

International Commission for



the Northwest Atlantic Fisheries

Serial No. 3314
(D.a.73)

ICNAF Summ.Doc. 74/32

ANNUAL MEETING - JUNE 1974

Polish Research Report, 1973

by

E. Stanek
Sea Fisheries Institute
Gdynia, Poland

Total Polish catches in the ICNAF^{and} Statistical Area increased from 174,282 tons in 1972 to 254,314 tons in 1973. This was mainly due to the increase in mackerel and herring catches in Subarea 5 and at a smaller degree in Subarea 6, and also the increase of Greenland halibut in Subarea 2, of other kinds of flatfish in Subarea 3 and of squids in Subarea 5.

At the same time there occurred a decrease in cod catches - from 42,158 tons in 1972 to 28,800 tons in 1973 - caused by an earlier icing than usual which rendered difficult catches in the Labrador fishing grounds.

Comparative data concerning the Polish catches of particular species of fish in the ICNAF^{and} Statistical Area in 1973 and in 1972 are shown in table 1.

The data presented in table 1 show that in 1973 the Polish fisheries in the ICNAF^{and} Statistical Area caught mainly mackerel /117,254 tons/, then herring /50,307 tons/, cod /28,800 tons/, witch /11,812 tons/, greenland halibut /9066 tons/, squids /9,427 tons/ and redfish /5,199 tons/. Other species were of insignificant importance in Polish catches.

The biggest yield in the Polish fisheries in 1973 was obtained in Subarea 5 /170,087 tons/ then in Subarea 3

Table 1

Polish catches in the IONAF Statistical Area,
broken down by species, in 1973 and 1972

Species	1973		1972	
	metric tons	%	metric tons	%
Mackerel	117,254	46.2	142,244	53.3
Herring	50,307	19.8	49,520	18.5
Cod	28,800	11.3	42,256	15.8
Redfish	5,199	2.0	3,286	1.2
Haddock	480	0.2	1	+
Silver hake	343	0.1	-	-
Red hake	158	0.1	16	+
Pollock	23	.	8	+
Greenland halibut	9,066	3.6	7,122	2.7
Witch	11,812	4.6	4,017	1.5
American plaice	1,381	0.5	3,374	1.3
Halibut	126	0.1	17	+
Roundnose grenadier	294	0.1	270	0.1
Scup	651	0.2	635	0.2
Angler	160	0.1	-	-
Searobins	1,052	0.4	-	-
Wolfishes	166	0.1	8	+
Bluefish	197	0.1	15	+
Swordfish	74	.	-	-
Butterfish	2,804	1.1	-	-
Capelin	3,412	1.3	24	+
Alewife	3,308	1.3	1,888	0.7
Rough scad	491	0.2	36	+
Sharks and rays	3,850	1.5	-	-
Squids	9,427	3.7	5,428	2.0
Other species	3,474	1.4	6,941	2.6
Total	254,314	100 %	267,106	100 %

/48,741 tons/. Much smaller were the catches in Subarea 6 /20,221 tons/, and Subarea 2 /13496 tons/. Catches in Subarea 4 were insignificant /1,769 tons/. Polish trawlers did not fish in Subarea 1.

In the IONAF ^{and} Statistical Area in 1973 factory trawlers, freezer trawlers and side motor trawlers performed catches. Factory trawlers fished mainly in Subarea 2 and 3, and the others in Subareas 5, 6 and 4.

A. Status of the fisheries

Subarea 2

In 1973, Polish trawlers in Subarea 2 operated all the time in Div. 2H and 2J mainly, and at a small extent in Div. 2G. The catch effort during the winter period, due to icing of grounds was markedly lower than in the same season in 1972. Trawlers operated at this time mainly in Div. 3K. During the period from January to March catches from Subarea 2 consisted mainly of cod. In April catches were almost entirely stopped in this Subarea, and they were resumed in May and continued till December. The cod composition, however, was small in these catches. Catches during the period from May to August comprised mainly greenland halibut /Div. 2H and 2J/ and redfish /Div. 2H/, and in the period from October to December - mainly capelin /Div. 2H/.

Generally speaking, in 1973, in the Subarea 2 Polish fisheries caught mostly greenland halibut /7,115 tons/, then cod /3,104 tons/, capelin /1,396 tons/ and redfish /1,260 tons/. The composition of Polish catches in Subarea 2, in 1973, according to species and subareas are presented in table 2.

C o d

Cod catches in Subarea 2 attained 3,104 tons in 1973 whereas in 1972 they reached 19,214 tons. In 1973, 3,076 tons of cod were caught in Div. 2J, 19 tons in Div. 2H and 9 tons in Div. 2G. The decrease in catches in 1973 in Div. 2H, compared to catches in 1972 was 99.3 % and in 2J - 81.7 %.

From the beginning of 1973 a marked influence of icing was noted on the location of the Polish fleet fishing cod. In January already, due to the fishing difficulties connected

Table 2

Polish catches in Subarea 2 broken down
by species and Divisions, in 1973

S p e c i e s	Subarea 2			Total
	2G	2H	2J	
Cod	9	19	3076	3104
Redfish	1	644	615	1260
Witch		1	78	79
Greenland halibut	3	5806	1306	7115
American plaice		2	38	40
Capelin	96	624	676	1396
Roundnose grenadier	3	49	36	88
Wolffishes			2	2
Halibut		3	8	11
other species	21	179	201	401
T o t a l	133	7327	6036	13496

with the occurrence of drifting ice, trawlers left the fishing grounds of Labrador for the fishing grounds of the northern part of Newfoundland.

The largest fishing output in Div. 2J was obtained in February /2.635 kg/h/ and much lower - in January and March /1.426 and 1.206 kg/h/.

Measurements of cod performed in January and March in Div. 2J /4 250 specimens/ showed that in this division specimens were caught which had a length of 27 to 104 cm. In January there was a preponderance of fish having a length of 31 to 50 cm /average length - 44.7 cm/ and in March 36 to 56 cm /average length 50.0 cm/. Compared to

the length cod composition, in January and in February 1972, there was no noted change in the length cod composition in 1973 /see table 3/.

Table 3

Average cod length in Div. 2J in 1973-1972

Length groups in cm	1 9 7 3		1972
	January	March	January/February
24 - 26			0,1
27 - 29	0,4		0,7
30 - 32	2,6	1,4	3,1
33 - 35	7,8	5,4	7,5
36 - 38	13,6	11,3	12,4
39 - 41	15,4	10,3	14,8
42 - 44	14,0	11,4	10,9
45 - 47	15,9	9,3	8,7
48 - 50	10,4	8,2	8,2
51 - 53	6,3	8,5	8,4
54 - 56	4,4	6,6	7,6
57 - 59	3,1	6,2	6,0
60 - 62	2,7	6,6	4,5
63 - 65	1,3	3,8	2,9
66 - 68	0,8	2,6	2,1
69 - 71	0,8	2,6	1,0
72 - 74	0,1	2,3	0,6
75 - 77	0,2	1,0	0,3
78 - 80	0,1	1,1	0,1
80	0,1	1,4	0,1
Mean length in cm	44,7	50,0	46,5

Redfish

Redfish catches in Subarea 2 in 1973 attained 1,260 tons, including 644 tons from Div. 2H, 615 tons from Div. 2J and 1 ton from Div. 2G. Compared to 1972 /649 tons/, redfish catches in 1973 increased by 94.1 % and this increase took place mainly in Div. 2H /from 165 tons in 1972 to 644 tons in 1973/. The increase of redfish composition in the Polish catches in 1974 was due to the increased intensification of catches of this species.

In Div. 2H redfish was caught from June to December, mainly in August and September, and in Div. 2J - from June to September /April and July excepted/ mainly in August.

The mass measurement of redfish performed in June and March / 774 specimens/ shows that the catch composition consisted of specimens having a length of 18 to 56 cm /mean length = 27,7 cm/. The most numerous were specimens having a length of 21 to 30 cm.

Greenland halibut

Greenland halibut catches in 1973, in Subarea 2 reached 7,115 tons, including 5,806 tons from Div. 2H, 1,306 tons from Div. 2J and 3 tons from Div. 2G. Compared to 1972 /3,323 tons/ the increase in greenland halibut catches was 114.1 %, and this increase was due to high output in Div. 2H.

In Div. 2H the greenland halibut was caught from June to December, and in Div. 2J - from January to September and in December. The best output in greenland halibut was obtained in Div. 2H in July /1.100 kg/h/ and in Div. 2J - in June /1 050 kg/h/.

Insofar as greenland halibut is concerned, in 1973 no biologic data have been collected. The high output obtained in 1973 seems to show a good state of resources in Subarea 2.

W i t c h

Witch catches in Subarea 2, in 1973 attained 79 tons only, which were caught almost exclusively in Div. 2J, mainly during the period from January to July and in December. Compared to 1972 the catches of this species in Subarea 2 decreased by 582 tons.

American plaice

Catches of American plaice in 1973 in Subarea 2 reached 40 tons, including 38 tons from Div. 2J and 2 tons from Div. 2H. This species was caught during the period from February to June, mainly in February. Compared to 1972 there appeared a catch decrease of American plaice in Subarea 2 attaining 26 tons.

Capelin

Capelin catches in 1973 in Subarea 2 attained 1,396 tons, of which 676 tons were caught in Div. 2J, 624 tons in Div. 2H and 96 tons in Div. 2G. During the past years, catches specially directed on this species were not performed. In 1973 capelin was caught during the period from August to December.

Roundnose grenadier

In 1973 roundnose grenadier catches in Subarea 2 gave 88 tons, of which 49 tons came from Div. 2H, 36 tons from Div. 2J and 3 tons from Div. 2G. This species constituted a by-side catch when fishing greenland halibut.

S u b a r e a 3

In Subarea 3 Polish trawlers performed catch all the year long, mainly in Div. 3K and then in Div. 3L, at a lessen extent in Div. 3 M, 3 N and 3 P_g. In Div. 3 K, during the period from January to April catches were the best. In the period from January to June, they included mainly cod and in a small number of witch, greenland halibut

and redfish. During the period from July to October there were insignificant catches consisting of various species of fish. From October to December capelin was mainly fished.

In Div. 3 L cod was mainly caught and next American plaice during the period from January to April, and capelin during the period from September to December.

In Div. 3 M, 3 N and 3 P_g catches consisted of cod, redfish and American plaice in March mainly and of capelin in the period from September to December.

In general the Polish fisheries in Subarea 3, in 1973 caught mostly cod /25,244 tons/ then witch /11,733 tons/, redfish /3,862 tons/, capelin /2,021 tons/, greenland halibut /1,951 tons/ and American plaice /1,341 tons/. Such species as halibut, roundnose grenadier and haddock had an insignificant part in the Polish catches. The composition of Polish catches in Subarea 3 in 1973, according to species and Divisions are given in table 4.

C o d

Cod catches in Subarea 3 constituted in 1973, 25,244 Div. 3 K, 5,645 tons came from Div. 3 L, 481 tons from Div. 3 M, 225 tons from Div. 3 N and 100 tons from Div. 3 P_g. Compared to 1972 /22,770 tons/ in 1973 there was an increase in the cod catches in Subarea 3, and this was mainly due to the increase in importance of Subarea 3 L for the fished species, i.e. from 897 tons /1972/ to 5,645 tons /1973/. In Div. 3 K, however, a decrease in cod catches was noted i.e. from 21,809 tons in 1972 to 18,793 tons in 1973; this was caused /like in Subarea 2 but at a lessen degree/ by the influence of icing on fishing.

The main cod catches in 1973 were obtained in Div. 3 K during the period from January to June. The largest output of cod catches took place in Div. 3 K in January /2151 kg/h/. An appreciable decrease in output happened in March /440 kg/h/.

Table 4

Polish catches in Subarea 3
broken down by species and Divisions
in 1973

Species	Subarea 3					Total
	3K	3L	3M	3N	3P _S	
Cod	18,793	5,645	481	225	100	25,244
Redfish	3,229	183	427	23		3,862
Greenland halibut	1,928	7		5	1	1,951
American plaice	185	684	39	432	1	1,341
Witch	10,713	1,011		9		11,733
Halibut	69	18	18	4	6	115
Roundnose grenadier	109	86	11			206
Wolffishes	12	2				14
Haddock	399	25	53	3	-	480
Pollock	3					3
Bluefish		1				1
Capelin	960	509	317	203	32	2,021
Alewife	2					2
Other species	1,403	301	37	18	9	1,768
Total	37,805	8,482	1,383	922	149	48,741

In Subarea 3, 14.536 cod specimens were measured and 1.800 specimens were examined as to their length, of which 6841 were measured and 800 measured in Div. 3 K in February and March, and 7.695 and 1.000 in Div. 3 L in February. /E. Stanek and J. Janusz/. The data concerning the above are presented in tables 5 and 6.

Cod catches in Div. 3 K comprised specimens having a length of 27 - 89 cm and of an age of 3 - 11 years. The mean

length of the fish was 48.8 cm and the mean age 5 - 8 years. Among the fish caught there were mainly cod - 36-59 cm long /83.1 %/ and 5 - 7 years of age /year class 1968 - 1966, 89.7%/ including mostly fish having a length of 39 - 53 cm /63.8 %/

Table 5

Length composition of 3 K and 3 L cod
in 1973 and 1972

Length groups in cm	Years, Divisions, Months			
	1 9 7 3		1 9 7 2	
	3 K	3 L	3 K	3 L
	Feb./March	February	February	March
21 - 23	-	0,1	-	0,2
24 - 26	-	0,3	-	0,9
27 - 29	0,1	2,0	0,1	2,7
30 - 32	0,8	6,6	0,8	6,6
33 - 35	2,7	15,5	3,0	14,5
36 - 38	6,7	14,6	6,7	20,9
39 - 41	11,5	15,6	10,3	21,1
42 - 44	14,6	14,6	11,3	13,7
45 - 47	14,3	11,1	10,2	7,5
48 - 50	13,0	8,8	11,0	4,5
51 - 53	10,4	5,3	10,1	3,0
54 - 56	7,3	3,5	10,4	1,9
57 - 59	5,3	1,9	8,2	0,7
60 - 62	3,7	1,1	6,7	0,6
63 - 65	2,8	0,9	4,7	0,6
66 - 68	2,7	0,6	2,9	0,1
69 - 71	1,9	0,4	1,7	0,2
72 - 74	0,8	0,3	0,8	0,1
75 - 77	0,5	0,3	0,5	0,1
78 - 80	0,4	0,1	0,3	-
81 - 83	0,3	0,2	0,1	0,1
84 - 86	0,1	0,1	0,1	-
87 - 89	0,1	0,1	0,1	-
Total	100,0	100,0	100,0	100,0

Table 6

Age composition of 3K and 3L Cod in 1973 and 1972

Years	Divisions	Months	Year classes													Total %		
			2	3	4	5	6	7	8	9	10	11	12	13				
1973	3K 3L	Febr./ Mar.		1970	1969	1968	1967	1966	1965	1964	1963	1962						100,0
		Febr.		0,2	3,8	42,7	31,5	13,7	7,3	0,6	0,1	0,1						100,0
1972	3K 3L	Feb.	1970	1969	1968	1967	1966	1965	1964	1963	1962	1961	1960	1959				
		Mar.	0,2	0,3	42,0	43,6	11,5	0,5	0,7	0,6	0,1	0,2	0,1	0,1	0,1	0,3	0,1	100,0

and 5 years of age /42.7 %/.

In Div. 3 L, 21 - 89 cm long cod was caught and its age was 3 - 10 years. The mean length of the fish was 42.6 cm and its mean age 5 years. The basic catches consisted of cod having a length of 30 - 53 cm /92.1 %/ and an age of 4 - 5 years /year classes 1969 - 1967, 94.0 %/ including mainly specimens 33 - 47 cm long /71.4 %/ and 5 years old /61.5 %/.

In Div. 3 K no essential changes in the length and age composition of cod in the catches of 1973 were noted compared to catches in 1972. Some changes appeared only in a decrease concerning the occurrence of 7 years old specimens. In Div. 3 L, however, in catches in 1973, a significant increase of small and young cod was noted.

Generally, it can be stated that in Div. 3 K and 3 L the fertile cod year classes of 1968 had a significant preponderance, whereas the 1967 year class had a secondary meaning. In Div. 3 L, 4 year fish i.e. the 1969 year class was relatively largely represented.

Redfish

Redfish catches in Subarea 3 in 1973 reached 3,862 tons, where the greatest part i.e. 3,862 tons came from Div. 3 K, 427 tons came from Div. 3 M, 183 tons from Div. 3 L and 23 tons from Div. 3 N. Redfish catches in Div. 3 K were performed in the first half of the year, in Div. 3 L in February and March, and in Div. 3 M and 3 N only in March. Compared to Polish catches in 1972 in Subarea 3 /2568 tons/, the redfish catches in 1973 amounted to 1,294 tons. This increase resulted from the tendency of the fisheries to catch this species due to the poor output in cod catches.

The redfish measurements /2 176 specimens/ carried out in February and March showed that catches in Div. 3 M were composed of specimens having a length of 18 - 45 cm, mainly 25 - 30 cm. The mean fish length was 29.0 cm.

Greenland halibut

Greenland halibut catches in 1973, in Subarea 3 amounted to 1951 tons, and almost all the catch /1928 tons/ came from Div. 3 K fishing grounds. Greenland halibut catches in Div. 3 K were performed in the period from January to August, mainly from April to June. In comparison with the 1972 catches the 1973 ones were lower by 1213 tons.

W i t c h

The Polish catches of witch in 1973, in Subarea 3 amounted to 11,733 tons, of which 10,713 were caught in Div. 3 K, 1,011 tons in Div. 3 L and only 9 tons in Div. 3 N. In Div. 3 K catches were carried out in the first half of the year, mainly in the period from February to April and in Div. 3 L in February and in March. In comparison with 1972, the witch catches in Subarea 3 in 1973 were higher by 8,380 tons. This was caused by a catch intensification in Div. 3 K.

To carry out a measuring of witch in Div. 3 K, 5540 specimens were taken in March and April, and 400 specimens were defined as to their age.

The results of these examinations made by A. Kosior show that in the catches, 30 - 70 cm long fish occurred /mean length = 52.8 cm and 51.6 cm/ and their age ranged from 5 to above 20 years. In comparison with the previous years, in the witch catches in 1973, a significant increase of bigger and older fish was noted and this seems to prove that there is a certain stability in the resources of this species.

American plaice

The American plaice in the Polish catches in Subarea 3 amounted to 1,341 tons. These catches came mainly from Div. 3 L /684 tons/ and from Div. 3 N /432 tons/ and in a lesser quantity from Div. 3 K /185 tons/ and from Div. 3 M /39 tons/.

In Div. 3 K catches were carried out from January to May, in Div. 3 L mainly in February and March, in Div. 3 M and 3 N only in March. Compared to 1972 catches, in 1973 these were lower by 911 tons.

In order to define the length composition of American plaice 1977 specimens were measured. Otoliths were also taken to define age of 200 specimens. The research made by A. Kosior showed that catches contained fish having a length of 20 - 64 cm /mean length - 37.5 cm/ and an age of 5 to above 20 years, with a preponderance of the 6 to 15 years of age.

Capelin

In Subarea 3, in 1973, 2,021 tons of capelin were caught, of these 960 tons in Div. 3 K, 509 tons in Div. 3 L, 317 tons in Div. 3 M, 203 tons in Div. 3 N and 32 tons in Div. 3 P_g. Catches were carried out in the autumn season. The previous years there had not been capelin catches specially carried out in Subarea 3.

Other species

The catches of other species carried out in Subarea 3 are specified in table 4. These fish caught mainly in Div. 3 K consisted primarily of halibut, roundnose grenadier, wolffish and haddock. Haddock catches amounted to 480 tons, roundnose grenadier - 206 tons, and halibut - 115 tons. The amount of other species was much smaller.

S U B A R E A 4

The total catches in Subarea 4 in 1973 were insignificant and amounted to 1,769 tons but they were higher than in 1972 /402 tons/. In this Subarea our trawlers operated mainly on the fishing grounds of Subdiv. 4 V_g. At a lesser extent they operated in 4 X, where only 55 tons of alewife and 7 tons of other species were obtained. The composition of the Polish fisheries in Subarea 4 in 1973 according to species, Divisions or Subdivisions are presented in table 7.

Polish catches in Subdiv. 4 V_g comprised mainly herring /1,021 tons/ and then various species of sharks and rays /325 tons/, squids /228 tons/, redfish /49 tons/, cod /22 tons/ and other species /62 tons/. Besides herring and squids catches of other species were sporadic or incidental.

Herring

Herring catches in Subdiv. 4 V_g were carried out mainly in January, May, November and December. Biologic examinations of herring in Subarea 4 were not performed.

Squids

Polish catches of squids amounted to 228 tons in this Subarea. The previous year no squids catches were carried out. The number given concerns exclusively Div. 4 V_g, in the months of October /129 tons/ and November /99 tons/. Exclusively *Illex illecebrosus* /shortfinned squid/. The Polish catches of squids in Div. 4 V_g were rather of an incidental character and cannot constitute satisfactory

information about the state of resources of short-finned squid in this division. Research on squids was carried out in Div. 4 X in the second half of September 1973 by M. Lipiński. 1 109 specimens of squids *Illex illecebrosus* were measured. The percent part of short-finned squid in length classes /according to dorsal mantle length/ with a breakdown in months can be found in table 8. No examination of the sex proportion was carried. In all, in Div. 4 X, 3 twohours hauls specially directed on squid catches, and the mean output amounted to 142 kg/h.

Table 7

Polish catches in Subarea 4 broken down
by species, and Divisions, in 1973

Species	Subarea 4		Total
	4 V ₅	4 X	
Herring	1 021	-	1 021
Cod	22	-	22
Redfish	49	-	49
Alewife	-	55	55
Sharks and rays	325	-	325
Squids	228	-	228
Other species	62	7	69
T o t a l	1 707	62	1 769

S U B A R E A 5

In Subarea 5 Polish fisheries in 1973 operated mainly on fishing grounds Div. 5 Z where in all 169,782 tons were caught. At a smaller degree, in Div. 5 Y, during the months of autumn, catches were carried out and the results were only 305 tons.

The main species caught in Div. 5 Z was mackerel /100,729 tons/ and herring /47,071 tons/. Much less significant were squids catches /9,157 tons/, butterfish /2,590 tons/, and other species presented in table 9.

Polish fisheries in Div. 5 Z caught all year round specifically mackerel, herring and squids. Other species were only bycatches.

Mackerel

Polish catches of mackerel in Subarea 5 increased from 61,456 tons in 1972 to 100,729 tons in 1973. All the catches in 1973 came from fishing grounds in Div. 5 Z.

Mackerel was mainly caught during the period from January to May and from October to December. The output of catches of all types of Polish trawlers in Subarea 5 and in Subarea 6 increased, compared to the output reached in 1972 by 10 % and more.

Owing to the fact that mackerel appearing in Subarea 5 and 6 constitutes the same stock, the results of biologic examinations concerning this species have been compiled together.

According to S. Uciński the population of mackerel exploited in Subarea 5 and 6 consisted in 1973 of fish whose length oscillated between 15 and 46 cm. There occurred a serious decrease in the mean length of mackerel compared to the years 1971 - 1972 /see Table 10/. The number of fish from 1967 and 1966 which constituted the bulk decreased from 48.4 % and 17.8 % respectively to 11.4 % and 3.0 % respectively. The results were a significant rejuvenation.

The mean age of the fish caught in Subarea 5 decreased from 5.41 years in 1972 to 3.27 in 1973 and in Subarea 6 from 4.88 to 4.16 respectively. A detailed estimation of the state of the exploited resources in Subareas 5 and 6 has been carried out at the meeting of the Working Group - ICNAF, in January 1974.

Herring

Polish herring catches in Subarea 5 increased from 41,224 tons in 1972 to 47,071 tons in 1973. 47,060 tons of these catches came from Div. 5 Z and 11 tons only from Div. 5 Y.

Herring catches were carried out mainly during the period from February to April and from August to October.

Nearly in all the months of 1973, there were better catching results than 1972, this concerns the catch output as well as the total mass of caught fish. The effectiveness of the freezer trawlers fishing in the period of spawning increased by 35 - 40 % compared to the same period of the last year. In September and October nearly 36,000 tons of herring were caught hence, 9,000 tons more than in the same period of the previous year. In such a situation, by the end of October 99 % of the assigned amount had been already reached and in November and December further specialistic catches of herring had been obtained. It should be stressed that all these results had been obtained in spite of the withdrawal of side trawlers B-14 from this area and of the operating limitation of trawlers B-20 during the period from January to July.

The materials to be studied were estimated during the period from February to October - where the part concerning February and March came from the trip of the research ship m/t "Wieczno" and the remaining part were collected on commercial ships. Length measurements were carried out on 46 553 specimens of herring and otoliths were taken from 5 500 specimens.

The length and age composition of fished herring in the summer and autumn season in Subarea 5, in contrary to the previous year was very little differentiated /according to A.Paciorkowski/. The length distribution in most cases were one-peaked and there was a predominance of fish having a length of 26 - 27 cm /table 12/. These length classes in August and October exceeded 65 % and in September only they decreased to 52 %.

A characteristic feature of the age composition of the catches was the exceptional quantity of 3 year fish born in 1970 and the significant fall in number of the fish appertaining to older age group /table 13/. Whereas the 3 year herring in 1972 constituted only 5.9 % of the total mass of fish caught.in the Polish catches, the part of this age group increased to 78.3 % in 1973. The part of the 1967 and 1966 year group which dominated till then decreased from 26.1 % and 18.9 % to 1.7 % and 1.3 % respectively. This shows on one hand that the 1970 generation was abundant, and on the other hand that the intensification of fishing of these fish shifted from older to younger year ages which entered the stock. This confirms also the increase of herring catches from the 1969 age group to 13.5 %. The catch increase in number of this generation may be also connected with the appearance in the spawning stock of that part which did not participate in the spawning of 1972. Similarly, even more marked were the tendencies in the age composition of the general catches.

If we admit that a great part of the exceptionally numerous generation of 1970 /whose number, as known, is estimated to 200 % and more of the abundant generation of 1966/ did not participate in the spawning in 1973, then in spite of the small foreseen completion of the stock by the 1971 age group, the resources in herring stock of the George's Bank in 1974 should not fall below 80 % - 90 % of the 1973 state.

The strength of the 1975 resources is very difficult to predict due to the absence of detailed data concerning the abundance of the 1972 generation.

However, even in case of a low abundance of this generation the strength of this stock resources, as was shown by the ICNAF Working Group, will not fall below the level ensuring the target amounting to 150,000 tons.

Squids

Polish catches of squids in 1973 in Subarea 5 amounted to 9,157 tons. Compared to catches in 1972 /5,062 tons/ the increase in catches amounted to over 80 %. Catches came exclusively from Div. 5 Z. Squids were fished mainly during the period from May to July.

The catches of squids in Div. 5 Z were composed of two species: *Illex illecebrosus* and *Loligo pealei*. Their exact proportion in the catches was not known, but it is estimated that *Illex illecebrosus* constituted more than 70 %. It seems that in the catches output in 1973, besides causes of a biologic and hydrologic nature, /this concerns particularly catches in May 1973/ there was an influence of the increase of the fishing effort on squids and of a greater operative-ness of the fleet in January, February, March, September and October.

During the studies in September and October 1973 in Subarea 5, mass measurements of 2 778 squid specimens - *Loligo pealei* /long finned squid/ and 2 596 squid specimens - *Illex illecebrosus*, were carried out /M.Lipiński/. The percent composition of short-finned squid and long-finned squid in the length classes /according to the dorsal mantle length/ with a breakdown in Divisions and months, is given in table 8.

The sex proportion among short-finned squids was near the unity, with an insignificant preponderance of males and a small part of youngsters /up to 5 %/. The sex proportion among long-finned squids was the following: 24 % of males,

Table 8

Percent composition of Squids Illex illecebrosus
in length class, according to M.l. with breakdown
in Subdivisions and months - research made by
m.t. "Wieczno"

Dorsal Mantle length /Ml/ cm	P e r c e n t				
	D i v i s i o n s				
	6 A	6 B	4 X	5 Ze	
	M o n t h				
	September	September	September	Septemb.	October
5					
6					
7	0,2				
8	0,4				
9	1,7	1,2			
10	3,6	1,7			0,1
11	4,9	6,5			0,3
12	7,8	4,1		0,1	1,0
13	6,6	1,7		0,2	3,6
14	5,1	1,2		0,4	5,7
15	3,3	0,6	2,7	0,4	8,6
16	5,3	2,0	13,2	1,2	19,7
17	7,2	6,1	22,8	3,7	24,2
18	17,4	18,6	23,7	11,5	21,8
19	18,9	30,6	22,4	19,5	13,0
20	14,9	21,2	12,3	24,0	2,0
21	2,1	2,9	2,2	17,1	
22	0,6	0,6	0,7	12,7	
23		0,4		4,8	
24		0,4		2,8	
25		0,2		0,9	
26				0,3	
27				0,3	
28				0,1	
29					
30					
Total	100,0	100,0	100,0	100,0	100,0

38 % of females and 38 % of youngsters /based on studies carried in September/.

In total during the studies in this area, 10 twohour hauls aiming at catching squids were carried out. The mean output amounted to 142 - 300 kg per hour of trawling.

Other species

Besides mackerel, herring and squids, other species were not aimed at but they constituted only a bycatch when fishing the former species. The composition of the species forming

the bycatch and the quantities caught are given in table 9. Insofar as these species are concerned no biologic research has been carried out.

Table 9

Polish catches in Subarea 5
broken down by species and
Divisions, in 1973

S p e c i e s	Subarea 5		Total
	5 Z	5 Y	
Mackerel	100,729	-	100,729
Herring	47,060	11	47,071
Cod	380	-	380
Redfish	28	-	28
Silver hake	343	-	343
Red hake	34	124	158
Pollock	3	17	20
Scup	499	-	499
Angler	160	-	160
Searobins	962	-	962
Wolffishes	150	-	150
Bluefish	184	12	196
Swordfish	74	-	74
Butterfish	2,509	81	2,590
Alewife	2,875	38	2,913
Rought scad	476	-	476
Sharks and rays	3,153	-	3,153
Squids	9,157	-	9,157
Other species	1,006	22	1,028
T o t a l	169,782	305	170,087

S U B A R E A 6

Polish catches in Subarea 6 fell from 92,824 tons in 1972 to 8,268 tons in 1973. From the results obtained in 1973, 13,370 tons came from Div. 6 A, 6,447 tons from Div. 6 B and 404 tons from Div. 6 C.

The main species participating in the Polish catches, was mackerel /16,525 tons/. There was much less herring /2,215 tons/. Other species caught in Subarea 6 have been shown in table 14.

Mackerel

In Subarea 6 Polish catches of mackerel in 1973 amounted to 16,525 tons, of which 10,657 tons were caught in Div. 6 A, 5,617 in Div. 6 B and 251 tons only in Div. 6 C.

In Div. 6 A 35 % /3,600 tons/ of the catches of this species were fished in January and nearly 50 % /5,174 tons/ in December. In Div. 6 B mackerel was mainly fished in April /2,617 tons/ as well as in December /1,052 tons/.

The decrease in mackerel catches in Subarea 6, in 1973, compared to 1972, from 80,513 to 16,525 tons is connected with the decrease of fishing effort in this Subarea, as well as with the shifting of catches to Subarea 5.

The biologic estimation of mackerel in Subarea 6 was carried together with mackerel from Subarea 5.

Herring

Polish catches of herring in Subarea 6 fell from 8,268 tons in 1972 to 2,215 tons in 1973. The main catches, 1,524 tons were obtained in Subarea 6 A, 635 tons in Subarea 6 B and 56 tons in Subarea 6 C. Most catches of herring was obtained in Div. 6 A in February and in Div. 6 B in April.

Biologic materials to estimate the herring stock in Subarea 6 were not collected in 1973. Due to this herring occurring in Subareas 5 and 6 appertains to the same stock and the estimation made in Subarea 5 concerns also Subarea 6.

Table 10

Length measurements of Polish mackerel
catches in Subareas 5 and 6 in 1972-1973

Length class	Y e a r			
	1 9 7 2		1 9 7 3	
	Subarea 5	Subarea 6	Subarea 5	Subarea 6
6	-	-	2	3
7	-	-	6	3
8	-	1	13	2
9	-	1	19	1
20	-	9	12	2
21	-	24	13	3
22	-	24	32	9
23	-	6	28	20
24	-	3	20	24
25	-	3	25	27
26	-	2	40	33
27	-	1	99	68
28	4	3	118	151
29	3	3	86	133
30	5	11	44	63
31	18	28	28	19
32	23	37	23	16
33	43	56	35	36
34	92	91	53	62
35	124	104	51	78
36	185	130	69	69
37	150	126	67	70
38	99	119	46	46
39	73	86	35	25
40	39	39	22	17
41	33	25	7	19
42	30	20	3	4
43	36	20	2	3
44	20	15	1	1
45	11	7	1	1
46	7	2	-	1
47	2	-	-	-
48	2	-	-	-
49	1	1	-	-
50	1	1	-	-
No. measured	6535	7093	7554	1862
Mean length	36,7 cm	35,2 cm	30,4 cm	31,2 cm

Table 11

Age composition of Polish mackerel catches /by numbers/
in ICNAF Subarea 5 and Statistical Area 6 in 1972-1973

Year		Year - class											Total /millions/
		1972	1971	1970	1969	1968	1967	1966	1965	1964	1963	1962	
1972	No	-	17000	3250	35546	22410	186231	68386	27816	6182	8500	10046	385 367
	%	-	4,4	0.8	9.2	5.8	48.4	17.8	7.2	1.6	2.2	2.6	
1973	No	110004	101222	15715	89667	48993	51766	13404	13404	5546	3235		452 956
	%	24.3	22.3	3.5	19.8	10.8	11.4	3.0	3.0	1.2	0.7		

Table 12

Length measurements of Polish commercial
catches of herring in SA 5 in 1973
/per ten thousand/

Length-class	Month			Total
	August	September	October	
22	1	-	-	1
23	16	-	-	5
24	142	16	11	50
25	868	537	688	675
26	3093	2720	3210	2968
27	3543	2352	3602	3054
28	1425	2147	1452	1740
29	369	495	278	396
30	207	370	162	263
31	148	444	199	289
32	92	466	168	273
33	65	291	155	187
34	24	105	44	64
35	6	45	21	27
36	1	10	10	7
37	-	1	-	1
38	-	-	-	-
Total	10 000	10 000	10 000	10 000
No measured	6 750	10 152	6978	23 880
Mean length	26,9	27,7	27,1	
Mean indiv. weight	163 gr.	176 gr.	152 gr.	

Table 13

Age composition of Polish commercial catches of herring
in Subarea 5 and 6 in 1972 and 1973

Year		Year class									Total
		1970	1969	1968	1967	1966	1965	1964	1963	1962	
1972	No.	19000	13000	24000	58000	42000	32000	15000	12000	6000	221 000
	%	8.6	5.9	10.8	26.1	18.9	14.4	6.8	5.8	2.7	100.0
1973	No.	250100	43200	14800	5400	4000	1000	300	500	-	319 300
	%	78.3	13.5	4.6	1.7	1.3	0.3	0.1	0.2	-	100.0

Squids

Polish catches of squids in this Subarea amounted to 42 tons. In 1972 they reached 575 tons. Catches were carried out in 1972 in March, April and May /150,103 and 322 tons respectively/ and in 1973 only in April. In April 1972 catches were performed in Div. 6 A, 6 B and 6 C; in 1973, however, in Div. 6 A and 6 B /21 tons in each/. In March and May 1972 catches were carried out in Div. 6 A only. The noted decrease in catches amounts to over 92 %. Studies carried out in Subarea 6 in 1973 /September - November/ do not permit to explain the differences between the year 1972 and 1973, which occurred in the discussed Subarea /M. Lipiński/.

During the research in Subarea 6 mass measurements were carried out on 2,614 specimens of squids - *Illex illecebrosus* and 11,297 specimens of squids *Loligo pealei* /table 8/.

The sex proportion among short-finned squids was nearly one with a marked preponderance of males. The part of youngsters amounted to 30 % /Div. 6 A in September/. The sex proportion among the long-finned squids was various

in the particular Divisions. In Div. 6 A females constituted 31 %, males 25 % and youngsters 44 %. In Div. 6 B there were 18 % of females, 24 % of males and 58 % of youngsters. In Div. 6 C there were 65 % of females, 24 % of males and 7 % of youngsters.

In all, during the studies in this Subarea m/t "Wieczno" performed 25 twohours hauls aimed at fishing squids. The mean output amounted to 100 to 445 kg per hour of trawling, depending on the area of studies.

Other fish

As in Subarea 5, in Subarea 6 too catches of fish, mackerel and herring excepted, constituted bycatch. Data concerning the importance of these other species of fish in catches are contained in table 14.

B. SPECIAL RESEARCH STUDIES

=====

Environmental Studies

Hydrographic studies

Hydrographic studies in 1973 were carried on board m/t "Wieczno" on Georges Bank, in the Gulf of Maine, in the western part of the waters of Nova Scotia, near the Nantucket Shoals and in the eastern part of the USA shelf /A. Furtak/. Studies comprised measurements of water temperature, collection of water samples in order to define salinity and phosphates. Samples were taken at two levels i.e. from the surface and 5 meters over the bottom.

Basing on the obtained results it can be stated that the temperatures of the water environment in the examined area in October 1973 had higher values, compared to temperatures of the similar period in 1972. The range of values of the level gradient in the frontal zone on the northern and north-western slopes of Georges Bank amounted to 0.36 - 0.83 °/Mm, whereas in 1972 it amounted to as much as 0.69 - 1.00 °/Mm. From the conducted studies it follows that the

Table 14

Polish catches in Subarea 6 broken down
by species and Divisions, in 1973

in metric tons

Species	S u b a r e a 6			Total
	6A	6B	6C	
Mackerel	10,657	5,617	251	16,525
Herring	1,524	635	56	2,215
Cod	50	-	-	50
Scup	102	50	-	152
Searobins	52	38	-	90
Butterfish	214	-	-	214
Alewife	273	27	38	338
Rought scad	4	8	3	15
Sharks and rays	300	31	41	372
Squids	21	21	-	42
Other species	173	20	15	208
T o t a l	13,370	6,447	404	20,221

largest differences in the discussed hydrologic elements between 1972 and 1973 occurred in the southern part of Georges Bank, in the southern part of the waters of Nova Scotia and near the Nantucket Shoals, which, in the case of surface waters, might have been caused by local insolation, insignificant clouds, and also at the extremities of the western part of Georges Bank by the affluence of hot masses of water of the Gulf Stream.

Plancton studies

In the frame of the international programme of ICNAF m/t "Wieczno" performed studies of the occurrence and numerability of herring during the period 29.IX. to 20.X.

1973. The stations and route of the trip are given in Fig. 1 and the method and results of studies have been described in ICNAF Res. Doc. 74/18 /S. Grimm/.

The total number of collected herring larvae out passes three times the similar collection made in 1972. The increased production of herring larvae is particularly visible on Georges Bank /about 5 times/. On Nantucket Shoals a beginning but altogether very abundant hatch of herring larvae were found.

Herring larvae occurred in the surrounding of banks which did not overstep the 200 m line, beyond which there were different and disadvantageous hydrologic and trophic conditions.

The high plancton biomass occurred with the appearance of herring larvae and oscillated from 40 - 80 cm³/100 m³ of filtered water. In the South of Cape Cod, on Georges Bank and South of Nova Scotia a plancton biomass exceeding 80 cm³/100 m³ of water was noted.

The main components of plancton were Copepods and Euphausiacea. There was a clear correlation between the high biomass of plancton and the occurrence of herring larvae in the area studied. In the areas of lowest biomass, in principle, no herring larvae were noted.

On the basis of the studies carried out in 1973 it may be supposed that the abundant spawning as well as the favourable hydrologic and trophic conditions should ensure a good complement to the commercial stock on the ICNAF fishing grounds in 1976.

During the trips of m.t. "Wieczno" in February and October layer samples were collected at 31 and 34 stations to study the biomass of phytoplankton by the marked spectrophotometric method /SCOR - UNESCO/.

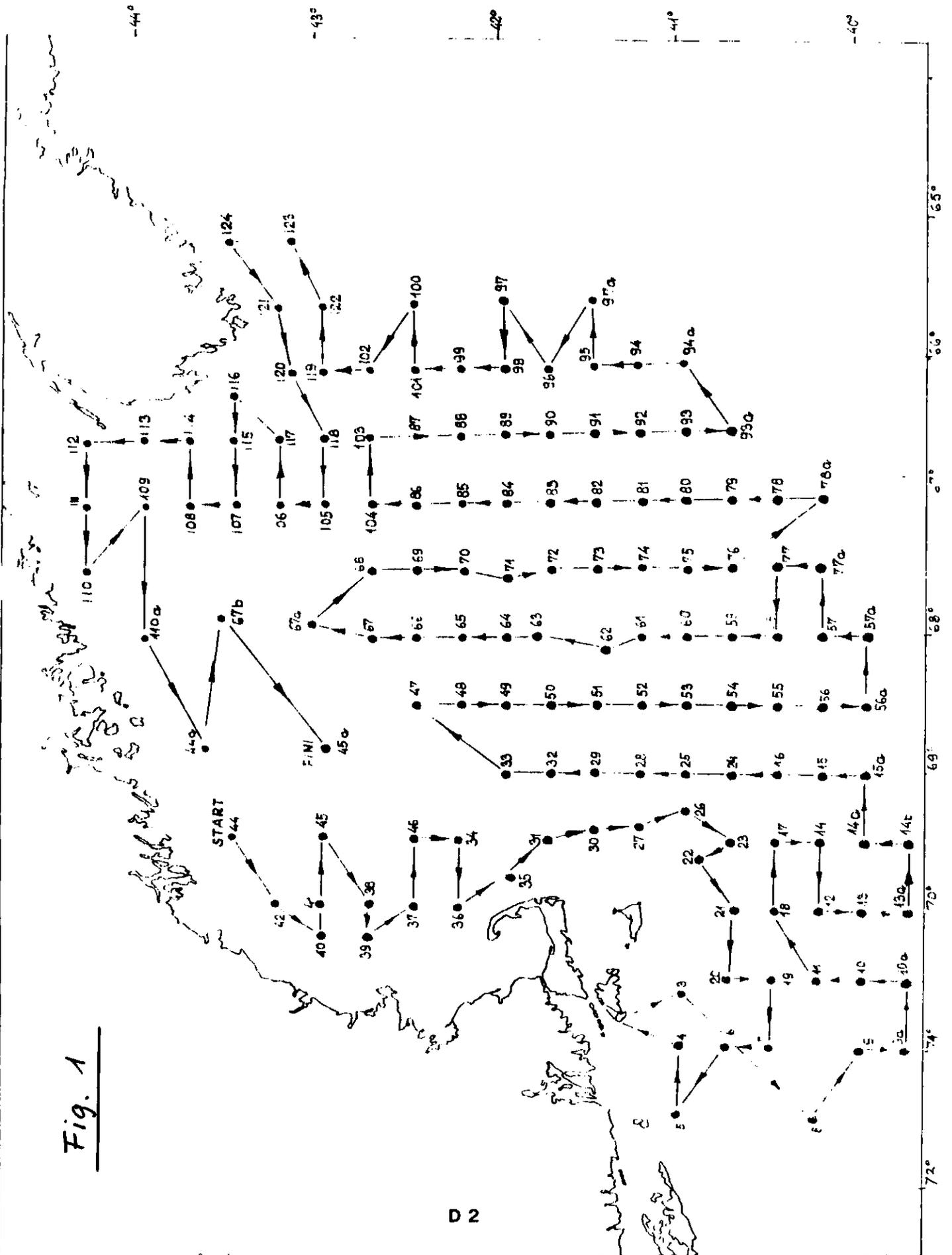


Fig. 1

Fig. 1. Cruise track, R/V Wicczno, 29 September-20 October 1973.

D 2

