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by

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Total Polish catches in the ICNAF Area increased from 72 034 tons in 1966 to 120 032 tons in 1967. In the first rate this is due to the increase of fishing effort. On different fishing grounds, mainly in Subareas 2 and 3, 20 Polish factory-trawlers fished principaly for cod and then for other species. These vessels made 52 trips to ICNAF area compared with 39 trips made by 17 factory trawlers in 1966. Moreover, 5 freezing trawlers, 14 side motor trawlers and 20 steam trawlers operated in Subarea 5 mainly for herring. These vessels made 43 trips. Comparative data for the years 1967 and 1966, with respect to major species and their percent relation in the catches, are given in the Table 1.

Table 1

Species	1967		1966	
	tons	percent	tons	percent
Redfish	11 897	9,9	14 962	20,8
Cod	57 663	48,1	36 448	50,6
Flatfish	5 514	4,6	3 334	4,6
Greenland halibut	3 321	2,8	1 119	1,6
Halibut	146	0,1	168	0,2
Other fish and ground fish	3 273	2,7	1 334	1,8
Mackerel	507	0,4	6	-
Herring	37 711	31,4	14 663	20,4
Total	120 032	100,0	72 034	100,0

Above data shows the decrease of redfish and actual increase of cod and herring in the catches.

Subarea 1

A. Status of the Fisheries

In March and June one trawler was operating in searc for good concentrations of fish. The results of these reconnaisance catches are given in the Table 2.

T a b l e 2

ICNAF Div.	Catch in metric tons Redfish	Cod	No.hours fishing	No.days fished
1 B	2	572	251	28
1 C	1	19	55	7
1 E	3	32	4	23
Total	6	623	310	58

As a matter of fact only cod was found in this subarea, the good concentrations of which were recorded by echo-sounders over stony, uneven bottom and thus they were not available for bottom-trawl catches, whereas over those bottoms, which were suitable for trawling - the yield of cod catches was rather poor.

B. Research work

In the middle of June 3,396 cod were measured and otoliths taken from 334 specimens in Div. 1 B. The length of measured cod ranged 30-107 cm., mean - 58,8 cm. Most abundant were fish in the length 48-65 cm. Also in June, in Div. 1 C, in which rather poor concentrations of redfish of the type marinus were encountered, 261 fish were measured. The length of these fish ranged from 20 to 65 cm., mean length - 42,2 cm. Most of the redfish were in the length 40-50 cm. In the sample there were 36% of males and 64% of females.

Subarea 2

A. Status of the Fisheries

In total 18 trawlers operated in the Subarea 2 during 9 months. In the period from July till September, in view of very poor yield obtained from those fishing grounds, no fishing operations were maintained. The yield and fishing effort in the Subarea 2 are given in the Table 3.

T a b l e 3

ICNAF Div.	Catch in metric tons				No.hours fishing	No.days fished
	Redfish	Cod	Flat-fish	Other fish		
2 G	-	1 039	74	-	340	28
2 H	69	8 504	515	-	3 420	272
2 J	2 659	28 592	1 526	3	13 820	1 081
Total	2 728	38 135	2 115	3	17 580	1 381

The yield of the catches, obtained by the vessels in these fishing operations, differed, depending upon the season and Division. In June the catches in the fishing grounds 2 G were poor, whereas intensive fishing was carried out in December, when the yield in this last month of the year reached 44 tons per day. In the fishing grounds 2 H more intensive catches were carried out only in January, March and May - the yield obtained was 24,6 to 34,2 tons daily. In the fishing grounds 2 J, in which fishing activity was greater than in the other Divisions, following yields were obtained in particular months: January - 31,0 t; February - 32,0 t.; March - 23,8 t.; April - 28,1 t.; May - 40,9.; June - 19,3 t.; October - 19,5 t.; November - 18,8 t. and December - 28,4 tons daily.

Since in the Subarea 2 fishing operations of Polish vessels were carried out approximately in the same months of 1966 and 1967, it may be interesting to compare both the yields calculated per 1 hour trawling. These yields were: in 1966 - 2.65 and in 1967 - 2.45 tons per one hour trawling.

It appears from this comparison that fishing yield dropped in 1967 by about 7.5%. Such decrease of the yield seems to be connected both with the introduction of Polish type chafer, giving better selection than it was formerly obtained with double codend, and smaller size of cod in spring concentrations. The mean length of cod in 1966 was 53,6 cm., whereas in 1967 - 51,6 cm.

B. Research work

During the period from 15th May till 21st June the measurements were performed on 6 481 cod and otoliths taken from 564 fish in Div. 2 J. In May the lengths of the fish ranged between 21-86 cm, mean length - 51,6 cm. The fish of the length 42-62 cm. made the most numerous group, and their age ranged from 5 to 9 years. In June the cod was of smaller size and though its length ranged 18 to 113 cm., its mean length was 41,9 cm. The most abundant were fish of the length 35-65 cm.

From our observations on the maturity of gonads it appears that in Div. 2 J the spawning in the deeper waters was in its final stage in May, whereas in the shallower waters it was considerably retarded. This is evidenced by the observations carried out in the middle of June in the off-shore fishing ground /position 54°00'N - 55°43'W/. Namely, in this fishing ground among the majority of cod in resting stage there were found 9,1% of fish with running gonads /stage VI/ and 22,5% of fish with gonads in stages IV and V.

The sampling of redfish was performed in the fishing grounds 2 J aboard commercial vessels in May and June. During this period 3 828 redfish mentella type were measured and 427 otoliths taken. The redfish of the type marinus was found in smaller quantities - 1 882 specimens were measured and 78 otoliths taken.

The lengths of the redfish mentella were: 21-50 cm. - mean length 35,2 cm. In May the females made 61,7% of the

investigated stock /58,8% were with running gonads/. In June there were 51,4% of females /with running gonads only 15,7%/.

More redfish of marinus type were caught in May than in June. The lengths of the fish were 31-63 cm.; mean length - 48,2 cm. Most of the captured fish were in the length 40-48 cm. In the stock there were 67,5% females and almost 90% of them with either running or spent gonads.

In the fishing grounds 2 J there were also collected materials on American plaice /Hippoglossoides platessoides/. From the measurements of 1144 fish it appears that the most fish were in length-classes 30-40 cm. - mean length 37,7 cm. The readings of 299 otoliths show that in the catches there were represented age-groups III-XXII. The most abundant were fish 7, 8 and 9 years old, which made in total 53,5% of the samplo.

Subarea 3

A. Status of the Fisheries

A fishing fleet of 19 factory-ships was operating in Subarea 3, out of which different number fished in particular months of the year. Besides, in the top season of cod catches there were fishing also 5 side motor-trawlers. The landings and fishing effort in the Subarea 3 are given in the Table 4.

T a b l e 4

ICNAF Div.	Catch in metric tons				No.hours fishing	No.days fished
	Redfish	Cod	Flatfish	Other fish		
			Factory-trawlers			
3 K	3 564	4 286	2 663	-	7 027	549
3 L	1 152	5 849	3 677	-	8 961	522
3 M	587	4 152	91	-	2 812	220
3 N	3 371	3 255	253	-	3 381	297
3 O	1	290	72	-	329	23
3 P	117	-	-	-	104	10
			Side motor-trawlers			
3 K	-	1 073	-	495	884	160
Total	8 792	18 905	6 756	495	23 498	1 781

From above data it appears that most of the vessels carried out their fishing operations in the fishing grounds 3 K and 3 L. Much less fishing activity is noted in the grounds 3 M and 3 N.

The exploitation of the fishing ground 3 K was not even in the course of the year. Most fishing days were noted here in the months of October and November, much less in April, May and December. In the other months the catches were very poor. In the months of more intensive fishing the yields obtained were as follows: January - 14,7 tons; February - 18,4 tons; March - 34,7 tons; April - 27,2 tons; May - 17,1 tons; October - 17,6 tons; November - 19,1 tons and December - 24,8 tons per day.

The exploitation of the fishing ground 3 L was commenced first in March, however the yields obtained here were much lower than in 3 K. Mainly cod and flatfish were caught here and the yields were as follows: April - 14,6 tons; July - 18,7 tons; September - 19,3 tons and October - 14 tons per day.

The fishing ground of Flemish Cap /3 M/ was exploited only in March. The yield reached 26,4 tons per day.

In the fishing ground 3 N, in which cod and redfish were caught, the yield obtained in August amounted to 26,6 tons and in September to 19,0 tons per day.

Side motor-trawlers were fishing only during the period of spawning concentrations of cod, obtaining the following yields: February - 8,2 tons; March - 7,6 tons and April - 19,0 tons per day.

Though the catches of Polish factory-trawlers in Sub-area 3 in the years 1966 and 1967 differed considerably both in respect of fishing activity and fish species caught, still, the comparison of fishing yield might to some extent make an index of the state of fish resources. In 1966 total yield was 1,68 tons, whereas in 1967 - 1,43 tons per one hour trawling. Thus in the last year the yield dropped by abt. 14,9%. For many years the object of Polish fisheries was redfish. The

decrease of the resources of this species in the Subarea 3 might have - as it seems - its adverse effect upon the total yield of Polish factory-trawlers.

B. Research work

Main species were sampled aboard commercial vessels in June and July and aboard R/V Wieczno in autumn months.

1. Cod - 2 339 specimens of this species from the northern part of the Great Newfoundland Bank were measured in the period from 2nd June till 28th July. The length of the fish ranged from 18 to 116 cm.; mean length - 60,1 cm. In the catches predominated fish in the length 51-71 cm.; being 6 to 12 years old. The examination of gonads showed at the end of July still 28% of fish maturating /stage V/ or running /stage VI, VII/. In 1967 the cod caught in above fishing ground was larger and older than in 1966.

2. Redfish - this species was sampled in July only in the fishing ground 3 K. 3 455 redfish type mentella were measured and 368 otoliths taken. The length of these fish ranged from 18 to 48 cm.; their mean length was 32,7 cm. The most abundant were fish in the lengths 28-39 cm. The examination of gonads showed that 90% of females were in resting stage.

In October the measurements of redfish mentella were repeated. Among 1 440 fish in the length 22-50 cm. predominated length 34 to 44 cm. The mean length was 39,2 cm. In the samples examined in October there were 79% females.

3. Flatfish - In the Div. 3 K there was not encountered any larger concentration of American plaice. Only 112 fish were measured. Their mean length was 37,2 cm.

In Div. 3 L American plaice was abundant in June and July. 3 973 fish were measured, among which most of the fish were in length 30-38 cm. Mean length was 36,5 cm. From the reading of 111 otoliths it appeared that in the catches there

were represented age-groups IV to XV. The most abundant were fish 8 and 9 years old, which made in total 39,6% of the examined sample. As regards sexual maturity, in June 40% of females had gonads in the stage II and 20% in the stage VIII, whereas 20% of males had gonads in the stage VI.

In Div. 3 N fishing yield was poor in October. Only 423 individuals of American plaice were measured. Their mean length was 40,3 cm.

Good fishing results of Greenland halibut were obtained in Div. 3 K in August at the depth 400-500 m /1100 kg per one hour trawling/. 1 165 fish were measured. Their mean length was 55,6 cm. Most fish were length - classes 55 to 65 cm. In respect of sexual maturity 100% of fish were in resting stage.

Studies on Selectivity

Again studies on selectivity - in 1967 by R/V Wieczno were carried out. For report on these studies see: Res.Doc. 68/4 - F.Bucki, W.Strzyżewski and G.Zdziebkowski: The selectivity of codend with "Polish" chafer made of 10 mm stylon for cod and redfish catches.

Subarea 4

A. Status of the Fisheries

First towards the end of June and at the beginning of July only one trawler was scouting for fish concentrations in the Subarea 4. The results of this scouting and the fishing effort are given in the Table 5.

T a b l e 5

ICNAF Div.	Catch in metric tons				No.hours fishing	No.days fished
	Redfish	Hake	Flatfish	Herring		
4 V	156	-	-	17	104	8
4 W	-	19	1	17	71	5
Total	156	19	1	34	175	13

The yield of these reconnaissance catches was very much varied, from 7,4 tons in Div. 4 W to 21,6 tons in Div. 4 V per day. Such an uneven yield could not attract other factory-trawlers.

No research work was carried out in Subarea 4.

Subarea 5

A. Status of the Fisheries

In the fishing operations in this Subarea there took part: 5 factory-trawlers, 1 large stern freezer-trawler, 4 smaller stern freezer-trawlers, 20 side motor-trawlers and 14 side steam-trawlers. The landings and fishing effort of these vessels are given in the Table 6.

T a b l e 6

ICNAF Div.	Catch in metric tons						No.hours fishing	No.days fished
	Redfish	Hake	Flat-fish	Herring	Mackerel	Other fish		
	Factory-trawlers							
5 Z	155	114	10	5 530	-	-	1 763	248
	Large freezer-trawler							
5 Z	-	11	-	1 518	180	560	759	88
	Freezer-trawlers							
5 Z	-	51	-	3 701	25	712	1 693	268
	Side motor-trawlers							
5 Z	-	249	-	17 809	312	110	6 454	1 292
	Side steam-trawlers							
5 Z	60	323	99	9 119	-	526	10 219	992
Total	215	748	109	37 677	517	2 008	20 888	2 888

In the Subarea 5 factory-trawlers caught herring in the period July-October and it was in October that they obtained the best fishing yield of 43,2 tons per day.

The big freezer-trawler made two trips to Georges Bank. In the period May-June it obtained the yield of 33 tons, while in October only 19,1 tons and in November 21,2 tons per day.

Freezer-trawlers carried out their fishing operations from July till November, obtaining the following yields: August - 15,4 tons; September - 15,9 tons; October - 17,5 tons and November - 17,5 tons per day.

Motor-trawlers operated from April till December with large fluctuation of their yields. In May during 51 fishing days mean daily yield amounted to 24,6 tons; in July /with 195 fishing days/ - 19,3 tons and in November /with 245 fishing days/ only 10,7 tons.

Steam trawlers operated from February till November. In those months, in which larger number of these trawlers operated in the fishing grounds, mean daily yields were as follows: March - 5,2 tons; July - 11,1 tons; September - 17,5 tons; October - 9,2 tons and November 10,0 tons.

In herring catches, carried out by factory-trawlers, there is noted a considerable decrease of the yield. While in 1966 these vessels obtained 4,24 tons herring per one hour trawling in 1967 the yield dropped to 3,14 tons per hour. Thus for this type of vessel the yield decreased by abt. 26%.

Some slight decrease of the yield we note for freezer-trawlers which in 1966 obtained 2,27 tons per one hour trawling and in 1967 - 2,19 tons. In the latter case the decrease of herring yield was only 3,5%.

B. Research work

9 hydrographic cross sections were made aboard R/V Wieczno in Georges Bank in the period from 31st October till 14th November, 1967. These cross sections were prepared nearly along the same lines as in 1966. On 39 stations there were performed temperature measurments and sampling of water for salinity, oxygen and phosphate contents. Temperature cross sections are given in the Table 7.

In the first half of November surface temperatures in Georges Bank remained above 10°C. The lowest surface temperatures /8,50 - 9,96°C/ were noted northwards of 42 N parallel. The temperatures in bottom layers were of course, depending on the depth of the ground and geographical position, though on general rather warm water covered the bottom.

The salinity of surface waters did not exceed 33,0‰. The salinity of bottom layers ranged from 32,0 to 33,5‰. Isohaline of 33,5‰ covered more or less accurately the isobate of 100 m. At the greater depths and in the open waters of the Ocean the salinity was considerably higher.

The contents of oxygen were rather high, both at the surface and at the bottom. All over the area of Georges Bank, down to the depth of abt. 200 m. there was 5 ml/l O_2. Only within the range of the North Atlantic Drift at the position 39°58'N - 69°00'W and at the depth of 200 m. there was observed lower oxygen content /3,5 ml/l/.

The contents of phosphates, measured in milligrams P_2O_5 per 1 m^3 were in Georges Bank relatively high. In the shallower waters they were 5 to 20 mg P_2O_5/ m^3. Along the isobate of 100 m. the contents of phosphates amounted to 40 mg/m^3. In the deeper layers, down from 100 m., there was 50 and in some cases even above 60 mg P_2O_5/m^3.

Plankton samples were taken on 49 stations. From the examined material it appears that in the zooplankton of Georges Bank there occur in autumn season the following groups: Copepoda, Chaetognatha, Ctenophora, Appendicularia, larvae of Decapoda, eggs and larvae of fishes. Most often in the plankton occurred Copepoda. They also made the main food component for herring.

II. Biological studies

1. Herring

Samplings of herring were made aboard factory-trawler m/t Aries and in the period August-October 11 874 fish were measured. In November 1 500 herring were measured and 200 otoliths taken aboard R/V Wieczno. The lengths of herring

in the catches were 26-36,5 cm. 2 206 herring otoliths were read for age. The year-class 1960 was predominant.

The observations on environmental conditions and on herring catches show that in November the best fishing results were obtained when the temperature in bottom layers was 8-9°C and the salinity ranged from 32,5‰ to 33,5‰.

More detailed data on herring investigations are given in Res.Doc. 68/53 - F.Chrzan and B.Draganik "Some Observations on Herring Caught in Georges Bank".

Haddock

1 196 haddock specimens were examined aboard m/t Aries and R/V Wieczno in the period August-November. At the period August-September there were caught two length-groups: a/ 27 to 39 cm. - mean 35,0 cm. and b/ 43 to 58 cm. - predominant length-class 50-55 cm. In November most of captured haddock were in the length 35-38 cm. The fish occurred in the catches were 3 to 7 years old. The most abundant was the year-class 1962 /5 years old fish/, which made 78,3% of the catch.

For more detailed data on haddock see Res.Doc. 68/54 - Cz.Żukowski: Some data on catches and biology of haddock /Melanogrammus aeglefimus L./ from Georges Bank and Sable Island Bank.

American plaice occurred as a by-catch in herring catches. The length of fish was 18-54 cm. - mean 27,5 cm.

Yellowtail

This species was caught in small quantities along with herring. 748 fish were measured in November. Their length was 18-49 cm. - mean 32,7 cm. Most of the fish were in length 30-35 cm. 122 otoliths were read. The determined age-groups were II-IX. Most abundant were fish 5 and 6 years old, which made in total 53,2% of the sample.

Further obsevations are given in Res.Doc. 68/52 by A.Kosior: Some biological data on yellowtail /Limanda ferruginea - Stor/ from the southern part of Georges Bank, November 1967.

Table 7

Position \ Depth /m/	Temperatures /°C/ 0	10	25	50	75	100	150	200	Bottom
Section along 68° meridian - 31 October - 1 November 1967									
42°25'N 68°00'W	11,73	11,80	11,70	9,98	6,97	5,58	4,94	-	6,06 /190m/
42°08'N 68°00'W	11,96	11,94	11,93	11,94	7,84	5,87	4,74	6,14	6,21 /250m/
44°55'N 68°00'W	12,43	/16m/ 12,52	-	/41m/ 11,66	-	/91m/ 5,58	-	-	5,30 /140m/
44°50'N 68°00'W	12,00	11,98	10,47	6,18	-	-	-	-	6,25 /61m/
Section along 67° meridian - 2-3 November 1967									
41°01'N 67°04'W	10,70	10,52	10,30	9,96	-	-	-	-	9,90 /70m/
40°46'N 67°00'W	10,56	10,96	10,27	8,98	7,54	-	-	-	6,90 /101m/
40°38'N 67°00'W	13,11	12,96	12,54	8,22	6,96	6,72	7,15	7,80	8,27 /255m/
40°36'N 67°00'W	11,94	-	11,76	8,87	7,73	7,08	8,00	7,90	5,20 /600m/
Section along 67°30' meridian - 5-6 November 1967									
41°00'N 67°40'W	10,40	/19m/ 10,42	-	/44m/ 10,41	-	-	-	-	10,26 /69m/
40°42'N 67°33'W	10,55	-	10,54	10,48	-	-	-	-	7,66 /86m/
40°34'N 67°32'W	11,87	11,84	11,84	8,18	6,94	6,94	-	-	8,64 /143m/
40°22'N 67°32'W	13,18	-	13,15	7,96	7,12	/98m/ 8,41	/147m/ 8,29	/176m/ 8,01	5,00 /530m/
Section south-west off Corsaire Canyon - 6-7 November 1967									
41°54'N 66°56'W	11,70	11,70	11,70	11,70	-	-	-	-	11,69 /66m/
41°22'N 66°36'W	9,70	9,70	9,26	8,98	8,02	-	-	-	-
41°12'N 66°19'W	11,45	11,43	11,45	7,56	6,24	6,36	-	-	6,38 /116m/
41°10'N 66°16'W	11,90	11,88	11,91	7,40	5,29	5,78	6,42	6,58	7,18 /250m/
41°09'N 66°12'W	12,60	-	12,50	8,06	3,46	4,24	5,90	6,69	4,81 /530m/

Table 7 (continued)

Position	Depth /m/	Temperatures /°C/ 0	10	25	50	75	100	150	200	Bottom
Section NNE off Corsair Canyon - 7-8 November 1967										
41°34'N 66°56'W		11,70	11,70	11,70	11,70	-	-	-	-	11,69/66m/
41°40'N 66°24'W		10,38	10,37	10,34	9,87	-	-	-	-	9,35/88m/
41°42'N 66°08'W		9,82	9,82	9,75	7,88	7,53	-	-	-	7,55/95m/
41°46'N 65°42'W		13,00	13,04	13,29	9,89	5,40	5,96	6,01	66,65	6,88/260m/
41°48'N 65°32'W		12,70	-	-	10,80	/82m/ 8,30	-	/164m/ 9,09	/246m/ 7,74	4,93/600m/
Section Georges Bank - Browns Bank, 9 Nov. 1967										
42°06'N 66°20'W		9,13	9,08	9,05	8,34	6,62	-	-	-	6,08/95m/
42°14'N 66°15'W		9,60	9,69	9,20	6,10	6,30	6,02	/157m/ 6,52	6,06	6,69/256m/
42°31'N 66°07'W		10,50	10,52	/29m/ 10,40	/54m/ 5,90	4,80	/98m/ 4,82	-	-	5,78/149m/
42°40'N 65°58'W		7,74	7,74	7,71	7,64	7,48	-	-	-	7,46/84m/
Section along 67° meridian - 10 November 1967										
42°23'N 67°00'W		8,50	8,51	8,30	5,75	5,08	5,70	6,66	6,46	6,25/330m/
42°10'N 67°00'W		9,86	9,86	9,64	9,04	7,00	-	-	-	5,65/110m/
42°05'N 67°00'W		9,96	9,98	9,98	8,50	-	-	-	-	8,08/63m/
Section along 68°30' meridian - 12 November 1967										
40°10'N 68°30'W		12,04	12,06	12,09	11,13	9,48	9,58	10,30	10,45	5,10/500m/
40°14'N 68°30'W		11,72	11,77	11,76	11,08	11,27	10,14	10,52	10,56	8,54/292m/
40°30'N 68°30'W		10,90	10,88	10,52	9,77	9,25	-	-	-	9,72/96m/
40°38'N 68°30'W		10,52	10,50	10,52	10,14	-	-	-	-	9,68/84m/

Table 7 (continued)

Position	Depth /m/	Temperatures /°C/ 0	10	25	50	75	100	150	200	Bottom
Section along 69°00' meridian - 14 November 1967										
39°58' N 69°00' W		11,10	11,10	11,14	15,48	13,30	14,50	12,90	11,20	4,64/600m/
40°05' N 68°57' W		11,15	11,14	11,17	/60m/ 9,14	/80m/ 9,36	9,70	/124m/ 10,22	-	9,62/142m/
40°18' N 69°00' W		10,30	10,40	10,35	10,81	9,86	-	-	-	9,75/85m/
40°40' N 69°00' W		10,80	10,78	10,78	10,46	-	-	-	-	10,45/68m/
40°56' N 69°00' W		11,08	11,09	11,04	10,99	-	-	-	-	10,95/73m/
41°29' N 69°00' W		9,70	9,65	9,10	5,30	4,20	4,39	-	-	4,40/140m/