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Polish Research Report, 1970

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Total Polish catches in the ICNAF Area increased from 159,863 tons in 1969 to 170,973 tons in 1970. This was due in the first place to an increase of the landings of mackerel and herring from Subarea 5. On the other hand, a considerable decrease of cod catches was noted in Subarea 2 and redfish catches in Subarea 3.

In Subareas 2 and 3, 26 factory trawlers of 2,850 gross tons each operated mainly for cod during winter and spring. These vessels made 41 trips to the ICNAF Area while in 1969 23 trawlers made 63 trips. The smaller number of fishing trips in 1970 was because a rather large number of Polish factory trawlers operated beyond the ICNAF Area in the summer and autumn seasons.

In Subareas 4 and 5 9 large freezer trawlers of 3,100 gross tons each and 8 smaller freezer trawlers of 1,900 gross tons each operated. Moreover, 10 side motor trawlers and 30 steam trawlers participated in fishing operations, mainly in Subarea 5. They made a total of 126 trips as compared with 111 trips made by freezer vessels and side trawlers in 1969.

Similarly, as in previous years, the side trawlers operated with the mother ships, thus reducing the loss of time for voyages between fishing grounds and their home ports. The comparative data for the years 1970 and 1969, with respect to major species and their percent relation in the catches, are given in Table 1.

Table 1.

Species	1970		1969	
	Tons	%	Tons	%
Redfish	5,846	3.4	14,083	8.8
Cod	49,587	29.0	76,680	48.0
Flatfish	4,502	2.7	2,196	1.4
Greenland halibut	8,270	4.8	5,440	3.4
Mackerel	41,036	24.0	13,448	8.3
Herring	56,050	32.8	37,223	23.3
Other species	5,682	3.3	10,793	6.8
Total	170,973	100.0	159,863	100.0

The above data show that Polish fisheries were interested mainly in the catches of herring, cod and mackerel. There was noted a considerable increase in landings of the latter species.

Subarea 1

Actually Polish commercial fishery fleet did not operate in Subarea 1. There was only one vessel for several days in June in search of cod concentrations, but none of the hauls made by it was a success. In spite of this sampling was performed.

1. Cod

In Div.1C, 990 cod specimens were measured. Their length ranged from 30 to 89 cm, mean length was 51.1 cm. From otolith readings, it appeared that over 80% were fish of V and VI age-groups.

In Div.1D, 1,900 cod were measured and their length ranged from 24 to 110 cm. Most of the cod specimens were in the length range 60-75 cm. According to otolith readings, over 85% of the cod were 5 to 9 years old.

In Div.1E, 300 fish were measured which were caught at a depth of about 450 m. Their length ranged from 30 to 100 cm, mean length - 59.5 cm. About 80% of the cod were fish 5 to 8 years old. More detailed data will be found in the contribution by Zukowski and Ernst (Res.Doc.71/103).

2. Redfish

In Div.1E, 522 redfish (type marinus) were measured. The length of these fish ranged from 25-68 cm; mean length - 36.1 cm. For age determination 200 fish were sampled.

Subarea 2

A. Status of the Fisheries

In total 15 factory trawlers operated in Subarea 2 from January till April and then in December. The best results were obtained by these vessels in the period from January till March, first in Div.2H and later in Div.2J. From May till November because of a low fishing yield, Polish vessels only visited the Labrador fishing grounds sporadically. The catch and fishing effort in Subarea 2 are given in Table 2.

Table 2.

ICNAF Div.	Catch in metric tons					Hours fishing	Days fished
	Redfish	Cod	Greenland halibut	Flat-fish	Other Species		
2G	-	-	32	-	-	48	4
2H	146	5,675	638	10	-	4,028	350
2J	1,375	30,673	919	1,211	12	10,519	1,090
Total	1,521	36,348	1,589	1,221	12	14,595	1,444

It was still possible to carry on fishing in January in Div.2G, but in the second half of that month the ice floes drifting down caused fishing vessels to shift to the fishing grounds in Div.2J. Here the fishing operations were carried out until the first days of April and then stopped owing to poor fishing yield. The following were the daily yields from the fishing grounds of Div.2J in successive months:

January	-	21.6 tons
February	-	44.8 "
March	-	27.1 "
April	-	20.5 "

Generally speaking, the daily yields in 1970 were considerably lower than in 1969, while in 1969 mean yield obtained in the months January-April amounted to 35.5 tons, in 1970 it was only 32.1 tons per day fished.

Because of the decrease in fishing yield on the fishing grounds off Labrador, a smaller number of vessels operated there in 1970 than in 1969. In total, the fishing effort (number of hours fished) decreased by 33% in comparison to that in 1969.

B. Research Studies

I. Cod

In Subarea 2, a total of 12,466 cod specimens were measured and 1,514 otoliths read for age. The observations on length and age composition of cod were carried out on the fishing grounds at various depths. The length of cod in the catches ranged from 21 to 89 cm. Most of the cod landed, however, were of the

length 24-59 cm, the age of which was determined to be 3 to 7 years (1967-1963 year-classes).

II. Redfish

In Div.2H, 2,171 redfish (type mentella) were measured and 400 otoliths read for age. The length of these fish ranged from 19 to 52 cm. Fish of the length range 28-45 cm - their mean length being 28.5 cm - occurred most often in the catches. The age ranged from 4 to 31 years with mean age 13.7 years.

In Div.2J, 1,179 redfish (type mentella) were measured and 440 otoliths read for age. The length of these fish ranged from 19 to 48 cm; mean length was 32.4 cm. The fish were between 5 and 23 years of age and the mean age was 12.4 years.

III. American Plaice

In autumn, only 197 fish were measured in Div.2J. They were of the length 24-49 cm and their mean length was 36.2 cm. The age of these fish was determined to be 4 to 16 years. In total, 54% of American plaice caught were 7, 8 and 9 years of age.

IV. Greenland Halibut

In Div.2H, 1,270 fish were measured. The fish caught here were of the length 37-105 cm and their mean length was 68.7 cm. Most of the fish in the catches were 55-69 cm (60%).

Subarea 3

A. Status of the Fisheries

In this subarea, 16 factory trawlers operated from February to October. The best fishing results were obtained from March to May. The catch and fishing effort are given in Table 3.

Table 3.

ICNAF Div	Catch in metric tons					Hours Fishing	Days Fished
	Redfish	Cod	Greenland Halibut	Flatfish	Other Species		
3K	3,702	12,340	6,665	3,095	25	18,930	1,272
3L	67	194	12	150	-	518	47
3M	15	53	-	17	1	42	3
3N	-	-	-	8	-	15	1
3Ps	154	-	1	-	1	171	14

The data in this table show that fishing operations were conducted mainly in Div.3K. In consecutive months of fishing the daily yields for vessels operating in Div.3K were as follows: February - 39.4 tons; March - 25.6 tons; April - 19.3 tons; May - 19.1 tons; June - 18.8 tons; July - 19.8 tons; August - 13.4 tons; September - 11.4 tons and October - 10.4 tons.

It might be interesting to compare mean fishing yield for factory trawlers operating in Subarea 3. In the last three years mean yield per hour fishing was as follows: 1968 - 1.33 tons; 1969 - 1.58 tons and in 1970 - 1.35 tons. The decrease of fishing yield in 1970 seems to be apparent only since in 1969 very few vessels operated on the fishing grounds of this subarea in the period of lowest yields obtained.

B. Research Studies

I. Cod

Most observations on cod in Subarea 3 were carried out in Div.3K. Here 14,458 cod were measured and 1,703 otoliths read for age. In general, the cod caught in Div.3K were 24-89 cm in length and 2-14 years of age. The year-classes 1965, 1964 and 1963 made up 77% of the catches.

More details concerning cod will be found in the contribution prepared by Stanek: "Some changes in the stock of cod of Labrador and Newfoundland area in 1970 (Res.Doc.71/104).

II. Redfish

In Div.3K, 2,619 redfish (type mentella) were measured and 433 otoliths read for age. Length of these fish ranged from 19 to 52 cm. Most often in the catches fish of the length range 30-48 cm occurred. The fish were between 5-36 years of age; mean age was 17.8 years.

III. Greenland Halibut

In Div.3K, 852 fish were measured. These fish were 31-89 cm in length; mean length was about 55 cm. Most abundant were length-classes 45-65 cm.

Subarea 4

A. Status of the Fisheries

In Subarea 4, there operated: 1 factory trawler, 2 freezer trawlers 3,100 gross tons each and 1 side motor trawler. The factory trawler carried out fishing operations from August to October, while freezer trawlers fished herring from January to March. The side motor trawler fished mackerel and herring in July. Fishing effort and fishing results are given in Table 4.

Table 4.

ICNAF Div.	Catch in metric tons					No hours fishing	No days fished
	Redfish	Cod	Herring	Mackerel	Other spec.		
	<u>Factory trawler</u>						
4 Vn	20	7	6	-	1	48	5
4 Vs	337	4	-	-	3	382	28
	<u>Freezer trawlers</u>						
4 Vs	-	-	1,093	-	440	392	42
4 W	-	-	33	8	5	32	4
	<u>Side motor trawler</u>						
4 W	-	-	39	41	-	58	9
Total	357	11	1,171	49	449	912	88

The above data show that the factory trawler fishing redfish obtained only 12.2 tons per day. Much better fishing results were obtained by freezer trawlers with the following catch per day: in January - 40 tons; in February - 43.6 tons and in March - 20.2 tons. Good fishing results were also obtained by the side trawler which in July obtained an average of 9 tons of herring and mackerel per day.

B. Research Studies

I. Herring

Sampling in Div.4W on Emerald Bank was performed in July aboard R/V Wieczno. 1,152 herring were measured and age determined for 171 specimens of this species. Among herring caught with bottom trawl, the 1963 year-class predominated making up 52.6% of the catch. Mean length of these fish was 31.8 cm. The next in

the catch was the 1962 year-class, which made up 16.4% of the landings. Mean length of these herring was 32.9 cm.

C. Hydrography

Hydrographic observations were carried out on the Scotian Shelf in July. An increase of surface temperature was noted starting from the coastal zone (7°C) up to the region of the Continental Shelf accompanied by an increase of salinity from 29.7 to 32.3‰. Also the recorded temperature of the water was 1-4°C at 50-100 m and salinity 32-33‰. These figures show that the water had its origin from the Labrador Current.

On the bottom, over elevated places of the banks, the temperature of the water reached 4°C while in the hollow places between the banks - up to 7°C. In the furrows the salinity amounted to 34.5‰. Minimum oxygen content in the bottom layer was 3 ml/l.

In the Fundian Channel between Browns Bank and Georges Bank toward the end of July a stream of warm water of the temperature 9°C and salinity 34.5‰ was noted moving westwards. In the western part of this Channel, the temperature of the water dropped to 5.5°C and salinity to 33.5‰.

Also zooplankton was sampled on the Scotian Shelf. Zooplankton in particular samples amounted from 0.2 to 41.6 grams per lm^2 of sea surface. In plankton samples Copepoda, Chaetognatha and Thaliacea were predominant.

Subarea 5

A. Status of the Fisheries

In Subarea 5, there operated 5 factory trawlers, 9 large freezer trawlers (of 3,100 gross tons each), 8 smaller freezer trawlers (of 1,900 gross tons each), 10 side motor trawlers (800 tons each) and 30 steam side trawlers (675 tons each). The side trawlers operated along with mother ships. The data on catch and fishing effort for these vessels are given in Table 5.

Table 5.

ICNAF Div.	Catch in metric tons				Hours Fishing	Days Fished
	Cod	Herring	Mackerel	Other Species		
			<u>Factory trawlers</u>			
5Y	-	43	-	-	33	2
5Ze	67	3,241	139	439	2,139	191
5Zw	2	66	587	5	201	22
			<u>Freezer trawlers of 3,100 gross tons</u>			
5Ze	122	12,303	8,433	397	6,512	840
5Zw	26	33	1,518	589	498	101
			<u>Freezer trawlers of 1,900 gross tons</u>			
5Ze	122	13,795	22,134	1,208	15,587	1,244
			<u>Side motor trawlers</u>			
5Ze	175	5,530	3,420	886	6,494	978
5Zw	33	19	469	107	336	70
			<u>Side steam trawlers</u>			
5Ze	94	19,359	3,798	1,210	31,205	3,458
5Zw	-	486	489	366	1,305	122
Total	641	54,875	40,987	5,207	64,310	7,028

Not all types of vessels operated throughout the year in Subarea 5. Steam trawlers and smaller freezer trawlers were fishing here during all months of the year, whereas, e.g. factory trawlers operated during the first half of the year on the cod fishing grounds. The months fished and the fishing yields for particular types of vessels are given in Table 6.

Table 6.

	Yield per hour (in kg).				
	factory trawlers	freezer trawlers 3100 gr.t	freezer trawlers 1900 gr.t	side motor trawlers	side steam trawlers
January	-	-	2,871	-	562
February	-	-	3,603	-	759
March	-	-	3,567	-	936
April	-	-	3,252	-	987
May	-	-	1,664	-	923
June	-	2,611	1,357	1,768	614
July	353	2,562	1,646	3,307	728
August	699	2,216	1,104	1,161	549
September	2,534	4,177	2,260	1,646	1,250
October	1,864	3,466	1,811	1,131	508
November	969	3,729	2,287	1,353	853
December		645	4,577	1,150	845
Mean	1,774	3,341	2,392	2,383	794

The figures show that the highest yields were obtained by large freezer trawlers. The smaller freezer trawlers and side motor trawlers obtained almost the same average fishing yields.

B. Research Studies

I. Herring

On Georges Bank the sampling was conducted in the period from May to August. 18,894 herring were measured and 3,037 otoliths read for age. Among specimens examined, the 1966 year-class made up 46.0%, the 1965 year-class - 22.8%. The index of total mortality (Z) for the period 1969-1970 was 0.98. This shows that within a year's period, the stock of fish was reduced by 62%.

More detailed data will be found in the contribution by B. Draganik: "Polish research studies on Georges Bank herring" (Res.Doc.71/105).

II. Mackerel

Sampling was conducted aboard commercial fishing vessel in the period May-June and on board R/V Wieczno in August. A total of 11,805 fish were measured and 3,090 otoliths read for age. In the catches, fish of the length 19-46 cm occurred, though the most abundant were fish 29.0 to 31.0 cm in length. The basis of the catches was three year-classes: 1967 - 50.1%; 1966 - 21.4% and 1965 - 8.0%.

C. Hydrography

In August, observations on temperature and salinity were carried out. On Georges Shoal, the temperature of water was 16°C and its salinity 32‰. In the region of Georges Bank at 75-100 m, the temperature was 6-7°C and the salinity 33-33.5‰. At the greater depths, particularly on the southern side at 100-150 m,

there was already found Atlantic water of the temperature 8-13°C and of salinity 35.0-35.5‰. In the layers stretching below a gradual decrease of the temperature was noted downwards to the bottom. At the bottom the oxygen content was 4.5-5.0 ml/l.

In the Gulf of Maine the two water masses were found. From the south an influx of warm water of the temperature 20°C and salinity 31.5‰ was noted, while from the northeast water flowed in of the temperature 13°C and salinity 32.2‰. The lowest temperature of 5-6°C with salinity 32.5-33.5‰ was found at 100-125 m. In the deeper layers only a slight rise of temperature up to 6°C was observed while salinity was 34.0‰. Minimum oxygen content at the bottom was 4.5 ml/l.

In the plankton on Georges Bank the same animal forms occurred as on the Scotian Shelf, though plankton was more abundant here for in some particular samples it amounted from 1.0 to 300.0 g/m². In the biomass Thaliacea were predominant.

In the Gulf of Maine the plankton was less abundant - 3.0 to 27.1 g/m². Main component of the biomass was Copepoda.

Carrying on the studies on feeding of fish it was noted that herring did not feed very intensively. In the stomachs of these fish Euphausiacea and Meganictiphanes norvegica were mainly found. On the northern part of Georges Bank, Copepoda and Chaetognatha were found.

In the stomachs of mackerel large amounts of various Euphausiacea, Chaetognatha and Thaliacea were found.