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Status of the fisheries and researches carried out
in Subarea 5 during 1963

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1. The following documents are pertinent to Subarea 5
 - No. 11 The United States report on the operation of the 10 per cent annual exemption to the mesh regulation, 1963.
 - No. 18 United States research report, 1963
 - No. 36 Canadian research report, 1963
 - No. 48 Selectivity and gilling of redfish in cod-ends of 58 mm manila and 76 mm nylon
 - No. 56 Catch/effort assessments in some ICNAF fisheries.
 - No. 59 Soviet research report, 1963
 - No. 61 Results of Soviet observations on the distribution of silver hake in the areas of Georges Bank (5Z) and Nova Scotia (4W) in 1962-63
 - No. 62 Plankton investigations in the areas of Georges Bank and Browns Bank in 1963
 - No. 65 Studies on Georges Bank sea scallop abundance and distribution
 - No. 73 Review of Canadian herring fishery and research in ICNAF area, 1963.
 - No. 74 Review of Canadian fishery and research on large pelagic fish in the ICNAF area in 1963
 - No. 75 U.S. report of discard and fish landed for industrial purposes, 1963.
 - No. 84 Annual catches in the Northwest Atlantic (ICNAF statistical area) 1963 (By Fisheries Division FAO)
 - No. 102 Groundfish and herring landings from the convention area in 1963.
- Proceedings No. I, Appendix I, Annual Meeting, 1964. Report of ad hoc group on herring and other pelagic species.

2. Arrangement of report

In 1963 fishing was carried out in Subarea 5 by Canada, USSR, USA and Japan and research studies have been reported by Canada, USSR and USA. My summary of these reports, by species, is supported by provisional data which appear in the accompanying table.

3. Silver hake

Silver hake landings exceeded those of any other species and were roughly four times as high in 1963 as in 1962 due principally to increased fishing by USSR on Georges Bank. In the spring, large USSR stern trawlers fished heavy concentrations and took 4.4 tons of fish per hour of dragging. In summer the catch dropped to 1.0 and hake were taken with herring. But the catch rose in November and December to 1.5-2 when the fish concentrated again.

The USSR reported that the bulk of her catch was composed of 3- and 4-year-old fish (30.2 cm); that most of them were spawning for the first time and that there was a heavy mortality after spawning. This would account for the small average size of the fish and the scarcity of old ones in the stock.

USA fished principally on more inshore grounds with smaller vessels that took an average of 17.4 tons per day as compared with 18.5 tons in 1962. USA is refining its ageing methods and reports that most of the fish were 3- and 4-year-olds (25 to 40 cm). The smaller fish are not used as food-fish.

USSR Researches included a study of hydrographic factors regulating horizontal and vertical distribution, the feeding behaviour of fish of various sizes, diurnal movement and pre-spawning concentrations. In the spring and early summer the fish concentrated at 85-200 m along the slope of the bank at the frontal zone separating Atlantic and Labrador waters where bottom temperatures approximated 10-12°C. In mid July spawning was complete and the fish dispersed. Tags were placed on 220 fish but there are no returns to date. Silver hake eat small crustaceans and in August show two periods of active feeding, about midnight and about noon. During the pre-spawning and spawning concentrations they stayed at bottom by day and rose in the water by night. This behaviour reduced nocturnal catches.

4. Herring

In 1963 the USSR took 97,329 metric tons of large herring from Georges Bank. Catches per unit effort by its large stern trawlers were about the same as last year but the catches of smaller boats using drift nets decreased substantially. As a result the total 1963 catch was only 64% of that in 1962. It is not clear whether this decrease was caused by changes in abundance (natural or fishing mortality) or by changes in availability, but there were differences in size-composition. In the early part of 1963 the fishery by both classes of boat depended on the 1957 and 1958 year classes (25-29 cm long). But after August the catch depended chiefly on the 1960 year-class (20-24 cm). This is the first time that young herring have been found in abundance on Georges Bank. The 1960 year-class seems strong and should support a good fishery in 1964.

The USA landed 66,552 metric tons of herring from inshore parts of the Subarea using weirs, stop-seines and purse-seines and took mostly 2-year-old fish. This was only 96% of the 1962 catch but it satisfied all demands and fishing stopped early. No satisfactory method has been worked out for calculating catch per unit of effort by the sardine fishery. Consequently there is no simple way of detecting abundance changes. Other methods of measuring abundance are being sought to meet this important need.

There are no reports of Canadian herring fishing in the Subarea in 1963 except for research sampling on Georges Bank.

USSR carried out some researches that are not referred to above. These involved tagging of 1760 herring (no returns to date), estimating mortality rates and observing hydrography and plankton as they relate to herring distribution on Georges Bank. USA is carrying out research projects to determine what factors regulate abundance of sardine herring in nearshore parts of the Subarea. She is also continuing researches to identify and relate what stocks of herring are present.

5. Sea Scallops

The total 1963 sea scallop landings were down to approximately 95% of those in 1962. USA landings fell to 80% and Canadian landings rose to 110% of that of 1962. Both countries used the same types of boat and gear. In the course of the year the Canadian fleet increased from 39 to 49 boats, and boats that had been using large rings in their drags reverted to small rings (76 mm inside diameter). Besides this the fishermen used smaller scallops and the 50% selection size for sorting catches decreased from 95 mm to 90 mm diameter. The change in the fishery is attributed to decreased abundance of scallops and USA presented sampling data that support this.

The sea scallop fishery has grown remarkably in recent years because of unusually heavy recruitment in 1959. The abundance of subsequent year-classes has been nearer average. The 1963 decrease in landings was therefore anticipated and landings in 1964 are expected to be lighter than in 1963.

Besides researches reported above a study of gear efficiency and larval development is being carried out by Canada.

6. Haddock

The 1963 haddock landings totalled 59,610 metric tons (500 tons more than in 1962). USA took 80% of the total although this was equivalent to only 90% of her 1962 landings. In contrast, Canada doubled her landings. Both these countries fish deliberately for haddock. USSR also doubled her landings but the tonnage was small (2,361, which is equivalent to 4% of the total). And this was all taken as by-catches while her trawlers were fishing for silver hake and herring. This tonnage is equivalent to less than 1% of the landings of hake and herring combined.

Although total landings remained high in 1963, the catch per unit effort fell because 1958 and 1959 year-classes were losing their dominance. The next three year-classes are weak but the 1963 year-class seems strong. Thus landings will probably change little in 1964 but may improve in 1965.

USA carried out researches with some assistance from Canada to define stocks. She also developed new methods for estimating abundance of pre-recruit haddock and these methods seem more useful for prediction than the old. They indicate that factors determining year class strength operate chiefly in the first few months of life. A study of past and current records to determine the relationship between fishing effort and yield is continuing. There is evidence that effort now exceeds that level which is likely to give maximum yield. It might be possible to catch more by fishing less.

7. Cod

The 1963 landings of cod totalled 29,687 metric tons (110% of the 1962 landings). USA took 60% of the total but her tonnage was down. Canada tripled her tonnage. The USSR cod (18% of the total) were taken as by-catches while fishing for silver hake and herring and is equivalent to 1.5% of the catch of these two species combined.

USA studies indicated that small changes in abundance may be taking place but that the current higher than average catches may continue for a few years. They also showed that tagging does not inhibit growth of cod.

8. Flounders

USA took most of the flounders and approximately half of these were yellowtails. The landings reached an all-time high. USA reports that the 1958-1960 year-classes were all unusually strong and that the 1961 year-class is weak. Overall abundance of yellowtails may drop slightly in 1964. Abundance changes observed over the past 20 years seem to result from natural causes rather than from fishing activity.

9. Industrial fish

USA was the only country that landed industrial fish from Subarea 5 and it took 58,107 metric tons which was nearly double that in 1962. The principal species were red hake and silver hake and they came chiefly from the southern part of the Subarea.

10. Redfish

USA took almost all the redfish that were landed and these came from the Gulf of Maine. She landed only 8,871 tons (67% of the 1962 production) although abundance was actually higher than in 1962. There is evidence that strong year classes may soon enter the fishery. USSR took about 1,000 tons while Canada's take was minimal.

Other USA researches show that some types of tagging affect growth rate. A parasite (Sphyrion) has been shown to affect natural mortality and its infestation of Gulf of Maine redfish has doubled in the past 20 years.

11. Large Pelagic Fish

Recent increases in landings of swordfish, porbeagles, tuna, skipjack and bonito in Subarea 5 and more southern waters have stimulated research activity by both Canada and USA. The prospects are that fishing and research will continue to expand.

12. Special Research Studies

Besides the researches reported above, which relate to particular species, several projects were carried out to supply information on environmental characteristics that affect many species. USSR studied hydrographic conditions on Georges Bank and described the seasonal temperature characteristics. It also continued its 1962 general studies of phytoplankton and zooplankton.

USA has been studying hydrography and water transport in the Gulf of Maine and on Georges Bank as well as the effects of tides and hydrography on movement of fish larvae in nearshore waters from Cape Ann to Grand Manan. She is also studying bottom organisms and mapping animal communities on Georges Bank.

13. Resumé

This review shows that there was a substantial increase in fish landings from Subarea 5 in 1963. Reports are incomplete and it is impossible to determine the exact amount of the change from 1962 but it is clear that the expansion has not been uniform. The big increase in silver hake landings accounts for most of the gain and also offsets losses in the recently developed herring fishery on Georges Bank.

We observe that Japan fished some cod from the Subarea in 1963.

Principal 1963 landings (metric tons, whole, fresh weight) from Subarea 5 compared with 1962

Species	Canada		USSR		USA	
	1963	$\frac{1963}{1962} \%$	1963	$\frac{1963}{1962} \%$	1963	$\frac{1963}{1962} \%$
Silver hake	-	-	231,000	460 %	42,000	112 %
Herring	-	-	97,329	64 %	66,552	96 %
Sea scallops	61,360 7,390 (1)	110 %	-	-	66,941 8,100 (1)	80%
Haddock	8,381	230 %	2,361	210 %	48,868	90%
Cod	7,837	310 %	5,350	100 %	16,499	88 %
Flounders	398	-	308	-	47,561 21,500 (2)	- 120 % (2)
Redfish	90	-	1,086	-	8,871	67 %
Industrial fish	-	-	-	-	58,107 (3)	190 (3)

(1) Weight of adductor muscles only

(2) Yellowtail flounders

(3) Includes some silver hake.