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Status of Fisheries and Research Carried out in Subarea 4 in 1972

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Pertinent Documents

Reports on research have been received from Canada, France (SP), Japan, Fed. Rep. Germany, Poland, Spain, USSR, UK and USA. Summary Documents 1, 2, 3, 5, 6, 7, 8, 9, 17, 18, 23, 25, and Research Documents 2, 7, 11, 16, 19, 20, 21, 24, 25, 34, 35, 36, 37, 42, 49, 51, 57, 61, 63, 64, 65, 66, 67, 68, 70, 73, 75, 76, 78, 79, 81, 83, 85, 91, 92, 93, 94, 95, 100, 101, 102, 103, 113, 115, report matters of interest to Panel 4.

1. Status of the Fisheries

Total nominal catches of all species including non-member countries declined about 15% from 1,064,000 tons in 1971 to 911,000 tons in 1972. Decreased catches were reported by Canada (669,000 to 600,000 tons), France (26,000 to 21,000 tons), Japan (5,500 to 4,500 tons), Poland (1,300 to 400 tons), Portugal (17,000 to 13,000 tons), Spain (53,000 to 42,000 tons), USSR (270,000 to 200,000 tons), German Democratic Republic (5,000 to 2,000 tons). Increased catches were reported by Denmark (F) (3,000 to 11,500 tons), Fed. Rep. Germany (100 to 600 tons), UK (0 to 1,300 tons), USA (13,000 to 15,500).

Nominal catches of almost all major species declined in 1972, cod from 222,000 to 209,000 tons, redfish from 142,000 to 130,000 tons, haddock from 31,000 to 18,000 tons, American plaice from 23,000 to 20,000 tons, witch from

21,000 to 6,000 tons, silver hake from 129,000 to 114,000 tons, herring from 310,000 to 259,000 tons, and mackerel from 23,000 to 21,000 tons. A decline in catches also occurred for yellowtail flounder, winter flounder, angler, red hake, wolffish, skates, alewife, argentines and squids. Nominal catches of pollock increased from 12,000 to 20,000 tons, white hake from 11,000 to 12,000 tons, and cusk from 4,600 to 5,300 tons. A small fishery for dogfish (2,500 tons) was reported by USSR.

2. Research Carried out

a) Canada. Assessment and inventory studies of groundfish population from research vessel cruises and samples and statistics of commercial fisheries. Sand launce biology was studied. Herring and groundfish larvae surveyed. Large samples of herring from commercial landings were taken for assessment purposes. Salmon smolts and adults were tagged and liberated. Hydrographic, plankton and oceanic pollutant studies were continued.

b) France (SP). Observations were made on hydrographic conditions and various fish species and prawns were studied from the eastern Scotian Shelf and the southern Gulf of St. Lawrence. In a France - Quebec Cooperation, the R/V Cryos carried out a hydrographic and searching study in Div. 4S.

c) Fed.Rep. Germany. Little fishery was carried out and only a small sample of herring was taken from Div. 4X. Hydrographic sections across the Laurentian Channel were made.

d) Poland. Plankton and oceanographic studies were carried out.

e) Spain. Three cod age-length samples were taken from a commercial side trawler.

f) USSR. Length and age composition studies of silver hake, argentine and herring. Extensive groundfish trawl surveys and abundance estimates for main species on the Scotian Shelf Population studies for argentines. Extensive oceanographic surveys carried out on the Scotian Shelf.

g) UK. Continuous Plankton Recorder sampling for 2,800 miles.

h) USA. Trawl survey on the Scotian Shelf. Estimates of abundance of haddock, cod and redfish. Cooperative studies with Canada on sexual maturity of haddock from Div. 4X.

i) Special Studies. Cooperative and coordinated groundfish surveys by Canada, USSR and USA.

ICNAF joint larval herring survey participated in by Canada (inshore); Fed. Rep. Germany; Poland; USSR; and USA.

3. Hydrographic and Plankton studies

Surface temperatures in the southern Gulf of St Lawrence at the end of the heating season were about 8°C cooler than in 1970. The presence of much lower temperatures prompted a prediction of an early freeze-up in the Gulf of St Lawrence and higher ice concentrations in that region.

The anomalous conditions which set in during the winter of 1972 on the Nova Scotian shelf were caused by an enormous outflow of cold water from Cabot Strait and its subsequent expansion over the entire eastern portion of the shelf. In January, the water temperature in the 0-100 m layer never exceeded 0.5°C-2.5°C and, in March, it was plainly negative in the same layer in the area of Canso, Misaine and Banquereau Banks. At the same time, floating ice was observed in great quantities on the northern slopes of Canso, Misaine and Artimon Banks. In the winter of 1972, in Cabot Strait, the water temperature in the 0-100 m layer was the lowest since 1967.

Much hydrographic data have been collected during the course of the ICNAF herring larval survey program and analysis of these data would be useful.

During a Polish research vessel cruise in September in Division 4x the biomass of plankton amounted to 107 cm^3/m^3. The main components of zooplankton were Copepoda, Euphausidacea, Amphipoda and Chaetognatha.

Continuous Plankton Recorder surveys showed the spring outburst of plankton to be sligh tly earler than usual in Subarea 4 during 1971 and unusually abundant in October of 1971. Various examples of results obtained from the long term series of continuous plankton records are given in Res. Doc. 73/78.

4. Cod

Abundance of the Div. 4T and Subdiv. 4Vn migratory cod stock appears about average, with abundance of year-classes expected to enter the fishery in 1974 also about average. Current stock appears capable of supporting a production of about 60,000 tons.

Estimates of year-class strength from research vessel surveys for Div. 4W and Subdiv. 4Vs cod stocks show that recent year-classes except 1968 are poor. Previous estimates of yield-per-recruit based on Canadian sampling are probably too high (since length frequency data for some Spanish catches in 1971 show significantly smaller cod being taken than in the Canadian fishery). It seems prudent not to let catches increase above the present level.

Preliminary results of cod tagging in Div. 4X continue to confirm a separation of inshore and offshore stocks. For the offshore stock adult abundance is low, expected recruitment is poor and mortality rates are excessively high.

Current analyses of this fishery indicate that at present stock levels, a reduction in removals to avout 3,500 tons is required to achieve maximum yield per recruit (Res. Doc. 73/7). However, it is noted that practical difficulties in separating the inshore and offshore fisheries would make management difficult.

5. Haddock

Abundance of age groups on which the 4V-W haddock fishery is based continued to decline to a new low level. Abundance of pre-recruit year-classes (1968-1971) is predicted to be poor. This stock, which has sustained annual catches of 25,000 tons in the past with normal recruitment, is severely depleted and exploitation rate continues very high.

Landings of Div. 4X haddock exceeded the 9,000-ton quota for 1972 by about 4,500 tons even though the directed fishing was closed in October of 1972. In 1973 the directed fishery was closed at the end of April. Research vessel surveys show that 1969 and 1971 year-classes are the strongest since 1963, but are poor by pre-1963 standards. Young of the year estimates for the 1972 year-class indicate that it is weak.

6. Silver hake

Silver hake landings have fluctuated widely over the history of the fishery (from 1961) apparently due to differences in recruitment. The USSR has conducted the only major fishery mainly in Division 4W and in 1971 introduced mid-water trawls. Current catches are based on comparatively abundant 1968, 1969 and 1970 year classes. USSR surveys in 1972 showed an increased stock over 1971 with 1970 and 1971 year classes being caught in great quantities. Silver hake mature at an early age (age 3). The fishery is currently dependent on fish of age 2, 3 and 4.

7. Redfish

Trawling with bottom and semi-pelagic trawls in Division 4R and 4S by the French R/V Cryos produced good catches of redfish.

Landings of redfish from Divisions 4VWX have fluctuated from 9,700 tons in 1955 to 62,000 tons in 1971, but have averaged about 30,000 tons between 1969 and 1971. Fluctuations have been without apparent trend. The substantial

increase in landings in 1971 was not accompanied by a comparable increase in c.p.e. Redfish in commercial landings were 20–40 cm in length in research vessel surveys about 10–40 cm and biomass estimates uncorrectedly catchability from Canadian research vessel surveys increased from 170,000 to 230,000 tons between 1970 and 1972.

8. Pollock

Pollock stock differentiation in the northwest Atlantic is not well known, but only one major spawning centre has been found in the vicinity of Jeffreys Ledge, Division 5Y. It is not unlikely that pollock caught in Divisions 4V and 4W are part of the stock found in Division 4X and Subarea 5 which is currently under quota regulation. Catch rates for Canadian trawlers (151–500 gross ton class) declined from 153 Kg/hr in 1965 to 45 Kg/hr in 1971 then increased to 145 Kg/hr in 1972. The higher catch rate in 1972 may imply improved recruitment, but the data must be interpreted with caution.

9. Flatfish

Total landings of flatfish increased from 10,000 tons in 1960 to 55,000 tons in 1968 and ranged from 29–37,000 tons between 1969 and 1971. Canada has taken most of these fish although the USSR has made sporadic large landings since 1965. Winter flounder is a coastal species although there is a stock in the shallows of Sable Island Bank (Division 4W). Witch show localized areas of high abundance in deep water (usually greater than 100 fathom) in Divisions 4V, 4W and 4X. According to USSR researches spawning is protracted, eggs were found in May in Division 4V and larvae in the same region during August. American plaice is widely distributed on the Scotian Shelf but major concentrations occur only in Division 4V at depths less than 100 fathom, particularly in the cold water area north of Banquereau. Yellowtail flounder

have a localized distribution on the tops of offshore banks in depths less than 50 fathom. Densest concentrations are located on Banquereau, Sable Island and Middle Bank.

Details of size, age composition mortality rates etc are given in Canadian Res. Doc. 102 and are too extensive to summarize here. Separation by species in landings prior to 1970 are speculative and information on discards and incidental catches are lacking so individual species assessments are only approximate. However, errors in estimated yield levels will largely balance out when assessments are combined, suggesting a maximum sustained yield level of 32,000 tons.

Studies on feeding of American plaice by France (St P.) indicate the diet, mainly of crustaceans, varies according to size of fish, season and temperature.

Herring

During 1972 and early 1973 herring stocks and fisheries have been studied intensively and discussed at length during two mid-term and two annual meetings of the Commission and a special herring working group. It seems inappropriate to attempt to summarize this voluminous material here but rather to refer to Summ. Doc. 73/1 and to Res. Doc. 73/115. The latter gives a preliminary summary of results of the ICNAF Joint Larval Herring Survey carried out in the fall of 1972.

Distribution of herring landings from Subarea 4 changed markedly in $972 with declines in Divisions 4T 4R and 4W and increased from Division 4X. Larval surveys continue to indicate that there is a discrete herring spawning stock off southwest Nova Scotia (Division 4X) with minimal drift of larvae outside Division 4X. However extensive larval drift from southwest Nova Scotia into the Bay of Fundy was observed. Estimates of pre-recruits in providing advice about stocks has become of prime importance. Preliminary juvenile surveys were made

during February and March 1973 (Res. Doc. 73/84). It appears that the 1970 year-class in Div. 4X is large but that the 1971 year-class may be relatively small.

Studies on the larval nematode Anasakis in herring have revealed substantial differences between infestation levels in herring of the eastern Scotian Shelf (Div. 4Vs and 4W) and those of the stock complex in Div. 3P and 4T.

A report on the herring fishery in Div. 4V and 4Wa (Res. Doc. 73/94) revealed that the fishery exploits mainly young herring (2-4 years old) in Chedabucto Bay (Div. 4Wa), adult herring of intermediate age in Subdiv. 4Vn and mainly very old herring on Barguerean Bank. In the absence of a satisfactory biological basis for recommendation of a TAC, the Assessments Subcommittee recommends a pre-emptive level of TAC of 45,000 tons for 1974 to prevent diversion of effort to this stock.

Mackerel

The greatly increased mackerel fishery in Subarea 5 and Statistical Area 6 has important implications for stocks in Subarea 4. Canadian researches using indirect methods of estimation (calculation of number of eggs in Division 4T) suggest a large spawning stock in the Gulf of St Lawrence. Canadian data provide evidence of the migratory nature of mackerel but the interrelationships of stocks and fisheries is still left in doubt. It is possible that the fishery in Subarea 5 and Statistical Area 6 exploits mackerel which migrate into Subarea 3 and 4. Between 1965 and 1972 there have been two outstanding year-classes, 1959 & 1967, in the spawning stock. These dominant year-classes grew more slowly and probably matured at an older age than non-dominant year-classes.

Capelin

French (St. P) research cruises in Division 4S indicated large numbers of larval capelin in depths of 100-175 metres and in cold water from $-1.5^{\circ}C$ to $-1.7^{\circ}C$.

Salmon

Tag returns from wild smolts of one river, liberated in 1970, continue to show high exploitation in distant fisheries off Greenland and Newfoundland. With banning of commercial fisheries in the Miramichi area Div. 4T escapment of 2-seawinter fish to the river spawning regions increased substantially. In this stream the improvement resulted in an increased escapement to about two-thirds of the normal requirement for optimum output of smolts.