491
58	165	184	349
60	60	1//	237
62	40	101	141
64	10	99	115
00 68	15	97	110
00		02 20	04 20
70		39 27	39 27
72 74		32	32
76		42	12
70		42	42
80		16	16
82		21	21
94		10	10
84 86		10	10
88		9	5
90		5	3 7
00		,	,
92		4	4
94		Z	2
90		1	1
90 100		1	1
100		1	1
104			
104			
108		1	1
100		1	1
Total	4908	3063	7971

TABLE 2. Greenland halibut length composition (ind.) of the Russian trawl catches in NAFO Div. 1D in 2005.

Length,	th, Age, years									Total	Weight,					
cm		4	5	6	7	8	9	10	11	12	13	14	15	16	10141	g
33		2													2	270
34															0	0
35		2													2	330
36			2												2	400
37			12												12	417.5
38			20	3											23	472.1
39		6	35	6											47	460.6
40			96	9											105	534.6
41			138	31											169	559.5
42			140	37											177	598.2
43			135	135											270	652.5
44			78	312											390	685.5
45			12	350	23										385	771.5
46				379	81										460	846.2
47				226	261										487	860.9
48				179	357										536	928.8
49				61	428	20									510	1013.8
50					457	14									471	1114.7
51					461	48									509	1116.7
52				25	427	75									528	1212.9
53					387	35									422	1215.8
54					294	112									406	1368.1
55					169	112									281	1414.8
56					104	155									259	1486
57					30	182	20								232	1582.2
58						156	43								199	1673.5
59				7		95	48								150	1855
60						54	61	13							128	1894.2
61						50	50	10							109	2211.8
62							63	7							70	2304
63					5	15	30	20							71	2358.2
64							39	25							64	2315
65							26	26							51	2518.8
66							4	43	8						55	2724.6
67								39	17						55	2876.5
68								41	7						48	2950
69								9	26						34	3147.5
70									17	6					22	3357.5
71								3	10	3					17	3656
72									7	4					11	4000
73									5	11					16	3733.3
74										15					15	4545
75										17					17	4550
76										23					23	3946.7
77											20				20	4421.7
78											18				18	5171.3
79										3	10				13	5138.8
80											10				10	4975
81															0	0
82										3	6				9	5655
83															0	0
84											7				7	5530
85											3				3	7350
86											3	3			6	8032.5
87													3		3	6990
88															0	0
89															0	0
90												4			4	8500
91															0	0

TABLE 3. Greenland halibut age composition of the Russian trawl catches (ind.) in the NAFO Div. 1D in 2005.

Length,	Age, years												Total	Weight,	
cm	4	5	6	7	8	9	10	11	12	13	14	15	16	10141	g
92														0	0
93														1	0
94														0	0
95													1	1	10030
Total	10	668	1760	3484	1123	384	236	97	85	77	7	3	1	7935	
Mean length,	360	558	786	1152	1613	2147.8	2679.8	3266	4323	5419.2	7655	6990	1003		1568.4
Mean weight,	35.7	40.9	45.2	51.2	57.0	61.4	65.6	693	74.6	804	88.0	87.0	95.0		53.7

TABLE 4. Redfish length composition (ind.) of the Russian trawl catches in NAFO Div. 1F, 2J in 2005.

Length,		Division1F			Division 2J			Total	
cm	Males	Females	Total	Males	Females	Total	Males	Females	Total
22	1	-	1	-	-	-	1	-	1
23	-	-	-	-	-	-	-	-	-
24	1	1	2	-	-	-	1	1	2
25	4	2	6	4	2	6	8	4	10
26	28	27	55	15	20	35	43	47	90
27	100	100	200	58	67	125	158	167	325
28	258	220	478	147	148	295	405	368	773
29	494	421	915	322	289	611	816	710	1526
30	1048	715	1763	689	518	1207	1737	1233	2970
31	1537	940	2477	1008	616	1624	2545	1556	4101
32	2360	1225	3585	1554	730	2284	3914	1955	5869
33	4264	1700	5964	2542	957	3499	6806	2657	9463
34	6978	2561	9539	3717	1271	4988	10695	3832	14797
35	8369	3957	12326	4118	1737	5855	12487	5694	18181
36	5795	4286	10081	2633	1739	4372	8428	6025	14453
37	4073	4604	8677	1764	1897	3661	5837	6501	12338
38	2190	3403	5593	1021	1394	2415	3211	4797	8008
39	896	1724	2620	414	738	1152	1310	2462	3772
40	244	683	927	121	311	432	365	994	1359
41	45	183	228	24	72	96	69	255	324
42	13	59	72	6	23	29	19	82	101
43	11	10	21	-	3	3	11	13	24
44	7	2	9	-	2	2	7	4	11
45	6	1	7	-	-	-	6	1	7
46	9	-	9	-	-	-	9	-	9
47	1	-	1	-	-	-	1	-	1
Total	38732	26824	65556	20157	12534	32691	58889	39358	98247
Mean length, cm	34.6	35.5	35.0	34.4	35.1	34.6	34.5	35.4	34.9

Age,		Division1F			Division 2J			Total	
years	Males	Females	Total	Males	Females	Total	Males	Females	Total
7	80	50	130	47	35	82	127	85	212
8	224	186	410	128	126	254	352	312	664
9	336	360	696	212	250	462	548	610	1158
10	1270	1288	2558	833	891	1724	2103	2179	4282
11	1884	854	2738	1237	538	1775	3121	1392	4513
12	4999	2089	7088	3005	1178	4183	8004	3267	11271
13	11597	3804	15401	6180	1855	8035	17777	5659	23436
14	8125	5942	14067	3876	2562	6438	12001	8504	20505
15	5935	6462	12397	2702	2667	5369	11637	9129	17766
16	3603	3970	7573	1630	1652	3282	5233	5622	10855
17	592	1677	2269	281	724	1005	873	2401	3274
18	50	124	174	24	48	72	74	172	246
19	20	16	36	2	7	9	22	23	45
20	7	1	8	-	1	1	7	8	9
21	8	1	9	-	-	-	8	1	9
22	2	-	2	-	-	-	2	-	2
Total	38732	26824	65556	20157	12534	32691	58889	39358	98247
Mean									
age, years	13/5	14.0	13.7	13.3	13.7	13.5	13.4	13.9	13.6

TABLE 5. Redfish age composition (ind.) in NAFO Div. 1F, 2J in 2005.

Length				Divis	ion 3L,by	month]	Division 3N	I, by mon	th		Division 3N	N, by mont	h	Total
cm	III	IV	V	VI	VII	VIII	XI	XII	Total	VII	XI	XII	Total	III	VII	VII	Total	3LMN
20			•								•	3	3					3
22		1							1			1	1			1	1	3
24		5		2	2				9									9
26 28		19		8	3				30		1	2	2	1			1	31
28	5	51 152	21	1/	0 10			2	74		1	2	3	0	0		17	322
30 32	5	152 527	21 57	200	19		5	2	301 026		1	5 12	4	9	8 18	24	1/	322 1033
34	9 19	951	37 80	290 466	12	12	5 7	1	920 1406		24	12	19	54	40	24	00 161	1055
34 36	18	634 1370	09 151	400	45 68	15	/	20	2490	15	24 51	23 17	49	54 80	121	37 88	280	2892
38	154	1682	145	982	70	101	138	20 62	3334	46	124	104	274	148	139	144	431	4039
40	377	1740	135	1196	66	168	323	103	4108	116	173	149	438	210	141	226	577	5123
42	468	1268	125	1197	56	171	379	121	3785	142	200	153	495	206	148	282	636	4916
44	463	898	66	1001	59	202	352	126	3167	141	258	261	660	186	100	323	609	4436
46	422	552	62	754	41	247	327	68	2473	160	222	223	605	205	78	303	586	3664
48	295	270	45	622	58	292	213	44	1839	66	200	151	417	182	45	291	518	2774
50	200	151	10	510	26	213	132	13	1255	65	108	86	259	145	22	230	397	1911
52	138	82	6	402	38	141	76	19	902	86	69	80	235	91	6	155	252	1389
54	94	51	1	324	20	127	50	11	678	53	51	66	170	78	1	118	197	1045
56	56	31	2	224	13	68	30	1	425	29	26	38	93	66	3	71	140	658
58	64	16	2	136	1	51	24		294	12	28	29	69	38		50	88	451
60	37	9		126	3	29	15		219	7	22	20	49	28		38	66	334
62	19	5	2	90	1	18	6		141	15	5	14	34	26		36	62	237
64	10	6		68		17	5		106	7	3	8	18	15		21	36	160
66 (8	4	4		59		15	2		84 52	1	4	4	9	9		17	26	119
08 70	2	5	1	30 26		15			55 56	2	5	0	12	10		24 14	34 22	90 100
70	2	5	1	36		6			50 49	2	1	5	8	10		14 8	32 21	78
74	2	2		22		2	1		42	2	2	0	11	0		6	21 15	64
74	4	2		25		1	1		30		1	2	3	9		4	13	43
78	3			13		3	1		20	2	4	6	12	7		8	15	43
80	1	6		10		5			17	2	1	1	4	6		3	9	30
82	2	-		12		2			16	3	-	2	5	7		2	9	30
84	3	2		10		1			16		1	1	2	4			4	22
86				7					7		1	1	2	3			3	12
88				2					2		1		1	6			6	9
90				5					5		1		1					6
92		1							1			2	2					3
94				3					3			1	1					4
96				1					1		1		1					2
98				1					1			1	1					2
100											1		1	1			1	2
102														1			1	1
Total	2934	<u>9769</u>	920	9518	630	1953	2131	597	28452	972	1597	1524	4093	1884	930	2524	5338	37883
Mean length, cm.	46.00	40.12	39.93	44.77	42.18	48.28	45.11	43.46	43.33	47.04	45.97	46.8	46.53	47.43	40.75	47.43	46.26	44.09

TABLE 6. Greenland halibut length composition (ind.) of the Russian commercial trawler catches by month in NAFO Div. 3LMN in 2005.

Length, cm									Age, year	s							Total	Av. weight,
Lengen, em	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	Ioun	g
20	2	1															3	71.1
22	2	1															3	84.5
24	1	8															9	112.1
26		21	1														21	143.1
20		12	16														15	105.0
30		15	10														29	255.5
34		0	20	10													54	347.8
36			24	62													86	399.1
38			1	81													82	480.1
40				84	8												<u>92</u>	555.0
42				68	23												91	645.6
44				25	66	1											92	747.1
46				1	81	13											95	840.5
48					43	33											76	973.4
50					3	55											58	1080.7
52					2	54	4										6U 70	1280.1
54						48	11	2									59 50	1429.2
50 59						12	37	3									52	1007.5
50						2	39 16	22	6								50 44	2134.9
62							8	17	5	1							31	2330.4
64							2	11	14	1							28	2616.8
66								4	25	8							37	3082.8
68									8	8	1						17	3207.1
70								1	1	28	1						31	3606.1
72										12	10	1					23	4362.2
74										8	19	1					28	4632.7
76											10	3					13	5261.5
78											6	16	•				22	5612.5
80											2	12	2				11	6459.5
82 84												13	1				14	0089.0 7642 5
86 86												1	+ 5				0	8364 4
88												+	3				3	9345.0
90													2	1	2		5	9992.0
92													2	1	4	1	2	9625.0
94														2	2	1	5	10980.0
96														1			1	10500.0
98															2		2	11940.0
100																1	1	14470.0
Total	5	62	112	331	226	218	117	67	59	66	49	51	17	5	6	3	1394	
Mean length, cm	17.79	27.47	33.91	39.78	45.78	51.68	57.89	61.72	65.42	70.33	75.02	80.80	85.82	93.80	94.86	96.00		
Mean weight, g	48.2	171.0	332.3	533.5	815.4	1194.2	1797.2	2271.6	2886.9	3671.3	4900.5	6445.3	8139.1	10252.0	11262.9	11566.7		

TABLE 7. Greenland halibut age-length relationship in the Russian commercial trawler catches (ind.) in NAFO Div. 3LMN in 2005.

Age, years	Division												
	3	L	3	Μ	3	N	3 L	MIN					
	n	%	n	%	n	%	n	%					
2	1	0.00	3	0.07	1	0.02	5	0.01					
3	415	1.46	9	0.22	25	0.47	450	1.19					
4	2879	10.12	93	2.27	298	5.58	3269	8.63					
5	12831	45.10	1317	32.18	1838	34.44	15986	42.20					
6	6830	24.01	1410	34.45	1469	27.52	9709	25.63					
7	3835	13.48	891	21.77	1111	20.82	5836	15.41					
8	842	2.96	195	4.76	264	4.95	1301	3.43					
9	317	1.11	69	1.69	109	2.04	495	1.31					
10	189	0.66	32	0.78	72	1.35	293	0.77					
11	138	0.49	26	0.64	69	1.29	234	0.62					
12	84	0.30	18	0.44	36	0.67	138	0.36					
13	63	0.22	19	0.46	32	0.60	115	0.30					
14	19	0.07	4	0.10	12	0.22	34	0.09					
15	4	0.01	3	0.07	0	0.00	6	0.02					
16	4	0.01	2	0.05	0	0.00	6	0.02					
17	1	0.00	2	0.05	1	0.02	4	0.01					
Total	28452	100	4093	100	5337	100	37882	100					

TABLE 8. Greenland halibut age composition of the Russian commercial trawler catches in NAFO Div. 3L, 3M, 3N and 3LMN combined in 2005.

TABLE 9. Length composition (ind.) of Roughhead grenadier in Russian trawler catches in NAFO Div. 3LMN in 2005.

Length, cm	3L	3M	3N	3LMN
24		1	8	9
27	3	3	11	17
30	2	5	10	17
33	28	8	9	45
36	49	24	14	87
39	70	41	25	136
42	113	59	53	225
45	133	47	56	236
48	96	54	57	207
51	62	36	25	123
54	45	17	28	90
57	23	17	22	62
60	13	7	14	34
63	14	12	5	31
66	6	6	7	19
69	8	6	3	17
72	10	5	4	19
75	4	2	2	8
78	5	6	2	13
81	4	2		6
84	4	2	1	7
87	3		2	5
90	1			1
Total	696	360	358	1414
Mean length, cm.	48.2	48.7	47.8	48.2

Length, cm	3M	3N	30	3MNO
13			1	1
14			1	1
15	4		2	6
16	4		1	5
17	16		4	20
18	28		13	41
19	37	1	44	82
20	44	10	145	199
21	54	21	155	230
22	33	22	145	200
23	40	31	118	189
24	32	34	108	174
25	22	37	65	124
26	24	24	46	94
27	28	27	43	98
28	9	18	26	53
29	9	16	14	39
30	3	6	14	23
31	3	3	4	10
32	5		20	25
33	4		15	19
34			6	6
35	1		3	4
36			3	3
37			3	3
38			1	1
Total	400	250	1000	1650
Mean length, cm.	22.5	24.8	23.2	23.3

TABLE 10.Length composition (ind.) of Acadian redfish (S. fasciatus) in Russian trawler catches in NAFO Div. 3MNO
in 2005.

Length, cm	3L	3M	3N	30	3LMNO
15		11			11
16		17			17
17		22			22
18		44			44
19		79			79
20		81	2		83
21	3	117	2		122
22	1	152	6	1	160
23	3	156	6	2	167
24	5	183	7	1	196
25	23	125	6		154
26	66	96	11	1	174
27	115	58	11	1	185
28	178	39	21	3	241
29	153	33	26	3	215
30	168	15	28	2	213
31	102	18	27	3	150
32	79	16	31	2	128
33	59	9	37	3	108
34	55	13	37	5	110
35	52	5	31	5	93
36	37	4	24	5	70
37	27	2	9	1	39
38	17		5	2	24
39	6		3	5	14
40	7		1	4	12
41	6			1	7
42	3				3
43	4				4
44	4				4
45	3				3
46					
47	_				
48	1				1
Total	1177	1295	331	50	2853
Mean length, cm.	30.5	23.5	31.3	33.3	27.5

TABLE 11.Length composition (ind.) of Deep-sea redfish (S. mentella) in Russian trawler catches in NAFO Div.
3LMNO in 2005.

Length, cm	Males	Females	Total
15	1	2	3
16	3	2	5
17	3	9	12
18	7	4	11
19	10	9	19
20	19	17	36
21	20	14	34
22	28	26	54
23	58	42	100
24	62	48	110
25	54	56	110
26	44	63	107
27	40	50	90
28	15	28	43
29	16	18	34
30	2	10	12
31	10	5	15
32	11	8	19
33	15	6	21
34	14	6	20
35	8	9	17
36	8	8	16
37	6	10	16
38	7	10	17
39	2	4	6
40		5	5
41	1	4	5
42		4	4
43		4	4
44		1	1
45	1	5	6
46		3	3
47		3	3
48		3	3
49		5	5
50		l	1
51		2	2
52		1	1
Total Mean length or	465	511	976 26 0
mean rength, cm.	25.9	<i>41.</i> ð	20.9

TABLE 12.Golden redfish (S. marinus) length composition (ind.) of the Russian trawler catches in NAFO Div. 3M in
2005.

Length, cm	3L	3M	3N	3LMN
14	1	2		3
16				
18				
20				
22	2			2
24	16	1		17
26	17	2	6	25
28	29		10	39
30	52		34	86
32	56		49	105
34	49		55	104
36	36		69	105
38	39		35	74
40	35		28	63
42	37		22	59
44	40		25	65
46	35		16	51
48	19		16	35
50	8		5	13
52	3		12	15
54	1		4	5
56			13	13
58			15	15
60			7	7
62			4	5
64			4	4
66			2	2
68			2	2
Total	476	5	433	914
Mean length, cm.	37.3	21.3	40.3	38.5

TABLE 13. Length composition (ind.) of American plaice in Russian trawler catches in NAFO Div. 3LMN in 2005.

TABLE 14. Length composition (ind.) of Yellowtail flounder in Russian trawler catches in NAFO Div. 3MNO in 2005.

Length, cm	3M	3N	30	3MNO
16		1		1
18		6		6
20		4		4
22		6		6
24		5		5
26		6		6
28		22		22
30		57		57
32		117		117
34		106	1	107
36		58	3	61
38	1	42	2	45
40	2	14	3	19
42		9		9
44		7	1	8
46		1		1
48				
50		1		1
Total	3	462	10	475
Mean length, cm.	39.8	33.6	38.7	33.8

Length, cm	3L	3N	3LN
10	7		7
12	3		3
14	1		1
16	4		4
18	12		12
20	9		9
22	7		7
24	5		5
26	11		11
28	2		2
30	10		10
32	8		8
34	7		7
36	21	1	22
38	21	3	24
40	19	5	24
42	20	4	24
44	16	2	18
46	12	2	14
48	10	1	11
50	1	2	3
52	1		1
Total	207	20	227
Mean length, cm.	34,2	42,8	35,0

TABLE 15. Length composition (ind.) of Witch flounder in Russian trawler catches in NAFO Div. 3LN in 2005.

Length, cm	3M	3N	30	3MNO
27			2	2
30			2	2
33			2	2
36		1	6	7
39		1		1
42		5		5
45	1	3		4
48		2		2
51				
54	1	2		3
57	2	4		6
60	4	6		10
63	4	2		6
66	3	7	1	11
69	6	3	2	11
72	8	7	5	20
75	4	1		5
78	6	2		8
81		2		2
84		9		9
87		5		5
90		1		1
93		10		10
96		6		6
99		7		7
102		7		7
105		1		1
108				
111				
114		1		1
117		2		2
120		3		3
123		2		2
126		1		1
129				
132				
135		1		1
138		1		1
Total	39	105	20	164
Mean length, cm	69.2	82.5	49.0	75.3

TABLE 16. Length composition (ind.) of Atlantic cod in Russian trawler catches in NAFO Div. 3MNO in 2005.

TABLE 17. Length composition (ind.) of Threebeard rockling in Russian trawler catches in NAFO Div. 3LMN in 2005.

Length, cm	3L	3M	3N	3LMN
12		1		1
15		8		8
18		5	7	12
21	3		12	15
24	16		4	20
27	42	6	10	58
30	81	13	9	103
33	192	44	5	241
36	306	71	9	386
39	230	66	5	301
42	165	69	5	239
45	55	36	5	96
48	9	5	1	15
Total	1099	324	72	1495
Mean length, cm	37.6	38.4	31.3	37.4

Length, cm	3N
24	
27	
30	3
33	7
36	14
39	12
42	16
45	8
48	1
51	
Total	61
Mean length, cm	39.9

TABLE 18. Length composition (ind.) of White hake in Russian trawler catches in NAFO Div. 3N in 2005.

TABLE 19. Length composition (ind.) of Thorny skate in Russian trawler catches in NAFO Div. 3LMN in 2005.

Length, cm	3L	3M	3N	3LMN
9		1		1
12		17		17
15		15		15
18		3		3
21		4		4
24				
27		1	1	2
30		2		2
33	1	9	3	13
36		7	21	28
39	1	7	17	25
42	1	4	23	28
45	1	5	31	37
48	2	8	38	48
51	9	9	64	82
54	7	12	141	160
57	5	6	138	149
60	4	3	111	118
63	4		115	119
66	1		116	117
69	2		74	76
72			62	62
75			35	35
78			28	28
81			1	1
84			8	8
87			3	3
Total	38	113	1030	1181
Mean length, cm	55.6	35.4	60.6	58.1

Length, cm	Males	Females	Total
45		1	1
48	8	2	10
51	8	2	10
54	18	5	23
57	16	3	19
60	19	7	26
63	18	7	25
66	5	2	7
69	1	8	9
72	1	5	6
75		6	6
Total	94	48	142
Mean length, cm	58.67	64.31	60.58

TABLE 20. Length composition (ind.) of Black dogfish in Russian trawler catches in NAFO Div. 3LMNO in 2005.

 TABLE 21.
 Length composition (ind) of Northern wolflish (Anarchichas denticulatus) in Russian trawler catches in NAFO Div. 3LMNO in 2005

Length, cm	Males	Females	Total
30		1	1
33			
36			
39	4	5	9
42	8	14	22
45	16	14	30
48	32	7	39
51	29	11	40
54	19	13	32
57	13	9	22
60	7	6	13
63	4	8	12
66	7	4	11
69	2	2	4
72	2	2	4
75	1	2	3
78		3	3
81		2	2
84		2	2
87		1	1
90		2	2
93		2	2
96		2	2
99			
102	1		1
105			
108			
111		1	1
114			
117			
120		1	1
Total	145	114	259
Mean length, cm	53.3	58.5	55.6

Length, cm	Males	Females	Total
18	2		2
21	2		2
24	5	4	9
27	22	13	35
30	31	36	67
33	58	58	116
36	22	24	46
39	9	10	19
42	6	3	9
45	1	2	3
48	2	2	4
51			
54		4	4
57		1	1
60		1	1
63		1	1
66		1	1
Total	160	160	320
Mean length, cm	33.3	35.2	34.3

TABLE 22.Length composition (ind.) of Blue hake (Antimora rostrata) in Russian trawler catches in NAFO Div.
3LMNO in 2005.

TABLE 23.Length composition (ind.) of Common grenadier (Nezumia bairdii) in Russian trawler catches in NAFO Div.
3LMNO in 2005.

Length, cm	Males	Females	Total
21	4	4	8
24	18	12	30
27	35	44	79
30	33	47	80
33	18	45	63
36	14	32	46
39	10	11	21
42		3	3
Total	132	198	330
Mean length, cm	30.8	32.1	31.6



Fig. 1. SST monitoring scheme in the Labrador and Gulf Stream currents zones and water masses boundaries dynamics at the surface between 55°W and 70°W.