1980 ANNUAL REPORT
Newfoundland Region

Canada

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NEWFOUNDLAND REGION

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DEPARTMENT OF FISHERIES AND OCEANS

NEWFOUNDLAND REGION

NEWFOUNDLAND FISHERIES IN 1980

Newfoundland seafish landings in 1980 amounted to 1,003 million pounds, down 20 per cent from the previous year's catch of 1,255 million pounds. (Preliminary Statistics)

According to the Statistics and Computer Services Division of the Economic Services Branch, Department of Fisheries and Oceans, the gross value of $144 million is down eight (8) per cent from the landed value of $156 million for 1979.

Groundfish landings amounted to 757 million pounds in 1980, compared with 825 million pounds landed in 1979. Cod landings increased three per cent from the 1979 catch of 477 million pounds to 489 million pounds in 1980.

The flounder catch decreased from 162.2 million pounds in 1979 to 133 million pounds in 1980. Greysole landings in 1980 amounted to 10 million pounds compared with 16.3 million pounds in 1979, for a decrease of 39 per cent. The redfish catch of 36 million pounds is down 57 per cent from the 1979 catch of 84 million pounds. Landings of greenland turbot in 1980 amounted to 74 million pounds compared with 71 million pounds in 1979 for an increase of four per cent. Other groundfish species amounted to 15 million pounds in 1980. This compared with 14.2 million pounds the year before.

Landings of pelagic and estuarial fish amounted to 143 million pounds. This compares with 198.5 million pounds landed in 1979. Herring landings totalled 77 million pounds compared with 115 million pounds in the previous year. Salmon landings amounted to 4.6 million pounds compared with 2.1 million pounds in 1979. The caplin catch amounted to 45.4 million pounds compared to 41.4 million in 1979, and mackerel landings totalled 13 million pounds, compared to 33.8 million the previous year.

Landings of molluscs and crustaceans amounted to 107 million pounds compared to 231.2 million pounds in 1979. The lobster catch amounted to 5.1 million pounds opposed to 5.7 million pounds in 1979. Crab landings decreased from 24.7 million pounds in 1979 to 20 million pounds in 1980. Squid landings in 1980 amounted to 63.8 million pounds compared with 189.7 million pounds the previous year.

TOTAL NEWFOUNDLAND LANDINGS AND VALUE FOR SELECTED SPECIES

(METRIC TONS - ROUND WEIGHT AND $'000)

	1975		1976		1977		1978		1979	
GROUNDFISH	Landings (MT)	Value ($'000)	Landings (MT)	Value ($'000)	Landings (MT)	Value ($'000)	Landings (MT)	Value (S'000)	Landings (MT)	Value ($'000)
Cod	77,523.8	14,820	119,567.1	24,515	142,001.6	34,502	172,709.9	47,472	216,409.5	63,846
Redfish	40,932.2	4,773	40,075.3	4,827	31,076.7	4,083	39,128.8	5,361	38,144.7	5,883
Flounders	64,287.3	10,499	82,606.8	14,810	81,367.9	16,523	81,364.5	17,060	81,005.1	18,698
Turbot	8,100.1	1,181	9,748.2	1,545	19,021.7	3,536	25,581.9	5,218	32,216.3	7,292
Other	3,134.7	702	4,226.5	759	4,794.9	1,033	6,198.8	1,378	6,449.8	1,558
TOTAL	193,978.1	31,975	256,223.9	46,456	278,262.8	59,677	324,983.9	76,489	374,225.4	97,277
PELAGIC										
Herring	42,473.8	3,010	48,921.8	3,815	50,355.4	5,015	45,744.9	8,451	51,963.5	12,229
Mackerel	3,062.9	274	5,352.1	453	7,925.8	482	13,723.8	1,656	15,331.6	2,360
Salmon	2,043.8	3,097	2,012.4	3,632	1,938.6	4,702	1,179.7	3,496	986.5	3,232
Capelin	4,589.4	130	9,612.7	286	13,472.8	588	18,252.4	1,122	18,798.0	1,960
Other	335.6	82	714.1	132	1,434.2	260	2,190.3	347	2,949.5	582
TOTAL	52,505.5	6,593	66,613.1	8,318	75,126.8	11,047	81,091.1	15,072	90,029.1	20,363
MOLLUSCS AND CRUSTACEANS										
Squid	3,201.7	278	9,927.2	889	29,733.4	3,256	44,057.8	8.104	86,068.6	19,329
Lobster	1,695.8	3,914	2,253.9	5,273	2,180.6	5,695	2,563.9	9,332	2,591.5	9,098
Crab	2,010.8	497	2,668.0	886	3,937.2	1,654	7,581.5	3,837	11,195.4	6,410
Shrimp	1,372.3	724	1,493.9	842	3,438.8	1,825	3,577.3	2,557	4,377.9	3,270
Other	8.4	2	30.7	11	106.4	44	103.3	67	619.8	433
TOTAL	8,289.0	5,415	16,373.7	7,091	39,396.4	12,474	57,883.8	23,897	104,853.2	38,540
GRAND TOTAL	254,772.6	43,983	339,210.7	62,675	392,786.0	83,198	463,958.8	115,458	569,107.7	156,180

The total number of licenced fishermen exceeded 35,000 in 1980, with over 33,000 involved in the inshore fishery and 2,000 in the offshore fishery.

Salted Cod

Salted cod production increased to 25 million pounds dry weight in 1980 from 16 million pounds in 1979. The percentage of the total cod landings used for salting increased to 25 per cent in 1980, compared with 14 per cent the previous year.

Frozen Groundfish

Production of frozen groundfish decreased from 204 million pounds in 1979 to 198 million pounds in 1980. Frozen cod products accounted for 52 per cent of the frozen groundfish production, followed by flounder at 19 per cent, turbot at 11 per cent, and redfish at five per cent.

ECONOMIC AND COMMERCIAL ANALYSIS DIVISION - ECONOMICS SERVICES BRANCH

The objectives and activities of the division are basically three-fold. The primary objective is to provide a comprehensive economic advisory function in support of the Region's responsibilities in fisheries management (licence limitation, optimum size and composition of the domestic fleet, and related economic research programs oriented towards the needs of the Department of Fisheries and Oceans and the fishing industry.)

Major economic studies of the Newfoundland shrimp, crab, and groundfish fisheries have been completed or are continuing. Efforts of the division continue to be directed towards basic economic analyses of specific fisheries and focus on the economic condition of a fishery, the incomes earned, and the number of fishing units that a particular resource can economically support Further, the division provides economic support and advice to various fishery advisory committees largely through the results obtained in studies of the specific fisheries.

While efforts are generally directed towards regional concerns, the division is becoming increasingly involved in studies and research projects of a broader nature. In conjunction with the Maritimes and Quebec Regions, a major economic assessment of the Gulf of St. Lawrence shrimp fishery was undertaken. This study will have a major impact on the management policy and decision-making process in the Gulf Region. Another study being undertaken in conjunction with the Quebec and Maritimes Regions is the Groundfish Resource Requirement Study. The latter is focusing on the resource requirements of the various fishing sectors in Atlantic Canada and will require another year to complete. Again, the study is intended to provide economic advice to senior management with respect to resource allocation and the size and requirements of individual fishing sectors. Finally, the division is also co-operating in a national study of processing sector production capacity and plant utilization which will be completed in 1981. This study will update and expand upon information obtained from a similar study in 1978.

The second objective of the division is to provide economic support to the Region's responsibilities in fisheries development. This function largely consists of providing advice to other government departments and agencies. These activities involve the assessing of applications for public financial assistance to establish, expand, and/or modernize fish processing facilities taking into account such factors as resource availability, harvesting capability, and available markets. In the past year, the division assessed 62 development projects, having a capital value of $38.6 million, comprising the following: Industrial Incentive Grant Applications under the Regional Development Incentives Act, administered by the Department of Regional Economic Expansion; Loan applications administered by the Newfoundland and Labrador Development Corporation; and Industrial Incentive Grant and Loan Program (ARDA) administered by the Department of Rural Development of Newfoundland and Labrador.

Further, the division provides input into special programs that have a bearing on fisheries matters but which are often administered by other departments. During the past year, involvement with the Canada Community Development Program in the assessing of projects related to onshore processing facilities provided the division an avenue for economic input into developmental projects sponsored by the Canada Employment and Immigration Commission. Thirty-six Canada Community Development Project assessments at a total value of $3.4 million, were undertaken by the division.

The division also provides economic advice to special interdepartmental committees or working groups. For example, the division is contributing to the establishing of an Atlantic Salmon Management Policy and the development of an Atlantic Salmon Enhancement Program.

The third objective of the division is to assess the commercial advantages for the Atlantic Coast fishing industry from effective administration of extended jurisdiction, of controlling foreign fleets, and ensuring through evaluation, that cooperative fishing arrangements with foreign companies are approved and carried out in accordance with Ministerial policies for such ventures. The Economic Services Branch administered foreign charter arrangements which took place in Newfoundland in 1980, including over-the-side sales arrangements, and a special inshore fish landing program.

FISHING AND INDUSTRY SERVICES

CONSERVATION AND PROTECTION BRANCH

Offshore Management

The primary responsibility of the Offshore Management Section is monitoring the fishing activity of both the domestic and foreign fleets, which operate within Canada's 200 mile fishing zone.

These fishing activities are controlled by fishing plans subjecting the fishing fleets to such procedures as licensing, sea, air and inport surveillance, and the deployment of observers.

Fishing Plan (Domestic)

The total groundfish catch by the Canadian offshore fleet in 1980 was 315,000 metric tons, approximately the same as the total landings for 1979.

The strike, which occurred during the summer months and the significantly reduced effort for redfish because of unfavourable market conditions, resulted in a decrease of approximately 50,000 metric tons of the total Canadian quotas.

In 1979, the total landing of groundfish by the inshore sector (as per stocks in Groundfish Management Plan) was approximately 225,000 metric tons with cod accounting for the greater percentage of this total.

In 1980, however, the total groundfish landings by the inshore sector is expected to be approximately 15-20% short of the 1979 total. (Final statistics were not available at report preparation time) This decrease as with the offshore fleet can be attributed to the strike - lock out during the Summer months.

Fishing Plan (Foreign)

During 1980, the foreign fishing vessels operating within Canada's 200 mile limit caught approximately 125,000 metric tons of groundfish, compared to 135,000 metric tons in 1979, with cod and silver hake making up the greater portion of the total.

Licensing

One hundred and eighty-nine foreign vessels were licenced to operate within Canada's 200-mile economic zone during 1980. Of these, 24 vessels participated in various cooperative arrangements with Canadian companies. In addition, another six foreign vessels were issued special permits to operate within Canadian fisheries waters.

TOTAL NUMBER OF FORIEGN LICENCES & AMENDMENTS
ISSUED BY COUNTRY-NFLD. REGION (to Dec. 24, 1980)

	FISHING		SUPPORT		RESEARCH		SPECIAL		
COUNTRY	LIC.	AMENDS	LIC.	AMENDS	LIC.	AMENDS	LIC.	AMENDS	PERMITS
BULGARIA							3	5	
DENMARK	24	1					2	2	1
CUBA									
FAROE	6	8					4	4	
FRANCE	14	33			2				
F.R.G.	9	42	2	2	1				
G.D.R.	5	6	1						
ICELAND									
ITALY									
JAPAN							2		
NORWAY	5	2							
POLAND									
PORTUGAL	42	120					11	7	5
ROMANIA									
SPAIN	53	74							

	FISHING		SUPPORT		RESEARCH		SPECIAL		
COUNTRY	LIC.	AMENDS	LIC.	AMENDS	LIC.	AMENDS	LIC.	AMENDS	PERMITS
U.K.	1	4							
U.S.S.R.							2	2	
	159	290	3	2	3		24	20	6

OVERALL TOTAL: Licences 189
Amendments 310
Permits 6

Surveillance

In 1980, Offshore Management, utilizing patrol vessels and aircraft, conducted effective surveillance in all areas of jurisdiction.

Vessels from the Department of National Defence, Bedford Institute, private charters, as well as Department of Fisheries and Oceans patrol vessels performed survillance duties on domestic and foreign trawlers during the past year. The following is a summary of sea days credited to each Department (up to Dec. 11, 1980):

DFO: 329.11
DND: 88.00
BIO: 49.76
Charter: 292.48
Totals: 759.35

Of the total sea-days accumulated, 138.79 days were incurred outside the 200-mile economic zone.

Tracker aircraft flew a total of 1,965 hours for the Newfoundland Region of which 1,892.7 were dedicated and the remaining multi-task. In addition Argus and Aurora aircraft made 55 flights mainly patrolling the Flemish Cap, but also covering the Davis Strait, Hamilton Banks, and the Tail of the Grand Banks.

Up until December 11, 1980, the Newfoundland Region had conducted a total of 582 fishing vessel inspections.

The following table is a summary of the inspections by country and area:

INSPECTIONS BY COUNTRY BY AREA 1980

COUNTRY	INSIDE 200 NM	OUTSIDE 200 NM	PORT	TOTAL
MEXICO	-	4	2	6
BULGARIA	-	-	-	-
CUBA	-	5	1	6
DENMARK	6	3	-	9
FAROE	12	3	6	21
FRANCE	41	-	-	41
F.R.G.	4	-	1	5

COUNTRY	INSIDE 200 NM	OUTSIDE 200 NM	PORT	TOTAL
G.D.R.	2	1	2	5
JAPAN	2	2	2	6
NORWAY	4	1	2	7
PANAMA	-	2	-	2
POLAND	2	-	4	6
PORTUGAL	28	22	26	76
ROMANIA	-	-	-	-
SPAIN	26	25	8	59
U.K.	2	-	1	3
U.S.S.R.	15	29	10	54
U.S.A.	-	1	4	5
VENEZULA	-	-	3	3
FOREIGN TOTAL:	144	98	72	314
CANADA:	254	10	4	268
COMBINED TOTAL:	398	108	76	582

Twenty-seven charges were laid against Canadian and foreign captains during 1980 for various breaches of the acts and regulations governing the fishery. Of the 19 charges against foreign masters, 12 resulted in convictions and seven are pending court action. A total of $46,600 was collected in fines and $238,150 was ordered forfeited for catch taken illegally. The other eight charges were against Canadian captains. Four are still pending while the other four resulted in convictions and fines totalling $5,400.

From patrols conducted outside the 200-mile limit, 10 citations were issued to foreign masters violating the applicable acts and regulations.

The following is a table outlining violations by country:

OFFSHORE MANAGEMENT VIOLATIONS

COUNTRY	PROSECUTIONS	CONVICTIONS	CASES PENDING	FINES	CONFISCATIONS
CANADA	8	4	2	$ 5,400	Nil.
FAROE	5	5	Nil	14,500	Value - $94,833.
FRANCE	1	1	Nil	5,000	Nil.
PORTUGAL	5	3	2	15,000	$23,622.80 in lieu of catch 77.63 mt. salted cod $53,430.
SPAIN	4	1	3	9,000	90 mt. salt Cod value $61,951.
U.K.	3	1	2	3,000	Nil.
VENEZUELA	1	1	Nil	1,000	$1,274 in lieu of catch.
TOTAL	27	16	11	$52,000	$238,150

Of the 27 charges laid in 1980, 13 were for misreporting or underestimating catches. As a result, portions of these catches (totalling 166.63 metric tons of salt bulk fish) were off-loaded and subsequently confiscated. As well, 45.28 metric tons of shrimp were off-loaded from two vessels fishing contrary to their licences.

There were 16 warnings issued to masters for minor infractions of the regulations.

Shrimp Fishery - Northern Labrador

During 1980, a total of 10 vessels participated in the shrimp fishery off Labrador. Again as in 1979 quotas were set in the Hawke, Cartwright, and Hopedale Channels as well as Divisions 3K and 2G.

Again as in 1979, the quotas for Hopedale Channel (4600 metric tons) and the Cartwright Channel (800) were equally shared among the 11 eligible licences.

The total landings of shrimp in 1980 for all areas mentioned above was approximately 4,150 metric tons with approximately 4,000 metric tons of this taken in the Hopedale Channel.

In 1980, a small number of vessels participated in the shrimp fishery on an experimental basis with slightly in excess of 300 metric tons taken.

In 1980, the total landing of shrimp by Canadian vessels (including charter) was 2,600 metric tons.

Northern Shrimp Patrol

For the third consecutive year, the patrol vessel Cape Roger was scheduled and did conduct two northern patrols within the Davis Strait area.

These patrols, regarded essential, had two main purposes; (i) to determine catch and effort of shrimp vessel activity, (ii) to acquire as much knowledge as possible regarding this rather new lucrative fishery.

Thirty-seven patrol days were logged in the vicinity of expected vessel activity. However, only seven vessels were sighted and subsequently inspected. These vessels were fishing on the Canadian side of the established equidistance line. A heavier concentration of vessels was evident on the European Economic Community side of the equidistance line.

Four Canadian observers were deployed to vessels fishing on the Canadian side. Their responsibilities were to collect biological data, observe catch rates and to monitor the apparent concern of redfish discards.

In line with gathering information pertaining to the northern shrimp fishery, visits to Greenland ports were necessary. Canadian fishery officers met with authorities at Holsteinsborg, Godthaab and Gronnedal (Danish Naval Base) where discussions concerning the shrimp fishery and surveillance took place.

Seal Hunt

In 1980, the direct monitoring of the offshore seal hunt became the responsibility of the Offshore Management Section. Effective monitoring necessitated the setting up of a co-ordination team at St. Anthony as well as the deployment of fishery officers and wardens to vessels actually enforcing applicable regulations and monitoring the hunt on a daily basis. Fixed wing aircraft and helicopters were again used to monitor the operation with one helicopter being placed onboard the CSS Hudson which operated in the vicinity of the large vessels throughout the hunt.

The hunt was regarded by most as being successful. Six Canadian and three Norwegian vessels engaged in the hunt.

The Canadian quota in 1980 for harp seals was set at 56,400 with 53,400 taken. The Norwegian offshore quota set at 20,000 was taken.

The total Hood quota in 1980 was 15,000 with the Canadian vessels taking 5,500 and the Norwegians 5,700.

Good weather conditions prevailed during the hunt causing very little difficulties in scheduling the aircraft used to monitor the herd formation and movements.

No protest groups were present at the Front during the hunt and none were evident at St. Anthony or any other area in close proximity to the seal herds.

Observer Program

This year, as in 1979, proved to be a very busy year with respect to deployment and sea day coverage by observers from the Newfoundland Region. A total of 7,174 sea days was spent onboard foreign and domestic fishing vessels during 1980, an overall increase of 29.2 per cent over 1979.

To date, the Region maintains a total of 110 trained observers with an active core of 70 individuals who are going to sea on a continuing basis. Plans are now being made to increase observer coverage in 1981 and an additional 40 individuals will be trained early in the new year. In late November the program was awarded to a third party contractor and it is anticipated that the changeover will be completed and operational around the end of January 1981.

The program has proven to be an efficient means of further controlling our offshore fishery and ensuring adherance to Canadian fisheries legislation. This year, observers have been involved directly in several cases as chief witnesses resulting in fines and forfeitures ranging up to $100,000.00.

Comparison of Observer Coverage 1979-80

	Sea Days		
	1979	1980	% Increase
Foreign	4143	4332	4.56

	1979	1980	% Increase
Foreign Co-operative Arrangement	514	956	86.0
Domestic	896	1888	110.7
Total	5553	7176	29.2

Licensing and Registration

The total number of Commercial Fishing Licences and Commercial Fishing Vessel Registrations issued increased overall by 7.4 per cent for 1980 in comparison with 1979.

In 1980, 3,228 new fishermen and 3,246 new vessels entered the fishery, giving a grand total of 35,271 fishermen and 19,810 vessels. Other licences issued, such as crab, shrimp, herring bar seine, otter trawl, etc. totalled approximately 11,500.

During 1980, computer terminals were installed in licensing. This greatly increased the efficiency of the department's operation, from the point of both issuing licences and accessing data. The long range plan is to provide each District Office with a computer terminal for information access only. It is expected that a pilot project using one District Office will be the first step. This will commence by March, 1981.

The Fisherman's Advisory Committee System, which serves as Management Committees for each fishery consists of the following: Salmon Advisory Committee; Lobster Advisory Committee; Shrimp Advisory Committee; Snow Crab Advisory Committee; East and West Coast Herring Advisory Committee; and Offshore Groundfish Advisory Committee.

In 1980, considerable time was spent on developing a new licensing program in the Atlantic Region for 1981. The program will distinguish between two groups of fishermen, "full time" and "part time". During the Fall of 1980 steps were taken to group these fishermen through information currently on file along with field officers' local knowledge in line with guidelines established by the Department of Fisheries and Oceans. All fishermen were informed of their status in December, 1980; and if they were dissatisfied with it they were given the opportunity to have it reviewed by a committee independent of the Department.

Coastal and Inland Surveillance

As in previous years considerable effort was devoted to patrolling all aspects of the coastal fisheries. These patrols resulted in 135 prosecutions and although this is down from 1979, it should be noted that there were also approximately 120 nets removed from the water from persons unknown. Fines on convictions ranged from $25 to $500 and forfeitures of nets, boats, and motors.

The enforcement staff were busy again this year in monitoring the landsmen seal hunt and spring and fall herring quotas. All other aspects of the fishery were maintained to ensure compliance with existing management plans and regulations.

Inland patrols of the salmon sports fishery resulted in approximately 161 prosecutions to date, again down from 1979. Fines ranged from $25 to $800, and six jail sentences with no option of fines.

While carrying out its continual role of monitoring coastal and inland fisheries and enforcement of department policies and regulations, Coastal and Inland Management employed approximately 300 men, nine patrol vessels, helicopters, fixed wing aircraft and a number of small boats. Winter patrols of inland ponds and rivers were carried out by foot and by snowmobile, while winter coastal patrols were carried out by patrol vessels and helicopter. Some mobile enforcement units were deployed during the year within districts mainly for the inland sports fishery.

Legislation and Training

Violations against fisheries legislation showed a decrease compared with 1979. In 1979 there were 502 violations while in 1980 there were 310. Although the number of violations were down, the totals for fines and forfeitures increased considerably from $32,000 in 1979 to $64,500 in 1980.

In 1980, two 3-week workshops for field officers were held in St. John's with a total of 19 persons from the Conservation and Protection Branch attending.

A three-day Management for Results Course was conducted in Corner Brook by the Extension Services of Memorial University of Newfoundland with the District Protection Officer from Corner Brook in attendance.

Two officers attended a seven-day Effective Presentation Course conducted in St. John's by the Canadian Police College, Ottawa.

INSPECTION AND TECHNOLOGY BRANCH

Regional Office and Field Staff

The statutory responsibility of the Inspection and Technology Branch is to ensure that all Canadian fish reaching consumers in various markets of the world is wholesome and of acceptable quality. To achieve this goal, the Branch has a staff of 100 in the Newfoundland Region who monitor the quality of fish and fish products and provide advice on quality improvement from harvesting through distribution.

Surveys of construction and sanitation requirements of fishing vessels in the Region continued during 1980, and by year's end, approximately 979 boats in the 38-45 ft. class had been surveyed. This is in addition to the 1,000 boat surveys that had been completed during 1979.

1980 PROSECUTIONS

AS OF DECEMBER 30, 1980

TYPE OF VIOLATION	NO. PERSONS PROSECUTED	NO. OF PROSECUTIONS	NO. OF CONVICTIONS	NO. OF DISMISSALS	CASES PENDING	TOTAL VIOLATIONS	MINIMUM FINE	MAXIMUM FINE
LOBSTER	40	52	48	1	1	53	$ 25.00	$ 500.00
SPORTS FISHERY	124	161	136	21	39	200	25.00	800.00
COMMERCIAL SALMON	6	7	6	1	0	7	25.00	100.00
HERRING	13	13	12	0	0	13	50.00	200.00
LICENCING & REGISTRATION	52	58	50	4	8	66	10.00	500.00
CRAB	2	2	2	0	0	2	75.00	200.00
SEALING	3	3	3	0	0	3	50.00	150.00
DOMESTIC - OFFSHORE	3	3	3	0	5	8	200.00	5,000.00
FOREIGN - OFFSHORE	9	11	11	0	8	19	2,000.00	5,000.00

Again, as in previous years, fish transportation methods were observed and monitored. Although there was some improvement, particularly with ground transport, there were still infractions of the Regulations and, where those occurred, violators were prosecuted in provincial courts and fined accordingly.

Fish processing establishments must be registered by this Department, and by the end of 1980, the Region had 214 registered plants, an increase of five per cent over 1979. Registered operations within these plants increased to 344, representing an increase of 10 per cent in the past year.

During February, representatives from Headquarters, Quebec, Maritimes, and Newfoundland Regions discussed final product grade standards for fresh and frozen groundfish, herring fillets and pickled, spiced and marinated cures that had been developed in the Newfoundland Region. The standards were then submitted to Headquarters, Ottawa, for further discussion and approval. In addition to the development of grade standards for fresh and frozen groundfish, this Region also prepared grading instructions to be applied to final product standards for these products.

Product grade standards for dried squid, also developed in the Region, were approved and included in the Fish Inspection Regulations by an amendment dated October 16, 1980. In collaboration with the Provincial Department of Fisheries, work was done on the development of Regulations for the handling and preparation of seal meat as a food product. In June, representatives of the Inspection Branch and the Canadian Saltfish Corporation met to discuss and determine grades of salted fish to meet buyers' demands in the Italian market.

During September, Inspection Officers conducted experiments in the field at LaScie and Southport to determine the effect of adequate and proper bleeding at sea on the quality of turbot.

In October, a group of Inspection Officers in the Region attended a Pickled Fish Workshop sponsored by the Department. The workshop taught the correct procedures for preparing groundfish and pelagic species for pickled, spiced and marinated cures, so that the Fishery Officers could advise fishermen and industry on the correct methods to use.

Also, during the month of October, a Bled Fish Workshop for experienced Inspection Officers was conducted by the Inspection Branch in conjunction with the College of Fisheries. It was conducted to see whether it were possible, based on external factors and/or destructive sampling, to determine if fish landed at dockside or at point-of-sale can be graded as "Live-bled" or "Dead-bled", in accordance with the proposed recommendations of the Fish Quality Improvement Committee. A report covering the findings of the workshop has since been submitted to the Department.

There was a sharp decline in squid landings during 1980, caused, no doubt, by uncertain market conditions, low prices and the comparative scarcity of squid. Dried squid production also showed a decline during the year; lower prices and the very unseasonable weather conditions were the main contributing factors. By the end of the year, slightly more than 2,000,000 lbs. of this product had been produced.

In December, the Inspection Branch moved to its new quarters in the Northwest Atlantic Fisheries Centre. The up-to-date facilities will, no doubt, contribute to the working efficiency of the Branch.

Inshore Fish Handling Program

The mandate of the program to provide infrastructure improvements in the form of net bag unloading, on-shore hoists, truck loading units, insulated containers and ancillary equipment, was enforced in 1980.

Numerous requests were received for improvements in handling, loading and transporting inshore fish, in order to upgrade the fishery in terms of value of fish produced and reduction of product wastage. There was increased use of and demand for insulated containers, net bags, etc. and facilities installed and operating during 1980 in many communities required maintenance and repair.

Funding for the program (approx. $14 million), approved by Treasury Board, was phased in over four fiscal years, 1977-78 to 1980-81. Funding of the Capital Works Program will be extended into a fifth year, 1981-82, to ensure completion of installations at some 200 inshore fish handling sites, where the greatest volume of landings traditionally occur.

During 1980, revenue was generated from the rental of insulated containers only. A second phase of the cost recovery program, user fees of wharf facilities, was not yet implemented, as an equitable user pay formula has not been finalized.

Hiring constraints in the Public Service made it necessary to contract out the repair/maintenance requirements of the Program. During 1980, contracts for all four field districts in the Region were let through Department of Supply and Services.

Regulatory requirements governing the movement and storage of fish, and prohibiting the pronging of the harvested product where approved unloading facilities are in place and operational have increased the demand for the Program's services. At year-end, approximately 8,000 insulated containers were in the hands of lessees, and some 50 requests for unloading facilities over and above those provided in the initial 200 selected sites had been received.

As the Inshore Fish Handling Program is replacing and changing habits traditional to the inshore fishery, a concerted educational program involving films, brochures, seminars and grass roots contact throughout the Region was undertaken.

Quality Improvement Program

A national program to emphasize the importance of producing high quality fish products was begun in 1980. The program is aimed at promoting the best use of the fishery resource and increasing the economic potential of Canada's fishery through regulation of industry-wide practices to minimize waste, increase yields and up-grade product quality.

By new regulations, increased resources and redistribution of effort, this program proposes to reduce wastage due to spoilage by changing the methods and practices used in handling fish and preserving fish quality on-board vessels and during offloading and on-shore holding and transportation, and by correcting deficiencies in the construction and equipment of vessels, unloading systems and holding and transportation facilities. Introduction of these measures, combined with the application of approved industrial quality control programs directed at all operations from receipt of raw material to distribution of products, will significantly increase: a) production yields, b) the proportion of production with enhanced quality, and c) the consistency of product quality.

In addition, the enforcement of mandatory quality grading at the point-of-sale (dockside) for raw material and at the finished product stage will facilitate the production of graded products of consistent quality.

This plan, while in the proposal stage, was discussed in detail during 1979 and 1980 with fishermen's unions and associations, provincial associations of processors, the Fisheries Council of Canada and with most provincial governments. The consensus was that industry self-regulation via voluntary standards and piece-meal government programs would be ineffective. All parties to these consultations agree that federal officials must provide the pivotal and crucial role of monitoring the point-of-sale grading of landed fish, based on price differentials for varying quality. This role would be in addition to that required for regulatory enforcement of at-sea and on-shore handling and operational requirements and the monitoring required to ensure industry's application of quality control programs and final product grading.

Seafood Technology Section

The Seafood Technology Section is responsible for conducting practical (useful) research into technological problems connected with the handling, preserving, processing, and packaging of marine organisms from the time of catching until time of sale to the consumer. In general, the research is particularly concerned with aspects of sensory quality but may also be concerned with the chemical, microbial, or physical quality of seafood.

During 1980, the Section conducted or initiated research regarding the following: effect of handling methods on the long-term frozen storage quality of offshore capelin, roughhead grenadier, and roundnose grenadier; effect of handling (prior to processing) methods on the quality and fish yields of Newfoundland trap-caught cod; effect of premortem age and carcass cut on the composition of inshore Newfoundland-caught harp seal meat; effect of subjecting live scallops to oil-polluted water on the sensory quality of the subsequently cooked samples; handling of herring during glut periods; quality of frozen stored (glazed or vacuum packaged), salted, and smoked harp seal meat.

A manuscript, "Utilization of Inshore Newfoundland-caught Harp Seal (Pagophilus groenlandicus): Sensory Quality of Frozen, Stored, Salted and Smoked Seal Meat", was published as "Fishery and Marine Service Technical Report No. 916" and a paper, "Quality Assessment of Inshore Newfoundland Trap-caught Cod (Gadus morhua), Landed, Transported, then Stored Using Traditional and New

Fish Handling Systems: was presented at the Canadian Institute of Food Science and Technology Annual Conference.

Fish Inspection Laboratories

The Fish Inspection Laboratories provide consulting and advisory services in microbiology, analytical chemistry and quality assurance to the Inspection and Technology Branch, other government departments and agencies, the fishing industry and private companies.

1) Microbiology Section

During 1980, the Microbiology Section continued to monitor the production of the various fish filleting, freezing, smoking and canning plants in the Newfoundland Region. The regional laboratory at St. John's and the district laboratories at Grand Bank and Corner Brook together performed, as part of the monitoring program, a total of 17, 147 microbiological analyses on 3,134 samples of fish and fish products, including 765 samples of canned fish for sterility testing. A total of 1,337 analyses was performed on 99 samples of detained products (groundfish, shrimp, crab and cod au gratin), 9,830 lbs. of which were reconditioned.

In response to high bacteriological counts, the Microbiology Section carried out 15 major sanitation surveys, involving swabs and extensive sampling, at nine fish processing establishments. A number of less concentrated surveys was also made.

A total of 525 samples of actual or proposed fish plant and unloading facility water supplies were subjected to 5,141 microbiological analyses in 1980. During June and July, the laboratories at St. John's and Grand Bank were involved in the assessment of water quality for two proposed mussel farm sites. This work was done in conjunction with the Environmental Protection Service and the provincial Department of Fisheries.

In August, the water supplies of 22 fish processing facilities in Labrador were sampled, many of these for the first time. A small temporary laboratory was set up in the Goose Bay Conservation and Protection headquarters and a helicopter used to sample the coastal communities. The co-operation and goodwill of both the Conservation and Protection Branch at Goose Bay and the Melville Hospital are gratefully acknowledged.

In April, the regional laboratory participated in the Laboratory Quality Assurance Program of the United States Food and Drug Administration.

For 1980, the Microbiology Section instituted a policy of charging nominal fees for analyses of samples done at the request of industry or other agencies. A total of 1,105 such commercial analyses was performed.

During March, all the Microbiology Section personnel participated in a general meeting-workshop in St. John's.

11) Chemistry Section

In 1980, the demand for chemical services provided by the Inspection Branch increased over that of 1979. A total of 10,087 analyses were carried out on 2,022 samples submitted from the Inspection and Technology Branch, other government Departments and agencies, the fishing industry and private companies.

A total of 2,844 analyses was performed on 476 samples submitted from within the Inspection and Technology Branch. Included were histamine and PCB analyses, collaborative studies and a major project to determine the biological, seasonal and geographical bases for fluctuations in the composition of seal meat.

In total, 5,784 analyses were carried out on 1,113 samples submitted from industry. Although the number of fishmeal samples received was down slightly from that of the previous year, this was more than offset by the tremendous increase in the demand for compositional and quality analyses on various types of fish and fish by-products.

The volume of work performed for other government departments, agencies and private companies was also up over 1979. Of the 260 such samples received, 149 were submitted by the Department of Consumer and Corporate Affairs for electrophoretic analyses.

111) Quality Assurance Section

The Quality Assurance Section is responsible for identifying health hazards and ensuring that the quality and labelling of domestic and imported fishery products comply to statutory requirements. The section also ensures uniform application of construction and equipment requirements and operating practices for canneries registered under the Fish Inspection Regulations. Further activities involve assessment of the applicability of various codes of practice and standards of quality proposed by the Codex Alimentarius Commission as international trading standards.

During 1980, a total of 8,458 analyses were performed on 4,437 fish samples, of which 3,836 were canned and 601 were fresh or frozen fish or shellfish products. Commercial sterility examinations were carried out on 765 canned products and, in addition, 4,992 cans were examined in the field. Because of non-compliance to standards, enforcement action, resulting in the voluntary destruction of one whole and three part lots, was undertaken against 12 lots of domestically produced fish. Twenty lots of imported fish and shellfish, representing a total of 69,270 pounds, were also examined. Of these, one full lot of 393.75 pounds and 86.62 pounds of another lot were refused entry into Canada. A total of 34 labels were evaluated for compliance to packaging and labelling regulations. Eighteen consumer complaints involving foreign matter, poor quality, defective can seams and improper labelling were investigated; 14 of these were confirmed and the pertinent information forwarded to the appropriate parties.

This year saw the introduction of a new Time and Temperature Process form which was to be submitted for all products, product sizes and processes undertaken by each canning establishment. To date, 21 submissions have been

analyzed, two of which have been approved while approval of the remainder depends upon receipt of amendments.

On May 13, 1980, a one-day seminar was held to outline and instruct the field officers in the intensified surveillance of the canning industry required in the region.

Seafood Consultant

During 1980, to help promote the sale of Canadian-produced fish and seafood products, the Seafood Consultant assisted Canadian fish processors in the preparation and presentation of products at two Trade Missions sponsored by the Canadian Department of Industry, Trade and Commerce, held in Atlanta and Philadelphia, USA. She particpated in receptions and promotional work in conjunction with the Newfoundland Lobster and Seafood Festival, Provincial Seafood Days and the Canadian Fish and Seafood Month, and staffed the Department's booth at Toronto's Royal Winter Fair.

To heighten consumer interest in serving fish, she completed work on a squid cookbook and developed new recipes for a variety of fish products. Encouragement to eat more and different types of fish and advice on proper handling and preparation procedures were given in radio and television shows, fish cookery demonstrations to consumers and students and regularly-contributed articles to several magazines.

INDUSTRIAL DEVELOPMENT BRANCH

With the dramatic increase in fishing activity, especially in the inshore sector in recent years, development activities for 1980 were directed mainly toward more cost-effective harvesting of the resource as opposed to increasing volume. The harvesting capability appears to have developed to the extent that most available fish can be harvested without difficulty. However, with operating costs rising sharply especially for fuel, gear and equipment, there is a greater awareness of the need to operate more efficiently; hence the continuing demand for new technology and technology transfer as it applies to vessel and gear development, as well as onboard fish handling techniques, with a view to improving quality.

Commercial resource surveys were also undertaken, especially on shellfish in areas outside those currently exploited, with a view to determining abundance and commercial distribution.

Groundfish Development

1. Line Fishing

With an obvious increase in abundance in Northern cod in Sub Areas 2J, 3KL on inshore grounds, and with greater emphasis being placed on landed

quality, considerable interest is developing toward a return to line fishing for cod. To support this renewed interest, the Industrial Development Branch during the past year initiated and implemented several projects directed toward greater mechanization in this fishery.

(a) Mustad Autoline Trawl Baiting System

A complete system was installed on a new 58 ft. longliner in Wesleyville for evaluation and demonstration purposes. This system, which is being used quite successfully in traditional longline fishing countries such as Norway, Faroe Islands, Iceland, etc., appears to have developed considerable interest in Eastern Canada.

An interesting feature about this particular project is that the automated equipment is containerized onboard the vessel for easy installation and removal. This permits much greater flexibility and allows multi-purpose vessels to convert from one fishery to another with minimum delay. In the case of the vessel in question, it has been demonstrated that the conversion time from mechanized longlining to purse seining is one day.

Results of the commercial operation of this equipment are presently being evaluated for inclusion in a detailed report. However, interim reports indicate that satisfactory catches of top quality cod were landed and the fishing crew involved appear quite pleased with the system.

In view of the relatively high capital cost of the system, it is felt that another full year operation is required to complete a cost/benefit analysis for interested fishermen.

(b) Semi-Automated Trawl Baiting Systems

In addition to the Mustad System, and as a result of increasing requests from fishermen for mechanization in trawl baiting, as opposed to the very tedious and time consuming traditional method of manual baiting, a number of experiments were carried out in eastern Newfoundland and Labrador using semi-automated "Baiters" which had been developed in Newfoundland over the past two years. These baiters are more simple and much less expensive than the "Mustad System" and are being developed primarily for smaller type boats.

During 1980, a number of projects were undertaken to evaluate the effectiveness of these semi-automated baiters. Results of projects undertaken appear somewhat inconclusive and vary from one area to another. One fairly general complaint is that considerably more bait is required because the baiting operation is of the "random" type.

However, toward the end of the fishing season increasing requests for information on at least four types of a similar design indicated a high level of interest among fishermen. It was reported that "home-made" designs were being constructed by fishermen with satisfactory results.

A more comprehensive and thorough evaluation of semi-automated baiting systems is presently underway and is scheduled for completion by March 31, 1981.

(c) Onshore Baiting Systems

Work is continuing on the design and development of an onshore baiting system which is intended to provide a baiting service for small open boat operators using longlines. The objective is to develop a system with the capacity to bait gear for a number of boats. It is hoped that such a system could be operated as a community rather than as an individual baiting system.

A prototype unit is nearing completion and hopefully will be ready for preliminary testing shortly. Depending on results and the need for further modifications, it is hoped that a pilot project is possible for early in the next fishing season.

(d) Automated Fishing Reels

Various types and designs of automated fishing reels have become available during the past two years. It is felt that these units improve the efficiency of handline fishermen who normally use jiggers and baited hooks. Several of these reels were acquired by the Branch this year for evaluation and demonstration to small boat fishermen both in eastern Newfoundland and Labrador.

Reports from fishermen involved were generally satisfactory. However, complaints were received relative to a lack of servicing in remote areas.

2. Mobile Gear-Bottom Trawling

As a result of requests from many gillnet fishermen seeking information relative to alternate methods of harvesting groundfish, because of escalating costs and quality problems associated with gillnet fishing, the Industrial Development Branch is conducting an extensive experimental fishing program with a view to determining the possible potential for developing a mobile gear fishery in near shore/middle water areas of Eastern Newfoundland and Labrador (Areas 2J, 3KL).

This project is being undertaken utilizing a number of fishing vessels, under charter arrangements, varying in size from 42 ft. to 65 ft. Fishing techniques being used are: (a) Pair Bottom Trawling and (b) Single Vessel Bottom Trawling.

Pair-Trawling - a technique used widely by Spanish fishermen using larger vessels for offshore groundfishing has proved highly successful. It involves the use of two vessels towing one net. Pair trawling allows vessels with limited horsepower to combine their efforts to fish bottom trawls effectively and efficiently. The fact that trawl doors are not required means that the main engines can operate at lower speeds reducing energy costs substantially.

During the past year, experiments were carried out utilizing two pairs. One pair, consisting of a 42 ft. and 45 ft. vessel, which operated in the Cape St. Mary's-Trepassey area, produced satisfactory commercial catches which indicated a potential for a limited number of vessels of this size.

A second pair of 53 ft. vessels, well equipped for pair trawling, operated in areas between St. John's and Cape Freels. Results of this project were not at all encouraging. This was due mainly to existing fishing patterns in this area rather than that of the technique. Most of the fishing grounds which appeared suitable for pair trawling were literally covered with heavy concentrations of gillnets, thereby preventing the use of towed gear. Much of the area covered has very rough seabed which also restricts pair trawling. Arease that were fished, especially in deeper water, produced very little cod. However, flounder and turbot appeared plentiful in most areas. Codfishing in the same general areas at the time but using different techniques (longlines and handlines) was reported productive. However, this activity was taking place closer to shore in shallow depths on grounds with rough seabed conditions which were not conducive to bottom trawling.

Single Vessel Bottom Trawling - Experiments were carried out using 65 ft. vessels well equipped with recent design gear, commercially proven, in areas off Eastern Newfoundland and Labrador from Trinity Bay North to Black Tickle. This project, in addition to that of pair trawling, was undertaken to determine the possible potential for bottom trawling as an alternate means to gillnets for harvesting groundfish, with a view to improving quality, could not be considered successful. Plans to operate in middle water areas, in addition to inshore and near shore, were minimized by almost continuous bad weather conditions from October to December.

Again, heavy concentrations of gillnets extending offshore up to 20-30 miles restricted trawling operations. Also, the scarcity of cod on grounds that were fished was disappointing. As with the pair trawling project, encouraging signs of flounder and turbot, especially turbot, were found in most areas.

Overall results of both projects indicate a limited potential for viable inshore/near shore bottom trawl fishing in areas north of St. John's, as long as existing patterns of wide scale use of gillnets continue.

Further work is required to determine the possible middle water potential in early Spring as cod migrate shoreward.

Shellfish Development

1. Shrimp Development - Gulf of St. Lawrence

The Newfoundland shrimp fishery in the Gulf of St. Lawrence (Sub-Area 4R) is confined mainly to an area north of 50°N. Latitude. This fishery has been ongoing for the past 11 years by vessels in the 52-65 ft. class. The southern section of Sub-Area 4R has not been fished commercially.

Over the past few years considerable interest has developed regarding the possible potential for the expansion of this fishery further south along the west coast of Newfoundland, south of 50°N Latitude.

Attempts to determine the possibility of extending this fishery were undertaken by the Branch during 1979 and 1980 utilizing vessels of 55 to 80 ft. in length.

The survey revealed some interesting aspects regarding the area south of Latitude 50° North: a) the area of suitable trawling grounds in the southern area of 4R is comparable in area to those commercially fished in the North - Port au Choix area; b) catch results were very interesting with catches being fairly high during the Spring then dropping drastically later in the year, similar to results found in the area being commercially fished; c) the distance to fishing grounds from nearest fishing ports, being in excess of 50 miles, is significantly greater than farther north. This travel distance, together with rougher normal weather and sea conditions, would require larger vessels, 65 ft. and over, to successfully harvest this area in early Spring and late Fall when fishing is usually best.

Results would indicate that the area surveyed could support a limited shrimp fishery, although distribution appears more dispersed than further north. Also, as is the case with the existing fishery, shrimp catches would likely require supplementation by other species for a viable operation. A detailed report on this survey has been prepared.

2. Commercial Snow Crab Survey (Chionocetes opilio)

The commercial snow crab fishery, which is relatively new in Newfoundland having started in the late 1960's, is carried out mainly in eastern Newfoundland bays and near water areas.

Other fishing operations, (gillnets and groundfish trawls) indicate, through incidental crab catches, that the crab resource could be much more widespread than in areas presently commercially fished.

In order to obtain more information on the abundance and commercial distribution of crabs in areas outside those presently fished, a preliminary survey was carried out in cooperation with the Research and Resource Services Directorate in specific areas off eastern Newfoundland and Labrador during the period June-November 1980.

The area between Horse Islands and Grey Islands received special attention in accordance with requests from fishermen and industry.

Information obtained from this survey is being evaluated for inclusion with that obtained through research efforts. A detailed report covering this survey is being prepared.

3. Icelandic Scallop Survey - Southern Labrador

A scallop survey was carried out during June-July 1980, to determine the abundance and commercial distribution of Icelandic scallops (Chlamys islandicus) in the area from Red Bay to Black Tickle in coastal Labrador. This survey was requested by scallop fishermen operating in the northern Gulf of St. Lawrence and off southern Labrador who were seeking further information relative to scallop fishery potential farther North.

The survey revealed that, while sparsely populated beds were found in few locations, there is very little, if any, potential for the extension of a commercial scallop fishery in this area, the one exception being in

the Williams Harbour area where it is felt that there is limited potential for a local fishery.

Overall results indicate there is no justification for further scallop surveys in the area in the immediate future.

4. Mussel Development

A three-year program to explore the possibilities for commercial mussel farming, using suspended culture techniques, was undertaken through agreements with Marine Sciences Research Laboratory, Memorial University of Newfoundland. the program expires March 31, 1981.

The work was carried out at Garden Cove, Placentia Bay, and preliminary results are encouraging. The quality of mussels produced and processed in various forms in a pilot plant operation were quite acceptable. Culture time to produce commercial size mussels was somewhat longer than at first anticipated. However, recovery rates and the absence of pearls make cultured mussels much more attractive than those harvested from natural beds.

Requests have already been received relative to the possibility of acquiring this facility for operation on a commercial basis.

Studies

Studies being carried out through consultants include:

a) Energy efficiency study on small fishing vessels using towed gear;

b) Feasibility study relative to the production of fishing charts, funded jointly by the Industrial Development Branch; Hydrographic Division, Ocean and Aquatic Sciences, and Department of Supply and Services;

c) Utilization of the "heat pump" system in the operation of mechanical salt fish dryers as an energy saving measure in cooperation with the Canadian Saltfish Corporation.

NEWFOUNDLAND BAIT PROGRAM

It was necessary to increase bait selling prices in March, 1980, due to the dramatic excalation in operational costs coupled with the equally dramatic demands on the Program.

Squid, which continues to be the preferred bait for the inshore line fishery and the crab fishery, was not as abundant as in recent years and in some areas such as the Southwest Coast landings were negligible. Squid also left Newfoundland waters earlier than usual thus preventing the accumulation of additional supplies.

Herring bait for the lobster fishery has become more difficult to secure each year due to the limited quantities available, and it is anticipated

that mackerel will eventually replace herring as the principal lobster bait.

Mackerel, which is a more than adequate bait for cod, lobster and crab fisheries, was acquired in greater quantities in 1980 to augment squid and herring stocks for the various fisheries in anticipation of a shortfall in these species in early 1981 before new stocks become available.

Caplin supplies on hand are considered sufficient as the demand for this specie for bait purposes continues to diminish.

Total bait sales to commercial fishermen amounted to 7,000,000 pounds. The Bait Program operated 41 bait depots and bait holding units throughout the province in 1980.

FISHERMEN'S ASSISTANCE PLANS

Vessel Insurance Coverage

During the year, 504 new policies were written representing a total insured value of $10,105,764.00.

During the same period, 712 renewal policies were issued with a total insured value of $14,574,475.00, making a grand total of 1,216 policies with a total insured value of $24,680,239.00.

Vessel Claims

During the period under review, 16 total loss claims were paid, with indemnity payments amounting to $926,635.00. Forty partial loss claims were paid amounting to $140,995.00 making a total of 56 claims and total payments of $1,067,630.00.

Approximately 16 claims remain to be processed when the necessary repairs have been effected and some reports and investigations completed.

Subsidy Program

During the year, the following list of fishing vessels were constructed and launched:

Length	Number	Construction Cost
26'	1	$ 10,500
27'	5	35,150
30'	3	41,000
31'	6	204,250
32'	4	54,400
33'	1	37,000
35'	13	445,000
36'	6	269,000

Length	Number	Construction Cost
37'	5	265,000
38'	5	362,000
40'	2	103,000
42'	6	590,675
45'	13	1,918,000
50'	3	575,000
53'	5	1,471,000
55'	7	2,606,475
58'	1	307,000
65'	1	658,000

For the current fiscal year, to date 58 applications have been approved for new construction, with an estimated construction cost of approximately $5,772,000.00.

RESEARCH AND RESOURCE SERVICES

Programs in Research and Resource Services are aimed at providing the scientific information necessary for effective management and use of the freshwater and marine resources within the Canadian Atlantic area in general and the Newfoundland area in particular.

Major emphasis is placed on research associated with the management of the Canadian fisheries, and about 77% of the Service's total budget and 79% of manpower resources are devoted to stock assessment and associated biological research. Salmon enhancement projects form the next most significant part of the Service's program with lesser resources devoted to habitat protection and a small fish disease research program.

MARINE FISHERIES MANAGEMENT - GROUNDFISH

Eighteen cruises with large research vessels were conducted; 10 of these cruises were designed to measure changes in abundance of the various resources and collect auxiliary biological data; one was a food and feeding study in Division 3L; two were to tag cod in Subdivision 3Ps and in Divisions 2J, 3K and 3L; two were to tag Greenland halibut in Divisions 2G-3L; one was to test the feasibility of using the acoustic survey technique to estimate abundance of redfish and shrimp; two were to investigate the distribution of juvenile and adult plaice, yellowtail and witch, especially the most suitable gear for capturing these juvenile fish. In addition, four cruises by the charter vessel BEOTHIC VENTURE estimated abundance of small redfish and shrimp in the Gulf of St. Lawrence. From these cruises much useful data on distribution, life history and abundance changes, etc., for the major commercial species were collected and will be used in the assessment of the annual and long-term potential of the resources in the areas studied. Biological samples were also collected from commercial fish landings at selected Newfoundland ports and studies of fish discards in Canadian fisheries were continued in 1980.

Stock assessments were presented to the NAFO Scientific Council Meeting in June on those stocks for which Canada had requested advice from NAFO. These were: four cod stocks, two redfish stocks, six flatfish stocks and one roundnose grenadier stock; the remaining stocks in the Newfoundland-Labrador area were assessed by the Canadian Atlantic Fisheries Scientific Advisory Committee (CAFSAC). These assessments formed the basis of catch quota regulations and in turn effort regulations for the different stocks in the Newfoundland-Labrador area. In addition directed studies continued on cod food and feeding, cod migrations, redfish stock discrimination, groundfish population mechanisms and juvenile flatfish abundance and distribution.

MARINE FISHERIES MANAGEMENT - PELAGIC, SHELLFISH AND MARINE MAMMALS

Herring

The general decline in herring abundance which has been observed along the coast of Newfoundland for the past few years continued in 1980. This decline has been most severe along the east and southeast coasts where the production of young herring has been poor since 1969. However, the decline in the Gulf of St. Lawrence herring stocks has been moderated by a significant production of young herring in 1974 which became available to the fishery in 1980.

Due to the importance of the yearly production of young herring to the maintenance of the herring fishery research related to the early life of herring continued in 1980. These studies are designed to provide information on the causes of annual variability in the production of young herring.

Of all gear types participating in the herring fishery the fixed gears, particularly gillnets, have undergone the greatest expansion. The accumulated gillnet catch rate data are being incorporated into the analytical models, which calculate herring stock size, and along with purse seine catch rate data are being used as a measure of herring abundance. Additionally a series of fixed gillnet stations have been established in each bay to provide information on incoming recruitment and also to provide a measure of abundance independent of the commercial fishery.

Caplin

The results from acoustic surveys in 1979 and analytical models (sequential caplin abundance models) confirmed earlier prediction that the 1979 stock biomass would be low. Projections made in early 1980 indicated that the caplin stocks would remain at a low level during 1980. As a result, no offshore fishery for caplin was allowed in 1980 although an inshore caplin fishery during the spawning season was allowed.

To monitor the caplin stocks, three acoustic surveys were conducted in 1980, one on the Grand Banks in June, the second to NAFO Div. 2J3K in October-November and the third on the west coast of Newfoundland in May. Additional tests were conducted on the new acoustic data acquisition system in 1980 and it should be operational in 1981. The underwater camera was deployed during the June survey but no pictures were collected.

A research vessel trip to collect young caplin was conducted in October. This study is part of a long-term project aimed at assessing the status of the caplin stock before the fish become accessible to a fishery.

The collection of samples from the inshore commercial fishery and research vessel cruises continued in 1980.

Mackerel

While the Northwest Atlantic mackerel stock appears to have stabilized current population levels are well below those observed in the late 1960's. With the elimination of the international fishery on overwintering mackerel off the New England coast the Canadian summer fishery currently represents the major mackerel fishery and accounts for approximately 80 per cent of the total annual catch. The fishery in the Canadian area is highly influenced by market factors and also the availability of mackerel in Newfoundland is strongly influenced by local water conditions, particularly temperature.

Biological monitoring of the Newfoundland mackerel fishery continued in 1980.

Lobster

Monitoring of the fishery in five study areas around Newfoundland for size and sex composition of the landings and CPUE was continued. Tags applied in 1979 and earlier years in these areas were collected from fishermen throughout the fishing season. These tagging studies provide information on growth and movements of lobsters and also enables estimates to be made of standing stock, recruitment, exploitation rate and annual growth.

Field studies of larval ecology were continued at Arnold's Cove during the Summer and additional tagging of commercial lobsters and shell condition sampling of catches was carried out in all five areas during the Fall.

Crustacean Population Dynamics

The small area around the Shag Rocks in Long Harbour, Placentia Bay remained closed to commercial lobster fishing and a tag recapture study of lobsters continued there for the fifth year. This study is providing a basis for estimating various lobster population parameters and for evaluating the impact of commercial fishing on these parameters.

Shrimp

Interpretation of data on catch and effort, biomass, stock composition and net parameters provided the bases for recommendations of TAC's at levels of 4,000, 800 and 850 metric tons for Hopedale, Cartwright and Hawke Channels, respectively. Preemptive TAC's of 500 metric tons were maintained for NAFO Divisions 2G and 3K. A research cruise was conducted in the Labrador area during July, 1980 and for the first time statistically acceptable confidence limits on biomass were obtained. The observer programme was continued in

1980 and coverage was increased over previous years.

Two research cruises were conducted in the Esquiman Channel (Gulf of St. Lawrence) and provided data on the distribution, abundance and migration of shrimp. The first of these was made in February and the second in November. Sampling of the commercial fleet at Port au Choix was continued in 1980. In addition, the possibilities of utilizing acoustic methods for estimation of shrimp abundance were investigated during such a survey for redfish in the northern Gulf area.

Observer data from the Davis Strait shrimp fishery provided information on catch rates, distribution, discards, stock composition and by-catch. These results were incorporated with data available from other participating nations and used in the overall assessment of the offshore shrimp resource. Consequently, it was advised that the TAC for shrimp in this area for 1981 remain at the 1980 level (29,500 metric tons).

Crab

The tagging program initiated in 1979 was continued this year. Efforts to obtain molt increment data by means of a permanent tag were expanded. Data obtained from the return of tags released in 1979 are currently being analyzed in order to obtain information on movement and fishing mortality.

Although the plant sampling program was continued this year, it was severely restricted due to the inshore fishery dispute.

Several research cruises were undertaken in order to determine catchability, size distribution, and shell condition of snow crabs in various commercial fishing areas.

Squid

A survey for larval/juvenile squid (Illex) was conducted during March, south of the Grand Banks. Limited success was experienced, as very few young squid were captured.

From results of a bottom-trawl survey in June on the slopes of St. Pierre Bank and Grand Bank, lower levels of inshore squid abundance were predicted than in the previous year. This forecast was successful as 1980 squid abundance was moderate and distribution around the island was discontinuous.

Seasonal collection of biological samples and catch per unit effort data was expanded to include seven inshore sampling localities. Water temperature was monitored throughout the season at Holyrood.

The inshore tagging program continued with more than 20,000 squid tagged during the Summer at various locations around the island. Although many tags were recovered, tag returns were below the previous year's level due to lower fishing effort in 1980.

A survey for Arctic squid (Gonatus) was conducted during November-December along the northeast Newfoundland and Labrador coast, with slightly higher catches recorded than in the previous year.

Scallops

In furtherance of its policy to develop and enhance its fishery resources, the Provincial Department of Fisheries has continued to support investigations into scallop culture. This has allowed us to complete on-going culture activities on various aspects of the culture of the mollusc. This included spatfall monitoring in Placentia Bay, Port au Port Bay and Bay of Islands. While spatfall in Garden Cove and Fox Island River reached near-record levels, extremely poor spatfall was recorded in the Bay of Islands.

Growth and survival of scallops at Spencer's Cove, Placentia Bay were monitored. Survival of one-year old giants and Icelandics was well over 80 per cent, a considerable improvement over that encountered in Garden Cove. The transfer of culture technology has begun.

A systematic line survey using four lined Digby buckets equipped with 2 1/2 inch rings was conducted in the northeastern Gulf of St. Lawrence covering approximately 97 square nautical miles. There was an active fishery in this area in 1980. Of the 910 metric tons (round weight) of scallops landed in Newfoundland, approximately 750 metric tons came from the northern Gulf fishery based exclusively on the Iceland scallop. Up to 13 vessels were involved, but only 10 were active through the season. An additional 204 metric tons, mainly giants, were taken from St. Pierre Bank by Maritime vessels. There was a small fishery for the Iceland Scallop off the Bay of Islands area.

Seals

A computer simulation model was developed to estimate the natural mortality rate of harp seals to enable population projection and to examine the influence of different harvests on the population trajectory.

Studies on the diet and growth rates of harp seals were continued in 1980. Particular attention was focused on the development and condition of harp seal pups after weaning.

In March 1980, approximately 3,600 harp seal pups were tagged off the coast of southern Labrador and in the Strait of Belle Isle. The results of this experiment were similar to those obtained in 1979 and suggest a production of approximately 230,000 pups on the Front.

A study was conducted to investigate age-specific variation in age determination of harp seals. The probability of a simple age reading being equal to the mean age reading was found to decrease linearly with age. The observed errors in age reading were modelled using probability theory which allows this age reading bias to be removed. It was found that the size of these biases may be sufficient to have significant impact on management advice for harp seals.

Additional age samples of hooded seals from the commercial catch were collected and will be incorporated into an assessment of this population which is currently underway.

Whales

During August 1980, a large-scale aerial sampling survey of whales in the eastern Newfoundland and S.E. Labrador marine areas was accomplished. Line-transect methodology is being used to estimate the numbers of finback, humpback and pothead whales in the study area (from 47°48'N to 55°00'N and seaward to approximately 100 nautical miles).

In addition, whale observers were on board the Gadus Atlantica during the two annual caplin research cruises. Data from the first cruise (June 11-July 7) will provide line-transect estimates of humpback numbers on the Grand Banks and Southeast Shoal, but the research cruise in 2J-3K from October 18 to November 23 produced few whale sightings due to bad weather.

Dr. Jon Lien of Memorial University of Newfoundland completed the second field season of his DFO-sponsored research into the documentation, causation, and prevention of baleen whale collisions with inshore fishing gear in the Newfoundland-Labrador area. Dr. Hal Whitehead of Cambridge University, England, completed a study of humpback whale feeding ecology and social behaviour in the Bay de Verde area.

FRESHWATER AND ANADROMOUS FISHERIES MANAGEMENT

Atlantic Salmon

Optimism for our Atlantic salmon stocks was renewed in 1980. The commercial fishery harvested 2100 tonnes, which was about double the catch in 1978 and 1979. The recreational fishery harvested 43,000 fish which was close to the record (45,000 in 1973). Above average migrations were counted at half of our eleven fishways, and only one fishway had a below average count.

Much of our success in assessing the 1980 returns was due to the cooperation of the Salmon Association of Eastern Newfoundland. We also received valuable assistance from a number of volunteer commercial fishermen, and anglers who provided the Department with daily records of their harvest.

Two experimental rivers, Western Arm Brook (St. Barbe Bay) and Highlands River (St. Georges Bay) were monitored in 1980. One objective was to estimate optimal spawning requirements in these rivers. Another objective was to see what types of river conditions were most suitable for juvenile salmon production.

Atlantic salmon biologists have assisted the International Commission for the Exploration of the Sea in its re-examination of the Greenland salmon fishery in the light of new knowledge gained since 1974. Canadian biologists have played a major role in demonstrating that the exploitation of salmon at West Greenland (1190 tonne quota) is resulting in a significant reduction in Canadian salmon stocks available to Canadian fisheries.

Arctic Char

Arctic char landings in northern Labrador totalled 204 tonnes during 1980. This was approximately 4 per cent lower than the 1979 total. The decline can be attributed to the successful salmon fishery in the area in which landings were 70 per cent higher than in the previous year. As a result, more emphasis was placed on salmon fishing during the latter half of the char fishery. Quotas were again in effect on several char stocks in the immediate Nain area. Experimental fishing for char in the Hebron Fiord yielded excellent catch rates and expansion of the commercial fishery into this area for the 1981 season appears promising.

Resident Species

A long-term study to assess the status of anadromous brook trout stocks in the upper Lake Melville area was initiated in 1980. These stocks presently support a commercial and domestic fishery for native and local residents of Happy Valley - Goose Bay and Northwest River area. Meanwhile, insular Newfoundland experiments to assess the effect of smelt introductions on salmonid growth were concluded, and results are presently being analyzed.

EXPERIMENTAL ECOLOGY PROGRAM

Experimental Ecology Program, unlike the other programs within Research and Resource Services Directorate, is not structured along species lines. Instead it functions rather as an umbrella organization for a number of very diverse activities primarily categorized as follows:

1. Research, other than along species lines.
2. Fish Habitat Protection.
3. Support Service to the Directorate at large.

The program is divided, organizationally, into seven sections. These sections are characterized by their diversity of function and there is little formal integration from section to section. Instead, most interfacing and liaison is with other programs, other directorates, other agencies, and with industry.

1. Fisheries Ecosystems

With respect to its research responsibility, this section is involved in global approaches to the understanding of complex marine ecosystems. This is accomplished by simultaneous study of hydrographic, planktonic, and other relevant biological factors. Scientific disciplines called upon include: oceanography (physical, chemical, and biological), fisheries biology and marine ecology. The service function of this section relates to the provision of equipment and expertise for making routine oceanographic measurements.

1980 Highlights

a. Continuation of the Flemish CAp project, an international experiment examining the mechanisms of larval redfish ecology in relation to the oceanographic forces that drive that particular ecosystem. The ultimate objective is to understand the mechanisms affecting

recruitment in this particular commercial species.

b. An expansion of our capability to use ocean climate indices as tools in the management of fisheries.

c. Initiation of the streamlining and upgrading of the collection and processing of oceanographic information within the Directorate, and;

d. A research cruise, collaboratively with scientists at MUN, to examine the physical oceanographic dynamics of Carson Canyon in relation to nutrient exchange and its role in the fisheries oceanography of the general area.

2. Biochemical Systematics

By studying the biochemical and genetic properties of fish tissues and blood, combined with more orthodox techniques, this section attempts to define fish stocks and their interrelationships, as well as actual speciation of fish in some circumstances. The science employed includes population genetics and biochemistry.

1980 Highlights

a. Using biochemical methods, established that Greenland halibut (turbot) form one continuous stock from northern Labrador to the northern Grand Banks.

b. Demonstrated that the witch flounder, a species inhabiting contiguous environments (northern and southern Grand Banks), can be separated into two distinct stocks on the basis of biochemical analysis.

3. Habitat Research and Management

The research arm of this section is responsible for the study of the effects of stress caused by both natural and man-made agents, on marine organisms, particularly commercial species. The section also provides expert advice in the field of pollution in general and oil pollution more particularly. Scientific disciplines utilized include physiology, chemistry, toxicology, microbiology and biochemistry.

The regulatory-based activities associated with Habitat Protection are also conducted within this section. Activities generally fall into the category of provision of scientific and technical advice in support of enforcment of habitat legislation, especially the Fisheries Act.

1980 Highlights

On the research side of business the following are noteworthy:

a. Research on the chronic toxicity of hydrocarbons continued with analysis and publication of data on lobster and winter flounder experiments.

b. Investigation associated with the toxic characteristics of Hibernia crude oil were conducted using adult and larval caplin and adult cod.

c. Work continued in the two very important areas of environmental research, namely, mixed function oxidase and its role in hydrocarbon depuration in fish, and environmental mutagenesis.

On the management side the following are highlighted:

a. Ongoing formal environmental assessment work associated with major hydroelectric developments on the Island and the Lower Churchill in Labrador.

b. Assessment and provision of input to offshore hydrocarbon exploration activities, from the point of view of carrying out the Department's responsibility in this area, was heightened in 1980 as we move from the exploratory to the production phase.

4. Microbial Chemistry

Disease micro-organisms of fish are studied from a unique point of view, involving the chemical analysis of the toxic agents (endotoxins) produced by these bacteria. Research associated with the development of vaccines for use in aquaculture or enhancement situations is another priority with this section. Microbiology and biochemistry are the two main scientific disciplines employed.

On the service side, utilizing the expertise of a postdoctoral fellow, the section provides a rudimentary fish disease diagnosis unit with the Region. The section also provides the local fish health officer responsible under the Fish Health Protection Regulations made pursuant to the Fisheries Act.

1980 Highlights

a. Continued research on the biochemical properties of endotoxins produced by fish disease-causing bacteria.

b. Established a rudimentary fish disease (bacterial and parasitological) diagnosis capability.

5. Statistics and Computer Services

This section functions in a service and a research mode within the Directorate. Computer requirements for Research and Resource Services are provided by this section as well as advice on the use of statistical methods and in programming. High level advice in experimental design and multivariate analysis is provided. In the research mode a program of basic research into statistical methodology related to fisheries is conducted.

1980 Highlights

On the EDP support side provision of high quality services was maintained

(programming, data conversion, statistical analyses, etc.) in the face of increasing new demand and stable resource allocations. Considerable time was spent by EDP staff in 1980 evaluating alternate sources of computing services to meet our changing needs.

On the statistical support and research side of things the following are highlighted:

a. Development of a program for multivariate statistical methodology for meristic data.

b. Collaborative research on stock separation problems associated with witch flounder applying multivariate analysis of meristic data.

c. Collaborative research on the sublethal effects of long-term exposure of fish to hydrocarbons using multivariate methodology.

6. Electronics Development

Development, maintenance, and provision of advice on various shipboard data acquisition systems, including oceanographic data systems, is a mandate of this section. Development and maintenance of the on-board acoustic fish counting systems is also a provided service.

1980 Highlights

a. Development of a new hydroacoustic data acquisition system (HYDRAS)

b. Operation and maintenance of the Directorate's varied (hydroacoustic system, Bioness, CTD, etc.) shipboard electronic data gathering instrumentation totalling 150 sea-days.

7. Technical Services

This section provides, to all programs within the Directorate, an ongoing support service in the fields of photography, drafting and illustration, and scientific records maintenance. The section also provides curatorship of a specimen museum and support to the Research Vessel Committee.

REGIONAL LIBRARY

The Regional Library supports all programs and branches of the Department of Fisheries and Oceans, Newfoundland Region, as well as the Environmental Protection Service, Newfoundland Region, by making available to their staff information contained in relevant literature which covers a variety of subjects and is written in several languages. The Regional Library also serves members of the general public by retrieving material either available for use in the library or for one week loan. This clientele includes provincial employees, consultants, university and college faculty and students and fishermen. Several consultants are now using the library on a regular

basis and in July 1980 accounted for almost half of the items borrowed. Ther term P/Y allotment was cut to 1.4 P/Y in 1980 and the continuing full time remained at 3.8 P/Y.

The library loaned 4,652 items, shelved 20,202 items, Kardexed 7,167 serial issues and processed 2,290 interlibrary loan requests to the end of November, 1980. In May 1980 the serials in the Microbial Chemistry reading room were amalgamated with the library collection and in December the collection from the Grand Falls Area Office was transferred to the Regional Library. The coding of serial holdings was continued during 1980 and approximately 80 per cent of our serials are listed in the 11th edition of Serial Holdings in Newfoundland Libraries, which was distributed in December, 1980.

In 1980 subject headings were assigned to 183 retrospective computer literature searches and cards filed in the card catalogue to provide general subject access to these printouts. In 1980 the fee structure was changed for the ongoing computer literature searches, CAN/SDI, and all profiles were revised accordingly. Also in 1980 Aquatic Sciences and Fisheries Abstracts (ASFA) became available on CAN/SDI so that now five of the existing profiles are receiving printouts from both ASFA and Biological Abstracts. A new profile was established for the Groundfish Programme which completed the coverage for Research and Resource Service, DFO staff.

During 1980, 672 monographs, reports or thesis were received bringing the number of monographic items in the collection to 6,200 items. The recataloguing project continued and card sets were received from 832 items. In December the library started inputting into an on-line cataloguing system (University of Toronto Library Automated Systems) through a contract with Memorial University of Newfoundland who are also using this database.

SMALL CRAFT HARBOURS DIRECTORATE

Harbour Development Program

The harbour development program is comprised of two distinct parts as follows:-

- Regular Program - which consists of repair and capital projects of facilities which are under the administrative control of the Small Craft Harbours Directorate; and

- Assistance to projects under Canada Works/Community Development Program - projects carried out under this program which also meet the program criteria of the Small Craft Harbours Directorate are assisted by providing technical advice and the supply of construction material which cannot be funded under the Canada Works/ Community Development Program.

A breakdown of the approved 1980/81 budget is as follows:-

1.	Regular Program Projects	$5,301,500
2.	Assistance to projects under the Canada Works Program which commenced in 1979-80 and were carried over to 1980/81	630,000
3.	Assistance to Projects under the Community Development Program which commenced in late 1980.	1,400,000
	TOTAL:	$7,331,500

Under the regular program the construction implementation of projects generally greater than $10,000 in value is carried out on behalf of Fisheries and Oceans by the Department of Public Works of Canada. Some of the larger projects under the regular program carried out this fiscal year are as follows:-

	Location	Project	Total Cost	1980/81 Cost
1.	Blue Beach	Harbour Development (Completion)	1,600,000	330,000
2.	Branch	Dredging (Completion)	300,000	85,000
3.	Port au Choix	Harbour Development (Phase 1)	250,000	100,000
4.	Red Bay	Fishermen's Wharf	255,000	255,000
5.	Bonavista	Harbour Improvements (Phase 1)	300,000	100,000
6.	Lamaline	Wharf	290,000	290,000
7.	Red Harbour	Wharf	280,000	230,000

One hundred and fifty-six minor and emergency repair projects of a value of $10,000 and less were carried out directly by Small Craft Harbours personnel. The total expenditure involved was $625,000.

Under the Canada Works Program, which commenced in late 1979, one hundred and sixty-two projects were assisted technically and financially and involved an expenditure of $630,000 in 1980-81.

Under the Community Development Program which commenced in late 1980, technical and financial assistance was provided to 100 projects and involved an expenditure of $1,400,000.

Five-Year Program

In early 1980, an extensive planning study for the development of a five-year program was completed. Key results of this study were:-

- A system of harbours necessary to support the commercial fishery was identified.

- A harbour classification system and classification of all harbours.

- An inventory of all harbour infrastructure under the administrative control of Small Craft Harbours.

- Harbour development plans for each harbour within the adopted system of harbours.

- A detailed listing of projects necessary to be undertaken within the next five years.

Similar studies were also undertaken in the other regions and were used as reference for the preparation of a National Five-Year Program and a Memorandum to Cabinet seeking a revised level of funding.

Property Management

In the Newfoundland Region there are approximately 1,000 marine facilities located in 583 harbours throughout the Region. In addition to the facilities the Directorate is also responsible for the administration of the property related to these facilities as well as over 100 leases and licences issued to the general public for the specific use of certain facilities or property.

On-site harbour management is carried out at 11 locations where Harbours Managers have been appointed to administer the Branch's facilities and property. During the year, the Directorate completed a Harbour Management Study to determine a management system for commercial fishing harbours which would be effective, economical and responsive to the needs of the users of the harbours. This study is now currently under review.