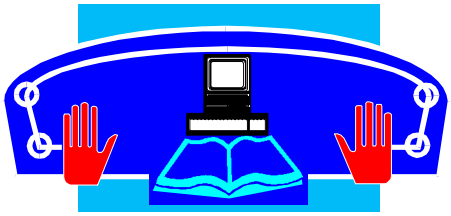

Review Of The Commercial Fishing, Commercial Aquaculture And Recreational Fish Stocking Sectors Of The Nwt Fishery

Type of Study: Industry Development

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FISHERIES

3-14-9

REVIEW

of the

COMMERCIAL **FISHING, COMMERCIAL** AQUACULTURE AND

RECREATIONAL FISH STOCKING SECTORS

of the

N.W.T. FISHERY- .

DEPARTMENT OF RENEWABLE RESOURCES
DEPARTMENT OF ECONOMIC DEVELOPMENT & TOURISM

FEBRUARY 1988

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COMMERCIAL FISHING INDUSTRY IN THE NORTHWEST TERRITORIES

BACKGROUND

The fishing industry in the Northwest Territories is composed of three sectors. These sectors include the domestic subsistence fishery, the commercial fishery and sport fishing. Management of fish resources in the NWT is the responsibility of the Department of Fisheries and Oceans (DFO). DFO is also responsible for inspection and stock assessment and assumes a role in test fisheries.

In terms of resource allocation, the domestic subsistence sector is given priority, subject only to the requirements of conservation. Only those fish stocks in excess of subsistence needs may be utilized for development of the commercial and sport fisheries. Although traditional harvesting activities are considered a priority, there is a gradual transition to commercial development of the renewable resource economy (Table 1).

Commercial fishing in the NWT dates to the opening of the Great Slave Lake fishery, in 1945. The industry grew rapidly during this period and by 1949, a total of 4.5 million kg of lake trout and whitefish were harvested making Great Slave Lake the largest producer of these fish in.North America (Table 2).

In 1961, attention was focused on development of the inland lakes and coastal charr fisheries. Three factors led to this initiative:

i) Great Slave Lake fish populations were in decline and there was a need to decrease fishing pressure;

ii) a decline in whitefish production from Lake Winnipeg and the Great Lakes had led to improved marketability of Northern production; and

iii) severe economic conditions in the Keewatin Region (due primarily to the closure of Rankin Inlet Nickel Mine).

From 1961 to 1970 over 140 waterbodies were fished. During this period numerous attempts were also made to develop the huge potential of the Mackenzie Delta.

Since 1970, fish production and the number of areas fished has declined significantly. During the 1986-87 fishing season, only the charr fisheries, Great Slave Lake and two pickerel producing lakes were being harvested. Despite this decline, the total fisheries still contributed $1.7 million (Table 2) in export sales with primary employment of approximately 120 people (Table 3).

TA8LE1

MAJOR FISH SPECIES IN N.W. T.
(kilograms)

QUOTA LEVELS

Species	Baffln	Fort Smith	Inuvik	Keewatin	Kitikmeot	Total
Arctic charr	194,000	0	38,500	183,000	261,800	677,300
Whitefish/Lake Trout	2,500	2,390,100	116,500	618,600	93,900	3,221,600
Burbot/Northern Pike	0	0	13,800	0	0	13,800
Cisco	0	0	30,200	0	0	30,200
Cod — Inconnu	45,500	0	11,400	0	0	56;900
Turbot	100.000	0	7,000 turbot	0	0	7,000 100,0
Pacific Herring	0	0	682,400	0	0	682,400
Pickerel	0	72,000	0	0	0	72,000
Total:	**342,000**	**2,462,100**	**899,800**	**801,600**	**355,700**	4,861,200

Estimated
HARVEST LEVELS
(Subsistence & Commercial)

Species	Baffin	Fort Smith	Inuvik	Keewatin	Kitikmeot	Total
Arctic charr	220,000		16,840	28,659	52,150	317,649
Lake Trout	0	1 10,17:	0	13,302	10,200	133,673
Whitefish	0	874,037	0	671	5,810	880,518
Arctic Grayling	0	0	0	12	0	12
Cod	0	0	0	65	0	65
Inconnu	0	71,082	0	0	0	71 .082
Northern Pike — Brook Trout	0	105,149	10,000 0	183 0	6 0	105 ,338 10, 0
Pickerel	0	42,700	0	0	0	42,700
Total:	**220,000**	**1,213,139**	**16,840**	**42,892**	**68,166**	**1,561,031**

Source: DFO, ED&T

TABLE 2

NORTHWEST TERRITORIES
LANDINGS BY FISH SPECIES
1985/86
(quantities in live weight equivalent tonnes)

Species	Great S1 ave	Cambridge Bay	Rankin Inlet	Al 1 Other Areas	Total
Whitefish	1001	0	0	0	1001
Pickerel	13	o	0	23	36
Lake Trout	108	o	0	0	108
Northern Pike	145	0	0	1	146
Arctic Charr	0	44	19	6	68
Inconnu	73	o	0	1	74
Total	**1341**	**44**	**19**	**30**	**1433**

NORTHWEST TERRITORIES
LANDED VALUES BY FISH SPECIES
1985/86
(Values in $0001s)

Species	Great Slave	Cambridge Bay	Rankin Inlet	All Other Areas	Total
Whitefish	916	0	0	0	916
Pickerel	28	o	0	51	79
Lake Trout	116	o	0	0	116
Northern Pike	107	0	0	0	107
Arctic Charr	0	204	89	27	320
Inconnu	116	o	0	0	116
Total	**1283**	**204**	**89**	**78**	**1654**

Source: DFO

TABLE 3

A summary of employment and incomes for the Northwest Territories Fishing Industry, 1970/71 - 1984/85.

Year	Self-employed Operators	Average Income per Operator (gross)	Total Employment
70/71	236	4,631	
71/72	199	4,882	
72/73	112	6,686	
73/74	119	6,788	
74/75	112	6,596	
75/76	136	5,237	
76/77	118	7,789	
77/78	144	10,116	239
78/79	121	12,875	205
79/80	100	15,363	168
80/81	102	18,284	198
81/82	97	16,000	161
82/83	89	15,199	134
83/84	69	25,060	118

Source: DFO

CURRENT SITUATION

The GNWT has assigned a high priority to the goal of maximizing the economic benefits from the renewable resource sector, including fisheries. The Commercial Renewable Resource Use Policy demonstrates this commitment. Schedule A (Commercial Fisheries Assistance) of this policy provides price support and freight assistance to the fishing industry (Table 4).

The Department of Indian Affairs and Northern Development, the Department of Regional Industrial Expansion and Canada Employment and Immigration each contribute to fisheries development through their economic development programming. These federal Departments provide capital investment as well as operational and training support to the industry.

Commercial freshwater and anadromous fish harvested in the NWT and shipped south are required by legislation to be marketed by the Freshwater Fish Marketing Corporation (FFMC). The FFMC, a federal crown corporation, has exclusive jurisdiction in the inter-provincial and export trade of freshwater fish from the NWT and the provinces of Manitoba, Saskatchewan, Alberta and portions of Ontario. The FFMC, however does not have an overall monopoly on the marketing of these products. The FFMC is required to purchase all fish (regardless of demand) delivered, on grade, to its fish receiving stations.

Current research, development and expansion initiatives in the NWT commercial fishing industry are summarized on a regional basis below.

1. 'BAFFIN'

Recent stock discoveries in the Baffin Region make this area the most dynamic and promising in terms of current initiatives. Baffin fishery activities fall into six categories:

a. Offshore Shrimp and Turbot Fisheries

Qikitaaluk Corporation, the corporate arm of the Baffin Region Inuit Association, has received a license to fish for shrimp in Davis and Hudson Straits. A quota of 1,000 metric tonnes was allocated for this purpose.

Qikitaaluk is also considering exploratory offshore turbot and scallop fishing.

b. Pangnirtung Turbot Fishery

A winter fishery for turbot is currently practiced in Greenland. The timing of this fishery coincides with premium turbot prices. Prospects for developing such a fishery in Baffin are exciting since this fishery is not capital intensive and is undertaken in the winter when unemployment is highest. The first commercial venture is expected in early 1988.

Efforts at resource assessment, training in harvesting and processing, market-development and feasibility analysis of a winter turbot fishery are underway.

TABLE 4

GREAT SLAVE LAKE FISHERY
G. N.W. T. PRICE SUPPORT
(cents/pound)

Item	YEAR 1985	1986
Sumner		
Freight Subsidy	13.50	13.50
Price Subsidy	15.00	15.00
	28.50	28.50
Winter Subsidy	9.50	9.50
Total Subsidy for Year:	$426,000.00	$476,000.00

Source: FFMC in Ference, 1987

co Pangnirtung Arctic Charr Fishery

Currently, Pangnirtung Arctic charr is sold on an intersettlement trade basis to Iqaluit and occasionally to other NWT locations such as Yellowknife.

Use of the local processing facility has been suggested to improve quality control at the supply end.

d. Pangnirtung Cod Fishery

In 1985, a limited Atlantic cod test fishery was undertaken. Competing priorities prevented further effort in 1986.

The catch-rates and harvesting economics for this species are very favorable and a limited market has been identified in Iqaluit and other communities within the NWT, including Yellowknife.

e. Pangnirtung Scallop Test Fishery

A test fishery for scallops has been approved. Current levels of production are set at ?0,000 lbs. (meat)

f. Igloolik (Steensby Inlet) Charr Fishery

A test fishery program has been in progress since 1985. Ten rivers in the Steensby Inlet area -of Baffin Island have been investigated for commercial fishery potential.

DFO has recentlv provided revised auotas for this svstem and efforts to determine the commercial viability of summer and winter fisheries are proceeding. On a trial basis, DFO is permitting lake frozen charr to be sent to FFMC in Winnipeg for inspection and processing. This arrangement may contribute greatly to the commercial development of remote charr stocks.

2. **KEEWATIN**

A limited potential to develop commercial fisheries for local sale of freshwater species such as whitefish and lake trout has been identified. Baker Lake has an annual quota of almost 23,000 kg. for these two species but production has been sporadic.

Significant subsistence fisheries for charr take place near all the coastal communities and account for about 80 tonnes annually. Recently, a 60% increase in the price paid to fishermen for searun Arctic charr by the FFMC has resulted in a significant increase in interest to expand the commercial fishery.

There is potential for further development of commercial fisheries for searun Arctic charr along the Keewatin coast. The commercial take in the region is about 16-20 tonnes annually. This represents only a fraction of the regional quota. However, these quotas were based on limited field work and are dispersed throughout the region.

Production costs and quality control prevent commercial development of many remote quotas. There is considerable pressure on DFO to establish harvest levels for new areas within an economic radius of established receiving stations and transportation links. Numerous test fisheries are ongoing near Repulse Bay and Chesterfield Inlet as are stock assessment projects at Duke of York Bay on Southampton Island.

Current and proposed initiatives in the Keewatin include:

i) use of a freezer/packer vessel at Duke of York Bay for commercial fishing and test fisheries;

ii) establishment of a multi-purpose food processing plant in Rankin Inlet to replace the current facility;

iii) test fisheries in the Ross Bay area of Lyon Inlet and the Chesterfield area (including: Daly Bay, Kamarvik Creek, Gordon River and Mistake Creek); and

iv) feasibility studies to address:

commercial fishing in Lyon Inlet
country food demand in the Keewatin
regional fishery infrastructure requirements
alternate ice harvesting technologies

In addition, the Department of Economic Development and Tourism-is initiating a study to develop a comprehensive fishing strategy for the region.

3. KITIKMEOT

The most widespread freshwater species in the area include lake trout and landlocked Arctic charr. To some extent both are utilized by subsistence fisheries. Lake whitefish and broad whitefish are also used for subsistence purposes. A small commercial fishery for local sale of lake whitefish is being developed on Netsilik Lake, near Spence Bay.

The estimated annual subsistence harvest of searun Arctic charr for the t(itikmeot region is in the order of 60-80 tonnes. Commercial fishing for searun Arctic charr in the Kitikmeot region produces 50-70 tonnes annually. This represent 35% of the total commercial landings of Arctic charr in the NWT and 80% of the total export sales. The fishermen's co-op plans to introduce a weir to the Ellice River system in the near future.

4. INUVIK

Development of a commercial fishery in this Region has made limited progress to date. The Fisheries Joint Management Committee (FJMC) has been established to represent the Inuvialuit and to provide guidance and advice on developing a commercial fishery that is consistent with the desires of regional residents.

The FJMC recommended a market study for Mackenzie Valley inconnu, humpback whitefish and broad whitefish. This study including product testing is currently underway. A second recommended project is the development of markets for herring roe and herring carcasses.

Northern pike, Arctic charr and Lake trout are also found in the Inuvik Region. Stock assessments and test fisheries will be required to determine whether these populations can sustain the pressures of 'a commercial fishery.

5. **FORT SMITH**

The Great Slave Lake fishery and pickerel production from Tathlina Lake and Kakisa Lakes represent the extent of the commercial fishery in the Fort Smith Region. Whitefish and Lake trout quotas for inland lakes in the Central Inland Region remain untapped at this time.

The Great Slave Lake whitefish fishery generates the greatest revenue of all commercial fisheries in the NWT. Fishing activities are well established in this Region.

It is worthwhile to note that FFMC and the GNWT have initiated a study to assess the feasibility of replacing the seasonal fish receiving station at Wool Bay with a year-round station located at Kam Point (near Yellowknife). The three fish receiving stations on Great Slave Lake are owned and operated by the FFMC and transfer of ownership and operation to.the fishermen is being considered by FFMC.

Abody of NWT fishermen remain highly critical of FFMC's monopoly over purchase and distribution rights to their production. In response to this ongoing concern two initiatives have been proposed: one involves a marketing study to determine the costs and benefits of opting out of the FFMC marketing arrangement; the other calls for the development and marketing of processed fish products that do not fall within the mandate of FFMC. These issues are being dealt with in detail by the FFMC review requested by the current Executive.

IMPEDIMENTS TO INDUSTRY DEVELOPMENT

It can be demonstrated that private development of the fishing industry is limited by estimates of probable profitability rather than by resource availability. To overcome the competitive disadvantage of distance to markets the NWT fishing industry has relied on significant occurrences of high quality fish stocks as"'well as on-going efforts to develop an efficient production process.

The following constraints re' ate to development of the NWT commercial fishery:

i) commercial development has been constrained by the relatively slow growth, depressed productivity and low abundance associated with arctic fish resources;

ii) territorial producers are remote relative to markets;

iii) for many species of commercial interest there are lower-cost sources of supply and substitute food items; and

iv) many northern residents have little or no experience in the production, processing and/or financial components of a commercial fishing venture.

OPTIONS FOR DEVELOPMENT

Despite the biological and economic constraints territorial fishery development will continue to be supported because of the limited economic base of many northern communities. In addition, fisheries development is seen to contribute to social and cultural objectives.

A need has been identified to develop a comprehensive fishing strategy for the NWT and to provide policy guidelines for determining trade-offs between economic efficiency and distribution and social objectives. A draft arctic fisheries policy will soon be released by DFO and will serve as a point of departure for general discussion. This policy is based on the following principles:

i) integration of subsistence and commercial fishing interests;

ii) sensitivity to the differing character of the North's regions and peoples;

iii) foundation upon sound biological information and sustainable ecological principles; and

iv) a view that economic criteria are important but not the sole determinants of commercial viability.

COMMERCIAL AQUACULTURE IN THE NORTHWEST TERRITORIES

INTRODUCTION

The need to develop the renewable resource economy in the Northwest Territories as a means of providing new economic alternatives and buffering the 'boom and bust" cycles of large-scale non-renewable resource development has been recognized by the Territorial government. The regional production and processing of renewable resources has been identified as a desireable social and economic goal. The development of a commercial aquiculture industry could be one of the new economic alternatives which could assist some regions in realizing this goal. Commercial aquiculture, if developed in the N. W. T., would most likely involve the culturing and rearing of finfish for commercial markets and possibly fish stocking in fee-fishing ponds/lakes. It has the potential to supplement the production and processing of existing commercial fisheries and to create new, albeit limited, business and employment opportunities.

BACKGROUND

In the past, aquiculture activities in the Northwest Territories, have been restricted to stocking a few lakes for recreational fishing purposes.

1. Feasibility Studies

a. Trout Farming

A feasibility study of establishing a viable trout farming industry in the existing lakes in the Hay River area was undertaken by the Department of Fisheries and Oceans (DFO) in 1978 upon the request of the community of Hay River. The successful stocking of a lake in the Hay River area with rainbow trout for sport fishing and the development of an extensive rainbow trout aquiculture industry in the prairie pothole lakes of central Canada served as stimuli for this request. The study concluded that the Hay River area is only marginally suited for the development of an extensive form of aquiculture, due mainly to a lack of existing potential sites (most of the lakes and borrow pits within the area are very shal low and not highly productive) and estimated slow growth rates for trout in the lakes in the area. It was further concluded that a 'put and take" sports fishery was a better utilization of the available lakes in the area.

b. Arctic Charr Farming

A government funded (EDA) study, to investigate the technical feasibility of establishing a charr farm at Jackfish Lake near Yellowknife, was carried out in 1986. It concluded that such an operation would be biologically and technically feasible.

2. Agreement on NWT Freshwater Aquiculture

In June, 1987, a joint agreement was entered into by the Government of the Northwest Territories, Department of Renewable Resources and the federal Department of Fisheries and Oceans (DFO) on a policy for Freshwater Aquiculture in the NWT. The agreement expands upon certain policy statements made at the 1986 First Ministers Conference and promotes federal-territorial cooperation in freshwater aquiculture initiatives which encourage individuals, groups or agencies to participate i n aquiculture opportunities/ventures in the NWT. Principles, criteria and procedures for freshwater aquiculture in the NWT have been developed and agreed to jointly by the two agencies.

3. Aquiculture Review Comnittee

The Aquiculture Review Committee (ARC), a body whose task it is to review all applications for aquiculture activities in the NWT (including recreational fish stocking), was formed in 1987. It consists of four members; two representatives from DFO and one each from the Department of Renewable Resources and the Department of Economic Development & Tourism. The committee will meet each year in October with a further meeting to be held in April of each year if necessary. An information package which includes applications and guidelines for proposals has been developed and will be sent out to the area Renewable Resource Officers. These packages cover stocking fish in a commercial aquiculture facility; stocking fish for recreational use; and stocking fish in a fee-fishing water body. A subcommittee, whose task it is to develop a public awareness program on all aspects of aquiculture in the NWT, has also been set up.

CURRENT SITUATION

1. Commercial 'Put and Take" Aquiculture

A 'put and take" commercial fishery, in this context, refers to stocking an existing natural water body with young fish (fry/fingerlings) and then harvesting them as soon as the target growth level has been reached.

Assessment work carried out in the South Mackenzie so far indicates little potential in the region for fish farming operations using existing water bodies due to the scarcity of suitable sites and/or slow growth rates. The Fort Liard area may have potential but has yet to be examined.

2. Rainbow Trout Aquiculture

An extensive rainbow trout aquiculture industry has developed in southern Canada. This along with the successful stocking of a lake near Hay River with rainbow trout for sport fishing has stimulated some interest in trout farming in the NWT.

At present, it appears extremely unlikely that an economically viable trout farming industry could be developed on a large scale in the NWT. Higher production costs (shipping in feed, labour, requirement for a heated indoor facility in order to achieve adequate growth rates, transportation to

market, etc.) would make it extremely difficult if not impossible for trout raised in the NWT to be compete successfully in the large southern market with trout produced in Southern Canada.

The extent of a local (NWT) market for farmed rainbow trout is not known. It is possible it could support "put and take" trout farming on a very small and localized scale if suitable sites can be found.

3. Arctic Charr Aquiculture

The greatest potential for a northern-based aquiculture industry, at least in the near future, appears to be in the culturing of Arctic charr. This uniquely northern species has become a delicacy in North America due to its superb taste, high market value and sporadic availability in the large southern market. Research carried out by the DFO Rockwood hatchery in Manitoba has shown that commercial culture of Arctic charr is biologically and technically feasible and that a market for the cultured product exists. This has stimulated a great deal of interest by many private entrepreneurs throughout Canada. Private aquiculture operations in British Columbia, Saskatchewan, Manitoba and the Yukon have already obtained charr eggs from the Rockwood hatchery, more or less on an experimental basis and are now in the process of growing-out fish. The Manitoba grow-out facility plans to begin test marketing their product in February, 1988. The Yukon facility (which received some EDA funding) should begin marketing their product in a year.

a. Location

A heated indoor farm is the most feasible for-cold climates in order to achieve reasonable growth rates. Acharr operation in the N.W.T. would best be located in a communities with major airports as the product must be shipped fresh. The facility should also be located close to a power generating station where waste heat could be utilized. For these reasons, the number of potential sites is limited.

b. Concerns

The main concern in the development of a cultured charr industry is the potential for destructive market competition between farmed charr and the wild fishery product. Advocates for development of the industry argue that for economic reasons, a cultured charr industry would only be producing a pan-size product that would be clearly distinguishable from the wild fish. The cultured charr would in actual fact compete directly in the marketplace with the cultured pan-sized rainbow trout. It can also be argued that although the flesh of cultured charr could be coloured, through the addition of diet-ary supplements, to resemble the characteristic orange of the wild charr (all cultured charr produced so far are white flesh coloured), it is unlikely that the cultured product will ever be able to match the taste of the wild fish. Cultured charr tend to be more bland; less "fishy" or wild tasting. From a culinary standpoint, the wild product will always have the superior taste and texture and should, particularly when sold fresh, command the highest price.

Whether we like it or not, the industry is being developed. Given time, the wild charr fishery will be sharing the marketplace with a cultured product, if not produced in the N.W.T., certainly elsewhere. Based on the current availability and production of certified charr eggs, it is estimated that this fledgling industry in Canada could produce upwards of 100,000 pan-size cultured charr over the next four years. Norway is also now trying to develop technology for raising charr in sea-pens.) If successful, they will be producing large size charr that would compete directly in the marketplace, in Europe and likely North America, with the wild product.

c. Market

There is some indication that in the present market, charr are undervalued. Poor marketing (charr presently compete in the marketplace with salmon and trout and have not been marketed as they should as a gourmet premium product) and inconsistency of supply (nearly all of the product comes on the market in the fall) have likely been major factors in keeping prices lower. Also most charr are presently marketed as a frozen product which do not command the premium price of a fresh product. The present wild charr harvest is about 60,000 Kg. annually. With the inherent problems in this industry, the potential for increase is limited. Optimistically the wild charr fishery could perhaps double its current production. The market potential for charr products is unknown but indications are that it is likely many times what can be produced by the wild fishery.

The development of a cultured charr industry that would be producing several times what the wild fishery could produce is conceivable. Much more effort could therefore be put into developing and marketing the product. With charr aquiculture it would be possible to obtain consistent product sizes and quality. It would also provide the ability to regulate the timing of the harvest and thus ensure a consistent flow of fresh product to the marketplace. There is strong indication from retailers that higher prices for charr products could be realized if consistency in supply were obtained. This could result in a ripple effect in the overall marketplace with higher prices being paid for all charr products including those from the wild fishery.

Hatchery facilities built for commercial charr aquiculture in the NWT could also have alternate uses such as providing fish (including species other than charr) for stocking sportfishing lakes and enhancement of existing fish stocks. Another use, which could potentially be the most significant, is as a supplier of charr eggs. The DFO Rockwood hatchery presently has the only certified brood stock of Arctic charr (from Labrador) in the country and as such have been the sole source of charr eggs. Rockwood cannot meet the rapidly growing demand for certified eggs to supply to aquaculturalists wanting to raise charr. Apparently, the problems involved in trying to develop and maintain an Arctic charr brood stock would make it uneconomical for most aquiculture operations, particularly if certified eggs

were readily available from another source. Therefore it appears that there is a growing market for anyone, who is able to develop a certified brood stock, to supply charr eggs for grow-out operations. The GNWT now has an enormous advantage over anyone else in producing a certified Arctic charr brood stock. Our aquiculture agreements with DFO includes having the Rockwood hatchery carry out the development of a GNWT charr brood stock. The GNWT also has an additional advantage in that it has ready access to wild charr stocks that can be used to develop a superior brood stock.

d. costs

One of the main drawbacks to the development of this industry in the N.W.T. is the high level of financial risk due to the large initial capital outlay and uncertainty of operating costs versus market return. Costs for the development a 45,000 Kg. charr farm (excluding costs for developing storage facilities or processing capacity), with projected gross annual revenues of $500,000 (sales would not occur until the third year of operation), has been estimated at $600,000. If this industry is to develop, it will almost certainly require some form of government financial assistance. At present, potential sources of government funding are through the Renewable Resources Development Sub-Agreement (RRDSA) of the Economic Development Agreement (EDA), Venture Capital Program (VCP) and the Native Economic Development Program (NEDP).. Proposed amendments to the .Bank Act, which would allow banks to make loans or advances to aquaculturalists on similar security to that provided by farmers, will also make it easier for this type of business to get financing.

e. Current Initiatives

Eagle Mountain Trout Farms Ltd. of Revelstoke, B.C., presently one of the largest producers of farmed trout in Western Canada, has recently submitted a proposal for the development of an intensive charr aquiculture operation at Jackfish Lake near Yellowknife. The proponent has readily admitted that southern Canada is a much more favorable area for an intensive culture operation. However, government loans and incentives, spin-off benefits to the northern economy and likely a market advantage in producing a "genuine" northern product make it worthwhile to consider such a development in the NWT. The proposal is presently under review by Aquiculture Review Committee.

4. **Fee-Fishing**

Fee-fishing, which is charging a fee for the privilege of fishing in waters for which you hold title or fishing rights, has not occurred in the N.W.T. to date. Until such time that lands claims are settled and the ownership of land and water is resolved, the potential for fee-fishing enterprises in the N.W.T. appears to be extremely limited or non-existent.

FUTURE ACTIVITIES

A study should be carried out to determine a marketing strategy for charr that is complimentary to both the wild fishery and commercial aquiculture.

RECREATIONAL FISHING IN THE NORTHWEST TERRITORIES

ng been an attraction in the N.W. T, both for local ts . Resulting economic benefits to the N.W.T. from considerable, even though these benefits are usually e difficult to measure. It has been estimated that from the sport fishery, both direct and indirect, in 1987. This figure, in comparison, is over seven e revenues derived from the entire commercial fishery

"fly-in" sport fishing opportunities abound in the , these ventures are often costly and beyond the means d tourists. Much of the sport fishing activity has trated where relatively good access, particularly road fishing waters. With the increase in the resident sm, the pressure has increased in recent years, mainly re, to the point where demand may already exceed the ad access fishing opportunities. Some fish stocks are over-exploitation.

g .

the Northwest Territories for recreational purposes been very limited. In 1971 Polar Lake, a small lake mately 60 km east of Hay River, was the first lake to brook trout being the fish species first introduced. ed with rainbow trout in 1977 and several times in with the last stocking occurring in 1986. Two other ellowknife/Hay River areas have been stocked with a limited basis. An experimental transfer of adult attempted. Other than Polar Lake these ventures have success.

NWT Recreational Fish Stocking Workplan

hen Minister of Renewable Resources, N. Cournoyea, intention of the Department to participate in a g program for freshwater fish in the N.W.T. The main program, at least initially, was to create new and -rig opportunities in areas adjacent to the N.W.T. n support of tourism growth.

the Department of Renewable Resources' stated 1985 the Department of Fisheries and Oceans (DFO) hey, in cooperation with the GNWT, develop a workplan e opportunities pertaining to fish stocking for -noses. In 1986 the NWT Fish Stocking Committee was ng of members from both DFO and the GNWT, with the oping a five-year workplan for recreational fish

In June, 1987, a joint agreement was entered into by the Government of the Northwest Territories, Department of Renewable Resources and the federal Department of Fisheries and Oceans on an NWT Recreational Fish Stocking Workplan. The purpose of the agreement is to promote federal-territorial cooperation in developing recreational aquiculture opportunities in the Northwest Territories. Recreational aquiculture, under the terms of this agreement, is defined as the introduction of finfish (eggs, larvae, fry or adults) into a closed water body/system for recreational fishing. The workplan identifies various roles and responsibilities of the agencies involved and includes components dealing with waterbody/system assessment, stock monitoring, research activities and public awareness information.

CURRENT SITUATION

1. Uater Body Assessment

Preliminary water body assessment work to identify future potential fish stocking sites has been carried out in areas bordering much of the highway system (approximately 8 km corridor on either side of the highway) of the south Mackenzie (excluding the Liard Highway). With the exception of the Ingraham Trail, assessment results indicated little potential for fish stocking in the areas so far surveyed in the South Mackenzie. Nearly all of the lakes within this surveyed area are too shallow and would therefore winterkill fish. Of the few lakes found with sufficient depths, all but one presently have resident pike populations. The presence of an existing population of predatory fish makes these "lakes more or- less unsuitable for stocking: " Initial assessment work was also carried out on 25 lakes in the area bordering the Ingraham Trail (east of Yellowknife), this past summer. This was in addition to the approximately 50 lakes that had previously been assessed in the area by DFO in past years. Twelve of the lakes surveyed this summer appear promising as future stocking sites.

2. Development of Arctic Charr Brood Stock

One of the primary research goals outlined within the workplan is the development of an arctic charr brood stock to be used in future stockings of inland lakes in the N.W.T., and possibly as a source of supply for any commercial charr aquiculture ventures that are initiated in future. As part of the GNWT's commitment outlined in the workplan for the development of an Arctic charr brood stock, a charr collection was undertaken in the Kitikmeot Region last fall. The purpose of this collection was to obtain a sufficient number of spawning charr (approximately 30) for both fish health certification purposes and for the provision of eggs and milt necessary for the actual production of the future brood stock (to be carried out over a five year period out at the DFO Rockwood Hatchery in Manitoba). Fish fry hatched from these eggs that were surplus to the requirement for brood stock development (possibly upwards of 60,000) were to be used for experimental stocking of some lakes in the southern Mackenzie this spring. Unfortunately, the collection was carried out too late as the charr had already spawned. A sample of 13 charr were retained for disease testing. These have since tested out negative for disease.

FUTURE ACTIVITIES

1. Water Body Assessment

Current plans are to complete the assessment work on the lakes along the Ingraham Trail. A preliminary assessment of lakes along the Liard and Dempster highways will also be carried out in 1988.

One area that could warrant closer examination as future potential stocking sites is Pine Point. The Cominco mining operation here has resulted in the creation of dozens of large and deep open pits. With the shut-down in mining activity and given time, these pits will fill with water and could become productive enough in future for aquiculture activities. There is also the possibility of speeding up the process by artificially fertilizing these water bodies.

2. Development of Arctic Charr Brood Stock

Another charr collection to obtain eggs for the development of a brood stock will be carried out in September, 1988. If further problems are encountered in developing a brood stock (i.e. next year's collection test out positive for disease and has to be destroyed) an alternative route to obtain a certified brood stock may be undertaken. The DFO Rockwood hatchery currently houses an uncertified brood stock of Arctic charr which originated from the NWT (Kent Peninsula). Development of a certified brood stock from the Kent Peninsula charr would require about two years.

3. Stocking

An application by the Hay River Fish and Game Association to re-stock Polar Lake in 1988 with 12,000 rainbow trout has been given tentative approval by the Aquiculture Review Committee.

Three lakes (2 along the Ingraham Trail and 1 near Hay River) will also be stocked with a total of 13,000 rainbow trout for experimental purposes in the spring. These stockings will be carried out jointly by the Department of Renewable Resources and DFO. Two of these 1 akes will be harvested in the fall to assess growth rates. The third will be harvested the following year. Annual biological monitoring of all stocked water bodies will be carried out.