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Ъy

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INTRODUCTION

The overall catch by the Polish fishing fleet in NAFO Subareas 2-6 in 1983 was 13,614 (Table 1), exceeding the 1982 catch by 6,695 tons. About 38.4% (5,224 tons) of that catch was taken under cooperative arrangement with Canada (Table 2) and about 33.3% (4,532 tons) was taken under cooperative research mackerel program between Sea Fisheries Institute (MIR) Gdynia - Northeast Fisheries Center (NEFC) Woods Hole, USA (Table 1). The fleet was not able to fully utilize the allocated cod quota in Division 2GH due to unfavorable fishing conditions (ice coverage) as well as quotas for cod in Div. 3M and for squid (*Illex*) in Subarea 3+4 due to low biomass level of these two stocks which made the fishing operations unprofitable.

The largest share in catches constituted Greenland halibut (38.6%), mackerel (31.5%), redfish (10.3%), witch flounder (7.4%) and cod (6.3%). The latter one was taken as by-catch in fisheries directed for Greenland halibut and redfish in June-July period in Div. 3K and October-December period in Div. 2J (Tables 3 and 4). Nine other species as by-catch in the groundfish fisheries and in the pelagic fishing operations directed for mackerel amounted 808 tons (5.9%).

SUBAREA 2

Status of the Fisheries and Research

The total catch by Polish vessels in Subarea 2 was 4,242 tons (Table 3) compared with 989 tons in 1982. The bulk of the catch - 82% was taken in Div. 2J and the remaining part originated from Div. 2H. The prevailing amount of the total in Subarea 2 constituted Greenland halibut (59%), and redfish (22%). Among other species which were taken as by-catch the most abundant was cod (11%).

<u>Greenland halibut</u>. The catch of that species (656 tons) taken in Div. 2H was only slightly higher than that in 1982. The 6.4 fold increase in catches in 1983 as compared with 1982 from Div. 2J (from 289 tons to 1,856 tons) was due to the additional allocations. Most of the catch was taken from October to December (Table 7).

No biological sampling was carried out in this division due to lack of technical staff to cover fishing operations both in summer and fall-winter seasons.

<u>Redfish</u>. A substantial increase of redfish catches in Subarea 2 from 5 tons in 1982 to 922 tons in 1983 (Table 3) resulted from a proportional increase of fishing effort which was made possible by greater allocations than in 1982 (Table 2). The bulk of the catch was taken in November and December.

No biological samples were collected due to the same reasons as in the case of Greenland halibut.

<u>Cod</u>. Cod catches were taken exclusively as by-catch in fishing operations directed to Greenland halibut and redfish. Increased quotas of these two species contributed to a distinct rise in cod by-catch as compared with 1982 fishery from 79 tons to 478 tons in 1983.

Since no sampling teams were available during the last two months of the year when the greatest share of the catch was taken, no samples were collected.

SUBAREA 3

Status of the Fisheries and Research

The overall catch in Subarea 3 increased from 1,429 tons in 1982 to 4,853 tons in 1983 (Table 3). In practical terms the whole catch was taken in Div. 3K. The single day fishing operation in Div. 3L resulted in 12 tons only. Almost 57% of the total constituted Greenland halibut, 19% witch, 10% red-fish, 8% cod and 4% American plaice.

<u>Greenland halibut</u>. Almost 4 fold increase of the quota for that species from stock Division 2J+3KL as compared with 1982 resulted in increased catches in Div. 3K from 262 tons in 1982 to 2,744 tons in 1983 (Table 4). More than 75% of the catch was taken during May-July, 12% during January-March and 10% in October (Table 7).

Length measurements were taken on 6,413 specimens during May-July period. Individual weight of 1,361 specimens was determined. Detailed biological analysis was conducted on 900 specimens. Mean length of males ranged from 43.6 cm to 45.9 cm while that of females from 43.0 to 46.8 cm (Table 11). Gonads of more than 90% of fish were at stage 2 (in 8-grades Maires scale). In May the prevailing number of fish had empty stomachs (57.3%) or at grade 1 (20.5%) while in June and July 54.5-41.0% of stomachs were at grade 2-4 (in 5-grade scale).

<u>Witch</u>. The total catch of witch in Div. 3 decreased in 1983 by 203 tons as compared with 1982 when 1,105 tons was taken. The decline can be perhaps attributed to a break in fishing activity of Polish vessels during the best part of the fishing season in April. The most productive months were from February to June when 83.0% of the total was caught (Table 9).

Length measurement were taken on 4,389 specimens during May-July period. Weight of 1,342 individual specimens were recorded. Detailed biological analysis was carried out on 900 specimens. Mean length of males ranged from 36.0 to 43.5 cm and mean length of females ranged from 46.6 to 48.2 cm (Table 13). Gonads of 70.6% to 87.7% were at second and third stage of maturity. The share of empty stomachs decreased from 44.0% in May to 14.0% in July while the proportion of specimens which stomachs were at second and third grades of fullness raised from 54.0% in May to 82.5% in July.

<u>Redfish</u>. The increased allocations for that species by 2.8 times in 1983 as compared with the amount allocated for 1982 (Table 2) enabled the fishery to operate more effectively in Subarea 3 too. The total catch increased from 19 tons in 1982 to 486 tons in 1983. More than 48.0% of the total was taken in Div. 3K in May and June and about 42.0% in December (Table 8).

Length of 3,369 specimens was measured. Observations on parasitic infestation were conducted on 341 specimens. No detailed biological analysis were carried out. Length of fish in catches ranged from 20 to 59 cm (Table 12). Average length of males increased from 27.6 cm in May to 35.6 in June while that of female from 27.5 to 35.0 cm during the same period of time.

<u>Cod</u>. The species was taken as by-catch in fisheries directed for Greenland halibut and redfish. The total catch due to reasons already specified was much greater than in 1982 (10 tons) and amounted to 374 tons (Table 4). The bulk of the catch (73.0%) was taken during June-July period.

Length of 2,816 specimens was measured. Detailed biological analysis were conducted on 300 specimens. Length of fish in samples ranged from 18 to 108 cm in June and from 18 to 87 cm in July while the average length was 57.9 cm and 50.2 cm respectively (Table 14).

SUBAREA 5 AND STATISTICAL AREA 6

Status of the Fisheries and Research

Fishing operations in Subarea 5 and Statistical Area 6 were conducted under cooperative mackerel research program between MIR and NEFC. Two freezer trawlers of equivalent types (B-29 and B-89) as present in Polish fishing fleet during the 1970's provided with commercial pelagic trawls were employed. The overall catch in Subarea 5 was 143 tons while in Subarea 6 was 4,389 tons thus almost the same as in 1982 when 4,403 tons were taken. Bycatch species were scup (3.1%), alewife (1.8%), spiny dogfish (0.06%) and menhaden (0.02%) (Tables 5 and 6).

<u>Mackerel</u>. The total mackerel catch in Subarea 5 and Subarea 6 was 4,283 tons. More than 57.0% of that was taken in Division 6A, almost 23.0% in Division 6B, 14.3% in Division 6C and only 3.3% in Subarea 5 (Tables 5 and 6). The fishery extended from February to May. The greatest share (56.0%) was taken in April (Table 10).

Biological sampling was conducted from aboard both trawlers by Polish and US scientists, technicians and observers. Sampling comprised length and weight measurements, detailed biological analysis, measurements of relevant environmental parameters, collecting of data on feeding habits and parasitic diseases. Length measurements were performed on 23,990 specimens. Average length of mackerel increased from 32.4 cm in February to 39.3 cm in May (Table 15). The age composition was dominated by 1981 year-class (29.0%) followed by 1982 year-class (10.8%), 1974 year-class (1.9%) and 1978 year-class (9.9%) (Table 16). Individual weight measurements of 1,086 fish yielded the following length-weight relationship:

3.387 W = 0.0026 L

Mackerel at developing stage (D) was predominant constituting 60-100% of fish in samples. From 75-100% of fish had empty stomachs which could be attributed to high digestion rate and the prevailing type of prey (Copepoda).

SPECIAL RESEARCH STUDIES

The Polish research vessel *Wieczno* conducted one survey cruise during 25 January-12 March 1983, in cooperation with the Northeast Fisheries Center, Woods Hole, USA. Both the first and the second part of the cruise which covered the area from Cape Hatteras to Southern Georges Bank (25 January-24 February) were aimed at defining distribution of the wintering mackerel concentrations, measuring relevant environmental parameters and collecting biological observations on mackerel, squids, herring and spiny dogfish.

Standard stratified-random groundfish survey was applied. In 77 sets 44,281 kgs of finfish and squids comprising 74 species were taken. The most abundant was spiny dogfish (29,664 kg) followed by Squid (Loligo) (2,626 kg). Atlantic mackerel consisted of 0.7% of the total. For the first time since 1977 a sample of Atlantic herring was taken (0.9%).

The third part of the cruise extending from Hudson Canyon to Cape Hatteras (26 February-12 March) was devoted to biological and ecological studies of apex predator like sharks, tunas and swordfish (NEFC program). The fishing was carried out using longlines. In 17 sets 276 specimens (13 species) were taken. Materials on age, growth, feeding habits, breeding and parasites of sampled species were collected. In addition hydroacoustical observations and tagging experiments were conducted.

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|--|-------------------|-------|----------------|--|--|
| Species | ļ | 1982 | | 1983 | 5000 0000 4000 4000 4000 8000 8000 8000 |
| 29 000 000 000 000 000 000 000 000 000 0 | | tons | % | tons | 8 |
| Cod | | 89 | 1.3 | 852 | 6.3 |
| Redfish | | 24 | 0.3 | 1 408 | 10.3 |
| American plaice | | 13 | 0.2 | 266 | 2.0 |
| Witch flounder | | 1 151 | 16.6 | 1 005 | 7.4 |
| Greenland halibut | | 1 111 | 16.1 | 5 258 | 38.6 |
| Atlantic halibut | | 6 | 0.1 | 6 | * |
| Skates | | 7/ | 0.1 | 199 | 1.5 |
| Roundnose grenadie | er | 15 | 0.2 | 50 | 0.4 |
| Wolffishes | | 2 | - | 51 | 0.4 |
| Mackerel | | 4 215 | 60.9 | 4 283 | 31.5 |
| Alewife | | 81 | 1.2 | 77 | 0.6 |
| Menhaden | | 683 | - <u>1</u> 260 | 8 | 0.1 |
| Butterfish | | 1 | 4 | 810 | 43 |
| Scup | | Čins | 49 | 135 | 1,0 |
| Spiny dogfish | | 103 | 1.5 | 16 | 0.1 |
| Squid - Illex | | 77 | 1.1 | . ca | and a second |
| Other finfish | 1 | 24 | 0.3 | 619 | 8239 |
| | | | | | |
| Total | | 6 919 | 99.9 | 13 614 | 100.2 |
| | | | | | |

Table 1. Polish catches in NAFO Subareas 1-5 and Statistical Area 6 in 1982 and 1983

| | Stock division | Catch quotas | Catches | <u>Catch</u> quota % |
|---------------------|-------------------|--|--|--------------------------------|
| Cođ | 2GH 3M | 500 500 | 60 | 12.0 |
| Redfish | 2+3K | 660 1 220 ^{1/} | 188 1 2 20 | 28 .5 100.0 |
| Witchflounder | 2+3KL | 1 600 | 1 005 | 62.8 |
| Greenland halibut | 2GH 2J+3KL | 500 200 ^{1/} 650 3 800 ^{1/} | 458 198 796 ^{2/} 3 806 | 91。6 99。0 122。5 100。2 |
| Roandnose grenadier | 2+3 | 800 | 50 | 6.3 |
| Squid - Illex | 3+4 | 1 000 | 2 2 0 0 0 | |
| Mackorol | 5+6 | 5 000 ^{3/} | 4 283 | 85.7 |

Table 2. Polish allocation versus catches in NAFO area in 1983 /metric tons/

1/ Qubbas allocated under a separate cooperative arrangement with Canada.

2/ Comparises 82 tons taken as by catch in directed witch and redfish fisheries.

3/ Special quota for fishing operations within MIR-NEFC cooperative research mackerel program.

Table 3

Polish catches in SA 2, 1983 /metric tons/

| Species | Subarea | 2 | Mo+ol |
|---------------------|-------------|------|-----------|
| | 2 H | 2 J | TOLAT |
| Cod | 60 | 418 | 478 |
| Redfish | 10 | 912 | 922 |
| American plaice | 17 | 52 | 69 |
| Witch | Casa | 103 | 103 |
| Greehland halibut | 656 | 1856 | 2512 |
| Atlantic halibut | 1 | 4229 | 1 |
| Roundnose grenadier | | 25 | 25 |
| Wolffishes | | 27 | 27 |
| Skates | 8 | 97 | 105 |
| | | | |
| TOTAL | 752 | 3490 | 4242 |
| | | | |

Table 4

| Species | S | ubarea | | መለተ e ገ |
|--|---|--------|----------------------------|---|
| | 3 K | | 3 L | IUUAL |
| Cod Redfish American plaice Witch Greenland halibut Atlantic halibut Roundnose grenadier Wolffishes Skates | 373 484 197 896 2744 4 25 24 | | 1 2 - 6 2 1 | 374 486 197 902 2746 5 25 24 |
| TOTAL | 4841 | | 12 | 94 4853 |

Polish catches in SA 3, 1983 /metric tons/

- 5 -

Table 5

Polish catches in SA5, 1983 /metric tons/

| Species · | S 5 Ze | <u>u b</u> | <u>area 5</u> 5 Zw | Total |
|---------------|-----------|------------|-----------------------|-------|
| Mackerel | 40 | | 101 | 141 |
| Spiny dogfish | 2 | | | 2 |
| TOTAL | 42 | | 101 | 143 |

Table 6

Polish catches in Statistical Area 6, 1983 /metric tons/

| Species | Stati | stical Area. | 6 | Total |
|---------------|-------|--------------|---|-------|
| | 6.A | 6 B | 60 | 1004 |
| Mackerel | 2.546 | 982 | 614 | 4.142 |
| Alewife | 34 | 31 | 12 | 77 |
| Menhaden | | 8 | | 8 |
| Scup | 135 | etta | 6529 | 135 |
| Spiny dogfish | 6 | 10 | 11 | 27 |
| TOTAL | 2.721 | 1.031 | 637 | 4,389 |
| | | | and the second second state of the second | |

Polish Greenland halibut catches in SA 2 and 3, 1983 /metric tons/

| DiV | Jan | Feb | Mor | Apr | May | Jun | Jul | Ang | Sep | Oct | Noa | Dec | Total |
|-------------------|-----|----------------|------------|------------|-----------|-----------------|------------------|-------------|--------------|-----------------|----------------|---------------|---------------------|
| 2 W 2 J 3 K | | - 132 75 | 4 7 | 62 63 | 555 | 872 | 450 | - 66 | - - 26 | - 175 262 | 1 1546 ~ | 205 3 4 | 656 1856 2744 |
| 3 L TOTAL | 204 | 207 | 2 49 | 200 201 | ي 5555 | - 872 | ت 1083 | - 66 | 26 | - 437 | - 1547 | - 212 | 2 5258 |

Table 8

Polish redfish catches in SA 2 and 3, 1983 /metric tons/

| Div | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nev | Dec | Total |
|-------|---------------------|-----|-----|-------------|----------|-----|-----|-----|-----|-----|-----|-----|-------|
| 2 H | | | | G 20 | - | | 10 | | 655 | | | - | 10 |
| 2 J | ан С. 6 5 | 4 | - | - | . | | - | - | - | 18 | 236 | 654 | 912 |
| 3 K | 2 | 20 | 23 | | 89 | 146 | - | - | - | - | 2 | 202 | 484 |
| 3 L | es , * | | 2 | - | - | - | - | - | - | - | - | - | 2 |
| LATOT | 2 | 24 | 25 | - | 89 | 146 | 10 | | | 18 | 238 | 856 | 1408 |

Table 9

Polish witch catches in SA 2 and 3, 1983 /metric tons/

| Div | Jan | Feb | Mar | Apr | May | Jun | Jul | Ang | Sep | Oct | Nov | Dec | Total |
|-------|-----|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----------|-------|
| 2 J | - | 13 | ~ | | | | - | 20 | - | 67 | 23 | - | 103 |
| 3 K | 12 | 144 | 344 | - | 100 | 158 | 67 | 3 | 5 | 61 | - | . 2 | 896 |
| 3 L | - | 600 | 6 | | _ | - | - | - | - | - | - | ' | 6 |
| TOTAL | 12 | 157 | 350 | - | 100 | 158 | 67 | 3 | 5 | 128 | 23 | 2 | 1005 |
| | | | | | | | | | | | | | |

Table 10

Polish mackerel catches in SA 5 and 6, 1983 /metric tons/

| Div | Jan | Feb | Mar | Apr | Мау | Jun | Jul | Aug | Sep | Oct | Noa | Dec | Total |
|-------|---|-----|-----|------|----------|-----|-------|-----|-----------|--------|-----|-----|-------|
| 5 Ze | 2010-00-00-00-00-00-00-00-00-00-00-00-00- | | - | | 40 | • | | - | - | - | 650 | - | 40 |
| 5 Zw | - | 600 | - | - | 101 | - | | - | ** | : - | - | _ | 101 |
| 6 A | - | 779 | 32 | 1572 | 143 | - | - | - | - | - | ~ | - | 2546 |
| 6 B | - | 53 | 141 | 788 | - | - | can l | - | . 85 | - | - | | 982 |
| 6 C | - | 102 | 512 | - | . | - | | - | . | - | - | | 614 |
| TOTAL | - | 934 | 685 | 2380 | 284 | | | | _ | - casa | 680 | - | 4283 |

. 6 .

Length frequencies of Greenland halibut from directed commercial fishery in Div. 3K, May-July 1983 /per mille/

| Length-class | M | зу | Ju | ne | Ju | ly |
|---|--|--|--|---|---|---|
| /2 cm/ | Male | Female | Male | Female | Male | Female |
| $\begin{array}{c} 20 - \\ 22 - \\ 24 - \\ 26 - \\ 28 - \\ 30 - \\ 32 - \\ 34 - \\ 36 - \\ 38 - \\ 40 - \\ 42 - \\ 44 - \\ 46 - \\ 48 - \\ 50 - \\ 52 - \\ 54 - \\ 56 - \\ 58 - \\ 58 - \\ 58 - \\ 58 - \\ 58 - \\ 66 - \\ 68 - \\ 70 - \\ 72 - \\ 74 - \\ 76 - \\ 78 - \\ 80 - \\ 82 - \\ 84 - \\ 86 - \\ 88 - \\ 90 - \end{array}$ | - 6 14 10 29 41 71 47 73 6 19 12 57 75 6 2 | - 5 12 13 15 16 26 34 5 12 15 16 26 34 5 12 15 16 26 34 5 12 15 16 26 34 5 16 28 92 92 96 8 24 15 16 20 92 96 8 24 15 16 27 8 92 92 96 8 36 46 12 11 11 11 11 11 11 15 16 26 34 12 12 13 15 16 26 34 12 12 12 12 12 12 13 15 16 26 34 12 12 12 12 12 12 12 12 12 12 | - 1 4 10 282 40 358 70 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 230 74 510 20 70 75 70 70 75 70 70 75 70 70 75 70 70 75 70 70 75 70 70 70 70 70 70 70 70 70 70 70 70 70 | - 4 1236 425166177182412246543-2-1-11 | 4 1 6 330 555 276 697 715 1928 699 4 39 1 1 1 1 1 1 1 1 1 1 1 1 1 | 3 3 8 26 46 52 35 29 29 29 29 29 29 29 29 29 29 29 29 29 |
| Total | 1000 | 1000 | 1000 | 1000 | 998 | 999 |
| Number measured | 547 | 753 | 787 | 929 | 983 | 1053 |
| length | 45,9 | 46,8 | 44.0 | 45•5 | 43.6 | 43.0 |

Length frequencies of redfish from directed commercial fishery in Div. 3K, May - June 1983 /per mille/

| Length - class | | May | Ju | 1e | |
|---|---|--|--|--|---|
| / 1 cm / | Male | Female | Male | Female | |
| $\begin{array}{c} 20\\ 21\\ 22\\ 23\\ 24\\ 25\\ 26\\ 27\\ 28\\ 29\\ 30\\ 31\\ 32\\ 33\\ 34\\ 35\\ 36\\ 37\\ 38\\ 39\\ 40\\ 41\\ 42\\ 43\\ 44\\ 45\\ 46\\ 47\\ 48\\ 49\\ 50\\ 51\\ 52\\ 53\\ 54\\ 55\\ 56\\ 57\\ 58\\ 59\\ 9\end{array}$ | $ \begin{array}{c} 6\\ 15\\ 24\\ 24\\ 24\\ 41\\ 71\\ 108\\ 138\\ 108\\ 68\\ 50\\ 30\\ 32\\ 24\\ 26\\ 21\\ 15\\ 19\\ 19\\ 8\\ 4\\ 4\\ -\\ 2\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\ -\\$ | 3 13 15 26 33 64 60 100 117 129 86 46 39 30 24 18 18 20 11 15 7 8 11 6 7 1 - < | -2 10 13 15 54 9 34 57 9 36 7 9 8 5 10 4 2 4 8 7 9 8 5 10 4 2 4 8 7 9 8 5 10 4 2 4 8 5 10 4 5 10 4 5 10 4 5 10 4 5 10 4 5 10 4 5 10 4 5 10 4 5 10 4 5 10 4 5 10 4 5 10 4 4 7 9 8 5 10 4 4 8 5 10 4 4 8 5 10 4 4 8 5 10 4 4 8 5 10 4 4 8 5 10 4 4 8 10 4 4 8 10 4 4 4 9 2 4 8 8 11 1 8 8 11 1 8 8 11 1 8 8 11 1 8 8 11 1 8 8 11 1 8 8 11 1 8 8 11 1 8 8 11 1 1 8 8 11 1 8 8 11 1 8 8 11 1 1 8 8 11 1 1 8 8 11 1 1 8 8 11 1 1 1 8 8 11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | -55 134 42 44 45 57 60 71 50 70 71 50 71 50 71 50 71 50 70 71 50 70 71 50 70 71 50 70 71 50 70 71 50 71 50 70 71 50 70 71 50 70 71 50 70 71 50 70 71 50 70 71 50 70 71 50 70 71 50 70 71 50 70 70 71 50 70 70 70 70 70 70 70 70 70 70 70 70 70 | |
| Total Number | 1000 | 1000 | 1000 | 1000 | |
| measured | 464 | 698 | 1066 | 1141 | • |
| length | 29.6 | 27.5 | 35.6 | 35.0 | |

€ -s ... C

Length frequencies of witch from directed commercial fishery in Div. 3K, May - July 1983 /per mille/

| Length-dass | Me | ay | រ័យ | 0.0 | Julv | | an a |
|--|--|--------|--|--|---|--|--|
| /2 cm / | Male | Female | Male | Female | Male | Female | and and a second se |
| $ \begin{array}{c} 14 \\ 16 \\ 18 \\ 20 \\ 22 \\ 24 \\ 26 \\ 28 \\ 30 \\ 32 \\ 30 \\ 32 \\ 36 \\ 38 \\ 40 \\ 42 \\ 44 \\ 46 \\ 48 \\ 50 \\ 52 \\ 54 \\ 56 \\ 58 \\ 60 \\ 62 \\ 68 \\ 70 \\ 72 \\ \end{array} $ | 2 35 64 144 226 206 137 94 69 21 2 | | - 1 2 1 6 2 1 3 3 6 6 5 5 1 8 3 3 5 6 6 8 5 8 5 9 1 3 3 5 6 6 8 5 7 8 8 8 5 7 8 8 8 8 7 8 8 8 8 7 8 8 8 7 8 8 8 8 7 8 8 8 8 8 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8 | 1 - - - - - - - - - - - - - | 5 15 10 20 35 25 50 105 115 85 64 80 110 116 60 30 30 25 15 - - - - - - | - - - - - - - - - - - - - - | |
| Total | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | |
| Number measured | 418 | 592 | 779 | 731 | 199 | 328 | |
| Mean enth | 43•5 | 47.9 | 43•5 | 4 8 •2 | 36.0 | 46-6 | |

Length frequencies of cod taken as bycatch in commercial fishery directed for Greenland halibut and redfish in Div. 3K. June - July 1983 /per mille/

| Length - dass / 3 cm / | June | July |
|--|---|--|
| 18 - 21 - 24 - 27 - 30 - 33 - 36 - 39 - 42 - 45 - 48 - 51 - 54 - 57 - 60 - 63 - 66 - 69 - 72 - 75 - 78 - 81 - 84 - 87 - 90 - 93 - 96 - 99 - 102 - 105 - 108 - 111 - 11 | $ \begin{array}{r} 1 \\ 4 \\ 6 \\ 8 \\ 15 \\ 23 \\ 28 \\ 41 \\ 58 \\ 68 \\ 85 \\ 86 \\ 82 \\ 106 \\ 84 \\ 89 \\ 61 \\ 47 \\ 32 \\ 20 \\ 13 \\ 11 \\ 10 \\ 6 \\ 4 \\ 3 \\ 1 \\ 1 \\ 2 \\ 1 $ | 4 5 16 13 30 60 64 53 59 80 82 83 91 75 68 91 75 75 68 91 75 75 68 91 75 75 68 91 75 75 68 91 75 75 68 91 75 75 68 91 75 75 68 91 75 75 68 91 75 76 75 76 75 75 76 75 75 76 75 75 76 75 76 76 77 75 76 76 77 77 75 76 77 77 76 77 77 76 77 77 76 77 77 76 77 77 |
| Total | 1000 | 1000 |
| Number measured | 2093 | 723 |
| Mean length | 5 7 •9 | 50.2 |

0 0 6 0;

| | | · · . | | | | |
|---|---|-------------------------------------|---|---------------------------|---|---|
| | Length -dass / 1 cm / | February | March | April. | May | Ne degeneration (see an organise and organise |
| | 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 45 36 37 -38 39 40 41 42 43 44 | ++1360 104399620348062159781051+ | - - - - - - - - - - - - - - - - - - - | ++1102915456014833318602+ | - - - - - - - - - - - - - - - - - - - | |
| | Total | 1000 | 1000 | 997 | 1000 | |
| | Number measured | 7840 | 3630 | 11631 | 889 | |
| | Mean langth | 32•4 | 35•8 | 37•4 | 39•3 | |
| 2 | | | | | | |

Length frequencies of mackerel from directed research fishery in SA 5 and SA 6, February-May 1983 /per mille/

| ω | • |
|-------------|---|
| at | 1 |
| length | • |
| mean | 1 |
| and | • |
| composition | • |
| Age | • |
| 1 6° | |
| Table | |

| Excel and a subscription of the | < 67 | 1.3 | 41°2 |
|---|------|------------------|--------------------|
| | 68 | 0.1 | 41.6 |
| | 69 | 0.4 | 41.04 |
| | 01 | 0.6 | 40°9 |
| | 11 | 1.7 | 40°6 |
| | 72 | 2°2 | 40.7 |
| | 73 | 6°6 | 40°5 |
| හ | 74 | 11.9 | 40°1 |
| c l a | 75 | 8 . 3 | 39°9 |
| | 76 | 4°2 | 39°6 |
| 4 | 277 | 4°1 | 39 ° 0 |
| Yea | 78 | 9°8 | 38°6 |
| | 62 | 2 ¢5 | 37°4 |
| | 80 | 6 _° 4 | 34°1 |
| | ŝ | 29*0 | 27.9 |
| | 1982 | 10,8 | h 18.2 |
| | | Per mille | Mean lengt /cm/ |

sition and mean length at age of mackerel from Polish research catches in SA5 and SA6, February-May 1983

- 12 -