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CANADIAN RESEARCH REPORT, 1982

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SECTION I. NEWFOUNDLAND REGION

by

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SUBAREAS 0 AND 1

A. Status of the Fisheries

1. Shrimp. Canadian landings of shrimp from Subarea 0 in 1982 totalled 2,655 t.

2. Other species. No other species of fish or invertebrates were landed by Canada from these Subareas in 1982.

B. Special Research Studies

1. Environmental Studies

   a) Hydrographic studies. The Bedford Institute of Oceanography deployed five moorings in Hudson Strait in 1982 just west of Ungava Bay. These studies were aimed at an evaluation of inflow/outflow parameters in the area. Hydrographic and nutrition samples undertaken on the Labrador Shelf extended through Hudson Strait into Hudson Bay.

2. Biological Studies

   a) Atlantic salmon. A research vessel cruise was carried out off the coast of West Greenland between Cape Farewell and Disko Bay to collect biological samples of salmon to determine continent of origin and to study non-catch fishing mortality and gear selectivity. In total, 515 salmon were caught and 454 blood samples collected. At Holsteinsborg and Godthaab fish plants, 1,746 salmon were sampled.

   b) Biological observers were placed aboard thirteen vessels with fishing activity in Subareas 0 and 1 during 1982. These were domestic and foreign vessels as well as foreign vessels licensed to fish the Canadian allocation of shrimp in Davis Strait.

   c) Shrimp. A research survey was conducted for Pandalus montagui in September 1982 in Ungava Bay and eastern Hudson Strait (overlapping Div. 0B). A Sputnik 1600 trawl was used and biomass was estimated in two areas of concentration. A total of 145 sets was made with the greatest catch of shrimp (1,966 kg) being obtained just west of Resolution Island. Catches in Ungava Bay were considerably smaller, the greatest being 110 kg.

SUBAREA 2

A. Status of the Fisheries

1. Cod. Canadian landings were about 77,200 t, up substantially from 38,300 t in 1981. Landings from the inshore sector remained about the same; however, offshore landings were up from only 24,000 t in 1981 to almost 62,000 t in 1982. Most of the landings occurred in Div. 2J, with Div. 2G and 2H landings amounting to only 3,200 t. Landings from the inshore sector amounted to 20% of the total landings from this Subarea.

2. Redfish. Canadian landings were 7,100 t, up from 3,600 t landed in 1981. These landings were almost entirely from Div. 2J.

3. Other groundfish. Canadian landings of the combined flatfish species were 11,100 t, up dramatically from only 1,000 t in 1981. Greenland halibut amounted to 97% of these landings, with Div. 2H landings increasing from virtually zero in 1981 to over 5,100 t and Div. 2J landings increasing from only 900 t in 1981 to almost 5,600 t. These increases in landings reflect an increase in Canadian fishing effort for Greenland halibut in this Subarea during 1982.

4. Capelin. Landings of capelin remained at a low level.

5. Herring. Landings of herring remained at a low level.

6. Atlantic salmon. Commercial landings of Atlantic salmon in Subarea 2 during 1982 were 497 t, a decrease of 35% from 1981. The recreational harvest totalled 6.5 t.

7. Arctic charr. Landings of Arctic charr in Subarea 2 during 1982 were 242 t, a decrease of 4% from 1981. Landings have continued to remain high due to the expansion of the commercial charr fishery into the Hebron and Saglek regions.

8. Shrimp. The Subarea 2 shrimp fishery was subject to a total quota restriction of 6,150 t in 1982, 4000 t of which were in the Hopedale Channel. Total landings in 1982 were approximately 1,880 t.

B. Special Research Studies

1. Environmental Studies

a) Hydrographic studies. The annual oceanographic cruise was carried out during July occupying part of the standard oceanographic lines in our Region.

Two cruises were mounted by the Bedford Institute to the Hamilton Bank in 1982 as part of long-term monitoring of the Labrador Current, with emphasis on temperature, salinity and velocity. Hydrographic and nutrition samples were taken along the entire Labrador Shelf.

Petrocan Exploration (oil industry) continued ongoing oceanographic observations on the Labrador Shelf in 1982 in support of offshore exploratory drilling operations.

As always, a temperature profile was made for every fishing station occupied for biomass estimates.

b) Other environmental studies. Summer field investigations were completed of biological and oceanographic variables affecting the inshore migration of codfish on the southern Labrador coast.

2. Biological Studies

a) Cod. Biological sampling of the commercial fishery included observations from both the inshore and offshore sectors. From research vessels, distribution and abundance studies were carried out, detailed biological sampling was conducted, and several thousand cod tagged.

b) Redfish. A research cruise to Div. 2J in the fall collected data on the distribution and abundance of redfish. Samples of length frequencies and otoliths were taken both from research and commercial catches in order to monitor the age distribution of commercial catches and the population as a whole.

c) Flatfish. Data on distribution and abundance of American plaice, Greenland halibut, and witch were collected during a regular fall survey of Div. 2J. Since all flatfish stocks in Subarea 2 overlap Subarea 3, research projects will be covered under the latter Subarea.

d) Capelin. An acoustic survey in Div. 2J3K in October 1982 located capelin mainly in Div. 2J.

e) Atlantic salmon. A total of 1,896 Atlantic salmon caught in the commercial fisheries was sampled for size and age distribution. Adult salmon (N=45) were tagged and released in Div. 2H.

f) Arctic charr. In excess of 3,600 samples were obtained for age determination of Arctic charr in commercial landings from eight northern Labrador fishing areas. Approximately 17,000 fish were sampled for length distribution from the same areas. Tagging studies were continued to clarify the extent of seasonal and annual movements and to determine the degree of annual commercial exploitation.

A counting fence research facility which was established on Ikarut River, Hebron Fiord in 1981 was operated again in 1982. Characteristics of upstream migrating charr and the dynamics of the population are being examined.

g) Shrimp. A research vessel survey which was conducted in July 1982 completed a biomass survey using a Sputnik 1600 shrimp trawl in the major areas where commercial concentrations occur. A total of 167 sets was made with the greatest catch (625 kg) being obtained in the Hopedale Channel. Catches in the Cartwright Channel ranged to 257 kg. An intensive observer program on commercial shrimp vessels provided much useful data.

SUBAREA 3

A. Status of the Fisheries

1. Cod. Canadian landings were 193,000 t, up from 165,000 t in 1981. Offshore landings remained about the same; however, inshore landings showed an increase of almost 29,000 t. Increases in inshore landings were especially evident in Div. 3K and Div. 3L. About 68% of the total landings from this Subarea were from the inshore sector.

2. Redfish. Canadian landings were around 17,900 t, down from almost 30,000 t in 1981 and about the same as the 17,200 t landed in 1980. The most dramatic decrease in landings occurred in Div. 3K, down almost 6,000 t from 1981 as a result of decreased effort.

3. Flatfish. Total Canadian landings of the combined flatfish species were 79,200 t, down significantly from 99,600 t landed in 1981 and 102,000 t in 1980. American plaice landings amounted to 53,200 t,

down from 58,400 t in 1981. Yellowtail landings were 11,600 t, down from 14,200 t. Witch landings remained around the same as in 1981 at about 3,500 t. Greenland halibut landings showed the most dramatic decrease in this Subarea, with 10,500 t landed compared with 23,100 t landed in 1981 and 31,000 t landed in 1980. Inshore landings amounted to 19% of total flatfish landings in this Subarea.

4. Other groundfish. Canadian landings were around 6,200 t, comprised mostly of catfish (2,900 t), hake (1,200 t) and haddock (1,100 t).

5. Capelin. Approximately 30,000 t of capelin were landed inshore in Div. 3L in 1982, compared with 26,000 t in 1981. Landings in other Divisions in Subarea 3 were low. The inshore catches were registered during the inshore spawning migration. Female capelin are preferred to satisfy the Japanese roe market.

6. Herring. Herring landings from eastern Newfoundland (Div. 3KL) were 2,500 t and 60 t from southern Newfoundland (Div. 3P). These declines were a result of quota reductions which reflected the poor recruitment pattern currently being observed in Subarea 3 herring stocks.

7. Mackerel. Mackerel landings in Subarea 3 were less than 300 t in 1982, a substantial decrease from over 6,000 t in 1981. Mackerel proved unavailable in inshore areas.

8. Squid. Total catch of squid in 1982 was 11,160 t (preliminary data), down from 17,303 t in 1981. Early season catch rates on the southern Grand Bank indicated a relatively low inshore resource level for the summer/autumn fishery. Low inshore availability contributed to the reduced catch.

9. Atlantic salmon. Landings were about 70 t in the commercial fishery and 56 t in the recreational fishery. Abundance of large salmon was lower than previous years.

10. Scallops. A diversion of Maritime-based vessels onto St. Pierre Bank resulted in removals approximating 800 t (meats) of giant scallops.

B. Special Research Studies

1. Environmental Studies

a) Hydrographic studies. Oceanographic work was substantially reduced in 1982 as a result of mechanical problems with the WILFRED TEMPLEMAN. No work was carried out on the Southeast Shoal and only part of the annual oceanographic survey was carried out on the A. T. CAMERON. Table 1 lists sections occupied by the Northwest Atlantic Fisheries Centre. Most of the standard sections in Subarea 3 were occupied and some, such as the 47°N line (Flemish Cap), were occupied repeatedly. In addition, data were collected south of the Grand Banks as part of an international squid survey. As always, a temperature profile was made for every fishing station occupied for biomass estimates.

Mobil Oil (oil industry) continued ongoing oceanographic observations on the Grand Banks in support of offshore exploratory drilling operations.

b) Plankton studies. The Flemish Cap grid was occupied to collect plankton and ichthyoplankton during July 1982.

c) Other environmental studies. A number of priority polycyclic aromatic hydrocarbons have not been detected in samples of lobster taken in the Region.

d) The Northern Institute of Cold Ocean Science and Memorial University undertook detailed oceanographic investigations in the Hermitage Channel, Fortune Bay.

Table 1. Oceanographic sections occupied by NAFC (Nfld.) in 1982.

Section	Date	Ship	Stns.	Notes
Flemish Cap (47°00'N)	Jan. 26-28	GADUS 62	13	Knudsen casts
	July 28-31	A.T. CAMERON 331 (81-4)	18	CTD casts
Flemish Cap (Grid) (44°30'W)	Aug. 1-2	A.T. CAMERON 331 (81-4)	6	6 Bongo casts, 5 CTD casts
(45°00'W)	Aug. 2	A.T. CAMERON 331 (81-4)	5	CTD, Bongos
(45°30'W)	Aug. 2-3	A.T. CAMERON 331 (81-4)	5	CTD, Bongos
(46°00'W)	Aug. 3	A.T. CAMERON 331 (81-4)	5	CTD, Bongos
Bonavista Triangle (SW leg)	Aug. 8	A.T. CAMERON 332 (81-4)	9	CTD casts
(SE leg)	Aug. 8-9	A.T. CAMERON 332 (81-4)	9	CTD casts
(Bonavista line)	Aug. 9-10	A.T. CAMERON 332 (81-4)	12	CTD casts
Squid Survey (56°00'W)	Feb. 21-28	GADUS 62	21	Knudsen casts, Bongos, 10 midwater trawls (EMT 80), 11 midwater trawls (Sputnik 1600)
(55°00'W)	Mar. 1-3	GADUS 62	7	Knudsen casts, Bongos, midwater trawls (Sputnik 1600)
(54°00'W)	Mar. 4	GADUS 62	5	Knudsen casts, Bongos, midwater trawls (Sputnik 1600)
(53°00'W)	Mar. 5-8	GADUS 62	17	Knudsen casts, Bongos, midwater trawls (Sputnik 1600)

2. Biological Studies

a) Cod. Sampling of the landings from the commercial fishery both inshore and offshore was continued in 1982. By means of research vessels, surveys were carried out in all NAFO Divisions to determine the distribution and abundance of cod. Detailed biological sampling was extensive during these surveys. Several thousand cod were tagged.

b) Redfish. Several research cruises throughout Subarea 3 (except Div. 3NO) were conducted yielding information on abundance and distribution. The collection and subsequent ageing of otoliths from both research and commercial catches, and the application of these to respective length frequencies yielded information about commercial catch at age as well as population structure.

c) Flatfish. Distribution and abundance of flatfish were studied during random stratified surveys of Subarea 3. Information from these surveys additionally provided information on year-class strength of pre-recruited flatfish, especially American plaice and yellowtail on the Grand Bank (Div. 3LNO). These surveys are also a major source of information for continued biological studies on the various flatfish species.

Research was continued on stock delineation problems in Greenland halibut. Preliminary results of tagging were presented at the NAFO Symposium on Stock Discrimination.

A juvenile flatfish survey was carried out on the southern half of the Grand Bank (Div. 3N and 3O) to study the abundance and distribution of juvenile yellowtail, plaice, and witch flounder.

d) Capelin. An acoustic survey in Div. 3L in April 1982 detected good concentrations of juveniles in Div. 3L and a large spawning biomass in Div. 3NO.

e) Herring. Surveys to determine distribution and abundance of herring larvae were conducted in Fortune Bay in June and Trinity Bay in June, August, September, October, November and February. Abundance of larval herring in Trinity Bay was higher than in Fortune Bay in previous years. The goal of the project is to determine at which stage in the early life history recruitment of a particular year-class can be reliably predicted.

f) Squid. In February-March a survey was conducted toward studying the distribution of larval and juvenile squid in the Gulf Stream system. From a pre-recruit survey in June on the Grand Bank a predictive index of inshore abundance was determined. Inshore catch effort and CPUE were collected throughout the season. Samples were taken from the commercial catch at regular intervals to study changes in size, sex composition and maturity. Water temperature was monitored at Holyrood and the tagging program was continued.

g) Atlantic salmon. Long-term research studies are underway to develop a model which could be used to estimate salmon production capacities of streams, optimal egg deposition and stock and recruitment relationships. A survey of about 75 commercial salmon fishermen was conducted to assess local sales and by-catch. In June and July 1982, there were 656 salmon tagged and released in the Bay of Exploits. One hundred and fifty-one were recaptured in the commercial fishery and thirty-nine in the recreational fishery. A total of 1,068 salmon from the commercial fishery was sampled at Twillingate, Newfoundland.

h) Whales. A large proportion of the dedicated and opportunistic whale sighting data collected between 1979 and 1981 was put into machine-readable form.

i) Sampling of foreign and Canadian offshore catches. A total of 2,839 samples representing 587,409 lengths and 9,739 ages* was taken from the catches of foreign and Canadian offshore fisheries (Subareas 0-3 + Gulf of St. Lawrence) as follows:

Species	Samples	Lengths	Ages	Meas.
Cod	1,118	251,821	8,965	
Shrimp	458	116,909	-	
Plaice	316	74,217	-	
Witch	24	7,937	107	
Yellowtail	29	6,676	-	
Turbot	200	43,067	254	
Redfish	134	31,075	192	
White hake	23	5,332	221	
Haddock	4	1,092	-	
Roundnose grenadier	62	10,891	-	
Blue hake	372	19,141	-	
Capelin	99	19,251	-	
	2,839	587,409	9,739	

About 14,453** sets were observed with about 4,058** observed days fished. Percent coverage on foreign was 59%; Canadian 13%.

*This figure represents the total number of otolith pairs collected, but not necessarily read.

**These figures include Canadian and foreign vessels.

j) Scallops. An exploratory survey for scallops was conducted during July-August 1982 in Div. 3LNO. Several areas of Iceland scallop concentrations were located.

k) Multispecies. Investigations of multispecies relationships were initiated using stability studies of computer models of marine trophic webs.

SUBAREA 4

A. Status of the Fisheries

1. Cod. Newfoundland landings were about 58,200 t compared with 56,900 t landed in 1981 and 61,700 t landed in 1980. The inshore sector of the fishery accounted for about 45% of these landings. Div. 4R landings amounted to 88% of the total Newfoundland landings in this Subarea.

2. Haddock. Newfoundland landings were around 800 t, down from about 5,800 t landed in 1981.

3. Flatfish. Newfoundland landings were 2,500 t, down from about 4,400 t in 1981. Most of these landings were comprised of American plaice (1,200 t) and witch (950 t).

4. Redfish. Newfoundland landings totalled 6,800 t, up somewhat from 5,400 t landed in 1981. Most of these landings were from Subdiv. 4Vn (4,000 t) and Div. 4R (1,900 t).

5. Other groundfish. Newfoundland landings were around 1,000 t, comprised mainly of pollock and hake.

6. Atlantic salmon. Landings were about 116 t in the commercial fishery and 33 t in the recreational fishery.

7. Iceland scallop. Preliminary 1982 landings for the northern Gulf fishery (363 t) indicate a substantial drop from 1,380 t (round) in 1981.

B. Special Research Studies

1. Environmental Studies

This area is likely a major reservoir for pollutants originating in the industrial northeast and entering the region via the St. Lawrence River. Preliminary assessment indicates that the sediments in the area contain "non-detectable" levels of mutagenic chemicals as assessed in the Ames Salmonella typhimurium assay.

2. Biological Studies

a) Cod. Studies of the cod population in the eastern Gulf of St. Lawrence were continued in 1982 by means of sampling of the commercial fishery and through research vessel surveys.

b) Redfish. In August a survey was conducted in Div. 4RST to determine the distribution and abundance of small redfish. Otoliths were collected and applied to research length frequencies. Commercial frequencies were collected along with otoliths to gain information on the catch at age. Again in 1982 a hydroacoustic survey was conducted in Div. 4RS.

c) Atlantic salmon. Smolt and adult migrations were monitored in Western Arm Brook and Highlands River for the second consecutive year.

d) Iceland scallop. A systematic lattice sampling design was used to obtain estimates of exploitable scallop biomass in the northern Gulf of St. Lawrence (Div. 4R).

SUBAREA 5

A. Status of the Fisheries

1. Groundfish. Newfoundland groundfish landings amounted to only 90 t in Subarea 5.

SUBAREAS 2, 3 AND 4 (SEALS)

A. Special Research Studies

1. Biological Studies

i) A simulation study of the harp seal population was completed and the results were submitted for publication.

ii) Approximately 1,800 harp seal jaws were collected from all components of the commercial kill in 1982 to determine the age composition of the catch.

iii) Complete morphometric data were collected from 78 harp seal mothers and 83 pups of approximate known age from birth to weaning at the Front in March 1982.

iv) Feeding and morphometric data were collected from 97 and 21 beaters in April and May 1982, respectively.

v) A study was completed of the validity and accuracy of age determined by counting growth layer groups in harp seal canine teeth of known age.

vi) Considerable progress was made in the analysis of 800 harp seal stomach samples collected between 1979 and 1982. Data are currently being prepared for computer analysis.

vii) A detailed review of the population dynamics of the hooded seal population was completed in 1982. The results were presented to an ad hoc working group of the ICES Marine Mammals Committee.

SECTION II. SCOTIA/FUNDY REGION

by

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SUBAREA 4

A. Status of Fisheries

1. Groundfish General

Total nominal catches (Maritimes and Quebec (M&Q)) decreased by about 4% to 326,000 metric tons (MT). Cod landings were at the same level as in 1981 and redfish catches increased slightly, but substantial decreases in haddock and flatfish reduced the total.

Newfoundland landings also decreased, to about 70,000 MT, 5% below the 1981 level.

2. Cod

Total landings (M&Q) were almost the same as in 1981 at 170,000, 52% of total groundfish. A slight reduction in Gulf of St. Lawrence (Divs. 4R-S-T-Vn) catches was compensated for by an equivalent increase on the Scotian Shelf (Divs. 4Vs-W-X). Catches in Div. 4W decreased by 25% but this was matched by a similar increase in Div. 4Vs.

Newfoundland landings totalled 58,000 MT, a 3.7% increase from 1981, mainly due to increased catches from the northern Gulf of St. Lawrence (Div. 4R) and the northeast Scotia Shelf (Div. 4Vs).

3. Haddock

Nominal landings, almost wholly from the Scotia Shelf (Divs. 4Vs-W-X) decreased by almost 15% to 38,000 MT. The decrease was due to a 25% reduction in landings from the Browns Bank area (Div. 4X).

Newfoundland landings were only 15% of the 1981 level.

4. Flatfish

Total nominal landings (M&Q) of combined flatfish species (except Atlantic halibut) decreased by 3% to about 25,000 MT. the decrease was spread throughout Subarea 4 and all identified species with only the unspecified category, mainly from the Gulf of St. Lawrence (Divs. 4R-S-T), showing an increase. Greenland halibut landings showed the most serious decrease (21%).

Newfoundland landings rose by 21% from the 1981 level to over 4,000 MT.

5. Redfish

Redfish landings continued to increase from the low 1980 level. The 1982 catches were 1% above the 1981 level at 33,000 MT with an increase from the Gulf of St. Lawrence area (Divs. 4R-S-T-4Vn) more than compensating for a reduction in catches from the Scotian Shelf (Divs. 4Vs-W-X).

Newfoundland catches increased by 25% to almost 7,000 MT.

6. Pollock

Total pollock landings fell for the first time in recent-years. The catch, approximately 32,000 MT, was about 9% below the 1981 levels, still almost 10% of total groundfish landings for the Subarea. As usual, almost the whole catch was from the Scotian Shelf (Divs. 4Vs-W-X) with Div. 4X supplying 64% of the total. Increased catches from Divs. 4X and 4Vs were not sufficient to compensate for a 30% fall in catches from the central part of the Shelf (Div. 4W), compared to a 100 per cent increase from that area in the previous two years.

Newfoundland did not report any landings of pollock.

7. Other Groundfish

Landings by M&Q (21,003 MT) were down 33% from 1981, mainly due to reductions in the white hake catches which fell by 41% to about 10,000 MT. This, in conjunction with a fall in the 'unspecified' category, eliminated a 32% increase in cusk catches. White hake remained the main constituent (47%) of "other groundfish" with cusk constituting about 25%. Wolfish catches remained at about 2,500 MT.

8. Scallop

Landings totalled 22,171 MT round weight, a 23% increase from 1981 and almost the same level as 1980. The increase was mainly due to improved catches on the Scotian Shelf (Divs. 4W-X).

Newfoundland landings of Iceland scallops decreased by about 75% to 468 MT.

9. Herring

Total nominal catches (M&Q) were 134,000 MT, a 2% decrease from the 1981 level. Landings from Div. 4X were up 8% at about 96,000 MT, constituting 72% of the total catch, but landings from Div. 4W were down by more than 50%. The southern Gulf of St. Lawrence (Div. 4T) landings increased by 12% to more than 24,000 MT while in Sydney Bight (Div. 4Vn) there was a 9% decrease to about 4,000 MT.

No landings from Subarea 4 were reported from Newfoundland.

10. Mackerel

Nominal total landings of mackerel increased by 30% from the 1981 level to 16,000 MT. The main increases were in the southern Gulf of St. Lawrence (Div. 4T) (41%) and the southwest part of the Scotian Shelf (Div. 4X) (44%) while there was a 25% decrease in the central part of the Shelf (Div. 4W).

11. Tuna

No information available.

12. Swordfish

No information available.

13. Atlantic salmon

Nominal landings, including both commercial and sports fisheries, but excluding those from the Newfoundland fishery in the eastern Gulf of St. Lawrence (Div. 4R) were virtually the same as for 1981 at 400 MT. Lower angling catches in the Maritimes were compensated for by higher angling catches in Quebec while commercial catches remained practically unchanged. There is a quota system effective on the commercial fishery in New Brunswick.

The Newfoundland set net fishery in Div. 4R yielded 118 MT, a 21% decrease from 1981.

14. Squid (Illex illecebrosus)

The squid fisheries on the Scotian Shelf (Divs. 4V-W-X) and Southern Gulf of St. Lawrence (Div. 4T) yielded 1,149 MT a 45% increase in catches from 1981. Improved landings from the central part of the Shelf (4W) and the southern Gulf of St. Lawrence (Div. 4T) more than compensated for decreases elsewhere. The central Shelf (Div. 4W) yielded 633 MT, 55% of the total and a ninefold increase over 1981.

B. Special Research Studies

1. Environmental Studies

(a) Hydrography. Physical oceanographic measurements were taken from St. Georges Bay (Div. 4T) to Cabot Strait (Div. 4Vn) to investigate spatial variability in temperature and salinity structure as a means of identifying the origin of Cabot Strait water.

(b) Plankton Studies. The vertical structure of particulates, phytoplankton and zooplankton in the water column was studied by undertaking 48-hour stations in St. Georges Bay and the Magdalen Shallows (Div. 4T). In situ phytoplankton production measurements were carried out and sediment traps monitored sedimentation rates within the water column.

Zooplankton and micronekton samples were taken and acoustic observations made in depths down to 600 m on the central Scotian Shelf and Shelf edge (Div. 4W) to evaluate effectiveness of a new multiple frequency sounder system. Primary productive studies were also carried out.

(c) Benthic Studies. the extent of genetic control of production in marine organisms is being assessed by experiments with blue mussels (Mytilus edulis).

2. Biological Studies

(a) General. The annual groundfish research survey programme continued with three seasonal surveys (March, July, October) on the Scotian Shelf-Bay of Fundy (Divs. 4V-W-X), and a juvenile silver hake survey, in cooperation with U.S.S.R., in November. A special series of surveys was initiated in relation to the 4X fisheries Ecology Project (see below). Three annual herring larval surveys were completed in the Bay of Fundy (Div. 4X).

Monitoring and biological sampling of commercial catches, both at landing places and at-sea (observer programme) continued.

Monitoring of incidence of pseudobranch tumors in cod, and of Ichthyophonus hoferi in yellowtail flounder continued.

(b) Cod. Some 1700 stomachs were collected for stomach contents analyses in relation to feeding studies.

(c) Haddock. The Fish Ecology Project, a 5-year intensive study of Div. 4X haddock life history and related environment and ecology, was implemented. A number of special research cruises were completed in relation to the

Project, including egg and larval surveys and feeding distributions and behaviour studies. A special trawling survey was completed on Sable Island Bank to investigate distribution and behaviour of juvenile haddock.

In tagging experiments, 2973 haddock were tagged and released.

(d) Pollock. A total fo 8,304 young pollock were tagged and released in the Bay of Fundy (Div. 4X).

(e) Herring. Two acoustic-trawling surveys were conducted for herring, directed at calculations of abundance from acoustic signals. A total of 7,124 herring were tagged in the Canso area (Div. 4W).

(f) Silver Hake. Studies of diel migration of silver hake were completed.

(g) White Hake. Special studies were made on age determination and growth analysis and comparative study of intestinal parasites of the hakes, including white hake, was initiated.

(h) Large pelagics (Tuna, Swordfish). No information available.

(i) Squid (Illex illecebrosus). Studies on egg, larval and juvenile stages continued, including environmental conditions associated with geographic and diurnal distribution of both larval and adult squid, spawning behaviour, growth and feeding behaviour. A cooperative survey programme with the U.S.S.R. continued, studing life history stages in all water masses from Continental Shelf water to the Gulf Stream complex into the Sargasso Sea. A joint Canada/USA/Japan survey was conducted through Subareas 4 & 5. Major concentrations of larval and early juvenile stages occur in the southern boundary of the Gulf Stream in winter.

3. Gear and Selectivity Studies

Acoustic research centered on discrimination of fish from bottom echoes. An acoustic survey was carried out in conjunction with the winter herring fishing off Chedabucto Bay (Div. 4W) in which new acoustic survey design was tested. Development of towed bodies for underwater photographic and television studies continued.

SUBAREAS 5 AND 6

A. Status of Fisheries

1. Groundfish General

Total nominal landing's from Divs. 5Y-Z increased by 48% from the 1981 level to 32,393 MT, almost wholly from Georges Bank (Subdiv. 5Ze). Most of the increase was due to improved cod landings, which constituted 41% of the catch. Cusk catches were down 44% and haddock was marginally lower but landings of all other species increased.

2. Cod

Catches doubled to 19,196 MT, 92% from Georges Bank (Div. 5Ze).

3. Haddock

Catches were at about the same level as in 1981, 6,150 MT.

4. Pollock

Nominal landings of pollock increased by 32% to 5,356 MT with 83% of the catch from Subdiv. 5Ze.

5. Other Groundfish

Catches of flatfish doubled from 1981 to 177 MT, virtually all from Georges Bank (Div. 5Ze).

6. Scallop (Placopecten magellanicus)

Landings totalled 35,291 MT round weight, a 54% decease from 1981, but about the longterm average.

7. Herring

No herring were landed from Subarea 5.

8. Large Pelagics

No data available.

SUBAREAS 2, 3 AND 4 (SEALS)

A. Status of Fisheries

Harp Seals

The total catch fo harp seals was 142, 051, 19% below the 1981 level, of which 27,427 were taken by landsmen, the remainder by ships. The "Front" yielded 100,465, 71% of the total northwest Atlantic catch, 2% above the 1981 percentage level.

Hooded seals

The total catch of hooded seals was 5,831, 99% being taken on the "Front" and almost all by ships. The 1982 catch was only 70% of the 1981 catch.

B. Special Research Studies

Harp Seals

From fisheries in the estuary of the St. Lawrence River studies were made of age composition, reproductive rate and feeding intensity.

Hooded seals

From a helicopter, 162 young hooded seas were tagged in the period 10-20 March, 1982.

Grey Seals

The cohort marking programme on Sable Island (Div. 4W) continued with tagging of the total live escapement of 4,138 newly weaned pups out of the total production of 4,456. The colony was completely covered to record the presence of all branded adults for studies of homing and breeding site specificity. In addition to the Sable cohort, 652 ice breeding seals were tagged in the Gulf of St. Lawrence (Div. 4T).

Harbour Seals

From 396 live births, 388 harbour seals were tagged on Sable Island. Recoveries continued from adjacent areas and from the northeast, U.S.A. An exceptional recovery was from New Jersey, a straight line distance of 1,475 Km. Reports indicate the east coast population is increasing since removal of the bounty in 1975.

SECTION III. GULF REGION

by

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This report describes activities by the Moncton, Québec City, Rimouski and Arctic Biological Station in Ste-Anne-de-Bellevue laboratories of the Fisheries Research Branch, Department of Fisheries and Oceans, Gulf Region, all identified by "DFO" and those of the Direction générale des Pêches maritimes, MAPAQ, Governemnt of Québec, identified by P.Q.

A. Status of Fisheries

Presented in Section II - Scotia Fundy Region

B. Special Research Studies

1. ENVIRONMENTAL STUDIES

a) Hydrographic studies

Data on physical oceanography were collected during the biology - oriented scientific cruises in the Gulf of St.Lawrence (DFO & P.Q.). Two current meters were moored from June to August near Havre-Saint-Pierre in the northern Gulf while thermographs at 2 sites in the Iles-de-la-Madeleine recorded near surface temperature from December 1981 to May 1982 (DFO).

b) Plankton studies

Vertical and spatial distribution of crustacean larvae (principally lobster and snow crab) was surveyed in the Bay of Chaleur and in the Iles-de-la-Madeleine (area 4T) from May to September; larval fishes from this survey were also worked up (DFO).

c) Benthic studies

The project on structure and dynamics of coastal benthic communities on the North Shore of the Gulf was continued. The multi-year study of settling benthic organisms on navigation buoys suggests annual variations in density may be linked to fluctuations in the flow of the St.Lawrence River (DFO).

d) Other environmental studies

A description of the ichthyofauna of the salt marshes of the Kamouraska region (St.Lawrence Estuary) was completed; this habitat was found to be seasonally important for several species, in particular early life stages (DFO).

The risk of introduction of toxic dinoflagellates from the St.Lawrence estuary or other infected waters to uncontaminated Iles-de-la-Madeleine waters through ship ballast resulted in measures taken to control deballasting operations in that part of Div. 4T (DFO).

2. BIOLOGICAL STUDIES

a) Snow crab

Beam-trawl sampling was the basis for a study on the ecology of juvenile snow crabs off Cape Breton; concurrent samples of predator species (principally cod) were taken to assess predation pressure on juveniles. Preliminary studies of micro-tagged snow crabs were carried out in the laboratory in order to select best area of insertion. Fishery monitoring was carried out for assessment of stock status, aided by development of computer programs to treat sampling and statistical data and by introduction of a new logbook for fishermen (DFO).

In addition to the usual activities, a study was conducted along the Middle North Shore (4S) on the snow crab recruitment mechanism. Even if individuals with a 2 to 30 mm wide shell are found from 100 to 120 meters, no 30 to 45 mm individual was found in the grounds studied (P.Q.).

b) Shrimp

Biological catch sampling was carried out throughout the northern Gulf (4RS). A survey cruise of 60 d duration was conducted aboard a chartered 85 ft trawler (jointly with the Region's redfish program) for assessment of stock abundance. Stock status was summarized in an assessment document (DFO).

The study of shrimp vertical migration was continued. Data analysis shows a variation in the nychtemeral migration pattern according to the seasons and year classes. Research works were carried out to study the impact of fishing ovigerous females in the spring on the abundance of the stock. The works aimed at improving the distribution of commercial catches in the different year classes were continued (P.Q.).

c) Lobster

The analysis of the tags attached in the past years was continued in the Iles-de-la-Madeleine. It confirms that there is no exchange between the northern and the southern part of the Islands as far as adults are concerned (P.Q.).

d) Scallop

A 10 d survey cruise was conducted at the Iles-de-la-Madeleine to obtain information on abundance and prospects of the resource; results, in combination with sampling data from past years, were analysed in collaboration with P.Q. and summarized in an assessment document. Research vessel surveys of scallop beds in southern Div. 4T were conducted to obtain data on abundance, distribution and population parameters (DFO).

A program of catches sampling at sea was implemented (P.Q.).

e) Cod

Catch sampling and compilation of commercial fishery data were carried out and summarized for an assessment of status of the 4RS/3Pn stock. A 25 d research survey was conducted in January; in addition to information on abundance and age composition of the stock, collections were made for a study of trophic relationships (DFO).

Special sampling of the landings was carried out on the Lower North Shore to initiate a study aimed at determining the stocks of origin of the catches landed in this area (north of 4S). The first analyses seem to indicate greater similarity with stock 2J 3KL than with stock 4RS (P.Q.).

f) Greenland halibut

1400 fish were tagged during a July cruise in the lower St.Lawrence estuary. The first returns indicate a migratory movement towards the Gulf itself during the second part of the summer (P.Q.).

g) Herring

In subdivision 4T, data on coastal and offshore fisheries were combined with biological sampling information in an assessment of stock status, confirming the low level of stock abundance and the need for continuing restrictions on fishing. Results from an observer on purse seiners and from inshore fishery questionnaire surveys program were extremely useful in describing fishery dynamics. A purse seiner survey in the western Gulf in August yielded much information on distribution and abundance of juveniles and adults, and 27,000 adults were tagged in this area (DFO).

A study of spawing dynamics and ecology of early larvae (yolk-sac and post-yolk-sac stages) was completed in the St.Lawrence Estuary, including building and dispersal of a pre-spawning aggregation and retention mechanism of young larvae in a tidally-energetic milieu. Results should be applicable both to spawning biomass estimation and to undestanding of recruitment mechanisms (DFO).

In subdivision 4S, a purse-seine survey indicated low abundance (or availability to the gear) in June. Cath sampling and surveys of the inshore fishing tended to confirm that herring abundance is low in this area. Returns from the 1981 tagging suggest a localized stock in eastern 4S; a further 1000 fish were tagged in December 1982. In subdivision 4R, catch sampling data and commercial fishery data were used to assess stock status and prepare management advice (DFO).

Following a workshop on herring aging, studies were initiated on histological definition of maturity stages and on morphometric characters of otoliths, with the general objective of improving the precision of spawning-group assignement (DFO).

Studies were carried out along the North Shore to confirm the hypothesis according to which there were many local stocks in this region. The data collected have not been analysed yet. A study on the abundance and distribution of herring larvae was carried out in the Grande-Entrée lagoon in the Iles-de-la-Madeleine (P.Q.).

h) Mackerel

Monitoring of biological characteristics of the catch was continued, and sampling was conducted for estimation of spawning biomass based on egg production in 4T (DFO).

i) Salmon

Sampling of post-smolts in the marine environment was sucessfully carried out through contracts with commercial gillnet fishermen, but trials of a purse seine for at-sea sampling yielded no post smolts (DFO).

j) Eel

A study of mass mortalities of downstream-migrating-eels suggested that a major cause of mortality is osmotic stress. Bacteriological and virological studies are continuing but suggest that disease is not a primary cause of these mortalities. Sampling and analysis of adult eels for Mirex contamination were carried out. Seasonal and annual variations in upstream migrations of elvers were examined through sampling for the third consecutive year. Movements, population abundance, and biology of eels in a north shore reservoir were studied, as were interactions between eels and salmon smolts (DFO).

k) Smelt

A study of stock discrimination using parasites and statistical analyses of meristic and biological data was completed, covering anadromous spawning smelt of the St.Lawrence estuary and Chaleur Bay (DFO).

l) White whales (beluga)

A study of the behaviour of white whales was made from Pointe Noire at the confluence of the Saguenay and St.Lawrence rivers during June-August. A stratified, random transect aerial survey was flown in July, which gave an estimate of about 500 animals, the same as observed in 1973. Four stranded animals were examined for length, sex, age and pathological condition (DFO).

m) Whales (all species)

Strandings of whales in the Gulf of St.Lawrence (and eastern Canada generally) in 1982 were summarized for publication. A report on the status of whales in the Gulf of St.Lawrence was prepared at the request of Parks Canada to assist in selection of an area for a national park. Emphasis was placed on the history of exploitation and initial population size of the white whale (DFO).

n) Harp and hooded seals

A tagging experiment on harp seals in 1978-80 was written up n collaboration with W.D. Bowen (Newfoundland Region). During tagging of hooded seals in the Gulf in March 1982, tags from previous years were found on adult females, demonstrating return to their place of birth, and providing more information on age at maturity (DFO).

o) Grey seals

A collection of 200 specimens was made at Anticosti Island by hunters. Analysis of the data obtained will provide new information on age frequency, reproductive status, feeding habits, and nematode parasite burden. The latter will be related to the parasite burden of flatfish collected over a wide area in the Gulf of St.Lawrence (DFO).

3. RESEARCH WORKS ON GEARS AND SELECTIVITY

a) Crab traps

Three types of traps were selected in both the Gaspé (Div. 4T) and the Lower North Shore regions. Commercial yields seem to remain the same when the density is low but rectangular traps give a superior yield on high-density grounds. Besides, trap selectivity seems to depend on the slope of the trap walls (P.Q.).

b) Lobster traps

Experiments were carried out to assess the efficiency of various types and sizes of escape gaps built to allow young individuals to escape. Those experiments indicate that escape gaps with a 44 mm diameter are those which allow commercially undersized individuals to escape best (P.Q.).

c) Longlines

A comparative study of three types of longlines was initiated. It seems that longline entirely made of monofilament and equipped with floats to support them away from the bottom give a better yield than either classical or mixed longlines (P.Q.).