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Status of Fisheries and Research Carried Out in Subarea 3
in 1971

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I. Pertinent Documents

The following research documents contain information relation to Subarea 3: 72/1, 4, 14, 15, 16, 25, 30, 31, 32, 33, 35, 36, 37, 39, 40, 41, 42, 43, 44, 45, 46, 52, 56, 60, 63, 84, 86, 87, 88, 90, 92, 94, 96, 98, 99, 100, 102, 103, 104, 105, 106, 107, 109, 110, 120.

Documents relating solely to salmon have been omitted. The latest information regarding the state of the fish stocks and the most recent assessments are given in the Report of the Assessments Subcommittee, the report of its Midterm Meeting (Res. Doc. 72/1) and the Report of the ICES/ICNAF Joint Working Group on Cod stocks in the North Atlantic (Res. Doc. 72/33). Cod catch statistics for the years 1958-1970 for each division of Subarea 3 and for the adjacent subareas are given in Res. Doc 72/57.

II. Status of the Fisheries

Table I gives the total nominal catch from Subarea 3 of all species and of Cod, haddock, redfish and herring considered separately for the year 1971 and the four preceding years.

Table 1. Nominal catches from Subarea 3 (thousand metric tons round fresh)

	1967	1968	1969	1970	1971
All species	1,103	1,144	983	972	951*
Cod	721	734	569	529	492*
Haddock	11	7	5	7	5
Redfish	89	54	88	84	102
Herring	79	145	145	135	118

*Catches of Denmark (P) assumed to be the same as in 1970.

Table 2 gives the nominal catches of selected other species taken in Subarea 3 for the years 1969, 1970, and 1971.

Table 2. Nominal catches Subarea 3 1970-1971 (metric tons round fish)

	1970	1971	1971*
Salmon	50	812	792*
Greenland halibut	17,190	23,561	11,139
American plaice	70,959	89,136	79,116
Witch	4,177	21,726	26,918
Yellowtail flounder	10,561	26,899	37,686
Flounders (not specified)	37,019	4,997	6,325
Roundnose grenadier	11,682	22,396	18,111

*Catch of Denmark (D) assumed to be the same as in 1970. All catches may be slightly low because of lack of reports from some non-member countries.

Table 3* gives the nominal catches in Subarea 3 by species and countries for the years 1970 and 1971, as noted above these may not be quite complete. If it is assumed that Denmark caught the same weight of fish in 1971 as in 1970, then the total catch of all species decreased by about 20,000 tons. Catches by Spain and USSR increased slightly while those of Norway and Canada decreased. The latter by about 10,000 tons.

Cod

Although the information is not yet quite complete it seems that cod catches again declined slightly in 1971. Table 4 below compares the 1971 nominal catches by divisions with the average catches taken in the 10 years 1961-70 (from Res.Doc. 72/57).

*Contains 10,000 tons as estimated catch by Denmark (D) not allocated to divisions. The only divisions showing a substantial decline from the 10 year average catch were 3V, 3M and 3Pi. Some German landings reported as from 3K are to be attributed to 3M (Res.Doc. 72/44 revised). The catches from Divisions 3N and 3O were substantially above the 10 year average while those of 3L and 3Ps continued at the average level. Cod catches by Spain and Portugal remained very stable but those taken by Canada and the USSR declined slightly. Norway fished to only a small extent in Subarea 3 compared with 1970. As in 1969 and 1970, the heaviest catches were made in the northern part of the Subarea; production from these two divisions (3V and 3L) was similar to that of 1970.

Table 3. Nominal catches from Subarea 3 in 1970 and 1971 by species and country (thousand metric tons round fresh)

Species	Year	Total	Canada	Denmark	France	Germany	Iceland	Japan	Norway	Poland	Portugal	Romania	Soviet Union	USSR	UK	Other
Cod	1970	529	129	9	14	12	-	-	38	13	91	-	145	60	Ø	Ø
	1971	492	116	NA	17	12	Ø	Ø	2	12	95	-	172	44	5	Ø
Haddock	1970	7	2	Ø	Ø	-	-	-	Ø	-	-	-	3	Ø	-	-
	1971	5	1	NA	Ø	-	-	-	Ø	-	-	-	3	Ø	-	-
Redfish	1970	44	1	-	1	Ø	Ø	3	Ø	1	-	Ø	-	Ø	Ø	-
	1971	302	Ø	NA	1	Ø	Ø	8	-	Ø	-	Ø	-	Ø	Ø	-
Greenland Halibut	1970	23	11	-	-	-	-	-	-	7	-	-	-	Ø	-	NA
	1971	14	9	NA	-	-	Ø	-	-	3	-	-	-	2	-	Ø
American plaice	1970	88	70	NA	Ø	-	-	-	-	Ø	-	-	Ø	17	-	NA
	1971	79	58	NA	1	-	-	-	-	-	-	-	Ø	20	Ø	-
Witch	1970	22	7	NA	Ø	-	-	-	-	3	-	-	-	12	-	NA
	1971	27	10	NA	Ø	Ø	-	Ø	-	-	-	-	-	13	Ø	Ø
Yellowtail Flounder	1970	27	20	-	Ø	-	-	-	-	-	-	-	-	3	-	NA
	1971	38	24	NA	Ø	-	-	-	-	-	-	-	-	13	-	-
Herring	1970	135	135	-	-	-	-	-	-	Ø	-	-	-	-	-	-
	1971	118	118	-	-	-	-	-	-	-	-	-	-	-	-	-
Total- All species	1970	972	404	10	18	12	-	4	38**	27	91	3	169	186	Ø	12
	1971	951*	361	NA	20	12	Ø	8	21	27	95	2	176	198	5	16

Ø Catch less than 500 tons

* Catches of Denmark (F) assumed to be the same as in 1970.

** Includes some fish caught in Subarea 2.

Table 1. Subarea 3 Cod catches by divisions (metric tons)

Division	3K	3L	3M	3N	3O	3P n	3Ps	Total
Average 1961-1970	106,773	199,822	30,234	52,589	50,620	17,775	61,272	515,062
Provisional Catch 1971	81,891	191,633	19,356	67,510	65,596	7,844	61,658	492,000*

Landings from the Canadian coastal fisheries again decreased except for the inshore fishery in Div. 3Ps. The trap catches were dominated by the 1966-1968 year classes but the deep water gill-nets took a greater proportion of older fish. On the N.E. coast of Newfoundland the trend among the larger coastal vessels towards fishing by bottom gill nets in deeper water for a variety of species continued; the total weight of other species usually greatly exceeding that of Cod. (Res.Doc. 72/36).

In Canadian research vessel surveys in Div. 3L with a lined cod end in June and October 1971, the 1968 year class formed 45-50% by numbers.

Portuguese catches were taken mainly in Div. 3L and were dominated by 5-7 year old cod (Res.Doc. 72/40). In the Spanish catches Div. 3L and 3O provided 61% of the total (Res.Doc. 72/39).

Polish vessels fished mainly in Div. 3K. The bulk of the catches was made up by the 1964-66 year classes. The mean yields per hour's fishing for Polish trawlers operating in Subarea 3 during the last 4 years were 1968--1.33tons; 1969--1.58 tons; 1970--1.35 tons and 1971--1.61 tons (Res.Doc. 72/43).

The German catches from Labrador and Div. 3K and 3L were dominated by the year classes 1963-66 which comprised more than 80% by numbers (Res.Doc. 72/44 - Revised).

Soviet research vessel surveys during May-August 1971, covering all divisions of Subarea 3 and comprising 240 one-hour hauls, indicated that an improvement in the cod fisheries in Divs. 3N, 3O, and 3P may be expected in 1973 due to the high abundance of the 1968 year-class. This year-class is also likely to be strong in Div. 3M (Flemish Cap) (Res.Doc. 72/42).

Haddock

Landings of haddock fell slightly from the 1970 level and neither Canadian nor Soviet vessel surveys revealed any evidence of incoming year-classes which might restore the fishery (Res.Doc. 72/36, 42, 106, and 107). Nevertheless, significant quantities of haddock were reported as being caught in the inshore fishery along the south and east coasts of Newfoundland (Res.Doc. 72/36).

Redfish

Redfish landings from Subarea 3 increased by more than 20% to give the highest total since 1965. The greater part of the increase was taken by the USSR but catches by Japan, Poland and probably non-members also increased. Canadian landings decreased. The largest catches were made in Division 3Ps but all divisions were productive except for 3L. Little research on redfish was reported but sampling was done by Japan, Germany, Poland and USSR. In a special trawl survey by the USSR during the summer of 1971, which covered the whole of Subarea 3, beaked redfish (Sebastes mentella) dominated the catches; the highest average yield per hour's trawling was obtained from Div. 3N viz. 693 kg (Res.Doc. 72/106). Poland recorded an appreciable quantity of young redfish (mean length 12.2 cm) on Green Bank in Div. 3C (Res.Doc. 72/3).

Herring

All the herring were landed by Canada but the total catch from Subarea 3 was 17,000 tons less than in 1970. As a new development, 20% of the catch in the 1970/71 season was utilized for human consumption and this trend is expected to continue in the 1971/72 season. Extensive Canadian research on Newfoundland herring is presented in Res.Doc. 72/87, 88, 92, 96, and 100 and is summarised in the Canadian Research Report (Res.Doc. 72/36). New assessments are to be found in the relevant section of the Report of the Assessments Subcommittee.

Flounders

The estimated landings from Subarea 3 of the three most important species of flounders in the period 1968-71 are shown in Table 5.

Table 5. Estimated total nominal catches of flounders from Subarea 3--all countries

<u>Year</u>	<u>American plaice</u>	<u>Yellowtail</u>	<u>Witch</u>
1968	89,000	12,000	29,000
1969	90,000	14,500	17,500
1970	89,436	26,899	21,726
1971	79,144	37,686	26,948

(4,997 tons of flounders (not specified) landed in 1970 and 6,325 tons (not specified) landed in 1971 are not included)

The main fishing areas for American plaice are Divisions 3L and 3N, although landings in excess of 10,000 tons are also reported from Divisions 3K and 3Ps. Assessments have been prepared for the seemingly separate stocks in Divisions 3L and

3N (Res.Doc. 72/1, 14. 15) and are summarised in the Report of the Assessments Subcommittee.

The yellowtail fishery occurs mainly on the shallower parts of the Grand Bank in Divisions 3L and 3 N. There seems to be only one stock and a first assessment is available in Res.Doc. 72/86. It is possible that the yellowtail stock has expanded as the haddock on the Grand Bank have declined. Information on pre-recruit strength is insufficient to indicate whether the recent increase in abundance of yellowtail will continue, but a Canadian research vessel cruise in June 1971 showed that yellowtail has spread to most parts of the bank less than 90m in depth and catches equivalent to 460 kg/hr were obtained in several localities (Res.Doc. 72/36).

Very little information is reported concerning witch (grey sole). The most important fishing areas are 3K and 3L.

Other species

Landings of Greenland halibut declined. Catches by USSR, Poland and Canada (N) were all substantially reduced.

Catches of roundnose grenadier fell slightly from the level of recent years. Only small quantities of argentines were landed mostly by Japan.

~~Canadian (N) salmon catches at 1,576 tons were similar to those of 1970~~
(1,595 tons).

Squid, which had been very scarce in the Newfoundland coastal fishery for several years, increased to about 1,600 tons (Res.Doc. 72/36).

Groundfish landings reported in 1971 as "not specified" were negligible but "other fish (ns)" increased to 11,893 tons, the bulk being landed by the USSR. "Other shell fish" totalled 3,526 tons, all landed by Canada.

Adequacy of Sampling

Sampling efficiency, assessed according to the criteria recommended in 1970 by ICNAF, was either barely adequate or insufficient in respect of almost all species of major commercial importance in Subarea 3 (Res.Doc. 72/63). The figures given below are based on a standard of 1.0 and values below this indicate that the minimum requirement (200 length measurements for each 1000 tons of a species caught) was not satisfied.

	Cod	Haddock	Redfish	Herring	American plaice	Yellow tail	Witch
1969	0.5	15	1.2	0.4	0.4	0.9	1.9
1970	0.8	2.1	0.3	0.8	0.5	0.3	0.0

(In some cases additional research vessel samples are available)

III. Research Work

Research studies made in Subarea 3 were reported by Canada, France, Germany, Japan, Poland, Portugal, Spain, USSR, UK, and USA.

Hydrography

Hydrographic studies were reported by Canada, Poland and USSR.

In the spring and early summer of 1971 the water masses of the Labrador Current on the north Newfoundland Bank and the northeastern slope of the Grand Bank were colder than in any year during the period 1957-71. At the same time on the southwestern slope of the Grand Bank, and in the channels between the Grand, Green and St. Pierre Banks, the temperature was above the norm. Later in the year the temperature in these areas also fell below the norm (Res.Doc. 72/105). The circulation patterns in the South Labrador and Newfoundland areas in 1970-71 are described in detail in the USSR Res.Doc. 72/104.

Plankton

Plankton studies were reported by the UK and USSR. The Plankton Recorder Survey was continued by the UK with 13,244 miles sampled in Subarea 3. The data processing of the results is now fully automated and the accessibility of the data has been improved. In 1971 phytoplankton was below average in Subarea 3 with an early spring maximum. Calanus abundance was near to the long-term average.

The USSR carried out a survey of ichthyoplankton during April and May covering the area of Divs. 3K, 3L, 3M, and 3N: 234 stations were worked. The mean number of cod eggs in Divs. 3K and 3L was somewhat lower than in 1970 and the larvae hatched later, due to more severe hydrographic conditions. The analysis of the data confirms that the main cod spawning grounds are located near North Labrador and that eggs and larvae drift to Divs. 2H, 2J, 3K and 3L with the current. Although there is some spawning in these divisions, it is much less than in Div. 2G. (RD72/42)

Groundfish Surveys

Progress in the ICNAF Groundfish Survey programme is reported in Res. Doc. 72/12: the provisional schedule for 1972 shows surveys by Canada in January (Div. Pn), March (Div. Ps), May (Divs. L and N) and November (Div. Pn) and by the USSR in April (all divisions), and by France in March and May in 3Ps and 3Pn. Res. Doc. 72/110 gives biomass estimates for selected commercial species from Canadian surveys in Divisions 3L, 3N and 3Ps. Abundance of young cod in Div. 3K in the years 1969-71 is shown in Canadian Res. Doc 72/108 and the results of the annual Soviet Survey over the whole of Subarea 3 in Res. Doc. 72/42.

Special Biological Studies

Biological investigations of American plaice, including spawning areas and larval distribution in Subarea 3, are reported in the USSR Res. Doc. 72/103. French investigations on this species in Div. 3Ps are described in Res. Doc. 72/56.

The relation between abundance fluctuation in cod and haddock and hydrographic conditions, especially temperature, is discussed in Res. Doc. 72/107. An inverse dependence between cod and haddock catches on the Grand Bank is suggested. USSR investigations on diurnal variations in catches of cod in relation to feeding habits are reported in RD 72/99.

Soviet investigations on the distribution and biology of capelin on the Grand Bank are reported in Res. Doc. 72/102.

Tagging

Tagging activities on fish other than herring were reported only by USSR and Canada. Canada tagged Greenland halibut in Trinity Bay, Newfoundland; recoveries from earlier tagging in this area included 2 more taken on the edge of the Continental Shelf, indicating perhaps, that this is a normal migration pattern (Res. Doc. 72/36). USSR recaptures of American plaice from Canadian and USSR taggings in 1970 included 9 fish making long migrations from the open sea shoreward (Res. Doc. 72/62).