INTERNATIONAL COMMISSION FOR THE NORTHWEST ATLANTIC FISHERIES

Serial No. 1151 (D.b.)

Document No. 79

ANNUAL MEETING - JUNE, 1963

STATUS OF THE FISHERIES AND RESEARCHES CARRIED OUT IN SUBAREA 5 DURING 1962

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The following documents are pertinent to Subarea 5:

Document 2.	Meeting of Scientists from Canada and the USA, December 4-6, 1962, St. Andrews, N.B.
Document 12.	U.S. Research Report, 1962
Document 15.	Canadian Research Report, 1962. B. Subareas 4 and 5, Biology.
Document 16.	Canadian Research Report, 1962. C. Subareas 4 and 5, Oceanography.
Document 29.	Atlantic Herring Research. USA.
Document 44	French Research Report, 1962.
Document 45.	Review of Literature on Herring in the Canadian Atlantic.
Document 54.	USSR Research Report, 1962. Soviet Fishery Investigations in the ICNAF area in 1962.
Document 74.	Meeting Scientific Advisers to Panel 5 meeting in Boothbay Harbour.

Investigations were carried out in Subarea 5 during 1962 by the following countries: Canada, France, Norway, USSR and USA. Commercial fishing was conducted by Canada, Poland, USSR and USA.

A comparison of landings by countries for the major species, 1962, compared with 1961, is given in Table 1. The total harvest of fish and shellfish from Subarea 5 increased over 40% over 1961 due to the USSR more than tripling its landings from Georges Bank.

Haddock, Melanogrammus aeglefinus (L.)

Landings of haddock from the subarea in 1962 were 59.1 thousand metric tons compared with 51.9 thousand metric tons in 1961. US and Canada landings accounted for most of this increase although the USSR landed 1.1 thousand tons.

Abundance of haddock on Georges Bank is now at a relatively high level due to strong year classes in 1958 and 1959. Abundance is expected to remain high until the summer of 1963 when scrod abundance probably will decline because of the apparently weak incoming 1960 year class. Catches of young-of-the-year haddock in 1961 and 1962 fall surveys conducted by U.S. suggest that the broods for these years are also weak.

The first reports of the co-operative study of haddock in statistical division 4X provides some interesting comparison with the haddock on Georges Bank.

The average age of haddock in the Browns Bank landings is higher than for Georges Bank. About 90 percent (by number) of first quarter landings from Browns Bank is composed of ages 4-8, whereas the same proportion of first quarter Georges Bank landings is composed of ages 3-7.

Catch curves based on first quarter age compositions show that recruitment into the spring fishery is completed between ages 4 and 5 on Georges Bank, and between ages 5 and 6 on Browns Bank. After full availability to the gear, the relative abundance of comparable ages in the spring appears to be substantially higher on Browns Bank than on Georges Bank. The estimated total annual mortality rate for age 6 and older is 42 percent for Browns Bank as compared to 50 percent for Georges Bank.

Georges Bank haddock grow faster than Browns Bank haddock and the average difference in length increases with age.

Haddock Yield:

US scientists undertook a new study of the effect of fishing effort on the Georges Bank haddock stock. Analysis of data covering the years 1918 to 1960 indicates a definite drop in abundance (as measured by catch per standard days fished) with increasing fishing intensity.

The maximum sustainable yield is in the neighbourhood of 50 thousand metric tons and at the level of 5 to 6 thousand standard days fishing.

Recent levels of effort of over 8 thousand standard days probably exceed that corresponding to the maximum yield, and further increases in fishing intensity would not, in the long run, increase landings, rather, it seems more likely landings would decrease.

Cod (Gadus morhua L.)

Landings of cod from the subarea in 1962 was 26.2 thousand metric tons compared with 17.5 thousand tons in 1961. US landings accounted for only a part of this increase; Canada increased its landings to 2.5 metric tons and USSR to 5.3 metric tons. Poland took a minor quantity of cod.

Cod are unusually abundant on New England Banks at this time and the abundance is expected to continue through 1963.

Redfish (Sebastes marinus)

Landings of redfish from Subarea 5 held steady in 1962. A drop of about 1.5 thousand metric tons in US landings was compensated by an equal catch by the USSR who did not report any redfish in 1961.

US abundance indices for redfish in the Gulf of Maine, which have been maintained for many years, do not show any increase in abundance during recent periods of light fishing intensity. Special studies by the US in selcted small areas in the Gulf show much the same trend. Abundance of redfish in the Subarea is not expected to change radically during the coming year.

Yellowtail Flounder (Limanda ferruginea)

Landings of this species were almost entirely by the US fleet and amounted to 25.6 thousand metric tons, a considerable increase over the 16.6 thousand tons landed in 1961. These high landings were the result of high abundance due to strong year classes in 1958, 1959 and 1960. These year classes will continue to support the fishery during the coming year.

Returns from the tagging experiment conducted by US in 1955, 1957 and 1959 have now been analysed. Of the 4,960 fish tagged there were 1,020 or 20.6 per cent recovered. Analysis of the returns show a definite seasonal pattern of movement which repeated in each of the three years. There is an easterly migration in the spring and summer and a westerly return in the fall and winter.

Silver Hake (Merluccius bilinearis (Mitchill)).

Landings of this species from Subarea 5 were more than doubled in 1962 due to the catch of the USSR which amounted to about 41.9 thousand tons.

The USSR catch was taken from Georges Bank during the period April to October, from the northwest edge of the bank and in the southwest area in depths of 40 to 110 meters and in temperatures of 5.0° to 11.5°C. The bulk of the catch were 28-32 cm in length and 94.1% of the catch were fish belonging to the 1958 year class. This year class is expected to continue dominant in 1963 when fishing is expected to be good according to the USSR report.

The Sable Island stock and Georges Bank stock are different as shown by different spawning times and vertebral numbers.

Silver Hake on Georges Bank fed on invertebrates, Euphausids and prawns, during their early life, but fish over 35 cm fed chiefly on small silver hake, haddock, and red hake.

Herring (Clupea harengus)

The landings of herring jumped from 90 thousand tons in 1961 to 231.6 thousand tons in 1962 due to greatly increased landings by both the USSR and USA.

Research on herring was conducted by the US on an inshore stock of immature fish (the Maine sardine) and by the USSR on the Georges Bank stock of mature fish. The US research is summarized in Document 12. It covers the following three subjects: racial studies to determine the origins of the coastal Maine stock; age compositions and abundance studies with a view toward forecasting abundance; and environmental studies designed to shed light on factors controlling abundance and availability.

The USSR research is presented in Document 54. It includes description of age compositions of the Georges Bank stock in 1961 and 1962. The dominant year classes were 1955 and 1956. The modal size remained near 25 cm. Herring older than 9 years did not occur in the catches. Abundance decreased in 1962 and is expected to decrease further in 1963, having an adverse effect on the fishery. The average monthly catch per net varied from 90 to 550 kg in 1961 and from 12 to 192 kg in 1962. Although the number of vessels was much greater in 1962 the decrease in catch per net was probably not due to gear competition. The November 1962 catch per net was three times lower than for 1961 even though the number of vessels was several times less in that month than in the same month in 1961.

The USSR report also describes the feeding and distribution of herring in the spring and summer, the pre-spawning concentrations in the late summer and the spawning in the fall.

The fat content of the herring reaches a maximum of 16% in July and then decreased to 4.5% during spawning as the gonads develop. Further decrease to 1.4% occurs in April.

Age of maturity is 4 years. In 1961, spawning reached its height in September to October and took place in the northern part of the bank at depths of 50 to 150 meters. In 1962, spawning took place in the same area but the peak was observed somewhat later.

Sea Scallops (Placopecten magellanicus)

United States landings of sea scallops from Subarea 5 dropped about 8 percent in 1962, but Canada's landings increased about 30 percent. Total landings for the Subarea increased about 2.4 thousand tons.

Abundance: The rather sudden increase in abundance that occurred in 1959 was due to an unusually large year class of scallops that arrived at commercial size that year. This year class supported the fishery for four years. It is now declining and there appears to be no similar year class coming along. Thus we expect abundance to decrease in 1963. The decline in abundance was observed by both Canadian and US scientists working in the area.

Canadian biologists have had success in rearing sea scallop larvae, probably beyond the normal age of settling; a foot was developed but no larvae settled.

Porbeagle (Lamna nasus)

There was no commercial fishery for this species in Subarea 5 durin 1962, but the Norwegian research vessel "G.O. SARS" included the Gulf of Maine in its cruise to the Convention Area in the summer of 1962, working in the Gulf of Maine in June and July.

Porbeagles were caught on floating long lines at depths of 10 to 30 fathoms over depths of 200 meters. A report on the collections made is in preparation. This will include growth rates, age compositions, and other biological information on the species throughout the Convention Area.

Cruise of the Thalassa

The French research vessel "THALASSA" conducted an exploratory cruise between Georges Bank and the Laurentian Channel between 11 July and 10 September 1962 in depths principally between 150 and 350 meters.

Herring were found principally in cold waters (6° - 8°C) but were also found in warm water (14° - 15°C) on the northern edge of Georges Bank, probably because of the presence of Euphausids which were abundant there. Silver hake (Merluccius bilinearis) were found in temperatures of 7° to 12°C on the northwest and northeast parts of Georges Banks and hake (Merluccius albidus) were found in small quantities on the southern slopes of the bank. Lobsters were found in 11° - 13° waters 80 miles south of Cape Cod.

Plankton - Hydrographic Studies

The US continued its observation posts at lightships and towers. The temperatures in eastern New England waters were near normal during most of the year 1962. As compared with 1961, temperatures were somewhat higher during the first half of the year and slightly lower in the latter half.

The Woods Hole Oceanographic Institution has continued its drift bottle program in co-operation with the Fishery Research Board of Canada and with other institutions in the US. Monthly charts have now been prepared showing the direction and speed of surface drift and the percent of recovery from 30 minute rectangles.

A sea bed drifter program has also been inaugurated and is proving very useful in the study of bottom currents. Results suggest that the non-tidal drift along the bottom in the Gulf of Maine area is in the same direction, in general, as the surface drift, but about one-tenth as fast.

The USSR conducted four research cruises in the Georges Banks area in the period March to December in fish scouting operations and in the study of hydrographic conditions and investigations of herring and silver hake and on the numberical strength of the hake.

Plankton studies were carried out from February to August. Spawning of Calanus finmarchicus was followed during this period and changes in the phytoplankton-zooplankton dominance. Biomass values were also determined throughout reaching a high in July of 500-1000 mg/m3.

Benthic Studies

The US conducted benthic studies in the northern Gulf of Maine, and south of Marthas Vineyard and Nantucket Island. Based on the analysis of 100 samples of the northern Gulf of Maine, the macroscopic benthic fauna was found to average 80 grams per square meter of bottom. The fauna was particularly dense (300-1000 g/m2) off Penobscot Bay, Maine. General comparisons indicate that the Gulf of Maine benthos is only about half as dense as that occurring on Georges Bank. Preliminary results indicate the presence of 5 macro-benthic faunal communities. Biomass at the shallow, inshore stations was moderately low (20-40 g/m2), whereas over most of the shelf the biomass was moderate to very rich (50-300 g/m2). Exceedingly high faunal density (over 1000 g/m2) occurred at a few localities, usually associated with aggregations of mollusks.

The benthic studies program is providing a rich body of information on the distribution and abundance of bottom fauna which will be used in preparing charts of faunal types, and in providing very useful knowledge for an understanding of the nutritional support of our commercial bottom fish as well as an understanding of the ecosystem dynamics of the area.

Table I attached.

Table 1--Subarea 5 landings, comparison of 1962 with 1961
(Metric tons)

	Canada	Norway	USSR	Poland	USA	Totals
COD						
1961	241	-	55	-	17,669	17,965
1962	2,488	-	5,303	143	18,222	26,156
HADDOCK						
1961	189		-	-	51,681	51,870
1962	3,571		1,134	-	54,381	59,086
REDFISH						
1961	25	-	-	-	14,040	14,065
1962	3	-	1,590	-	12,541	14,134
PLAICE						
1961	-	-	-	-	1,522	1,522
1962	44	-	-	-	1,931	1,975
YELLOWTAIL						
1961	-	-	-	-	16,626	16,626
1962	27	-	-	-	25,538	25,565
SILVER HAKE						
1961	-		-	-	42,517	42,517
1962	-		41,900	-	44,202	86,102
OTHER GDFS.						
1961	386		6	-	77,000	77,392
1962	750		6,089	4	13,636	20,479
HERRING						
1961	-		68,000	-	22,000	90,000
1962	144		151,144	277	80,000	231,965
SCALLOPS						
1961	37,891		-	-	88,795	126,686
1962	47,433		-	-	81,574	129,007
OTHER						
1961	1,000	140	-	-	20,000	21,140
1962	453	-	153	-	44,411	45,017
TOTALS						
1961	39,732	140	68,061	-	351,850	459,783
1962	54,913	-	207,317	424	376,436	639,486